Air Trails
model annual
for 1952
50 CENTS (60 Cents in Canada)
All-American Rubber Model
(see Page 31)
Fokker Triplane
(see Page 46)
Ole Slippery Team Racer
(see Page 54)
Ole Slippery
Over 100
OUTSTANDING MODEL PLANE PLANS, PHOTOS, DIAGRAMS WITH DATA including the AIR-MODEL MANUAL and BUILD YOUR OWN RADIO CONTROL Receiver-Transmitter
152
World's Fastest Jet
(see Page 57)

What is R.O.C.?

Streaking upward with all four rocket engines firing is Bell Aircraft's all rocket-powered plane, the X-1. 6000 pounds of thrust drive the plane upward . . . its R.O.C. (rate of climb) presses the pilot against the rear of the cockpit as the X-1 reaches a higher speed climbing than most planes attain while diving.

Those of you who plan to enter the aviation industry should also be concerned with R.O.C. Shown below is a partial view of PARKS COLLEGE. PARKS has enabled thousands of graduates to climb to a position of leadership in aviation in less time than those with an inferior education.

PARKS also increases your R.O.C. by offering you a complete education in aviation in three years instead of four.

At PARKS you will receive a Bachelor of Science in Aeronautics Degree from Saint Louis University — the first university west of the Mississippi. In the 400-year old tradition of Jesuit schools, Parks teaches you not only how to make a living, but also how to live.

ENTRANCE REQUIREMENTS

Applicants must be graduates from a 4-year high school, of good moral character and demonstrated ability.

Air Force ROTC

Complete your schooling — without interruption — and receive a commission as a Second Lieutenant in the United States Air Force Reserve.

MAIL THIS COUPON *today!*

PARKS COLLEGE
OF
ST. LOUIS UNIVERSITY

SILVER ANNIVERSARY
PARKS COLLEGE
1927-1952

2002 CAHOKIA ROAD EAST ST. LOUIS, ILL.

PARKS COLLEGE OF SAINT LOUIS UNIVERSITY
2002 Cahokia Road, East St. Louis, Ill.

I am interested in:

☐ Air Transportation ☐ Aeronautical Engineering
☐ Aircraft Maintenance Engineering

Name.. Age..........

Address.. Zone..........

City.. State..........

Air Trails model annual for 1952

Editor
Albert L. Lewis

Art Director
W. F. Tyler

Editorial Production
Carl Happel

Editorial Assistants
Rose Borello
Rosalba Accardi

AIR TRAILS MODEL ANNUAL published by Street & Smith Publications, Inc., 575 Madison Ave., New York 22, N. Y.; President, Gerald H. Smith; Executive Vice President, Ralph R. Whittaker, Jr.; Vice President and Secretary, Arthur P. Lawler; Treasurer, Thomas H. Kaiser. Air Trails Model Annual Advertising Mgr., Walter J. McBride, 575 Madison Ave., New York 22, N. Y.; Mid-Western Advertising Mgr., Frank C. Smith, 230 No. Michigan Ave., Chicago 1, Ill.; West Coast Advertising Representative, Kimball, Menno Co., 1052 West 6th St., Los Angeles 17, Calif. 50c per copy in U. S. and Possessions; 60c per copy in Canada; $1 per copy elsewhere. All Communications to the editors should be addressed to Air Trails Model Annual, 304 E. 45th St., New York 17, N. Y. We cannot accept responsibility for unsolicited manuscripts or art work. Include return postage with all contributions. Printed in U.S.A.

The Official Word on Modeling!

THE PRESIDENT OF THE UNITED STATES*

"This early interest in flying, the understanding of aerodynamics acquired in the construction and flying of model planes, a study of wind currents—all work together to give the modeler a comprehensive knowledge of many of the problems of aviation before he enters actively into the field of flying.

"I understand that approximately two-thirds of all pilots in the United States Air Force, the Navy and Marine Corps were modelers in their younger days.

"Building model planes and acquiring the skill to fly them calls for full resources of the modelers and in the case of young boys provides them with a hobby which directs their energy into a useful employment of their leisure hours."

Gen. Hoyt S. Vandenberg, Chief of Staff, USAF

"An Air Force capable of rapid expansion requires popular interest in aviation throughout the country, so that hundreds of thousands of young people will start learning at home. With this head start, they will fit more readily into their proper place either in flying or ground duties.

"Many ranking officers of the Air Force today got their first taste of aviation through building and flying model airplanes. This exacting hobby teaches the principles of flight and lays a foundation of practical knowledge which may be extended to full-scale airplanes.

"The work builds character and develops craftsmanship which can be applied to a variety of Air Force duties. There is no cleaner sport than competition between model flyers.

"The Air Force long has encouraged airplane model activities as a hobby for military personnel on all bases. Civilian employees also may join these local programs.

"The main purpose of the hobby program is to advance the morale and welfare of airmen in their leisure time. This is of especial importance at isolated bases. It is customary to equip wood and metal working shops where airmen may work as they please.

"Aeromodeling, of course, accomplishes a double purpose in furnishing wholesome recreation together with aviation knowledge. Non-flying personnel especially benefit by gaining a better understanding of the problems of flight which is the end purpose of all Air Force work.

USAF's Gen. Vandenberg was born in Milwaukee in 1899 ... graduated from US Military Academy in '23 ... was CG of 9th Air Force in Europe during World War II. Awards include DSM, Legion of Merit, Silver Star.

"During the past year, competitions were held throughout the whole Air Force. Each of the major air commands, both in the United States and overseas, held competitions at their bases. The winners in each command were sent as a team of not more than 10 to compete for Air Force championships at Sheppard Air Force Base, Texas.

"From this competition, some 30 winners were sent to the 1951 National Model Airplane meet at Dallas, Texas, and several prizes were won. An Air Force team was sent also to the international meet at Detroit where one of our airmen, Pfc. Tommy Baker, broke the world jet model speed record previously held abroad.

"It is hoped conditions in 1952 will make it possible to hold an even more extensive program of competitions. The Civil Air Patrol, as an Air Force auxiliary, also encourages aeromodeling as part of its Cadet program.

"It is definitely to the advantage of the Air Force and of national defense that aeromodeling activities, under civic as well as military sponsorship, be encouraged throughout the nation on as wide a scale as possible."

*In a message to the National Capitol Model Air Meet.

PROGRESS REPORT

Another year of all-out model plane flying is upon us, yet the design and popularity trends are not as easy to discern as they have been in the past. We've had no skyrocketing upstarts intrude upon the scene as did Half-A or PAA-Load a couple of years ago. It has been more of a gradual development and refinement in all categories. As usual, the contest flyers and ships have set and steered the trends. Outside of contest flying, however, there have been the usual interesting freaks, some successful, some flops. Contestwise; the trend all last year followed the 1951 A.M.A. Rules lead—reduced number of events, combined classes, dropping of events not widely popular.

Since present Contest Rules will hold through 1952, following the new two-year A.M.A. policy, trends noted below will probably continue through this year.

Free Flight Gas: Still holding its own, F/F had a big year despite continued growth of C/L. The really big jobs, C and D, seem to be slowly losing out as Half-A continues to gain. There were several hot new Half-A engines added to the previous list, and Half-A's are being stuck into everything that can fly! In the larger sizes, new and improved models of the old Torpedo engines in .19, .29, and .32 classes were put to good use by F/F'ers. Lots of models were entered in several contest classes by a simple engine change; the shift from .29 to .32, for example, would hardly change balance or trim a bit, yet allowed flyers to get into two different classes with just that much more chance at hardware collecting.

PAA-Load is still going strong—or, should we say, stronger! Kits like "Bootstraps" and "Liftmaster" have helped this trend, along with excellent promotion (including plenty of prizes) by Pan-American. As in every other form of modeling, Half-A is pushing strongly in PAA-Load, too. In addition to the Half-A group, PAA-Load was flown in a combined A-B class. There were two new experimental groups also, the Clipper Cargo and Tow-Load. The former called for a Half-A plane to R.O.G. with as much weight as it could carry, fly at least 40 sec. and land safely. This event was introduced at the Nationals, and the winner carried 14 1/2 oz. for 40.4 seconds!

R.O.W. continues to be the big crowd pleaser it always has been. Nothing startlingly new in this line could be seen in '51. Most R.O.W. contest events were flown on a basis of combined motor sizes; planes were, almost without exception, successful "overland" gassies with added floats. The "one big float in front and two little ones on stab tips" school still prevails.

Jetex continues to grow, with a few kits available, but has not yet reached contest-event status in this country.

CO_2 flying was a total casualty, having been eliminated as an official contest event.




PROGRESS REPORT

Indoor events: Despite the efforts of enthusiasts, indoor flying appears to be dying slowly, probably because of lack of good test sites. Even in a city like New York, with its dozens of armories and other large enclosed areas, it is virtually impossible to obtain a good flying spot.

Outdoor glider: Towline glider seems to retain popularity and is well fought-for at those meets where it is included. There are quite a few kits available, mostly from Jasco, though this event shows lots of original designs, too. Here is one event where we can pick up pointers from our European friends, who have excelled in gliding for years. We are seeing more and more of the foreign characteristics tried out here—the droop-snoot fuselages, super high-aspect ratios, tow-bars, etc. A class of towline gliders called the "Nordic" is practically unknown here, though the Nordic International Contest causes as much excitement in European modeling circles as does the Wakefield Event. These ships are big, combined area 495-526 sq. in., weight 14.46 oz. minimum, 328 ft. towline.

H/L gliders, from which you can probably get the most action for the least expenditure and work, continue in popularity and will doubtless do so for years to come.

Control line: Last year we saw plenty of action on wires; several new, or relatively new, forms of C/L flying seem headed for considerable popularity, among them Endurance, Half-A Speed, Combat, and the Navy Carrier Event.

Endurance is just like it sounds—an event to see how long the ship, engine, fuel, flyer (and spectators!) can last. It has created considerable interest. A gal (!), Bernice Jaynes of Sacramento has flown a Spitfire .60 g.p. job for 3 hours, 29 1/4 min.—1,904 laps, 158.6 miles at average speed of 45.48 mph!

Combat is really spectacular; it got heavy backing by being included in the carefully screened list of events at the Plymouth Internationals. This is a form of flying at which the youngsters with their sharp reflexes can excel.

Speed has gone along on a pretty even keel. One new development was the change in A.M.A. rules allowing single or Mono-Line flying in all classes. Many speed men feel this may allow more mph, and experimental speed flying on a single line has been in progress for six months, but final conclusions and comparisons with the more usual two-wire control have yet to be made.

Stunt ships appear to be gaining in realistic appearance and in finish. 1951 saw many semi-scale stunters, which not only looked good, but flew and gathered points just as well as the half-finished and horrible-looking stunters many modelers seemed to consider necessary in the past.

Team racing continues to be a lot of fun, but there aren't too many entries at the meets. Just why, no one knows, but many feel simplification of the rules may help. There are many good kits for team racers, with new ones appearing constantly.

C/L Scale is ever popular, but is still the Contest Director's nightmare, due to the judging requirements. Some of the ships flown in this event defy description; an authentic B-36 with six working engines was entered at the Nats! It is in C/L scale that the kit buyer has his most bewildering choice; there are literally hundreds of beauties to choose from. Who sez scale has no appeal?!! These kit

jobs range from real ancients up to the very latest jets, and the oldies are still top favorites.

Outdoor rubber: Since the rubber ships have been cut to two categories, a lot more effort is being concentrated on design, one result of which is a real rash of new Wakefield jobs. The U.S. was able to send a full six-man team to Finland last year (thanks mainly to Jim Walker), and though we didn't win, our "Long Tom" planes with their lengthy, thin, lightly built fuselages created quite a sensation. Sweden won the meet with quite an orthodox ship, and the experts are divided on opinion as to the future of the radical new U.S. design, particularly since a rather special grade of wood is required to make the long skinny fuselage light, yet strong enough.

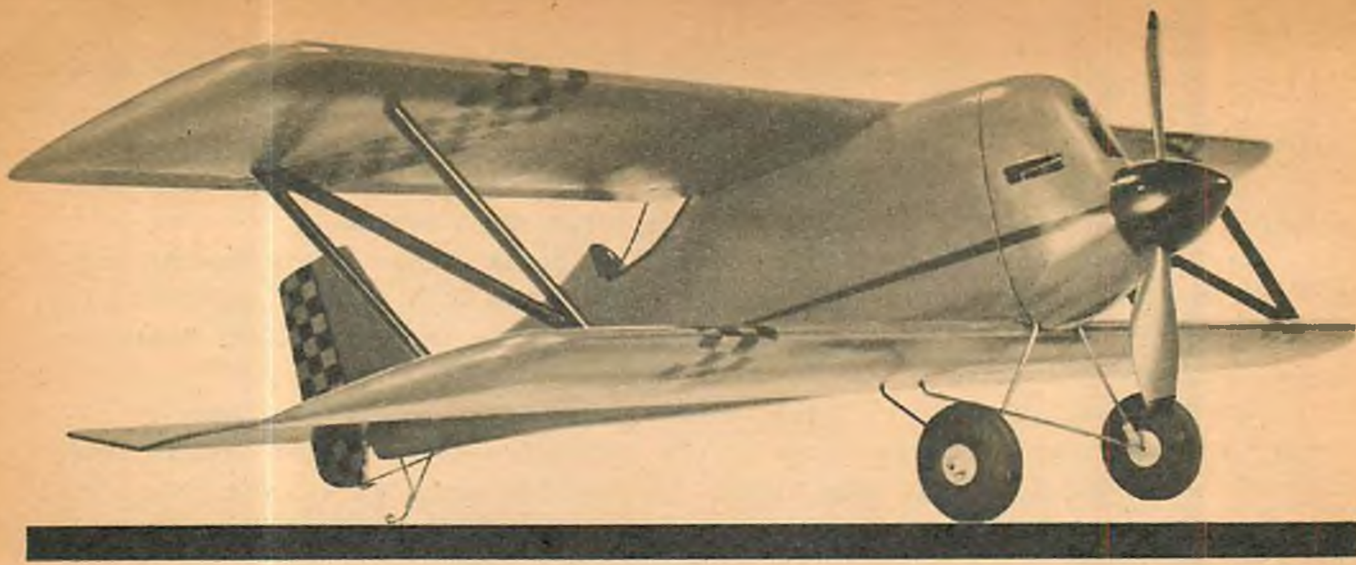
Competition-minded, flying scale rubber proponents are offering many suggestions to inject new life. Most of the thinking centers around transferring this event to Half-A, though some believe it should be made "open power," that is, allow Half-A, Rubber, CO_2, or Jetex, as desired. Judging is just as tough in this scale event as it is in C/L scale, and means will have to be worked out to alleviate this problem. Meanwhile, many Half-A scale enthusiasts are transforming rubber scale kit models to gassies, both free flight and C/L.

Radio control: This "sport of kings" is really climbing in popularity and activity. There are now scores of clubs around the country devoted exclusively to R/C flying.

The old Rudderbug still flies everywhere, but new designs, suited to the type of flying that must be done to win contests today are now appearing. The Robot, a compact high-performance ship, is one of these. A good many A and Half-A R/C planes are flying very successfully. In fact, it appears that the day of the R/C giants, weighing many pounds and powered by Class D plus engines, is definitely past.

Techniques and materials: Combat flyers are using jigs now to turn out quickly expendable craft for that plane-wrecking category. Prefabrication has set in pretty much 100% in the kit field; even the "built-up" contest kits have all ribs and formers finished. Testor's molded fuselage sides and wing sheets have created a sensation within the model industry. Sullivan Products has come up with control handles, bellcranks and speed pans, to mention just a few items, made from Dupont Nylon. Three times lighter than aluminum, the material—new to the modelplane field—holds great promise.

Sponsorship: Here's one phase that's on the upswing! The Navy played host again in '51 to the National meet, sending admirals and Arthur Godfrey to build up the competition. The Air Force held its first world-wide meet with winners going on to the Nationals as an official team. Plymouth "PAL" Clubs are forming in many sections as Plymouth officials become interested. American industry is beginning to recognize the importance of aeromodeling and agree with Plymouth's General Sales Manager R. C. Somerville, who declared, "When a youngster adopts model plane building and flying as a hobby he involves himself in an activity that is a constant challenge to his imagination, his patience, his ingenuity and his skill . . . he builds the qualities of character which have marked successful men of the past and which will be even more important to the men of the complex future."



DOUBLE WHAMMY

By WALTON HUGHES

Negative stagger, "real" appearance distinguish this scale-like stunter

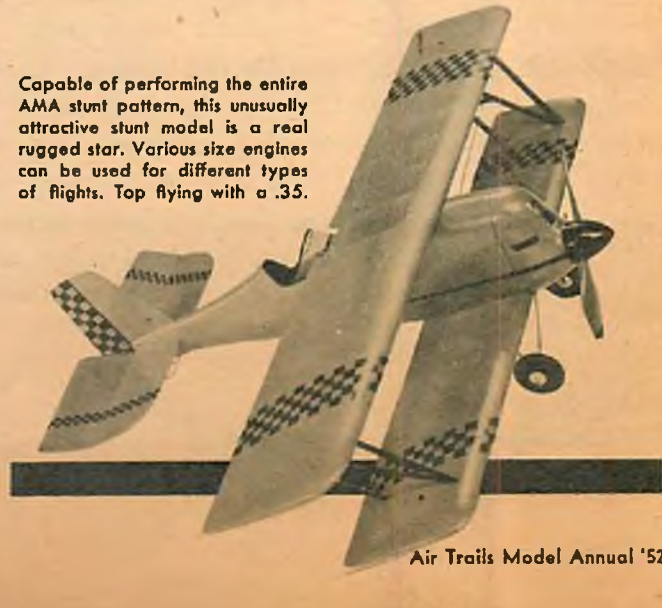
■ *Double Whammy* is a good-looking biplane designed for many hours of flying as well as nice appearance. This ship could be used for control line sport flying, with a Fox .29 or .35 engine, and will fly very well with the extra weight of a super finish. It also makes an excellent contest control line stunt model for AMA rules when built with careful attention to reducing weight. A Fox .35 or engine of equal power should be employed for stunt.

The odd fuselage construction was incorporated in this design to eliminate troublesome cabane struts between the fuselage and upper wing. These struts are good looking but are usually the main source of trouble in assembly, and are so weak that the top wing flips off at the first rough landing. The *Double Whammy,* with top wing attached directly to the fuselage, will withstand considerable bouncing around.

If this ship is being built for contest stunt flying, overall weight and correct balance should be kept in mind at all times. The two controlling factors are proper selection of wood and limiting the weight of the finish or paint job. The fuselage is quite large in sections and will have sufficient strength when a soft grade of wood is used throughout. Select soft to medium 3/32" sheet for the sides. 1/16" sheet would be strong enough but this does not allow sufficient material for sanding when the complete fuselage is assembled.

The bulkheads should be lightweight quarter-grained balsa. Balsa blocks for fuselage top and bottom and wing tips should be soft enough so that the corner can be mashed down slightly with the ball of the thumb. This type of wood is fast to carve and will be light when hollowed down to 1/8" thickness. The elevator and stabilizer are at the extreme rear of the ship and will cause the plane to be tail heavy unless light wood is selected. Try to find a piece of soft 1/8" sheet that is slightly hard on one edge. Place this edge along the hinge line when laying out the parts. In general, all parts to the rear of the wing should be made from the lightest wood, and heavier, stronger material used around the front.

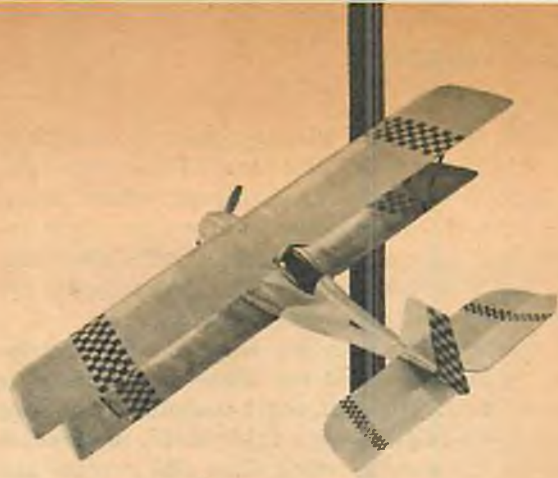
As mentioned before, the paint is the second con-

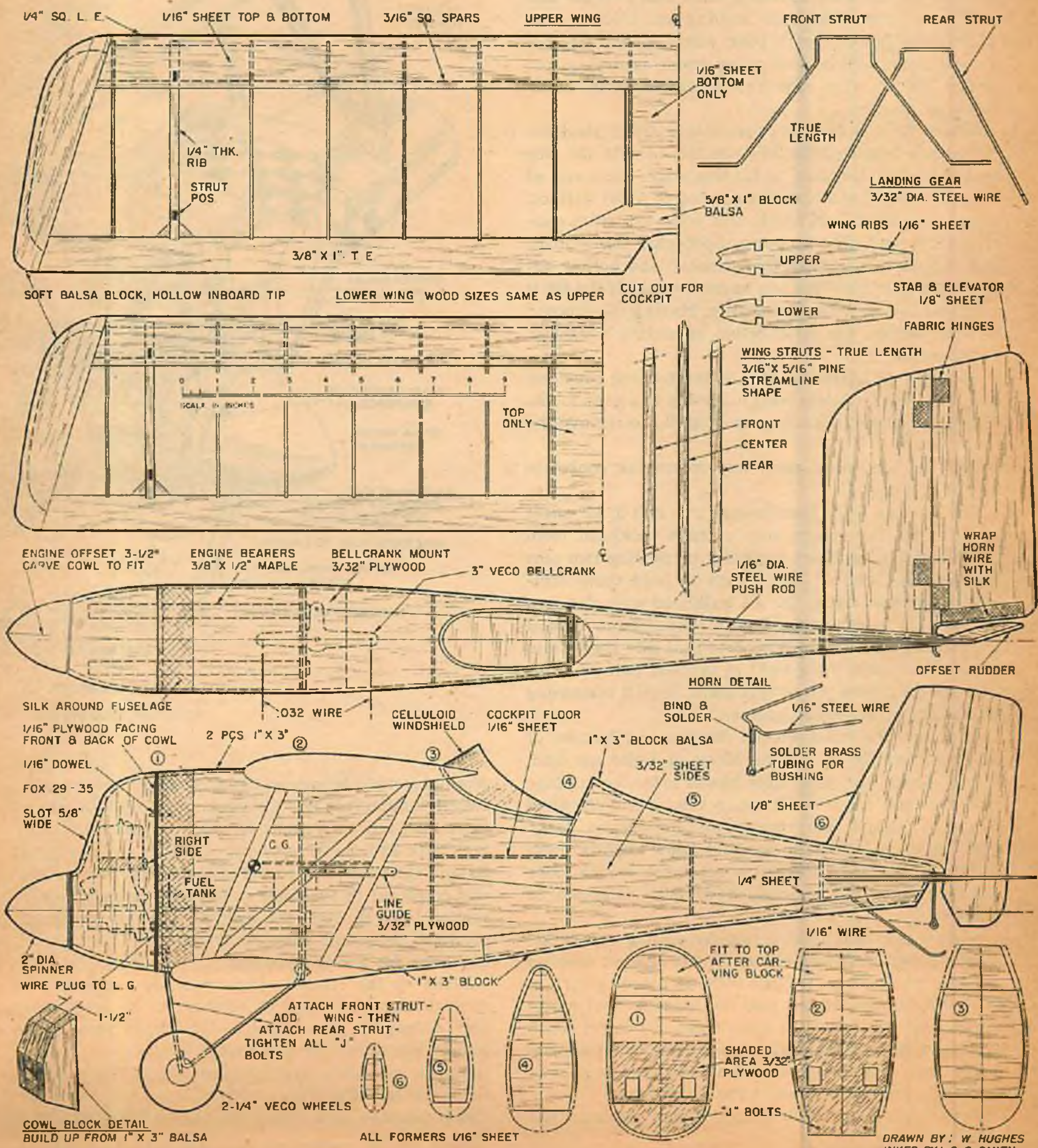


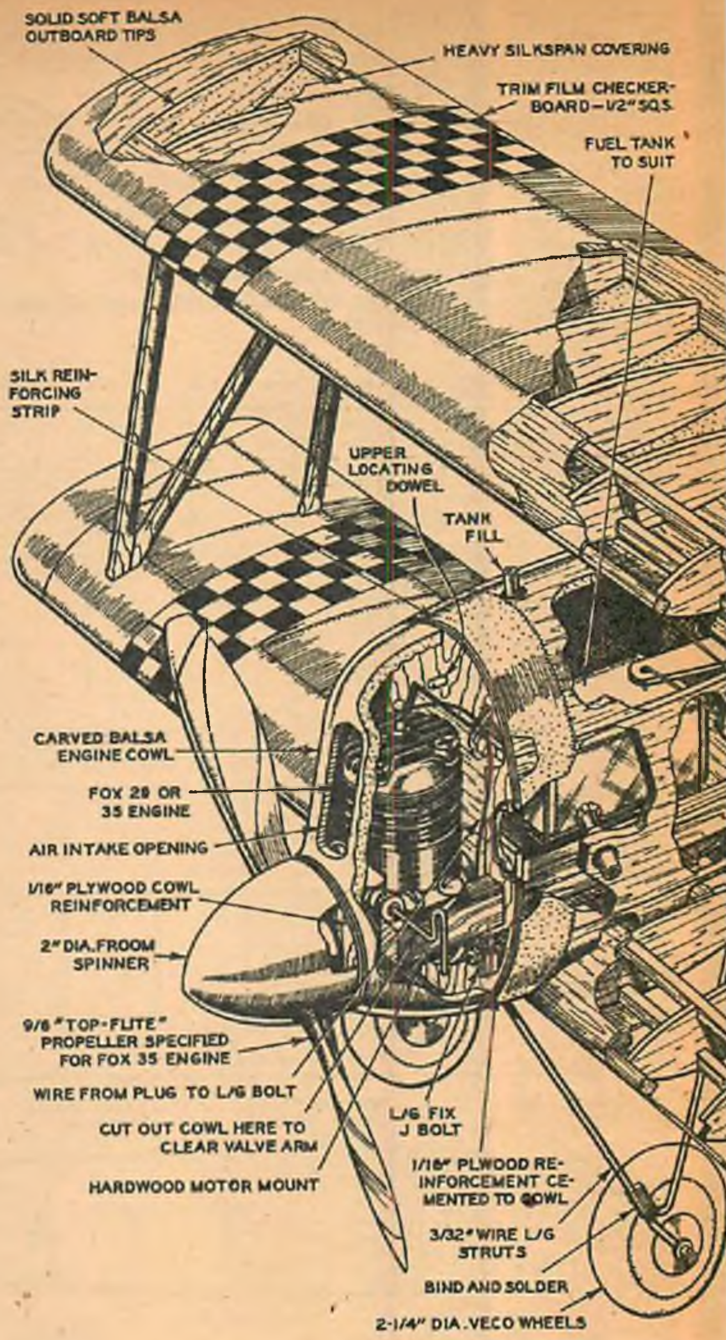
Capable of performing the entire AMA stunt pattern, this unusually attractive stunt model is a real rugged star. Various size engines can be used for different types of flights. Top flying with a .35.

trolling factor in weight and balance. A good job can be done by covering the fuselage and tail surfaces with the lightest gas model paper available, then adding one coat of filler and sanding smooth. The wings should be covered with paper. Follow with two or three coats of color and fuel proofer. A lighter job could be produced by using some fuel proof dope such as Aero Gloss or STA. This eliminates the fuel proof coating and saves considerable weight.

Too much weight from poor selection of wood or







an overdose of paint not only increases the weight of the ship, but also makes it tail heavy. This necessitates adding lead to the nose of the ship to restore proper balance; thus, three extra ounces of weight might result in a total gain of six or seven ounces after balancing. The last three ounces on a stunt model are like the straw that broke the camel's back.

Start construction with the wings. Cut two strips from ¼" sheet balsa and use these as templates to carve remaining 1/16" ribs. Start assembly by pinning one spar down to plans with 1/16" shims underneath to allow for the wing sheeting. Glue ribs in place and add upper spar. Next, glue trailing and leading edge in position, holding with pins, and allow to dry for several hours. While first wing frame is drying, cut second set of wing ribs and assemble them in an identical manner.

When the first frame is completely dried, sand the ¼" square leading edge down to fair in with the ribs and add 1/16" sheeting to leading edge. Trim end of wing at an angle as shown and sand to a flat surface, using a large sanding block. Cut wing tips from one-inch stock and glue in place. Spot-glue the inboard tips and carve to shape, then remove and hollow out as thin as possible. This can be done easily if the tip is split lengthwise with a thin knife. Making the inboard tips hollow has the same action as adding weight in the outer tip.

Add gussets to the ¼" ribs at the trailing edge and then sand the complete wing assembly to a good finish. Apply one coat of dope and sand lightly to remove the rough grain.

Now set the wings aside and commence construction of fuselage.

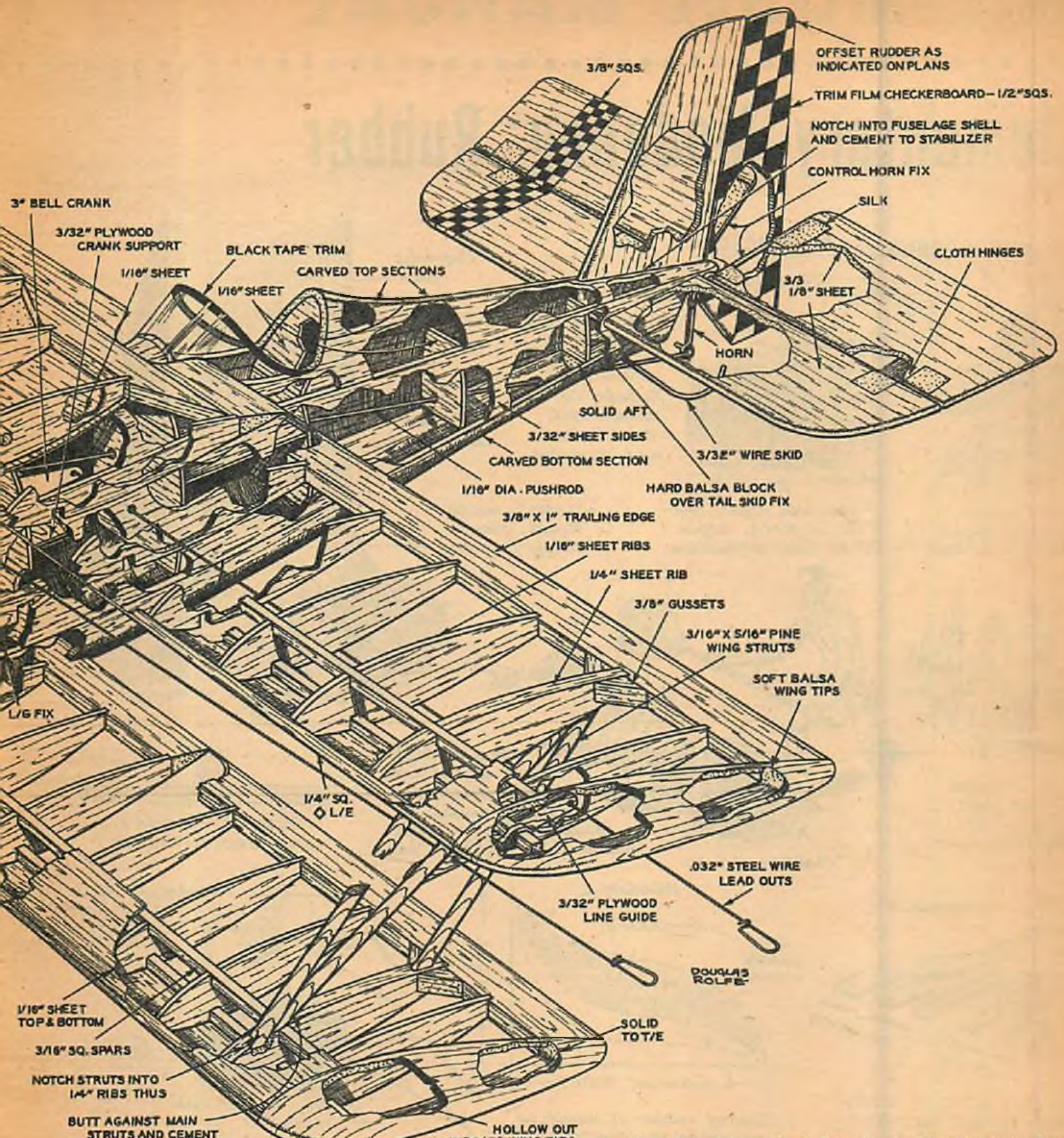
Cut the two sides from medium or soft 3/32" sheet and cut out the center area of each bulkhead from 1/16" sheet balsa. Start assembly by putting two pins through rear end of side sheets to hold them temporarily in line. Insert the #1 bulkhead with glue and put one pin in each side, then a rubber band around the sides at this first bulkhead to pull side sheets into a curve and hold them tight at top and bottom. Pins will not do a good job at this point. Install remaining bulkheads in the same manner.

Next cut the balsa blocks for top and bottom of fuselage. Saw from a large block or build up from 1" x 3" stock. Spot-glue these blocks to center fuselage assembly and carve to shape so they blend in. Sand roughly to shape, then remove and hollow out. Make rear section ⅛" thick or less and allow slightly more thickness around wings. Now set these blocks aside until all the interior parts have been mounted in fuselage.

Start motor mount assembly by cutting two 3/32" plywood bulkheads as shown in the shaded area on #1 and #2 bulkheads. Slide these in place in back of the balsa bulkheads and line the holes so that motor mounts can be slipped in from front. Fit lower block to these plywood bulkheads so it can be assembled easily, then glue motor mounts and bulkheads in position, still leaving the lower balsa block loose.

Next install the tank above motor mounts. The original *Double Whammy* had a rectangular tank with swivel suction line and air vents pointing to inside of the circle, but each stunt fan has his own particular fuel tank and there is plenty of room for anything. Extend the vent with pieces of Neoprene tube so they will come out of the sides or top and extend the fuel suction lines through the firewall. Glue in the 3/32" plywood bellcrank support in contact with the #2 bulkhead for added strength.

Make up the elevator and stabilizer assembly and control horn. Cut ends of elevator to fit the control horn extension, glue in place and wrap a strip of silk around the wire to hold securely to elevator. Slip this complete assembly into fuselage and glue in place. Bend the tail skid with a loop at front end to anchor inside fuselage, and insert through the lower carved



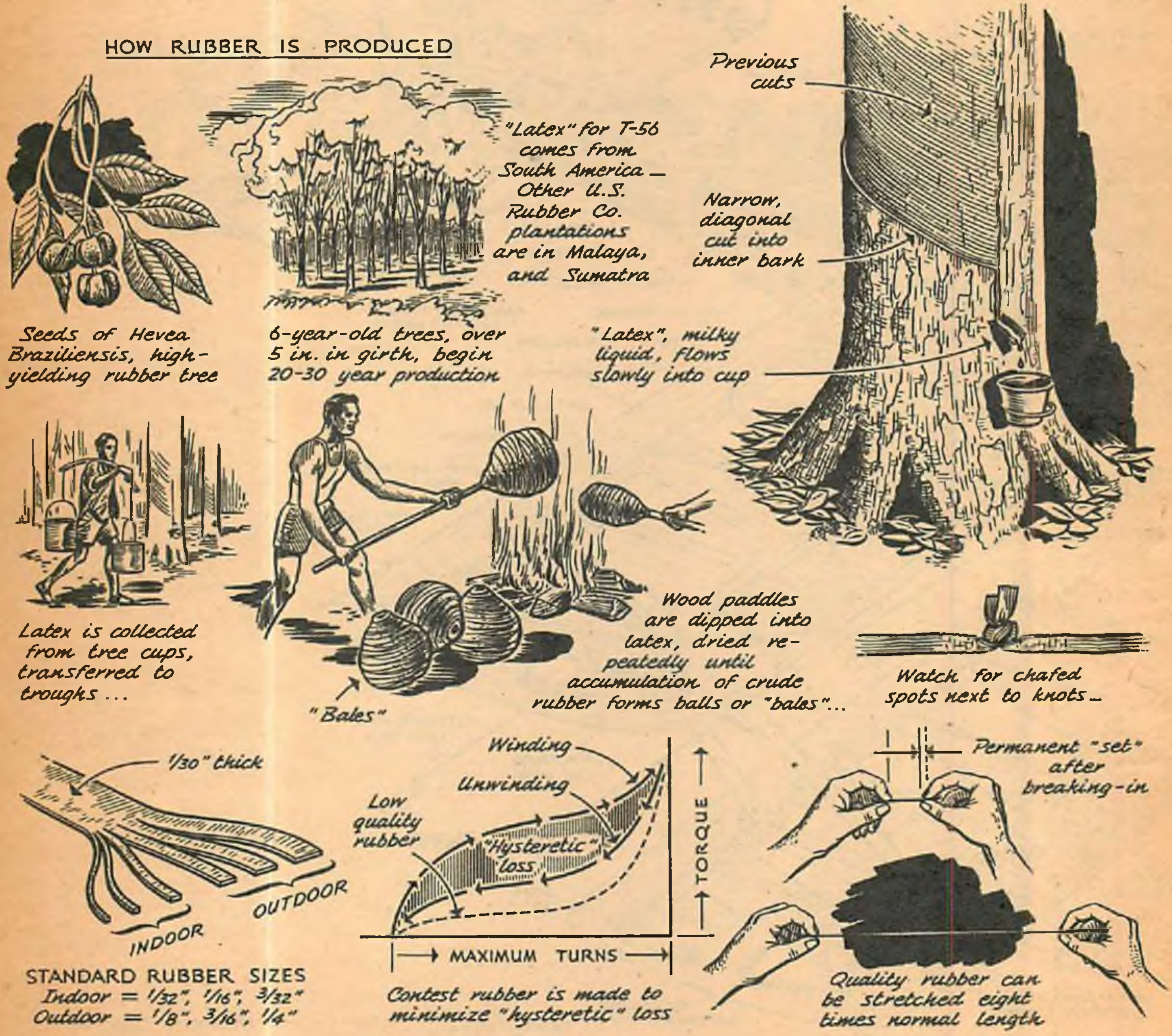
block. Fit a block of hard balsa over the top of the wire and glue in place. Glue both lower blocks in position on the fuselage assembly.

Insert the bellcrank, pushrod and control lead-out wire, working from top of fuselage. Keep pushrod in a straight line, otherwise the 1/16" wire will buckle when doing loops.

Next step is to fit upper sections of bulkheads (stations 1, 2, 3 and 4) into the upper carved blocks and glue in position so they will match center bulkheads. Also glue cockpit floor in position in main fuselage assembly. Glue the top blocks in position and sand the finished assembly.

The engine cowling is made by gluing up 1" thick blocks as shown in the small perspective sketch. This arrangement gives a stronger grain structure than using one piece for the cowling. Spot-glue this assembly to fuselage and carve roughly to shape, leaving excess material around spinner to be finished later. Remove cowl and hollow out, then add 1/16" plywood reinforcement to the front and rear as shown in plans and install dowel pins in fuselage to line up with holes drilled in the cowl. (*Continued on page* 87)

Elementary Modeling: Rubber



STANDARD RUBBER SIZES
Indoor = 1/32", 1/16", 3/32"
Outdoor = 1/8", 3/16", 1/4"

Contest rubber is made to minimize "hysteretic" loss

Elastic strands for models are of highest quality fine para rubber. U. S. Rubber Company's "T-56" is made from milky "latex," drained from inner bark of Hevea *Braziliensis* trees in South America. Trees average 25 years' production, though some 252-year-old trees continue to produce. Latex is accumulated into ham-shaped balls or "bales" by drying over heat, then sent to U. S. for manufacture. Smoke in drying process protects coagulated latex from molding.

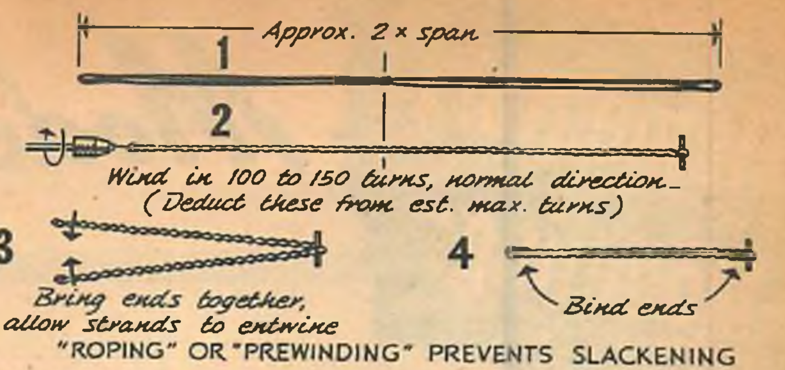
In the mill, natural rubber is cleaned, dried, run through compounding mill where sulphur, accelerators, anti-oxidants are added. Result, after testing, is the T-56 compound. Huge calendering machines form rubber into large sheets of uniform thickness. Finished sheet, approximately 1/30 inch thick, is wound on drums, subject to cycle of controlled temperatures to vulcanize. Final operation is stripping to uniform thread widths, winding on spools.

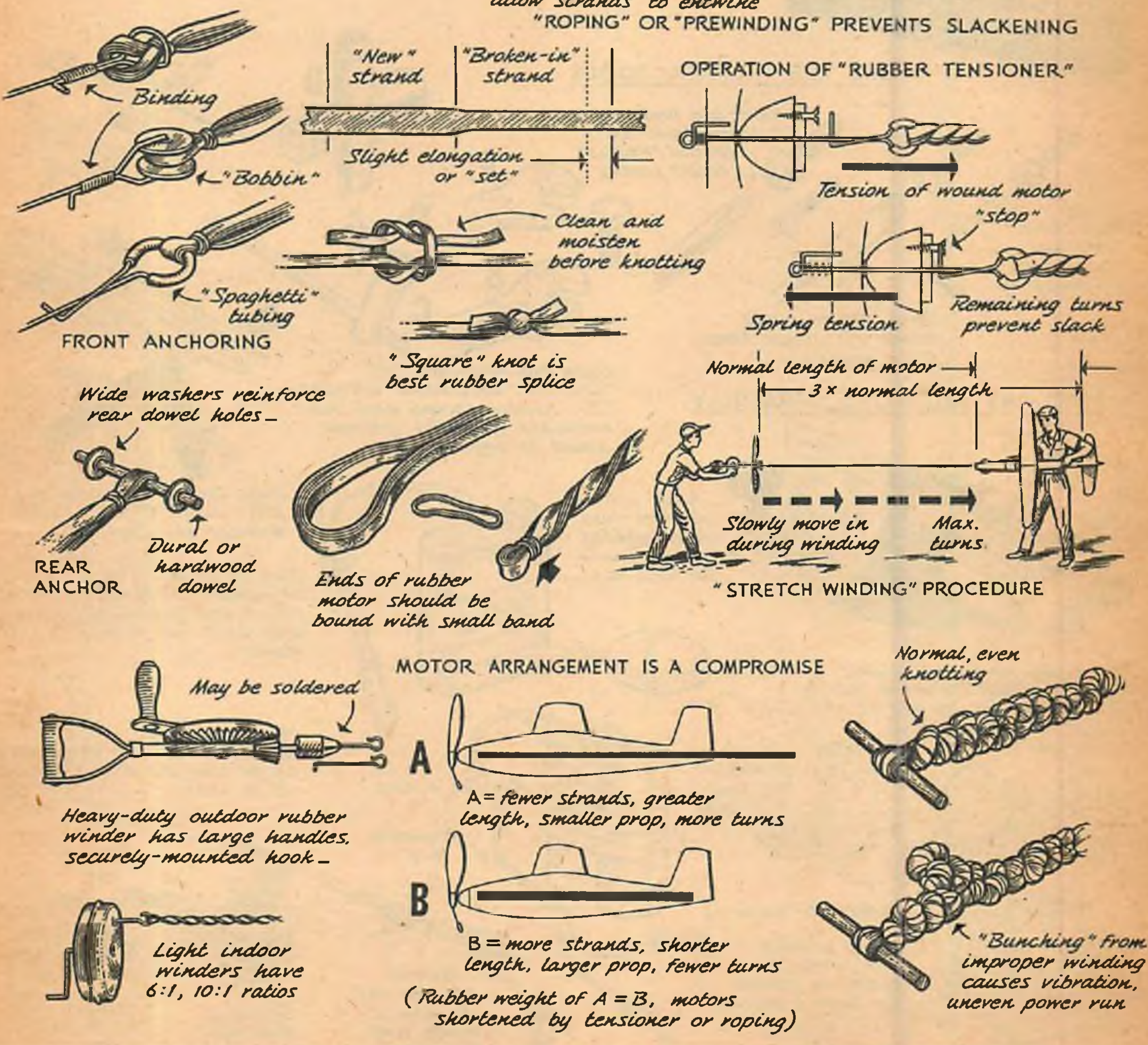
Main consideration in contest rubber are: resistance to chafing, high elongation, low hysteresis loss (the retention of as much of the initially wound-in energy in torque as possible) and a flat torque curve (power output remaining as uniform as possible during unwinding).

Heat, sunshine and abrasive foreign matter are enemies of rubber motors. Storage, when not in use, in cool, dark place is important. Life of rubber can be extended by washing, drying at intervals, by making up motors properly, correct knotting, lubricating, winding.

Experiments with sample strips is good idea for beginner. Test-pull strand between fingertips, note that maximum stretch is 7 to 8 times normal length.

ITS PREPARATION AND USE FOR MODELS





After several tests, up to 15 percent permanent "set" or elongation may be noted. Tie various knots, pull to breaking point which will likely occur at chafed point near knot.

"Square" knots tied before lubricating motor are preferred. Do not clip loose ends too closely. Broken strands can be washed, knotted, then relooped to equalize strand lengths.

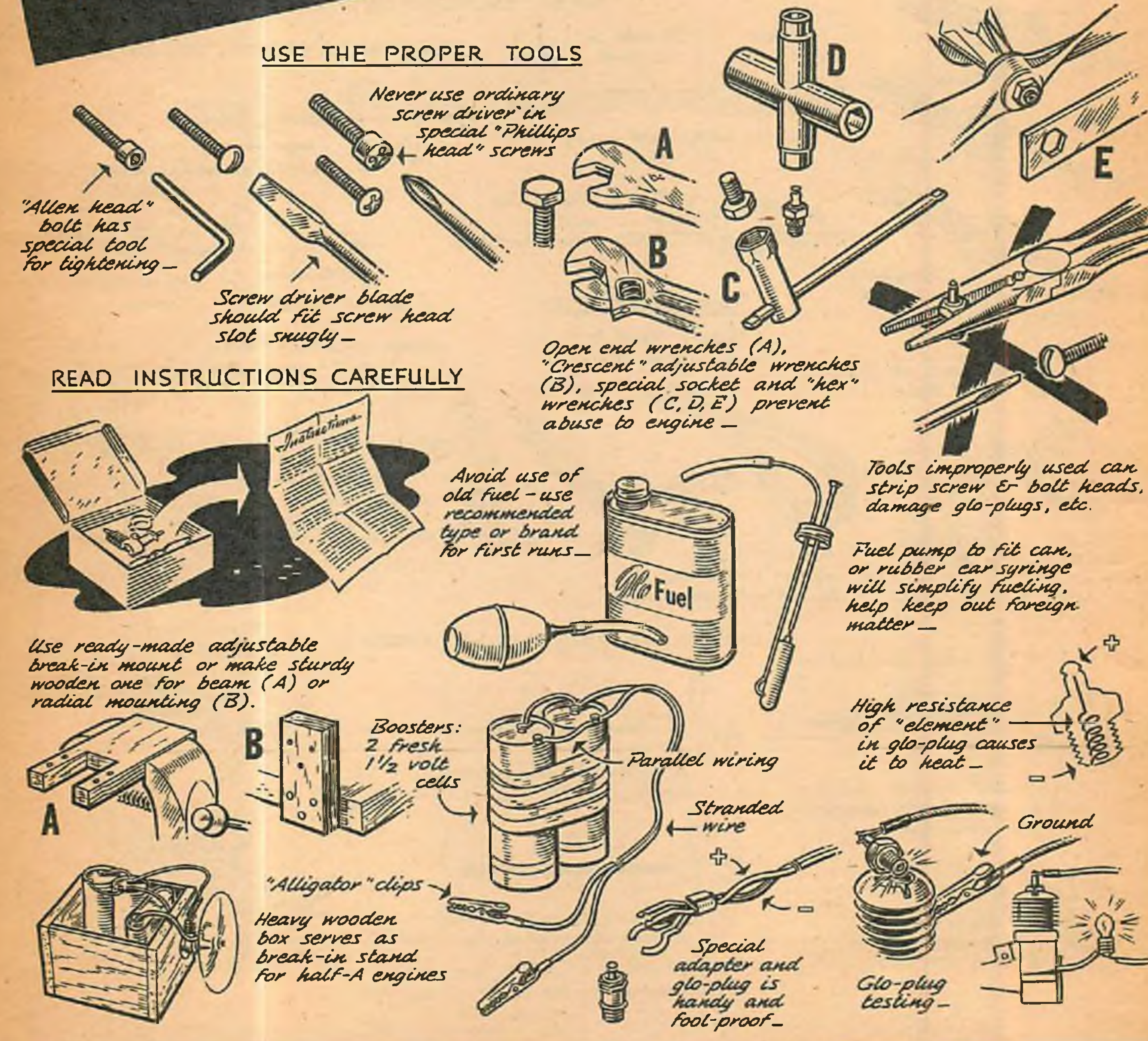
Larger multi-strand motors need "spaghetti" insulation over the hooks. Larger radii of bobbins and rear dowels reduce cutting tendency. Rubber "lube" prevents strands sticking when tightly wound. Effect of lube is to increase maximum winds by 25 percent; maximum torque is somewhat reduced. Lubricant is worthless unless worked thoroughly into strands. General lubricant formula: 4 parts liquid soap, 1 part glycerine, 8 parts water, boiled until the mixture arrives at a syrupy consistency.

Consecutive windings result in rubber "fatigue," largely overcome by rest between flights.

Short, sample rubber motor can be rigged for test. Wind to destruction (after break-in), record turns. Compute maximum turns on per inch basis, allowing 5 to 10 percent safety factor in practice.

Amount of rubber for given model varies from one-third total weight for sport models to over half total weight for contest ships. Most motors are longer than distance between anchoring points, are "tensioned" mechanically or "pre-wound" to prevent slack strands bunching in nose or tail, upsetting balance. Slow winding-in last turns prevents knots bunching unevenly. Launching should be done as quickly as possible after motor is wound, as delay causes power loss.

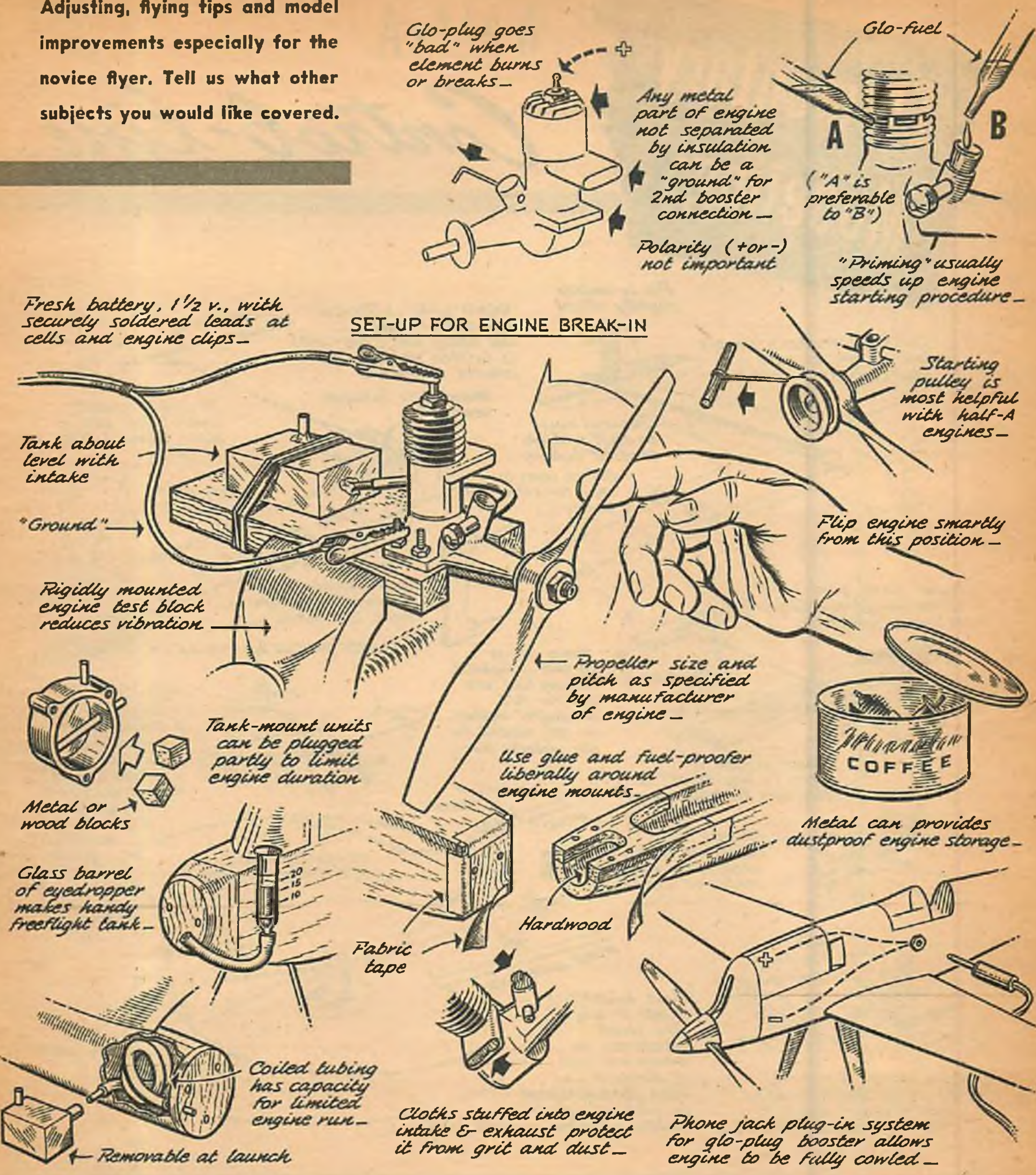
Elementary Modeling: *Model Engines*



The new modeler should remember that his engine is a piece of precision apparatus fitted to amazingly close tolerances. He should thoroughly familiarize himself with the manufacturer's instructions as to its operation, never weighing his own judgment against that of engine's builders. He is smart if he invests in the few tools necessary to service engine properly rather than subjecting it to possible abuse by using improper or makeshift tools. Parts bolted or screwed together should be tightened evenly and snugly, preferably after running engine. *Never disassemble engine unless it is absolutely necessary.*

Length of engine's life and performance both hinge on type and amount of lubricant supplied to moving parts. Model engines of two-stroke cycle type carry lubricant mixed with fuel, oil being forced by compression to all points needing lubrication. Castor oil, a fine lubricant, is usually employed in ready-mixed glow-fuels, additional castor oil often being used during break-in period. However, if engine shows no tendency to "freeze" (tolerances reducing through heat expansion until engine slows or stops), no additional oil is needed if needle-valve is left to rich setting. Rich settings mean slow running, smoke, a relatively cooler engine; lean

Adjusting, flying tips and model improvements especially for the novice flyer. Tell us what other subjects you would like covered.



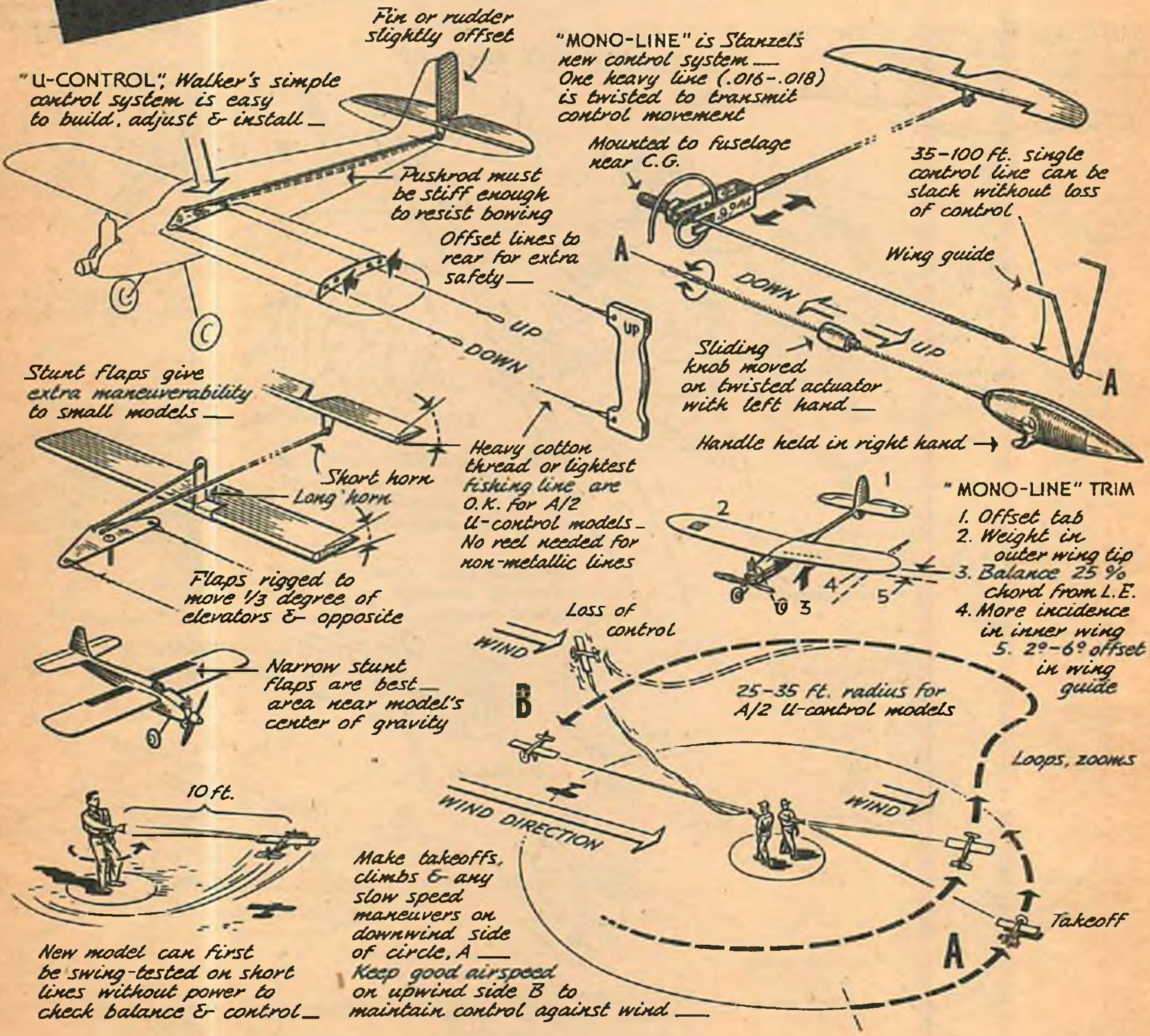
settings give greatest speeds and most heat.

Glow-plugs are heated by batteries for starting, then continue to glow and provide ignition by heat of combustion. Check condition of plug by light bulb wired into starting battery circuit, or remove plug, connect batteries and check glow. Sometimes reflected glow can be observed through exhaust port without removing plug, thus assuring glow-plug is O.K. After starting, wait until engine is adjusted for smooth running before disconnecting booster.

If engine runs smoothly without overheating, little break-in is necessary. If it overheats, make numerous short runs or add more castor to fuel, or drop small quantities in intake while engine is running; continue until engine loosens. Cover intake and exhaust ports to keep out foreign matter between runs. If engine lands in dirt, remove plug, flush thoroughly in gasoline, then lubricate.

If glow-plug checks O.K. and fuel reaches intake, engine should start after priming. If too lean, it may make short, fast bursts; if too rich, will run sluggishly and smoke. Go easy on priming in exhaust or intake—only a drop or so at a time. Flip prop smartly, having it positioned on shaft for easiest cranking.

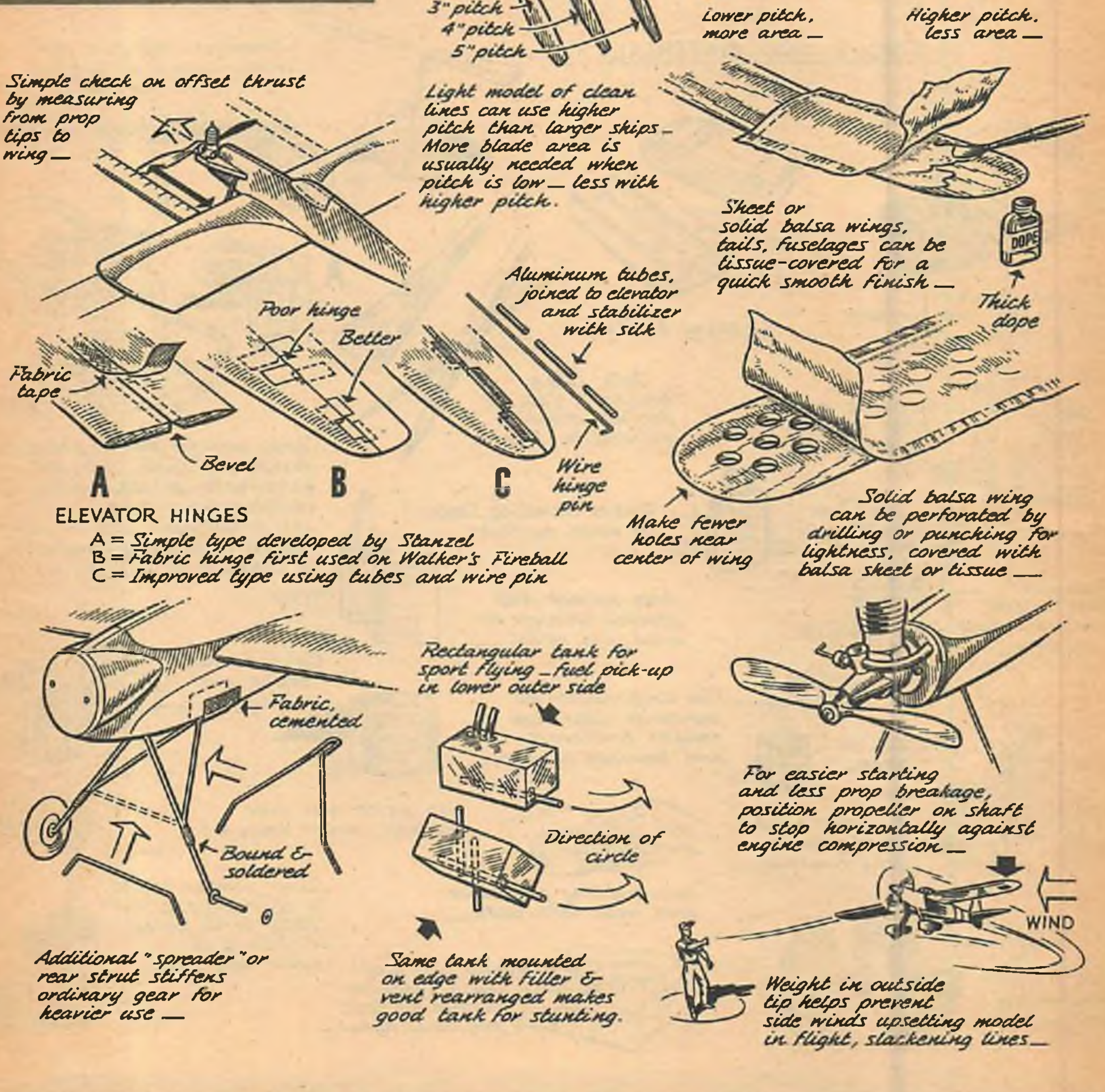
Elementary Modeling: half-A Control-line



Though the intriguing Half-A control-line models are leaders in popularity, particularly among beginners in modeling, they are not without their shortcomings. With engine displacement reduced to a small fraction of the size we have been accustomed to in the past (a Half-A engine is only *one-twelfth* the displacement of a Class D .60 engine!) there is a corresponding reduction in power. The smaller, lighter ships that result are more at the mercy of the winds than the larger ones and have little of the very "solid" feel we associate with larger, more powerful control jobs. An inexperienced modeler with a new Half-A control ship is wise to wait for calm weather. Follow the wind diagram carefully for proper operation.

Jim Walker's "U-Control" and the new Stanzel "Mono-Line" are the control systems in use nowadays. U-Control, with its inherent simplicity, is foolproof; it utilizes two tether lines to handle, movements of which are transmitted to a pivoted bellcrank, thence to hinged elevator. The lines must be kept taut, however, and such methods as outward offset engine thrust line, outward offset rudder tab, weight in outer wing tip, more incidence in inner wing panel, and rearward location of control line wing guides are resorted to in various combinations to maintain line tension. These many "tools"

Adjusting, flying tips and model improvements especially for the novice flyer. Tell us what other subjects you would like covered.

can be used to extreme, causing a crabbing flight attitude which is neither efficient nor desirable. An untested model should incorporate perhaps two of these wrinkles for a safe test flight; reduce them as much as the flight attitude indicates you can get by with.

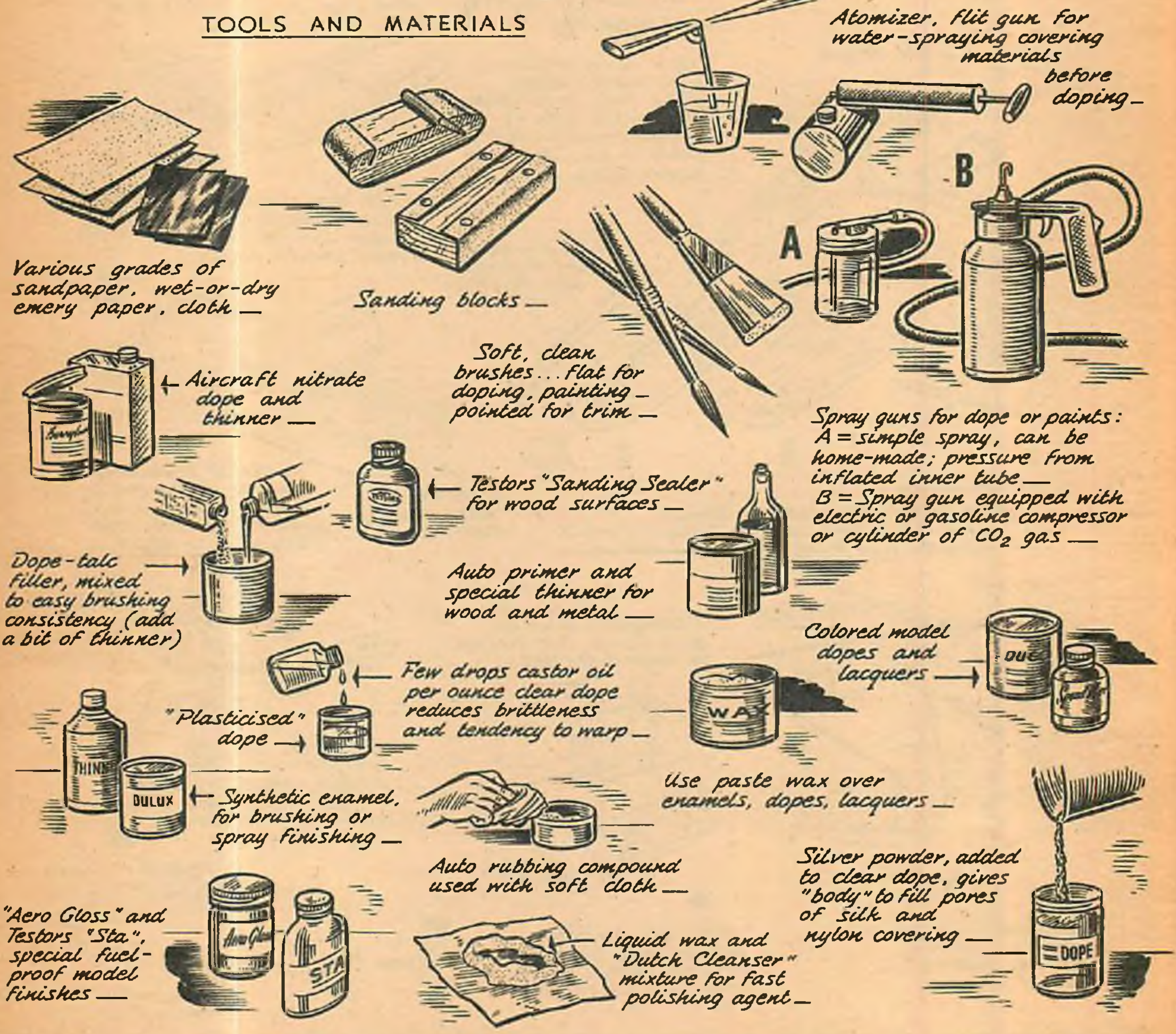
Half-A models can be flown on very lightest casting line or heavy commercial cotton thread. Only the lightest wire lines need be used. Heavy threads can be wrapped around the handle, while metal lines require use of a reel to prevent kinking or curling.

Mono-Line flying presents two outstanding advantages: longer lines can be used—up to 100 ft. radius—and full control is maintained even if the line should become slack. When short lines are used, .016" dia. steel wire is specified, and when length is increased to 100 ft., the diameter is increased to .018". Smaller or larger sizes of wire affect control; don't use stranded or braided "cables."

It is best to balance U-Control models fairly nose-heavy, somewhere near the wing leading edge. Mono-Line ships should balance about 25% of chord from leading edge. Selection of woods, type and extent of paint job, wheels, propellers, etc. affect balance greatly. Improper balance of a finished model can often be corrected with lead weights.

AIR-MODEL MANUAL

...finishing your model



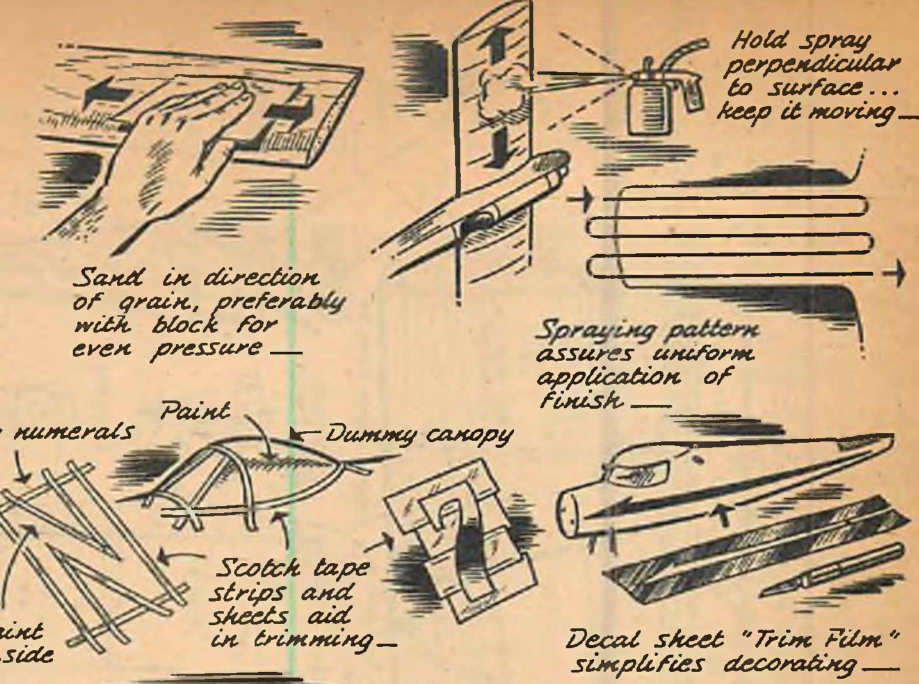
■ Model finishing begins with preparation of the surface—smoothing, filling—for the final protective and/or coloring coats to follow. Wood filling, after initial smoothing, serves to fill depressions, grain pores, and seals the wood against absorbing other materials to be applied.

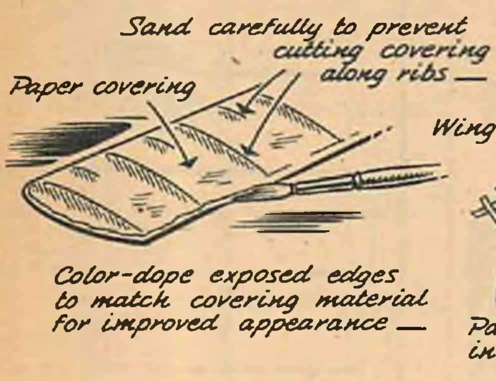
Application of finish materials is by brush or preferably by spray. Once having sprayed a finish, few modelers revert back to brushing. Good finishing can be done by brush, however. Invest in good brushes; keep them clean and soft. Thin your paint for brushing, using long, even strokes. Avoid finishing in damp, humid weather, which makes dope "blush."

Remember that nitrocellulose materials (dopes, lacquers) *cannot* be applied over enamels, varnishes, shellacs, though enamels *can* be applied over nitrocellulose.

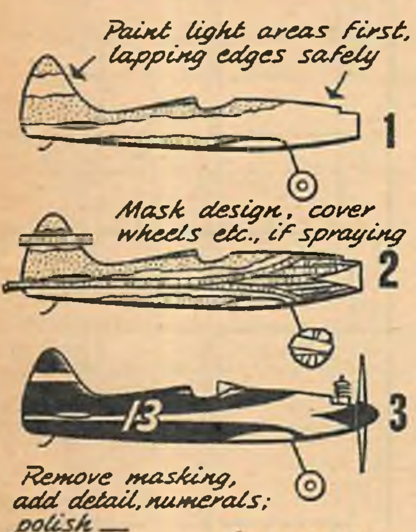
Advent of glow-fuels has made model finishing complex. But specially developed model finishes such as "Aero Gloss" and Testor's "Sta" can withstand dissolving effects of glow-fuel though often require use of special thinners and primers. Some finishes are merely hot fuel *resistant*. "Fuel proofer," clear substance to protect colored dopes from hot fuels, is

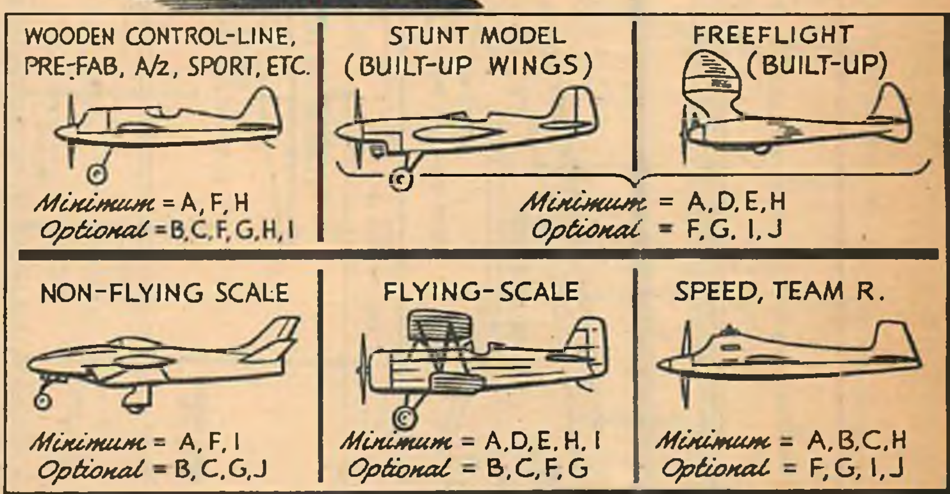
This informative material offers adjusting, flying tips and model improvements especially for the novice flyer. Tell us what other subjects you would like covered.





PAINTING SEQUENCE



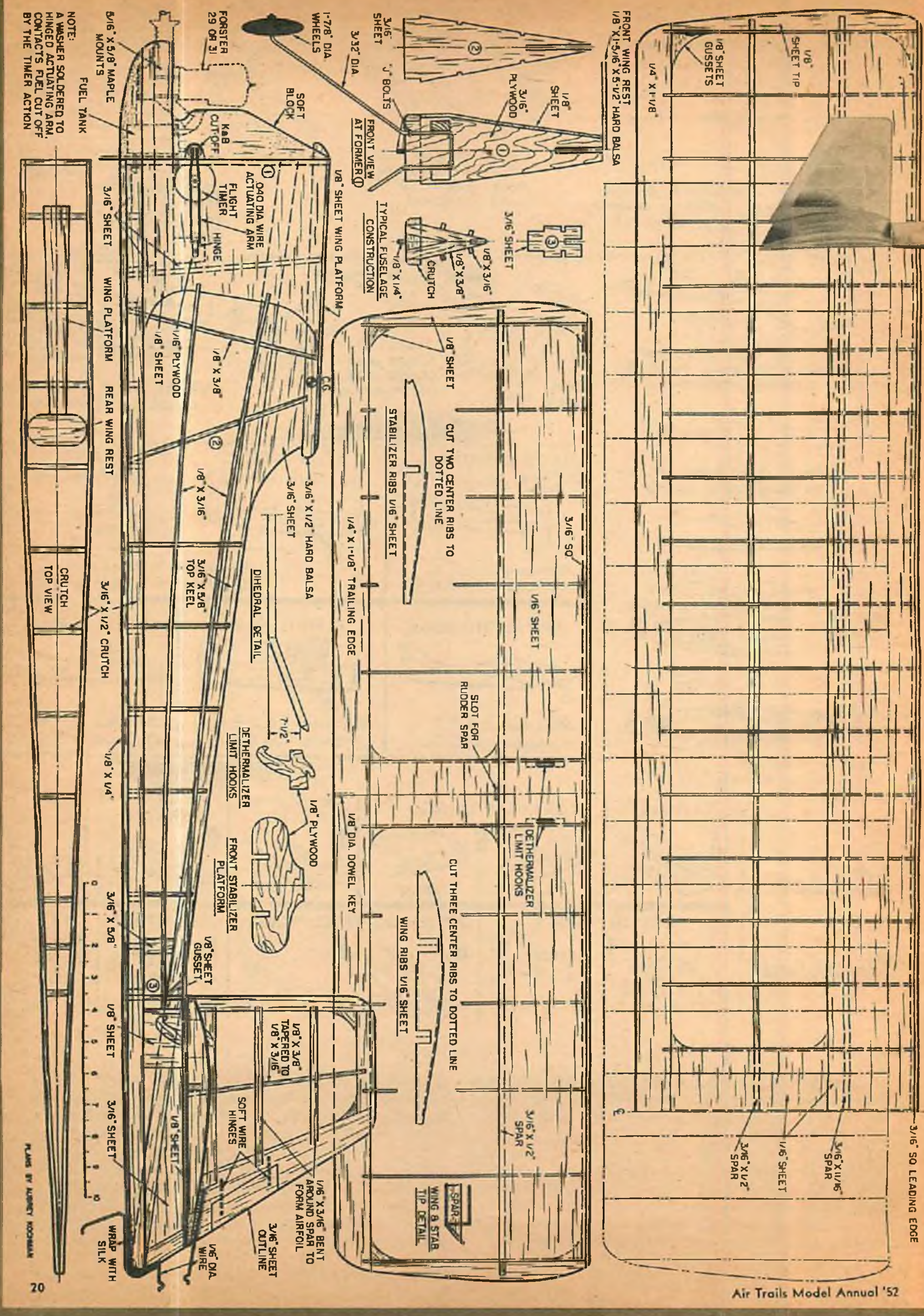


practical, needs only be applied around nose of model but makes repairing difficult where recementing and doping are needed. Ideal for free flight where weight is important factor.

Superior finishes, after thorough smoothing and filling of surfaces, are had by application of numerous thinned coats, first ones with light sanding between, later ones with polishing between coats. Polishing agent must be cleaned away before next coat is applied. Final buffing and waxing assure sheen.

Speed jobs, team racers, flying scale models and similar types can be finished successfully in synthetic enamels (auto finishes) where extra weight can be tolerated. This can be brushed or sprayed over any type filler; should be "aged" several weeks for best results in polishing to satin finish. Auto cleaner containing rubbing compound works fine here. Synthetic enamels, particularly after "aging", resist hot fuels; further protection can be had by heavy waxing.

Any finish, particularly a slow drying one, needs dust-free atmosphere for good results, though small imperfections from dust particles can be polished out if finish is thick enough—hence suggestion of several thinned coats which also dry faster than thicker ones.



FRONT WING REST 1/8" X 1-5/16" X 5-1/2" HARD BALSA
1/4" X 1-1/8"
1/8" SHEET GUSSETS
1/8" SHEET TIP
1/8" SHEET
3/16" PLYWOOD
3/16" SHEET
"J" BOLTS
1-7/8" DIA WHEELS
3/32" DIA.
FRONT VIEW AT FORMER 1
3/16" SHEET
1/8" X 3/16"
1/8" X 3/8"
CRUTCH
1/8" X 1/4"
TYPICAL FUSELAGE CONSTRUCTION
FORSTER 29 OR 31
SOFT BLOCK
K&B CUTOFF
.040 DIA WIRE ACTUATING ARM
FLIGHT TIMER
HINGE
1/8" SHEET WING PLATFORM
5/16" X 5/8" MAPLE MOUNTS
FUEL TANK
NOTE: A WASHER SOLDERED TO HINGED ACTUATING ARM. CONTACTS FUEL CUT OFF BY THE TIMER ACTION
3/16" SHEET
WING PLATFORM
REAR WING REST
1/16" PLYWOOD
1/8" SHEET
1/8" X 3/8"
1/8" X 3/16"
3/16" X 1/2" HARD BALSA
3/16" SHEET
3/16" X 5/8" TOP KEEL
CRUTCH TOP VIEW
3/16" X 1/2" CRUTCH
DIHEDRAL DETAIL
7-1/2"
DETHERMALIZER LIMIT HOOKS
1/8" PLYWOOD
FRONT STABILIZER PLATFORM
1/8" X 1/4"
3/16" X 5/8"
1/8" SHEET GUSSET
1/8" SHEET
1/8" X 3/8" TAPERED TO 1/8" X 3/16"
3/16" SHEET
1/8" SHEET
SOFT WIRE HINGES
1/16" X 3/16" BENT AROUND SPAR TO FORM AIRFOIL
3/16" SHEET OUTLINE
1/16" DIA. WIRE
WRAP WITH SILK
CUT TWO CENTER RIBS TO DOTTED LINE
STABILIZER RIBS 1/16" SHEET
1/4" X 1-1/8" TRAILING EDGE
3/16" SQ
1/16" SHEET
SLOT FOR RUDDER SPAR
DETHERMALIZER LIMIT HOOKS
1/8" DIA. DOWEL KEY
CUT THREE CENTER RIBS TO DOTTED LINE
WING RIBS 1/16" SHEET
3/16" X 1/2" SPAR
SPAR
WING & STAB TIP DETAIL
3/16" X 11/16" SPAR
1/16" SHEET
3/16" X 1/2" SPAR
3/16" SQ LEADING EDGE
PLANS BY AUBREY KOOMAN

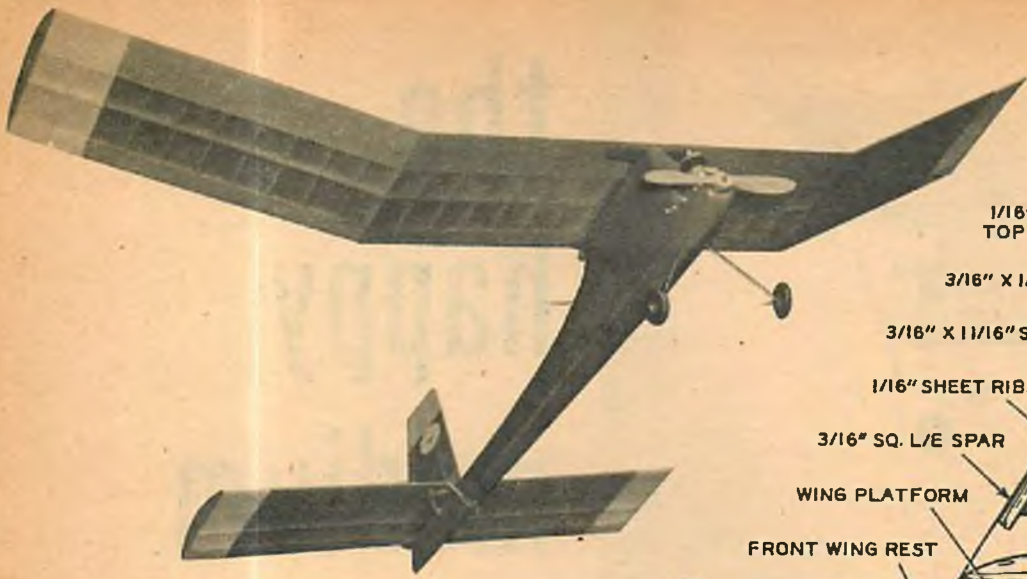
the happy medium

First at the Canadian and U. S. Nationals—this Class B-C "combo" free flight is HOT!

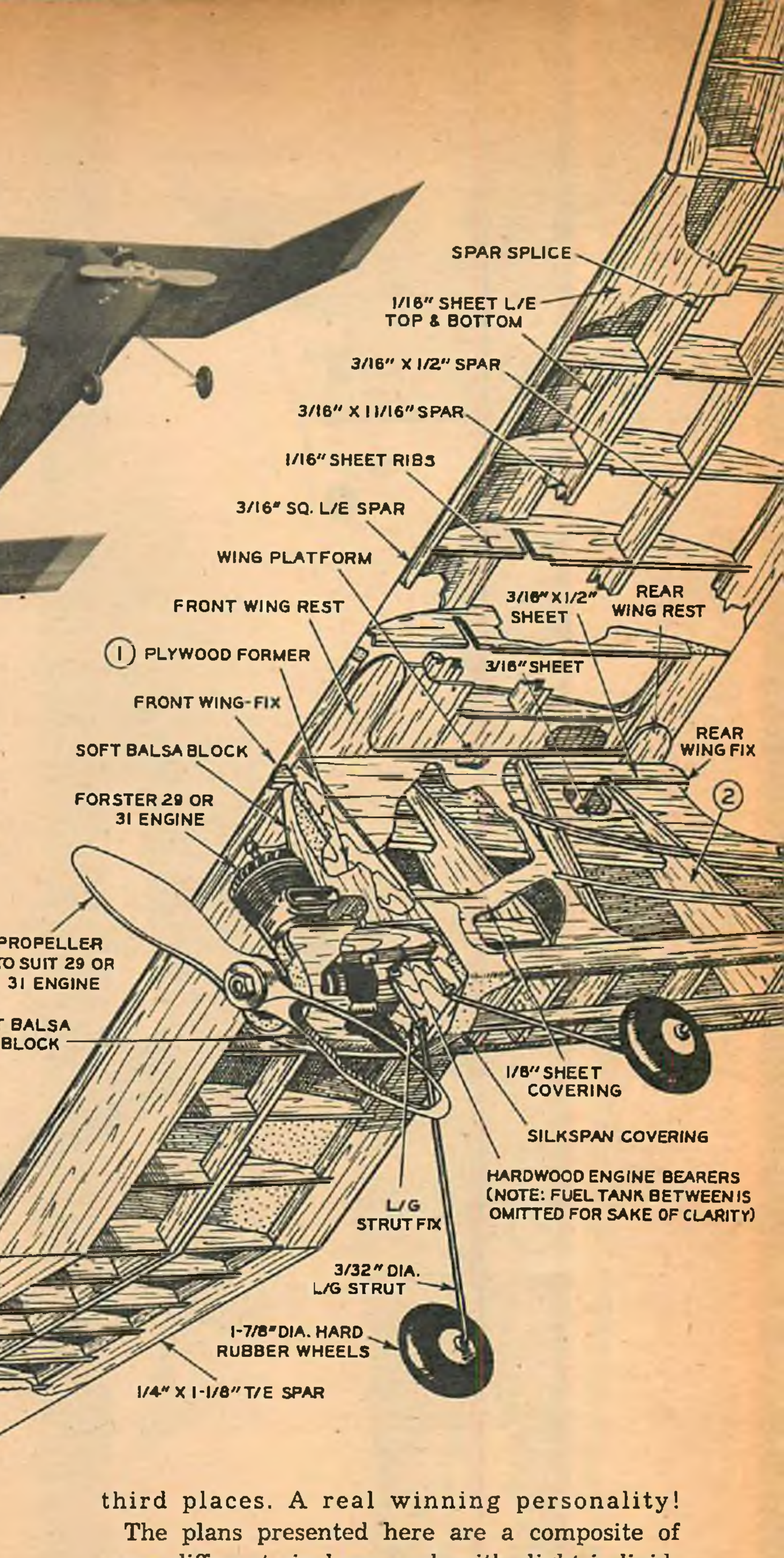
Designed by ERNIE SHAILOR

■ The quiet-looking gentleman standing to our left here is one of the country's outstanding free flight modelers—yet is one of the least known. Twenty-eight-year-old Ernie Shailor of Detroit, a neon sign repairman by trade, started modeling about 15 years ago. His record of victories in local, regional and national modelplane competitions is a staggering one, yet few model builders outside the Sky Guys Club of which he is a member have any idea of his amazing performance.

Ernie's *Happy Medium* airplane won first place at the last National Meet in Class B and fifth in Class C. It won the Canadian National Class C championship and placed third at that important contest in the B Class. In addition, during the last contest season it was first in Class C at the Michigan State meet while a Half-A version cleaned up in another Canadian contest.



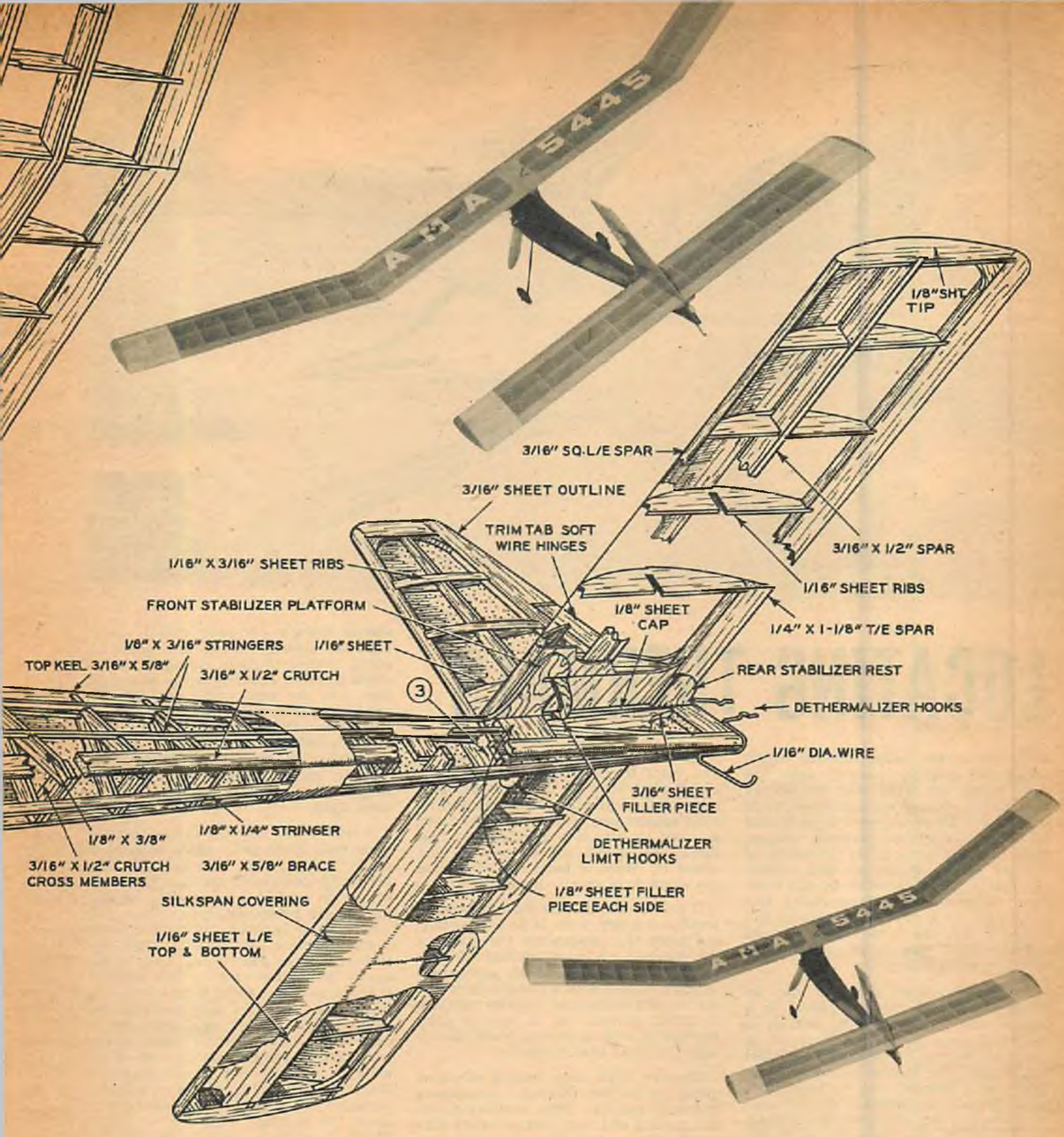
The Editors of Air Trails say this is the best free flight craft by an amateur designer to come out of the '51 flying season



In 1951 alone Sky Guys members took not less than 7 firsts and a dozen second and third places at big meets with Shailor's design.

And here's still more evidence of the model's ability to git up and go—at the 1950 Nationals the design won a first in R.O.W., two seconds and two third places. A real winning personality!

The plans presented here are a composite of many different airplanes each with *slight individual* modifications which have been built by Michigan modelers. Ernie originally dubbed this ship the "Wombat" but after a dozen different versions appeared and after extensive cross checking with the designer and his flying friends, it was only logical that this particular Class B-C job be dubbed "The Happy Medium."

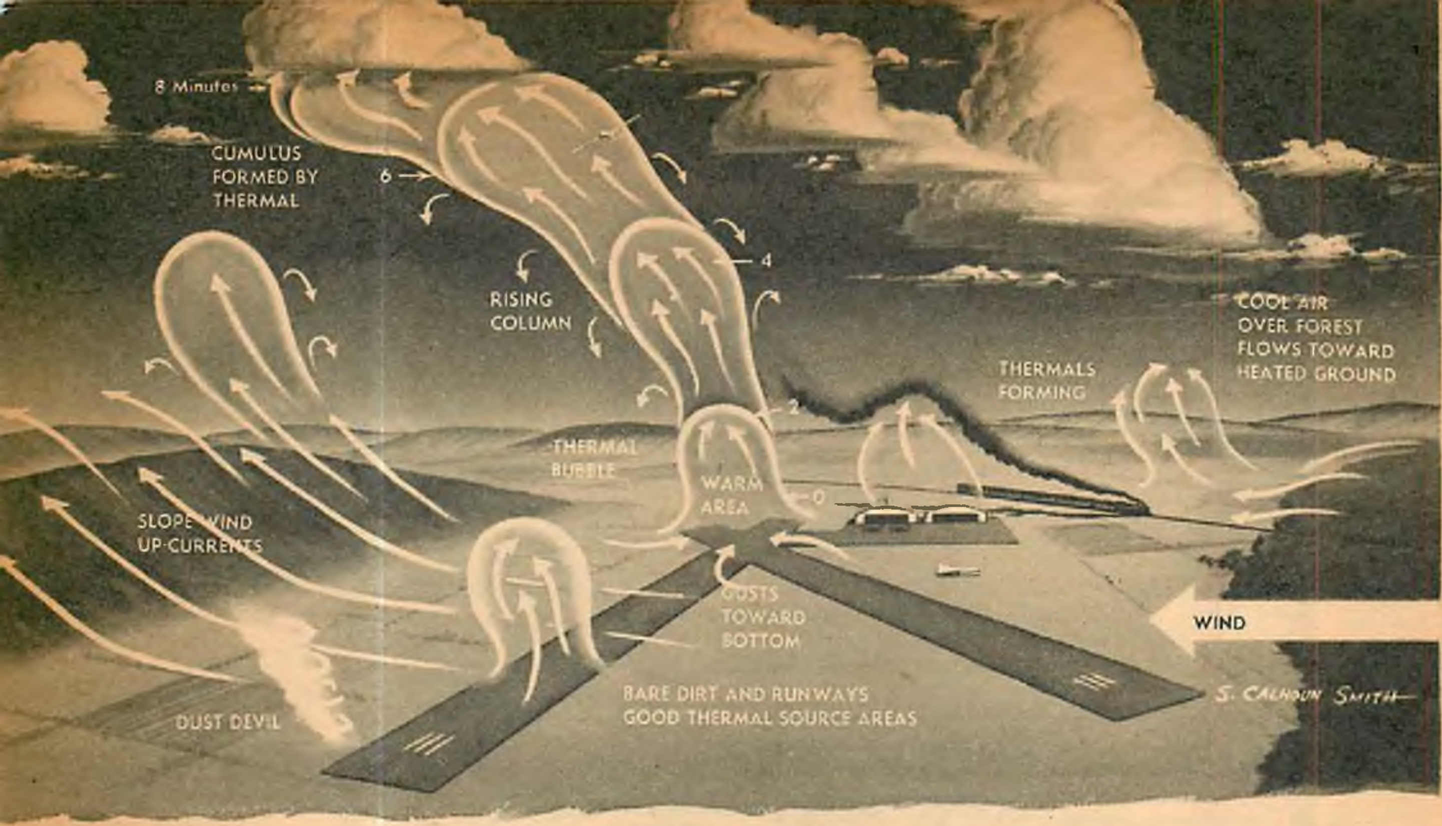


The designer uses a Forster .29 for his Class B flights and a Forster .31 for Class C.

Ernie's instructions for building the model are quite brief since it is entirely conventional in structure. He recommends that you begin building the body by making a crutch over the top view, then place firewall and motor mounts in position, slide top keel in slot in firewall and down between crutch longerons, cement onto this the wing and stab mounts. Then put in formers and after re-cementing all joints remove from plan and fit in sheet wood around nose.

The rest is built in the conventional way, except for the stab hooks—they limit stab travel and serve as excellent keys.

Before flying put in about two degrees right thrust and a very slight left turn (at first) for glide. Make sure the model flies right under power, then *gradually* adjust for left glide. Always launch or R.O.G. to the right of the wind.



LOCATING THERMALS

■ Thermals are rising columns of air which are slightly warmer than the surrounding air. They may be likened to hot-air balloons being released from the earth. When air over a particular portion of the ground becomes warmer than the surrounding air (because of heating action of sun on that section of terrain), that mass of air breaks loose from the earth and starts rising like a bubble. As it rises it accelerates and moves faster, the acceleration upward depending on how much hotter it is than the surrounding air.

The formation of thermals may be likened to water being warmed in a pot; as the water near the bottom is heated, it tends to rise. A lump of air cools 5.5 degrees F. for every 1000 feet it goes up. The maximum vertical velocity of a thermal and its height depend on the temperature of the surrounding air, for whenever the thermal has cooled to the temperature of the air around it, it ceases to rise.

Watch how other models are performing. Thermals tend to be emitted from a particular spot periodically, so if any other model catches a thermal you would be wise to send your ship up the same place 5 or 15 minutes afterward. You can watch a series of models and get an idea of the period of the thermals. If you can send your model up right after you see another model catch an updraft, you can often get yours up in the same thermal.

Watch the cumulus clouds. When there are cumulus clouds marking the tops of the thermals you can actually "see" the up-current. The problem is to estimate where the lower part of the up-current is in relation to the cloud.

Thermals do not last very long, so you want to get your model under a cloud when it is growing, not dissipating. If the cumulus cloud has a firm, solid appearance, with a flat, dark base, you can be sure it is growing and that there are strong up-currents in and under it. When it looks frayed around the edges it is usually breaking up.

If the clouds that are forming are all small and wispy, there is no way of telling from the appearance the stage of the thermal. A good method of estimating the strength of an up-current which connects with a cloud is to watch the cloud's horizontal velocity relative to other clouds. If it tops a good thermal it will be moving more slowly with the wind than its mates.

Observe birds, dust, insects or paper going up in the thermal. Sometimes thermals are like little whirlwinds on the ground and will pick up solid material. When they do you can be sure the up-current is very strong up high. Your model can probably climb in any updraft that lifts a bird.

Suppose you find yourself launching a model on a cloudless day in a part of the country where all the ground is flat and there are no smoke plumes or birds or other models. You then cannot guess where the next thermal will be very accurately, but you can tell if thermals are present by noting whether or not the wind is steady. Whenever the wind is gusty there are some up-currents nearby.

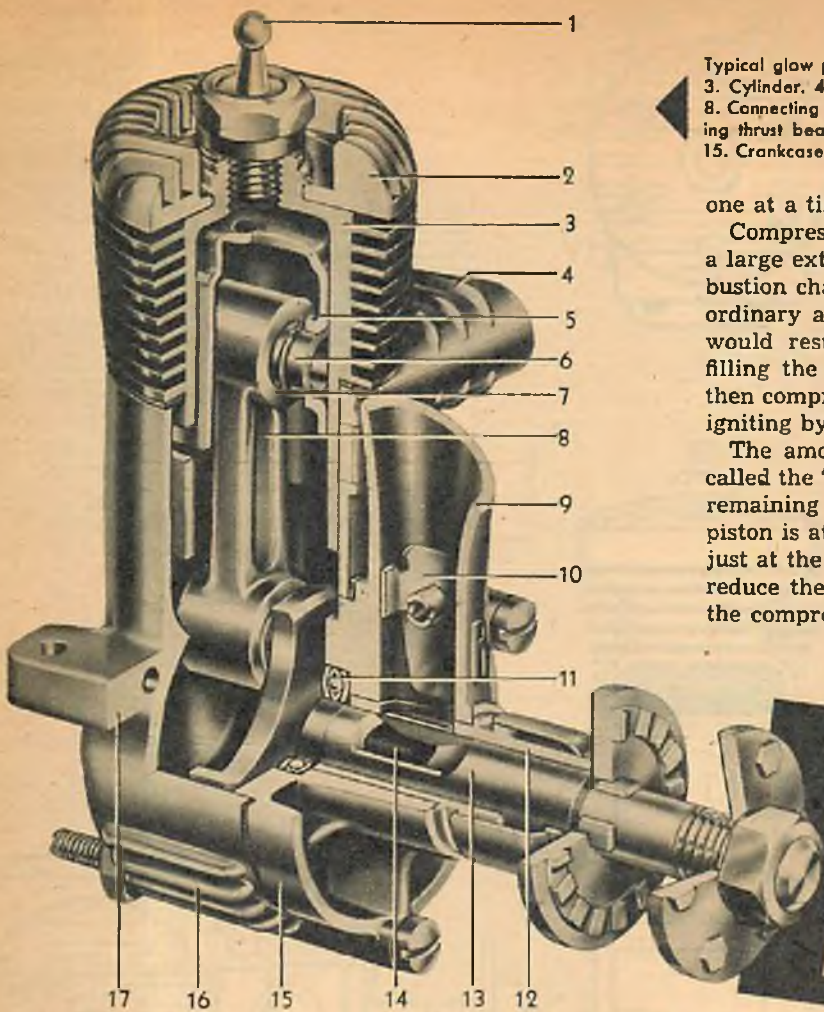
Let's imagine you have a powerful thermal all lined up and waiting for your model—you still have to make proper use of it. If the day seems to offer good thermal possibilities you should always get your model up as high as possible while the motor is going. When it starts gliding it should circle tightly. A stable model in a tight turn has the best possible chance of catching a thermal and staying in it. Good thermals are gusty, so your model must be able to recover from any unusual position it assumes. It must be able to make use of both large and small thermals; hence its circle must be very tight.

A model will not stay in one thermal more than about ten minutes if there is much wind. The best model sinks vertically downward through the mass of air in which it is circling at approximtely 3 feet per second, no matter what the air is doing. If there is wind a thermal does not extend straight up; instead it leans downwind. Thus as the model is carried aloft in the thermal it tends to drop out of it on the downwind side. Then it finds itself in the gentle down-current, and descends. It may hit another thermal lower down. and start up again. Most days the thermals go up until they squash against a layer of very stable air called a "temperature inversion." When they hit this layer the thermals push out sideways. This is another reason why your model may lose the thermal—it gets pushed out sideways near the top.

On a typical day the thermals become strong enough to be useful about 11 A.M., die out around 6 P.M., and are strongest between 1:30 and 3 in the afternoon. If you think the day is going to be a very good one you should try to get your flights in as early as possible, because there is usually less wind then and your model will take longer to go out of sight. Another point —thermals do not go as high earlier in the day, which means the timer can keep your model in sight longer.

By PAUL B. MacCREADY, Jr.

POWER DEPT.



Dwg. By Lee Scott

Typical glow plug engine: O&R "23"—1. Glow plug. 2. Cylinder head. 3. Cylinder. 4. Exhaust stack. 5. Piston. 6. Wrist pin. 7. Retaining ring. 8. Connecting rod. 9. Venturi. 10. Interchangeable venturi. 11. Ball bearing thrust bearing. 12. Main bearing. 13. Crankshaft. 14. Rotary valve. 15. Crankcase cover. 16. Crankcase. 17. Beam mounting flange.

■ Model airplane engines are nearly all the single-cylinder two-cycle type as illustrated. Power is developed by compressing an air-fuel mixture in the cylinder during the upward stroke of the piston and igniting it at the top of the stroke. Rapid burning causes a sudden increase in temperature and pressure which acts on the piston with a force as great as *500 pounds*. This is transmitted to the connecting rod and then the crankshaft.

At the bottom of the stroke, intake and exhaust ports open, allowing fresh air and fuel to flow from the base through the by-pass and into the cylinder, pushing the burned fuel mixture out the exhaust port. While this explosion is occurring in the cylinder above the piston, the base of the engine is pumping fuel for the next power stroke.

The upward travel of the piston causes a partial vacuum in the base and draws air and fuel through the intake or rotary valve. When the piston is at top center the valve closes and the mixture is compressed in the base during the downward stroke. The resulting pressure *blows the mixture up through* the by-pass when the ports open.

This operating cycle sounds very simple, but when an engine is built and put into operation several complications set in. High pressure is difficult to seal against leakage at the piston, and intense heat plays havoc with close fits when the parts begin to expand. These individual problems must be understood and overcome one at a time in order to get a perfect engine tune-up.

Compression controls the personality of an engine to a large extent. If fuel and air were placed in the combustion chamber with the piston at top dead center at ordinary air pressure and exploded, very little power would result. Engine output is greatly increased by filling the cylinder with piston completely down and then compressing the mixture to a small volume before igniting by the upward movement of the piston.

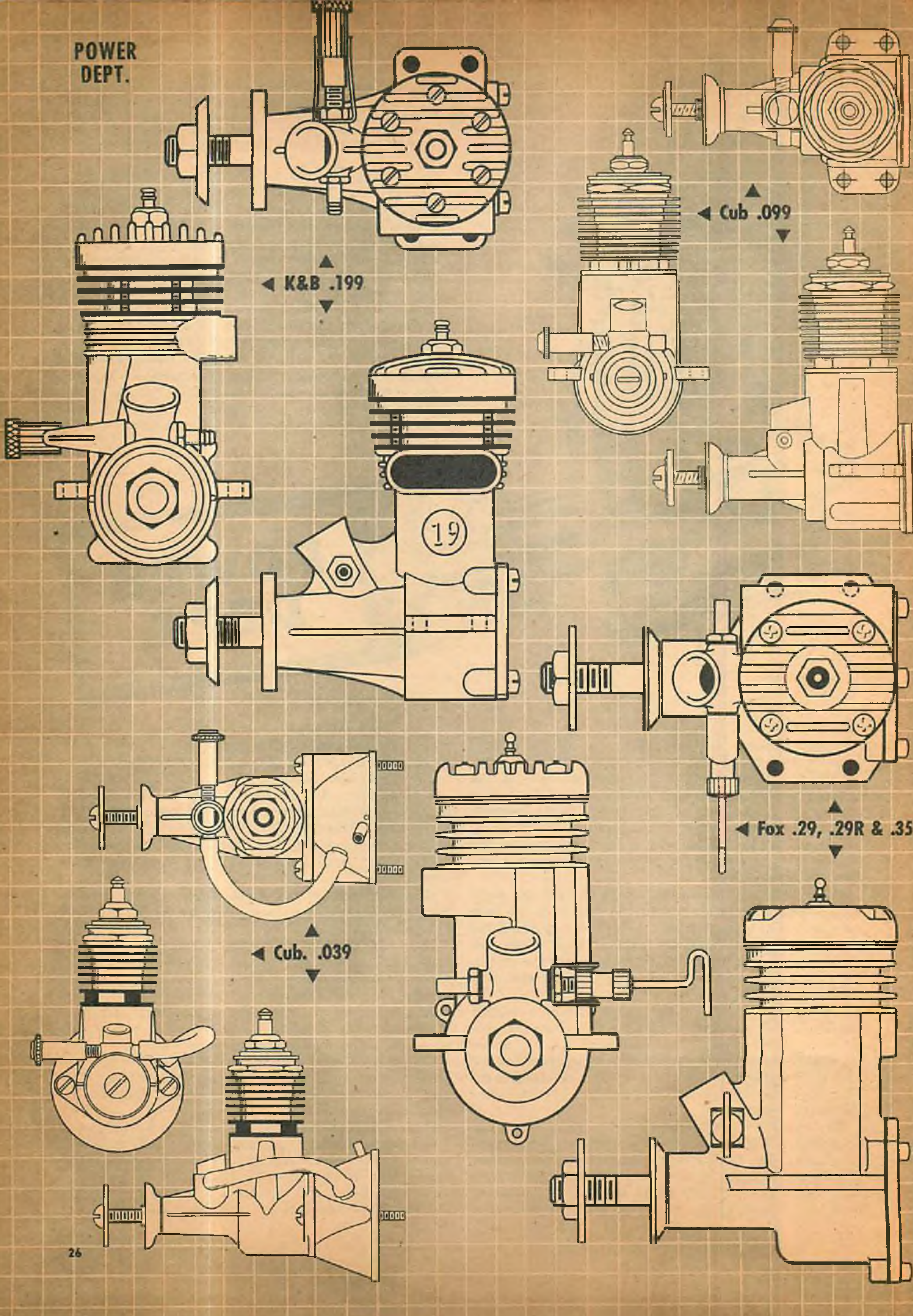
The amount that the fuel is "squeezed" together is called the "compression ratio." (This means the volume remaining in the cylinder over the piston when the piston is at its topmost position, compared to the space just at the time the exhaust port closes.) Leakage may reduce the "effective compression" considerably below the compression ratio and cause loss of power. It may seem logical to make a close-fitting piston and cylinder to stop all leakage, but expansion of metal parts due to heat renders this impossible.

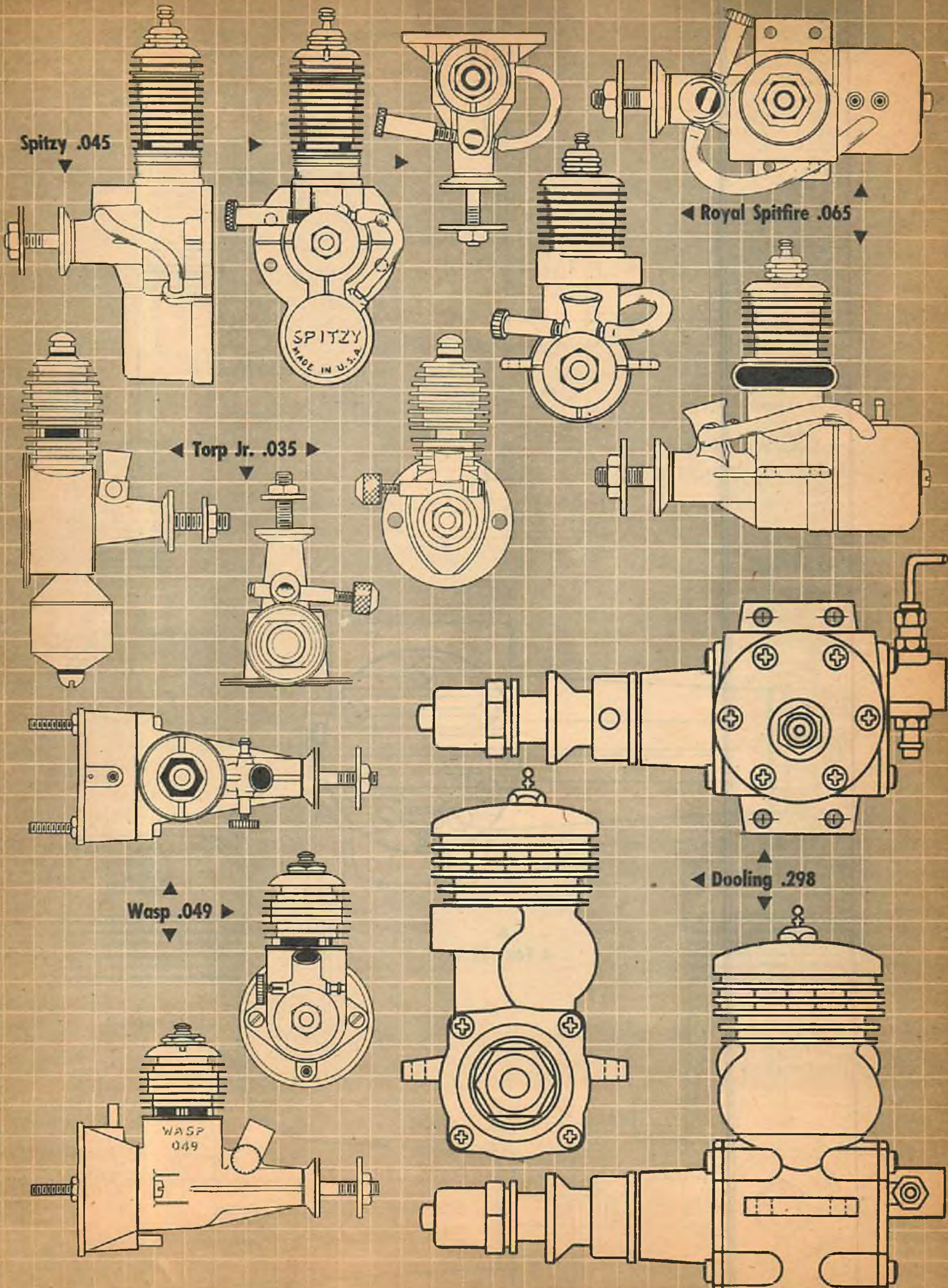
Burning inside the cylinder starts when the piston is near the top center and is completed before the piston moves down very far. The resulting heat is picked up by the piston, cylinder and cylinder head. Fins on the cylinder and head keep these parts at a reasonable temperature.

However, considerably higher temperatures exist in the piston because it is cooled only by contact with the hot cylinder.

High temperatures at the top surface of the piston cause the greatest expansion at that point, and its skirt expands somewhat less. Piston clearance is reduced because the piston expands much more than the cylinder. Most small-bore engines take care of this change in clearance by allowing .0005" clearance cold and depend on heavy oil to make a compression seal.

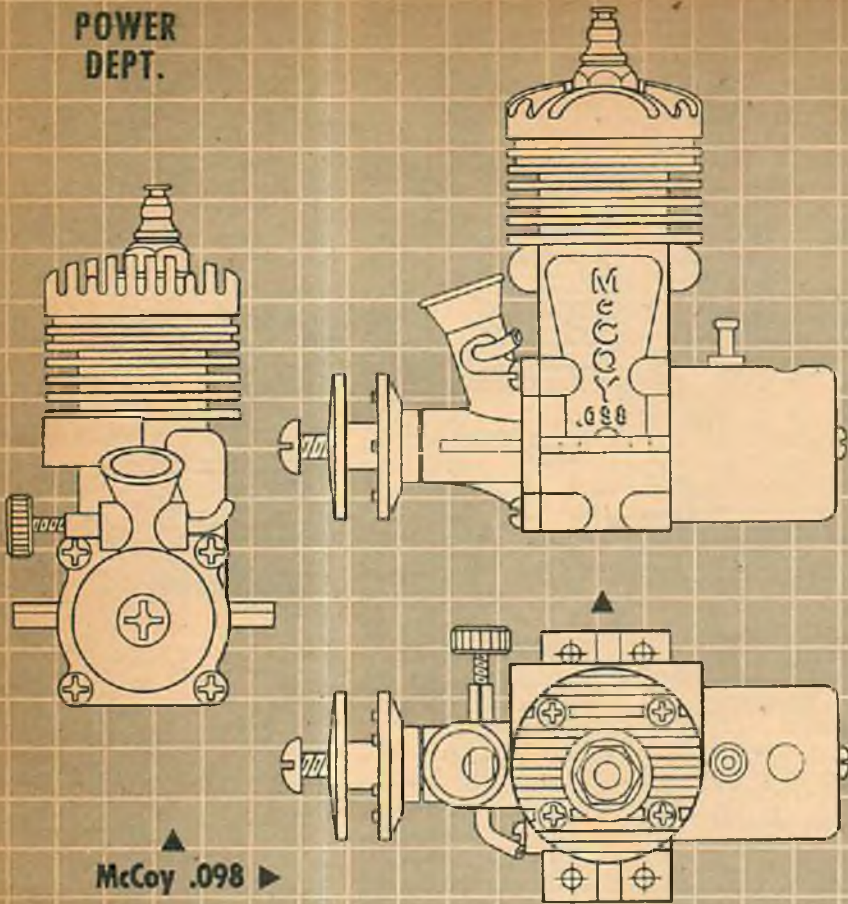
Cast-iron or steel pistons must be used in this arrangement because of their low rate of expansion. Cast iron or steel has proven satisfactory, especially in the comparatively lower speed engines, but for top-speed engines a lighter piston is necessary to avoid excess vibration, so aluminum is usually used. But aluminum pistons expand about two and one-half times as much as cast iron or steel and the oil film no longer seals. Cast-iron piston rings are used to make a seal with .002" to .0035" piston clearance for expansion.


Cub .099
K&B .199
Fox .29, .29R & .35
Cub. .039

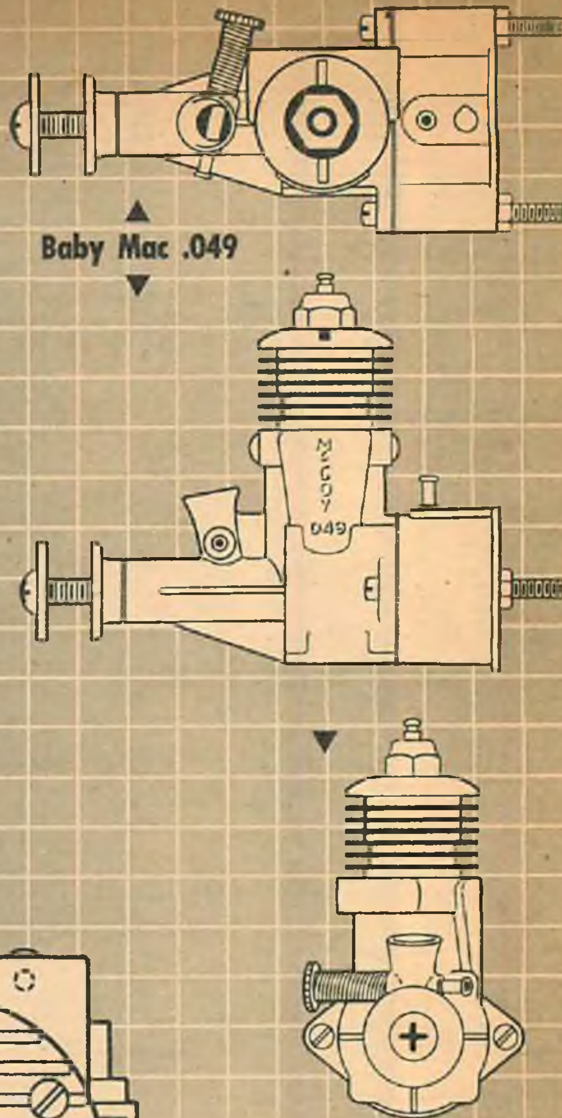


Spitzy .045
SPITZY
MADE IN U.S.A.
Royal Spitfire .065
Torp Jr. .035
Dooling .298
Wasp .049
WASP
049

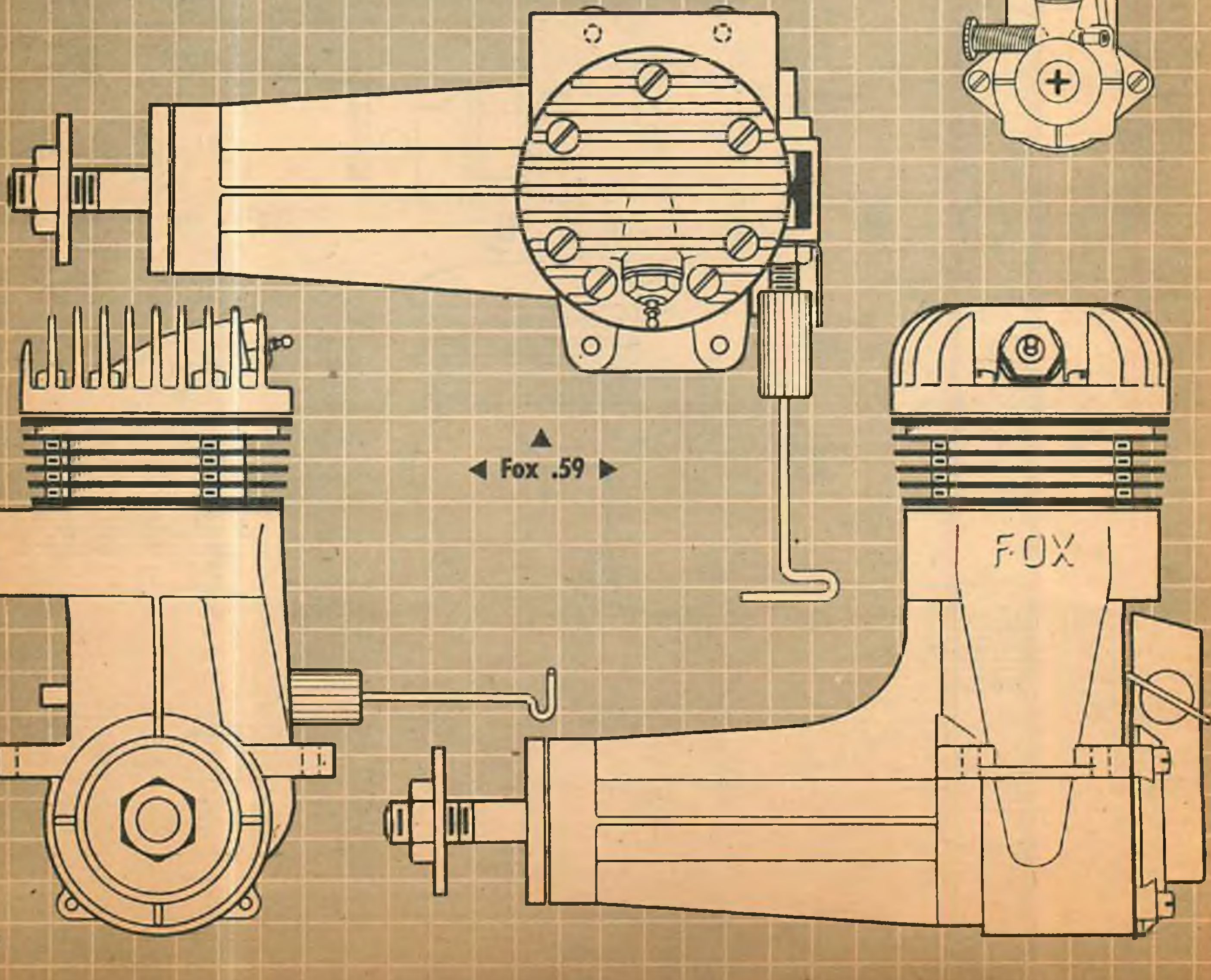
POWER DEPT.



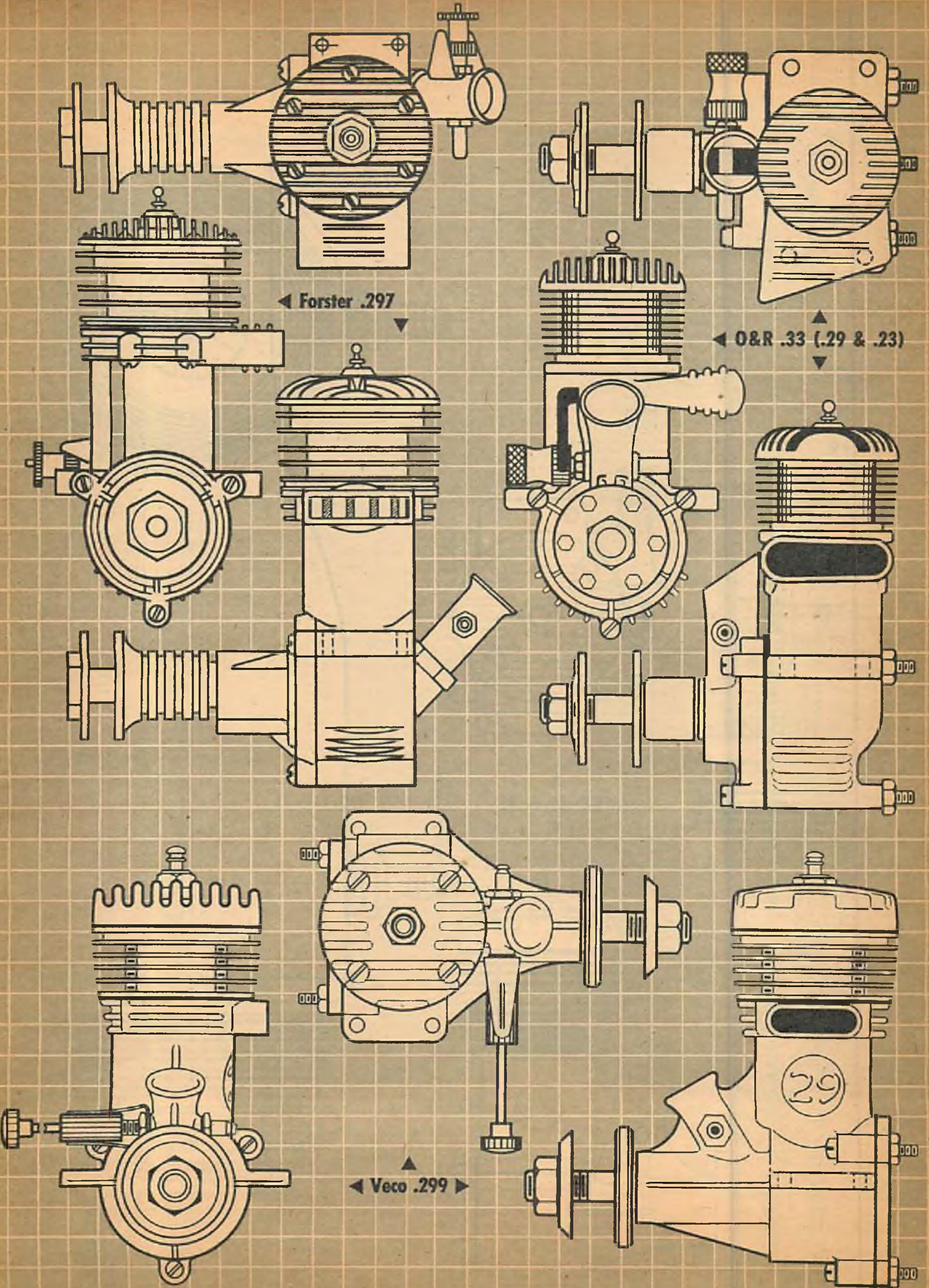
McCoy .098



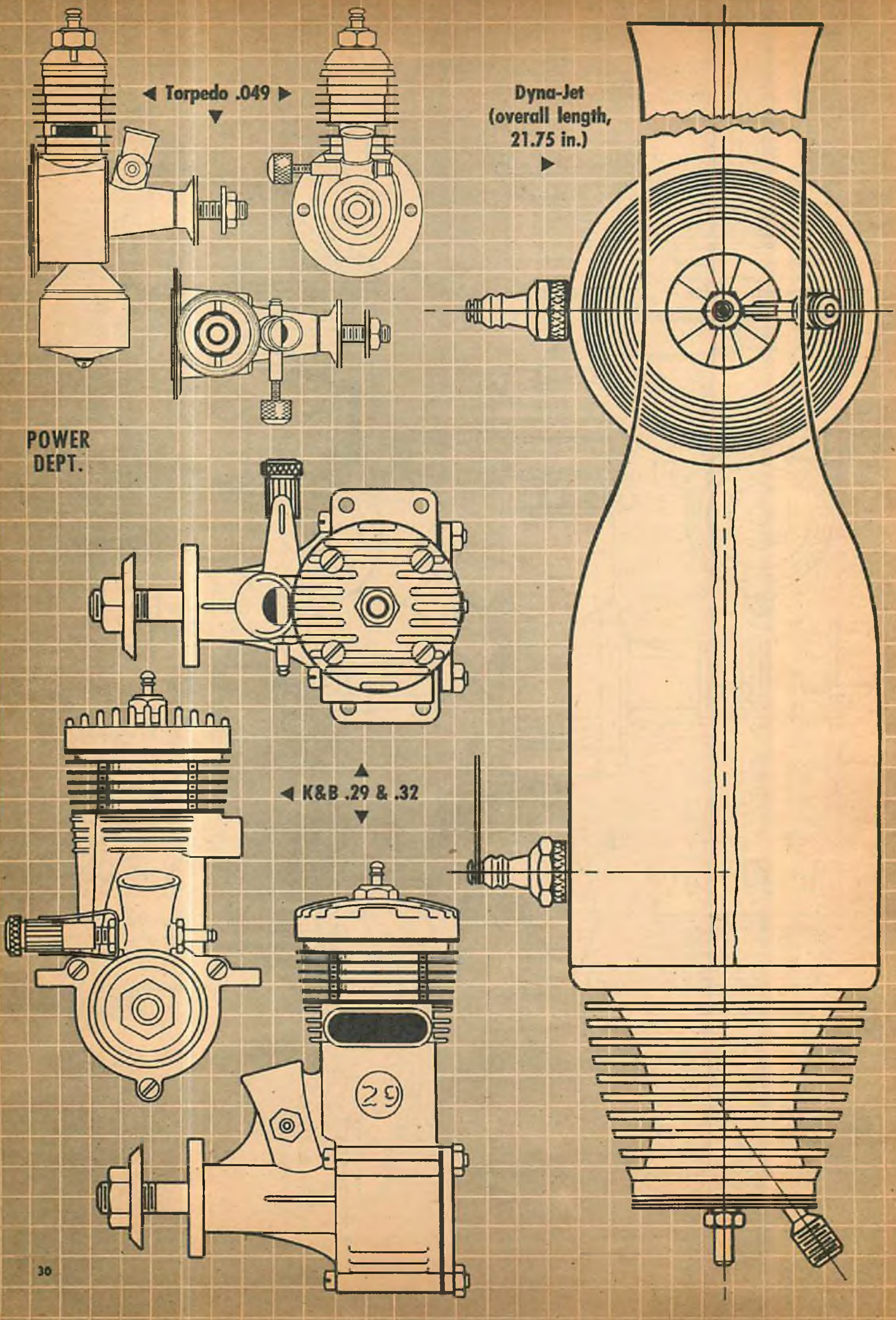
Baby Mac .049



Fox .59



◀ Forster .297 ▼
◀ O&R .33 (.29 & .23)
29
▲ ◀ Veco .299 ▶


◀ Torpedo .049 ▶
Dyna-Jet
(overall length,
21.75 in.)
POWER
DEPT.
◀ K&B .29 & .32
29

ALL AMERICAN RUBBER MODEL

■ After competing in three Nationals with cabin models employing a diamond fuselage design, we thought that a change was in order. The main disadvantage of a diamond type fuselage model is found in the mounting of the wing. It is necessary to use a wire birdcage arrangement or a drag-pro-

By ROBERT J. DUNHAM

ducing, difficult-to-construct wing platform. To eliminate this it was decided to employ a slab-sided cabin, somewhat resembling a full-scale airplane.

Plans were drawn for a model using the same airfoil, and force arrangement of lifting surfaces, as on the previous diamond fuselage model. The results were most gratifying as dead air flights resulted in times close to three minutes' duration. At the National Meet, the day for this type of model was windy and overcast. Despite this, two out-of-sight flights were made, the model being lost in a field on its last official. Total time of three official flights was 10:23.6. The plane was later found and returned undamaged. While retesting, the ship hooked a slow rising thermal and flew for 50:20, coming down about four miles from the launching point.

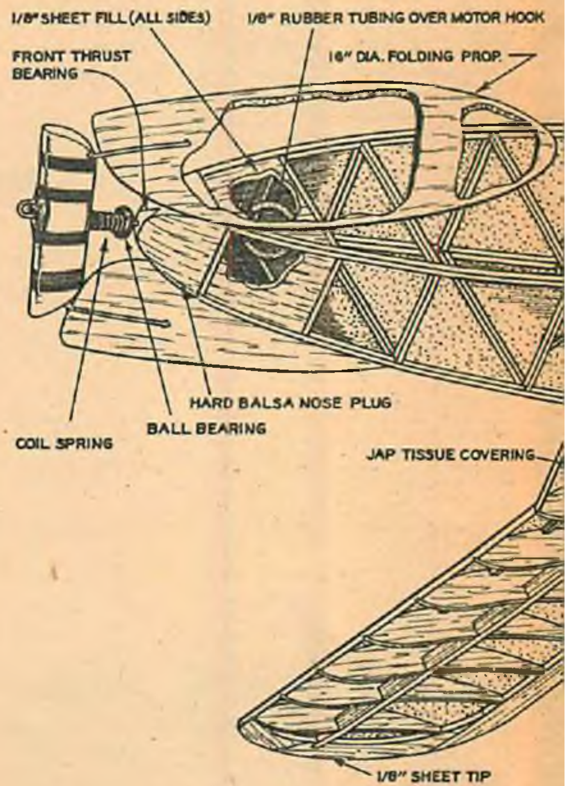
It is still in excellent condition. Due to the plane's simplicity of construction, many of the younger inexperienced fellows in the Tulsa area have built and successfully flown this model. No special tools or materials are needed.

The two fuselage sides are constructed on side view, one over the other, to insure being identical. The four main longerons should be ⅛" square hard balsa, cut from same piece to produce even bending when drawing front and rear together on the top view. The truss-like construction aft of wing results in a strong, lightweight fuselage. The sheet balsa fill-in for the nose, window, landing gear, and rear dowel anchor are then added. Cement a ⅜" diameter fiber bushing at anchor dowel position. Don't forget wing mount wire or the 3/32" dowel peg to hold rubber band which pulls tail section into the dethermalized position.

The landing gear is of 1/16" music wire and securely cemented and braced. Wheels are made from ⅛" sheet balsa with balsa hubs cemented cross-grained for strength. Wrap thread or solder brass washers on each side to secure.

This exceptional clean, trouble-free design has racked up a first and numerous high places in National meet and regional contests.

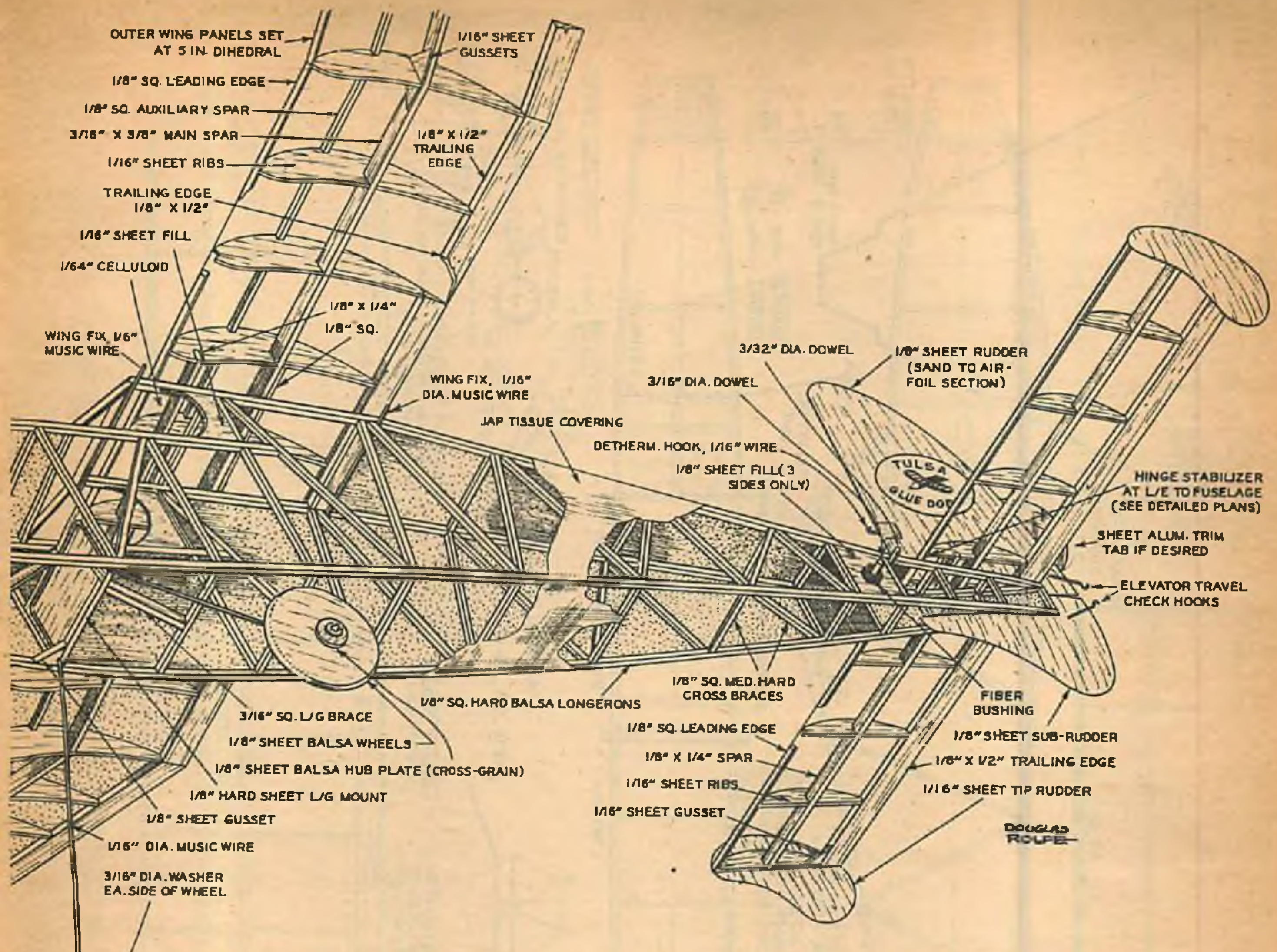
An elevator rib template is cut from lightweight aluminum and 10 ribs sliced from quarter-grained sheet balsa. Pin down main spar and tapered trailing edge on plan, cement ribs in, then add square leading edge. The sheet corner gussets keep covering from becoming wrinkled at corners. Next, cover with Japanese tissue, and glue tip rudders to

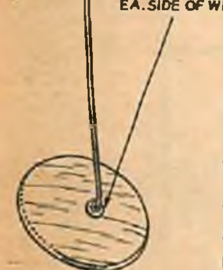


the end stabilizer ribs. Water dope, then clear dope several times. The center rudder and sub-rudder are made of medium hard sheet balsa, sanded to a symmetrical airfoil and given three coats of clear nitrate dope.

A wing rib template is fashioned from lightweight aluminum and 21 ribs are cut from quarter-grained sheet balsa. Construction procedure is similar to that of elevator. Block up front of trailing edge with scrap sheet to insure a smooth-contoured airfoil. When the three wing panels have been completed, spars and leading and trailing edge are fitted by trial and error method, so as to have 5 inches of dihedral in tip panels. The dihedral joints on main balsa spar are reinforced with sheet balsa gussets. Wing tip outlines are from medium soft balsa, with grain as shown. Round off tips and leading edge with sandpaper. Wing is now ready for covering. If Japanese tissue is used for covering, grain of paper should run lengthwise of the wing.

The propeller used on the original model was quite low pitched, which resulted in a fast climb and short motor run of about 50 to 60 seconds when





fully wound—ample to get the model high.

The folding mechanism is self-explanatory and has been used successfully for a number of years. It is strong and durable, resulting in a minimum of maintenance. Other types of folders could be chosen. Both front and rear of prop are reinforced with sheet tin and wrapped with thread.

The nose block is of hard balsa, grain running lengthwise. The block is also reinforced with tin thrust bearings on both front and back to hold noseblock adjustments.

A compression spring was utilized to engage prop tensioner peg, which extends through back of the nose block. By stopping the propeller at same point each time, the same glide circle is assured on every flight.

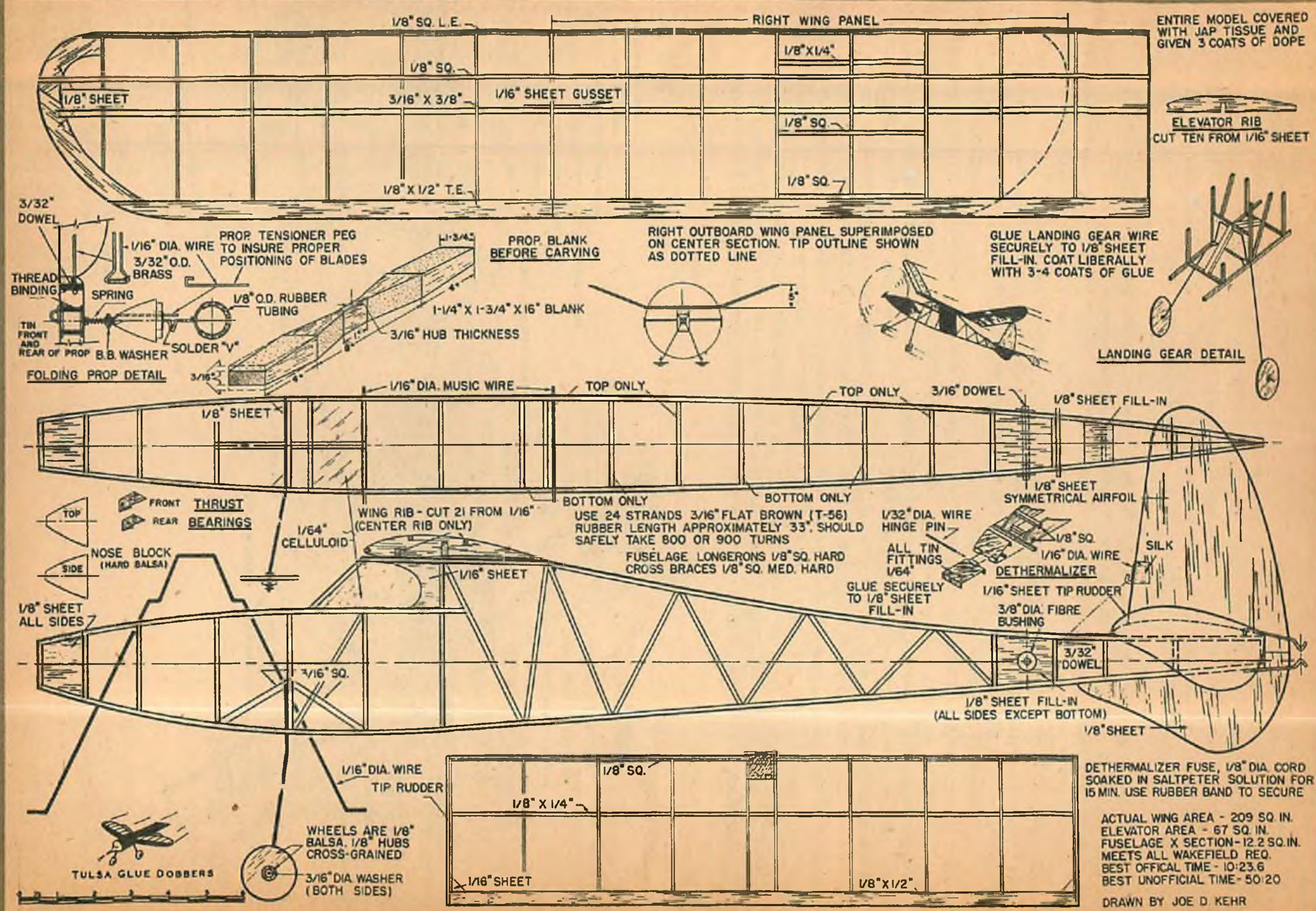
The hinge device on leading edge of elevator has been found to be shear resistant and trouble free. It is constructed of sheet tin with short pieces of brass tubing soldered in place. The hinge pin is about 1" in length, and once engaged, both ends should be coated with glue to prevent its slipping out and allowing tail surfaces to get out of line.

A short length of thread is used to stop the elevator travel at desired angle. This angle should be about 30 to 40 degrees for the slowest dethermalized descent. Saltpeter fuse can be purchased already prepared or made by soaking a ⅛" diameter cord in a saturated solution of saltpeter. The rate of burning depends on concentration of the solution and flying speed of model.

The original model was covered with orange Japanese tissue and given three coats of clear dope. To keep the tissue from becoming brittle with age, add about four drops of castor oil to each four ounces of dope. This mixture also produces a high gloss surface with a minimum of weight.

The completed model weighed 8 ounces and power consisted of 24 strands of 3/16" flat brown (T-56) rubber approximately 33 inches long. The motor should be pre-wound before attempting to apply maximum winds. If windy conditions prevail, an additional 2 to 4 strands of rubber should be used to get plane up and away from turbulent ground currents.

The original model climbed straight into the wind at about a 40 degree angle for one-half of the motor run. It is suggested that the model be test flown during the calm evening hours. First flight should be given about 200 turns, and more turns added as satisfactory flights are made.


RIGHT WING PANEL
1/8" SQ. L.E.
1/8" SQ.
3/16" X 3/8"
1/16" SHEET GUSSET
1/8" SHEET
1/8" X 1/2" T.E.
1/8" X 1/4"
1/8" SQ.
1/8" SQ.
ENTIRE MODEL COVERED WITH JAP TISSUE AND GIVEN 3 COATS OF DOPE
ELEVATOR RIB
CUT TEN FROM 1/16" SHEET
3/32" DOWEL
1/16" DIA. WIRE
3/32" O.D. BRASS
THREAD BINDING
SPRING
TIN FRONT AND REAR OF PROP
B.B. WASHER
SOLDER "V"
PROP. TENSIONER PEG TO INSURE PROPER POSITIONING OF BLADES
1/8" O.D. RUBBER TUBING
FOLDING PROP DETAIL
PROP. BLANK BEFORE CARVING
1-1/4" X 1-3/4" X 16" BLANK
3/16" HUB THICKNESS
RIGHT OUTBOARD WING PANEL SUPERIMPOSED ON CENTER SECTION. TIP OUTLINE SHOWN AS DOTTED LINE
GLUE LANDING GEAR WIRE SECURELY TO 1/8" SHEET FILL-IN. COAT LIBERALLY WITH 3-4 COATS OF GLUE
LANDING GEAR DETAIL
1/16" DIA. MUSIC WIRE
TOP ONLY
TOP ONLY
3/16" DOWEL
1/8" SHEET FILL-IN
1/8" SHEET
BOTTOM ONLY
BOTTOM ONLY
1/8" SHEET SYMMETRICAL AIRFOIL
FRONT
REAR
THRUST BEARINGS
TOP
SIDE
NOSE BLOCK (HARD BALSA)
WING RIB - CUT 21 FROM 1/16" (CENTER RIB ONLY)
1/64" CELLULOID
USE 24 STRANDS 3/16" FLAT BROWN (T-56) RUBBER LENGTH APPROXIMATELY 33". SHOULD SAFELY TAKE 800 OR 900 TURNS
FUSELAGE LONGERONS 1/8" SQ. HARD
CROSS BRACES 1/8" SQ. MED. HARD
1/32" DIA. WIRE HINGE PIN
ALL TIN FITTINGS 1/64"
1/8" SQ.
1/16" DIA. WIRE
DETHERMALIZER
SILK
GLUE SECURELY TO 1/8" SHEET FILL-IN
1/16" SHEET TIP RUDDER
3/8" DIA. FIBRE BUSHING
1/16" SHEET
1/8" SHEET ALL SIDES
1/16" SQ.
3/32" DOWEL
1/8" SHEET FILL-IN (ALL SIDES EXCEPT BOTTOM)
1/8" SHEET
1/16" DIA. WIRE
TIP RUDDER
WHEELS ARE 1/8" BALSA, 1/8" HUBS CROSS-GRAINED
3/16" DIA. WASHER (BOTH SIDES)
TULSA GLUE DOBBERS
1/8" SQ.
1/8" X 1/4"
1/16" SHEET
1/8" X 1/2"
DETHERMALIZER FUSE, 1/8" DIA. CORD SOAKED IN SALTPETER SOLUTION FOR 15 MIN. USE RUBBER BAND TO SECURE
ACTUAL WING AREA - 209 SQ. IN.
ELEVATOR AREA - 67 SQ. IN.
FUSELAGE X SECTION - 12.2 SQ. IN.
MEETS ALL WAKEFIELD REQ.
BEST OFFICAL TIME - 10:23.6
BEST UNOFFICIAL TIME - 50:20
DRAWN BY JOE D. KEHR

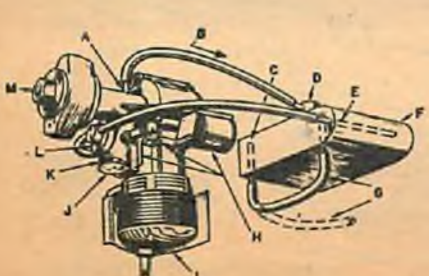
Progress in Speed

■ Although speed racing has reached the point where records are pushed upwards by mere 1/10ths of miles-per-hour instead of by 10 or 12 mph, each new speed mark carries as much satisfaction as did those in the early days on U/C flying. Although many "old timers" some of whose models are shown here have dropped out of active competition, the current crop of speed fans continues the never-ending quest for cleaner, faster models, more efficient props and hotter engines. And better fuels? —"Just concocted one, Mac!"

TWO-SPEED GLOW PLUG

■ One of the most effective two-speed and pressurized fuel tank systems for use with a glow plug engine is that devised by Howard Thombs of Warren, Ohio.

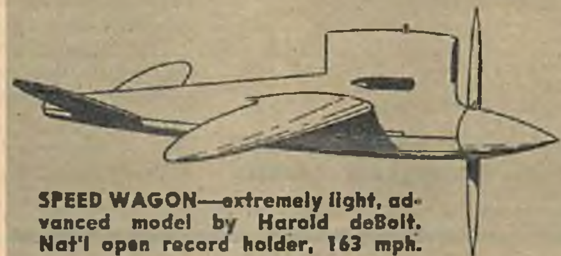
Set-up: A) pressure bleed off rotary; drill 1/32 inch diameter hole opposite intake; insert ⅛ inch outside diameter copper tubing. B) pressure to tank. C) leave space above tube ends. D) standpipe. E) fuel line to regulator. F) fuel tank. G) closed for flight; undo tubing to fill tank. H) 22.5 volts on relay; armature drives choke plate. I) aluminum sheet baffle fits close around fin portion of cylinder, guides air around rear and out side. J) sheet tin choke plate; two 1/32 inch diameter holes in center for idling when plate is closed; cover holes for cut-off action. K) intake half plugged in rear. L) Jim Walker Fuel Regulator. M) K&B .32 engine.



JUGHAID (1946)—Ernie Babcock's Hornet powered job, lathe-turned fuselage. 112-120 mph.

WALLY'S WINNER—took '46 Nat. Typical of speed models out of California.

CIRCULATOR—Dick Rigney's Class B entry took '48 Nationals. Pine fuselage, metal wings.



SPEED WAGON—extremely light, advanced model by Harold deBolt. Nat'l open record holder, 163 mph.

SCREAMIN' DEMON—high pressure tank, metal wings. 150 mph plus. Bill Wisniewski.

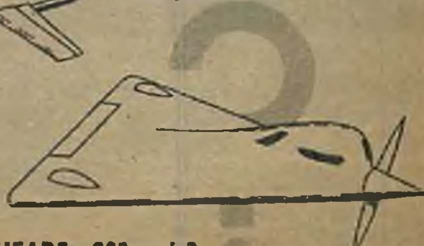
VEE GEE (1945) had cowled inverted engine. Early model in the 95-110 mph class.

DMECO SPECIAL (1946)—Harold deBolt's elliptical wing speed job. 120 mph.

SNOWFLAKE—Bill Viet's 1947 record holder featured dural mounts in pine fuselage. 143 mph.

INVADER—completely all-metal speed entry broke 130 mph in Class B. Ed Sharpe.

HELL RAZOR (1950) —national senior record held with it by George Fong. Uses cast magnesium bottom half. 159 mph.



AHEAD?—200 mph ?

Whirlaway "C"

By DON W. NEWBERGER

Famed National Meet winner greatly influenced designs throughout country

■ I would like to say that I developed this ship after many years of experimenting, but I can't. Bill Atwood had just finished a sample model of his Triumph 49 Special and gave me the opportunity to use it. In the short space of a month I built and flew the model which took first with a speed of 136.21 mph.

The wing is made of one very hard ⅝" x ⅝" x 12" oak spar which is tapered to shape. A slot is cut into the left side of the spar for the bellcrank. The covering of the wing is .012" sheet aluminum. The next step in the wing construction is a paper pattern of the wing top and bottom. Lay this directly on the aluminum and cut out around the pattern. After the sheet aluminum is cut out it is a very easy matter to bend in the leading edge so trailing edges of the aluminum just meet to make a symmetrical airfoil. The trailing edge is riveted together. The wing tip is made of .045" sheet aluminum inserted between the top and bottom wing skin. The wing panels are held onto the spar by small wood screws.

The take-off dolly is made of 3/32" piano wire. All of the joints are wrapped with copper wire and then soldered. One pair of 2½" wheels are used for the two front wheels of the dolly and a 2" wheel is used for the rear. The parts that rub against the model are wound with rubber tape to prevent scratching the paint.

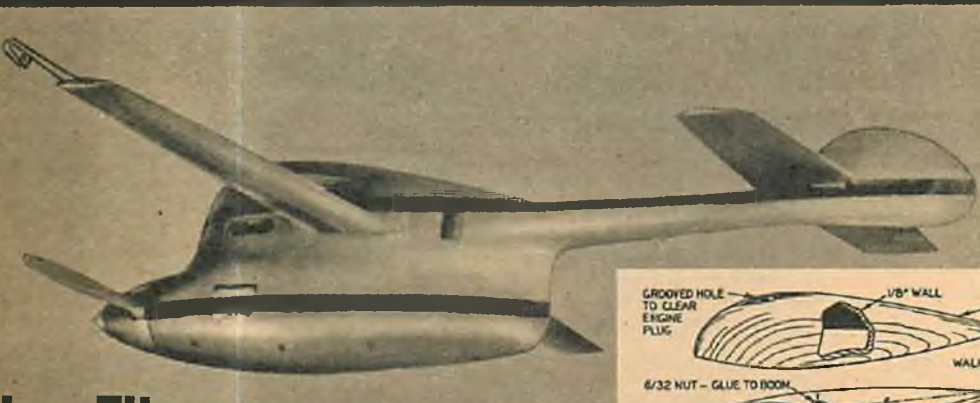
The Screamin' Demon

By BILL WISNIEWSKI

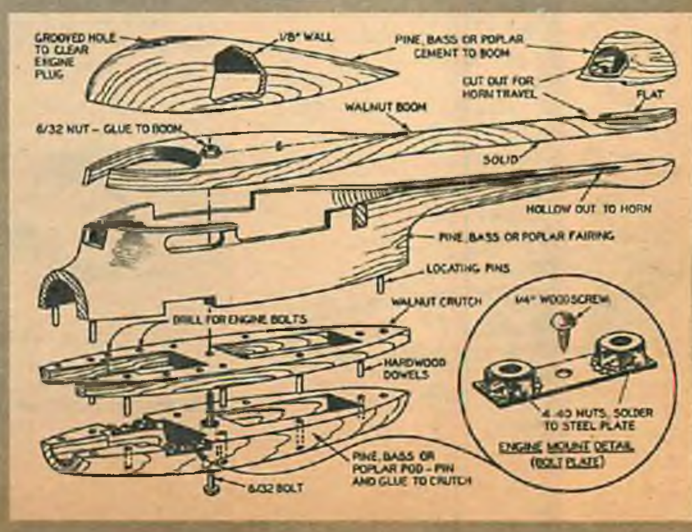
■ Most of the trouble I had in the past few years has been with fuel tanks. Probably you have experienced the same difficulties. The tank I am now using is a very high-pressure one. Inflated with fuel and engine started, the pressure remains constant until almost the last moment when the pressure increases.

The tank is made of a *natural* rubber ink sac from an ordinary fountain pen (these may be obtained from any fountain pen repair shop and cost about 15 cents), a piece of Neoprene tubing and a penny balloon. To assemble tank cut the ink sac down to 2 inches in length, slip the Neoprene tubing to the bottom of the sac and wrap tightly with thin wire or thread. Put about 8 drops of castor oil into the balloon and then insert the sac into the balloon. The oil is very important as without it the tank is liable to break immediately, due to friction.

The Fling

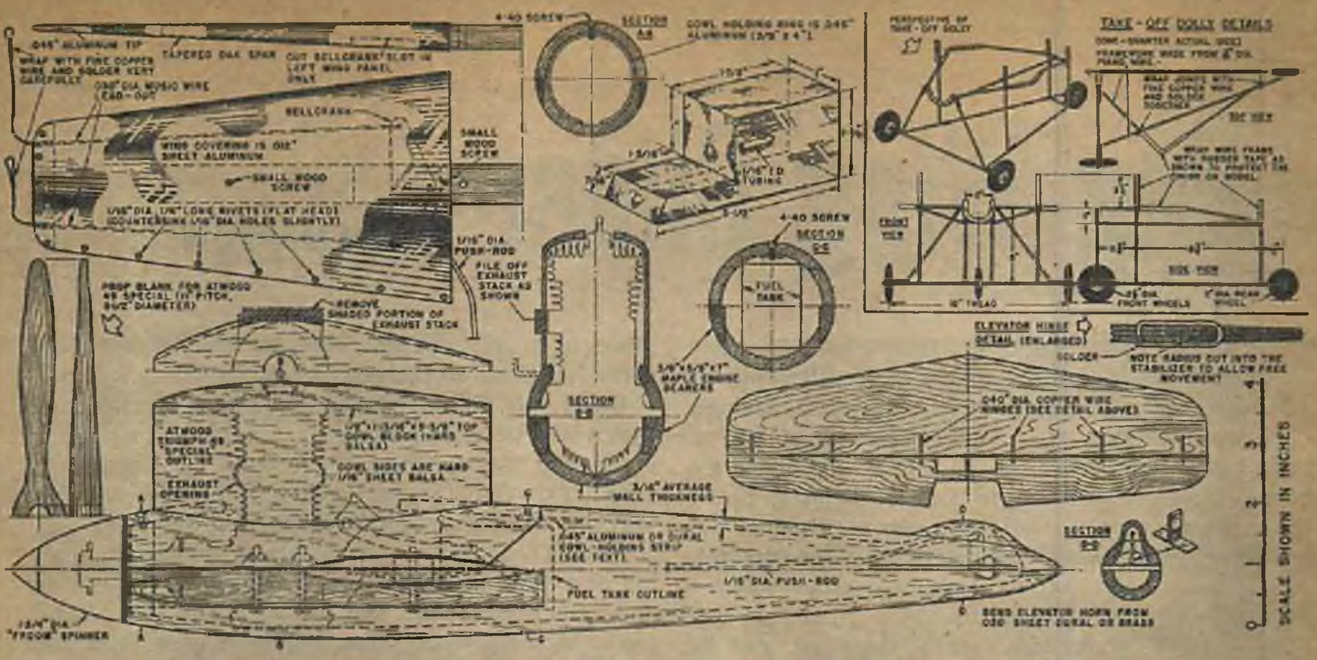


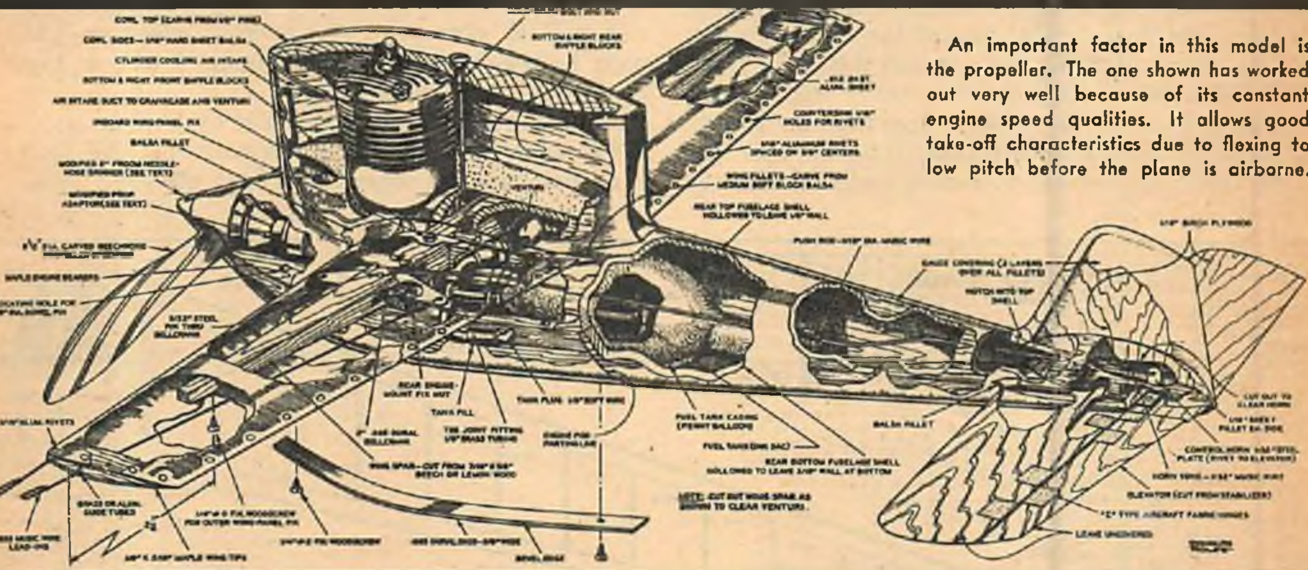
By FLETCHER SLADE and ART HASSELBACH



■ The original was powered with a Dooling .29 using a 7/10½ propeller and stock Hell Razor fuel. All the early test flights were very encouraging, despite the fact that these were made during the winter season. During the summer an impressive number of first places have been racked up in Eastern contests by *The Fling*.

This model is constructed of poplar; two walnut crutches are used, one for the engine mounts and the other for the boom extension. A conventional type speed tank, rectangular in shape with a pinhole vent,





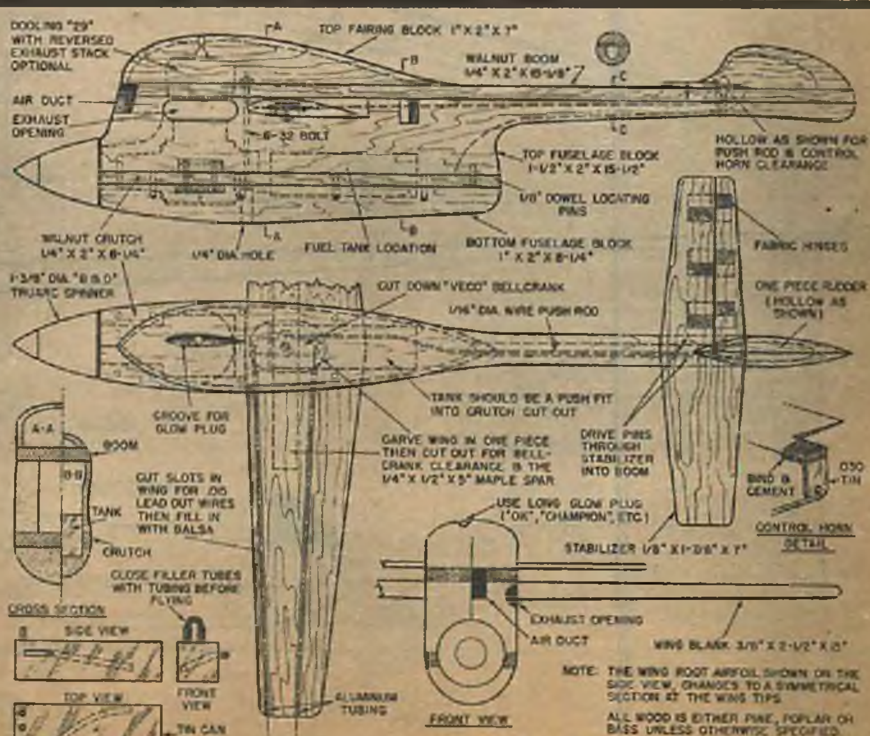
An important factor in this model is the propeller. The one shown has worked out very well because of its constant engine speed qualities. It allows good take-off characteristics due to flexing to low pitch before the plane is airborne.

proved most satisfactory.

One very important factor to be noted is that the wings and empennage are high. This will prevent model damage on rough circles.

Exploded view of fuselage assembly shows component parts. Upper assembly which carries wing and stabilizer is formed in three sections glued together. The lower pod assembly made from two pieces is held to the main assembly by a single bolt passed through the pod and bearing against the underside of the hardwood pod crutch and secured to the nut affixed to the boom section. Bread-and-butter construction makes *for easy carving of the* component parts. Note: the engine bolt fix plates must be put in position before completing the pod section, and both nuts and base plate filed off later to conform to fuselage contour.

Finish-sand entire model. Then apply three coats of sanding sealer. Rub with fine 6/0 sandpaper, then wax. Install engine and tank. A regular tank with a pinhole is used. In flying you will find this model easy to hand-launch at zero incidence.



Flying Wing Glider

By LEN MARLOW

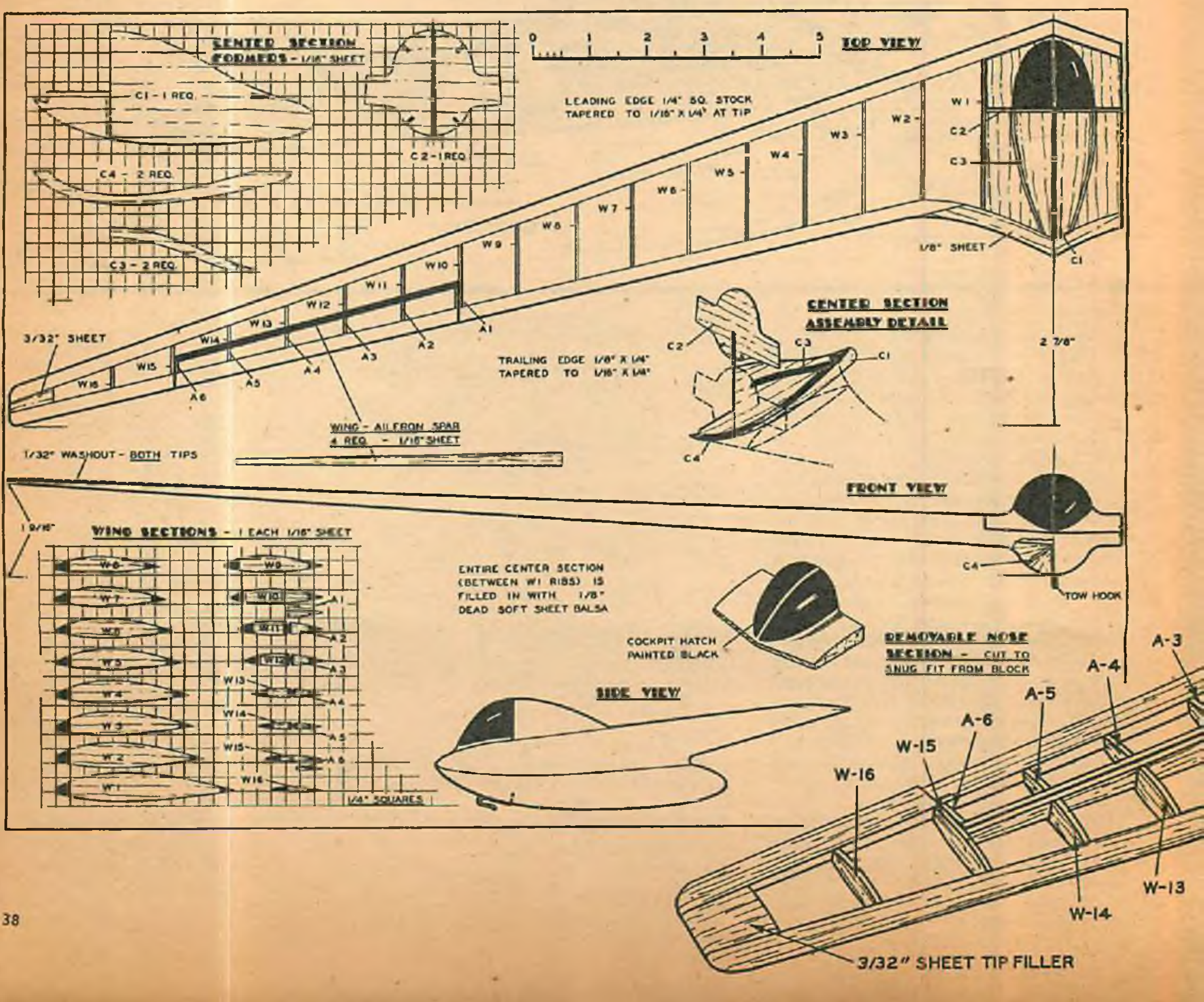
■ We suppose that everyone, sooner or later, gets the urge to try something just a little different. In our case, the Horten designs looked interesting enough to be well worth a try. There were a number of reasons for singling out the IV Model; the efficiency of the full-scale design, the lack of balance problems—due to power installations—in a sailplane, the clean design and attractive appearance of the original, and the simple fact that the very high aspect ratio—21.16 to 1—rather intrigued us.

That narrow wing, incidentally, does not lead in this case to the weak wing structure you might expect. Surfaces are very flexible toward the tips, of course, but by no means flimsy for a model this size. There is no main spar, a comparatively heavy leading edge providing most of the support. Spars for the control surfaces provide a little extra starch for the tips. The combination aileron-elevator-drag rudder takes the place of three separate controls which performed these functions on the large craft.

You'll note that airfoil sections shown are not those that would be employed on a sailplane of conventional design; performance is nevertheless amazingly good. This may, in part, be attributed to the fact that this model has lighter wing area than most.

Wing is constructed in two halves, pinning the leading and trailing edges in place over top plan view and cementing 1/16" ribs between the two. Small pieces of scrap wood must be placed under L.E. and T.E., raising them above the surface of plan so that ribs will fit properly. The trailing edges of both wing halves are raised an additional 1/32", so that the washout specified is built in.

The left wing half is shown, but by placing larger blocks under the edges and inverting ribs, the right wing half may be constructed over the same view.



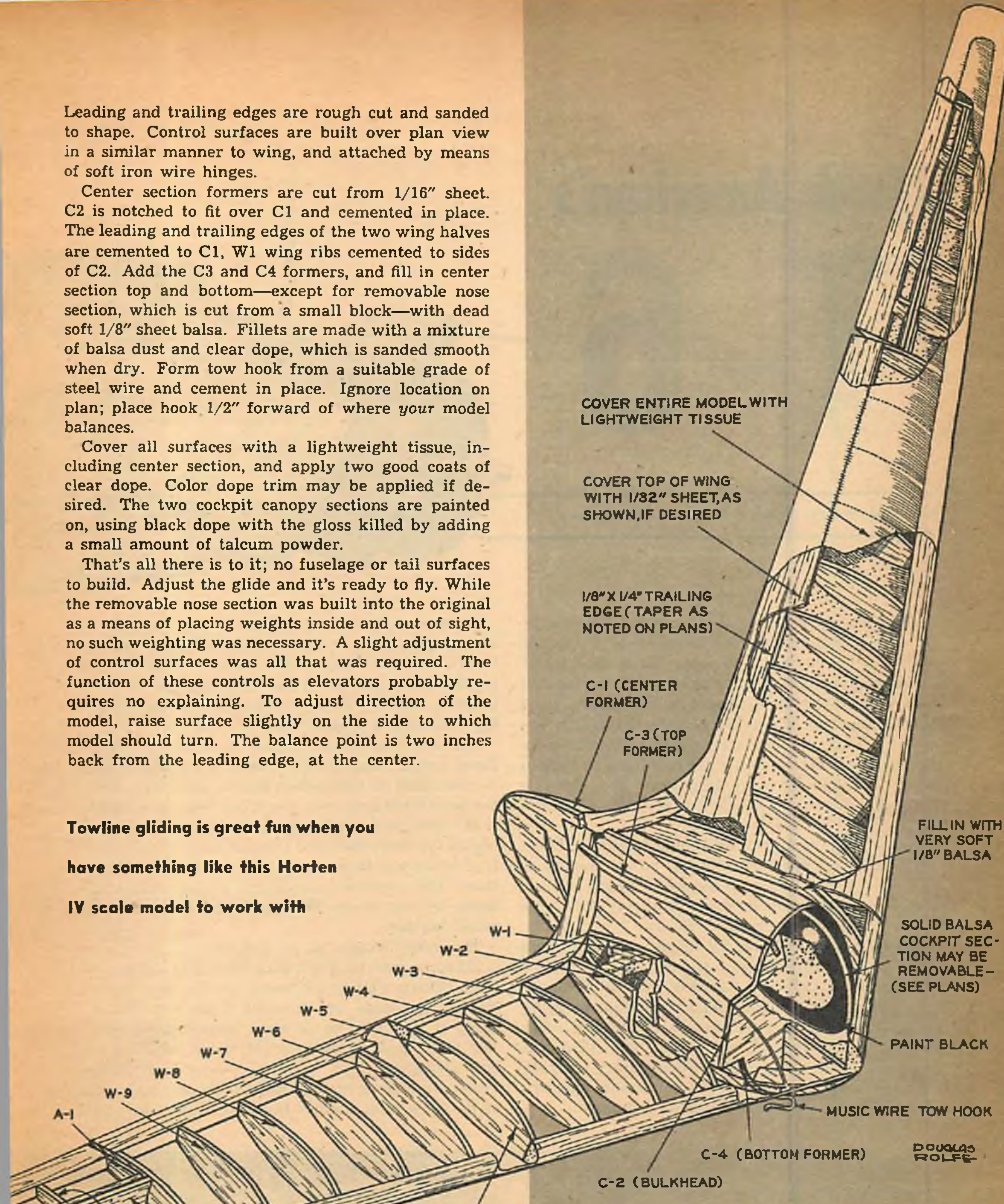
Leading and trailing edges are rough cut and sanded to shape. Control surfaces are built over plan view in a similar manner to wing, and attached by means of soft iron wire hinges.

Center section formers are cut from 1/16" sheet. C2 is notched to fit over C1 and cemented in place. The leading and trailing edges of the two wing halves are cemented to C1, W1 wing ribs cemented to sides of C2. Add the C3 and C4 formers, and fill in center section top and bottom—except for removable nose section, which is cut from a small block—with dead soft 1/8" sheet balsa. Fillets are made with a mixture of balsa dust and clear dope, which is sanded smooth when dry. Form tow hook from a suitable grade of steel wire and cement in place. Ignore location on plan; place hook 1/2" forward of where *your* model balances.

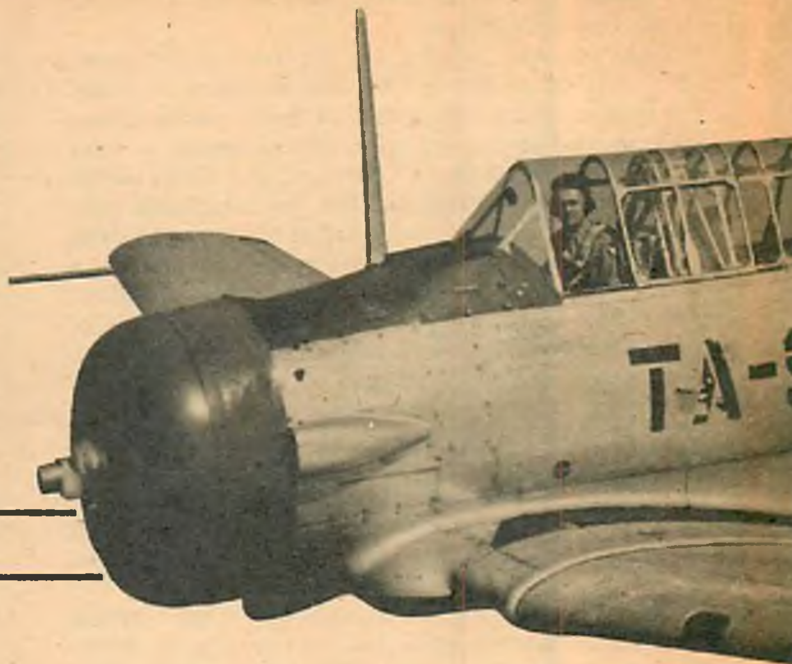
Cover all surfaces with a lightweight tissue, including center section, and apply two good coats of clear dope. Color dope trim may be applied if desired. The two cockpit canopy sections are painted on, using black dope with the gloss killed by adding a small amount of talcum powder.

That's all there is to it; no fuselage or tail surfaces to build. Adjust the glide and it's ready to fly. While the removable nose section was built into the original as a means of placing weights inside and out of sight, no such weighting was necessary. A slight adjustment of control surfaces was all that was required. The function of these controls as elevators probably requires no explaining. To adjust direction of the model, raise surface slightly on the side to which model should turn. The balance point is two inches back from the leading edge, at the center.

Towline gliding is great fun when you have something like this Horten IV scale model to work with



North American's T-6



More pilots have flown it than any other plane

■ Flip open any military pilot's log book, be he Aussie, Canadian, British, Mexican, Brazilian or U. S., and chances are you will find some AT-6 time listed. Undoubtedly more military pilots the world over have won their wings flying the AT-6 than any other training aircraft. The AT-6 became universally accepted during the last war when thousands were produced both here and in other countries. Its various names included Harvard (Canadian and British), Wirraway. (Australia), and AT-6, SNJ-4, Texan (U. S. A.).

Built by the manufacturer of the famed P-51 and B-25, the North American AT-6 is no less famous as a trainer. It has become a fixture in flying training since it was first used by the U. S. Army Air Corps in 1936 under the designation BC-1.

Known most familiarly by its ear-cracking "high rpm" roar (exceeded only slightly by the Vultee Vibrator), the AT-6 has served well in advanced flying, fixed and flexible gunnery, instrument flying and carrier transition training—a record few other airplanes can even begin to touch. The AT-6 was also used as an all-purpose cross-country aircraft, a fighter, and a patrol and reconnaissance aircraft, particularly by the Latin American nations.

More recently the AT-6 (now T-6 under new Air Force designation) is still being flown by the National Guard and the Navy and Air Force Reserve. The regular Navy and Air Force now use the "6" as a primary trainer. Time changes everything—yesterday's Advanced Trainer now in Primary!

The model is scaled directly from the prototype. Since actual measurements were made and factory 3-views used we feel certain the drawings will satisfy the most rabid scale fan. Scale is 1"-equals-1', giving a 42"-span model. The exterior detail drawing includes the decoration and insignia used on the prototype which was based at the Newark, N. J., Air Force Base. This particular airplane is an instrument ship flown by Air Force Reserve pilots, including this model builder.

The model weighs 32 oz. and effective wing area is 232 sq. in., resulting in a wing loading of 13.5 oz./100 sq. in. This is a bit on the heavy side for tight vertical 8's, but big loops and inverted flight can be done easily if you want to do some limited stunt flying. The plans show a symmetrical airfoil which is the only departure from scale on the original model. True scale airfoils are also shown. Power can be any of the glow plug engines from .32 to .60 cubic inch

Since insignia and numerals of scale size and shape are practically unobtainable commercially, Trim-Film sheets were used to good advantage to cut out the shapes needed. Check the exterior detail plan for outlines and positioning.

Details such as steps, hinges and control horns are included in the drawings. Aileron, flap and tab outlines can be added with drawing ink and a ruling pen.

Details such as sheet dural seams have been omitted as being impractical to duplicate on the model. The prototype carries numerous instructions and placards on the exterior pertaining to starting, hydraulic filler caps, external power source, etc.—the aircraft is literally covered with them.

Most of this lettering is ½" high or less. This scales down to 1/32" or less on the model so you can see

By S. CALHOUN SMITH

One of the most detailed scale plans of all time is this fine "Harvard", "Texan", SNJ!

displacement . . . the small motors for low-and-slow.

As the result of flight reports from numerous modelers who have built this model, we recommend that you lower the bellcrank location at least ½ inch from that shown on the plans. The line leads come down too. This means they pass through the wing part way out toward the tip. We have changed the location on our model so that the bellcrank is level with the top of the wing with the leads passing out through the wing, and emerging from the bottom of the wing, about halfway out to the tip. This is not difficult to do before the model is completed, and well worth the trouble.

Another thing that will help stability is to move the C.G. forward about ½" by adding a bit of lead weight in the nose. The line leads need not come out straight from the bellcrank. The front wire can be slanted back so it is even with the L. E. at the tip as on the original set-up. The combination of slant front and straight rear makes up enough of an angle to yaw the model outward slightly.

why they have been omitted. However, if you detail boys are hot for it, we suggest a visit to the nearest AF Base and the flight line. Or better still, see your recruiting officer—he can guarantee you a good close look at the T-6!

AT-6—Bill of Materials
(Balsa, unless otherwise specified)

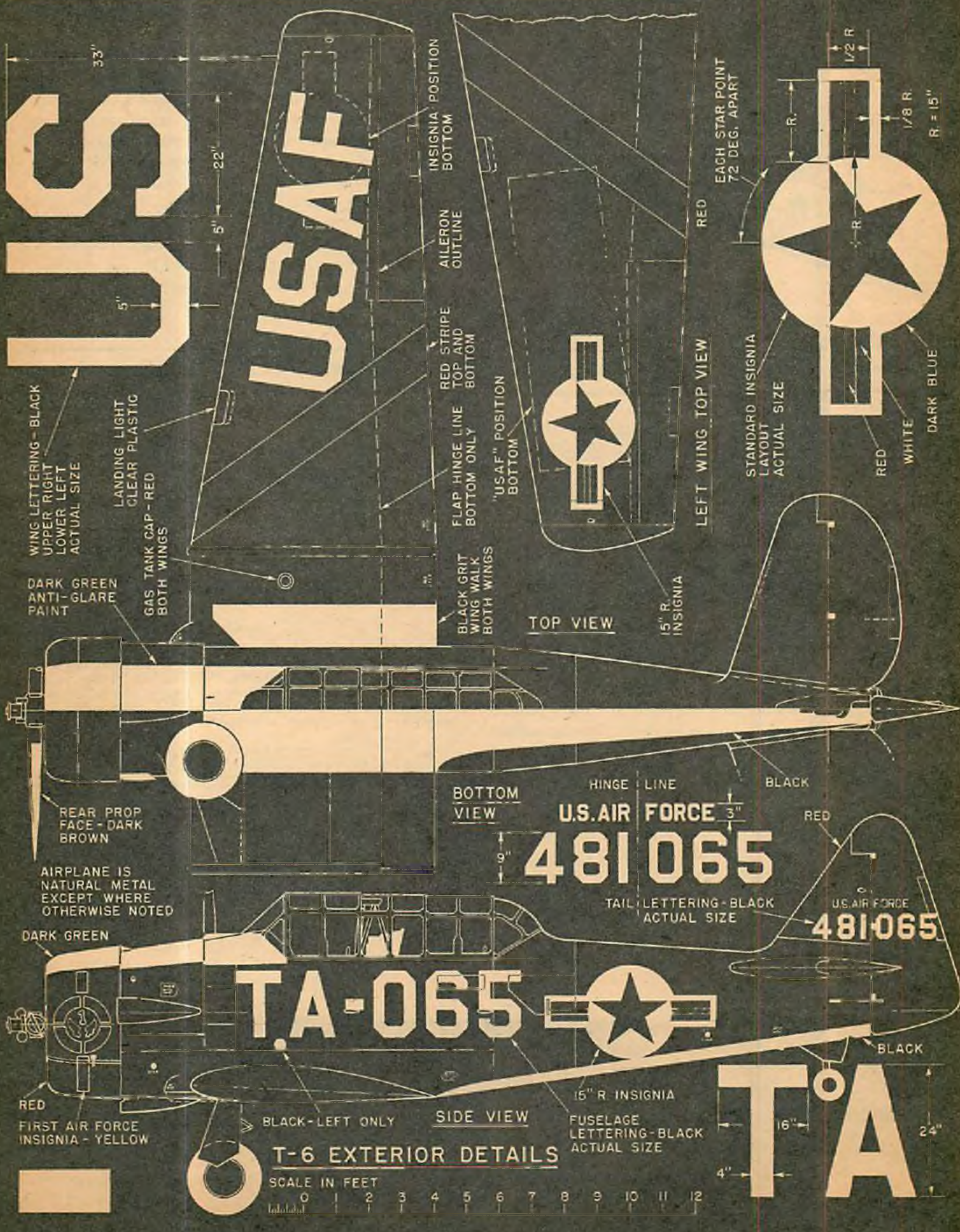
2 pcs. ¼" x 1" x 36", crutch, 3 pcs. ⅛" x 3" x 36", formers, ribs. 1 pc. ¼" x ½" x 36", wing L.E. 1 pc. ¼" x 2" x 36", tail spars & L.E. 1 pc. ½" x 2" x 36", tail spars & L.E. 1 pc. ½" x 2" x 36", fillets, tips, fairing. 6 pcs. 3/32" x ⅜" x 36", fuselage planking. 1 pc. ⅛" x ¼" x 36", fuselage stringers. 9 pcs. 1/16" x 3" x 36", wing-tail covering. 2 pcs. 1/16" x 6" x 12" (plywood), crutch sides, wing spars.

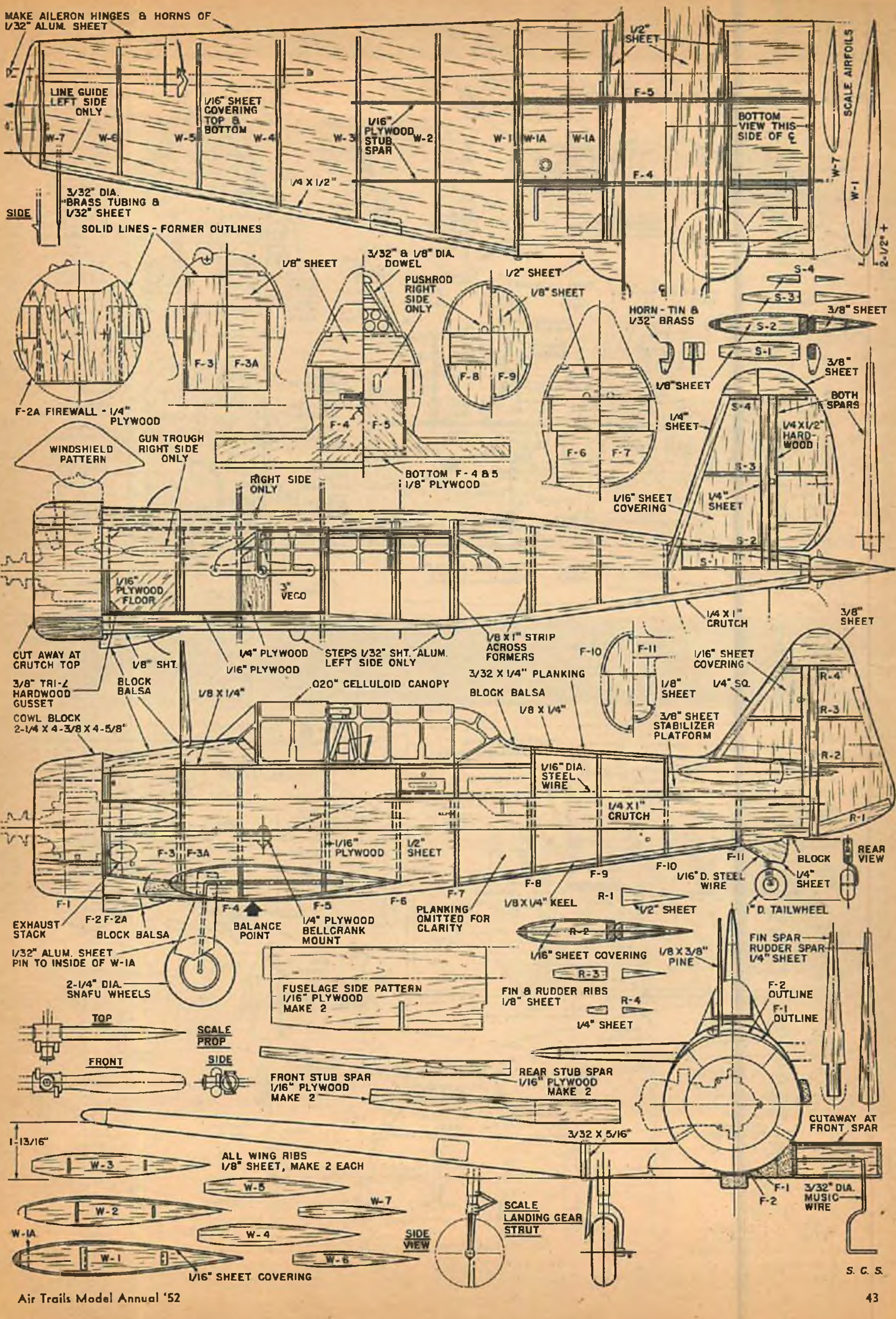
1 pc. ⅛" x 6" x 12" (plywood), center section spars. 1 pc. 2½" x 4½" x 5" (built-up block), engine cowling. 1 pc. ¼" x ⅝" x 12" (hard wood), elevator spar. 1 pc. ¼" x 3½" x 4½" (hard plywood), firewall. Scrap blocks for cowling, wheel wells, fillets, cockpit details.

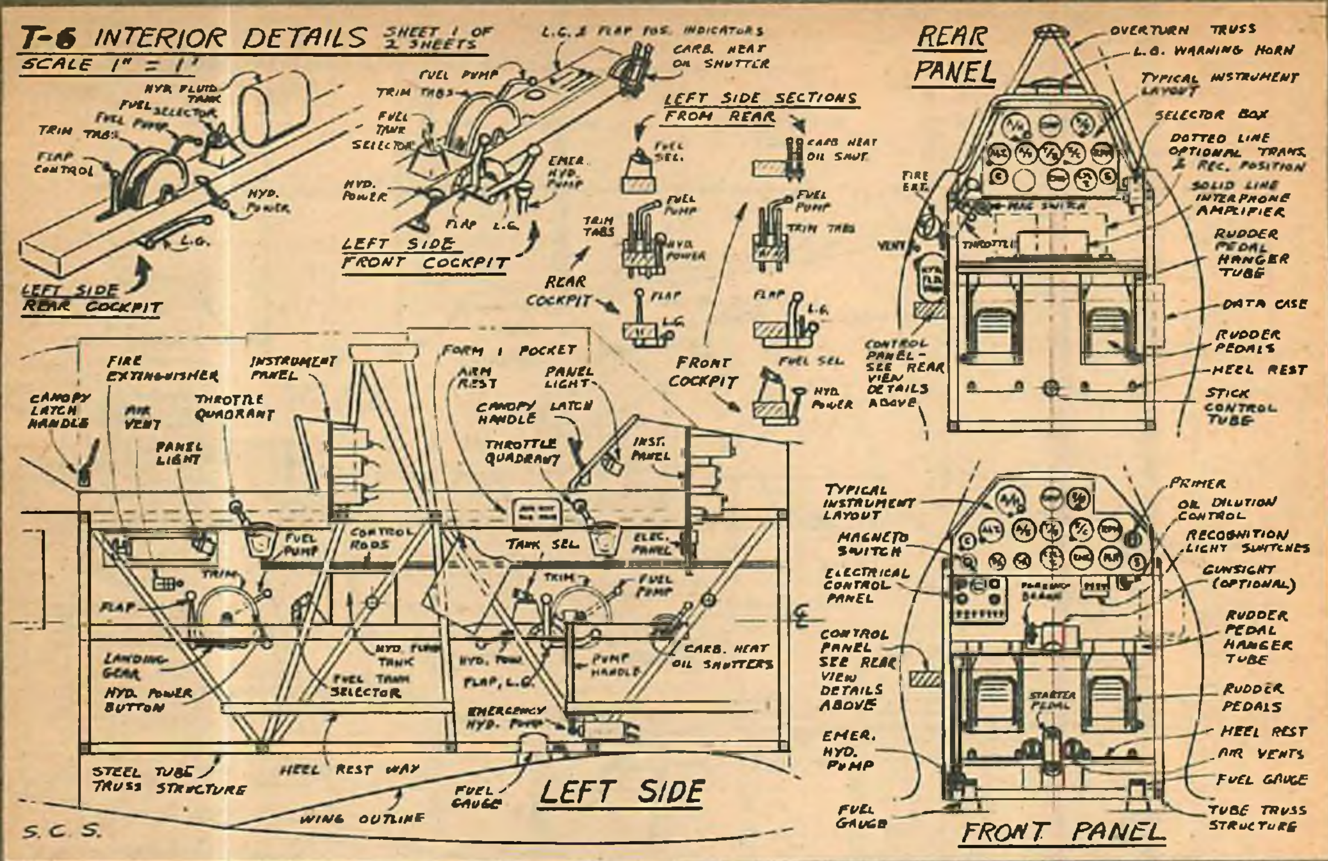
Twenty inches of ⅛"-dia. steel wire, landing gear. Eye or J bolts for L.G. mounting. 18" of 1/16"-dia. steel wire for push rod. 18" of 1/32" dia. steel wire for canopy frames. .020" thick celluloid for canopy. 3" Ceco bellcrank. 1 pr. 2¼" Snafu wheels. One 1" tail wheel.

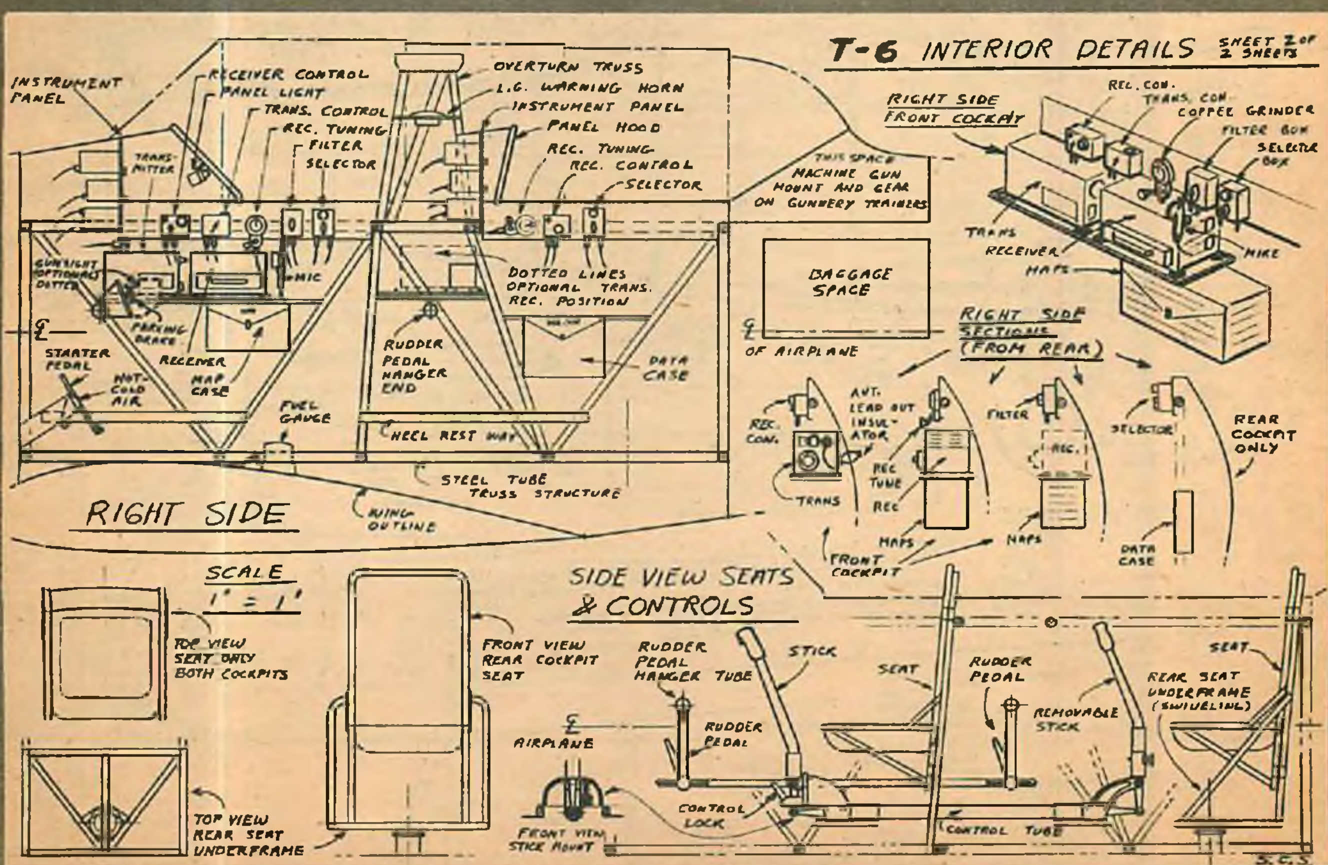
Heavy flexible wire for control line leads. Scrap 1/32" aluminum sheet for wheel covers, steps, etc. Wood filler, silver dope, dark O.D. dope, black dope, red dope, fuelproofer, cement. Red, white, blue, yellow, black Trim-Film decal material for scale decorations. Wedge tank.

Standard military trainer in 33 countries. A flying scale control-liner with all the trimmings, for engines from .32 to .60 cubic inch displacement



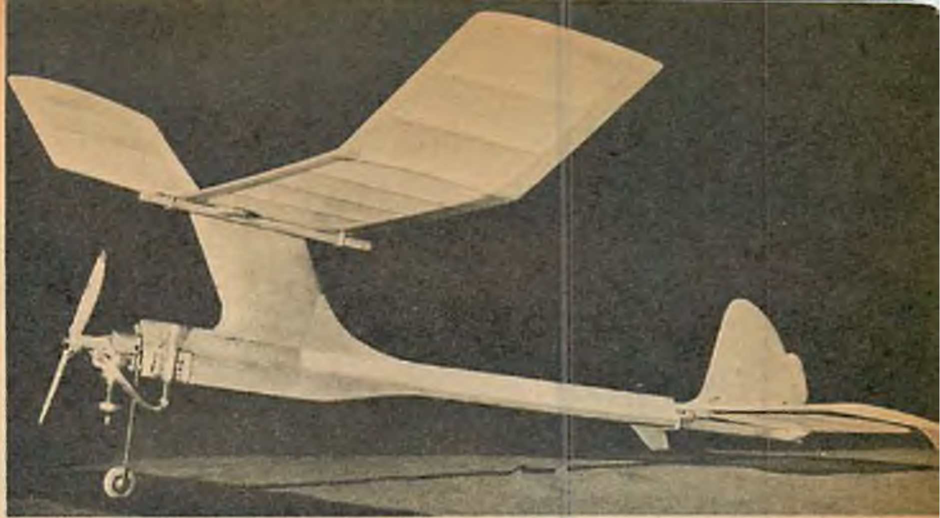

MAKE AILERON HINGES & HORNS OF 1/32" ALUM. SHEET
LINE GUIDE LEFT SIDE ONLY
1/16" SHEET COVERING TOP & BOTTOM
1/16" PLYWOOD STUB SPAR
W-7
W-6
W-5
W-4
W-3
W-2
W-1
W-1A
1/2" SHEET
F-5
F-4
BOTTOM VIEW THIS SIDE OF ℄
SCALE AIRFOILS
1/4 X 1/2"
3/32" DIA. BRASS TUBING & 1/32" SHEET
SIDE
SOLID LINES - FORMER OUTLINES
1/8" SHEET
3/32" & 1/8" DIA. DOWEL
PUSHROD RIGHT SIDE ONLY
1/2" SHEET
1/8" SHEET
2-1/2° +
S-4
S-3
S-2
S-1
3/8" SHEET
HORN - TIN & 1/32" BRASS
F-3
F-3A
F-4
F-5
F-8
F-9
F-6
F-7
1/8" SHEET
3/8" SHEET
BOTH SPARS
1/4" SHEET
1/4 X 1/2" HARD-WOOD
F-2A FIREWALL - 1/4" PLYWOOD
WINDSHIELD PATTERN
GUN TROUGH RIGHT SIDE ONLY
BOTTOM F-4 & 5 1/8" PLYWOOD
RIGHT SIDE ONLY
1/16" SHEET COVERING
1/4" SHEET
1/16" PLYWOOD FLOOR
3" VECO
1/4 X 1" CRUTCH
CUT AWAY AT CRUTCH TOP
1/8" SHT.
1/4" PLYWOOD
1/16" PLYWOOD
STEPS 1/32" SHT. ALUM. LEFT SIDE ONLY
1/8 X 1" STRIP ACROSS FORMERS
F-10
F-11
1/16" SHEET COVERING
3/8" SHEET
3/8" TRI-L HARDWOOD GUSSET
BLOCK BALSA
1/8 X 1/4"
.020" CELLULOID CANOPY
3/32 X 1/4" PLANKING
BLOCK BALSA
1/8 X 1/4"
1/8" SHEET
1/4" SQ.
3/8" SHEET STABILIZER PLATFORM
R-4
R-3
R-2
R-1
COWL BLOCK 2-1/4 X 4-3/8 X 4-5/8"
1/16" DIA. STEEL WIRE
1/4 X 1" CRUTCH
F-3
F-3A
1/16" PLYWOOD
1/2" SHEET
F-11
BLOCK
REAR VIEW
F-10
1/16" D. STEEL WIRE
1/4" SHEET
F-9
F-8
F-7
F-6
F-5
F-4
F-1
F-2 F-2A
EXHAUST STACK
BLOCK BALSA
BALANCE POINT
1/4" PLYWOOD BELLCRANK MOUNT
PLANKING OMITTED FOR CLARITY
1/8 X 1/4" KEEL
R-1
1/2" SHEET
1" D. TAILWHEEL
1/32" ALUM. SHEET PIN TO INSIDE OF W-1A
R-2
1/16" SHEET COVERING
1/8 X 3/8" PINE
FIN SPAR RUDDER SPAR 1/4" SHEET
2-1/4" DIA. SNAFU WHEELS
FUSELAGE SIDE PATTERN 1/16" PLYWOOD MAKE 2
R-3
FIN & RUDDER RIBS 1/8" SHEET
R-4
1/4" SHEET
F-2 OUTLINE
F-1 OUTLINE
TOP
SCALE PROP
FRONT
SIDE
REAR STUB SPAR 1/16" PLYWOOD MAKE 2
FRONT STUB SPAR 1/16" PLYWOOD MAKE 2
CUTAWAY AT FRONT SPAR
1-13/16"
3/32 X 5/16"
ALL WING RIBS 1/8" SHEET, MAKE 2 EACH
W-3
W-5
W-2
W-7
W-4
W-1A
W-1
W-6
1/16" SHEET COVERING
SCALE LANDING GEAR STRUT
SIDE VIEW
F-1
F-2
3/32" DIA. MUSIC WIRE
S. C. S.


T-6 INTERIOR DETAILS
SHEET 1 OF 2 SHEETS
SCALE 1" = 1'
LEFT SIDE REAR COCKPIT
HYD. FLUID TANK
FUEL SELECTOR
FUEL PUMP
TRIM TABS
FLAP CONTROL
HYD. POWER
L.G.
L.G. & FLAP POS. INDICATORS
CARB. HEAT OR SHUTTER
FUEL PUMP
TRIM TABS
FUEL TANK SELECTOR
EMER. HYD. PUMP
HYD. POWER
FLAP
L.G.
LEFT SIDE FRONT COCKPIT
LEFT SIDE SECTIONS FROM REAR
FUEL SEL.
CARB HEAT OIL SHUT.
FUEL PUMP
TRIM TABS
HYD. POWER
REAR COCKPIT
FLAP
L.G.
FRONT COCKPIT
FUEL SEL
HYD. POWER
REAR PANEL
OVERTURN TRUSS
L.G. WARNING HORN
TYPICAL INSTRUMENT LAYOUT
SELECTOR BOX
DOTTED LINE OPTIONAL TRANS. & REC. POSITION
SOLID LINE INTERPHONE AMPLIFIER
FIRE EXT.
MAG SWITCH
THROTTLE
VENT
RUDDER PEDAL HANGER TUBE
DATA CASE
RUDDER PEDALS
HEEL REST
STICK CONTROL TUBE
CONTROL PANEL - SEE REAR VIEW DETAILS ABOVE
FIRE EXTINGUISHER
INSTRUMENT PANEL
FORM 1 POCKET
ARM REST
PANEL LIGHT
CANOPY LATCH HANDLE
AIR VENT
THROTTLE QUADRANT
PANEL LIGHT
CANOPY LATCH HANDLE
THROTTLE QUADRANT
INST. PANEL
FUEL PUMP
CONTROL RODS
TANK SEL.
ELEC. PANEL
TRIM
FLAP
TRIM
FUEL PUMP
LANDING GEAR
HYD. POWER BUTTON
HYD. FLUID TANK
FUEL TANK SELECTOR
HYD. POW.
FLAP, L.G.
PUMP HANDLE
CARB. HEAT OIL SHUTTERS
EMERGENCY HYD. PUMP
STEEL TUBE TRUSS STRUCTURE
HEEL REST WAY
FUEL GAUGE
WING OUTLINE
LEFT SIDE
S.C.S.
TYPICAL INSTRUMENT LAYOUT
MAGNETO SWITCH
ELECTRICAL CONTROL PANEL
CONTROL PANEL SEE REAR VIEW DETAILS ABOVE
EMER. HYD. PUMP
FUEL GAUGE
PRIMER
OIL DILUTION CONTROL
RECOGNITION LIGHT SWITCHES
GUNSIGHT (OPTIONAL)
RUDDER PEDAL HANGER TUBE
STARTER PEDAL
RUDDER PEDALS
HEEL REST
AIR VENTS
FUEL GAUGE
TUBE TRUSS STRUCTURE
FRONT PANEL


T-6 INTERIOR DETAILS
SHEET 2 OF 2 SHEETS
INSTRUMENT PANEL
RECEIVER CONTROL
PANEL LIGHT
TRANS. CONTROL
REC. TUNING
FILTER
SELECTOR
TRANSMITTER
OVERTURN TRUSS
L.G. WARNING HORN
INSTRUMENT PANEL
PANEL HOOD
REC. TUNING
REC. CONTROL
SELECTOR
GUNSIGHT OPTIONAL DOTTED
MIC
PARKING BRAKE
STARTER PEDAL
RECEIVER
MAP CASE
HOT-COLD AIR
FUEL GAUGE
DOTTED LINES OPTIONAL TRANS. REC. POSITION
RUDDER PEDAL HANGER END
DATA CASE
HEEL REST WAY
STEEL TUBE TRUSS STRUCTURE
RIGHT SIDE
WING OUTLINE
THIS SPACE MACHINE GUN MOUNT AND GEAR ON GUNNERY TRAINERS
BAGGAGE SPACE
OF AIRPLANE
RIGHT SIDE FRONT COCKPIT
REC. CON.
TRANS. CON.
COFFEE GRINDER
FILTER BOX
SELECTOR BOX
TRANS
RECEIVER
MAPS
MIKE
RIGHT SIDE SECTIONS (FROM REAR)
REC. CON.
ANT. LEAD OUT INSULATOR
REC TUNE
REC
TRANS
FILTER
REC.
SELECTOR
REAR COCKPIT ONLY
MAPS
MAPS
FRONT COCKPIT
DATA CASE
SCALE 1" = 1'
TOP VIEW SEAT ONLY BOTH COCKPITS
TOP VIEW REAR SEAT UNDERFRAME
FRONT VIEW REAR COCKPIT SEAT
AIRPLANE
FRONT VIEW STICK MOUNT
SIDE VIEW SEATS & CONTROLS
RUDDER PEDAL HANGER TUBE
RUDDER PEDAL
STICK
CONTROL LOCK
SEAT
RUDDER PEDAL
REMOVABLE STICK
CONTROL TUBE
SEAT
REAR SEAT UNDERFRAME (SWIVELING)
S.C.S.

CARL R. WHEELEY'S

Little Senator

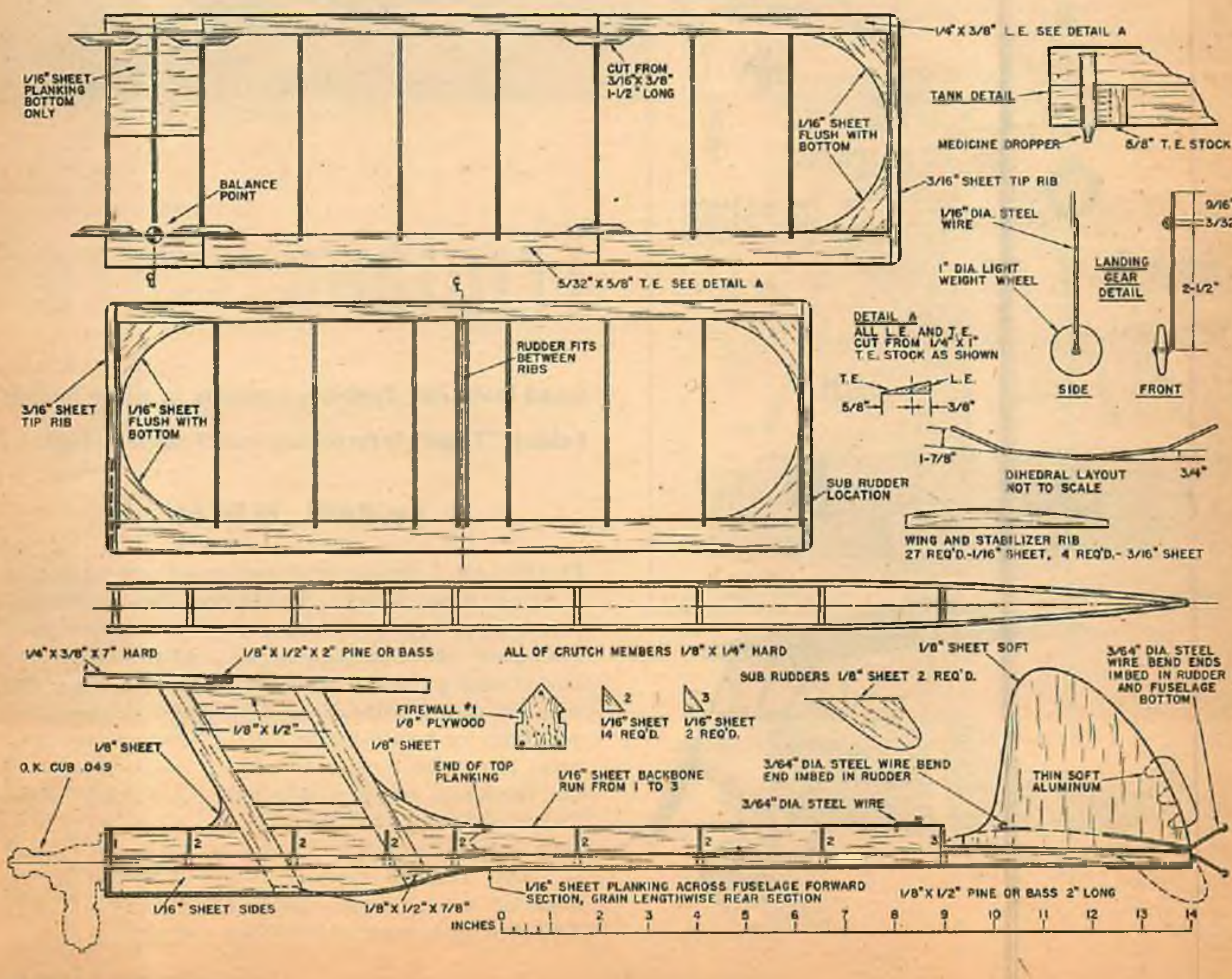


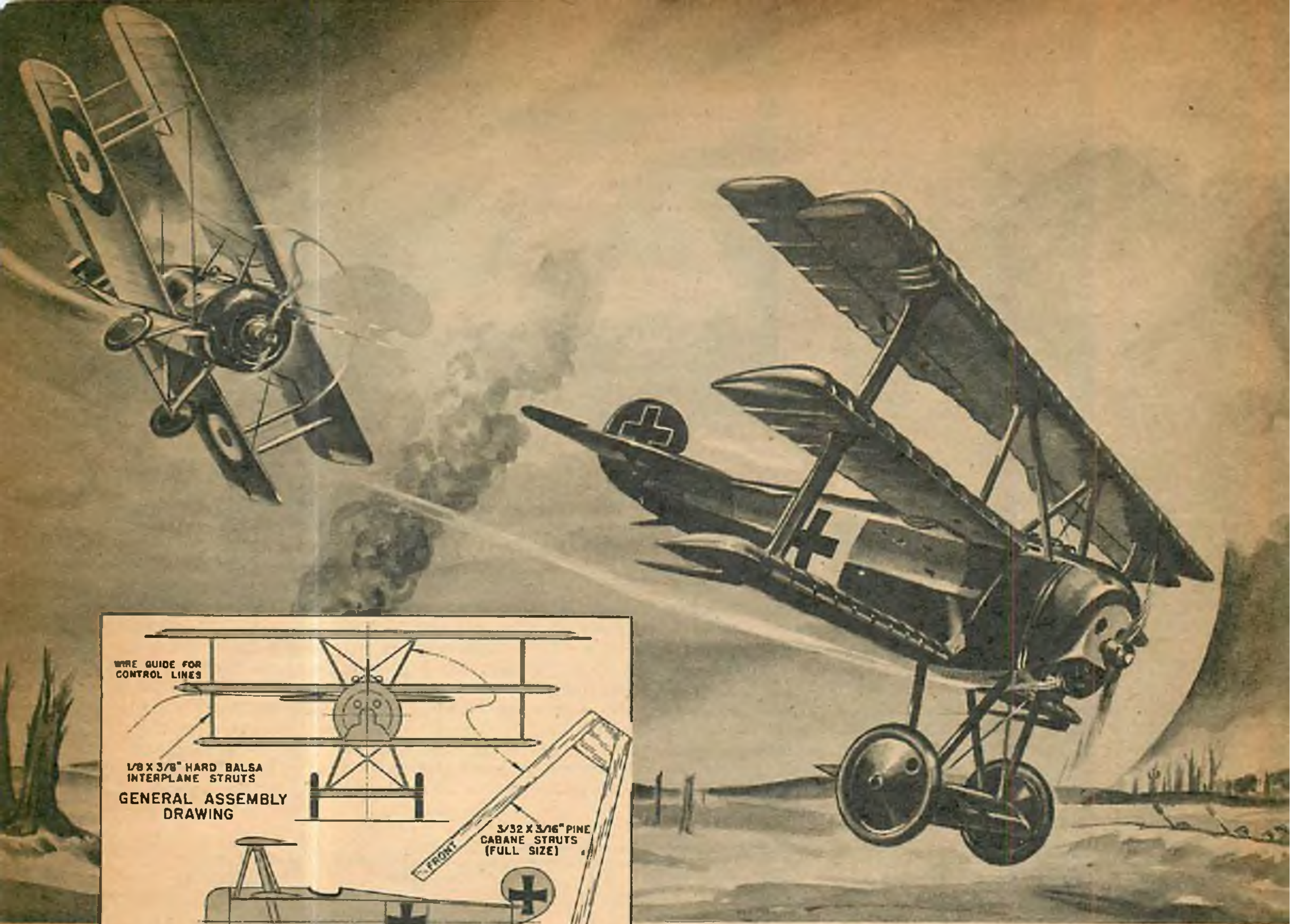
■ Here is an "A/2" job that can be built in one evening and you'll lose nothing in performance because it is a speedily built job. In general, the model follows current trends in "under-.09" competition—it has more area than the early Half-A's, it features an almost symmetrical airfoil, and its fuel tank is made from an eye-dropper.

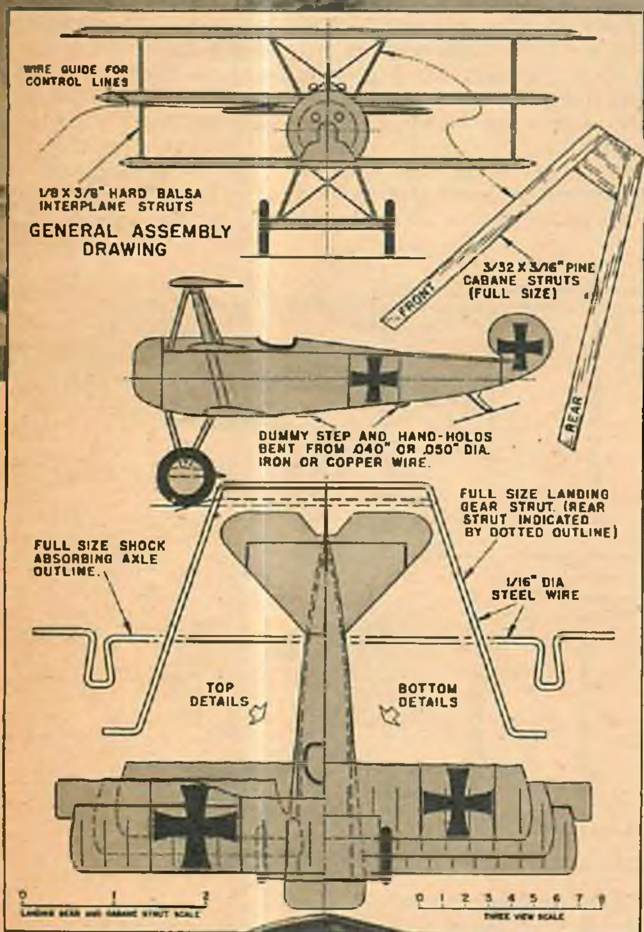
The veteran flyer will note there is no variation of incidence between the wing and tail shown on the plans and that at least a small amount is needed to have the model pull out after the motor has cut. Therefore, if your model balances where shown or just a little in front of that mark, it will be necessary for you to raise the trailing edge of the elevator a small amount, unless incidence has been warped into your model. It is dangerous to have the balance point back further than shown.

What you are trying to do is get the model to glide fairly straight without stalling or diving. This is done by placing thin shims of balsa under the trailing edge of the elevator for negative incidence if the model dives or under the leading edge to give it positive incidence to correct stalling tendencies. Use the rudder tab only slightly if it is inclined to turn too much. The major portion of the turn-in-glide adjustment should be done by tilting the elevator, high side being the direction you want the job to turn.

No particular climb or glide directions are recommended as you should let the model go the direction it tends toward, if possible. Don't worry about getting a fine adjustment by hand gliding as this can be achieved only in the power flights where model gets sufficient altitude.







Triplane Terror

Good looks and flyability combine to make famous Fokker "Tripe" interesting, exact scale U-Control

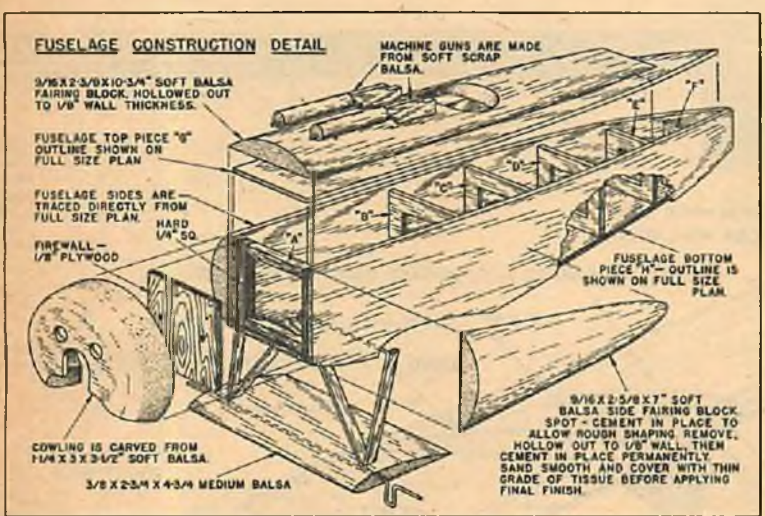
By PAUL PLECAN

POPULAR a decade or so ago as a rubber-powered flying scale design, the Fokker Dr. 1 "Tripe" promises to retain its popularity as a stable scale U-Control job. Compact, strong, and generously endowed with plenty of wing area, the *Tripe* flies well without any modifications from absolute scale. A good ship for beginners because of its simple yet clean lines, it can be flown from fairly rough ground, as the relatively large wheels will not snag in grass. You might think that the high top wing makes for a very high center of drag, resulting in a model hard on "dive" control. Luckily, however, the elevator is mounted at a positive angle, overcoming this stalling tendency in a very satisfactory fashion.

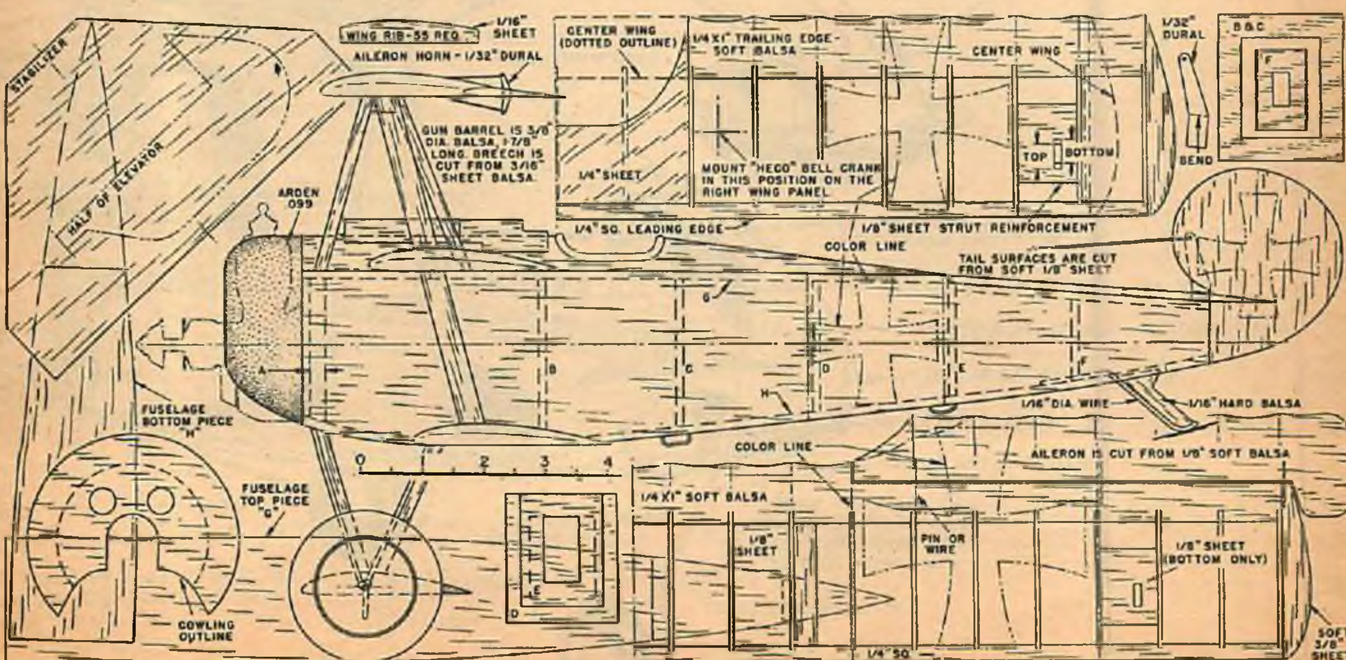
The plane is to a scale of 1″ to 1′, resulting in a relatively small model (23½″ wingspan) excellent for any engine up to and including .19 cu. in. plants. The original model weighed 10 ounces and had a tendency to "float," resulting in slack lines. This was overcome by cementing a ½″ x 1″ drag plate or spoiler to the lower interplane strut on the side of the ship *away* from the control-lines. This caused the model to yaw towards the outside of the circle, keeping lines taut. If built a bit heavier or powered by an engine of over .099 displacement, the *Tripe* may not need this spoiler, since centrifugal force will be greater, thus tightening the lines and improving control.

Appearance of our *Tripe* brings whistles of admiration at the local basketball court where it is flown, as the all-red coloring with silver cowl and contrasting black Maltese crosses on a white background make for a really "flashy" model. Recent examination of actual photos of Baron Richtofen's ship shows that all undersurfaces were light blue. Although this change wasn't made in the original model, since red is so hard to cover completely with a lighter color, you can do it if you plan building this interesting and historic ship.

The model should balance at 25% of the chord of the center wing. This will vary slightly if wing incidence is a bit off or if slight warps are present. Never try to fly this or any other model with wing warps that would bank the model towards the center of the flying circle. It is doubly true of this model, since it is so lightly loaded and loose on the control-lines. Consequently, when powered by an .099 engine, *always* fly at full revs, even when testing. The higher speed attained will help keep the lines taut. When using engines over .099 displacement, they can be throttled down somewhat, but always bear in mind the light wing-loading which is only an exceptionally low 6 ounces per square foot!—remarkable in a control line flying scale.



JUST LIKE REAL WW I GERMAN JOB
Details of the control horn and mounting. Any of the engines near .09 cu. in. displacement can be used; takes up to .19. Arden .09 g.p. here.



the EXECUTIVE—

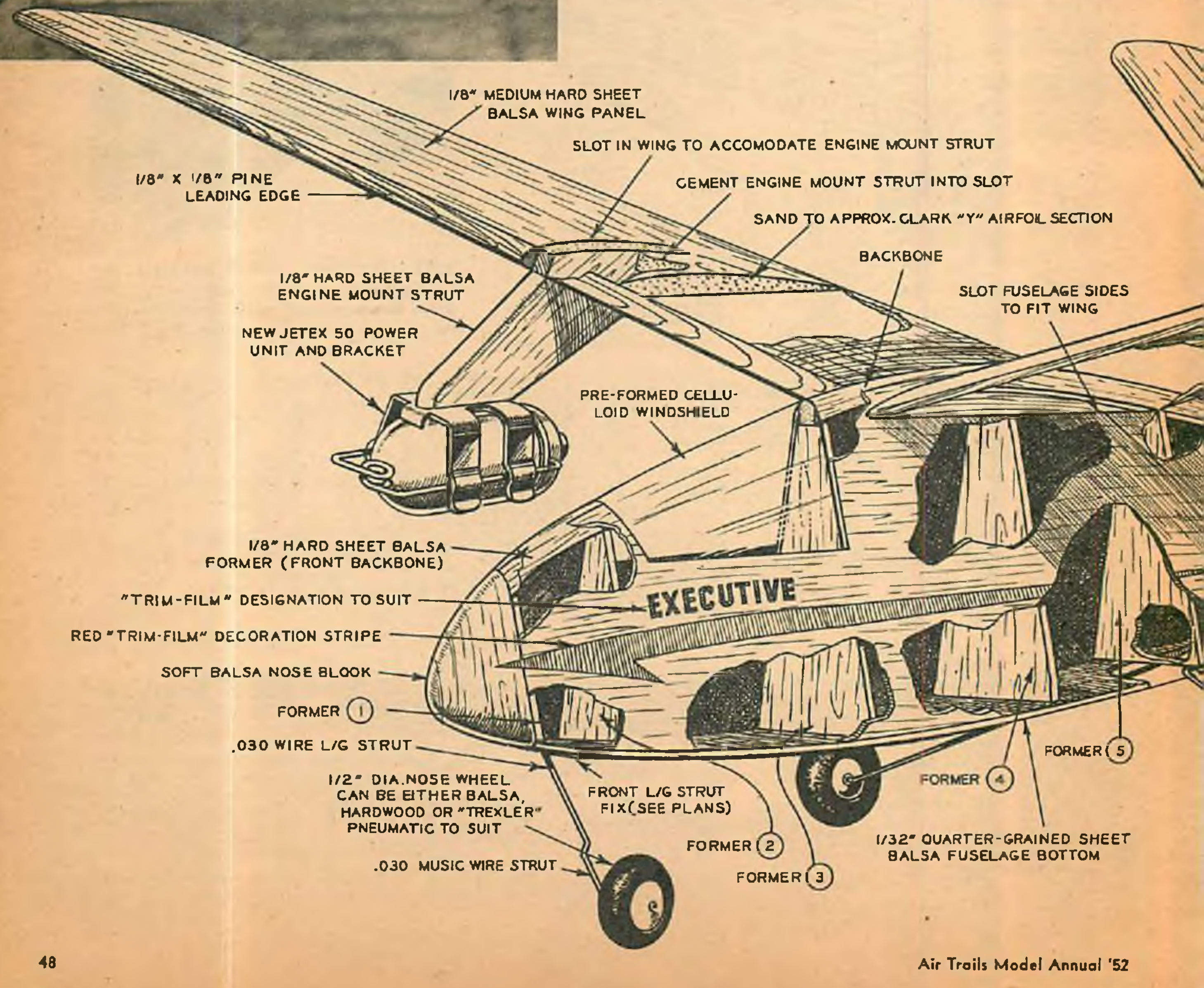
■ The *Executive* is a twin-jet-propelled free flight model developed especially for the Jetex 50 power unit.

Our basic idea was to incorporate the use of twin jets for power in order to get away from run of the mill model design, and to produce a model that had good performance yet was of rugged construction, simple, light, stable in flight and realistic looking.

The *Executive* is built up on a backbone, insuring perfect alignment and giving shape in final assembly.

Construction is conventional as indicated by the plans. The bottom of the fuselage is cut from 1/32" sheet with the grain running lengthwise. Attach this piece by gluing and using stick pins to hold in place until dry. Wheels are of balsa or hardwood, or small Trexler pneumatic wheels may be used.

Draw a windshield pattern on heavy paper, cut to shape



twin Jetex powered transport

from celluloid, and glue in place. The leading edge of the wing is stripped with ⅛" square pine to protect the panels in case of collision.

Finish the model by assembling wings, "V" stabilizer to the fuselage. Add two coats of clear dope mixed with a little castor oil to stop any parts from warping. Decoration may be added as shown.

Your model should balance without adding weight, but in the event that it doesn't balance at the center of gravity location, balance it at the wing tips and add bits of modeling clay to the nose or tail as required.

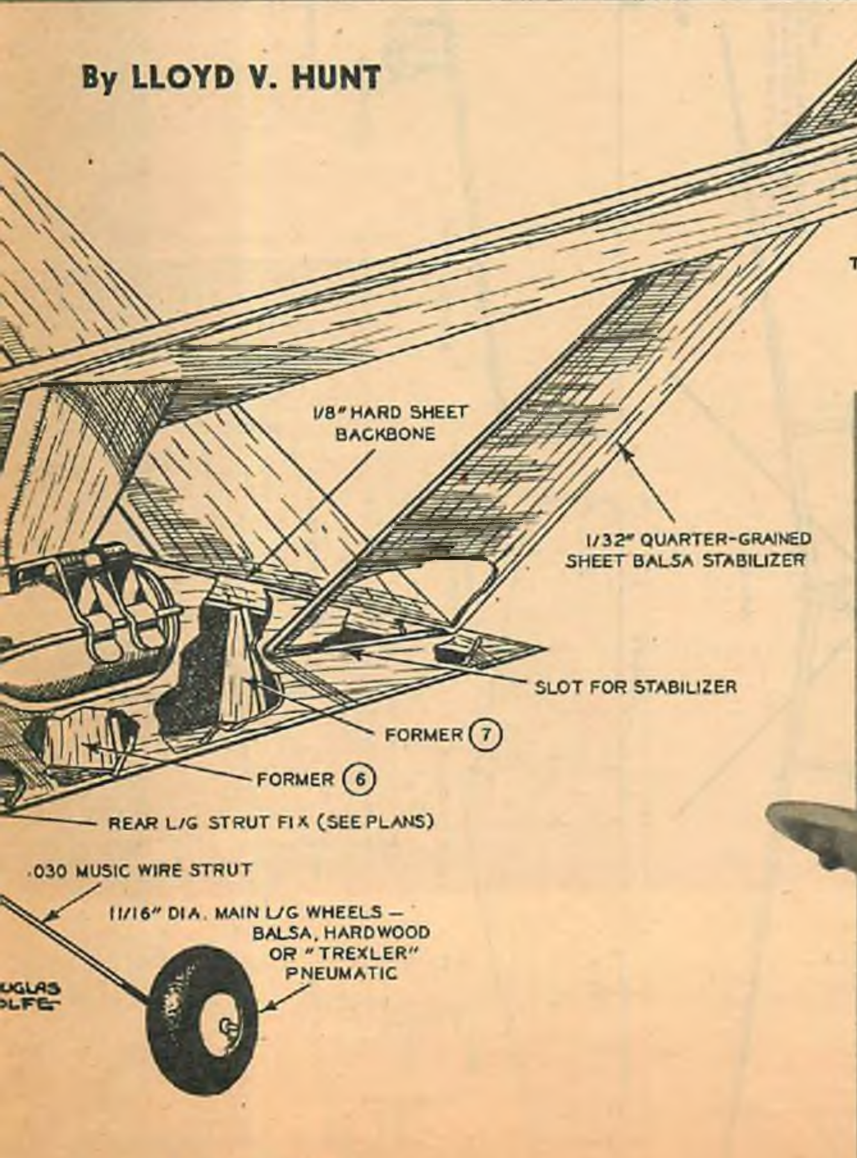
You will notice when you glide your *Executive* that it has a slow floating glide; don't let this deceive you; under power it will perform at high speeds. For the first power flights use only half a pellet in each Jetex unit. This not only saves expense, but aids in adjustment. If the model behaves well you may safely employ a full pellet for subsequent flights.

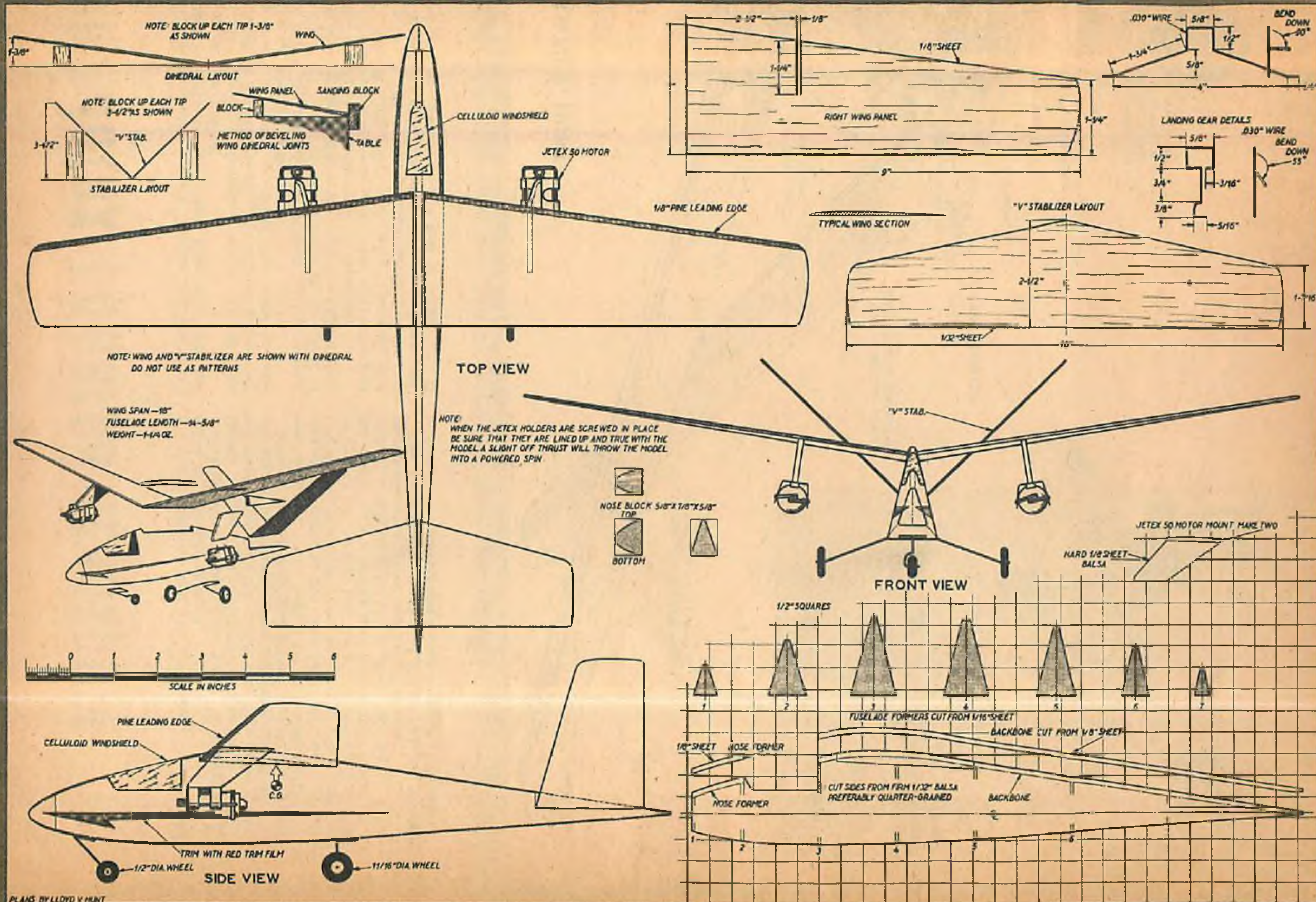
On a calm day glide test the model thoroughly, adjusting for a slight right or left turn. We emphasize "slight" adjustment because the model flies fast under power, and any slight maladjustment is greatly amplified.

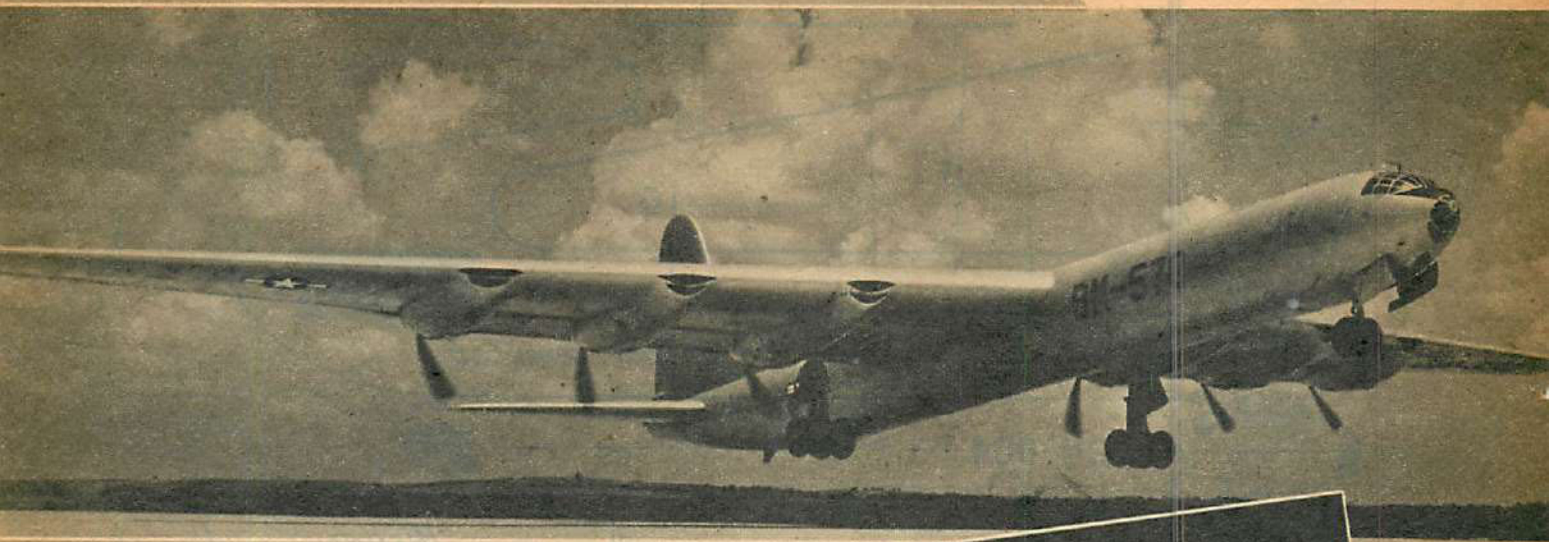
Have a friend help you when it comes to igniting your Jetex unit. The reason for this is that both units should be ignited at the same time. Wait until you can feel equalized thrust from both units. You have lots of time to get the ship into the air. Do not attempt to fly the model with only one unit in operation. This would cause it to spin in under power. Note: Downthrust should permit adequate power trimming if needed.

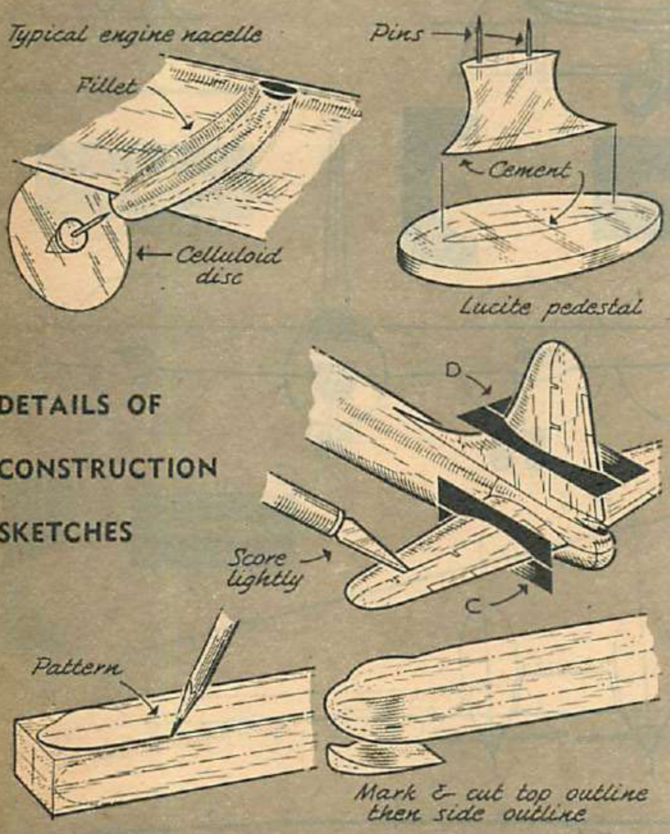
The *Executive* is capable of a minimum of 100 feet altitude under power, and a long duration in its glide.

By LLOYD V. HUNT




NOTE: BLOCK UP EACH TIP 1-3/8" AS SHOWN
WING
1-3/8"
DIHEDRAL LAYOUT
NOTE: BLOCK UP EACH TIP 3-1/2" AS SHOWN
"V" STAB.
3-1/2"
STABILIZER LAYOUT
WING PANEL
SANDING BLOCK
BLOCK
METHOD OF BEVELING WING DIHEDRAL JOINTS
TABLE
CELLULOID WINDSHIELD
JETEX 50 MOTOR
1/8" PINE LEADING EDGE
TOP VIEW
NOTE: WING AND "V" STABILIZER ARE SHOWN WITH DIHEDRAL DO NOT USE AS PATTERNS
WING SPAN—18"
FUSELAGE LENGTH—14-5/8"
WEIGHT—1-1/4 OZ.
NOTE: WHEN THE JETEX HOLDERS ARE SCREWED IN PLACE BE SURE THAT THEY ARE LINED UP AND TRUE WITH THE MODEL. A SLIGHT OFF THRUST WILL THROW THE MODEL INTO A POWERED SPIN
NOSE BLOCK 5/8"X7/8"X5/8"
TOP
BOTTOM
2-1/2"
1/8"
1/8" SHEET
1-1/4"
RIGHT WING PANEL
9"
.030" WIRE
5/8"
1/2"
1-3/4"
4"
BEND DOWN 90°
LANDING GEAR DETAILS
.030" WIRE
BEND DOWN 55°
3/4"
3/8"
3/16"
5/16"
TYPICAL WING SECTION
"V" STABILIZER LAYOUT
1/32" SHEET
10"
1-7/16"
"V" STAB.
FRONT VIEW
JETEX 50 MOTOR MOUNT MAKE TWO
HARD 1/8 SHEET BALSA
1/2" SQUARES
FUSELAGE FORMERS CUT FROM 1/16" SHEET
BACKBONE CUT FROM 1/8" SHEET
1/8" SHEET
NOSE FORMER
CUT SIDES FROM FIRM 1/32" BALSA PREFERABLY QUARTER-GRAINED
BACKBONE
SCALE IN INCHES
PINE LEADING EDGE
CELLULOID WINDSHIELD
C.G.
TRIM WITH RED TRIM FILM
1/2" DIA. WHEEL
11/16" DIA. WHEEL
SIDE VIEW
PLANS BY LLOYD V HUNT



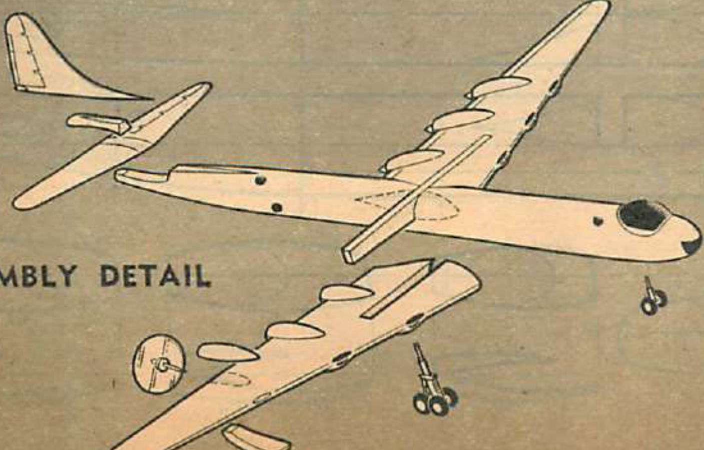


DETAILS OF CONSTRUCTION SKETCHES

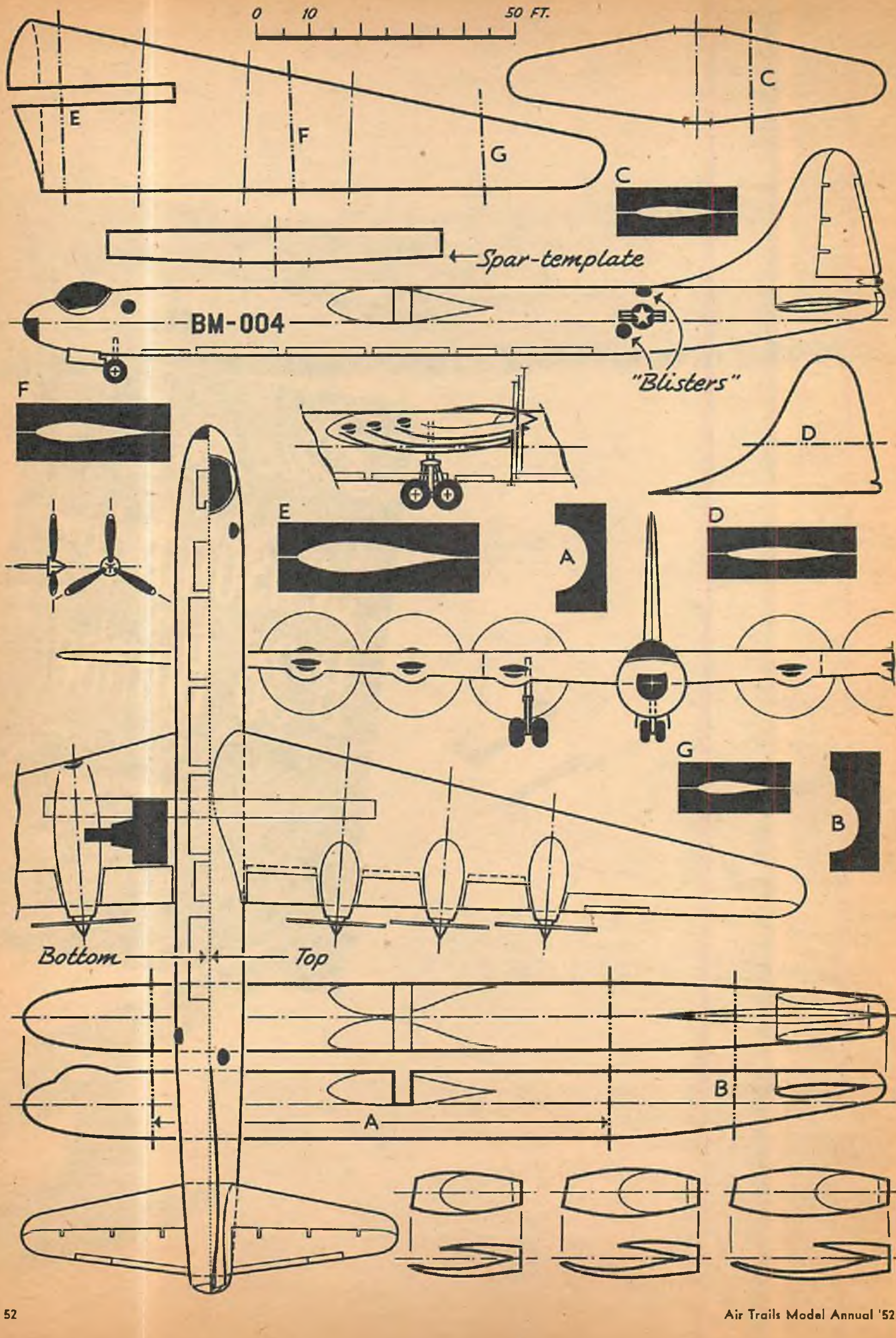
Solid Stuff:
Consolidated B-36 Bomber

BY H. A. THOMAS

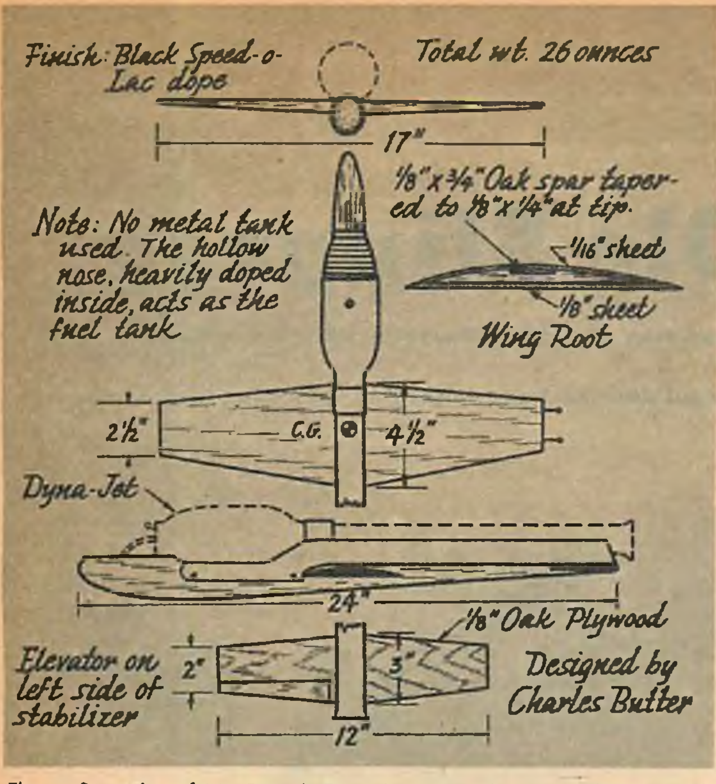
HERE'S AN INTERESTING PROJECT IN SOLID SCALE. BUILD THIS CONVAIR B-36, WORLD'S LARGEST BOMBER, A PROUD ADDITION TO YOUR COLLECTION



ASSEMBLY DETAIL

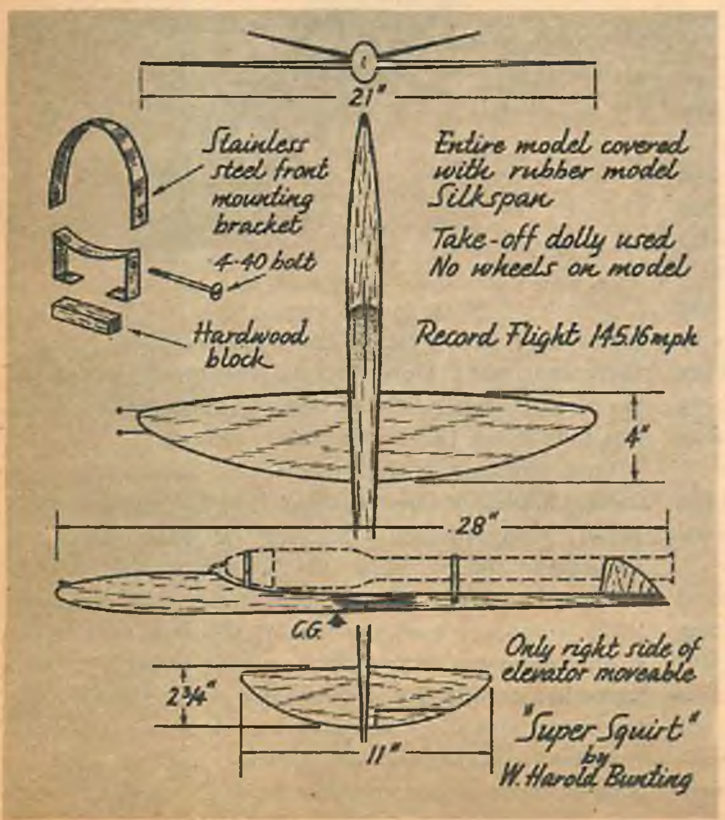


0
10
50 FT.
C
E
F
G
C
Spar-template
BM-004
"Blisters"
F
D
E
A
D
G
B
Bottom
Top
B
A



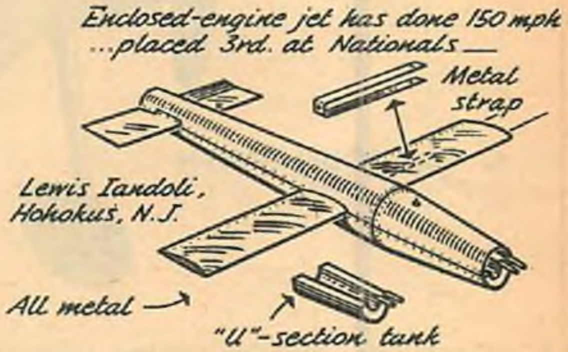
The configuration of Mr. Butter's Dyna-Jet powered record holding model represents one of two prevailing schools of thought on the design of jet speed jobs. One group favors the stumpy fuselage with fuel tank carved inside the "hull." The other favors the long, tapered nose type of model represented by Bunting's ship below. Record is currently held by Butter-type.

Harold Bunting's "Super Squirt" is a refinement of his original record-setting Dyna-Jet powered speed model which racked up its national record back when jets were just beginning to get established. This one shown here weighed 19 oz. without fuel, all surfaces set at zero. Tank capacity 2.25 oz.; engine powers model for 16 laps before tank runs dry. Maximum width 1.3 in.

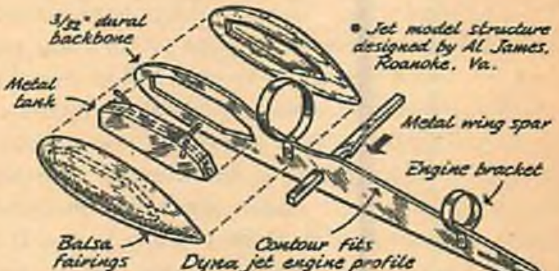


Junior Jets

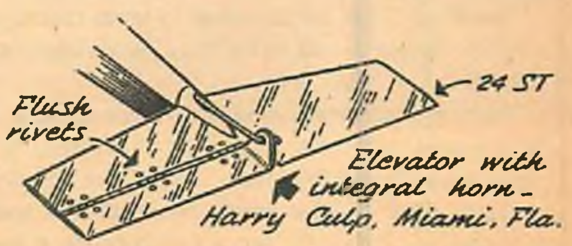
■ The "minimum" airplane has always been the quest of the jet speed designer. Since it is pretty generally believed the Dyna-Jet engine would fly itself around the circle very nicely with the addition of some small stabilizing vanes, jet model surfaces have been chopped down, down, down. Single wing, single stab jobs have been attempted, but without much success. Dollies have pretty much disappeared from the scene. All the jet speedster asks is a smooth circle from which he can skid his model off into the air. Variations in design trends are illustrated by the two record-holding models. Some not so conventional ideas on construction are below.



Since the introduction of the Dyna-Jet powerplant modelers have been experimenting with enclosing the engine. So far most successful applications are like this one.



This design utilizes a metal fuel tank with minimum size balsa wood fairings. Another method is to carve fuselage of hardwood and scoop out section for the fuel stowage.



A problem with jet models is developing good connections at the bellcrank and elevator horn which will be unaffected by heat and vibration. This is a neat solution, works well.

Ole Slippery

Good way of getting started with team racing is with this famous design—more requested than any other AT aircraft

By S. CALHOUN SMITH

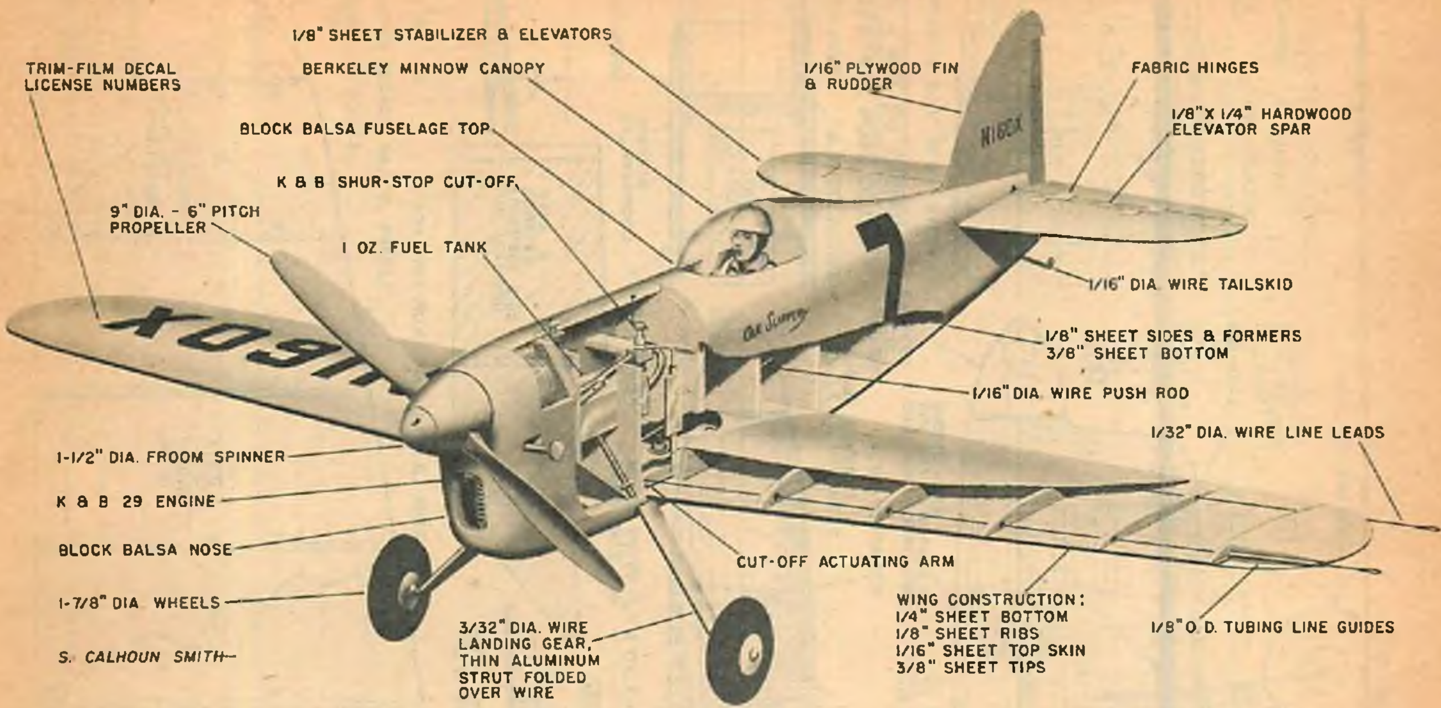
■ Team racing is probably the best thing that has happened to control-line flying since glow fuel was introduced.

If you haven't tangled wires with other racers yet, "you haven't lived." Some builders have stayed away from the sport because it looks pretty complicated at first glance. We won't deny this, but as every contest minded modeler knows any phase of model competition puts a premium on performance of both model and flyer. Team racing is no different, and that little extra effort is well repaid when the checkered flag drops on your model. Once you try it, you'll buy it. We're sure team racing has that extra something you'll like. The direct competition is a refreshing change from the old battle between model and stop watch.

The West Coast led the way in team racing and the very workable set of rules they established are now part of the A.M.A. book.

Various interested modelers have kicked around the rules a bit with rather freakish results. Using fuel tanks of greater than one-ounce capacity, for instance, destroys the whole basic idea of team race competition. It is fine for an endurance contest but team racing isn't an endurance contest from the standpoint of getting airborne with the greatest fuel load. The challenge of nursing as many laps as possible from one ounce of tiger milk really requires thought and experiment. Here's where the sport enters into the picture, because the modeler with the hottest ideas can take home the hardware.

Fuel economy without sacrificing too much speed means finding a good combination of fuel and propeller. Many modelers restrict the intake stack on the engine and by doing this can *double the number* of laps obtained from that one ounce of fuel. Lower pitch props are used for fast acceleration and flying in the seven-lap races. Higher pitch props giving best speed are used in the longer races where speed counts the most. Heavily methanated fuels should be used for short dashes, and the slowest burning fuel for longer races. Some modelers use gasoline and oil-based glow fuels for maximum economy.



Ole Slippery was conceived a while back when team racing was first starting. It originated in an illustration in Air Trails. The gap between picture and model has been filled in with considerable time watching and flying in team races. We don't claim *Ole Slippery* to be the final word, but rather an incorporation of pet design ideas.

Construction is conventional and has proved rugged and light. A.M.A. rules governing fuselage size are complied with. Button-head, the pilot, is close to size. Wing area is 140 sq. in., considerably greater than the 125 sq. in. minimum. The lifting airfoil (zip-zip section) is thicker than ordinarily used. The reduction in wing loading is a definite aid to acceleration and helps the model get air borne more quickly. It is doubtful that the slightly increased drag of this type of wing offsets its advantages.

Weight is 23 oz. This figure could probably be reduced by using medium grade balsa, rather than the heavier hard grade used in the original model. However, don't employ such soft wood that overall strength suffers.

The drawings show two different engine installations. The original has been flying on a well-broken-in McCoy .29. With hot fuel, a 9/6 prop, speed is 82 mph for 23 laps. With an intake restriction, slower burning fuel and higher pitch prop, speed is 70 mph for 32 laps.

Construction may be started with the fuselage. As can be seen from the drawings this will vary slightly depending on the engine used. The K&B .29 is mounted radially on a piece of ¼" hardwood plywood. The McCoy .29 is beam-mounted on 5/16" x ½" hardwood bearers. Before starting construction, study the plans for differences in structure for the particular engine you wish to install.

Cut out the 1/16" plywood fuselage side doublers and the hardwood engine bearers. These should be joined with Weldwood glue. Put a couple of small wood screws through the plywood into the bearers for a tight joint. Cut out the ⅛" sheet fuselage sides and glue the plywood doublers to the front portion, again using Weldwood glue. Clamp carefully and let dry thoroughly, at least eight hours. Complete building instructions are on the full-size plan available from "AT."

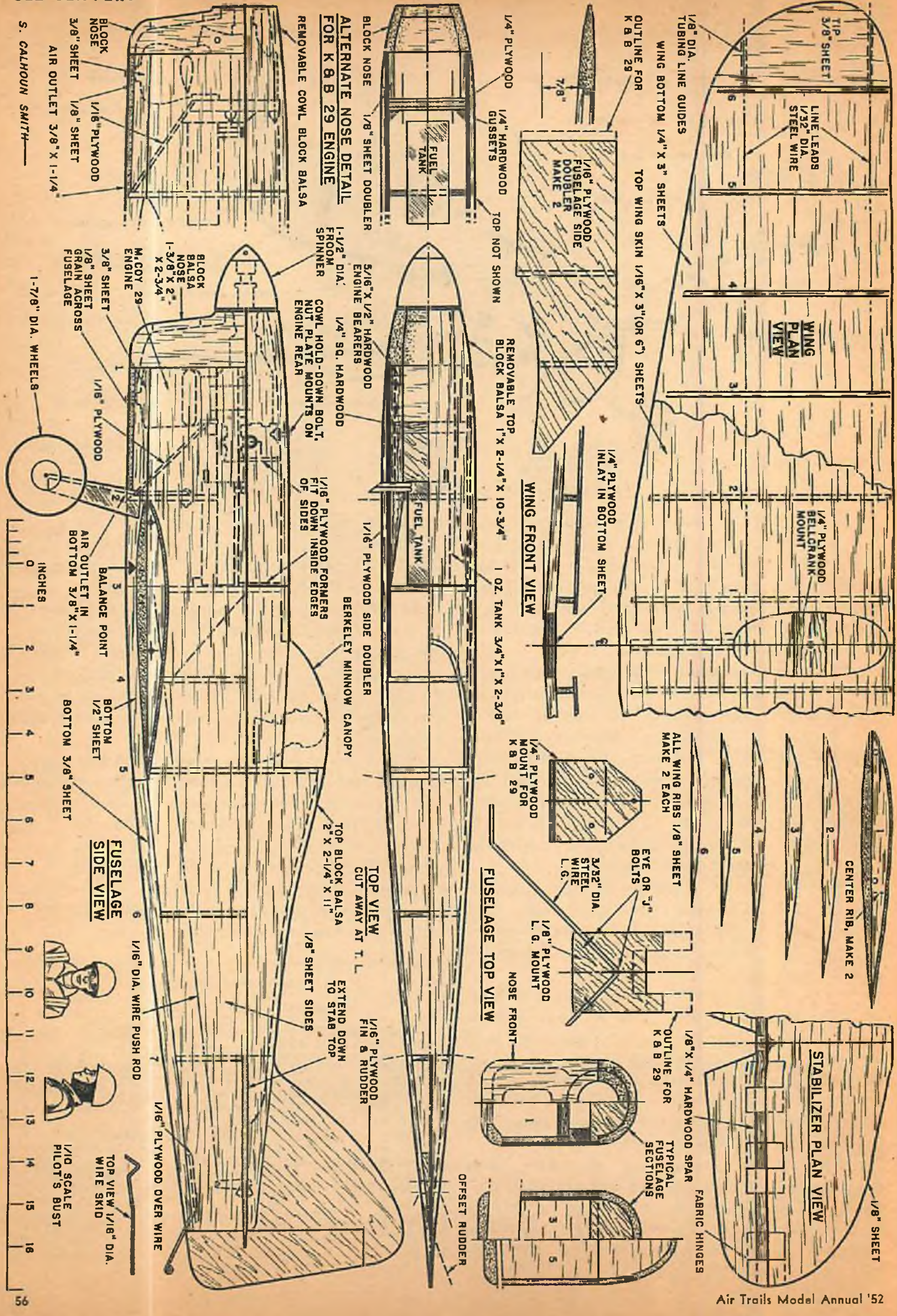
No fuel cut-off system is shown on the main plan. However, the detail is shown on the cutaway drawing. A K&B Shur-Stop is mounted in the fuselage above the fuel tank. The release is actuated by an arm extending down beside the front of the bellcrank. This utilizes only the very last bit of down travel of the bellcrank. You may prefer to use a cut-off system other than this. Don't overlook the possibility of two-speed for your team racer.

Bill of Materials—Ole Slippery

(Balsa unless specified otherwise)

Two ¼"x3"x36", wing bottoms. One 1/16"x6"x36" (or equiv. 3" wide), wing tops. Three ⅛"x3"x36", fuselage, stab, elevator, formers, wing ribs. One 1"x2¼"x11", front cowl block. One 2"x2¼"x11", rear cowl block. One 1⅜"x2"x2¾", nose cowl block. One ⅜"x3"x18", wing tips, fuselage bottom. One ½"x3"x7", fuselage bottom. One 5/16"x½"x11" (hardwood), engine bearers. One ⅛"x¼"x12" (hardwood), elevator spar.

Scrap ⅛" plywood for landing gear bulkhead. 36" of 1/32" dia. wire for line leads. 18" of 1/16" dia. wire for pushrod and tail skid. 12" of 3/32" dia. wire for landing gear. One ½" dia. Froom Spinner. Eye or "J" bolts for landing gear fastening. 1 ounce fuel tank. 3" Veco bellcrank. 1⅞" dia. wheels. 1/10 scale pilot's head. Berkeley Minnow canopy. Fabric for elevator hinges. Weldwood glue, cement, fuel-proof clear and colored dope. Lightweight Silkspan. Trim-Film decals.


S. CALHOUN SMITH
BLOCK NOSE
3/8" SHEET
1/8" SHEET
1/16" PLYWOOD
AIR OUTLET 3/8" X 1-1/4"
REMOVABLE COWL BLOCK BALSA
ALTERNATE NOSE DETAIL FOR K & B 29 ENGINE
BLOCK NOSE
1/8" SHEET DOUBLER
FUEL TANK
1/4" PLYWOOD
1/4" HARDWOOD GUSSETS
TOP NOT SHOWN
7/8"
OUTLINE FOR K & B 29
1/16" PLYWOOD FUSELAGE SIDE DOUBLER MAKE 2
1/8" DIA. TUBING LINE GUIDES
TIP 3/8" SHEET
LINE LEADS 1/32" DIA. STEEL WIRE
WING BOTTOM 1/4" X 3" SHEETS
TOP WING SKIN 1/16" X 3" (OR 6") SHEETS
WING PLAN VIEW
1/4" PLYWOOD INLAY IN BOTTOM SHEET
1/4" PLYWOOD BELLCRANK MOUNT
WING FRONT VIEW
REMOVABLE TOP BLOCK BALSA 1" X 2-1/4" X 10-3/4"
1 OZ. TANK 3/4" X 1" X 2-3/8"
BLOCK BALSA NOSE 1-3/8" X 2" X 2-3/4"
M.COY 29 ENGINE
3/8" SHEET
1/8" SHEET GRAIN ACROSS FUSELAGE
1-1/2" DIA. FROM SPINNER
5/16" X 1/2" HARDWOOD ENGINE BEARERS
1/4" SQ. HARDWOOD
COWL HOLD-DOWN BOLT, NUT PLATE MOUNTS ON ENGINE REAR
1/16" PLYWOOD
1/16" PLYWOOD FORMERS FIT DOWN INSIDE EDGES OF SIDES
1/16" PLYWOOD SIDE DOUBLER
FUEL TANK
BERKELEY MINNOW CANOPY
1-7/8" DIA. WHEELS
AIR OUTLET IN BOTTOM 3/8" X 1-1/4"
BALANCE POINT
BOTTOM 1/2" SHEET
BOTTOM 3/8" SHEET
INCHES
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
FUSELAGE SIDE VIEW
TOP VIEW CUT AWAY AT T. L.
TOP BLOCK BALSA 2" X 2-1/4" X 11"
1/8" SHEET SIDES
EXTEND DOWN TO STAB TOP
1/16" PLYWOOD FIN & RUDDER
1/16" DIA. WIRE PUSH ROD
1/16" PLYWOOD OVER WIRE
TOP VIEW 1/16" DIA. WIRE SKID
1/10 SCALE PILOT'S BUST
OFFSET RUDDER
FUSELAGE TOP VIEW
1/4" PLYWOOD MOUNT FOR K & B 29
3/32" DIA. STEEL WIRE L.G.
EYE OR "J" BOLTS
1/8" PLYWOOD L. G. MOUNT
NOSE FRONT
TYPICAL FUSELAGE SECTIONS
ALL WING RIBS 1/8" SHEET MAKE 2 EACH
CENTER RIB, MAKE 2
OUTLINE FOR K & B 29
1/8" X 1/4" HARDWOOD SPAR
FABRIC HINGES
STABILIZER PLAN VIEW
1/8" SHEET

World's *Fastest* Model

By GLENN TEMTE and BOB THOR

■ This is the jet that did 179.03 mph to set a new national record which has never been exceeded despite changes in rules or the influx of new enthusiasts to the Dyna-Jet powered circle.

Construction of B.J. VI is along conventional control model lines. If anything, the building of a jet model is a good deal simpler and faster. Use good wood and try to build as strong and yet as light a ship as possible.

Select an appropriate sized block of medium balsa for the fuselage and saw to side and top outline, being extremely careful to cut in the wing incidence at zero degrees. The model is set up for clockwise flight. but there is no reason why it won't fly equally well in a counterclockwise direction if the necessary changes in gas tank and bellcrank leads are made.

The wing is of very conventional construction. The spar is of hardwood lying flat along the top. A hickory spar cut from an old ski has worked out well for us. From medium-hard balsa cut out the bottom of the wing panels, and on them assemble the ribs and spar in their proper location. Install the control units in the wing, screwing the mounting bolt only far enough down to hold the bellcrank assembly in place. Cut the top wing covering from 1/16 " medium balsa and glue in place. When completely dry, sand carefully to final shape.

As a final step in the finishing process, paint a half-inch wing walk of silver heat-resistant paint on each wing panel where the wing is not protected by asbestos. Reassemble the metal side fittings and fasten the asbestos in place using liquid glass as the adhesive. Liquid glass is obtainable at any drug store and is used because of its heat-resisting properties. Note that the asbestos wing walk is necessary on the outer wing panel only.

The hold-down strap is constructed from a piece of tin can metal and must be made right on the engine tube. Do not use brass or aluminum for the strap, as neither will stand the severe heat. Rivet or bolt a small block of aluminum in place on the strap and tap out a hole for the tie-down bolt. A square nut will substitute for the block of aluminum.

Drill the hole through the hardwood insert and fasten the engine in place with a long bolt. Tighten snugly, but do not use so much force that the fuselage is distorted. Check this bolt before each flight. Its job is to hold the engine in the mounts and is adequate if it is kept snug. There are no side forces on the bolt as these are taken care of by the engine mounts.

Your completed model should weigh in the neighborhood of 25 to 27 ounces. We strongly recommend .016" flying wires in good condition. The control wires should leave the handle at a distance of about two inches apart. In flight, these models pull from ten to twenty pounds and while this is not excessive, it is constant, and near the end of the flight you will probably be very happy when the engine quits. The tank is sufficient for about twenty-five laps, which is definitely a good workout on a warm day.

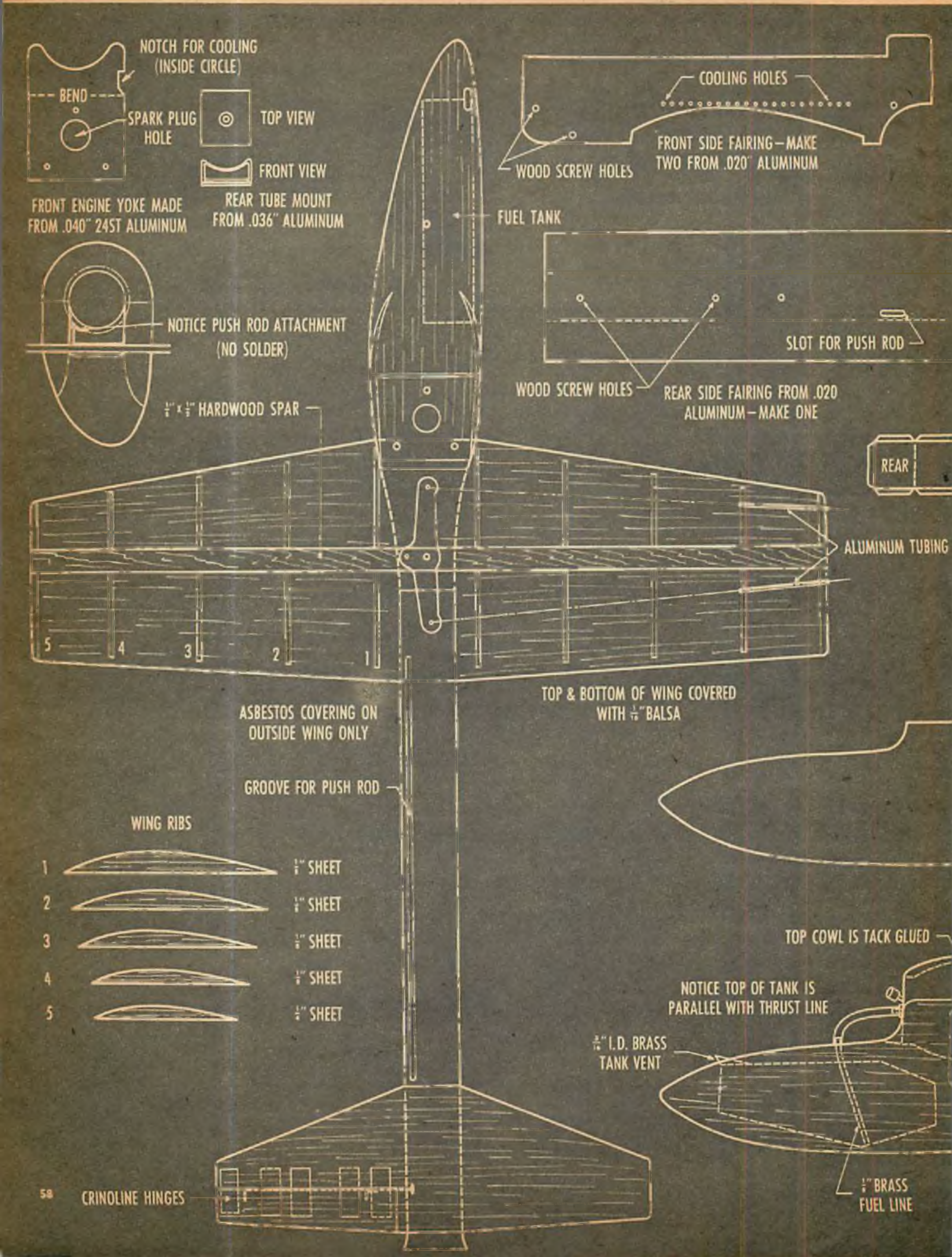
We have always favored four-wheel dollies, but any type will work if some provision is made for supporting the long nose of the model. The plane should fit snugly in a horizontal position in the dolly, and the wing bumpers of the dolly should be at least two inches above the wing leading edge. Wheels should be about three inches in diameter, preferably without tread, so that the dolly will skid instead of tipping. It may be wise to cover the wheels with Scotch Tape when flying from concrete.

Never ground-run the engine in the plane for more than four or five seconds.

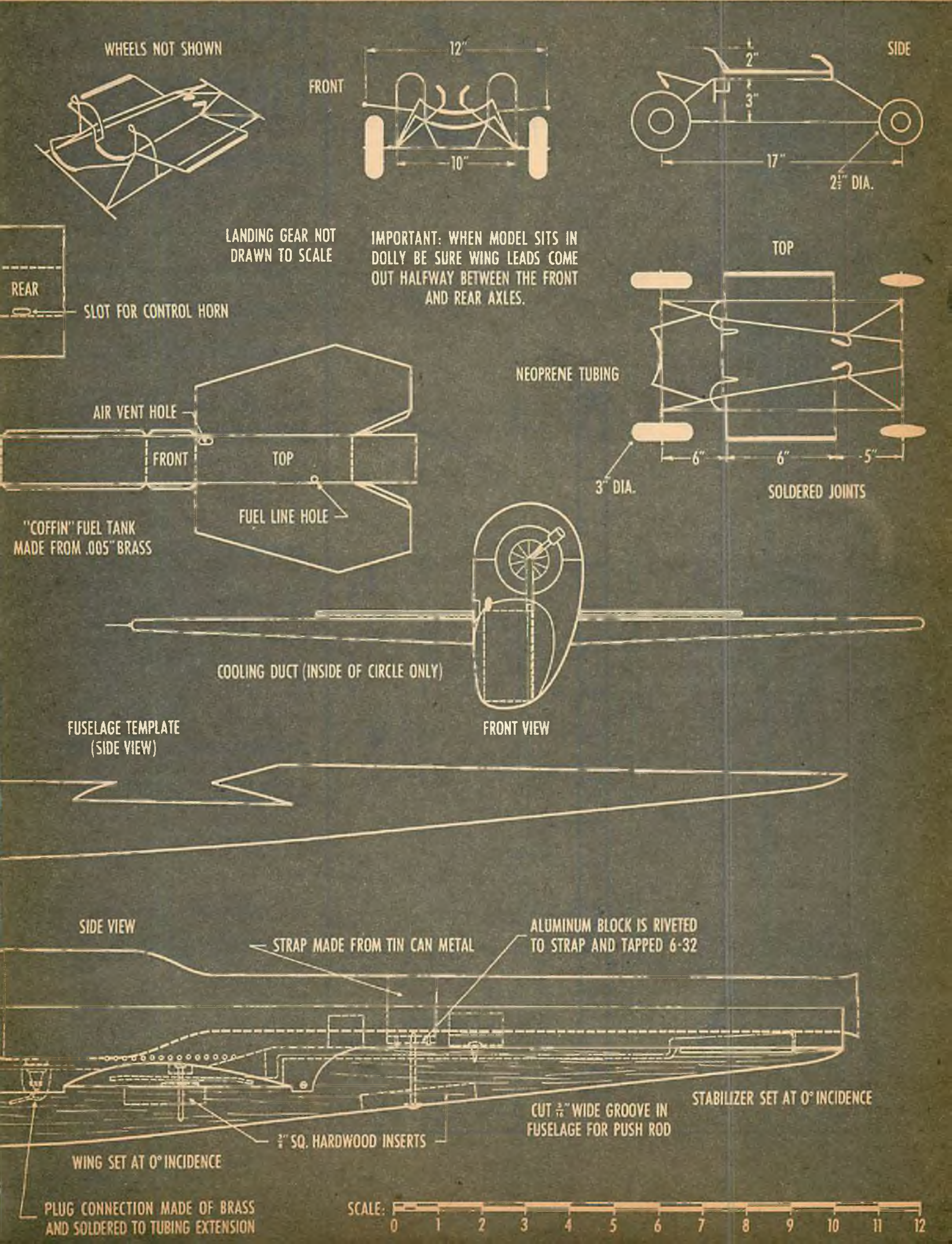
Be prepared for the terrific acceleration that will take place upon release of the model. Hold full up (this is important) until the model breaks clear of the dolly and then neutralize the controls before it has a chance to climb too high. From this point on it will fly like anything else. Landings are no problem because of the exceptional glide.

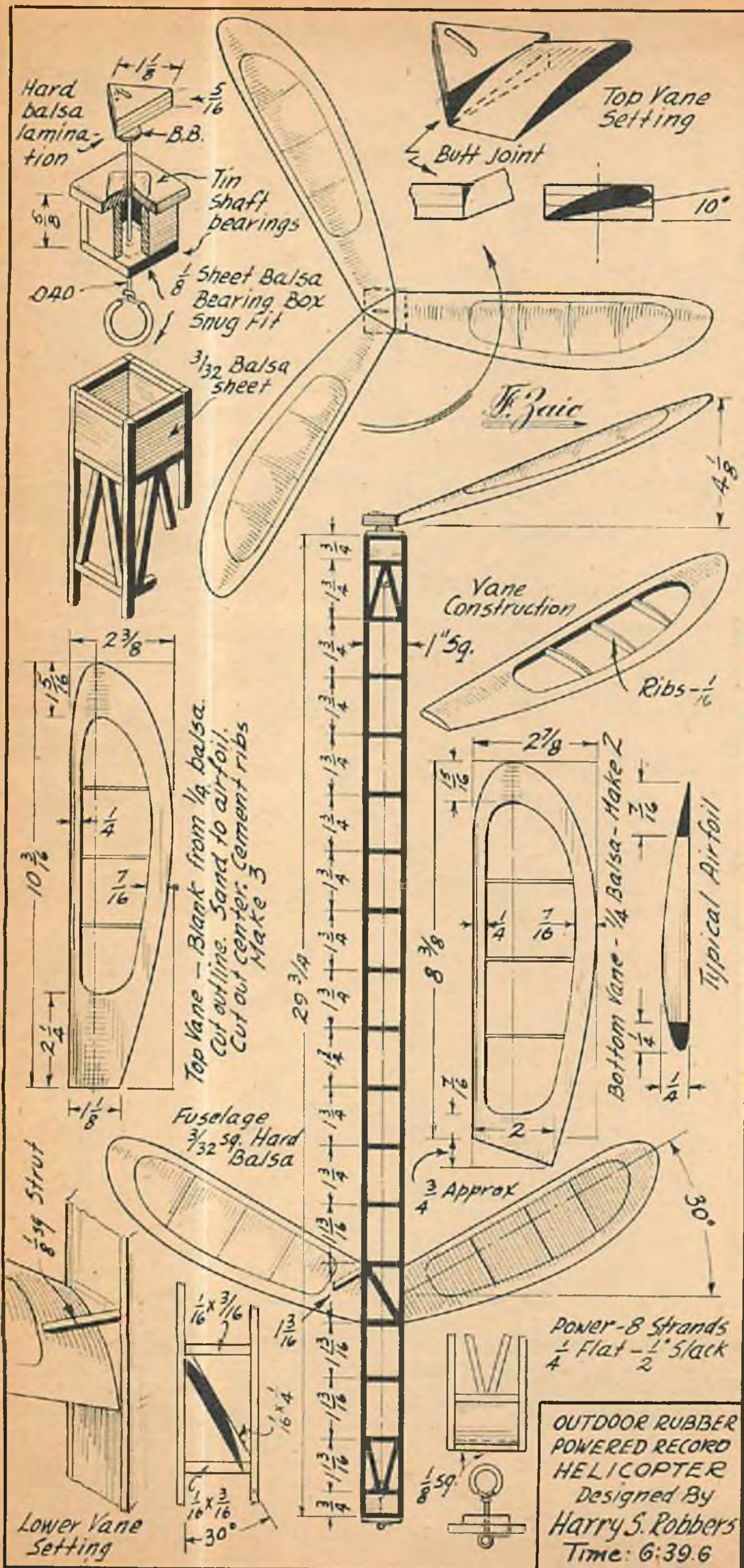
World's Fastest Model

Top time ever recorded by A.M.A. was by this jet job



The World's Fastest Model is the sixth in a series of jet designs worked out by the Minneapolis team





Record Flighters

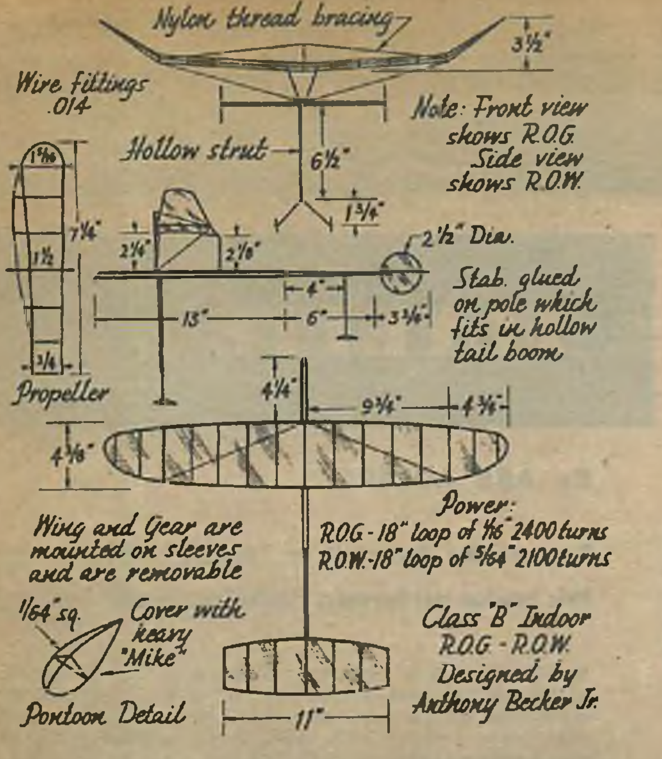
Meet the gang! And what a crowd . . . each a record-holding model. On your left there is Harvey S. ("Pop") Robbers' famous helicopter. The design has held numerous American records as well as Australian and South African top times.

That indoor microfilm model over there (top left, opposite page) is "Tony" Becker's original creation which set an R.O.G. mark of 22:22.5 and a rise-off-water record nearly as high—18:51.6. And for awhile it held the stick h. l. time of 24:16!

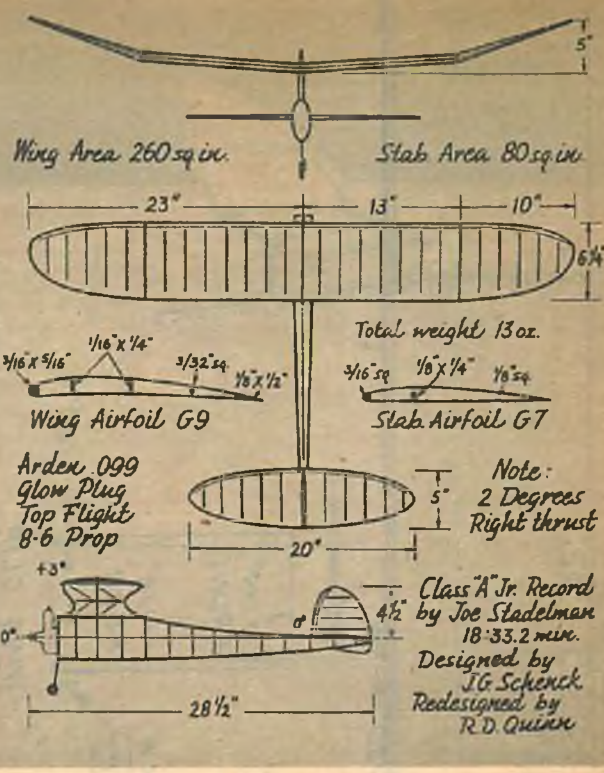
Real hot ship in Pittsburgh free flight circles has been the 260 sq. in, job shown at top, right (opposite). Originally designed by Jim Schenck of R/C fame, it was redoodled by R. D. Quinn and flown to a Class A record by Junior contender Joe Stadelman.

Another Philadelphian, Anthony D'Alessandro, flying partner of "Tony" Becker, established an official AMA national record with the stick model (opposite, center) at the big Plymouth International meet. A square prop had washed-out tips.

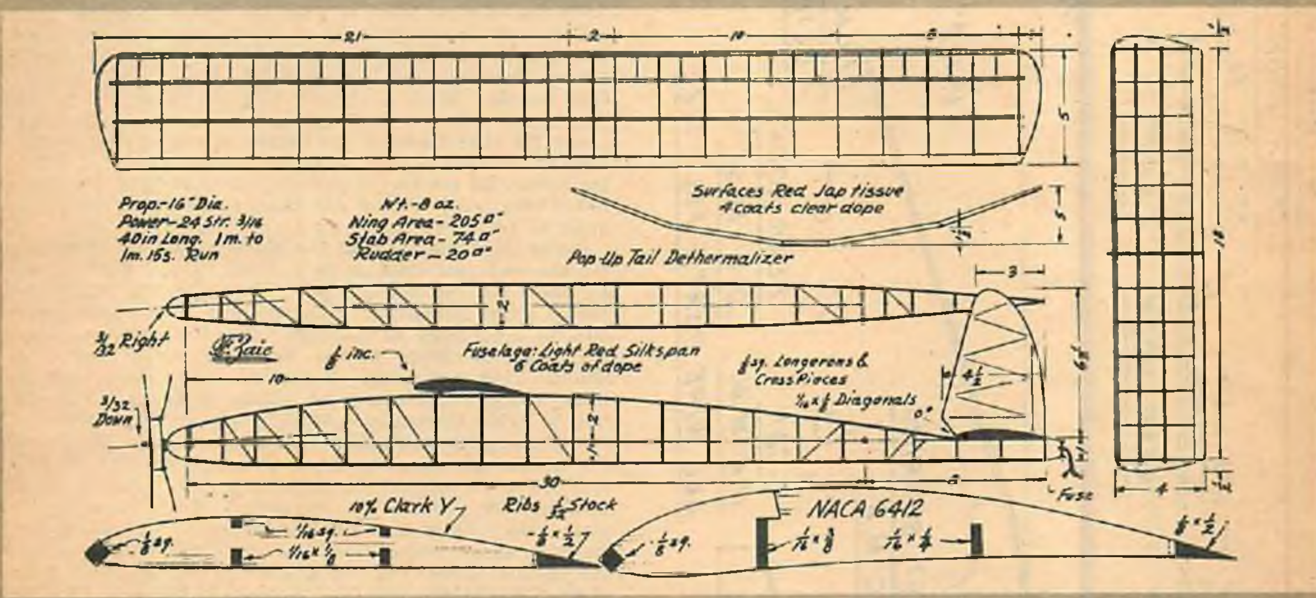
Here's a neatly constructed craft (bottom, right) flown to a National Class D record by Paul Simon, 1951 National Champion. Paul says this model is from Bob Bienenstein's drafting board. Bob was the '51 Open Class champ. (See also pg. 90.)



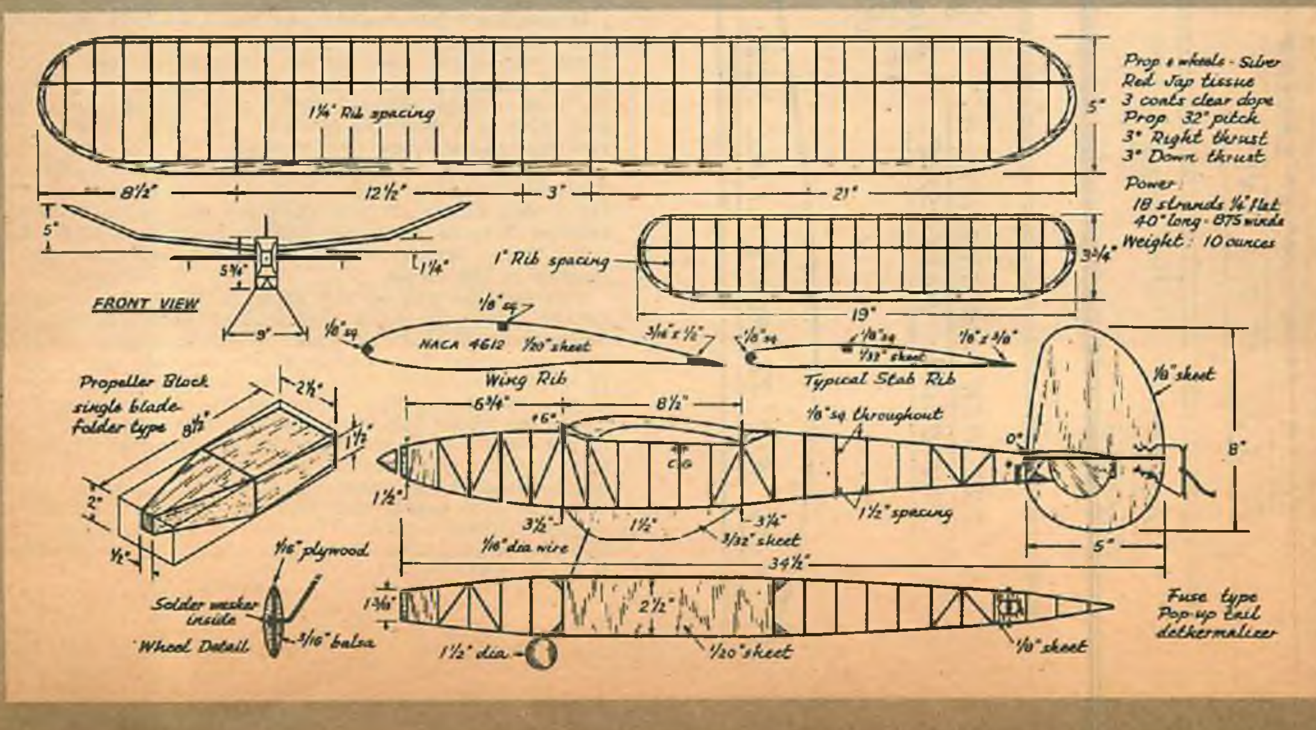
Nylon thread bracing
3½"
Wire fittings .014
Hollow strut
6½"
Note: Front view shows R.O.G. Side view shows R.O.W.
1¾"
7¼"
2½" Dia.
Stab. glued on pole which fits in hollow tail boom
13"
6"
4"
Propeller
4¼"
9¾"
4⅜"
Power:
R.O.G.-18" loop of 1/16" 2400 turns
R.O.W.-18" loop of 5/64" 2100 turns
Wing and Gear are mounted on sleeves and are removable
1/64" sq.
Cover with heavy "Mike"
Pontoon Detail
11"
Class "B" Indoor R.O.G.-R.O.W.
Designed by Anthony Becker Jr.



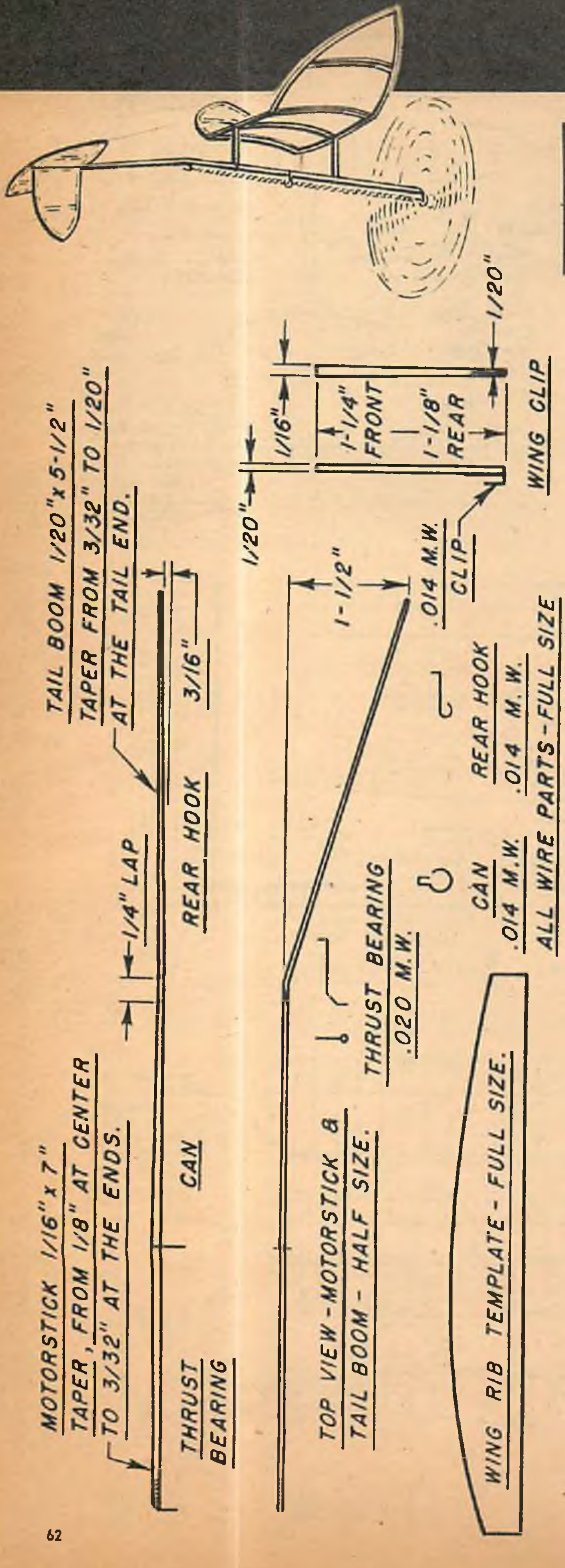
5"
Wing Area 260 sq in.
Stab Area 80 sq in.
23"
13"
10"
6¼"
Total weight 13 oz.
3/16" x 5/16"
1/16" x 1/4"
3/32" sq.
1/8" x 1/2"
Wing Airfoil G9
3/16" sq.
1/8" x 1/4"
1/8" sq.
Stab. Airfoil G7
Arden .099 Glow Plug Top Flight 8-6 Prop
5"
20"
Note: 2 Degrees Right thrust
+3°
0°
4½"
28½"
Class "A" Jr. Record by Joe Stadelman 18:33.2 min.
Designed by J.G. Schenck
Redesigned by R.D. Quinn



21
2
10
8
5
Prop.-16" Dia.
Power-24 Str. 3/16
40in Long. 1m. to 1m. 15s. Run
Wt.-8 oz.
Wing Area-205 □"
Stab Area-74 □"
Rudder-20 □"
Surfaces Red Jap tissue
4 coats clear dope
Pop-Up Tail Dethermalizer
3
18
3/32 Right
1/8 inc.
Fuselage: Light Red Silkspan 6 Coats of dope
1/8 sq. Longerons & Cross Pieces
1/16 x 1/8 Diagonals
3/32 Down
10
30
Fuse
4
10% Clark Y
Ribs 1/32 Stock
NACA 6412



1¼" Rib spacing
5"
8½"
12½"
3"
21"
Prop & wheels - Silver
Red Jap tissue
3 coats clear dope
Prop 32" pitch
3° Right thrust
3° Down thrust
Power
18 strands 1/4" flat
40" long - 875 winds
Weight 10 ounces
5"
5¾"
1¼"
1" Rib spacing
3¼"
FRONT VIEW
9"
19"
NACA 4612
1/20" sheet
Wing Rib
Typical Stab Rib
1/8" sheet
Propeller Block single blade folder type
2½"
8½"
1½"
2"
½"
6¾"
8½"
1/8" sq throughout
8"
0°
C.G.
1½"
3½"
1½"
3¼"
1/16" dia wire
3/32" sheet
1½" spacing
5"
34½"
1/16" plywood
Solder washer inside
Wheel Detail
3/16" balsa
2½"
1½" dia
1/20" sheet
1/8" sheet
Fuse type Pop-up tail dethermalizer



FLYETTE

By ABE ADLER

Tops in fun for club or "family" contests! Fly this parlor performer, "mike" or paper covered.

■ FLYETTE is a ten-incher that was originally covered with microfilm and carried the 7½" prop. It was and still is powered with a single strand of 3/64 T-56 brown rubber with loops tied at both ends. These loops fit onto the rear hook and prop shaft. *Flyette* was a bit temperamental with the original prop, so a 6" fan was substituted.

The most important part of the model is its propeller. Use a light but firm piece of balsa for the block. Lay it out as shown on the drawings. Pierce the center with a thin needle. With a sharp knife or razor cut to the diagonals. Allow a 3/32" thick hub at the center. Next carve the rear faces of the blades to about 3/32" undercamber at the widest sections. Rough-sand the carved faces with #1 sandpaper just enough to remove the ridges left. Using #280 wet or dry sandpaper, sand both blades until all traces of the rough sanding are removed.

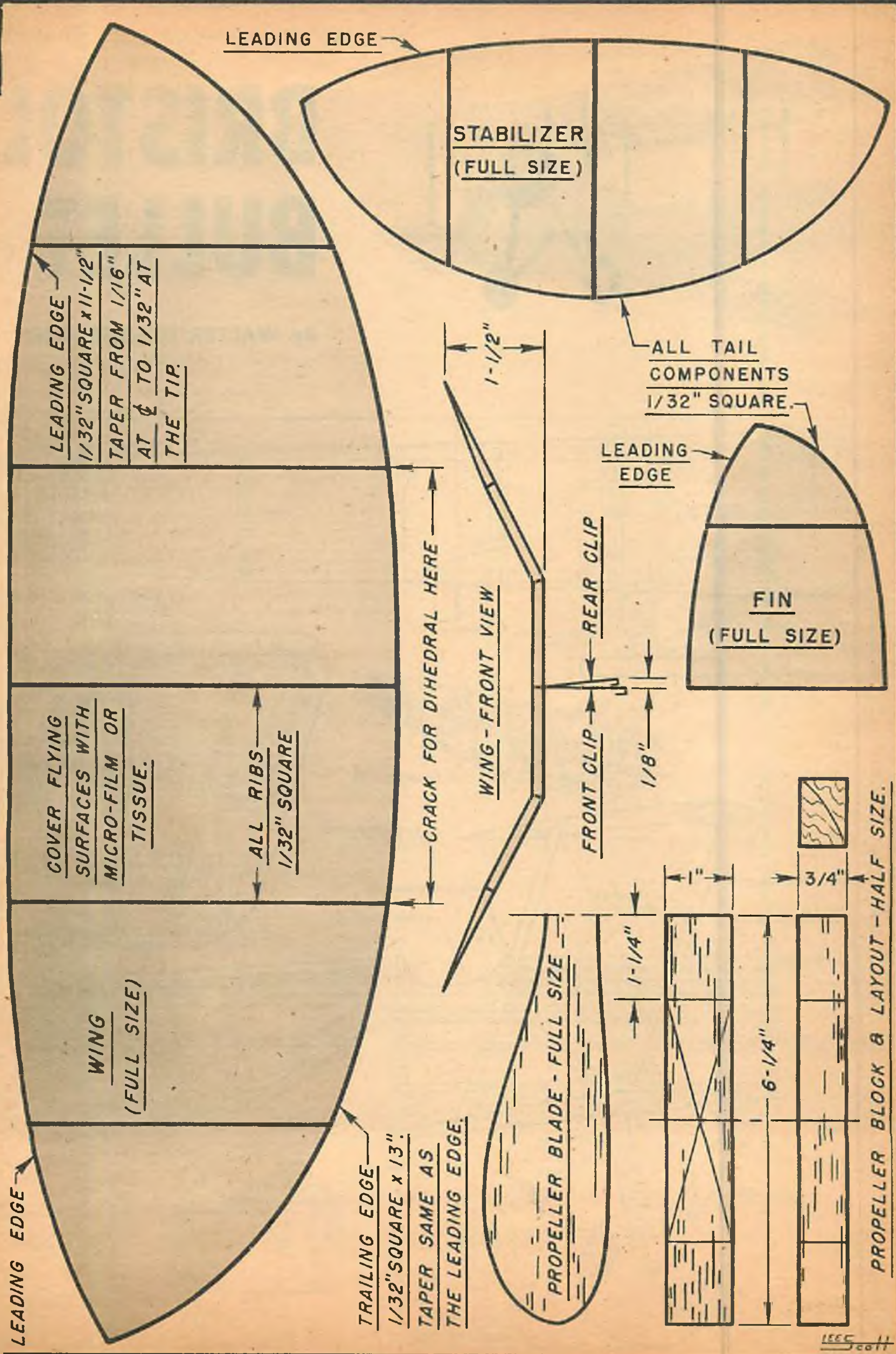
Carve the front faces of the blades to a 1/16" thickness. Rough-sand just enough to remove ridges. Cut out the template for the blade shape. With a sharp soft pencil sketch a line parallel to the shaft hole at the prop center and on both sides of the hub. Fasten the inner end of the blade template to the sketched center line with Scotch Tape, and draw around the template to get the blade shape. Cut and sand blades to shape. Thin the hub to 1/16" thickness and apply a coat of cement.

Use the #280 sandpaper to sand the outside faces until the blades are about as thick as a playing card. During this operation support the blade on a round surface. Next, balance the prop. This completed, finish sanding the prop with #400 wet or dry sandpaper or 10-0 sandpaper. Balance again. Make a shaft from .014" music wire and cement into place. Use two washers or a small bead on the shaft. Cement the adjacent washer to the hub (if bead is used, cement bead to hub).

If you can't find or buy any small washers or beads you can make your own. Pierce .010" thick aluminum sheet with a pin, then flatten the dimpled area. Use a pair of scissors and cut three-quarters of the way around the washer-to-be. Hold it with a pair of long-nose pliers and finish to a diameter of about 3/32". The Flyette carries this type of homemade washer.

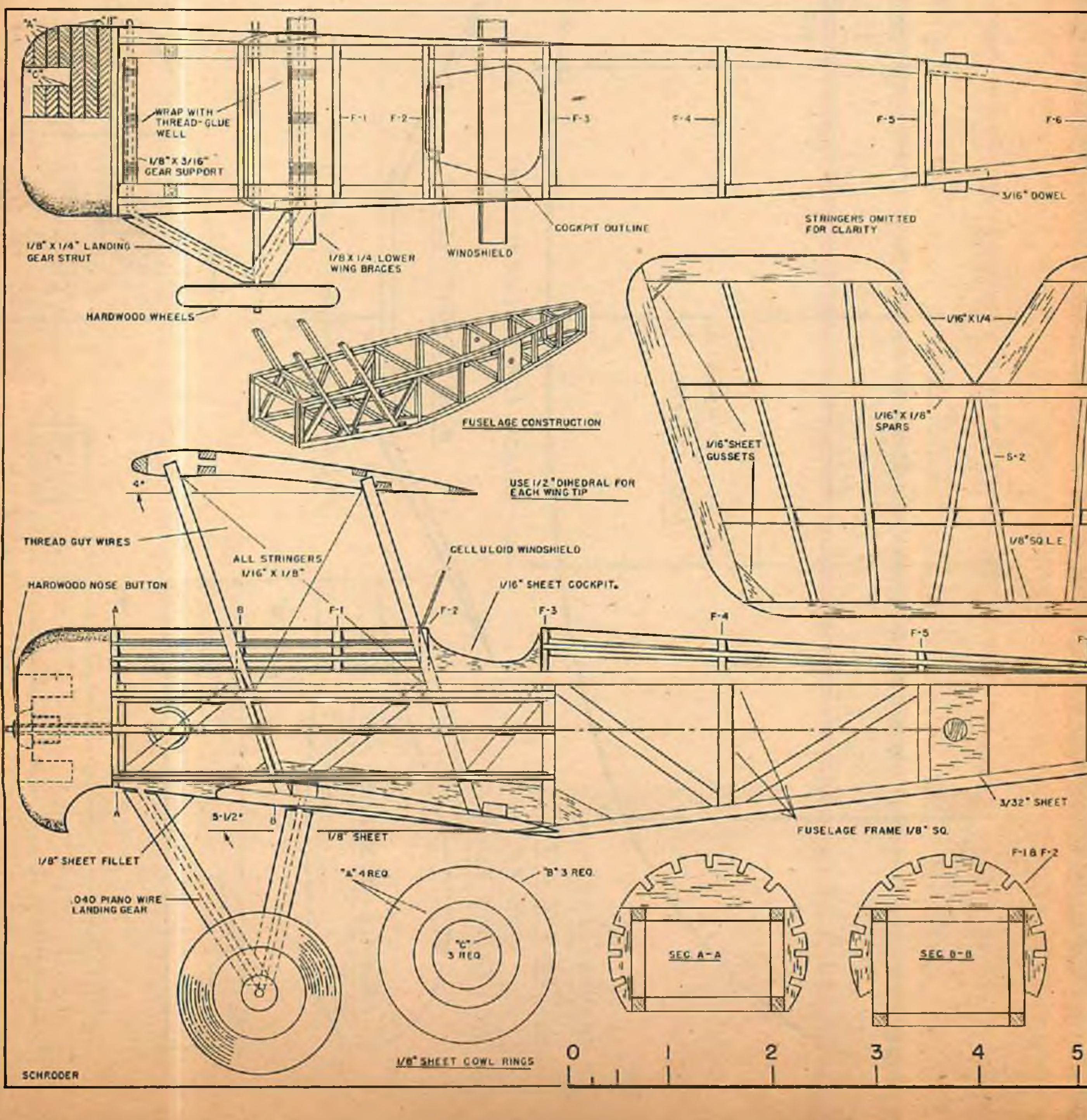
When you are satisfied with the glide—and don't be too critical—wind the prop until there is enough power for a slow climb. If you can't get the model to climb because it stalls, move the wing back. If you think the wing is too far aft move it forward until the model mushes in the climb.

This location will be just about as far forward as you can go. Move the wing slightly back until the mushing disappears and you'll have the best wing location. If you have any spiral dive trouble as you increase the number of winds, warp some more wash-out into the right wing. If you are dissatisfied with diameter of the circles in which the model flies, warp the tail boom and right wing to get what you want. The original turned in circles of from 3 to 5 feet diameter. When flying with the rubber fully wound, some additional washout was warped into the right wing before each flight to keep the initial burst of power under control. The wing springs back and that last fine twist before each flight with high power never seems to hurt.


LEADING EDGE
STABILIZER
(FULL SIZE)
ALL TAIL COMPONENTS 1/32" SQUARE.
LEADING EDGE
FIN
(FULL SIZE)
1-1/2"
WING - FRONT VIEW
REAR CLIP
FRONT CLIP
1/8"
CRACK FOR DIHEDRAL HERE
LEADING EDGE 1/32" SQUARE x 11-1/2" TAPER FROM 1/16" AT ℄ TO 1/32" AT THE TIP.
COVER FLYING SURFACES WITH MICRO-FILM OR TISSUE.
ALL RIBS 1/32" SQUARE
WING (FULL SIZE)
LEADING EDGE
TRAILING EDGE 1/32" SQUARE x 13". TAPER SAME AS THE LEADING EDGE.
PROPELLER BLADE - FULL SIZE
1-1/4"
1"
6-1/4"
3/4"
PROPELLER BLOCK & LAYOUT - HALF SIZE.

BRISTOL BULLET

By WALTER L. SCHRODER



■ Designed by Captain Frank Barnwell in 1914, the Bristol Bullet scout type D was the first single-seater scout to go into production during World War I.

It saw service with England's Royal Flying Corps toward the latter part of 1914 and was used as a scouting reconnaissance plane. (The fighting Scout was a much later development.) After its service days were over the Scout was turned over to training squadrons.

One full-scale version of the model outlived its contemporaries by many years. It was bought by a private owner after the Armistice and became G-EAGR on the English civil register. Ten years later it was still being flown by a private owner at Shelburn-in-Elmet, Yorks, England. It ended its days in a junk yard around 1936.

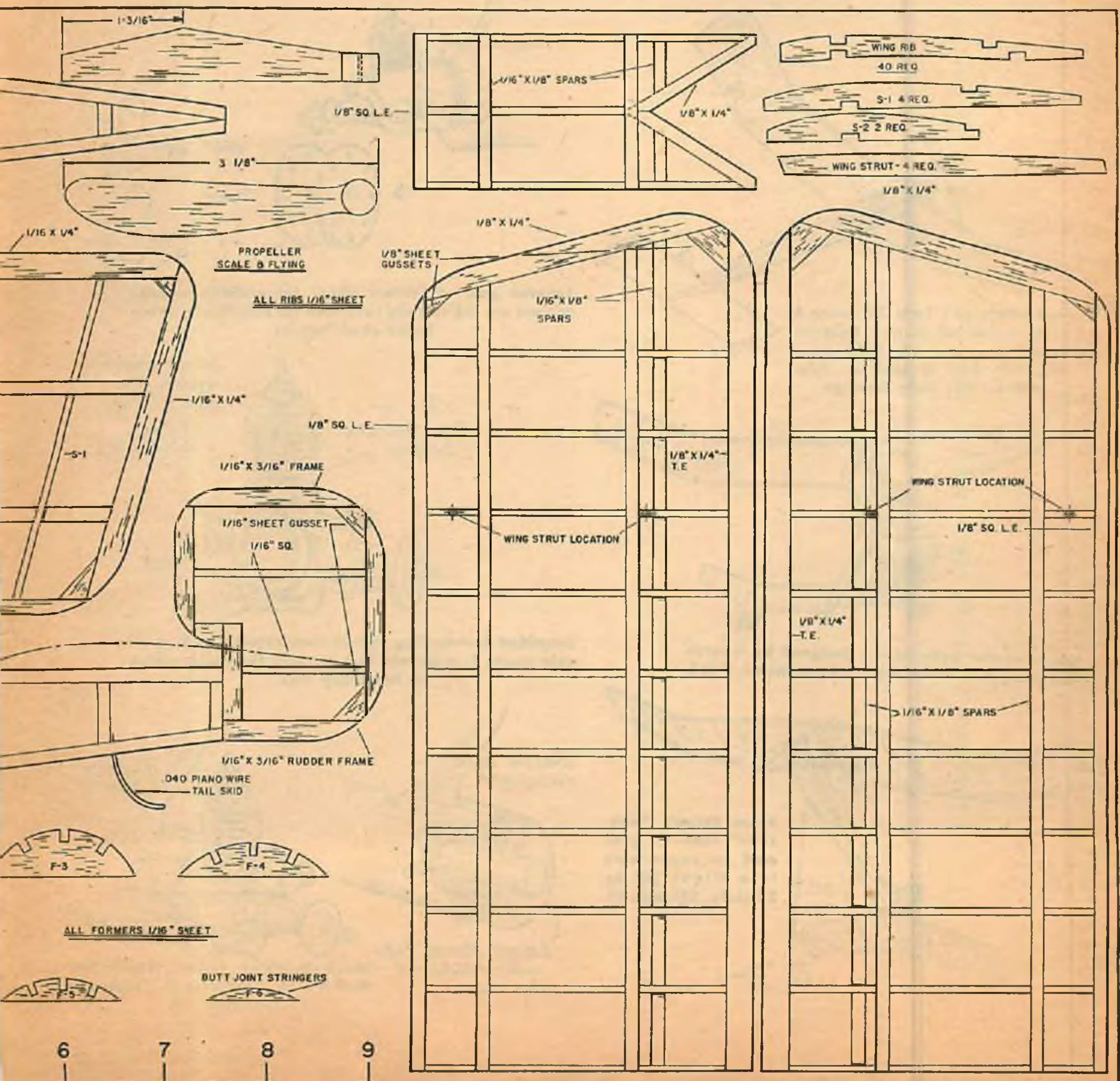
For the above information, plus specifications for the model, we are indebted to *Aeromodeller*, the English model magazine. All details shown here are from plans by E. J. Riding.

For those who are interested the scale details of the model are one inch to one foot.

The plans are designed to give the modeler the best assistance possible. In the size shown here in plan form the model may be constructed for powering with rubber or Herkimer's CO_2 motor; as a Half-A free flight scale it offers good possibilities; double all measurements for powering by gas engines in control-line flying scale events.

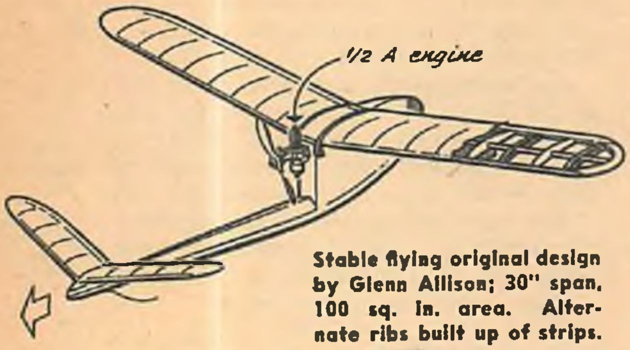
As for the design, simplicity is the keynote, and the model is an ideal project for the newcomer. Old-timers should like the simple cabane strut rigging. A good suggestion is to use rock-hard ⅛″ squares for these combination upright-cabane struts.

The combination scale-flying propeller blank shown for rubber will provide adequate power for the most avid flyer. Six to 8 strands of U. S. Rubber Co.'s T-56 ⅛″ flat rubber is recommended.

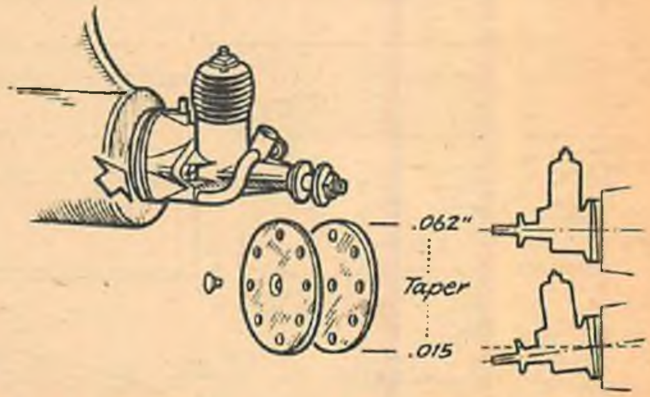


Those Ingenious Free Flighters

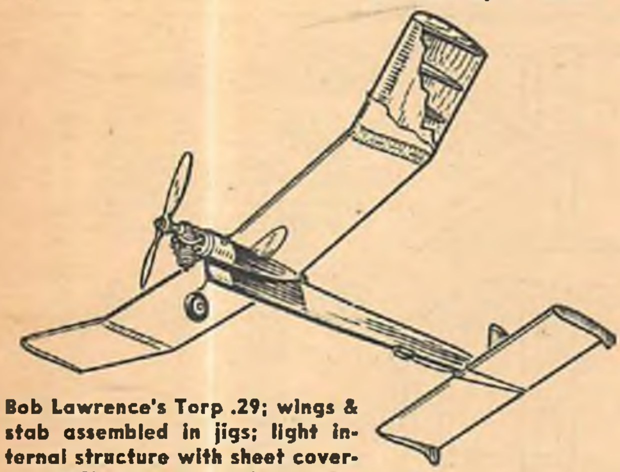
Faced with the problem of producing a skyrocket climb and a floating glide, most free flight designers come up with the great compromise—high power and light wing loading. But why not retracting wings for the climb?—as more than one experimenter has asked himself. While the average contest goer has not worked himself up to *that* stage, he has been refining his designs and producing some pretty effective gadgets to help him toward his cherished goal—ten minute flights directly over the point of take-off. The real super-gadget for that, however, is radio control.



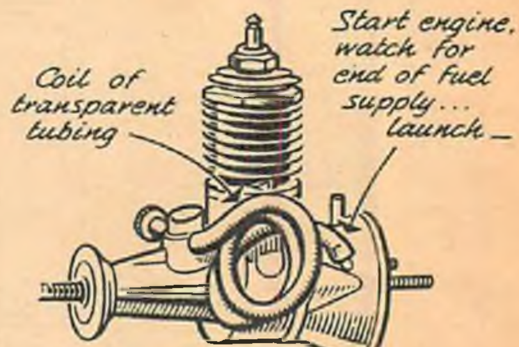
Stable flying original design by Glenn Allison; 30" span, 100 sq. in. area. Alternate ribs built up of strips.



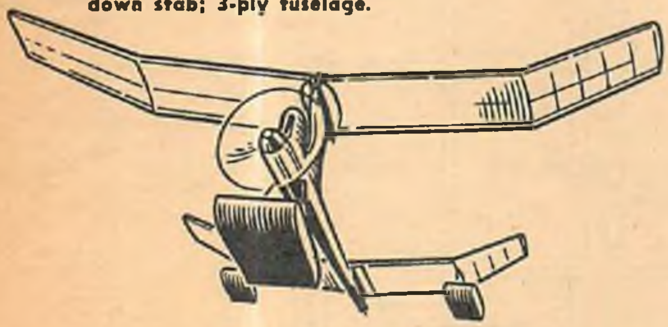
Tapered pair of "thrust discs" for radially-mounted engines are individually rotatable for side-thrust, down-thrust combinations.



Bob Lawrence's Torp .29; wings & stab assembled in jigs; light internal structure with sheet covering, 10% RAF 32 section. Pop-down stab; 3-ply fuselage.

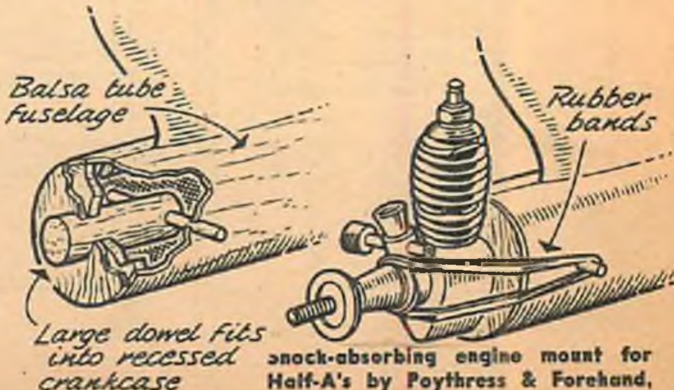


Simplified fuel-limiting system uses regular tank, variable length transparent fuel line coil for visible check on remaining fuel.

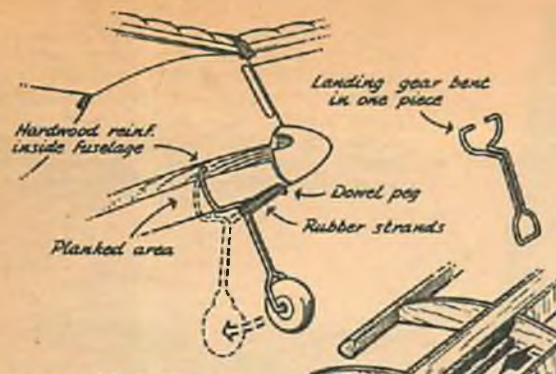


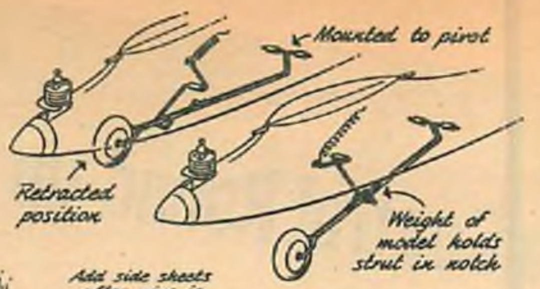
Rise-off-water pylon model designed by George Perryman, West Point, Ga. Cowled engine, V-tail.

Frank Ehling's "jack-knife" take-off gear used on swept-wing free flight job by Ed Mate, Chicago, Ill.



Shock-absorbing engine mount for Half-A's by Poythress & Forehand, Hampton, Va.



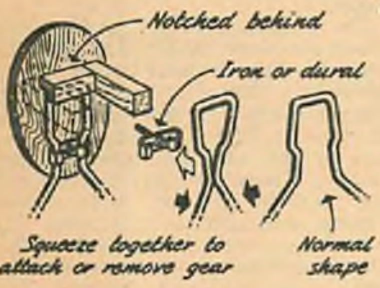


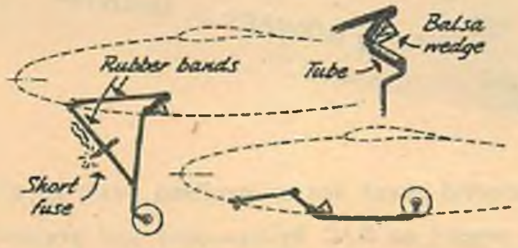
• Bill Halpain, Sulphur, Okla., finds ordinary cotter pins dependable for quick attachment of wire landing gear member. Mount to firewall or engine bearers, spread tips —

by Douglas Taffinder, Brooklyn, N.Y.

• Extra strength & lightness & simplified assembly are advantages of "box" wing spar for large rubber, gas models— Submitted by: Yves Allouchérie, Quebec, Canada

Submitted by: Don Wallace, Atascadero, Calif.



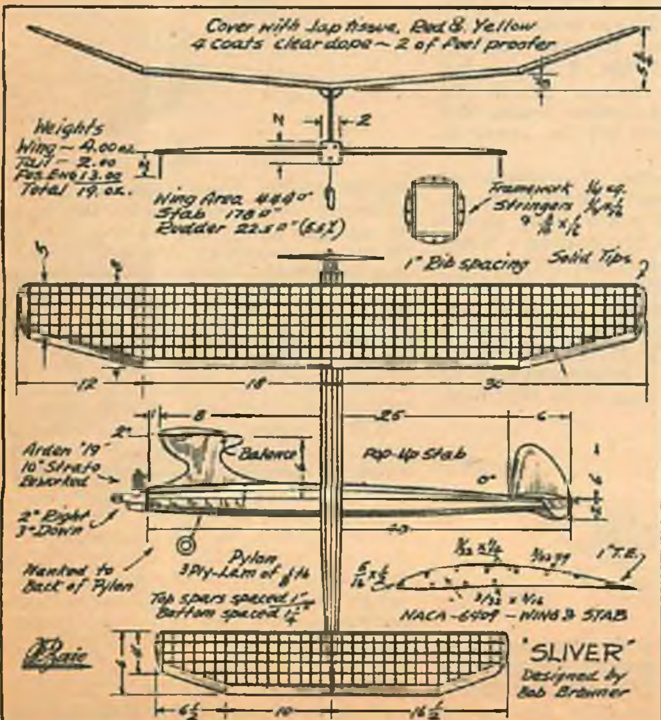


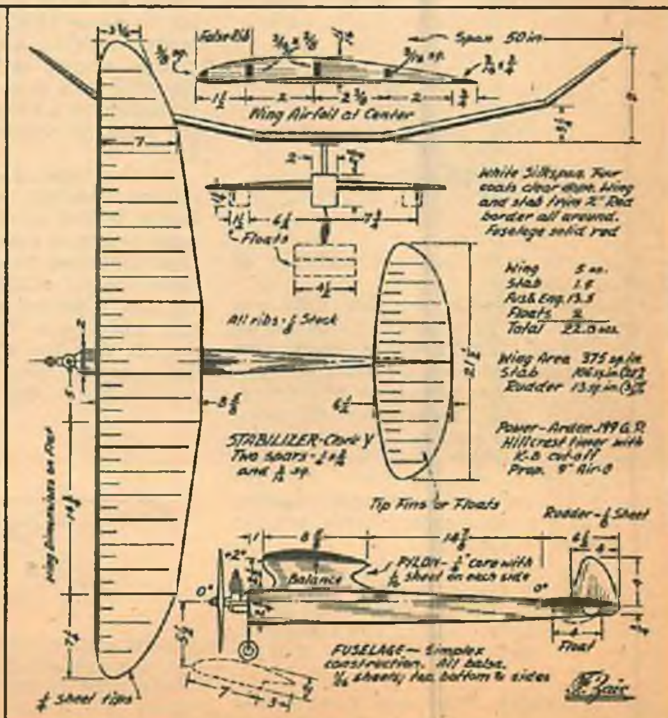
Brawner's "Sliver"

Bob Brawner, an officer of the Phoenix, Ariz., Model Airplane Club, has built a number of free flights from Half-A up through the large Class C jobs, of which "Sliver" is representative. Note the large number of spars he used on this record-setting ship to insure an even airfoil with no paper sag. Bob distinguished himself during the last National meet.

Mahieu's "Zeek"

Lew Mahieu of Long Beach, Calif., proved that he's one of the West Coast's better builders with a remarkable series of records established with his "Zeek" free flight job. The model sketched here set a national record in Class A Open R.O.W. of 22:01. It also placed second in seaplane events at the Nationals and 1st in R.O.G. Class A at the Plymouth meet.





Modeldom's most colorful event has an exciting past; here's an authoritative, updated report on R/C flying—past and present

■ Radio control of models is not new. Despite the idea of many model builders that R/C work was discovered around 1937 or 1939 with the holding of the first R/C event at an A.M.A. Nationals meet, the control of models by means of radio actually was an accomplished fact long before World War I. The early pioneers did not use model airplanes, but instead worked mainly with model boats. The planes of that day were virtually 100% rubber-propelled, of course, and the hardwood-framed models had enough

Fig. 1

weight to carry without addition of radio apparatus.

Since the modern vacuum tube was not available in practical form before the First World War, the experimenters in older days utilized a cranky and unreliable receiver known as a coherer-decoherer. For transmitting the principal element was an induction coil, operation of which was invariably accompanied by crashing sparks and fireworks of all kinds. Ranges reached were only a few hundred yards, but yet it *was* Radio Control.

During and after World War I, experiments in radio control of airplanes —not models, but the equivalent of today's lightplanes—were quite successful, and some slight use was made of these aircraft as target planes.

Radio control of model planes, however, began in earnest soon after the development and marketing of reliable miniature gas engines, and progress was so rapid that the Radio Control Event was added to the Nats schedule in 1937. This was the 10th National Meet at Detroit and half a dozen R/C models were entered. While three of the ships managed to get off the ground, two crashed immediately after take-off. The only really successful entrant was Chet Lanzo; his plane (Fig. 3) was a simple stick model with an open fuselage built in crutch shape, and the 9 foot wing mounted on a wire "pylon." Power was furnished by a Baby Cyclone engine and the airplane weighed 5¾ lbs. ready to fly.

After checking the possibilities of aileron, elevator, and rudder controls, Lanzo settled upon rudder only as the most practical, possibly starting a trend that continues to this day. The complete control installation weighed only 1¾ lbs., a phenomenally low total in a day when most R/C men felt 5 or 6 pounds was the irreducible minimum. The complete control equipment may be seen in Fig. 8; the long balsa tray con-

Fig. 2

taining entire receiver fitted between the two fuselage members; second from lower right is the tiny 45V B battery, which had a life of only about two weeks, whether you used it or not! Batteries fitted into the fuselage in front of the receiver, and the rudder motor and gears were just to the rear.

The radio system operated in the 80-meter (3.5 mc.) Amateur band, and the receiver often responded to signals from Amateur transmitters several hundred miles away! The motor was geared down and linked to the rudder; if allowed to operate steadily, the rudder would turn alternately right and left.

Fig. 3

It could be stopped at the straight-ahead position, or at any intermediate degree of right or left turn up to the full range of motion, and thus acted as a slow-motion motor driven sequence control.

The 3-tube receiver included an oscillating detector and two audio amplifier tubes; unmodulated pulses from the transmitter caused an audio beat note when received by the detector, this audio note serving to nullify the high C bias of the amplifier tubes and thus causing a sensitive relay to operate on the resultant increased plate current. Tuning was critical, but Lanzo made many successful flights with the system. The plane flew nicely and control was good enough to win the Event, netting Chet two trophies and an engine.

In the summer of 1937 a group of radio men led by Ross Hull of the American Radio Relay League began active experiments in the Radio Control field, and the equipment they developed left an indelible print on R/C work that is still felt today. Their original work was done in Connecticut and large

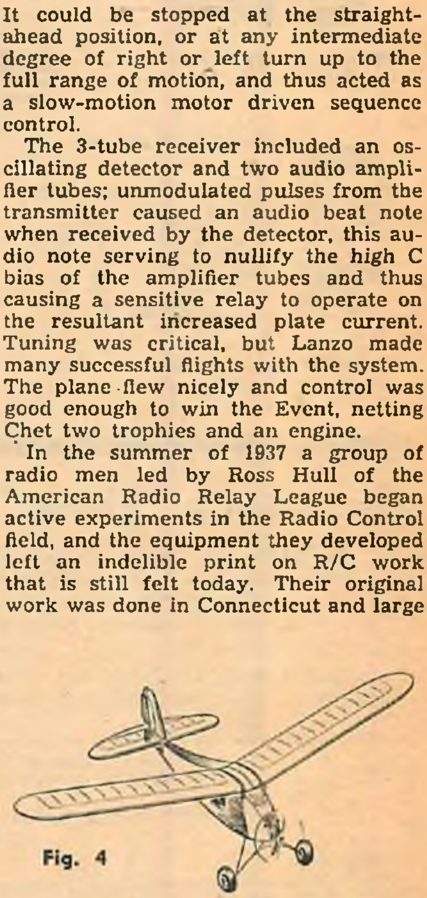


Fig. 4

model gliders were used almost exclusively. They decided at the outset to confine operations to the Amateur 56 mc. band, and 95% of R/C work today is still done on the present equivalent band, 50-54 mc. Their greatest "masterpiece" was development of the magnetic escapement to operate their rudder surfaces; here again, probably at least 90% of R/C planes flying today utilize an escapement in some form.

The *Connecticut group originally* used 2 and 3 tube receivers, but felt the need for something lighter and simpler. This "something" they helped to develop in 1938; it was the forerunner of the RK61 tube so popular at present. Another collaborator, Clinton DeSoto, formed a concern shortly after that which dealt exclusively in radio control apparatus, the first firm to specialize in the new field, in which it is still actively engaged today.

Hull and his co-worker, R. B. Bourne, had planned to enter a high-performance model soaring glider at the annual glider meet in Elmira, but rules techni-

Out to Launch: Photo, top, shows Walter Good launching *Big Guff* of Minneapolis Nationals. Brother Bill's at xmtr (see feet?)

calities prevented this. However, the sleek 16-foot model made many successful exhibition flights.

As the 11th Nationals rolled around, the R/C boys had great hopes for their various systems, but unfortunately the R/C Event was the victim of that uncontrollable factor—windy weather. The only ship to fly was that built by Walter Good, and it cracked up shortly after take-off. Walt had had the same airplane at the '37 Nats where he gave a successful demonstration of his equipment on the ground, but didn't attempt a flight. The same plane and radio equipment were used in 1938—in fact, this plane, shown in Fig. 4, is the same

Fig. 5

used by Good right up to and including his win at the 1947 Nats in Minneapolis!

We should probably say it's an "equivalent" plane, for the original 8-foot *Big Guff* received a new fuselage in 1938, new tail surfaces in 1939, and new landing gear in 1947, plus various motors along the way. *Big Guff* has a deep and spacious fuselage to carry any required radio gear and total weight runs about 8 lbs., depending upon the equipment carried.

Walter Good was joined in 1939 by his brother, Bill, a licensed radio Amateur, and the Goods have been a famous team ever since.

Several other interesting planes

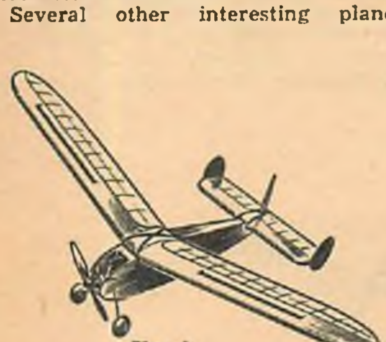


Fig. 6

appeared at Detroit that year, one of the most awe-inspiring being the "model" built by DeSoto. Of semi-scale design, this cabin job had a 14-foot span, weighed about 28 lbs., and was powered by a special Forster twin-cylinder engine which developed nearly one horsepower. Four separate receivers using RK62 tubes were fitted, connected so that one radio channel each was used to give right or left rudder, and up or down elevator. Though he didn't fly the monster at the meet, DeSoto was awarded second place after he had demonstrated that this equipment was fully workable.

In 1939 at the 12th Nationals, again held in Detroit, the first demonstration of what radio control could really do was given by the Good brothers, who made turns at will, figure 8's and ended with a landing only 100 feet from the take-off point. This flight clinched first place for them. Although the *Big Guff* carried twin-channel equipment for actuating both rudder and escapement (it was, in fact, fitted with twin-channel apparatus from 1937 through 1940), only the rudder channel was ever used in competition. Walter had developed a single tube super-regenerative receiver using a type 30 tube—a battery-operated triode—in 1937, and this was later produced commercially. In 1939, the type 30 tube was replaced by the RK-42, a triode of the same type, which had a more economical filament.

This same year several other builders, among them 2nd place winner Joe Raspante, gave convincing demonstrations that R/C model flying had really grown up. There were eleven entrants.

In 1940 the Nationals moved to Chicago, and the Good brothers again topped all comers with a very convincing demonstration, using exactly the same plane and radio equipment they had employed in 1939. Their task was made more difficult by the fact that their transmitter was stolen the day before the radio event, forcing them to toil through the night at a Chicago radio laboratory to build the transmitter that was to put them in first place again the next day.

Also, this same year another contestant, C. H. Siegfried, now well-known in R/C circles, placed high. "Siggie" took second with a large monoplane carrying a complex-sequence-selection control system which he operated by

Fig. 7

means of a telephone dial at the transmitter. Only a single radio channel was used, but the control unit in the phone enabled high-speed selective operation of rudder, elevator, motor speed and motor cut-off; moreover, right or left movement in any desired degree could be had.

In 1940 there were again about a dozen entrants in the National Meet, and almost all of them flew and collected at least some points.

The last prewar Nats was the 14th in 1941, still in Chicago, and at this meet a newcomer took over first place, using a control system not seen previously. Jim Walker, already well-known for his work in U-Control, topped the field of 26 entries, flying a very attractive 7-foot-span tricycle-gear monoplane (Fig. 5), a rather small size in relation to radio planes normally flown up to that time. Walker's control utilized an ingenious fluid clutch, driven by a motor that was directly controlled by the receiver, and the result was what is termed proportional control. In other words, the rudder surface could be made to follow exactly the movement of a control at the transmitter. The rudder would move either right or left at any instant, and to any degree selected by the operator as he moved the ground control stick.

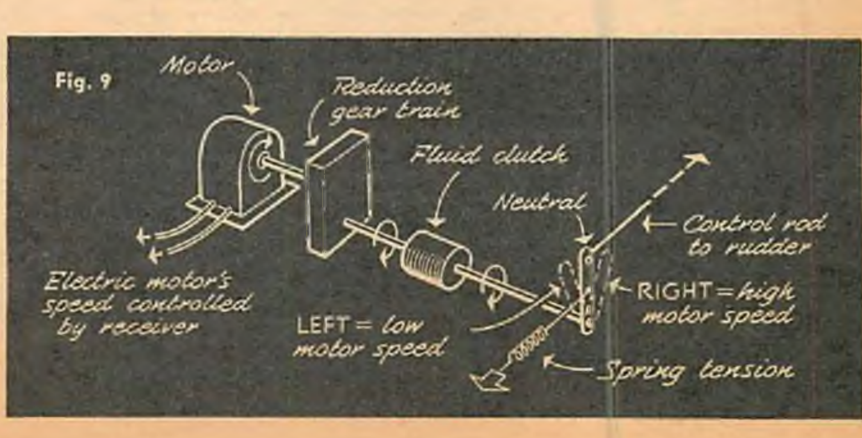
Fig. 8

Though better means have since been found to do the same job, the elements of Walker's 1941 system are shown in Fig. 9. If the electric motor were operated at medium speed, the fluid clutch would tend to rotate the control arm toward the right, and spring tension would be adjusted just to counteract this, thereby holding the arm in the center, or neutral position. If motor speed were decreased, the spring action would predominate, thus giving left rudder; increased motor speed would produce various degrees of right rudder.

Control of the motor speed was a tricky proposition, but Walker had the system balanced to perfection, and made some fine flights, while demonstrating beautiful control in taxiing on the ground. A second radio channel was utilized to operate a two-speed timer on the motor.

Several other flyers with complex controls appeared at the 1941 meet, including Siegfried with his rotary selector system. A group of modelers from Purdue University brought a 12-foot-span ship which carried a 14-tube superheterodyne receiver! Audio-selection made possible the use of five control movements, but the ship was kept grounded by windy weather.

The war years saw great strides in radio control, though not in the model field, since R/C flying by civilians was banned. Many thousands of radio-controlled target planes (Fig. 1) were used by the Armed Services as an aid in gunnery practice. They included the OQ series, no larger than some of the planes flown at the Nationals (and, in fact, originally developed from civilian R/C model planes by Reginald Denny, the movie actor, who had a great interest in model aviation—remember the Dennymite engine?), and larger jobs all the way up to radio-controlled B-17's



used as gigantic guided missiles.

The first postwar Nats at Wichita in 1946 saw a rather small gathering of contestants who were somewhat hampered by freakish weather conditions. However, the radio boys put on a good event, and, in fact, outshone a group of Service men who were on hand to demonstrate the Army target planes. Jim Walker again came out on top, nosing out veteran R/C contestant Siegfried who was second.

Walker flew a neat semi-scale ship, equipped with tricycle gear and illustrated in Fig. 2. He had improved his proportional control system a great deal since winning with it in 1941; two radio channels were used, ending up in RK-61 receivers in the plane. Full control of elevator and rudder was available, but Jim usually flew with proportional rudder and motor speed controls (the latter accomplished with a two-speed timer) and obtained very fine results from this combination.

In 1947 at Minneapolis, the Good brothers returned to active Nationals competition, as did Chet Lanzo. The Goods won handily this time, as one after the other of the veterans, including Siegfried, Lanzo, and Walker, suffered various mishaps. The latter was ahead in points up to the last day, but then had a disastrous crack-up which could not be repaired in time to finish the meet. The Goods were still flying old reliable *Guff* but had only a single receiver in their plane. All the radio equipment they used was of commercial manufacture built from their own designs. They had a new gimmick, a thermal motor cut-off that enabled them to stop the motor at any chosen time.

Some new faces appeared at this meet, notably a group of modelers from Indianapolis, who, though they were attending the meet "just for experience," still managed to take third place. These flyers, Joe Hughes, Vic Brown, and Gene Foxworthy, have done very well since: Foxworthy was third at the 1948 Nats, and won that event in 1950 (Fig. 6).

With the move to Olathe in 1948, a real top grade radio event was seen. Fourteen entrants actually made official flights, though many more were on hand. Both winners Jim Walker and runner-up George Trammel put on breath-taking exhibitions which included consecutive loops and other complex maneuvers made possible by the fact that both had full rudder and elevator control. Walker flew a new ship of shoulder-wing design, and incorporating what might be called a pulse-selection system. Only a single radio channel was required, the receiver being connected to an ingenious selector unit driven by a small electric motor. Practically instantaneous selection of rudder and elevator movement in several degrees could be had; motor speed control was also included.

Second place winner Trammel flew with what should be termed the "poor man's proportional control." In place of the complex motor-drive units employed in the past by Walker and others to operate the control surfaces, George had developed very simple and lightweight "actuators." He had these fitted to rudder and elevators, and by use of dual-channel radio equipment could really make his plane perform.

The R/C Event in 1949 at the 18th Nats in Olathe was notable for the fact that Walt Good at last entered a new design in the competition! His *Rudder Bug*, with which he took first place, was a big success, and as seen in Fig. 7 is a very attractive design, with many features intended expressly for R/C flying.

As usual, Good used rudder only, escapement-actuated, but he flew with the same smoothness and sure touch that had enabled him to do so well with *Guff* in the past. A new note was added, in that he used what is now generally called a "Beep-Box"—a motor-driven transmitter control box which "remembers" the proper sequence for operation of the escapement.

Second-place winner was Paul Johnson, who had flown in his first Nats the year before. Paul used a sort of semi-proportional control which gave him instant left neutral or right, with no sequence involved, though there were no intermediate positions available.

The 19th Nationals at Dallas had the biggest radio event ever—about 40 entrants! This meet saw the first use of equipment in the so-called "Citizens Band," which equipment can be operated legally by anyone without the need for possessing an Amateur license. Gene Foxworthy used the 465 mc. equipment in his ship, with escapement operation of rudder only, to win the event. In addition to 465 mc., and the 50 mc. Amateur Band used by most of the other entrants, an experimental 27 mc. transmitter licensed to the A.M.A. was in operation.

Several flyers gave it a try, and Jim Schenck, using this transmitter and a Beep-Box, took second place; he flew a *Rudder Bug* with escapement-operated rudder. 1950 saw the first flying of the Navy-sponsored Radio Control Bomb Dropping event, won by Schenck.

In the 1951 R/C National event, A.M.A. rules were adhered to strictly, and F.C.C. rules were followed likewise. Not since 1948 had the F.C.C. been "in attendance" at the Nats, but they were there this time! However, as far as we could learn, no one who really wanted to fly was prevented from so doing because of their forbidding presence. Several flyers who had no ham licenses *really* flew by radio remote control! They called out signals to a ham operator who then pushed the control button. (When, oh when, are we going to be able to stop such foolishness and fly with a genuine license-free band, as do the modelers in England, South Africa, and other "enlightened" countries!)

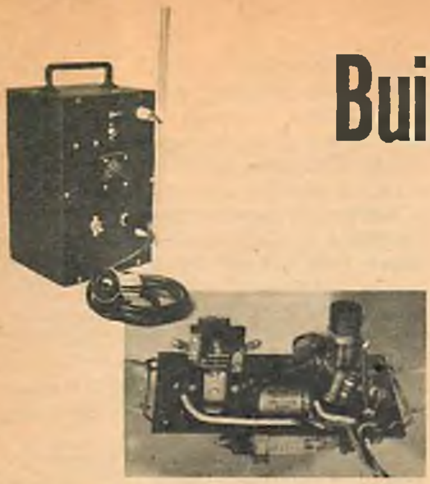
This year marked the first widescale use of Citizens Band (465 mc.) equipment at the Nationals, with a dozen or so flyers employing it. Even these transmitters had to be checked for frequency before use: all were passed as O.K., however. (In fact; we did not hear of *any* off-frequency operation.) It is unfortunate that none of the A.M.A. Experimental Licensed 11 meter transmitters were in use. Aside from Citizens Band activity, all other flyers were on the old faithful 6 meter band, though we heard rumors of one who worked on the 10 meter band to avoid possible interference he had experienced before.

The flying in '51 was practically continuous and of high order. A study of some of the score sheets shows that many received points for such items as "Motor Cut-off by R/C", and almost all the top placers did good Immelmans, chandelles and loops, while several executed two consecutive loops or rolls. Spot landings were generally good with many flyers scoring 40-45 points (50 is tops for a perfect spot).

Despite this high grade of flying, most men still used rudder only, although quite a few had motor 2-speed attachments of one sort or another. Escapement operation is still by far the most prevalent, but there were several pulse control systems flying, and several more that didn't fly, though not because of the control system. Top man Walker used the same positive-position selector system he had at the last two Nats; second to fourth place planes were all escapement-steered, while a pulse man took fifth.

In addition to the systems mentioned, we saw audio-tone control, Rudevator, Motorudder, and last but by no means least, the rotary selector equipment of C. H. Siegfried. "Siggie" was the hard-luck man of *this* meet; he started out with several flat tires, and when these were repaired and he had just about gotten his huge ship ready to fly, the only serious rain squall of the entire week forced him to disassemble frantically before the downpour struck. Next, his ship taxied into a parked car during an attempted take-off, damaging the nose. (*Continued on page 96*)

"His receiver went out—so he has to fly it himself."



Build Your Own Receiver-Transmitter

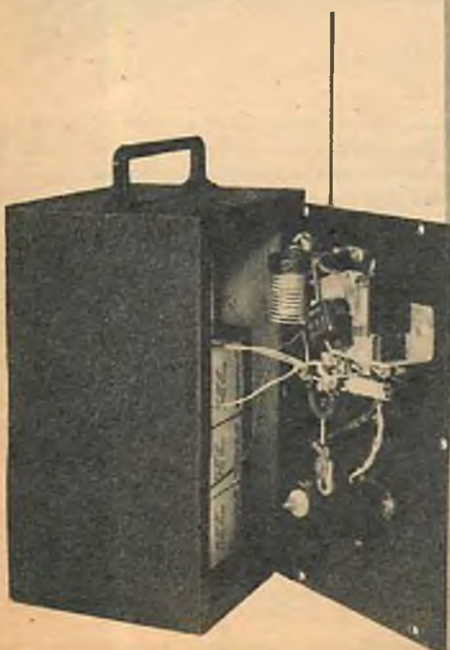
Operate your models by radio control with these two units designed for the Novice Class amateur radio fan

■ We have covered the history of modelplane R/C development. Let's look now at the legal side of R/C operation. In other words, what must you do to work your equipment under Federal Communications Commission rules? Radio Control comes under the category of Amateur Radio and you must have both an Amateur Radio Station license and an Amateur Operator's license. The former is simple; it's the latter that causes all the trouble.

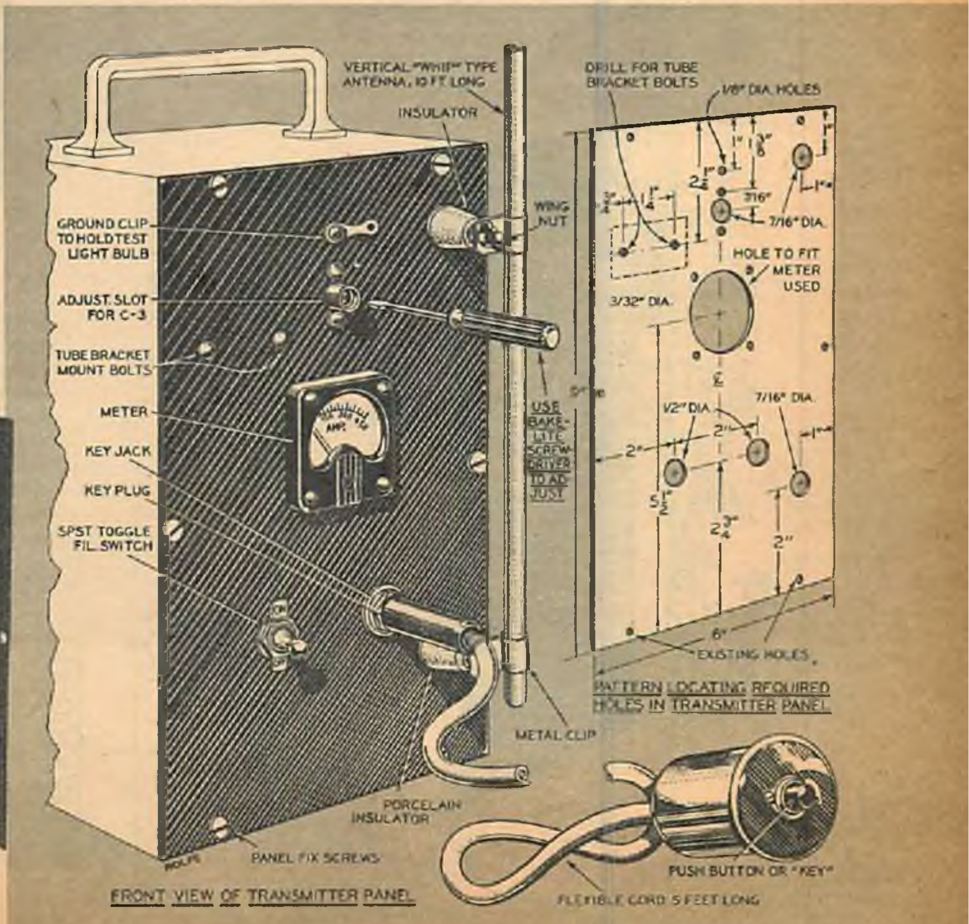
Silly as it may seem to modelplane flyers, who have no interest in communication via radio but just want to operate their plane a mile or less away, it is necessary to pass a code test plus a written exam in communication theory and law before they can legally fly their planes under Radio Control. This restriction has held back the development of R/C in this country to a tremendous extent. Proof of this is seen if we look at the impetus given Radio Control in England where flyers were given two genuine license-free bands several years ago. Prior to this, R/C work in England had been practiced only by a very few licensed pioneers; now that *anyone* can get in on the fun, with homemade equipment and no license problems whatever, R/C has made huge strides.

It is true that the A.M.A. has been battling unceasingly to get the same privileges for U. S. modelers that are enjoyed by flyers in England and several other countries, and we are glad to say that some progress is being made. Until there is a true license-free band available here, however, when we can build and operate R/C equipment subject only to reasonable restrictions of frequency and power input, let's examine the possibilities of the various Amateur operator license classes now available.

The simplest license that gives an Amateur operator most of the existing privileges is called the Class B, or General Class license. The examination for this requires a code speed of 13 words per minute (both sending and receiving), plus a written test of simple radio theory and radio rules pertaining to Amateur operation. While there are a dozen or so bands (or groups of frequencies) set aside for exclusive Amateur operation, practically all R/C is conducted in the 6 meter band (50-54 megacycles). This was the band in which the early R/C experimenters started their work, and R/C enthusiasts have stuck to it ever since.



This is the transmitter. All parts are mounted on the front of the case. The tube is a Raytheon IS4, the crystal a Petersen Type Z5.



The F.C.C. announced two new classes of Amateur licenses that went into effect on July 1, 1951; both are of interest to radio controllers. The simplest is called the Novice Class and for this you must pass a code test of only 5 words per minute, plus a simplified theory and law quiz. The Novice license is our best bet so far for R/C operation. Though good only for one year, and non-renewable, it's an ideal place to start. The Novice license is restricted to operation in only three of the many ham bands, and only in certain portions of those. Also, the power is limited and the transmitter *must* be crystal-controlled. These restrictions do not affect the worth of this license class for Radio Control, however; it is the best thing yet for legal R/C work in this country.

A second new license is called the Technician Class; the code test here is also only 5 words per minute, but the theory examination is just the same as for the B Class. The Technician license is good for five years and is renewable indefinitely; licensees are extended all Amateur privileges *above* 220 mc. While little R/C work has been done up to now in this part of the frequency spectrum (aside from that in the "Citizens Band" at 465 mc., to be covered in a moment) it may be that this new simplified license will spur R/C activity on the higher frequencies—a very desirable outcome.

There are other Amateur license classes, offering special privileges or covering special conditions, but we won't go into details here, for the Classes mentioned are those of most interest to R/C enthusiasts.

Learning the code is the big stumbling block, of course. You *can* pass the written exam just by memorizing the answers to the questions, but this is a foolish procedure, for you should understand the elements of radio theory in order to keep your R/C apparatus functioning correctly. Actually 5 words per minute is a very slow code speed. Five letters per word is considered average, so you must send or receive only 25 characters each minute—try writing at this speed! The difficulty is simply that you must learn an entirely new means of conveying information.

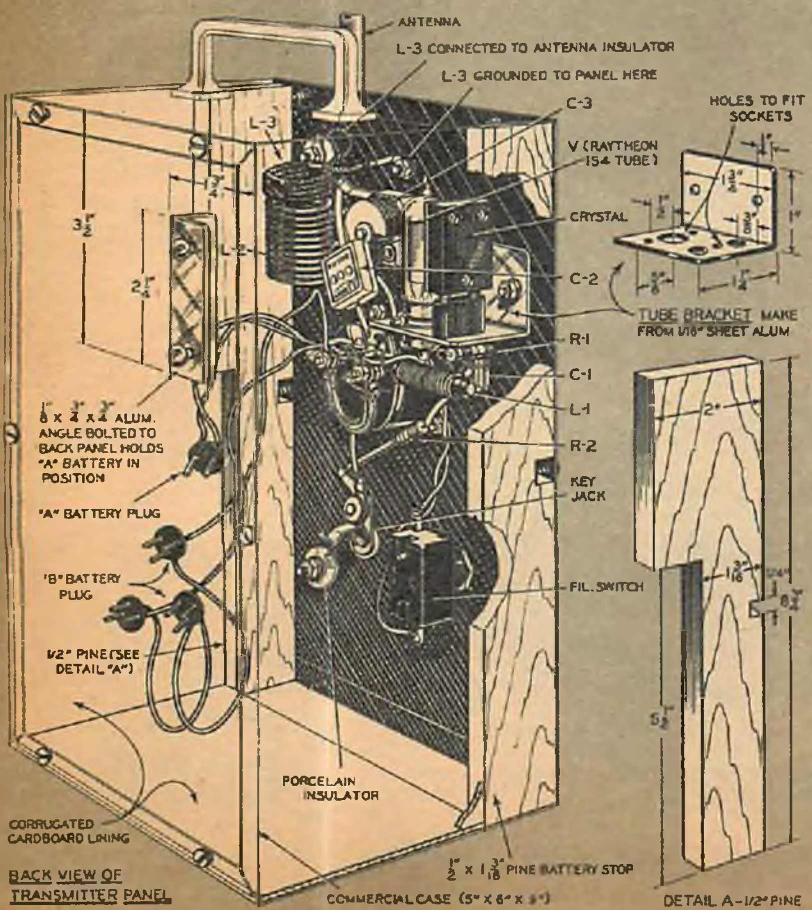
There are several ways to learn the code, or we should say, to increase your speed once you have learned the code. Regardless of how you do this, however, you must first memorize the letters. After you've done this you can team up with a friend, one keying a buzzer while the other receives. This will give both persons practice in receiving and sending—a real necessity when you recall that the code exam includes *both* receiving and sending ability.

Receiving speed may be gained by listening to radio stations on an all-wave receiver, or by practice with "code machines" such as the Instructograph, which you can set at any speed you desire. Some of these code machines can be rented at a nominal cost, an ideal way for several persons or a club to pick up code speed.

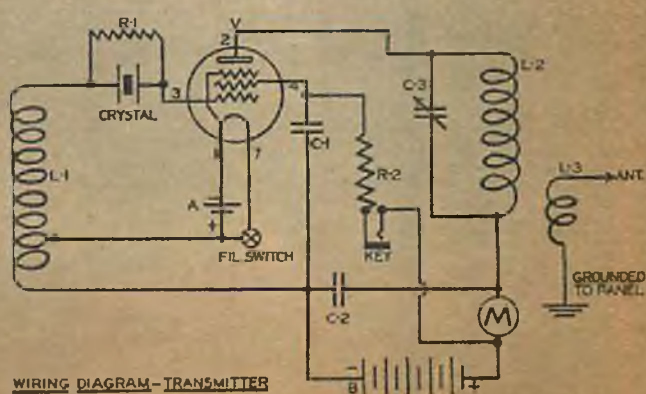
There are, of course, scores of radio schools throughout the country that give radio theory and code courses of any complexity you desire.

No one who intends to take an Amateur license exam should be without "The Radio Amateur's License Manual," available for 25¢ from American Radio Relay League, West Hartford 7, Connecticut, or from most large radio supply houses. In addition to many hints on learn-

The Transmitter:



Cutaway view of transmitter (left) should be of great assistance. Author has not gone into detailed hole-by-hole and wire-by-wire construction analysis. It must be assumed that the reader has some knowledge of radio building and fundamentals, if he has or is about to obtain a Novice or other "Ham" license. In the case of complete unfamiliarity with the subject the modelplane enthusiast desiring to get active in R/C work is urged to link forces with a nearby licensed radio "ham."



ing the code, this manual lists the requirements for every class of license, the licensing offices of the F.C.C. all over the country, radio laws, and answers to typical theory examination questions.

The foregoing covering license problems applies only to Amateur Band operation. If you wish to build your own transmitter, either from parts you collect together yourself, or from one of the commercially available kits, you *must* have an Amateur license to operate it legally, regardless of the amount of power used, the distance you want to cover, or the intended use. For those who don't want to bother with a license, yet want to stay within the law, there is still an out, however. We have previously mentioned the Citizens Band, and this is your spot.

Note, however, that you must use a commercially built and F.C.C. approved transmitter (there is only one on the market now—the Citizen-Ship unit); you are not allowed to service or adjust the transmitter, even to the extent of replacing a burned-out tube. The tube used in the transmitter, however, has a life of many hundred hours, and you can, of course, install new batteries as required. No license is required for operation of an approved transmitter in the Citizens Band. You just fill out a very simple form, send it to the F.C.C., and a permit is issued without charge. (There is no charge for any class of Amateur license.) If you are technically able to do so, it is quite legal to build your own receiver for Citizens Band use. The R/C portion of the band, incidentally, is a spot frequency at 465 mc.

There is a possibility that the efforts of the A.M.A. will win us a frequency in or near the present 11 meter band, which covers 26,960 to 27,230 kc. Tests are now being conducted on 27,255 kc. in several sections of the country with a group of transmitters licensed to the A.M.A. You will probably see these transmitters in operation at some R/C meets.

If and when we gain a license-free R/C band, wherein anyone can legally build and operate his own transmitter, it will undoubtedly be in the vicinity of 27 mc., as are the free bands in England and other countries. We present plans for a receiver and transmitter designed to be legally operable in the present 11 meter Ham Band, by holders of the Novice Class license.

The transmitter is very little more complex than those used in present-day R/C work on 50 mc.; such added complexity as we have is necessitated by the fact that the F.C.C. requires crystal controlled operation by Novice licenses. The transmitter is set to one frequency (unless you have several crystals) and it is necessary therefore to vary the receiver tuning as required.

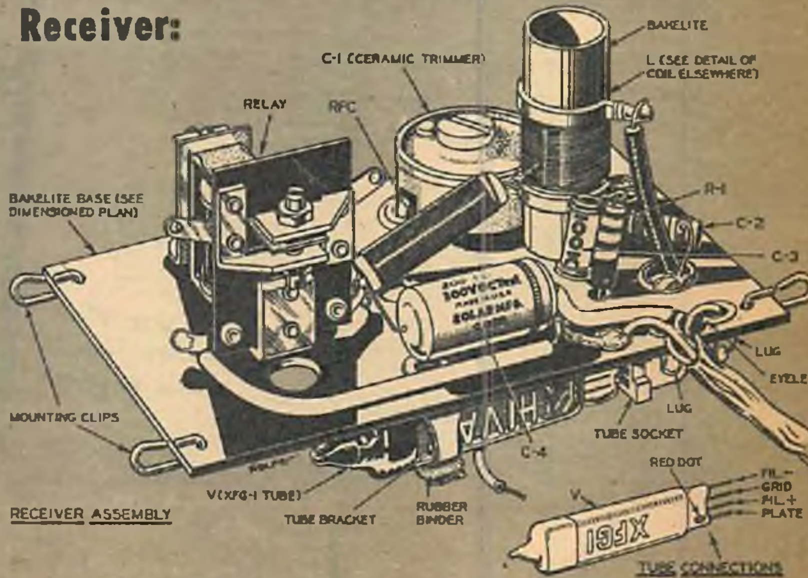
A standard battery-type receiving tube, the 1S4, is employed, and the power, while very modest, has been found adequate for normal R/C operation. All batteries and other parts fit in a commercial 5"x6"x9" case, while the antenna is of the vertical "whip" type, about 10 feet maximum length.

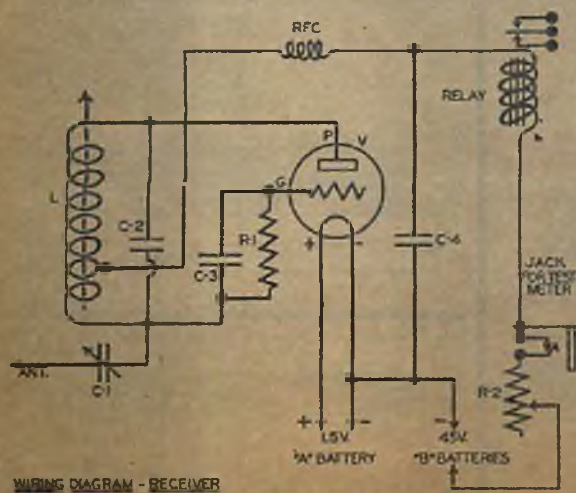
All transmitter parts are mounted on the front of the case. The tube and crystal sockets are fastened to a small aluminum bracket, while other components are bolted directly to the panel. We used an ICA #3801 Steel Utility Case, and location and size of principal panel holes are shown herewith.

A meter is (*Continued on page 78*)

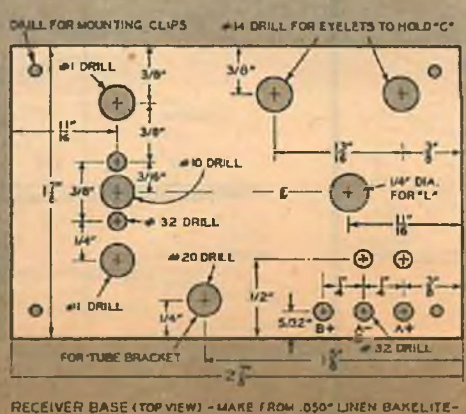
Underside of receiver. Unit features English XFG-1 tube distributed in America by Berkeley. American Telasco imports the E.C.C. type 5A sensitive relay.

The Receiver:

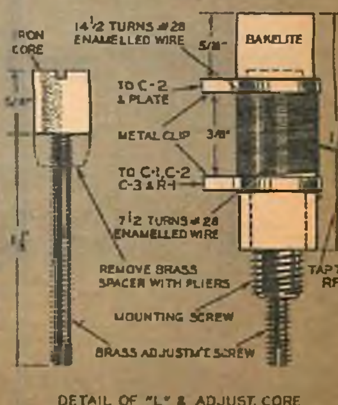




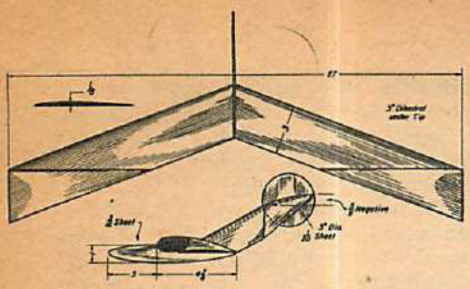
WIRING DIAGRAM - RECEIVER

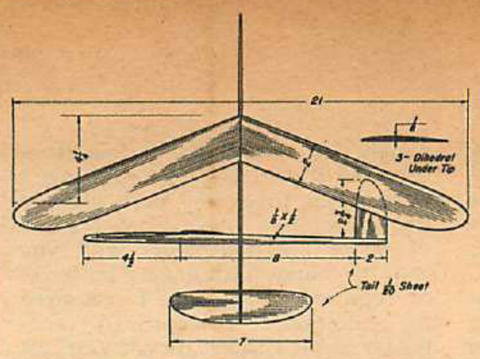


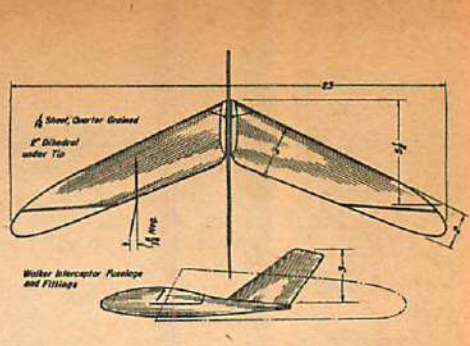
RECEIVER BASE (TOP VIEW) - MAKE FROM .050" LINEN BAKELITE-



DETAIL OF "L" & ADJUST. CORE

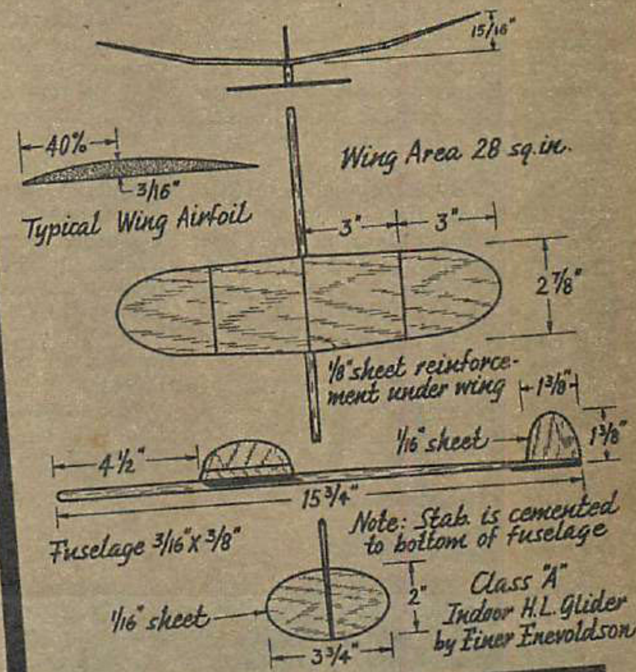


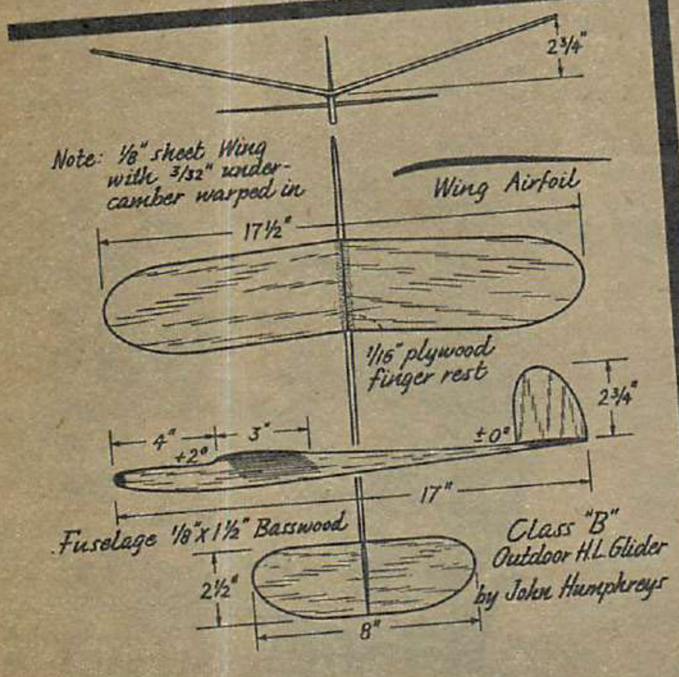




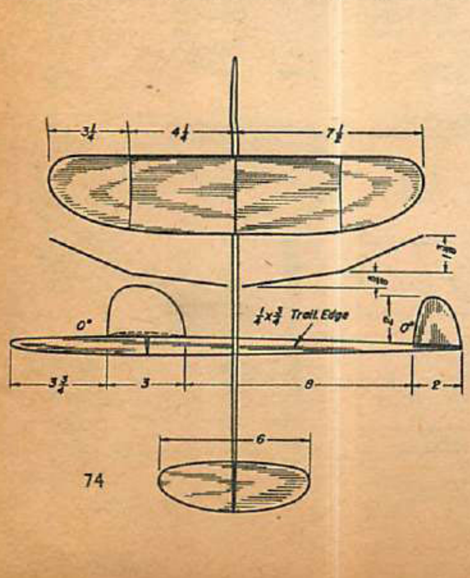
gone with the wind

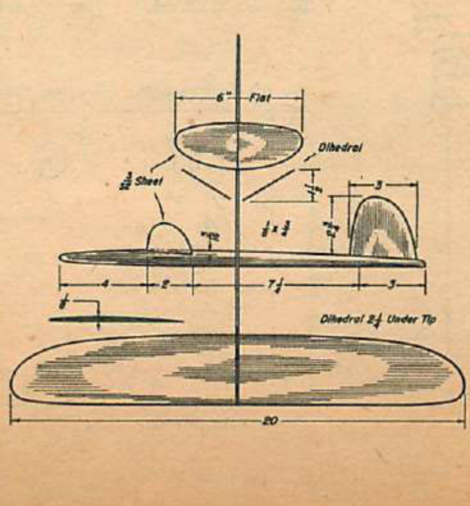
A brace of hand-launched gliders for indoor and outdoor fun and contest work

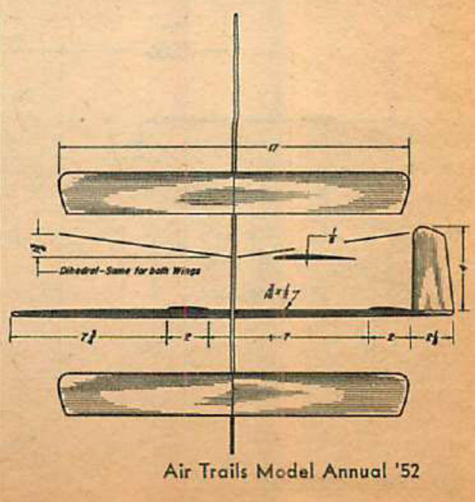




■ Although contestants have demonstrated it is quite possible to fly an indoor glider outdoors with considerable success, generally speaking the indoor glider is a light, fragile thing like Mr. Enevoldson's creation (above). The more rugged outdoor type is illustrated by John Humphrey's record setter. The other designs are less conventional suggestions from "AT" readers.







Airlines use Speed-O-Laq . . .

NORTHWEST AIRLINES
EASTERN AIRLINES
MID-CONTINENT AIRLINES

because they insist on the Best!

DO YOU? Get SPEED-O-LAQ for your model plane and you get the same high quality performance enjoyed by the airlines! SPEED-O-LAQ Dope fulfills *every* model aircraft requirement . . . and then some! Airlines that insist on the *best* use SPEED-O-LAQ Dope under flight. It's the only complete line of authentic colors.

10¢

Ask for SPEED-O-LAQ Cement, too!
At your hobby counter

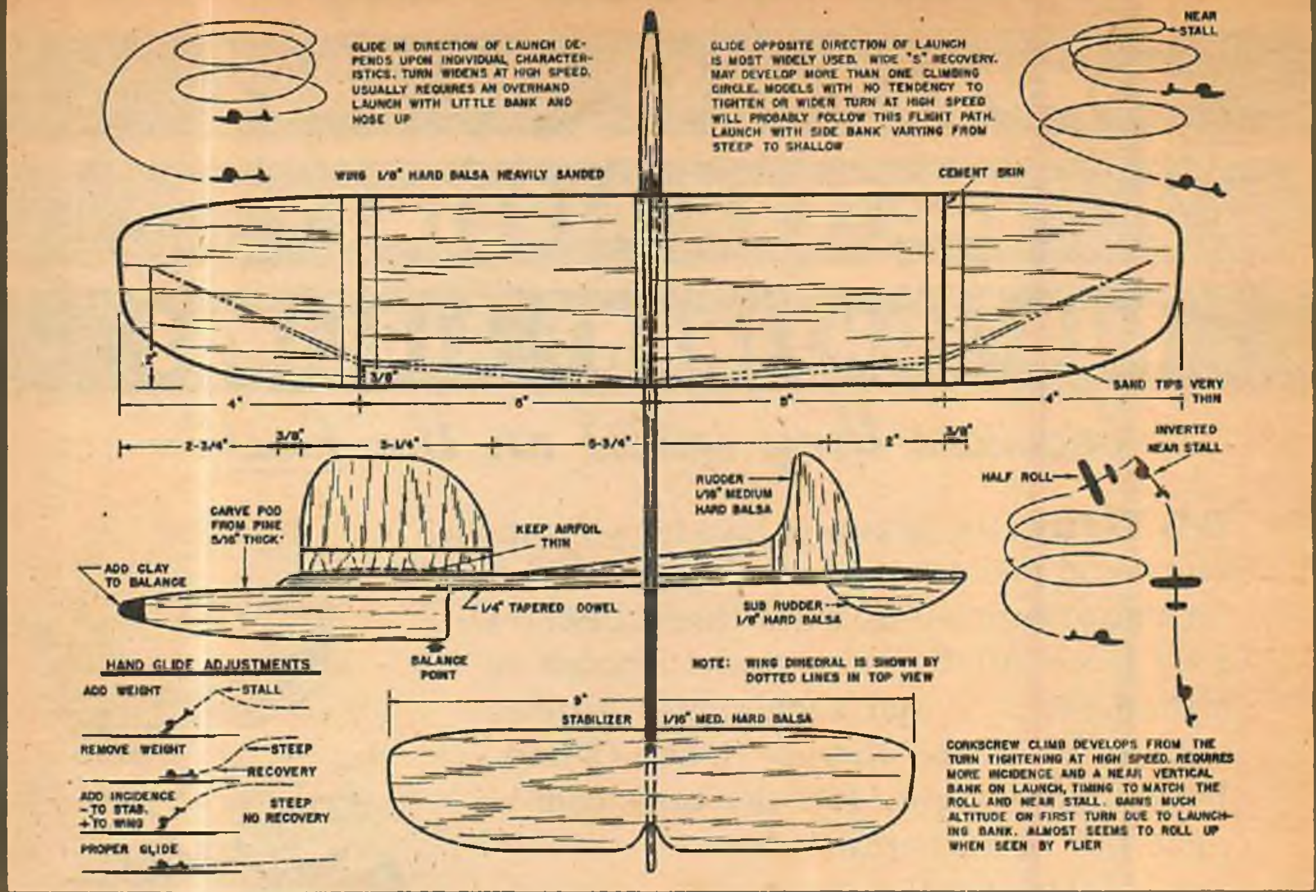
SPEED-O-LAQ
FLIGHT TESTED
MODEL AIRCRAFT DOPE

SPEED-O-LAQ

SPEED-O-LAQ PRODUCTS CO., INC.
2386 Wycliff St., St. Paul 4, Minn.

WHISTLE WAGON

By GERALD WAGNER



Rcvr-Xmtr

(*Continued from page* 73)

a great convenience, but there is not much space available, and a small one is necessary. We employed a surplus 1½" square job with a scale marked 0-450 amps! It is really a 10 ma. meter movement and we connected sufficient resistance wire across it to give a full scale reading of 45 ma. Actually, a meter of about 0-25 ma. range is just right.

The meter is connected to read only the plate current of the 1S4. Since the circuit is keyed in the screen grid lead, screen current can be checked at the key jack.

Mount and wire the parts carefully. Coil L1 is supported only by its leads, as are L2 and L3. The latter connects to the upper antenna insulator and to a lug on the front panel; scrape the paint clean under this lug. The lower insulator serves only to support the antenna, so the lower 7 in. of the latter is not used.

When all connections have been made and checked, hook up the batteries and turn the switch on. If you have a milliammeter of 0-10 or so range, connect it to the key plug. Turn C3 through its full range (it has no dial, as it should be set at the correct spot and left there). The plate meter should read about 22 ma. near the full capacity position (this indicates the tube is not oscillating). As you reduce capacity to around the halfway position, the meter will *suddenly drop* to about 5 ma., showing that the crystal is oscillating, and all normal operation is near this half-capacity setting.

You can check for output by connecting a #40 pilot lamp (6-8V, .15 A, brown bead) from the antenna post to the panel. Re-set C3 until this bulb glows brightest. If you get a good bright yellow glow, your transmitter is ready for business.

The antenna should be about 9½ ft. long from the top antenna post, or 10 ft. overall. It must be a light one or the transmitter will tip over in a strong wind. With the antenna extended, retune C3 for minimum plate current, which shouldn't be higher than 13 ma. If it is, or if you get no recognizable dip in plate current, move L3 a bit away from L2 and check the current again. With everything working correctly, plate current should be from 12 to 13 ma., and screen grid current 3.1 to 3.4 ma.

You may find another point, near minimum capacity of C3, where your test bulb will light; avoid this spot as it is not the correct frequency. If the parts are made and mounted as specified, the correct operating point will come near the midpoint of C3. If you have a friend owning a frequency meter, have him check your output, just to be sure.

Due to the type of antenna used, it is best to adjust C3 while the transmitter is sitting on the ground or on a car top or hood. Always use it in this same position thereafter; if it is placed on a wooden table the tuning will require rechecking and L3 will probably have to be re-set. In fact, we find that the plate current at resonance can only be brought up to 13 ma.—even with L3 as close as possible to L2—when the transmitter is on the ground.

You will need a flexible cord of 5 ft. or so with a plug at one end and some sort of push button at the other for keying purposes. When using the transmitter, do not hold this cord too near the antenna; don't stand right alongside of it yourself, as this varies the transmitter plate current somewhat. We usually set C3 just a little toward the *low capacity* side from the point of minimum plate current; this assures that the transmitter will not stop oscillating if we inadvertently touch the antenna, or hold the key cord near it.

This transmitter is relatively low powered compared to the average transmitter used for R/C today. The plate input is only 1.7 watts, and the power put into the antenna is about half this. However, tests have shown the transmitter power is adequate for R/C purposes; many R/C flyers make little attempt to attain peak transmitter efficiency or to be certain their transmitter is properly coupled to the antenna, and that the latter is of correct length. Under such conditions it is wise to use considerable transmitter power input so that even though a lot is wasted, enough will be radiated to assure adequate receiver action. It has been proven that, *given* a well adjusted transmitter and receiver, a tiny fraction of a watt into the transmitter will give perfect receiver operation as far as you can see the plane.

It is well to mention that the transmitter tube is operated somewhat over its normal rating in this circuit. However, we had it going literally for hours at a time during tests with no bad results; but, do *not* leave it turned on for long periods with the plate current over 13 ma., or with no antenna or other load connected, even with considerably lower plate current. For testing in the

(*Continued on page* 86)

THE PAYOFF IS IN THE PAYLOAD!

PAA LOAD EVENTS

are loaded with fun

Ask the Champions

PAA Load Class ½A,
Junior-Senior division winner:
Gene Jackman
Oklahoma City, Oklahoma. 9:06.8

PAA Load Class ½A,
Open division winner:
Frank Ehling
Jersey City, New Jersey. 15:31.4

PAA Load Class AB,
Junior-Senior division winner:
Michael Cook
Granville, Ohio. 3:36.6

PAA Load Class AB,
Open division winner:
Herbert Kothe
Grand Prairie, Texas. 15:19.0

PAA CLIPPER* CARGO,
Age class combined winner:
La Mott Randolph
Dallas, Texas. 0:40.4—14½ oz.

● Payload events, first sponsored by Pan American World Airways in 1948, have become an outstanding free flight competition at numerous local and regional meets—and a highlight of the Nationals.

These exciting contests provide model flying that brings out the basic purpose of aviation itself—*to carry a load.*

PAA Load Events, responsible for many new designs and flying techniques, offer trophies and cash prizes to the winners. Here's where sheer inventiveness is the mark of a champion.

You could be a champion in '52 . . . why not get started on your job today?

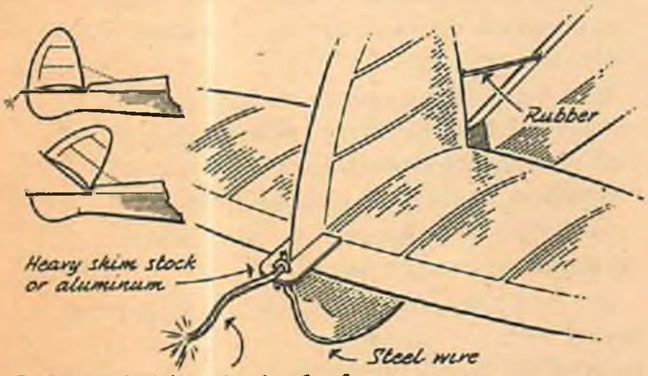
For rules and specifications for 1952 PAA Load Events, write to: Educational Director, 28-19 Bridge Plaza North, Long Island City 1, New York.

*Trade-Mark, Reg. U. S. Pat. Off.

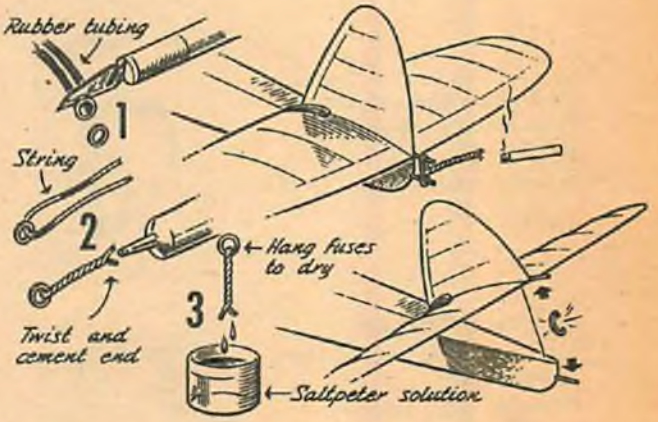
PAN AMERICAN

WORLD'S MOST EXPERIENCED AIRLINE

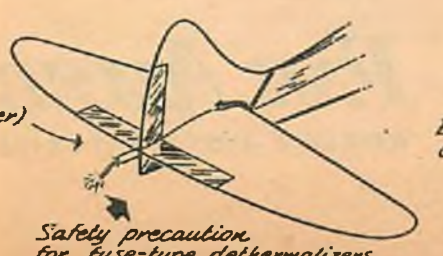
dope on dethermalizers



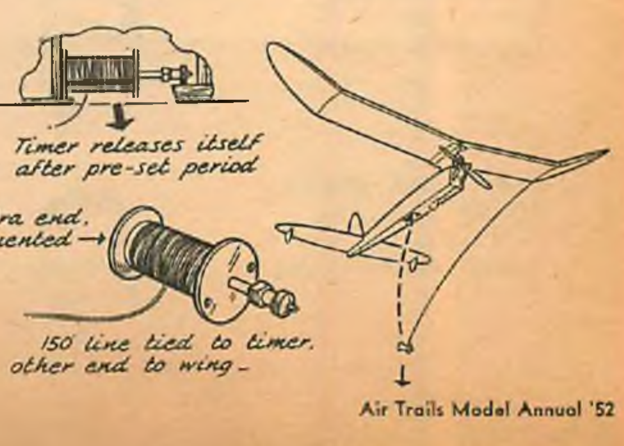
String soaked in saltpeter for fuse



This type of dethermalizer fuse is considered more reliable, more even burning by members of the famed NACA BrainBusters Club. String is twisted through some thin-walled rubber tubing. Pegs on rudder and fuselage are spaced to give tension. Fuses are made in batches to keep them uniform. Other examples here are of interest.

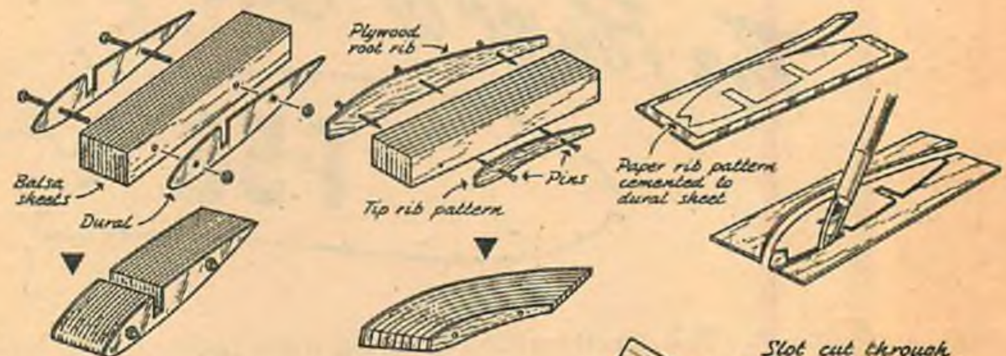


Safety precaution for fuse-type dethermalizers by Ted Jones, Oxford, Pa.

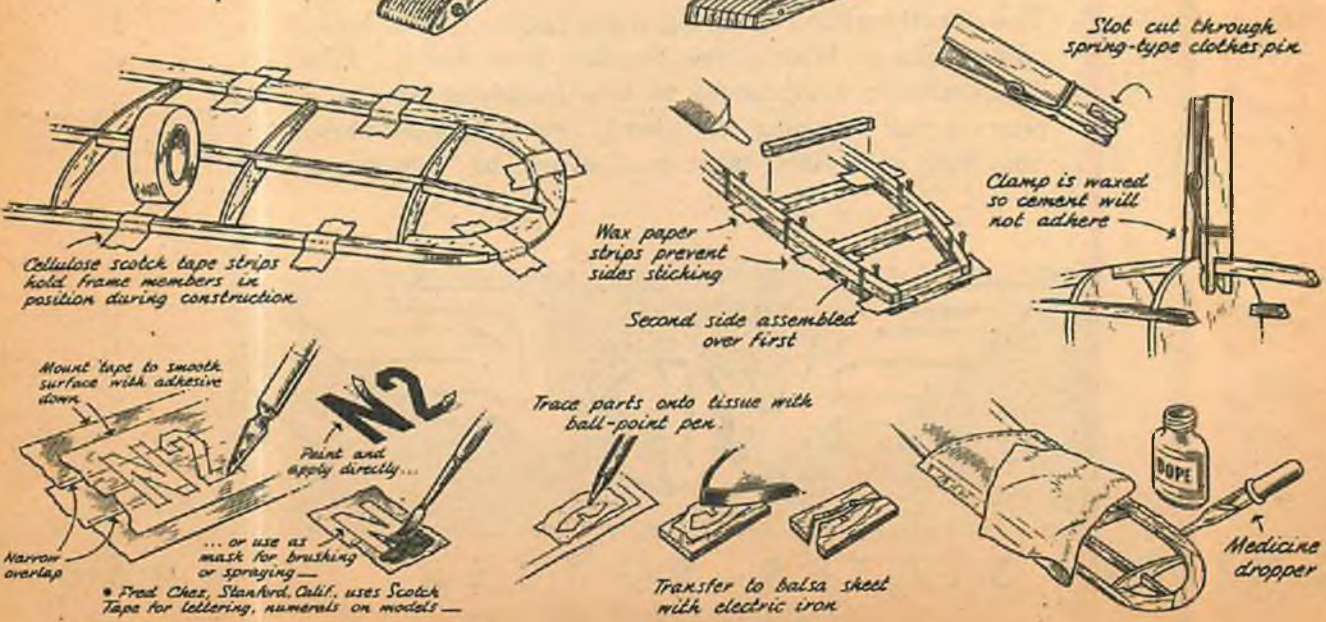


150 line tied to timer, other end to wing.

handy hints



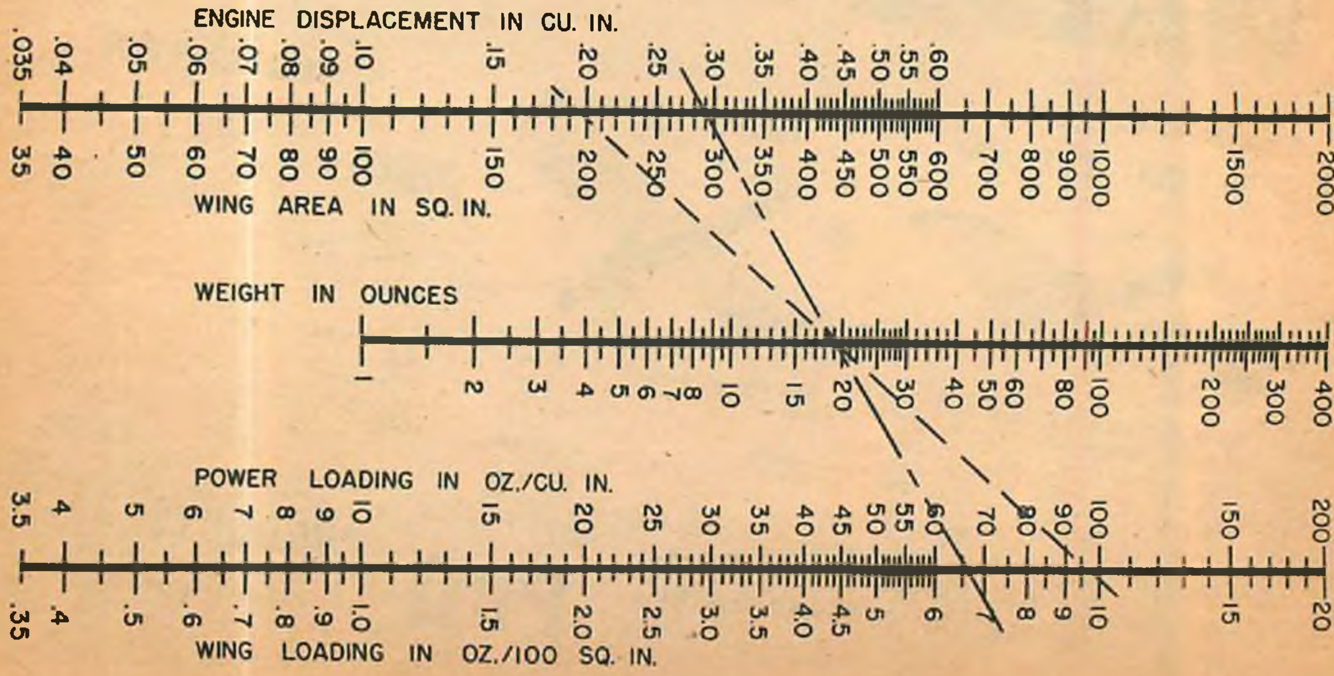
Balsa sheets
Dural
Plywood root rib
Pins
Tip rib pattern
Paper rib pattern cemented to dural sheet



Slot cut through spring-type clothes pin
Cellulose scotch tape strips hold frame members in position during construction
Wax paper strips prevent sides sticking
Second side assembled over first
Clamp is waxed so cement will not adhere
Mount tape to smooth surface with adhesive down
Paint and apply directly...
N2
Narrow overlap
... or use as mask for brushing or spraying—
• Fred Chez, Stanford, Calif. uses Scotch Tape for lettering, numerals on models—
Trace parts onto tissue with ball-point pen
Transfer to balsa sheet with electric iron
DOPE
Medicine dropper

Wing and Power Loading Nomograph

WING LOADING: Locate area on left line and plane's weight on center line. Connect two points and extend straight line across right graduated line. Intersection point gives wing loading in oz. per 100 sq. in. Example (dotted line), plane with wing area of 196 sq. in. and wt. of 19 oz. has 9.75 oz. per 100 sq. in. wing loading. POWER LOADING: Locate engine displacement on left line and plane's weight on center line. Connect two points and extend straight line to right. Intersection point gives power loading in oz. per cu. inch. Example (broken line) plane with motor of .29 cu. in. and wt. of 19 oz. has a power loading of 65.5 ounces per cubic inch.—T. J. McMurray



B

D

A

(*Continued from page* 78)

shop, always use the #40 pilot lamp as a load if you don't have the antenna in place.

For the receiver we selected the simplest possible circuit, built around a so-called "gas tube" designed especially for R/C purposes. Because the American-made RK 61 tube is temporarily scarce due to defense orders, we have used the English XFG-1 with excellent results. The receiver circuit is familiar to every R/C flyer, but the component values have been chosen especially for the XFG-1 and for proper operation on the 11 meter band. We urge builders not to deviate in any way from the circuit values indicated. For one thing, the tuning system we used does not give us as wide a range of frequency shift as does the more common variable condenser tuned circuit; use L and C2 just as specified and you will have a sensitive, yet stable receiver.

Control Research can supply many of the essential parts of both receiver and transmitter. The English tube is available from Berkeley Model Supplies or from most of their local agents, while the sensitive relay we used, the E.C.C. type 5A, is to be had from American Telasco, Ltd.

The layout of the bakelite receiver base is shown here in detail. The hole sizes are those we employed for the various screws, eyelets and lugs in the test receiver. While the holes shown at the left of the base are for the E.C.C. relay, there is room on the base for either the Kurman 13C44, or the Sigma 4-F relays; the E.C.C. job weighs about ½ oz., considerably less than these two.

The best sequence of assembly is as follows: 1. Cut bakelite base to size. 2. Drill all holes. 3. Insert the various eyelets and lugs. 4. Mount C1 by soldering to the two eyelets. 5. Wind L and RFC and fasten L to the base. 6. Solder the tube socket to the four lugs at lower right corner. 7. Mount relay, add C2, C3, C4, and R1 and complete wiring.

Though the tube socket has five holes, only four are required. Cut the tube leads to ⅜" length, and scrape each lead carefully with a razor blade. Don't fail to do this! The leads are coated with a thin invisible lacquer and if you don't scrape it off you will have erratic operation, or complete failure. The tube is held by its leads in the socket, and by a small rubber band around the lug eyeletted to the base. The red dot on the tube signifies the plate lead.

Battery leads are soldered directly to the three lugs at the lower chassis edge, while the control circuit leads connect to the relay lugs. Most R/C flyers use a phonograph jack and plug for the test meter. These are very light and entirely satisfactory, but you will need *two plugs*, one to connect to the meter and the other to be shorted and put in the jack when the meter is not in use.

There is not much to do to get the receiver operating. Hook up the batteries and other units temporarily on your workbench, and attach 2 ft. of wire to the antenna side of C1. R2 should be set to bring the plate current to about 1.2-1.3 ma. C1 is normally used near the low capacity setting; lowest capacity is had with the metalized portion of the movable disc opposite the two mounting holes—rotate the disc about 45 deg. from this position. Turn on your transmitter (with the bulb connected to the antenna post) and turn the core of L with a bakelite or other insulated screwdriver. A position of the core will be reached where the plate current of the receiver dips sharply to about .1 ma. This is the correct operating point, of course.

If the meter needle seems very jumpy with no signal, it indicates that your receiver is too "hot"; simply increase capacity of C1 another 45 deg., shift R2 to bring the plate current back to 1.2 ma., and retune the core of L. You will find the meter needle will be much steadier—the receiver is now more stable but less sensitive.

At this point it is wise to make a full-scale field test. Either mount the receiver in your plane, or place it on a board with the meter and batteries, and shift test work to the nearest open area. *Final tuning of the receiver should be done at a distance of at least one-quarter mile*, and preferably even farther. You cannot tune it accurately close to the transmitter when the antenna is on the latter. Once properly tuned at a distance, however, the receiver will still operate perfectly, right next to the transmitter.

Our field tests were made at a distance of one-half mile. From a normal idling current of 1.2 ma., the receiver plate current dropped to .15 ma.; right next to the transmitter, the current reading was about .05 ma. These figures are with what we consider to be normally sensitive adjustment of C1 and R2. At the half-mile position, when C1 was considerably increased in capacity (the same result could be had by doubling the antenna length and leaving C1 as it has been), the current dropped only to .5 ma.

The relay should be set to open or "drop out" at about .7 ma., and to pull in at .85. All experienced R/C men have their pet relay settings, but these will be satisfactory as a starter.

For flying batteries we suggest two Olin #0918, or equivalent, 22.5 V. units for B, and 1½ V. flashlight cells as large as your ship can conveniently carry for A. For *real lightweight* jobs, two Olin #0915 B's and one Eveready 912 sub-midget pen cell, a total weight of 1.6 oz., will give fair life. The receiver alone, with tube, relay, and battery leads, but less meter jack and R2, weighs 1.8 oz.

Because the transmitter antenna is a vertical, a vertical antenna should also be used with the receiver. A piece of music wire makes a good antenna, and need be only heavy enough so that it doesn't bend back at 90 deg. when the plane is in flight. A moderate backward bend will cause no trouble. It is characteristic of vertical antennas of this sort to operate least efficiently off the ends—in other words, your range will be shortest when your plane is directly over the transmitter. Check this carefully on your first flights to see just how far up you can go without evidence of loss of control.

Well, there is your radio link for legal R/C operation with a Novice license, or with any other grade of Ham ticket. We have found this equipment to be simple and relatively un-fussy to operate.

Receiver Parts List

V. XFG-1 tube, Berkeley Model Supplies. *L.* 22 turns #22 enamel wire close wound on CTC form. Tap 7½ turns from *grid* end. *C1.* 4.5-25 mmf ceramic trimmer. *C2.* 4.7 mmf ceramic fixed condenser. *C3.* 100 mmf ceramic fixed condenser. *C4.* .1 mf 150V paper. *R1.* 3. 9 meg. ⅓ watt. *R2.* 25000 ohm variable, Control Research. *Relay.* ECC type 5A sensitive relay, 4500-5000 ohms coil, American Telasco Ltd. *RFC.* Form ¾" x 5/32" diameter wound full of #34 en. wire. *Socket.* Cinch #2H5 sub-miniature socket. *Meter plug and jack,* Control Research.

Transmitter Parts List

V. Raytheon 1S4. *Crystal.* Petersen Type Z5, about 26,980-27,200 kc. *M.* Plate milliammeter 0-25 ma range. *R1.* 50000 ohm ⅓ W carbon. *R2.* 15000 ohm ⅓ W carbon. *C1, C2.* .005 mf., 300V mica. *C3.* 25 mmf variable trimmer, Control Research. *L1.* 30 turns #22 DCC wire on ¼" dia. bakelite rod; tap 3 turns from lower end. *L2.* 11 turns #14 bare tinned copper wire 1⅛" long, ¾" inside diameter. *L3.* 3 turns insulated hookup wire at lower end of L2. *Ant.* Collapsible aluminum whip, 10 feet long. *Key Jack.* Single circuit midget type—insulated from panel. *Fil. Switch.* S.P.S.T. toggle, Control Research. *Socket.* 7 prong miniature, Control Research. *A batt.* Olin #4816, 1.5V. *B batt.* Olin #6210, 45V, three used in series. *Case.* ICA #3801, 5" x 6" x 9". *Crystal socket.* Cinch #2KB or equivalent for FT 243 holder. *Antenna insulators.* Johnson 135-44. One 2 prong A batt. plug. Three 3 prong B batt. plug. Plug, wire and push button as desired.

Double Whammy

(*Continued from page* 11)

Mount the engine in position as shown, making sure to incorporate the 3½ deg. offset according to the top view. Put cowl back in place after cutting necessary clearance, and assemble the spinner so the front section can be carved to blend in. Finish sanding the cowl to match fuselage, then cut air intake, exhaust slot, and a hole for the needle valve.

With sanding complete, cover front section of fuselage with silk to act as reinforcement in the area marked in plans. The fuselage assembly can be painted with primer or covered with light paper and primed according to the finishing process used.

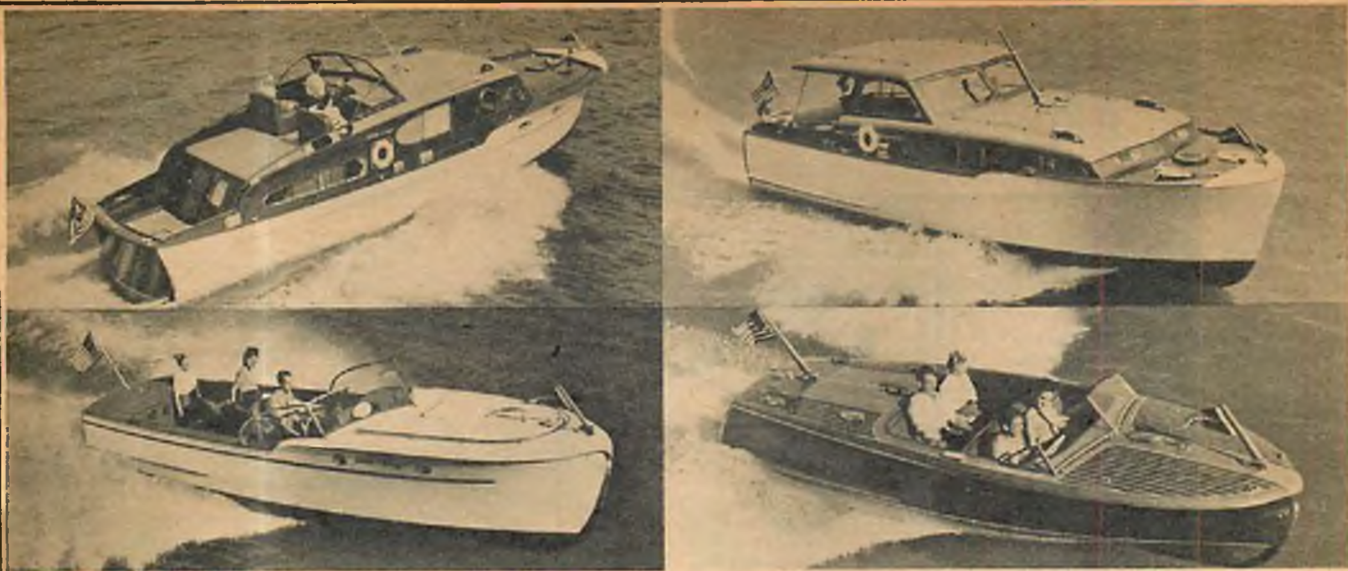
Attach lower wing and landing gear. This procedure must be followed carefully to avoid trouble. Cut two small slots in the bottom of the fuselage so that the front section of the landing gear can be inserted in the lower wing cut-out slipped forward to contact the firewall. Assemble to firewall with "J" bolts. Cut a slot in top sheeting of lower wing so it can be slid over #2 bulkhead, and then fit to fuselage and glue in place.

This leaves the #2 plywood bulkhead extending down into center of wing where rear section of landing gear can be bolted in place. Install this part of the gear and bind to the front section with soft iron wire. After tightening all "J" bolts, cover rear section of the lower wing with 1/16" balsa sheet around the landing gear and cover both wings with heavy paper.

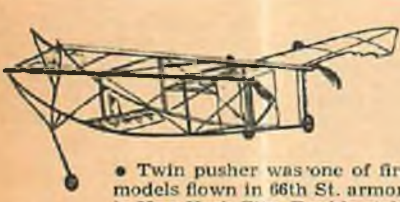
Cut a slot into top of fuselage with a thin knife and insert rudder, gluing it against stabilizer. Attach rear section of rudder with plenty of offset as indicated in plans, then sand and cover with paper or primer. The assembled airplane and upper wing should be painted with the final color coat. Fit top wing against fuselage and glue in place at the center section, making sure it is parallel and equally spaced from the lower wing.

Cut the struts from a thin piece of pine box wood to size shown on the plans as "true length." When glue on

(*Continued on page* 96)



Those Good Old Days!



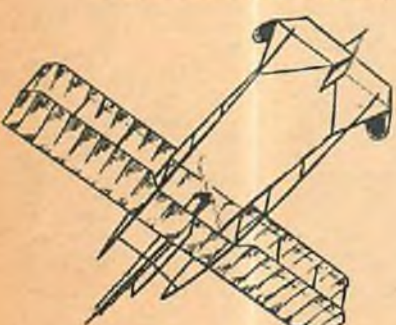
• Twin pusher was one of first models flown in 66th St. armory in New York City. Double stabs.

■ Langley, Wright, Montgomery, Lillienthal, Bleriot and a host of other pioneers all depended upon data obtained from models in flight or in the wind tunnel, to guide them in the creation of their full-scale aircraft.

Americans were not long in accepting the challenge to aviation. A few young geniuses assembled in New York in 1907 to form the New York Model Aero Club. On the membership roster were names of many who are now on aviation's roll of honor, such as Jean Roche, Cecil Peoli, Vincent Burnelli, Percy Pierce, Armour Selley, Frank Schober, Frank Cavanaugh, George McLaughlin, Russ Halderman, John Carisi, Andy Surini.

The New York Aero Club held the first model plane contests in the United States at a large armory at 66th Street near Broadway in New York City. Actually, model activity began with indoor flights, although these models were more of the outdoor type as we know them today. The early models were heavy and clumsy. Many of them consisted of two straight surfaces without dihedral, mounted on a two-stick frame with hardwood propellers at the rear. Ninety per cent were rubber driven but a number of builders with a yen for experiment appeared with models powered by compressed air or steam power plants.

—CHARLES H. GRANT



• Model of a Curtiss Biplane in flight overhead. This sketch is from a photograph that was taken 1909

• An experimental racing tractor built by author, flown, '09. Cambered lifting stabilizer.

• Tandem tractor "Langley" monoplane by Frank Schober was a 1908 winner. Truss braced motor stick and bamboo skids.

• Rubber powered pusher, 1910. A simple hydroplane, it used a birdlike wing structure.

• Twin tractors with I-beam motor stick. Holes in stick to save weight. Beaucoup bracing.

Mulvihill Trophy Winner

By BOB BIENENSTEIN

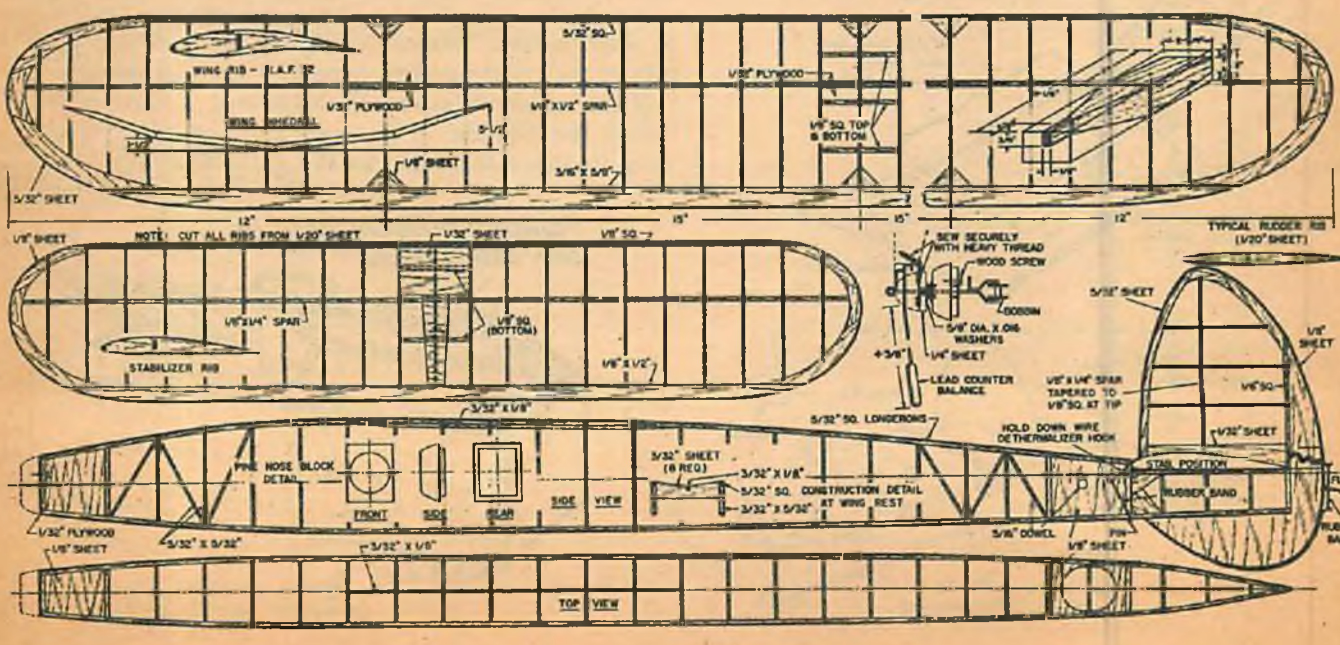
■ This stick job was designed with one thought in mind: the need for a consistent contest model that would fly in all kinds of weather and hold up with the best of them. Its contest record is proof enough of its ability to snare top hardware at any meet. Most impressive wins were the taking of first place for three consecutive years at the Nationals, plus capturing the famed Mulvihill Trophy twice, which is a record in itself.

There have been two changes made since the original model took to the air. A sheet leading edge on the wing was omitted because it proved unnecessary. We also incorporated a tail pop-up which was found to be more effective. It is also simple and fool-proof. Fuselage, wing and empennage construction is conventional, but don't spare the glue.

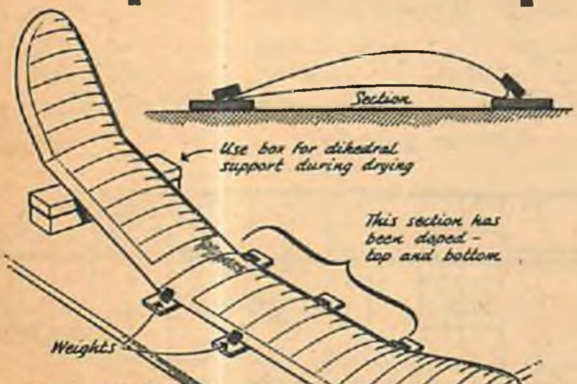
After cutting the propeller block to proper outline, carve in undercamber; get a smooth job. Finish this completely before working on the front side of the blade. When the prop blade is finished, sand and give two coats of clear dope. The spinner is made from layers of ¼" hard sheet balsa glued to the prop center. It is best to clamp this until dry. Then carve to shape. When the prop and spinner are complete, cover the hinge and spinner with gauze. Give this several coats of glue. The whole prop is then covered with tissue. This will greatly increase the life of the prop, and give it a satin smooth finish.

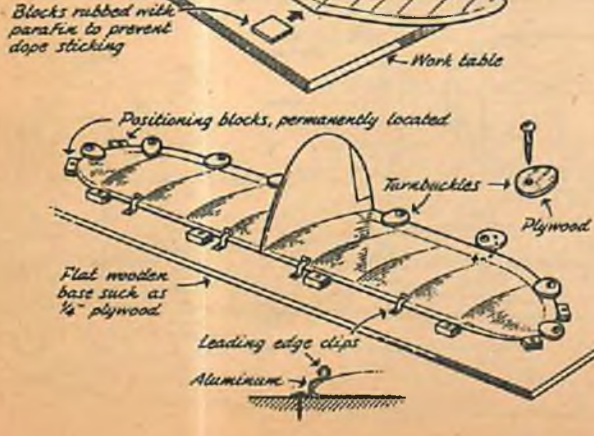
The tail pop-up dethermalizer is quite simple. Start by gluing the hold-down wire on the leading edge of the stab. This is one piece. By changing the angle of the wire, you will also change the angle at which the stab will pop up. There is no limit-string necessary with this arrangement. To align the stab, glue a piece of 1/8" square balsa under each side of the stab. This will prevent it from shifting and losing adjustments.

Power is supplied by 16 strands of 1/4" T-56 50" long. This may vary with conditions. Ship is adjusted to turn to right. Power for climb and glide should be about the same, approximately a 300-foot circle. When the correct thrust adjustments are found, you can carve away or add to the nose block. Calculate all your adjustments carefully, and with thought, for your ship will fly no better than it has been adjusted.



Stop That Warp!



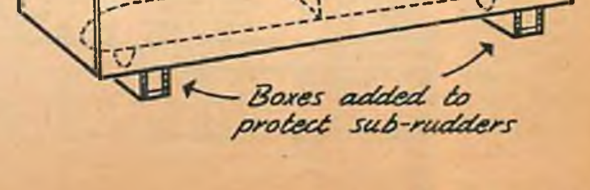


■ It is good insurance to build carrying cases or boxes for elevators. These can be made to protect the tails and prevent their warping, both at home and on the field. Two tails can be carried in each case. When a model collects dew or rain, all that is needed is to place the tail in the rack. If sun warps the elevator, water-dope and strap down in the case for a while. This can be done on the field.

If the wing and elevator have been built, covered, and doped properly, warps can be removed overnight by water-doping the surfaces and weighting the panel down on a flat surface. Water-doping the elevator and placing it in its rack will simplify removing warps from elevators.

If the builder is especially ambitious, a wing rack following the dihedral in the wing can be built to hold the wing in shape the same as the rack holds the elevator.

—C. O. WRIGHT



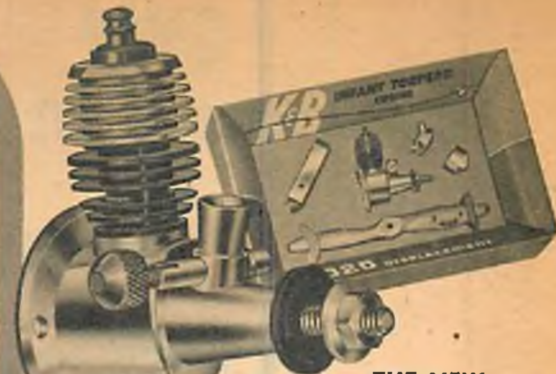
K&B TORPEDO

the greatest name in model aircraft engines

K&B TORPEDO INFANT

TORPEDO .049– TORPEDO .19 –TORPEDO .29 &.32

Quality Line Accessories



THE NEW
TORPEDO INFANT
complete with slip-on connector and 3"x5" P propeller

SUPERSONIC FUELS
more power performance for your engine

Supersonic 1000 — Supersonic Ultra Glo — Supersonic 100

A fuel for every engine—every use.

TORPEDO K&B ENGINES

K&B MANUFACTURING COMPANY

224 EAST PALMER AVENUE, COMPTON, CALIFORNIA

MATT SULLIVAN SAYS:

Dupont Nylon Accessories

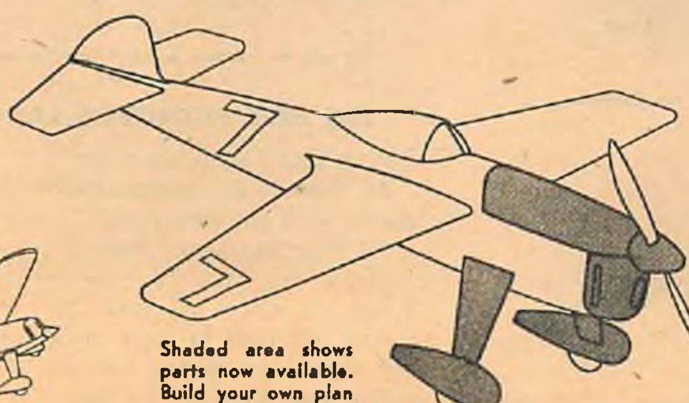
Will be the "New Look" for '52 . . .

Nylon is an amazing material . . . nylon increases the strength and durability of your model beyond your dreams . . . eventually nylon will replace every metal and plywood part now in use. Our engineering is far advanced beyond the small picture we can show here. Watch for needle valves, bell cranks, wheel collars, pans, cowls, spinners, landing gear, wheel pants, free flight pylons, motor mounts, control horns, hinges, rubber power gears, wing tips, etc.

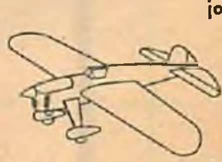
Remember, nylon lasts longer, looks better, performs better. Demand the best, get accessories of Dupont Nylon.

Fuel-proof, fire-resistant nylon adds safety to team racing.

Look to lighter weight nylon for better speed jobs.



Shaded area shows parts now available. Build your own plan around them, or, include them in your next prefab.



Extra strength at stress points means better stunting.

The added strength of nylon makes stunting better.

More fun in free flight with nylon, the material that won't bend out of shape.

Sullivan Products Proudly Announce Accessories of **DUPONT NYLON**

Each engine has fuel enough to run forever.

"Did you buy Junior a robot bomber model kit?"

"That was no invading warplane—it was this lad's radar controlled model!"

THE FREE FLIGHTER'S LAMENT

I think that I shall never see
An obstacle as unsurmountable as a tree.
As far as I am concerned
All trees are better burned.

I had my model adjusted fine
And it turned in some pretty good time.
My story's sad as you can see
The darn thing lit in a tree.

Now Kilmer claimed trees were grand,
Obviously he wasn't a free flight man.
Step right up and hear the word:
Tree are oke—if you're a bird.

—Plymouth "Timer"

Prefabrication replaced by dehydration.

"Junior, come down here this instant!"

MODELER'S 12 POPULAR EXCUSES

1. The surfaces got warped in the shipping box.
2. Back home I could always pack in 550 turns.
3. The wind changed on me.
4. It was only a 5-second engine run.
5. Somebody must have walked on my lines.
6. I would have sworn I gave it "up."
7. It was too early for thermals.
8. The timer musta been blind.
9. The batteries must be dead.
10. I sent my entry blank in two weeks ago.
11. Must be something wrong with the fuel.
12. It's only an hour's drive.

—Based on Plymouth "Timer"

"It's no use, I've been trying to catch that kid and his overgrown model for a month."

(*Continued from page 87*)

upper wing is completely dry, cut rectangular holes in the ¼″ ribs at points shown on the wing plan, then spring the wings apart slightly and slip the struts in place. Check for correct length and trim if necessary to keep the wings parallel, then glue.

Add the plywood line guide to inboard struts and touch up with paint at all the exposed glue joints. The original *Double Whammy* is red with ½″ square checkerboard Trim Film on the wings and ⅜″ square checkerboard on the tail surfaces. The stripe on fuselage is black Trim Film. Glue the plastic windshield in place and trim with two pieces of black tape.

Before attempting any flights, make a careful check of the balance point. If your model balances to the rear of the point shown on the plans, add lead to the nose of the ship to restore correct balance. Fly on .012 diameter steel lines 55 to 60 feet long. Good results were obtained with a Fox .35 engine using a 9/6 Top Flite prop and Power Mist fuel. A slight under camber was carved on the back surface of the prop.

The original *Double Whammy* weighs 35 ounces (about 5 ounces too much), but will do 8 or 10 consecutive vertical 8's without any trouble. This ship is very steady in flight when balanced properly and makes perfect landings with the short sturdy landing gear and large wheels. In spite of the excessive weight the model would hold the lines very well during tight overhead 8's with engine and rudder offset as shown.

Bill of Materials

5 pcs. 1/16″ x 3″ x 36″ medium balsa. 2 pcs. 3/32″ x 3″ x 36″ soft balsa. 2 pcs. ⅛″ x 3″ x 36″ soft balsa, hard on one edge. 1 pc. ¼″ x 1″ x 36″ hard balsa. 4 pcs. 3/16″ sq. x 36″ hard balsa. 2 pcs. 1″ x 3″ x 36″ soft balsa or large block. 2 pcs. ⅜″ x 1″ x 36″ medium balsa. 1 pc. 1/16″ plywood, 6″ x 6″. 1 pc. 3/32″ plywood 3″ x 6″. 2 pcs. ⅜″ x ½″ maple motor mounts, 6″ long. 1 pc. 1/16″ dia. wire. 1 pc. 3/32″ dia. wire. 1 pc. 1/16″ maple dowel, 2″ long. 1 pc. silk, 12″ square. Bellcrank. 2″ dia. spinner. Pine box wood for struts. Light and heavy paper. Dope. Trim Film. 2¼″ Veco wheels. 9/6″ propeller.

R/C Round-up

(*Continued from page 70*)

Then, as he awaited his turn for an official flight, the plane of another R/C contestant dove in and—sure enough—went right through Siggie's stab. We'd like to say this ended the bad luck, but further little equipment trouble bedeviled this R/C pioneer. He did manage to get in several official flights.

This brief coverage of the Radio Control Events at the Nationals will serve as a progress outline of model plane R/C work in this country. Though we have covered only the Nationals, there have been R/C events at hundreds of other meets since 1946. On the East Coast, the huge Flying Fairs put on by the New York *Daily Mirror* have always featured the Radio Event, and in the West such meets as the All-Western Open serve to keep the radio boys in practice. Between the two coasts, the interest has been just as great, with especially active groups in Chicago, Pittsburgh, Kansas City, and elsewhere.

FULL SIZE PLANS

For information on full-size plans of models appearing here, drop a note to Air Trails, 304 E. 45th St., New York 17, N. Y.

Air Trails MODEL ANNUAL for 1952

ADVERTISERS' INDEX

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this Air Trails MODEL ANNUAL for 1952 index.

BIG PRIZES... with *Berkeley* "1/2 A" FLYING SCALE

NATIONAL FLYING SCALE CHAMPIONSHIP TROPHY
Won three times and permanently awarded to HENRY STRUCK, Berkeley designer.

Contests for 1952 will feature this great new Free-Flight Event with big Cash and *Merchandise Prizes.* 100 Berkeley Merchandise Awards totalling $500.00 will be given at Official AMA Contests. Pan American World Airways will sponsor a "½A" PAA-Load Flying Scale Event with *Cash Prizes!*

Bob Bienenstein, National Flying Scale Champion and his Interstate Cadet—photographed just before take-off on the winning flight of over nine minutes!

Since 1938, in Flying Scale National Competition, Berkeley designs have never been beaten by any other commerial design!

FULL ONE-INCH SCALE

No models at any price can equal the sound value found in these great kits. Designed for free-flight flying they may be powered with .035 to .049 gas engines, O.K. CO or rubber power. As a controliner it can take engines from .049 to .099 displacement.

$1.95

National Champion in 1941 and 1951!

INTERSTATE CADET
35" Wingspan
Henry Struck won the 1941 National Flying Scale Championships with the beautiful flying qualities of the Interstate Cadet.

$1.95

STINSON VOYAGER "150"
34" Wingspan
Equipped with Wing Slots. A beautifully detailed model of America's most popular 4-place airplane.

$1.95

AERONCA SEDAN
34" Wingspan
Newest addition to this line, it can be flown as a land or seaplane. Material is included for a landplane only.

$1.95

National Champion in 1946 and 1948
2nd & 3rd in 1951 Nationals-Open!

STINSON SENTINEL L-5
33½" Wingspan
Here is the model that won the 1946 and 1948 Wichita and Olathe Nationals. A commercial version of the Army's famous "Flying Jeep."

$1.95

CULVER "V"
29" Wingspan
This popular sport plane is ideally suited for control-line conversion. A tricycle landing gear aids in landings.

$1.95

West Coast Champion "½A" Scale Gas!

PIPER SUPER-CRUISER
35½" Wingspan
First light plane to fly around the world. Plans show details for making seaplane floats. Landplane material included in the kit.

$1.95

FAIRCHILD 24 "RANCHER"
36⅝" Wingspan
This beautiful light plane design is the largest in the series. Stable characteristics make it ideal for free-flight.

$1.95

CESSNA "140"
32⅝" Wingspan
Every old-timer knows that a Cessna is a great flying scale model. The new "140" lives up to reputation.

The "HOGAN" Design... Champ Free-Flight!

$5.95

"SANDY-HOGAN"
70" Wingspan—For .29 to .35 Engines
Featuring warp resistant "Hoganamic" construction, this proven design has amassed an enviable contest record. Die-cut parts, complete hardware, etc.

"MINI-HOGAN 34"
34" Span—.035 to .074 Engines
$1.95

"MINI-HOGAN 45"
45" Span—.074 to .099 Engines
$2.95

The "ZILCH"... Stunt Controline Series!

"SUPER-DUPER ZILCH"
52" Span—.45 to .65 Engines **$5.95**

"LIL-DUPER ZILCH"
42" Span—.19 to .49 Engines **$3.95**

"WEE-DUPER ZILCH"
34" Span—.045 to .099 Engines **$2.95**

"MINI-ZILCH"
20½" Span—.020 to .049 Engines **$1.25**

Each kit includes: Shaped & notched leading & trailing edges; die-cut parts; genuine "U-Control"; complete hardware & deluxe extras!

TEAM RACERS... designed by Keith Storey!

"THE KEY" **$5.95**
29" Span—.19 to .36 Engines

"THE KEY-DET" **$2.95**
18" Span—.074 to .099 Engines

$4.95

"THE QUEST"
30" Span—.19 to .36 Engines

RADIO & PAA-Load Designs...

$2.50

½A PAA-Load "BOOTSTRAPS"
40" Wingspan—For .035 to .049 Engines
Designed by Henry Struck for sport and PAA-Load contests, this easily built pre-fabricated kit features "Auto-Semble" construction.

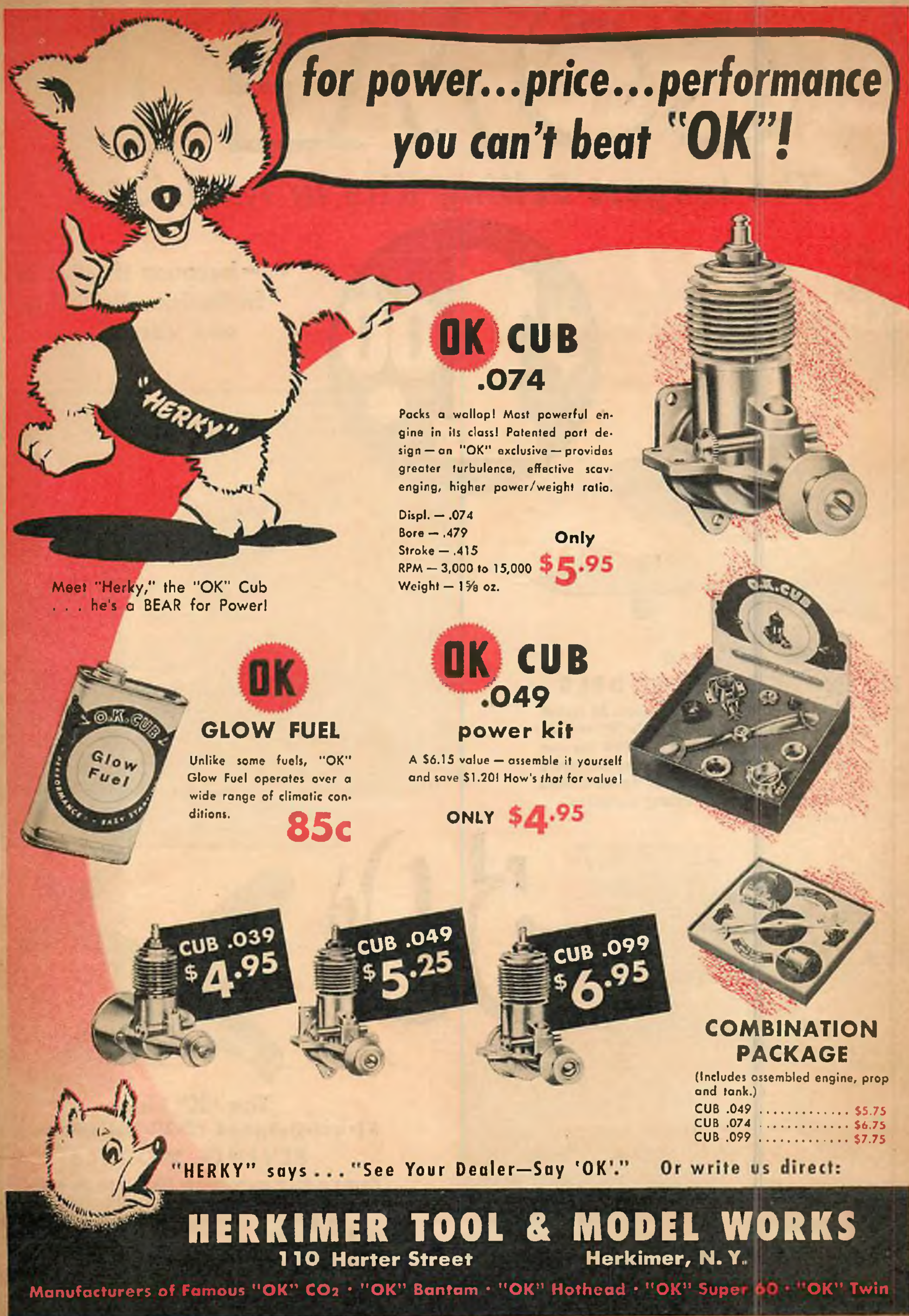
$4.95

"SUPER BRIGADIER"
58" Wingspan—For .19 to .36 Engines
Especially designed by Henry Struck for Radio Control and PAA-Load flying. Plans show details for installation of equipment. Pre-fabricated.

Berkeley's 1952 CATALOG...
25c. Completely revised — up to date! Contains complete line of kits, Supplies, Accessories, Information.

SOLD THRU
BERKELEY
DEALERS & DISTRIBUTORS

If no local dealer is convenient, mail orders will be filled by Berkeley Models Supplies, Dept. AT., West Hempstead, N. Y. Please include 25¢ packing & postage.


for power...price...performance
you can't beat "OK"!
"HERKY"
Meet "Herky," the "OK" Cub
. . . he's a BEAR for Power!
OK CUB
.074
Packs a wallop! Most powerful engine in its class! Patented port design — an "OK" exclusive — provides greater turbulence, effective scavenging, higher power/weight ratio.
Displ. — .074
Bore — .479
Stroke — .415
RPM — 3,000 to 15,000
Weight — 1⅝ oz.
Only
$5.95
OK
GLOW FUEL
O.K. CUB
Glow Fuel
Unlike some fuels, "OK" Glow Fuel operates over a wide range of climatic conditions.
85c
OK CUB
.049
power kit
A $6.15 value — assemble it yourself and save $1.20! How's that for value!
ONLY $4.95
O.K. CUB
CUB .039 $4.95
CUB .049 $5.25
CUB .099 $6.95
COMBINATION PACKAGE
(Includes assembled engine, prop and tank.)
CUB .049 .... $5.75
CUB .074 .... $6.75
CUB .099 .... $7.75
"HERKY" says . . . "See Your Dealer—Say 'OK'."
Or write us direct:
HERKIMER TOOL & MODEL WORKS
110 Harter Street
Herkimer, N. Y.
Manufacturers of Famous "OK" CO2 · "OK" Bantam · "OK" Hothead · "OK" Super 60 · "OK" Twin

COMET

The Largest Selling Kits in America

$1.00

—because they're tops in Design, Flyability and Value!

The "P" Line
FLYING SCALE MODELS

Want big wingspans? Here they are—from 24 inches to 54 inches! Want versatility! Comet's "P" models can be flown rubber-powered or adapted for use with Glo Plug engines! Want value? These are really big values at $1.00! Buy, build and fly all eleven models including the famous Mustang warplane pictured above!

The "M" Line
Struct-O-Speed "E-Z"-Built Pre-Fab
FLYING MODELS

Add up all the features and you will find that you have far more than a dollar's worth in each of the six kits in this line! Pre-fabricated to the "Nth" degree! Rubber-powered but suitable for ½A engines; spring-type shock-absorbing landing gear, shaped Holl-o-Wing, finished plastic prop and cowling —and many more features!

50¢

The "L" Line
FLYING and
FLYING SCALE MODELS

This Sabre Jet is typical of the "hot" numbers contained in this group of twelve popular models! Fly 'em rubber-powered or with Glo Plug engine. Designed to guarantee easy construction and excellent flyability! Truly tops in value at 50c.

The "K" Line
Struct-O-Speed "E-Z"-Built Pre-Fab
FLYING MODELS

Here are the most complete 50c kits on the market—six terrific numbers, including the Thunderjet shown above, the Sabre and Mustang. Plastic cowling and prop, balsa Holl-o-Wing, completely pre-fabricated with die-cut, color-printed balsa sheets.

See these and other Comet Kits at other prices at your Hobby Dealer's

COMET MODEL HOBBYCRAFT, INC.
501 WEST 35th STREET CHICAGO 16, ILLINOIS