

HELIO-COPTER™

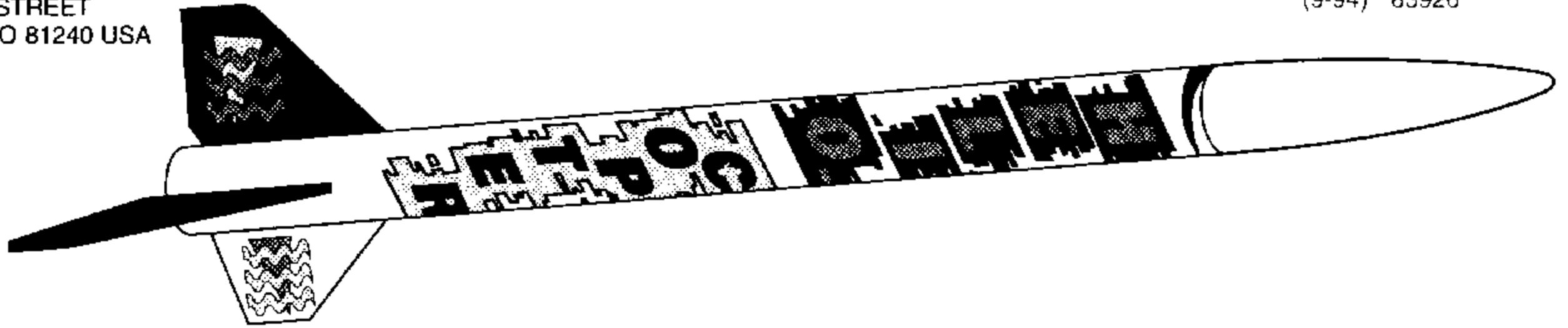


ESTES INDUSTRIES
1295 H STREET
PENROSE, CO 81240 USA

FLYING MODEL ROCKET KIT EST 1995

BETA™ SERIES

(9-94) 83926

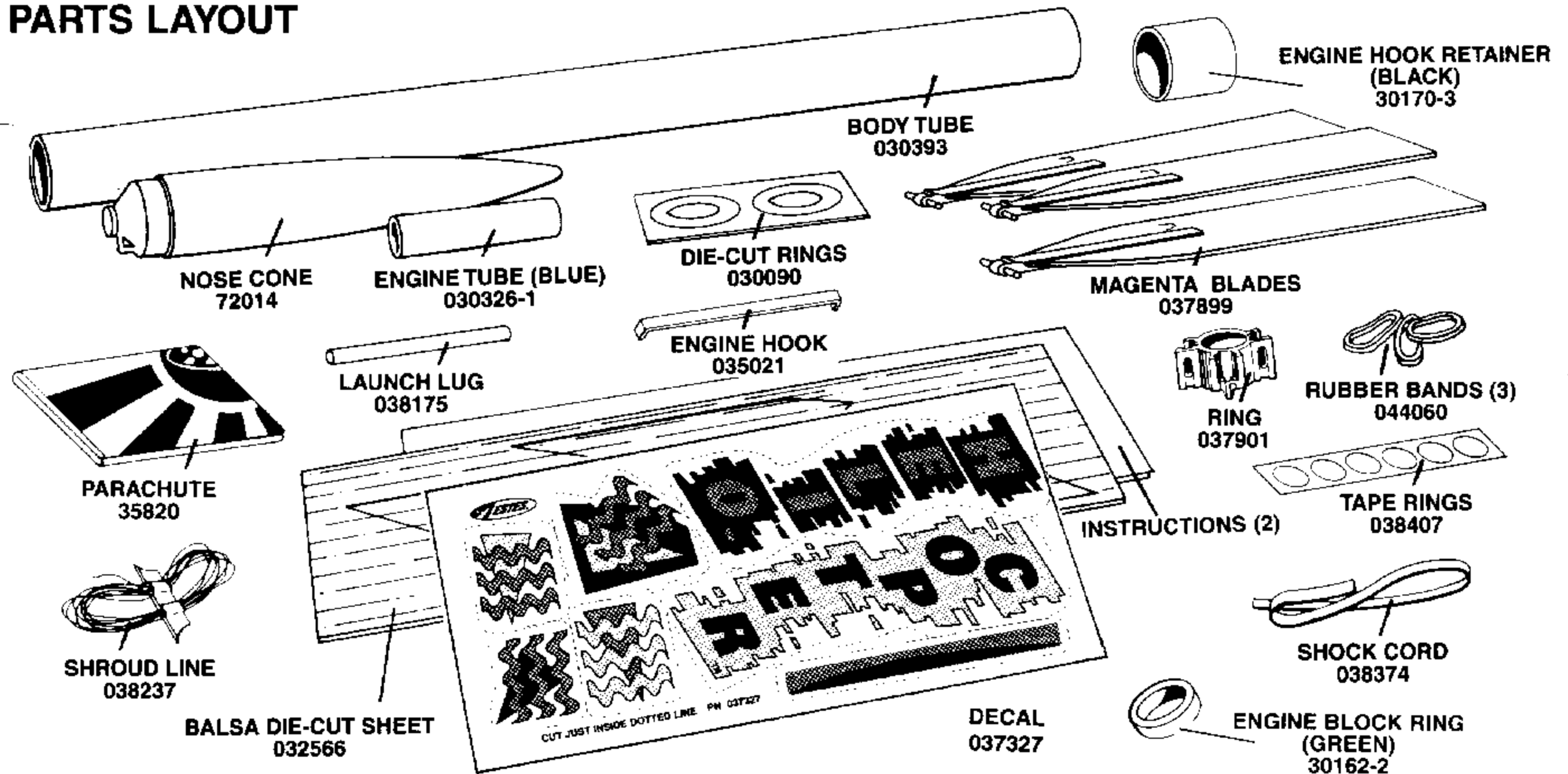


HOW TO USE THESE INSTRUCTIONS:

READ ALL INSTRUCTIONS BEFORE STARTING WORK ON THIS MODEL.

- A. This rocket, incorporating basic model rocketry construction techniques, will help you in the continuing development of your rocketry modeling skills.
- B. Read each step first and visualize the procedure thoroughly in your mind before starting construction.
- C. Lay the parts out on the table in front of you. (Check inside tubes for any small parts.)
- D. Use the parts layout to match all parts contained in kit.
- E. Collect all construction supplies that are not included in this kit.
- F. Test fit parts before applying any glue.
- G. The construction supplies required for each step are listed at the beginning of each step.
- H. Check off each step as you complete it.

PARTS LAYOUT



EXTREMELY IMPORTANT: THE PARTS LAYOUT IS FOR REFERENCE ONLY!

The parts layout is only intended to assist you in locating the parts included in this kit.

CONSTRUCTION SUPPLIES

In addition to the parts included in your kit, you will need these construction supplies. Each step shows which supplies will be required.



RULER



SCISSORS



HOBBY KNIFE



GLUE (white or yellow)



MASKING TAPE 19 mm (3/4") wide



Sanding Sealer (optional)



SPRAY PAINT (Lime Green)



ROCKET BUILDER'S MARKING GUIDE - EST 2227 (optional)



PLASTIC CEMENT



PENCIL



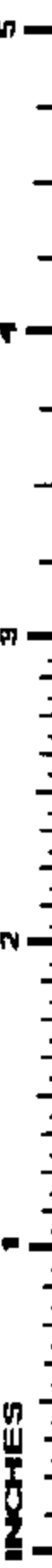
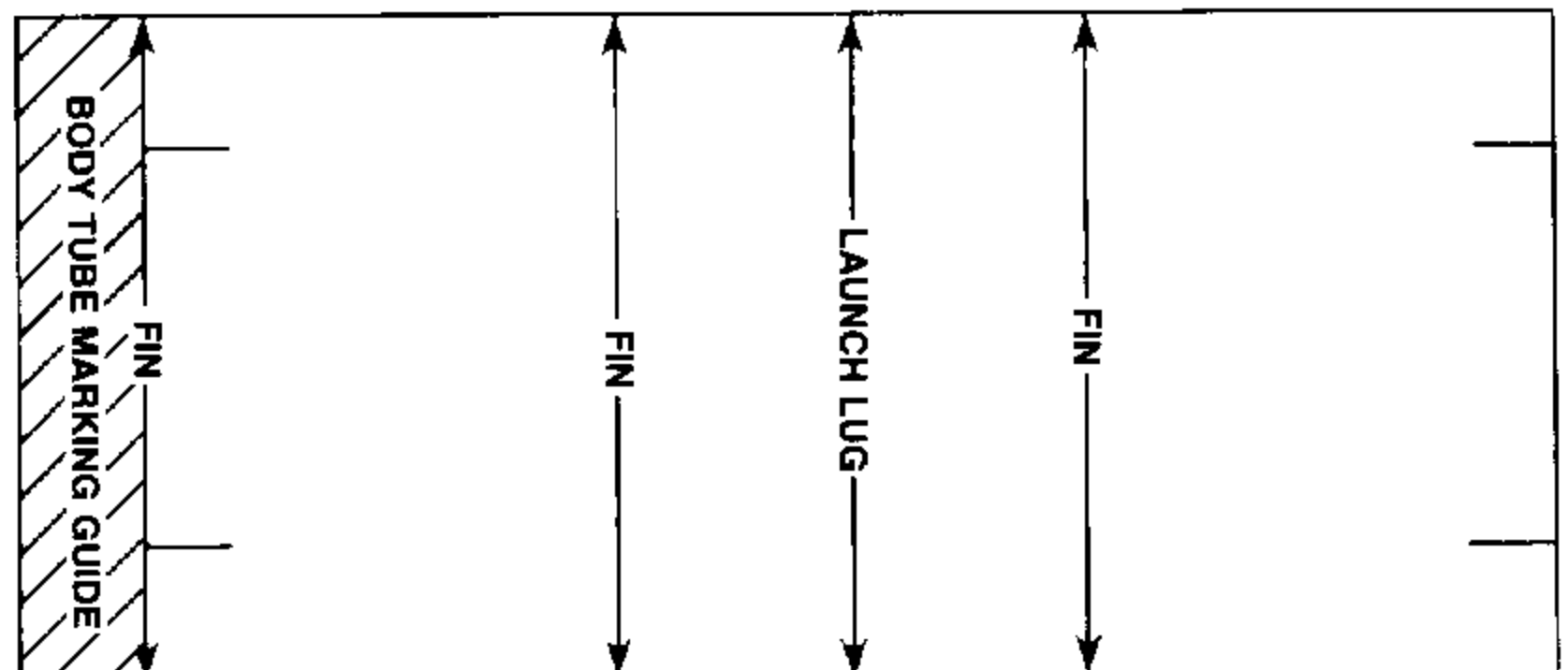
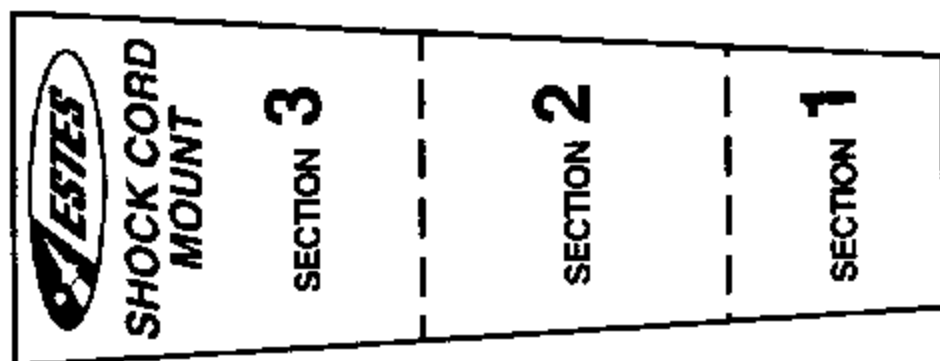
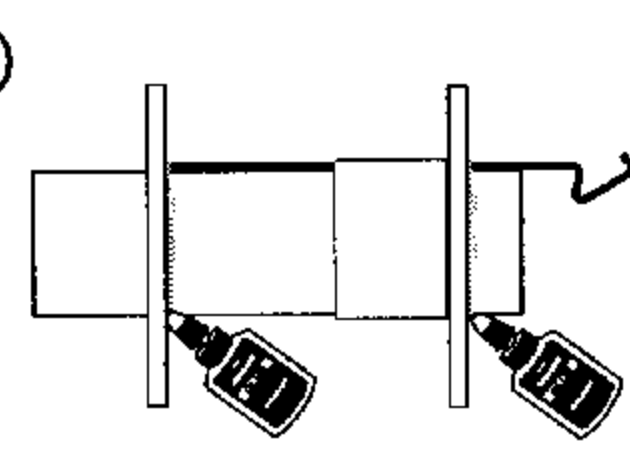
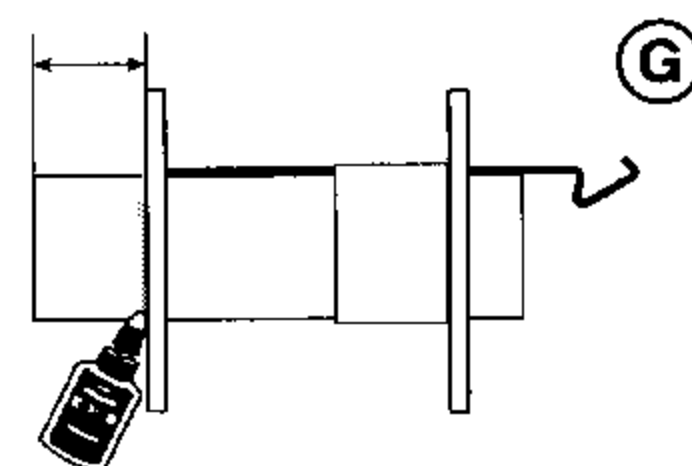
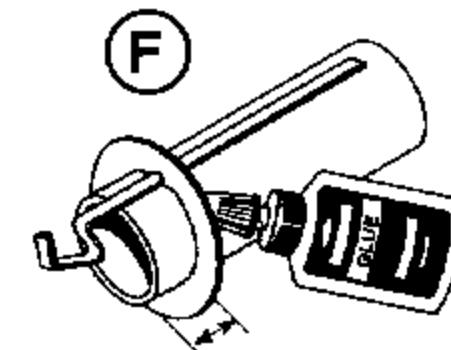
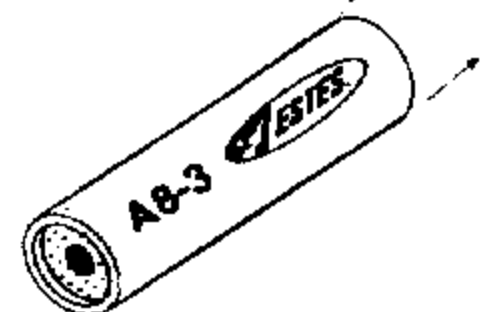
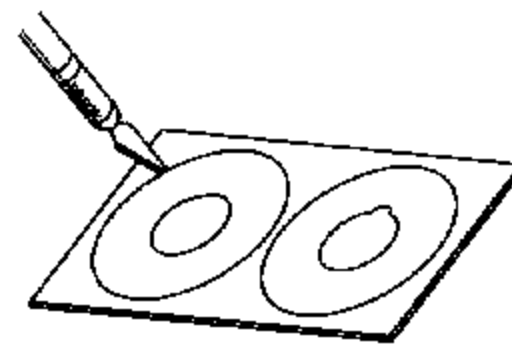
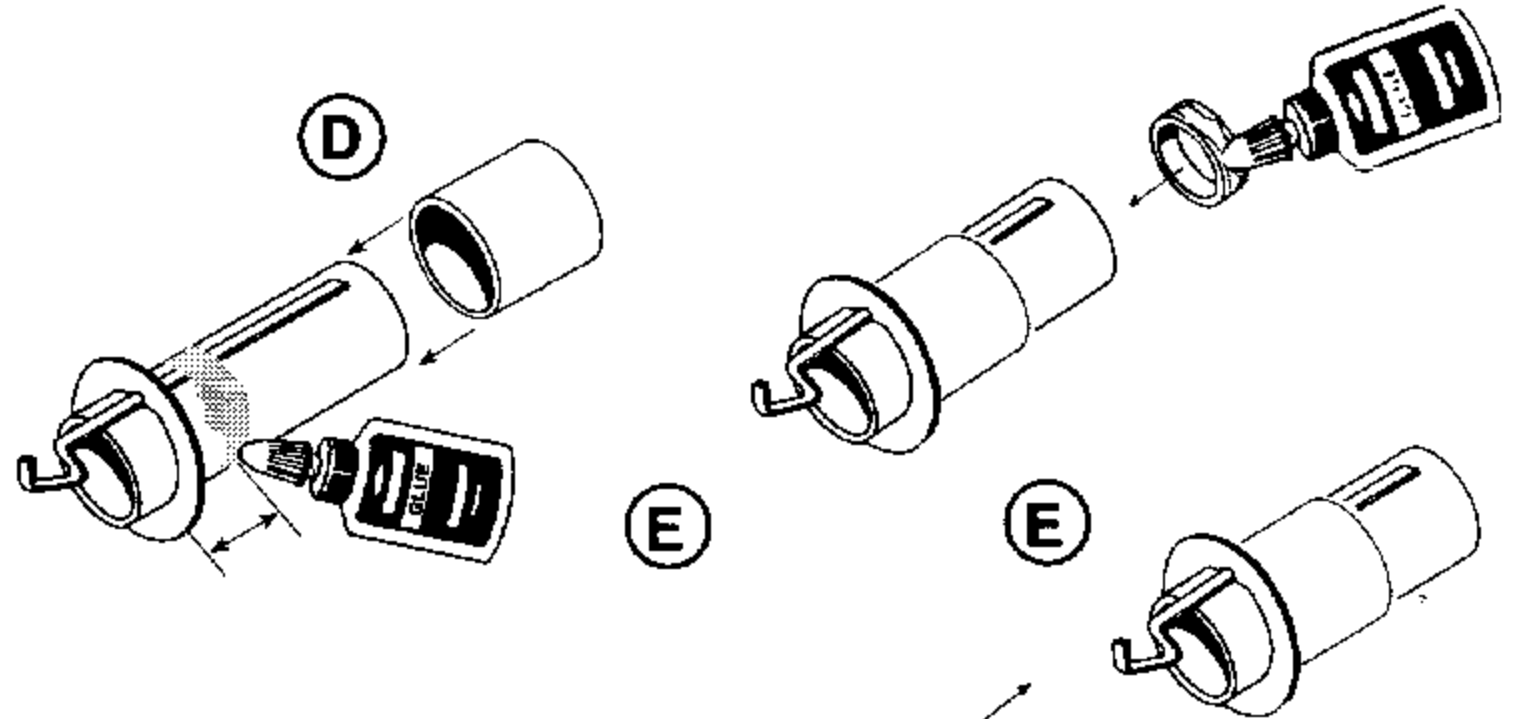
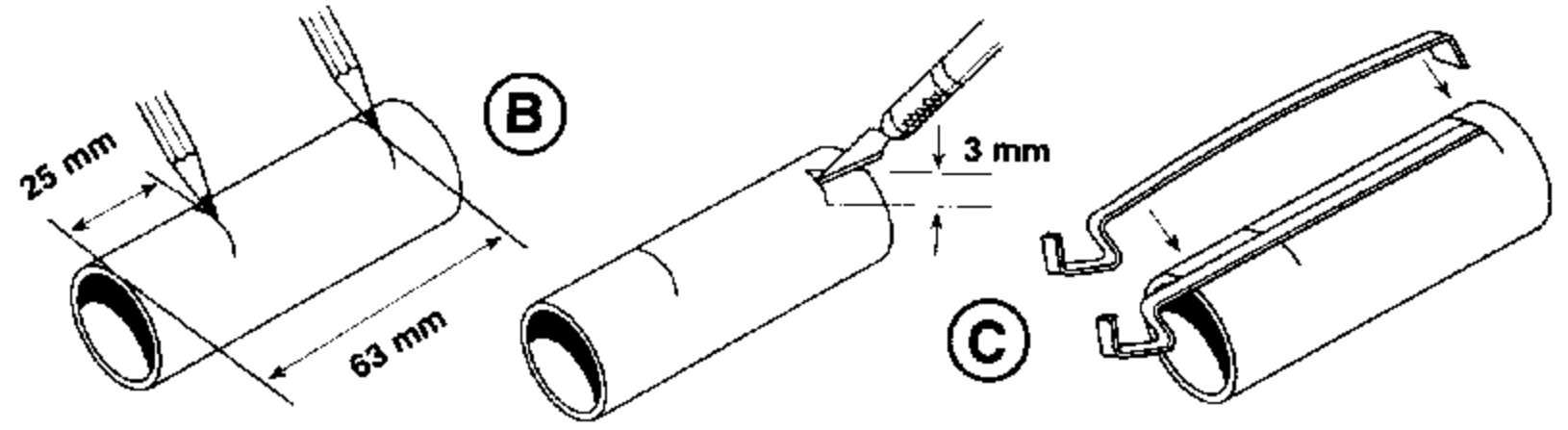
SANDPAPER

ROCKET ASSEMBLY

1. ENGINE MOUNT ASSEMBLY



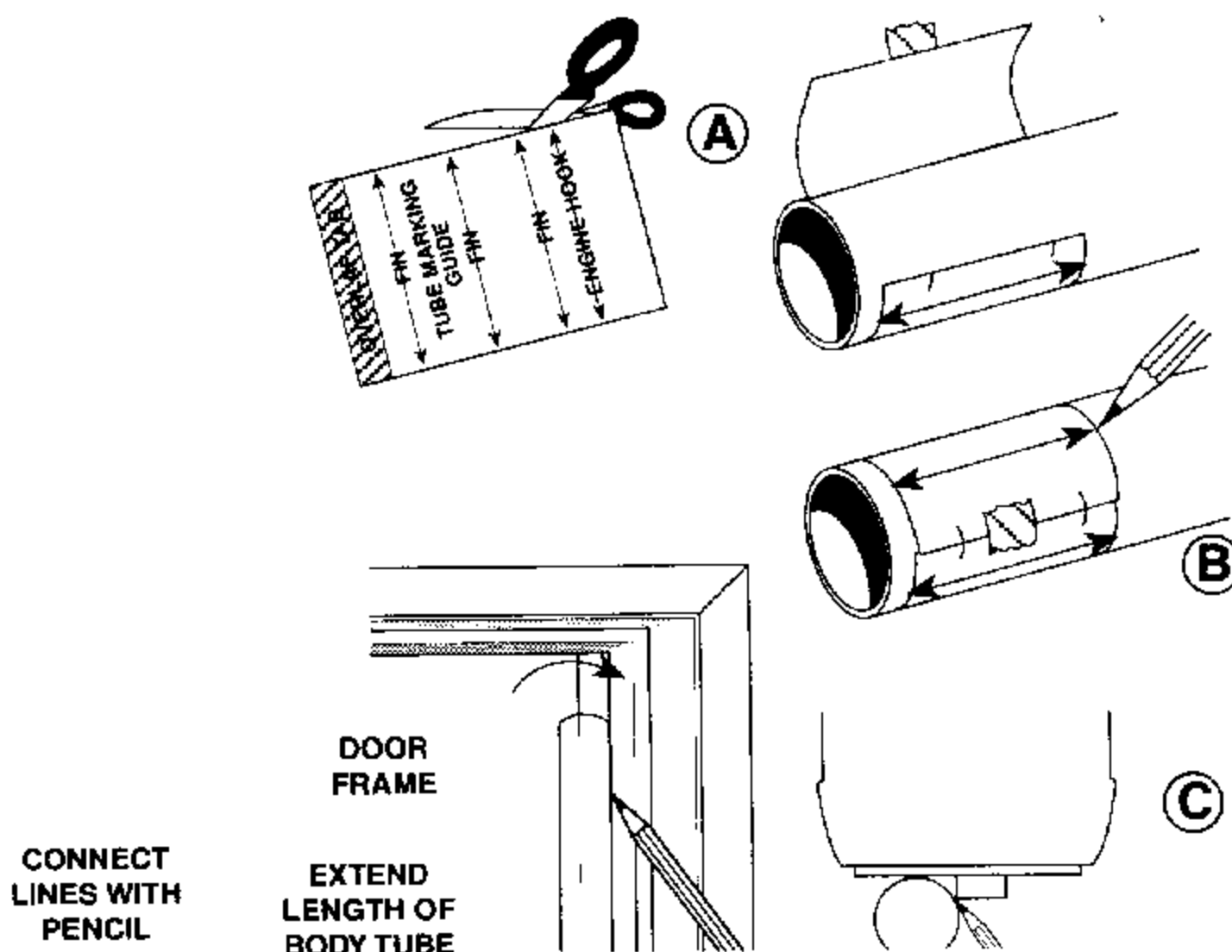
- A. You will need the light blue, engine mount tube, the engine hook, the die-cut rings, green engine block ring and the black engine hook retainer ring.
- B. Use a ruler (or the one provided in the center of these instructions) and mark out the following positions from one end of the engine tube: 25 mm (1.0") and 63 mm (2 1/2")
- C. Cut a 3 mm (1/8") slit at the 63 mm (2 1/2") mark. Insert the engine hook as shown.
- D. Apply glue around engine tube as shown about 3 mm (1/8) ahead of the 25 mm (1") mark. Slide the black engine hook retainer ring up to the 25 mm mark and no further. Do not stop while sliding ring into place or glue may grab at the wrong point.
- E. Apply glue on engine block ring. From the front, slide block into engine mount tube, until the block rests against the engine hook tab. Wipe excess glue away. Optional: Slip an engine (new or spent) into the mount to insure that the block is "square" inside the tube. Remove engine quickly.
- F. Separate the die-cut rings from the card. Slide the notched ring onto the tube from the rear and position it. The engine hook should be positioned inside the notch. The ring needs to touch the black retainer ring (as shown). Apply a line of glue around both sides of the ring where it touches the tube.
- G. Slide the remaining ring onto the forward end of the engine tube and position it 2 mm (1/16") from the end. Apply a line of glue around both sides of the ring where it touches the tube. Smooth out with finger.
- H. Let assembly dry.



2. TUBE MARKING DETAIL



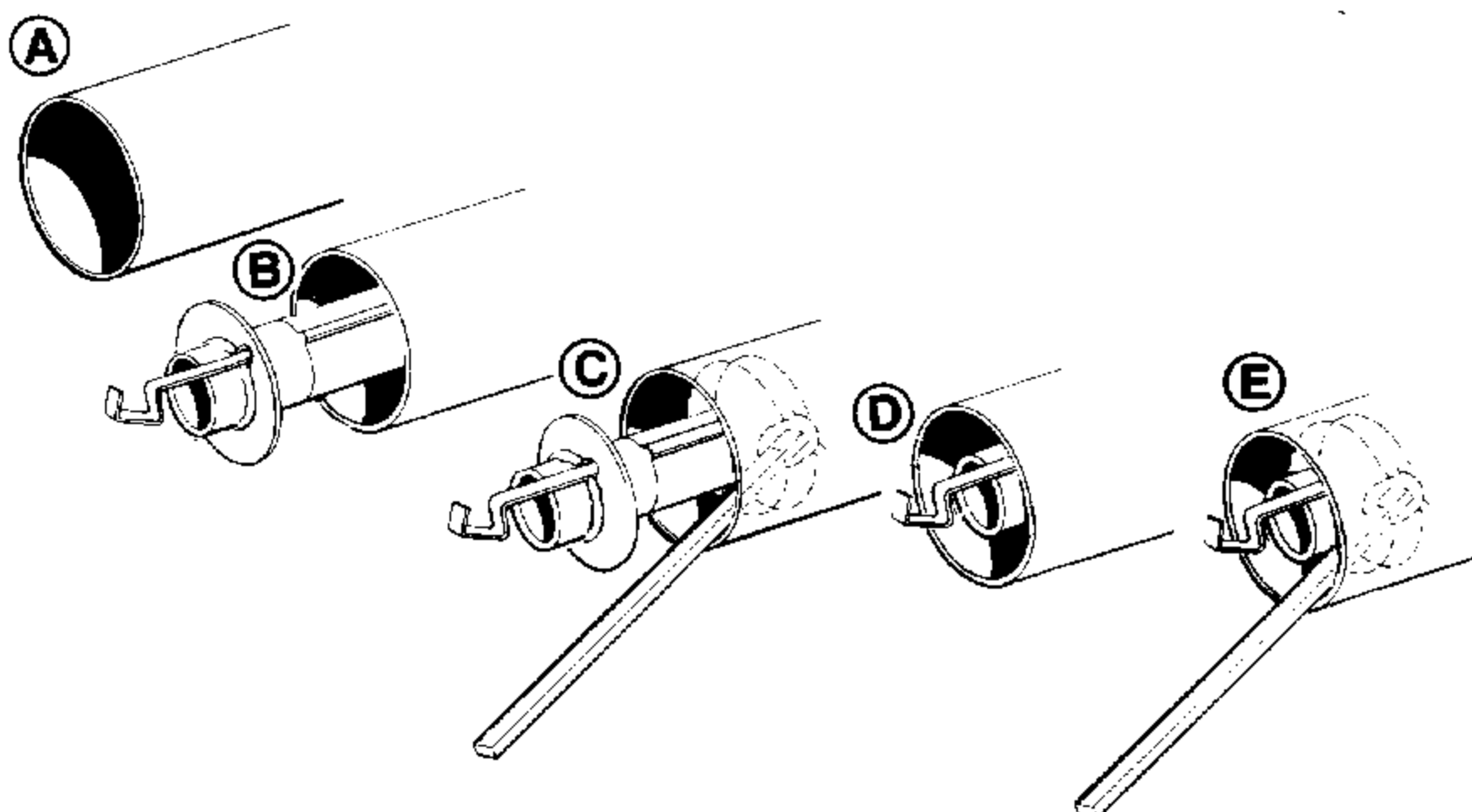
- Locate the tube marking guide on the bottom of page 2 in the patterns section. Cut the guide along the outline.
- B.** Wrap the guide around the body tube and tape it in place.
- C.** Mark tube at all arrow locations. One line on your tube marking guide is labeled LL. This is for launch lug alignment. Write LL on the body tube for that line. Remove marking guide.
- D.** Using a door frame as a guide or the Tube Marking Guide, draw straight lines connecting each pair of fin marks. Extend these lines 127 mm (5") along the tube. Draw a line the full length of the tube for the launch lug.



3. ENGINE MOUNT INSTALLATION



- A.** Locate the body tube.
- B.** Slide the front end of the engine mount assembly part way into the marked end of the body tube.
- C.** Using scrap balsa glue applicator, spread glue around the inside rear end of the body tube.
- D.** Continue to push the engine mount assembly into the body tube until the end of the engine mount tube is even with the end of body tube.
- D.** Make a glue reinforcement joint between the body tube and rear centering ring.



4. FIN PREPARATION



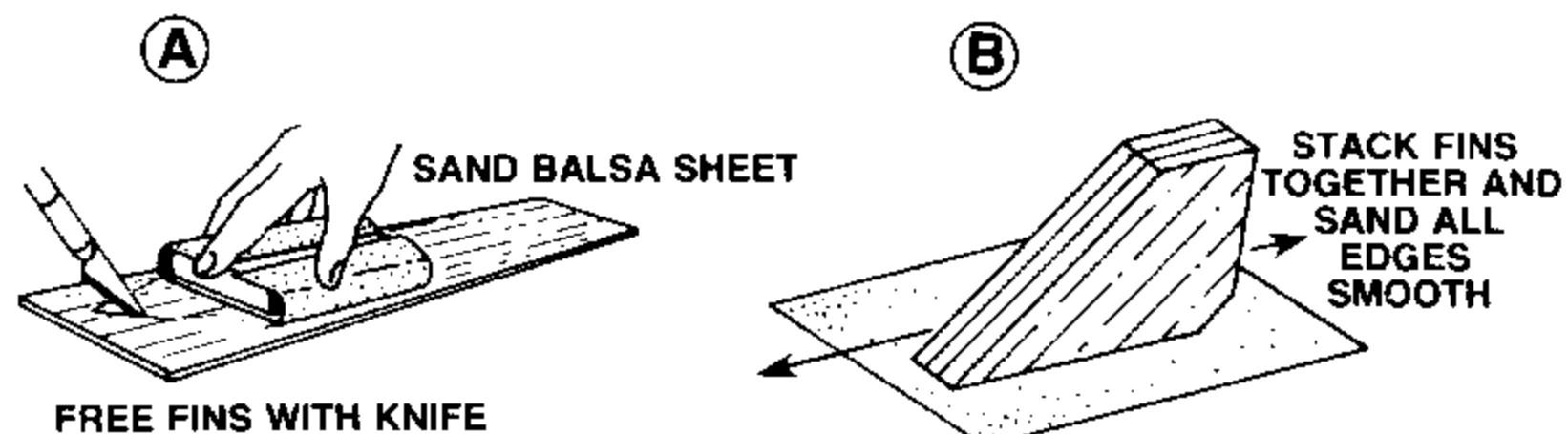
- A.** Free the fins from balsa sheet with your hobby knife.
 - B.** Lay sandpaper, rough face up, on your table. Stack the fins together and lightly sand the edges smooth and flat.
- HINT:** To replace damaged fins, trace fins onto a sheet of paper and save it with your instructions

NOTE: Read before proceeding with this step. Since your fins are not completely cut out of the balsa sheet stock, you will need to **work carefully** with your hobby knife to free the fins from the sheet.

Be sure to cut completely around each fin outline before attempting to remove fins from the sheet.

Check both sides of the sheet to make sure you cut through.

Pay close attention to the corner areas where die cutting is not complete. As you cut around each fin, cut away from adjacent fins so you will not damage the other fins on the sheet.



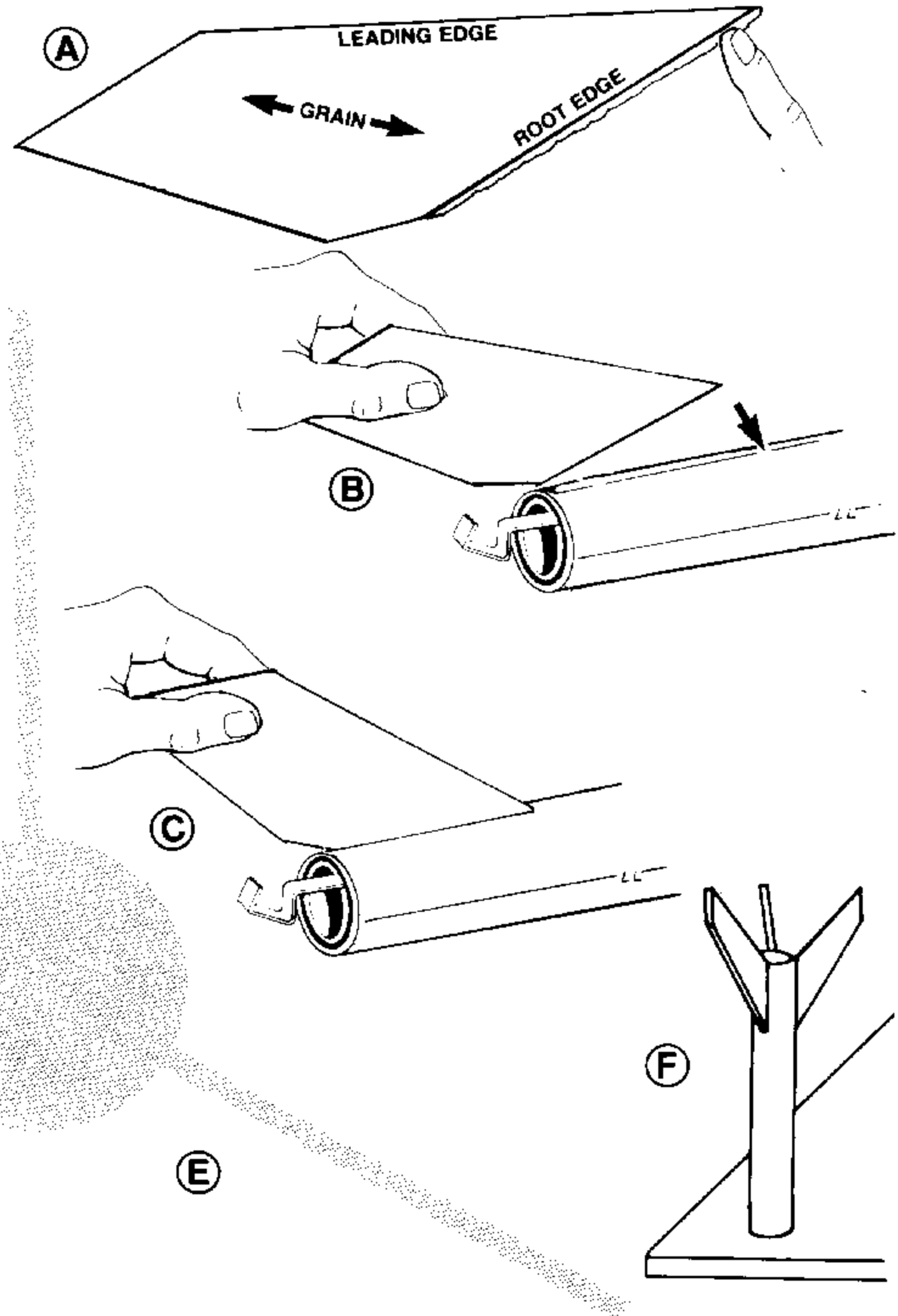
5. FIN ATTACHMENT



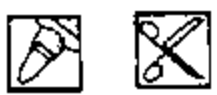
NOTE: The fin jig on the Marking Guide accessory (EST 2227) will make this step easier. Follow the instructions that came with the Marking Guide for assistance.

Note: Before gluing your fins, identify the root edge (which will be glued to the body tube) and the front (leading) edge. The leading edge always parallels the grain of the wood for extra strength. This will help you attach your fins correctly. **Remember:** Fins must be attached correctly for stable flights.

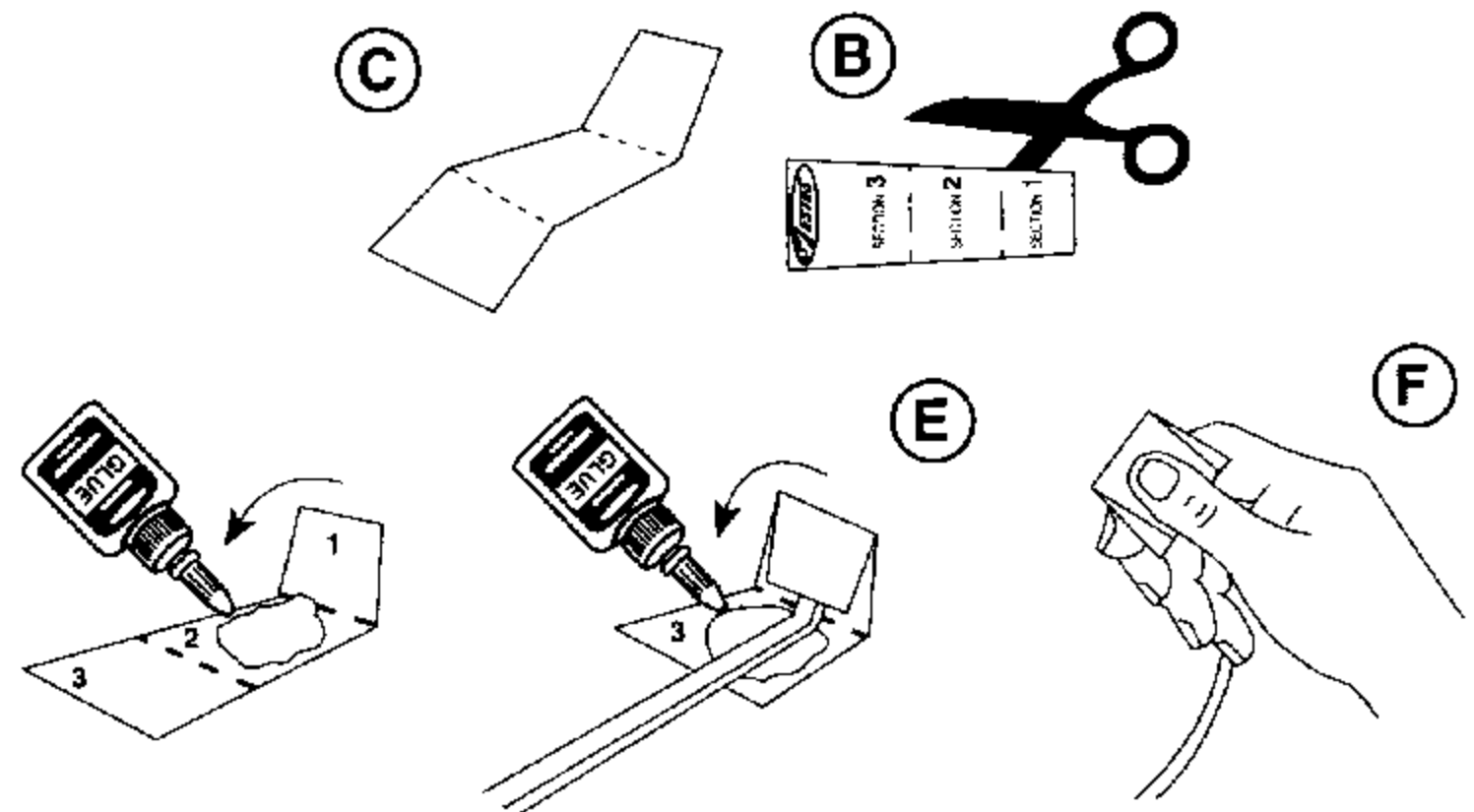
- A. Apply a thin film of glue to the root edge of one fin. Allow it to dry for a minute or two.
- B. Apply a second thicker film of glue to the root edge of the same fin.
- C. Set the rear edge of the fin even with the rear of the body tube and gently press the root edge along the body tube fin line.
- D. Carefully adjust the fin, if needed, so it will project straight up from body tube as shown. Work slowly and carefully so as not to disturb the glue joint. Attach remaining fins in same manner. Hold the fin upright. Do not set the rocket on its fins while glue is still wet.
- E. After all fins are attached, use shaded end view to check proper fin spacing.
- F. Important: Stand the rocket on the table as shown to allow the fins to dry completely.



6. SHOCK CORD MOUNT



- A. Locate the shock cord mount on the bottom of page 2 in patterns section
- B. Cut out the shock cord mount along the solid black outline.
- C. Crease on dotted lines by folding.
- D. Spread glue on section 2 and lay end of shock cord into glue at a slight diagonal as shown.
- E. Fold section forward. Apply glue to section 3. Fold forward again.
- F. Clamp firmly with your fingers for 2 minutes until glue sets.

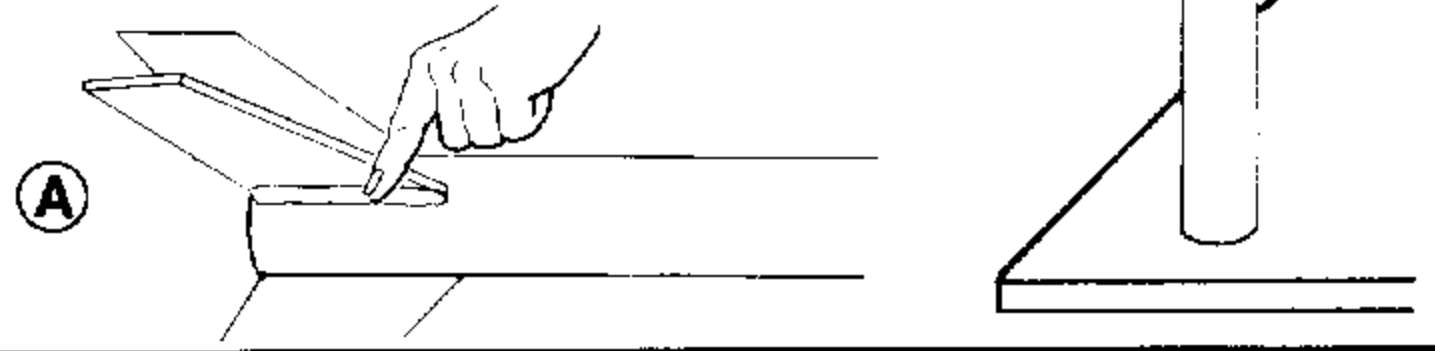


7. GLUE REINFORCEMENT DETAIL



- A. Reinforce each fin/body tube joint with glue and each side of launch lug as shown. Use your finger to help smooth the glue fillet.
- B. Stand rocket on table as shown. Wipe away any excess glue that may run down the side of the body tube. Allow to dry.

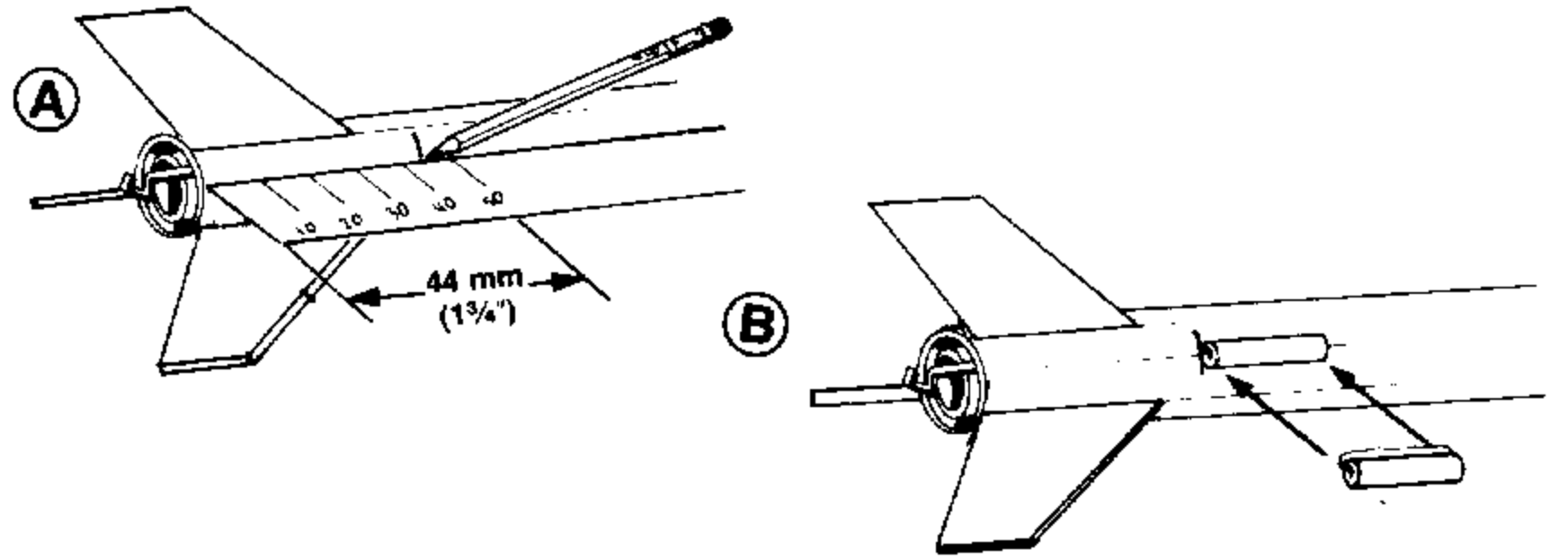
NOTE: Glue joint reinforcements of fillets are important because they help blend the fins, launch lugs or other components into the body tube. This blending improves the looks of your model, allows smoother air flow over your rocket during flight and strengthens the attachment points.



8. LAUNCH LUG ATTACHMENT



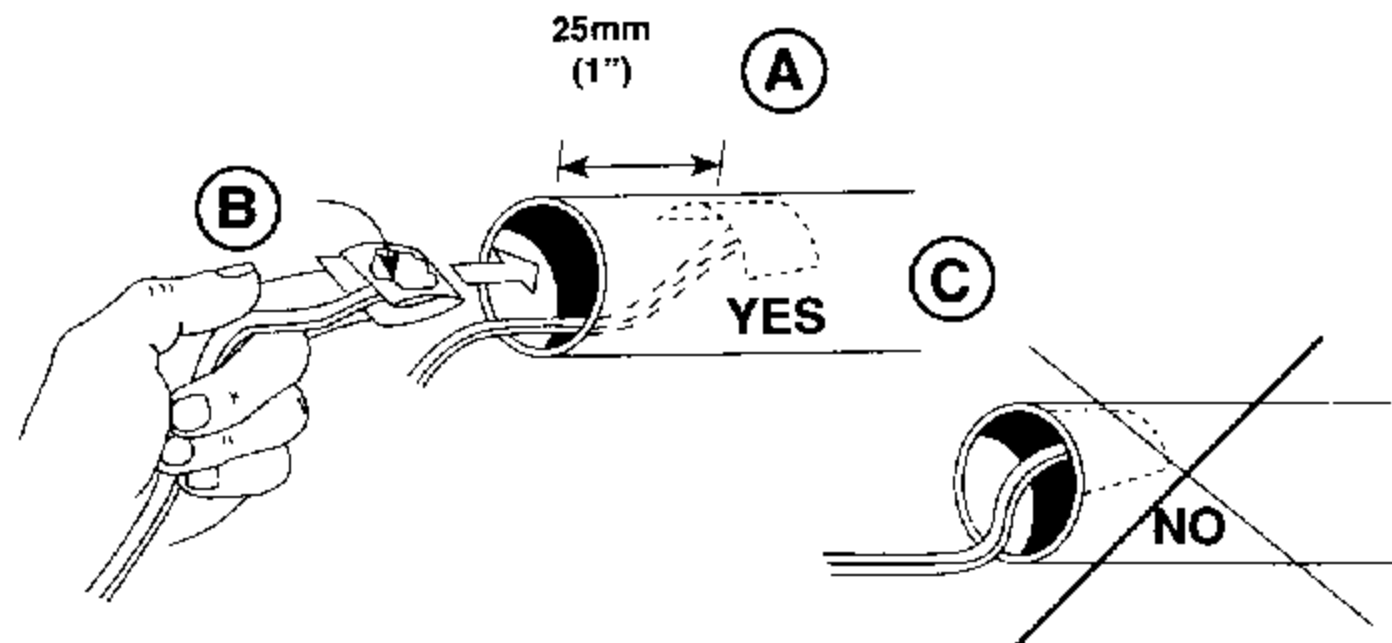
- A. Measure 45 mm (1 3/4") from rear of body tube and place a mark on the launch lug (LL) reference line. Use this mark as a starting point to attach the launch lug.
- B. Apply glue to the launch lug and attach it to the body tube.
- C. Make sure the launch lug is aligned with body tube as shown in the end view. Allow to dry.



9. SHOCK CORD MOUNT ATTACHMENT



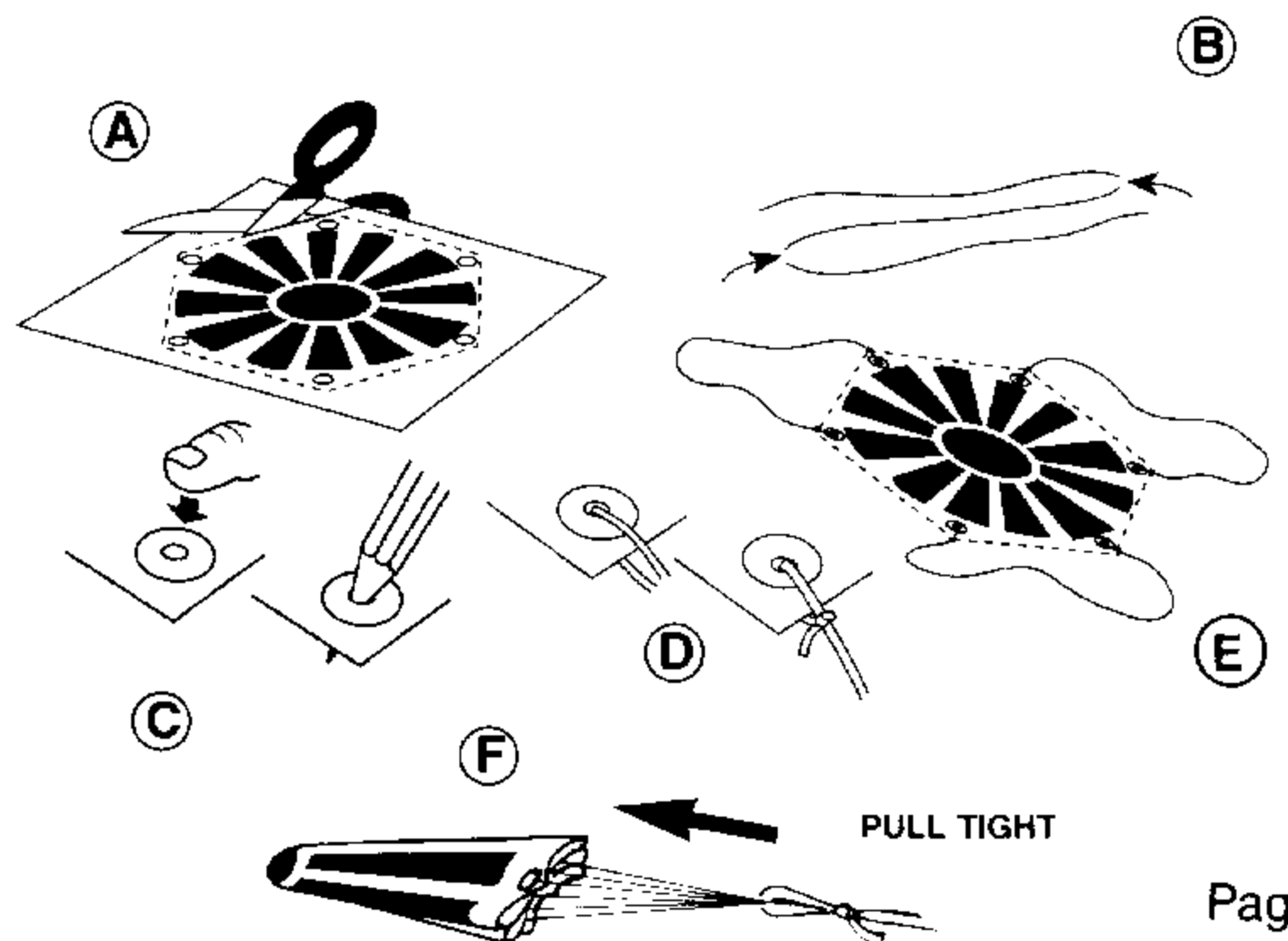
- A. Measure approximately 25 mm (1") from the front end of the body tube.
- B. Apply glue to shock cord mount and insert into tube.
- C. Set the mount back at least 25 mm (1") to allow for nose cone clearance and press mount firmly into glue as shown.
- D. Hold until glue sets.
- E. Tie a loop in end of shock cord.



10. PARACHUTE ASSEMBLY



- A. Cut out parachute on printed edge lines.
- B. Remove tape from shroud lines and cut into three equal lengths.
- C. Attach tape rings to the top corners of the parachute and press firmly into place. Punch holes through the parachute material with a sharp pencil point. (**Do Not** use a blunt object)
- D. Pass the shroud lines through the holes in the parachute tape rings. Tie the lines with double knots. Follow the pattern shown.
- E. Attach remaining lines to other corners to complete parachute.
- F. Gather shroud lines, form a loop. Pass through loop on shock cord. Pass parachute back through shroud line loop, pull taut.

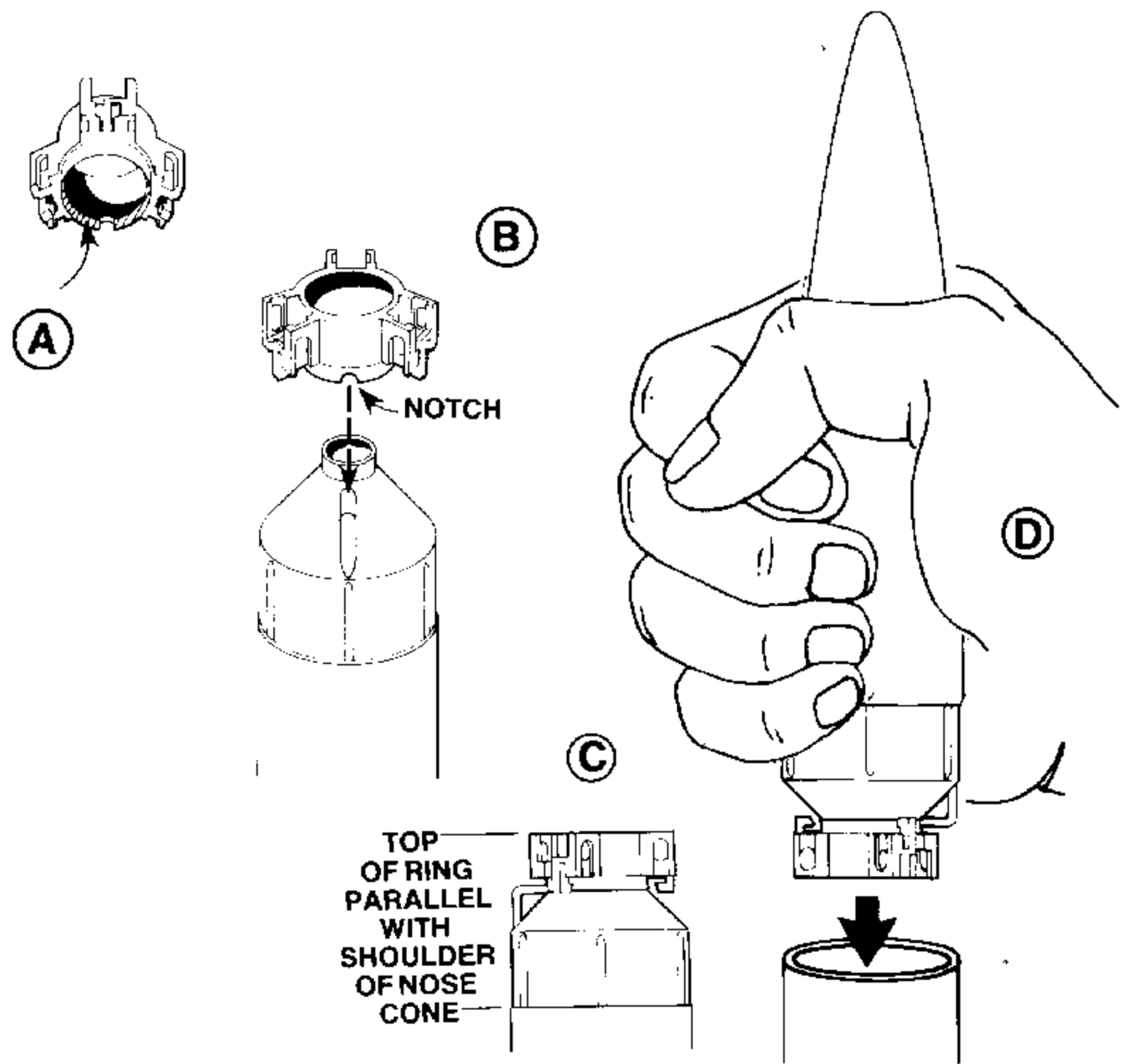


11. HELIO-COPTER HUB

ASSEMBLY

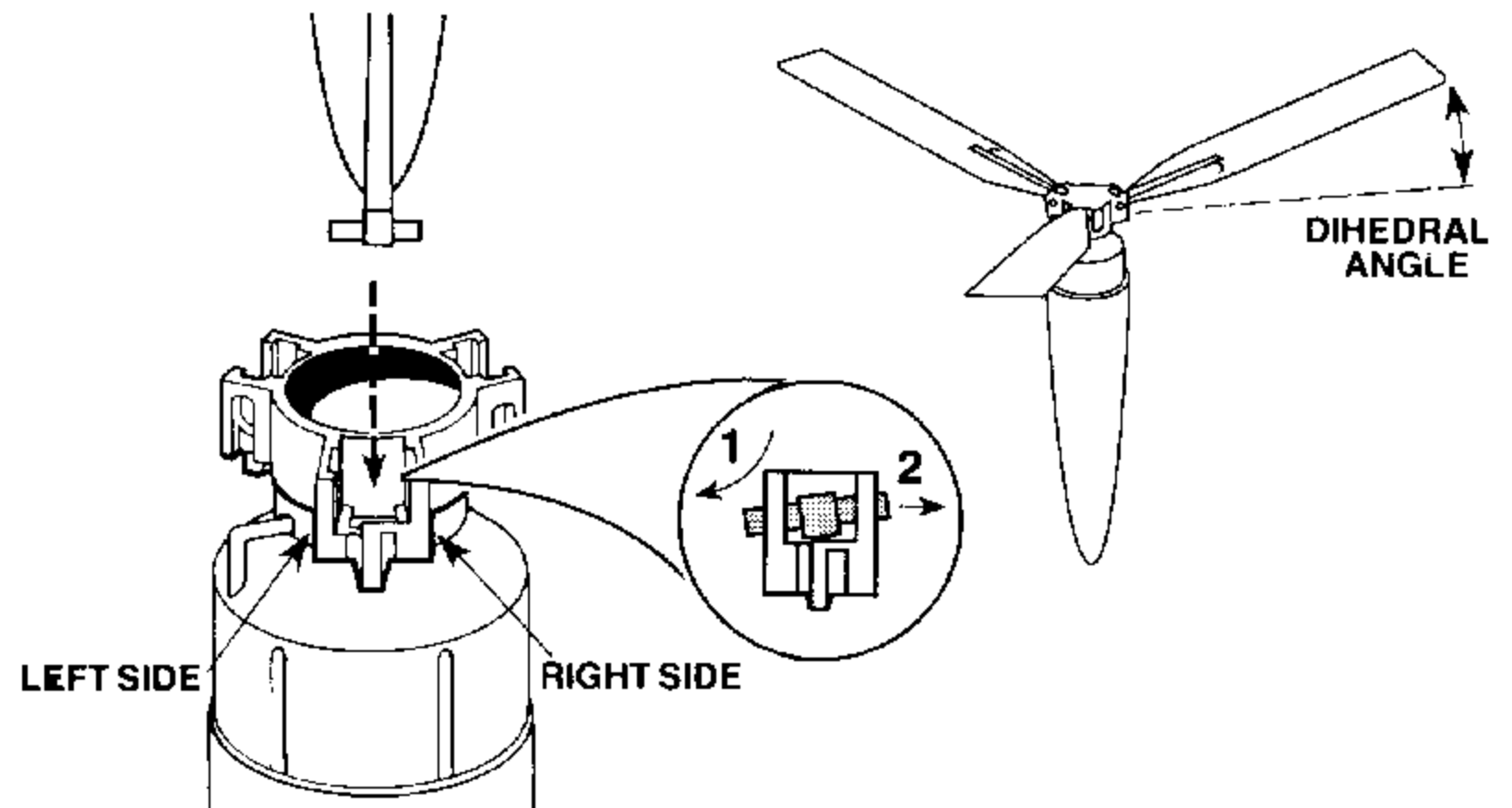


- A. Apply "tube type" plastic cement to beveled surface of bottom side of Helio-Copter ring. Notch in ring fits over loop on nose cone shoulder.
- B. Install ring on nose cone shoulder as shown. Seat firmly.
- C. Be sure ring is straight on nose cone shoulder before glue dries. The top of ring should be parallel with shoulder of nose cone. Make sure ring is even all the way around. Allow assembly to dry thoroughly before proceeding with Helio-Copter™ assembly.



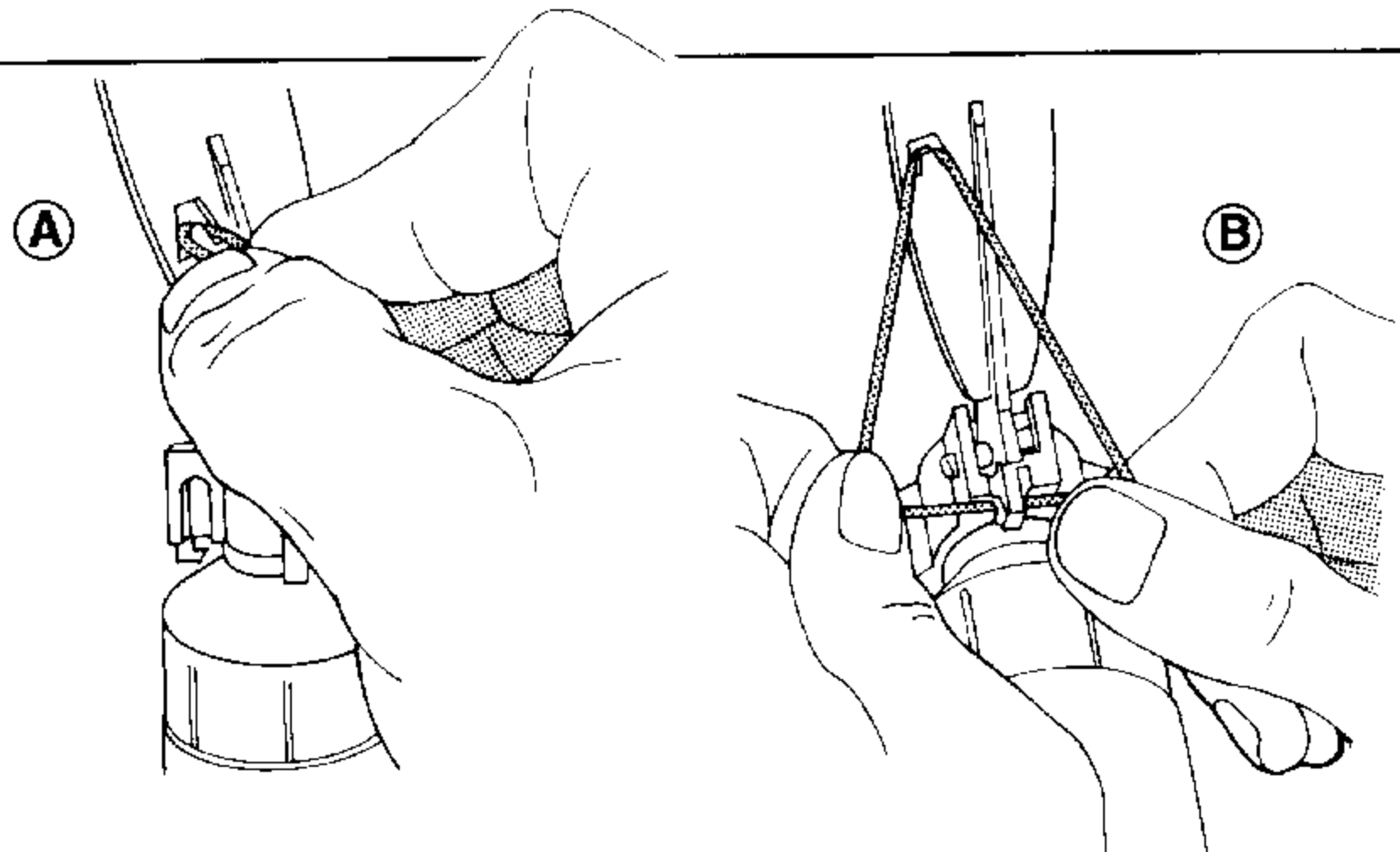
12. HELIO-COPTER BLADES

- A. Install Helio-Copter™ blades into ring by sliding the left side pin into the hole on the left "ear" of ring station. While gently pushing to the left, snap the right side pin down into its hole. Do not force the blade in. Be sure the "U" shaped rubber band slot is on the left side as shown. If the blade is upside down, it will not go into the ring station.
- B. Repeat this operation with the other two blades.
- C. Compare the completed assembly with illustration.



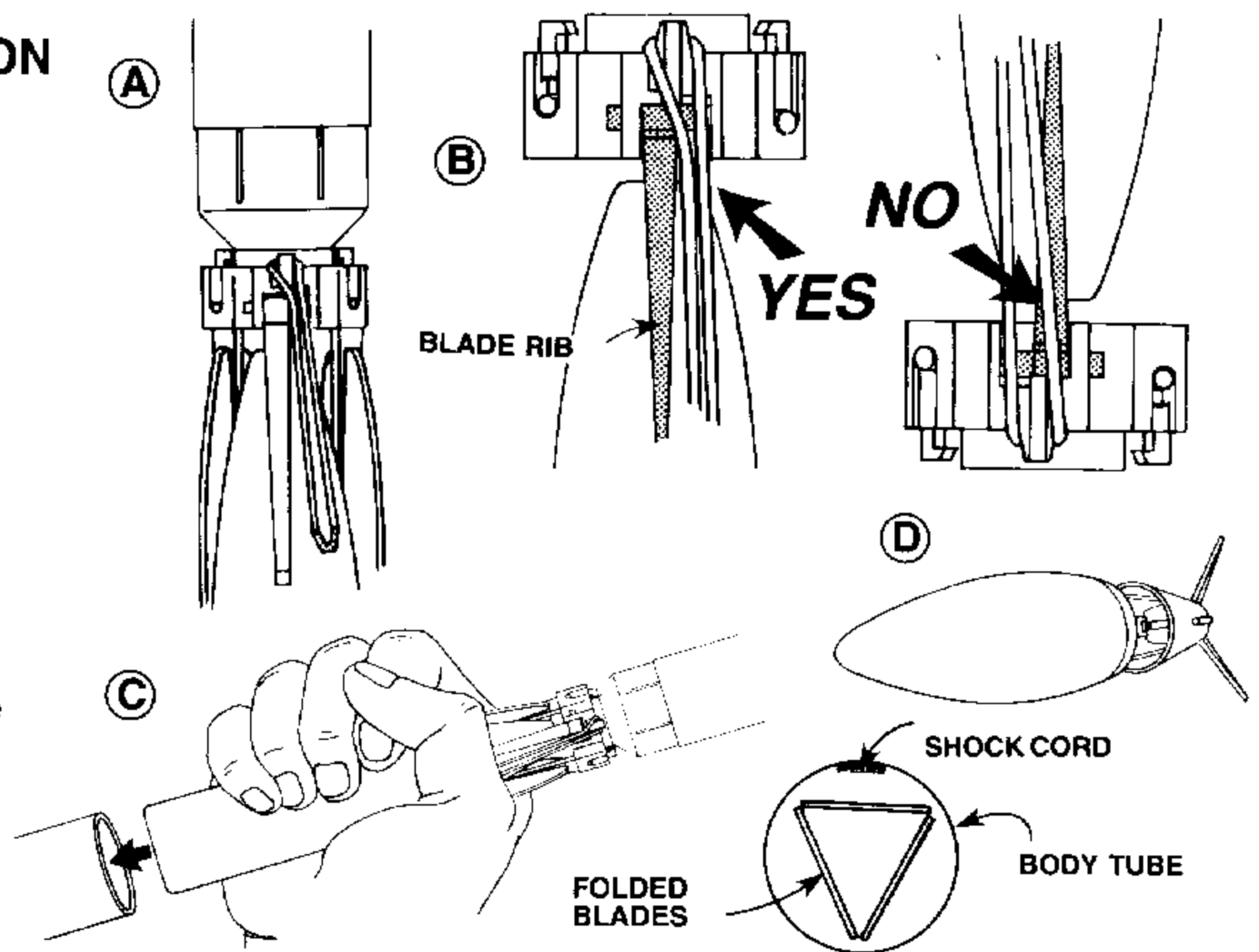
13. RUBBER BAND ATTACHMENT

- A. Take one rubber band in thumb and index finger and push it through "U" shaped slot in blade.
- B. Hold nose cone in left hand and grasp rubber band with both thumbs and index fingers. Pull down to form a triangular shape with rubber band as shown. Push under hook and release. Be careful not to point rubber band at your eyes while doing this.
- C. Repeat operation for other blades.



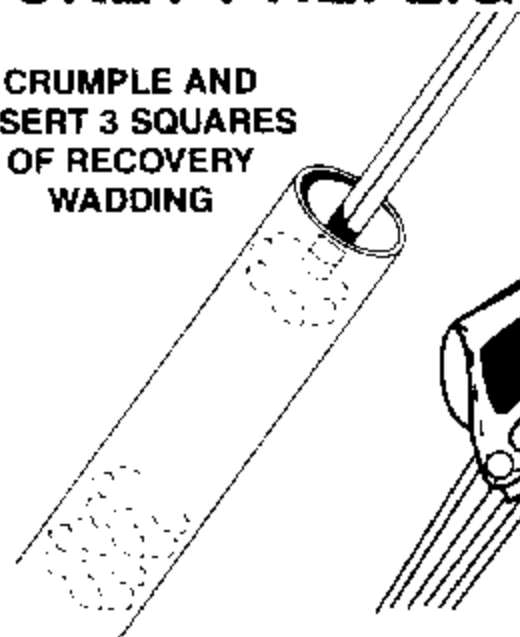
14. HELIO-COPTER PREPARATION

- A. Point tip of nose cone up and slide one hand down over blades and bring blades together into a triangular shaped bundle as shown.
- B. Be sure each rubber band rests to the side of the flat area of the "blade rib", not on top of it. If the rubber band is left on top of the "blade rib", it will interfere with the body tube wall, and may not deploy properly or at all.
- C. Slide folded Helio-Copter™ assembly into body tube about 25 mm (1").
- D. Look into end of body tube and locate shock attachment. Rotate Helio-Copter™ assembly until the center of one blade is aligned with the shock cord as shown in the illustration.
- D. Now, slide the Helio-Copter™ assembly all the way into the rocket body.

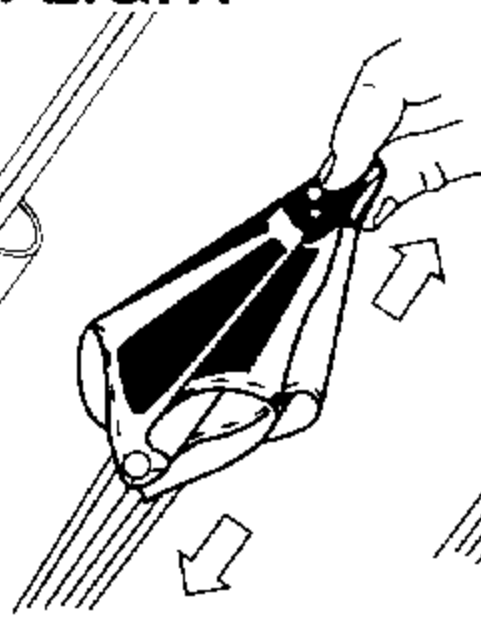


ROCKET PREFLIGHT

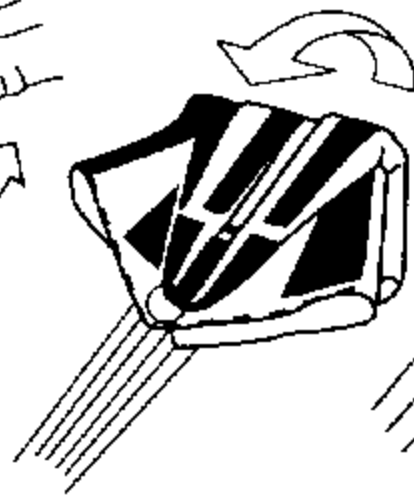
CRUMPLE AND INSERT 3 SQUARES OF RECOVERY WADDING



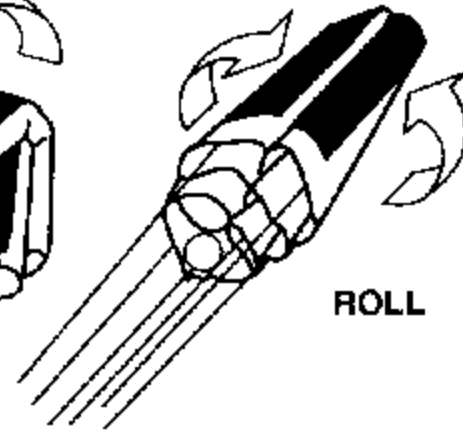
SPIKE



FOLD PARACHUTE

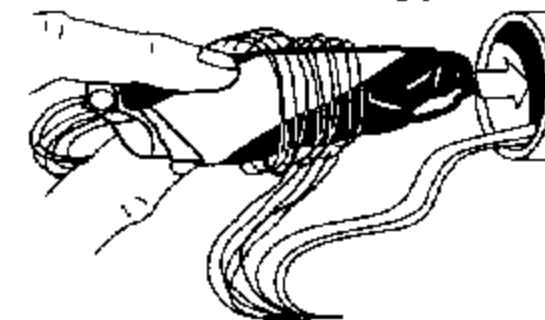


ROLL



WRAP SHROUD LINES AROUND PARACHUTE

INSERT PARACHUTE, SHOCK CORD

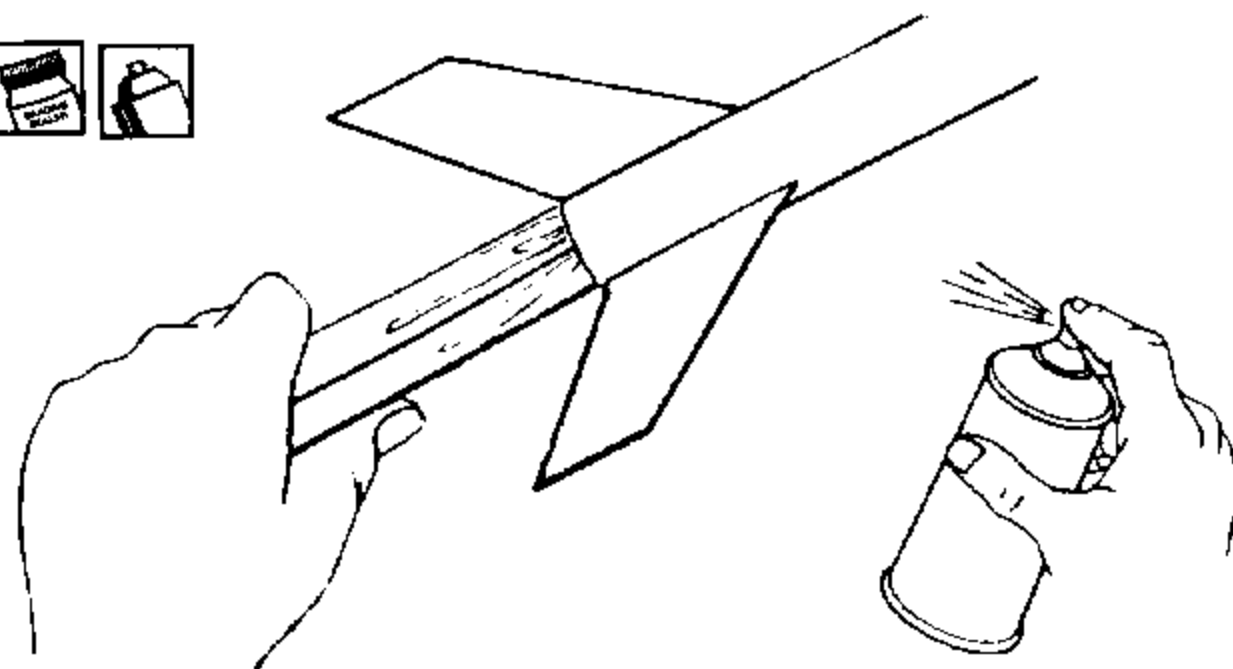


Recovery device should slide easily into body tube. If too tight, unfold and repack.

15. FINISHING YOUR ROCKET



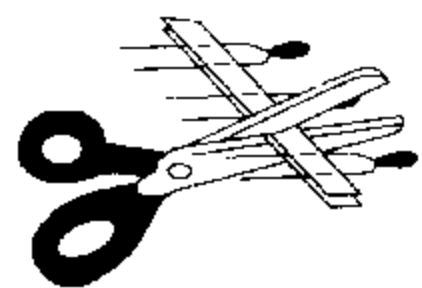
- A. Before you paint your rocket make sure all the glue joints are completely dry.
- B. Optional : For a smoother and better looking finish, spray a coat of automotive primer on your rocket. Do not apply too much, Lightly sand the rocket with a 400 to 600 grit sand paper. Apply another coat if needed. Sand between coats. The primer will allow the final coats of paint to adhere better to the rocket. Several light mist coats of paint are preferable. Too much paint will add to the rocket's weight.
- C. Refer to the illustration on the front of the color panel for paint locations and decal placements.
- Use spray enamel to paint your model rocket . Make a handle by rolling a piece of paper. Insert it into the rocket while painting. Allow paint to dry.



NOTE: Be careful when handling and cutting the self-adhesive decals supplied in this set. Do not crease the decal sheet. Decals will take a set to any crease. Cut out each decal with a sharp pair of scissors or a hobby knife. Make smooth cuts. Do not nick as this can cause the decal to tear when it is peeled off the backing sheet. Cutting decals out along edges as blocks of decal will make application of decals much easier. To apply large decals, it is advisable to peel backing paper off decal slightly. Cut away a slice of backing paper to expose only enough decal adhesive to align decal. Once decal is aligned peel backing off and smooth down decal removing any air as it is adhered to rocket.

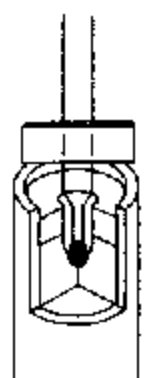
PREPARE ENGINE

NOTE: Igniter plugs come with rocket engines. If your engines did not come with plugs, follow the instructions that came with the engines.

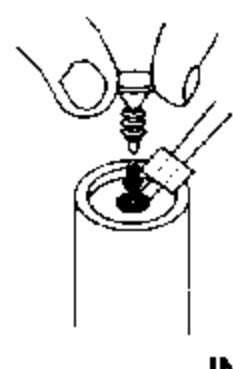


SEPARATE IGNITER AND IGNITER PLUG

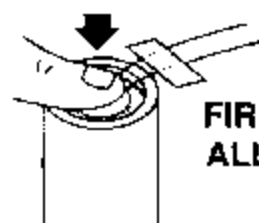
HOLD ENGINE UPRIGHT, DROP IN IGNITER



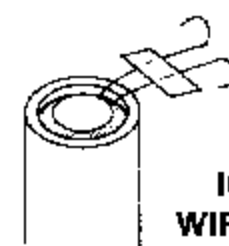
IGNITER MUST TOUCH PROPELLANT



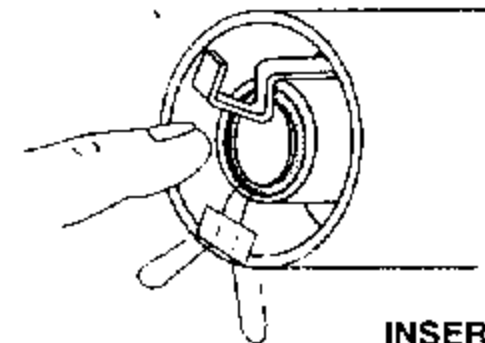
INSERT IGNITER PLUG



FIRMLY PUSH ALL THE WAY IN



BEND IGNITER WIRES BACK



INSERT ENGINE INTO ROCKET

LAUNCH SUPPLIES

To launch your rocket, you will need the following items:

- Estes Electrical Launch Controller and Launch Pad
- Estes Recovery Wadding EST 2274
- Recommended Estes Engines: C6-3 (First Flight) C6-5

To become familiar with your rocket's flight pattern, use a C6-3 engine for your first flight.

Use only Estes products to launch this rocket.

FLYING YOUR ROCKET

Choose a large field away from power lines, tall trees, and low flying aircraft. Try to find a field at least 76 meters (250 feet) square. The larger the launch area, the better your chance of recovering your rocket. Football fields and playgrounds are great.

Launch area must be free of dry weeds and brown grass.

Launch only during calm weather with little or no wind and good visibility.

If you use the E2™ or Command Control™ Launch Controllers to fly your models, use the following launch steps:

- After attaching micro-clips, etc., insert safety key into the controller receptacle. If the igniter clips have been attached properly to the igniter, the red L.E.D. will now begin to flash on and off and the audio continuity indicator will beep on and off.
- Hold the yellow (left) arm button down. The L.E.D. will stop flashing and the audio indicator will produce a steady tone.
- Verbally count down from five to zero loud enough for the bystanders to hear. Still holding the yellow arm button down, push and hold the orange (right) button down until the rocket ignites and lifts off.

FOR YOUR SAFETY AND ENJOYMENT

Always follow the National Association of Rocketry (NAR) MODEL ROCKETRY SAFETY CODE while participating in any model rocketry activities.

LAUNCH ROD

LAUNCH LUG

BLAST DEFLECTOR

MICRO-CLIPS

SAFETY KEY MUST NOT BE IN LAUNCH CONTROLLER WHEN ATTACHING MICRO-CLIPS TO ENGINE IGNITERS

MICRO-CLIPS MUST NOT TOUCH BLAST DEFLECTOR OR EACH OTHER

COUNTDOWN AND LAUNCH

- BE CERTAIN SAFETY KEY IS NOT IN LAUNCH CONTROLLER.
- Remove safety cap and slide launch lug over launch rod to place rocket on launch pad. Make sure the rocket slides freely on the launch rod. Make sure micro-clips are clean for a good electrical contact.
- Attach micro-clips to the igniter wires. Arrange the clips so they do not touch each other or the metal blast deflector. Attach clips as close to protective tape on igniter as possible.
- Move back from your rocket as far as launch wire will permit (at least five meters - 15 feet).
- INSERT SAFETY KEY to arm the launch controller.

Give the audible countdown 5...4...3...2...1

LAUNCH!!

PUSH AND HOLD LAUNCH BUTTON UNTIL ENGINE IGNITES

REMOVE SAFETY KEY FROM LAUNCH CONTROLLER. KEEP SAFETY KEY WITH YOU OR REPLACE SAFETY KEY AND SAFETY CAP ON LAUNCH ROD.

MISFIRES

If the igniter functions properly but the propellant does not ignite, keep in mind the following: An Estes igniter will function properly even if the coated tip is chipped. However, if the coated tip is not in direct contact with the engine propellant, it will only heat and not ignite the engine.

When an ignition failure occurs, remove the safety key from the launch control system and wait one minute before approaching the rocket. Remove the expended igniter from the engine and install a new one. Be certain the coated tip is in direct contact with the engine propellant, then reinstall the igniter plug as illustrated above. Repeat the countdown and launch procedure.