



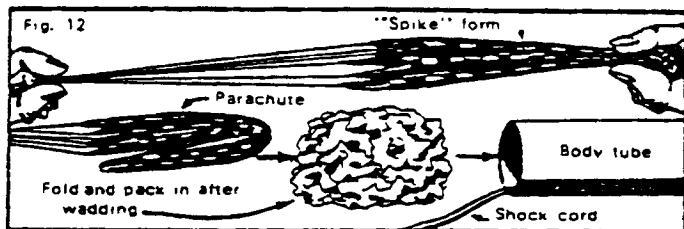
COUNTDOWN CHECKLIST

15. Cut one square of flame-resistant wadding into 2" square pieces. Wad up one piece and insert it into the FORWARD end of one of the engines above the end cap. Repeat this with the other two engines.

14. Install an electrical igniter in each engine as directed in the instructions which came with the engines.

13. Insert the engines into the engine mount tubes, taping the engines for a tight fit. Use a pair of tweezers or small nosed pliers to twist the igniter leads together as shown in fig. 19.

12. Loosely crumple 8 or 9 squares of flameproof wadding. Pack the wadding into the body tube from the top. The wadding should fill the tube for a distance of about 2-1/2 inches and seal tightly along the sides of the tube. Hold the booster section parachute between two fingers at its center and pass the other hand down it to form a "spike" shape. Pack the shock cord and parachute into the tube, then fold the payload section parachute and pack it in on top. Slide the payload section into place.



11. Load the payload into the payload section. When a heavier payload is being flown, a layer of masking tape should be wrapped around the nose cone-tube joint to prevent the payload from coming loose at ejection. When a small, heavy payload is installed, the extra space inside the tube should be filled with foam padding or wadding to keep it from bouncing around.

10. Remove the safety interlock or key from the launch control panel. (If a simple spring switch is used, install the protector around the spring.) Carry the key or interlock on the person of the launch control officer.

9. Place the rocket on the launcher. Check to be sure the panel is disarmed. Clean the micro-clips very carefully and attach them to the igniters as in fig. 11.

8. Clear the launch area, alert the recovery crew and trackers.

7. Check for low flying aircraft and unauthorized persons in the recovery area.

6. Arm the launch panel.

5.

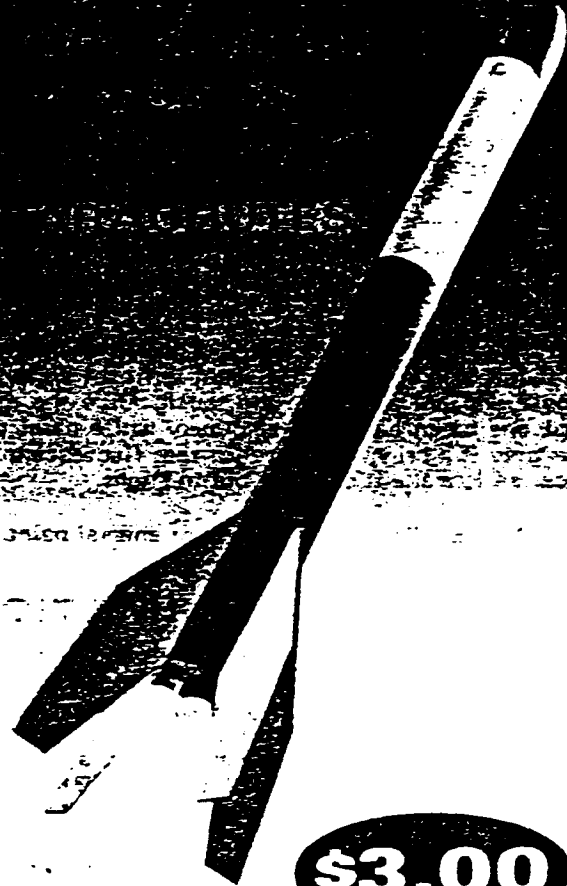
4.

3.

2.

1. LAUNCH!

ESTES



\$3.00

RANGER

KIT NO. K-6 \$3.00

SPECIFICATIONS

Length: 24 in.

Body Dia: 1.6 in.

Weight: 3.35 oz.

RECOMMENDED ENGINES

A8-3 B6-4 C8-5

PARACHUTE RECOVERY

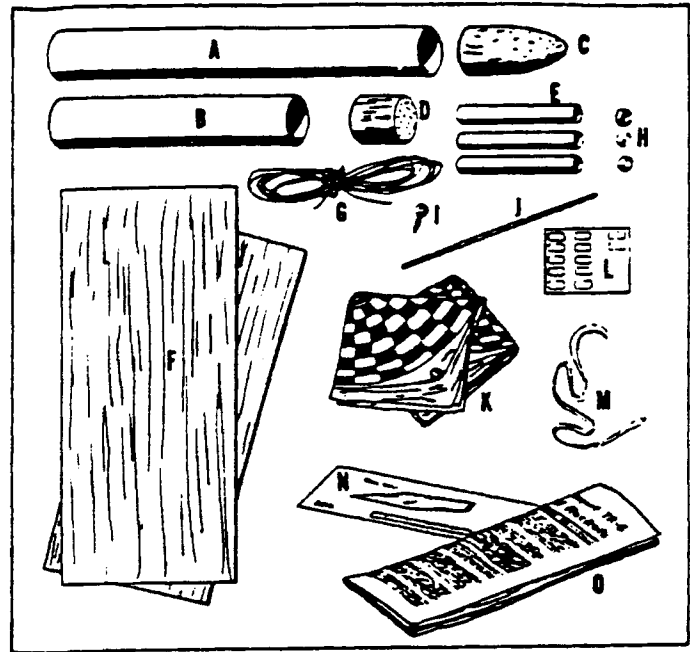
ASTRON

RANGER

PARTS LIST

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) 1 Shroud Line Cord #SLT-252
- 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



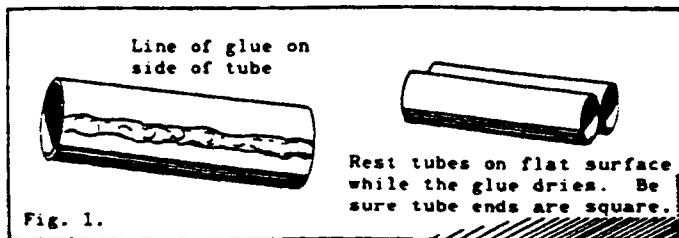
In addition to the materials included with your kit you will need the following tools and supplies:

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

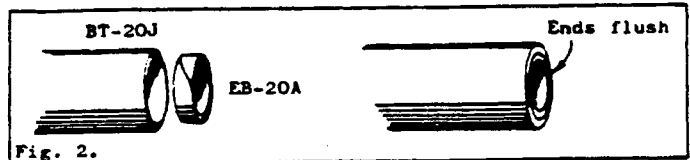
Check to be sure your kit is complete. Then read the entire instructions before beginning to assemble your rocket.

ASSEMBLY INSTRUCTIONS

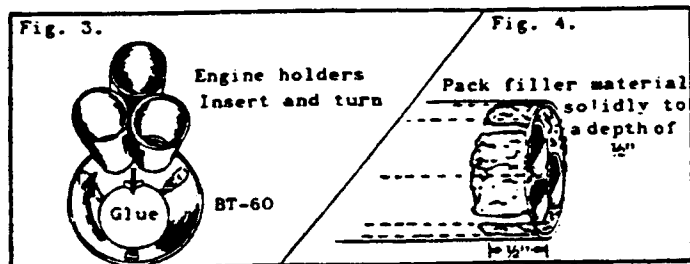
(1) Glue the three engine holder tubes together. To do this, run a strip of glue down one side of one of the tubes. Place another tube against it so that the sides and ends of the tubes are matched and the tubes run perfectly parallel to each other. Glue the third tube to the first two in the same way.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



General layout of chute-shroud lines-tape straps.

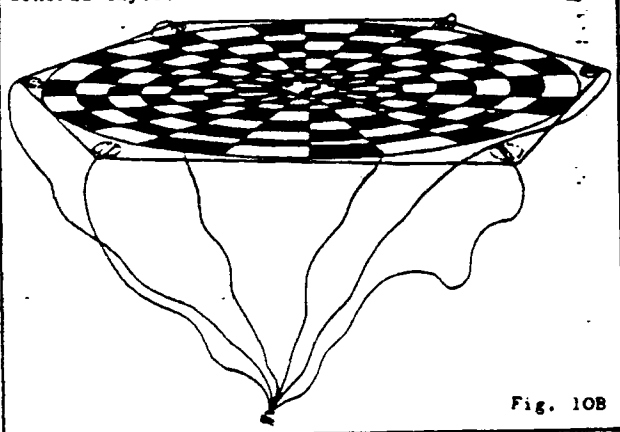


Fig. 10B

(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.

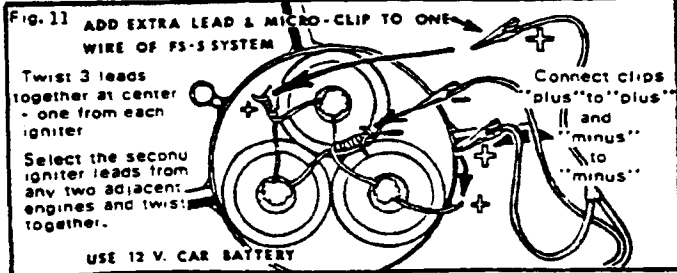
(16) Sand all balsa surfaces with extra fine sandpaper. Apply a coat of sanding sealer or white enamel paint to the balsa, and sand again. Repeat until all surfaces look smooth and are smooth to the touch. Give the rocket at least one clean base coat of glossy white paint or dope, then give it a bright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

NOTE: Do not use dope over enamel paint.

GENERAL INFORMATION

The maximum recommended payload weight for the Astron Ranger is 3 ounces. For low altitude flights without a payload, A8-3 engines are recommended. For medium altitude flights with light payloads (under 1 oz.) use B6-4 or B4-2 engines. For medium altitude flights with heavier payloads (1 to 2 oz.) use B14-5 engines. For maximum altitude performance with or without a payload, use C6-5 engines.

The launch rod or rail used with this model should be at least 36" long and should be securely anchored to a stable launcher base. Use a 12 volt car battery for your electrical power source. Connect the igniters as shown in fig. 11. Please read technical report TR-6 before attempting to launch your model. Follow the countdown procedure given below to eliminate mistakes and to obtain top performance.



Payload Section

'Chute #1

Shroud Lines

Shock Cord

Wadding

Engine Block

Fins

Nose Cone

'Chute #2

Nose Block

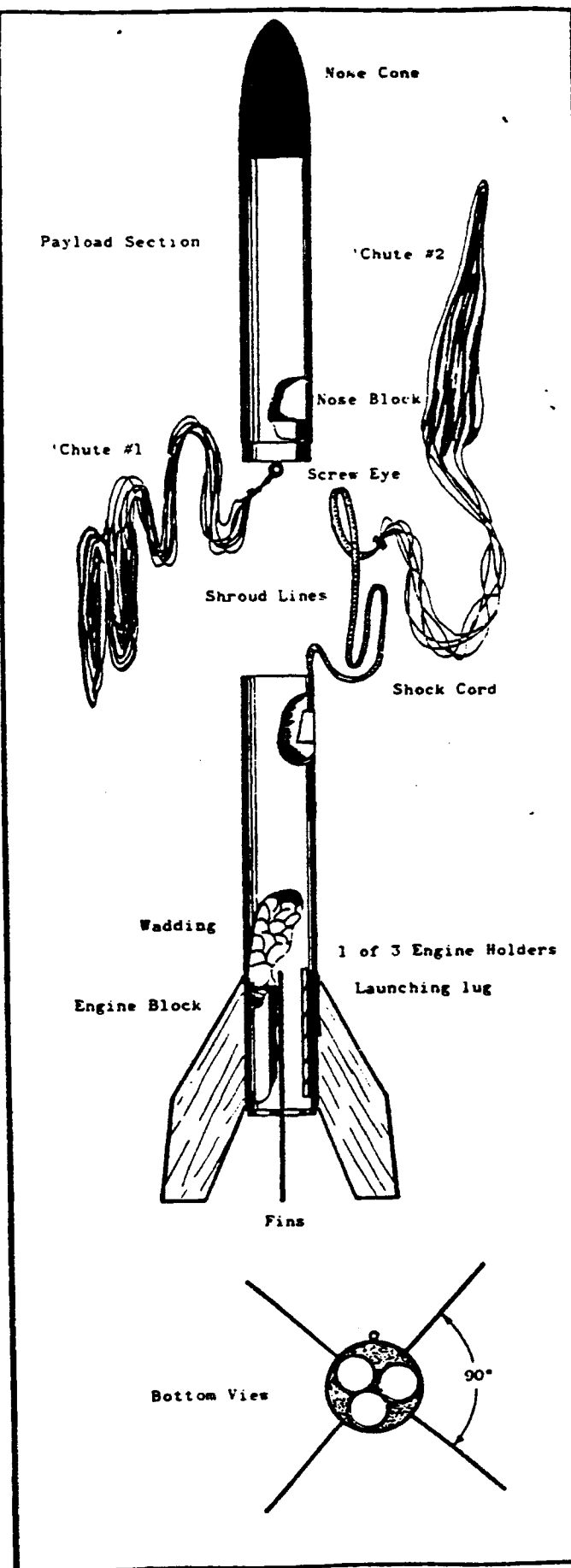
Screw Eye

1 of 3 Engine Holders

Launching lug

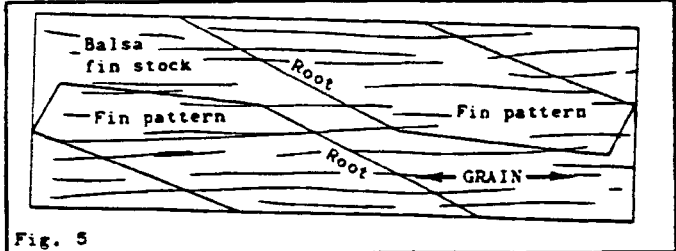
Bottom View

90°



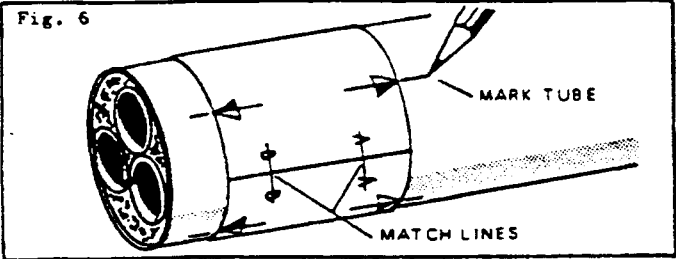
(4) Moisten small wads of facial tissue with glue and pack them into the gap areas between the engine holder tube and the body tube and into the hole between the holder tubes in the middle. This packing should fill the rear 1/2 inch of the gap area. Work the wadding into place to completely fill and 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 tube 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.



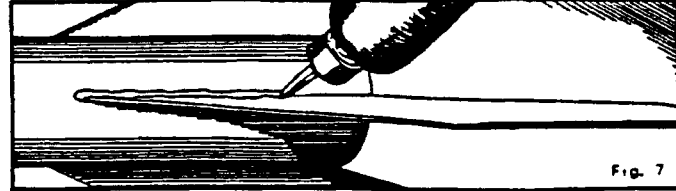
(6) Using fine grit sandpaper round all edges of the fins except the edge which attaches to the body tube. Sand this root edge until it is perfectly flat and even. Sand the sides of the fins until smooth.

(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. Connect the marks. See fig. 6.



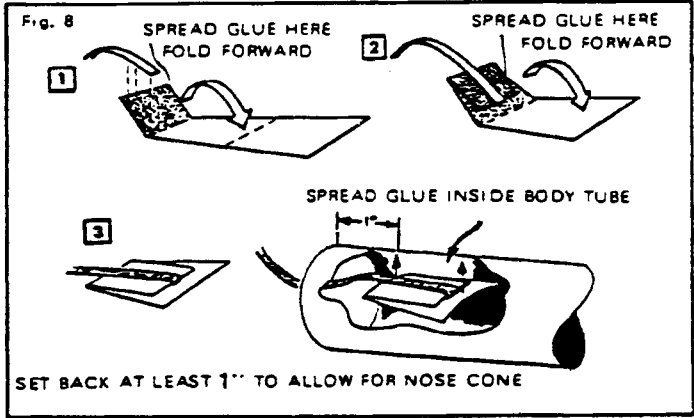
(8) Apply glue to the flat edge of one fin and press this edge against the body directly over one of the lines from step 7. Align the fin along the line so it is perfectly straight and sticks straight out from the body. Hold the fin in position until the glue starts to set, then repeat with the other 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.

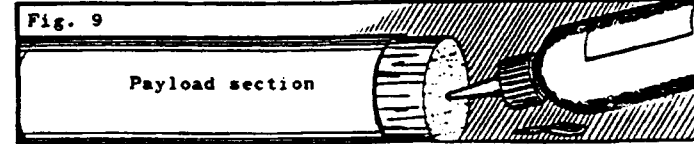


(10) Apply a line of glue to one side of the launching lug and press the lug against the body between two fins. Align the lug so it points straight forward and is in line with the body.

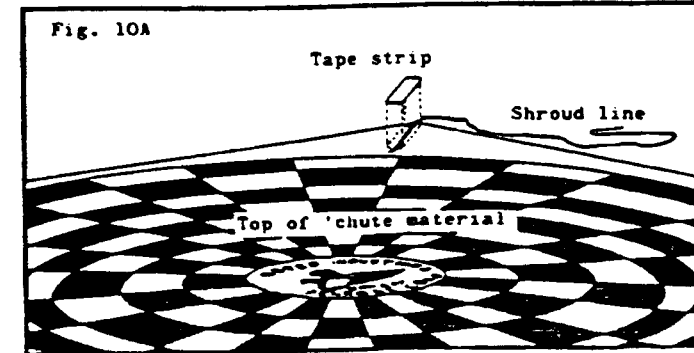
(11) Cut out the shock cord mount. Prefold it on the dotted lines, then flatten it out again. Smear glue over section 1. Lay the end of the shock cord into place and fold section 1 over. Apply glue to the back of section 1 and the exposed part of section 2 and fold again. Clamp the unit together with your fingers while the glue sets. Apply glue to the inside of the body tube over an area approximately 1" to 1-1/2" from the front end. The glue should cover a shape approximately the same as the shock cord mount. Press the mount onto the glue and hold it until the glue sets.



(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.

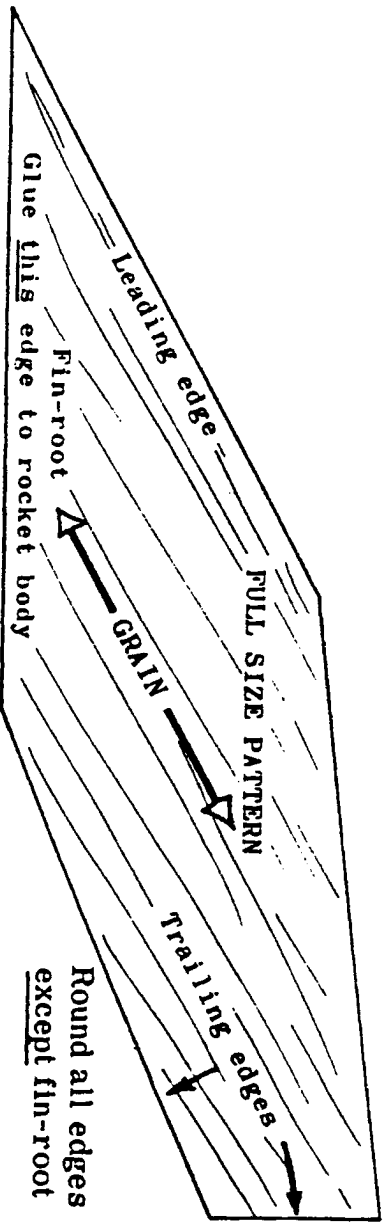


(13) Cut out the two parachutes on the outside lines. Cut twelve 18" lengths of shroud line cord and attach one shroud line to each point indicated on the 'chute with a tape strip as shown. Tie the free ends of the shroud lines on each 'chute together.



(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.

Fig. 7



Round all edges
except fin-root