

# ASTRON

# RANGER

## Assembly Instructions

Your Astron Ranger rocket kit consists of the following parts as illustrated in the drawing at right:

- A) 1 Body Tube (11" long) #BT-60D
- B) 1 Payload Tube (7" long) #BT-60K
- C) 1 Balsa Nose Cone #BNC-60L
- D) 1 Nose Block #NB-60
- E) 3 Engine Holder Tubes (2-3/4" long) #BT-20J
- F) 2 Balsa Fin Stock #BFS-30
- G) Shroud Line Cord #SLT-7
- H) 3 Engine Blocks #EB-20A
- I) 1 Screw Eye #SE-1
- J) 1 Launching Lug #LL-1C
- K) 2 Parachutes #PK-18A
- L) 12 Tape Strips #TD-2
- M) 1 Shock Cord #SC-2
- N) 1 Fin Pattern #SP-6
- O) 1 Technical Report #TR-6

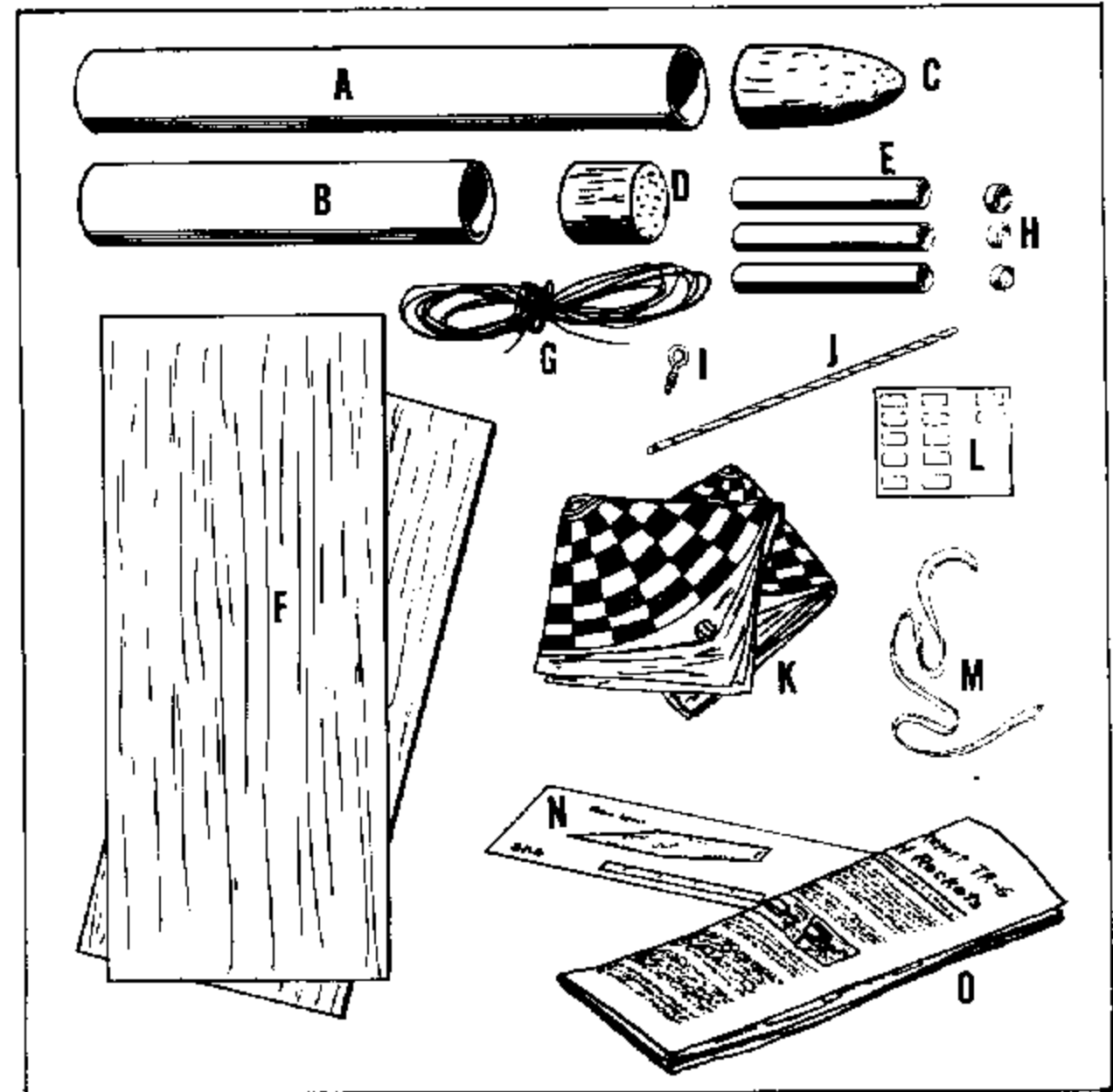
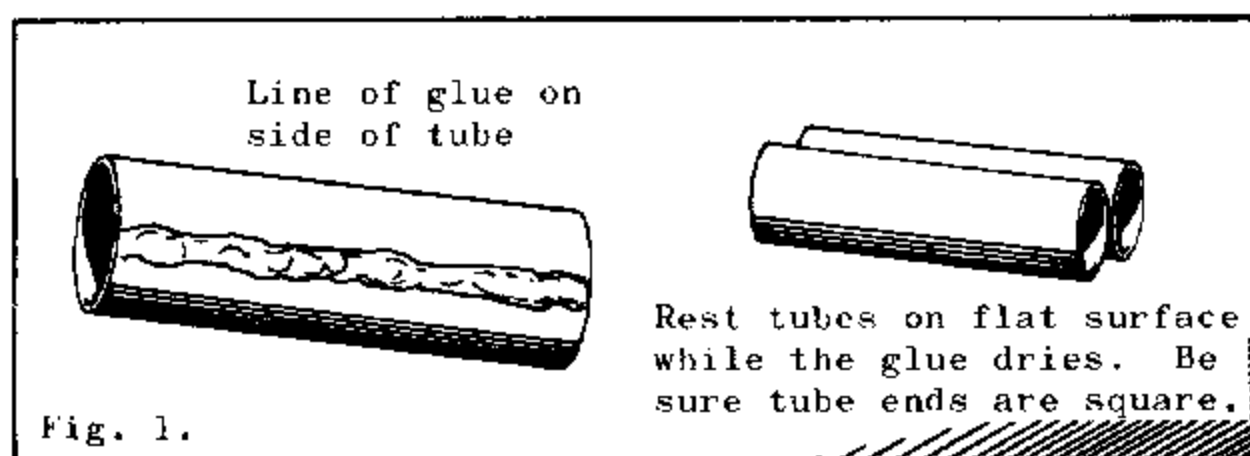
In addition to the materials included with your kit you will need the following tools and supplies:

1. Modeling knife or single edge razor blade
2. Scissors
3. Extra strong white glue
4. A sharp, pointed punch
5. Ball point pen or pencil
6. Fine and extra fine grit sandpaper
7. Paint or dope
8. Facial tissue or similar paper

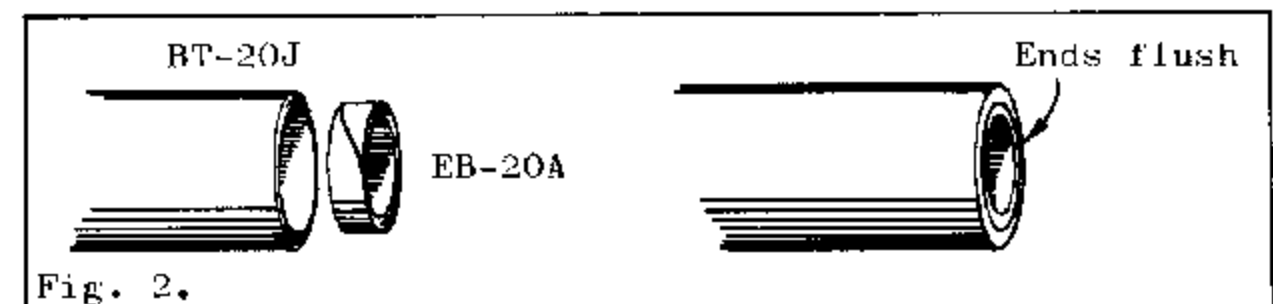
Check to be sure your kit is complete. Then read the entire instructions before beginning to assemble your rocket.

## CONSTRUCTION

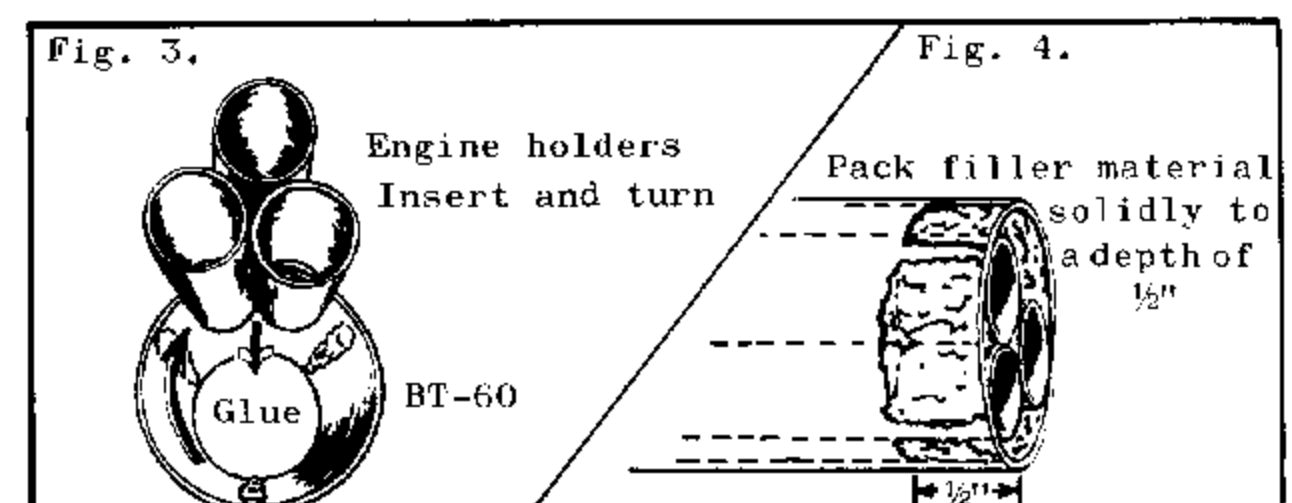
(1) Glue the three engine holder tubes together. To do this, run a strip of glue down one side of one of the tubes. Place another tube against it so that the sides and ends of the tubes are matched and the tubes run perfectly parallel to each other. Glue the third tube to the first two in the same way. See fig. 1.



(2) Glue the engine blocks into the engine holder tubes. This is done by applying glue to 1/4" of the inside of the length of a tube at one end and slipping the engine block into place so the rear end of the block is even with the rear end of the tube. All three blocks must be glued in their tubes securely, and at the same end of the engine holder assembly. See fig. 2.



(3) Apply glue liberally to the inside of one end of the main body tube. The glue may be in three strips spaced equally around the inside of the tube and pointing forward. Insert the engine holder assembly, the end of the assembly containing the engine blocks first, into the end of the body. Insert it until the entire assembly is inside the body, the end of the engine holders even with the end of the body. Turn the engine holders until each of the small tubes makes a good contact with the glue. See fig. 3.



(4) Moisten small wads of facial tissue with glue and pack them into the gap areas between the engine holder tube and the body tube and into the hole between the holder tubes in the middle. This packing should fill the rear 1/2 inch of the gap area. Work the wadding into place to completely fill and seal all gaps. When this step is completed, the only route by which air may pass through the body tube should be through the engine holder tubes. This is to prevent leakage of the ejection charge gases, keeping them from leaking rearward through unsealed holes. If there is any leakage, the recovery system will not work, and the rocket will be damaged on landing. See fig. 4.

(5) Cut out the fin pattern. Lay it on a sheet of balsa and align it so that the grain of the wood is exactly in line with the grain shown on the pattern. Trace around the pattern, then reposition it on the sheet and trace again. If the pattern is positioned as shown in fig. 5, it will be possible to cut two fins from each sheet of balsa. Trace out the other two fins on the other sheet of balsa. Cut out the fins using a sharp razor blade or modeling knife.

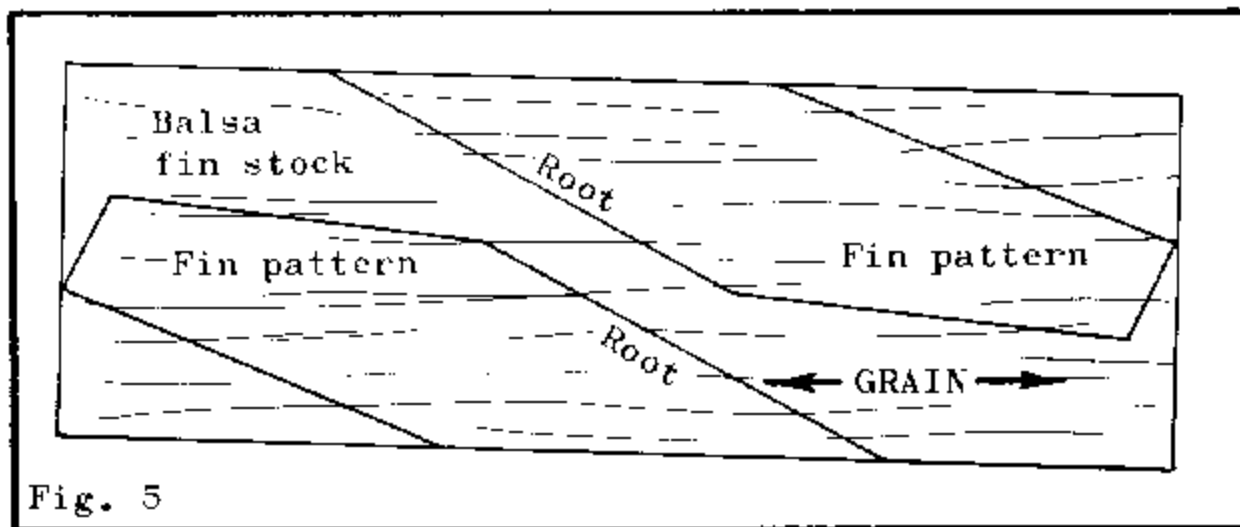


Fig. 5

(6) Using fine grit sandpaper round all edges of the fins except the edge which attaches to the body tube. Sand this root edge until it is perfectly flat and even. Sand the sides of the fins until smooth.

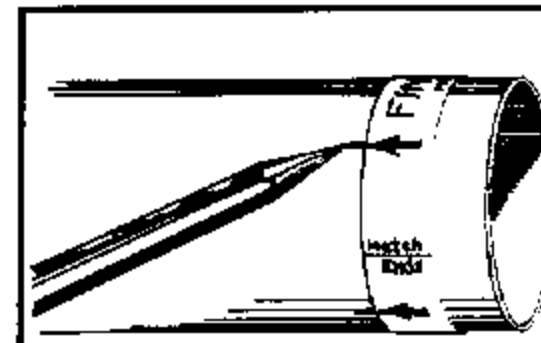
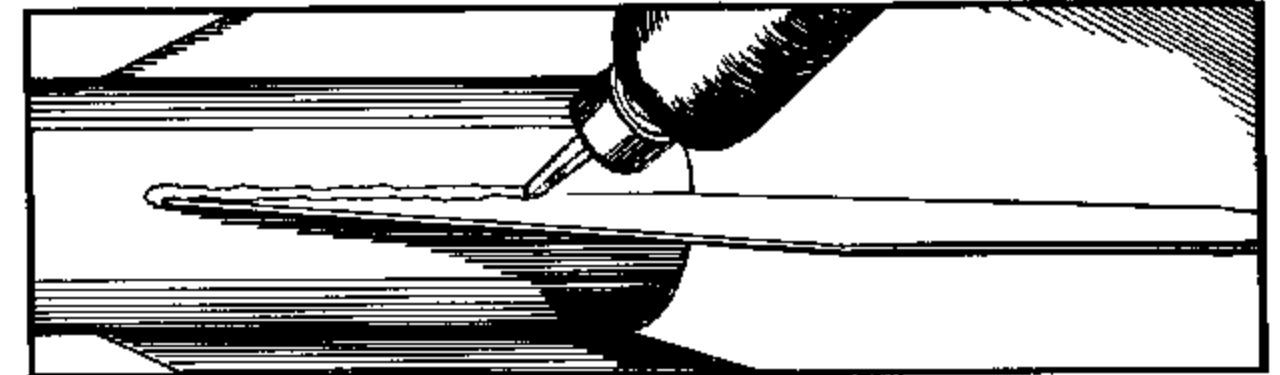


Fig. 6

Cut fin-spacing guide from the pattern sheet and wrap around BT-60 matching the ends. Mark the tubing at the guide arrows as you see here.

(7) Cut out the fin spacing guide on the dotted lines. Wrap it around the rear of the body tube with the printing on the guide on the outside. Mark the body at the points indicated by the arrows. If this is done correctly, there will be four marks spaced equally around the outside of the tube. See fig. 6.



(8) Apply glue to the flat edge of one fin and press this edge against the body directly over one of the marks from step 7. Align the fin by sighting along the body so it is perfectly straight and sticks straight out from the body. Hold the fin in position until the glue starts to set, then repeat with the other fins. Do not set the rocket on its fins until the glue has dried.

(9) Apply a glue fillet to each corner between fin and body as shown in fig. 7. Set the rocket on its side during this operation, but not on its fins. Use only a small amount of glue. Leave the rocket on its side while it dries so the glue will not run to one end.

(10) Apply a line of glue to one side of the launching lug and press the lug against the body between two fins. Align the lug so it points straight forward and is in line with the body.

## RECOVERING YOUR ASTRON RANGER

(11) There are two methods for attaching the recovery system on your Astron Ranger. The one, described in section (a) below, lowers the main body of the rocket nose first, reducing the possibility of fin damage on

landing. The other, described in (b), lowers the main body tail first, but gives a somewhat cleaner and less cluttered outside appearance to the rocket. Follow either (a) or (b), but follow only one of the steps.

(a) Punch a small hole in one fin 1-1/2" ahead of the rear of the body. The hole should be as close to the body wall as possible. Cut a 14" length of shroud line cord and tie a large knot in one end of the cord. Insert the other end of the cord through the hole, and pull through until the knot is against the fin. Apply glue to both sides of the hole to anchor the cord securely in place. See fig. 8A. Tie the other end of the cord to an end of the shock cord.

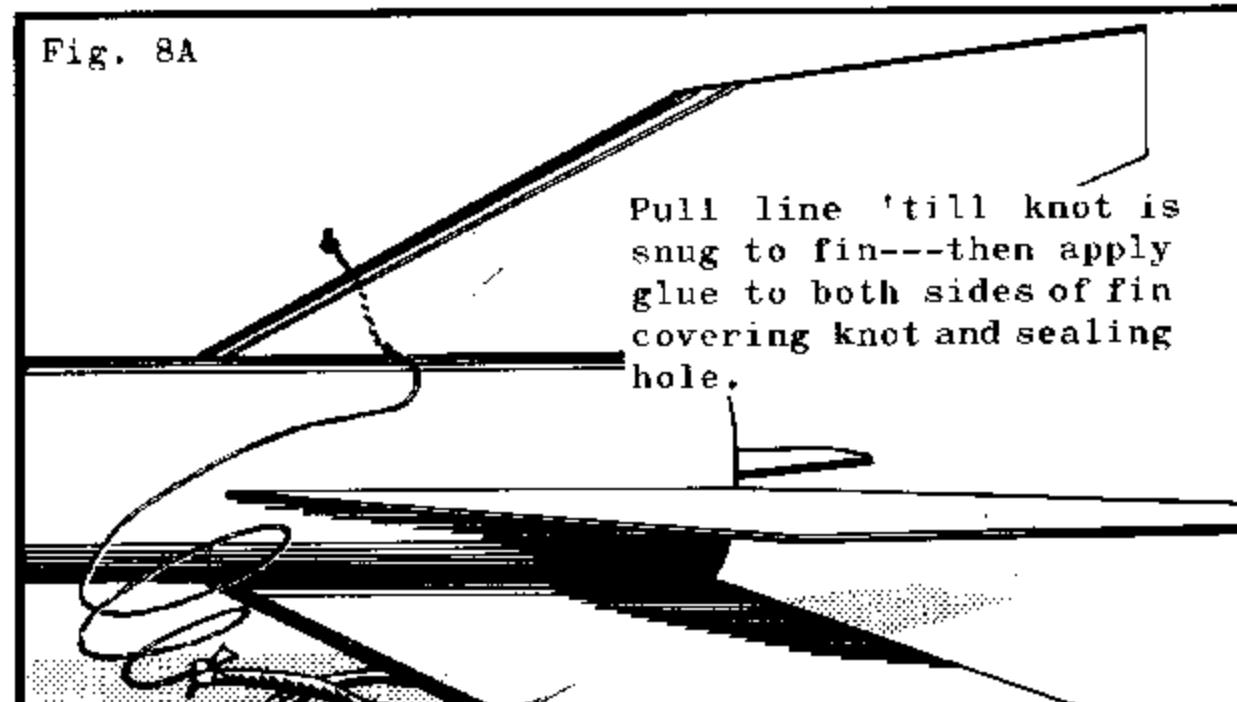


Fig. 8A

Pull line 'till knot is snug to fin---then apply glue to both sides of fin covering knot and sealing hole.

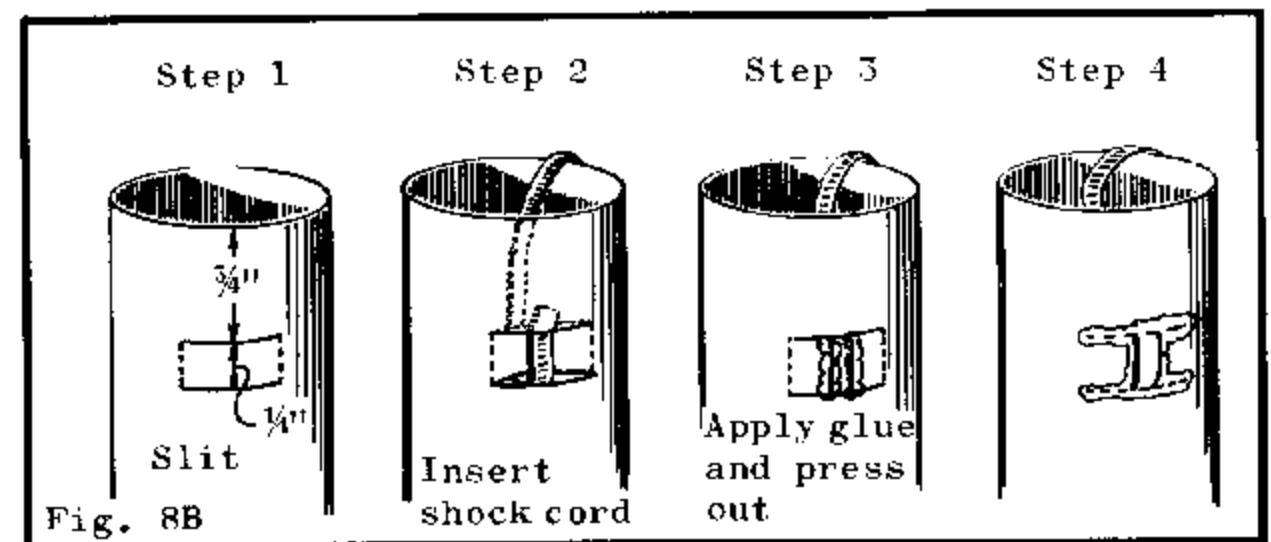


Fig. 8B

the opening as shown. Apply glue under and over the shock cord and along the cut edges of the body tube. Next, reach inside and push the caved-in portion outward as near to its original position as possible. When the glue dries the shock cord will be securely fastened.

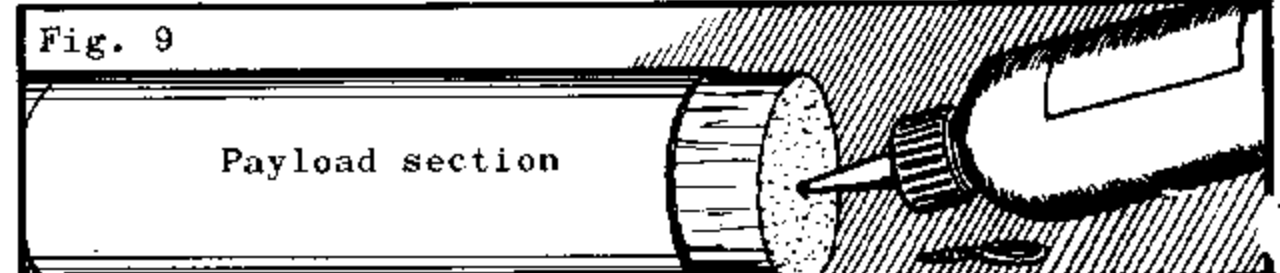


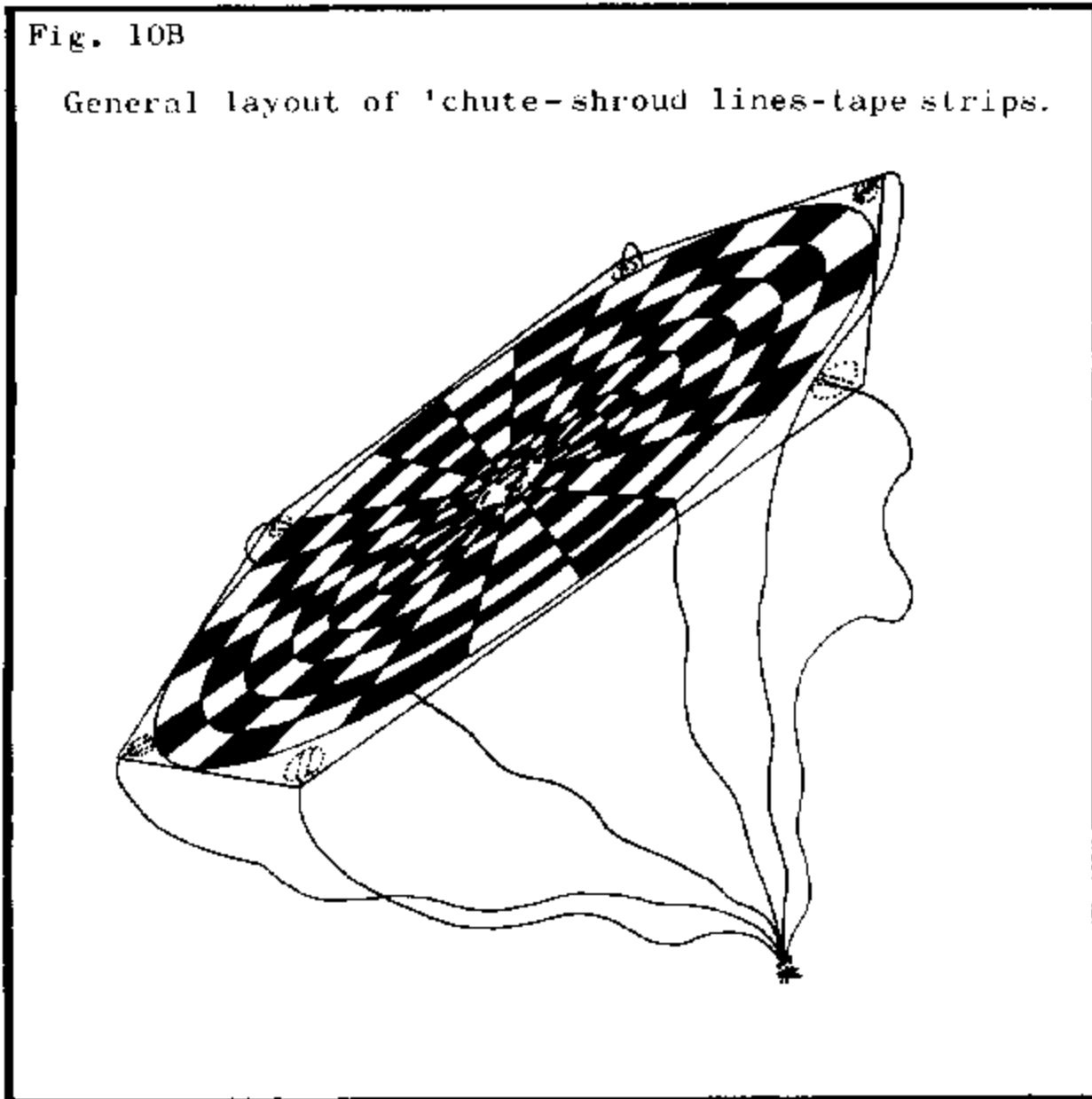
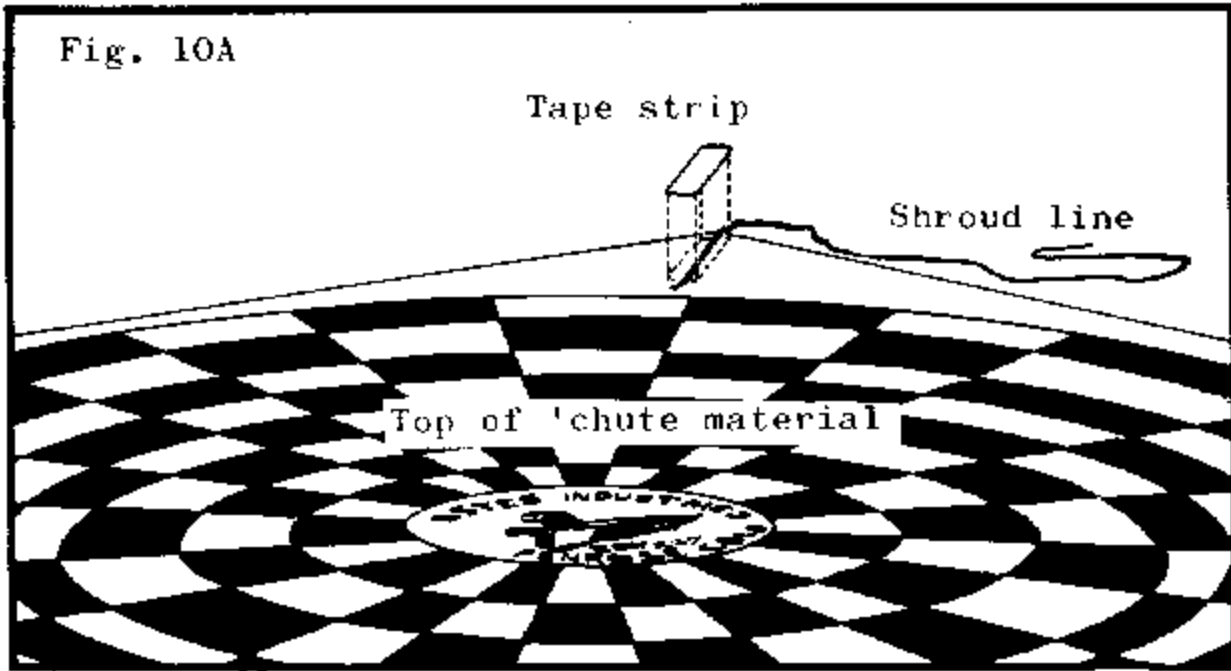
Fig. 9

(12) Glue the nose block into one end of the payload section tube so that 1" of the length of the block projects from the end of the tube. Twist the screw eye into the center of the nose block. Remove the screw eye, squirt glue into the hole and re-insert the screw eye. When the glue dries it will be tightly anchored.

(b) Cut two 1/2" long slits in the forward end of the body, the one directly behind the other, 3/4" and 1" from the front of the body. Cave in the portion between the two cuts and slide one end of the shock cord through

glue into the hole, and re-insert the screw eye. When the glue dries it will be tightly anchored. Glue the 4" long payload tube to the other end of the adapter.

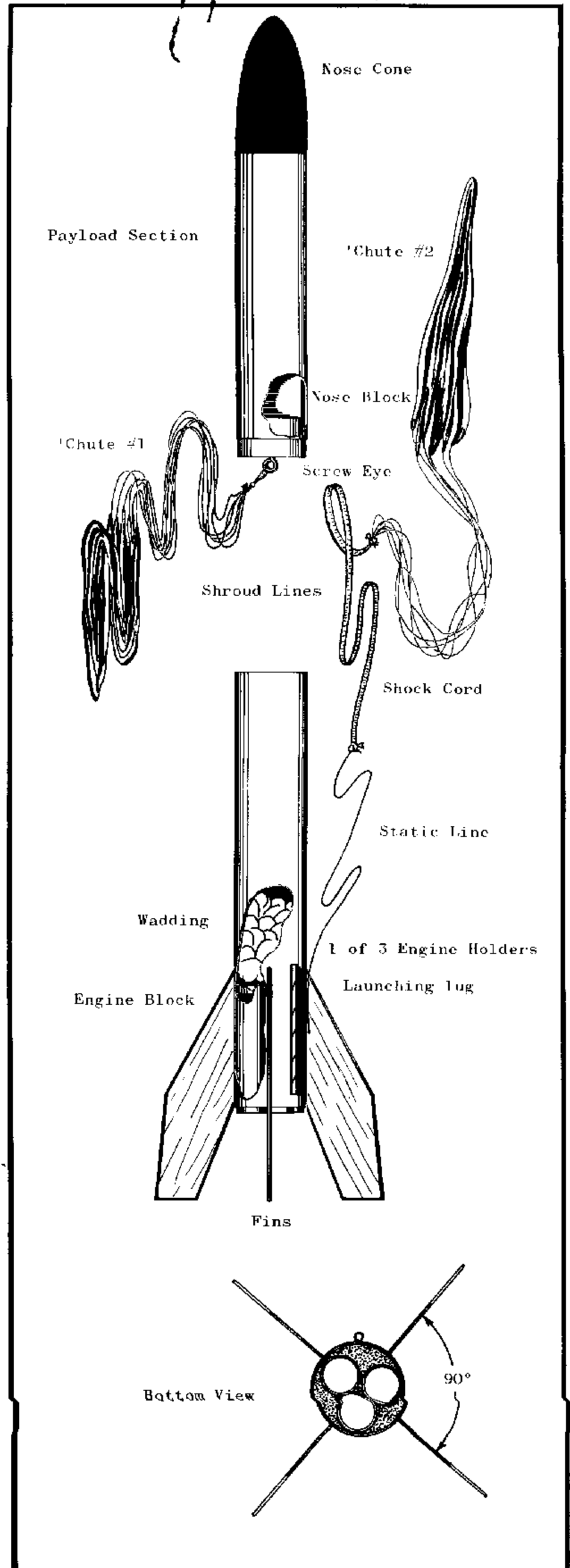
(13) Cut out the two parachutes on the outside lines. Cut twelve 18" lengths of shroud line cord and attach one shroud line to each point indicated on the 'chute with a tape strip as shown. Tie the free ends of the shroud lines on each 'chute together.



(14) Tie the shroud lines on one parachute to the screw eye in the payload section. Tie the other parachute to the free end of the shock cord.

(15) Stick the base of the nose cone into the open end of the payload section. The nose cone should make a tight fit in the tube. If it is loose, wrap tape around the base of the cone until it does make a tight fit. Stuff the parachute into the body tube, pack the shroud lines and shock cord in over it and slide the payload section into position in the end of the tube. The payload section should fit loosely, but not so loosely that it falls out when the rocket is held upside down. If it is too loose, wrap tape around the nose block. If the block is too tight sand it to obtain a better fit.

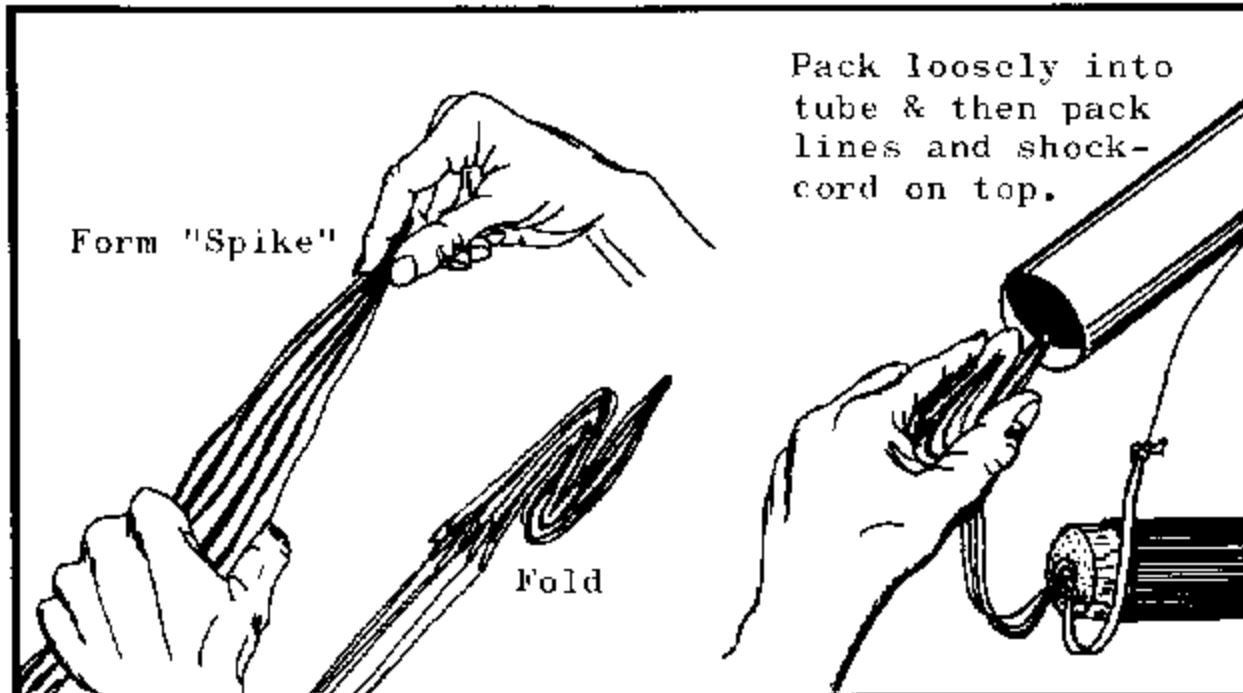
(16) Sand all balsa surfaces with extra fine sandpaper. Apply a coat of sanding sealer or white enamel paint to the balsa, and sand again. Repeat until all surfaces look smooth and are smooth to the touch. Give the rocket at least one clean base coat of glossy white paint or dope, then give it a bright final coat of red, fluorescent orange, or cerise to make it more visible in flight.



# Flying the Astron Ranger

1) Read Estes Industries Technical Report TR-6 completely before preparing your Astron Ranger for its first flight. The procedures outlined in the report will be used in flying the Astron Ranger.

2) Pack flameproof recovery wadding into the propulsion section from the top. The wadding should rest against the engine holder tubes, extend forward in the tube for about 2" to 2-1/2" and seal tightly against the sides of the tube. Hold the parachute for the lower section between two fingers at its center and pass the other hand down it to form it into a "spike" shape. Fold this spike in three sections as shown. Push the folded parachute down into the tube on top of the wadding and pack the shroud lines and shock cord in on top of the parachute. Repeat with the payload parachute and then slide the payload section into place.



3) Before inserting the rocket engines, tamp kleenex or cotton into the ejection end of each so it will be impossible for the ejection charge of one engine to ignite the rear end of an engine that did not ignite at launching. Then wrap the engines with tape to make a tight fit in the rocket body. This fit must be tight so the engines will not blow out when their ejection charges are activated. Install igniters as directed in TR-6.

4) Launch the Astron Ranger using an approved, electrically operated model rocket launching system. Consult our catalog or the store where you purchased your rocket for further details. If a two-piece rod is used, solder the rods together. They may be unsoldered later if you wish to use the rod only for lighter rockets.

5) Use caution when flying rockets. Do not launch in high winds, near flying aircraft, or around persons not participating in or watching the rocket launching. Always follow an approved model rocket safety code. Inspect the rocket carefully after each flight to make sure it has not been damaged and is in satisfactory condition for the next flight. Extra care is required since cluster rockets are not always as reliable as single engine models.

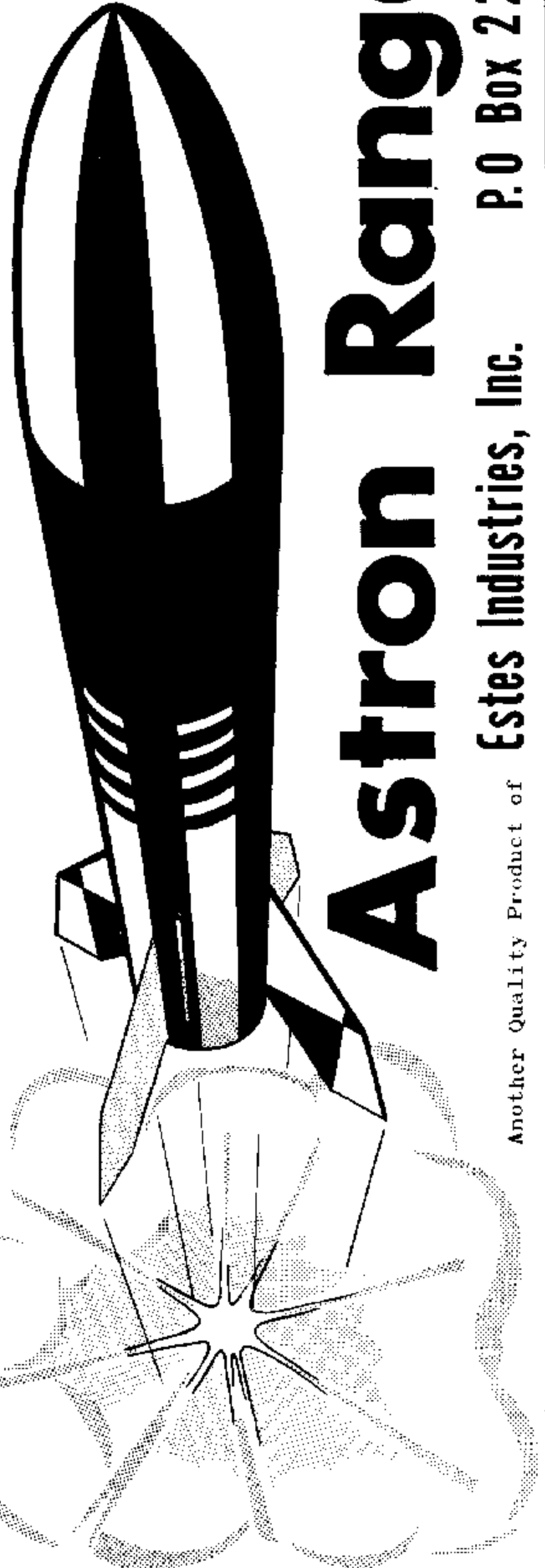
6) The engine types recommended for use in the Astron Ranger are the A.8-3, B.8-4, and B 3-5. Which type you use will depend both on how high you wish the rocket to fly and on the ignition system you are going to use. A.8-3 engines are recommended for first flights using either the Jetex or direct electrical systems. Maximum recommended payload weight for the Astron Ranger is 1 oz. with type A engines, 3-1/2 oz. with type B engines.

**KIT NO. K-6**

**\$3.75**

**Packs KING-SIZED Payloads**

**Separate  
Recovery of  
Payload & Power  
Section**



**Astron Ranger**

Another Quality Product of

**Estes Industries, Inc.**

**P.O. Box 227**

**Penrose, Colorado**