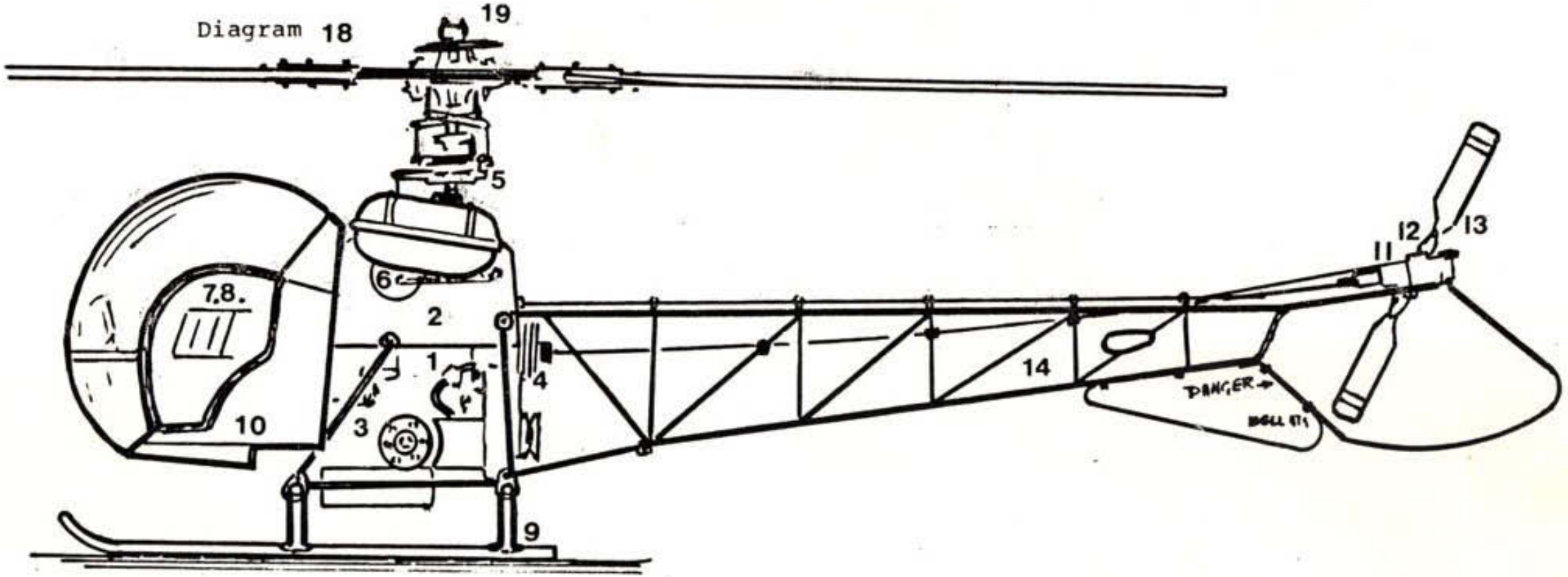
Diagram 18



MORLEY HELICOPTERS BELL 47 G INSTRUCTIONS

MORLEY BELL 47G SPECIFICATION

1/9 semi scale model Bell 47G Helicopter.

Length (less rotor)	44in.	1118mm
Rotor diameter	45in.	1143mm
Main rotor rpm	approx 1100.	
Main rotor	Morley `AT´ collective head	
Engine	.40 cu.in.	6.5 cc
Radio	four channel proportional for main rotor cyclic (2) main rotor collective/throttle tail rotor collective	
Fuel capacity	8fl oz (250cc) in tank supplied	
Flying weight	7.5 lbs (3.4kg) approx	

Dear Customer

Thank you for choosing `Morley´. We hope you enjoy making a successful model.

A helicopter is a most fascinating machine, and exciting to fly, but it does need care and persistence to become successful and enjoy the performance that the model will be capable of.

This model is an attractive representation of what to some people is THE helicopter. The Bell 47G was the first widely used helicopter. It was manufactured in several countries and has a very long service history.

Your model is built around the Morley Mk 3 mechanics and therefore has many spares in common with other helicopters in the range. It should serve you well and we wish you many happy landings.

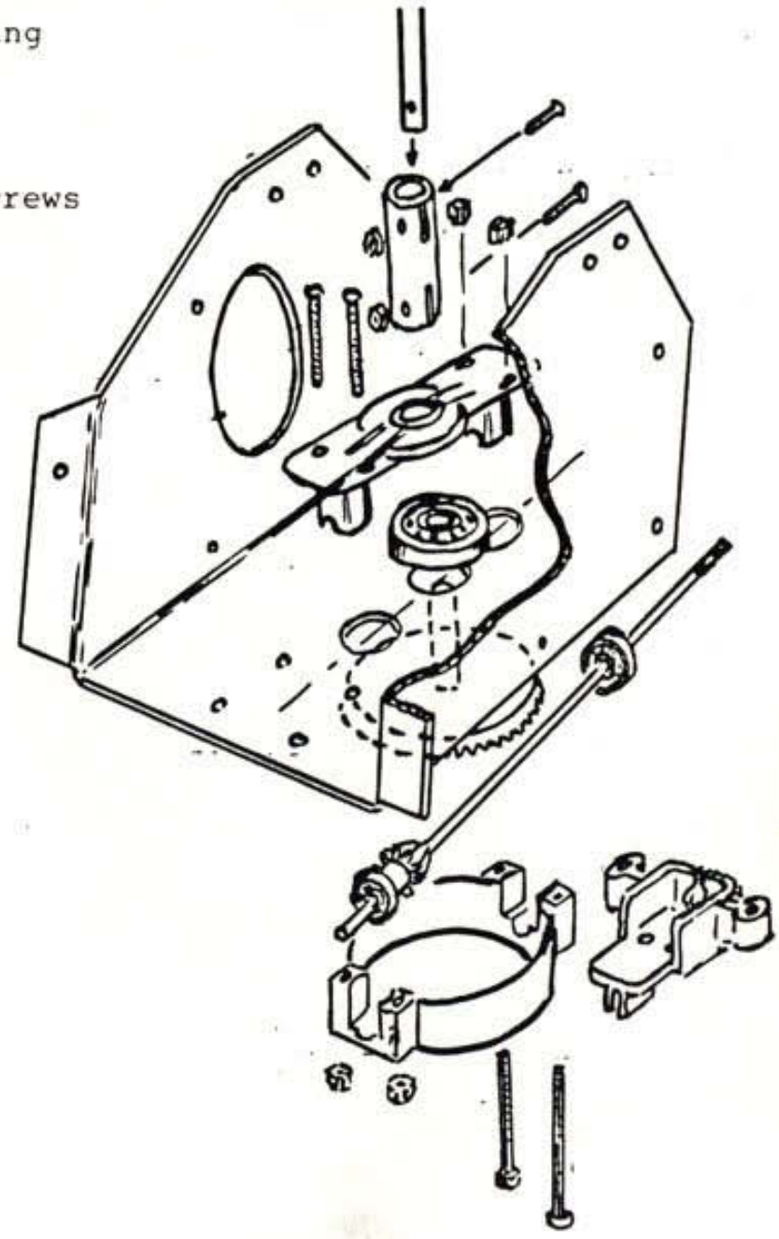
Jim Morley

Morley Bell 47G

Diagram 1. Pack

BELL 47G MAIN GEARBOX

1	crownwheel and shaft
1	8mm ball bearing
1	short input shaft assembly
1	gearbox top moulding
1	gearbox case moulding
1	gearbox bracket moulding
1	rotor mast
1	mast coupling
4	M3 x 30 screws
2	M3 x 16 socket head screws
6	M3 nyloc nuts



The main gearbox is assembled onto the `U´ chassis plate from Pack 2.

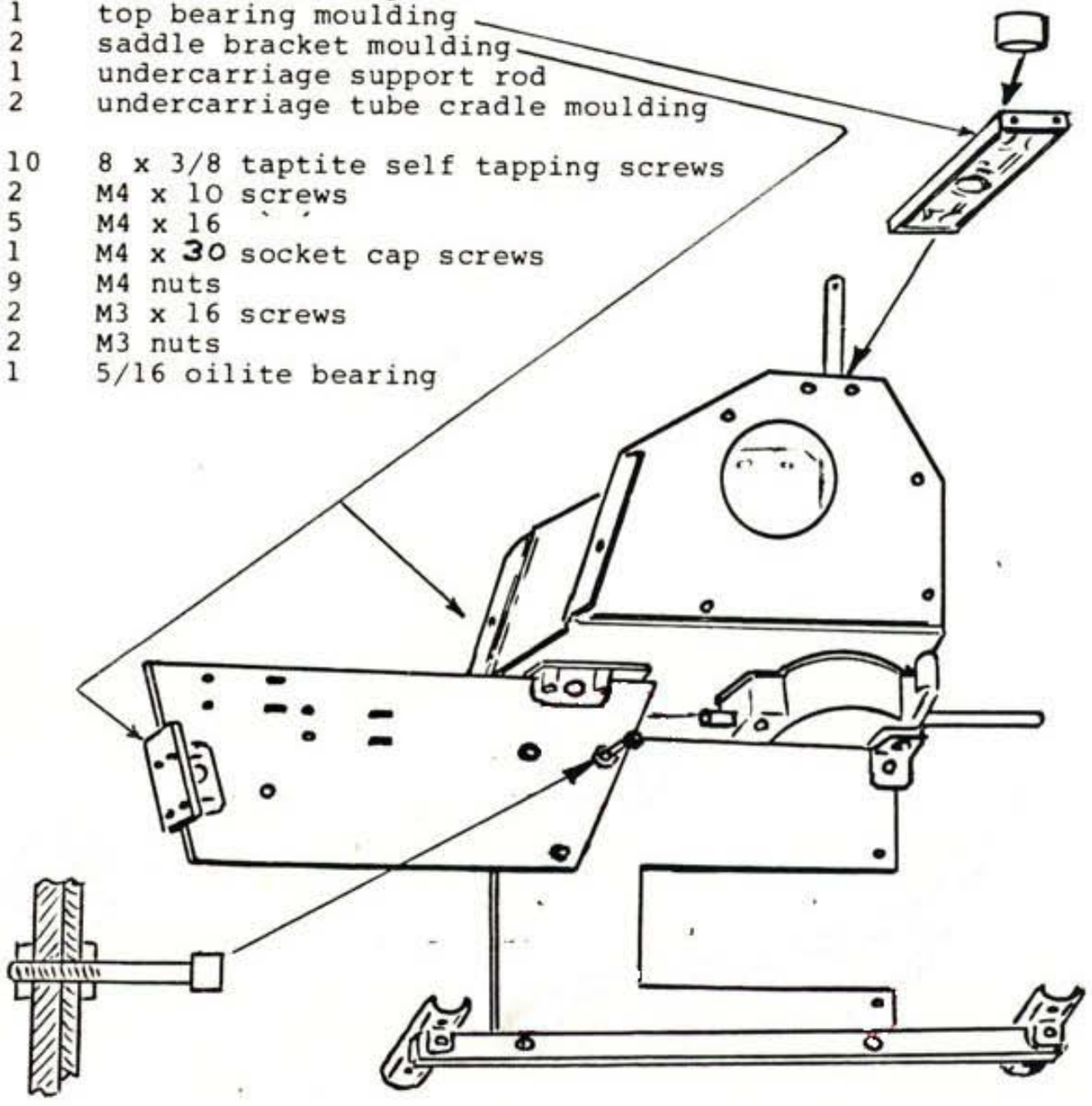
With crownwheel shaft upwards through the centre of the three adjacent holes in chassis, slide the 8mm ball bearing down the shaft until it is touching the gear. The gearbox top moulding is also slid down the shaft, over the ballrace, and through the chassis. Make sure the (larger) recess in the moulding for the input ballrace is at the front (the end with flanges to go against the cabin). Cover the crownwheel with light grease.

Place the input shaft assembly into position with the lower gearbox case and gearbox bracket moulding over it, and pull into position with the four M3 x 30 screws and nyloc nuts. Tighten but ensure that rotation is reasonably free. It will loosen under load. There is a hole immediately above the pinion gear in the well of the top moulding for subsequent lubrication with gear oil before flying sessions.

Morley Bell 47G

Diagram 2 pack — BELL 47G CHASSIS

1	Black `U´ chassis
1	Engine mount plate
1	Forward chassis plate
1	top bearing moulding
2	saddle bracket moulding
1	undercarriage support rod
2	undercarriage tube cradle moulding
10	8 x 3/8 taptite self tapping screws
2	M4 x 10 screws
5	M4 x 16 ` ´
1	M4 x 30 socket cap screws
9	M4 nuts
2	M3 x 16 screws
2	M3 nuts
1	5/16 oilite bearing



The gearbox and bracket moulding are already in place. Put the two taptites from inside the `U´ chassis into the bracket moulding. Also fix one of the saddle brackets in place under the `U´ chassis with four more taptite screws.

Bolt the forward chassis plate into this assembly, and the engine mount plate under the gearbox. Fasten together with three bolts, the rearmost one being the pivot for a bellcrank from the controls pack at a later stage.

Fix the top bearing mount moulding at the top of the `U´ with four taptites. Slide the oilite bearing down the mast into the mount moulding, and epoxy it in place.

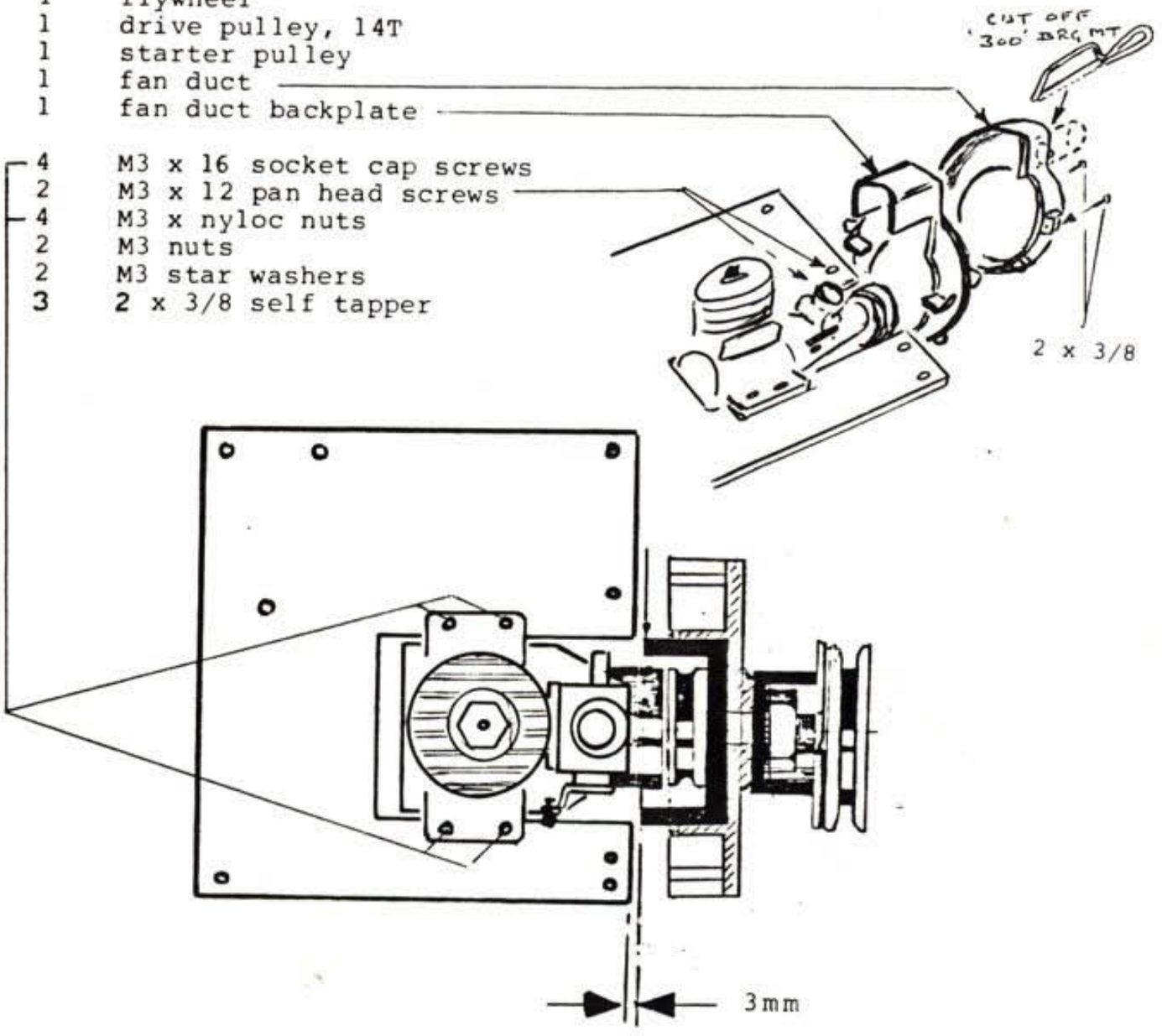
Bolt the undercarriage support rod to the engine mount plate, longest end rearwards, and the two tube cradles at the ends, cradle upwards.

The second saddle bracket moulding goes at the extreme front to mount the receiver battery pack. The other items on the mould cluster are for boom fitting etc. at a later stage. Keep safely.

Diagram 3 pack

BELL 47G ENGINE MOUNT

1	fan
1	flywheel
1	drive pulley, 14T
1	starter pulley
1	fan duct
1	fan duct backplate
4	M3 x 16 socket cap screws
2	M3 x 12 pan head screws
4	M3 x nyloc nuts
2	M3 nuts
2	M3 star washers
3	2 x 3/8 self tapper



Temporarily fit the flywheel, fan and drive pulley to the engine so that it may be placed correctly for belt alignment. Make sure that the inside face of the flywheel is properly up against the prop driver.

The engine should be on the centre line of the cut out and with the edge of the flywheel 3mm from the engine plate. Mark and drill for the 3mm fixing screws, and fit the engine.

Remove fan and pulley from the engine in order to position, drill and fit the fan duct backplate. Also at this stage fit a ball from the controls pack onto the throttle lever.

Refit the flywheel, fan and pulley using loctite or paint between the surfaces, especially between the propdriver and the flywheel. An engine backfire on starting will undo this assembly unless it is properly tightened and locked.

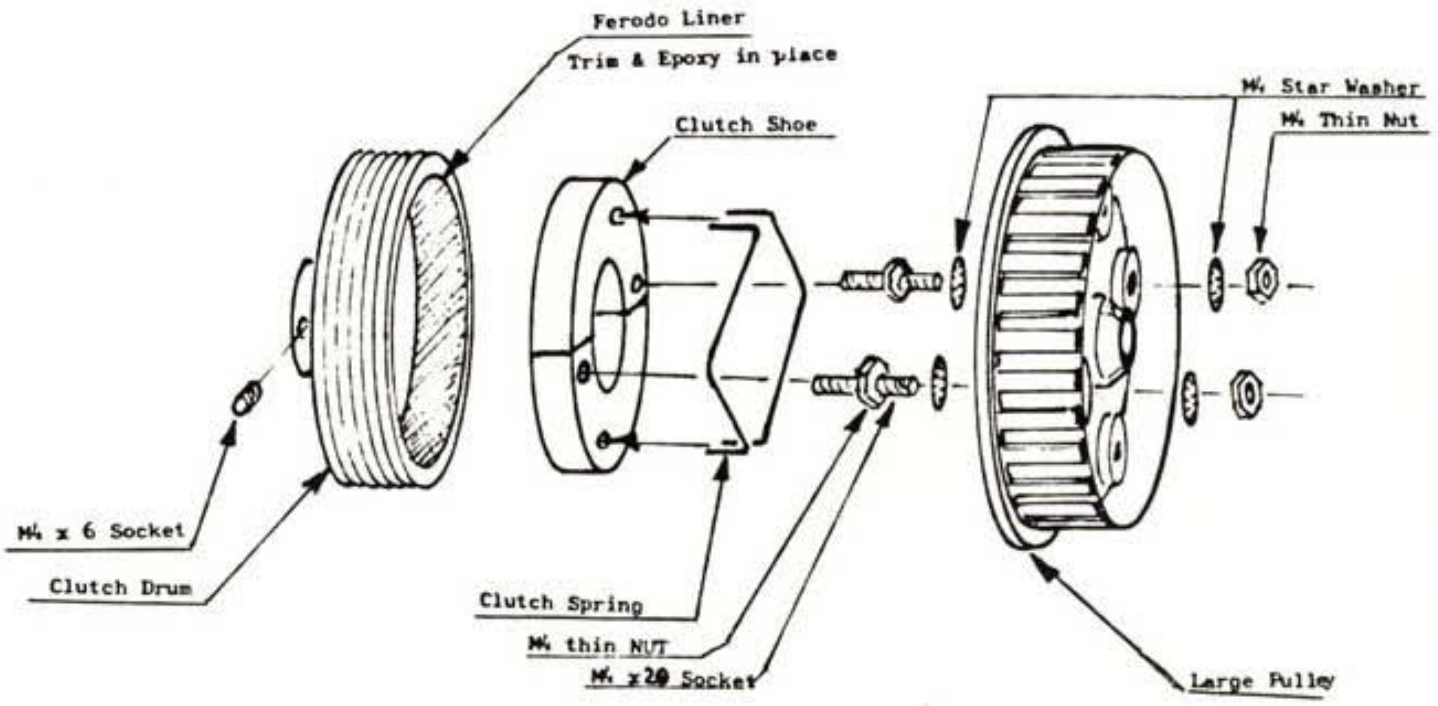
Fit starter belt V-pulley over the engine pulley using epoxy or super glue.

Fit fan duct onto the back plate, making sure it clears the fan and that the throttle lever operates freely.

Morley Mk 3

Diagram 4 pack CLUTCH UNIT

1	large pulley
1	clutch drum
1	100 XL 037 drive belt
1	Ferodo liner
2	clutch shoe
2	clutch shoe spring
1	M4 x 6 socket set screw
2	M4 x 20 socket set screw
4	M4 thin nut
4	M4 star washer
1	Set screw key



Carefully cut the Ferodo clutch lining to the correct length to fit inside the clutch drum. Roughen the drum with emery paper or a file and cover it and the lining sparingly with epoxy adhesive, then press the lining tightly into place. Hold in position until set.

Thread the M4 screws into the clutch shoes and an M4 thin nut one turn clear of the shoe. Locate clutch springs in clutch shoes and add star washers onto screws. Place the assembly into the large pulley as shown in diagram and secure with star washers and thin nuts. Adhesive tape across the shoes is a help while doing this. Check that the shoes are free to swing outwards slightly.

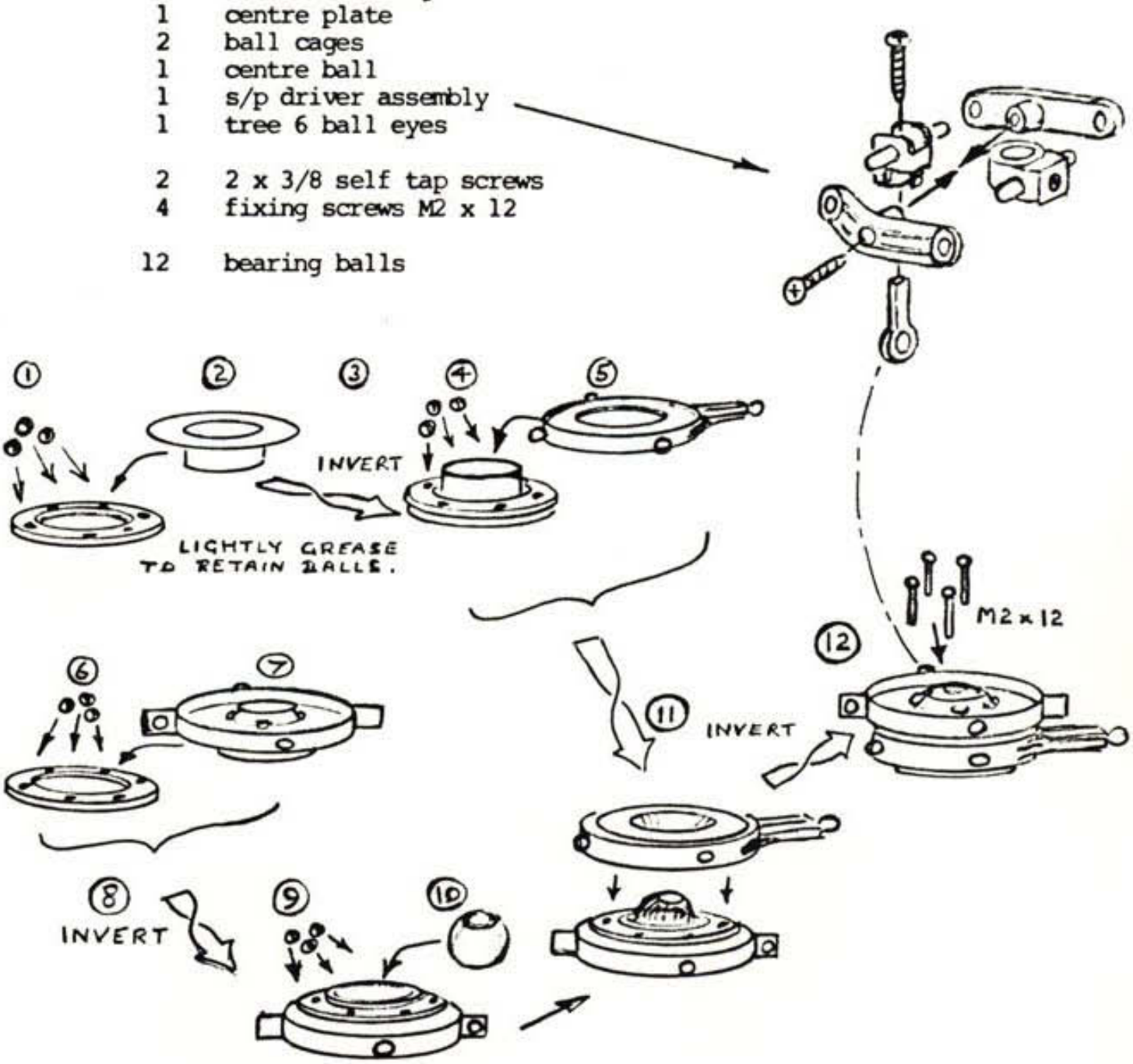
Fit drive belt round engine pulley and slide large pulley onto gearbox input shaft, followed by clutch drum. Align large and small pulleys, and tighten clutch drum grubscrew into flat on input shaft, after applying paint or thread locking compound to the screw only.

Morley Mk 3

Diagram 5 pack

SWASHPLATE

1	top moulding
1	bottom moulding
1	centre plate
2	ball cages
1	centre ball
1	s/p driver assembly
1	tree 6 ball eyes
2	2 x 3/8 self tap screws
4	fixing screws M2 x 12
12	bearing balls



Place three balls in one of the ball cages, and place the bottom moulding over it to keep the balls in position. Invert, and place the remaining three balls in the cage. Place the centre plate over the assembly, and repeat for the second cage and balls.

Sandwich the centre ball between the swashplate top and bottom mouldings and secure with the four screws. Place on rotor mast with long arm to the rear.

Assemble swashplate driver and fit a ball eye to small pivot.

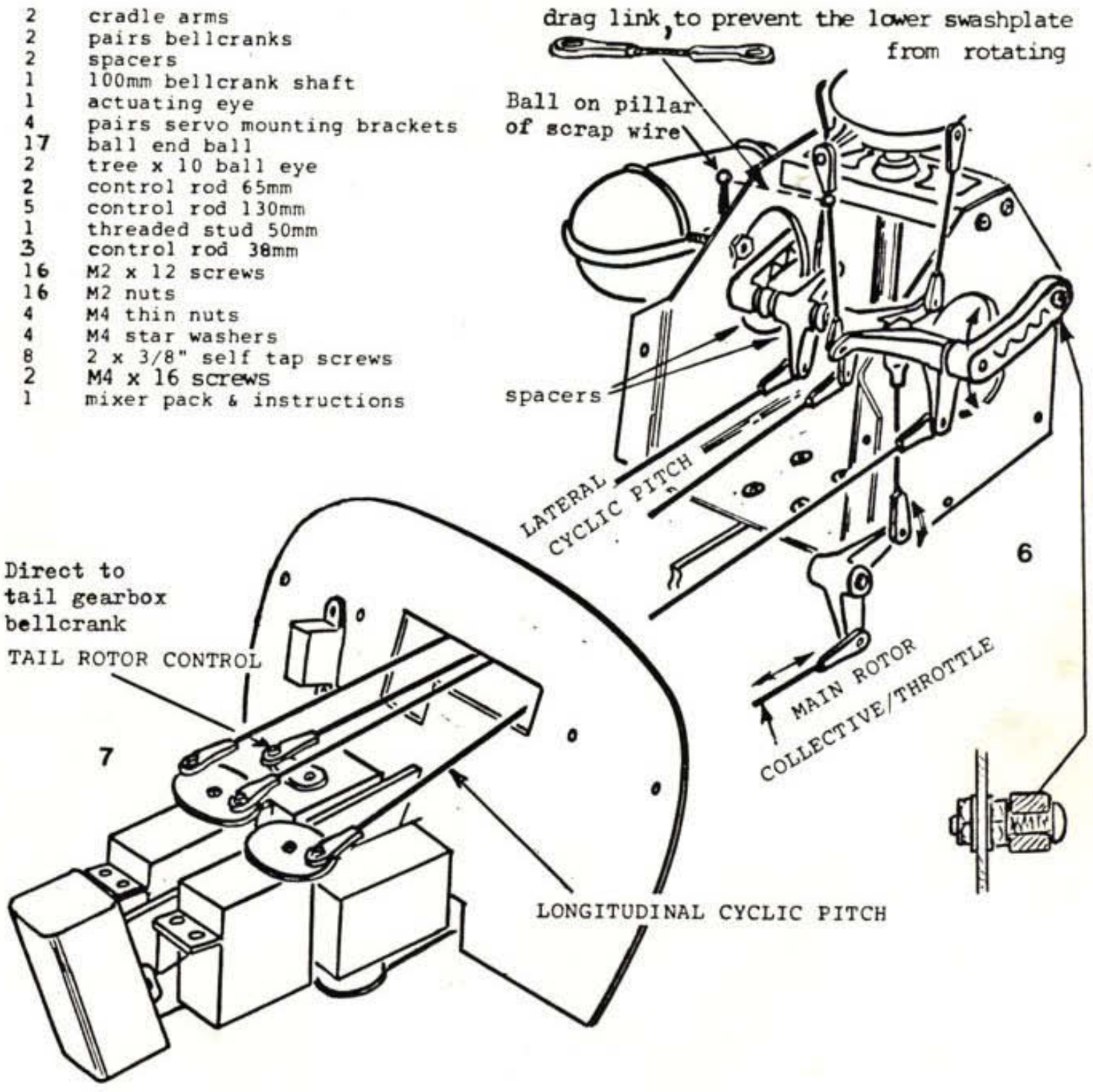
Swashplate rocking movement must be free and the assembly should slide easily up and down the main rotor mast. Slide the swashplate driver over the mast before fitting rotor head but leave locking to mast until later when the correct position has been found.

Morley Bell 47G

Diagram 6, 7

2	cradle arms
2	pairs bellcranks
2	spacers
1	100mm bellcrank shaft
1	actuating eye
4	pairs servo mounting brackets
17	ball end ball
2	tree x 10 ball eye
2	control rod 65mm
5	control rod 130mm
1	threaded stud 50mm
3	control rod 38mm
16	M2 x 12 screws
16	M2 nuts
4	M4 thin nuts
4	M4 star washers
8	2 x 3/8" self tap screws
2	M4 x 16 screws
1	mixer pack & instructions

BELL 47G CONTROLS



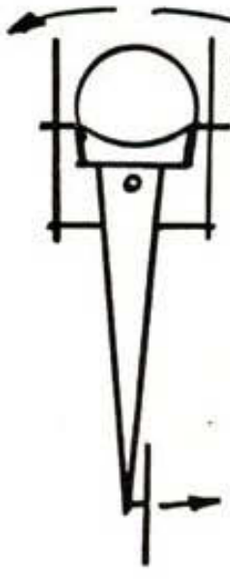
The collective cradle is assembled by sliding one of the plain bellcranks and two cranked bellcranks onto the shaft as in diagram 6, with spacers, and the actuating eye fitted with a 65mm control rod. Fit ball end balls in place on cranks using M2 screws and nuts so that connections can be made as shown.

Feed the assembly into the 'U' chassis and push the cradle arms onto the shaft. Use M4 x 16 screws to act as pivots on the chassis, with the heads outwards and two nuts and washers clamping the metal of the chassis. Tighten the cradle arm set screws.

Fit the remaining plain bellcrank onto the long M4 screw at the engine plate, with balls and eyes to operate the cradle.

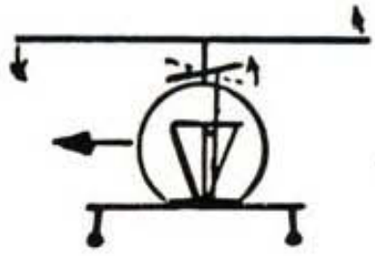
The servo mounting brackets are fitted on either side of the 'keel' with self tap screws going through one and into the other. Fit the servos between the brackets and bind the battery pack onto the front fitting. The receiver may be mounted on top of the battery pack to simulate the control console, or on the bulkhead panel near the switch.

Diagram 8 BELL 47G CONTROLS

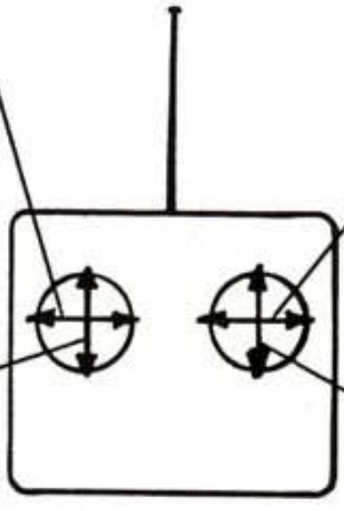


TAIL ROTOR CONTROL
Stick moved to left
= extra pitch on T/R blades
= nose moves to left

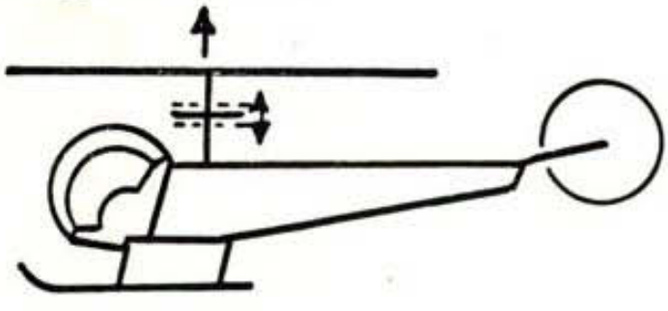
and opposite



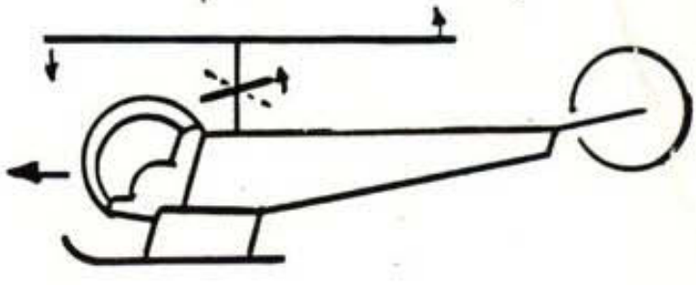
LATERAL CYCLIC PITCH
Stick moved to left
= Swashplate tilt left
= model tilts and moves left.
and opposite for right



MAIN ROTOR COLLECTIVE/THROTTLE
Stick pushed forward
= Swashplate moves up & throttle opens
= extra pitch & lift
and opposite for down



LONGITUDINAL CYCLIC PITCH
Stick pushed forward
= Swashplate tilt forward
= model tilts and moves forward.
and opposite for back



THROTTLE/COLLECTIVE MIX

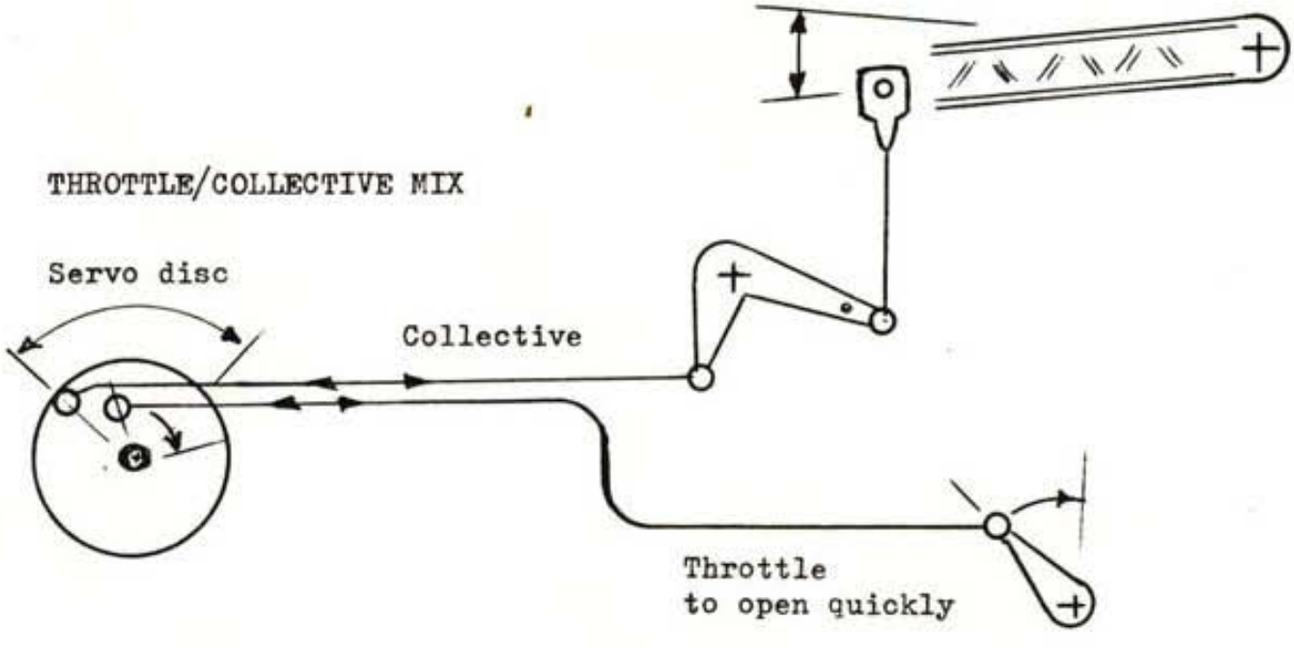
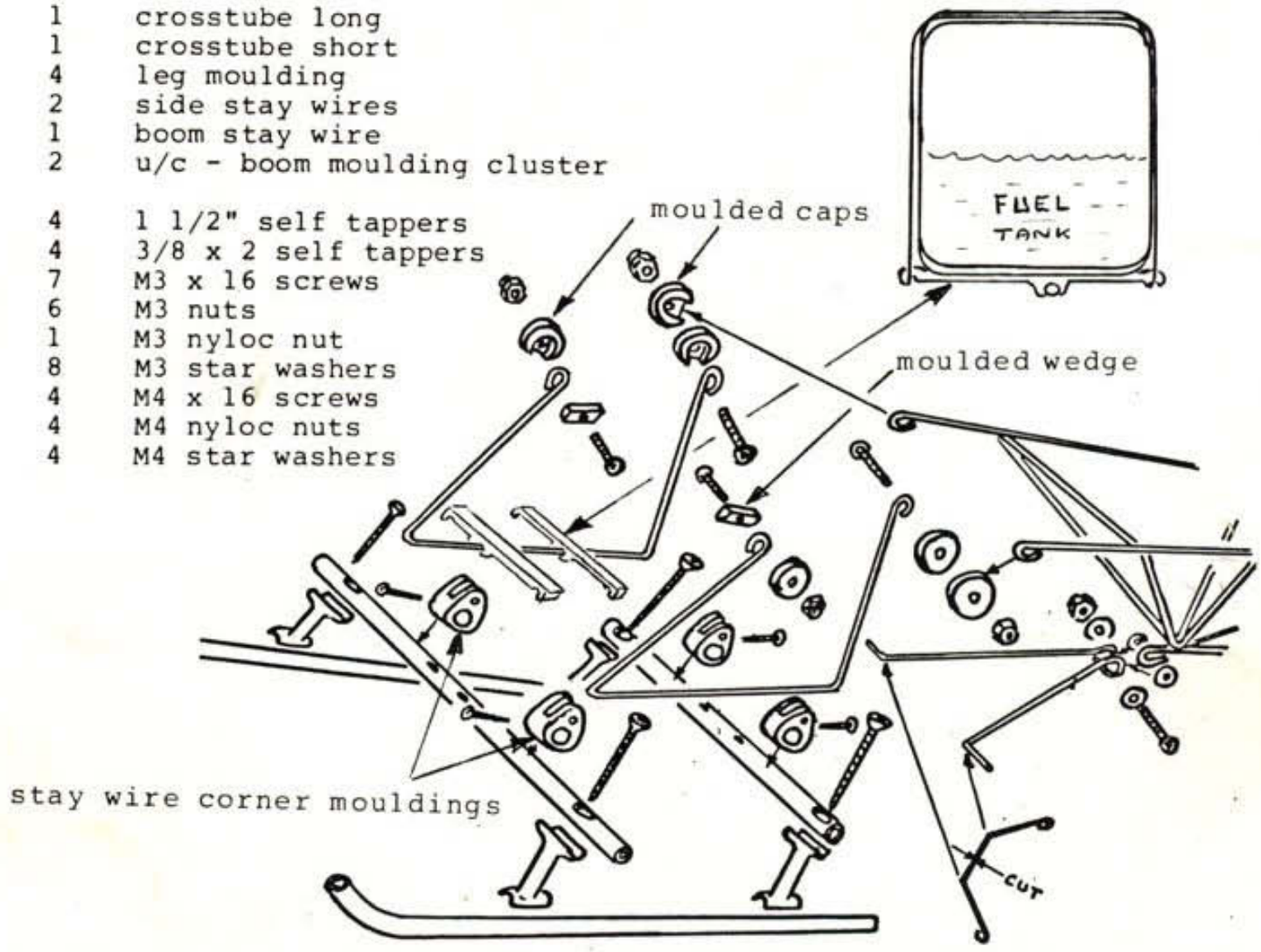


Diagram 9 pack BELL 47G UNDERCARRIAGE

2	skids
1	crosstube long
1	crosstube short
4	leg moulding
2	side stay wires
1	boom stay wire
2	u/c - boom moulding cluster
4	1 1/2" self tappers
4	3/8 x 2 self tappers
7	M3 x 16 screws
6	M3 nuts
1	M3 nyloc nut
8	M3 star washers
4	M4 x 16 screws
4	M4 nyloc nuts
4	M4 star washers



Fasten the side stay wires to the `U´ chassis with M4 screws, moulded caps and nuts as shown in the diagram. Use the moulded wedge pieces (left over from the chassis pack) inside the chassis at the front, otherwise the screw head will be on the bend. Do not overtighten the nut onto the outer cap on the rear screw, or it may be damaged without the tail boom in place.

Push one of the stay wire corner mouldings over each bend of the side stay wires, fixing the front two with M3 screws and nuts. Cut the boom stay wire in two and push through the rear corner mouldings to retain on the bend.

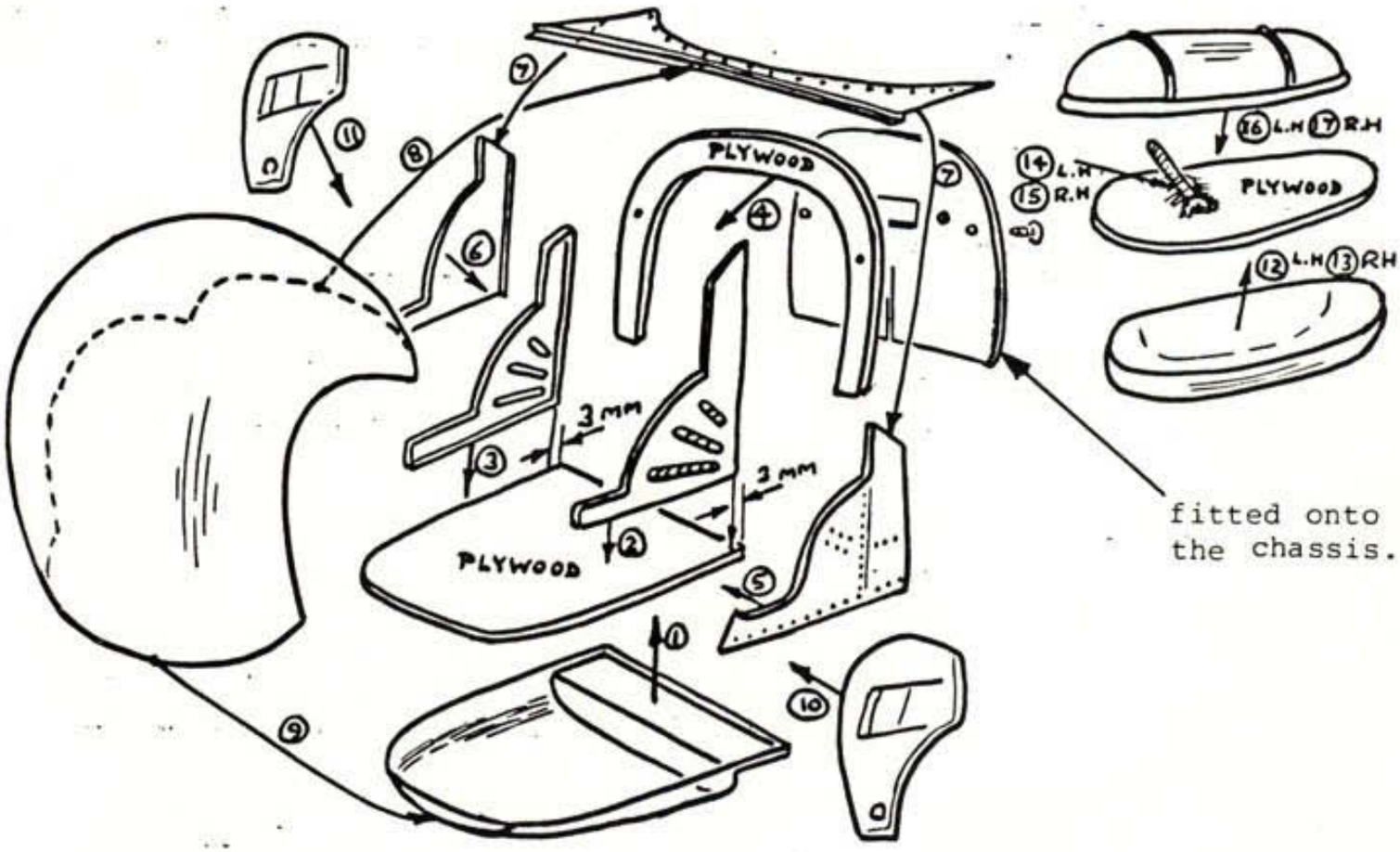
Push the longer u/c tube through the front pair of mouldings and the shorter through the rear pair. Position tubes over the tube cradle and pull down with M3 screws and nuts. Do not strain the assembly, put packing on the cradle under the tubes if necessary.

Insert a 1 1/2" self tapper through each of the tube end holes and through a leg moulding. Drill the skids 3mm for the self tap screw and assemble with adhesive between the metal and leg faces. Remove the nut and caps from rear side stay wire fixing and attach the tail boom. Prop the boom up at the rear to the correct height (top of boom horizontal) and by adjusting bend and distance apart of the stay wire corner mouldings on the u/c cross tube the lower boom mounting can be assembled. Use washers between as well as outside the wire loops.

Drill a 2mm hole in each of the stay wire corner mouldings and cross tubes for the small self tap screws to lock in position.

Diagram 10 pack BELL 47G CABIN

1	clear canopy moulding
1	set of die-cut ply parts
2	8 x 3/8 taptite screws
2	M4 x 30 screws
2	M4 x 10 screws
6	M4 nuts
4	M4 star washers



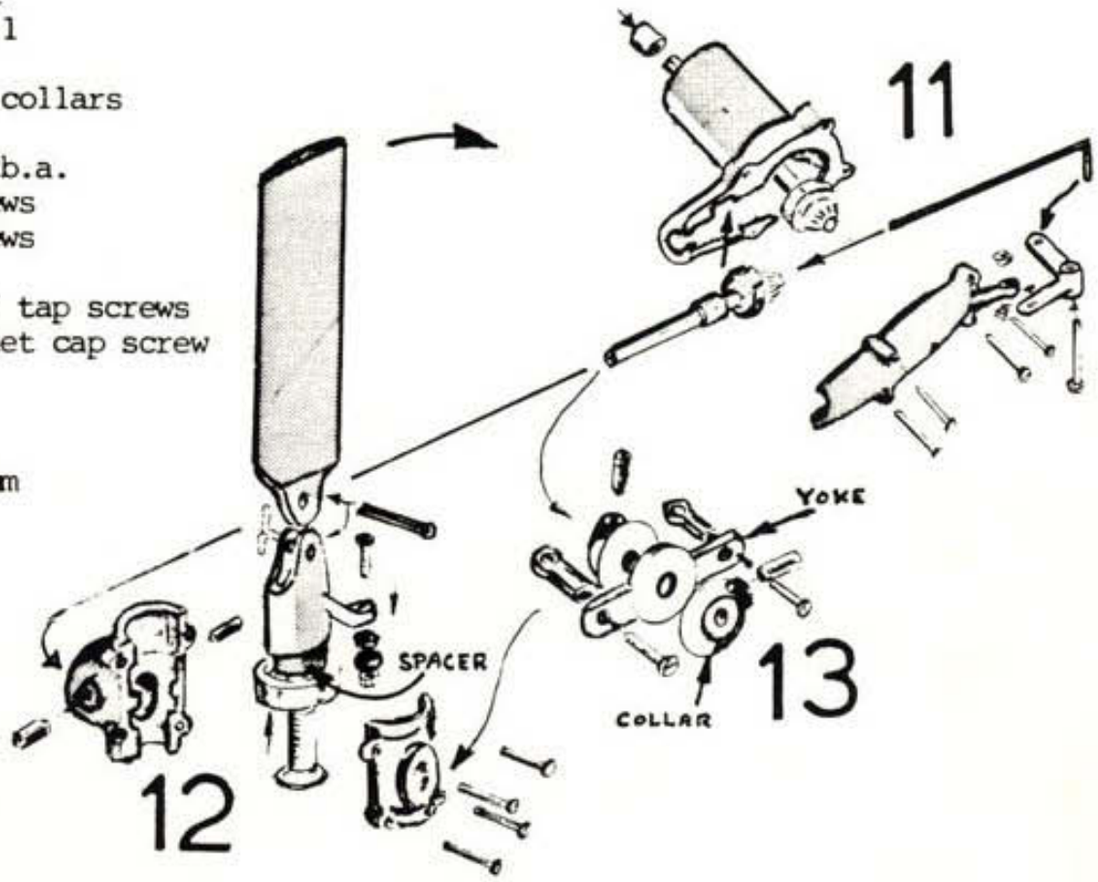
Assemble the cabin in the numerical sequence shown in the diagram. Cut each part of the canopy material by cutting first near the desired line then trimming to shape on the desired line. Use a sharp modelling knife. Do not attempt to cut the canopy material when very cold or it will crack.

One of the `clear´ glues is best for the job. Use as an impact adhesive, i.e. apply to both surfaces, allow to dry for a few minutes, and then push together. Use an epoxy glue to fix the screws to the tank ply outline before adhering the moulded halves. Also strengthen the plywood parts local to the fixing screws by rubbing in epoxy or super glue.

Paint and fasten the rear ply bulkhead to the chassis and check the cabin for accurate fit. Leave fitting the dummy fuel tanks until the rest of the model is completed.

Diagram 11, 12, 13, pack TAIL ROTOR

1	gearcase moulding	
1	gearcase back moulding	
1	input mitre gear and shaft	(each with ballrace
1	ouput mitre gear and shaft	and oilite bush)
2	blade	
2	blade mount	
2	1/2 hub and spacer moulding	
1	control yoke	
2	ball end ball	
2	eye end	
2	control rod collars	
2	csk screws 2b.a.	
4	M2 x 16 screws	
6	M2 x 12 screws	
12	M2 nuts	
2	2 x 3/8 self tap screws	
1	M3 x 20 socket cap screw	
2	M3 nuts	
2	split pins	
2	ballrace 6 mm	



Gearbox.

Remove the oilite bush and push the input shaft (i.e. the smaller of the two shafts) into the case as in the diagram. Place the output shaft in position in the case. Fill case with light grease and attach back moulding using M2 x 16 screws and nuts. Push the second oilite bush along the input shaft into the gearcase. Check for free rotation.

Tail Rotor.

Place the ballraces on the countersunk screws followed by the moulded spacers and, with paint or locking compound, screw tightly into blade holders. Fit ball ends to the pitch control arms of the blade holders using M2 x 12 screws and a nut on each side of the arm. Slot the blades into the holders. Refer to the diagram for correct installation. Spread the split pins fully after inserting through the blade root and holder.

Clamp the ballraces between the moulded hub halves and draw halves together using M2 x 12 screws and nuts. File small flats on the output shaft of the gearbox to seat the set screws, and fit tail rotor hub to output shaft. Note that the outer surface of the hub should be flush with the end of the shaft. Cut the pitch control rod from 16 g. wire and bend as shown. The wire passes through the centre of the shaft and moves the pitch control yoke which is positioned between two collars.

Each ball eye is fitted to the yoke with a self tap screw. The bellcrank pivots on a 3mm bolt on the arm from the gearcase back, again with a nut both sides of the arm.

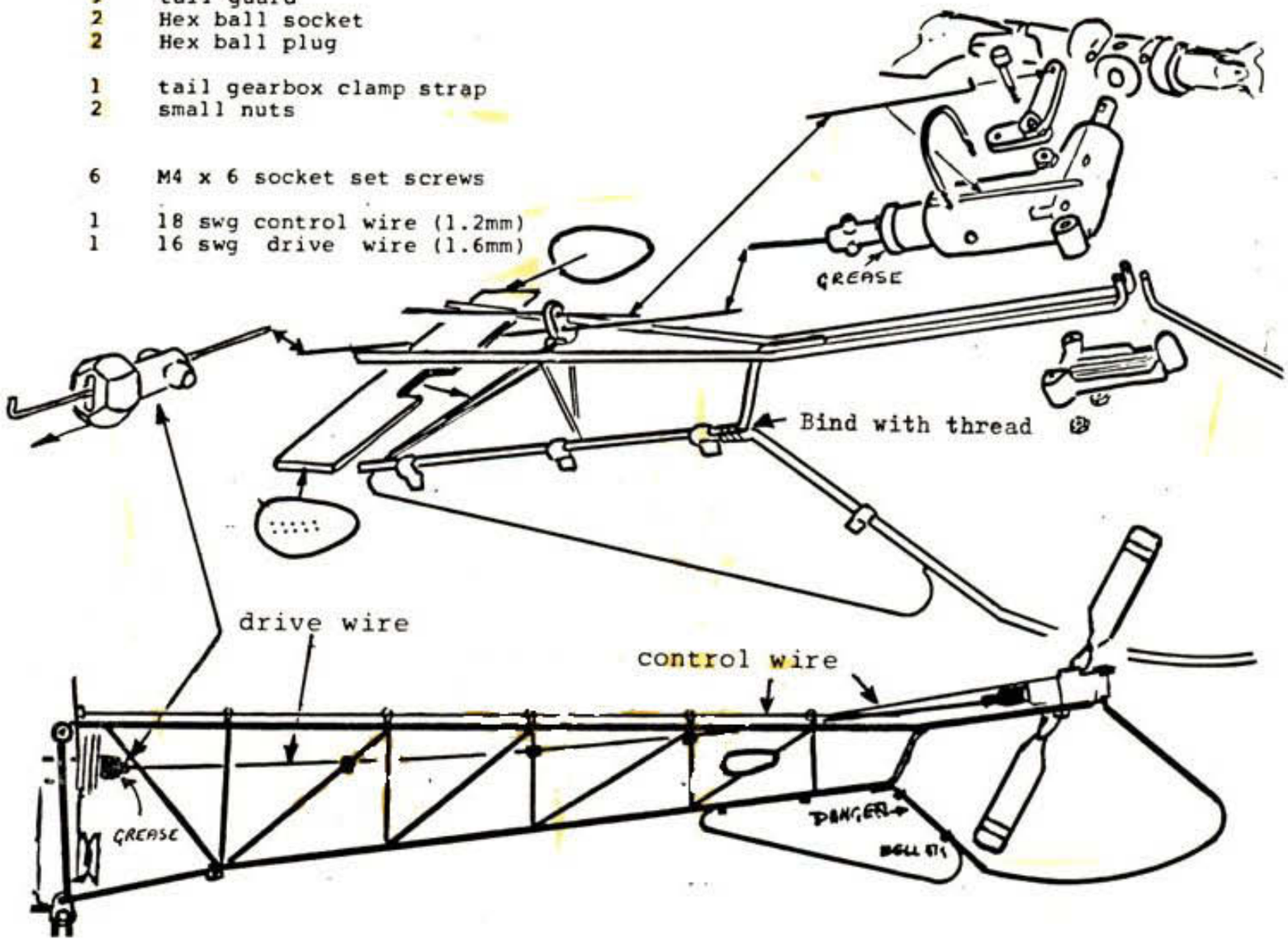
Diagram 14, 15 pack BELL 47G TAIL BOOM

1 tailboom structure
1 tail gearbox seat moulding
1 set drive supports
1 tail guard
2 Hex ball socket
2 Hex ball plug

1 tail gearbox clamp strap
2 small nuts

6 M4 x 6 socket set screws

1 18 swg control wire (1.2mm)
1 16 swg drive wire (1.6mm)



Leave the tailboom on the model while building it up. Use a good adhesive such as epoxy to fix the tail gearbox seat moulding over the rearmost part of the tailboom. Fix the tail guard into the hole in the gearbox seat, and curve to join the lower tailboom longeron by binding and covering the join with epoxy. Rest the tail gearbox assembly in position and clamp temporarily with the wire strap and nuts.

File a flat on the gearbox input shaft and fit one of the hex ball sockets to it, clamping with an M4 x 6 socket set screw. Fit the other hex socket to the output shaft of the main gearbox. Push one of the hex ball plugs onto the 16 swg (1.6mm) drive wire, bend over the end, and pull the hex plug back over it. Tighten the two M4 x 6 set screws. Feed the drive supports onto the wire and then feed the assembly into the tailboom from the engine end.

Insert some grease into the hex drive socket at the main gearbox and settle the hex drive ball into the socket. Jig the drive supports into position with the drive wire alongside the t/r gearbox. Push the second hex drive plug over the 16 swg drive wire, cut to length, and bend and fix with M4 x 6 set screws as before. Remove tail gearbox, insert grease in the drive socket, and replace on the tailboom with drive connected to gearbox. Epoxy the drive supports in position.

The control guides should be epoxied to the tail boom top cross stays, while the control wire (18 swg) is resting through them. The end of the control wire is set upwards to run through the groove in the top of the tail gearbox, under the clamp strap, and bent at the extreme end to go up into the tail rotor control bellcrank. Make sure the control run is free from stickiness or binding.

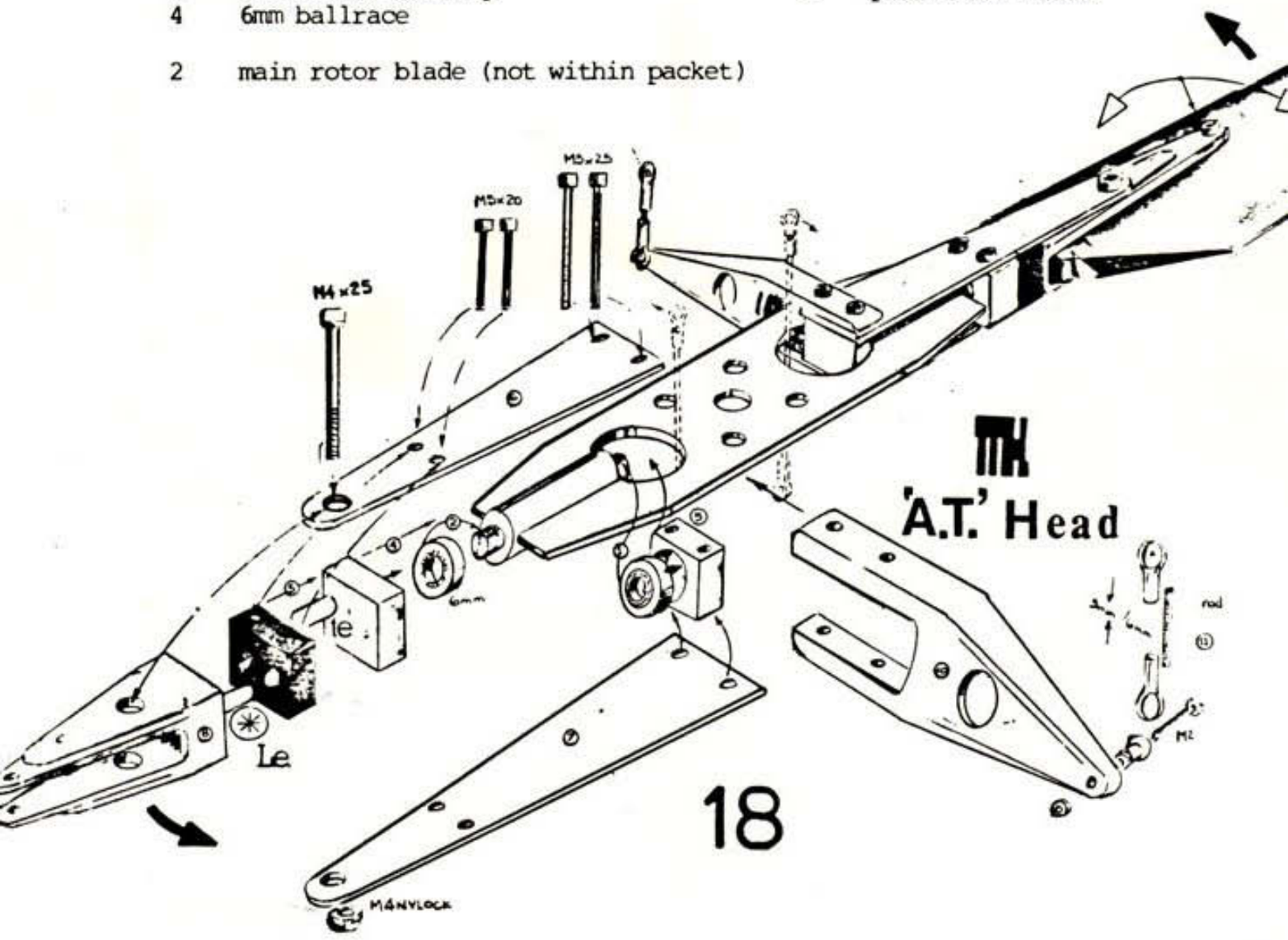
The tail fin, cut from the canopy sheet, is glued to the boom wire and uses the small '?' shaped pieces to reinforce. The tailplane is sanded to shape, fitted with tip fins and epoxied to the tailboom.

Morley Mk 3

Diagram 18, 19

ROTOR HEAD

2	M3 x 40 cap head screw	1	head plate
4	M3 x 25 screw	1	set 4 fingers
4	M3 x 20 "	1	top plate moulding
4	M3 x 20 cap head screw	1	mast top
2	M3 x 16 "	2	teeter rubbers
2	M2 x 16 screw	2	drag damper rubbers
2	M4 x 25 cap head screw	2	blade mounts
2	M2 nut	2	pair bearing mounts
14	M3 nut	1	collective cradle
2	M4 nyloc nut	1	cradle carrier
2	M4 x 12 socket set screw	1	slider top
8	3mm star washer	2	incidence arm
		2	fly bar operating arm
2	collective slide tube sleeves	2	fly blade
2	brass collar	1	flybar (not within packet)
2	3mm oilite bearing	1	pack 6 ball ends
4	6mm ballrace		
2	main rotor blade (not within packet)		



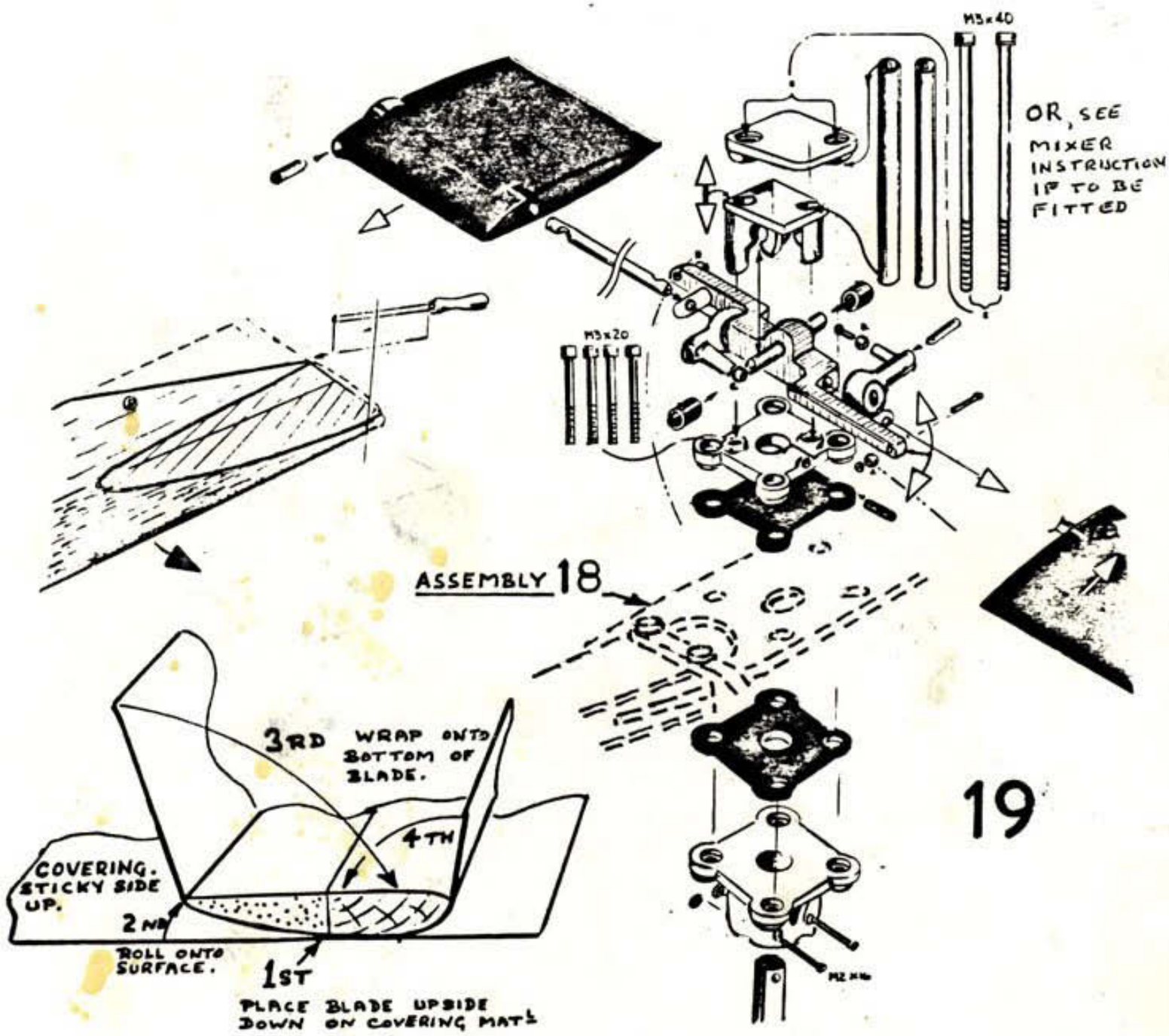
Push the ballbearings onto the stub axles moulded into the alloy plate. Assemble two steel fingers onto the outer (rectangular) bearing block with stud to trailing edge using M3 x 20 screws. Push onto the outer bearing with inner block in position. Push the formed incidence arm over the fingers and secure with M3 x 25 screws and nuts through the inner bearing block.

(cont.)

ROTOR HEAD (cont.)

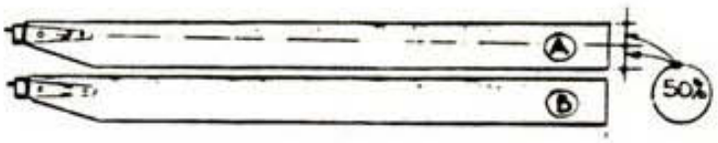
Push mast top onto mast. Remove rotor head fixing screw from inside the top plate moulding. Sandwich the headplate between the two teeter rubbers and between the mast top and top plate moulding. Use M3 x 20 cap head screws. Make sure the nuts are pulled home but the teeter rubbers should be only lightly clamped. Replace screw in top plate moulding, through mast, and fasten M2 x 16 screws and nuts in mast top clamp.

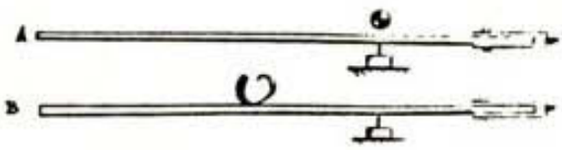
Snap the fly bar 'zig-zag' cradle into the carrier and then push in the oilite bearings. Pass the fly bar through the cradle with the operating arms in place. The unit slides up and down the tubular sleeves on long 3mm screws with slider top as spacer. The fly blades fit onto fly bar with collar set screws tightened into deep grooves at outside end of flybar.



Cut away the balsa at the blade root to taper the blade, and if necessary flatten the top of the blade where it fits into the moulded holder. Sand the blades lightly to smooth the surface then cover with the self-adhesive vinyl supplied. The overlapping edges should be under the blade trailing edge 'downwind' - (see diagram).

ROTOR HEAD (cont.)





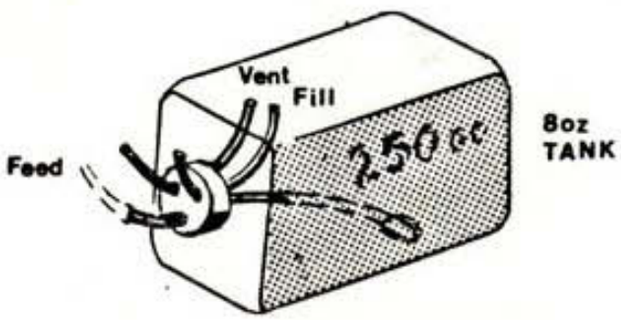
The rotor blades must be in static and dynamic balance. To achieve this is simply a case of making sure they have the same weight, and that the centre of gravity of each blade is at the same point.

If the blades are of equal weight but differing C. of G., add covering material or electrical tape to move the balance point of one blade out towards the tip, and a similar amount of material to the other blade to bring the balance point towards the centre. Try and get the balance equal to within 1-2mm.

If the blades are of unequal weight and balance point, add covering material to the lighter blade in such a position that it will also move the balance point to match the other blade.

Insert the blades in the blade holders and position so that a line from the two holes in the holders would extend to a point 50% back from the leading edge at the blade tip. This gives the correct amount of blade lead. Drill and fit the M3 x 16 bolt and nut, then drill for larger 4mm retaining bolt and fit. Place the rubber drag dampers in position and push the complete blade assembly in place between the rotor head fingers using M4 screw and nyloc nut to secure.

Paint or tape one rotor tip red and the other white. Check that each tip in turn is the same height above the boom. This is static tracking.



FINALS

Assemble the fuel tank as in the diagram and fasten on the seating behind the engine with light rubber bands. These must not be tight or engine vibration will cause foaming of the fuel.

Secure the radio receiver on the vertical surface of the chassis, on the opposite side to the fan duct, with a strap or servo mounting tape. Lead the aerial out to the rear but so it hangs clear of the tail rotor.

The hole above the engine is intended for glow plug access only. Use a long glow clip from below or a remote plug and cable during engine starting.

Have you got lubricant in the gearboxes? Occasionally lubricate the main gearbox with oil through the hole in well at rear of gear case.

SETTING UP

Main Rotor

Precise trim can vary widely according to many factors, including model weight, engine power, air temperature, humidity, height above sea level, type of fuel used, glowplug condition, engine condition, etc. However, a reliable starting point is to set the bottom surface of the main blades to 0 degrees with the engine throttle closed. Total vertical travel of the collective carrier on the rotor head should be 6-7mm while throttle moves to open.

The model will move in the direction of tilt of the main rotor disc, which is controlled by the tilt of the swashplate. Tilting the swashplate down at the front will result in the rotor disc also tilting down at the front, and the model dropping its nose and moving forward from the hover. The same goes for left, back, and right, and any other angle - the rotor follows the tilt of the swashplate and the model moves in that same direction.

An angular movement of the swashplate of about 15 degrees in each direction (total 30 degrees) is sufficient for ample control without over-sensitivity.

Tail Rotor

With the tail rotor control (which replaces what would be rudder control on a fixed wing aircraft), a suitable setting is for the flat surface of the blades to be at right angles to the pitch control rod (i.e. pitch is 0 degrees) when the transmitter control stick is pushed fully to the right (with Tx trim at neutral). It is most important that the control rods move freely.

Engine

The carburettor must be set rich enough to keep the engine cool, yet lean enough to provide ample power. With the rotor collective pitch set as specified the engine should be set to a rich two stroke mixture.

The rotor head should be held while starting the engine with the throttle just open. The centrifugal clutch will drag at all but a correct idle speed. Open the throttle by pushing forward left hand stick if you have installed according to the drawing. Some people prefer to fly other modes. This will speed up the rotor head and apply collective pitch. Rotor speed is important on any model helicopter and too great a deviation can cause aggravating problems.

At about half stick the rotor should be spinning fast and tracking correctly - the coloured tips enable you to see this. If incorrect throttle back and increase pitch on the lower blade. If in order, advance the throttle/collective to the point where the model is decidedly light. Note that moving the cyclic stick will tilt the rotor.

If there is a shake on the model, stop the rotor and add an extra band of covering material to one blade (15mm wide for minor shake, 50mm for vicious), try again, if worse put it on the other blade. The fly blades may also need dynamic balancing in this way.

When tracking and balance are sorted out the throttle/ collective may be advanced to the point of lift off. Powerful oscillations of the whole model are caused by too low a main rotor speed. The answer is to reduce collective pitch by lengthening the push rods between the paddle arm and the rotor incidence arm. Incidentally, a great excess of collective pitch will cause the clutch to slip and heat up, and the tail rotor will be unable to cope with torque because it is running too slowly. Also in this condition the engine is working very hard at low rpm of the cooling fan, so this is a dangerous condition to stay with.

If the model screams and shows a reluctance to lift off then more pitch is required relative to throttle. If it lifts off but is very twitchy and sensitive on the controls again increase pitch to slow the rotor down. Lift off is best at about 2/3 to 3/4 of full throttle stick movement. Main rotor should be turning at approx 1100 rpm, equivalent to 4500 at the tail rotor.

Oscillations can also occur with any two bladed rotor head if the teeter is reduced by excessive tightening. Try to adjust so the rotor head plate is held firmly but not solidly between the rubbers.

Similarly with the tail rotor. If the model tends to revolve at the point of lift off increase or decrease the tail pitch setting by moving the collars on either side of the yoke.

The model is now ready to fly.

FLYING

There are a great many technicalities concerned with the flight of a helicopter, only the essential reactions will be related here.

Start by standing about three paces to the rear and three paces to the side of your model which is pointing into wind and on level ground. This is the best position for observing the attitude of the model and to be able to control the hover.

Increasing throttle/collective to the point of lift off will indicate that the model wants to go in one direction or another. Ignore this but apply a control (the cyclic control is as if you had hold of the model by the rotor top) to correct the movement. You can trim out the tail at this stage. Repeat until you are confident that your reactions will give a control in the right direction.

A touch more collective and the model will clear the ground. If at this stage it persistently goes in one direction the trim may be adjusted, either on the transmitter or by adjusting the length of the control rods to the swashplate. Repeat until confident.

When the model is one metre clear of the ground (out of ground effect) control will be easier but a miscontrol will be more disastrous. If flying from rough grass then Morley floats can be an advantage, other training aids are more trouble than they are worth but the Morley string method may help.

A light extension to the tail boom is fitted to make an attachment for a 3 metre length of cord clear of the tail rotor. An active and understanding anchor man holds the other end with the model pointing downwind. The model has forward trim set and the pilot stands to the left of the anchor man, who raises and lowers the string with the model. In this way the pilot learns the response of the model two controls at a time instead of having all four to worry about. This method has been tried, and it works.

When you find that height control (do not let the model go above head height) and lateral control are an automatic reaction, then the forward trim is removed and the fore and aft cyclic becomes operational. As the string goes slack so the tail rotor control is needed. Persist until you find it easy. Try to get used to settling the model down - landing - rather than slamming the throttle shut when in the right place else you may chop the tail boom.

Now you can hover! Which you need to do to land. Follow this with slow flights forward, backwards and sideways until you can place the model at any point you want, and can keep it there.

The next stage is a circuit, which is easy, but coming out of forward flight back to the hover is not always so. On a calm day a circuit is just a hovering circle. Note that the controls are used to change the attitude of the model to position it as required, and not 'held' in any particular way. Note also that in forward flight a lot less power is required - this is caused by the addition of translational lift due to the extra air going through the rotor, and is what can give rise to trouble in stopping.

To slow down, gently reduce collective and bring the nose up slightly, but before the model stops travelling the attitude must be brought back to level and the power increased a lot to stop sink. Almost immediately slightly reduce power to stop a vertical climbout. You can then settle it down.

Happy Landings