MFA SPORT 500

INSTRUCTIONS

model flight

MODEL FLIGHT ACCESSORIES

MFA 'SPORT 500' HELICOPTER

Congratulations on your purchase of this kit and, if you are new to R/C helicopters, welcome to this exciting, challenging and probably the ultimate flying experience! The kit offers unequalled value for money even though it incorporates only the best quality components integrated in to a quick building, easy to set up but, above all, superb flying model. Being all British made (designed, manufactured and kitted entirely by MFA), spares and technical assistance are readily available 'off the shelf'! Remember, this design has done a lot of flying in all weathers (very enjoyable!) so, it is well proven and we know it inside out! The MFA high performance fixed pitch Hiller type teeter rotor system works very well indeed and as mentioned, is very simple to set up, gives a very stable stable hover but also has an agile but smooth forward flight performance. The idea is to keep things simple but, above all, well tried with fine engineering! We are confident you will get a lot of pleasure from this helicopter and when you have progressed or you already have some helicopter experience, you can convert it to the beautiful scale Hughes 500E available as an add-on kit.

IMPORTANT:

Please, abide by the instructions! Do not rush the assembly and setting up (it is already straightforward and enjoyable!) in an attempt to get the model into the air quickly, that is not the way to treat a helicopter. Remember, any helicopter is potentially dangerous due, obviously, to the rotating rotor blades so, go carefully and precisely which will be rewarded with a fine flying model! Note, if you have any difficulty assembling a part or, a part for example is not free to rotate, carefully check the reason, it will probably be due to machining burr or plastic moulding 'flash', in which case simply remove the burr with a fine file or the moulding flash with a sharp knife.

ADDITIONAL ITEMS REQUIRED:

RADIO: Any modern 4-5 channel.
GYRO: For dampening tail movements. Any one suitable. Illustrated is the 'Quest'. A gyro is not essential but makes flying much easier and smoother.
ENGINE: Most .40-.45 cu.in., see ENGINE INFORMATION below. Special helicopter engines with heat sink heads are not necessary unless operating in very hot climates.
FUEL FILTER: A good quality in-line (engine to tank) filter is essential.
ADHESIVE: MFA 'Yellow Hyloglue' (pt.no.666) or equivalent wood type 'Super Glue'. Use this for ALL gluing on the model.
SCREW & NUT LOCKING LIQUID: MFA pt.no.697 or equivalent.
FUEL PROOFER: Small tin of fuel proofer for the ply (F.1), inner portion of the rotor blades and transfers.
TRIM TAPE: 2 different colours MFA Pt.no.96 or 207 for the rotor and tail tips. Also 1.5mm 'Snake Tape' (pt.no.216) is ideal for the door outlines.
SERVO MOUNTING TAPE: MFA pt.no.37 for receiver etc. hold down.
PAINT: For body and tail parts as desired (epoxy or enamel recommended).
TOOLS: 1.5mm, 2mm, 3mm and 4mm twist drills will be required for the ply parts, together with a few everyday tools e.g. scissors, screwdriver, small adjustable spanner, fret saw (available from MFA) or Como Jig Saw, a couple of medium adjustable spanners are also useful for fine tuning the rotor pitch settings, a metric ruler and medium grade sandpaper. The socket drivers are included in the kit.
ENGINE STARTING EQUIPMENT: Glow engine starting equipment will obviously be required e.g. electric starter, small 'V' belt for starter (MFA pt.no.739), 12v battery (MFA pt.no.183), 'Power Panel' (MFA pt.no.518 or 668), glow plug connector, 5% nitromethane glow fuel.

ENGINE INFORMATION:

The following list of engines have been found to be suitable for the model:

O.S. 40 SF, O.S. 46 SF, O.S. 40 FSR, O.S. 45 FSR.
Enya SS 40 FSR, Enya SS 45 FSR.
Thunder Tigre Magnum Pro 40.
H.P. 40 F Gold Cup, H.P. 40 F Silver Star.
A.S.P.40 FSR.
Royal 40, Royal 45.
Fox 40 BBRC, Fox 45 BBRC.
Como 40.
Irvine 40 R/C (see note below regarding this engine).
Super Tigre S.40 (this engine can be used but will require the rear of the fan blades trimming slightly to clear the carburettor).

Other .40 -.45 two stroke engines (not four stroke) can obviously be used provided they have a ball race supported crankshaft, but first check that the flywheel and small toothed pulley fits the engines crankshaft and also the rear of the fan blades clear the carburettor. Also some engines may not quite fit into the Engine Plate (H.18) due to variations in crankcase width (the O.S.40 SF and 46 SF are ones that have wide crankcases), in this case simply file the inside edges of the Engine Plate slightly to obtain a snug fit.

The Irvine 40 R/C requires a flywheel with a larger (9.5mm) hole. If required, this is available from MFA on an exchange basis. Send the existing flywheel back to MFA with £1 specifying part number HI.43. Also the fan should be drilled to 9.5mm for this engine.

SCREW IDENTIFICATION:

Note that when identifying a screw, the size refers to the actual length of the thread EXCLUDING the head, i.e. an M3 x 25 is 3mm diameter by 25mm THREAD length.

ASSEMBLY:

1. USE THE SCREW & NUT LOCKING LIQUID ON ALL SCREWS AND NUTS (except the self locking M4 nuts). Assemble the basic chassis by bolting the 4 U/C legs (H.44) to the main chassis plate (H.20) with 4 M5 x 35 screws and nuts, sandwiching the 4 U/C leg spacers (H.19) between the left legs and the chassis at the same time, Figs.1 & 2. Attach the skids (H.98) to the legs with the 4 leg/skid joiners (H.40) using M3 x 8 screws and nuts, Fig.1. Note the holes in the 4 joiners are slightly off centre, they should be fitted so that the hole is towards the front, Fig.1.

2. Fit the clutch springs (H.85) to the shoes (H.42) and insert 2 M3 x 12 screws (note the heads of the screws go into the recesses and the springs are on the opposite side to the recesses) and then nuts, Fig.3. Put an M3 washer on each screw and insert the clutch shoes/springs into the large toothed pulley (H.21) from the side of the pulley with the flange on it. Now place an M3 washer on each screw and then tighten down an M3 nut on each. Note: The inner nuts should be set so that the shoes are just free to pivot on the screws, Fig.4. If any excess spring protrudes through the holes, simply grind/file them flush with the shoes. Insert the clutch lining (H.86) temporarily into the clutch drum (H.10) and mark the appropriate length but, mark an overlap of about 1/2mm, this will make sure that when the lining is cut and glued in, the butt join will make the lining press nice and tight against the inside of the drum. Cut and glue in, Fig.4.

3. Slip the M5 washer on to the main gear shaft (H.11), Fig.4, followed by one of the main gearshaft bearing blocks (H.6), note which way round this goes, Fig.5. Slide on the clutch drum and retain with the split pin (H.87).

4. Place the flywheel (H.43) on to your engine, followed by the fan (H.24) which fits over the flywheel, then the small toothed pulley (H.22), then the V belt pulley (H.41) and finally the star washer (H.88), firmly tighten down the engine's prop nut. Now mark and drill (3mm) the engine plate (H.18) to suit your engine so that there is a gap of 3mm between the back face of the flywheel and the edge of the engine plate, arrowed on Fig.6. Fit the engine with 4 M3 x 12 screws & nuts. Now offer up the fan duct (H.23) to the engine and plate assembly and trim it as necessary to clear your engines needle valve and throttle arm, Fig.7. NOTE: Due to variations in height, some engines may require the fan duct to be trimmed slightly at the top to clear the cylinder head, this is O.K. When satisfied, attach the two duct halves to the plate with 2 M3 x 12 screws & nuts, Fig 8.

5. Slip the toothed drive belt (H.100) over the large toothed pulley and attach the gear shaft/bearing blocks assembly to the chassis with 4 M3 x 25 screws & nuts. Attach the engine assembly to the chassis with 3 M4 x 25 screws and nuts, hooking the belt over the small pulley. Before fully tightening, carefully check the belt is as near right angles to the gearshaft and engine shaft as you can tell, Fig.9. Also check the belt tension, this is not too critical but, if a pressure of about .5Kg (1lb) is applied to the middle of one side, the belt should move in about 6 - 8mm.

6. Attach the upper mast bearing block (H.5) to the top of the chassis with 2 M3 x 25 screws & nuts (don't fully tighten yet). Attach the lower mast bearing block (H.4) with the ball race downwards to the chassis (don't fully tighten yet). Slide the mast (H.33) down from the top and check the mast slots straight into the lower mast bearing block, if it is slightly to one side, pull the mast gently in the appropriate direction to re-align the upper mast bearing block. Attach the large bevel gear (H.72) to the mast with an M3 x 16 SOCKET HEAD screw & nut, Fig.10. Tighten the two blocks but, note that if your chassis has elongated holes for the lower mast bearing block, set this so that the gears mesh with no up and down play of the mast. Put some nut locking liquid between the block and the chassis. Also put an M3 washer behind the two M3 nuts.

7. Attach the fuel tank plate (H.50) to one of the fuel tank clips (H.84) with an M3 x 5 screw (head toward inside of clip) & nut. Run an M4 nut a short way down the two rear M4 x 25 screws, fit the plate/clip and retain with two more M4 nuts. Set this so that the end of the M3 screw just clears the engine crankcase. Fit the other clip to the third screw and set so that it is an equal distance out from the chassis as the other. NOTE: One of the clips has an ENLARGED (4 mm) HOLE in it, this should be used on the front clips M4 screw. Also note that the unused holes in the clips should be at the bottom, Fig.11.

8. Assemble the fuel tank (67) as Fig.12 and trim off the left mounting 'ear' (arrowed). Fit the tank to the clips, Fig.13. NOTE: If the clips tend to distort the tank at all, simply spread the clips until the tank is held snugly without distortion. Cut two pieces of the fuel tubing (108) and join the lower tank vent to the engine with the in-line filter. Fit two short pieces to the other two vents and keep the ends plugged with short peices of dowel or screws when the model is not being used. If your engine's instructions specify pressure feed, connect one of the top vents to the silencer connector and keep the other vent plugged at all times except when actually filling the tank.

9. Slip a brass ball on to an M2 x 12 screw, then an M2 nut and screw in to the tail boom (H.45), Fig.14. Now attach the boom to the chassis with 2 M4 x 25 screws & nuts. Attach the lower end of tail boom support (H.49) to the chassis with an M4 x 12 screw & nut. Attach the top with one of the tail drive supports (H.46) and 2 M4 nuts, Fig.14. Similarly fit the other tail drive support to the other end of the boom, Fig.15. Do not tighten these yet until final alignment of the tail drive rod (H.75). This is shown temporarily fitted in Fig.14 for approximate alignment before the tail rotor gearbox is fitted.

10. Trim off any moulding 'flash' from the inner faces of the two tail rotor gearbox halves (H.25). Slide a 5mm ball race (H.79) down each tail gearbox shaft (H.9) followed by a 5mm Oilite bearing (H.82) and fit to one gearbox half, Fig.16. Lightly grease the gears and and fit the other half, retaining with 9 M2 x 20 screws & nuts, heads of the screws on the gearbox side without the bracket.

11. Assemble the tail rotor hub (H.13) with the tail rotor blade holders (H.29) as shown in Fig.17. Use M3 x 12 screws and the M3 stepped washers (H.101) to retain the 3mm ball races (H.81), note STEPPED SIDE of the washer AGAINST the ball race. Attach a brass ball to each arm with an M2 x 12 screw & nuts and hold the two pairs of halves together with 4 M2 x 12 screws & nuts. Attach to the tail gearbox with an M4 x 4 grub screw, tighten securely.

12. Bend the end of the tail pitch change rod (H.77) to 90 degrees (about 10mm long) and insert in the gearbox shaft. Fit the tail rotor pitch crank (H.26), with brass ball fitted, to the gearbox bracket with an M3 x 15 screw and 2 nuts as shown in Fig.19. Attach 2 M2 x 12 screws & nuts to the tail pitch yoke (H.27) followed by two ball clevis. Slip a 16 swg collet (H.47) on to the rod followed by the yoke and the other 16 swg collet. Retain the collets with M3 x 3 grub screws and set so that when the pitch change crank is straight, the two blade holders are at an angle of about 15 degrees, Figs.18 & 19.

13. Drill and cut out (in that order) the fin (F.6), sand smooth and round off the corners. Paint as desired. Fit the tail gearbox to it with 4 M3 x 8 screws & nuts. Attach to the boom with 2 M3 x 25 screws & nuts, Fig.20. Similarly smooth and paint (white) the tail rotor blades (H.31) and fit to the holders (curved side of blades outwards) with 2 M3 x 12 screws & nuts but, TIGHTEN ONLY ENOUGH TO PREVENT ANY PLAY, THE BLADES SHOULD PIVOT QUITE FREELY. Incidentally it is a good idea if a small triangle is cut off each blade as shown in Fig.20 to allow the blades to swing fully. Cut out the tailplane (H.7) sandpaper and paint as desired then attach to the boom with 2 M3 x 25 screws & nuts. The notch for the aerial rubber band should be on the side opposite the tail rotor blades.

14. Attach a tail drive coupling (H.34) using 2 M3 x 3 grub screws to the main gear shaft. File a slight flat on each end of the tail drive rod (H.75) about 8mm long (no more than 1/4 of the thickness of the rod) and thread through the two drive supports and attach to the coupling with 2 M3 x 4 grub screws, making sure one of the screws sits on the filed flat. Slide the other coupling on to the drive rod at the rear and attach to the tail gearbox in the same way. Adjust the two drive supports as necessary so that the drive rod is in a straight line.

15. Insert the 'O' ring (H.83) into the centre of the swash plate (H.1) and attach the 5 brass balls with 4 M2 x 12 screws & nuts, Fig.21. Note the double ball is in the centre of the 3 lower half holes (NOTE: DO NOT put a nut on the inside of this double ball as is illustrated, attach with an M2 x 12 screw only). Slide the swash plate down the mast (ball race down).

16. Make up one of the 'T' bellcranks (H.28) as Fig.22 using 3 M2 x 12 screws, 6 nuts and the T bellcrank bearing & washer (H.30). This is then attached to the chassis with an M4 x 30 screw and 3 M4 nuts as Fig.23 (head of the screw either way round), making sure the nut on the rear of the T bellcrank is as close to the mast as it will go. Note: If the bellcrank does not move freely, trim out any moulding flash from the hub. Connect up to the swash plate with two 35mm control rods (H.78) and 4 ball clevis, adjusting these so the distance between the bottom of the swash plate and the top of upper mast bearing block is 18mm.

17. Similarly connect up the other 'T' bellcrank to the other side of the chassis but this time with only 2 M2 x 12 screws & 4 nuts and the hub of the bellcrank facing inwards and the two brass balls on the outside. Attach to the chassis with an M4 x 16 screw & nut, Fig 24. Connect up to the swash plate (inner of the double brass ball) with a 35mm control rod and ball clevises so that the swash plate and T bellcrank are level. Now hook up the anti-rotation link (145mm control rod with 2 ball clevis) to the outer double ball and the brass ball on top of the tail boom, setting it so that the swash plate is straight when viewed from above.

18. Assemble the complete rotor head made up of mast/rotor joiner (H.3), stepped pivot (H.8), rotor head (H.2), 4mm ball races (H.80), teeter damper wire (H.76), 4 M2 x 6 screws, M3 x 3 and M4 x 6 grub screws, Figs.25, 26 & 27.

19. Attach the 2 top and 2 bottom blade holders (H.16/H.17) to the blade joiner (H.7) with 4 M3 x 15 screws & nuts. NOTE: The bottom blade holders are the ones with TWO 4mm holes, the top are the ones with only ONE 4mm hole. ALSO IMPORTANT: The 'sharp edged' side of the four blade holders (there is always a sharp edge and a rounded edge side on stamped parts) should FACE INWARDS in each case. Top view shown, Fig.28.

20. Next is covering the main rotor blades (H.48). Cut the covering material in half lengthwise and remove the backing off one. On a flat surface, starting on the trailing edge bottom, press the blade down on to about 8mm of covering, Fig.29. The amount of uncovered blade at the root should measure about 30mm. Now rotate the blade round pressing the covering down at the same time, Fig.30, ending again at the trailing edge, trimming off the excess with a sharp knife, Fig.31. NOTE: For best results, this should be done in front of a gentle heat source so the covering is reasonably pliable. If you find that the covering does not stick down properly in places, simply gently warm it, pressing down at the same time. Repeat with the other blade.

21. Temporarily attach the two rotor blades to the blade holders with 2 M4 x 15 screws & nyloc (nylon insert) nuts. Set the coning angle ('dihedral') of the blades. This is done by first cutting out the pitch & coning angle guage. On a flat surface, rest the rotor assembly on two scrap pieces of 4mm ply as Fig.32. Now offer the coning angle guage (with the end resting on the flat surface) to the end of the rotor blade, the dotted outline should now line up. Gently bend the blade holders until it does, repeat with the other blade. Wrap some different coloured trim tape round each rotor tip as illustrated. Remove the rotor blades.

22. Attach the two head side plates (H.15) to the blade joiner with 4 M3 x 5 screws (sharp cornered sides inwards). Attach the rotor head to the blade joiner with the fly bar (H.37) making sure that the head fits between the side plates with no play, if there is, carefully bend the side plates to cure. At the same time, fit the teeter wire retaining bolt (H.12) with 2 M4 nuts and set the nuts so that the head is level with the blade joiner. Attach a brass ball to the fly bar operating arm (H.35) with an M2 x 12 screw & nut and slide it down the fly bar. Slide the 4mm collet (H.89) down the other side and temporarily retain both with M4 x 4 grub screws, Fig.33.

23. Screw on the fly blades (H.32) until resistance is felt, indicating the bottom of the thread (use the locking liquid). Set these so that the short sides face forward and are both level with each other and the fly bar operating arm, Fig.34. Now balance the fly bar by holding the assembly upside down as Fig 35 (or alternatively resting H.3 on a flat surface) and adjusting the fly bar operating arm and the 4mm collet until the fly bar balances level.

24. Now re-attach the rotor blades but, do not over tighten the screws, the blades should be able to swing back without too much pressure. Balance the rotor by resting the fly bar on two level supports (vice jaws are convenient, Fig.36) and checking the blades are level. If they are not, add some more trim tape to the lighter blade or, if this is not enough, wrap an appropriate sized piece of blade covering round the tip.

25. Drill and cut out the remaining ply parts. Cut and drill (1.5mm) the servo cut outs to suit your servos. Now glue F.2, F.3, F.4 and F.5 to F.1 as Fig.37. Fuel proof the reverse side of F.1 and then attach to the chassis with 3 M4 x 12 screws & nuts.

26. Screw in (2 x 12 self tap screws, 262) the three top servos noting the information on F.4. (written in 'fixed wing' language for simplicity). Attach three brass balls to the holes in the appropriate servo discs/arms to give 11 - 12mm radius, with three M2 x 12 screws and six nuts (check the ends of the screws clear the top of the servos, shorten if necessary), Fig.38. Now connect up the for/aft cyclic (elevator) to the T bellcrank with the 90mm control rod and ball clevises, setting it so that when the servo is central, the T bellcrank is level. Do the same with the left/right cyclic (aileron) using the 80mm rod. Figs.38, 39 & 40.

27. Connect up the tail rotor pitch (rudder) servo with the tube & cable (21). Solder the cable to one of the threaded connectors (704) and glue the tube into F.1, Figs 38,39 & 40. Similarly connect the cable to the tail rotor pitch crank (H.26), setting it so that when the servo is neutral, the pitch crank is angled slightly forward, Fig.43. Hold the tube & cable to the boom with the three cable ties (H.90), note the position of the rear one which is important. Also PLEASE NOTE: Apply a drop or two of glue to all three tie down/tube & cable/boom joints to prevent movement, arrowed Fig.43.

28. Attach the radio switch to F.1 and install the nicad (wrapped in soft foam) against F.1. Fit the receiver using Servo Mounting Tape. Fit the gyro if used, Fig.41. Attach the two body hold-down brackets (H.70) with 4 M2 x 12 screws & nuts, Fig.41. Now hook up the throttle servo using the 145mm control rod, note the slight Z bend. Use the nylon clevis (702) on the engine end. Set the control rod so that full throttle and forward trim on the transmitter gives engine full throttle, slow throttle (with trim still forward) on the transmitter gives engine tick-over and pulling the trim back stops the engine. This will obviously have to be fine tuned when first running the engine. Check that when the engines throttle arm is full forward, the clevis does not touch the fan, if so, simply bend the throttle arm back slightly, Fig.42.

29. Cut out the body moulding (H.97). Use a pair of sharp scissors and cut first round the edge leaving a flange of about 3 - 4mm. Now carefully cut (NOT WITH SCISSORS but with a 'razor saw' or similar) across the middle on the marked line to separate the two halves. Cut or drill (6mm) the two holes for the body hold down screws (H.70). Carefully glue the two halves together doing a short length at a time holding together with croc clips or sellotape, Fig.44. Sandpaper round the flange to even it up and paint as desired, either leaving the 'glass' area clear or black painting it. For the door outline, MFA 1.5mm 'Snake Tape' (pt.no.216) is ideal. Add the transfers (H.96), these are water slide type i.e. cut the separate items out, soak in water for a minute or so and slide the film into position pressing down with a soft cloth. After 24 hours, fuel proof over the top.

30. Slide the swash plate driver (H.36) down the mast (note which way up it goes) followed by the rotor assembly. Retain the rotor assembly with a socket head M3 x 16 screw & nut. Attach

the swashplate/fly bar link (the remaining 35mm control rod and two ball clevis) and set so the fly blades and swash plate are level. Retain the swash plate driver with an M3 x 16 screw & nut, setting it so that the swash plate/fly bar link link is vertical and the gap between the swash plate driver and the bottom of the mast/rotor joiner is approximatey 1mm, Fig.45. IMPORTANT, PLEASE NOTE: After initial hovering flight has been accomplished, the cyclic control response should be increased by substituting the top swash plate M2 x 12 screw for an M2 x 20 screw, Fig.47. If you have any helicopter experience, this should be done initially. Attach the body with the two nylon screws (H.70).

31. Using the pitch guage as in Fig.46, check the rotor pitch by lining up the top edge of the guage with the fly bar and looking along from the tip of each rotor blade. Carefully bend the blade holders with the two adjustable spanners (one on H.7, the other near the M4 blade mounting bolt), DO NOT try and alter the pitch by putting pressure on the actual rotor blade. Check the balance; pick the model up by the fly bar (rotors for and aft), the mast should angle slightly forward indicating a balance point just in front of the mast.

SETTING UP:

1. Put a drop of thin oil on the Fly Bar (H.4) pivot bearings, the teeter wire retaining bolt (H.12), the tail pitch yoke (H.55) bearing, upper mast bearing (H.23), the two outer bearings of the tail rotor gearbox (H.60), the two tail drive supports (H.21) and the large toothed pulley bearing (H.33), put just a minute amount of oil on this latter bearing as a lot of oil here could end up on the clutch lining with obvious results! Repeat this only when the oil has obviously dried out. Put a smear of grease on the large bevel gear (H.72).

2. Fill the fuel tank. Note, to simplify engine starting, when the tank is filling and just before it is full, squeeze the vent tube (the one that goes to the silencer when using pressure feed), this will force fuel up the feed tube to the carburettor. It is a good idea to have a fuel filter from your fuel supply to the models tank and ALWAYS WHEN NOT IN USE, KEEP THE FUEL TANK VENTS PLUGGED to prevent dust etc. entering the tank. Set the engines main needle valve to the recommended setting.

3. Switch the radio on and set the transmitter throttle a few 'clicks' from closed. Grasp the rotor head, connect up the glow plug and V belt and start the engine as shown in Fig.48. Place a heavy weight on each skid and release the rotor. Bring the engine up to about 1/2 to 2/3 throttle and check whether the two rotor blades are tracking together by observing the coloured tape on the tips. If you keep your eye level with the edge of the rotor disc, the appropriate colour will show on the high and low blade. Stop and carefully increase the pitch very slightly on the low blade and decrease the pitch on the high blade.

4. While doing this, carefully adjust the engine settings if necessary so that it runs reliably from tick over to full power but, keep it slightly on the rich side. Once set, it should not be necessary to adjust anything so, if a large adjustment is suddenly required later on, BE WARNED, as this could be a clogged filter/split fuel line/contaminated fuel etc. so, CHECK! You should never have an engine problem if the engine and plumbing is treated with a little care.

5. Now remove the skid weights and place the helicopter on a piece of hardboard or ply a metre or so square (this is obviously only used for initial setting up, normal best flying surface is mown grass) and gently increase the throttle (turn the gyro OFF if one is fitted at this stage). The tail will probably start to swing one way or the other, re-trim at the transmitter or re-set the servo linkage if not enough. Now increase the power slightly more until the model becomes 'light' on its skids, another 'click' on the transmitter throttle and one skid will probably try and lift, so re-trim. The same for for-and-aft, although it is best to set this so that slight back stick is required to keep the model level.

6. Now the model is ready to go but, check a final couple of things first. Make sure the toothed belt is tracking roughly central on the top pulley, if it is tending to try and run one way, the motor mount assembly will have to be adjusted slightly to cure. Also make sure that the tail drive wire is not tending to 'whip' or resonate as the engine approaches take off rpm. If it does, it can be cured easily by adjusting the supports (H21) up or down slightly so that the drive wire is not quite in a straight line.

7. Vibration: Note that any helicopter will have a certain amount of vibration however carefully it is balanced. It will be found that when the throttle advanced from tick-over, and usually at about 1/4 - 1/3 throttle, the model will go through a vibration phase and then smooth out again as the throttle is advanced further. If however there appears to be excessive vibration generally (although a little difficult to define), carefully check the rotor/fly bar balance etc. again.

FLYING:

1. Pick a flying field away from trees and buildings and preferably no wind (when gyro fitted) or just a gentle breeze blowing (when no gyro fitted) for initial flying. Turn on the radio and gyro, start the engine and always face the model into the wind. Stand about 3 or 4 metres to the rear of the model and about 2 or 3 metres to the left. Gently open the throttle until the model lifts off, it will probably stop at about 1/2 metre altitude as it comes out of ground effect (if you have opened the throttle gently!) but, reduce the throttle gently if it climbs any higher than this. Keep these first attempts brief (to maintain concentration) and just try to keep the model roughly over one spot or slowly moving forward (walk with it). Every time you become disorientated, close the throttle, have a breather and try again!

2. You should begin to get the idea of the controls at this stage, the for & aft and left & right cyclic control ('aileron' & 'elevator', right hand stick) will feel quite positive and is the easiest and most logical control. The throttle/vertical climb & descent will feel 'soft' so a certain amount of anticipation is required. The tail pitch ('rudder', left hand stick) control is the most difficult as the tail is not naturally stable (as on any helicopter) so, this will seem very sensitive, this is where a gyro is so helpful. Keep practising and do not allow the model to gain a lot of height or fly away from you at this stage. Hovering is the most difficult flying to do with any helicopter but is also the most rewarding for the pilot so, once mastered, forward flight seems easy. DO NOT ATTEMPT FORWARD FLIGHT UNTIL YOU CAN HOVER REASONABLY WELL or you will find it very difficult to get the model down for a safe landing.

3. As confidence is gained, keep in the hover but climb the model to a height of about 4-6 metres for a while before bringing it down, this is good practice for maintaining orientation while looking more underneath the model. Now attempt to land the model over a specific mark on the ground, when you can do this you will have mastered basic hovering flight! NOTE: KEEP CHECKING THE FUEL LEVEL, it is easily visible and stop when it drops to less than about 1/4 full.

4. The next stage is brief forward flight. Take off and hover at about 2 or 3 metres, move the forward cyclic stick gently forward, the model will tilt forward and start to fly forwards, it will also start to climb (as happens when a helicopter comes out of hover) so, reduce throttle slightly and almost immediately halt the forward flight by bringing the cyclic stick back to neutral and then briefly into slight back stick (don't hold back stick or the model will try and reverse). Increase power as the model goes back into hover and fly it back down to the ground. Repeat this a few times.

5. The next stage is a circuit. Take off as before and as before gently go into forward flight (always into wind) and allow the model to climb a little higher this time until it is about 30-50 metres away from you and reduce throttle slightly and turn left by applying slight left on both sticks and then left again. When it has flown back down wind and is back level with you, turn it back round into wind so that in fact you have flown the model in a complete circle round you, ending up slightly down wind and probably fairly high but still looking at the left side, push in a little forward cyclic to maintain forward flight into the wind. Halt the forward flight as before, go back into hover and slowly descend to a landing. Note the method of landing at this stage i.e. hovering and then slowly descending to the ground, is the easiest way. The more scale type of landing i.e. slowly flying forwards while descending, then halting the forward flight and descent just before touch down, requires practice so, perfect the easier method first!

6. Flying in a wind: The model will fly in quite a high wind with no problems but, in these conditions keep well away from trees, buildings as turbulence is created making flying tricky. You will find the model will require less throttle than normal both for taking off and hovering so be prepared for this. IMPORTANT: When flying in a wind, always make sure the tail lifs first before the nose at the moment of take off because if the nose should lift first, the wind will get under the rotor disc and cause the model to be blown backwards. Set the for/aft cyclic trim further forward as necessary.

7. From here on, it is practice makes perfect! Do keep everything gentle and progress slowly until the full extent of the controls and the 'feel' of a helicopter become second nature. Large amounts of control input too early in practice could end up with the model getting away from you, flying fast (extremely exhillarating when you become more experienced) and not in proper control, very hazardous. This brings us to the next paragraph!

SAFETY:

PLEASE READ AND ABIDE BY THIS! It could save you frustration/time/expense and possibly endangering yourself/spectators/property!

1. Has the model been built and set up according to the instructions? If in doubt, re-read the appropriate instruction.
2. Has the screw & nut locking liquid been used on ALL screws and nuts (except the 2 self locking M4 nuts)? If in doubt, undo the appropriate screw or nut and apply some!
3. Regularly check important screws and nuts for tightness.
4. Always fly in an open area away from people and houses and DO NOT GET OVER CONFIDENT DURING INITIAL FLYING, progress slowly!
5. Make sure your radio is operating perfectly before take off and the batteries are always fully charged before each flying session.
6. Even when you become more confident and proficient, ALWAYS HOVER BRIEFLY AFTER TAKE OFF ON THE FIRST FLIGHT OF THE DAY, as a final check on everything before going into forward flight.
7. Always filter the fuel used and change the engines glow plug periodically even if it is still working.
8. Keep checking the fuel level, it is very visible!
9. Don't fly with a damaged rotor, dents and nicks in the balsa trailing edge as the result of a 'tip-over' are O.K. but NOT any splits or cracks in the hardwood leading edge. IF IN DOUBT, DON'T!
10. Don't get too close to the model when hovering, we know it's fascinating but, those rotor blades are dangerous!
11. When flying, if anything appears abnormal i.e. change of engine note, change in handling characteristics, a vibration noise that wasn't there before etc., LAND AND CHECK.
12. Always clean the model thoroughly with a spray detergent cleaner after flying, a build up of oil and dirt is bad modelling practice.
13. Have third party insurance cover for all your model flying. This is available from the S.M.A.E. or the ASP magazine group, if required.

Above all, we at MFA hope you enjoy your Sport 500 helicopter!

OPTIONAL EXTRAS:

Hughes 500E scale body conversion kit: Part no.737.
Extended U/C legs (by 30mm) for rough terrain use and/or greater silencer to ground clearance: Part no.H.53.
'V' belt for electric starter: Part no.739.

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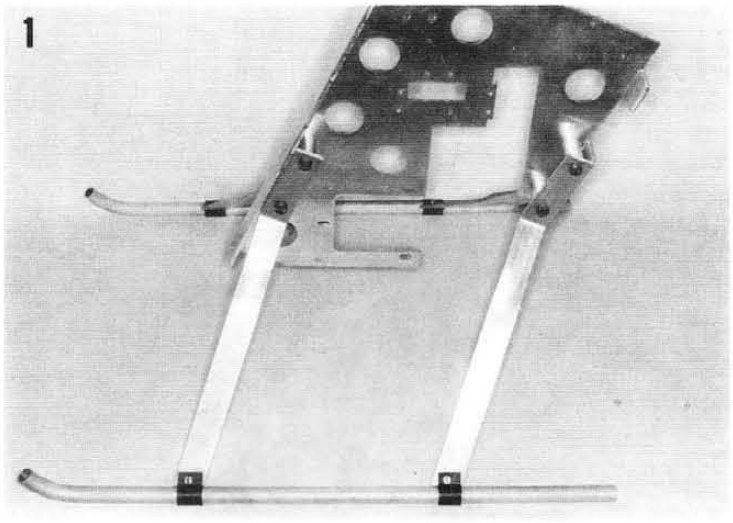

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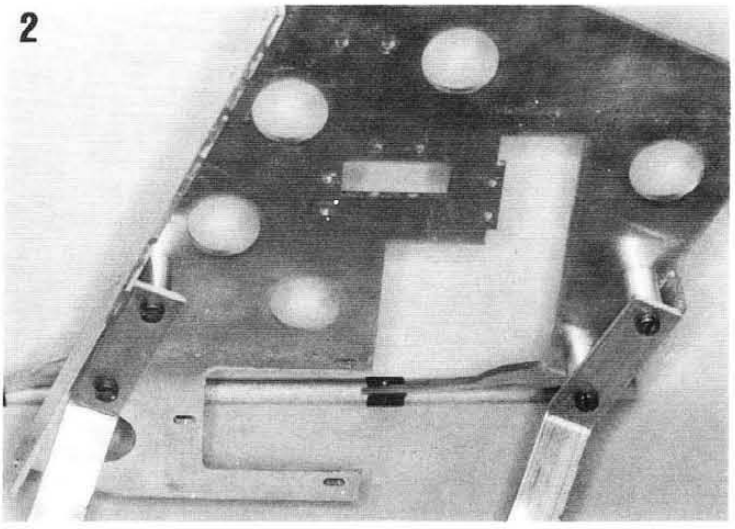

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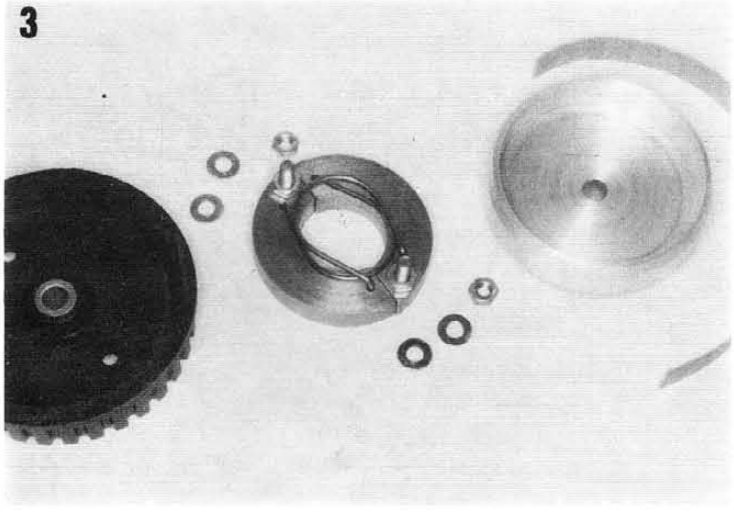

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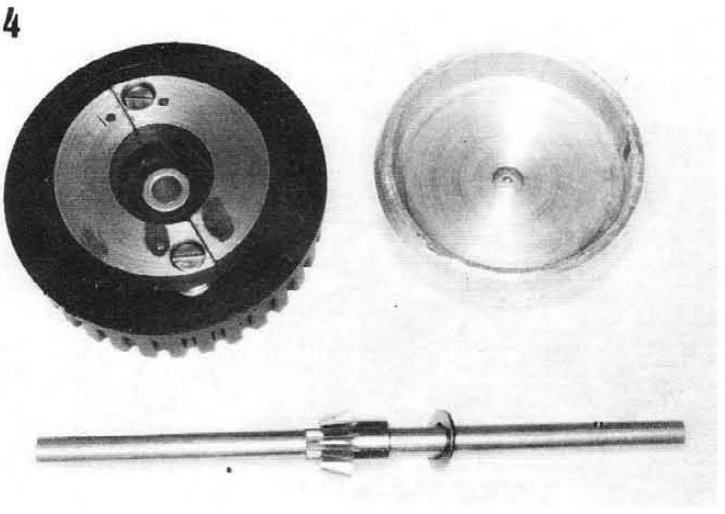

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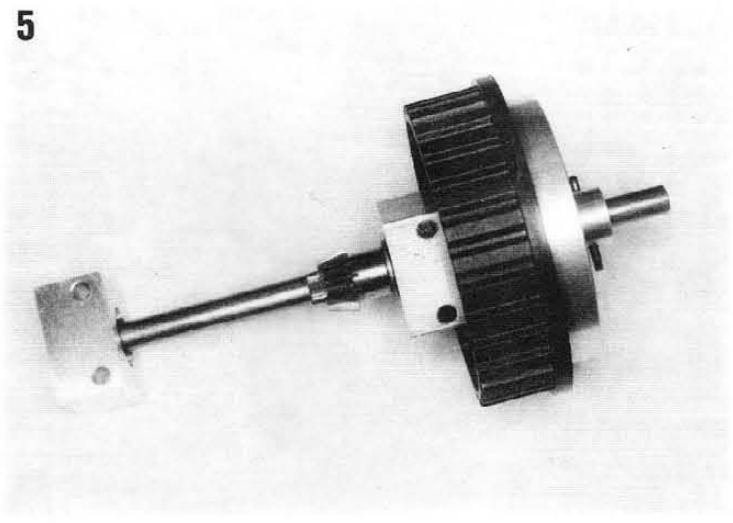

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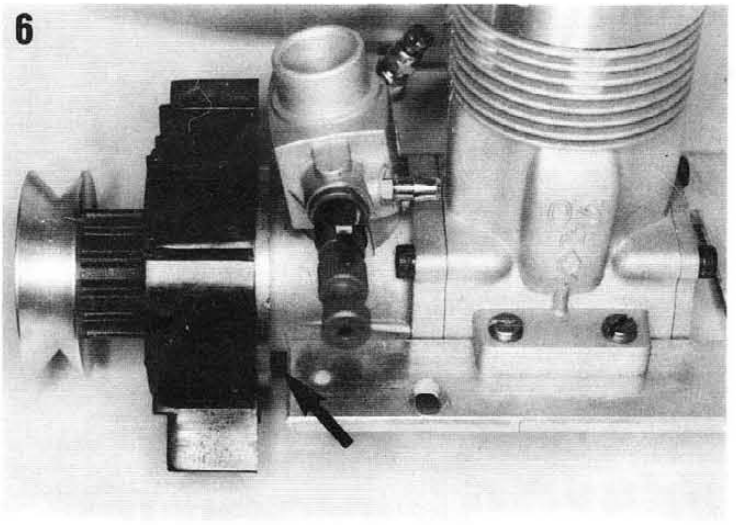

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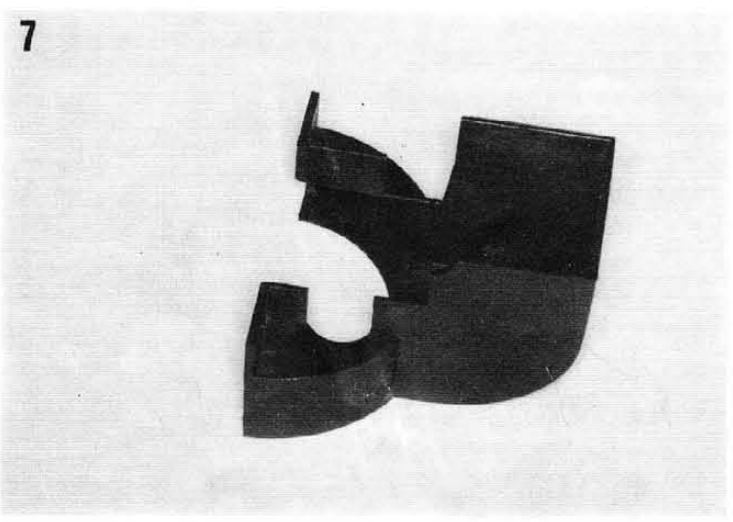

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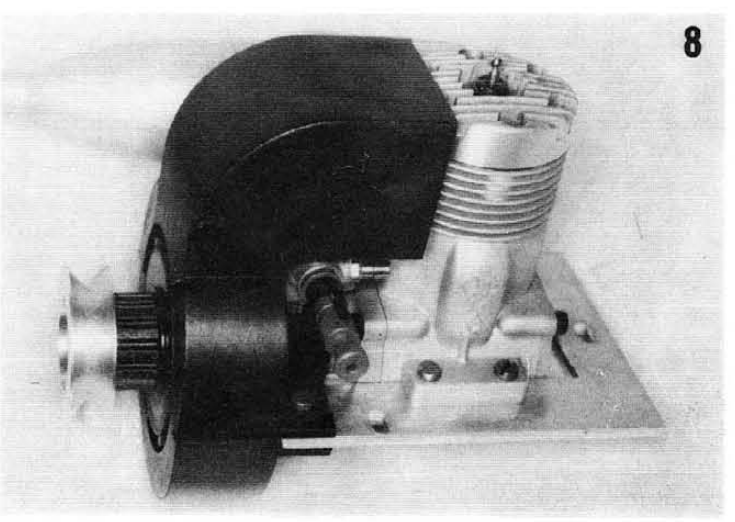

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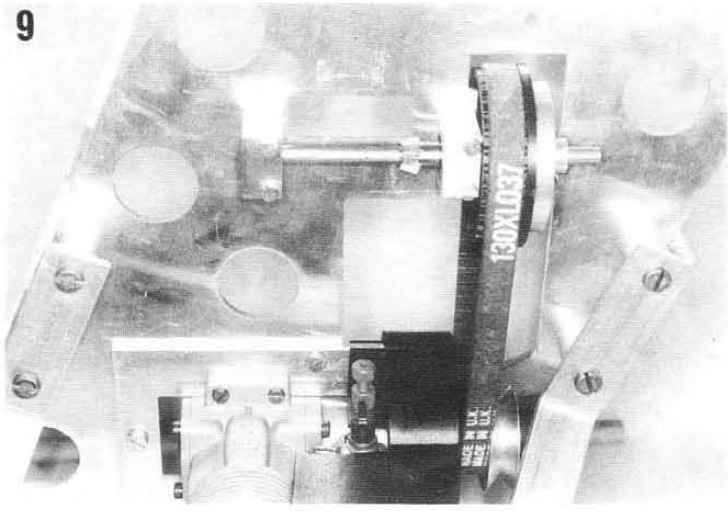

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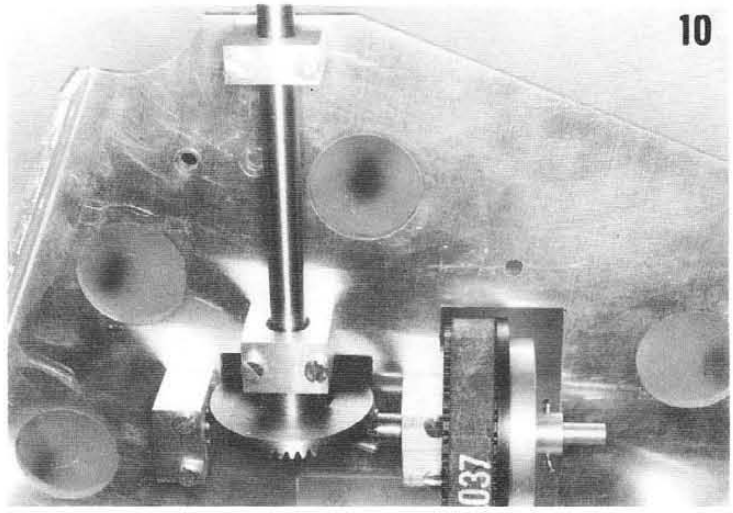

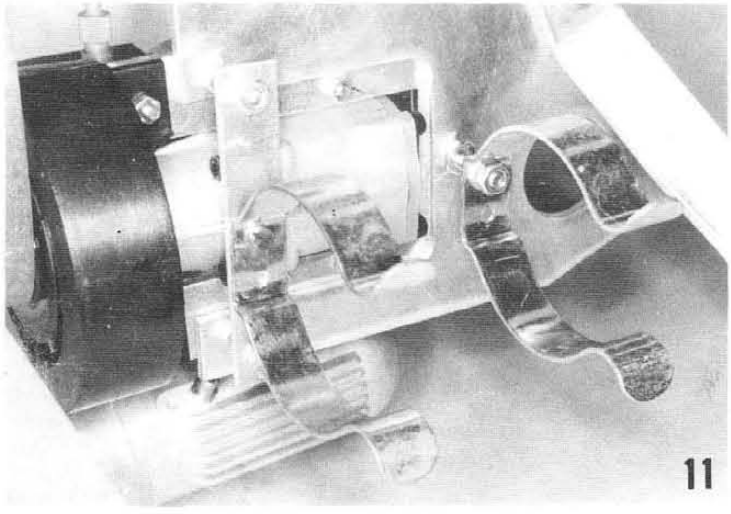

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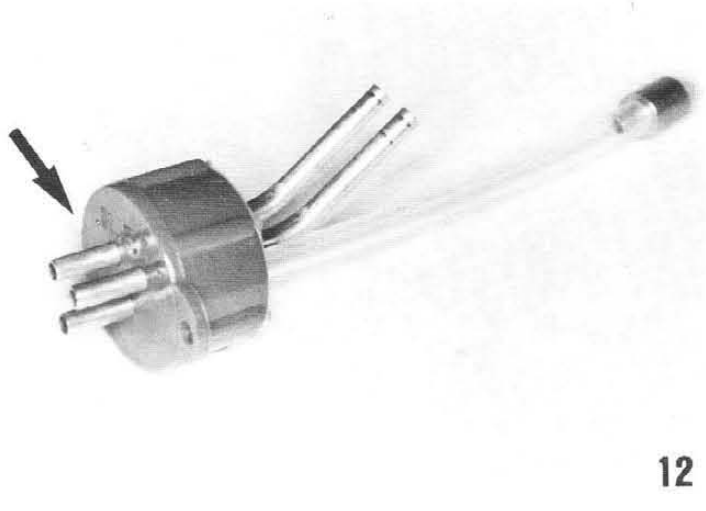

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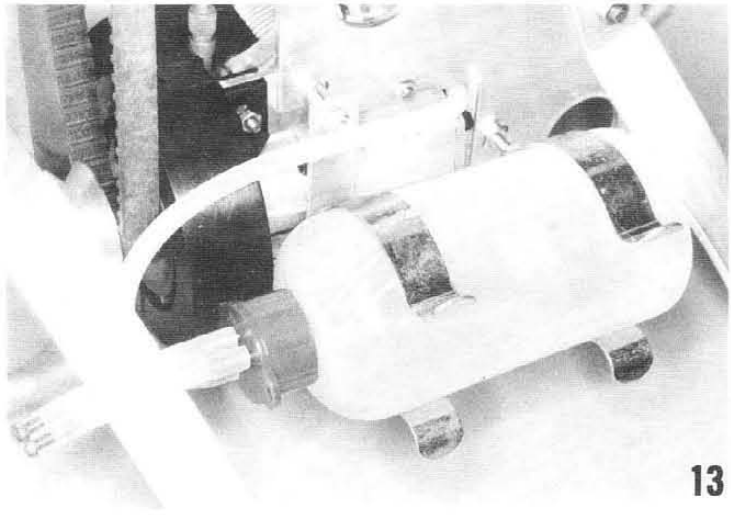

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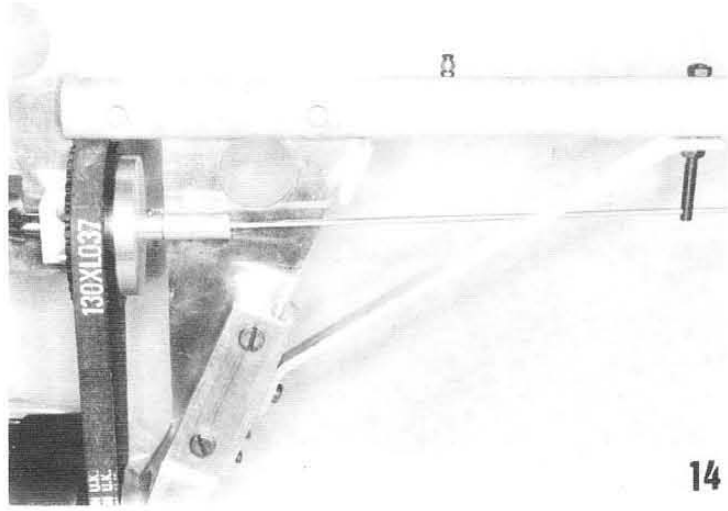

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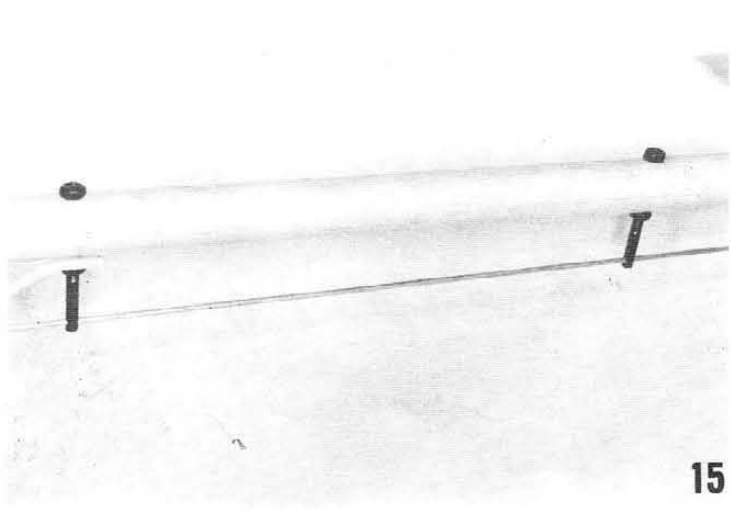

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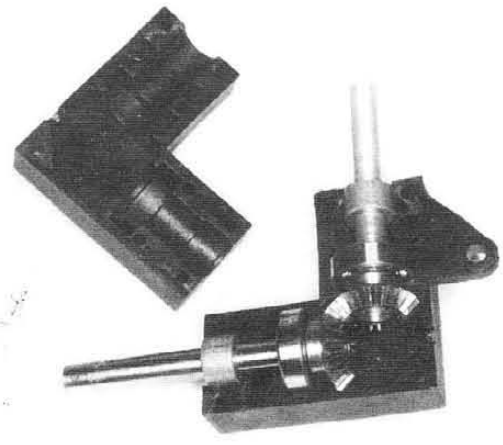

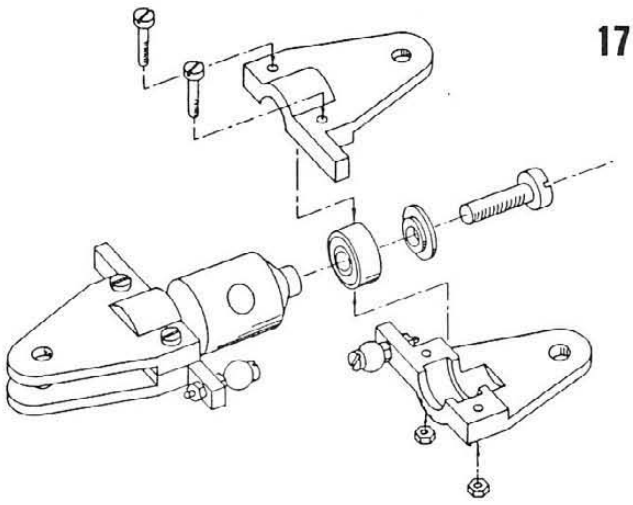

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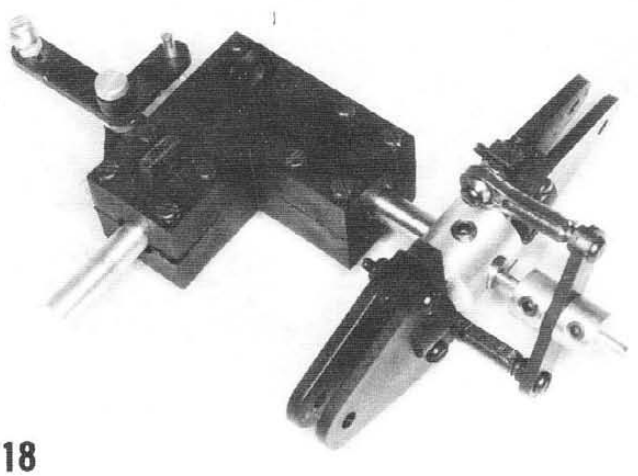

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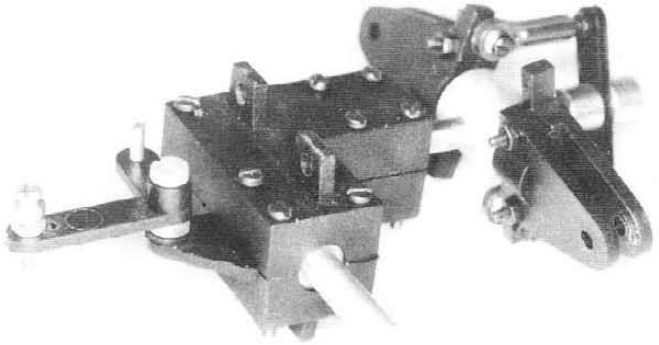

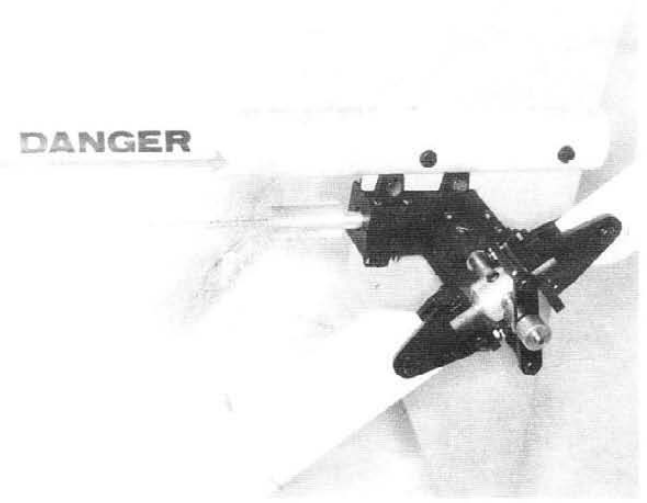

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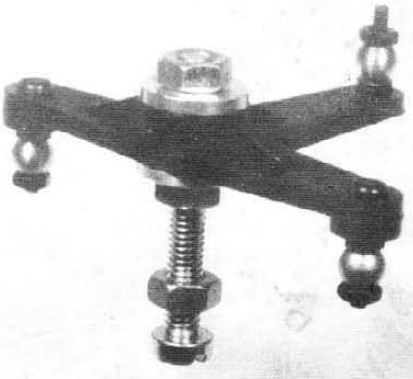

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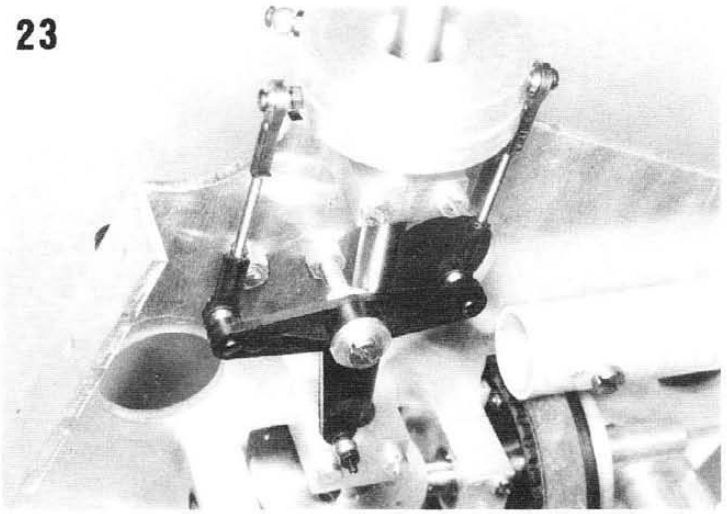

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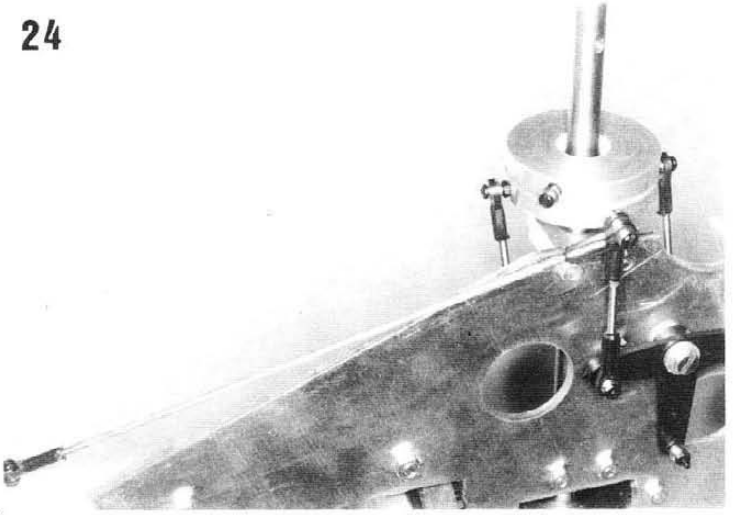

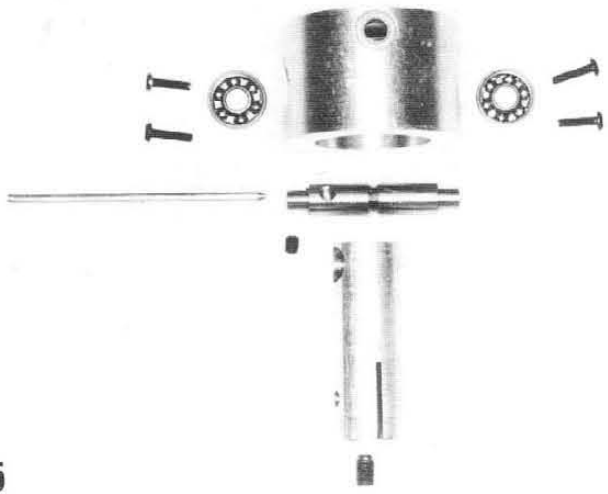

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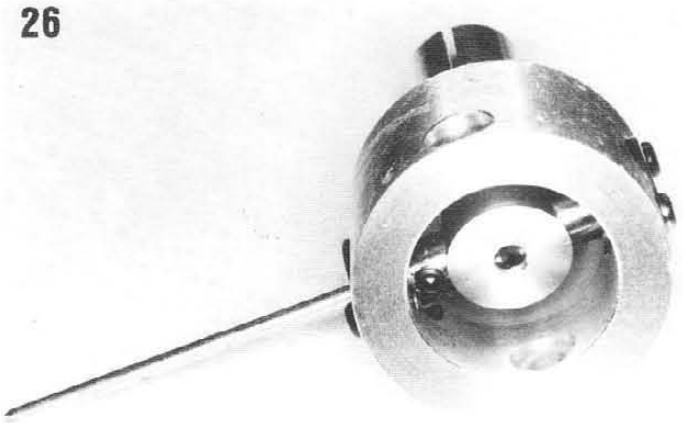

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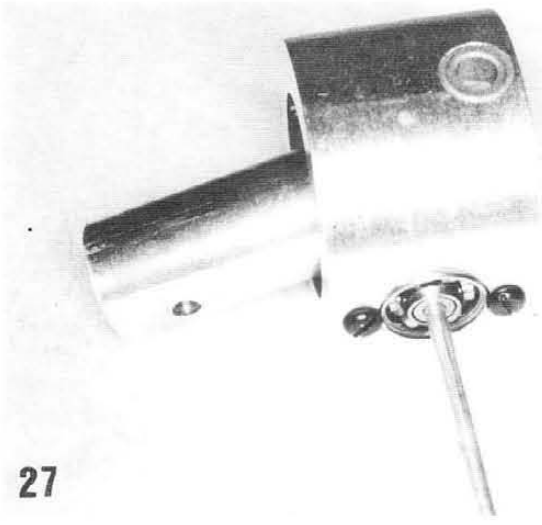

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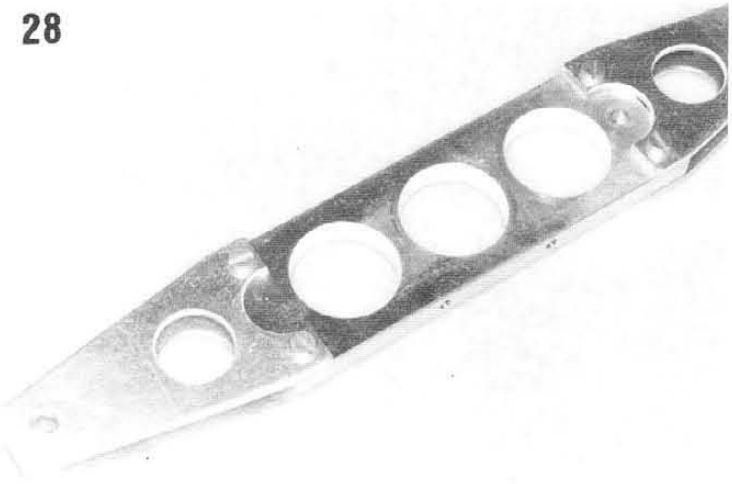

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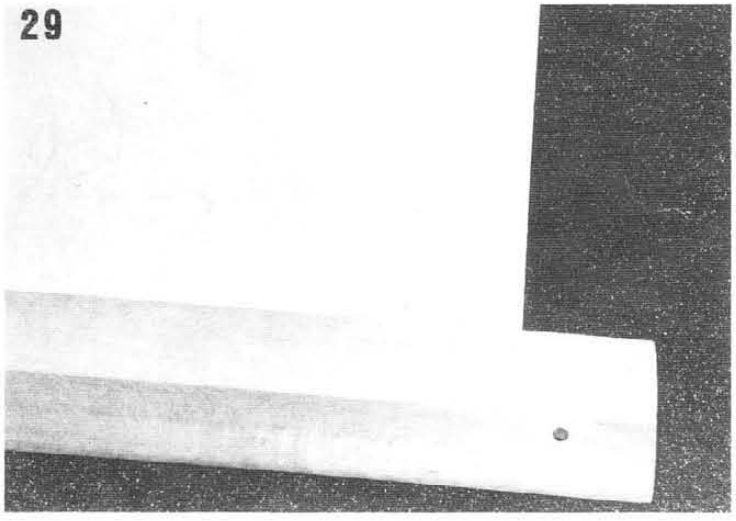

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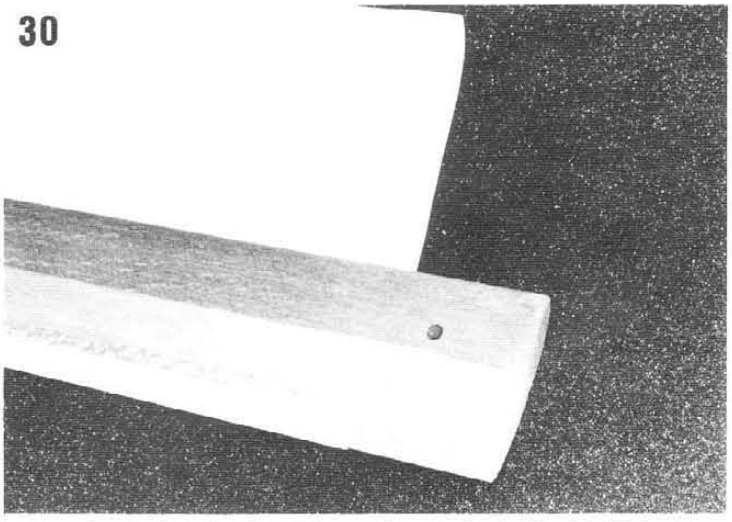

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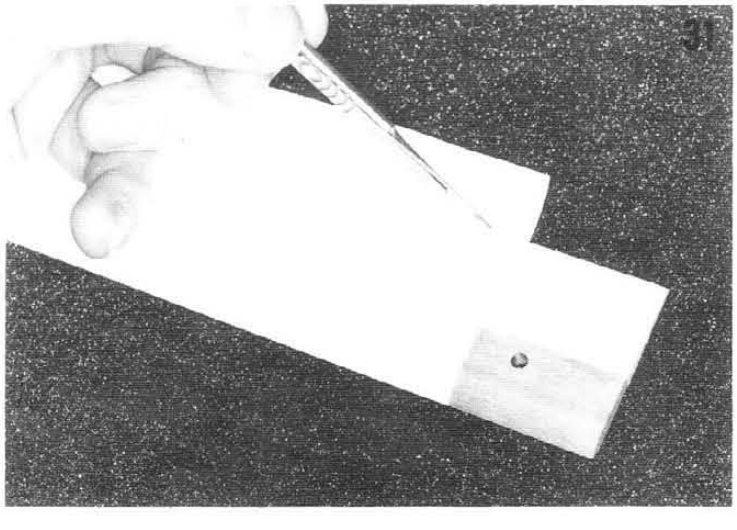

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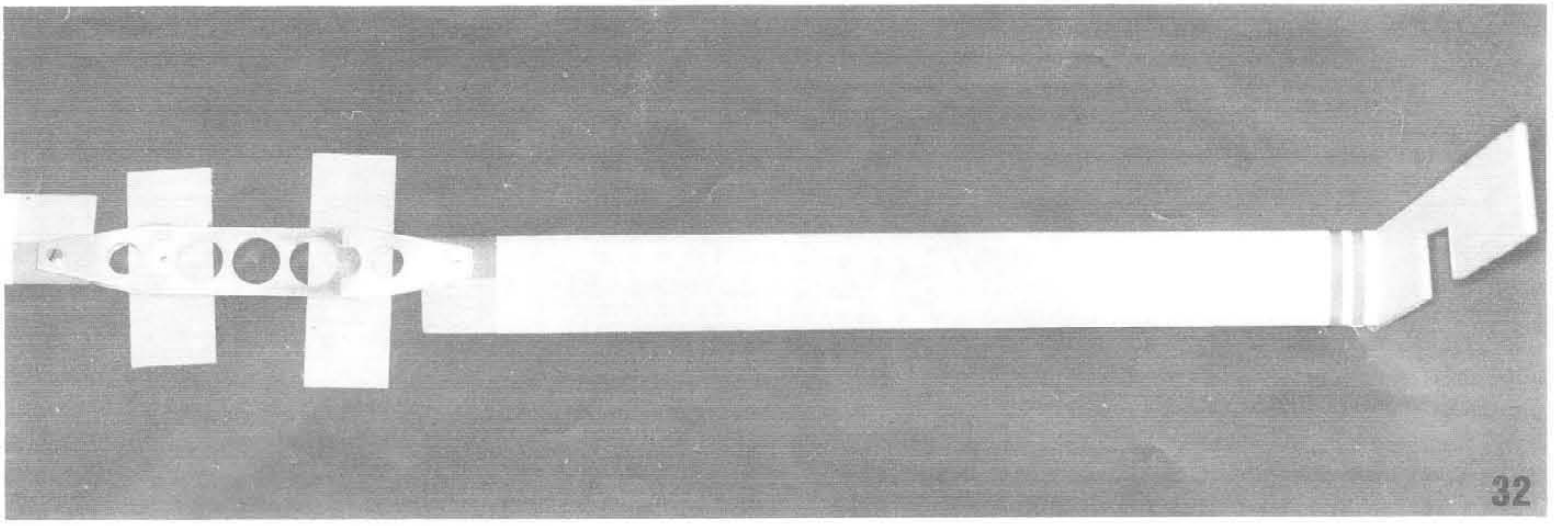
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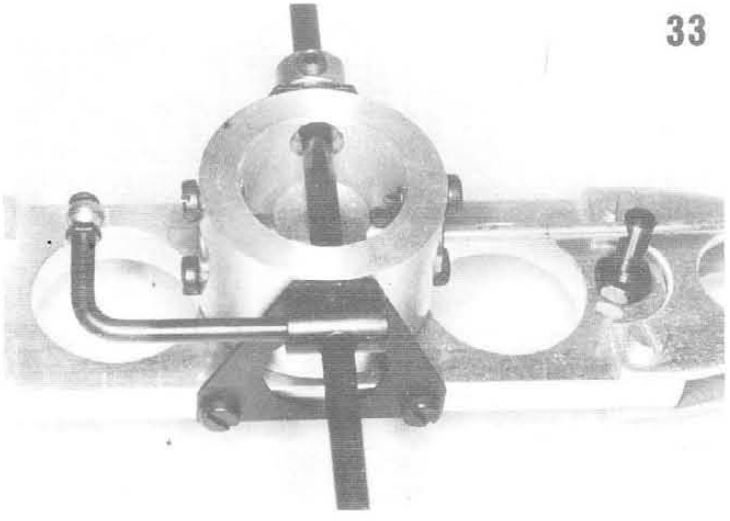
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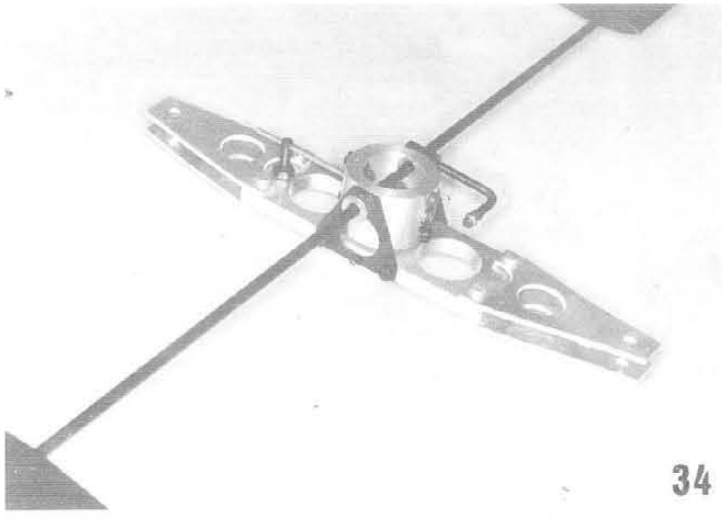
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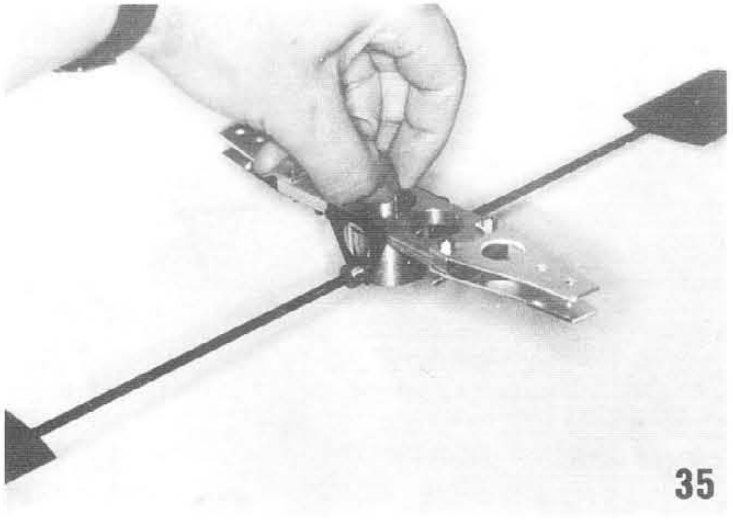
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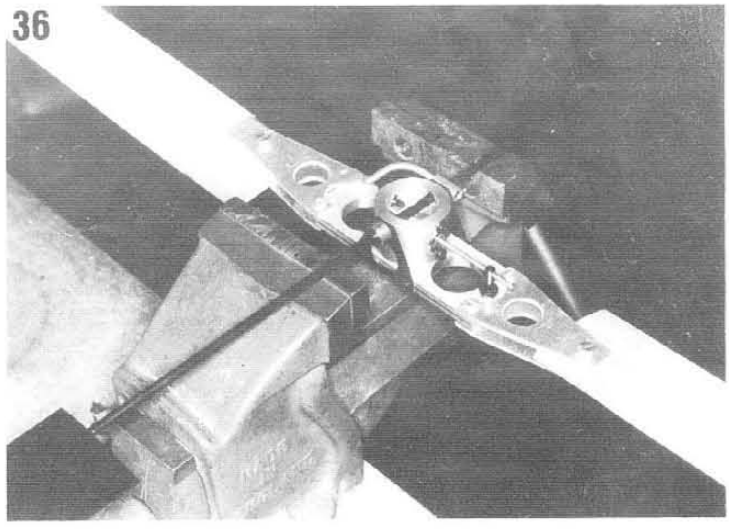
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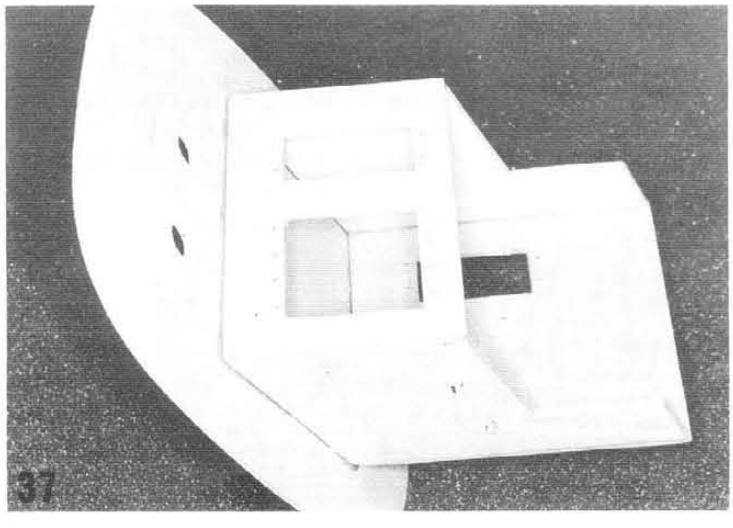
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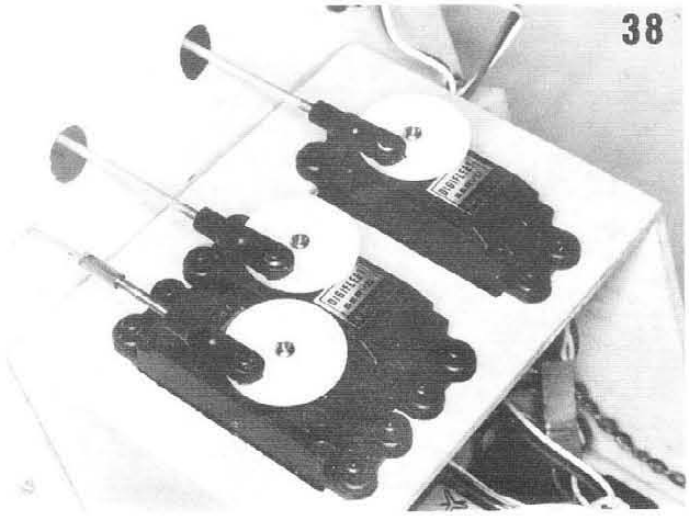
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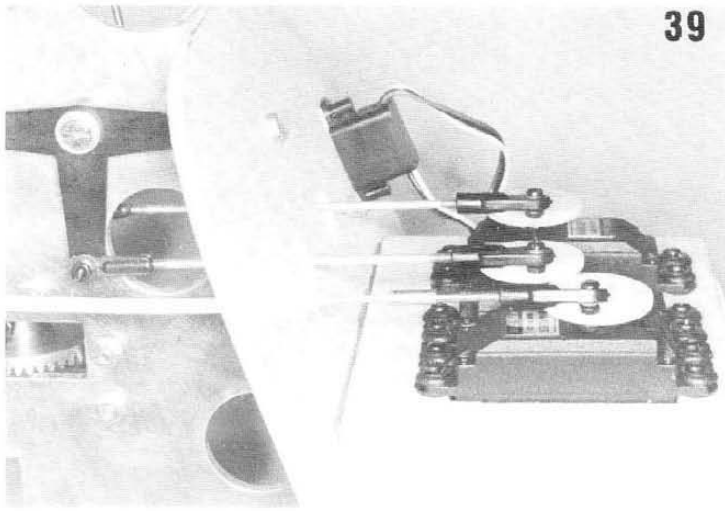

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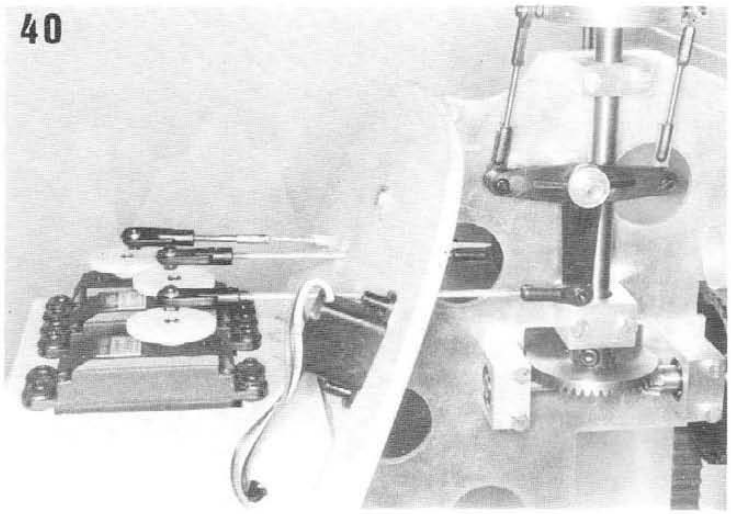

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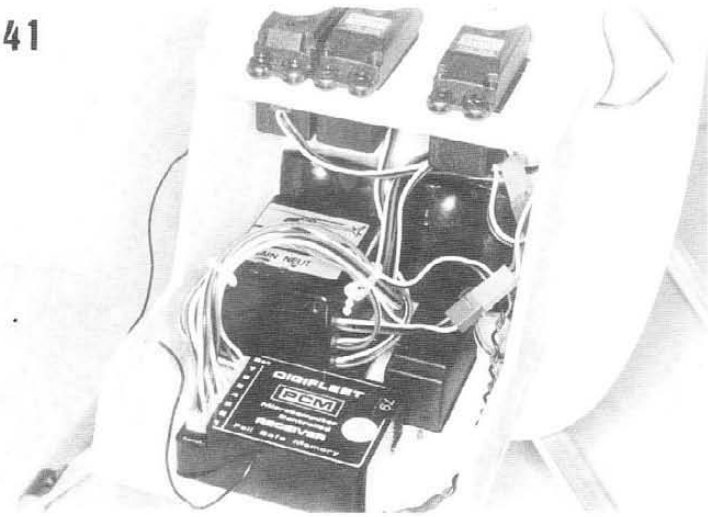

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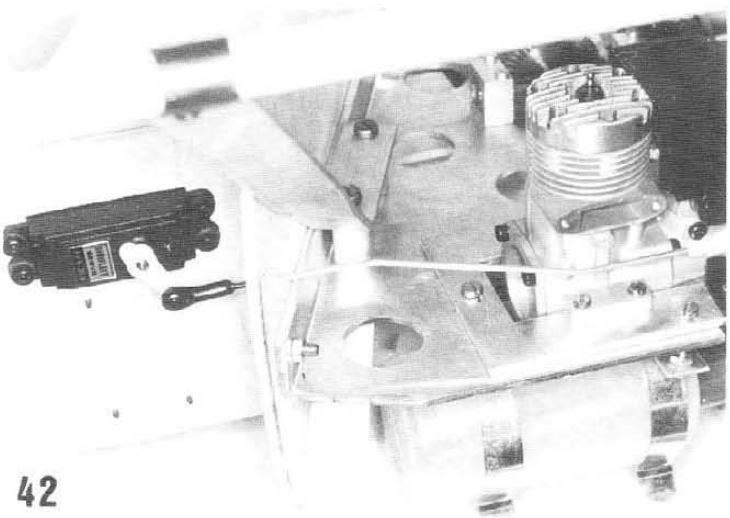

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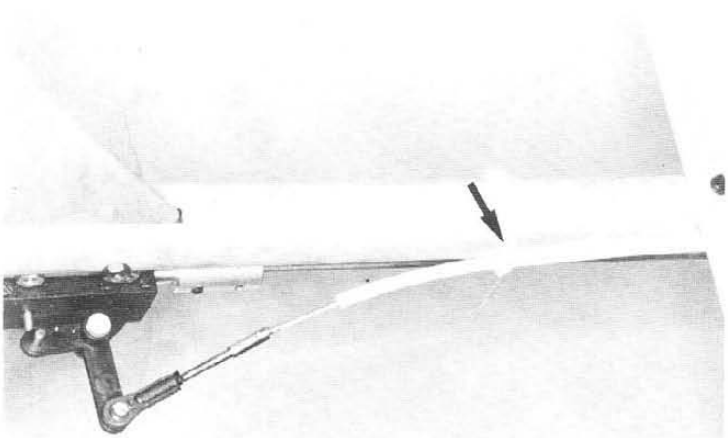

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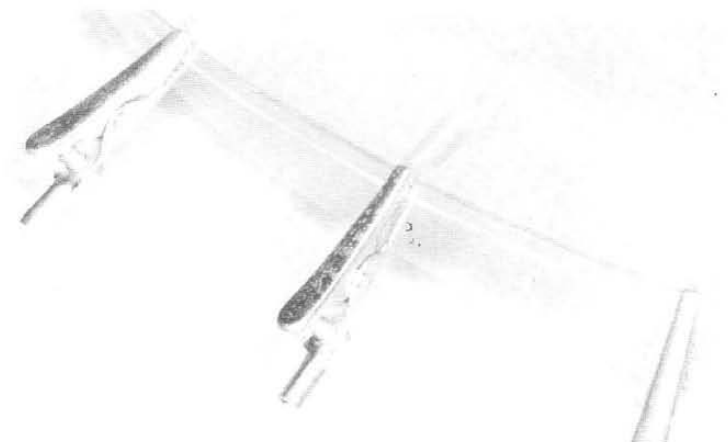

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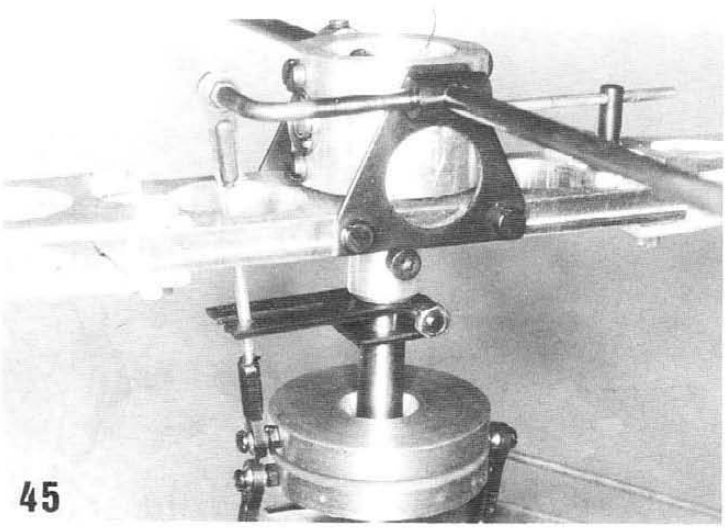

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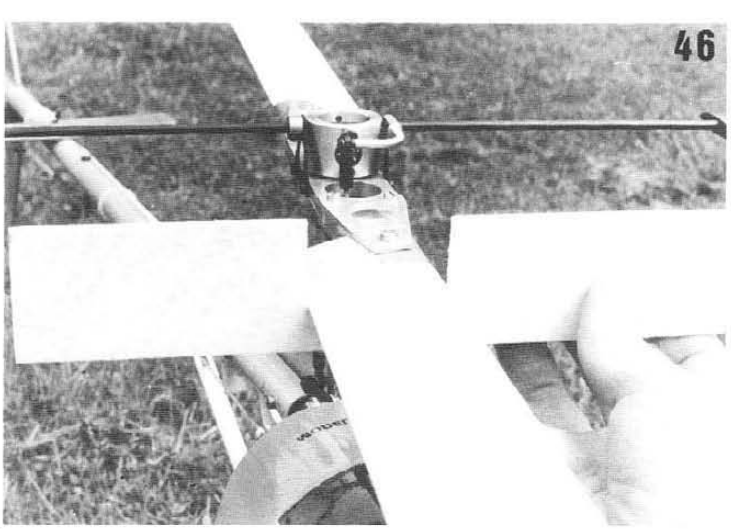

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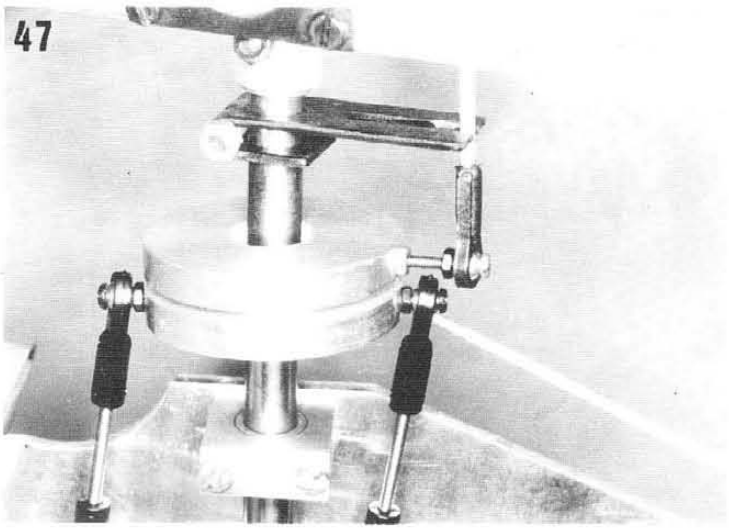
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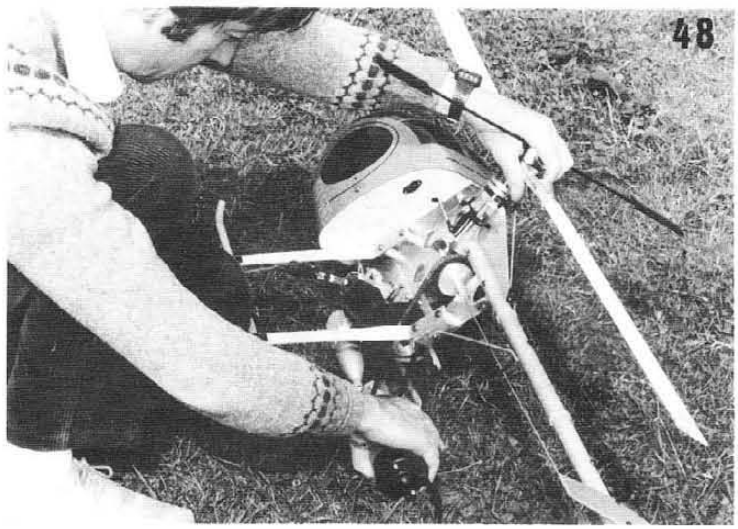
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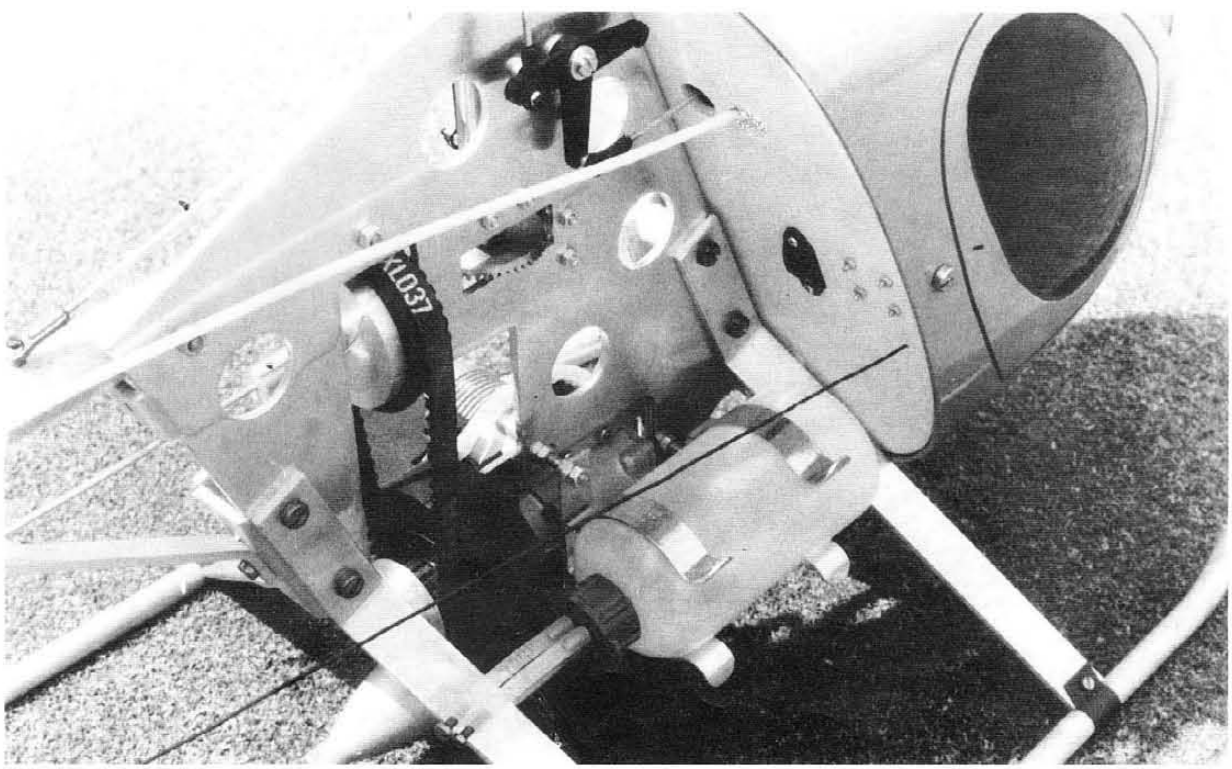

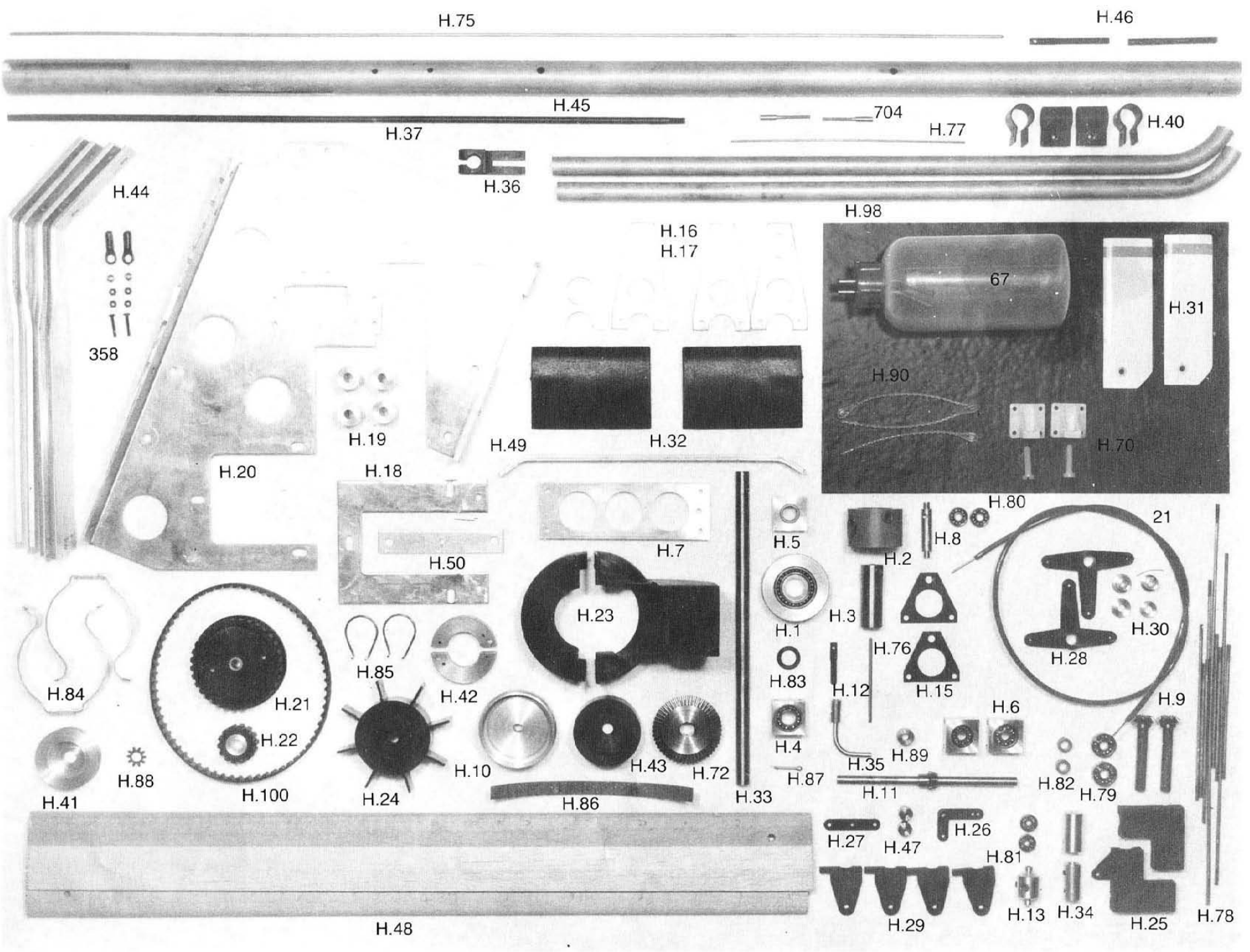
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