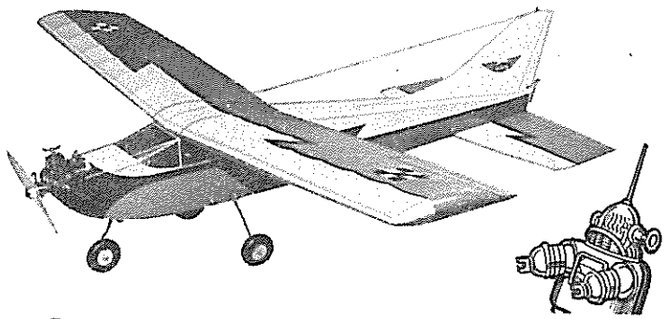
VERON MINI-ROBOT



Sport Radio Model

BUILDING INSTRUCTIONS

The "MINI-ROBOT" has been designed as a 36" Sport Radio Model for rudder control only. It is a compact version of the larger International "ROBOT" Radio Trainer. It has identical characteristics - easy to build inherent stability, dependable and robust structure.

It may be powered with beam mount motors up to .95cc (.054 cu.ins.), though certain makes of lower powered motors up to 1cc may be fitted if light and compact.

The 205 sq.ins. wing area and high lift section (N.A.C.A.4415) will carry most weights of commercial single channel transistorized radio receivers with preferably rubber-driven escapements, and batteries.

For those radio units not supplied with actuators, we recommend the F. Rising "Compound" or "Lightweight", Elmic "Conquest" or "Commander", Bonner "Varicomp" (trimmed in width), Babcock "Compound" - all rubber driven. Experienced modellers may fit relay type receivers such as "Gemini" with electric actuators such as "Unimite". The extra weight with batteries will make the model fast and responsive and is recommended only for experienced pilots.

Simple tools are needed. Use "BRITFIX" Balsa Wood Cement, or "BRITFIX" 55 White P.V.A. Also Britfix Clear Shrinking Dopes and Thinners, or for glow-plug powered models,"Humbrol" Butyrate Clear and coloured dopes. Use a "VERON" Balsa Knife; modelling pliers; 1/16", $\frac{1}{8}$" and 3/16" drill and handbrace, grease-proof paper to protect the plan, tissue paste and garnet paper, also "VERON" Modelling Pins.

We recommend the M.S. Small Free-Flight Round Tank (for Diesels) For glow-plug motors, a $\frac{1}{2}$ or $\frac{3}{4}$ oz. oval Polythene bottle (Scent Bottle) made into a "clunk" tank; or metal tank.

The simple sequence of assembly is pictorially laid out in a diagrammatic sequence which if followed carefully with the corresponding paragraphs in these instructions, will greatly facilitate building.

1. BULKHEADS.

Laminate $\frac{1}{8}$" balsa former 2.9/16" x 2.15/16" (3 x 65 x 75 mm) to 1/16" (1.5 mm) ply bulkhead. Double coat all joining surfaces with cement. Note positioning of balsa former, 1/16" (1.5mm) from bottom with equal spacing of 3/32" (2.5mm) each side for Bulkhead "A".

Make up Bulkhead "B" of $\frac{1}{8}$" x $\frac{1}{2}$" (3 x 12.5mm) strips over plan.

2. SHEET SIDES.

Lay sides over plan and trim accurately so that all edges are identical, especially the upper edge which sets the wing incidence. Mark in pencil the exact position of formers, "A" is $\frac{1}{8}$" (3mm) from front edge, and "B" is 6" (152mm) from that. Laminate 6" long 1/32" x $\frac{3}{4}$" (.8 x 8.5mm) ply to upper and lower edges between former marks.

3. PREPARATION OF SIDES.

Mark location of holes for wing and undercarriage dowels. Place sides accurately together and drill holes.

4. JOINING SIDES.

Double coat with cement, jointing edges of bulkheads and sides. Cement all together, pinning while setting. Ensure square by resting on a flat building board. Inset slightly tapered tail block of $\frac{1}{4}$" x $\frac{1}{4}$" (6.5 x 6.5mm) and draw sides together at rear; add lower 3/32" x 3/32" (2.5 x 2.5mm) strips along inner face of lower edges. Add front cushion block of soft balsa $\frac{1}{2}$" x $\frac{1}{2}$" (12.5 x 12.5mm).

5. FUSELAGE SHEETING.

Lower sheeting of radio bay is 1/16" ply (1.5mm) Rear top and bottom sheeting panels are 1/16" (1.5mm) pre-cut balsa. Cement in place. Trim and sand off surplus.

6. ENGINE MOUNT.

If necessary, trim out slot to suit intended engine. Mark and drill holes for engine securing bolts - allowing for sidethrust of 2°. Drill $\frac{1}{8}$" (3mm) holes for 6B.A. and 3/32" (2.5mm) for 8 B.A. Double coat all jointing edges of ply mount and slot. Assemble nose with balsa block $\frac{1}{2}$" x $1\frac{3}{4}$" x 2" (12.5 x 45 x 51mm) to "square" it. Trim and sand outer edges of cowl with rounded edges and taper sides to the front - see plan top view.

7. NOSE WHEEL STRUT ATTACHMENT.

Plan gives detail for marking out location of 1/16" holes for securing wire nose wheel strut to 1/16" (1.5mm) ply plate. Drill holes and sew strut in place with heavy Terylene thread. Coat with cement. Thoroughly double coat joining surfaces of ply and locate very firmly in place.

8. WINGS.

Set $\frac{1}{2}$" x $\frac{1}{4}$" (3 x 12.5mm) spar upright on edge above plan, also pin trailing edge in place. Slot all ribs except base ribs in place. Add diagonally inset leading edge of $\frac{1}{4}$" x $\frac{1}{4}$" (6 x 6mm). When set, raise from board and build opposite panel.

9. WINGS CENTRE SECTION.

Trim ends of leading edge, spars and trailing edge to fit exactly when one wing tip is supported upon a 4" block to give 2" dihedral each side. Join spars with ply dihedral gussets each side. Add trailing edge gusset. Laminate two centre ribs, enlarging slot to fit gusseted spar and trimming at rear. Locate with gussets of balsa. SEE DETAIL IN FLYING INSTRUCTIONS WITH REGARD TO DIHEDRAL TRIM.

10. CENTRE SECTION AND TIPS.

Cross-grained balsa sheet is inset between ribs in top of centre section bays, grain crosswise. Also on underside only between leading edge and spar. Sand all smooth. Add tip blocks; when set trim and sand to streamline. Cover wing and dope as required.

11. TAILPLANE

Join 1" (25mm) wide hard balsa 3/32" leading edge to lighter main sheet of 4" wide (102mm) tailplane. Place above plan and trim to shape. Inset $\frac{3}{8}$" x 3/32" (9 x 2.5mm) strips near tips for warp prevention. These are essential. Sand tailplane smooth both sides.

12. TAILPLANE COMPLETION.

Cover tailplane both sides with tissue, brushing into place with banana oil, rubbing down with pad of tissue. DO NOT USE DOPE or warps will be inevitable. Dry whilst lying on a flat surface. Add 1/32" (.8mm) ply stiffener to underside.

13. FIN AND FIN FAIRING.

Cement fin and fairing piece firmly in place between 3/32" x 3/32" (2.5 x 2.5mm) strips. Trim fairing to streamline. Check alignment. At this stage whole fuselage may be covered with tissue adhered with banana oil.

14. UNDERCARRIAGE AND FITTINGS.

Wheels are retained upon wire axles by soldered washers. 3/16" (4.5mm) dowels are located through fuselage for main undercarriage attachment with rubber bands - see diagram.

Make lid of battery compartment of ply $1\frac{3}{4}$" x $1\frac{3}{4}$" (44 x 44mm) resting on 3/32" x 3/32" (2.5 x 2.5mm) strips. Rubber bands around wire clips will retain. Add wing and tail retaining dowels.

15. FUEL TANKS.

Alternative tanks are suggested, Small "M.S." Round Free Flight screwed to balsa block, or oval Polythene "clunk" tank or metal tank above beams with 3/32" (2.5mm) sheeting to fill in at top where required. After locating engine bolts with tin securing strap - see sketch on main plan - fill in lower engine bay with $\frac{3}{8}$" (9.5mm) balsa block - trim and sand to streamline.
Thoroughly proof engine bay with Banana Oil and/or Fuel Proofer.

16. GENERAL INSTALLATION OF RADIO.

Diagram shows location of components. Actuator on rear bulkhead, separation bulkhead for foam rubber or "Hairlok" packed compartment to house receiver; switch through port side, batteries under nose.

17. SLOTS FOR ACTUATOR BULKHEAD.

Drawing shows mounting bulkhead of 1/16" (1.5mm) ply with top and bottom spacers, secured in slots created by 3/16" x 3/16" (4.5 x 4.5mm) uprights. Ply parts not supplied.

18. ATTACHMENT FOR SWITCHES.

Shows ply panel with dowel pins cemented to inner face of fuselage to allow removal of switch with harness. Parts not supplied.

19. HINGES ON RUDDER.

Mark and make holes through fin and rudder, sew hinges as detailed with waxed Terylene thread. Cement knots to prevent slipping.

20. RUDDER OPERATION.

Three alternatives shown for torque rod, rotary action and push-pull actuators. Wire, bolt and tubing supplied, fulcrum is not. In each case operating rod is hard $\frac{1}{4}$" x $\frac{1}{4}$" (6 x 6mm) balsa.

21. PUSH-PULL CONNECTION.

Shows method of attachment of connecting rod to rotary action lever ("Unimite" etc). 18 s.w.g. wires bound to operating rod have 20 s.w.g. retaining springs bound and soldered to clip into rudder horn and rotary link.

22. COMPOUND ACTUATOR TO TORQUE-ROD LINKAGE.

Reference to the details and drawing will explain this system, giving a simplified operating linkage to the rudder.

23. ALTERNATIVE RUBBER WINDER.

Suggestions are given on plan - and parts supplied - for rubber winding access hatch. Drawing illustrates alternative method of winding from rear with wire clutch loop.

24. COLOUR SCHEMES.

These should be applied as lightly as possible - preferably sprayed. Use Britfix Colour Dopes or Humbrol Enamels with diesel power, Humbrol Butyrate Clear and coloured dopes for glow-motor power. See illustration on box for detail.

25. ALTERNATIVE BATTERY IDENTIFICATION.

For Single Channel Transmitters, Receivers and Electric or Rubber Driven Actuators.

26. RADIO INSTALLATION AND OPERATION.

Many combinations of transmitter, receiver and actuator are possible. Most modern transistorized units are supplied complete with wiring harness, switch and plugs, manufacturers' instructions give recommended battery and actuator installations.

Receivers should always be located well forward in the fuselage in Sponge Rubber - NOT plastic - or "Hairlock", close enough to prevent damage in the case of impact but free enough to slip out if the model is inverted. Packing too tightly will encourage vibration.

A "lid" of sponge rubber will secure the receiver when the wing is located.

Wires to batteries should be soldered direct to the terminal and base of the cells. "Ever-Ready" Super-cells (U.7) $1\frac{1}{2}$ volts each will give ample power for transistorized receivers either with relayless types or through relay types grouped in the bay under the nose. See Diagram 16. Wires from battery to receivers pass through Bulkhead "A". "Deac" cells may be installed.

Lubricate rubber motors for actuators - gives more even power, prevents bunching.

FLYING.

Correct balance is essential. The model, with all radio gear and batteries, should hang slightly nose down (gliding attitude) when supported under the C.G. Balance point.

Glide test throughly in quiet conditions, using minimum of tailplane packing for incidence corrections, above leading edge if model tends to dive, above trailing edge if model tends to stall.

All makers radio instructions give details for range testing and tuning. It is thoroughly recommended that COMPLETE RANGE TESTING BE CARRIED OUT (MINIMUM 250 YARDS) WITH THE MODEL HELD HIGH BY HELPER WITH ENGINE RUNNING AT PEAK REVS. Arrange code of hand signals to check radio action.

Do not run motor at full revs. for first flights. More powerful motors such as Webra "Piccolo" should have propeller not less than 7" diameter. "Penetration" is essential and that is what this design provides, ability to fly fast into wind to prevent any tendency to fly out of range down wind. Its inherent stability will permit self-rectification from awkward attitudes if controls are neutralised.
Always check engine and fuel. Range check Radio. Ensure batteries are fresh. Check rubber bands on wing, tail and undercarriage.

After checking that radio is "ON", launch into wind. Let model fly ahead and gain altitude before sending signals. ONLY use radio at low altitudes if it is essential for the safety of the model. Keep model well up into wind until you are familiar with its responsiveness. If too high, continued turn to port will spiral it down.

SPECIAL NOTE.

During development of this model with only 1" dihedral either side, it was found that if the model is "flipped" into a turn it will continue to hold that turn indefinitely without spiralling unless held in a very tight turn. Competition enthusiasts may like to build in this dihedral angle to give a model which has to be "flown" through its powered flight.

Do not forget that to operate radio you require a licence. £1. for five years. Apply for a "Model Control Licence" from:-

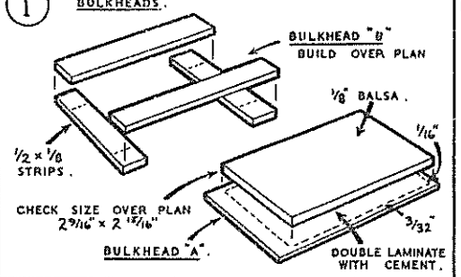
Radio Branch,
Radio and Accommodations Dept.,
G.P.O. Headquarters,
London E.C.1.

MODEL AIRCRAFT BOURNEMOUTH LTD. NORWOOD PLACE BOURNEMOUTH

VERON Mini-Robot

36" SPORT RADIO PLANE
FOR ENGINES UP TO ·95 c.c.

EASY TO BUILD LIGHTWEIGHT RADIO PLANE FOR TRANSISTORIZED RECEIVERS FOR RUDDER CONTROL ONLY.

1 BULKHEADS.


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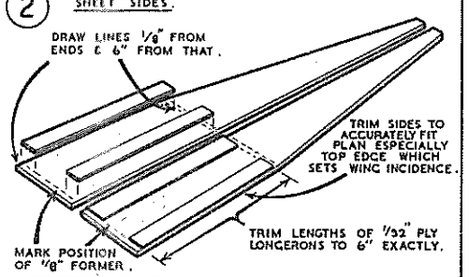

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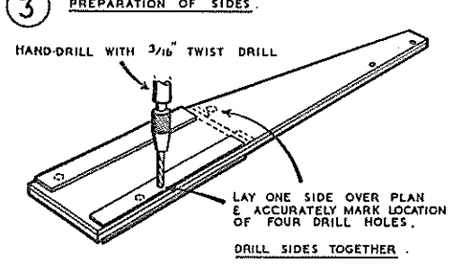

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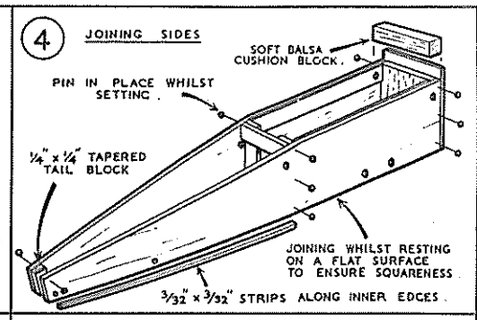

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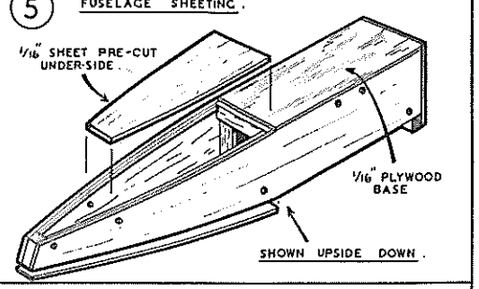

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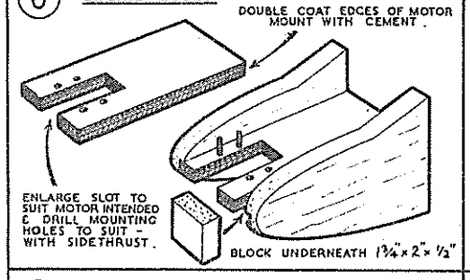

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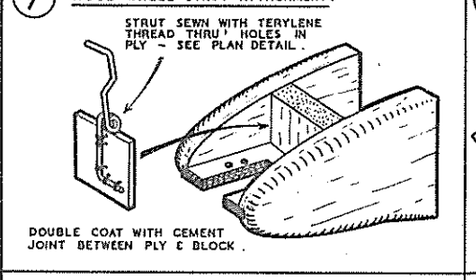

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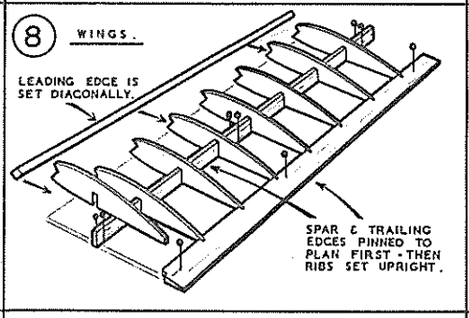
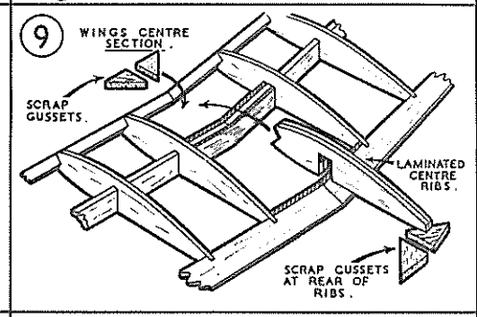


9 WINGS CENTRE SECTION.


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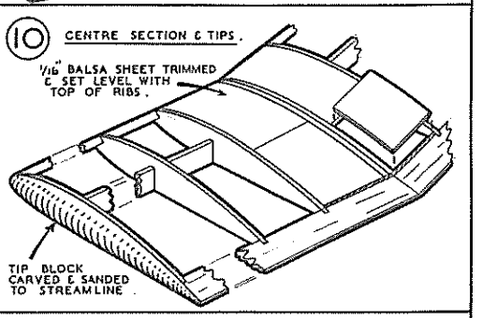

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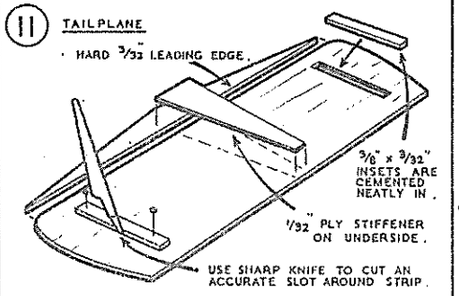

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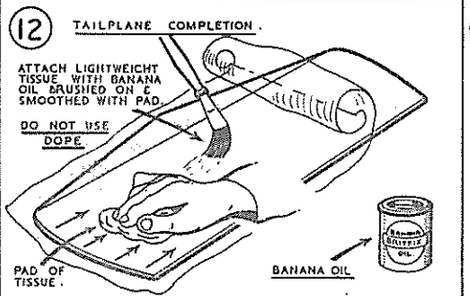

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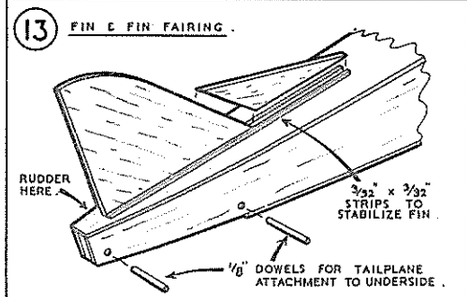

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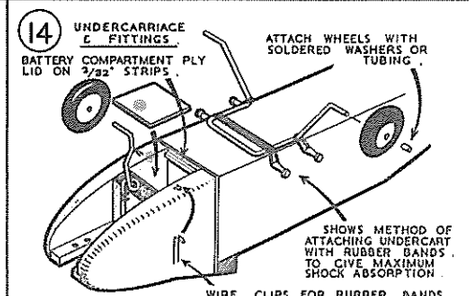

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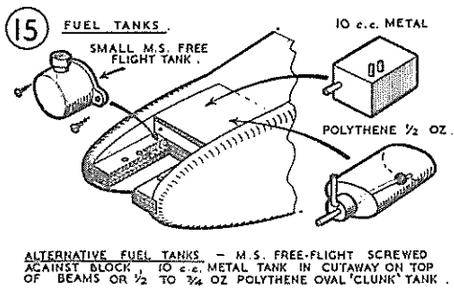

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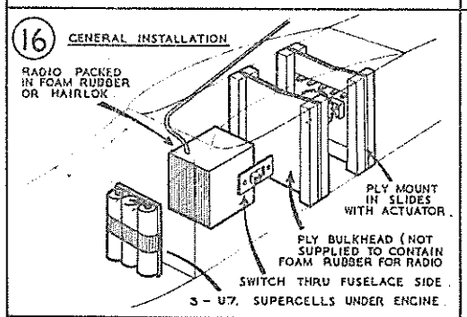
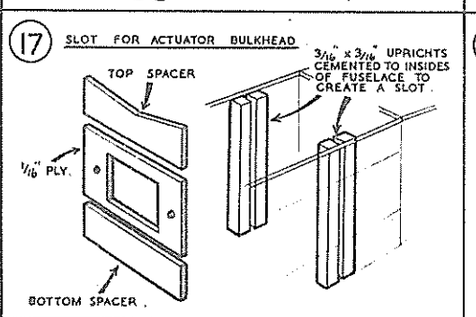
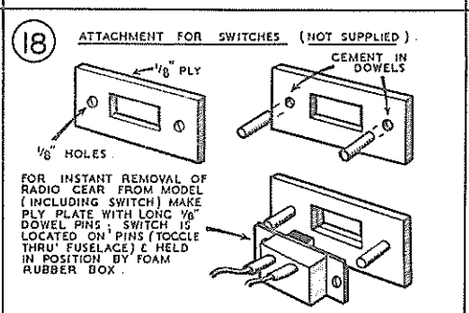


17 SLOT FOR ACTUATOR BULKHEAD


18 ATTACHMENT FOR SWITCHES (NOT SUPPLIED).


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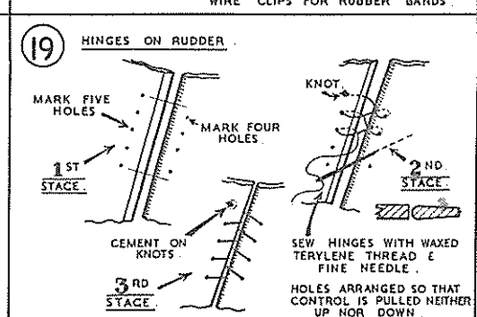

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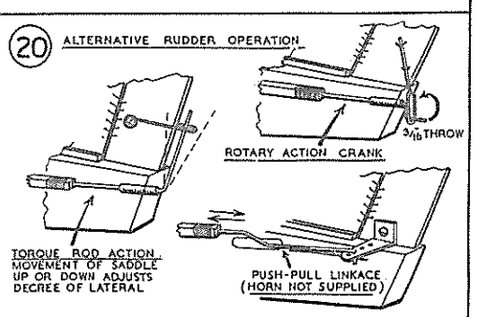

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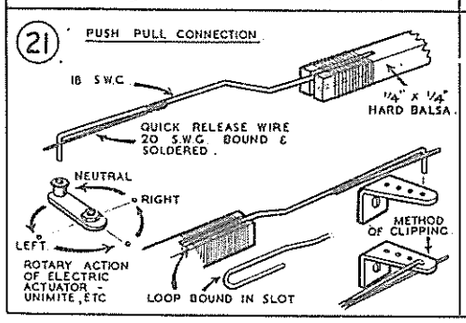
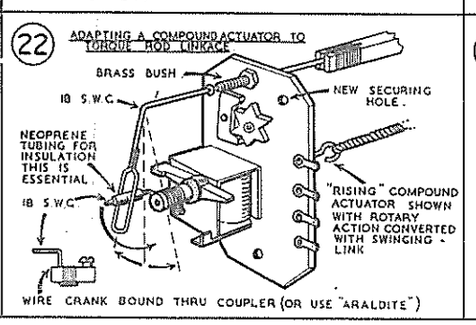


22 ADAPTING A COMPOUND ACTUATOR TO TORQUE ROD LINKAGE


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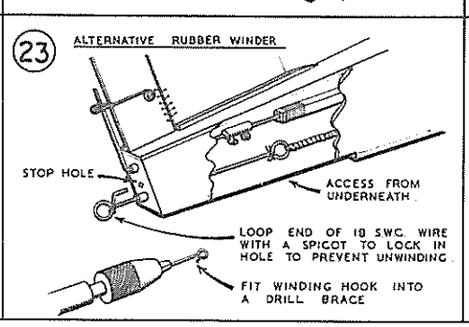

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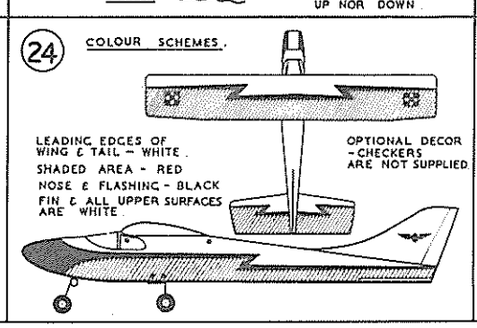

25 ALTERNATIVE RADIAL MOUNT
FOR DART, BANTAM, ALSO COX "BABE-BEE", & COX "TEE DEE" .020 & 0+9 c.c. ins