

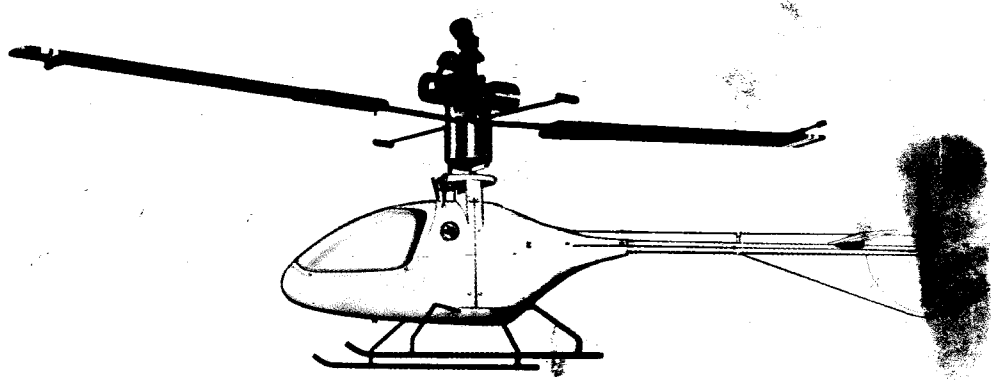
*John Thema*

\$3.50

# **ASSEMBLY** and **FLYING**

## **INSTRUCTIONS**

**"DU-BRO WHIRLYBIRD 505" RADIO CONTROLLED HELICOPTER KIT**



designed and manufactured by  
**DU-BRO PRODUCTS INCORPORATED**

wauconda, illinois 60084

**U.S.A.**

## INDEX

Page	Section
2	INTRODUCTION
2	WOOD FRAME ASSEMBLY
2	TAIL BOOM ASSEMBLY
3	SOLDERING TIPS
4	LANDING GEAR ASSEMBLY
4	TAIL ROTOR ASSEMBLY
7	TAIL ROTOR DRIVE SHAFT
7	MAIN ROTOR ASSEMBLY
12	CONTROLS
13	ROTOR AND BODY INSTALLATION
15	ADJUSTMENT AND SET-UP
17	ADJUSTMENT AFTER CRASH
19	FLYING INSTRUCTIONS
25	DRAWINGS
32	PARTS LIST

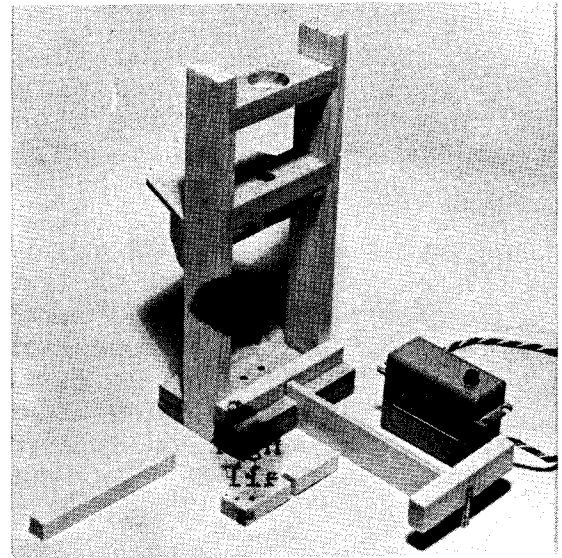
## INTRODUCTION

Since helicopters are so new to the radio control field, and all copters including the full-sized ones, are very dependent on everything working perfectly, we strongly advise you to read and follow all instructions. If you deviate from any of the prescribed steps or try to change the engine size, props, weight of model, or any other parts, then you are on your own. If, however, you build this kit as we have described, you should have no trouble learning to fly it. After you learn to fly the model, you can start to modify it and try your own ideas. It is suggested that you read the instructions completely and study the drawings and pictures before starting constructions. If you use the written instructions for assembly procedures, the exploded view drawings for part identification and location, and the pictures to see what the assembly should look like when finished, you should have no trouble building this copter.

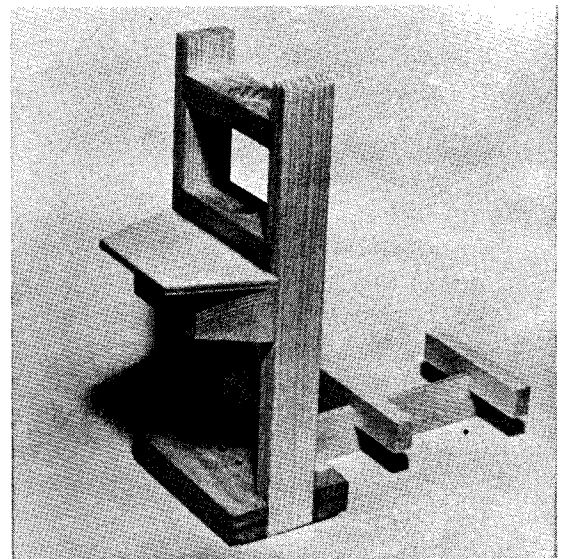
### WOOD FRAME ASSEMBLY

1

1. Install bearing blocks in side rails. ✓  
(Top block hole up, bottom block hole down.)  
Note mark on one end of each bearing block. Install blocks so that the marks are on the same side. ✓ See Drawing A for part identification. Use white glue on all wood joints except where noted. Sand all wood parts before assembling.
2. Glue landing gear block in place. ✓
3. Glue servo mounting plate in place. ✓ You may have to sand the thickness of this plate in order to press it into the slot of the landing gear block.
4. Glue servo mounting rails in place.  
(Adjust to fit your servos.) See Pix #1.  
After installing rails, fit servos in place. If you are using some of the larger servos, you may have to cut out some of the side rails so that you have about 7/16" between the servos.
5. Glue tail boom mounting plate in place.
6. Glue tail boom mounting block in place.  
Be sure the small hole is on the left side as you face the front of the copter. See Pix #2.
7. Round top 1 1/2" edges of side rails so plastic body will fit.



2

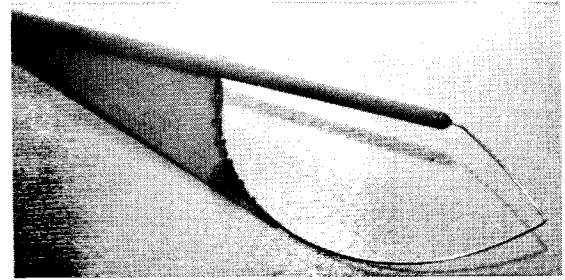


### TAIL BOOM ASSEMBLY

1. Bend tail rotor protector wire to shape as per Drawing B. Use 14" long 1/16" wire provided.
2. Glue protector wire in place using the wood button plug. You may have to square off the end of the tail boom with sandpaper. Make the first three bends and insert the wire through the boom and make last bend. Epoxy wood plug and wire into tail.
3. Trim plywood fin to fit protector wire.

4. Mount fin in place using soft copper wire. Drill small holes in plywood along edge of protector wire and lace plywood fin to protector wire. See Pix #3.

3



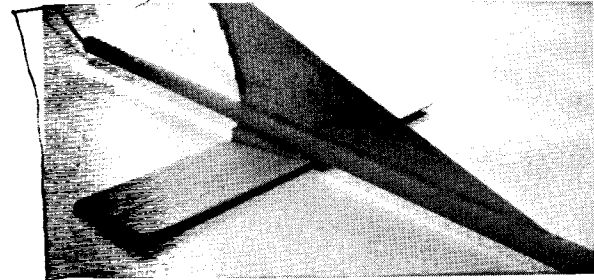
5. Epoxy fin to wire and tail boom. See Pix #3.

X 6. Glue stab on stab mounting block. (Use white glue.) Be sure to put block in center of stab.

X 7. Trim stab mounting block to fit over the tail rotor protector wire.

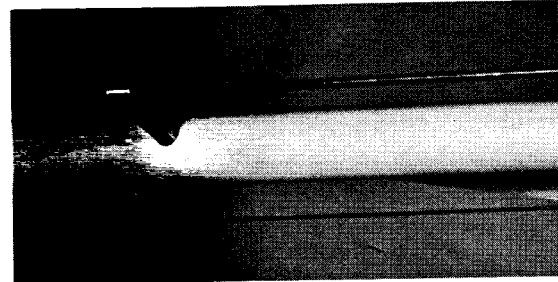
X 8. Epoxy stab onto tail boom. Be sure it is square. See Pix #4.

4



9. Make tail rotor drive shaft guide using 1/16" collar, 4-40 stud made by cutting the head off a 1 1/4" x 4-40 bolt, and 1/2" brass tubing. Screw stud into collar and slip tubing on stud. Hold in place with 4-40 nut and solder tubing to collar. Remove nut. See tips on soldering.

5



10. Mount guide on tail boom using small 4-40 nut. Be sure hole for shaft is in line with the tail boom. Trim excess and epoxy to boom.

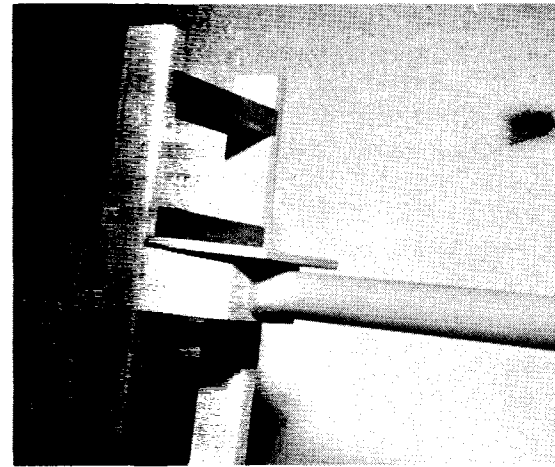
11. Mount tail rotor control wire guide in place using two 2-56 nuts. See Pix #5. Be sure hole in end of guide is level with tail boom.

12. Epoxy nuts to tail boom.

13. Sand tail boom for good fit into tail boom mounting block.

14. Epoxy tail boom in place in block. Be sure tail boom is straight and in line with the main frame. See Pix #6.

6



15. Sand and give three coats of clear dope to all surfaces. Then spray on color.

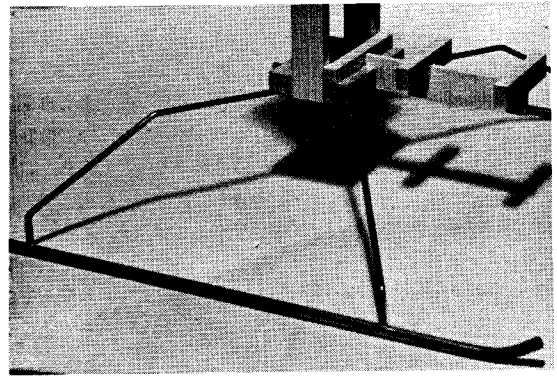
### TIPS ON SOLDERING

Use a good grade of resin core solder on all joints. Also use a good soldering flux on all joints. This makes a much better joint. You should use a 150 to 250 watt gun or iron. Be sure to clean all joints with lacquer thinner to remove any flux. For a good solder joint, use plenty of heat and not much solder. A good joint will be smooth and shiny when finished.

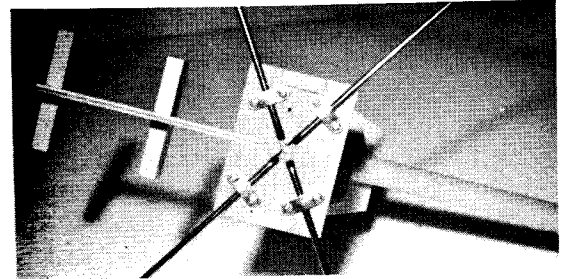
## LANDING GEAR ASSEMBLY

1. Burrs should be removed from all wire parts before assembly.
2. Slip landing gear wire in place in landing gear block. (Do not screw down at this time.)
3. Fit landing skids onto wire with turned up end in front.
4. Solder skids to wire. Use flux to get good solder joint. See Pix #7.
5. Carefully remove landing gear from block and paint.
6. Install landing gear in block and screw down using the four steel brackets and 1/2" sheet metal screws. See Pix #8.

7



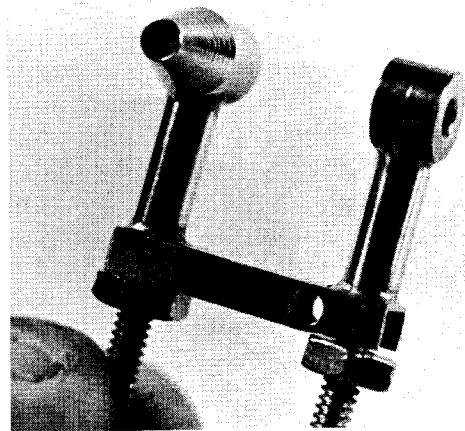
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## TAIL ROTOR ASSEMBLY

1. Study Drawing C carefully before starting assembly for part identification. All burrs should be removed from all brass tubing and brass parts before assembly.
2. Cut the head off one of the 1 1/4" 4-40 bolts and file the end of bolt flat to make a stud. Screw 4-40 stud into drive shaft support collar. Be sure the 3/32 x 5/8 brass shaft bearing will slip through hole in collar.
3. Slip 3/8" brass tubing over 4-40 stud. Hold in place against collar with 4-40 nut and solder tubing to collar. Then remove nut.
4. Now slip this assembly into the channel mounting plate. Hold in place with 4-40 nut. Do not solder at this time.
5. Make stud from another 1 1/4" 4-40 bolt. Screw 4-40 stud into prop shaft bearing. (Be sure stud is not in too far.)
6. Slip 3/8" brass tubing onto stud and hold in place with 4-40 nut.
7. Solder tubing to bearing and remove nut.
8. Slip this assembly into channel plate and hold in place with 4-40 nut. Do not solder at this time. See Pix #9.
9. Slip the drive shaft bearing into the support collar and then using a short piece of 1/16" wire for the drive shaft, line up the support post with the channel plate and solder the post to the channel.
10. Mount the nylon gear on the short wire you are using for the drive shaft.

9



11. Slip the prop shaft with small brass gear into the shaft bearing and line it up 90 degrees to the channel plate. Check to see that the two gears mesh properly and solder the bearing post to the channel plate.

12. Now slip the drive shaft bearing in against the nylon gear until the two gears are properly meshed (not too tight) and solder the bearing to the collar. See Pix #10.

13. Using one of the 1" 2-56 studs, make two 3/8" studs. Cut the stud off, file flat and run a 2-56 nut over the threads to straighten them. Screw the cut off end into the prop shaft all the way and very carefully solder the studs to the shaft. Very little solder is needed. Do not get too much solder into the threads of the studs. After soldering, you can clean the threads by screwing a Kwik-Link onto the studs. The links must rotate free on the studs.

14. Slip the prop shaft into the bearing and force the small brass eyelet over the end of the shaft. Don't make it too tight, shaft must rotate freely. Solder eyelet to shaft using very little solder. Clean all solder joints with lacquer thinner to remove flux. See Pix #11.

15. At this time, check to see that the gears turn freely by turning the drive shaft. If gears do not turn freely, check all alignment and joints until the assembly turns freely.

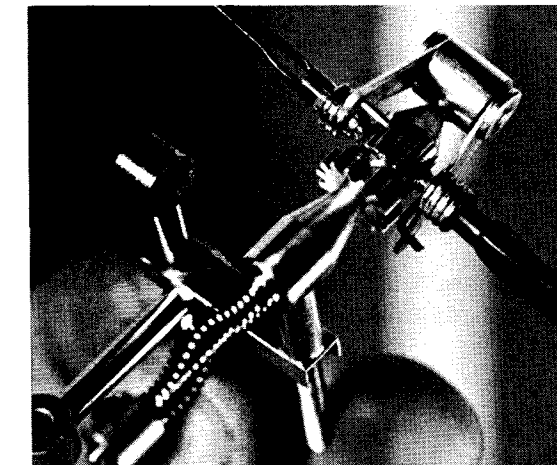
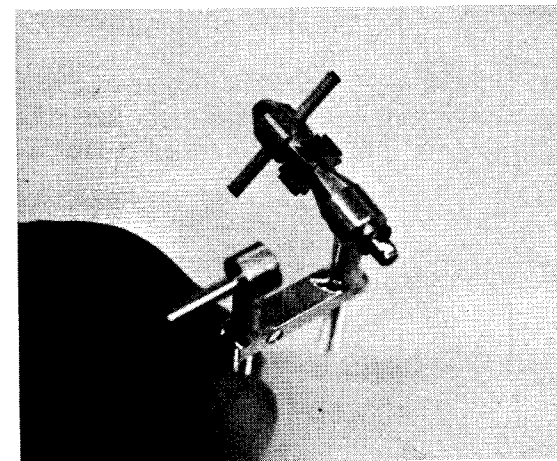
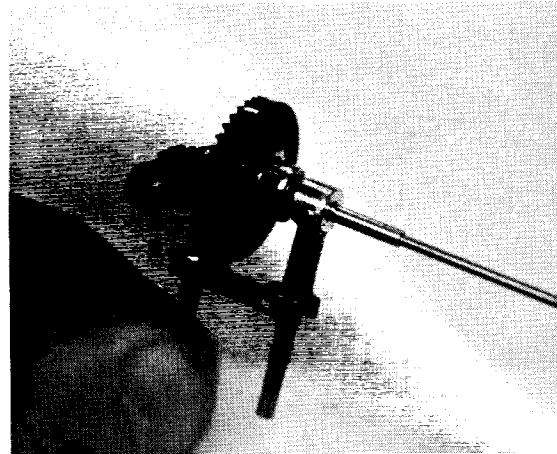
16. Mount the two blade pitch control arms on the brass pitch control head and hold in place with small brass washers. Very carefully peen over the brass studs to hold the washers in place. (Do not solder because you will solder the arms too.) The arms must move freely.

17. Solder the control head to the 2" x 1/16" wire shaft.

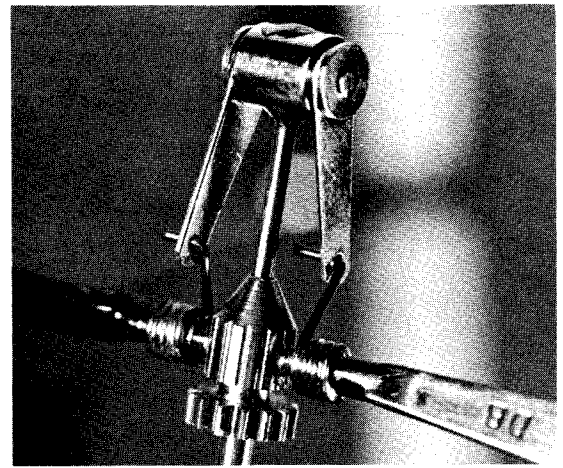
18. Twist the spring like blade control arms onto the two Kwik-Links which have been flattened. See Drawing C. Note one arm is bent in and one is bent out. The one that is bent out should be twisted all the way on and flush with the end of the Kwik-Link. The arm that is bent in is not twisted all the way on. Leave about 1/2 of the last turn of wire overhang the Kwik-Link. After installing, cut off excess wire on the arm which is going to fit into the pitch control arms. The wire should be about 1/16" long.

19. Adjust the arms on the links. The arms must be parallel with the blades and both arms should be in the same place in relation to the blade. See Pix #12. Very carefully solder the arms to links. Just tack solder do not try to completely cover the spring with solder because solder will get into the threads of the Kwik-Link.

20. Screw the Kwik-Links onto the 2-56 studs on the prop shaft. Screw them all the way down. Then back off until they rotate freely.



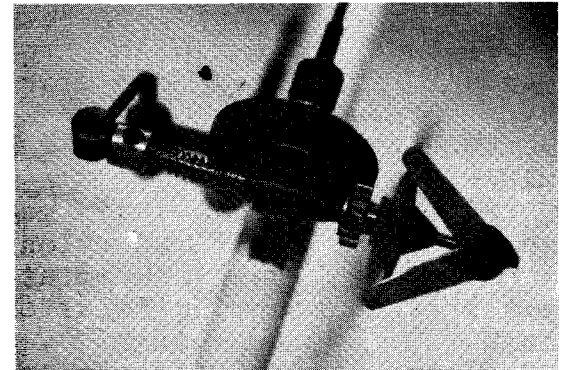
21. Slip the pitch control head shaft into the prop shaft, put spring on over the shaft and down onto brass eyelet. This spring is the shorter of the two straight springs. Hold spring in place with collar on end of pitch control shaft. See Pix #12. Adjust collar flush with end of shaft.



13

22. Slip the pitch control arms onto the blade control arms. See Pix #13.

23. To make the control arm assembly, screw 2-56 x 1" stud into 3/32" collar and slip 3/32" x 5/8" brass tubing through collar. Temporarily slip the L-shaped control crank into the brass tubing. (Do not solder any of these joints at this time.) Slip 1/8" x 5/8" brass tube over 2-56 stud.



14

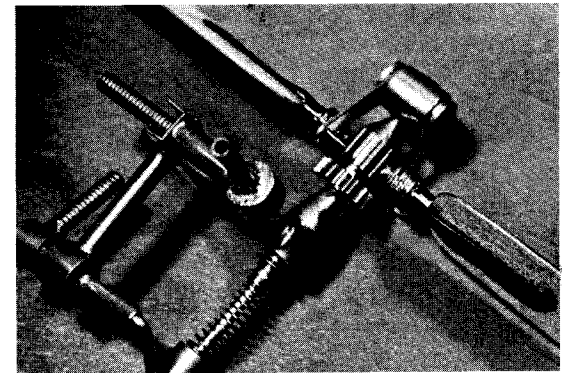
24. Mount the control arm assembly into the channel plate and hold in place with a 2-56 nut.

25. Now move tubing up and down in the collar until the control crank will line up with the pitch control shaft. When everything lines up, solder the tubing to the collar and to the channel plate.

26. Now remove the 2-56 nut. Trim excess 2-56 stud and solder to channel plate.

27. Mount the pitch control bearing on the control crank with set screw. Position so pitch control shaft rides in center of bearing. See Pix #14.

28. Make stud by cutting head from 1/2" 4-40 bolt. Screw 1/2" 4-40 stud into collar, which has a tapped 4-40 hole on both sides, and solder. With set screw, mount this arm on the control crank so the set screw sets on the flat spot on the crank. See Pix #15.



15

29. Sand and round the corners of the tail rotor blades.

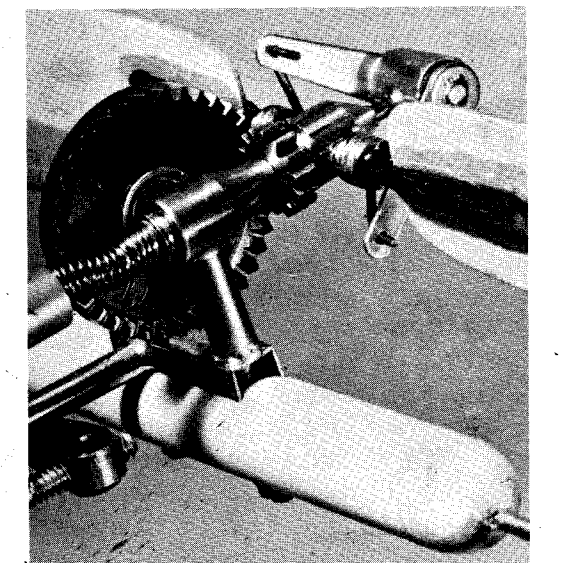
30. Slip the plywood blades into the Kwik-Links with the links in the center of the blade and in line with the length of the blade. Epoxy in place. See Pix #15.

31. Screw brass coupling on 4-40 1/2" stud to complete the blade pitch control arm and crank assembly.

32. Check to see that when you move the control arm, the blade pitch shaft moves in and out and the blades change pitch.

33. Sand and put on three coats of clear dope on the tail rotor blades.

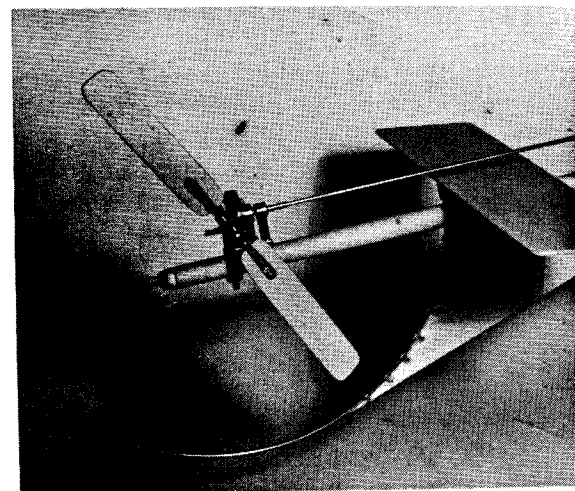
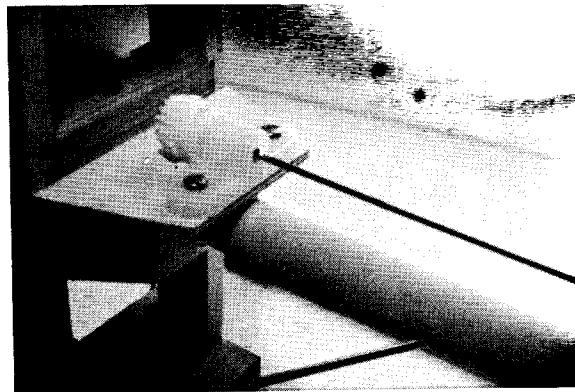
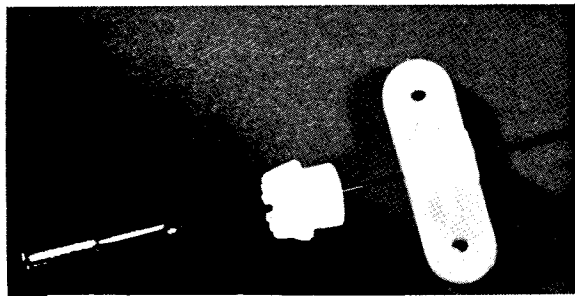
34. Mount the tail rotor assembly on the tail boom by slipping the 4-40 studs through the two holes in the boom and hold in place with small 4-40 nuts. Cover nuts with epoxy to hold in place. See Pix #16.



16

## TAIL ROTOR DRIVE SHAFT

1. Solder the brass gear mounting onto the 1/16" x 24" drive shaft.
2. Slip gear on shaft and press gear in place on knurled brass gear mount. Be sure the gear is pressed on all the way to the 17 flange and is facing the right way. See Pix #17.
3. Slip nylon shaft bearing onto shaft and slip shaft through shaft support bearing on tail boom. Do not put shaft into tail rotor bearing at this time. Push shaft through support bearing until nylon bearing will set on plywood plate over tail boom.
4. Press the two ball bearings into the holes in the two hardwood bearing mounts.
5. Slide the main shaft into the ball bearings with the large nylon gear on the 18 shaft between the wood bearing blocks.
6. Lock the large gear on the shaft using a 1/2" 6-32 bolt.
7. Adjust the drive shaft gear and nylon bearing until the large nylon gear will mesh with the small gear and rotate freely. Then mark the two mounting holes on the plywood plate.
8. Remove the drive shaft and large nylon gear.
9. Drill the holes in the plywood plate with a #24 drill and install the two 4-40 blind nuts.
10. Put the drive shaft back through the support bearing and screw the nylon bearing to the plywood plate with two 4-40 1/2" 19 bolts. See Pix #18.
11. Pull the shaft back as far as it will go and mark the length of the drive shaft which should be cut long enough to go almost to the prop shaft bearing (about 1/16" from it).
12. Remove the shaft once more and cut it off and file a flat spot on the shaft for the set screw in the nylon gear.
13. This time install the drive shaft through the support bearing and into the rear bearing and into the nylon gear. Mount the nylon bearing block with the 4-40 bolts and pull the shaft back as far as possible. Push the nylon gear as far forward as it will go and tighten the set screw onto the flat spot of the drive shaft. See Pix #19.
14. Check to see if the tail rotor turns free when you turn the bevel gear on the front of the drive shaft.



## MAIN ROTOR ASSEMBLY

1. Assemble tank and main shaft. Screw main shaft all the way into top part of tank, slip the tank over the shaft and onto the top of the tank. Slip the brass nut with 1/4" hole in it over the shaft and down onto the tank. Using a large soldering iron or a torch, solder the nut to the main shaft. After shaft has cooled remove from tank and clean.

