

OCTOBER 1963

R/C *modeler*

40 CENTS

R-C

1963 NAT'S

Coverage

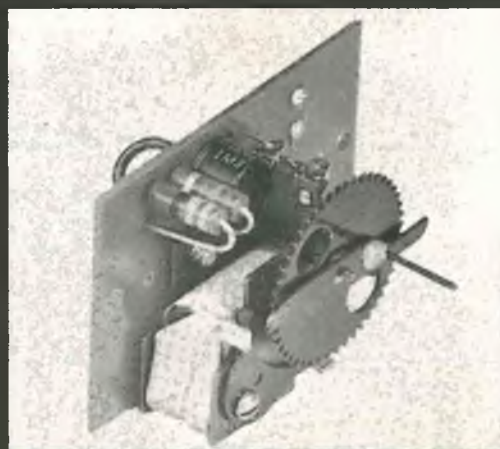
Results

Photos

Data

STAGGER-BI

MULTI-BIPE by Phil Kraft

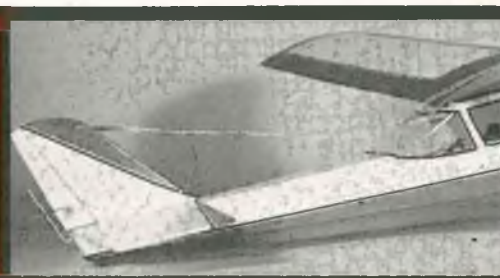


Escapements

INCREASING
PERFORMANCE

EXODUS

.010-.020 SINGLE CHANNEL SPORT



YOU SAW IT AT THE NATIONALS . . .

THE KRAFT QUADRUPLE PROPORTIONAL SYSTEM

. . . has already won more West Coast contests than any other proportional system

➡ **5 years of continual development — over 2000 test flights without failure.**

➡ **Instantaneous response, perfect tracking, and no interaction.**

➡ **Full servo power for even the slightest increment of control movement.**

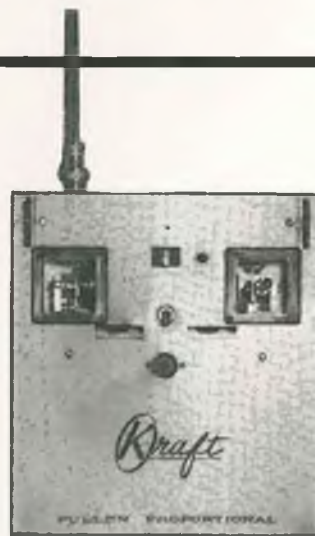
➡ **Complete freedom from drift even under the most adverse environmental conditions.**

TRANSMITTER

- The most powerful RC transmitter available. Size $2\frac{3}{8}$ " x 8" x 9".
- RF Section utilizes 3 silicon transistors, crystal oscillator, RF amplifier, and Class B collector modulator and final. 1.2 watts input to final.
- 4 Transistors and complimentary type transformer coupled Class B modulator used to provide 90% modulation and sine wave form to minimize splatter.
- Logic network consists of 27 transistors forming clock, ring counter, 3 kc synchronizing sub-carrier and gaited 4 kc sub-carrier.
- Two control sticks: left hand provides control of elevator and rudder — right hand operates aileron and motor. As an option, system may be purchased with left hand providing rudder and motor and right hand, aileron and elevator.
- Rechargeable 12V NiCad battery pack. Charger for transmitter and receiver-servo power supplies is integral in the transmitter can.

RECEIVER AND SERVOS

- Size: 3" x 1-1/2" x 2-3/16". Weight: 4-1/2 oz.
- Superhet RF section employs 5 transistors. RF stage forward AGC and special circuitry is provided to eliminate cross-Modulation.
- A crystal filter is employed to provide excellent bandpass characteristics.
- All transistorized logic and filter network. No mechanical switching is used.
- Servos are assembled from Bonner parts and are installed in standard Bonner servos. Wire-wound feedback pots used for long, trouble-free life. 7 transistor servo amplifiers. No current drain in absence of stock movement.
- Battery pack is a special rechargeable type and has a life approximately the same as if used with relayless reed systems.
- Total installed weight including receiver, batteries, servos, plugs, harness, etc.: 25 ounces.



PRICE:
\$499⁹⁵

The Kraft Proportional System is complete with transmitter, receiver, rechargeable battery packs, charger, and four servos. No wiring is necessary.

KRAFT CUSTOM RADIO CONTROL

2519 LEE AVE. • SOUTH EL MONTE, CALIF.

Unfortunately, the complexity and high manufacturing costs of this system makes it impossible to sell at this time through our many good dealer friends. Order Direct. Include bank money order or certified check. California residents add 4% sales tax. Include \$5 for postage and handling.

FIRST TIME EVER!
NO ADDITIONAL MONEY CHARGES
FOR ORDERS OF ANY SIZE!
We Welcome Your Patronage.

LEES
HOBBY
SUPPLY INC.

FREE! GLUE DISPENSER
FREE! 1" SHED RESIST. BRUSH
FREE! 1 YR. SUBSCRIPTION TO "GRID LEAKS"
ORDERS OVER \$ 3.00
ORDERS OVER 5.00
ORDERS OVER 10.00

PLASTIC CASES

NO. 21A1-PB #1, 1 x 1 x 1/2	.25
NO. 21A2-PB #2, 1 1/2 x 2 1/4 x 1	.10
NO. 21A3-PB #3, 2 x 2 1/4 x 1	.15
NO. 21A4-PB #4, 3 1/2 x 4 1/2 x 1	.20
NO. 21A5-PB #5, 1 1/2 x 5 1/2 x 1	.25
NO. 21A6-PB #6, 2 1/2 x 3 1/2 x 2	.25

DIODES TRANSISTORS - TUBES

DIODES - TRANSISTORS	12901	12902	12903
1N34	.48	2N224 in switching use	1.00
1N457	1.10	1T605 RF	1.00
1N229	.48	6X4	.50
1N457	.97	6X4	1.50
#1215 Federal	.00	6X4	2.00
#1215 International	.00	6X4	3.00
2N214	1.00	6X4	1.25
2N217	1.20	6X4 (RKS)	4.25
2N224 Type plain	1.00	6X4	2.00
2N224 Type blue	2.00	12A	1.10
2N224 Type red	1.00	155	1.10
2N229 Type MPN	.97	18A	.75
2N283	.00	18A	2.50
2N1283 Type	.00	18A	3.00
2N1302 Type NPN	.00	6X4	3.45
2N1303	.00	34A	1.50
2N207	1.50	34A	2.00
1T124 RF	1.00	387	.25
72518 (replaces)	1.00	387	.25
2N224 in audio use	.25	384	1.45
1T605 IF	1.00	384	1.45

MAGAZINES AND BOOKS

NO. 3308-R/C PRIMER	\$2.00
by Howard G. McEntee	
NO. 3308-R/C HANDBOOK	\$4.95
by Howard G. McEntee	
NO. 3304-MODEL RADIO CONTROL	\$2.95
by E. L. Safford	
NO. 3308-RUN WITH R/C MODELS	\$3.20
by E. L. Safford	
NO. 3308-HINTS AND KINKS FOR RADIO, TV AND AUDIO	\$2.95
NO. 3308-R/C FOR MODEL BUILDERS	\$4.25
by Bill Winter	
NO. 3307-GRID LEAKS PROPORTIONAL	\$2.00
CON. VOL. FOR RUDDER ONLY	

ENGINES

TORNADO .049	3.95
Ideal for beginners, integral fuel tank.	
TORNADO .08	8.95
Light weight, easy start, all model types.	
TORNADO .10	13.95
201 is interchangeable with .19, 1/4 A & B	
TORNADO .20	14.95
Champions choice for 10 yrs., F.F. & C/L	
TORNADO .35	15.95
Idle engine, easy starting and long life.	
TORNADO .35C	18.95
Designed for combat and rat racing.	
TORNADO .40	19.95
1961 Mats stunt champion engine.	
TORNADO "Series 81"	19.95
Features Mehanite Liner and "Electrolizing"	
TORNADO 200	21.95
Includes spinner and coil type needle valve.	
TORNADO .35	19.95
Features new shut-off type spray bar.	
K.B. "Stallion Series"	
Stallion .049 (with tank)	3.95
Stallion .049 (less tank)	3.49
Stallion .35 (new and hot)	8.95

R/C MODEL KITS

TAURI (Top Flite)

No. 1301-NOMAD (Electronics)	1.95
48" span, 010-024 eng. Single Ch. Glider	
No. 1303-FREEDOM 7 (Electronics)	7.95
40" span, 049-099 eng. Single Ch. Shoulder Wing	
No. 1302-FREEDOM 15 (Electronics)	14.95
52" span, 15-19 eng. Multi Trainer, Shoulder Wing	
No. 1301A-CONCORD (Electronics)	8.95
46" span, 07-10 eng. Single Ch. Cabin type	
No. 1301B-SCHOOLMASTER (TOP FLITE)	5.95
39" span, 049 eng. Single Ch. Cabin type	
No. 1304-LIBERTY 7 (Electronics)	7.95
40" span, 049-099 eng. Single Ch. Low Wing	
No. 1305-LIBERTY 15 (Electronics)	14.95
52" span, 15-19 eng. Multi, Low Wing	
No. 1302B-18-HAWK (Electronics)	8.95
1/2 A Bi-plane, Single Ch. Cabin type	
No. 1301C-TAURI (Top Flite)	2.95
70" span, 45 eng. Multi, Low Wing	
No. 1301D-TAURI (Top Flite)	18.95
57" span, 15-25 eng. Multi, Shoulder Wing	
No. 1308-RASCAL (Top Flite)	2.95
27" span, 010-020 eng. Single Ch. Cabin type	
No. 1308-SCHOOLBOY (Top Flite)	3.50
29" span, 010-020 eng. Single Ch. Cabin type	
No. 1301E-ROARING 20 (Top Flite)	2.95
20" span, 010-020 eng. Single Ch. Shoulder Wing	
No. 1301F-CESSNA (Top Flite)	3.95
30" span, 020-024 eng. Single Ch. semi-scale	
No. 1301G-JR. FALCON (C.G.)	3.95
37" span, 049 eng. Single Ch. Shoulder Wing	
No. 1301H-FALCON (C.G.)	9.95
56" span, 09-19 eng. Multi, Shoulder Wing	
No. 1302A-Viscount (DMECO)	\$20.95
60" span, 29-49 eng. Multi, low wing	
No. 1302B-Paragon (DMECO)	\$28.95
61" span, 19 to 40 engines, Multi, low wing	
No. 1302C-Yankee (DMECO)	\$ 7.95
42" span, 07-09 eng. single ch. cabin type.	
No. 1302D-Sonic Cruiser	\$19.95
65" span, 15-49 eng. Multi, cabin type.	
No. 1301I-TAURI (Top Flite)	11.95
No. 1301J-ORION (Top Flite)	10.95
No. 1306-R/C RACER FUSELAGE (Hartman)	17.95
Moulded fiberglass fuselage, weight 9 oz.	

MARCYTONE PRM 1 SYSTEM

NO. 1008-MARCYTONE PRM-1 SYSTEM \$105.95	
First Proportional Rudder only system with positionable engine control. Recommended for 15 engine or larger. Uses no relays. Combo kit includes transmitter, pulser, receiver rudder and motor control servo kits.	
NO. 1008-MARCYTONE PRM-1 SYSTEM \$105.95	
Completely built, all units assembled, ready to install.	

TRANSMITTERS AND KITS

NO. 11A3-KIT KIT, 26-28 mc (Kraft tone)	24.95
NO. 11A4-KIT KIT, 50-54 mc (Kraft tone)	28.95
Both kits include ASP 211 telescoping antenna, transmitter, tube, crystal, hardware, case, PC board and revised instructions.	
NO. 11A1-ELECTRONICS KRAFT TRANSMITTER	34.95
Same as above, but assembled, tuned and certified.	

RECEIVERS AND KITS

NO. 11A1-CS-502 (Falcon)	29.95
Single Chan. Tone, matches C. & S. receivers and others.	
NO. 11A3-CS-502 KIT (Falcon)	24.50
Same as above, but in kit form. Easy instructions.	
NO. 11A16-TTX TRANSMITTER (CitizenShip)	29.95
Transistorized Tone Transmitter, 27.255 mc operation.	
NO. 11A2-PACESETTER TRANSMITTER (Electronics)	24.95
Single Channel Tone Transmitter, Neon-tuned modulation.	
NO. 11A7-MC 250T TRANSMITTER	22.95
Tone Transmitter designed for MC100T Receiver	
NO. 11A12-KIT KIT 27 mc 6 channel	48.95
NO. 11A13-KIT KIT 52 or 52.75 mc	51.95
Kraft 6 channel kits. Complete with all required parts.	
NO. 11A8-KIT-KID KIT (Specify crystal freq.) 10 channel	87.50
(Specify crystal freq.) 10 channel	
(Specify crystal freq.) 10 channel	
Kraft Triple Tone Transmitter kits. Complete kit features highest grade components, use of two heavy toroids, 10% capacitors, epoxy glass PC boards.	
C & S SUPERNETS	
NO. 12A37-CS507S Oracle (Single Ch.)	\$45.90
NO. 12A38-CS507S Oracle (Single Ch.)	\$45.90
NO. 12A39-CS507M (Multi)	74.50
NO. 12A40-CS508M (Multi)	74.50
The single channel series is designed for operation with the C & S Falcon transmitter.	
The multi channel is designed for use with the new C & S Eagle Transmitter.	
NO. 12A7-KRIT KIT 26-28 mc	18.95
NO. 12A8-KRIT KIT 50-54 mc	21.95
Most highly recommended single channel "super" receiver available to kit builders.	
NO. 12A9-ELECTRONICS KRAFT RECEIVER	29.95
Same as above, only completely assembled; avail. 26-28 mc.	
NO. 12A15-COURIER RELAYLESS RECEIVER	21.95
Electronics relayless single channel, all-transistorized.	
NO. 12A10-KYMK KIT	13.95
Kraft 3 volt-all transistor-relayless, 26-28 mc.	
NO. 12A12-OTARION 0-21	24.95
CB relayless tone receiver, weight 1/2 oz., temperature stabilized.	
NO. 12A7-OTARION 0-22	27.50
Proprietary relayless receiver, temperature stabilized 0-140°F.	
NO. 12A26-ELECTRONIC RELAYER	24.95
3 V. Relay Tone Receiver! All transistor, 1 1/2 oz.	
NO. 12A28-CITIZENSHIP LT-3 COMBO	29.95
Super-receiver relayless tone receiver with SE-2 escapement.	
NO. 12A26-CITIZENSHIP R/C PAK	32.95
Single channel 27 mc receiver with SE-2 escapement, no soldering or wiring.	
NO. 12A27-MC 100T	20.95
Tube and transistor tone receiver, use with MC250T	
NO. 12A11-CS-501 HUMMING BIRD	22.50
Weight 1/4 oz. Uses SE-2 or Babcock Mark II escapement, simple wiring.	
NO. 12A12-CS-503 LARK RECEIVER	29.50
Weight 1 1/4 oz. Less than 4 ma idle, 35 ma on signal.	
NO. 12A13-CS-505 FINCH RECEIVER	27.50
All transistor dual output relayless receiver. Weight 1 oz.	
NO. 12A4-CS-505 FINCH RECEIVER	28.50
Same as above, but with metal case.	
NO. 12A15-KRIT SUPERHET CONVERTER	39.95
Convert from broad-tuning super receiver to nice sharp superhet.	
NO. 12A16-KRIT 27mc KIT	85.95
NO. 12A18-KRIT 50-54 mc KIT	71.95
Unique printed circuit board construction. Uses light Deans Reads for best performance. PC boards are drilled.	
NO. 10A3-COMBO 6 CHANNEL RCVR. AND CHANNEL TRANSMITTER KIT	\$105.95
(Specify freq.-Relay type)	
NO. 12A20-KRIT 27 mc relayless	44.95
NO. 12A21-KRIT 50-54 mc relayless	48.95
NO. 12A22-KRIT 27 mc relayless	42.95
NO. 12A23-KRIT 50-54 mc relayless	42.95
The Kraft multi-tube super receiver relayless receiver kits are available with a 6 or 10 channel read bank. Use with transmitter servos.	
NO. 10A7-KRIT 6 channel relayless 87.50	
with 6 channel transmitter kit (specify frequency).	

ESCAPEMENTS

NO. 10A14-ARISTO MOTOR OR RUDDER CONTROL	3.95
NO. 10A15-ARISTO SELECTIVE COMPOUND	6.95
Light weight, instant responsive escapement.	
NO. 10A40-ARISTO CODE-A-MATIC CONTROL BOX	10.95
Features "flight-fee" control stick and separate throttle button.	
NO. 10A48-ARISTO QUAD-TRIP	12.95
Actually two compound units, pre-mounted on "Din-Pan"	
NO. 14A8-BABCOCK MOTOR MINDER	4.95
Motor-minder motor control escapement. Perfect in-flight control.	
NO. 14A9-BABCOCK MARK II	
Most popular of all model aircraft servos.	
NO. 14A10-BABCOCK MARK V	8.49
Easy, reliable stick-box or manual control.	

NASSAU STORE
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LEE'S HOBBY INDUSTRIES INC.
 MAIL ORDERS AND CORRESPONDENCE
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 L. I., N. Y., 11554

SUFFOLK STORE
 3018 JERICHO TPKE
 EAST NORTHPORT
 L.I., N. Y.

SEND 25c FOR SUPER SAVINGS LEE'S CATALOG.

KRAFT CUSTOM R/C

NO. 12A22-Kraft Superhet 10 channel	88.50
NO. 12A22-Kraft Superhet 12 channel	90.95
Smallest, lightest multi-channel superheterodyne receivers available. Weight is 3 1/2 oz.	
NO. 12A32-Kraft Single Superhet (Convertible)	54.95
NO. 12A23-Kraft Hybrid 10 channel	89.95
NO. 12A34-Kraft Single Convertible Hybrid 10 channel kit	47.95
NO. 12A24-Kraft Hybrid Front End kit only	41.95
NO. 11A12-KIT 27 mc Kraft Transistor	119.95
NO. 11A17-KIT 52 mc Kraft Transistor	129.95
Smallest practical physical size. Light weight.	

SERVO

NO. 14A12-G & M. DYTOMATIC	12.95
Single channel servo. Provides forward, stop, reverse motor and instantaneous rudder action.	
NO. 14A11-BABCOCK MC. 897 SERVO	9.95
Electric compound servo for even the largest boats.	
NO. 14A24-CITIZENSHIP ACTUATOR KIT	11.95
NO. 14A30-TNA SERVO	25.95
Transistorized for direct operation from any standard read bank.	
NO. 14A31-RNA SERVO ASSEMBLED	9.95
NO. 14A32-RNA SERVO KIT	7.95
NO. 14A18-HILLCREST MOTOR CONTROL	5.95
Throttle control servo designed for multi-channel.	
NO. 14A17-BABCOCK MC. 887 SERVO	10.95
For battery-powered R/C boats, cars and trucks.	
NO. 14A19-BONNER DURAMITE	12.95
NO. 14A20-BONNER TRANSMITE	29.95
NO. 14A21-BONNER TRANSMITE TRIM ONLY	27.95
NO. 14A22-BONNER TRANSMITE AMPLIFIER WIRE	19.95
Relayless transmitter servos specially designed for Bramco, Apollo, Kraft relayless 10, orbit and CG.	
BONNER COMPONENTS	
NO. 14A33-Cam followers	1.95
NO. 14A37-Rotor wheel	1.95
NO. 14A38-Vari-comp cam wheel	1.95
NO. 14A39-R. E. Vari-comp cam wheel	1.95
NO. 14A40-Duramite servo sector	1.50
NO. 14A41-Duramite crown gear	50
NO. 14A42-Duramite combination gear	35
NO. 14A43-Duramite pinion gear	20
NO. 14A44-Duramite cams, bottom half	2.00
NO. 14A45-Duramite cam, top half	2.00
P.C. board	
NO. 14A46-Duramite adjusting screw	1.95
NO. 23A1-BONNER MOTOR	3.95
NO. 14A47-KRAFT SERVO AMPLIFIER KIT	13.95
NO. 14A48-KRAFT 10 CHANNEL SERVO SWITCHER KIT	49.95
NO. 14A49-CUSTOM BUILT KRAFT 10 SERVO SWITCHER	89.95

ACTUATORS

NO. 14A80-GO-AC KIT (Stroeder)	11.95
GO-AC ASSEMBLED (Stroeder)	14.95
DU-AC ASSEMBLED (Stroeder)	14.95
NO. 14A25-GM PROPOMATIC	18.95
NO. 14A27-SEPTALLETTE MARK III	8.95
NO. 14A28-SEPTALLETTE MARK V	8.95
NO. 14A29-SOUTHWESTERN	8.95
NO. 14A33-POUVOIR	8.50
Has double coil with only 30 ohms-plenty of power-low drain.	
NO. 14A30-MARCY FEED BACK KIT	27.50
NO. 14A31-MARCY FEED BACK CUSTOM BUILT	32.50

PULSERS, P.O.D. KITS

NO. 1304-CS PULS-TRAN 504	24.90
ASSEMBLED	
NO. 1305-SHOWS NO PULSER KIT	17.95
NO. 1306-SHOWS GG PULSER KIT	17.95
NO. 1307-SHOWS WIMP SIMUL	21.95
PULS-TRAN	
NO. 1308-SHOWS P.O.D. KIT	12.95
NO. 1309-BROADHURST P.O.D. KIT	7.95

TEST INSTRUMENTS

NO. 22A1-BASIC FSM KIT	1.90
NO. 22A2-BASIC TRANSISTORIZED FSM KIT	2.85
NO. 22A3-SUBMINI 0-1 MA METER	3.95
NO. 22A4-0-500 MA METER	3.95
NO. 22A5-SPACE CONTROL 0-1	5.95
NO. 22A6-SPACE CONTROL 0-5	5.95
NO. 22A7-SPACE CONTROL 0-50	5.95
NO. 22A8-MET 2000 MULTITEST (Imported)	8.95
Low cost pocket multimeter with features found in higher priced units.	
NO. 22A9-102F FUSION KIT	18.95
American made volt ohm millimeter, larger than above unit.	
NO. 22A10-METER TEST LEADS	3.95
40" red and black standard.	

BATTERIES

NO. 30A35-NICKEL CADMIUM 4AH	1.95
NO. 30A36-EVEREADY N46	2.95
NO. 30A4-WILLARD BB 210 LEAD ACID	8.95
NO. 30A5-ARISTO 24 LEAD ACID	4.75
NO. 30A6-MALLORY ALKALINES MN 1500	.30
NO. 30A38-MALLORY 2400B	.45
GAA pan cell size	
NO. 30A37-MALLORY 1400B (Medium cell size)	.75
NO. 30A1-MEDCO KMS POWER PAK	4.95
NO. 30A2-MEDCO PMS (as above but with nicad)	19.95

BATTERY CHARGERS

NO. 34A8-NICKEL CADMIUM CHARGER KIT	11.95
NO. 34A9-TOWER VARI-VOLT CHARGER	7.95
NO. 34A11-TOWER HYDROMETER TEST	1.25
NO. 34A7-TOWER BATTERY BOOKLET	19.95
KLEINERSON'S CHARGER	7.95
NO. 34A8-ARISTO 24-6 CHARGER	8.95
NO. 34A1-MEDCO CHARGER	8.95
NO. 34A2-MC 2 VOLT CHARGER	8.95
NO. 34A3-MC 2.5 CHARGER	11.95
NO. 34A4-MC 10-40 CHARGER	6.95
NO. 34A10-ACE NICAD CHARGER	3.75
PARIS PACKAGE	

TRANSMITTER CONVERTERS

NO. 20A5-ACE TC 3.6 K KIT	10.95
Convert from 3.6V to 135V	
NO. 20A11-MC 135V-20	11.95
NO. 20A27-MC 135V-40	14.95

RECEIVER CONVERTERS

NO. 37AB7—CLA ANTENNA (Center loading Antenna)	5.95
49" long, collapsed 18", increased output.	
NO. 37A7—TCU 54	4.25
Heavy duty, 54" 3 section telescoping antenna.	
Collapses to 24".	
NO. 37AB—ASP 211	2.45
42" 5 section telescopes to 93 1/4".	
NO. 37AX—TCU 112	4.95
Deluxe ground based type antenna. Full 112" for effective radiation.	

R/C modeler

DEVOTED EXCLUSIVELY TO RADIO CONTROL

DON DEWEY
EditorCHUCK WAAS
Assistant Editor

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Barry Halstead
Art Director

Contributing Editors

Hank Giunta
TechnicalH. G. Cooper
Research & DevelopmentFrank Justin
MultiCliff Rausin
ForeignBill Murray
CanadianHenry C. Holcomb
EasternDale Willoughby
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EDITOR'S MEMO



by Don Dewey

At The Edge Of The Field

I can remember, some twenty years back, being ten years old and scared. Standing at the edge of the flying field, I felt a mixture of excitement at seeing the many gull-winged free flight ships seeking thermals in the warm morning air, and a feeling of embarrassment at the crude results of my own first attempts at model building. I had only been there a short time when a man---unnamed, but never forgotten---came over to the edge of that field and helped me strap on the wing and stab. A few minutes later my first model was in the air and actually flying! That man---who spent most of the afternoon helping a young boy solo---created an image of a modeler that has never been forgotten or destroyed.

This same image has been everywhere apparent since the very beginning of R/C Modeler. When we began work on the magazine, we were told that we had a 92% chance of failure before we even got off the ground.

And so did that first model, twenty years back---if it hadn't been for the help of another modeler. When you stop to think about it, if you have a 92% chance of failure, then conversely, you have an 8% chance of success! We hadn't been at work too long before we found the formula to success---when you take that 8% and then multiply it by the number of modelers that offered their help in a multitude of ways---that came over to the edge of the field---then we couldn't possibly fail.

So we made it to the flight line. The credit goes to each and every one of you for your ideas and suggestions in your letters; for the handshakes and the words of encouragement from those we were fortunate enough to meet personally at the Nationals. And, too, to the many members of the hobby industry for their time and efforts in helping a new venture get started. You'll find their names in the advertisements in this issue---men who are part of this image---buying space in a magazine they had never seen, written by people of whom they had never heard!

It's called coming over to the edge of the field....

We have begun with a challenge--to bring the finest material together between two covers of a magazine in order to provide you--the radio control modeler--with a panorama of the RC world in a fashion unmatched by any other magazine or medium. It is your magazine---it will be what you want it to become. This is our promise to you---our editorial policy.

The true riches of any man's life is in the friendships he is privileged to enjoy---the measure of his success lies in the challenge to be of service to others. In these respects, we consider ourselves among the most fortunate.

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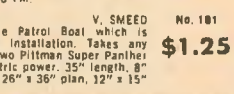
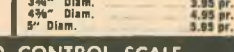
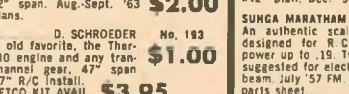
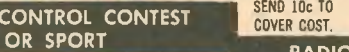
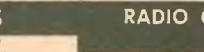
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TIMELY PLANS
BOX 31 • HALESITE, N.Y.

► For this first column, a few hints on wiring should be of general interest. The result of 'snooping' at various fields gave the impression that some installations are somewhat less than neat. A close look at your own ship may reveal that "plate-full-of-spaghetti" look. If it does, chances are that somewhere - sometime - your control system is going to malfunction as a direct result of that tangle of wires.

It is not really difficult to make a neat wiring job, which not only looks better, but is more reliable as well. A point to remember is that an extra hour or two spent in doing a clean wiring job will pay-off in dividends of reliability and ease of installation.

A Kraft 6 receiver was chosen for our example since it is representative of the middle ground between single channel and full multi. The procedure and methods outlined here can be easily carried forward to eight and ten channel installations. The photos indicate the end result, but a short description may be helpful. The red, white, and black wires which carry power to the servos are first spliced to make each wire splay out into three (for 6 channels). This splice is not difficult to make, and is the basis for this type of wiring. Strip about 3/8" of the insulation from each wire, then twist three of the four wires together. Slide a piece of thermoshrink or spag-

hetti over the one remaining wire then twist the end of this wire onto the other three. (See Fig. 1) Solder the joint, and slip the thermoshrink over the splice and heat - shrink. Make the other two splices in the same manner.

After an examination of the receiver case, it was decided that minor surgery was required. Being a six-channel receiver, three holes were required for the servo cables. The third was made between the two holes already in the case, and a grommet was inserted. Since the Kraft receiver is a two-deck affair, and in the interest of small physical size, two other modifications were needed; the hole in the lower printed circuit board through which the



BENCH BITS

By Hank Giunta, WA6QEX

power cable passes was enlarged to 5/64", and a new hole was drilled in the upper printed circuit board between the two outermost relays. (See Fig. 2) The holes in the lower board were enlarged in order to facilitate carrying the black and red wires through to the lower printed circuit board in the event that a power converter is added later on. Believe me, it is a real job to enlarge that hole with wires in it! When the converter is added, the power is brought to the lower board from the power cable, then routed back to the upper deck.

The red, white, and black wires were then threaded from the top through the hole in the upper deck with the splayed ends (three wires each) just barely pulled through the hole. The

other ends of the wires were threaded through the power cable grommet.

When the leads to the relays were soldered, they were led out through the three grommets, one set of five wires coming from each pair of relays. In addition, the three power wires (white, black, and red) were threaded through the grommets of each relay pair. The ultimate result is one cable entering the receiver carrying all necessary power, and three cables leaving the receiver for the servos. An eight-pin connector is necessary for the servo connection. Although Amphenol rack-and-panel type connectors were used for this installation, the popular 8-pin Dean's or Orbit plugs will serve as well.

It is difficult to completely describe the entire operation, as words seem to

make the job look more complex than it really is. Again, the photos will clarify matters.

The wiring harness is the final step of the job. Because it is no longer necessary to carry power to the servos from this harness, it is very simple to make. At this time, a few measurements of the plane's radio compartment will give you an idea of the length required for the harness, its associated switches and plugs. Each airplane is different in physical configuration, so no figures can be given here. If desired, the harness can be made long enough to accommodate any airplane, the excess being neatly dressed in an inconspicuous spot during the installation.

As shown in the photos, thermo-

(Continued on page 5)



Where did the wires go? Simplified multi hook-up features neat, clean installation.



shrink tubing is used on all joints to remove mechanical strain and to prevent disastrous short-circuits. The 30V "B" battery is patched into the power plug, and is easily dispensed with later if a power converter is added. The switch is placed in the +30V and +1.5V lines, the length of its leads dictated only by the physical dimensions of the fuselage. As the photographs testify, this arrangement makes a very neat wiring job, with the extra work fully justified.

Incidentally, this arrangement was not just "done on the bench." Upon completion, the equipment was installed in a highly modified deBolt Champion and flown for several weeks.

Owners of transmitters equipped with DC to DC converters, take note: If you have ever wondered about the state of charge in the nicads before or during flight, here is a very simple yet effective gimmick to ease your mind. It is a relaxation oscillator of the most elementary form which blinks away at a rate determined by the circuit constants and the applied voltage. Build it, place it across the B+ supply, and stick the neon bulb through a grommited hole in the transmitter case. Don't worry about the current drain on the B supply as it is only a few microamperes. In use, merely note how fast the light blinks. As the batteries run down, the blinking rate will slow down. If you previously check the blink rate at full charge and at near-discharge, you have a good idea of how slow the blink rate can become before a recharge is needed. The value of the capacitor may be adjusted to provide any blink rate desired. Increasing the value of the capacitor slows down the blink rate while decreasing it speeds it up. Total cost of parts is less than 75¢ and it may save you a \$500 airplane.

In closing for this month, I would like to state that this column is intended to serve our readers in semi-technical and technical aspects of RC. It is important that we, here at RC Modeler have a good idea of the interests of the readers. If you have any preferences as to the general trend of this column, I would appreciate hearing from you. In addition, if you have developed any gimmicks, methods or circuitry which may be of interest to other RC enthusiasts, and are willing to share them, drop me a line c/o R/C Modeler, P. O. Box 487, Sierra Madre, California. Full credit and a year's subscription will be given upon publication of any material used.

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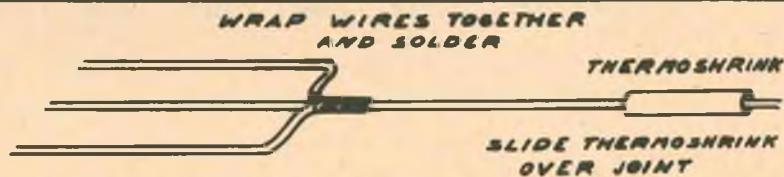
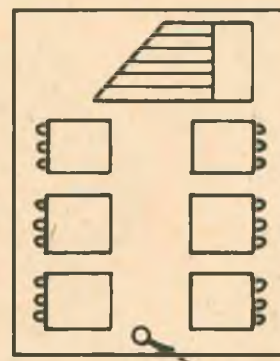


FIG. 1

TOP DECK OF KRAFT 6 CHANNEL RECEIVER



DRILL 1/8" HOLE

FIG. 2

STATE OF CHARGE INDICATOR

NE-51 NEON BULB

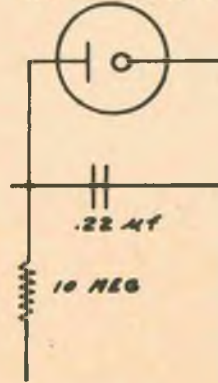
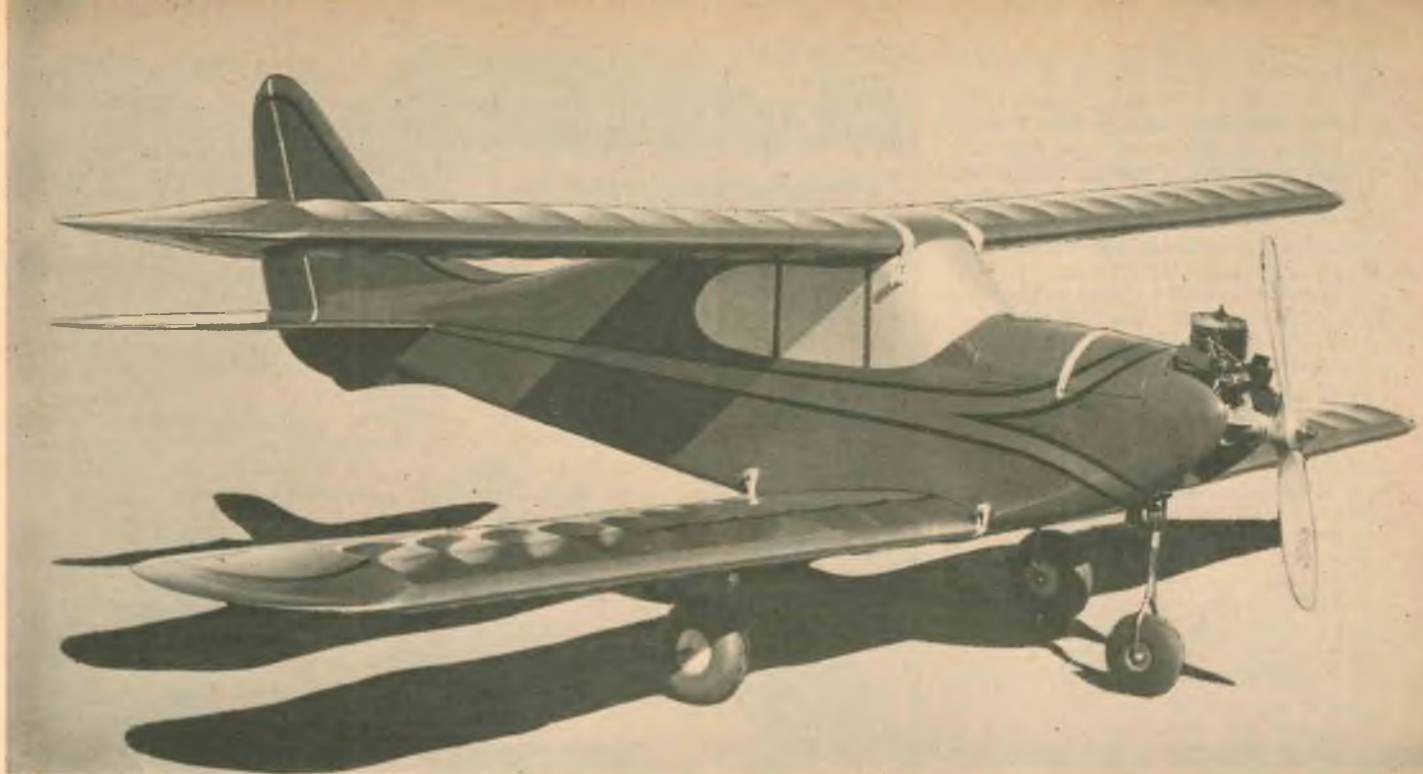


FIG. 3



Creative design and proven performance make an unbeatable combination for biplane addicts.

Phil Kraft's

STAGGER-BI

Beautiful Multi-Bi for Proportional or Reeds

Full Size Timely Plan Available

► For many of us, the biplane evokes a feeling of nostalgia for the early days of aviation. Although certainly obsolete for full-scale use, the biplane still has a definite place as a radio-controlled stunt aircraft. It has the advantages of compactness, light weight, and extreme maneuverability. In addition, we can absolutely guarantee that when flying the Stagger-Bi, the spectators will pay little attention to any other model on the field!

The first Stagger-Bi was flown in the Summer of 1959. It was a success from the beginning: very fast, highly maneuverable, and exceptionally spectacular in the pattern. Two years ago, a cleaned-up version was built, adding the tricycle gear. This is the ship shown in the picture.

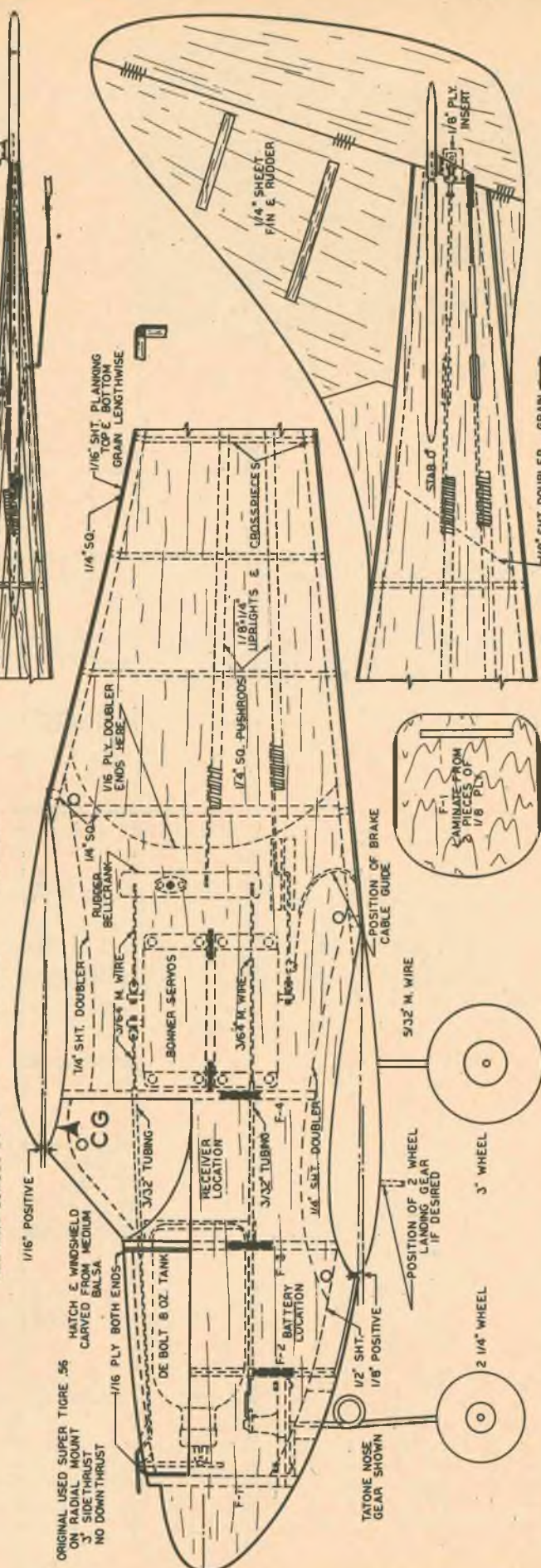
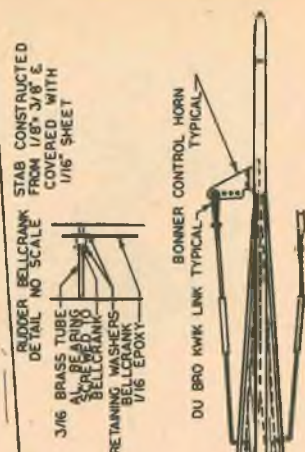
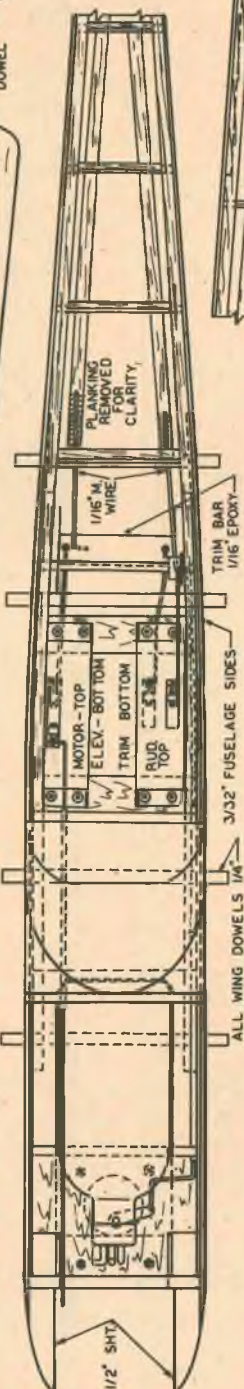
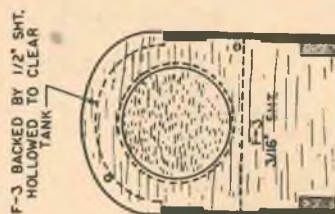
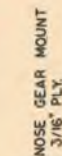
For the technically minded, the theoretical advantage to negative stagger over positive stagger is that the decalage set-up of the wings is so arranged

(Continued on page 31)

Stagger-Bi and friend. Note new proportional transmitter.



DESIGNED BY *B.A. Kraft*
DRAWN BY *Beverly Melsted*







John Schroder's modified Tri-Squire. First in Jr.-Sr. Class I. You should be proud, Walt!



Bud Atkinson and original Aristo-Cat. 4th in Class II.

1963 Nationals Coverage by Chuck Waas



Frank Johnson and Chuck Boyer's B-17. Failed to qualify due to engine trouble.



Dr. Don Crow and original Miss Witchkraft. Must have been the right brew — scored third in Class III.

Los Alamitos

Monday, July 29: The first day of the 1963 Nationals, and everyone----contestants, spectators, and officials alike---are caught up in the air of excitement and anticipation that prevails at these annual championships. Our radio mobile unit arrived at the NAS at 7:00 AM, and already there was considerable activity around the air station. It is a slightly overcast morning and begins with delays due to incoming Navy aircraft, during which time operations temporarily cease.

A major point in the morning's activities is the arrival of a fully-scale, tri-motored C-125, brought by builder Claude McCullough. This magnificent model gathers a following of spectators for Claude that stays right with him throughout the day.

On the scene, too, is Maxey Hester with a new P-63. Joe Martin, last year second-place scale winner, arrives with his XB-47D, complete with Digicon proportional gear. Also a very interesting B-24 at the field.

First day qualification flights were plagued by intermittent interference which was subsequently traced to leakage from the screen room where transmitters are tested. Class III Combined qualifiers are: Maxey Hester (130.5); Jerry Pullen (124.5); Lloyd Sager (120.5); J. Kirkland (113); and W. Williams (112.5). Class II Combined: R. Jackson (90); Hugh Clark (85). Class I Open: T. Williams (82.5); Al Doig (62.5); and Harrison Morgan (55.5). Class I Jr.-Sr.: E. J. Schroeder (50). Pylon: G. Carter, (1:36:55) and Granger Williams (1:24:2).

By the end of this first day, 132 entrants had registered, with 81 in Class III, 14 in Class II, 27 in Class I, and 10 in Pylon.

First day impressions----the quality of flying very good--reeds still predominant---a great number of retractable geared ships----scale entries down almost 75% over last year. A great predominance of Taurus's, modified Stormers, and the fast twin-rudder Torero. The pylon event is dominated by the

deltas--almost too fast to fly. The life span here is short---very!

Tuesday, July 30: The first scale qualification trials. R. Jackson's B-24, a fantastic flight! The big ship completely stable and under control at all times----all four Fox 15's working to perfection--the pattern and touch-and-go beautifully executed. The landing was accomplished with all motors throttled back, perfect taxi, and then braked to a stop.

One of the most interesting features to date was the flight of a very old vintage model with--believe it or not---a very old Morton M-5, five-cylinder engine, which started on the second flip and was extremely quiet running. A short flight, but very realistic.

The XB-47D--almost indescribable --about a 150 yard takeoff run--smooth and perfect. The pattern flown was excellent to the point of almost equalling any multi in the air. Then it happened

(Continued on page 35)



Dale Willoughby's Cessna Skylane. Time ran out for this magnificent entry as engine difficulty developed at flight line. To be featured in RCM.

'63 Nationals



Bud Atkinson with Mooney Mite. Second in Scale. REMAT plus flaps, retractable gear and lights. Orbit 12.



A pair of Champions. First place Class III winners Jim Kirkland and Beachcomber. Sampey 404 proportional. Could that be a Florida tan, Jim?



Joe Martin's spectacular XB47-D. Destroyed on landing.

1963 NATIONALS . . . continued



Bernard Williams and modified Live Wire Cruiser. First in Open Rudder. 7 degrees upthrust!



B-24 ala Ralph Jackson. 4th in Scale.

RC Coverage



The most beautiful multi at the Nat's—Vic Husak's Altair. Acrylic lacquer.



First in Scale—Maxey Hester's P-63. Note instrument panel. Good detail and excellent flight pattern.



"You mean these aren't the Internats?" Dr. Ralph Brooke and Bob Dunham.



Scale Corsair by Joe Murphy.



Designed for weekend flying fun, the Exodus is an excellent choice for the beginner

Full Size Timely Plan Available

EXODUS

By Barry Halstead

► We would like to state at the outset of this article that the Exodus is the result of several years of research and development in single channel, rudder only airfoils, moments, and areas.

Only we can't.

The truth of the matter is, the Exodus was sketched out on the back of an envelope one night while watching the Johnny Carson show. Conceived in rebellion against the nauseous supremacy of RC ships with slab sides and block windshields, the Exodus started life as a vast expanse of celluloid cabin area around which an airplane developed.

As it turned out, the model was one that could be built in two or three evenings with a minimum of effort and expense, with the additional incentive of at least resembling a full-scale aircraft. There is sufficient room in the fuselage for any of the small, lightweight receivers, a couple of pencils, and the Citizenship SE-2 escapement.

To prove that the Exodus could be built in two or three evenings even by a beginner, and since our first two prototypes flew OOS (hence, the name Exodus), we gave the templates to RCM's editor. He completed the plane in just under five days which proves our point that any normal person could do it in two or three.

Before digging into the balsa bin, a

point or three to keep in mind: the Exodus is an extremely stable model with excellent sport flying and RC trainer characteristics. Thrust adjustments are built in, and along with CG location, are not particularly critical. However, one thing to keep in mind, as with all small RC jobs, is to keep the weight down! Build and finish for lightness -- the Exodus is rugged and no extra beefing up is necessary.

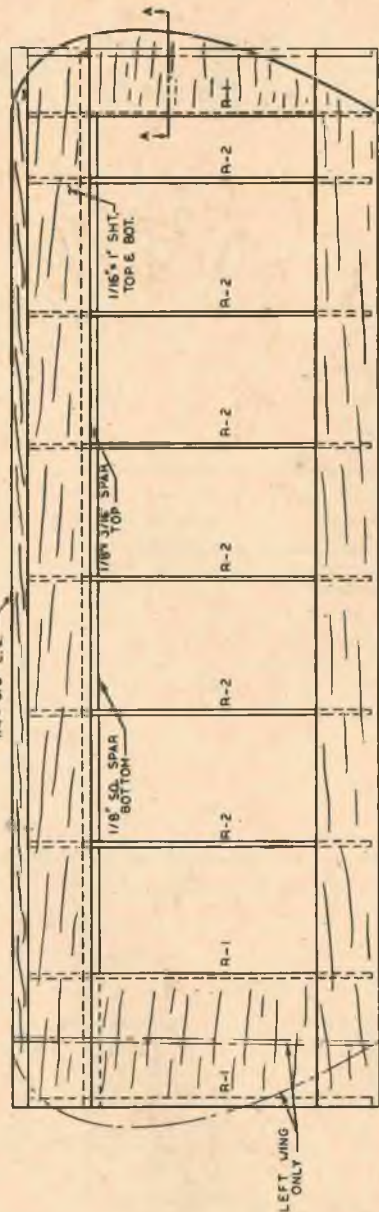
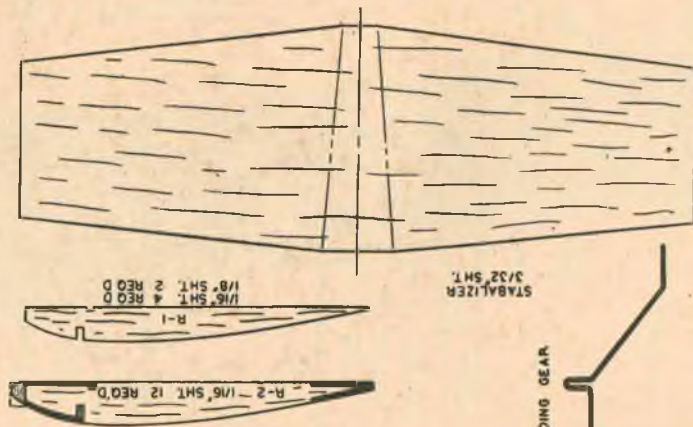
Begin wing construction by pinning the 1/16" x 1" leading and trailing edge sheeting in place over the plan. Do

(Continued on page 29)

Lots of cabin area. Change of pace from usual slab sided jobs.

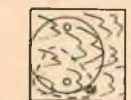
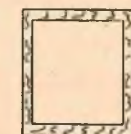
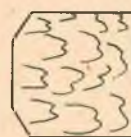
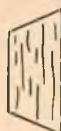
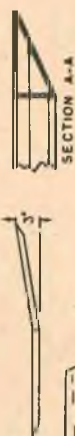


Exodus with automatic starter. Manufacturer unknown.



1/16" x 1" T. E. TOP & BOTTOM

BEVEL ROOT SECTION
E. JOIN WING HALVES
COVER JOINT WITH
GAUZE

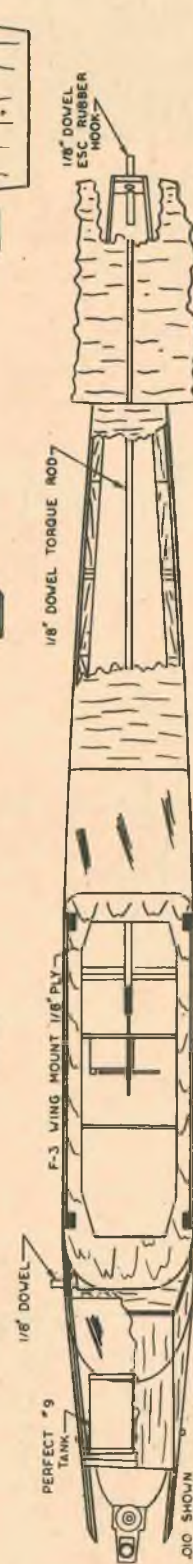


F-4
1/8" x 1/4" SPRUCE

ESCAPEMENT
MOUNT
FORNER
1/16" PLY

F-2
1/8" PLY

F-1
1/8" PLY



PERFECT #9
TANK

COX .010 SHOWN
EXODUS FLIES
EQUALLY AS WELL
WITH PEE VEE .020

1/16" SHT
TOP & BOTTOM

1/8" SQ. E. 1/8" DOWEL
NOT SHOWN TOP VIEW

F-3 VING MOUNT 1/8" PLY

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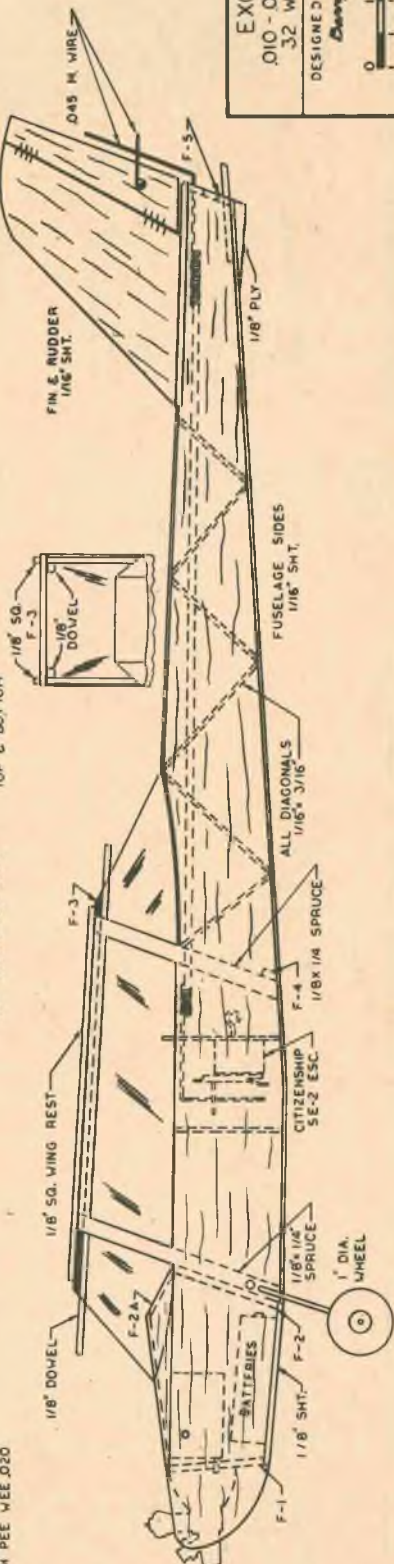
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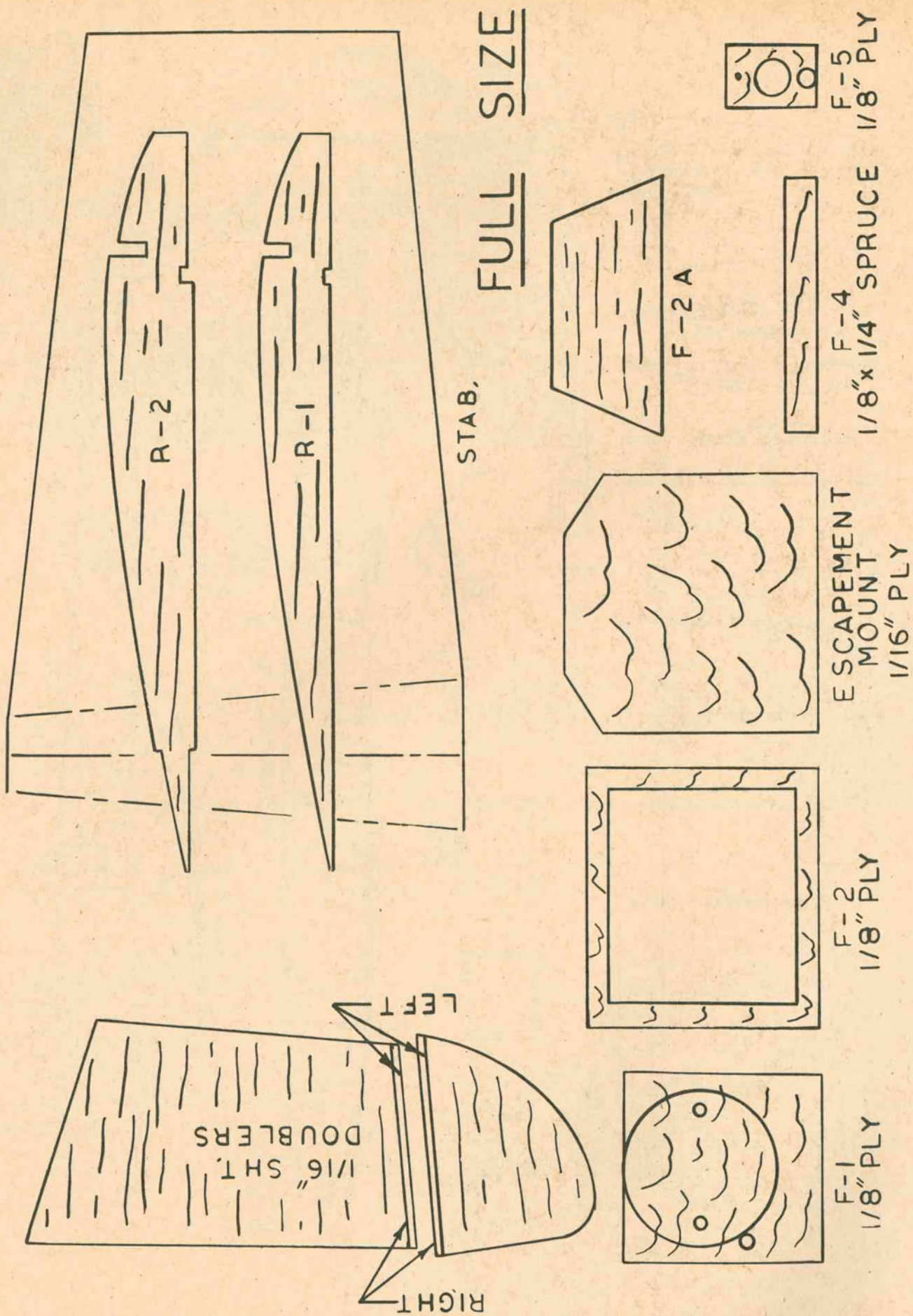
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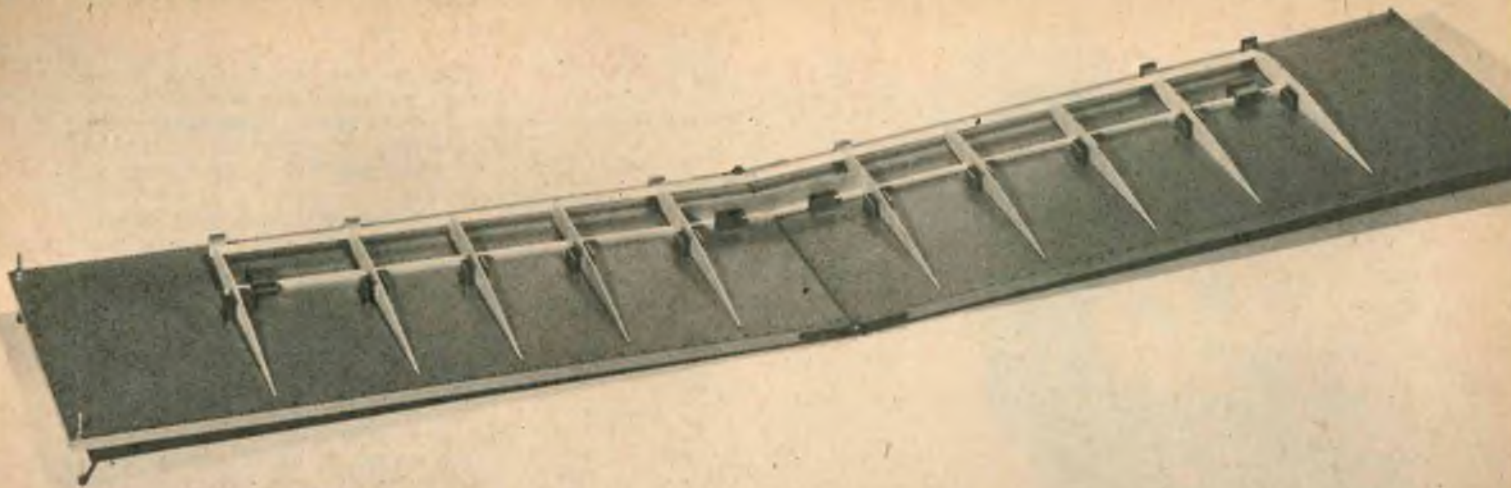
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Build 'em Right

Precision building in half the time . . . and an insurance policy for successful flights

► The strides that have been made during the last few years in the field of model building, and particularly in radio control, are just short of phenomenal. Manufacturers have provided us with a fantastic array of equipment from which to choose. Generally, this equipment is of the highest order, with the result that modelers of today are producing radio controlled aircraft that literally defy description.

Interestingly enough, while radio equipment, accessories, and plane designs have been considerably advanced, there is one area where we have not kept up-to-date ----- the actual construction of the model itself. Kit manufacturers have done everything possible to make the model easy to build, and independent designers are always looking for building shortcuts. However, until recently, there have been very few commercial developments that would give the modeler a method of assembling with any degree of speed and accuracy. Most modelers have depended upon the old system of using pins, clamps, clothespins, and anything else at hand in order to build their models. This is somewhat of a paradox, because it is, after all, the airframe that is the most important unit of the RC model. There is nothing that detracts from total performance as much as a warped wing or other flying surface, and it is doubtful if there has ever been a set of instructions written that has not cautioned the builder to take care to avoid warps and twists and to build with as much accuracy as possible. It is obvious that nothing less than the best should be our goal in airframe construction, particularly when we consider the fact that this same airframe is carrying an investment in radio gear ranging up to several hundred dollars!

Yet, under most building conditions, this has been impossible. What, then, is the best way to build a perfectly-aligned model? The answer is by the use of a jig. A jig or fixture is a device used to hold parts or assemblies in exact alignment and position while work is being performed. Master builders such as Hal deBolt or Jim Jensen, build all of their models using such devices. Jim, for example, using a twelve minute level, measures the accuracy of his surfaces in thousandths of inches! The result of this effort, however, can only be appreciated when you see his ship literally fly right off the jig, requiring little or no trim-for the first flight.

Traditionally, the typical model building jig is a flat

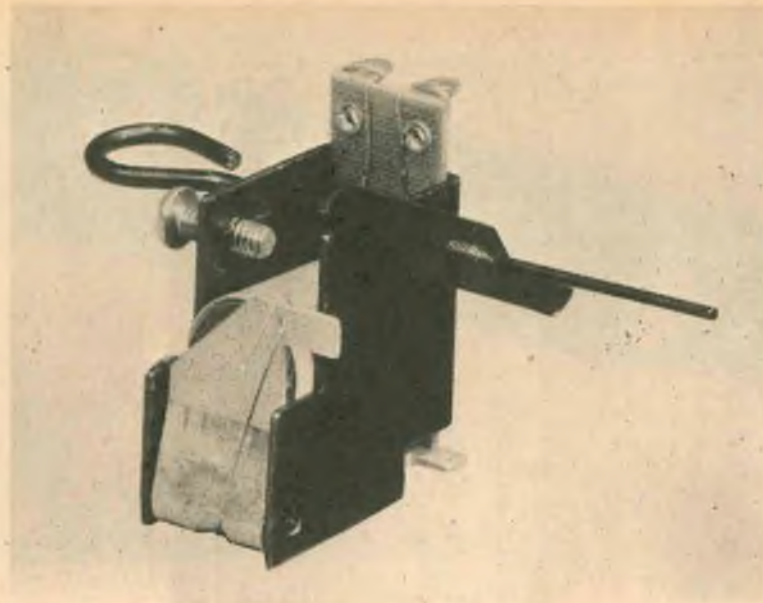
plywood panel with wood blocks, formed on a table saw, and placed in appropriate positions. While this method of assembly works in most cases, the time, materials and equipment costs involved lead most modelers back to the old pin and breadboard method. Too, wooden jigs themselves are subject to warping. Perhaps the biggest drawback is the fact that this type of jig is more or less permanent, and capable of producing only one kind of part.

A year or so ago there came onto the market the first really new approach to the problem of building any model with jig and fixture precision, yet providing a universal application to all structures. This was the Magna-Jig, developed by Dave Berg, former Naval pilot and current active RC'er, for his own use in building RC models. Dave's design rapidly became a 'demand' item, and was subsequently manufactured by Norquist Products, where Dave now serves as general manager of the Magna-Jig division.

The concept of Dave's design is fundamentally simple, yet unerringly accurate. Basically, the Magna-Jig replaces the old plywood work surface with a flat steel, unitized work panel. The standard jig is 36" long by 15" wide and is completely stable, and of course, warp proof. The deluxe dihedral unit, used in our tests, consists of two 15" x 36" work panels with adjustable hinge and leg sets, giving an overall working span of 6 feet. This allows a complete wing to be built as a unit with no loss of alignment due to dihedral blocking or joining of wing panels. When not in use, the unit folds into a 36" x 15" package for storage. Both units are finished with a tough baked enamel surface with a convenient working scale printed along the left and bottom sides. The jig also has legs as an accessory to elevate it above the work bench, or to set dihedral angle. These legs are independently adjustable in fractions of inches, allowing the jig to be precisely leveled with a carpenter's level.

The heart of the Magna-Jig is found in the small, yet very powerful nickel-plated jig blocks. In size, these blocks measure 1-1/8" x 7/8". They use a berrium-ferrite magnetic core and have a "pull" of about 8 pounds! These are ground to a precision right angle and replace the wooden blocks that were ordinarily glued to the plywood panel. We found that they will hold the structure tightly and securely --- far more so than any other method of assembly. The unit is thus completely interchangeable because of

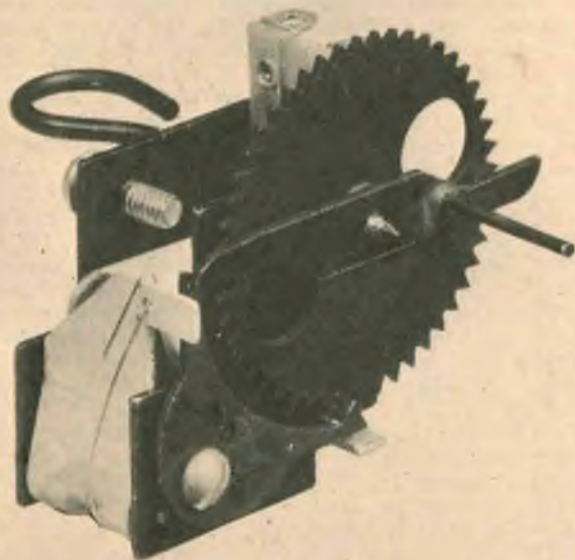
(Continued on page 32)



Improving Escapement Reliability and Performance

RX for Escapements

By H. G. Cooper



For Sale: One single channel escapement, \$100.

Chances are, you wouldn't beat a path to the door of this advertiser, but this is what a faulty escapement could conceivably cost in plane and equipment loss if the escapement "hangs-up" in the air.

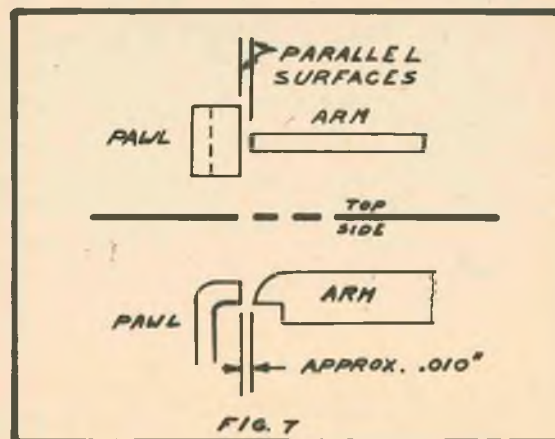
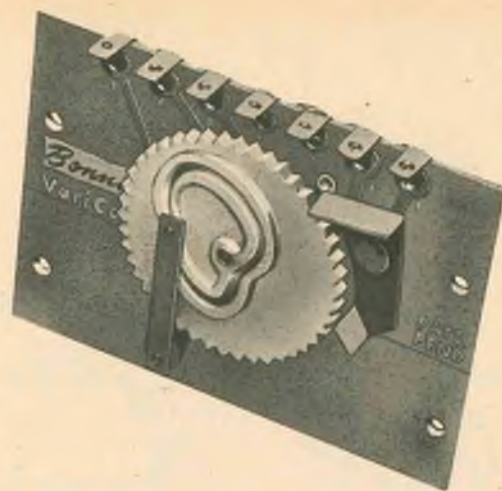
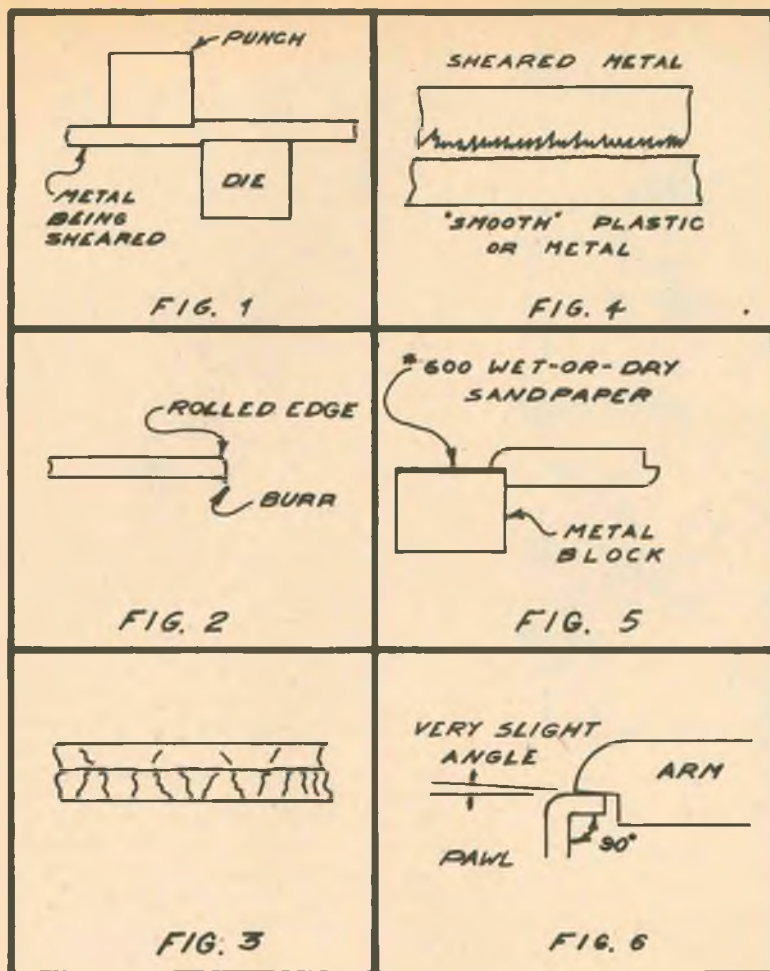
Rubber powered escapements have been the principal actuator for rudder-only flying for many years, and due to the lack of reliable single channel servos, will probably continue in this prominence. It is true that intermittent escapement operation has caused numerous difficulties, but it is similarly true that they have been blamed for more than their share of mishaps.

We are getting the best dollar value for our limited budgets in the many fine escapements on the market today. There is no such thing as a "bad" escapement---they all work just as you get them from your hobby dealer. But, we can't expect a manufacturer to deliver \$20 - \$30 worth of merchandise for the \$5.95 to \$12.95 prices we pay at the hobbyshop counter or mail order house. But---with a little bench work we can increase the performance so that we can obtain complete reliability with each flight.

Let's look at the various types of escapements and see what makes them tick. The escapement is an electro-mechanical device which is powered by the torque (twist) of a loop of rubber. A pawl or clapper is pulled against the pole piece of an electro-magnet when direct current energy is applied to the winding of the magnet. This allows the actuating arm, which is connected directly to the rubber band, to swing from a neutral stop on the pawl to an actuate stop. The arm will stay on the actuate stop as long as energy is applied to the coil. When this flow of energy is removed, a spring pulls the pawl back against a stop and allows the arm to proceed to the next neutral position.

When there are two neutral stops and two actuate stops (actuate in one direction, neutral, actuate in the other direction, second neutral), the escapement is called an SN type, regardless of the number of claws on the arm (2 or 4), or the number of claws on the pawl or clapper.

Other escapements of the compound type have up to four claws on the arm for actuate positions and another claw for neutral position. The pawl has one claw for actuate stops against the actuate claws of the arm, and one claw to stop the neutral claw of the arm. The actuate claws of the arm must always pass the neutral claw of the pawl as the arm rotates from neutral clear around to the next (and only) neutral. Since compound escapements give many controls in sequence before returning to neutral, it is necessary to slow down the speed of rotation so that the pilot can apply the proper number of pulses to get the desired control, such as 1=Right; 2=Left; 3=Up; 4=Down, etc. varying in pulse-response according to



By following these simple steps you can eliminate escapement failure

various escapements. The slow-down device is a star-wheel attached to the arm or driven by a gear attached to the arm. The action of a rocker arm against the star wheel acts as a governor. The faster the escapement tries to rotate, the more resistance the star wheel offers to this rotation. Naturally, the star wheel robs the rubber motor of some of its power, but this is negligible, assuming that all other parts of the system are "go."

In the manufacture of escapements there are two main processes employed in nearly all of the units on the market today. The first process is shearing of the metal (or punching) for the frames, pawls, arms, etc. As you can see (Fig. 1), the action of punching or shearing is similar to the downward action of scissors shearing a piece of paper, except there is no slicing action, since the punch moves straight into the die. Since the cutting edges of the punch and die can never remain perfectly sharp and aligned, we find that one side of a sheared piece of metal is rolled and the other side is hooked into a sharp burr (Fig. 2). Most manufacturers remove this burr by tumbling the pieces in a barrel filled with abrasive material.

If the imperfectly matched punch and dies move further toward each other, as in Fig. 1, they will proceed

to tear the metal apart, which in addition to the hook-like burr, will leave a surface along the shear line which will look like Fig. 3. This sheared roughness, which cannot be removed by high-production manufacturing techniques, is the heart of our "hung escapement" problem. In all of the escapements examined in the preparation of this article, either the pawl or the arm (or both) was fabricated of sheared metal, and the sheared surface was in contact with a plastic or smooth metal surface, or another sheared surface as in Fig. 4.

Close examination under a magnifying glass or jeweler's loupe will show that the sheared metal is like a crude file, and that it is trying to cut away the material with which it is in contact. This filing action is mechanical resistance or friction, which prevents the adjacent parts from sliding smoothly over each other. To make your escapements perform with the precision of a fine watch will require some small reworking chores. Any sheared edge in contact with any other working part must be polished. Fig. 5 shows the polishing process. Remove some of the "sharpness" from #600 wet-or-dry sandpaper by rubbing one sheet against the other. Place the paper on a smooth metal block and gently move the sheared surface back and forth over the

paper until the shear lines are removed and the metal takes on a polished lustre. You must be extremely careful to keep your polishing operation parallel to the original shear line, although a very slight angle, as shown in Fig. 6 is permissible.

Check the swing clearance and parallelism (Fig. 7) and true them up by filing the end of the arm with a fine needle file. With compound escapements it may be necessary to rework the star wheel as well as the previously described polishing operations on the pawl. Some escapements with plastic star wheels, especially those manufactured several years ago, have tiny burrs at the edges that might hang up with the rocker arm. These burrs are easily removed with a sharp X-Acto blade. Other compounds that use a gear drive to the star wheel do not seem to have star wheel "hang-up" problems.

Some escapements with extra light springs tend to hold the pawl against the electro-magnetic pole piece in spite of the springs' efforts to return the pawl to neutral position. This condition is due to residual magnetism within the magnet. It can often be cured by placing a thin piece of cellophane tape on the end of the pole piece between it and the pawl. Since this tape will slightly reduce the throw of the pawl,

(Continued on page 29)



John Worth, Maynard Hill, and Tom McGraw, following successful record attempt. Photo by Fremont Davis.

FLY-IN

News of RC'ers Around the World

Russian Altitude Record Clobbered . . . New World's Speed Record Set

Walt Good and Tom McGraw on tracker, with Capt. R. F. Sellars, U.S.N. Official photograph U.S. Navy.



► The FAI Altitude and Speed Record attempts, held at the US Naval Weapons Lab, Dahlgren, Va., during the Fourth of July holiday weekend turned out to be a record-smashing derby! The Soviet-held FAI RC altitude record of 7,380 feet was exceeded seven times by four different fliers! Maynard Hill, AMA Vice President and DC/RC prexy, flying an original design high shoulder wing with Sampey proportional gear and Fox 59 mill, was top man with an altitude of 13,320 feet. Walt Good, Howard McEntee, and Bill Northrop also exceeded the existing record during the attempts. C. R. Scott of the NVRC broke the old US held speed record with a Hustler type delta and McCoy 60, setting a new worlds record of 126,914 mph!

For his attempt at the record, Walt Good flew his own Multibug with WAG TTPW operating REM, Engine was a Merco 49. McEntee's model was an original design KD III with CAR, elevator and motor control. Radio gear was his own Mac - Tone KD -- engine, ST 40. Bill Northrop's model was his Honest John biplane with REMA operated by DeeBee Quadruplex. A Fox 59 supplied the power.

Altitude instrumentation for the record trials was supplied by the Navy lab and NASA, consisting of radar for distance, elevation, and azimuth tracking and measuring. The optical tracker manually operated by two people, was coupled to the radar antenna for synchronous tracking. Each model had patches of aluminized Mylar glued or taped to it in addition to a ten foot streamer attached to the tail as a radar tracking aid. One of the optical trackers used was equipped with a long-range camera which took moving pictures of the flights. Speed instrumentation consisted of a manually switched system of precision electrical clocks, triggered at course start and finish poles by operators. An electrical network tied the remote trigger operators to the central clock station.

On the international scene comes news from Harry Brooks in England, via Cliff Rausin, our Foreign Editor, of the successful flight of the first four-engine scale model, a B-17 Flying Fortress. Here is the way Harry tells it:

"On the evening of May 18th, at 8:15 p.m., Dave Walker's fully scale Flying Fortress was successfully flown by Harry Brooks for a period of not less than 8 minutes, starting with a correct unassisted take-off, a steady climb to approximately 800 feet, five large circuits of the field, followed by a correct three point landing. The model was using the F & M Matador/Midas combination. . . . We had to wait most of the evening until the wind dropped to approximately 15 mph, then I started the two starboard engines while Dave started the port pair. With the four engines singing, I made a few needle valve adjustments. . . . feeling the nacelles and watching the exhaust for a rich setting. The noise was tremendous. . . . a check over all the controls, throttle back the

motors, a quick glance at Dave who looked a shade pale, then throttle open and the Fort was rolling. The tail came up almost at once, and I slowly pulsed "up" to keep it level, a touch of rudder to stop her slight swinging, and then it lifted! Very slowly at first, a touch of aileron -- the trim was perfect. What a sight! I held my breath... with all four motors singing perfectly and a faint trail of exhaust curling out behind, the slow climb continued, until at about 300 feet I gave a touch or two of elevator to prevent the nose dropping, and then she was returning over the field.

Then it happened! As the speed built up, the nose suddenly reared! I slapped on full down without effect. It slowly stalled, dropping one wing. I lifted the nose and heard Dave shouting, "Get it up!" Up came the trim, the nose lifting, and we slowly gained height. At about 800 ft. I leveled out and made a turn back into the wind. Then, again, it lifted its nose and stalled! But we had height, and it appeared to lift its nose only when the model gradually accelerated and reached a speed something like flying speed plus 20 mph. I made five circuits of the field at about 500 ft. After approximately 8-10 minutes I throttled back the motors and made my landing approach. The position was good and I started the approach well back. Surprisingly, the Fort glided very well considering the sink speed was quite high. Up came the trim to level out.... two motors had cut but I did not notice any swing one way or the other.... now full up trim was on, still the nose was not high enough.... we could hear the air whistling over the model now. The speed seemed not too low, so I started slowly pulsing up.... faster pulse now, up came her nose, she was flattening out. Down went one wing slightly, aileron correction, no stall tendency, height, 10 feet.... she was slowing right down, sinking fast now, another touch of aileron, then she touched all three points and rolled slowly to a stop."

Whew! Harry states that this tendency to lift its nose at certain speeds is being investigated and corrected, and that, following extensive flight tests, this fabulous RC model will be flown in public!

The first Heart of America RC Contest was held in the latter part of June at Lake Jacomo, Mo. This is another annual event that proved to be a "must" if you can make it. Sponsored by Ace Radio Control and Grid Leaks magazine, the event drew fifty contestants, despite the blistering 100 degree heat! Ten judges were used for the two day meet and flights were made two at a time using three sets of judges each plus timers. Judges were continuously rotated. One of the most unusual aspects of this contest was that there were only two crack-ups! Maxey Hester won the Best Finish Award and top honors in Multi. Dr. W. Clark won the Sportsmanship Award, with C. Smith and Bud Atkinson taking

(Continued on page 33)



Beautiful scale Tony by Dick Riggs.

Larry Scarlett's Fox Navion with Space Control.

Doug Spreng and Digicon proportional system.



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Tony & Addie Hobby Lobby
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Dyck's Hobby House
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Fullerton, California

Lee's Hobby
10526 Garden Grove Blvd.
Garden Grove, California

Hawthorne Hobby Den
269 West El Segundo Blvd.
Hawthorne, California

Craft Service
3966-1/2 Studebaker Rd.
Long Beach, California

Lakewood Village Hobby
4127 Nasse Way
Long Beach, California

Modelcraft
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RELAYLESS RECEIVER
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Weight: 5/8 oz.

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UTMOST RANGE AND
RELIABILITY. RELAY
FOLLOWS FASTEST PULSE
Size: 1 x 1-1/2 x 2-1/8 in.
Weight: 1-5/8 oz.

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CS-505A FINCH II

DUAL BALANCE OUTPUT.
OPERATES ALL STANDARD
ESCAPEMENTS, QUICK BLIP
FOR MOTOR CONTROL. ALSO
DRIVES MAGNETIC ACTUATOR
FOR PROPORTIONAL CONTROL
Size: 5/8 x 1-1/4 x 1-5/8 in.
Weight: 3/4 oz.

\$24.50

*Automatically adjusts sensitivity to prevent close-up blocking, yet provides tremendous operational range.

ACTUATOR

SINGLE CHANNEL BOAT SERVO

BOTOMATIC

\$12.95

Size: 1-1/2 x 2-1/2 x 3 in.
Weight: 1-1/8 oz.

Provides L-R steering, fwd-stp- rvs motor control. 3 volt battery. Self neutralizing.



6 VOLT LEAD ACID BATTERIES



NICKEL CADMIUM BUTTON CELL BATTERIES

ENCLOSED IN DURABLE
PLASTIC SHEATH WITH
SOLDER LUGS AT BOTH ENDS.

1.25 volts per cell. All may be tapped between cells for additional voltages. Rechargeable - Indefinite life with proper treatment. Negligible self discharge. Constant voltage output.



	100 mah	225 mah	500 mah (sintered)
2 cells	.7 oz \$2.90	1 oz \$3.50	1.9 oz 6.00
3 cells	1 oz 4.20	1.3 oz 5.00	2.9 oz 9.00
4 cells	1.3 oz 5.50	1.8 oz 6.50	3.9 oz 12.00
5 cells	1.7 oz 6.80	2.3 oz 8.00	4.9 oz 15.00
6 cells		2.8 oz 9.50	5.9 oz 18.00

BATTERY CHARGERS

Made especially for these batteries. Assure full charge without damaging cells through overcharging. Handle from one to six cells.
13 ma output (for 100 mah cells) \$5.50
28 ma output (for 225 or 500 mah) 6.50

AMP HRS	LENGTH	WIDTH	HEIGHT	PRICE
4.5	3-9/16	3	4-11/16	\$7.95
7.0	4-7/8	2	4-1/8	\$8.95
9.0	4-11/16	2-1/4	5-1/4	\$9.95

PLASTIC HOUSING, FUEL AND OIL RESISTANT.
IDEAL FOR MOTORCYCLES, SCOOTERS, TRANSMITTERS, BOATS, ETC.

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*CS-507S



*CS-508S

\$54.50
(SINGLE CHANNEL)



CS-507M

Size: 1 x 1-3/4 x 2-1/2 in.
Weight: CS-507S - 2-1/2 oz.
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CS-507M EQUIPPED WITH
SUBMINIATURE NEW HAVEN
10 CHANNEL REED BANK.



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Size: 1 x 1-3/4 x 3 in.
Weight: CS-508S - 3 oz.
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CS-508M EQUIPPED WITH
STANDARD MEDCO (OR DEAN'S)
10 OR 12 CHAN. REED BANK
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(10 CHANNEL)

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PRECISION ELECTRIC MOTORS

VARIOUS GEAR RATIOS. FINEST
MOTORS IN THEIR CLASS FOR
SLOT RACERS, BOATS, AND PLANES.
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BUILT TO STAND ABUSE, STRAIN
AND LOADS NEEDED FOR R/C.



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MINICOMBO II

Single channel rudder, SN,
positive positioning, com-
pound action. Uses two
pencils. No rubber bands.



\$7.95

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"TICK OFF" and
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(Dethermalizing)
TIMERS

\$3.95 ea



1/2A "TICK OFF"
TIMER. SMALL
ENOUGH FOR
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REALISTIC FLYING with PROPORTIONAL

RUDDER-ONLY CONTROL OF YOUR SMALLEST RADIO CONTROL AIRPLANE

PULSER PROPORTIONAL CONTROL

CS-504 "Pulsi-Tran"
Compact, all transistorized pulser attaches to hand held transmitter. Only two wires to connect. Knob control of pulse width (20%-80%-20%) and flight trim. FULL-ON and FULL-OFF buttons for stunting, motor control, or regular escapement flying.



\$24.50


Size: 1 x 2-5/8 x 4-5/8 in.
Voltage: 4.5 volts
Current Drain: 25 ma average

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CS-502 **FALCON**
Most POWERFUL Hand Held Single Channel Tone Transmitter Available!

Doubler operation and MOPA circuitry for maximum performance and stability. Low current drain for extended battery life. Matches C&S rcvrs, but operates all other tone receivers.



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Size: 2-7/8 x 4-3/8 x 7-1/2 inches
High quality 3-section collapsible chrome antenna. 21 in. retracted - 56 in. extended.

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CS-506 **SEPTALETTE** TREMENDOUS WHEN USED WITH THE NEW CS-505A FINCH II

MARK III 1" long 3/4" wide 3/4" high Weight: 5/8 oz. **\$6.95**

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MAGNETIC ACTUATORS FOR PROPORTIONAL RUDDER OPERATION. USE MARK III FOR .01 and .02 POWERED PLANES, MARK V FOR .02 THROUGH .049 SHIPS.

BOATS

Luxury cabin cruiser. All pre-cut hardwood parts, easy to assemble. Great for R/C.



\$7.95
29 in. long 7-1/2 in. beam

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THIS BEAUTIFUL CABIN CRUISER KIT HAS ALL PRE-CUT HARDWOOD PARTS. R/C HANDLING CHARACTERISTICS ARE EXCELLENT. 24-1/2 in. long 7-1/2 in. beam

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75 in. span contest model designed by Jan Adesson, Scandinavian Champ. Top notch wood all pre-cut.

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Easy to build yet a contest winner. Designed by Hans Hansen of Denmark. 66 in. wing span. Top wood all pre-cut.

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Standard hub size.	10-4, 10-6	\$0.65
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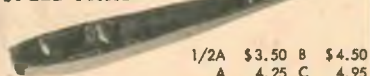
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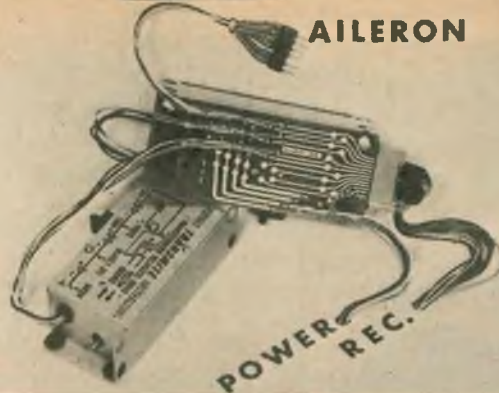
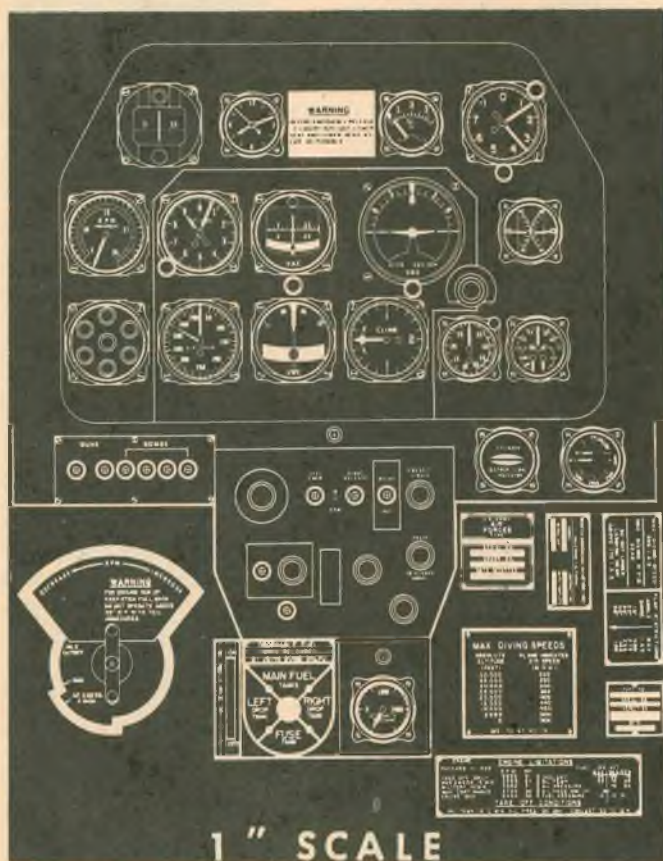


Foolproof single channel superhet and transistorized transmitter from Wen Mac.

SHOWCASE

'63

"Instant Instruments" from Hamilton Scale Products.



Justin, Inc.'s, Micro-Tie servo connector.

RC Product Report

This monthly feature is a staff written editorial report of domestic and foreign products commercially available and of interest to the radio control modeler. Since this is the first issue of R/C Modeler, and before we are accused of taking payola, let us state that this is not an offer to sell and space herein cannot be purchased. This column is open to product news from all manufacturers, and items included have been selected by the editor for their general interest. Whenever possible, they have been examined and tested by consumer staff members.

Enough said.

The MICRO-TIE Servo Connector should be welcomed by every multi flier. A high-quality printed circuit board and connector designed to simplify multi-channel installations, the Micro - Tie will eliminate up to 6 connectors and 44 solder joints in the average ten-channel craft. The unit provides connections for five servos and receiver plus servo power and reed hook-up. One of the features we liked was the hardware included to mount the Micro-Tie to the back of a Bonner servo. Price: \$7.95. Available from your local dealer or from Justin, Inc., Box 135, San Gabriel, Calif.

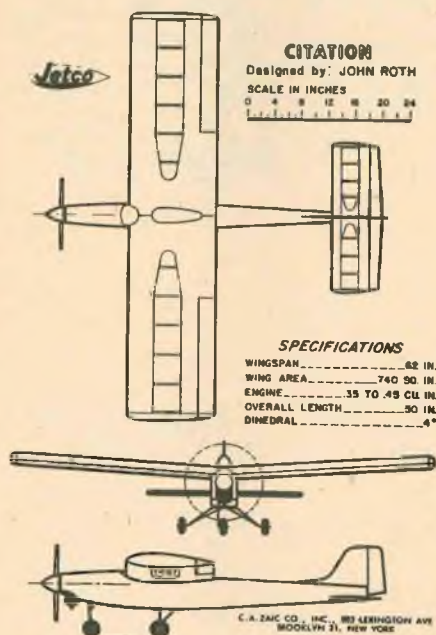
While we're on the subject of simplifying multi installations, Lew Patten of Skyline Models forwarded samples of two new items, a RUDDER AND STEERABLE NOSE GEAR BAR and AILERON SERVO CONNECTOR BAR. Both of these connectors are well made, lightweight, and extremely rugged pieces of hardware. It was this ruggedness that first drew our attention to Skyline's original brake and trim bar --- this is one place where soft, shearable metal is definitely no go. Each of these connectors sell for a buck and are available locally or from Skyline Models, 2805 South Forest, Denver, Colorado.

It's a well known fact that to build anything with accuracy and precision, and to build it faster, jigs and fixtures must be used. Top model builders talk about "flying right off the board," while most of us wrestle with warps and twists that raise havoc with flight performance. The secret has been in the use of jigs, designed and built for each specific model. We were intrigued by the ads for MAGNA-JIG, and asked Norquist Products to give us a few answers. This product is truly unique. No more pins, etc. This is a precision building tool on which you can frame wings, fuselages, and tail sections with ease. And no more warps. Magna-Jig is completely adjustable to each model you build, opening up a whole new world of building skill and accuracy-- almost like having a second pair of hands. It's excellent. Available from Magna-Jig division of Norquist Products, Jamestown, New York.

From Polk's Model Craft news of the SERVOautoMATIC a 2 - channel actuator for a host of functions in both the model airplane and boat field --- engine speed control, flaps, trim, wheel brakes, rudders, etc. It is of the non-



Irresistible Cessna 210 for single channel. Scale Line's kit flies like proverbial dream.



neutralizing type and its control lever can be brought into any desired position by short pulses and held there. One big advantage is that it is thus possible to take off and climb to altitude with the motor running flat out and to throttle back and fly stunt maneuvers on reduced revs. Sells for \$11.95. A special eight-stranded connection cable with 8 pin mini plug and matching socket is available for use with the Servo-automatic. This unit sells for \$1.95 and features color coded wires and short-circuit proof construction with long silver-plated contact pins. A stepped keying pin, which fits into the corresponding groove of the socket, prevents any

For the finishing touch. Graph-A-Plan trim tapes.



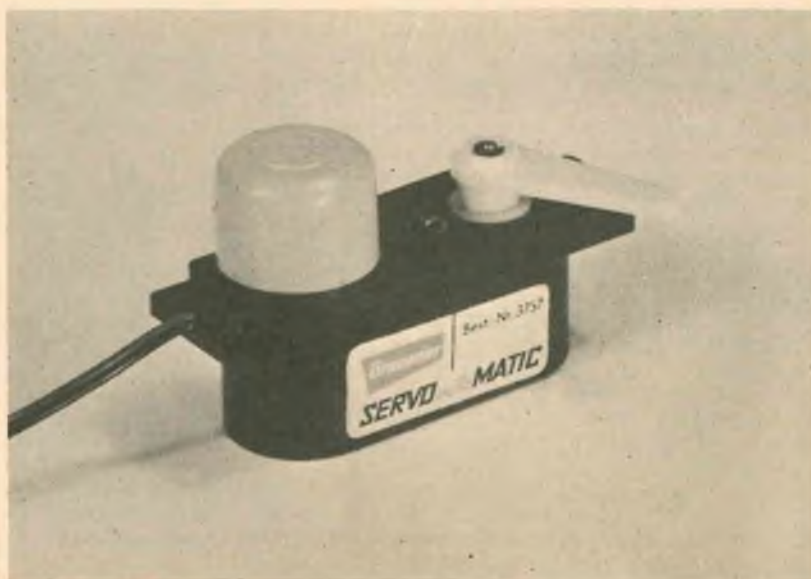
INSTANT INSTRUMENTS are the newest addition to the Hamilton Scale Products line. Based on a typical WWII fighter, each panel contains eighteen instruments, plus throttle quadrant and cockpit data plates, to add that extra touch to the cockpit that helps make the difference between the winner and the runner up. These instruments are specially processed on heavy grade

(Continued on page 34)



Kwik Kleen plane cleaner from Lee's.

John Roth's top multi becomes Jelco kit.



2-Channel actuator, imported by Polk's.

Q. Hal, your name has been synonymous with modeling for many years--when did you first get started?

A. This can be embarrassing to answer ---most of the time I don't feel or believe that I am actually as old as I am ---it's only when I think back as far as this that the truth strikes home! I built my first ROG at a YMCA hobby class in 1929---sliced my thumb pretty good hacking out the prop with a razor, too. Off to a good start you might say!

Q. When did you make the plunge into RC?

A. I started in RC by swapping for a Rudderbug with a flying buddy, George Swank. I think that the year was 1951. The Bug was the first RC model built and flown in Buffalo, and without any help, we had to learn by doing. George and I had a bang-up good time trying to get this bird to fly--we finally managed it after a fashion. I think that the escapement was our largest problem---the darn thing was always on the verge of sticking. It also took us a few fly-aways to learn that you had to tune the Aero-Trol receiver before each flight. After this, we flew and flew each evening (we get to fly until after 9 PM here during the middle of summer) until a one-last-flight in the dusk resulted in a lost model. This killed the Bug as far as we were concerned---laying in the field overnight killed the Aero-Trol, too, and how did you get another that would work?

Q. What prompted you to become a manufacturer?

A. I had always been an avid model builder. After school, I banged around in several industries trying to find a notch, eventually ending up in full-scale aviation which I had hoped would be "it." After a session at this, including a hitch in the Navy, I realized that modeling was my meat and nothing else. Hence, I entered the model industry in December 1945 after my discharge.

Q. Several kit manufacturers purchase only top contest winning designs, Hal---many of your kit designs go the other way--starting out in relative obscurity and then going on to set standards of dependability and excellence for the average flier as well as offering contest performance. How do you obtain your designs?

A. The original Rudderbug taught us a lot, Don---mostly that a specialized RC model was needed---one that flew more like a full-scale machine and built to take the hard knocks of everyday flying. We sat down with a list of some 14 requirements that we felt an RC model should have and designed the first LiveWire. Most of the points were aerodynamic but the big deal was that this new model would be built more like control-line than free flight. All previous RC designs had used beefed-up free flight structures. With the new



Pappy and his Viscount IV. Note retractable gear, space control.

RCM INTERVIEW:

Hal deBolt

McNabb 465 radio, we ran up over 300 logged flights without incident--rather sensational for those days! Most model designs result from an existing need. For example, the Cruiser evolved from that original Live Wire. Our present Sonic Cruiser came about because we found that the trend was to put the basic multi gear into smaller models, plus the fact that there was a need for a transition model between the high-wing multi and the hotter low-wing types. The Viscount is another story. With modelers expressing a desire for a design which would have contest performance with a minimum of building time, the Viscount was laid out to eliminate as much of the work as possible. Time checks showed a reduction of 50% in the assembly time over an average multi type, and yet it will match the best in flying ability. The easiest and most economical way to produce an RC kit, of course, is to purchase a so-called "winning design." This way, you eliminate all development and design costs, which more often than not, are spread out over a year in time. If you buy the right one you can make some money at it that cannot be made in the normal way. The drawback to it is that this is a "contest model" which won for a particular individual. As such, it may or may not be a good design for the average modeler. If you run a complete

evaluation of the design, you defeat the purpose of the idea and no one does this. We try to develop our designs with the average modeler foremost in mind and contest performance secondly. Fortunately, it seems to work out that a well-developed model with all "kinks" removed not only suits the average flier well, but in experienced hands, is the equal of any other contest design.

Q. From a modest beginning, RC has advanced to the forefront of the hobby industry. What do you foresee for the future of radio control?

A. RC has to continue to grow, Don---there is no other answer for a sport which offers such challenges. I think that the thrill of flight is born into everyone and model flying is an ideal outlet for this urge. Inasmuch as RC is the ultimate in modeling, it just has to progress. It will have setbacks, to be sure, but they will be overcome as they have been in the past. It would grow much faster if the youth interest in modeling was as great today as it was a few years ago....we just don't have the vast number of boys coming up the ladder as we did in years past. One of the things we need today to create greater interest is a practical jet engine---this is the rocket and jet

(Continued on page 25)

(Continued from page 24)

age and we still have a prop on the front of our models!

Q. To make radio control more attractive to the modeler coming from other modeling fields, what steps should be taken, Hal? What about the non-modeler without the years of experience most of us have put in?

A. RC has been said to be the ultimate in model flying. If this is true, every model builder is eventually going to want to fly RC. If the RC people simply offer these modelers the help and courtesy which would be expected this is all that should be required. Non-modelers seem to be able to enter the RC field rather easily provided they are given proper guidance and help. Many examples exist today of excellent radio control fliers who never built models seriously before. I believe that Ed Kazmirski is one rather obvious example!

Q. If you were advising a new RC'er, what recommendations would you make as to how to start?

A. This question has to be qualified by the almighty dollar. If cost is the object, I have to go along with the .09 powered single channel plus engine control. This seems to be an ideal size which will take many hard knocks and teach a great deal about flying at a cost of less than \$100. If the dollar is not too involved, we find a better combination to be either a relayless reed rig using rudder, elevator, and engine---or even better, a proportional system using the same controls to start with. Strangely enough, one big advantage to proportional is the packaging of the equipment! Most beginners problems result from wiring and equipment installation---the single package proportional rig eliminates 90% of these problems, thus far greater immediate success!

Q. Speaking of proportional Hal, with more and more proportional systems making their appearance, do you feel this is the ultimate in RC? Is the multi-reed system becoming obsolete?

A. Proportional equipment, Don, has been a foregone conclusion. Proportional has been talked about, dreamed about, and worked on since the very beginning of modern RC. It does not take much thought to realize that this is the only way to fly. Good reed flying has long since been called "nervous proportional," and this sort of flying can be excellent too. The only drawback in the latter is that pilot skill is a greater issue. Today's proportional systems offer exactly what we have asked for plus greater reliability than reeds. I doubt that today's proportional systems

are the ultimate simply because progress never ceases and it certainly is not going to quit at this time! One observation that can be made is that newcomers to multi are having a greater degree of immediate success when starting with proportional plus a much faster advancement in their flying ability!

Q. In your opinion, do you feel there is a "formula for success" in RC?

A. There is a formula for success in any venture and it is the same for RC---the answer is hard work and persistence. You can't do anything on a "now-and-then" basis, or in a haphazard manner, if you expect to be on top. You must work and learn in a consistent progressive manner if you expect to be good.

Q. What about contests---does the average modeler have a chance today?

A. I personally believe that the average modeler would like to attend contests with a good chance of winning. Many of these people have other interests than modeling which prevents them from devoting the time to the sport which is required of the expert flier. However, in any sport someone is going to take the time to do the things which it takes to make an expert and this person is going to come out on top. I do believe that we need to divide our contests into classes simply because the so-called Sunday fliers should have an opportunity to compete. There should be a class for the Expert Contest Flier, and one for the Novice Contest Flier. In this case the Expert would be the one who believes he has an equal chance with anyone else to come out first. The Novice might be an excellent modeler and flier but in competition he would be a Novice simply because he does not have the contest experience. If RC is to progress, we must keep the door open to the newcomer---let's not make all of RC so specialized that there is no place for the beginner! There must be an event in every contest tailored just for him, no matter how simple, and regardless of whether it is covered by AMA rules or not. Many people have asked why I continue to compete.... I do it simply because I get great enjoyment from the good fellowship that I enjoy with my fellow modelers. There was a time that I felt that I just had to win or else my ego would be deflated. Believe me, the years have taught me that this is the least that can be had from a meet. Fly your best to win, yes, but it really makes no difference who is announced as the winner if you enjoyed the meet, did your best, and went home with that honest feeling in your heart! When the years teach this to more and more of us, our contests will become even better than they are today.

This concludes this month's feature interview. Each month, RCM will visit a well-known RC personality, manufacturing plant, or place of interest.

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Solo

By FRANK JUSTIN

Looking back over my RC modeling gives a pretty good rundown on the "state of the art," and maybe therefore a few worthwhile items might occur to the beginner in this hobby.

My first model was a rudder-only "Bootstraps," with a Citizenship hard-tube receiver and English transmitter. The plane was pulled aloft by the mighty McCoy .09 --- no mean trick since the receiver and its batteries were monsters! The "Bootstraps," with its high aspect ratio wing and terrific glide ratio was a good choice for me---lots of time to think, full rudder producing on ly large, gentle turns. A lot of time was spent just flying a pre-determined pattern and trying to make spot landings. This type of flying----I guess it could be called "sport flying"--reached its peak for me with the Trixter Beam, a K&B 15 and the Babcock tone receiver. The Babcock brought a real measure of reliability to RC. There were not many stations on the air at that time, and the fact that there was a somewhat selective band pass was a big help. This was BCB ----Before Citizens Band!

The Trixter Beam was a "goofup special"---what RC'ers call stable---- just get off the button and she went to level flight. When an aircraft designer talks of stability he is talking of a flying platform that will maintain a given attitude in the air mass once placed in that attitude by the pilot. This is what we want for contest work. However, something between this and the ship that takes a barn door for a rudder is what the sport flier wants and needs. It seems to be found most often in the high-wing, slab-sided ship in the .19 class, making it heavy enough to afford some measure of wind penetration. My closest to this ideal at that time was the Beam. Today there are many such ships for the beginner and sport flier---the Aero series, Tri-Squire, Rudderbird, Falcon---to mention just a few.

In my experience the greatest fatalities in single channel come on first flights with a ship that scallops. Remember, when the nose comes up and a stall is building, you need only to apply gentle amounts of left or right rudder to break the climb. A really short motor run, down trim, and a calm day will help you through the rough ones to a good flying ship.

Wanting some measure of control in addition to rudder, reeds seemed to come along just for me. The receiver weight was up but the battery pack was smaller. We figured that with two channels on elevator, two for the rudder, and one for the escapement-operated motor control choke, we were really flying! All this took time---not to mention six Beam kits and a fling at what-ever seemed to be a hot flying machine ---a Smog Hog, Astro Hog or two, and plenty of crackups due to relays, inter-

ference, superregen receivers, and most of all, the loose nut on the transmitter! In the interim, superhets, transistors, Transmite servos and NiCads came into use. This was IT. This afforded the best we would see for a few years or until the reedbank was eliminated. Back to the fields we went with the newest 10-channel rigs. If you ever want more than one channel you can't afford NOT to buy a full 10 or even 12 channel rig ---you can add servos as you go to the larger ship.

For the single channel devotee I would strongly recommend a superhet rig. I know that truly small superhets for the 1/2A boys are not available for the kind of money spent for superregen equipment, but reliability is of prime importance to me, and I would rather spend hours on selection and installation of equipment than days in rebuilding an airframe!

If you're going to go multi and skip all the learning-curve jazz--get help! It's like getting a demonstration ride in a J-3 and putting a down payment on a 707-----you're going to have to be checked out. Hunt up one of the better fliers in your group, then look and listen, and most important--take the advice! If you're a "lone wolf" type, there will be time later to show up at the field with your ion-propelled proportional controlled cigar box---after you have a few flights in the conventional craft.

When you put that first multi together, don't skimp on the radio installation. The reliability we should have for a multi is not to be had for at least four times the price we pay for equipment. It's a tribute to the equipment manufacturers that we get equipment as good as we do for the price that we pay --- believe me, none of them are getting independently wealthy! Take their instruction books to heart and get a good clean wiring job done. Bundle those cables, tie them clear of pushrods and get strain relief on those connectors.

I like to build, but I like to fly even more. It took a few ships to convince me that no matter how bad I wanted to get into the blue, time had to be spent to get a true model. Master modelers such as Jim Jensen out here in California, construct a model whose flight surfaces are literally true in measurements to a thousandth of an inch. Jim sees nothing unusual in using a 12 minute level to check his building surfaces! You only appreciate this when you see his ship lift off in it's maiden flight and realize that not one surface will need trim for the second flight!

I have never been "original"---what-ever has proven to be the most successful for other people is what I try. The Taurus is a good airplane for a good

(Continued on page 29)

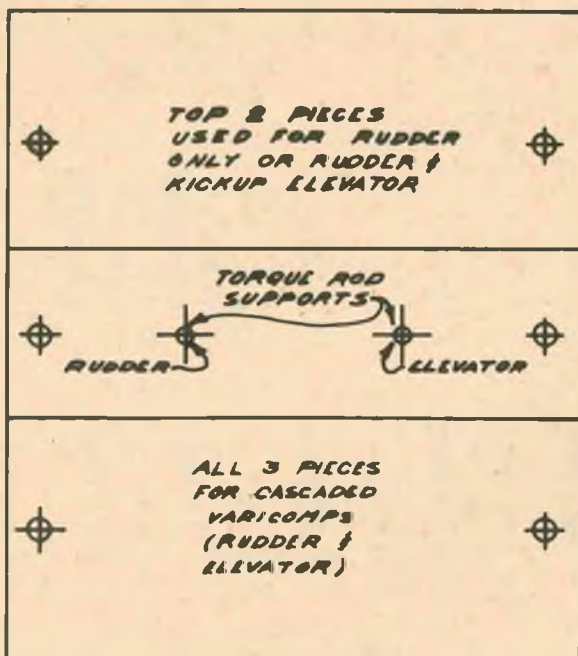
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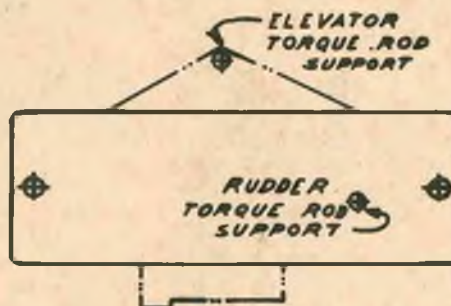
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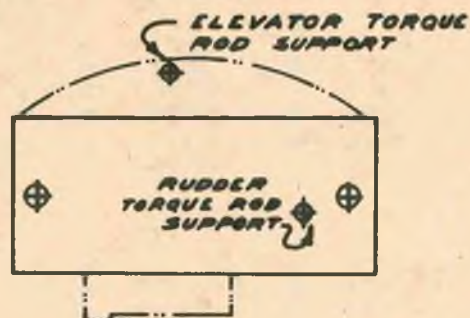
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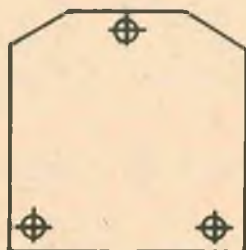
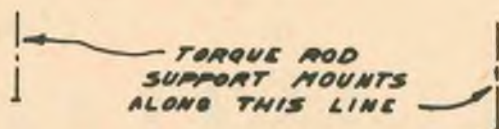
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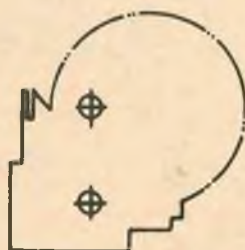
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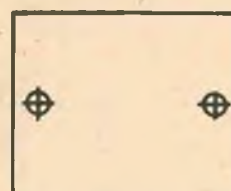
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the same for the spar. Cement the leading edge to the LE sheeting and give the ribs to the trailing edge, spar, and leading edge. When dry, glue the top leading and trailing edge sheeting in place. If you're building the wing in halves, build the opposite half in the same manner. When completely dry, join the two halves at the proper dihedral angle. When these have set thoroughly, sand the center section and apply a 1" strip of gauze around the joint. Glue on the sheet tips, then sand the entire wing and cover with silkspan. Spray or brush on several coats of thinned, clear butyrate. Allow the dope to cure while you construct the rest of the plane.

Commence construction of the fuselage by gluing the doublers and the 1/8" x 1/4" spruce cabin supports to the fuselage sides. Glue the 1/16" x 3/16" braces to the sides. When dry, cut out and glue in place on the fuselage sides, formers F2, F3, and F4. Check the alignment with a triangle to prevent that "pretzel" look. Drill F1 to accept either the Cox .010 or the Pee-Wee .020. (One or the other--not both) Cement F1 and F5 in place and allow to dry completely. Install your escapement and torque rod, making sure there is no binding, then plank the top and bottom of fuselage. If an integral tank is desired, install it at this point. Plank the nose, then glue on the stab and fin.

Cut a paper template to approximate shape for the windshield and windows, trim as required, then cut out the necessary celluloid and glue in place. (Pactra's C-77 works well for celluloid to balsa joints). Carefully puncture the celluloid for the 1/8" wing hold-down dowels, then install with white glue. Glue the 1/8" sheet pieces to top of former F3. Drill a 1/8" hole in the fuselage for the landing gear dowel. Install. Complete the miscellaneous details included on the plans, sand, and apply clear dope, sanding lightly after two or three coats. The prototype in the picture received a coat or two of white AeroGloss sprayed on plus a bit of red trim. A few feet of black Graph-A-Plan trim tape satisfied our aesthetic senses. Be sure to brush a strip of clear dope over the trim tape to prevent it's lifting off.

Flight testing this weekend warrior is easy. Launch it straight ahead and it should be good for a glide of a hundred feet or so. For the first powered flights, inject a squirt or two of fuel and launch straight ahead. The Exodus is an extremely stable model and should fly right off the board. Any erratic tendencies should be corrected during these initial tests. When satisfied that all is well, fill 'er up and let 'er go.

The Citizenship MDL modular receiver we used is well suited for these small ships, but the Exodus is an excellent free-fighter, so make sure your transmitter is turned on!

flier and yet one of the best for a novice. I preceeded my first Taurus with an Orion--this ship was just too fast for me--I don't operate at that speed. The Taurus does more things I want to do at a speed I want to do them than any other ship I've owned. You may get tired of building the same ship several times, but you will learn how to fly it well. You can always add an extra "goodie" each time--I've got another Taurus on the bench with a deBolt retractable gear system.

Be it single or multi, contest or sport, this RC is a great hobby. It takes a little more than just the ability to buy the equipment, and I guess that's why the great appeal to so many. Take the time to learn each aspect of it thoroughly and you will receive full value for each dollar and hour expended.

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by **KEN WILLARD**

Escapements

(Continued from page 17)

be sure to check the swing clearance again. If the tape doesn't do the trick, increase the spring tension very slightly, checking the operation after each change.

If you are one of those RC'ers that installs his escapements permanently, you might find that a test fixture to bench check your unit before installation is a good investment in time and material. After you have reworked your escapement, try it with 1/8" and 1/4" rubber on the bench fixture with radio and batteries. With 1/8" rubber the escapement should operate every time, even to the point where the rubber is almost completely unwound. With 1/4" rubber, the escapement should operate just as reliably. Each movement should be crisp and solid with no skipping and no hesitancy as the pawl slides away from the arm. Escapement pull-in and drop-out can be checked out by using an appropriate potentiometer in the bench test unit. If skipping occurs with the heavier rubber, gently bend the offending claw inward toward the arm. Recheck parallelism and clearance, and recheck on the test fixture.

Now that your escapement is operating reliably, be sure to check the rest of your system for those cold solder joints, binding linkages, and stiff hinges. Your escapement is now the strongest link in the chain----be sure the other links are just as strong.

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AMA

Washington, D. C.: During these hectic days of rounding up last-minute details for the Nats, finalizing travel arrangements, and tying down Headquarters for our visit to Southern California, it becomes more and more evident that membership in the AMA means more than just the right to use an AMA number on our models.

As RC'ers, our AMA membership privileges us to enter all AMA sanctioned competitions including the Nationals, which rotates around the country from Los Alamitos, to Dallas, to Willow Grove, to Glenview. As members of the Academy, we also have the right to earn a berth on the FAI R/C team, entering the international competition for the chance of becoming World Champion-----the highest honor that can be bestowed on an RC modeler.

There are, of course, other membership benefits such as liability insurance, RC rules book, and a subscription to Model Aviation, all of which more than offset the four dollars per year dues. A more important advantage, however, is the fact that the Academy is the governing body of model aeronautics which has as its guiding principle, Of, By, and For the Model Builder. As a member, you share in the privilege and responsibility of determining the present and future of model aviation.

More specifically, your voice will be heard in policy making. This is accomplished because you have the deciding power as to who will officially represent you in your district---you elect a District Vice President and RC Contest Board Member. The Vice Presidents of the eleven districts comprise the Executive Council which is the official governing body of the Academy, Dictating its policies in accordance with your wishes. The Contest Board members you elect have full control on the rules best suited for the majority concerned, and have the final word on record performances, etc. Thus, the future of radio control---and model aviation---depends upon your participation in AMA activities and benefits.

Be an active AMA member---and be proud of your Academy affiliation with your fellow RC'er!

RC Club Notes: One sure-fire way to increase club attendance is by showing good movies at monthly meetings. The Academy has available a library of 16mm sound motion pictures which are loaned to clubs free of charge (except for shipping charges which range from 15¢ to 40¢). Reservations should be sent directly to Headquarters listing one or two alternate choices and allowing two weeks for delivery. Write for listing of available films.

(Continued from page 6)

that the forward, or bottom wing, stalls first. This gives better control at very low speeds due to the fact that the rear, or upper wing, is seldom in a stall condition. Also, the forward wing provides an air cushion during landings which makes for smooth touch-downs.

The plans show a considerable amount of modification in structure over that used in the original Stagger-Bi. The only drawback to the original was the tendency for the surfaces to develop warps due to the open-frame type of construction. Since the ship is extremely fast, this made it difficult to trim for all maneuvers during the initial flights. For this reason, the plans show a conventional planked type of construction. It is absolutely essential that accuracy be observed in order to avoid warps.

Due to its speed and extreme maneuverability, the Stagger-Bi is definitely not recommended for the less experienced. For this reason, and since the plans are well-detailed and self-explanatory, only a few construction notes will be given.

Begin fuselage construction by cutting the 1/16" ply doublers and 3/32" sheet sides to shape. Be sure to cut notches in the doublers for bulkheads F2, F3, F4, plus servo mounts and tube for rudder bellcrank. Glue the doublers to the fuselage sides. Glue the 1/4" square corner longerons to each side and the 1/4" x 1/8" uprights to the sides and stab doubler. See the rudder bellcrank detail and assemble accordingly. Glue F1, F2, F3, F4, nose wheel mount, servo mounts and rudder bellcrank assembly in place. Install the 1/4" sheet wing doublers and the 1/2" sheet nose doublers to one side. Glue on other fuselage side and let dry. Tack glue cowl and hatch blocks in place. Carve blocks roughly to shape, then remove and hollow out. Note that each end of the hatch is covered with 1/16" ply. Glue cowl block permanently in place. Cement rear of fuselage together and install cross pieces. Install nosewheel, servos, trim bar, pushrods, throttle linkage, etc. Plank top and bottom of fuselage. Note that bottom planking between F2 and F3 is 1/8" sheet, while 1/2" sheet hollowed to clear the nosewheel is used between F1 and F2.

Engine selection is entirely up to the builder. The ship pictured has had virtually every popular type of RC engine installed—a hot Fox 59 provided the most spectacular performance. The ship is setup for a radially mounted engine which makes it possible to quickly interchange the power unit. It is inconceivable why most RC designers use the archaic beam mount arrangement. Beam mounts are heavier, tend to transmit vibration, soak up oil, break-up in a crash, and are very difficult to modify in order to accept a variety of engines. In fact, we cannot think of one good

feature for beam mounts except that in some instances they make the engine easier to cowl-in.

Since engine mounting plates are not usually standard, it is necessary to make one to suit your particular engine. These are merely sawed from 1/8" thick aluminum and drilled to match the four crankcase cover retaining bolts. In addition, drill 3 holes for the mounting bolts. We suggest you use #6-32 nuts & bolts to mount the engine to the firewall, and also double-put the bolts to avoid their loosening from vibration. After this is accomplished, remove the engine and all equipment. The fuselage is now ready for silking and doping.

The wing should offer no particular problems, and can be built in two halves. Cut the wing spars and assemble over the plans. Secure the front spar in place, then block the rear spar and fasten in place. Lift from the jig or board and sheet the leading and trailing edges on the bottom side. Note that the Top Flite landing gear mount is to be sheeted over and a slot cut for the gear. Build the other wing half in the same manner. Install center ribs, landing gear mount, servo rails, bellcrank platform and sheet center sections. Leave the bottom of the wing center section (top wing) open for servo mounting. Build the ailerons separately. Cover the top center of the top wing and install ailerons. Complete the aileron linkage and cover bottom of top wing.

The stabilizer is self-explanatory. Cover the top with 1/16" sheet before

removing from plan. Turn over and sheet the bottom.

The elevator is cut and shaped from 1/4" medium balsa and joined with 3/16" I.D. aluminum tubing over a section of 3/16" dowel. Secure the tubing and -dowel hinge to the elevator with pinking tape.

The fin and rudder are cut to outlines shown. Do not omit the stiffener in the fin.

The original Stagger-Bi had several coats of red butyrate dope with gold and black trim. If light balsa was used throughout, the finished weight should be between 5 1/4 and 5 3/4 pounds. Flight trimming is quite conventional, however it is important that the decalage set-up of the wings be very close to that shown on the plans. The ship is not overly-sensitive to CG placement, but it is desirable to come as close as possible to the position shown.

Some readers will be interested in the contest potential of this particular design. It has been successfully flown for hundreds of flights without incident, using both reeds and proportional control, and we feel that, properly constructed, the Stagger-Bi has a definite contest potential. The ship does all maneuvers well. It is, however, very fast, which makes it somewhat less of a contest aircraft by the current standards of the larger and slower ships seen in today's meets.

We think you'll like the Stagger-Bi—----in the hands of a capable pilot, it is always the star of the show!

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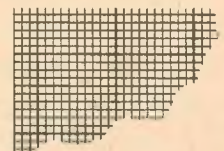
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Build 'em Right

(Continued from page 15)

these individual magnetic blocks, and allows the unit to be set for any type of surface you want to build.

Using the Magna-Jig is simplicity in itself. To illustrate this, let's consider the most important part of the model airframe -- the wing. It is important to remember that a wing that is not true in every respect is going to have a detrimental, if not disastrous, effect on the performance of any model. This is particularly true with regard to RC ships when you remember that expensive radio equipment you are hauling aloft,

and what can conceivably happen as a result of a spiral dive brought about by a twisted wing!

For our experiments with this unit, we laid out the wing for our Polytron, World Wide Radio Control's contest winning rudder only kit. Since we were using the dihedral unit, the first order of business was to set the correct dihedral angle by adjusting the legs on each end. A conversion chart supplied with the unit tells you how many inches of height at the extreme end of each panel is needed to equal a certain number of degrees of angle. Following this, a carpenter's level was used to assure that the entire surface of the jig was level, with necessary minute corrections being made to each leg. Construction is begun on either the double board or the standard Magna-Jig by placing your plan on the work surface, covering it with Saran wrap, and holding these in place with one or two jig blocks. The lower spar was the first part of the structure laid down, and was held in place by using the jig blocks in combinations as clamps.

The setting up of the ribs was almost automatic. A magnetic block placed on each side automatically aligns each rib at right angles to the work surface, with no guesswork and no getting down on your knees to sight the angle. Back in the "good ole free flight days," we almost had to use a surveyor's transit to sight for correct angles! These Magna-Jig blocks will hold the ribs securely in place even to the extent that you can put in "washout" in the tips with complete ease. Leading edges are a snap as the jig blocks hold it in place with pressure.

A neat trick with this unit is the sheeting of wing leading edges. Normally the wing looks like a porcupine with the many pins needed to hold the sheeting in place while the glue dries. We applied Wilhold contact cement to the ribs, leading edge, and top spar, and in corresponding locations on the wing sheeting. While the cement was setting for the required fifteen minutes or so, we wet the sheeting in the area of the drastic bend required on the Polytron wing. When ready, we placed the sheeting along the leading edge, making a bond between the sheet and the leading edge itself. Then a piece of Saran wrap was draped over the entire wing and sheeting, held in place against the leading edge by several magnetic blocks. The Saran wrap was then pulled back tightly along its entire length, which pulled the leading edge sheeting back over the curvature of the ribs and against the top spar. The Saran wrap was then held in place momentarily against the trailing edge to assure good cement bonding. This Saran wrap blanket will give uniform pressure over the entire wing surface, assuring a uniform wing planform, not spot-holding as with pins. Although we use contact cement for this sheeting, normal model cements will work equally as well. Use care when working with contact cement, as once joined, it cannot be re-located.

As we said before, the whole principle of the Magna-Jig is embodied in the use of right angle magnetic jig blocks. It can readily be seen that this function lends itself to the solution of all types of construction problems. As an example, let's look at the model fuselage.

In most cases, the jig will be of great assistance in achieving precise alignment in fuselage construction. If your fuselage is made up of sheet balsa sides with typical bulkheads, you'll find that the jig blocks will not only hold the bulkheads in perfect position, but will also keep the sides drawn in while the glue is drying. Crutch or half-former construction is equally simple as the jig blocks hold the half-formers in place rigidly, surely, and accurately. Built-up construction with longerons and cross members can be accomplished much faster with this system, eliminating the annoying splitting of wood that so often accompanies the old pin method. For our use, with the Polytron one-piece glass-epoxy fuselage, we used the magnetic jig blocks to hold the fuselage in place while we drilled dowel holes, installed equipment bulkheads and slides, and installed the fin and rudder.

In using the Magna-Jig, you will soon discover dozens of different applications. For example, we used the jig blocks to correct a warp that had been built into an uncovered wing constructed in the old fashion. By applying pressure with the jig blocks, the curvature in the trailing edge was relieved, and filler pieces were inserted between the top and bottom trailing edge sheeting between each rib. When dry, the warp was gone and the wing was completely true. Butt gluing of sheet balsa stock is easy. Using the jig blocks as clamps and in combination with one another, you can hold several sheets edge to edge without the use of weights, pins, or other devices.

The new Magna-Jig building system offers several accessory features of interest. One of these is a 36" x 15" transparent grid sheet made of tough DuPont Mylar and printed with an overall 1/4" grid accurate to .005". As the Magna-Jig work panel makes an ideal drafting board, we discovered, its use in conjunction with the grid sheet gives the modeler an ideal combination for those scaling-up or enlarging jobs that always come along. In addition, the scale along the two sides of the jig make a handy reference for either drafting purposes or the actual sizing of wood.

With a jig and fixture you will find that not only will you build your model faster, but you will build it better. And building it better means more time in the air. Consider the fact that a flier like Phil Kraft has built only five multi-ships in the past years and all are still in top condition after hundreds of flights! All of this is achieved with the jig system of building. Accuracy, precision, speed and versatility -- and here's a model tool that will last a modeling lifetime!

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(Continued from page 19)

the hardware in Class I and II, respectively. The entire meet was coordinated by Paul Runge from his Micro-Bus with the wives keeping the flight tallies. According to Carl Lindsey, CD, the awards were handed out as soon as the last fliers plane touched the ground! The remarkable aspect of this meet is that everybody wins something---all you have to do is fly and you'll go home with at least twice your entry fee in prizes!

Another hot event--weatherwise and flying-wise--was the Fifth Annual Mile Hi meet held at Lowry AFB. Jack Butler, Bill Kessler, and Sid Gates won top honors in Class III, II, and I. Class I Junior and Senior was taken by Den McQuillan, while Lew Patton's beautiful PT-19 won out in the Scale competition. Two of the top competitors, Chuck Boyer and Zel Ritchie, were out of the contest due to crashes. Reminding us of the time Walt Good's transmitter was stolen at one of the early Nationals, Zel worked all night to put his Space Control rig in another plane! Quite a lot of interest was shown in the new Orbit-Space Control unit, by the way. Ralph Schellenbaum of Albuquerque put on a very spectacular demonstration with his Fokker Triplane---including a snap roll that was something to behold!(In a tripe?) A buffet dinner at the Lowry NCO Club Saturday night highlighted the social side of this two-day annual event.

Our good friend, Dale Willoughby stopped by our office with a copy of the Zephyr, the excellent monthly newsletter of the Harbor Slope Soaring Society. In April of 1963, a number of avid slope soaring fans banded together to form this group---America's first RC club whose members are flying without the aid of towlines or engines. President of the group is Grover Moore, who was instrumental in forming the club and obtaining the permits to the private flying site. Membership in the society is on a sponsored basis, and enables the card holder to fly anytime during daylight hours at the slope soaring site which is located on the bluff overlooking Back Bay near Newport, Calif. And if you want to see an interesting sight, these boys fly perfect scale replicas of WWI crates in combat---sans engine! All you can hear is the swoosh of wings and occasional singing of strut wires! Contact Dale Willoughby, 14695 Caneda Pl., Tustin California.

Club of the Month: St. Paul Radio Controllers. This is a club comprised basically of rudder only fliers, and most of them beginners in RC. In addition to the Junior, Senior, and Open memberships, they have the additional incentive of Father-and-Son and Family

memberships. Most of the members are married, and this family type participation is greatly responsible for their increase from 8 to 38 members in 18 months! According to Don Sekman, in the Pulse, by flying together and aiding each other at the field and at meetings, they have graduated from controlled crashes to flights that include rolls, loops, spot landings, etc. This is one group that is not out to see how large they can get or how many trophies they can harvest. As dedicated sport fliers who thoroughly enjoy their hobby, they would prefer to limit their membership to around fifty, and thus continue and promote the family participation and mutual assistance.

Speaking of family participation, the MARKS had a spot-landing and balloon busting contest at the Lodi Lakeland Airport. These events were preceded by a family picnic complete with glider contest for the kids. This type of contest, falling in the "something different" category, is not only a refreshing change and good fun for the whole family, but is good public relations--remind the wife of the picnic the next time she complains about balsa chips on the living room floor!

Phil Kraft was the guest speaker at the July meeting of the San Gabriel Valley Radio Control League. Phil demonstrated his new Kraft-Pullen Proportional system which created quite a stir of excitement among the forty members present. The model used in the demonstration was a shoulder-wing Stormer modification. It's quite a sight to see Phil arrive in his Triumph sports car, then haul one or two complete multi jobs plus transmitter and field box from under the tonneau cover!

The July issue of the AMPS newsletter (Miami, Fla.), contained Editor Pete Hendricks varied and interesting experiences in RC, and was appended by the following note: "If you do not wish to be belabored every month with articles on the flying prowess of your editor, please start contributing to this paper!"

And that goes for the Fly-In section of this mag, too! Send your club news to the Editor, R/C Modeler Magazine, P. O. Box 487, Sierra Madre, California. If you're east of the Mississippi, forward your material to our Eastern Editor, Hank Holcomb, 455 Nassau Avenue, Freeport (L. I.), New York. Photos are always welcome and should be glossy---size is not critical.

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See Page 30

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3 ohm	Inner resistance	1.3 ohm
1/2 to 2 v	Voltage	1/2 to 3 v
60%	Efficiency (without gears)	70%
41/1, 141/1, 485/1	Ratios	4/1, 15/1, 60/1

MODEL 05	
Motor only	\$ 8.40
Gearcase only	\$ 2.25
Complete unit	\$10.65

MODEL T 03	
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**All motors are fully guaranteed
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Postage paid when check or money
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MICRO-MO ELECTRONICS
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Showcase '63

(Continued from page 23)

plastic aluminum background card stock, and have amazingly sharp resolution even in the smallest scales. Eight scales are available to cover the entire popular range of models from the smallest 1/8A up to the 7 footers.

From down South--Nashville, Tenn. to be exact--a list of miniature capacitors from R/C COMPONENTS. These boys are stocking electrolytic condensers for the RC fraternity, most of which are MEC and need no introduction.

Many values listed are hard to come by locally, especially in the smaller working voltages. Ask for a price sheet. P. O. Box 6596, Nashville 12, Tenn.

Dwight Hartman sent us some pics--including his popular fiberglass RC float kits and Gold Rush type pylon racer fuselage. Dwight's "ZEUS" FIBREGLASS FUSELAGE is quite a popular item---designed for Taurus type semi-symmetrical airfoil wings set at 0-0 incidence. This design features one piece fuselage construction with no seams to epoxy together and has all motor mounts, bulkheads, and servo rails installed. Extremely strong and well made. Available from D. R. Hartman, Argenta, Illinois.

Although this unit hasn't received too much publicity, we were extremely pleased with the tests of the Wen-Mac all-transistor single channel AIR-GUIDANCE SYSTEM. The receiver is completely encased, fully transistorized relayless superhet which will reject neighboring signals outside of 100kc range. The transmitter is fully transistorized and uses a single 9V battery which will give over 150 hours of operation before replacement. Maximum signal efficiency is assured by 90-100% tone modulation. The power input of this mighty mite is 1/10 watt, and if you want a real surprise, check this unit out on an instrument or three! We did---it's a whole handful of power! A completely wired battery case with plug and switch is included for the receiver and escapement power supply. Developed by Packard-Bell for Wen-Mac, this system is so simple and trouble free as to be almost fool-proof. Highly recommended to the beginner. We have used the Air Guidance System in several installations, both in the air and on the bench, and its performance and reliability is excellent.

BOB HOLMAN, Box 3212, San Bernardino, Calif., sent us a set of blueprints for an SE-5A. Bob specializes in supplying blue-line prints of WWI aircraft, compiled from factory drawings and from information received from air museum sources throughout the world. This two sheet set on the SE-5A is ex-

tremely detailed, complete with bracing and turnbuckles between the up-rights and longerons, and cockpit details. Speaking of cockpits, Bob has over 15,000 photographs of WWI and WWII planes available, including many WWII cockpit photos. Blueprints list from 75¢ to \$4 with pics going for 30¢. Scale fans will like these.

SCALE LINE Model Products CESSNA 210 is a lot of kit. No die cutting---prefab fuselage sides cut from one-piece 8" wide stock, plus pre-shaped blocks and some finished ply parts. On top of that, the 210 is a wet kit. For you newcomers to model biz, this means that dope and glue comes with it--top grade Sig clear dope, Ambroid glue, and imported wheels, also via Sig. The plans are highly detailed and self-explanatory, which is why they are accompanied by a complete instruction book for building the kit. Which means if you still can't do it, Henry, try slot racing. The photo of the model tells the whole story. Scale Line, Box 25, Milford, Connecticut.

Still more scale. John TATONE's SCALE INSTRUMENT KITS---each instrument package containing six metal instrument cases, turned and plated; all dials and glasses to fit cases; a selection of 20 typical instruments; panel background plus full instructions. Kit sizes are 1/4, 5/16, 3/8, 7/16, 1/2. Even a pro would find it hard to beat an instrument panel made from a TATONE kit---one of the most difficult details in scale building. Other items from Tatone include "invisible" metal hinges designed to provide flutter-free action for high-speed RC models, plus elimination of surface "welt" for scale models. John also sent along samples of his steerable nose gear---versatile kits to fit almost any style multi-belly mount bulkhead mount, and engine - gear mount. These are all cast in alloy mountings, surfaced, drilled, and bright polished with cadmium plated parts and all necessary hardware.

For the single channel boys from Spacetrone---a receiver with a two year guarantee! Their OPAL 400 is a relayless tone, superregen unit fully encapsulated (except for the tuning adjustment) in lightweight foam epoxy. This is the stuff the military uses in their airborne equipment. This "potting" is said to make the 400 an extremely rugged receiver, protecting it from dirt, humidity, spray, and condensation---plus accidental shorts or detuning from handling. Operating voltage for the Opal is 2.2V to 3V with two small Ni-Cads recommended. A matched relay is supplied by Spacetrone for those wishing to convert to a relay receiver. The matching transmitter is a 650 cycle, tone - modulated high - output MOPA type called the MUSTANG 1. \$18.95 for the Opal 400--\$24.95 for the Mustang 1. Throw in \$2.98 if you want the relay. Spacetrone, Box 43, River Forest, Illinois.

(Continued on page 40)

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If your dealer can't supply you ... send stamped, self-addressed envelope for literature and prices.

OCTURA MODELS BY MODEL BUILDERS ... FOR MODEL BUILDERS!
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(Continued from page 9)

---throttled back for a touch-and-go--- the big ship bounced, rolled over on its back, and this magnificent scale-replica was completely destroyed!

The flight of the C-125 was slightly erratic, but capably handled by Claude McCullough. This airplane has to be seen to be believed!

Multi flights are looking even better today. Hal deBolt, flying his very fast Interceptor. Ron Chapman, Internats contender from Canada, racks up top points in Class III with a score of 139.5. Runners-up are L. Jensen (136.5) Zel Ritchie (133.5); J. Stevens (132); with Hal deBolt and Clarence Lee tied at 130. Class II: B. Atkinson (89.5); and Don Crow (82.5). Class I Open: Al Doig (101); Harrison Morgan (100.5); J. Gardner (73). Class I Jr-Sr: J. Coffman (51.5). Pylon times down to 1:22. Total entrants to date: 152.

Wednesday, July 31: A cool breeze from the nearby Pacific is a welcome relief to the sunburned participants. No scale activity today. Carl Goldberg on the scene with a low-wing, twin-engine multi-Falcon. Best flight of the qualifiers today scored by Nate Rambo with 138.5. Second is D. Usher (135); followed by Cliff Weirick (134.5); Don Brown (130); and R. Allen (130). Class II: R. Kern (99.5) and F. Barr (81.5). Class I Open: Bill Williams (79.5); D. Prull (75.5); and R. Angus (74.5). The only Class I Jr - Sr. qualifier was S. Carter with 63.5.

Several new designs in evidence--- the Miss Behaving, 74" span multi proportional or reed job from Pico Model Products; the Push-Pull, an interesting pusher-tractor multi, and the Dominator ala Bill Williams. Very little overall activity today---gave us a chance to follow LARKS Nat's Queen Toni La Vier around---lots of fun photographing this cute model!

Thursday, August 1: The morning is overcast and cool, but the temperature drop is more than compensated for by the heat of competition as the 1963 Nat's reaches the half-way point. Granger Williams, who had reduced his scale Nieuport to trash-can material on Tuesday is back with the same model---looking as good as new and evidencing the same quality craftsmanship that characterizes his models---and goes on to qualify in Scale! This is a real competitor in the highest tradition! Dale Willoughby at the field with his magnificent multi Cessna Skylane (to be featured in RCM), but ran out of time in the qualifications due to engine difficulties. A scale B-17 with 4 K&B 19's ---all engines started and idled well, but did not start at the flight line during qualifications and this excellent entry also beat by the clock. Zel Ritchie flies the pylon course at 1:13 for the fastest time to date. Keith Storey and W. Williams also qualified in Pylon on Wednesday. At noon there is a break

in the activities as the Navy's Blue Angels arrive in a spectacular six point formation.

Friday, August 2: Clear and warm, the day starting with fierce competition as the Nationals go into the final days. Scale judging has started and everyone awaits the judges decisions which should come on Saturday. The finals in Pylon are in progress with all scores very close. Ken Willard at the field yesterday and today, covering the Nats for a special feature to appear under his byline in RCM. Jerry Nelson, American Internats contender has arrived for the last days of the competition. Walt Good, Howard McEntee and Sid Axelrod from Top Flite seen about the field. From 2 PM to 3 PM the Navy's jet aerobatic team, the Blue Angels, put on a few spectacular demonstrations. In addition, contestants and spectators were thrilled to a nerve-shattering display of sky diving by the Shooting Stars, the famous Navy stunt parachute team.

Saturday, August 3: What we've all been waiting for --- the results of the judging in Scale --- and Maxie Hester comes out on top with his famous P-63. Dark horse second-place winner is Bud Atkinson's Mooney Mite. Third place goes to Granger William's Nieuport--- a well deserved victory following the almost total destruction of this plane a few days earlier. Third and fourth place winners are R. Jackson's B-24 and Claude McCullough's tri-motored C-125, respectively. Quite a feather in the cap for the single engine contenders over the point capturing multi-engine entries! Points were as follows from 1st through 5th place: 10, 422.8; 9, 164.8; 7, 123.3; 5, 157.1; 4, 812.7.

The standings in the flyoffs as of today: Class I Jr-Sr: Schroeder (74.25); Carter (64.50). Class I Open: B. Williams (117); T. Williams (85); H. Morgan (75.75); D. Prull (63). Class II Combined: R. Jackson (157.75); P. Black (144.25); D. Crow (129.25); F. Barr (103). Class III: J. Kirkland (193); Zel Ritchie (185.25); Maxie Hester (183.25); Bill Williams (182); Jerry Pullen (180.75); and Cliff Weirick (180.75). Scores are based on the best

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two out of three flights.

Sunday, August 4: The final day of the 1963 Nationals -- and these are the new champions:

Cl. III(O)	J. Kirkland	193.00
	Z. Ritchie	185.25
	D. Usher	185.00
	M. Hester	183.25
	W. Williams	182.00
Cl. II (O)	R. Jackson	157.75
	P. Black	144.25
	D. Crow	129.25
	B. Atkinson	120.25
	F. Barr	103.00
Cl. I (O)	B. Williams	129.5
	H. Morgan	97.95
	T. Williams	85.0
	D. Katagiri	82.0
	D. Prull	73.25
Cl. I (J-S)	J. Schroder	80.5
	S. Carter	76.5
	D. Hertzog	46.75
	J. Coffman	36.0
	H. Ritter	34.75
Pylon:	Z. Ritchie	1:10.4
	W. Williams	1:13:55
	K. Storey	1:13:85
	C. Weirick	1:14:6
	G. Carter	1:14:9



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Area - 665 sq. in.
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14-year-old Doug Hertzog and dad. 3rd in Class I, Junior-Senior.



10-year-old Bobby Wood, youngest RC Nats contestant. Transmitter almost as big as he is. Dad helps with R.O.G.



1963 NATIONALS . . . continued



Before and After. Granger Williams worked 'round the clock to repair damage — Went on to capture 3rd in Scale!

Ron Chapman, Canadian Internats contender and Norseman. A fine sportsman.



Zel Ritchie and Phantom. Second in Class III. Space Control and Fox 59.



Keith Storey and LARKS RC Queen Toni La Vier. One in the middle is the Gold Rush.

Ralph Jackson and Stark Shark — pair won Class II Open.

1963 NATIONALS . . . continued

U. S. Is Out Front In Race For Space

DAHLGREI, VA. July 5—The United States surpassed Soviet Russia in a space race by setting a new world altitude record for Radio - controlled model air-planes.

Maynard Hill, of Silver Springs, Md., flew his model air-plane controlled by the Sampey 404 Proportional Control equipment from the ground to an altitude of 13,320 feet to exceed a Russian record of 7,380 feet.



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Willie Williams and original Dominator. 5th in Class III. Kit by Williams features hi-strength plastic ribs.



Carl Goldberg and sneak preview of new Skylark kit. Two Cox .09's. 10 channel. Available soon as twin or single. \$12.95.



Phil Kraft and shades. New Kraft-Pullen proportional xmtr.



Spectacular arrival of the Blue Angels, Navy's jet aerobatic team.

Mr. Fast — Zel Ritchie and 1st place Pylon winner.



"Zue" modified from AM plans. Took 4th in Class II. Dave Katagiri.

Keith Storey and LARKS RC Queen Toni La Vier. One in the middle is the Gold Rush.

Ralph Jackson and Stark Shark — pair won Class II Open.

1963 NATIONALS . . . continued

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P.O. BOX 487 • SIERRA MADRE, CALIF

Showcase '63

(Continued from page 34)

We strongly recommend the AERO-TROL CATALOG AND DATA BOOK. Aero-Trol is a large mail order house specializing in RC, and their catalog is well worth having in any RC library. Costs a buck which is refundable when you order from them. Jere Tyner is a person who will bend over backward to help you with your RC problems. AT is one of the few houses offering extended payment plans for RC buyers, by the way. Write to Jere at Aero-Trol, High Ridge, Missouri.

In the not-exactly-new department, the CHALLENGER from VK Model Aircraft. This is a kit which is four-star gold-medal par excellence! It is one of the most highly prefab jobs we've seen---hand formed from the best in balsa. Ribs all finished (even look like they've been sanded) and packaged; steerable nose gear; multi-hardware--the whole bit. Get your name on the waiting list for this one--Vern Krebbiel has outdone himself!

While we're in the kit department--the Citation by John Roth joined the Jetco line. John is one of the East's outstanding designers and fliers, and this competitive machine is his latest achievement. Although designed primarily for contest work, the flight characteristics and functional construction should lend themselves well to the newcomer to multi as well.

A couple of items from Timely Plans. Paul sent us a sample of his TRIM TAPES which come in sizes from 1/64" up to 1" in width. They have an adhesive backing which is fuel proof and seem to have far less tendency to peel off than the stuff we'd used from the local artists store. Less expensive, too. Excellent way of getting pin-striping and other decorative effects. (See the Exodus in this issue--that's Trim Tape). The other item from Timely is their RADIO CONTROL HANDBOOK---kind of a short digest for the newcomer to RC. How to fly. AMA maneuvers, plans, installations, even a field box. Timely Plans, Box 31, Halesite, N. Y.

We like Jack Levine's idea of supplying a nylon glue gun dispenser with each pint of LEES CEMENT. Hot fuel proof and really grips. (The cement, not the gun). \$1.79 per. Lee's also makes KWICK KLEEN which is a wipe-on, wipe-off plane cleaner--takes off fuel and leaves the paint. So quit being a flight line slob.

From Phil Kraft comes news of a new single channel line of Kraft products to be released in the near future. Included will be an all transistorized transmitter, a superregen relay receiver, a superhet relay receiver, and a low cost, reliable proportional rudder and positionable motor control system.

IN THE

NOVEMBER ISSUE . . .

1963 RC INTERNATIONALS

Exclusive Coverage

THE SAFARI

Top Multi-Contender
By JERRY NELSON

1963 NATS DATA SHEET

MULTI-PROPORTIONAL

A Look at the New Systems
By HANK HOLCOMB

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1/2x2 1/2 22c
1/2x2 1/2 24c
1/2x2 1/2 26c
1/2x2 1/2 28c
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1/2x2 1/2 86c
1/2x2 1/2 88c
1/2x2 1/2 90c
1/2x2 1/2 92c
1/2x2 1/2 94c
1/2x2 1/2 96c
1/2x2 1/2 98c
1/2x2 1/2 100c

STRIPS

36" LENGTHS

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

BLOCKS

3" LENGTHS

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

SIG BAG OF Balsa

#1 BAG - ALL BLOCKS 79c

#2 BAG - BLOCK, STRIP, SHEET 79c

CELOPHANE-WRAPPED PACKET OF "OFF-SIZE" OR BUSHED Balsa STRIPS AND SHEETS. 50c

SIG SPRUCE

36" LENGTHS

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

RAZOR PLANE

USES DOUBLE-EDGED BLADES \$1.50

SOLDERING IRON

LIGHT-DUTY, 115-120 VOLT \$1.50

PEE-WEE OILER

FILLED WITH HIGH GRADE LIGHT OIL - HYPODURIC - NEEDLE LEAK PROOF. REFILLABLE. (Wen 96) 79c

SIG STEEL WIRE

1/32 dia. 5c
1/16 dia. 10c
1/8 dia. 15c
3/16 dia. 20c
1/2 dia. 25c
5/8 dia. 30c
3/4 dia. 35c
7/8 dia. 40c
1 dia. 45c
1 1/8 dia. 50c
1 1/4 dia. 55c
1 1/2 dia. 60c
1 3/4 dia. 65c
2 dia. 70c
2 1/2 dia. 75c
3 dia. 80c
3 1/2 dia. 85c
4 dia. 90c
4 1/2 dia. 95c
5 dia. 100c

COPPER WIRE

FOR BINDING C/LINES, 1/GFAR 15c

BRASS SHEET

FINEST QUALITY - 6 x 12 SHEETS
#01 .60c #03 .65c #05 .70c #07 .75c
#09 .80c #11 .85c #13 .90c #15 .95c

BIRCH PLYWOOD

FINEST GRADE 24" LENGTHS
#1 1/2x2 1/2 10c
#2 1/2x2 1/2 12c
#3 1/2x2 1/2 14c
#4 1/2x2 1/2 16c
#5 1/2x2 1/2 18c
#6 1/2x2 1/2 20c
#7 1/2x2 1/2 22c
#8 1/2x2 1/2 24c
#9 1/2x2 1/2 26c
#10 1/2x2 1/2 28c
#11 1/2x2 1/2 30c
#12 1/2x2 1/2 32c
#13 1/2x2 1/2 34c
#14 1/2x2 1/2 36c
#15 1/2x2 1/2 38c
#16 1/2x2 1/2 40c
#17 1/2x2 1/2 42c
#18 1/2x2 1/2 44c
#19 1/2x2 1/2 46c
#20 1/2x2 1/2 48c
#21 1/2x2 1/2 50c
#22 1/2x2 1/2 52c
#23 1/2x2 1/2 54c
#24 1/2x2 1/2 56c
#25 1/2x2 1/2 58c
#26 1/2x2 1/2 60c
#27 1/2x2 1/2 62c
#28 1/2x2 1/2 64c
#29 1/2x2 1/2 66c
#30 1/2x2 1/2 68c
#31 1/2x2 1/2 70c
#32 1/2x2 1/2 72c
#33 1/2x2 1/2 74c
#34 1/2x2 1/2 76c
#35 1/2x2 1/2 78c
#36 1/2x2 1/2 80c
#37 1/2x2 1/2 82c
#38 1/2x2 1/2 84c
#39 1/2x2 1/2 86c
#40 1/2x2 1/2 88c
#41 1/2x2 1/2 90c
#42 1/2x2 1/2 92c
#43 1/2x2 1/2 94c
#44 1/2x2 1/2 96c
#45 1/2x2 1/2 98c
#46 1/2x2 1/2 100c

SIG BASS WOOD

18" LENGTH SHEETS
1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

SIG CELLULOSE

08x6x10 12c 015x8x10 30c

PIRELLI RUBBER

IN 1 POUND CANS ONLY \$5.50
(475 FT. OF 3/32") (285 FT. OF 1/4")

SIG FLIGHT RUBBER

PACKED IN LIGHT-PROOF CANS
1/8 x 25 ft. 30c
1/4 x 25 ft. 35c
3/8 x 25 ft. 40c
1/2 x 25 ft. 45c
5/8 x 25 ft. 50c
3/4 x 25 ft. 55c
7/8 x 25 ft. 60c
1 x 25 ft. 65c
1 1/8 x 25 ft. 70c
1 1/4 x 25 ft. 75c
1 1/2 x 25 ft. 80c
1 3/4 x 25 ft. 85c
2 x 25 ft. 90c
2 1/2 x 25 ft. 95c
3 x 25 ft. 100c

SIG BIRCH DOWELS

12" LENGTHS 36" LENGTHS
1/2 dia. 10c
3/8 dia. 12c
1/4 dia. 14c
3/16 dia. 16c
1/8 dia. 18c
5/16 dia. 20c
3/8 dia. 22c
1/2 dia. 24c
5/8 dia. 26c
3/4 dia. 28c
7/8 dia. 30c
1 dia. 32c
1 1/8 dia. 34c
1 1/4 dia. 36c
1 1/2 dia. 38c
1 3/4 dia. 40c
2 dia. 42c
2 1/2 dia. 44c
3 dia. 46c
3 1/2 dia. 48c
4 dia. 50c
4 1/2 dia. 52c
5 dia. 54c
5 1/2 dia. 56c
6 dia. 58c
6 1/2 dia. 60c
7 dia. 62c
7 1/2 dia. 64c
8 dia. 66c
8 1/2 dia. 68c
9 dia. 70c
9 1/2 dia. 72c
10 dia. 74c
10 1/2 dia. 76c
11 dia. 78c
11 1/2 dia. 80c
12 dia. 82c
12 1/2 dia. 84c
13 dia. 86c
13 1/2 dia. 88c
14 dia. 90c
14 1/2 dia. 92c
15 dia. 94c
15 1/2 dia. 96c
16 dia. 98c
16 1/2 dia. 100c

SIG BAMBOO STRIP

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

MOTOR MOUNTS

W/MUWU, 12" long 3/8 x 1/2 12c
3/8 x 3/8 10c 3/8 x 3/4 15c

SIG MODEL PINS

1/2 dia. 10c
3/8 dia. 12c
1/4 dia. 14c
3/16 dia. 16c
1/8 dia. 18c
5/16 dia. 20c
3/8 dia. 22c
1/2 dia. 24c
5/8 dia. 26c
3/4 dia. 28c
7/8 dia. 30c
1 dia. 32c
1 1/8 dia. 34c
1 1/4 dia. 36c
1 1/2 dia. 38c
1 3/4 dia. 40c
2 dia. 42c
2 1/2 dia. 44c
3 dia. 46c
3 1/2 dia. 48c
4 dia. 50c
4 1/2 dia. 52c
5 dia. 54c
5 1/2 dia. 56c
6 dia. 58c
6 1/2 dia. 60c
7 dia. 62c
7 1/2 dia. 64c
8 dia. 66c
8 1/2 dia. 68c
9 dia. 70c
9 1/2 dia. 72c
10 dia. 74c
10 1/2 dia. 76c
11 dia. 78c
11 1/2 dia. 80c
12 dia. 82c
12 1/2 dia. 84c
13 dia. 86c
13 1/2 dia. 88c
14 dia. 90c
14 1/2 dia. 92c
15 dia. 94c
15 1/2 dia. 96c
16 dia. 98c
16 1/2 dia. 100c

SIG RUBBER BANDS

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

SIG GLASS KIT

FOR MOLDING COWLINGS; WHEEL PAINTS; FUSELAGE; BOAT HULLS. CONTAINS 8 OZ. CAN OF RESIN AND HARDENER - 28" x 38" GLASS CLOTH - 1 OZ. CAN OF RELEASE AGENT - MIXING RODS - MIXING CLIPS - FULL DIRECTIONS. \$2.65

SIG SLICK-SAND

CONTAINED 1/2 x 3 x 3 FOAM-PADDED - COATED WITH FAST CUTTING ABRASIVE. 10c

SANDPAPER

TEN 4-1/2 x 5-1/2 ASS. SHEETS 15c

GARNET PAPER

FIVE 4-1/2 x 5-1/2 FINE SHEETS 15c

THRUST WASHERS

BALL BEARING WASHERS FOR UP TO 1/16" DIA. SHAFTS. each 15c

RUBBER WINDER

4-1 RATIO RUBBER WINDER, WITH SPRING STEEL HOOK. \$3.95

SIG MICROFILM

IN .MODEL COVERING 4 oz. 55c

GLIDER TOWLINE

NYLON 20 LB. TEST, 175 FT. 50c
NYLON 28 LB. TEST, 175 FT. 55c

GLIDER WINCH

6-1 RATIO LIGHTWEIGHT IMPORTED WINCH, COMPLIES WITH F.A.I. CONTEST RULES. \$4.75

FUEL PUMP

FOR 1 PINT & PINT CANS 50c

CARVING KNIVES

HEAVY-DUTY, FOR C/L AND R/C READY-TO-USE WHEELS - ALUM. HUB 79c

1/2x1/2 10c
1/2x1/2 12c
1/2x1/2 14c
1/2x1/2 16c
1/2x1/2 18c
1/2x1/2 20c
1/2x1/2 22c
1/2x1/2 24c
1/2x1/2 26c
1/2x1/2 28c
1/2x1/2 30c
1/2x1/2 32c
1/2x1/2 34c
1/2x1/2 36c
1/2x1/2 38c
1/2x1/2 40c
1/2x1/2 42c
1/2x1/2 44c
1/2x1/2 46c
1/2x1/2 48c
1/2x1/2 50c
1/2x1/2 52c
1/2x1/2 54c
1/2x1/2 56c
1/2x1/2 58c
1/2x1/2 60c
1/2x1/2 62c
1/2x1/2 64c
1/2x1/2 66c
1/2x1/2 68c
1/2x1/2 70c
1/2x1/2 72c
1/2x1/2 74c
1/2x1/2 76c
1/2x1/2 78c
1/2x1/2 80c
1/2x1/2 82c
1/2x1/2 84c
1/2x1/2 86c
1/2x1/2 88c
1/2x1/2 90c
1/2x1/2 92c
1/2x1/2 94c
1/2x1/2 96c
1/2x1/2 98c
1/2x1/2 100c

SURGICAL KNIVES

WITH PLASTIC HANDLES. IDEAL FOR CUTTING LIGHTWEIGHT Balsa AND TRIMMING PLASTIC MODELS ETC. NO 10 STRAIGHT BLADE. No. 11 ROUNDED BLADE. 35c each

RAZOR PLANE

the justin micro-tie

ELIMINATES UP TO 6 PLUGS AND 44 SOLDER CONNECTIONS IN MULTI

AILERON

POWER

REC.

Complete for a
ten channel
installation

\$795

• all *the R/C* franchised dealers
and better hobby shops everywhere
stock the micro-tie, or if you prefer,
send your order direct to . . .

The Justin Micro-Tie is a high quality

printed circuit board designed to simplify the installation of multi-channel equipment. The use of the Micro-Tie eliminates up to 6 connectors and 44 solder joints in the average ten channel installation. It provides hook up for 5 Bonner Servos, power to the receiver and servos and hook up for the reeds. The Micro-Tie uses a mil spec edge connector to supply the receiver with all requirements except the antenna lead. The connector has gold contact and supplies a maximum wipe area to the circuit board and is able to withstand extreme shock and vibration.

The Micro-Tie comes complete with all necessary hardware for mounting to the back of a Bonner Servo, although it can be mounted in any convenient spot that allows servo leads to reach the unit. Lacing cord and insulation tubing is also supplied.

ELECTRONICS PRODUCTS DIVISION

justin, inc.

BOX 135, SAN GABRIEL, CALIFORNIA