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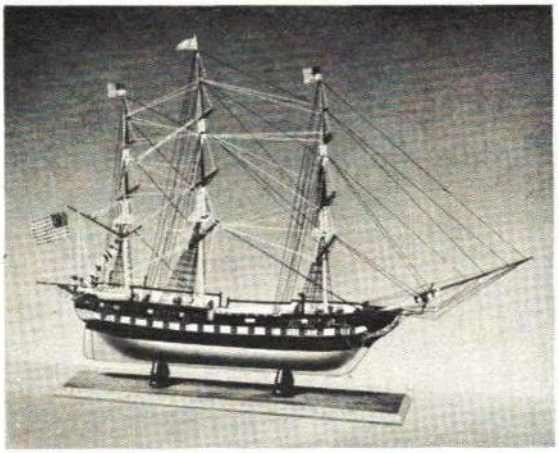

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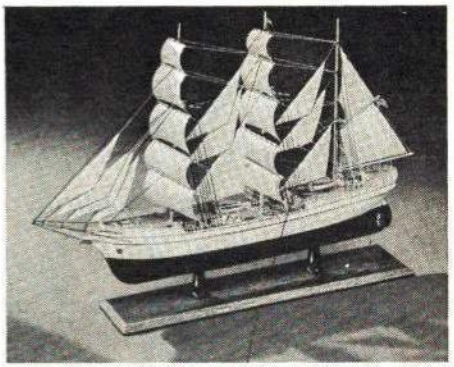

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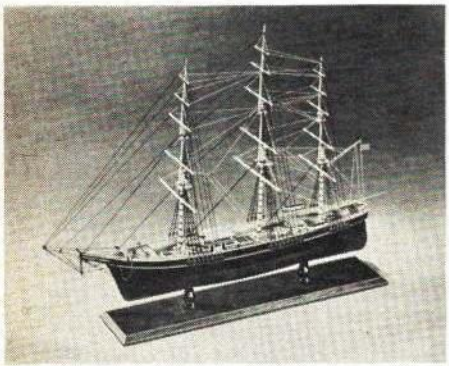

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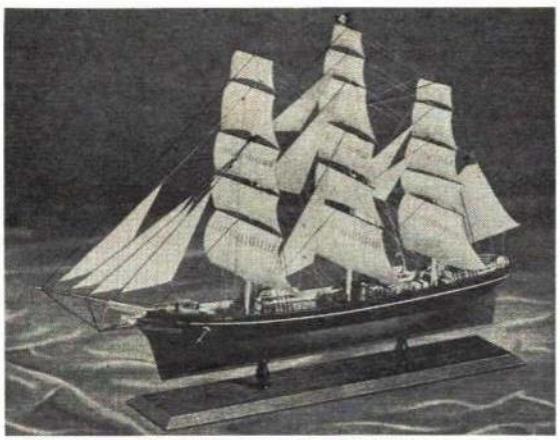

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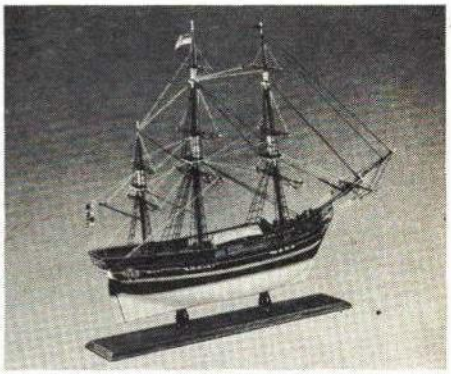

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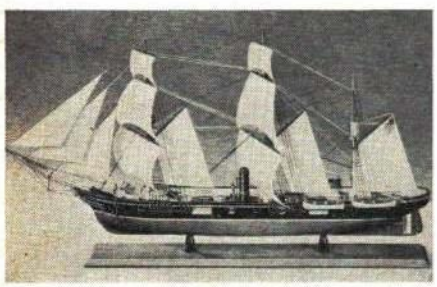

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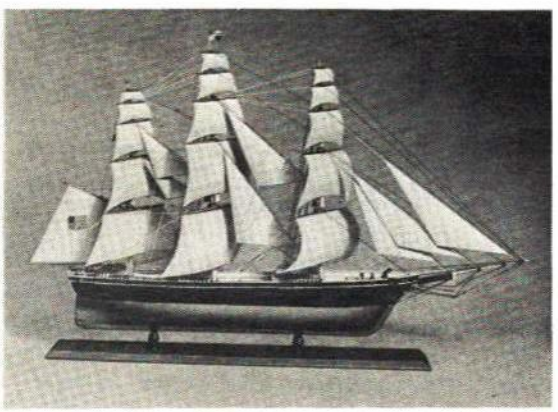

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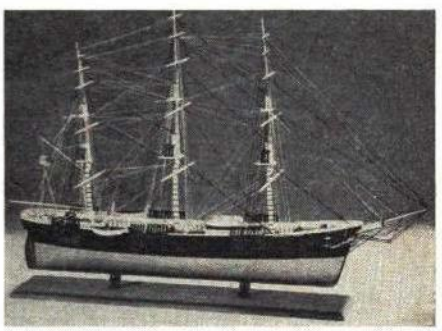

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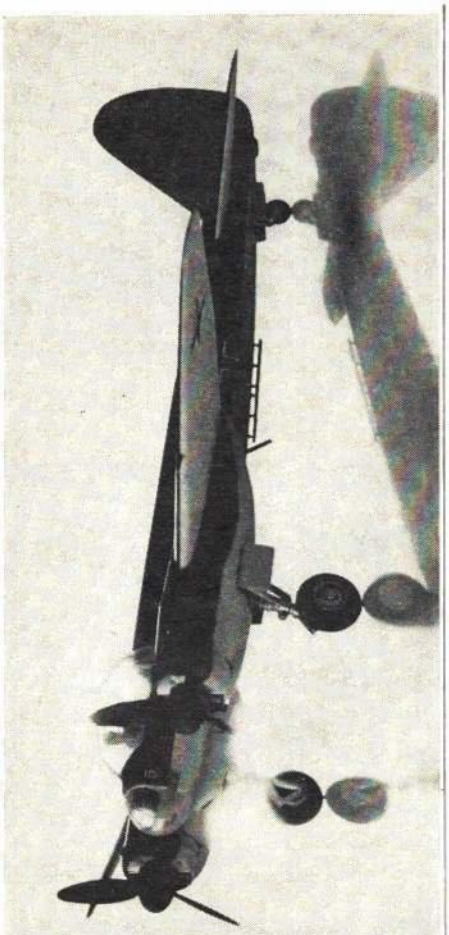

MAY, 1968

american aircraft MODELER

VOLUME 66, NUMBER 6 JUNE 1968

COVER PHOTO: Most famous of all the Schneider Trophy machines was this Supermarine S6B, painted especially for us by Bjorn Karlstrom. It influenced the Spitfire of WW II.

WILLIAM J. WINTER — EDITOR AND PUBLISHER

Edward C. Sweeney, Jr., Associate Editor Harry E. Harps, Assistant Editor

Sally Barry, Production Editor

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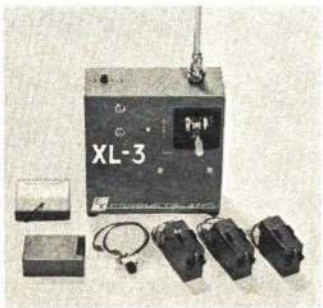
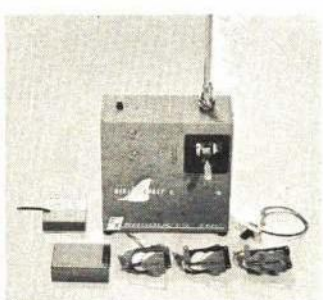


This new HI-REL System from EK is ideal for beginners and for mini-size airplanes. It's extra little and extra light on the budget. The XL-3 offers three controls — two are proportional and motor control is positionable. It has the same HI-REL features as the dynamic LOGICTROL III Mini-System. The complete system includes a single stick transmitter, 3 Mini-Mite servos, a 4.8 v.—500 MA/HR nickel-cadmium battery, receiver, and switching harness. Operation instructions are included. Complete system price is $250 less charger and transmitter battery pack.

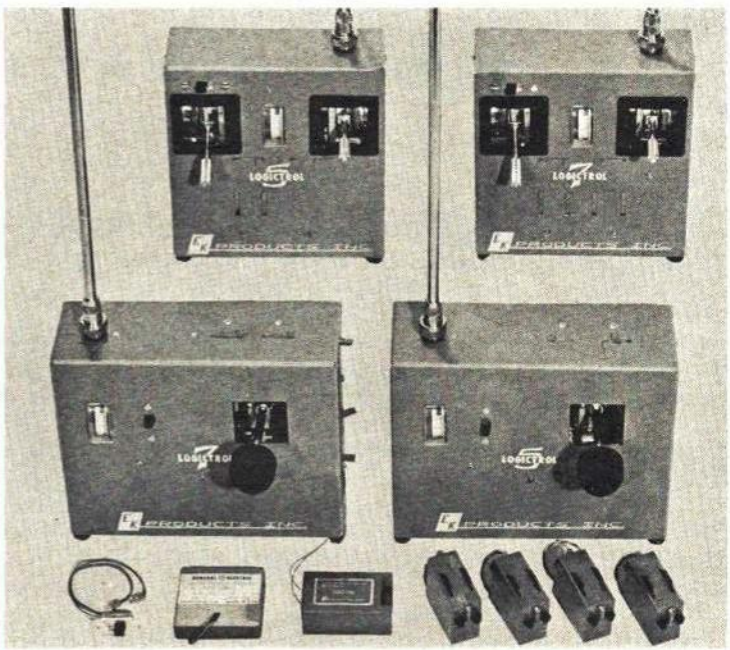
HI-REL DIGI-GHOST



The DIGI-GHOST uses the same HI-REL features found in the LOGICTROL III MINI-SYSTEM. A complete system includes transmitter, receiver, Rand actuator(s) 3.6 volt Nickel Cadmium battery, and switch harness. Charger and transmitter battery pack are not included. Two DIGI-GHOST models are available: The DG-1 (low rate) price is $135—The DG-2 (high rate) price is $180. The transmitter is equipped with a switch for low or high rate.

HI-REL LOGICTROL III

MINI-SYSTEM



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STRAIGHT AND LEVEL

The old order changeth. New policies and treatments are becoming evident in the model airplane magazine field.

ONE of the essential qualities of any magazine is that it have character. By character we mean an approach, a treatment, a philosophy, really, with which the reader comes to identify. It is not to be implied that any one magazine has more character than another. But each has its own special character.

For example, we have in our field one magazine devoted totally to radio control. And we have three magazines with their own "filter blend" of various modeling categories, but with a pronounced leaning toward radio. Just how much radio control one should publish seems to have become a problem which no one can decide lightly. The broad approach taken by the American Aircraft Modeler, has been so well received that we should like to take the reader into our confidence about future planning. For the time is close at hand when familiar contents selections will be doubted, and radical departures may be seen in editorial policies.

With this June issue, for instance, this magazine has taken another significant step in its planned program. Thanks to solid advertising support, we have added the four-color centerspread drawings by Bjorn Karlstrom. These magnificent drawings will be of interest, and very great value, to collectors, historians, for plastic display, scale fans, and any modeler, actually, be he dedicated to radio, free flight, control-line or indoors. Breathes there a soul so dead, that such a lovely work of art would not be appreciated?

Now, a costly improvement like this one, does present many options. Eight pages of general articles could be added instead, and they could easily have been devoted entirely to radio. Well, why not? Having built and flown 108 radio control models, the writer protests vigorously whenever he is told he cannot see, and read about, the many interesting developments in all forms of modeling. Like most R/Cers he has flown free flight and/or control-line.

All forms of modeling are soundly supported; each offers things of value applicable to radio. A better throttle, or a tank, or retract gear. Just a profile, perhaps, to set a designer's mind to dreaming. Better finishing, covering, aerodynamic concepts. Did you know that the finest articles ever written on free-flight adjustments were done by Phil Kraft?

With McEntee's R/C World, Jerry Nelson's new column On the Coast, selected radio model designs every month, and frequent supplementary articles on methods and equipment — and the Blue Ribbon series of reviews just added — endless additions of redundant material is simply a case of not knowing when to stop. The most dedicated R/Cer — and none are more dedicated than both your editor and associate editor — is hungry for entertaining, useful things, to round out his picture.

So we shall continue to develop and expand this magazine, always with the deepest awareness of R/C, but with a sense of the beginner and sport modeler, the builder of free flights and control-liners, from whose ranks come future radio flyers. With the same deep awareness of the dedicated love of the competition modeler for his preferred category — carrier, speed, Nordic, rubber, indoor. And his number is legion. For the scale fan to whom drawings like Matt's are the bread of life — and, believe us, they don't hesitate to tell us so! For the plastic modeler who has turned what once was considered kid stuff, into a fine art. What excuse can a modern magazine find for intolerance?

VERMONT AVENUE FLYING CIRCUS — THE AMA!

THE picture at the right should give you guys the idea of what it takes to be an Executive Director of the AMA. Especially at Nationals time. Or, maybe when the rules books are to be gotten out. Before jumping to the conclusion that the redoubtable John Worth has flipped his helmeted lid, we hasten to explain that this Rembrant photo is the work of Jim Davis, of Midwest Products, who had the World War I regalia at their booth in Toledo. If you think John looks wild, you should see Northrop, Kasmirski, Sid Axlerod and all the others.

And talking of AMA, it is about time we explained to members, and many who are not, that the Academy of Model Aeronautics is a separate organization, not related in any manner to the American Aircraft Modeler. All we do is publish for AMA the section called Model Aviation. When you don't like some new rule, or a kookey rumor, don't write ye poor editor. He couldn't know less about it. We do get a kick out of the occasional well-wisher who tells us that the AMA has made the magazine so much better! Even though there is no one here but us chickens, we appreciate unconscious humor!

We know nothing about rules books, and we shudder when members experience delays in their renewals, or, or, or. Do we get told off! If our shoulders are good naturedly broad, it is because we do know enough about the hard working AMA headquarters operation, to realize the very great problems they have in providing so much service to so many people.

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A.M. Reviews

STANLEY M. ULANOFF

The Wind and Beyond: Theodore von Karman, Pioneer in Aviation and Pathfinder in Space is written by Theodore von Karman with Lee Edson and published by Little, Brown and Co. (376 pages — $10).

THIS is the life story of a man who, although not widely known to the general public, may be considered one of this century's greatest scientific geniuses. His work in aerodynamics and rocketry has shaped history. Near the end of his remarkable career, at the age of 81, he received from President Kennedy an honor never bestowed upon an American scientist — the nation's first National Medal of Science. Von Karman had been selected for his still unexcelled range of unique contributions to engineering, science and education.

In the military, von Karman's influence was unique. No other scientist in this century has wielded as much intellectual power over a military department as he did over the U. S. Air Force in the years just before, during, and after World War II. Both subtly and directly, he helped change the direction of American scientific and military thought and power. He had the extraordinary ability to fuse together the military and the scientist in a bond of mutual understanding. The Air Force generals, amazed at the results of the V-2 and the A-bomb, sought him out and all but made him their patron saint.

As tremendous as was von Karman's role in the growth of the U. S. Air Force, it must not be considered his greatest contribution. According to Mr. Edson, "it is his role as a teacher for which he should perhaps be best remembered. As head of the Aeronautical Institute of Aachen, Germany, and late of Cal Tech's Guggenheim Aeronautical Laboratory at Pasadena, von Karman guided two generations of scientists and engineers into pioneering areas that led to the establishment of aviation and astronautics on firm scientific foundations. It is said of him in comparison with Leonardo da Vinci that the great Renaissance scientist created gadgets while von Karman created students. His student disciples on five continents were called the 'Karman Circus.' They include scientists and engineers who today guide the world's feats in outer space."

A few years before his death, von Karman, with the assistance of science journalist, Lee Edson, started writing the story of his life. After his death, Mr. Edson completed the unfinished autobiography.

Nowarra Photos of German Aircraft, World War I and II, by Heinz J. Nowarra; 30c for each of 20,000 different 5 x 7 photos. Distributed by Bob Holman, P. O. Box 741, San Bernardino, Calif. 92402.

BOB Holman, well-known modeler and designer of model aircraft plans, is the American agent for the Heinz J. Nowarra collection of 20,000 different World War I and World War II aviation photos. This is probably the most complete collection on Von Richthofen, Udet, Voss and the other German First War aces. It runs the gamut from the Fokker Eindekker E I to the Bf 109, of which he has 300 photos, alone. He also has photos of other periods, and other nation's aircraft and aces.

Write to Bob for any particular photos you need, or request his lists. Photos are 30c each.

Aircraft Markings of the World 1912-1967, compiled by Bruce Robertson, 232 pages, $11.75. Published by Aero Publishers, Inc., 329 Aviation Road, Fallbrook, Calif. 92028.

IN the usual fine Harleyford tradition, now published in the U. S., this volume makes an important contribution to the reference works on the subject. Complementing Bruce Robertson's previous book **Aircraft Camouflage and Markings, 1907-1954,** this volume also includes markings of civilian aircraft and covers the gap in both civil and military aviation from 1954 to 1967.

In a country-by-country review and a chronology of world events in the field of aircraft markings, the history of this subject is covered spanning a period of over 50 years. There are 431 examples of national insignia and world airlines emblems painted in full color. With these color photographs, and referring to a spread page World Map of Civil Aircraft and Registration Markings, the reader can identify most airline and military aircraft of all nations.

Explained are the significance and relation to world history, of national insignia, airline motifs, unit badges, crests and emblems that adorn aircraft. The modeler should find most useful the details of the markings as to size, shape, shade and proportion given by the drawings, photographs and descriptions.

Aircraft in Profile, Volume 1 (Profile Nos. 1-24) and Volume 2 (Profile Nos. 25-48), edited by Martin C. Windrow; $12.95 each volume. Published by Doubleday and Co., Inc., Garden City, N. Y.

IN these handsomely bound volumes, newly published by Doubleday, are the exceptionally fine series of Profiles, printed

in England, presenting military and civilian types of aircraft of all nations from 1914 to the present time. Each Profile, a 12-page attractive booklet dealing with one specific aircraft written by an authority on the subject, contains a concise but complete history of the aircraft — its design, technical development, operational service and specifications. Printed on quality art paper, each Profile is profusely illustrated with photographs and full-color art work showing details of technical features, operational markings, camouflage schemes, squadron insignia and personal emblems.

Because of the extraordinary clarity of both description and color, these Profiles are a "must" for aviation fans and model builders. Of the 24 Profiles in Volume 1, World War I aircraft are represented by: No. 1 S. E. 5A, 5 Vickers FB 27 Vimy, 9 Albatros DV, 13 Sopwith Pup, 17 SPAD XIII C. 1, 21 Bristol Fighter.

The years between the wars are represented by: No. 2 Boeing P-12E, 6 Bristol Bulldog, 10 Gloster Gauntlet, 14 Boeing P-26A, 18 Hawker Fury I, 22 Fiat C. R. 32.

World War II aircraft: No. 3 Focke-Wulf Fw 190A; 7 Republic P-47D Thunderbolt; 8 North American P-51D Mustang; 11 Handley Page Halifax B. III, VI, VII; 15 Heinkel He 111 H; 16 Fiat C. R. 42; 19 Consolidated B-24J Liberator; 23 Messerschmitt Bf 110; 24 Hawker Hurricane IIC.

Post-War period aircraft: No. 4 Hawker Hunter F6, 12 Gloster Meteor F8, 20 North American F-86A Sabre.

Volume 2 also contains 24 Profiles. Representing World War I are: No. 25 Fokker D.VIII, 26 de Havilland D. H. 4, 31 Sopwith Camel, 37 Curtiss JN-4, 38 Fokker Monoplanes, 43 Pfalz D.III.

Inter-War aircraft: No. 27 Boeing F4B-4, 32 Westland Wapiti, 33 Gloster Gamecock, 39 Supermarine S4-S6B, 44 Fairey IIIF, 45 Curtiss Army Hawks.

World War II is represented by: No. 28 Macchi C.202, 29 Junkers Ju 88A, 34 Fairey Battle, 35 Curtiss P-40 Tomahawk, 40 Messerschmitt Bf109E, 41 Supermarine Spitfire I and II, 46 Nakajima Ki-43 Hayabusa, 47 Chance Vought Corsair F-4U-1.

After World War II aircraft: No. 30 North American F-100 Super Sabre, 36 SAAB J-29, 42 North American FJ Fury, 48 de Havilland Vampire 5 and 9.

Heroes of the Sunlit Sky, by Arch Whitehouse, 384 pages, $6.50. Published by Doubleday & Co., Inc., Garden City, N. Y.

THE latest from Arch Whitehouse, prolific author of military histories and air biographies, is a collection of 134 capsule biographies of great aces of World War I.

It was in this war that the airplane developed as a combat weapon. It started without a clear cut concept as to how aerial warfare was to be conducted; the new type of soldier — the fighting pilot made up his own rules as he went along. Although in later wars, the emphasis was on the development of superior planes and armament, in this First World War it was still essentially the man — the pilot — who played the important role.

Not all the aces who ran up lengthy scores are included in this collection, but only a representative list. As Whitehouse states in the introduction: "I have picked out individuals who brought a special essence to the war, men who came from unusual backgrounds, men who performed with a certain elan or military style. It will be seen that most of them were outstanding in their accomplishments and many were (or were not) rewarded with the highest decorations or honors their

Continued on page 68

Put Back The Fun

In a recent editorial, you stated that modeling is in trouble because the "rules boys" have managed to take most of the fun out of it, thereby chasing the juniors away.

Flying Aces Club News is an attempt to put that fun back where it belongs, and so far we have had a pretty enthusiastic response from many of our readers, who qualify for membership by competing in our contests or just having the right attitude. Our little blurb is a labor of love and appears about four times a winter, when most flying fields are shut down and we have to keep our inspiration going.

Bob Thompson and Dave Stott, Southport, Conn.

Flying Aces Club News is one of the most interesting, and probably the most amusing, club papers we've seen in a solid model's age. Little spot drawings, technical reprints, three-views and what not. An A for effort. . . . Ed.

More on Smithsonian

While vanity prevents me from finding too much fault with the article "Foremost Scale Model Collector" in the March issue, by Frank and Nancy Pierce, I do want to fill in a couple of missing details.

A number of photos were taken which included members of our staff, particularly Win Shaw. For some reason these did not get into print. In fairness to our hard working staff, I feel this note is necessary.

Win Shaw is our able museum specialist and custodian of our model collection. Bob Wood and John Bingham of our Historical Research Center bear the brunt of the many inquiries.

We are pleased that you ran the article in order to inform the public of our double requirement for detail, accuracy and durability.

Louis S. Casey, National Air and Space Museum

Seldom are we able to include all pictures in a layout that come with an article. To compress a maximum of material into a minimum of space compells hard compromises. A.A.M. regrets that full credit was not given to all the NASM people whose work bears upon the subject of the article. Ed.

Vox Pop

While at my hobby shop, I overheard a modeler complaining about how poor balsa wood is getting. He thought it was terrible that we pay high prices for supposedly quality kits. He found that some wood disintegrated when he worked with it.

Many leading manufacturers who enjoy a reputation perhaps have put inferior material into some kits through no fault of

their own. In order to keep the modelers faith, the kit manufacturer should be aware of the quality of the material that makes up a kit.

William H. Lipstreu, Hudson, Ohio

The control of every piece of wood that goes into a kit is a herculean task, especially for manufacturers who have great volume. Everybody tries and some nearly attain perfection. And in a sense a magazine is a manufacturing enterprise, subject to the same problems of quality control. We, too, get sassy letters. Perhaps a little vinegar now and then is good for all our souls. Ed.

Right, Left, Left

If you believe only kids build two left wings, you are mistaken. Our adult, inexperienced group does the same thing. The root of the problem is the penny-minding plan producers, who print only one half of a wing and one half of a stabilizer. Even the experienced builder has to go through time-consuming duplication, as I have yet to see a wing plan where you can build both wings on the same half.

Likewise, building half a stab, then having to wait for it to dry so you can flip it over on the half plan for symmetry, doesn't make sense. I can show you a 20-ft. shelf of abandoned, partially constructed models, due solely to frustrations with poor plans. Incidentally, of our abandoned models, most have two right wings. Maybe some producers will get the point.

Michael Palma, San Francisco, Calif.

Guns Again!

This is in answer to a letter in your February issue entitled "Fair Play."

The area Maj. Nonte refers to is probably within the boundaries of Naval Air Station Miramar. The boundaries are in places miles from the actual fences of the base. This gives the Marines the right to confiscate firearms in this area, as an indiscriminately discharged firearm could pose a serious hazard to high performance aircraft approaching and/or departing the base. Close examination of a map will disclose that the entire area is within the city limits of San Diego in which the discharge of firearms is illegal. Even if the area were not within the confines of the base, the shooters would have to contend with the San Diego police. The people who shoot in this area are, in my opinion just too lazy to drive to a safe and authorized area and have nobody to blame but themselves.

James R. Hutchinson, Escondido, Calif.

Final on Garros

Have been following the Roland Garros unsynchronized MG discussion, in "You Said It." It may be pertinent to examine the German version of the story: In John Caler's recent publication "The Jew With the Blue Max," German historian Heinz J. Nowarra comments and illustrates with photos, the actual devices that were removed from Garros' Morane.

Bill Hannan, N. Hollywood, Calif.

What the book says: "French had brought a new weapon to the Front, the Morane-Saunier Type N. . . . the first aircraft to feature a fixed machine-gun firing through the propeller arc. It was equipped with special metal wedges on the propeller blades which deflected the bullets aside, when the blades were in the line of fire . . . especially the famous

(Continued on page 74)

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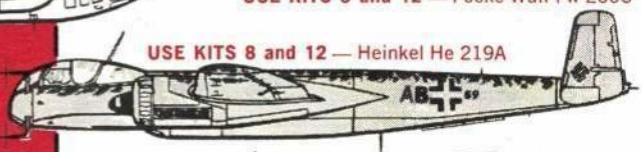

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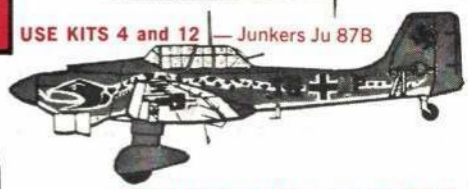
USE KITS 4 and 12 — Junkers Ju 87B



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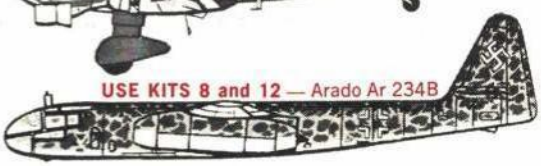

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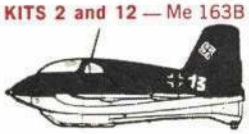

USE KITS 3 and 12 — JU 52/3m

USE KITS 5 and 12 — Me 410A

USE KITS 4 and 12 — Junkers Ju 88A

USE KITS 9 and 12 — Dornier Do 217E

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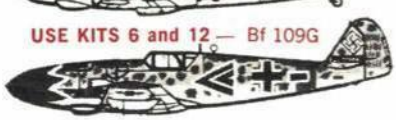
12 — Hs 129B

Howard Bowen

USE KITS 2 and 12 — Bf 109E

USE KITS 10 and 12 — Fw 190A

USE KITS 6 and 12 — Bf 109G



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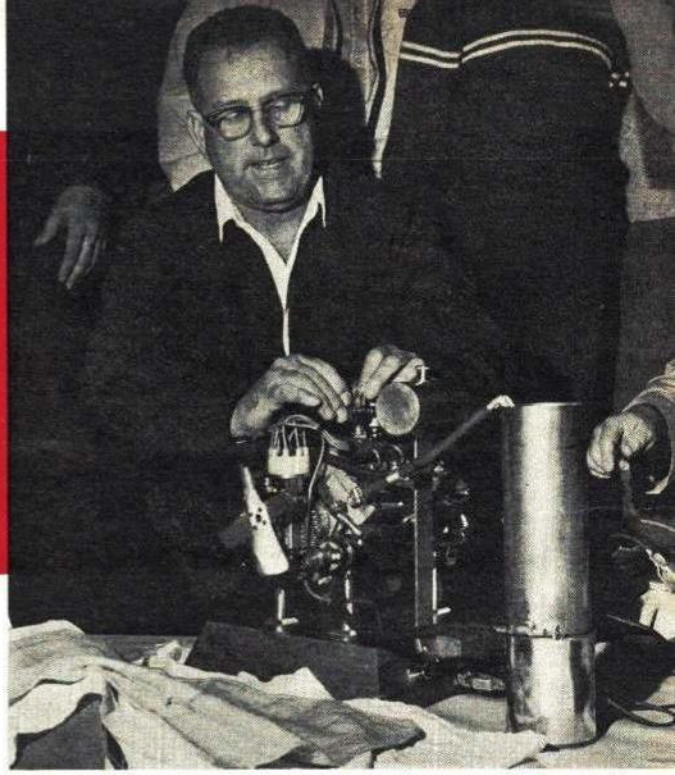
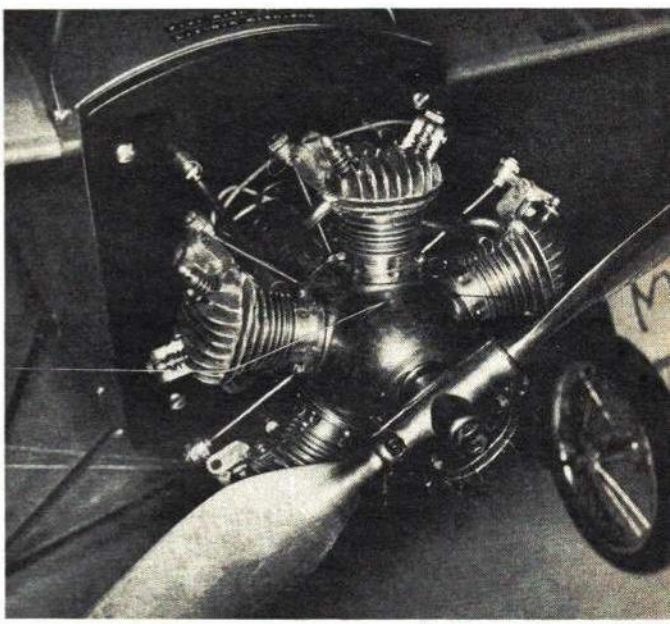
model world
...on the international scene



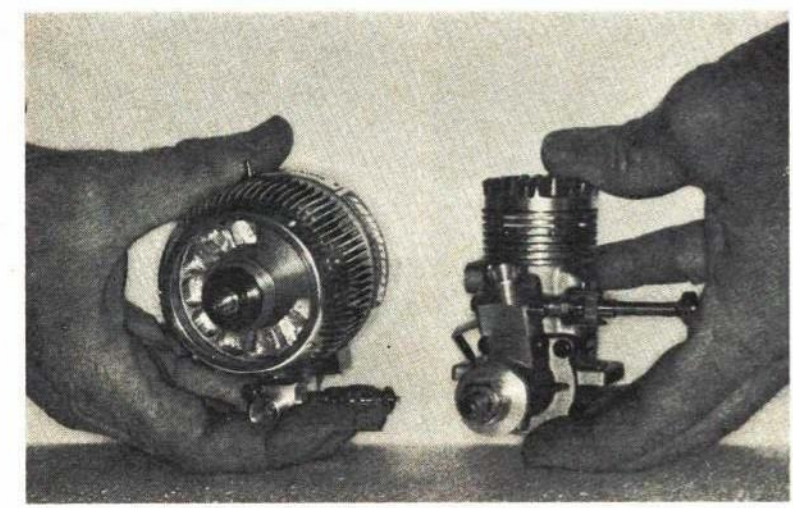
14th ANNUAL TOLEDO R/C SHOW

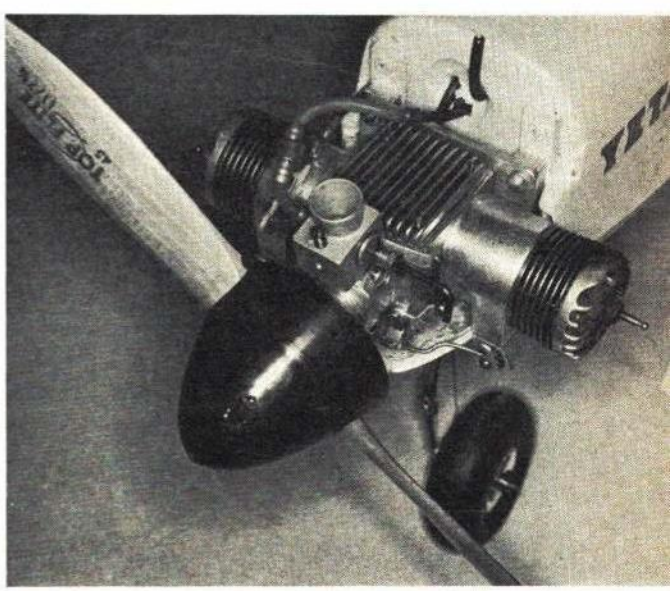
The "Weak Signals" R/C club sponsors another record-setting conference. 'Seen at Toledo' appears on page 48.

Unique powerplants display craftsmanship and progress



Home-built V-8, L-head gasoline engine at upper right by Clayton Thomas of Pekin, Ill. took 20 months of effort. Bore and stroke are 1". Crankshaft runs on ball bearings, bronze connecting rods have babbit bearing liners, aluminum pistons have two compression rings and one oil ring each. Steel valves are ⅜" dia. Engine has a water and oil pump, uses motorcycle spark plugs. Special Nylon distributor by Al Bacthold of Forest, Ill. Thomas is shown adjusting the carburetor. Engine never runs hot, he claims. Cylindrical tank at right is for cooling water since there's no radiator. Small tank on strap support is the fuel tank with gravity flow. Engine starts with a pull-cord on the flywheel. Sounds great and drew a large crowd. Vintage Morton M-5, radial five cylinder model engine, at center right, was shown by F. J. "Mick" Lasker of Livonia, Mich. Appearance enhanced looks of his modified Antic model. At bottom right is a twin built by Clovis Burrow of Noblesville, Ind. He calls it the Burco .71. Photo below shows size comparison between two engine types. Both are .29's. Graupner's Wankel is at left, Enya on right. Readers interested in the Wankel should see Howard McEntee's article on page 22.



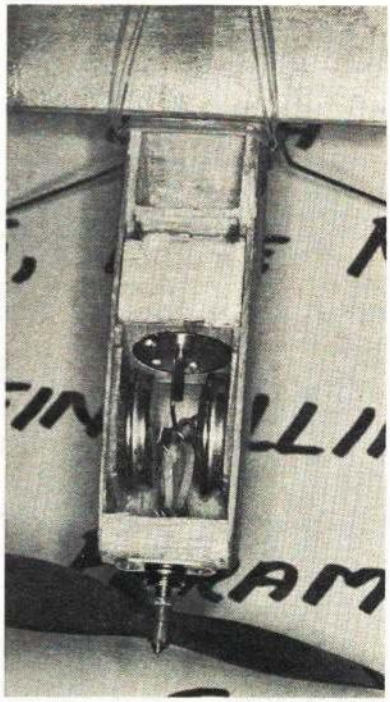


Beautiful Boats

One-Design Electronic Models, Inc., displayed operating sailboat. Both sails worked by one servo. In foreground is One-Design's new fiberglass "Moppie." Over five feet long, it is a replica of famous ocean-racing power boat. Two O&R engines drive it.

Before the crowd came

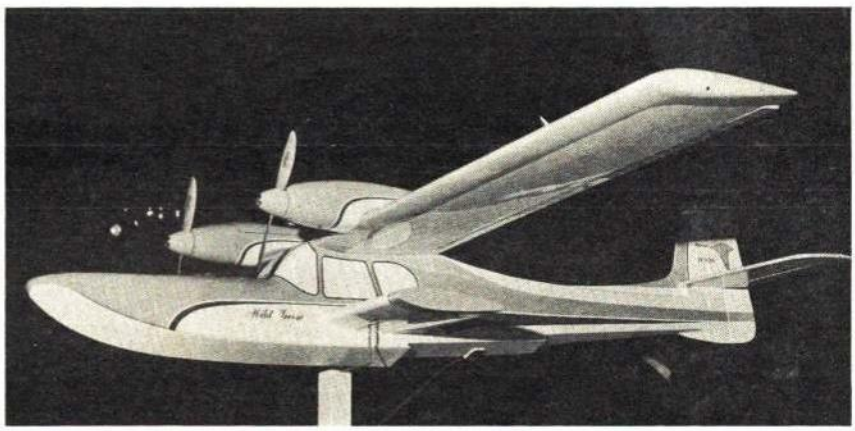
Looking toward entrance, just as the doors opened at 9 a.m. on Saturday morning. Crowd was so dense 10-15 minutes later that no exhibit or display could be seen from a distance. Crowd remained heavy until 6 p.m. Saturday and 2:30 on Sunday.



Electric motor power for indoor R/C models

The bipe won the Class I trophy. Chris Soenksen is designer and builder. Flying weight is 5½ oz. Salt-water cells power motor to drive 14″ dia., very low pitch prop. Wheels are foam sheet. Receiver is Testor's S/het; using 100 Ma cells. Small Adams actuator works rudder. Close-up shows Dick Adams' model. Rubber links motor to prop to eliminate breakage.

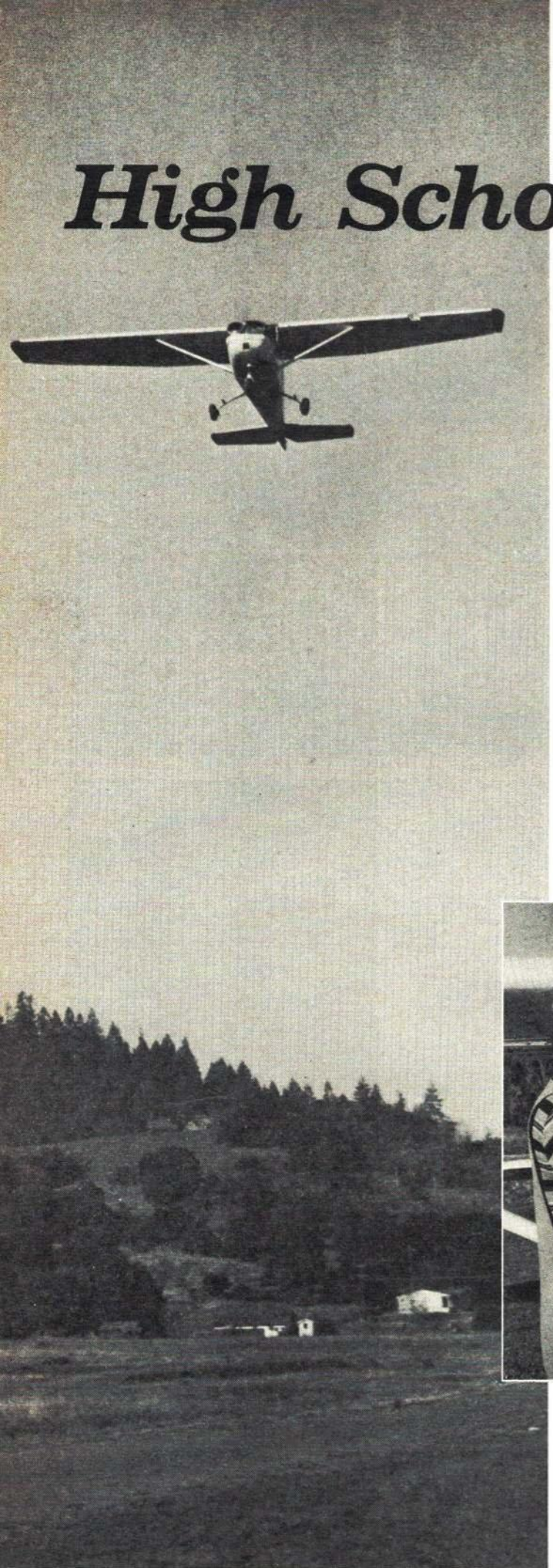
model world
...on the international scene



Great models of all types and sizes abounded

At top left is Nick Ziroli's Heath Baby Bullet scale model of 1928 racer. Powered with ST .60. At top right is Owen Kampen, Madison, Wis. with two original designs, both with new small Adams actuator. Rivets in foreground spans less than 26", flys with Cox .020. R/C system is under 3 oz., total weight is 10 oz. Powered glider uses a Cox .010, same R/C system. Two 225 Ma button cells are used. Both models are equipped with throttle devices designed by Carl Vogt. Throttle is adjusted prior to flight and enables slower flights than usual, without wild screaming type of Cox performance. The Rivets placed second in Class I.

Top of lower three photos shows Wild Goose (Liki-Tiki) by Jerry Smith, Mishawaka, Ind. Won best finish award. Two ST .40's used for power. Ship weighs 9 lbs. and has an Acrylic lacquer finish. R/C gear by Micro-Avionics. Center photo is of an XSW-1 original design by Art Feigley of Lancaster, Ohio. This ship has full-span wing slots. Orbit propo radio gear used. Powered by a ST .51. At bottom is famous antique Hoosier Hotshot, R/C winner at the 1950 Nationals. Was flown by Gene Foxworthy of Dallas, Tex. Powered by a Forester .29 on ignition. Control by Citizen-Ship 465 gear operating a four-position escapement mounted at the stabilizer.



With a student pilot at the controls, Anderson Valley High School's Cessna 150 climbs out. It was sold to the school for $1.

High School Aviation:

With 35 of 135 students in air classes, Anderson Valley High may have the most progressive aviation education program in the nation. Next year 80 may take training.

Text and photos / TOM ROE

HOW would you like to attend high school and major in Commercial Flying? Or how about Aircraft Mechanics? Most air-minded youngsters would give their proverbial right arm to be able to learn an aviation trade in high school. Few have the opportunity.

Such is not the case at Anderson Valley High School in tiny Boonville, Calif. Anderson Valley has what is most probably the nation's most progressive aviation education program. As School Board clerk Homer Mannix put it, "The air age is not coming, it is already here." It is with such enthusiasm that the entire community of 950 people greet the program.

Progressive education has been given a dirty connotation lately so Superintendent J. Robert Mathias prefers to call it "humanized education." Anderson Valley uses a flexible modular system of scheduling classes. That is a day divided into

Senior Linda Harding checks oil in preflight check. Determined to become an airline pilot, she worked all summer to raise money to work on her license.

California Style

20, 20-minute periods. The student spends half his school day in the pursuit of academic classes. The second part of each day may be spent in vocational lab. This system allows the student to spend large blocks of time in the vocational lab of his choice.

Mr. Mathias describes himself, modestly, as not aviation oriented as much as aviation frustrated. He was an aviation cadet during World War II, but it was discovered that the Air Corps had a surplus of flyers so he was transfered, along with thousands of others, into the ground forces. Mathias has certainly remained aviation conscious although he never flew after that. As an educator he held a strong desire to add an aviation program to his vocational curriculum, Mathias found a sympathetic ear with Philip E. Nickerman, Director of Vocational Education for Mendicino and Lake Counties. Nickerman himself was a high school drop-out and feels an adequate vocational educational program would have held him in high school, to say nothing of an aviation program. Nickerman and Mathias teamed up and began to plan their program.

G&H Aircraft of El Monte, Calif. sold the school a 1961 Cessna 150 for $1 and they were on their way. Now they needed personnel.

Superintendent Mathias screened several applicants for both post of aircraft and powerplant (A&P) instructor and flight instructor. According to Mathias he received many fine applicants for the positions. The A&P mechanic position was filled by Lawrence Johnson.

Johnson's father was Lawrence W. Johnson, once a top model airplane flyer. Mr. Johnson taught his son to build and fly model airplanes at the age of five. The younger Lawrence Johnson attended Chaffe (Calif.) Junior College and got his A&P license. Upon graduation he went to work for United Airlines. In eight and one-half years with United he became an inspector. Johnson was always aware of the influence of model aviation both on himself and other mechanics. In his experience in the industry he found more than 75% of the mechanics he worked with were or had been modelers. Johnson said, "Anyone who has been a modeler is a far better mechanic. They develop a dexterity and a mechanical reasoning far beyond that offered by a general shop class. In experience I could tell those who had been modelers. This was confirmed later in conversation with the mechanic."

Johnson's dedication to his new endeavor is proved by the fact that he left a job with an earning potential of $14,000 plus to accept a position with an earning potential of $8,500.

While at United, Johnson worked with young people in his church. He enjoyed the contact with the young people and felt he might enjoy teaching. He went back to college and obtained the necessary degree to teach. When the position opened at Anderson Valley he jumped at the opportunity.

Several capable men answered the call for the position of flight instructor. Mathias chose John Merriman, a flight instructor from Manhattan Beach, Calif. Merriman had learned to fly in Buffalo, N. Y. in the family-owned Cub and Stagger-Wing Beech. In 1961 Merriman and his wife moved to Alaska where he obtained his Commercial ticket. He came to California and got his instructor's rating. The opening appealed to Merriman. He had earlier obtained a degree from the University of Wyoming. Work for free-lance instructors is sporadic

Mike Coffman, right, bucks a rivet for instructor Lawrence Johnson. Short of tools, school has only one electric drill for four shop classes. Rivet gun costs $35. Says Johnson, "for that we could get 35 more Cessnas."

With a model plane Superintendent J. Robert Mathias beams the pride of his high school aviation program. He was an aviation cadet in WW II.

Flight Instructor John Merriman checks instrument settings with 17-year-old student Mike Ashiku. Merriman teaches junior high school science in addition to his flying duties.

Student Don Smith and mechanics instructor, Lawrence Johnson hold student, Linda Harding, while flight instructor, John Merriman tries to cut dress after solo.

and he felt the position would give him more full time connection with aviation.

Merriman, like Johnson, took a pay cut but enjoys his work more. According to Merriman, the main idea of the program is to introduce students to aviation. No courses were known to be available in high schools as part of the daily schedule. Merriman said, "Second to the agriculture industry in this country, aviation and aerospace hires the most people. Possibly only five or so of the 20 enrolled in the flying program will follow an aviation career. But we do expect to be able to graduate commercial pilots in two years."

And no doubt they will. Flight time costs the student but $2.75 per hour. Linda Harding, a 17-year-old senior worked all summer to raise enough money to work on her license this year. She plans to be an airline pilot. "I don't know if there are any female airline pilots in America or not. It doesn't bother me that I may be the first," said Linda. "I have gained other goals I have set for myself and I really don't have any doubt about this one." Linda will graduate this spring with a private license. She plans to work as a nurses aid to raise the money to complete her commercial ticket.

There are others who have their eyes on the sky. Sixteen-year-old junior Don Smith is described by both Johnson and Merriman as "a very adept student." He is enrolled in both the flying and A&P program. Don was the first to solo and looks forward to becoming a commercial pilot.

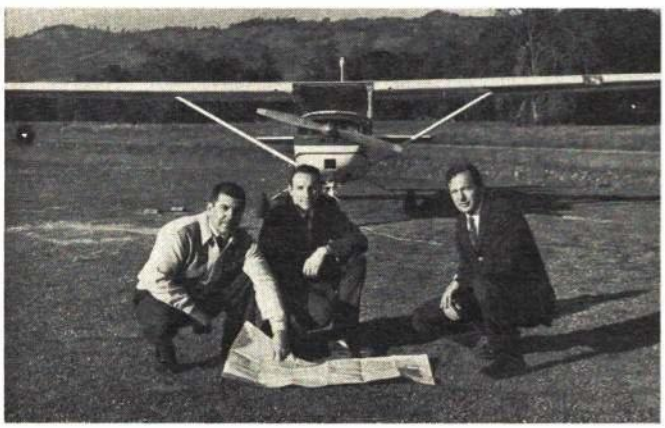
Johnson's close personal relationship with United has been helpful. They have furnished material from their educational department. The school receives damaged or obsolete parts to work on. They are loaned models of aircraft systems, some costing as much as $2,000.

The school is planning to purchase a government surplus Beech C-45 and a S-19 helicopter for the mechanic program to work on.

Johnson is considering the possibility of building an airplane as a class project. Aircraft could be an easy to fly single seater so the flight program could make good use of it.

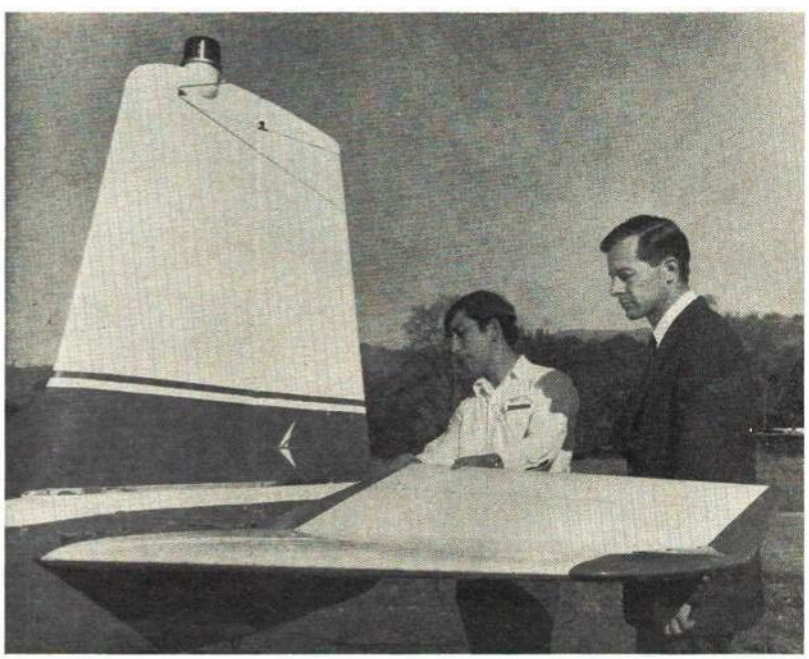
Those enrolled in the A&P program seem to be less decided about aviation as a career. Most seem to be taking the course for general information. But such contact with the career will undoubtably realize some later devotees.

Continued on page 74



Anderson Valley High School's aviation faculty; left to right: Superintendent, J. Robert Mathias; A&P instructor, Lawrence Johnson; and flight instructor, John Merriman. School will purchase surplus Beech C-45 and S-19 helicopter for mechanic's program.

Johnson shows student Wayne Hiatt fine points of safety wiring. Students are taught aircraft construction, hydraulic and electrical systems and maintenance. Student graduates with airframe mechanics license after two years of training.



Flight instructor, John Merriman double checks as Nick Ashiku, 17-year-old student preflights aircraft. School has excellent safety record, having logged well over 200 hours without incident since the acquisition of the plane last fall.

ULTIMATE IN SPORT R/C

The Porterfield

A smooth, slow-flying scale model for any system — and any flyer.

HERB CLUKEY

THE 1939 Porterfield Model 50 was one of the best known light planes of the era. A fully cowled 50-hp engine in the nose, wheel pants, plus parallel wing struts made this tandem stand out. Our thanks to the late E. E. Porterfield, Jr., the designer and president of Porterfield Aircraft Corp. for making this article possible.

Our model was first designed as a ½ A R/C beauty called the Porterfly (Sept. '67 American Aircraft Modeler) and was such a success that it was decided to build a larger model which could incorporate any of the radio gear on the market today. Hence the semi-scale Porterfield which American Aircraft Modeler displayed on the front cover of its June '67 issue.

Since the Porterfield is tagged as semi-scale, let's explain the phrase. Any time areas are added or subtracted, landing gear positions shifted, struts changed or any other deviation from absolute scale, you have a semi-scale airplane. The joy of all this is the fact that you have improved the ability of the model but have retained the original looks of the prototype. So semi-scale does not necessarily mean an ugly out-of-proportion airplane.

On our Porterfield the chord was increased by one inch, airfoil thickened by 2% and horizontal tail group increased by 20%. The landing gear location was advanced 1¼ inches which showed up on takeoffs, landings and touch-and-goes. V-type struts were used instead of parallel struts, thus making two groups to hook up instead of four which allows for easier alignment. With these minor changes the Porterfield is one of the best semi-scale sport trainers available.

The plans have been drawn as self-explanatory as possible. Before starting to build, bear in mind that good material is half the battle, so choose it wisely. The fuselage is a good place to start so obtain two sheets of ⅛ x 6 x 48 medium balsa and two sheets of ⅛ x 4 x 48 balsa of the same weight and texture, if possible. Cement a 6" and a 4" sheet together to form a 10" wide plank. Make two. Draw in fuselage sides, mark bulkheads and sections.

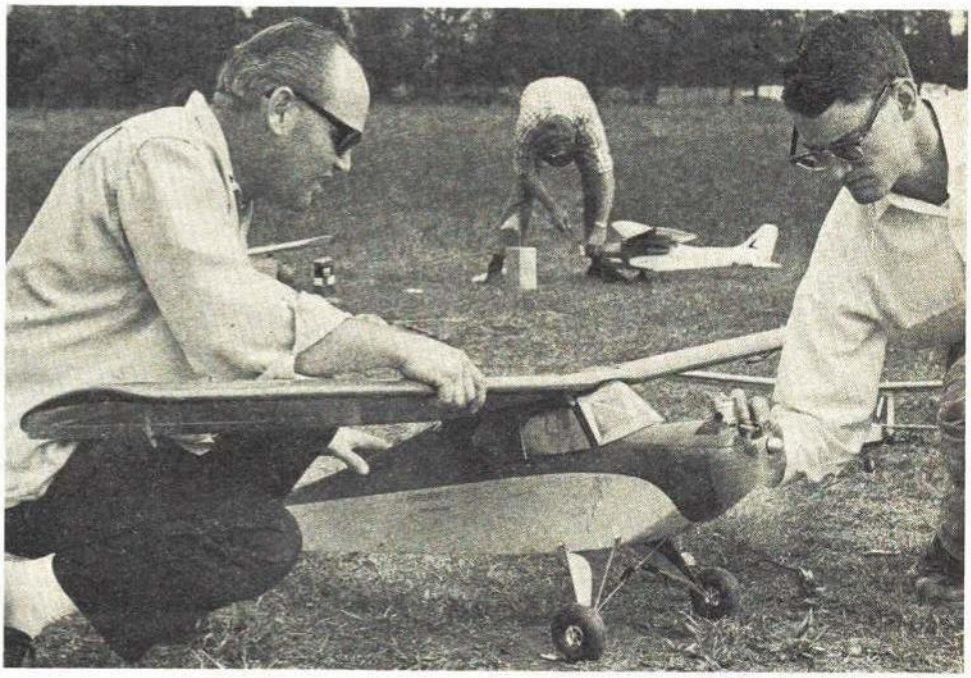
Cut out #10 and #11 from ¼ sheet and glue in place. Install the ½ and ¾ bass mounts and let dry. Meanwhile, cut out #1 (nose block) and #2, 3, 4, 5, and 6. Glue to fuselage sides, then add the ¼ x ½ balsa cross members and uprights from section 6A on back to section 9. Add ⅜ square cabin brace, then #12's on outside of cowl and all blocks on top and bottom of nose section. Next, bend the strut from 1/16 wire and epoxy to ply floor, then install as shown on side view. Follow up by installing remainder of ply cabin floor. Cover top and bottom of rear fuselage then add #14 and also the dowel windshield braces. At this time cut out cabin windows and trim all cowl blocks to conform with fuselage.

Using a razor saw or sharp knife, cut top nose cowl off as shown by cowl separation on the drawings. Shape #13 and drill for particular engine to be used and install as shown. Cut out engine cowl to suit. Also, all servos and receiver shown on plans are of no particular type and are shown for positioning purposes only. This is due to the wide variety on the market.

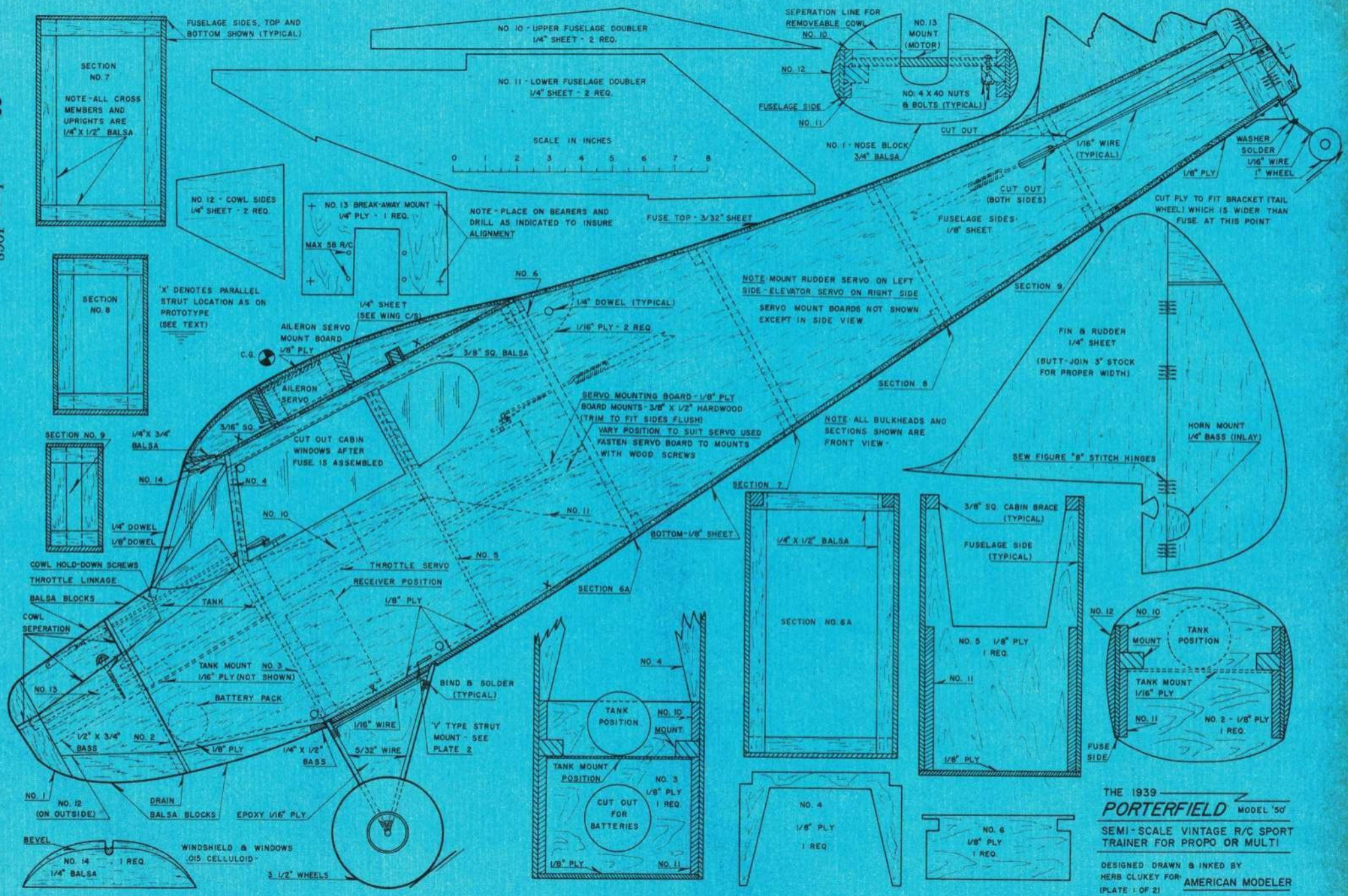
For the tail group obtain medium light C-grain balsa and butt join for proper width. C-grain balsa has a flaky appearance. Insert bass inlays where shown for horn attachment. Two type hinges are shown but all hinges are optional to the builder.

The wing is of standard construction. Make a right and a left panel first. Do not add any sheeting at this time. Now cut two each of the spar reinforcement from a sheet of 3/32 x 12 x 24 plywood.

Continued on page 64



Herb Clukey and Ed Sweeney tuning up the big Porterfield for a test flight. That 58 is excessive power for this design, but pull whatever power you need. Majestic in flight, it will do all primary scale maneuvers. Will also loop, barrel roll, and spin gently.

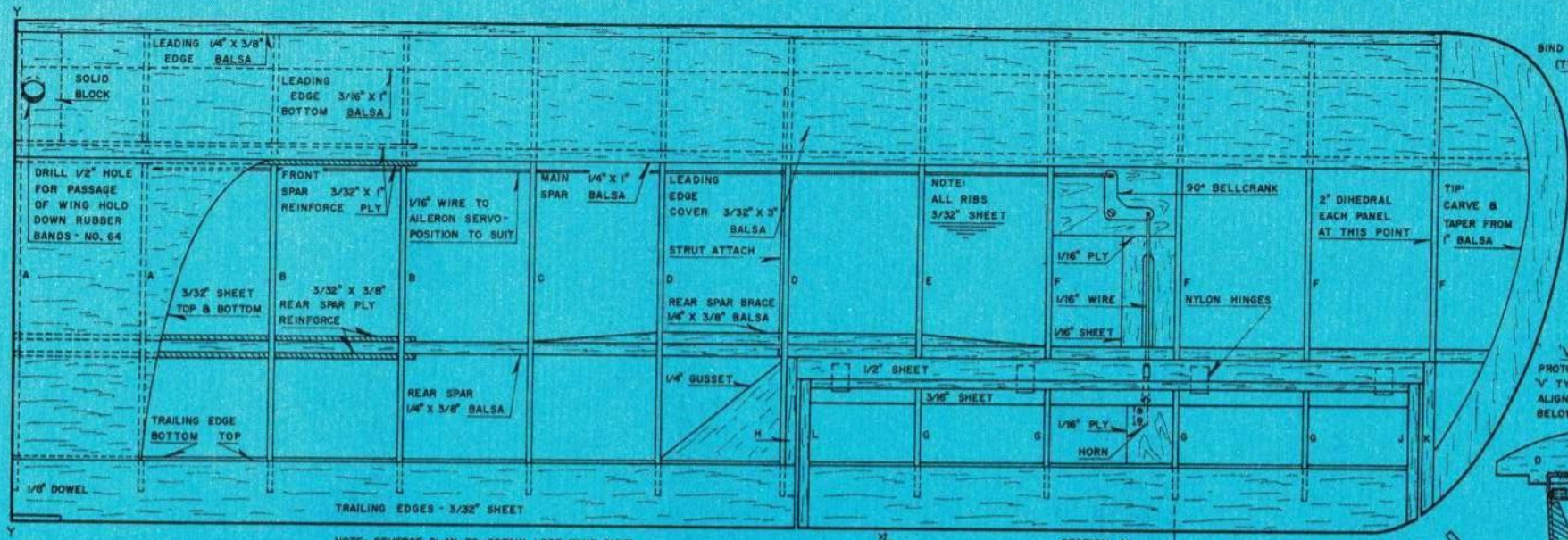


THE 1939 **PORTERFIELD** MODEL '50'

SEMI-SCALE VINTAGE R/C SPORT TRAINER FOR PROPO OR MULTI

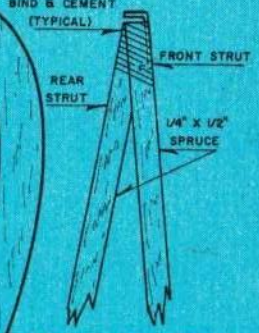
DESIGNED DRAWN & INKED BY HERB CLUKEY FOR AMERICAN MODELER

(PLATE 1 OF 2)



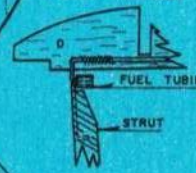
NOTE: REVERSE PLAN TO OBTAIN LEFT WING PANEL

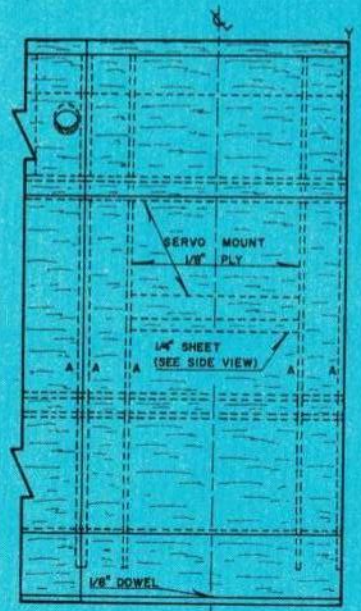
SECTION M



'V' TYPE WING STRUTS

PROTOTYPE HAD PARALLEL STRUTS - 'V' TYPE SHOWN FOR EASE OF ALIGNMENT - ATTACH AS INDICATED BELOW - (TYPICAL)

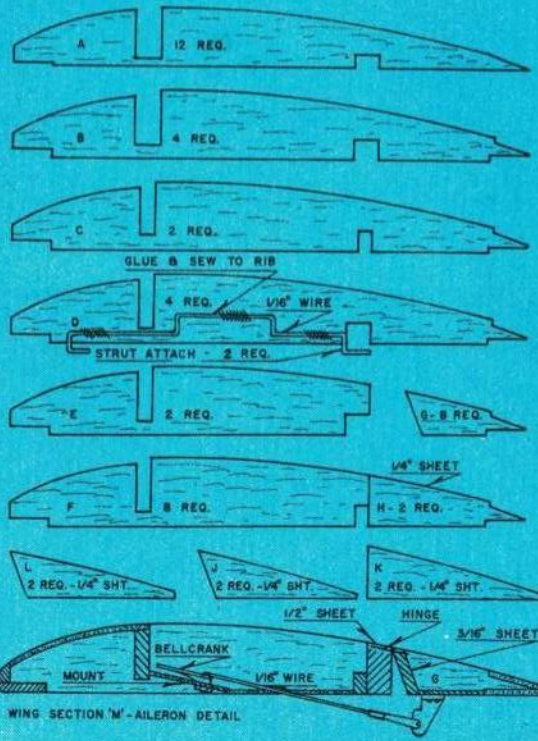




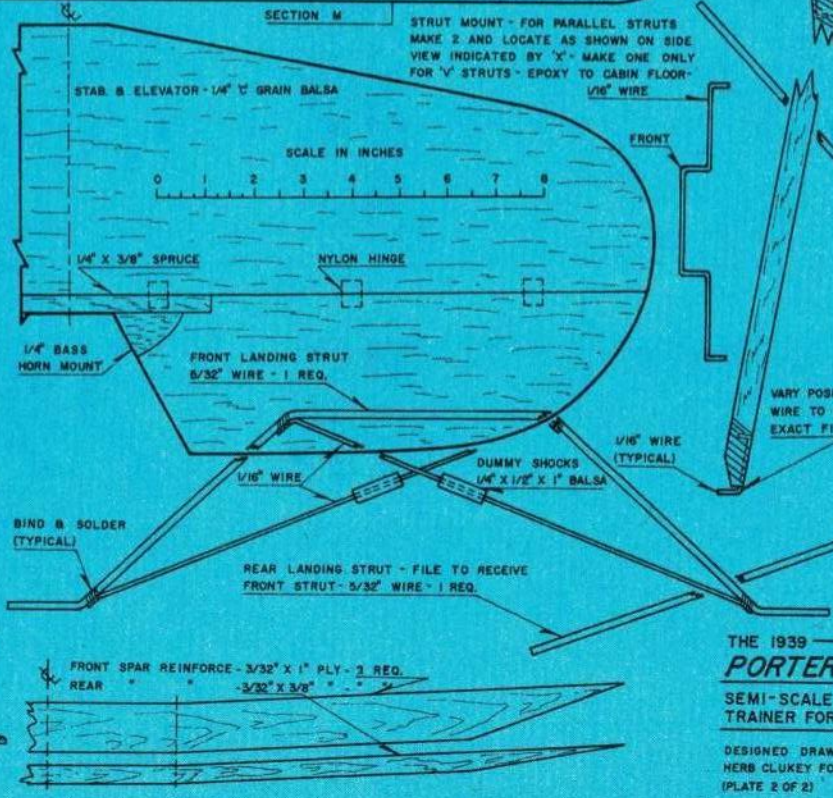
WING CENTER SECTION

JOIN 'Y' TO MAIN WING PANEL

NOTE: ALL MAIN WING NOMENCLATURE APPLIES TO CENTER SECTION



WING SECTION 'M' - AILERON DETAIL

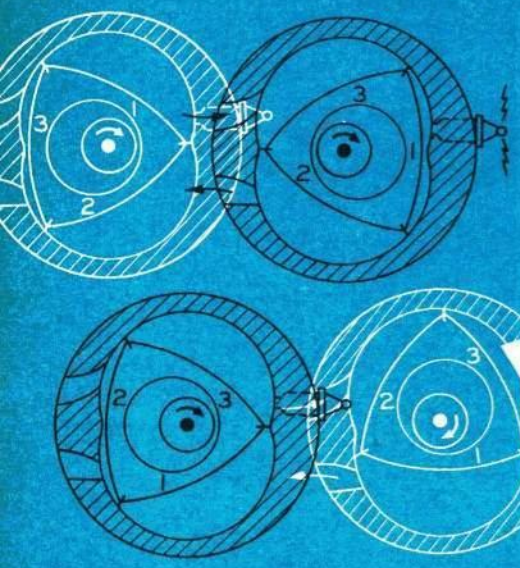


THE 1939 **PORTERFIELD** MODEL '50'

SEMI-SCALE VINTAGE R/C SPORT TRAINER FOR PROPO OR MULTI

DESIGNED DRAWN & INKED BY HERB CLUKEY FOR AMERICAN MODELER

(PLATE 2 OF 2)



There's a WANKEL in your future

It may look like no engine you have seen before and it apparently runs by black magic. Smaller, lighter, more potent, it's a comer.

HOWARD McENTEE

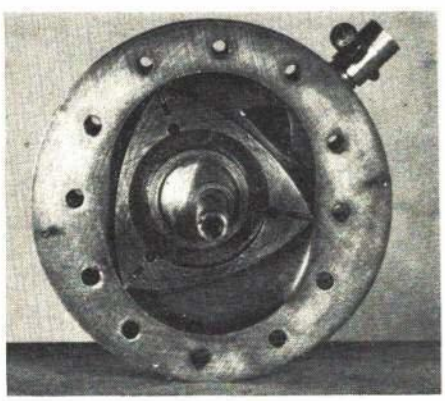
SOME months ago we noticed a line on the cover of a popular mechanical mag; which touted an article on the latest "R/C engines." Thinking the products of some of our model plane powerplant makers had hit the big time, we grabbed a copy.

The story was interesting, but it had nothing to do with our size engines. It described the latest version of a rotary combustion engine, a design known as the Wankel, after the German inventor. These engines were first heard of around 1959; have been under intensive development in many countries ever since. Actually, they are not unknown in our field. An Orion, powered by a homemade Wankel built by Floyd Neal, was demonstrated at the 1962 Chicago Nats — more on Neal's interesting designs later.

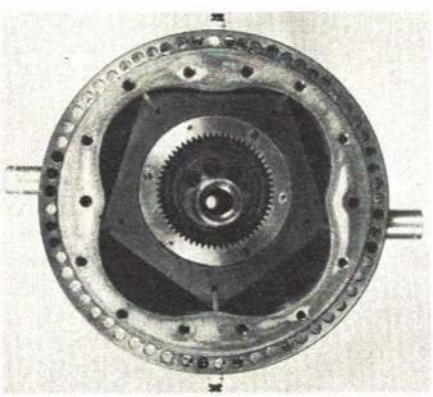
There have been many attempts at designing a successful rotary combustion engine — and there will doubtless be many more. But the design of Felix Wankel, a German scientist, looks like the most practical yet. So much so, that the idea was taken over by the German NSU concern (makers of motorcycles, autos) way back in 1951. First use of the idea was for a small compressor in 1956; it was fitted to a conventional motorcycle engine which set a speed record at the Utah salt flats.

Curtiss Wright Corp. secured rights to manufacture Wankel engines in the U. S., but has concentrated mostly in development of larger sizes — 100 hp and over. C-W has, however, built and tested engines in all sizes from one of a couple horsepower fitted to a power lawnmower, up to several hundred, both liquid and aircooled. They have driven extensively a standard U. S.-made auto, fitted with one of their engines. No such car is known to be anywhere near sale in the U. S. at present; but you *can* buy one from Germany (NSU has them now and Mercedes is working hard on one), and from Japan (the Toyo Kogyo concern). Some 20 concerns all over the world are licensed to build Wankels. And you can be certain the U. S. auto makers are hard at work on the same thing!

Why all the interest and excitement? The Wankel has many advantages over conventional engines, for a wide variety of purposes. First, it is much smaller, simpler and lighter than even two-cycle engines. The basic Wankel (not including accessories) has only two moving parts. Furthermore, these parts do not operate on a start-stop-reverse sequence as do the piston and other components in conventional engines; those two parts are always rotating in the same direction.



One of the first Wankels to run in this country was built by William Thomas and Bill Jr. in March, 1960. Shown are the rotor, shaft with eccentric, and trochoid cavity. This was a side-port design.



Later Thomas design was this five-lober which gave two firing impulses per shaft rotation. Diameter was 3¾". Turned 14-6 prop at 5,000 rpm. Merely experimental, no effort to save weight.

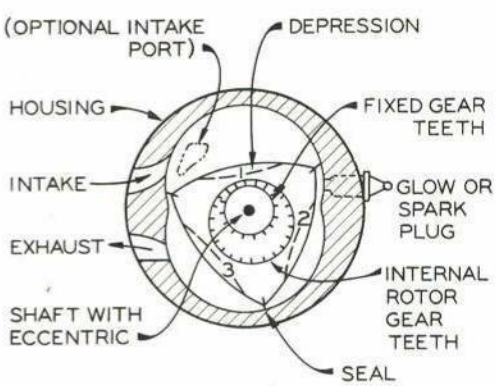


FIG. 1

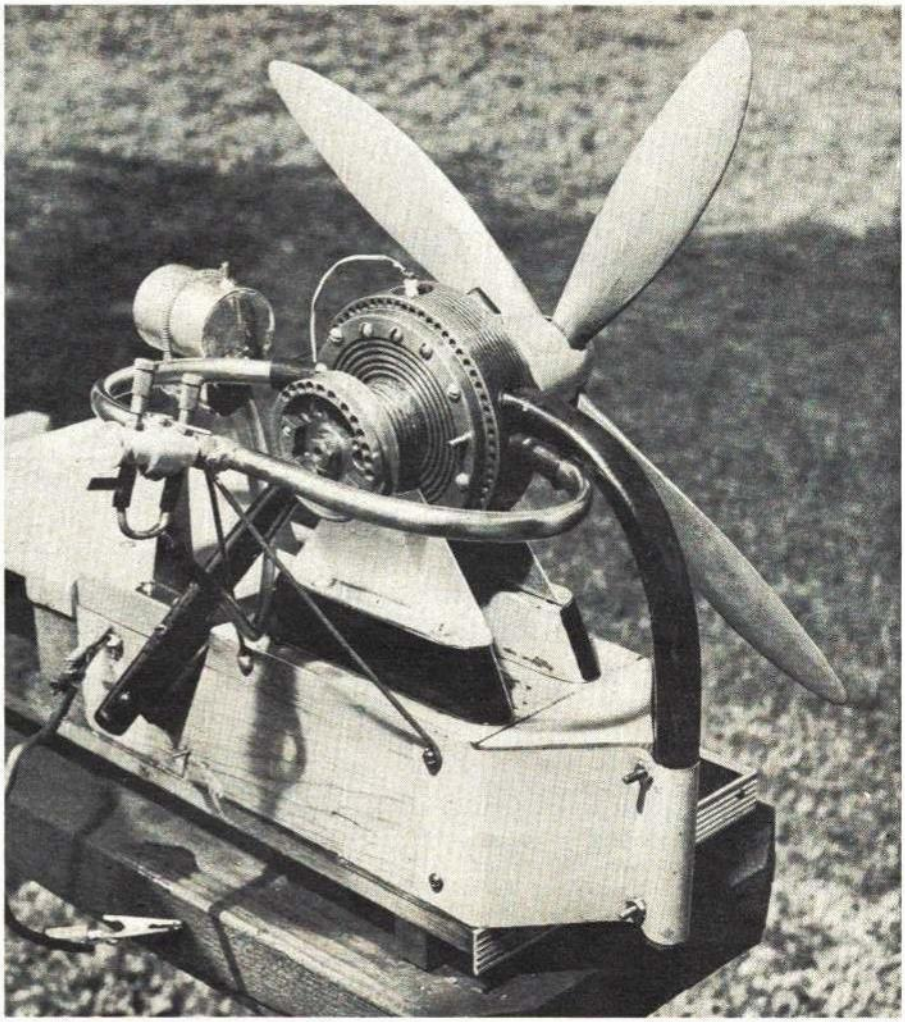
This conserves power, reduces friction and above all, makes it possible to balance the Wankel almost perfectly. Because of only two parts, there's lots less to go wrong. Machining is a bit tricky — mainly because it's entirely different from that of conventional engines, but special tooling is rapidly being developed.

Present-day Wankels of automotive size can produce the same power in about half the weight and size of a standard engine. They are at least as economical in fuel. And they run smooth as silk! These same advantages will be seen soon in outboard engines (several U. S. outboard makers are well along in this field). Lawnmower and other small units may be next.

Like everything else, there are some disadvantages — though constant development is overcoming even these. One is sealing the rotor inside its chamber. Another is wear. Recent reports claim that these problems have been practically licked, however.

It takes some study to understand how the Wankel operates, even though it has so few parts. Take a look at Fig. 1. The "cylinder" or chamber in which the triangular rotor operates is almost an oval, but not quite; there is a slight waisting-in at two points to form a very fat figure 8, a shape called a "trochoid." The three-pointed rotor has surfaces that are a bit rounded from tip to tip; also, as indicated in dotted lines in Fig. 1, there is a slight depression on each face. Now comes the tricky part! The shaft (you can't call it a "crankshaft" as there's no crank — better term it an "eccentric shaft") rotates in the center of the trochoidal cavity, and has an eccentric attached. The center of the rotor fits over this eccentric.

Key to the whole operation is two gears. The smaller is fastened rigidly and does not turn; Fig. 1 shows only the center portion of the engine body, but there are, of course, two end plates. The fixed gear is attached permanently to one of these. The small ring centered around the shaft in our five sketches represents this fixed gear, which has teeth on its outer periphery. Engaging these are teeth cut on the *inside* of the rotor. Thus, as the shaft is rotated (it's probably easier initially to envision the action by having the shaft turn the rotor, rather than the opposite, as occurs when the engine is running), the eccentric "wobbles" the rotor around the shaft. At the same time however, the gear teeth assure that the *rotor turns around the eccentric*, to keep the rotor points from jamming into the chamber walls.



Long intake manifolds on this Thomas Wankel were found to increase efficiency. All the Thomas engines were bench run, but were not flown. Spark ignition was used. Note balance weight at the rear.

To keep everything moving correctly, there must be two-thirds as many teeth on the stationary gear as there are teeth inside the rotor. And this results in the rotor making a third of a revolution for each full revolution of the main shaft. Let's follow through as one face of the rotor goes through the sequence of intake compression-firing-exhaust.

At Fig. 1, face 1 on the rotor is well along on the intake and is just about to start compressing the fuel mixture it has drawn in through the intake port. At 2A, compression has started. The eccentric and gear teeth are moving the triangle so that face 1 is approaching the wall of the enclosure, thus compressing the fuel. At 2B the spark plug fires (or it could be a glow plug which ignites the fuel at this point). In 2C, the rotor face is moving away from the wall, forced to do so by the

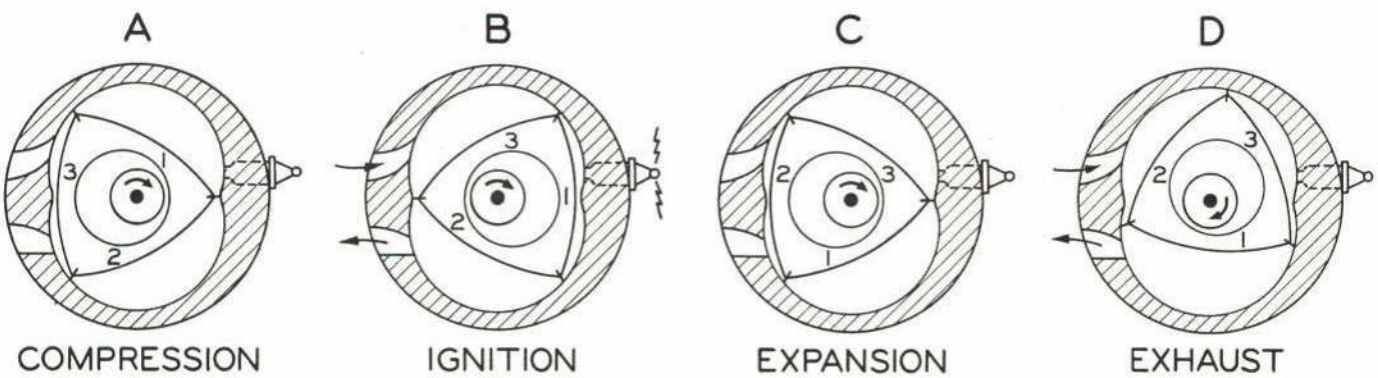
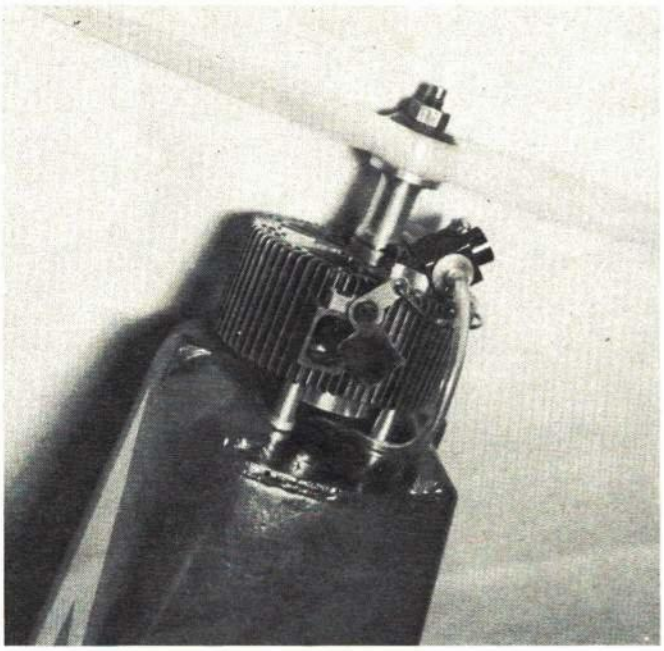
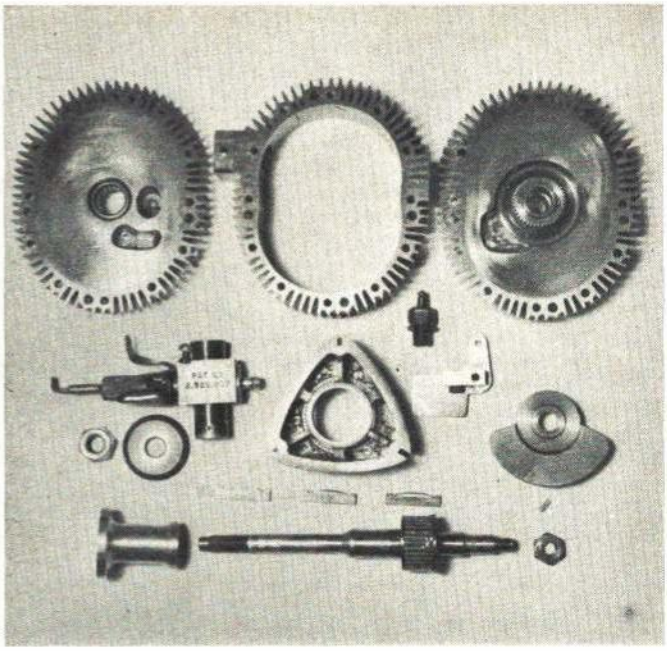


FIG. 2





Wankel, installed in Orion was built by Floyd Neal, and flown during 1962 Nationals. Interesting point is pivoted flap over the exhaust port. Neal flew earlier Wankel in 1961 Smog Hog. As with Thomas engines, rotor is lapped to snug fit between two side plates.

expanding gases, and at the same time the rotor is pushing upon the eccentric to turn the shaft. At 2D the advancing tip of rotor face 1 has cleared the exhaust port, and the gases rush out.

Rotor face 1 is not doing all the work, of course. As it goes through the above cycle, faces 2 and 3 are just a jump or two ahead, and the shaft is thus being turned almost continuously. This is one reason for the "silky smoothness" that most test drivers have commented upon, who have driven Wankel-propelled autos. This, and the almost perfect balance of the engine. We have not shown any balance weights in Fig. 1, as they would just confuse matters. But picture an off-center weight on one or both ends of the main shaft, and attach just opposite to the fat part of the eccentric. The weight would be just enough to perfectly balance the off-center weight of the eccentric itself, and the rotor it is driven by.

As can be seen, Wankel operation is a continuous smooth rotational process — not a harsh start-stop-reverse procedure, as in conventional engines. Though it has no moving valves as such, and draws in fuel mixture and shoots out exhaust fumes through ports (as in a two-cycle engine), the Wankel is a true four-stroke-cycle design. The style we show here is therefore equivalent to a two-cylinder, four-stroke of the usual design, or to a single-cylinder two-stroke — in number of "explosions" per revolution of the shaft — but the other advantages make it vastly superior to either.

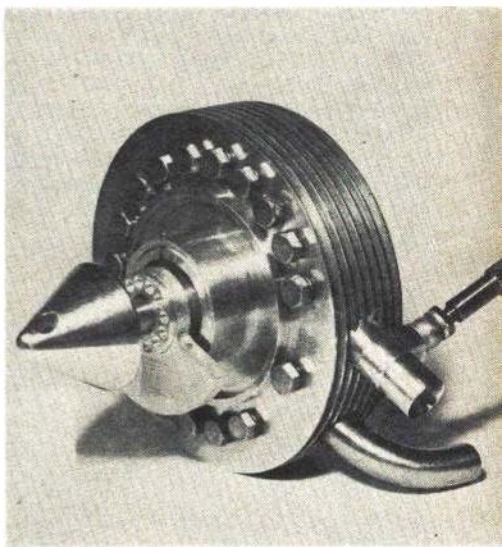
We have shown an engine with both intake and exhaust ports on the cavity periphery. Some designers (Curtiss-Wright among them) prefer to put the intake port on the side of the housing; this has been found to increase low-speed torque and fuel economy at partial throttle opening — matters of little consequence to model engine users.

Probably one of the first Wankel engines to run in the U.S. (other than those of Curtiss-Wright) was one built in a home shop by the team of William Thomas and Bill Thomas Jr. (Daytona Beach, Fla.); it was fired up in March, 1960. A photo of it with one side plate removed shows rotor, shaft with eccentric, and the trochoid cavity. The two gears are on the opposite side of the rotor. Note that this engine has a side port. Lightly spring-loaded metal strips at the rotor tips are for sealing. Bill Jr. says machining and sealing left much to be desired, but the engine did run. No effort was made to reduce weight (overall dia. was 4½", weight was 9 lb.) or attain high power. An external view of this engine was carried on page 5 (July-Aug. 1963 issue of A.M.) and showed later Thomas developments in five-lobe rotors (the only ones of this type we've heard of).

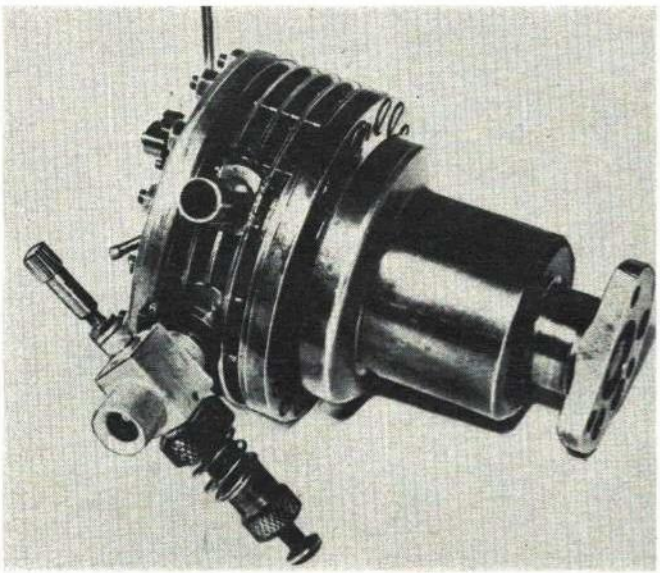
The five-lober gives two firing pulses per shaft rotation, is thus equivalent to a four-cylinder, four-cycle conventional type. Another photo shows the most recent Thomas five-lober; it is 3¾" OD, turns the four-blade 14-6 prop at 500 rpm, weighs 3½ lb. Again, no effort was made at weight reduction. The Thomas' are interested mainly in engine development, and their creations have only been bench-run. They have used spark ignition on all their engines to date. The long intake manifolds seen in one photo were found to increase efficiency. Note the balance weight on near side of this engine.

As mentioned earlier, Floyd Neal (St. Louis) flew a Wankel-Orion combo at the '62 Chicago Nats. Photo shows underside of the engine (Floyd also favors the side intake port) and interesting point here is the pivoted flap over the exhaust port, coupled to the intake throttle. As with the Thomas engines (and apparently with most small-sized Wankels) the rotor is lapped to a snug fit between the two side plates (larger engines employ spring-loaded strips on the sides as well as at the triangle tips). The fixed gear may be seen attached to the right-hand side plate. Below this is the counterweight that balances the off-center eccentric and rotor. Though the shaft at bottom is so-placed that you can't see there is an eccentric, there really is — it's the fat area toward the right end.

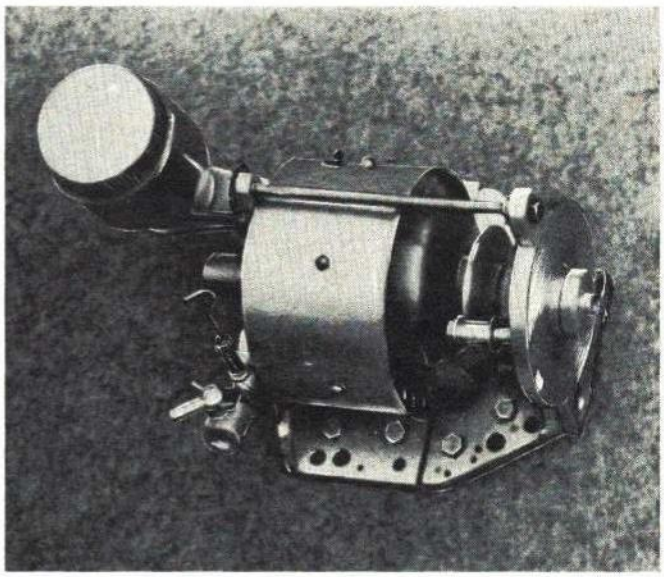
Floyd ran his first Wankel in Nov., 1960. It was later installed in a Smog Hog, and flown on Feb. 23, 1961 — probably the first Wankel-powered model flown in the U.S. Actually, Floyd is the only modeler we've been able to trace who has flown a model Wankel in the States — but there must have been others. The engine we show here was very much the same, but simply refined. That Nats



Falecki SW-92. Weight of this neat design is 35 ozs. Outside diameter is 3½". Displacement is 9.2 cc. Produces 1 hp at 12,000 rpm. Note periphery intake. Maximum power developed so far, 1½.



An early Polish Wankel was produced by J. Falecki. Run on both glow and spark ignition, it produces 1½ hp, has turned 21,000 rpm. Diameter is 3⅜", weight 75 ozs. The displacement is 9.2 cc.



Water-cooled Wankel, S. Gorski, Poland. Believed first marine Wankel in Europe. Twelve cc displacement, 29 oz. bare weight — less flywheel, pull-starter. Turned 23,000, 1½ hp at 12,000.

flight was its first time in the air! The plane and engine were flown continuously for two years thereafter.

This particular engine has .50 cu. in. displacement, turns a 12-6 prop at 12,000 rpm. Body size is 2¾ x 3", length is 4" and weight is 20 oz. This engine (as was the first one) is entirely of steel and cast iron, but Floyd started a copy with considerable aluminum to lower weight; however, at last reports it hadn't been completed. This builder has been so impressed with the Wankel design advantages that he purchased an NSU Spyder, which has a 64 hp R/C powerplant.

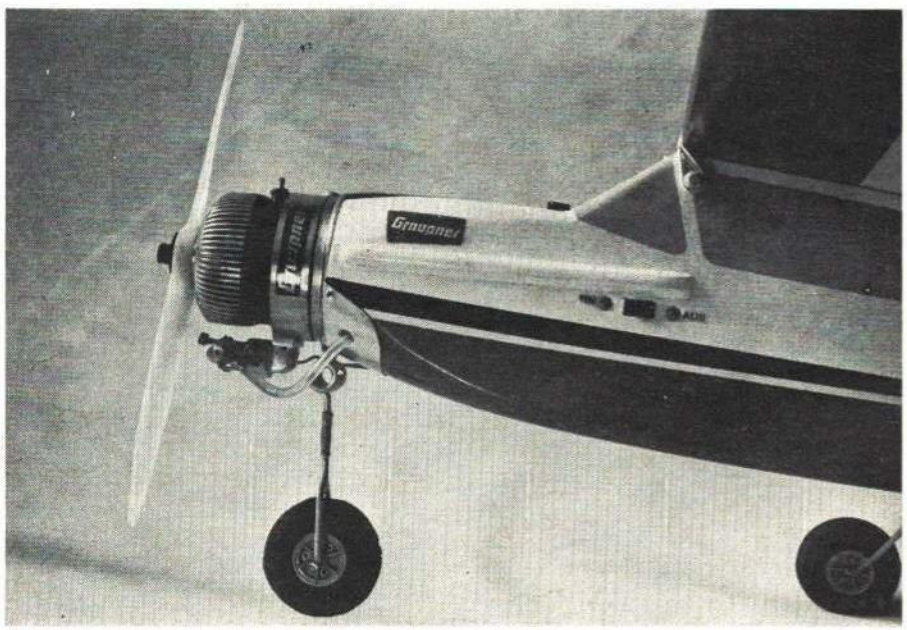
We spotted several model Wankels in the very comprehensive manual entitled "Miniature Combustion Engines," a 436-page volume published in Poland (interested readers could obtain a copy from author Wieslaw Schier, Sulejowek k/ Warszawy, ul. Okiewska 1, Poland — and even if you can't understand Polish this very profusely illustrated book is extremely interesting). Mr. Schier kindly sent us pix of several Polish model Wankels; one of the first in that country was the SWT-1 produced by J. Falecki. It has been run on both glow and spark ignition, has 9.2 cc displacement and has produced as much as 1½ hp. Diameter is about 3⅜" and weight is about 75 oz. It has run at over 21,000 rpm with little loss of power, will idle at 4500 rpm on glow. Partial plans for this engine (enough for an experienced builder to follow) are in the Shier book.

An SG-X water-cooled engine built by S. Gorski was used in a model boat in 1963. This is felt to have been the first Wankel-powered model boat in Europe.. This is a 12 cc displacement engine, weighs about 29 oz. bare (less flywheel, pull starter and other auxiliaries). It produces 1½ hp at 12,000 rpm, has run as high as 23,000 with no problems.

Another Falecki engine, the SW-92, is a neat design completely detailed in the Schier book. It weighs about 35 oz., has an outside diameter of 3½" and 9.2 cc displacement. This glow engine will produce 1 hp at 12,000 rpm, and a maximum of 1½ hp. All the operational figures we have quoted were given by the engine designers. Note that the SWT-1 and the SW-92 have periphery intakes. In the photo of the Gorski you can see one counterweight, which is apparently machined from the same piece that the prop is tightened against. There is a similar counterweight at the rear of this engine. The counterweight of the SWT-1 is part of the two-diameter circular section to the right of the main engine body; this entire section rotates with the eccentric shaft.

All the model engines we have depicted so far are the work of ingenious experimenters, and doubtless all one-of-a-kind. So where can you buy a Wankel for your new R/C plane? Well, you can't as this is written — but you might by the time it's printed! For the German Graupner concern demonstrated their engine at the 1967 R/C World Championships, and considerable data on it was given in the "New in R/C" section, Nov. '67. It was shown at Toledo this year. Briefly, it's a .25 cu. in. job, measures about 3" dia. x 3" long, weighs 13 oz. (production engines will be around 9-10 oz.) and is a glow engine. It turns a 10/4 nylon prop at 12,000 rpm, but later versions do quite a bit better. It is extremely smooth in

Continued on page 65



Most famous of the Wankels is the well-publicized Graupner which was seen at last year's Radio Control World Championships at Corsica. The continuous, smooth rotational process reduces vibration.

TERRY D. ALDRICH

F-82 Twin Mustang

A control-line show-stopper, this profile F-82 is as startling in appearance as the real one. It's easy to build, too!

BUILT by North American Aviation Inc., and designed as a long-range, high-performance fighter-bomber, this twin-engine, twin-fuselage aircraft was test flown July 6, 1945. Our model is a profile, scaled one inch to the foot, giving a wing span of 52.5". Two 35 McCoy powerplants provide more than enough get up and go to give all the thrills one could want in an aircraft.

Used as a show plane, it is a crowd pleaser of the first order. Painted all black with white trim and rubbed out to a high polish, this plane becomes something one enjoys having.

The airfoil shown was used because of the anticipated weight of this type of model. For those who want more than level flight and loops, a symmetrical airfoil may be substituted.

Fuselage: Use hard-grade balsa 6 x 36 x ½ stock for the fuselage. Cockpit and airscoop are butt glued from scrap (if cockpit and airscoop included use 7¼ x 36 x ½ stock). The fuselage is tapered from rear of cockpit to rudder, per the drawing. The ⅛ hard-grade plywood doublers extend from the nose to halfway past the wing leading edge.

Motor mount material is ½ x ¾ x 6, hardwood. Distance between the mount bearers depends on the motor used and crankcase size. The 2¼ spinner is a Veco product.

The 35 powerplants are mounted with the cylinders to the outside of circle. Drill ⅛ holes and use 4-40 lock nuts and bolts. (Blind nuts may be substituted.) On some engines the needle valves will need to be in the top position, for ease of making adjustments. Side mount 4-oz. tanks, using strap-type hold-downs. Fuel filters are an extra safeguard for reliable and smooth running.

Make left and right ⅛ landing gear struts for 2" wheels (Perfect or Veco). Also, bend left and right tailwheel struts, using 1/16 wire set in hardwood. The hardwood is recessed into the fuselage. Make two metal main-gear skirts. Attach them with nylon clamps.

The vertical tails are 7½" high. Use 3/16 thick balsa, rounded as shown. The rudder is tapered and offset to outside of circle to maintain line tension.

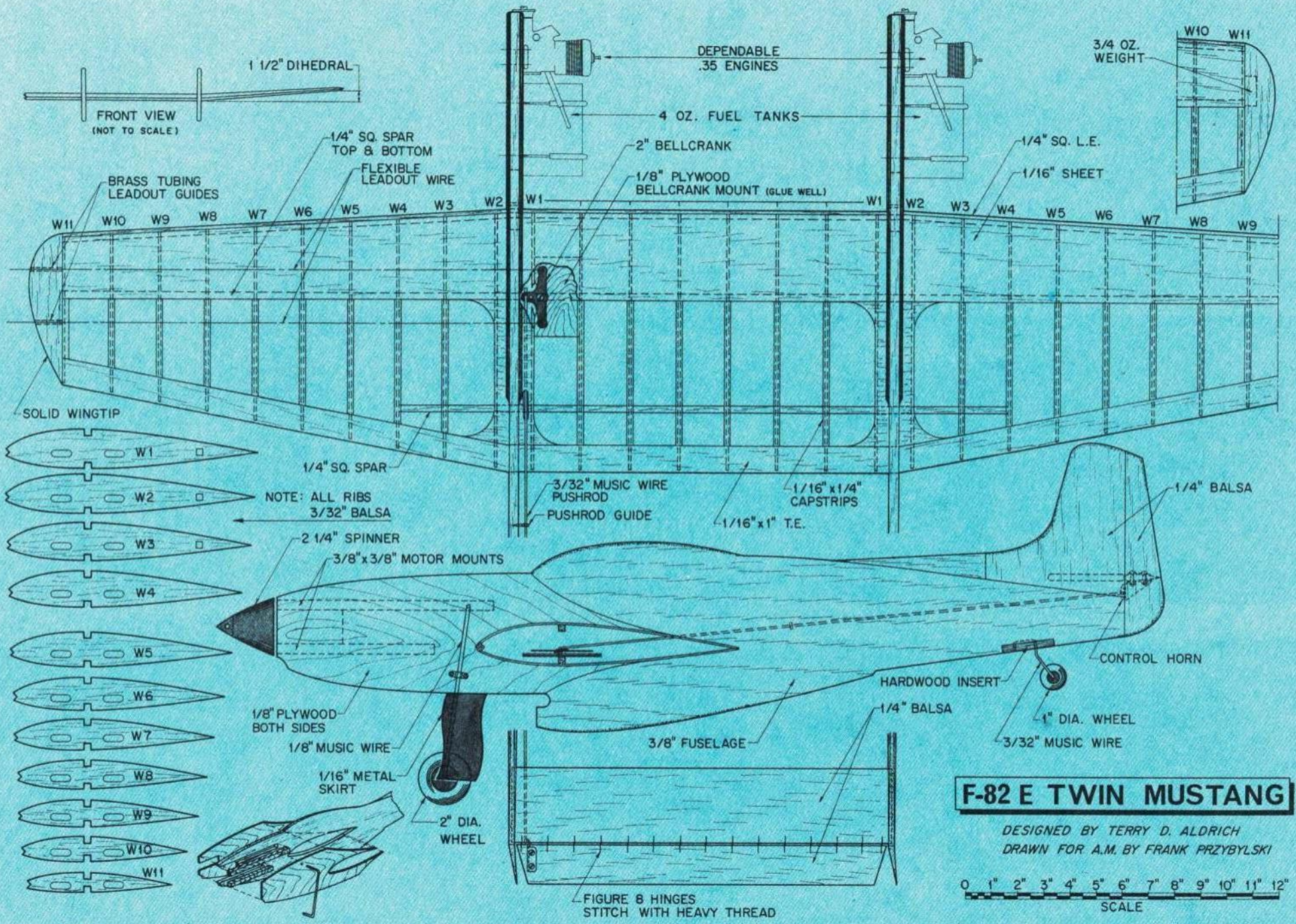
The horizontal stabilizer is 3 x 14 11/16 x ¼ balsa. Elevator is 1½ x 14½ x ¼, tapered. Note that the horizontal stabilizer is countersunk into the vertical stabilizer 3/32 for extra strength. Distance between one vertical stabilizer and the other vertical stabilizer is 14.5". Make figure-eight elevator hinges from waxed string.

Wing: The center section rib length is 10". A standard lifting airfoil is used. A symmetrical, stunt airfoil may be substituted for the full pattern. Cap strip the ribs with ¼ x 1/16 balsa. The ¼ x ¼ main spars are located 3½" from the leading edge, the single rear spar 2⅜ from trailing edge. Use hard ¼" sq. balsa for the leading edge. The wing's 1/16 sheeting butts against the leading edge and continues rearward, overlapping each main spar. Use medium to medium-hard sheeting on the wing. Top and bottom

Continued on page 65

In flight, with its two 35s snarling, the Twin Mustang has maximum appeal. Clubs take note. It is an ideal demonstration model.

Four-bladed props are a plus. To construct — cement two regular wood props together, using a half-lap joint and epoxy. Carefully check the balance and true running of the prop tips. Wing is the only built-up component; the others are constructed of sheet stock.



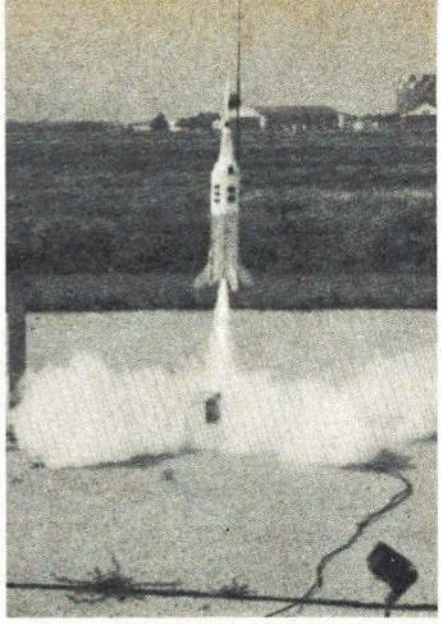
F-82 E TWIN MUSTANG

DESIGNED BY TERRY D. ALDRICH
DRAWN FOR A.M. BY FRANK PRZYBYLSKI

0 1" 2" 3" 4" 5" 6" 7" 8" 9" 10" 11" 12"
SCALE

West Coast modelers use Top Flite's Mono-Kote for finishing. Wide color choice; it gives a high gloss without the coat-after-coat routine. Bruce Williams' Astron Ranger gets a checkout by Mike Poss at table.

Pop go thin wings! A Boost Glider by V. Milbauer of Prague loses a wing panel (see the object near tail) at start of launch. This was the scene at the 1966 Czech national championships in Hradec Kralove.



Spectacular liftoff of a magnificent "Little Joe II" scale model by Al Kirchner. Photo made at Mitchell Field, N. Y. on Oct. 10, 1965. Model has taken trophies at two NARAMs. Powered by Class F engine.

COUNTDOWN

Scale Tips and Tech

G. HARRY STINE

MORE SCALE TIPS

HERE are a couple of little tricks or points to watch for when building scale model rockets.

Usually, a scale judge will knock off scale points if you have built your model with a joint in the body tube where no joint exists in the prototype body. In other words, if you have a scaler with a long, skinny body tube whose prototype also has a long, skinny body unbroken by welds or joints that are not normally visible, you should make your scaler with an unbroken body. If the body tube must be longer than any available commercial body tube, you can either roll-your-own (a difficult art at best) or join two sections of body tube with a ring coupler inside. The latter method requires that you fill and smooth the tube joint so that it can't be seen.

No matter how good a job you do on the finish of a body tube with a joint where it isn't supposed to be, the joint will show up after a couple of flights due to ordinary wear-and-tear on the model. A couple of kit scalers suffer from this joint-where-it-isn't-supposed-to-be problem.

Sometimes the gas emitted by the delay in an engine will discolor the boat-tail or fin trailing edges of a scaler after a few flights. Or your scaler may get dirty, particularly if you have a flat paint job. This delay charge discoloration or accumulated dirt can be easily removed with a Kleenex or a soft rag dampened with water. If you have a good finish on your model, wet weather or a damp rag shouldn't bother it at all.

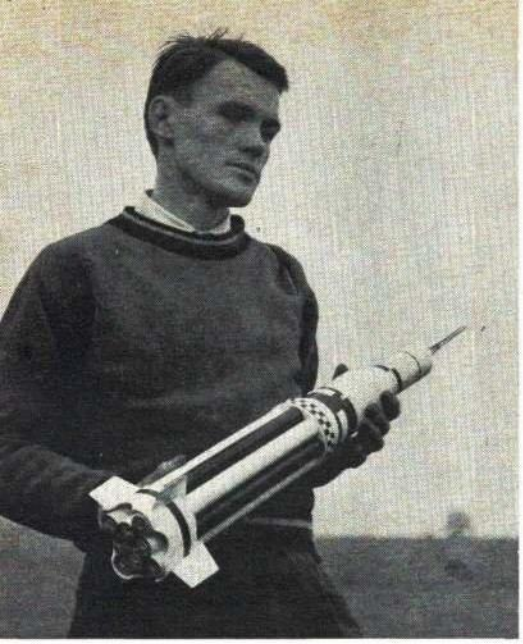
To eliminate marring the body tube on scale models with the shock cord installation, don't cut the tube. Glue the shock cord to the inner surface of the body tube using gauze reinforcement or the Estes-type paper reinforcement. On larger scale models, you can often attach the shock cord to the engine mount; use very fine, stranded flexible wire for this.

Sometimes, the rubber shock cord will cause the nose cone to rebound and strike the front end of the body tube. If an enamel paint job or a poor dope finish has been applied to the model, the finish chips off where the tube has been dinged by the rebounding nose cone. I've even had a rebouncing nose cone have a whole side split off by the front end of the body tube. The answer to this problem is to use a non-elastic shock cord. Strong cotton twine or string should be used, and it should be much thicker than shroud line cord. Don't use nylon; it may melt. Cotton cord has been found to be excellent. It should be a little bit longer than a standard rubber shock cord to give the nose cone time to slow down before it is snubbed and stopped by the cord. If you discover that you need a little bit of elasticity in the shock cord, use the bungee system shown on page 150, Figure 8-4, of the Second Edition, *The Handbook of Model Rocketry*.

IGNITION TIPS

For nearly instantaneous ignition of large Class F engines or for clusters, you can't beat the special igniter sold for 30 cents by Flight Systems, Inc. This is commonly known as an "electric match." It can be fired by flashlight batteries. But you must be very careful when using electric matches such as the FSI igniter. It is very sensitive! It will fire with milliamperes of current through it, not the amperes of current that we are usually required to slug to nichrome wire type igniters. A milliampere is a thousandth of an ampere! You must treat these super-sensitive igniters exactly as they do for the regular igniters used in professional rocket work. When inserting them into an engine, the two wires should be shorted to each other by wrapping the two bare ends of wire together. You should not install these igniters if somebody has a walkie-talkie transmitter turned on nearby; electromagnetic radiation may set it off, even though the leads are shorted together! In fact, store these electric matches in a closed steel box for just this reason. Your firing system has got to be good; you can't afford to have what is known as a "sneak current" in it — a trickle of current available even with the safety key out and the firing switch open. Check your system out for no-fire operation by hooking up an igniter-without-engine first. You do not want that thing to go while you are hooking it up!

When using FSI electric match igniters with firing systems incorporating an "arm light" wired across the firing switch to provide a continuity check, remove the light bulb. The amount of current that goes through the light bulb will not fire an ordinary nichrome igniter, but it will fire an FSI electric match. In other words, the



A super-scale engine cluster is seen on this carefully built Saturn I Block I model by R. Frydecky of Ostrava, Czechoslovakia. Cluster is assembled from eight ADAST model rocket engines.

niques

FSI job will go the instant you insert the safety key unless you take the bulb out of the circuit beforehand.

Here is another point to look out for when launching cluster-powered models: If you use paralleled nichrome igniters as specified in the instructions included with the kit, a "clip whip," and a regular firing system that uses a continuity check light wired across the firing switch, the fact that the continuity check light comes on when you insert the safety key does not assure you that all of your clips are properly attached for good electrical contact with the igniters. The continuity light will tell you that one of three things has happened: 1) you have good continuity through all igniters in the cluster, or 2) you have good continuity through at least one of the igniters, or 3) your system is shorted-out somewhere between the igniters and the firing switch.

In the case of 1, your cluster bird will probably ignite and liftoff properly. Case 3 means that the bird will not ignite at all and that you'll discharge your firing battery. Case 2 is the one to look out for; it means you are not going to get ignition on all engines in the cluster, and this could mean an underpowered liftoff, a pranged flight, or other hair-raising or hair-parting action on the part of the cluster model. This has been pointed out in a technical note to me by Mr. R. E. Depka, Technical Advisor of the Dreher Park Section of the NAR in West Palm Beach, Fla.

There are several ways to combat this cluster ignition problem. One sure and certain way to get your cluster bird off

Continued on page 60

model rocketeer
NATIONAL ASSOCIATION OF ROCKETRY
1239 Vermont Avenue NW, Washington, DC 20005
NAR

Coming up is 10th Nationals
Membership sets record

THE 10th National Model Rocket Championship Meet (NARAM-10) will be held at NASA's Wallops Station, August 19-23, 1968. James Barrowman, NARAM Section Advisor, has been selected as Contest Manager. About 100 contestants will be selected by the National Contest Board.

This is the second time the NARAM has been held at the NASA facility on the DelMarVa Peninsula, about 150 miles southeast of Washington, D. C.

Mr. Robert Krieger, Director of Wallops Station, is an avid supporter of model rocketry and served as a R and D judge at NARAM-6. The Wallops Island launch site is 10 miles from the main station which is the former Chincoteague NAS.

Housing will be provided on-site for the selected contestants and meet officials. There are a number of newly constructed motels within ten miles driving distance of Wallops Station.

An events list has been sent to all NAR members in a special Model Rocketeer supplement. Additional information on the meet obtainable from NAR Headquarters.

LEADER GROUP MOVES

The Leader Administrative Council is now preparing a comprehensive How-to-Do-It manual for section activities. LAC Manual Editor Jay Apt is hoping the manual can be made available by the time NARAM-10 begins in August. The LAC has also provided NAR Technical Services with copies of the newly revised NAR By-Laws. They will be available at very low cost from NARTS in the late spring.

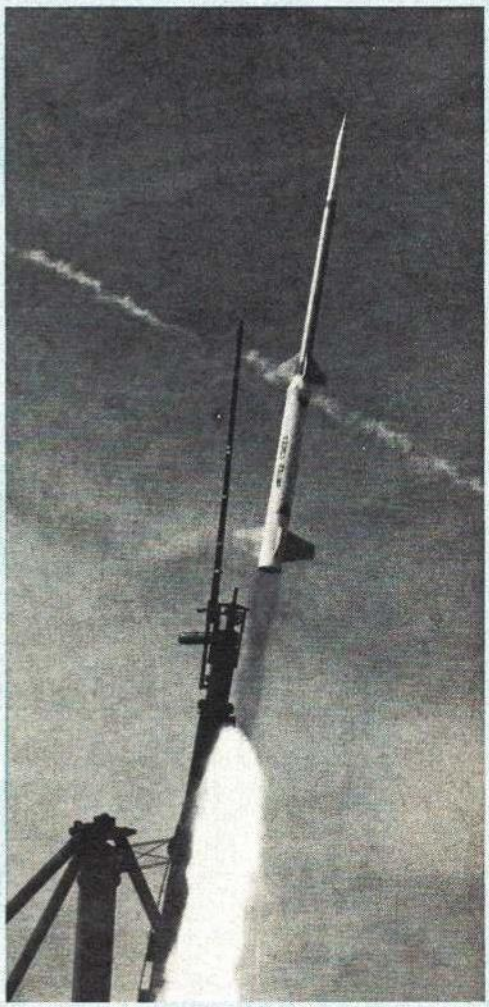
SCALE PLANS

A number of NAR sections are currently gathering data for submission to NARTS as scale data for model building. Don't ask when, since you will be notified in this column. It takes a great deal of time and effort to make this information available. Remember, all NAR members can obtain a list of NARTS model plans available, reports, supplies, etc. from NARTS. Write for a "Materials Available" form to NAR.

CONVENTION REPORT

Reports from the Pittsburgh convention will be printed in this space next month. A Board of Trustees meeting was held at the convention. This was the third convention sponsored by the Steel City Section and it appears that it will become a regular affair. The success of the convention was once again the direct result of good planning by the Steel City Section.

We will also have a report from the convention held at MIT. This was a college level meeting and was attended by numerous modelers who are working in the advanced areas of model rocketry.



Authentic details come easier after the examination of photographs of full-scale equipment. Pictures are easily obtained.

MEMBERSHIP REACHES NEW HIGH

As of March 1, 1968, NAR membership showed a remarkable growth over previous years. As of that time a large part of the 1967 members had not yet renewed and memberships were still pouring into Headquarters. Warm weather also brings a large amount of renewals. Remember, late membership only hurts you, in that you do not receive all yearly benefits. Renewal of all your section membership is important.

An Editorial

"This larger plane category was set up solely as a Goodyear 'beginner' event, to be flown by the less accomplished R/Cer."

HAVE felt right along that the "600" category of Goodyear racing was one for the common flyer, as opposed to those super hotshots who have become ecstatic over the smaller, much faster and harder to handle, 450 sq. in. category. We felt strongly enough on this matter, when the 600 was first demonstrated in the unofficial Goodyear Pylon races held at the Chi Nats in '66, to run the plans for the M-600 by Maxey Hester (Aug. 1967 A. M. — plans available from Hobby Helpers, Group #867, $1.75 plus postage).

Apparently the top Goodyear flyers felt the 600 suggestion was a threat to their beloved 450 category, and they did little to encourage 600 activity — to say the least. But not too long after Chi, the 450 cu. in. category was accepted as a provisional AMA event and, of course, was flown with great success, and a huge entry, at the '67 L. A. Nats (which is the real center of Goodyear interest in the U. S.). It is our understanding that the hot 450 flyers would probably never stoop to fly 600 planes, but why should they? This larger plane category was set up solely as a "beginner" Goodyear event, to be flown by the less-accomplished R/Cer, and especially by those who operate from rough grass fields.

A most interesting meeting of Goodyear flyers took place at the Buffalo Bison Midwinter R/C Conference. There were probably 26 flyers in attendance, including some of the top Goodyear (450 category) men in the East. Most of the meeting was devoted to discussing 600 matters, and just about everyone on hand agreed that if Goodyear was to be set up on a solid base, there woud *have* to be a category for the less experienced — and again most agreed that 600 was ideal. Hal deBolt, who is the area VP of the National Miniature Pylon Racing Assoc. (generally referred to as NMPRA) explained the new feeling of NMPRA officials toward the larger Goodyear planes, which are now officially termed the "Continental" category. The 450 cu. in. sized planes are considered the AMA "Scale" Pylon category now, while the Continental jobs are still in the provisional group of AMA events. We have noted for some months that the NMPRA News (official newsletter of the group) urges more activity in the Continental class.

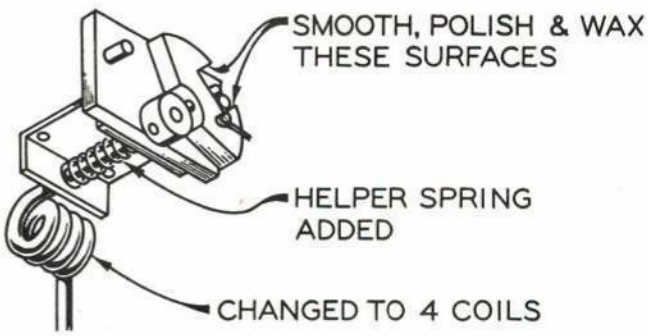
As was pointed out at the Buffalo meeting, you can't work up any interest in an event if there are no scheduled competitions for it. It was then early in the season and not many contests had been scheduled as yet, but we were assured that there would be a Continental event in the Flying Aces meet at Jamestown (N. Y.) Municipal Airport, June 15-16 — with at least $150 cash prizes to lure entrants. So there's the first Eastern event for this category, and we hope to hear of more in the East, where Goodyear in general has nowhere near the following it does in the Southwest. A check of the 1968 Racing Schedule in NMPRA News shows Continental events listed for Phoenix, Ariz. (Apr. 27-28); Turlock, Calif. (May 4-5); Long Beach, Calif. (June 22-23) and over Labor Day weekend at Memphis, Tenn. A very good beginning.

Now, what about planes. Aside from those who wish to design their own, there are several outs right now. The 600-M mentioned above is ideal. Then there is the Lanier Midget (this is really "instant Continental," for those who don't have time to build a conventional balsa plane!). Hal deBolt has worked out simple mods that will convert his rapid-build Jenny to an acceptable Continental with Buster or Bonzo outlines ($2 for plans and info). He has plans for a 600 design of his own, never published ($3.50 per set). And his Cobra, which will be marketed in kit form by the time you read this, has 640 sq. in. area, has gone through speed traps at 105 mph with a K&B 40; could be Continental possibilities here too.

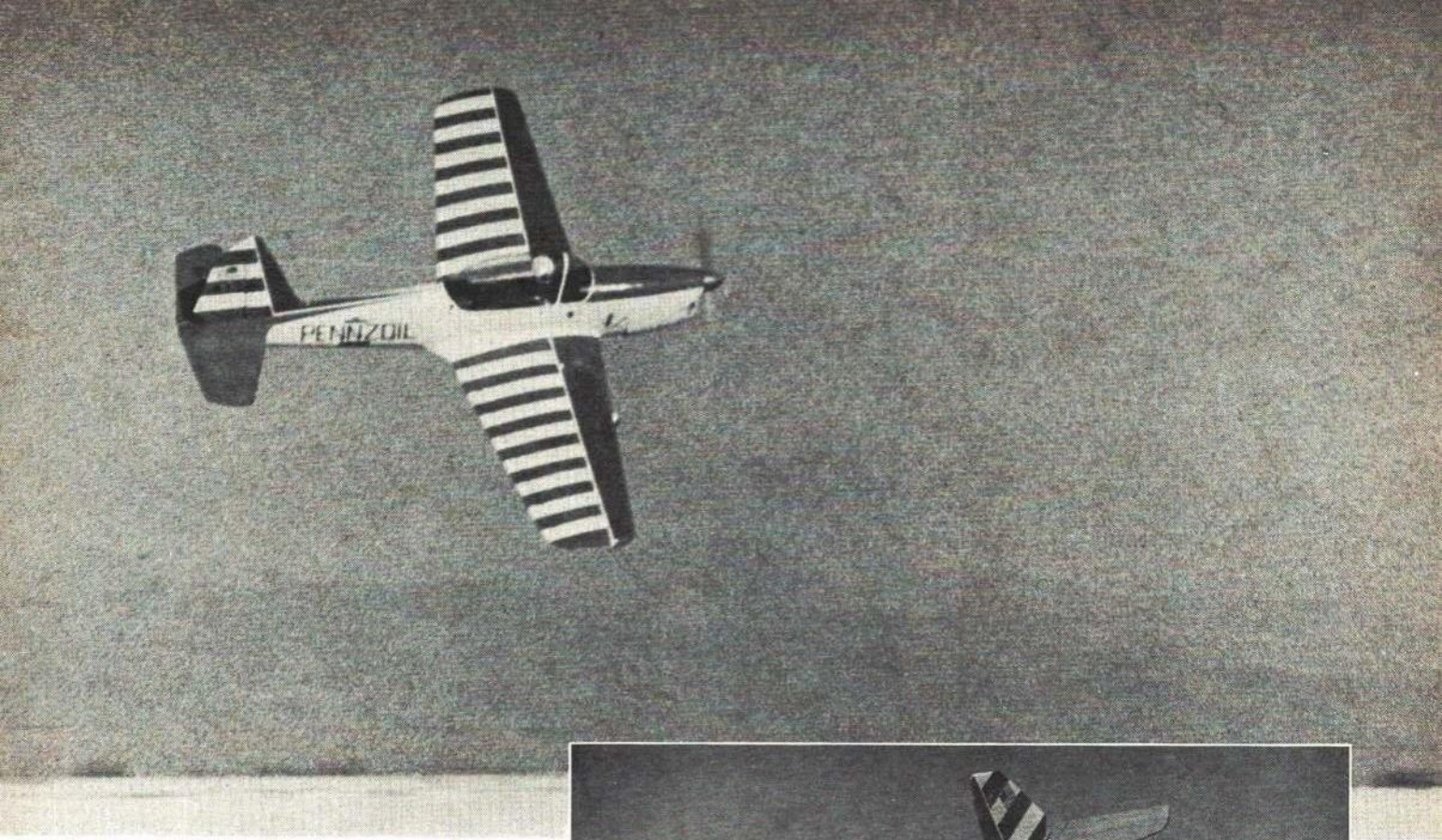
If a site and time can be found, a Continental race will be set up at the Olathe Nats by the NMPRA. So . . . those of you who would like to give Goodyear racing a try, with a more docile plane than the ultra hot 450's, events have been scheduled, planes and plans are available.

RADIO CONTROL WORLD

A ROUNDUP OF LATEST NEWS



B. K. Model Products retract gear modified by Martin Deitrich who uses them in two-wheel delta sport model.



CONDUCTED BY HOWARD MC ENTEE

Tom Roe.

Art Scholl's red, white, and blue aerobatic Chipmunk, makes a high-speed fly-by. Uses Bonner 4RS, strip ailerons, Kavan carburetor on its Veco-Lee 61. Finish is a high-gloss acrilic lacquer, well-polished. Weighs 6 lbs.

Where did 465 go? The first "license-exam-free" R/C spot made available by the FCC was 465 MHz; unfortunately, the transmitter specs were so tough that only two manufacturers ever obtained FCC approval of their transmitters. The 465 died out rapidly when the FCC opened up 27.255 MHz. We've wondered several times if new receivers couldn't be made with modern transistors (there are now plenty of low cost units that will work above 500 MHz), to get some of those old 465 transmitters back in service. The 465 MHz spot will be closed to hobby use as of Nov. 1, 1971, when it will be allocated to business paging services. But there is no reason why the old transmitters couldn't be shifted to the Amateur 420 mc band, with a little modification. R/Cers with ham licenses could then have practically an "interference-free" band in which to operate.

Modest changes to the tuned circuits and antennas of the transmitters should allow good output on 420 MHz; perhaps nickel-cad cells and a transistor DC converter would be a wise substitute for the A and B batteries. The receivers are more of a problem, but some experimentation should bring out possibilities here, especially on the Babcock, which had tuned AF filters. We'd like to hear results, if anyone cares to give it a try.

Dual output Controlaire: A simple modification to adapt a Controlaire 5 relayless receiver to operate an Adams actuator comes from John Phelps (7 Forester Rd., Liverpool, N. Y. 13088). It entails addition of only three parts to the existing receiver circuitry; only two pencells or three nickel-cads are required to drive the actuator.

Retractable gear mods: The BK Model Products retract gear units have been found highly satisfactory by Martin Dietrich (9690 SW Beaverton Hwy, Beaverton, Oreg. 97005), but he offers a couple of suggestions for their use. He will use them on a delta with two-wheel LG (plus a subfin) and since the prop is a pusher, the struts have to be 6" long, and they carry 3½" dia. wheels. Martin substituted four-turn coil springs on the BK units, since he found the original two coils didn't allow the wheels to flex back and touch the wing without bending the LG wire — and if this happens the wheels won't fold into their wells properly. With the long struts, a helper spring was found advisable, as shown; it is installed to aid the motor in raising the wheels, of course. LG operation was found much better if the surfaces shown were carefully smoothed and waxed.

Heart of the retract system is the servo drive, and a ServoAutomatic was found ideal for the purpose. It's a German Graupner unit marketed in this country by Polks Hobbies. It weighs a bit under 2 oz., is very compact, and has a 2400-1 gear ratio! There is plenty of power available for the task; the two wheels retract in 6 sec., and the servo draws 350 ma from 2.4 V. There is a slip clutch in the servo (which is intended for throttle actuation) and Martin found this clutch was the limiting factor in lifting the wheels — not the motor and gear train. So he tightened the clutch with light hammer blows until it didn't slip under this load. A disc was mounted on the servo output shaft in place of the lever it comes with; the servo had to be mounted so this disc was somewhat above the position shown on the BK instruction sheet, but operation is still fine. The original delta

weighs 6 lbs., has a Veco 45 with 10/6 pusher prop and an 8 oz. plastic tank. Plane has a music wire tail skid, but later model (which has the retract gear) will have a steerable subfin with a tiny wheel inset. However, the two wheel and skid job shows no tendency at all to groundloop, even though the wheels are 4" in front of the CG. M.D. thinks this is because everything is so short-coupled.

Linking GG for CAR! CAR means coupled-ailerons-rudder, and Michael Byrd (3601 Newport, Denver, Colo. 80207) suggests the linkage seen here for the purpose. Mike doesn't say whether he has flown such a system, but suggests Ny-Rod for the rudder and elevator linkages. An arrangement such as that depicted is asking that poor LR3 to do an awful lot of work, and all parts of the system must be practically friction-free. It would be necessary to utilize the free-est hinging you could find, and possibly music-wire pushrods would be preferable to Ny-Rod in this instance.

Trim servo setup: Still a flyer of reed equipment, Walt Watkins (RFD 1, Box 137, Eatontown, N. J. 07724) shows a trim servo arrangement he has used for some years. The main elevator servo is mounted so that it can pivot at the grommet end, as the 90-degree bellcrank is moved by the trim servo. The elevator servo is prevented from moving sideways by the single 4-40 screw covered with teflon tubing. As the bellcrank is moved, the right end of the servo slides up and down, which pushes the elevator linkage fore and aft a slight amount.

This idea is especially useful in a plane with narrow fuselage, such as the Senior Falcon; the rudder and elevator servos may be mounted side-by-side, with trim and throttle servos forward of them. Walt finds that if the servo is moved up and down $\frac{3}{32}$" ($\frac{3}{16}$" total movement) at the bellcrank end, he has ample trim action at the elevator. The horizontal bellcrank arm is cut so there is about $\frac{3}{8}$" between its pivot and the connection to the servo.

Short battery life: A note in newsletter of the East Bay Radio Controllers (Oakland, Calif.) by Dale Root might clear up some mysterious cases of short battery life, after batts have been fully charged. Root found some flyers were only getting 20-30 minutes life out of a set of cells that should be good for two or three hours air time. He suggests the trouble can be caused by restricting movement of a feedback servo at its limits (usually happens on the throttle servo) which causes it to jam up against the stops and draw considerable current because of the motor being stalled. Throttle linkage should be adjusted so the throttle reaches its full open position just a bit **after** the throttle stops moving in that direction. Since the control system spends most of its time with the throttle in high speed position, this will remove the overload at this end of the throttle servo travel.

At the idle end, some flyers install a spring, so the servo won't bang up against a solid stop, but will still move the throttle to full idle position. Root also points out that binding linkages, stiff hinging, stiff steerable nose gears and **any** mechanical drag can overload a servo, cause it to draw much higher than normal current, shorten motor life or damage motor drive transistors. Some of those servos which "fail for no good reason" could be a result of such misuse.

Not mandatory? Note in a recent R/C newsletter that the 50 mc spot frequencies suggested by the AMA are not mandatory is quite correct. But they are highly advisable. These spots were selected most carefully, with an idea to prevent interference between up to five super-hets on the 50 mc band, plus two super-regens. Many flyers may not know that they must not only stay clear of other **transmitter** frequencies, but they have to watch for receiver "image interference" as well; the latter is usually about 900 KHz lower than the transmitter frequency, and the AMA spots take this into account. There are all sorts of oddball frequencies being used on 50 mc these days, and planes are being shot down regularly. Use of the AMA suggested spots will help to prevent a lot of these crashes from "unknown" causes.

George Hickson.

This Boeing China Clipper, by Carrol Greenleaf, was seen at the Third Northwest Conference, which always brings out interesting outsized models. Four Super Tigre 56's. Can you imagine what an ROW takeoff would be like?

George Hickson.

Boeing P-26 by Gordon Jensen, also at Northwest Conference. Fiberglass fuselage, foam wing, Fox 74 engine. Authentic markings are beautifully done. An all-time favorite. Bjorn Karlstrom's 4-view on the centerspread gives colors.

COMPETITION FLYING

Tuned exhaust banned? The NMPRA has requested that the AMA ban tuned exhausts from the Goodyear event. No use of such tail pipes has been noted in R/C or Goodyear so far — but it could come. Since this is a safety proposal, it can be acted upon immediately by AMA and could be inserted in the rules for the 1968 season.

Because Goodyear racing is becoming a popular spectator sport, and exhibitions are often requested from R/C groups at aviation and other events, the NMPRA is setting up an Exhibition Pilots Division, composed of the top Goodyear flyers in the country, who, in the NMPRA view, are fully qualified to fly exhibitions with a maximum of safety. A tentative group of 29 pilots has been selected for the Charter Group, but not all are presently NMPRA members; membership must be obtained to be considered in the E. P. D. Application for membership in this exclusive group may be made through Bob Francis (1225 Buchanan, Santa Clara, Calif. 95051).

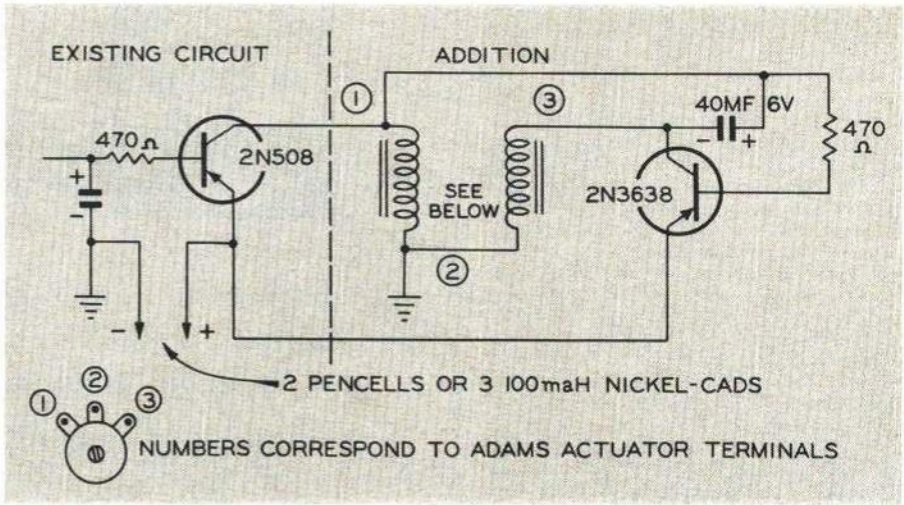
FAI seaplane trials: R/C Record trials originally scheduled for a spot in Michigan have been shifted to a pond near York, Pa., on May 4-5. Record tries will be conducted for duration and closed-course distance. There are no present FAI records in these categories. FAI stamp is needed on your AMA card for these events (stamps will be available at the flying site). Three fly-for-fun events will he held; closed-course race around pylons for five laps, and for ten laps, and an event for quickest takeoff and landing (which also includes a loop). No plane, equipment or other restrictions except AMA maximums on weight and engine size. Pre-registration required for the FAI trials, not for fun events. Write to CD Red Gunning (2303 Medford, Ann Arbor, Mich. 48104).

Novice meet: Noting that contest entries in the area are dropping off, The Rockaway Valley RCC has decided it's because less experienced flyers just don't want to fly against the hotshots, and they are doing something about it. Entry to their forthcoming meet will be open **only** to flyers who have not placed 1, 2 or 3 in an AMA-sanctioned meet in the past, regardless of whether they have flown as Novice or Expert. Flight time will be limited to eight minutes, with four min. to get airborne. Maneuvers will be modified from the 1967 AMA pattern. The old Classes II and III will be flown, with two flight lines in operation. Club hopes to enlist top flyers in area as judges, but several events for the judges are planned, too. Write to Bill Wardlow (9 Salem Drive, West, Whippany, N. J. 07981) for date and complete maneuvers list.

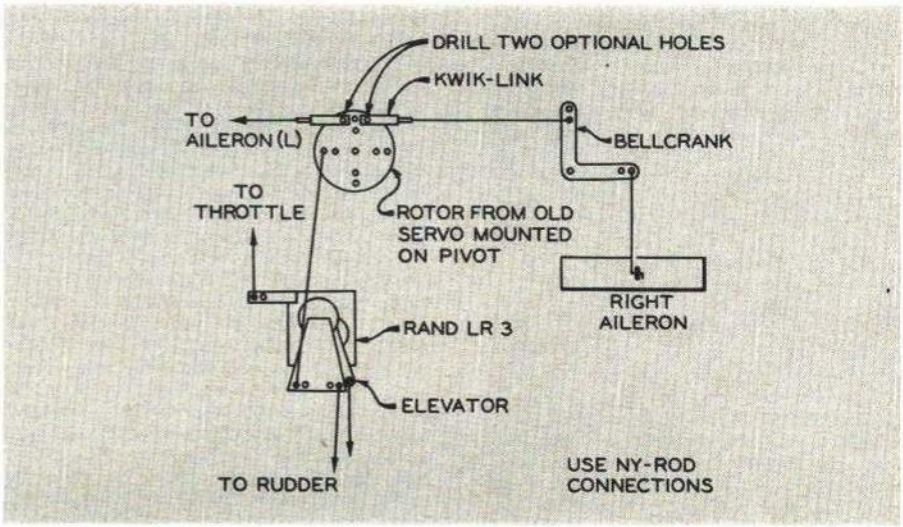
All-racing contest: The Flying Aces of Jamestown, N. Y. will hold a racing meet on June 15-16, including three pylon events and one for WW I scale planes. Three categories will be set up in Goodyear Pylon and Cabin Pylon, and the Continental Goodyear event is definitely scheduled. In both Goodyear and Cabin Pylon, experts will be pitted against experts, Sunday flyers against others in their class, and prizes will favor the less-experienced flyers.

There will be two classes of Open Pylon, possibly a special class for Sport flyers, if enough show up. Rules for WW I event not announced yet, but will favor flying and racing. Over $1000 in cash prizes already on hand, plus much added merchandise and trophies. Remember — the Sport flyers get the biggest share of it! Free barbecue for all entrants Saturday night. Only one entry fee for all events; use as many planes as you wish. This is an AMA-sanctioned meet. Further details: Bob Dart (Lakewood, N. Y. 14750).

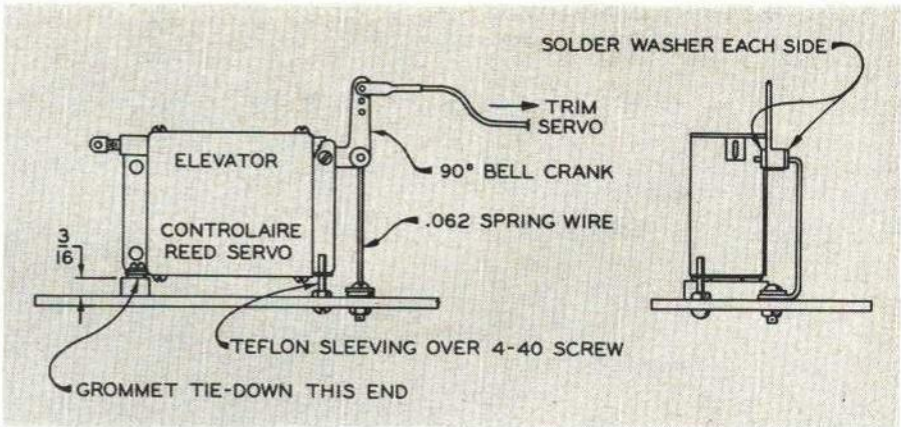
Carrier landing event: Since the meet to be sponsored by the Pensacola Aeromodelers on June 15-16 is being held at the "home of Naval aviation," the club will include a special Carrier Landing event, in addition to the regular AMA events in Stunt, Pylon and Scale (club will provide tail hooks for the Carrier event). Meet is held in conjunction with annual Fiesta of Five Flags, a Mardi Gras type affair honor-



John Phelps suggests this addition for Controlaire 5 receiver to operate an Adams magnetic actuator on one battery. As simple as you can get.



Coupled ailerons and rudder offer flying advantages with a Galloping Ghost servo. Michael Byrd uses Rand actuator; also applies to the Rand Dual Pak. See equipment review on pages 34 and 35 for more useful information.



There's always another way to skin a cat! Walt Watkins' clever method for achieving trim elevator action with a reed system. People do still fly reeds!

ing Pensacola's colorful history. The club is fortunate in being able to fly at Corry Field, formerly a basic flight training field for the Navy.

This AMA-chartered group has some 20 active flyers, just started publishing a newsletter (The Trim Tab). A club trainer plane has recently been put into service; it's a Tri-Squire fitted with Digitrio proportional, and under the supervision of the club flight instructor, Jim Owens. Spectators and R/C beginning flyers are invited to pilot the trainer at 50c a flight. Info on club and meet may be had from our informant, Capt. Russ Verbael (219 N. Madison, Pensacola, Fla. 32505).

Competition cars: In colder climates some groups turn to model cars in the winter to keep their R/C thumbs limbered up, but a new group on the West coast intends to race all year around. The Radio Operated Auto Racing Assoc. (625 S. Euclid, Anaheim, Calif. 92801) was formed to promote the racing of model cars with glow engines. Any size car may be raced, but they feel ⅛th scale (1½" to 1') is best, with 1/12th scale a second choice. It is hoped that local competition will be followed by a ROAR Nationals each year. The organization acts as a clearing house for members to disseminate info on obtaining components, on construction techniques etc., is preparing an 8 mm film on their activities. Many of the cars have clutches, some even have working gear boxes. Only superhets may be used, so several cars may be raced together. Engines are presently in the .09-.19 cu. in. range. ROAR publishes a newsletter, solicits inquiries to above address. One of their typical cars is pictured on page 34, March '68 issue of A. M.

CLUBS AND MODELERS

Third Northwest Conference: The affair sponsored by the RAMS (Seattle) appears to expand each year, and even though the Third Annual started out in heavy rain, it was a real success — again. Date was Feb. 3-4, place Tyee Motel (Olympia, Wash.). Our informant, George Hickson (11809 18th SW, Seattle 98146) ran R/C movies most all day Saturday, aided by his son and Paul Good. Planes on display, included one immense Boeing China Clipper. Manufacturers displays were sparse; the RAMS feel the R/C makers don't even know R/C is flown in the Northwest! Featured speaker was Phil Kraft, who gave a slide-illustrated talk on the 1967 R/C World Championships after the evening banquet.

Sunday dawned with beautiful weather and all hands headed for Olympia Airport to watch R/C demos. Trophies were awarded for some 11 different categories, with three places in many. Among the more unusual winners was **Best Of Show** by Clyde King, Portland Skynights (P-47); **Most Interesting Display,** Mike Ogilvie (fiberglass molding process); **Best Kit Modification,** Dave Katagiri of the RAMS (Sklarkenschmidt, a twin-engine takeoff of Skylark with WW II camouflage and markings); **New Construction Idea,** Bill Eldridge of Rams (fiberglass molding of Ryan STA fuselage). A Seattle modeler won the Bonner 4RS system that was raffled.

Interchangeable club membership: Interesting idea has been proposed by the Tucson RCC (seen in TRCC Noise, c/o Ken McDaniel, 4808 E. Fairmont, Tucson, Ariz. 85716). Their Executive Board voted to drop the club initiation fee for any member of another AMA-chartered club who moves to Tucson and wishes to join the TRCC. They suggest other chartered clubs give consideration to the same idea, and that clubs stamp the AMA cards of their members to indicate current club membership. They feel that AMA might even issue

Continued on page 55

Matched dual-rate

Citizen-Ship's new NPT transmitter and updated SSH receiver, combine with Rand's Dual Pak actuators for single-channel Galloping Ghost — and more sophisticated things!

SUPPOSEDLY the type designation (NPT) for the new Citizen-Ship Radio Corp. (Indianapolis, Ind. 46220) single-channel propo transmitter stands for "Nervous Proportional Transmitter." In any case, you shouldn't be nervous about it — we found it worked fine! It's intended for such single-channel propo uses as Galloping Ghost and the more sophisticated systems that operate on pulse rate-length changes — such as the Rand Dual-Pak.

The type NPT is a single-stick transmitter with trim levers for both controls. The trim levers operate in the same direction as the stick, thus avoiding confusion. It is housed in a case of rather small size, not too bulky to feel uncomfortable. The stick is on the right hand side of the case front, but is quite convenient for a lefty flyer to use. The case is held together with four screws, and when the back is removed, we see a rugged assembly of angles and partitions which holds the printed circuit plate very firmly. The battery compartment is such that the power supply is prevented from jouncing upward to damage any of the transmitter parts; a full width partition holds it near the case bottom. We don't know whether it was planned or not, but the rubber feet on the case bottom have large projections inside, which prevent the battery from banging up against the inner ends of the case assembly screws, and causing a possible battery short. The battery can't move to any extent, which prevents excessive strain on the leads to the snap connector.

Control stick assembly is identical to that used in the Citizen-Ship propo transmitters, and case size and general arrangement is about the same. This assembly is of the open type, has good feel and a centering arrangement that prevents applying any rudder action, for example, when you want just elevator. The stick itself may be removed to take less overall space, for shipping or carrying.

A big feature of the transmitter, which allows use for both normal GG and such systems as the Rand Dual-Pak, is an internal switch to alter the pulse rate range. There is also a control which varies the tone frequency over a range of 700 to 1400 cycles, to match a particular receiver. Two other small pots may be seen, but should not be varied from the factory setting, as there is considerable interaction between them. The transmitter may be adjusted to center position for various servos by simply loosening Allen screws that hold the control pot shafts — a quick and easy operation.

A most unusual feature is that while the transmitter is designed for use with a dry battery — and due to its long life nickel-cads really aren't required — there is a built-in charger. This is designed to charge the battery pack used in the plane, specifically, the battery that comes with the

Single-stick assembly is identical to that in Citizen-Ship's already marketed proportional transmitter. Note how Rand's dual actuators are arranged on single mounting plate.

Blue Ribbon Radio Control Equipment

pulse proportional system

Rand GG-Pak or Dual-Pak. With the transmitter you get a line cord with two connectors; one plugs into the back of the NPT, the other matches the Rand battery pack connectors. An internal lamp indicates when charging is taking place. The charger is designed to put out about 40-50 ma, for the Rand GG-Pak battery, which has 600 maH cells and which takes about 14 hours for a full charge. When utilized with the Dual-Pak cells (which have 1 AH capacity), full charge will be had in some 24 hours.

An FCC license form is packed with each NPT, and we are glad to see that as with all C-S instruction booklets, the one with this transmitter has a complete circuit diagram.

Transmitter specifications: Two-transistor RF circuit delivering RF power to antenna via an internal loading coil. Five further transistors utilized in pulser, tone and modulation circuits. Case front carries single stick for two propo controls, two push-buttons for high and low engine speed, two trim levers, on-off slide switch. Case size, less projections, 6⅞ x 5⅝ x 2¾" deep. Six-section antenna is 53" long extended, 9" collapsed. Weight with antenna and battery, 2¾ lb. Battery required, Eveready type 276 or equivalent 9V unit.

Model SSH-P receiver: This is the old familiar and very compact SSH super-het, with a few changes to better adapt it for high speed pulse operation. The main change is of one electrolytic capacitor; owners of the older SSH may have it updated at the factory for $4, or the vital capacitor may be had for them to make the changeover themselves, for $1.50. The SSH is no longer marketed. However, the newer version or the converted SSH may be used just as well as the original for operating an escapement in the 8-10 ohm resistance range. (Citizen-Ship models SE-2, PSN-2 or SE-2-M recommended, naturally!) A comparison between the old and new versions of the SSH shows a few transistor and small component changes, the new electrolytic capacitor (which is same size as the old) and a wire soldered from the top of the crystal case to an adjacent IF can.

This receiver is 7-transistor, 2-diode job of the relayless variety. The newer version comes with a connector to match the Rand Paks. However, the receiver has two battery minus leads, to accommodate battery supplies in either dry or nickel-cad types.

To figure out crystal frequency, subtract .455 from the transmitter crystal frequency. As an example, 27.145 Mhz (the transmitter frequency) minus .455 equals 26.690 Mhz, the crystal frequency required for the receiver.

Specifications, Model SSH-P receiver: This super-het measures 1⅞ x 1 1/16 x ¾" overall, weighs 1.15 oz. with connector. Single tuning adjustment to peak up antenna circuit (unless you are thoroughly familiar with such receivers, **do not** change the three colored screws in the IF cans). For 2.4-3V battery, use the black and yellow and the black lead connected together to battery minus; for 3.6-4.5V, use only the black lead (tape up the black and yellow). Suitable for driving escapements, or pulse circuits up to 20 CPS or so.

RAND DUAL PAK

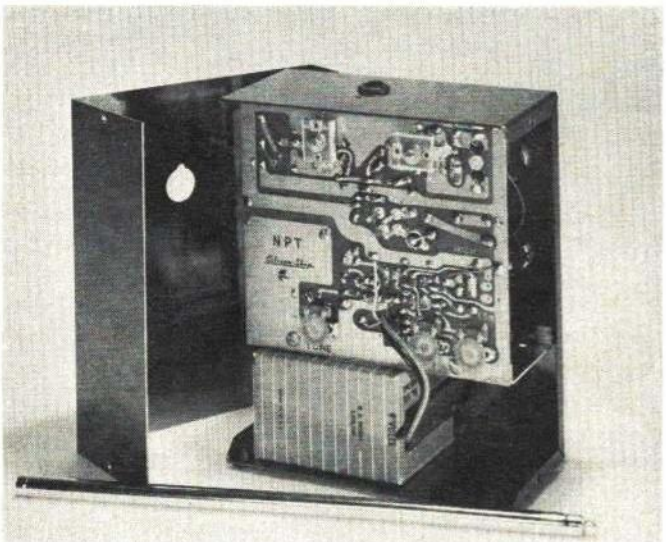
A more sophisticated simple proportional installation may be had by use of the Rand Mfg. Co. Inc. (Detroit 48228) Dual Pak, a logical follow-up to the GG-Pak announced earlier by this firm. The latter utilized a single Rand servo, mechanically akin to the Rand LR3, but with electronic switching built-in. The Dual-Pak outfit includes two servos, each with its own electronics. One servo handles rudder and engine throttle, is somewhat like the Rand HR-2. It has the same overall size, gear and lever arrangements, but the underside of the base plate has a protected compartment for quite a few circuit components. Linkage to rudder is from the top triangular-shaped plate, while the throttle is handled by an arm extending from the side of the unit. The latter is positionable by hand over a wide range, to match various throttle and linkage setups.

The second servo is mechanically similar to the Rand HR-1, but is also on the larger baseplate with underside electronics compartment. This one is for a single control, such as elevator, and operates via pulse rate variation from the receiver; the rudder-throttle servo is handled by pulse length changes.

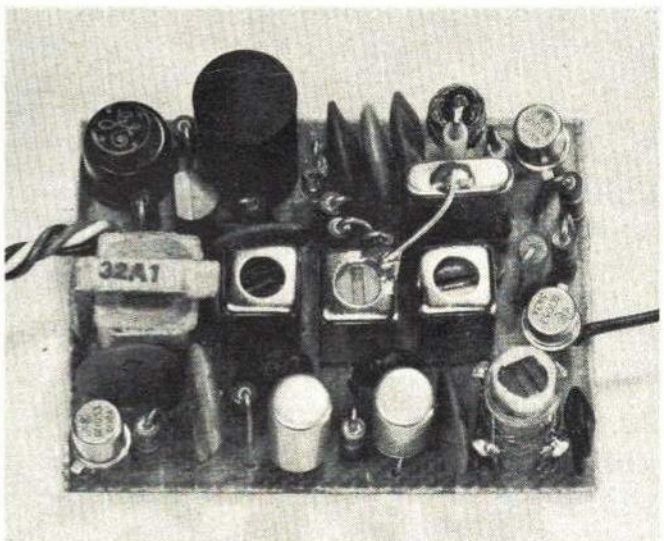
What does one gain with this added complication, over the plain LR-3, or the GG-Pak setup? You really gain a lot. Firstly, there is practically no interaction between the two servos, regardless of how the transmitter control stick may be held. Secondly, you have **full** servo power on each control surface. There is no sharing of power on the two surfaces from a single servo, as in GG. Thirdly, the pulse rate can be raised greatly, thus reducing to a minimum any dither of the control surfaces. These advantages mean your system will handle a plane much more like the multi propo rigs do it, and you can fly larger or faster planes with the Dual-Pak setup than with GG.

There is another advantage to the Dual-Pak. It comes fully wired up and ready to use; part of the wiring ends in a connector to mate with those on the receiver of several transmitter-receiver matched pairs that are marketed today, such as the Citizen-Ship NPT and SSH-P. In addition part of the wiring harness is an on-off switch, and a connector for the

Continued on page 62



Transmitter uses 9-volt dry battery but includes a charging circuit for the Rand airborne battery pack. This transmitter also compatible with the Simpro proportional system.



The old reliable SSH receiver has a few changes made for high-speed pulse operation. You can have older receivers updated at the factory for nominal charge of $4.00.

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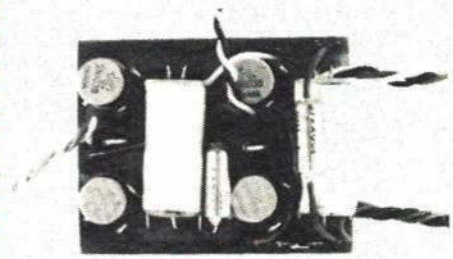


SIMPRO III KIT

The Simpro III kit above is a refinement of the earlier Simpro units which have appeared in American Modeler. The October 1967 issue contains full info on a relayless version for use with commercial actuators . . . Does away completely with any adjustments—and provides non-interacting rudder and elevator controls when used with the Ace Jansson or Sim-Plus transmitters, or most other GG transmitters. Motor control is achieved by full on and full off . . . The Simpro III makes into a compact unit. Measures 1½ x 1⅞ x ¾". Designed to work with most of the commercial proportional actuators available. Go-Around types are required for motor control. Compatible with Rand HR1 and HR2. Mini Max, Mini Max RM, Ghost, Airtrol, Bellamatics, and home made units built around Micro Mo motors. (NOTE: 1.8 ohm resistors required only for Micro Mo units are not furnished in kit.) . . . Kit contains reed units, all transistors and diodes, capacitors, resistors and an etched and drilled PC board to duplicate this fine decoder. Connectors not supplied.

No. 15K43—Simpro III Kit $27.75

Note—Simpro III systems require pulse rate of 15 to 25 pulses per second. Transmitter modification may be required.

SIMPRO III DECODER PACKAGE OFFERS

You've got a good GG system, and it's a lot of fun—but you have wished for something that performed as well, in a plane just a bit larger? Well, there's no reason to start from scratch—simply add the Simpro III decoder unit, along with the required actuators and mounting board, and you are there! The Simpro III decoder can be adapted to almost ANY existing simple GG system and provide you power enough for engines up to .45! . . . Extra cost is minimized since you can use your transmitter and receiver (relay or relayless), and with Simpro III, Rand HR1 and HR2, you have proportional Rudder, Elevator and positionable Motor Control. Packages include a special 3/64" mounting plate for the Rand units to simplify mounting—template for use with any servo is silk screened on. . . . Or, you have a GG system using the LR3. Use the LR3 as the rudder-motor servo, and add a Rand HR1 for elevator and you cut cost still more with our package #2. . . . The Simpro III decoder pulses fast enough so there is only a slight dither in rudder; elevator works only on command.

No. 15K1—Simpro III package #1: Contains Simpro III decoder kit as detailed above, Rand HR1 and HR2, and special 3/64" mounting plate for use with YOUR GG receiver and transmitter combination. A $65.00 value. . . . . Only $59.50

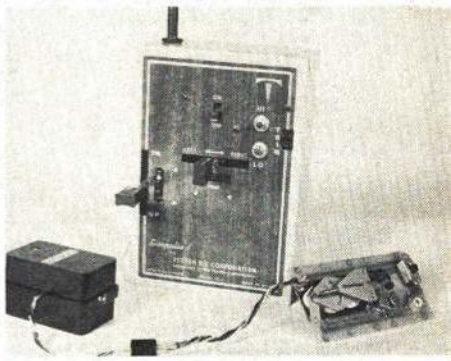
No. 15K2—Simpro II package #2: Contains Simpro III decoder kit as above, Rand HR1, special 3/64" mounting plate for use with your GG combo and your LR3. A $46.00 value. Only $41.50

Note—Simpro III systems require pulse rate of 15 to 25 pulses per second. Transmitter modification may be required.

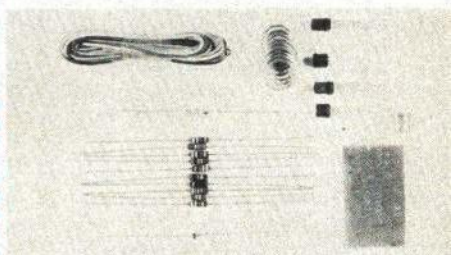
WHAT'S NEW AT ACE R/C

Among the many fine lines Ace represents—Coming the new Rand Decoder, MRC-Webra Engines, Diesel and Glo; Wright Electric Fuel Pump More-Craft Goodies, Wilhold White Glue (best b test), Epoxy Bond products, Jensen, Rocket City Micro Molding, and many, many more represent ing the BEST additions to our highly selectiv line.

NEW! COMING DICKERSON—TESTOR CONVERSION KITS



COMING SOON in pages of "American Aircraft Modeler" are Don Dickerson's conversion of the Testor Skyhawk for GG operation. Ace will have complete conversion kits for this. They will be available as soon as publication of this material is made in this magazine.



NEW! MARKS BASIC VERSAPULSER KIT

The Versapulser is a revolutionary design as up to date as tomorrow. Features a rate adjustmen that allows it to be used with ANY pulse system that is on the market today. It is linear over the entire range And no interaction pulse rate is completely variable from 2 to approximately 50 pulses per second. This means it can be used with magnetic actuators, Rand and other types of actuators, Rand Dual Paks, Simpro, and other decoders that require the faster pulsing, including the ones that use feedback servos. No other pulser is available today that is as capable o this broad rate change, and yet still feature com plete linearity and less interaction, than any pulser in use . . . Secret is a linear stabilizer which was developed by Fred Marks, and which is an Ace exclusive priority design . . . Basic ki is offered two ways so it may be easily adapted to any existing tone transmitter. With tone key in negative side (Mule, etc.), you need Mode NPN. With keying in positive leg (Commander Kraft, etc.), you need Model PNP . . . Basic ki contains all components such as resistors, capa citor, printed circuit board, all transistors and diodes. Base measures 1¾ x 11/16 inches, so it may be fitted into a very small space inside your case. Uses same 9 volt battery.

Versapulse Kit does not contain: Pots, switches or stick assembly. Pots required for the stick are 2.5K for width, 10K for rate, and 5K is required for rate adjustment.

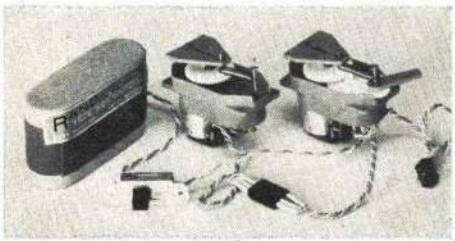
No. 15K49—Marks Basic Versapulser Kit, NPN $12.25.

No. 15K50—Marks Basic Versapulser Kit, PNP $10.75.

ACE-CLASSIC FULL SIZE PLANS

The UGLY STIK . . . designed by Phil Kraft, and originally called the Square Stik. By adding scal loped ailerons and scalloped elevators and semi-scale type rudder, this .45 to .65 propor tional test bed resembles the Fokker-Eindecke World War I plane. Features extremely fast con struction, and is designed as a proportiona trainer.

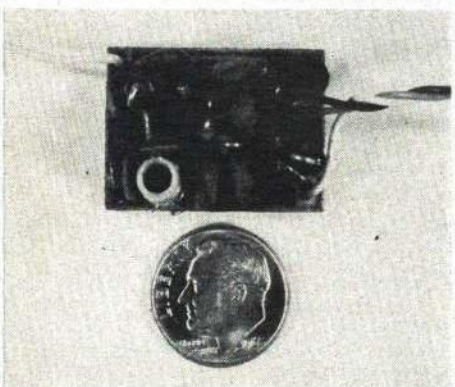
No. 13L108—Kraft's Ugly Stik, $3.00.



RAND FOR GG

Full line of Rand products for GG fans. We have the HR1, HR2, LR3, GG Pak and Dual Pak. These offer the modeller the finest approach to GG servos and decoders at the lowest cost and gives the most for your money—completely built . . . Our Simpro pack kits use Rand actuators; our Rand GG #1 uses the Rand GG unit. Our new Versapulser will adapt to either the Rand GG or the Dual. Also, the new Citizenship NPT and SSH-T TX and RX combos are adaptable for either GG or Dual. Our updated Jansson transmitter may be used with either Rand GG or Duals . . . We also carry **all** replacements for **all** Rand units in stock at **all** times. Also, **all** Rand rack items.

No. 15G46—Rand Dual Pak, 6PAK 6080, $75.00.
No. 15G40—Rand GG Pak, PAK, 6040, $39.90.
For complete listing see our new 1968 Handbook-Catalog.



NEW! ALBIN MICRO RECEIVER KIT

Would you believe a superregen receiver weighing just .2 oz? This Bill Albin kit design measures 13/16 x 1 1/16", uses silicon transistors, 1/8 watt resistors, micro mini caps, drilled 1/2" PC base. Single ended output for actuators of Bentert type.

While it is superregen, this kit will be used in applications where this is not too important. Makes indoor R/C a distinct possibility!

Recommended for those with some building experience, since small size makes care necessary. Not complicated, however.

No. 12K60—Albin Micro Receiver Kit, $12.95

NOW MORE-CRAFT

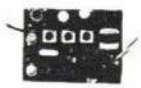
GOODIES

ARE GOODIER

And there are more of them! From Fair-its and Edge-its to T pins; from 4 and 6 pin connectors to finest grade hookup wire in ten different color packs; from breakaway motor mounts, base materials, nylon bolts, wing mounts, servo mounts to almost any other accessory not available from other sources. These are More-Craft Goodies—Now produced at Higginsville.

NEW! ACE GG PACKAGE!

Galloping Ghost Transmitter by Dick Janson 9 volt battery - Citizenship SSH Receiver and the new Rand GG pack, with batteries



If You are going GG—Go First Class—With ACE GG!

Now you can go First Class all the way with simple proportional on Galloping Ghost. Ace has pioneered in proportional for 14 years. This is a combination package that we believe takes the best of all of the components that are available and puts them into one first class package.

Start with the Galloping Ghost Transmitter by Dick Janson, which has been acknowledged as being one of the most versatile, couple this with a the new improved Citizenship SSH Receiver and the new Rand GG pack, with LR3 and new 600 ma GE sintered and vented batteries, and you have a winner! The package even includes a 9 volt battery for the transmitter—the dependable Mallory M1603. The Ace GG package is completely prewired and requires only installation in the plane. . . . Weight of the receiver with GG Pak, LR3, nickel cadmiums, and harness, hooked up ready to install is approximately 7 ounces, yet it has power enough to handle planes with engines up to .35. **Go First Class—Go Ace GG.**

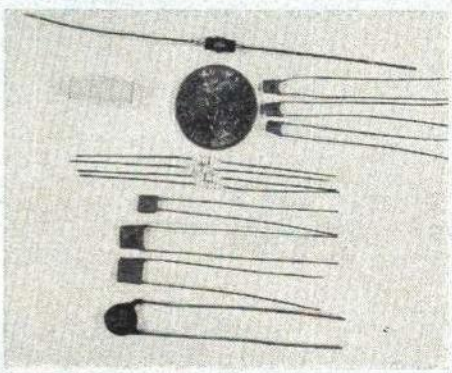
No. 10G1—Ace GG Package, ready to go with all batteries $129.50

VARI-CHARGER

The new Ace Vari-Charger is a most useful accessory—it will charge nickel cadmium batteries from 20 mils to 150 mils. It is capable of charging up to 12 volt packs . . . The dial is indexed, and an easy to read chart is furnished which enables you to set your milliamp reading for the battery pack size you are using . . . Completely isolated from the AC line supply . . . The unit is housed in a handsome Dakaware case which measures 3 25/32" long and 2 21/32" wide and is 1 15/32" deep. Metal cover is used and has an on-off switch. This is an extra deluxe item, using highest quality newly manufactured transformer, UL approved line cord, 500 milliamp diode, on-off switch, and full instructions.

Available in two forms, either as a kit and completely assembled.

No. 34K21—Ace Vari-Charger Assembled. $8.95
No. 34K22—Ace Vari-Charger Kit. $7.50



The dime in photo is a giant when compared to new R/C components/

MICRO MINIATURE COMPONENTS

Submini Capacitors. Extremely small, lightweight. Temperature compensated, close tolerance for R/C. Gulton and Erie.

No. 18K32— 10 UUF/N750 Gulton Disc, $ .28
No. 18K33— 15 UUF/NPO Gulton Disc, .28
No. 18K34— 27 UUF/NPO Gulton Disc, .28
No. 18K35— 39 UUF/N330 Gulton Disc, .28
No. 18K36—.01 UF/Erie 35V Trans-Cap, .25
No. 18K37—.02 UF/Erie 25V Trans-Cap, .25
No. 18K38—.05 UF/Erie 12V Trans-Cap, .25

Submini RF Choke. No. 17K51—22 UHY, $ .75

Submini Coil Form (Glass Tork). 3/16" diameter, epoxy, slug for up to 70 MC. Not wound. Must be cemented into base.
No. 17K52—Glass Tork Coil Form/Slug, $ .45

Submini Switch. Used in Testor Skyhawk. Is 1 x 13/32 inches.
No. 30K33—Continental-Wirt, DPDT Slide, $ .50

1/8 Watt Resistors, 10%.
No. 29K33 (Specify value), $ .25 each.
1K, 1.2K, 3.3K, 10K, 15K, 33K, 47K, 470K, 560K, 680K.

MORE THAN JUST A CATALOG FOR 1968!

Our 1968 version of the Ace R/C Catalog is also a handbook—has an R/C Glossary; How To Solder; Pulse Proportional Control for Rudder and GG, including Decoders; Schematic Symbols; Batteries and Charging, Resistor Color Code, Transistor Chart; Electric Motor Spec Chart and many more Data Sheets you will refer to again and again. Three holes punched, 8 1/2 x 11 in size, it is designed to be added to! Will fit special* Ace Binder, for permanently keeping any of your R/C instruction as well . . . In addition it lists all the latest Ace R/C Products and thousands of other R/C items and R/C accessories made by other manufacturers all over the world . . . Cost is only $1.00. BUT this is refundable on your first order! So actually the catalog costs you nothing. Your order also places your name on the Ace mailing list to receive regular additional R/C Data info, and newsletters . . . The Ace Handbook-Catalog is a must for the tinkerer, the Sunday and the sport flyer. We have served the R/C field since 1953 . . Send your catalog buck on a round trip today. You can't lose!

*Ace Virgin Vinyl Binder. For the protection of your Ace Catalog R/C instructions, data, news letters and much more! Only $2.00

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Address _____

City _____ State _____ Zip _____

QUANTITY	STOCK #	NAME OF ITEM	PRICE	TOTAL

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Guaranteed delivery anywhere. Orders over $3.00 sent prepaid. Orders under $3.00 please add 50¢ for postage and packing.

The Spirit of St. Louis

JOHN N. TOWNSLEY

Immortalized in Lindbergh's flight to Paris in 1927 the Ryan-built monoplane merits any collector's attention.

NEXT to the Kitty Hawk, the Spirit of St. Louis was the most important airplane in the development of aviation. In building the model you cannot help but realize the frailty of the small aircraft, particularly considering the monumental task it and its pilot performed. That the flight was accomplished solo — without benefit of radio or pressurized cabin — makes the accomplishment even more amazing.

The model in the article is built from a ¼" scale Lindberg kit (No. 520) which retails at 98¢. Hawk has a 1/72nd kit which sells for about 50¢ and AMT-Frog has a 1/72nd scale model in a three-plane kit, Ocean Pioneer Kit at $2.00 the set.

The Spirit of St. Louis was built by Ryan Aircraft Co., of San Diego, to Charles A. Lindbergh's specifications for the nonstop New York-to-Paris flight. It was stripped of all extras, yet designed to be airworthy enough to withstand the trip. The plane was constructed in 60 days with only a small working crew who were caught up with the "spirit" of the venture and Lindbergh's great enthusiasm.

This was no lark that Lindbergh was to embark upon — $25,000 was offered by a New York hotel man, Mr. Raymond Orteig, to be paid to the first pilot to fly nonstop from Paris to New York or New York to Paris. Many well known pilots with far more capital and experience than Lindbergh had the same idea. Some had tried and failed.

Early on the morning of May 20, 1927, a bad-weather day at Roosevelt Field, Long Island, "Slim" Lindbergh rolled his heavily loaded monoplane onto the rain-soaked turf. That it became airborne at all was no small miracle in itself — the 225-hp motor had to lift 5,130 pounds, about 750 pounds more than had ever been loaded into it before. On takeoff, the "Spirit of St. Louis" practically "bumped" its way into the sky, over hillocks, down dips, and up again on grassy knolls, barely clearing a shanty and a line of telegraph wires at the end of the 5,000-foot turf runway. After 33 hours and 30 minutes of gruelling, trail-blazing flight — 3,610 air-miles almost entirely over the hostile Atlantic, "The Lone Eagle" at the age of 25, landed at Le Bourget Airfield in Orly, France.

The hour was 10:21 on the evening of May 21, 1927. Some 20,000 Frenchmen had waited for hours to have a personal part in this most important achievement. The airfield was ablaze with searchlights and landing lights and, as the plane started to taxi back, thousands of the massed enthusiasts started running toward the aircraft.

As Lindbergh cut the motor, lifted one cramped leg out of the cockpit door and announced quite unnecessarily: "I am Charles Lindbergh!" the crowd surged past the military cordons in a frenzied effort to great him. Eager hands pulled him out of the aircraft, and bodily hoisted him aloft. For the next half-hour "Lindy" was alternately on the shoulders of the deliriously excited mob and rising and falling with the surge of the crowd, until it seemed that he was destined to have survived the hazardous flight, only to fall victim to the enthusiasm of the friendly French!

A neatly executed rescue was effected by a group of enterprising French military pilots on the scene, who had the wit to place Lindberg's leather helmet on an American correspondent covering the event, then pointing to him and shouting above the din: "Vive Lindbergh!" In the confusion, Myron T. Herrick, our American ambassador spirited Lindbergh away in a waiting car, while the hapless correspondent was pummeled and mauled, then protestingly whisked away to a reception for Lindbergh!

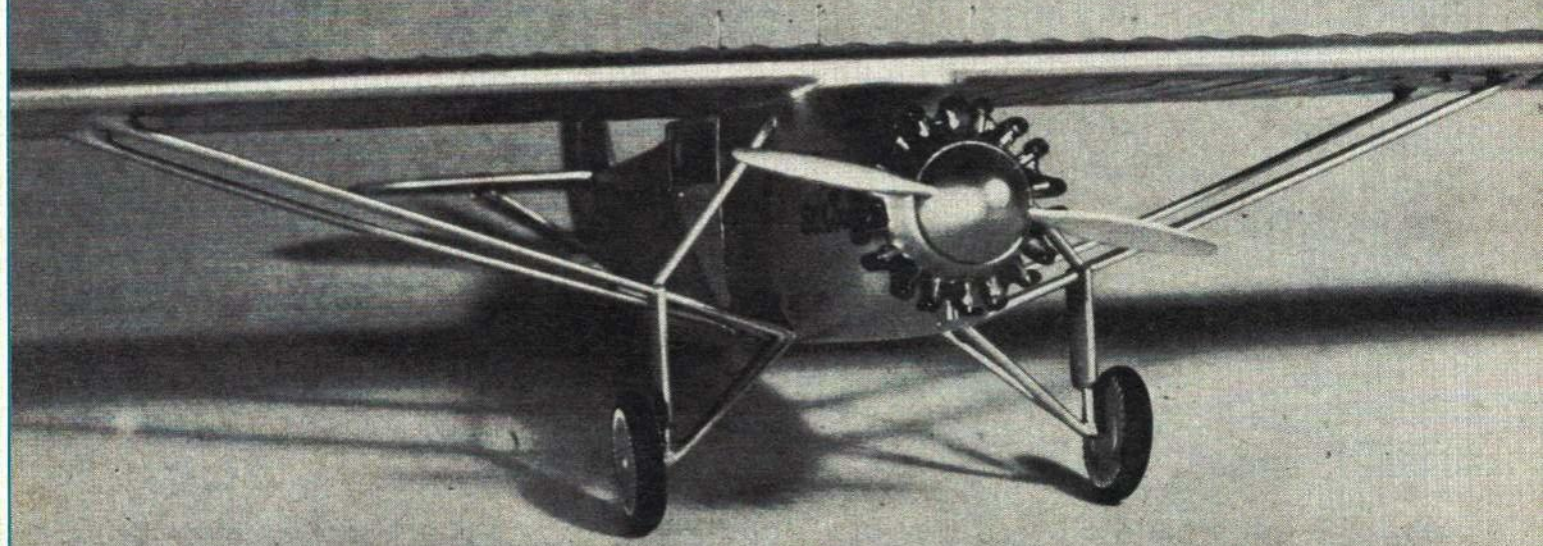
SPECIFICATIONS

Length: 27½ ft.; span: 46 ft.; wing area: 319 sq. ft.; gross weight: 5,130 lbs.; range: 4,110 miles; fuel capacity: 450 gals.; engine; Wright "Whirlwind" J-5-C; rated horsepower: 225 hp; total engine displacement: 788 cu. in.; compression ratio: 5.2 to 1; actual flight distance, New York-Paris: 3,610 mi.; elapsed flying time: 33 hrs., 30 min.; average ground speed: 107.75 mph.; ground adjustable propeller of Duraluminum: 8 ft. 9 in., manufactured by the Standard Propeller Co.

Color Scheme: Plane is aluminum color and from struts forward to motor, panels are of a circular, machined pattern. The "Spirit" is one plane that can be assembled and sprayed in one piece, except for the engine cylinders which are painted black.

Continued on page 69

Aluminum in color, this aircraft can be assembled and spray-painted in one piece.



TOP FLITE

Introduces Brand New

SUPER MONOKOTE™

(Patent Pend.)

*The **NEW, IMPROVED** Covering with the Built-in Finish*

TESTED AND ACCLAIMED BY MANY OF THE WORLD'S BEST KNOWN MODELERS

Maynard Hill

SUPERB FINISH IN FRACTION OF TIME

Super MonoKote is a modern material that will be widely used on all types of models. It is easy to apply, durable and provides a superb finish in a fraction of the time needed for conventional methods.

Ken Willard

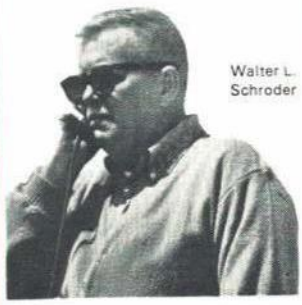
TOUGH . . . FUELPROOF . . . EASY TO CLEAN

Super MonoKote covers a model easier and faster than any other covering material, yet it gives your model a high gloss, professional appearing finish that you can be proud of. It's strong and tough, easy to clean, fuelproof, and simplifies patching over repair jobs. I now use Super MonoKote on all my models, and recommend it.

Dr. Walt Good

A TRULY BEAUTIFUL FINISH

The new Super MonoKote has given my Aeromaster biplane a truly beautiful finish. The dry nature of the undercoating and the thinness of the film make it very easy to apply, even around sharp corners. I highly recommend Super MonoKote to the modeler who wants a beautiful finish in the shortest time.



Walter L. Schroder

DOES EVERYTHING A COVERING SHOULD

When asked why I liked working with the new Super MonoKote, my answer was simple and direct, "Its new dry adhesive makes it the simplest material to cover with that I have used as yet. It works evenly and smoothly around corners and curves and when shrunk, it *holds its tautness.*" When a covering material does all it is required to do and then adds a bonus of a fine-looking, colorful machine, it rates tops in my shop.

Dale Willoughby

STAYS TIGHT OVER OPEN FRAME

Super MonoKote has been tested for over a year on my radio controlled gliders. The red and orange colors in one mill thickness applied over open framework on both wings and tail surfaces were repeatedly exposed to extremes in heat and cold, but showed no creeping nor wrinkling tendencies. I consider Super MonoKote to be the best all-round model covering material and my choice for the "BIG SAILOR," a radio controlled glider design created for World Records Trials.

Don Dewey

COVERS COMPOUND CURVES WITH EASE

There is absolutely no question that Super MonoKote is the fastest known method of finishing a model aircraft. Super M-K is easy to apply, adheres uniformly and covers compound curves with extreme ease. RCM does not hesitate to put its tested, approved and recommended stamp on this new material from Top Flite.

William C. Northrop, Jr.

NO WRINKLING . . . NO SLIPPAGE

With the development of Super MonoKote, Top Flite has at last fulfilled *all* of the requirements for a one-shot model airplane covering material. There is no wrinkling, no slippage, no softening of the adhesive by glo fuel, no "fly paper" stickiness while handling. Having tested Super MonoKote for more than a year, I'm sure that like me, once you've tried it, there'll be no returning to outmoded covering and finishing methods.

Dario Brisighella

SAVES TIME AND WEIGHT

I'm careful and finicky about finishing my planes. It usually takes me 30 to 40 days (about 4 hours per day) to cover and finish with silk and dope. Using Super MonoKote I can cut this down to 7 days . . . less than ¼ the time. Another big advantage is a weight savings of about 1 lb. 3 oz. on my biplane. I'm sold on Super MonoKote . . . it's great!

TOP FLITE MODELS, INC. 2635 S. WABASH CHICAGO 16, ILL.

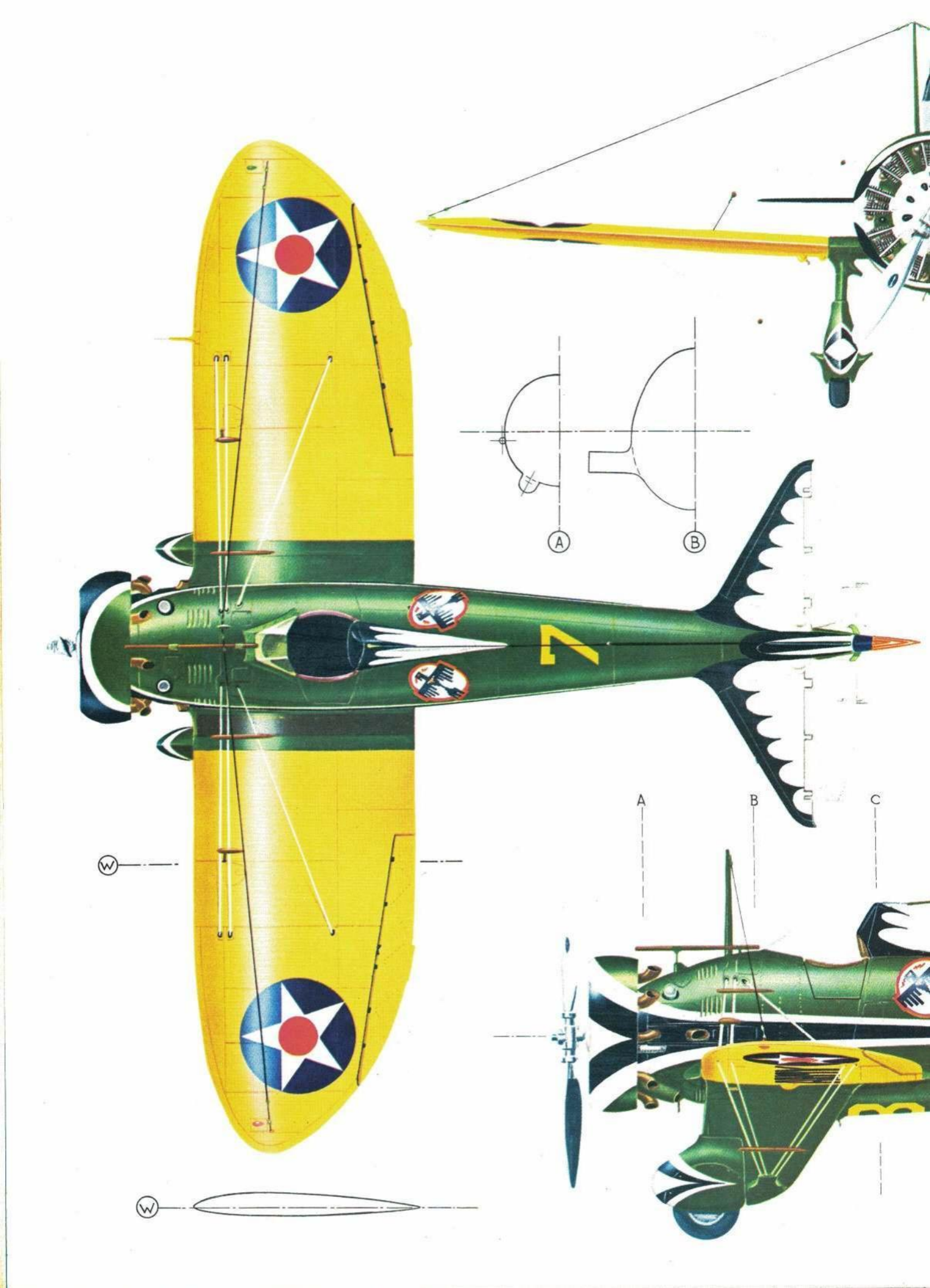
New Super MonoKote, because of its dry adhesive backing, will not adhere to itself. It's fast, simple to apply, and is easier to work around compound curves. Another important benefit of new Super MonoKote lies in the fact that it comes in rolls 26" wide and can be purchased by the running foot.

AVAILABLE AT ALL LEADING HOBBY SHOPS

NEW SUPER MONOKOTE IS AVAILABLE IN 6 ULTRA HIGH-GLOSS FINISHES

only $1.35 per running foot 26" width

International Orange
Piper Yellow
Missile Red
Mustang Aluminum
Sky Blue
Jet White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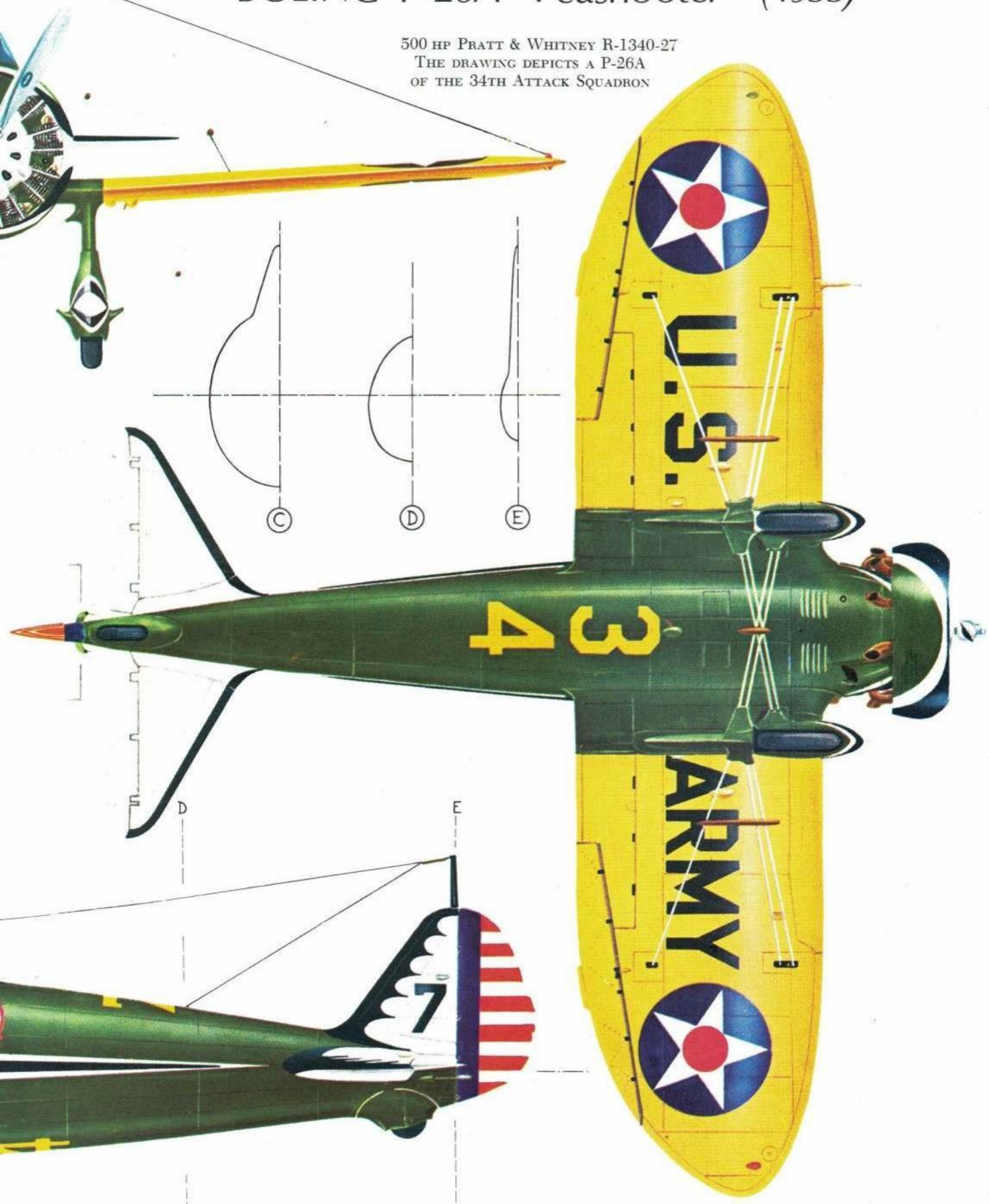
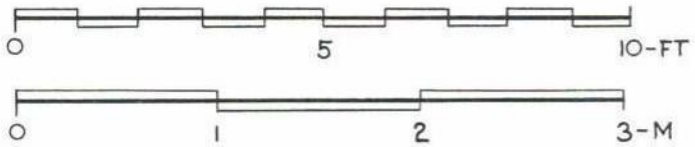
BOEING P-26A "Peashooter" (1933)

500 HP PRATT & WHITNEY R-1340-27
THE DRAWING DEPICTS A P-26A
OF THE 34TH ATTACK SQUADRON





BJÖRN KARLSTRÖM

HALLCO Adds "EXPANDIBILITY"

NEW NEW

HALLCO "STEADY GHOST"

AVAILABLE NOW

HALLCO 103 Galloping Ghost system is now expandable to a high-rate / dual-servo system (Steady Ghost). The HALLCO 20 add-on electronic decoder will convert your 103 system for as low as $33.50. Only two easy steps are required to modify the systems already out.

FLIGHT NOTES:

I test fly all the new systems myself and flew .30 powered "TriSquire" and "Champ" models with our HALLCO 123 system and had very satisfactory control.

Of course I still believe our HALLCO 103 Galloping Ghost, pulsing surfaces and all, does a fine job with suitable models up to .15-19 engines. (Ask the man who flies one.) However those flapping surfaces seem to bother many people even though the flapping does not bother the model AT ALL. Therefore, here is an easy way to stop being bothered and to increase the capacity of the HALLCO 103 System as well. ——— Bill Hall.

NOW YOU CAN:

* Start with the reliable and easy to install HALLCO 103 Galloping Ghost system at a low initial cost, and then expand when you wish.
* Fly smaller models with Galloping Ghost system.
* Fly bigger faster models without interaction between rudder and elevator with Steady Ghost.
* Easily change GALLOPING / STEADY GHOST back & forth and obtain full performance from either version.
* ALSO YOU CAN add the HALLCO 20 to most any centertapped powered system, relay or relayless, using the LR3 Actuator.

"GALLOPING" / "STEADY" GHOST AVAILABLE AS FOLLOWS:

UNIT	PLAN DIMENSIONS	SYSTEM FLYING WEIGHT	BATTERY CELL CAPACITY (4.8 / 2.4 V)	SAFE FLYING TIME	BATTERY PACK SUPPLIED	SUGGESTED LIST PRICE
HALLCO 103	1.85 x 5.4	6.8 oz.	500 mah	105 Min.	500 mah	$134.50
HALLCO 20	1.85 x 2.25 (Separate) or 1.85 x 7.25 (Attached)	8.7 oz.	500 mah	35 Min.	None	33.50
		12 oz.	1000 mah	80 Min.	1000 mah	49.50
HALLCO 103 and 20 (ordered together)	1.85 x 7.25 (Attached)	12 oz.	1000 mah	80 Min.	1000 mah	171.00
HALLCO 123 Side/Side Servos	2.30 x 5.4 (One Piece)	12 oz.	1000 mah	80 Min.	1000 mah	171.00

Send 50¢ for our NEW Galloping Ghost / Steady Ghost Manual, Flight Notes and Technical Data.

NEW ALSO! We have added an EXTRA large gear for King Size models.

Temper-Lock LANDING GEARS

	Hallco Part No.	Thickness and Mounting Surface	Approx. Tread	Axle Size	Suggested Model Wt (lbs)	Price
Medium Duty Models:	B105-1	.040 x 1 x 2	7.0"	6-32	Under 1.7	$2.95
	B105-2	.050 x 1.1 x 2.5	8.7	6-32	1.7 to 2.7	3.25
	B105-3	.060 x 1.2 x 3	10.3	8-32	2.7 to 3.5	3.55
	B105-4	.080 x 1.5 x 3.2	12.8	8-32	3.5 to 4.5	3.95
	B105-5	.100 x 2 x 3.5	15.0	8-32	4.5 to 6.0	4.25
Heavy Duty Models:	B106-3	.080 x 1.2 x 3	10.3	8-32	3.5 to 4.5	3.80
	B106-4	.100 x 1.5 x 3.2	12.8	8-32	4.5 to 6.0	4.25 NEW SIZE
	B106-5	.125 x 2 x 3.5	15.0	8-32	6.0 to 8.0	4.75
	B106-6	.125 x 2.5 x 4	18.0	10-32	8.0 to 10.0	5.75

See your dealer. If not available, write direct; prices postpaid. Ohio residents add 4% Specify black or clear L.G.

HALLCO PRODUCTS, INC. DEPT. A ··· 416 EAST WATER ST. ··· URBANA, OHIO 43078

Alex and Marlene Chisholm, Fresno, who have devoted much time to model promotion work. Alex flies all events. And that Aeromaster was built by Marlene!

On the Coast

What happens 'out there' can shake up your R/C life.

With Jerry Nelson.

NCRCS/SCRC² MEETING

THE Northern California and Southern California R/C clubs held their annual meeting at Madera to determine the dates for this year's R/C activity calender. There will be over 30 organized contests, fly-ins, and special events. Highlights of the year's activity will be the West Coast Championships in Long Beach during the Labor Day weekend, Aug. 31, Sept. 2. New events will probably be added later in year. Contact Joe Bridi, 23625 Pineforest Lane, Harbor City, Calif. (Southern Calif.), or Sam Crawford, 65 Maplewood Dr., San Rafael, Calif. (Northern Calif.). Or contact me at 8638 Patterson Pass Rd., Livermore, Calif.

Every kind of modeling event is scheduled. Gliders, World War I, FAI Stunt, Pylon racing, fun contests, you name it and, somewhere in California, there will be a contest for your interests.

I really enjoy the fly-ins. These meets are strictly informal. The pressure of competition isn't there. People are friendly and very helpful if you have a problem on which you would like advice. Even if you could not care less about contests, try attending the fly-ins. You will like them, I'm sure.

R/C GLIDER ASSOCIATION

Quite a bit of interest has developed during the last two years within the R/C Glider sport, enough in fact to justify the formation of an R/C Glider association in principle much like the NMPRA (pylon racing organization).

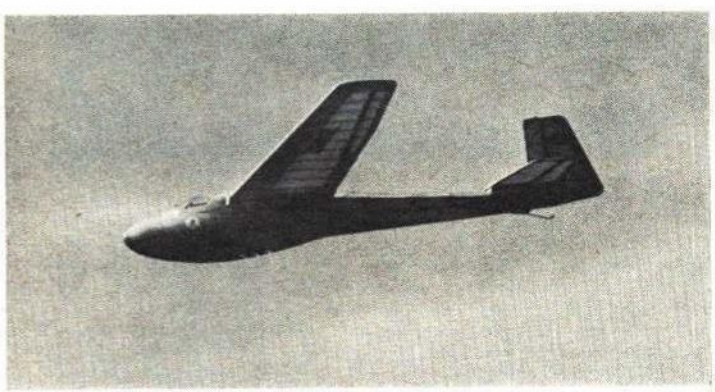
During last year's contest board meetings, Dale Willoughby was appointed chairman of this new organization, which will be the recognized R/C glider advisory group to the AMA. What this group decides will have strong bearing on AMA's actions towards future glider regulations and promotional aspects of the sport.

Tentative rules have been established. These are preliminary rules and no doubt there will be changes as experience dictates. Basically we have the following rules: 1) Two classes of R/C Gliders: Standard, up to 100" wing span — Open, over 100" wing span; 2) Controls: No limitations; 3) Wing loading: Min. 5 oz./100 sq. in. of wing area — Max. 15 oz./100 sq. in. of

Continued on page 65

Flight-line activity prior to meeting of NCRCS/SCRC² meeting at Madera. Will run over 30 contests, topped by West Coast Championships over Labor Day weekend.

Tuning the K&B 40 on his modified Shoestring racer is Ed Snipe, president of the NMPRA. This organization is selecting group of skilled, exhibition pilots.

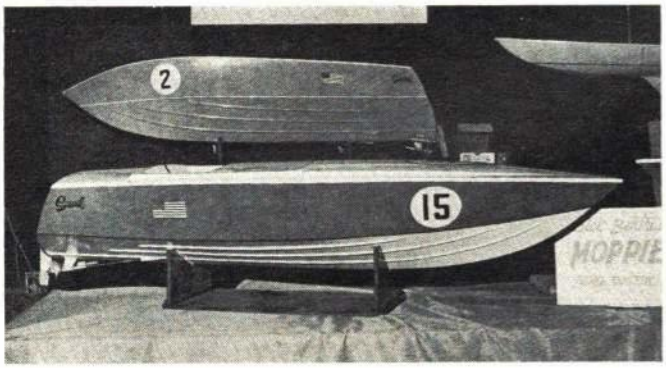


Great to learn on, says Jerry of this Zugvogel glider, flown by Lloyd Connelly. Had over 150 flights when picture taken. Has rudder, aileron, and rudder controls.

"CHECKED AT TOLEDO"

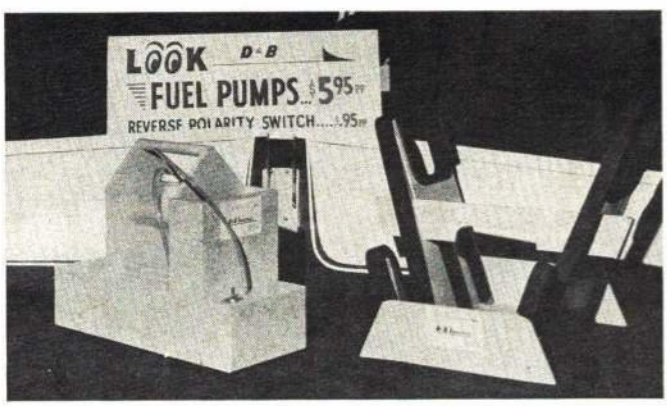
NEW PRODUCTS CHECK LIST

Write the manufacturers for more data; tell them, "I saw it in American Aircraft Modeler."



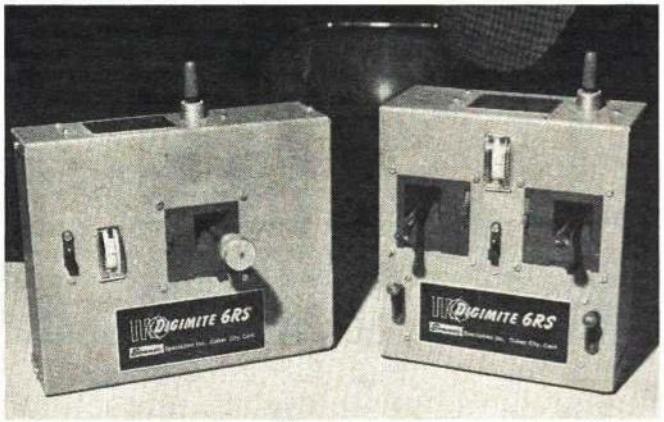
One Design Electronic Models/Moppie. These makers of the "Half Meter" model sailing yacht, now produce a model ocean racing power boat. Semi-scale version of Dick Bertram's famous "Moppie," the fiberglass model is potent looking. It's big too — length overall is 5'-3" and the beam is 19". A 1/6th replica of the full-size boat; it weighs about 12 lbs. empty. Install most any chain saw engine. The show model had two O&R engines with power trains and clutches, and there was still room to spare. One Design's experience in 'glass construction is evident in the excellent finish. Moppie comes in several kit packages — and fully assembled too. Basic kit consists of hull, deck and hatch in color but unassembled for $99.50. With one O&R engine — all power train components and prop included — this jumps to $215. Two engines increase the cost to $305. Several accessories are available, too. Request the data sheet, make your choice of color and equipment desired: ONE DESIGN ELECTRONIC MODELS, INC., 3100 E. Washington St., Rte. 37, Toms River, N. J. 08753.

Du-Bro Products/Aero Commander 100. Big attraction at the Du-Bro booth was this semi-scale, Almost-Ready-to-Fly, R/C model. It's a first for Dewey Broberg and Du-Bro. The wing and stabilizer have foam cores. Servo rails and a fuel tank mount are installed in the vacuum-formed plastic fuselage. Little time or effort is needed to get airborne. Epoxy the wing halves together. Bolt landing gear to fuselage and add engine with radial mount — then cowl. Attach tail group after hinging the rudder and elevator. Apply your favorite finish (two coats will seal the wing and stab. covering) and trim. Primarily designed for Galloping Ghost, the 49" span model will take a multi installation. Strip ailerons can be added. Use engines .15 to .19 in size; wing area is 380 sq. in. Total flying weight — radio too — will be 3 lbs. 12 oz. Kit price is $34.95. Query: DU-BRO PRODUCTS, 7667 Milwaukee Ave., Niles, Ill. 60648.



D & B Industries/Field Equipment. Ray Davis and Paul Bartels (that's the D & B) produce a field box designed to take the effort out of flying. It has a built-in, constant displacement, 6V. fuel pump with switch. The pump rate is 10 oz. per minute. The box (at left) will hold a gallon jug plus props, tools, a starting battery and other small items. Its finish is fuel-proof, too. A 90 day guarantee applies to the pump and switch. Price is $19.95. Pump and switch can be purchased separately at $5.95 and 95c respectively. D & B's airplane carrier will accommodate a contest-sized R/C ship plus transmitter and accessory items. Make only one trip from the car to the airstrip! Loaded, the carrier is only 14" high; it's low enough to fit in a standard size auto trunk. Price for this is $8.95. Write: D & B INDUSTRIES, 3655 Calumet Rd., Decatur, Georgia 30032.

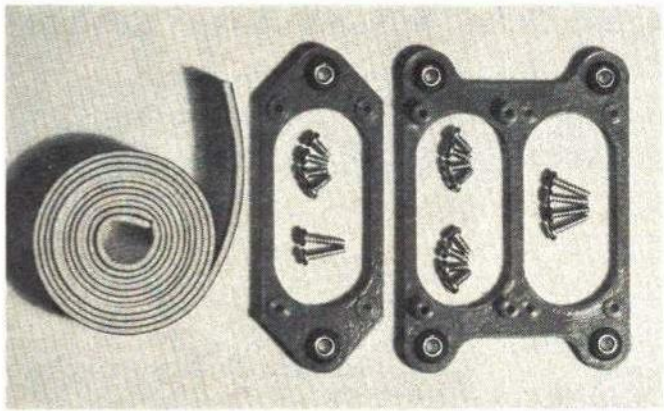
Wing Mfg./A6M2 Zero. Ralph Andrae (left) and Ted Camis display Wing's first R/C kit model. Their deluxe, SUPER-FAB kit includes: a one-piece fiberglass fuselage with firewall and molded-in fillets; foam wing core with landing gear mounts and a balsa skin; a covered, foam stabilizer core; formed cowl section with flaps; molded wing and stabilizer tips, elevator, rudder, air intake scoop, canopy with its framework structure; Posi-Tract retractable landing gear and actuator switch plus many other components. Wing claims: less than eight hours construction time result in an exact scale, highly detailed model. Span is 59"; area is 560 sq. in. and flying weight — 6 lbs. Scale is 1½" to the foot. Kit price is $89.95. Write: WING MFG., P. O. Box 44, Morton Grove, Ill. 60053.



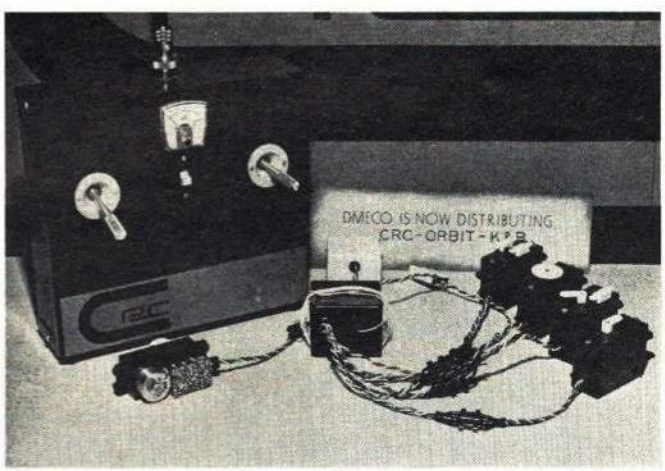
Bonner Specialties/Digimite 6RS. Bonner used the proven circuitry of their 4RS in producing this digital propo system. "More channels per cubic inch," is the claim. The standard size transmitter layout is used (see unit at right) with the two, auxiliary controls located in the bottom corners. Receiver size has not changed from the 4RS either; and same servos are used, too. Total airborne weight with four servos is 14.4 oz.; with six servos — 18.8 oz. Price of the 6RS with four servos is $425. Add $15 to this if 52 or 72 MHz. frequencies desired. What attracted a great deal of attention at the show is the unit at the left — a single-stick 6RS prototype. No firm price was announced, though the production model would probably cost about $40 more. Transmitter case is different in shape, but overall volume is same as the standard. The stick has a trim function built into the knob! Single-stick will also be available in the four channel. BONNER SPECIALTIES, INC., 9522 W. Jefferson Blvd., Culver City, Calif. 90230.

Vic's Custom Models/Phantom. One of the sharpest plastic and foam models at the show was Vic's Phantom, displayed here by Mrs. Vic Elnitski. Vic's entry into the man-made materials field of kits and ARF's is a multi R/C. It was designed for a flying weight of 6½ lbs. and engines ranging from .45 to .60. Wing span is 66" and fuselage length — 50". Several component packages are sold. At $69.95, the Phantom kit is complete with prefinished fiberglass fuselage and fin in color and ready for engine mounting; a prefinished, plastic covered foam wing and stabilizer; main gear and nose gear plus elevator and aileron linkages; all hinge material and a formed canopy. An assembled fuselage with nose gear mount and canopy costs $44.95 (parts in foreground). A fuselage disassembled, in halves with mount, is $29.95. Wing kit, less ailerons, is $22.95. VIC'S CUSTOM MODELS, 618 Cowpath Rd., Lansdale, Pa. 19446.

Orbit Electronics/Miniature Proportional Systems. Smaller, lighter and more reliable, that's Orbit's new 4-8/IC and 6-12/IC digital systems. Integrated circuits (IC's) are used in the receiver's logic section, replacing several individual parts. It measures only ¾ x 1 7/16 x 2¼ inches. PS-3D servos are new; their ceramic, feedback pots are guaranteed for the life of the system! Dual linear/disc output eases the installation. Flying weight of receiver, four servos, RS4500 power pack and all connectors is less than 16 oz. The 4-8/IC transmitter provides four channels, trim on all except the single-stick's throttle. The 6-12/IC transmitter has trim on all six channels. You also have the choice of throttle or elevator with the ailerons on the right stick. Cost of a complete system on 27MHz. is $415 for the 4-8/IC and $465 for the 6-12/IC. Add $15 for the six meter or 72MHz. frequencies. A free, illustrated catalog is available from: ORBIT ELECTRONICS, INC., 11601 Anabel Ave., Garden Grove, Calif. 92640.



Rand Mfg./Mounting Accessories. We call these *convenience* items. Left to right: the mounting tape, double-coated with adhesive, takes the "grim" out of servo mounting. It's ½" wide and 1/16" thick; of closed-cell Vinyl, it will not absorb fluids. Thirty-six inches for 75c. At center is the single-actuator mount. You get the plastic plate, grommets, eyelets and screws for 75c. It offers maximum vibration protection. Simply drop a Rand actuator in! At right is the double-actuator mount for 95c. Again, all hardware is included. Its two-level design means movement of one actuator does not hang the second unit up. Locate and mount these plates on your own deck or rail setup. Rand's servo mount, screw kit at 60c contains eight sets of screws, eyelets and grommets. That eyelet is important — it lets you compress the grommet enough, without crushing, to isolate against vibration. Pan head, sheet metal screws are getting wide use for engine mounting, since they seem to hold better than wood screws and their case-hardening makes them tough to fracture. One dozen in either size — #4 x ½" or #6 x ¾" — costs 35c. RAND MFG. CO., 8909 Hubbell Ave., Detroit, Mich. 48228.

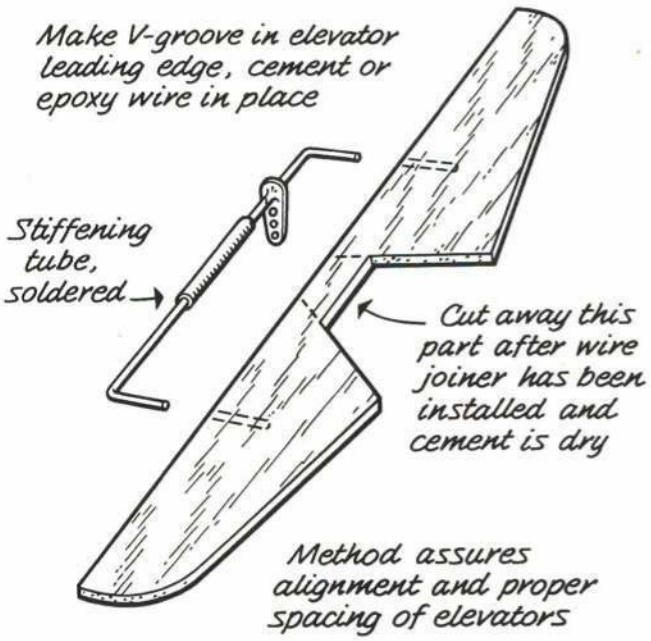


Canadian R/C Electronics Co./CRC Digital 4-6 System. This is basically a four channel set with six channel circuit boards. You can start with the four, including Tx and Rx, four servos, nickel-cadmium power supply and charger for $465. Extra channels can be factory-installed at $60 each (with servos). Transmitter input to the final is about a watt. Dual sticks are available with ailerons/motor or ailerons/elevator on the right side. Receiver design has stressed solid operation under high noise conditions. The two-deck affair is 1⅞" square by 1¼" deep. Weight is 3 oz. Three integrated circuits used. Servos offer rotary and double linear outputs. Overall, they are ⅞ x 1¾ x 2.6 inches. Each weighs 2¼ oz. and has 4 lbs. of thrust. Airborne weight of the four channel group is 17 oz. All 27 MHz. and six meter frequencies are available. DMECO is the U.S. distributor — service should be no problem. A 90 day guarantee applies from purchase date. Write DEBOLT MODEL ENG. CO., 3833 Harlem Rd., Buffalo, N.Y. 14215 or CANADIAN R/C ELECTRONICS CO., 38 Guardsman Rd., Thornhill, Ontario, Canada.

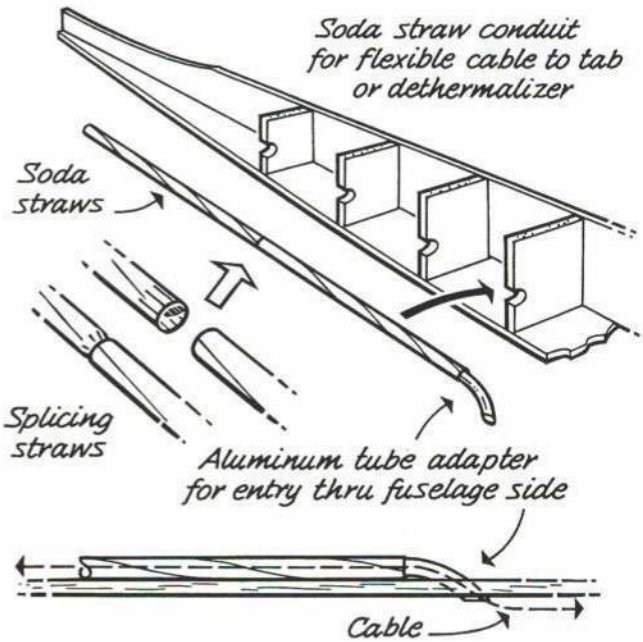
H. A. THOMAS

SKETCHBOOK

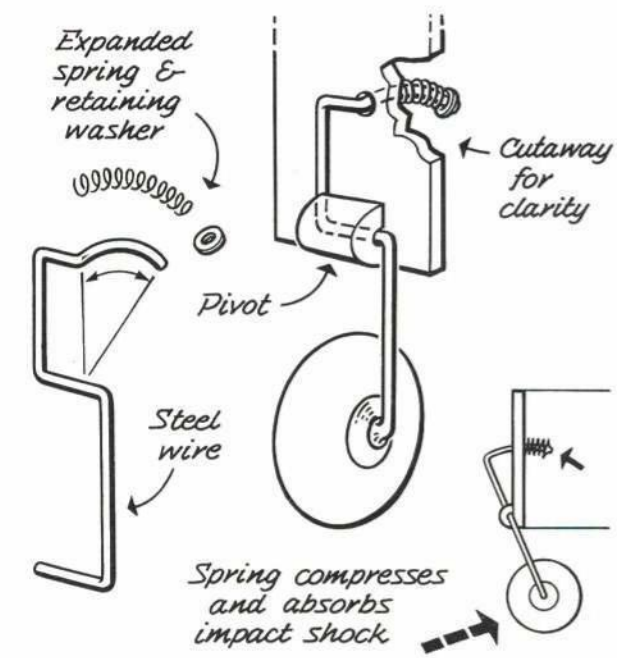
Have a new idea for construction, adjustment or operation of model aircraft or RC? AM pays $10 for each 'hint & kink' used. Send rough sketch and description to Sketchbook, c/o American Aircraft Modeler, Potomac Aviation Publications, Inc., 1012 14th St., NW, Washington, D.C. 20005.



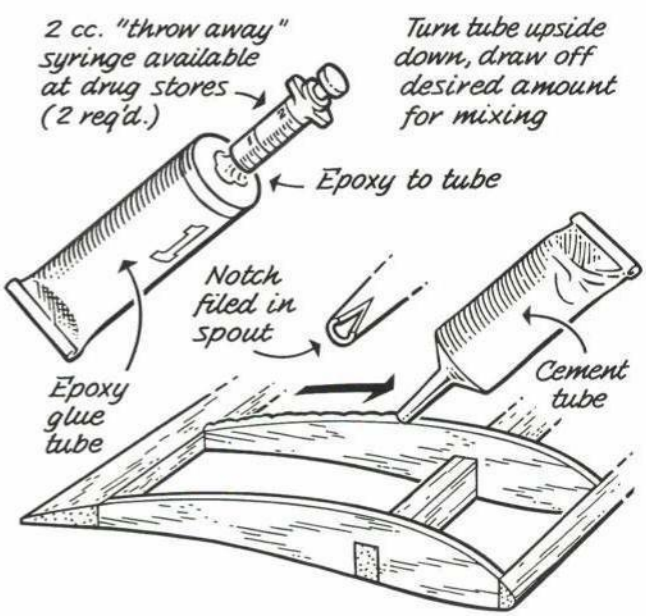
Exact alignment of U-control elevators is assured in method used by Tom Clemmons, Puyallup, Wash. Central joining section between elevators is left in place until wire parts are cemented, later removed.



Actuating cable from timer to tab or dethermalizer can be easily installed inside fuselage says J. A. Krell, Satellite Beach, Fla. Soda straws, notched in former sides, provide guide through which flexible cable can be easily inserted.



Clever, shock-absorbing nosewheel gear for light U-control or R/C models is contribution of Charles Cole, Hacienda Heights, Calif. Steel spring around gear leg extension compresses against back of firewall to limit backward movement of nosewheel.



Cementing ideas from Jerry Smith, Mishawaka, Ind.: 1) Use of throw-away syringe epoxied to top of each epoxy cement tube cap to measure equal quantities. 2) Filing notch in spout of cement tube to facilitate applying smooth strip of cement along ribs for capstrips or covering.

JUNE 1968

model aviation

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Nationals reborn at Olathe

The planning conference for the 1968 National Model Airplane Championships might never have happened. That it did — and with a spectacular climax — was due to a dramatic reversal of a seemingly unalterable trend. The Navy was unable to justify continued spending money and manpower on an event in which the youngsters of yesteryear had become adult hobbyists. There was nothing wrong with that in itself, but the young in heart had done little to seed a follow-on generation.

Without any real evidence of activity which would suggest that the situation would do anything but further increase the average age of Nationals contestants, the Navy at one point last year had actually canceled the 1968 meet. But, fortunately, some groundwork laid some months before enabled the program to be reactivated. No one thing did it — a combination of factors made the difference.

Some good Navy friends played a big part. Those originally assigned to organize the 1968 effort attended the '67 event in California, determined to do the best preparation job possible for the meet to be held at Olathe Naval Air Station in Kansas. By Christmas of last year when other happenings within the Navy were calling for cancellation of the Nats, the Olathe people had already done a tremendous job of planning. The 1968 Nats project officer, Cdr. Al Shiner, and his assistant, LCdr. Dick Gray, together with the Public Affairs Officer, Cdr. Mac Bailey, had well organized a new concept of Nats operation under the leadership of the Olathe Commanding Officer, Capt. Frank Culley.

Meanwhile, officers of the Academy of Model Aeronautics had brought to a head various Junior program efforts which had been long simmering but relatively unnoticed. When the time came to prove that AMA could produce and operate an effective youth program for model aviation the evidence was documented (See the Model Aviation section of American Modeler, April 1968, page 45).

Both the Navy and AMA efforts were detailed in a special meeting held in Washington last December, attended by representatives from the civilian and military organizations. Sufficient promise of a successful future National meet youth program was produced that pre-planning for the 1968 meet was allowed to continue. But the threat of cancellation persisted and it was obvious that more vigor than ever would have to be applied so that by Nats Planning Conference time at the end of February more evidence of progress would be necessary.

The planning conference, due to exceptional efforts by the Olathe officers, produced a tremendous community-backed pledge of support. The proof was in an amazing Kick-Off banquet during the conference in which over four hundred people representing all interests participated. Businessmen, representatives of the Exchange Club, Chambers of Commerce, civic and service groups, members of the Kansas City Aero Club, Civil Air Patrol, Boy Scouts, and Junior Chambers of Commerce were on hand — they came from more than a hundred mile radius to join with AMA and Navy officers from all parts of the country, to learn about the planning to date and to offer their enthusiastic support.

The banquet was held in the drill hall at Olathe NAS, where twenty years before a thousand contestants at the first Navy hosted National meet had been housed in hundreds of double decked bunks. Dozens of youngsters were on hand. They were shown movies of past Nats, were given AMA Racer kits by **Sig Mfg. Co.**, and were treated as regal guests symbolizing the spirit of youth for future Nats programs. Many were shown how to fly finished models of the kits they received and some won prizes of more advanced **Comet** kits donated by the manufacturer.

Special promotional packets, which included literature promoting youngster model aviation programs and a copy of the April issue of **American Modeler**, were distributed to dinner guests representing all levels of community support. A display, featuring Navy scale models built by members of the Kansas City RC club, was set up in the center of the dining area. And during the dinner the Executive Director of AMA launched a "Fly Navy" version of the Delta Dart model which is to be the basic trainer for the new Navy junior program.

Vice Admiral S. A. Heyward, Chief of Naval Air Training, then delivered a keynote speech emphasizing the need for youth and educational aspects of model aviation. He indicated that if the current planning for the Nats operation produced reasonable success in these areas a new beginning for Navy hosted National and regional meet support could be expected. As proof that Navy thinking went beyond the 1968 Nats at Olathe, it was noted that an officer from NAS Willow Grove, Penna., was on hand to observe and make basic preparations for the 1969 meet.

So a new era of National Model Airplane Championships is underway. Our Navy friends have reopened the door to future hosting. But we still have to prove that we're doing more than just talking about getting more youngsters into model aviation. Both for 1968 and long range, more youngsters — especially in the eight to eighteen range — will have to be in greater evidence. And they will be, due to fast developing special programs being put into effect now — both in the Kansas City area and across the country. It is fitting, therefore, that twenty years after the Navy began its Nationals hosting a rebirth of the program is taking place. AMA members and clubs can help by helping to get more youngsters to the Nats.

Best Nats Ever?

It's shaping up that way! Despite restrictions imposed by the current military mission Navy support for the Nats at Olathe is enthusiastic and substantial. From one standpoint alone this year's Nats will be the best ever: The site itself. Free Flighters should drool over the wide-open spaces — an unobstructed runway 7500 feet long with many thousands of empty acres beyond the downwind end of the field. The Olathe Naval Air Station is bigger than it was during the last Nats there in 1949, mostly in land acquired for longer runways and approach zones. Advance observers rate it the finest free flight site in all of Nats history.

Radio Control and Control Line sites are also excellent, each able to operate on a completely independent basis from the other. And, barring freak wind shifts in

U. S. Navy photo.

Youngster at Nats planning-conference and AMA Exec. Director preview Olathe Jr. Program.

case of abnormal weather, there should be no cases of free flight models dropping into the other areas.

The tight housing situation of other stations in recent years does not apply to Olathe. At least a thousand bunks are available. And trailer camping on the station is also available, convenient to the drill hall for access to showers and lavatories, for males and females. Eating on station is also simpler — pay-as-you-go, meal by meal, rather than by advance commitment.

And even though a whole day has been chopped from the competition schedule, the total hours needed to permit as many events as last year have been maintained. Instead of the usual 8 AM to 5 PM outdoor contest day, the '68 hours are 7 AM to 7 PM. And housing is available earlier — on the Friday before the contest starts.

If ever there was a Nats worth attending, the '68 event rates highest. The "inside" advice to AMA members is "Don't miss this one — and bring a Junior."

U. S. Navy photo.

February Nats planning conference was on Kansas City TV. Shown are Earl Witt; Capt. F. Culley, C.O., Olathe NAS; J. Worth; TV photog.

Nats Entry Details

To enter in advance, by mail, entry forms must be postmarked no later than July 7. After that date, entry forms must be presented at the Nats, in person, and will be subject to late fees.

Advance Basic Entry Fee: Junior and Senior AMA members — $2.00, includes two events; Open members — $10.00. **Additional events** (all age categories) are $1 per event, except RC which are $5 per event.

Late Basic Entry Fee: Same as advance fee for Juniors and Seniors, $15 for Open members. **Additional events** (all age categories) are $2 per event, except RC which are $5 per event.

Event Additions at Nats for either late or advance entries: $2 per event, except $5 for RC events. **Note: no event additions after 11 am Sunday, Aug. 4.** No changes or substitutions of events may be made, nor will any refunds be made for any events not flown.

Mechanics fee, advance or late is $2. Provides identification and field access privileges equivalent to contestants. **Available to AMA members only.**

Note: Nats entry forms available upon request from AMA, 1239 Vermont Ave., N. W., Wash., D. C. 20005. Send stamped, self-addressed envelope for priority return.

Nats Housing, Meals. Ample housing appears to be available aboard NAS Olathe in barracks and drill hall, for males only. No charge for housing, but no linens can be supplied — users must provide own sheets, blankets, towels, toilet articles, etc. Some locker space may be available, but probably not enough for all.

Meals are available to all contestants and mechanics, male and female, on a pay-as-you-go basis: pay at dining hall for each meal. Costs: breakfast — 27c, lunch — 60c, supper — 45c.

Camping trailer area available, on station, adjacent to drill hall — no charge. Trailer units must be self-contained; no electricity or water on site. However, drill hall lavatories and showers (both male and female) are close by.

Nats Entry and Competition Schedule

Friday (Aug. 2). Registration (including housing) for all those pre-entered by mail — noon to 9 pm. **Late Entries** accepted from 2 pm to 9 pm. **RC processing** from noon to 9 pm.

Saturday (Aug. 3). Test flying, where and if facilities permit, and Goodyear qualifications (both only for those registered) — 7 am to noon. **Goodyear qualifications** have air priority — other RC testing on a non-interference basis. **Registration** (including housing) — 8 am to 5 pm. **Late entry** — 8 am to 11 am. **RC processing** — 4 pm to 9 pm. **Navy Blue Angels Air Show** — 1 pm to 3 pm. **Note:** due to traffic problems in connection with the afternoon air show, all contestants are warned that they may have to park in general public spectator areas if arriving on station between 10 am and 3 pm.

Sunday (Aug. 4). Test flying and RC Goodyear qualifications, under same conditions as for Saturday (see above) — 7 am to noon. **Final Late Entry period** — 8 am to 11 am **(no late entries accepted after 11 am). Registration** (including housing) for those pre-entered by mail — 8 am to 5 pm. **RC processing** — 4 pm to 9 pm **Navy Blue Angles Air Show,** with same traffic problems as Saturday (see above) — 1 pm to 3 pm. **Official Indoor flying, Kansas City Municipal Auditorium** — 9 am to 9 pm. **Events are HL Glider, Stick, Paper Stick, and Cabin,** with separate time periods to be assigned for glider and rubber power. The auditorium has a 96-ft. ceiling.

Monday (Aug. 5). FF Scale (models must be flown before being judged, — 7 am to noon (½ day only). **FF Outdoor HL Glider** — 1 pm to 7 pm (½ day only). **FF C Gas and Nordic** — 7 am to 7pm*. **Control Line: FAI Speed, A Speed, Rat Race** (Open only), **Stunt** (Sr. only), and **Combat** (Jr. only) — 7 am to 7 pm*. **Radio Control: FAI** (abbreviated pattern) — 7 am to 3:30 pm*. **RC Scale** (models must be flown before being judged, all flights are official) — 3:30 pm to 7 pm.

Tuesday (Aug. 6). FF B Gas, Rocket, and Wakefield — 7 am to 7 pm*. **CL B Speed, Rat Race** (Jr. only), **Stunt** (Open only), and **Combat** (Sr. only) — 7 am to 7 pm*. **RC Pattern and RC Scale** — same as Monday.

Wednesday (Aug. 7). FF A Gas and FAI Gas — 7 am to 7 pm*. **Helicopter** — 7 am to noon (½ day only). **CL C Speed, Jet Speed, B Proto, Rat Race** (Sr. only), **Stunt** (Jr. only), and **Combat** (Open only) — 7 am to 7 pm*. **Radio Control Pattern Finals** (full FAI maneuver schedule) — 7 am to 4 pm*. **RC Goodyear Finals** — 4 pm to 7 pm. **Note: CL Stunt J. Walker Champs** after Jr. flying.

Thursday (Aug. 8). FF ½A Gas and Unlimited Rubber — 7 am to 7 pm*. **CL ½A Speed, ½A Proto, FAI Team Race, Scale, Carrier** — 7 am to 7 pm*. **RC Pattern and Goodyear** — same as Wednesday.

***Note: Model flying will be shut down Mon. thru Thurs. from noon to 1 pm.**

Special Nats RC Notes

Pattern event will be conducted in two stages. Top fifteen winners of the first stage will be eligible to compete in the second. **First stage** (Mon. & Tues., Aug. 5 & 6) **will be flown with an abbreviated FAI maneuver schedule, as follows:**

Unassisted ROG, FAI Top Hat, FAI Rolling Circle, FAI Double Stall Turn, FAI Horizontal Eight, Cuban 8, Slow Roll (5 secs.), Tail Slide, Traffic Pattern Approach, and Landing Perfection.

Separate awards will be presented to winners of first stage in all age categories and for Novice and Expert classes of Class C entrants. Best two flights will be totalled. Number of flights will be limited only by time available. After initial flight line balancing no attempt will be made to maintain equal rounds in first stage.

Second stage (Finals) contestants will consist of top fifteen winners from first stage, plus fifteen pre-qualified winners of FAI-approved regional meets, plus three 1967 FAI RC team members. The highest placing second stage winners, who have previously paid FAI program entry and stamp fees, will comprise the 1969 US RC team. They need not be the three top winners of the second stage, if any of the latter did not pay FAI fees — Nats second stage RC pattern awards will be presented to top finalists regardless of FAI status.

Note: pre-qualified Finals contestants are also eligible, but are not required, to compete in first stage — they may win first stage awards for their class of entry but will not be included when top fifteen first stage qualifiers for second stage are determined.

Goodyear Event. Contestants eligible for finals must be qualified in either of two ways: by performance at Tulsa Tahlequah, Okla. meet on Aug. 3-4, or by performance at qualification trials at NAS Olathe on Saturday and Sunday mornings, Aug. 3-4 (7 am to noon).

Scale. In order to provide more hours (and flight opportunities) for this event, and a more suitable time period than has been available in past Nats, **it is necessary this year that flying precede judging. All flights will be considered official,** and as many flights as possible within the time period may be made. Possibility of damage during flying, and such effect on scale judging score, is at contestant's own risk.

Special Nats Youth Program Launched

A new Nats feature this year will be a special AMA directed four day competition operating side-by-side with the usual type event program. The competition will be open to non-AMA members and no entry fees or other charges will be involved. Special age groups will be set up, to provide several separate competition categories for kindergarden through teenage contestants.

Kits for a "Fly Navy" version of the AMA-designed Delta Dart (AMA Racer) rubber powered model are being donated by various sponsors in the Kansas City area — several thousand have already been assured.

RC Team Regional Sites and Nats Finals Details

Selection of the 1969 RC team to represent the US in the World RC Championship will take place at this year's National Championship, Olathe, Kan. Prior to the Nats there will be 15 regional contests, which may use either the FAI pattern or the AMA Class C Expert pattern:

April
27-28 Phoenix, Ariz., Arizona RC Society.
May
18-19 Los Angeles, Calif., LAMHA
18-19 Port Arthur, Tex., The Oily Birds.
25-26 Fresno, Calif., Fresno Radio Modelers.
June
1-2 Atlanta, Ga., Greater Atlanta 4th Annual.
8-9 Los Angeles, Calif., Valley Flyers.
8-9 Rochester, N. Y., N.Y. State RC Champs.
22-23 Wallops Isl., Va., M. A. R. K. S.
22-23 Decatur, Ala., Decatur M. A. C.
22-23 Dayton, O. Wright Bros. Memorial.
28-29 Denver, Colo., Mile Hi RC Club.
29-30 Bridgeton, Mo., Spirits of St. Louis.
July
6-7 Chicago, Ill., Chicagoland RC Modelers.
13-14 Turlock, Calif., Pioneers.
13-14 Minneapolis, Minn., Twin City RC.

On Monday and Tuesday of the Nationals contest there will be additional qualifying trials using the FAI maneuvers.

The winners of each of the 15 regional trials will be eligible to compete in the Team Finals as will all those among the top 15 qualifiers at the Nats who have registered for the FAI team program. Thus, up to 30 qualifiers, plus the 1967 team (automatically qualified) will then vie for the three team spots in the Team Finals to be staged on Wednesday and Thursday of the Nats.

Flyers trying for the team must preregister by sending a $5 FAI RC entry fee to AMA Headquarters, postmarked by midnight prior to the regional qualifying meet being entered. Advance registration will also be applicable for the Nats qualifying trials; however, program entry fees will be accepted at Nats AMA HQ but only up to the deadline time of regular Nats registration cutoff, which is 11 am Sunday.

Although the 15 regional finalists will not have to pay the program entry fee again, they will have to enter the Nats and pay the normal Nats entry fees (applies also to 1967 team members). In addition, Nats finalists in the team program will be required to pay an additional $10 FAI Finals fee. It should be noted, however, that these FAI entry and finals fees all go into the RC team fund, to help pay team travel.

New Navy Regional Program Developing Fast

Prompt and extensive cooperation by AMA, HIAA (Hobby Industry) and Navy officials has kicked off a big, new and special model competition program a year earlier than originally anticipated. The program, aimed at encouraging the sending of youngsters to the Nats and producing many new elementary and high school age model flyers, features a commitment of well over $5,000 in prizes from the hobby industry, use of naval air stations all across the country, free AMA sanctions and contest direction by AMA clubs and leader members.

At press time, meetings between local AMA and Navy people were being held to determine dates and contest events which might be accommodated by the various stations. Contest timing in most cases is expected to be in June or July, although some were being planned to May and the annual Armed Forces Day observance.

A key element is the seeking of local community support for sending one or more young meet winners to the Nationals. Such male winners as could get to the Nats were also to receive berths on an aircraft carrier cruise out of Pensacola, Florida; with transportation to and from the Nats being furnished by the Navy.

Further details are currently being developed and advertised by the model industry and press. More information is also available from AMA Headquarters, 1239 Vermont Ave. N. W., Wash., D. C. 20005.

New Control Line Speed Rules Proposal

1968 CL Speed Proposal CL-68-A-1 has passed preliminary vote. This is an outgrowth of the '67 proposal which failed to pass a final vote of the Board, with some new additions. The basic proposal is divided into five parts so that the failure of one part will not eliminate the entire proposal.

Members concerned should make views known to their district CL CB representative prior to this year's Nats when an initial vote will be taken on this proposal. Additionally, any AMA member who wishes to modify any part of the proposal under consideration should submit a cross proposal prior to the Nats (to the district rep., with copy to AMA HQ). **The proposal:**

Part a: New Classifications. Add following new paragraphs after para. 6.2:

6.2.1 Classification for contestants: Age will not be used to classify contestants in control line speed as outlined below.

Expert Class: Anyone who can attain 92% (.92) or more of the existing Expert Class record for a particular engine classification is automatically placed in the Expert competition class. The record speed used for classification is that which is currently recognized by AMA Headquarters for the applicable engine size.

Advanced Class: Anyone who can attain a speed which is greater than 82% (.82) but less than 92% (.92) of the existing Expert Class record for the particular engine size is automatically placed in the Advanced competition class. The record speed used for classification is that which is currently recognized by AMA Headquarters for the Expert Class of the applicable engine size.

Novice Class: Anyone who attains a speed which is less than 82% (.82) of the existing Expert Class record for the particular engine size is automatically placed in the Novice competition class. The record speed used for classification is that which is currently recognized by AMA Headquarters for the Expert Class of the applicable engine size.

The performance of an entrant in a particular engine class shall only determine his competition level in that displacement class. A competitor may only compete in one skill level for each engine displacement classification.

6.2.2 Contest Entry: The contestant or team shall at the time of entry in each contest declare the skill classification in which he will compete. For the duration of the contest the entrant cannot compete in a lower achievement level than he has previously declared. Contestant skill level classification shall not be carried through to subsequent contests. The participant shall declare competition skill level at each individual contest.

6.2.3 Reclassification Due to Actual Performance: If a participant exceeds the level of performance permitted for his skill classification, one of the following actions will be taken by the officials: 1. The contestant will be reclassified in the skill level dictated by his performance. 2. The contestant will be eliminated from competition. In general, if a contestant exceeds the performance level for his declared skill classification he shall be moved up to the level indicated by his performance if the contest includes this higher skill classification. If not, he shall be eliminated from this competition. In either case, his previous or subsequent speed will not count in the lower or initial declared skill classification. Note: Corresponding changes will be made to Jet speed to reflect the above.

Part b: Line size Revision. Revise "size and construction of control lines" Para. 6.4 to following:

6.4 Size and Construction of Control Lines: All lines used to control flight shall be steel music wire or metal of equivalent strength, in good condition, and free of kinks and rust. Lines of braided or stranded construction will not be allowed. Line connections to handle and aircraft must have a strength equal to or greater than that of the flying lines. No swivels are to be used as part of the control system of control line speed models. Control lines shall be of uniform diameter from the leadout connection to the handle. No more than two (2) connectors may be used per line.

Line Sizes: The following wire diameters shall be used for each class of model regardless of model's weight:

	Min. Dia. (one line)	Min. Dia. ea. line*
½A & ¼A Proto	.012	.008
A	.018	.012
B & B Proto	.024	.016
C & Jet	.031	.022

*for 2 or more lines

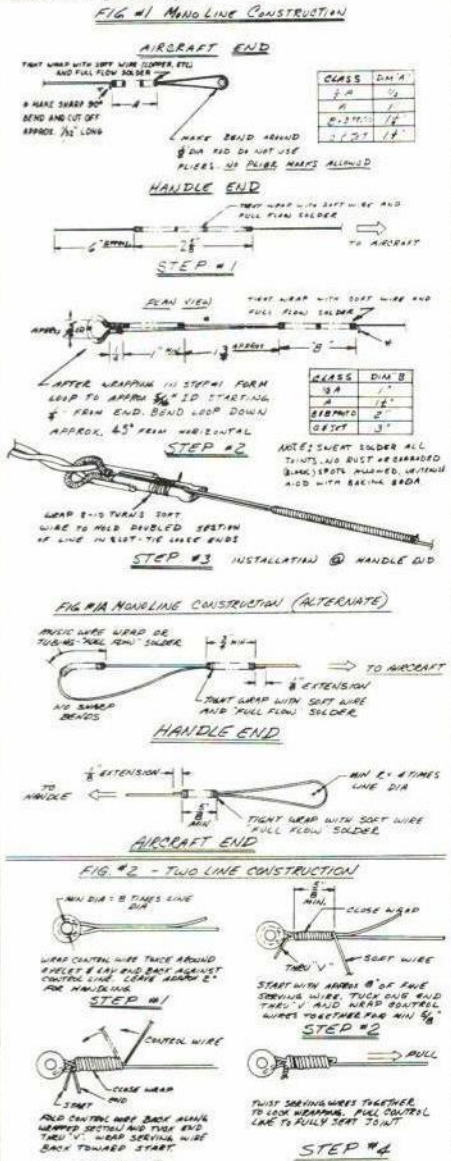
Note: As cross proposal -2, consideration will be given to increase ½A to .014, A to .020.

Line Construction: Line construction shall be per the two methods described below (Figures 1, 1A and 2). The contest director may allow alternate line terminations if he can satisfy himself that they are at least as strong and safe as those shown. Note: Corresponding changes will be made to Jet Speed Para. 7.3 to reflect the above.

Part c: Pull Test Revision. Revise the pull test in Para. 6.5 and 7.4 to be 40 times the weight of the model.

Part d: Whipping. Add to Para's. 6.9 and 7.8 the following: Any attempt to whip the model more than is necessary to get it airborne during the first lap shall constitute a foul, disqualifying the flight as well as previous flights. This shall apply to all classes.

Part e: Tuned Exhaust. Three cross proposals are being considered concerning tuned exhaust systems, they are: 1. A special "tuned exhaust" division for each engine size will be established for competition purposes, i.e., a "nontuned" division and a "tuned" division. 2. They will not be allowed in normal competition at all. 3. A proper handicap will be established (20 to 25%).



DIRECTORY OF AMA OFFICERS

Which officers live in your district? Select correct address when writing officers.

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Secretary-Treasurer:
Earl Witt, Longview Trailer Court, R.D. #3, Chambersburg, Pa.

Executive Director
John Worth, c/o AMA Hq., 1239 Vermont Ave. N.W., Washington, D. C. 20005

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VI: W. Weaver, 7248 Winchester Dr., St. Louis, Mo.
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VIII: L. Peters, 3025 Hillglen Rd., Dallas, Tex. 75228
IX: Stan Chilton, 446 Ida, Wichita, Kans.
X: J. Pond, 2162 43rd Ave., San Francisco, Calif.
XI: R. D. Stalick, 2807 S. Oak St., Albany, Ore.

CONTEST COORDINATORS:

I: W. Leonhardt, 100 Abbott St., Lawrence, Mass.
II: E. F. Hoffman, 158 Carpenter St., Belleville, N.J.
III: E. Biddle, 2156 Street Rd., Warrington, Penna. 18976 (East)
M. Weisenbach, 4568 West 146th St., Cleveland, Ohio 44135 (West)
IV: D. L. Johnson, 3367 Sudlersville So., Laurel, Md.
V: T. McLaughlan, 741 W. Hernandez St., Pensacola, Fla 32501
VI: Gosta Johnson, 6810 S. Crandon, Chicago, Ill. 60649
VII: Odell Marchant, 2004 N. Hillsboro, Minneapolis, Minn. 55427 (North)
W. Hartung, 14759 Kilbourne, Detroit, Mich. 48213 (South)
VIII: M. Frank, 2933 Blankenship, Wichita Falls, Tex. 76308
IX: R. R. Combs, RR #1 Box 712, Morrison, Colo.
X: D. C. Farnsworth, 301 Carl Dr., Visalia, Calif. 93277 (North)
Pete Brandt, 5817 W. Ironwood, Palos Verdes Peninsula, Calif. 90274 (South)
XI: A. L. Grell, Rt. 1 Box 165, Tangent, Ore. 97389

CONTEST BOARD COORDINATOR: Pete Soule, 26622 Fond Du Lac, Palos Verdes Peninsula, Calif. 90274

Bold type below indicates Chairman of Contest Board.

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IV: J. V. Boyle Jr., 219 Shenandoah Rd., Hampton, Va. 23361
V: Jerry Wagner, 274 E. 9th St., Hialeah, Fla.
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IX: Frank Monts, 6519 Marjorie Lane, Wichita, Kans.
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IV: H. Larsen, Rt. 1, Box 307, Manassas, Va. 22110
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VIII: G. M. Aldrich, 3219 Shady Springs, San Antonio, Tex. 78230
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V: Don Coleman, P.O. Box 436, Citronelle, Ala. 36522
VI: Bud Atkinson, 734 North 6th St. Terr., Blue Springs, Mo. 64015
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VIII: C. Summers, 7132 Shook Ave., Dallas, Tex.
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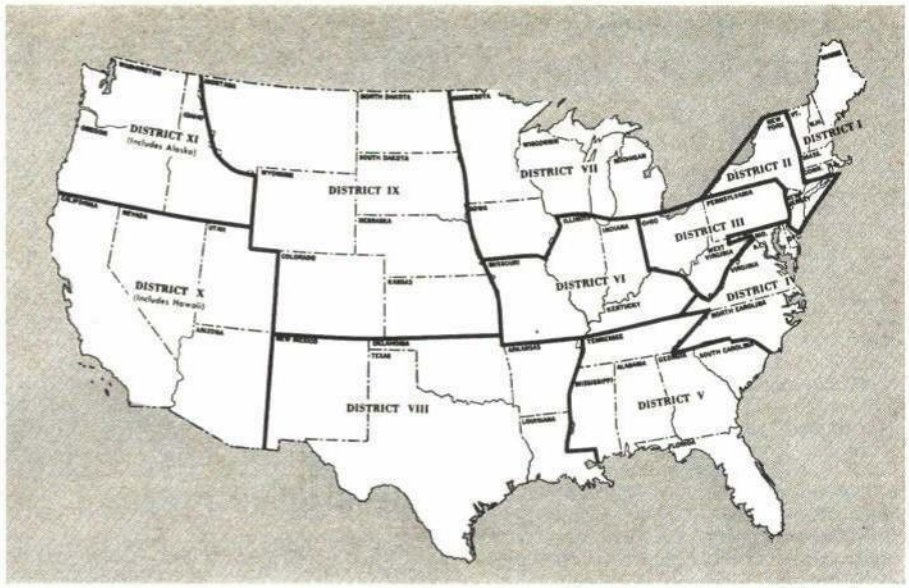

CONTEST CALENDAR

Official Sanctioned Contests of the Academy of Model Aeronautics

MAY

May 4-5 — Mobile, Ala. (AA) 5th Annual Gulf Coast RC Meet. Site: Plum Forty. J. Sabine CD, 10 Maury Dr., Mobile, Ala. 36606. Sponsor: **Gulf Coast RC Club.**

May 5 — Dayton, Ohio (A) Mid-American Model Aviation Assoc. 1000 Lap Restricted CL Meet. J. Martin CD, 551 Aberdeen, Dayton, Ohio 45419. Sponsor: **Dayton Buzzin Buzzards.**

May 12 — Suffield, Conn. Goodyear Fun Fly. Site: NCRCC Air Park, G. Swan CD, 6 Audrey Lane, Thompsonville, Conn. 06082. Sponsor: **Northern Conn. RC Club.**

May 12 — Tullahoma, Tenn. (AA) Coffee Air Foilers 4th Annual Old Timer's Meet for FF. Site: Air-Foilers Field. M. Collier CD, 518 Sharondale Dr., Tullahoma, Tenn. 37388. Sponsor: **Coffee Air Foilers.**

May 12 — Council Bluffs, Iowa (AA) Balsa Busters 2nd Annual CL Meet. H. Hough CD, 924 Ave. I, Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

May 18-19 — Maryland, DSRC 11th Annual Technical RC Symposium. Site: John's Hopkins Univ. Applied Physics Lab. J. Spalding CD, 5803 Ellerbie St., Lanham, Md. 20801. Sponsor: **DCRC Club.**

May 19 — Ponca City, Okla. (AA) Ponca Skeeter Pilots Spring Annual CL Meet. Site: Agriculture Building Gr. G. Sanders CD, 1009 Shady Pl., Ponca City, Okla. 74601. Sponsor: **Ponca Skeeter Pilots.**

May 19 — Baltimore, Md. (AA) 2nd Annual Combat Meet. Site: Rosedale Park. L. Lauer CD, 831 Lannerton Rd., Baltimore, Md. 21220. Sponsor: **Flite Streaks Model Aeronautics Club.**

May 19 — Detroit, Mich. (A) Strathmoor CL Meet. Site: Rouge Park. G. Overby CD, 1551 O'Connor, Lincoln Park, Mich. 48146. Sponsor: **Strathmoor Model Club.**

May 19 — Niles, Ill. (AA) Aero Angel Midwestern CL Championships. Site: Croname Co., 6201 Howard. E. Schmidt CD, 3124 W. Ainslie, Chicago, Ill. 60625. Sponsor: **Aero Angels.**

May 19 — Denver, Colo. (AA) Model Museum Spring Annual for FF. Site: East Colfax Airpark. T. Dannels CD, 1265 Yates St., Denver, Colo. 80204. Sponsor: **Model Museum Flying Club.**

May 19 — Torrington, Conn. (AA) Balsa Bandits 6th Annual CL Meet. Site: Recreation Field. L. Abraham CD, R. F. D. 1 Gillette Rd., New Hartford, Ct. 06057. Sponsor: **Torrington Balsa Bandits.**

May 25 — Cleveland, Ohio (AA) NOFFA Old Timers FF Meet. Site: Wellington. R. Reuter CD, 4670 Columbia Rd., N. Olmsted, Ohio 44070. Sponsor: **Northern Ohio FF Association.**

May 25-26 — Hampton, Va. (AA) 4th Annual SEVRCG RC Meet. Site: Langley AFB. D. Holmes CD, P. O. Box 814, Grafton, Va. 23492. Sponsor: **South Eastern Va. RC Group.**

May 25-26 — Madera, Calif. (AA) Fresno Nats Qualifications for RC. Site: Madera Airport. A. Chisolm CD, 615 E. Belmont Ave., Fresno, Calif. 93701. Sponsor: **Fresno Radio Modelers.**

May 25-26 — Chicago, Ill. (AA) 6th Annual Season Opener for RC. Site: Kick-a-Poo Woods. S. Peterson CD, 6416 S. LaPorte, Chicago, Ill. 60638. Sponsor: **RC Club of Chicago.**

May 25-26 — Sumter, S. C. Iris Festival RC 1968 Invitational. Site: Sumter Co. Airport. J. Bradham CD, 35 Morgan Ave., Sumter, S. C. 29150. Sponsor: **Sumter MAC.**

May 26 — Salt Lake City, Utah (AA) Pre 500 Meet for FF. Site: Saltair Modelport. F. Haslam CD, 3731 S. 5450 West., Salt Lake City, Utah 84120. Sponsor: **Utah State Aeromodelers.**

May 26 — Fiskdale, Mass. (A) 2nd Annual Spring Hydro RC Fun Fly for Seaplanes. Site: Brimfield Dam. J. Ross CD, 19 Sterling Dr., Dover, Mass. 02030. Sponsor: **New England RC Modellers.**

May 26 — Elsinore, Calif. (AA) 2nd Annual A11 FAI FF Contest. A Vela CD, 11807 Crystal, Chino, Calif. 91710. Sponsor: **CAIFAS.**

May 26—Cincinnati, Ohio (AA) Cincinnati Controlliners Model Airplane Contest. Site: Lunken Airport. D. Patton CD, 2493 Downing Dr., Cincinnati, Ohio 45208.

May 26 — Cleveland, Ohio (AA) NOFFA 5th Annual FF Meet. Site: Wellington. R. Kluiber CD, 2021 Lakeland, Lakewood, Ohio 44107. Sponsor: **Northern Ohio FF Association.**

May 26 — Sacramento, Calif. (AA) Northern Calif. FF Council Meet. Site: Sunrise Ave. & Jackson Rd. W. Schnathorst CD, 647 Hunt Way, Davis, Calif. 95616. Sponsor: **Capitol Condors.**

May 26 — Fresno, Calif. (A) Fresno Monthly Meet for FF. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: **Fresno Gas Model Club.**

May 26 — Tucson, Ariz. (AA) Spring Invitational CL Meet. Site: Rodeo Park. T Snow CD, 909 E. Ellis, Tucson, Ariz. 85719. Sponsor: **Cholla Choppers MAC.**

May 26 — Youngstown, Ohio T.C.R.C. Invitational RC Fun Fly. Site: Military Base. B. Waterman CD, 4616 Walker Ave. N. W., Warren, Ohio 44483.

May 30 — Union, N. J. (AA) 14th Union Model Airplane Invitational Meet for CL. Site: Swanstrom Pl. F. DeCicco CD, 53 Broadview Ave., Maplewood, N. J. 07040.

JUNE

June 1-2 — Syracuse, N. Y. RC Jamboree. Site: ARCS Field — Nedrow. E. Izzo CD, 3950 Highland Ave., Skaneateles, N. Y. 13152.

June 1-2 — Detroit, Mich. (AA) 22nd Annual Great Lakes International CL Meet. Site: Rouge Park. J. Kilsdonk CD, 19473 Ward, Detroit, Mich. 48235. Sponsor: **Strathmoor Model Club.**

June 1-2 — Atlanta, Ga. (AA) 4th Greater Atlanta RC Meet. Site: Club Flying Site. R. Roberts Jr. CD, 2443 Woodside Way, Chamblee, Ga. 30005. Sponsor: **Atlanta RC Club.**

June 2 — Lake Elsinore, Calif. (AA) SCAT FAI FF Contest. Site: Lake Bed. B. Bogart CD, 469 Paulette Pl., LaCanada, Calif. 91011. Sponsor: **Southern Calif. Aero Team.**

June 2 — Warminster, Pa. (AA) 3rd Annual Early Bird FF Contest. Site: Johnsville NAS. J. Kutkuhn CD, 517 Georgetown Rd., Wallingford, Pa. 19086. Sponsor: **Golden Eagles MAC.**

June 2 — Orange, Mass. (AA) Antique Model FF Rally. Site: Airport. L. Wellman CD, 8 Park St., Groveland, Mass. 01830.

June 2 — New Bedford, Mass. (AA) '68 Classic Meet For CL. Site: Airport. L. Gadomski CD, 62 Durfee St., New Bedford, Mass. 02740. Sponsor: **New Bedford MAC.**

June 8-9 — Des Moines, Iowa (AA) Des Moines Modelaires RC Contest. Site: Model Airport. R. Russell CD, 2101 35th St., Des Moines, Iowa 50310. Sponsor: **Des Moines Modelaires.**

June 8-9 — Houston, Tex. (AA) Houston RC Annual. C. Hirsch CD, 412 W. 30th, Houston, Tex. 77018. Sponsor: **Houston RC Club.**

June 8-9 — Howard County, Md. (AA) RC Soaring Meet. Site: DCRC Flying Field. D. Rothbaum CD, 12505 Feldon St., Silver Spring, Md. 20906. Sponsor: **DCRC Club.**

June 8-9 — Rochester, N. Y. (AA) 8th Annual N. Y. State RC Championships. Site: Club Field. R. Edmunds CD, 1521 Mt. Hope Ave., Rochester, N. Y. 14620.

June 9 — Emporium, Pa. 3rd Annual RC Fly-For-Fun Meet. Site: Airport. J. Florio CD, 123 Fourth St., St. Marys, Pa. 15857. Sponsor: **St. Marys Area RC Society.**

Continued on page 72

Kit 152 **P-40 WARHAWK** .....18"
Drops 2 bombs in flight $1.49

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RUBBER POWERED MODEL KITS

Our simple construction eliminates the complicated bulkhead and stringer construction used by others. These models fly great distances and climb over 200 feet high. Kits contain Hi-Thrust propellers, formed wire parts, rubber and many extras.

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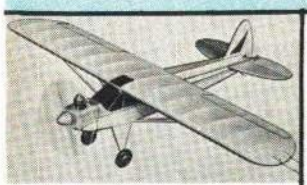

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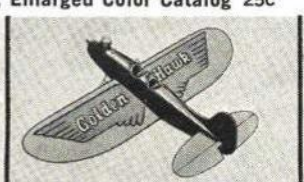

Kit 48 **GOLDEN HAWK** Our most beautiful airplane. Designed to fly smooth. Has fine carved fuselage....$2.95

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Kit 140 **BIG OTTO COMBAT** Big 24" high performance wing. Will out-maneuver all others. $2.95

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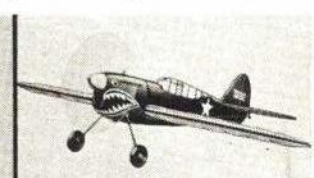

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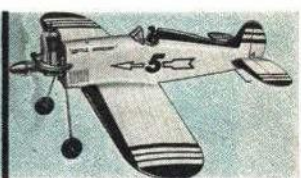


Kit 26 **LITTLE MERCURY** 18" wing & carved fuselage. .020 to .074 engines, rugged, stable, responsive $2.95

SEEN AT TOLEDO

A ROUND-UP OF LATEST R/C PRODUCTS

HOWARD MC ENTEE

FEBRUARY 24 and 25 found modelers from all over the U. S. — plus Canada and overseas — jammed into the big Lucas County Recreation Hall, near Toledo, Ohio, to find out what new goodies the trade had to offer. The Weak Signals Club outdid themselves to put on the tremendous 14th Annual Toledo R/C Conference.

Due to expansion, the auditorium section had been moved to a nearby building, and the Trading Post crowded into a corner, to make room for more manufacturer display tables. It helped — but with 900 more paid admissions than in 1967 (total this year was 3,100, plus about 200 manufacturers and guests, plus some 50 Weak Signals, plus all women and children who are admitted gratis) the crush was worse than ever. There were about 70 exhibitors on hand.

Just about every multi propo system maker showed much more compact systems, with smaller servos and receivers, reduced battery pack dimensions. There must have been twice as many makers of ARF (almost-ready-to-fly) planes as last year. This trend may be accelerated by the rapid and continuous rise in balsa costs (while plastic costs are holding steady or even dropping). We saw much larger boats this year, and more makers of those in the moderate sizes.

For the first time there was a manufacturer who displayed a race car that was out of the "toy" category. Powered by a glow engine, it had R/C operated clutch and gear shift. As for the model covering situation (and provided the ARF plane makers don't do completely away with all covering chores for the modeler!), soon a small flatiron will be just as important a modeling tool as a razor blade or tube of cement!

There seemed to be more unusual and multi-cylinder engines displayed this year than in the past. We saw several opposed twins, in-line twins, a four-cylinder radial engine, all of which should be on the market before long. And though not on continuous display, the Graupner Wankel engine from Germany was seen by many modelers (photo on p. 13, March 1968 issue).

For the first time in years, the weather was good enough for considerable exhibition model flying. With no snow on the ground, modest winds and warm sun (though nippy air) the outdoor part of the program was very successful.

A meeting on Friday afternoon provided real impetus to the rather moribund Radio Control Industry Assoc. which many of us have felt could be of real use to the R/C model industry, but which has never really gotten off the ground. New officers were selected, and there are plans for an Assoc. newsletter, and the possibility that the group will sponsor an important R/C contest each year. There will also be a membership drive in industry — many R/C makers don't even know the group exists.

As usual, there was a wonderful display of planes, cars and boats, with planes in the vast majority. Trophies and prizes were given to the top three placers in eight categories.

The number of tables rented at the Conference by exhibitors has exactly doubled in just two years (43 in 1966, 88 in 1968).

The Weak Signals have canvassed the area for a much larger exhibition hall. There won't be a new one for at least two years, so the Lucas County Rec. Hall will be the spot again in 1969, March 1-2.

WE'LL mention briefly one or two of the newest products of each exhibitor, listed alphabetically. We may miss a few — the final showing was quite different from the program. And the crowds were so thick you couldn't get near some exhibits! Many items have been described in more detail in recent issues. For others, write the manufacturers and check the ads.

Ace Radio Control (Box 301, Higginsville, Mo., 64037): Several versions Jansson transmitter, including complete GG systems; simpro kits and parts; tiny Albin super-regen (¼ oz. weight) featured in May issue — Ace offers kit; several versions Digital 7 Universal Transmitter, kit form by Delta Specialties, one or two control sticks.

Airtrol of Adrian, Inc. (Box 392, Adrian, Mich. 49221): SMR-1 Migipulse system, small, light, 2 oz. installation, non-flopping rudder, complete with battery pack, $59.95; development will include GG system. RCC-1 car 1/25th scale Mustang, 7" long, propo steering, variable-speed control via superhet, special transmitter with levers for two controls, $129.50 complete with 600 maH nickel-cads for car. Plans available for 15" span Goodyear plane, Cox .01, especially for Migipulse.

A-justo-jig Co. (Box 176A, Westfield, Ind. 46074). Improved jig allows building 95% of wing without removal from jig, perfect alignment, warp-free; polypropylene rib locators, light, unbreakable, impervious to solvents, cement, dope etc.; with locators, complete jig $35.00, FOB factory.

Andrews Aircraft Model Co., Inc. (2A Putnam Ct., Danvers, Mass.): Updated Aeromaster bipe (still available); three configurations, differing in wing span, sweepback. Includes parts all three, wing areas from 817 to 910 sq. in. New low-wing, Trainer Master, especially for sport. Constant-chord, 53½" span, 575 sq. in., designed for .35-.45 engines, trike LG.

Angel Mini-Flite Co. (Box 437, Fitchburg, Mass. 01420). Cubes of Epoxybond, epoxy you mold like putty, then use as cement, for filling holes, fillets. Flashing light systems, for planes and boats.

Aristo-Craft Distinctive Miniatures (314 5th Ave., New York, N. Y. 10001): Aristo-Kavan accessories, including fiberglass props, special carbs. Biplane kits for between-the-wars aircraft (Boeing PT-17, Curtiss Navy Hawk, Grumman Fighter, Staggerwing Beechcraft) spans 45-48", $25 each, including nylon fittings, canopies, aluminum cowls. Micon line equipment, superhet and regen, lots more; Pioneer low-wing stunter, which has fiberglass fuselage, wings built up of balsa and silk-covered, several coats of clear, 72" span tapered wing, controls installed, as do tail surfaces, $99.95 FOB.

Autocon Corp. (250 Orchard Rd., E. Patchogue, N. Y. 11772): Foam wings covered with Marvelite, a .015" 3-ply birch sheeting. Marvelite Hydro Skis, which have foam cores, 3-ply on all surfaces; pair of 38" long Hydro Skis up to 7-12 lb. planes, weigh about 1.2 lb., $24.95 in kit.

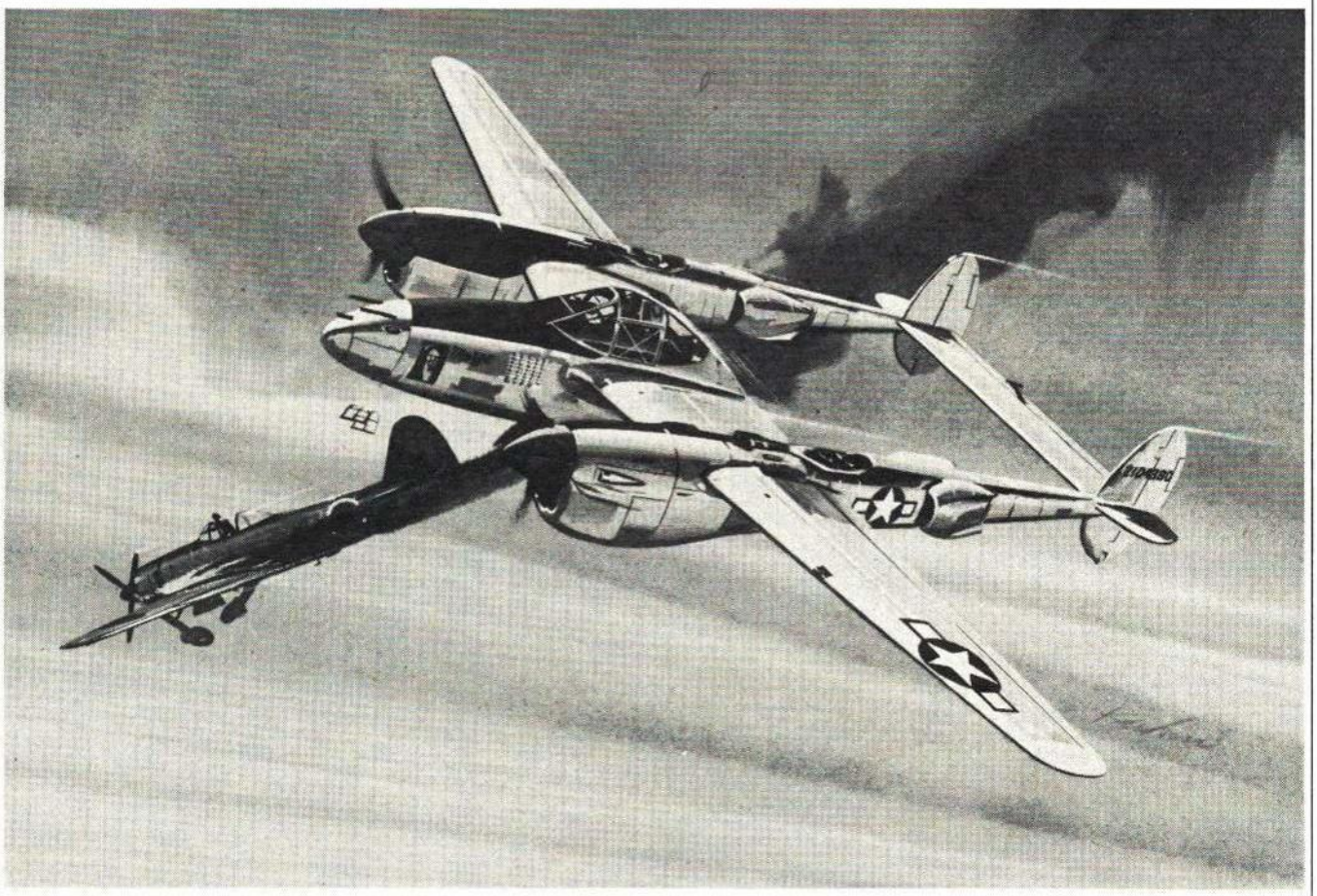
Balsa Corp. of America (510 E. Wister St., Phila., Pa. 19144). Command Master equipment (originally Sterling). RTE features three feedback servos for rudder, elevator and engine, with nickel-cad packs for receiver and transmitter, also charger, for $250. Low-cost replacement policy on components, exchanged for a fixed cost, regardless of damage.

BK Model Products (4765 E. Iliff, Denver, Colo.): Fuel pump fits into gallon can, won't deteriorate from fuel, no batteries, adapted to quart cans, $6.95. Variety of landing gear components, including steerable nose gears, main-gear wire parts and clamps. Retractable units, simple and rugged, operate from separate servo; foam wing cores for 30 planes.

Bonitron Inc. (633 Thompson Lane, Nashville, Tenn. 37204). Super Sport transmitter and superhet receiver, especially for Rand GG-Pak and Dual-Pak, Controlaire Ghost actuator. Transmitter features internal switches to select high or low pulse rate, to cut pulsing for use with escapements; pots to center servos, vary range of movement. Receiver features RF stage, designed for high pulse rates.

Bonner Specialties, Inc. (9522 W. Jefferson Blvd., Culver City, Calif. 90230): 4RS digital system expanded to six channels, receiver no larger; with six servos, total equipment weight in plane 18.8 oz., 6RS receiver and transmitter with four servos, batteries and charger cost $425 on 27 MHz, $15 more for 52 or 72 MHz use; integrated circuits in receiver

LOCKHEED P-38 LIGHTNING



One of the most fabulous airplanes of World War II! Now a fabulous 1/72nd scale kit!

The P-38 had a look and sound all her own. The Germans cursed "der Gabelschwanz Teufel," or forked-tailed devil. The Japanese trembled when they saw her distinctive silhouette. Her remarkable combat record includes the fantastic pin-point interception of Japanese Admiral Yamamoto after a 435 mile flight!

AMT's new model of this exciting airplane is authentic to the last detail. Model features include moveable propellers, "Christmas Tree" rocket launcher, detailed pilot's figure, and optional decal markings. Only $.80 each!

THE EXCITING KITS ARE FROM amt®

decoders; gold-plated connectors.

Bronner Mfg. & Tool Co. (Hanover, N. J.): Bantam .60 twin fitted with dual intake and exhaust throttles for widest possible speed range. Crankshaft runs on ball bearings.

Calmec (div. of Ametek, 5825 District Blvd., Los Angeles, Calif. 90022): 4-cylinder radial engine develops over 1 hp, smooth operation, scalelike appearance; consists of four .15 Cox engines geared to central prop shaft, cylinders fire simultaneously. Turns 12-6 prop at 10,500 rpm, idle 2,000; can be fitted with four added dummy cylinders to enhance scale. Also 2-cylinder opposed engine from same Cox .15 units, developing .6 hp; XA 904 costs $95, XA 902, $45.

Canadian Radio Control Electronics Co. (38 Guardsman Rd., Thornhill, Ontario, Canada): Digital 4-6 propo system, basically 4-channel, which may be converted at factory to 6 controls. Airborne weight of 4-control setup under 17 oz., with batteries and charger, $465; available on 27 or 50 MHz. Dual enclosed sticks, 1 W input to final RF stage, all silicon transistors. Receiver has FET RF and mixer stages and integrated circuits in the decoder stages; will be distributed in U. S. by deBolt Model Engineering Co.

Carl Goldberg Models Inc. (2541 W. Cermak Rd., Chicago, Ill. 60608): Skylane 62, semi-scale; 62" span, 450 sq. in. area, for .19-.35 engines. Kit costs $24.95; deluxe $28.95; complete nylon control components, tubing and hinge material, CG Models now offers many nylon parts and hardware components separately.

Citizen-Ship Radio Corp. (810 E. 64th St., Indianapolis, Ind. 46220): From single channel-escapement setups, to multi-digital propo; still offers reed equipment. Smaller, lighter DMS digital servos. New DPR-4 receiver allows light-weight installation; servo has 3 different outputs for universal linkage, integrated circuit reference generator; DPR-4 receiver will operate from C-S digital propo transmitters DPT-3, DPT-4 and DPT-5.

D & B Industries (3655 Calumet Rd., Decatur, Ga. 30032): Swinger low wing for full stunting. Full prefab claimed to eliminate need for cutting any balsa. Priced around $27.50; D&B field box includes built-in high volume pump which dispenses fuel from self-contained 1 gal. bottle at 10 oz. per minute, operates from 6V, $19.95 complete.

Darin Bros. (5221 Allen Rd., Allen Park, Mich. 48101): Qwik-Cote, fuel-proof, fade-proof, moisture-proof coating applied with small flatiron; needs no paper under open areas, in six colors plus black and white. A 26 x 36" sheet costs $3.70.

deBolt Model Engineering Co. (3833 Harlem Rd., Buffalo, N. Y. 14215): Kit for Cobra semiscale Bell P-39 stunter. 58" span, 630 sq. in. area, engines from .29 to .50 cu. in.; $34.95. First of new line of clank tanks.

Dee Bee (West Lambs Rd., Pitman, N. J. 08071): Four of new line of ARF planes. Price list for replacement parts for any now in production — or utilize parts for design of your own. Kits $55.95; wings $22.95, fuselage $21.95, etc.

Du-Bro Products (7667 Milwaukee Ave., Niles, Ill. 60648): Extensive line of wheels and small hardware, but real news is entry into the ARF plane field. Aero Commander 100, 49" span high-wing cabin monoplane with 380 sq. in. area; rugged foam and plastic fuselage.

Dumas Products (Box 6093, Tuscon, Ariz. 85716): Boat kits for power-scale jobs, high-speed hydros and ski boats — several sailboat kits from 17" to 45".

EK Products Inc. (3233 W. Euless, Hurst, Tex. 76053): Logictrol III multi systems, smaller receiver and servos, with 14½ oz. flying weight for 4 controls; servos require only three wires (no center-tapped battery) and servo connectors plug into receiver case for neater, more reliable installation. Receivers basically 5-control units, can be converted at factory to 7. Complete dual-stick system with four servos cost $395, on any desired frequency in 27, 50 or 72 MHz areas; XL-3 system offers two propo controls and one trimmable, for boats or sport flying, has same receiver and servo features as the Logictrol 5 and 7, but transmitter is single-stick. Cost $250 less charger and transmitter battery;

Digi-Ghost transmitter and receiver designed for use with Rand actuators for GG or dual-actuator operation; true digital in operation, servos operate in pulsing manner.

Fiber Foam Products (Box 12091, Plantation, Fla. 33314): Sleek fiberglass fuselages with molded-on fin, for Tiger and Phoenix; Tiger low-winger, flies well with Falcon 56 wing — foam wing and stab cores for $20.95 per set; 43½" fuselage, $39.95, adaptable to straight or swept Phoenix wing; new Dolphin ski boat hull is fiberglass, 36" long and 13" beam. Hull assembled, $44.95 FOB.

Finishing Touch (9941 Debbie Drive, El Paso, Tex. 79925): New decal sheets for 98c include insignia for smaller planes, 1/32 to 1/72 scale, either U. S. or German; plenty of larger sizes in Allied or German, for WW I or WW II stocked also.

Flight Control Products (1937 Simmons, Salina, Kans. 67401): Alternate-firing, in-line twin powerplants from pair of K&B .19 engines weigh 13½ oz., cost $49.95 complete, or buy adapters and parts separately; FCP offers several Cox engines fitted with throttles, either exhaust or intake; twin-cylinder opposed versions of these throttled engines will be marketed.

Franklin Glue Co. (2020 Bruck St., Columbus, Ohio 43207): Titebond glue in bottles from 2 oz. up to a gallon.

G. E. M. Models (Box 342, Broadview, Ill. 60153) Fiberglass and wood boat kits, engines, props, accessories for power boats; Fuji outboard motors in two sizes; .15 costs $29.95, .06 is $12.95; former water-cooled, for boats from 24-32" long, smaller unit air-cooled, for 18-24" craft. Both O&R and TAS utility engines, water or air cooled.

Hallco Products (Box 38158, Urbana, Ohio 43078): Hallco 103 GG control system. New size in sheet aluminum landing gear line, B106-6, for planes weighing 8-10 lb.; tread approximately 18"; axles, 8-32 bolts. Anodized clear or black, $5.95 postpaid.

D. R. Hartman (Argenta, Ill. 62501): New fuselages and cowls. Cumulus Zeus sailplane kit beautiful craft with T-tail, 137" wingspan, 1,425 sq. in. area; fuselage with tapered spruce wing spars, special hardware plans with all rib patterns for wing and stab, $40. Matched clear plastic canopy, $2.50, set of ribs, $5.50.

Heath Company (Benton Harbor, Mich. 49022): Heathkit version of well-known Kraft digital propo outfit includes the latest Kraft capacitor-style servos, all nickel-cad batteries, charger, $219.95. Receiver very similar to Kraft unit, but enlarged so that assembly easier for less-experienced; charger for both battery packs built into transmitter.

Kraft Systems Inc. (2466 Seaman Ave., S. El Monte, Calif. 91733): New Gold Medal series four-control propo, total weight little as 12 oz., 225 maH battery pack and KPS-10 servos with potentiometer-type circuit; if more weight can be carried, larger battery pack offered, new KPS-9 servos (with capacitor-type circuitry); new KPR-4 or KPR-6B receiver in all cases. Transmitters thinner aluminum cases, vinyl covered, fully enclosed sticks. All dual-stick on any of the accepted or specified R/C spots in 27, 50 and 72 MHz bands.

Lanier Industries, Inc. (Briarwood Rd., Oakwood, Ga. 30566): Semi-scale P-51, spanning 65" with 630 sq. in. area; for .45-.60 cu. in. engines and full-house controls, $46.95.

Lazott Plastic Corp. (Route 62, Stow, Mass. 01775): Tango biplane not completely assembled, as in Lazott Solo Monoplane, but hard work done at factory. Wingspan 52", total area 936 sq. in., dry weight 6 lb.; control hinging butt style for free action; wire center-section assembly finished, landing gear breakaway type; wing panels plastic-covered foam, joined by modeler. Kit $49.95.

Micro-Avionics Inc. (530 S. Mountain Ave., Ontario, Calif. 91762): XL digital systems offer 4-control plane equipment weight of about 15½ oz.; new One-Six servos considerably smaller, lighter, have unique snap-bracket mounting. Brackets for one, two or three servos side-by-side offered; new receiver accepts servo plugs at one end, positively locked in place; transmitters and receivers offered in 4 and 6-control versions; transmitters one stick or two, on all standard frequencies; charger separate dual-output unit with power transformer for utmost safety. Complete four-control system with 2-stick transmitter, $399.95.

Midwest Products Co. (400 S. Indiana St., Hobart, Ind. 46342): Semi-scale Fokker D-7 and Nieuport 17; with molded foam wings and stab featured in other Midwest kits. Span 44", area 504 sq. in., for .15-.19 engines.

Min-X Radio, Inc. (8714 Grand River Ave., Detroit, Mich. 48204): IC-4 digital propo system offers plane equipment weight of 15½ oz. through smaller servos and receivers; servos push-pull output plus wheel; vinyl-clad transmitter with either OS or Min-X sticks (latter cost $25 more); complete system with four servos, charger, batts., $350 with OS sticks; integrated circuits.

More-Craft Products Co. (Higginsville, Mo. 64037): Boat-Tote, combination tool box and boat stand; upper portion adjustable to hull angles; ample area to store transmitter and fuel. Costs $12.95, built-up, $17.95.

Model Rectifier Corp. (5300 21st Ave., Brooklyn, N. Y. 11204): Enya engines, also Webra's; MRC-Futaba single-channel equipment in several forms, completely prewired; lowest cost outfit has super-regen receiver, compound escapement for rudder, $39.95 less batteries; MRC-Futaba MU-2 completely assembled plane molded in plastic foam; spans about 36", simulated tip tanks and twin engine nacelles. An .09 engine.

Octura Models (8148 Milwaukee Ave., Niles, Ill.

60648): White Heat hydroplanes in many forms; 4-60 is 36" long, for .60-.71 power; kit costs $27.75. Coming soon White Heat XV, for O&R C-III engine in F Class racing, hull 42" long x 16" beam. Handles fiberglass ski boat line of Stinger Mfg. Co.; Aerokits also available, 46" long Sea Queen popular.

One Design Electronic Models, Inc. (3100 Washington St., Toms River, N. J. 08753): Large fiberglass power boats for one or two O&R utility engines. Called Moppie, hull exact copy of full-sized ocean-running speedster. Model about 4' long, tight hatches. Basic kit (hull, deck and hatch unassembled, $99.50), up to completed twin-engine boat with installed radio; also Half Meter all-fiberglass racing yacht, in many kit forms.

Orbit Electronics (11601 Anabel Ave., Garden Grove, Calif. 92640): New digital outfit with much smaller receiver and servos, guaranteeed installation weight under 16 oz., four controls; new 4-8IC, integrated circuits, system costs $415 on 27 MHz, $15 extra on 50 or 72 MHz; Orbit exhibited smallest digital servo at show — won't be produced yet.

Penford Plastics Corp. (Box 134, Prospect, Ohio 43342): Semi-Scale Goodyear-racer style mid-wing called Bruiser, .049-.15 power; rudder-only, or full house propo (small-size systems); 3-piece molded fuselage, integral fin and cheek cowls, 40" span molded wing, matching stab, tempered alloy LG; $34.95 kit. Also all-plastic Piper Skycycle, scaled for .09-.19 power, not yet in production.

Performance Aero Products Inc. (Box 6064, Shirlington Sta., Arlington, Va. 22206): Super-performance HP engines from Austria, several forms for planes and boats; HP 61-RC version costs $70, said to deliver 1.48 hp with 5% nitro fuel. Boat and racing versions stocked; muffler, spinner, other accessories.

Pettit Paint Co. (507 Main St., Belleville, N. J.): Hobbypoxy in every form. Wingamajig holds wing frame to speed covering; further development on Jacobs foam and fiberglass fuselage construction.

Proportional Control Systems (2466 Seaman Ave., S. El Monte, Calif. 91733): Improved version sells complete for $299.95, four controls. Transmitter new enclosed sticks, case vinyl-covered; servos Kraft-Hayes KPS-9 with capacitator feedback to eliminate pot troubles; available on 50 MHz or 72 for $20 extra.

Ra/Car Developments (524 W. Central Park Ave., Anaheim, Calif. 92802): Glow-engine race cars have clutches, gearshift operated via R/C, as well as steering and throttle; ready-to-run, or kits, or any desired components; ⅛ scale Indy racers, wheels fully sprung, racing tires are Goodyear; K&B or McCoy 19 power, driving gear box through centrifugal clutch.

Rand Mfg. Co. Inc. (8909 Hubbell Ave., Detroit, Mich. 48228): New switcher to convert LR-3 servo to same operation as servo in GG-Pak, either finished or kit; will also be switcher similar to elevator servo in Dual-Pak, but finished; future item a bomb and streamer dropping servo.

R/C Development (1836 Alabama Ave., Fort Wayne, Ind. 46805): One-, two- and three-axis sticks enclosed-front style; three-axis unit has pot in stick knob, $23 with Allen-Bradley pots; knob-pot-stick assembly sold separately, to fit Bonner control assemblies, $11.95 with pot; BC-1 nickel-cad charger has silicon bridge rectifier, filtered and metered output, variable transformer current control, up to 1 ampere or 24V output.

Royal Electronics Corp. (2101 S. Leyden, Denver, Colo. 80222): Royal Classic digital apparatus, in versions from 2 to 6 controls, available either finished or kit; Royal will continue to push single-channel R/C, transmitters to suit Rand Dual-Pak and GG-Pak, also new Pioneer-2 superhet.

Royal Products Corp. (6190 E. Evans Ave., Denver,

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Colo. 80222): R/C scale kits. P-38 Lightning, 74" span for two .35-.49 engines, has 695 sq. in. area, weighs 9-10 lb.

Sig Mfg. Co. (Montezuma, Iowa): Bud Atkinson's T-34, Feb. '68 A. A. M.; kit includes formed LG, canopy, molded plastic engine cowl, etc.; spans 70", costs $36.95. Maxey Hester's stunter, low-winger called Simco, .40-.60 power, kit $34.95, includes foam wing cores, full-length fuselage sides. The Baron's Buggy, 34" span bipe simulating WWI German fighter; for .049-.09 engines, $12.95 kit.

Special Products Ltd. (8444 Reseda Blvd., Northridge, Calif. 91324): Shrink-Tite covering, flatiron to tighten; also S. P. L. 990, finish material in 10 colors, either high gloss or flat, claimed good surface coverage 2-3 coats.

Sterling Models (Belfield & Wister, Philadelphia, Pa. 19144): Flatiron here too. Coverite fabric has adhesive already on it, glossy finish with ⅓ paint or dope required on silk or nylon. New WWI kit plane, Fokker D-7; scaled 2" to 1', 58½" span, 950 sq. in. wing area. Kit includes plastic engines and machine guns, metal cowl, nylon pushrods. $39.95.

Su-Pr-Line Products (34 Copper Dr., Plainfield, Ill. 60544): Nyrod, Su-Pr-Klevises, Su-Pr-Kreepers. Slim-Pak includes 30" length of Nyrod, Klevis, Keeper and hardware, $1.35; Su-Pr-Rack adjustable wall storage rack for wings or fuselages, kit $4.95.

Tech Aircraft & Electronics (2225 East 17 South, Salt Lake City, Utah 84108): Five different all-plastic planes in kit form or almost-ready-to-fly; kits take 6-10 hours to build, ARF's 1 hour; 56" span Tech Trainer shoulder-wing trike LG design .19-.35 power, $29 kit, or $40 in ARF; Chipmunk copy of Krier stunter, 56" span, for most .45 engines; $49 for kit, $80 for ARF version; P-51, P-40 and WWI scale planes forthcoming.

Top Flite Models, Inc. (2635 S. Wabash Ave., Chicago, Ill. 60616): New Super-Monokote in five colors plus white, $1.35 per running foot any length, 26" wide; original Monokote available, now recommended for trim, field repairs, $1.25 per running foot, 26" wide; regular (has sticky adhesive on back) in 6 colors, plus black and white.

Vic's Custom Models (618 Cowpath Rd., Lansdale, Pa. 19446): Phantom, low-wing stunter with fiberglass fuselage, pre-covered foam wings; span 66", engine side-mounted, trike LG. ARF form Phantom costs $69.95, disassembled fuselage at lower cost. 67" span Convertible Trainer shoulder-wing stunter good for sport or comp. Framework assembly about 6 hours; kit $24.95.

VK Model Aircraft Co. (12072 Main St., Akron, N. Y. 14001): Kit for refined Nieuport 17 flown by Vern Krehbiel at Rhinebeck WWI. Priced around $45. Scaled 2" to 1', 54" span, for .46-.51 engines. Includes metal ring cowl, finished hardwood wing edging, hardwood longerons and spars, aluminum aileron torque rods, nylon control fittings, balsa ribs, etc.; decal kit markings included, or separately for $1.25.

Warner Industries, Inc. (259 Hosack St., Columbus, Ohio, 43207): Foam wing kits for 19 planes (and five UC jobs). Dihedral angles precut, bellcrank, servo and landing gear cutouts as required, fiberglass reinforcing cloth for center joint; from $6.45-$11.45. Also fiberglass cloth and tape; coming is fuselage jig (called Jig-It).

Williams Bros. (6719 Salt Lake, Bell, Calif.): New sizes and styles wheel pants; balloon style 7" long, for 2½ x 1" balloon wheel. $2.49. Contour style same length, holds wheel up to ⅝" width, same price. Cosmic Wind pants 10" long, for 3¼ x 1 5/16" wheels, $3.10. Two-piece plastic spinners from 1⅝ to 2¾" dia., parabolic shape; scale dummy radial engines in Wright J-5 Whirlwind, P&W Wasp Jr. and 1918 LeRhone contours in sizes to 1", 1½" and 2" scale.

Wing Mfg. (Box 44, Morton Grove, Ill.): Model B Posi-Tract has several improvements, including Tru-Torque strut, adjustable for length, $11.95 per unit; actuator switch, nose gear conversion available. Andrae R/C scale plan kits include molded canopies, formed LG struts, detailed instruction book; A-30 Baltimore, Wildcat, Avenger plans kits stocked. Super-Fab kit for A6M2 Jap Zero includes molded foam wing and stab cores, fiberglass fuselage, Posi-Tract LG units, many molded components, formed cowl, scale spinner, etc. Spans 59", to 1½" scale, kit $89.95.

World Engines Inc. (8960 Rossash Ave., Cincinnati, Ohio 45236): Supertigre and OS engines, ST twin-cylinder opposed engine (availability unknown), and small opposed twin made from two Cox engines (.02's, we believe) complete with dual exhaust throttle. Latter is custom on sale soon. Also neat little flying boat with molded plastic hull, for Midwest 44" span foam wings.

R/C World

Continued from page 34

special membership cards to indicate that the holder is a member of a sanctioned club. If this idea takes hold, it's another inducement for modelers to join clubs, and for latter to apply for AMA charter.

Fabulous Goodyear racer: Having had some sad experiences with heavy handicaps on his 450 sq. in. Goodyear plane last season (at the Nats, Hal deBolt had such a large handicap that in some heats the first

planes off had finished a complete lap before his plane was flagged for takeoff!), he resolved to go Scale Goodyear event for 1968. The results were seen for the first time at the Buffalo Conference, and left even experienced builders a little shaken. First, his Midget Mustang is as close to scale as it can possibly be made (American Modeler plans were utilized). Second, the finish and decoration is out of this world!

This is a 50" span job with 480 sq. in. area, weighs 4½ lb., carries Orbit 4-8 radio and a K&B 40. deBolt built the plane, and the finishing details were applied by Buffalo modeler Dave Gierke, who is a fabulous workman in his own right (a UC expert, Dave won the Stunt event at the '67 Nats). The plane is finished in red, with light and dark decorations, but the small detailing amazes onlookers. You practically need a magnifying glass to read some of the lettering, and the rivet detail is amazing. The cockpit has a pilot, of course, and a beautifully equipped instrument panel. Hal challenges Goodyear officials to downgrade **this** plane for departure from true scale appearance!

Eastern glider meet: The first AMA-sanctioned R/C Glider meet that we can recall hearing of in the East will be held on June 4-5 by the DC/RC at their club field in Howard Co., Md. According to Don Rothbaum (12505 Feldon St., Silver Spring, Md. 20906) who sent the data, gliders must conform to min. wing loading, max. weight and size of the FAI Sporting Code. No engines will be allowed; there will be high-start and winch tow facilities at the field. Superhets only on 27 and 72 MHz, regens allowed on AMA-suggested spots on 50 MHz. One point awarded for each second glider stays in air after release from towline; 50 added points for landing within 30' of marked spot. CD might specify maximum flight time before meet starts; glider must be on ground within three min. after expiration of this max. time. Prizes for three top places, and for best looking glider at meet. Four dollar fee for each glider; tickets for Sat. evening barbecue at field, about $2 per person.

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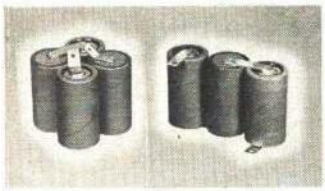

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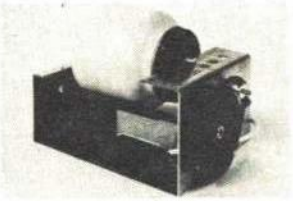
Save more than 50%! Long life—accept 300 charge and discharge cycles. 1.25 Volts per cell—750 milliampere hours capacity. Excel. charge retention. Hermetically sealed. Indefinite storage life. Multiple cells welded in series—easily cut. Combine to form btry. ⅞" dia. x 1⅝" high. Spec. price for 100 up. Low-cost charger separate.

Order No.	Cells	DC Volt	Price Ppd.
40,986KX	1	1.25	$ 1.50
40,987KX	2	2.50	2.75
60,634KX	4	5.00	4.80

70, 812KX Trickle Charger (1-10 cells) 10 95



NEW, LOW-COST GEM TUMBLER

Become a rockhound! Fascinating hobby . . . loads of fun, inexpensive, easy. Make jewelry of all kinds — decorative bookends, table tops, etc. Simple tumble-finish readily available gemstones . . . then polish to high lustre . . . brings out beautiful colors. Rugged 3-lb. capacity tumbler w continuous duty motor compares to units selling for many times its price.

Stock No. 70,874KX .....$10.75 Ppd.
6-LB. ROCK ASSORTMENT (10 Types)
Stock No. 70,868KX .....$ 9.00 Ppd.

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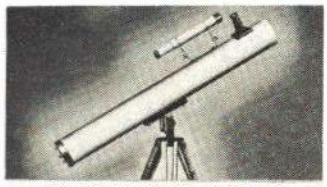
Big 8' and 16' diameter. Create neighborhood sensations. Great backyard fun. Exciting beach attraction. Blow up with vacuum cleaners or auto air hose. With helium use in sky to attract crowds, advertise store sales, announce fair openings, etc. Amateur meteorologists use balloons to measure cloud heights, wind speeds, temperature pressure, humidity at various heights. Photographers use for low-cost aerial photos. Heavy duty neoprene.

Stock No. 60,568KX .... 8' .....$2.00 Ppd.
Stock No. 60,632KX ....16' .....$7.00 Ppd.



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See the stars, moon, phases of Venus, planets close up. 60 to 180 power. Aluminized and overcoated 3" diameter f/10 primary mirror, ventilated cell. Equatorial mount with locks on both axes. Equipped with 60x eyepiece and mounted Barlow lens. 3x finder telescope, hardwood tripod. Included FREE: "STAR CHART"; 272-page "HANDBOOK OF HEAVENS"; "HOW TO USE YOUR TELESCOPE."

Stock No. 85,050KX .....$29.95 Ppd.
Stock No. 85,105KK (4½") $84.50 FOB
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WOODEN SOLID PUZZLES

Here's a fascinating assortment of 12 different puzzles to provide hours of pleasure and stimulate ability to think and reason. Animals and geometric forms. Take them apart and reassemble them. Lots of fun for the whole family—young and old. Will test skill, patience and ability to solve problems. Order yours now.

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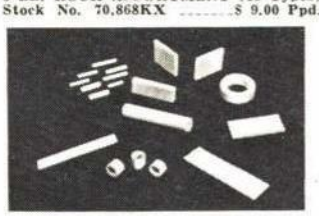

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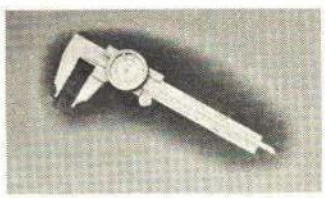
Stock No. 70,967KX .....$6.00 Ppd.

JUNIOR POCKET COMPARATOR

Check, measure, inspect with this low-cost 6 power comparator. Measures to .005". Linear, circular and thickness scales for checking layouts, machining on tools, dies, gauges, threads, chamfers, etc. Etched glass reticle insures accuracy. Won't bend or warp. Clear cell admits light. Magnifier can be focused and locked. 1¾" high, easily fits pocket. Case.

Stock No. 30,169KX .....$12.50 Ppd.



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4" capacity. Precision dial for inside outside, depth measurements. Read directly from dial graduated and guaranteed to .001". Beam scale graduated in inches and 10ths of inch. Measuring surfaces ground and lapped for accuracy. Stainless steel, chrome finish. 7" long x 2½" wide.

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WITH METRIC GRADUATIONS
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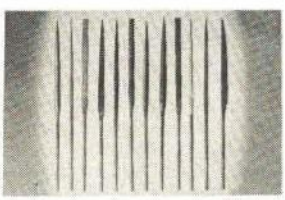

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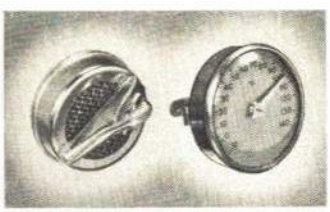
Projects illustrations up to 3" x 3½" — enlarges them to 35" x 30" if screen is 6½ ft. from projector, larger pictures if screen is further away. No film or negatives needed. Projects charts, diagrams, color or black-and-white. Operates on 115 volts A.C. current . . . 6 ft. extension cord and plug included. Size 12" x 8" x 4½" wide. Weight 1 lb. 2 ozs. Plastic case.

Stock No. 70,199KX .....$7.95 Ppd.



2-IN-1 THERMOMETER TIE CLASP

For the well-dressed "weather watcher." Helps you keep tabs on your tie and the temperature too. Handsome gold finished 1⅛" diameter face and clasp Precision American-made thermal sensing unit. Scientifically accurate. Calibrated from —10° F to 140° F in 2° F increments. Screened case backing for quick adjustment to sudden temperature changes. Great for yourself or as "a gift for all seasons." Assembled in France

Stock No. 41,127KX .....$3.95 Ppd.

MINIATURE BALL-BEARING MOTOR

1½ to 3-V DC type—most power with least current. Ideal for experiments, hobby projects, models, displays, etc. Sintered graphite-copper removable brushes with min. frictional drag. Field magnets **within** armature coils. Runs 50 hrs. on 2 flashlight bat., over a week on our 1.2-V Ni-Cd rechargeable cell. Shaft dia. .083—extends ¼" from each end of 2¼" x 1" dia. metal housing with transparent plastic end. Wt. 2½ oz.

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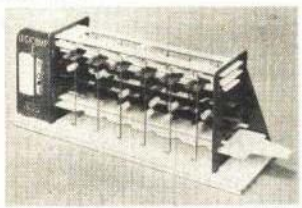

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Solve problems, teach logic, play games with miniature version of giant electronic brains! Adds, subtracts, multiplies, shifts, complements, carries, memorizes. Colored plastic parts easily assembled. 12" x 3½" x 4¾". Incl. step-by-step assembly diagrams, 32-p instruction book covering operation, computer language (binary system) programming, problems and 15 experiments.

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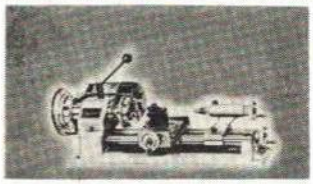
"FISH" WITH A MAGNET

Go treasure hunting on the bottom! Fascinating fun & sometimes profitable! Tie a line to our 5-Lb. Magnet — drop it overboard in bay, river, lake or ocean. Troll it along bottom — your "treasured" haul can be outboard motors, anchors, other metal valuables. 5-lb. Magnet is war surplus — Alnico V Type — Gov't. cost $50. Lifts over 150 lbs. on land—much greater weights under water.

Stock No. 70,571KX .....$12.50 Ppd.



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Compact, power tool for metal, plastics, wood with full capabilities of precision machine shop. Work as lathe or vertical drill press. Complete with motor—loaded with extras. 1 of a kind for industrial miniaturization, home workshop, model shops, labs, etc. Use basic tool to turn, face, bore, recess, polish. Converts in 1 minute to vertical machine to mill, drill, jig-bore, surface grind. Quickly mastered to do pro-quality work. Comp. inst.

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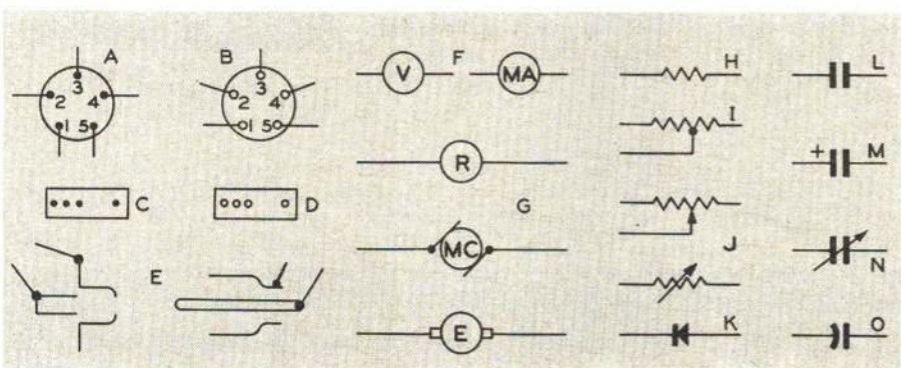
Getting Started in R/C

More Circuit Symbols for R/C use; Tenth in a Series.

HOWARD MC ENTEE

PART 9 of this series covered the simpler components seen in R/C circuit diagrams, those often utilized in wiring the control system in a model — but **not** all of the parts used in the system are components — receiver, servos, transmitter and so on. Though 12 sketches were described, it was apparent we couldn't cover in the space allowed all the parts in a system circuit. Therefore we continue the dissertation on circuit symbols.

While parts of the simpler R/C systems are often wired up with soldered connections, connectors are used in most systems today — even in many of the simplest. Connectors come in variety of shapes, sizes, contact arrangements; we depict only a couple here. One basic category in the connector field is shape — in R/C we use mainly those that are either round or oblong. Sketches A and B show the round variety, in this case with five pins. Generally — but not always — a circuit draftsman will show the pins on the plug as solid (as at A) while the socket has tiny circles for each contact, as in B. Since battery connectors are "hot" — that is, there is voltage present, and the leads could cause damage if shorted, the connector end with the recessed contacts (which are much more difficult to short out, should they contact metal accidentally) should **always** run to the battery; the connector end with exposed pin then goes to the switch and other components. Generally, the part with exposed pins, as at A, is called the plug or male end of the connector, while the other half as in B is the socket (or female) half. With receivers and servos, it isn't so important to observe this strict plug and socket rule, as these have no hot leads to short.



Plug and socket terms doubtless stem from the fact that tube sockets were one of the first forms of separable connectors; suitable plugs to fit the socket holes were matched to them. We still see quite wide use of the miniature 7-pin tube sockets. If more leads are required, the slightly larger 9-pin miniature sockets are utilized. These parts are now considered rather bulky, and smaller types are preferred. Some have the pins in A circular arrangement, but more flat types are now seen. Some connectors have numbers or letters at each pin, as we show in A and B; this makes it easy to keep the leads matched on both halves. Most do not have such pin designation however, and real care must be exercised to locate the wires properly.

It is conventional to number pin contacts on a tube socket in a clockwise rotation with the contaet next to the gap considered as #1, as in B. Such sockets generally have a wider gap between two of the contacts (as between 1 and 5 here) than between each of the other contact

pairs — 1 and 2, 2 and 3, etc. (A few sockets have even spacing between all contacts. However, a keyway or other marker between two of them serves to indicate and substitute for the normal gap. This numbering procedure is only valid when you look at the socket "bottom" or the side where the wires are soldered to the contact's lugs. View a plug with the pins or prongs away from you; this "top" end is where the wires are inserted and soldered. In order to match correctly with the socket, a plug's pins are numbered in a **counter-clockwise** rotation — again with the #1 pin next to the gap, key, or whatever.

All connectors with pins in circular arrangement are automatically "polarized" — that is, they can only be assembled one way. With flat plugs, however, quite a few are *not* polarized; they can be assembled in either of two ways — and the wrong way can lead to "fireworks" and component damage. Such non-polarized connectors may have grooves on the sides, and great care should be taken to match these grooves. It is smart to put a dab of bright colored dope on non-polarized connectors (use different colors for connectors to different servos) so there is no doubt that they will be assembled correctly.

Flat connectors may have one pin spaced apart from the others, as in C and D. These can only be assembled one way, of course. Or you may see a single pin on one half of the connector, and all the other pins on the other half — again they can only be assembled one way. C, with its solid pins, would be considered the plug, and D with the tiny holes is the socket.

The phono plug is seen frequently, where only two leads are needed. E shows one way to draw this; it is really a cross section of such a connector, with the portion that's generally fastened down at left.

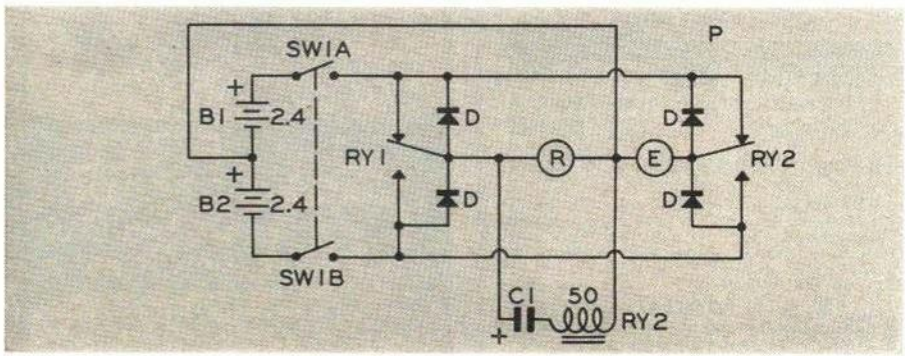
Meters often appear in circuitry, and are generally depicted simply as a circuit (as in F) with a letter in the center to indicate meter type. At the left in sketch F, V stands for voltmeter, while MA is milliammeter.

We mentioned servos in Part 9, and showed (at sketch I) one way to indicate them. But the simpler motor-driven servo is often shown as a circle with a letter, per sketch G. All three forms are common, and serving to indicate the servo motor itself. Slanted lines in the center symbol depict motor brushes, as do the "bumps" at either side of the bottom circle. Again, the letter shows what purpose the servo performs — R for rudder, etc.

Resistors are indicated by zig-zag lines, per H-J. H is a plain, fixed resistor; I shows a tapped resistor. At J are two variable resistors; the upper one can be either a rheostat (which has only two connections) or a potentiometer (which has three connections, though often only one end of the resistance element, and the variable contact are utilized). The lower unit at J is also a rheostat — there are only two connections, to one end of the resistance element itself, and to the variable contact.

At L we see a plain, fixed capacitor; it could be any of several types — ceramic, paper, mica etc. If there is a plus sign at M, you can consider it is an electrolytic capacitor, the plus end going to a positive point in the circuit. At N we have a variable capacitor. Both fixed and variables are often shown with one straight and one curved line, as at O (variable version would have an arrow across both lines). **Generally**, the curved line indicates the ground or common end of the unit (the outer foil plate of tubular paper capacitors usually goes to ground, and is indicated on the capacitor itself by a ring at the end

Continued on page 71



Countdown

Continued from page 29

safely is to always do it exactly right. Get those individual nichrome igniters installed in each engine properly. Make sure all the clips are brightly, spotlessly clean. Make sure each clip is correctly attached to its igniter wire. Make sure that no clip touches another clip or any metal parts of the launcher. Make sure your electrical firing system operates correctly. Make sure your battery is powerful enough. By carefully stressing these points and by having somebody else check the hook-up, too, it's been a long time since we've had a failure in a cluster launch in the NAR Space Pioneers Section.

NASA SATURN PLANS:

Some of you may have written to NASA Marshall Space Flight Center in Huntsville, Ala., requesting copies of the plans of the Saturn-Ib and Saturn-V specially prepared for modelers. Some of you may not have gotten them on request. If so, write again. NASA gets thousands of letters per day from people asking for information, and sometimes something slips up. The drawing numbers for the Saturn-Ib are 10M03737 and 10M03738; for the Saturn-V, the drawing numbers are 10M04575 and 10M04576. They are minutely detailed, and you will be driven nuts with all of the cross-sections, dimensioned doo-dads, and color schemes shown on these drawings. They are unimpeachable scale information sources.

However, scale modelers will be happy to note that the Estes kit of the Saturn-Ib is right on scale. To be absolutely correct, the Apollo capsule atop the model should be built with its protective launching shield over it, which is one of the two configurations in which you can build the kit capsule.

I haven't had the chance yet to assemble the new Revell Apollo Spacecraft kit in a scale of 1:48. But it is a beautiful plastic kit, and I'm waiting for some modeler to come up with a Saturn-V launch vehicle in 1:48 scale to go under it! The entire vehicle would stand 6 ft. 6 5/64 in. high!

KEEP YOUR PLASTIC FINS ON!

I got tired of having transparent plastic fins break off when used on scale models of finless vehicles. Using clear dope as a cement to bond the acetate plastic works, if you manage to get a good bond. I ran some experiments with various types of plastic cements to determine the best cement to use with clear plastic fin assemblies, and I am happy to report to you that I've found a plastic cement that's cheap, easy to get, and gives a better bond than 007.

This wonder stuff is DuPont Plastic Cement, Stock Number 9011, that comes in a 1.75 fluid-oz. tube, colored blue and white. It is available in most hardware stores. It will bond vinyl, styrene, acrylic, and phenolic plastics. It's fast drying and strong. It acts like contact cement because you don't have to use very much of it and the instant you put the two pieces of plastic together, it bonds almost at once. This gunk doesn't seem to care what kind of plastic you bond to any other kind of plastic, either . . . except it doesn't like Teflon, but nothing seems to like that introverted molecule.

I've used the DuPont Plastic Cement for building flying plastic models, and the plastic itself busts before the cement joint turns loose. It's real handy stuff, and no modeler's workshop should be without it. Cost: 69 cents.

NEW ENGINES

The Estes Type B and Type C engines now being shipped look a little bit differ-

ent from the usual Type B and Type C engines you've been getting until recently. These new Estes Type B and Type C engines are different. They have exactly the same outside dimensions as before, 18 mm. x 70 mm., but their inside dimension is larger, 0.500 inches as compared to the old 0.406 in. The nozzles also look different. These new Estes engines are NAR-certified. They have the same total impulse as the older versions, but a slightly higher thrust because of the greater burning area. As a result, thrust duration is a little shorter. These new Estes engines have a lot of snort to them, and they will loft large models at higher accelerations, and produce some higher altitudes, as well. The new Estes engines were certified for use in NARAM-9.

The NAR Standards & Testing Committee has also contest-certified the Model Rocket Industries Type A.8-2 engine; under the new NAR metric engine classification, it is a Type A5-3. Also certified are the following Rocket Development Corporation engines using the standard 18 x 70 millimeter casing; Manufacturer's type number is followed by NAR metric type number in parentheses: ½A1.1-2 (½A5-2), ½A1.1-4 (½A5-4), A.8-0 (A3-0), A.8-3 (A3-3), A.8-5 (A3-5), B.74-0 (B3-0), B.74-4 (B3-4), and B.74-7 (B3-7). Remember not to confuse the old type numbers based on the English system with the new numbers based on the metric system. The old Type B.8-4 engine becomes a B3-4 metric engine, which might lead you to confuse it with the old B3-5 engine. But you can always look at the nozzle to tell whether or not it is the quarter-inch diameter throat of the high- thrust core-burner type.

The Committee reports that the Centuri Mini-Max engines are not certified and that

the certification has been withdrawn from all old Coaster and Prodyne engines because of the advanced age of the remaining engines produced by these firms that are no longer in business. Same holds true for the little Uni-Jets, if there are any of them left around.

MODEL ROCKETRY IN THE MAGAZINES

We've been getting increasing exposure in various large circulation magazines lately. The March issue of **American Way** magazine, published by American Airlines, carried a story on model rocketry, as did a recent issue of **Campus Life**. Model rocketry needs this sort of thing because we all still need to do whatever we can to educate the general public about what we are and what we aren't. Good newspaper publicity about local club activities helps a great deal, and this is reinforced by the articles in general interest magazines read by the public all over the country.

(Editor's Note: This magazine is flattered by the many letters requesting more space for rocketry articles. We will consider a few design projects.)

Proportional System

Continued from page 35

nickel-cad battery pack.

The latter packages three G.E. 1 AH cylindrical cells in a plastic case. Current drain of the Dual-Pak system is such that you can be assured of one hour of flying time between full charges. The pack may be charged at rates up to 100 maH.

Wiring color codes and connectors are such that it is very simple to hook things up — in fact the entire Dual-Pak Rand assembly comes all plugged together, ready to connect to a receiver (but the battery may need charging before you are able to try out the equipment).

You can use part of the packing box as a template to mark out mounting holes for the two servos. A neat mounting alternative is the Rand Double-Actuator mounting kit, which includes a plastic plate to hold two servos, and all necessary hardware, including shock-absorbing grommets for the plate. We show the two servos here, mounted on this plate.

The instructions with the Dual-Pak are very complete, and include needed modifications to match nine different commercial receivers to the outfit. Of course, with such systems as offered by Citizen-Ship, Min-X, Bonitron and others, this "matching" has all been done for you, and you just plug in the receiver and are ready for trials. The Rand instructions cover use of superhet and regen receivers, also relay and relayless types.

Specifications: Includes two special servos, a three-cell (3.6V) nickel-cad battery, all required wiring harness and an on-off switch. Overall size of the two servos mounted on the Rand special plate is 2⅛" wide (less throttle arm, which projects another ¼") x 3" long x 1⅞" deep. Battery pack measures 2⅝ x 1¾ x 1" overall. Weights are: two servos on mounting plate, with switch and all wiring harness, 3.6 oz.; battery pack, 5.2 oz. Total system weight with the C-S model SSH-P receiver would be about 10 oz. System requires a neutral pulse rate of around 13-16 pps; full up elevator requires 9-11 cps, full down is had with 19-21 cps. A pulse length change of 60-40% each side of neutral (which is 50-50% plus) is needed. Full-on tone produces high engine speed, full-off produces low; both servos "go-around" when the throttle is being shifted. Loss of signal drives the throttle to low speed and servos spin, producing a neutral control effect.

— Howard McEntee

Save Over $200 On Your R/C System!

Build The New Heathkit® Digital 5 Proportional

Designed by Kraft Systems, Inc., and put into fast, easy-to-build kit form by the world's foremost electronic kit experts, this new Heathkit R/C System now offers the most economical way to go "full house" on a complete digital proportional rig. Just 15 hours from parts to package and save over $200!

"Full House" Operating Versatility. This all solid-state system consists of a transmitter, receiver, four servos and rechargeable nickel cadmium battern packs. System flyweight is 20 oz.

The transmitter features a fully assembled and tuned RF section to assure peak performance and help speed kit construction. It has five trimmable channels for complete command of five separate servos. And its antenna is self-storing . . . telescopes into the case for convenient portability. As for range . . . out-of-sight. Also features a signal-strength meter to keep you posted on battery condition.

The impact-resistant receiver is highly sensitive, virtually immune to noise and not affected by temperature variations. Compact in size, too. Both the transmitter and the receiver are handsomely housed and protected in lightweight blue enameled aluminum cases.

The powerful receiver pack uses only 4 nickel cadmium cells for space-saving versatility, yet operates up to 4 flying hours per charge. Weighs only 5 oz.

Unique Variable Capacitor Servos . . . no more failure due to dirty feedback elements or vibration. A sealed variable capacitor replaces outmoded resistive elements for fast, exact response. Each servo has multiple outputs . . . one wheel and two linear outputs. And each servo can be mounted in any position for versatile installation flexibility. You'll like their tiny "fit anywhere" size — only 1-7/16" H. x 15/16" W. x 2-9/16" L., and flyweight — only 2.5 oz.

Choice Of Operating Frequencies . . . 26.995 MHz, 27.045 MHz, 27.095 MHz, 27.145 MHz and 27.195 MHz. Be sure to specify when ordering.

A Word About Kit Assembly. 21 years of electronic kit leadership assure your success when you build a Heathkit. No special tools, skills, equipment or knowledge needed. World-famous Heathkit step-by-step instructions generously sprinkled with giant-size pictorials guide your every step of the way. In case you do encounter any difficulty, just call on our staff of technical correspondents and service people . . . they'll be more than happy to help.

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Kit GD-47, transmitter, receiver, 4 servos, and battery packs, ship. wt. 5 lbs. . . no money dn., $21 mo. (save $12.45) **$219.95**

Kit GDA-47-1, transmitter with battery, ship. wt. 3 lbs., no money dn., $9 mo. **$86.50**

Kit GDA-47-2, receiver only, ship. wt. 1 lb., no money dn., $5 mo. **$49.95**

Kit GDA-47-3, receiver battery pack only, ship wt. 1 lb. . . . **$9.95**

Kit GDA-47-4, one servo only, ship. wt. 1 lb. **$21.50**

GD-47 SPECIFICATIONS — TRANSMITTER — 5 Channel — Input power: 0.8 watt maximum. **Output power:** 0.4 watt minimum. **Weight:** 2¾ lbs. **Dimensions:** 6⅝" H. x 6¾" W. x 2⅝" D. **SERVO-Thrust:** 3.5 lbs. **Travel:** ⅝". **Dimensions:** 1 7/16" H. x 1 5/16" W. x 2 5/16" L. **Weight:** 2.5 oz. **RECEIVER — 5 Channel — Dimensions:** 1⅝" W. x 2 5/16" W. x 2⅞" L. **Weight:** 5 oz.

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Porterfield

Continued from page 19

Mark off where indicated by the dotted line, not the centerline. Block up each wing panel 2 inches at point shown on plan utilizing a true flat surface. Glue the spar reinforcement pieces in place having the outside rib A on each panel on the dotted line of each spar reinforcement. This will automatically give the correct center section width. Follow by adding the leading edges, trailing edges and ribs to same then proceed to sheet the entire wing. Leave bottom open where servo board located.

The landing gear is the conventional knock off type and very durable. The 1/16 ply inserts as shown on the side view enhance the appearance and also greatly strengthen the structure. Epoxy in place.

Finishing the Porterfield is strictly up to the individual, but just a little more output will be appreciated later. The only way to get a good finish is to cover all parts with silk after two coats of clear dope have been applied and finely sanded. This hides all wood grain. Next we have to fill all pores in the silk, so a minimum of five coats of clear is applied to the silk with fine sandings in between each two coats. Use 8/0 garnet paper for the job. Color used depends on how many coats are needed.

Our Porterfield was cream and red with black trim so three coats were enough. If the basic color had been white, it would have taken at least five coats to get a solid color, so go accordingly. Now spray a coat of clear over entire aircraft to eliminate all masking tape ridges and bring out the color.

Now comes the rough part of this article. How can we explain feelings beyond words! The craft has been put through just about all tests possible. Ground handling is very good. Takeoffs are straight with no wandering signs. Rough grass takeoffs are beautiful because with each bump you can actually see the load transfer from wheels to wing.

Now the touch-and-goes! We think that anybody having halfway knowledge of R/C flying could do this. The way this bird handles on low throttle is very similar to flying a glider. Up high on low motor, the Porterfield will float around in the same fashion but with the '58 revved up full, it will climb at a 40-degree angle and keep going! Build a Porterfield and we'll bet you can't describe it either!

Wankel in your Future

Continued from page 25

operation, a fact we personally verified at the Graupner plant — by the simple but certain "hand-on-fuselage" test! The dark line around the center of the engine is the cast iron "cylinder" inside which the triangular rotor moves. This is the "working" portion of the engine; the lighter colored sections fore and aft house the counterweights, bearings etc., and of course, help in cooling and mounting. No exhaust damper is utilized on this engine, but idling speed seemed reasonably low. This engine started as just a hobby project by an engineer of the Wankel-NSU group; it is thus backed by the vast know-how these pioneers have accumulated in this form of R/C engine.

Our certainty that commercial model Wankels will soon be here stems not only from the Graupner efforts, but from strong rumors that other model engine makers are engaged in development (Webra is supposed to be well along with a design, for example). There very probably is a Wankel in your future. . . . !

F-82 Twin Mustang

Continued from page 26

trailing edge is 1 x 3/32. Incorporate 1½ dihedral at each wing tip. Add 1½-2 oz. of lead weight to outboard wing, buried in the solid wing tip.

Bellcrank is a standard 2" heavy-duty type. Note that it is set in reverse. This places the pushrod (3/32) next to the left fuselage. The plywood bellcrank mount is epoxied to the bottom main spar, and butted to left fuselage center wing rib. Locate a guide eyelet halfway to elevator to prevent bowing of pushrod. Lead-out lines are swept back slightly, as normal on all U-control models.

Use plenty of balsa filler on all solid balsa components before the final assembly. Silk the wing and apply a filler coat over the silk before final assembly. Check all parts for a correct fit and alignment. Use a slow-drying epoxy on all final joints for strength. For *extra* strength, make epoxy fillets at wing roots and tail roots.

Finish: The grade of finish depends upon the builder. The finish I used is as follows: three filler coats, full strength, and a lot of sanding between each coat for all the pre-assembled parts. Wing is then silked and six coats of dope applied with sanding between each coat. At this time, apply three more coats to the fuselage and tail assembly. Total overall, is six coats. The model then is assembled. Spray on a coat of black (finish color) five times, applying three coats at each spraying — total of 15 color coats. Let the finish dry several days between these spray sessions. Also lightly sand with 350 grit sandpaper before each session. Rub out and wax for the final high polish.

On the Coast

Continued from page 39

wing area; 4) For Powered Gliders: Max. .02 in³ displacement/100 sq. in. of wing area — Max. 180 seconds motor run.

5) Launching Methods: Hand launch for slope soaring, tow line not to exceed 300 meters (984') with winch or auto tow; Hi-Start line stretched no longer than 300 meters; ROG takeoff for powered gliders unless site precludes ROG.

Actual methods by which the contests shall be run are not finalized. Many variables have to be considered. There are basically two kinds of flying sites, slope soaring and flat land. Procedures and

events for one site won't necessarily fit the other site. Several suggested ways of having competitions will be discussed in future months. For additional information contact Dale Willoughby, 14695 Candeda Pl., Tustin, Calif. 92680.

NMPRA EXHIBITION PILOTS

A system of selecting a group of highly skilled pylon race pilots is being established within the NMPRA. These pilots will be classified as licensed exhibition pilots. Bob Francis will be chairman of this division.

There are several reasons for this division of pilots. Primary reason being one of safety in regards to public pylon racing demonstrations. Pylon is a natural for impressing the spectators. At many airshows the pylon flyers receive a greater applause than the full-scale pilots. More and more air show people are asking local R/C'ers to put on a show for them.

Fortunately, the pylon race flyers are constantly aware of the possible safety considerations in such events. With an established group of exhibition pilots available to the modelers and air show people, safety problems can be minimized or eliminated. Quality or highly skilled pilots are assured. The result will be a professional type race that the crowd will enjoy. The intent is to allow only exhibition pilots to perform in these public events.

The 600 sq. in. continental event will be promoted quite strongly within the NMPRA. This event ties in with the new exhibition pilot division.

The Continental event will not be restricted as to pilot ability. Possibly the 450 Goodyear event will be restricted to exhibition pilots only. If the idea is received favorably among the pylon pilots,

then we possibly could leave the 450 rules the way they are now. The speed reduction requirement that the contest board has required for 1969 **may** be eliminated if the exhibition pilot system is adopted.

The reasons for the 600 Continental event will be discussed next month. This event will be even bigger than the 450 Goodyear event — at least I hope so. You should see several of the current pylon pilots flying these ships. I have one of these models in the works. Would you believe a Yellow Trash No. 2?

ODDS AND ENDS

Would like to have reader comments on the following subjects: Is R/C a sport or a hobby? What would you think of pylon racing with required pit stops? How about 19-powered pylon racers using the new little radios? An organization within the AMA to act as the official R/C Pattern advisory board (like the NMPRA)?

A.M. Reviews

Continued from page 9

country could bestow. But so many looked upon their service as a personal responsibility, and their right to serve became something dearer than life."

The great contending forces — America, the British Empire, France, Belgium and Germany — are represented in these 137 exciting biographies. Also included are 75 photographs of some of the heroes of the "sunlight sky."

The Blue Max Medal, $9.95. Distributed by Globe International, Revere Supply Co., Inc., 603 West 29th Street, New York, N. Y. 10001.

HERE is a unique collectors' item. The actual Blue Max or Pour le Merite medal that was worn by the Kaiser's top aces in the First World War. This beautiful medal is blue enamel on gold colored metal and was struck from the same dies as the original. The medal is suspended from an official black and metallic silver ribbon that can be hung around the neck. It is a fine momento, suitable for mounting and framing, and a great conversation piece.

The Zeppelin in Combat, by Douglas Robinson, 417 pages, $9.50. Published by Aeronautica, John W. Caler, 7506 Clybourn Avenue, Sun Valley, Calif.

IN a new revised edition, Dr. Robinson writes the history of the German Naval Airship division from 1912 to 1918. This is the organization which operated the hydrogen-inflated Zeppelin airship in the bombing raids against England and in the long-range scouting missions over the North Sea.

From the documents and official records of the German Navy, the author makes an authoritative study of the Zeppelins in World War I — the first strategic bomber force. He describes in detail the technological development, particularly of the high-altitude craft employed in the last two years of the war.

The book is illustrated with many photographs, diagrams and maps. An appendix contains the complete statistical data on all the Zeppelins used by the German Naval Airship Division. Also included are data of the German naval airship bases and building plants.

Editor's Note: Because of the large number of inquiries received, publishers' addresses are given. Write them direct.

Spirit of St. Louis

Continued from page 38

Preliminary Procedures: If you want your model to have a more customized look, use a No. 0000 jeweler's saw blade to saw elevators, rudder, cabin door and the skylight in top of cabin.

Painting: An airbrush will be required to apply the aluminum paint as it is nearly impossible to avoid streaking if done by brush. A $5.95 Badger No. 250 Airbrush will give excellent results. Spray wheels silver. After dry, paint tire gray-black to simulate rubber color. Spray unit silver then paint cylinders black; next spray propeller silver and when dry, burnish to high polish. To achieve this high gloss, use aluminum powder then buff briskly with a piece of soft flannel until a high sheen is achieved.

It is best to assemble and spray (using at least 3 coats) in following sequence: First cement and tape fuselage together. When dry, remove tape and fill crevices with auto spot putty along centerline and where horizontal stabilizer is cemented to fuselage. Now cement and tape wing halves together and when dry apply spot putty to leading edge if there are any crevices. All struts are to be filed smooth before being painted separately and, between coats of spray, are sanded smooth with wet or dry. Spray wing and fuselage silver and, when paint is dry, again use wet or dry to sand smooth. Install struts when completely dry. A very important point to remember is to scrape all paint from end of struts where they are to be joined to another part. Fuselage is done in same way. After installation, let dry at least 24 hours.

Now install windows and doors — i.e., all clear plastic parts, such as door panels, etc. After cement is dry on clear plastic parts, cut out decals and apply registry numbers on upper and lower side of wing and on rudder. After installing engine, tail skids, propellers, spinner and wheels, your model is complete.

MAIL BAG

AMT-Frog: To the accepted collector's standard of 1/72 scale, the expanded line of Famous Aircraft now numbers 28 models, available in 22 separate kits, from $.80 for P-28, up to $4.00 for Japanese Rita bomber of WW II. Features of AMT's plastic kits include movable parts; full-color matte decals; and accurate, authentically detailed reproduction. AMT's Famous Aircraft series includes the Mosquito MK IV, ME 410, Northrop F-5B, F-86F, Douglas A-20, F-5A Freedom Fighter, F-104, North American OV-10A Bronco, and the Grumman A-6A Intruder.

Lindberg Products Inc: Nine 1/72 scale model kits are being presented as follows: Curtiss Helldiver, Grumman Avenger, Heinkel HE 219, Dornier Do. 17-Z, Japanese Betty Bomber, P-51B Mustang, Curtiss Kingfisher, P-47B Thunderbolt, Grumman Hellcat.

Monogram: Chicago show-stopper was a 1/72-scale 30 in. wingspan B-52 with working features too numerous to mention — such innovations as jet noises! Also available soon, Junkers Tankbuster, JU-87D in 1/4 in. scale.

CHICAGO RADIO CONTROL CONTEST

Radio Control Club of Chicago will host on May 25-26, the "Middle West," Annual Season Opener Contest, for Class C, novice/expert. Contact: Bob Choronzuk, Radio Control Club of Chicago, 15421 Warwick Dr., Oak Forest, Ill.

Getting Started

Continued from page 59

lead attached to this foil). In many R/C—and other—circuits, neither end is grounded, though, and we feel this designation can be confusing.

Diodes are often seen in circuits and shown as in sketch K. The straight line is the cathode, and we often see a K adjacent to this line. The arrow head is the anode.

To show how a few of the circuit elements we have covered in Parts 9 and 10 might look in a simple circuit, examine sketch P. This is actually the Simpro II (upper left circuit on p. 37, March '67 issue of AAM). RY1 is the receiver relay; no coil is shown for this one—it is connected to the receiver circuitry, of course. RY2 is shown in two parts—the circuit is a little simpler this way. The coil is at the bottom, and the 50 indicates coil resistance—50 ohms. Across all relay contacts are arc-suppression diodes, D. No K for cathode designation is indicated—it really isn't needed on diodes. The two circles are servos R for rudder, E for elevator. SW1 is a double-pole-single-throw (DPST) switch, indicated by the dotted line connecting SW1A and SW1B together (remember this is a mechanical connection only, **not** electrical). You can tell at a glance that C1 is an electrolytic capacitor—it has a plus sign on one end.

A very simple circuit, of course, but it does show how electronic and electric circuit shorthand enables us to save hundreds of words, yet show precisely how all the circuit parts are interconnected.

ALWAYS FLY SAFELY

Magazine Mailing Problems

The supplemental mailing address tapes of those who were added to the American Aircraft Modeler subscription lists during the month of Feb. were lost in shipment to the printer. Despite a major effort to duplicate the original tapes, it is possible that some of these subscribers (including AMA and NAR memberships) may not receive March and April issues.

Loss of these tapes resulted in a major expense of man-hours in an effort to sort out thousands of address plates involved on the lost lists — they had been integrated in the master address list by the time the printer advised that the tapes were not on hand.

The further problem, accounting for this notice, is that there is no way of being absolutely sure whether address plates of all the affected subscribers had been retrieved and reprinted. Therefore, those who subscribed in Feb., or who joined the Academy of Model Aeronautics for the National Association of Rocketry during Feb., *and who have not yet received the March and or April issues*, should advise the subscription processing agency as soon as possible: contact AMA HQ., 1239 Vermont Ave., Washington, D. C. 20005, and send the address label from this issue.

Contest Calendar

Continued from page 46

June 9 — East Granby, Conn. (A) Goodyear RC Fun Fly. Site: NCRCC Field. E. Brant CD, 16 Amaryllis Dr., Windsor, Conn. 06095. Sponsor: **Northern Conn. RC Club.**

June 9 — Bryan, Tex. (AA) Houston FF Club Meet. Site: Old Bryan AFB. F. Parmenter CD, Box 523, Friendswood, Tex. 77546. Sponsor: **Houston FF Club.**

June 14-16 — Fletcher, N. C. 14th Annual RC/NC Invitational. Site: Old Asheville Airport. H. Stamper CD, 919 Lancaster St., Durham, N. C. 27701.

June 15 — Downers Grove, Ill. (A) FVMAA Restricted CL Meet. Site: South High School. J. Roush CD, 783 Redwood Dr., Aurora, Ill. 60506.

June 15-16 — Shreveport, La. (AAA) La. State Model Airplane Championships for CL. Site: Hobby Park. W. Lank CD, 9903 Witham, Dallas, Tex. 75220.

June 15-16 — Pensacola, Fla. (AAA) Fiesta of Five Flags 10th Annual Meet for FF & RC. Site: RC — Corry Field; FF — USN Site 8A. T. McLaughlan CD, 741 W. Hernandez, Pensacola, Fla. 32501.

June 15-16 — Jamestown, N. Y. (AA) Meet for RC Site: Airport. W. Johnson CD, 62 Widrig Ave., Jamestown, N. Y. 14701.

June 16 — Elk Grove Vil., Ill. (AA) 1st Annual Skylark RC Meet. Site: Higgans & Rt. 53. H. Brokhof CD, 410 Nash Rd., Crystal Lake, Ill. 60014. Sponsor: **Skylarks RC Club of Illinois.**

June 16 — Downers Grove, Ill. (AA) TIM 2nd Annual AA Contest for CL. Site: South High School. J. Roush CD, 783 Redwood Dr., Aurora, Ill. 60506.

June 16 — York, Pa. (AA) York Line Tamers Annual CL Round Up. Site: Caterpiller Tractor Co. F. Skelly CD, 2225 W. Market, York, Pa. 17404. Sponsor: **York Line Tamers.**

June 16 — Davenport, Iowa (AA) 11th Annual Model Airplane CL Meet. Site: Mt. Joy Airport. H. Pohlmann CD, 720 S. Ohio, Davenport, Iowa 52802.

June 16 — Kansas City, Mo. (AAA) Kansas City Regional Championships for CL. Site: Richards Gebaur AFB. B. Wright CD, 2818 Collin, Independence, Mo. 64052. Sponsor: **Sky Devils MAC.**

June 22 — Salt Lake City, Utah (AA) Summer Solace for FF. Site: Saltair Modelport. J. Jackson CD, 3205 Canyon Rim Lane, Salt Lake City, Utah 84109. Sponsor: **Utah State Aeromodelers.**

June 22-23 — Wallops, Va. (AA) MARKS 3rd Annual RC Meet. Site: Wallops Station. H. Jones CD, 59 Aigburth Ave., Towson, Md. 21204. Sponsor: **Mid Atlantic Radio Kontrol Society.**

June 22-23 — Dayton, Ohio (AAA) Wright Brothers Memorial Annual RC Meet. D. Lowe CD, 5936 Clar-Von Dr., Dayton, Ohio 45430. Sponsor: **Western Ohio Radio Kontrol Society.**

June 23 — Hempstead, L. I., N. Y. (AA) Long Island Drone Society 10th Annual RC Contest. Site: Mitchell Field. J. D'Amico CD, 9224 Rost Pl., Brooklyn, N. Y. 11236. Sponsor: **Long Island Drone Society.**

June 23 — Bergenfield, N. J. (AA) Twin Boro CL Meet. Site: Memorial Field. H. Stiles CD, 185 Franklin Tpk, Mahwah, N. J. 07430. Sponsor: **Twin Boro Flying Club.**

June 23 — Council Bluffs, Iowa (AA) 4th Annual Control Liner Contest. Site: New Airport. D. Bailey CD, 2215 6th Ave., Council Bluffs, Iowa 51501. Sponsor: **Balsa Busters.**

June 23 — Ft. Worth, Tex. (AA) Cowtown Circle Burners Annual CL Meet. Site: Forest Park. B. Davis CD, 1613 Carl, Ft. Worth, Tex. 76103. Sponsor: **Cowtown Circle Burners.**

June 23 — Burgettstown, Pa. (AAA) 2nd Annual Gr. Pgh. CL Meet. Site: Hillman's Model Field. J. Nickerson CD, 29 Maplewood Ave., Pittsburgh, Pa. 15205. Sponsor: **West Hills Aeromodeling Kontroline Society.**

June 23 — Fresno, Calif. (A) Fresno Monthly FF Meet. Site: Near Kerman. F. Gallo CD, 1725 Kenmore Dr. W., Fresno, Calif. 93702. Sponsor: **Fresno Gas Model Club.**

June 29-30 — Creve Couer, Mo. (AA) 2nd Annual Spirit of St. Louis RC Contest. Site: Spirits Field. R. Williams CD, 4060 Bondurante Dr., Bridgeton, Mo. 63042. Sponsor: **Spirits of St. Louis RC Club.**

June 30 — Oklahoma City, Okla. (AA) Central Okla. CL Championships. Site: Topping Park, 5300 N. Broadway Ext. M. McGee CD, 126 S. E. 35, Oklahoma City, Okla. Sponsor: **Controliners Model Club.**

June 30 — Endicott, N. Y. (AA) 3rd Annual Northeast RC Goodyear Championships. Site: Tri-Cities Airport. R. Noll CD, 96 Pine Knoll Rd., Endicott, N. Y. 13760. Sponsor: **Aeroguidance Society Inc.**

June 30 — Ridley Township, Pa. (AA) 2nd Annual Boeing Balsa Choppers UC Meet. Site: Boeing Vertol Parking Lot at Rte 291 & Sellers Ave. R. Heminway CD, 519 Oaklawn Ave., Oaklyn, N. J. 08107.

CORRECTION

In the article Canard Pointers, the April issue, formula No. 1 was in error as printed. The corrected formula appears below.

$$X = \frac{R}{4}\left[1 + \frac{2B(1+2K)}{35}\left(D - \frac{R(1-K)}{4}\right)\right]$$

High School Aviation

Continued from page 18

The finances to sustain the program come from the school district itself and from the U. S. Government under the Vocational Education Act of 1963. Under VEA 63 the Federal Government splits the cost of vocational education. The cost of operation of the plane is paid by the student. Maintenance is pulled by the students assisted by Johnson. The investment of the district to date has been about $300.

The state of California and the nation are watching the Anderson Valley School District and its flying program. From the school's experience they feel that such a program is possible with nearly all schools. While there is not a wealth of manpower to teach flying and A&P mechanics, there is a beginning. If more of a demand for such educators existed they would undoubtedly become available. There are probably many more people quite willing to aid with the donation or sale of aircraft to schools.

The Anderson Valley School District is quite proud of its forward looking school leaders and its fine aviation classes. This year they have 35 of the high school's 135 students actively enrolled. Next year it looks like the figure will jump to around 80. If they can do it so, with the right leadership, so can anybody.

You Said It

Continued from page 11

Garros and Vedrines, killed many German crews. But, on April 19, 1915, Garros was forced to land behind the German lines. His machine-gun arrangement was removed, and tested in Adlershof, near Berlin, by the Inspector of the Flying Corps. Anthony Fokker saw it there, and offered to develop a better arrangement. . . . the first aircraft fitted with the new interrupter gear, a normal Fokker M5 trainer. . . . was tested. Ed.

Serious About Fun

I wanted to compliment you on your January editorial. There is little doubt that the fun has left the hobby for the most part and the cut-throat competition has begun. Got to have the latest costly gimmicks, etc. to win. I have decided to limit contest work in the coming year to a minimum and concentrate on sport scale WW I etc. Even built a rubber ship for a change of pace. If more room were available, I think I could enjoy Old Timer free flights although most of them are older than I am.

Hale Wallace, Johnson City, N. Y.

February Sent Him

I have just been going through your February 1968 issue and feel compelled to compliment you on the fresh clean approach that your magazine now has.

Robert Reder, Monogram Models, Inc., Morton Grove, Ill.

INDEX TO ADVERTISERS

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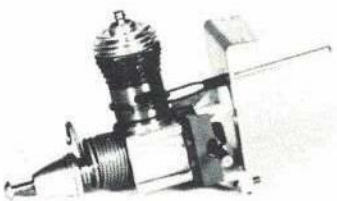

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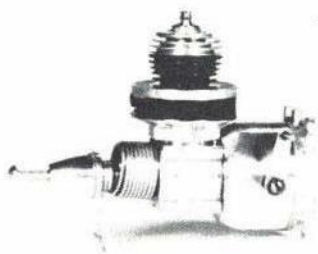

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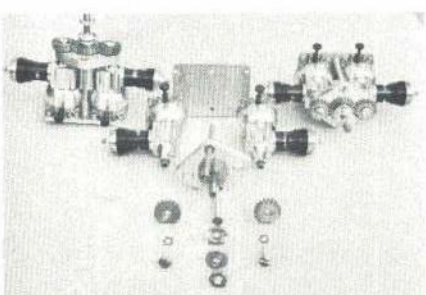

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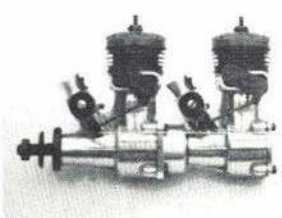

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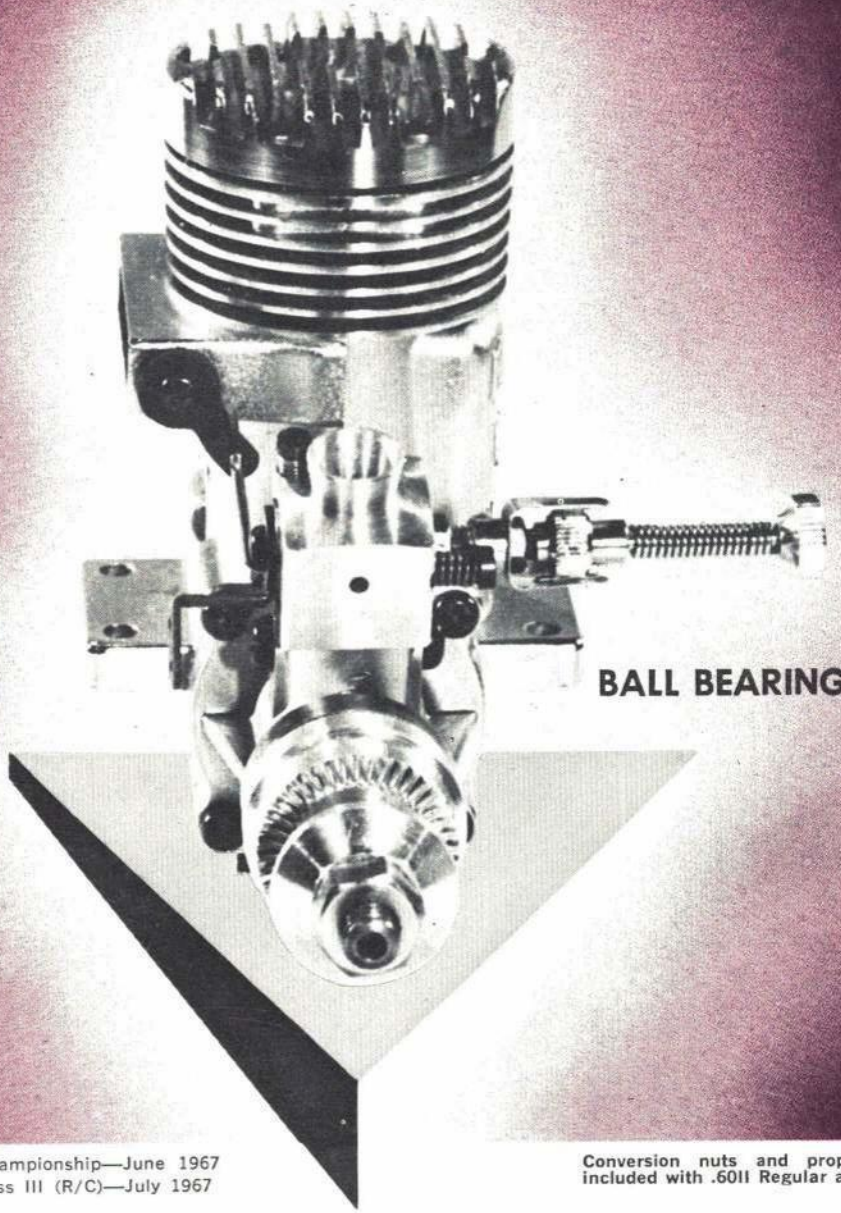

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