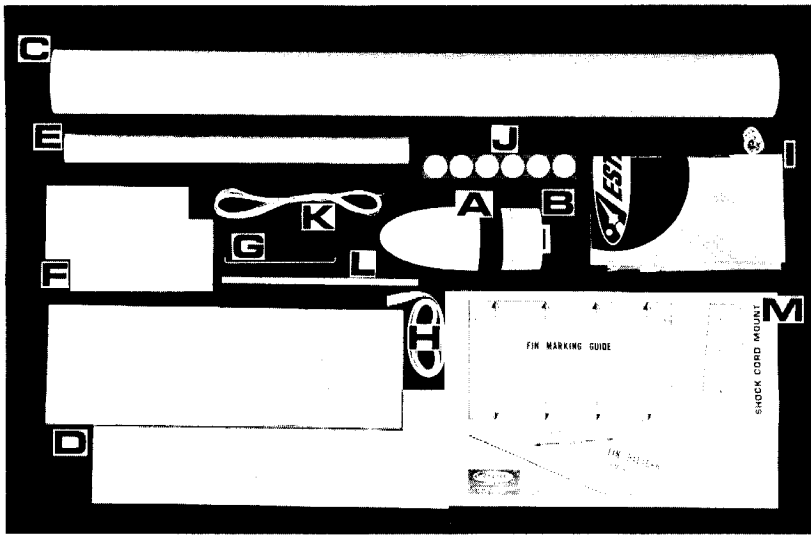




# BIG BERTHA



A SUBSIDIARY OF DAMON

**ESTES INDUSTRIES**

PENROSE, COLO. 81240

## PARTS LIST

Your Big Bertha model rocket kit consists of the following parts as illustrated in the photo above:

(A)	1 Nose Cone	Part #PNC-60L
(B)	1 Nose Cone Adapter	#PNCA-60L
(C)	1 Body Tube	#BT-60
(D)	2 Sheets Balsa Fin Stock	#BFS-40
(E)	1 Engine Holder Tube	#BT-20B
(F)	2 Ring Sets	#RA-2060
(G)	1 Engine Holder	#EH-2
(H)	1 Shock Cord	#SC-2
(I)	1 Parachute	#PK-18A
(J)	6 Tape discs	#TD-3F
(K)	108" Shroud Line Cord	#SLT-1C
(L)	1 Launching Lug	#LL-2C
(M)	1 Pattern Sheet	#SP-23

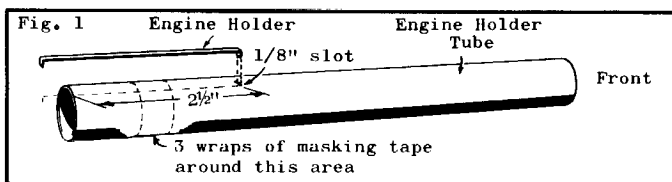
In addition to the materials included with your kit you will also need the following tools and supplies:

- 1) Modeling knife or single edge razor blade
- 2) Scissors
- 3) Extra strong white glue
- 4) Styrene plastic cement
- 5) Ball point pen or pencil
- 6) Fine and extra fine grit sandpaper
- 7) Paint or dope

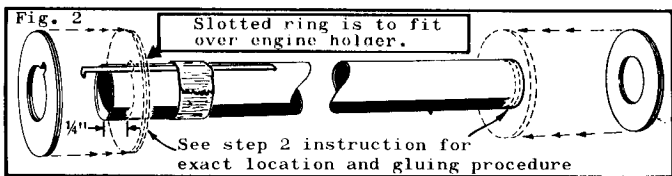
Read the entire assembly instructions carefully before beginning work on your rocket. Then start construction, following each step in order, checking off each step as it is completed.

**IMPORTANT:** Use white glue for all balsa-body tube construction. Use only plastic cement for nose cone assembly.

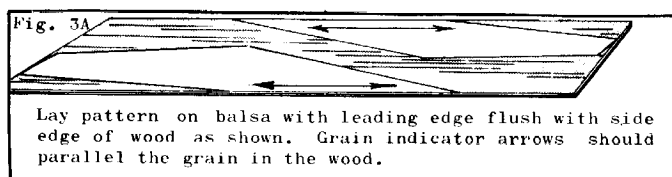
## ASSEMBLY INSTRUCTIONS



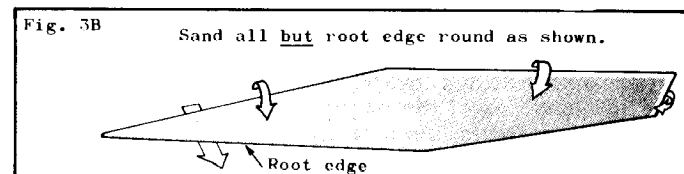
- (1) Measure 2-1/2" from one end of the BT-20B body tube and put in a 1/8" slot as shown. Place one end of the engine holder strap in the slot. Wrap at least 3 layers of masking tape around the tube and strap at mid-point of the strap.



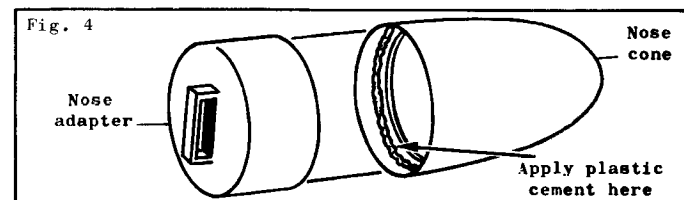
- (2) Glue the RA-2060 rings together in pairs. Cut a 1/8" x 3/32" slot into one pair as shown in Fig. 2. Slide the slotted ring onto the rear of the engine holder tube until 1/4" of the tube is through. Slide the other ring pair onto the front of the tube until about 1/16" of the tube is through. Apply a line of glue at the ring tube joint on both sides of each ring pair. Allow this assembly to dry.



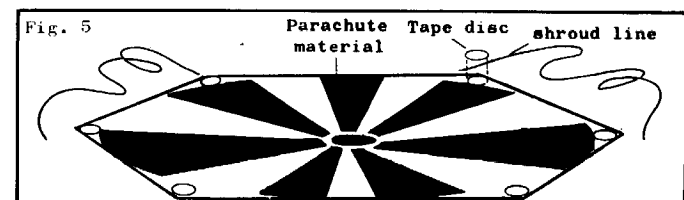
Lay pattern on balsa with leading edge flush with side edge of wood as shown. Grain indicator arrows should parallel the grain in the wood.



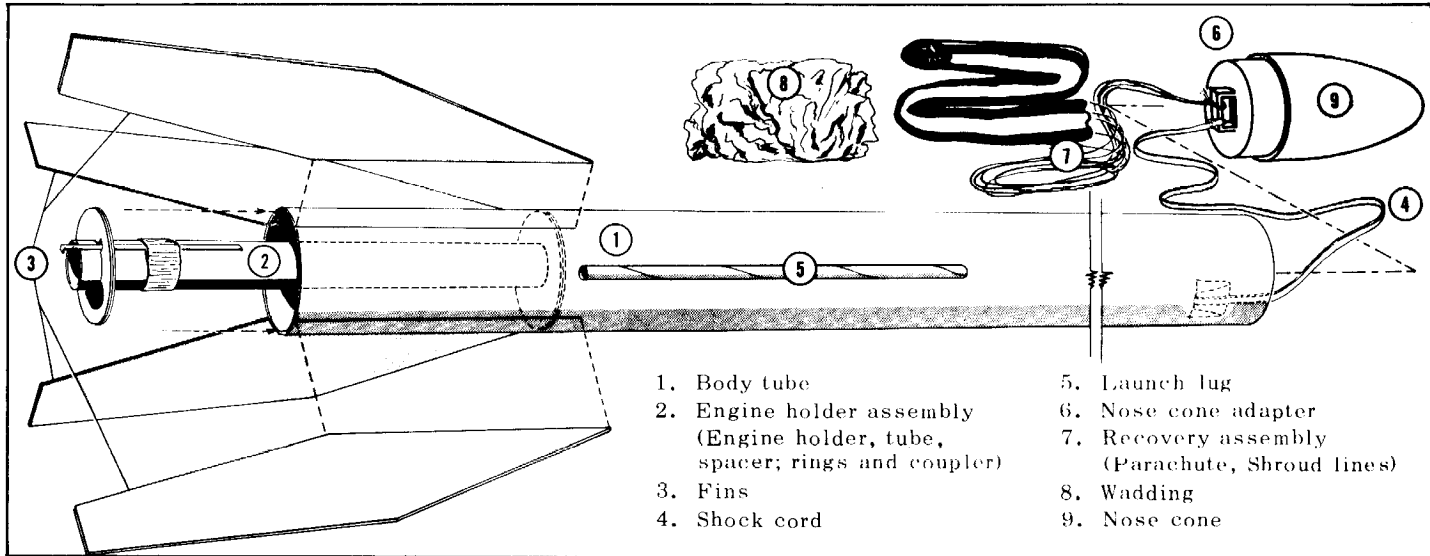
- (3) Cut out the fin pattern. Lay the pattern on the balsa fin stock as shown with the grain of the wood and the grain shown on the pattern matched perfectly. Trace out four fins, two on each sheet of the balsa. Cut out the fins carefully and sand them as shown in fig. 3B.



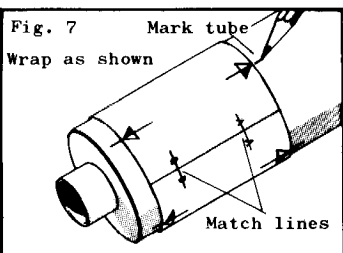
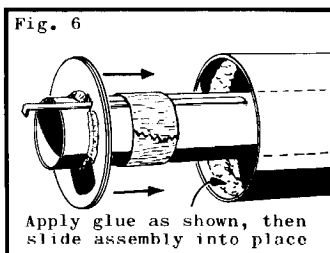
- (4) Trim away any excess plastic from the two nose cone pieces. Run a line of PLASTIC CEMENT around the nose cone just inside from the end. Push the adapter piece firmly into the nose cone until it stops.



- (5) Cut out the parachute on its edge lines as indicated on the plastic. Cut six 18" lengths of shroud line cord and attach one shroud line to each point of the parachute with a tape disc as shown in fig. 5. Tie the free ends of the lines together.

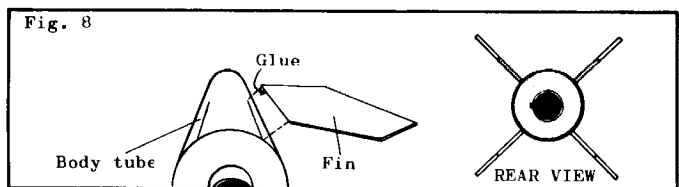


- |  |   |
|--|---|
| 1. Body tube   | 5. Launch lug                                     |
| 2. Engine holder assembly<br>(Engine holder, tube,<br>spacer; rings and coupler) | 6. Nose cone adapter                              |
| 3. Fins  | 7. Recovery assembly<br>(Parachute, Shroud lines) |
| 4. Shock cord  | 8. Wadding  |
|  | 9. Nose cone                                      |

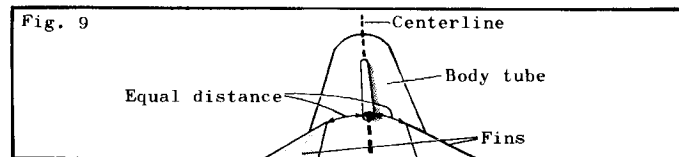


(6) Check the fit of the engine holder tube assembly into the main body tube. The front rings should be a smooth slide fit. The rear rings may be a tight slide fit, for they must only travel 1/4" into the body tube. Sand rings as needed to obtain the desired fit. Slide the front rings into the body tube (See fig. 6) and apply a line of glue about 1/4" inside the body tube. Slide the engine holder assembly in until the rear rings are 1/4" inside the body tube. Run a line of glue around the ring-tube joint and support the body tube in a vertical position until this assembly is dry.

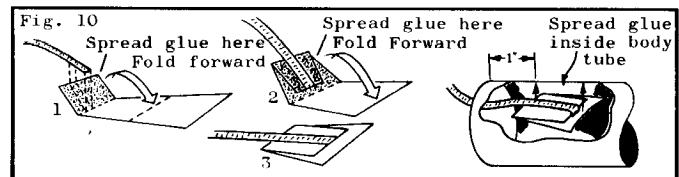
(7) Cut out the fin spacing guide, wrap it around the rear end of the body and mark the tube at each of the arrow points. Draw a straight connecting line between each matching front and rear mark (fig. 7).



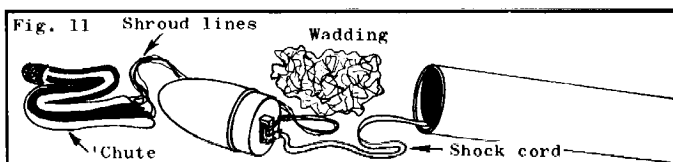
(8) Apply glue to the root edge of one of the fins. Attach the fin to the rocket's body tube with the edge of the fin along one of the lines drawn in step 7. Align the fin so it projects straight away from the body tube. Following the same procedure, attach the other three fins. Do not set the rocket on its fins while the glue is wet.



(9) Glue the launching lug to the body tube so its rear is even with the front of the fins and is halfway between two fins as shown. Sight along the tube and align the lug so it runs parallel to the body tube.



(10) 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.



(11) Connect the shock cord and parachute to nose cone adapter as shown in fig. 11. Push the parachute into the body tube, packing the shroud lines and shock cord over it. Push the base of the nose cone into the forward end of the body tube.

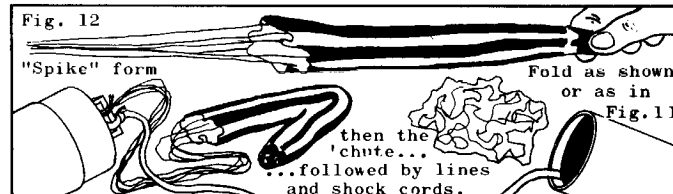
(12) Apply a heavy white glue fillet to the fin-body joints and to the launching lug. Support the rocket on its side while the glue dries.

(13) Before finishing let all the glue on the outside of the rocket dry so it is hard and clear. Sand all balsa surfaces with extra fine sandpaper. Apply a coat of sanding sealer to the balsa, let dry and sand again. Repeat until all surfaces look and feel smooth. Give the rocket at least one clean base coat of glossy white enamel or dope, then give it two or more coats of the final colors to produce the best appearance.

## GENERAL INFORMATION

The engine types recommended for use in the Big Bertha are the B4-2, B6-4 and C6-5. A5-2 and A8-3 engines may also be used on very calm days. Avoid launching in a wind with any engine type. Launch the Big Bertha using a standard electrical launching system with a 1/8" diameter rod at least 36" long.

## COUNTDOWN CHECKLIST



-13- Pack flameproof recovery wadding into the body tube from the top. The wadding should fill the tube for a distance of about 1-1/2 to 3 inches and seal tightly along the sides of the tube (8 to 10 squares of RP-1A are recommended). Hold the parachute between two fingers at its center and pass the other hand down it to form a "spike" shape. Fold this spike in two or three sections as shown in the illustration. 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. Slide the nose cone into place.

-12- Install an electrical igniter in the engine as directed in the instructions which came with the engine.

-11- Place the engine in the engine holder tube.

-10- Remove the safety interlock or key from the launch control panel. (If a simple spring switch is used, install the protector around the switch to separate the contacts.) 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 and attach them to the igniter.

-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!

LEADING EDGE  
THIS EDGE TOWARD  
FRONT OF BODY



FIN  
PATTERN

ROOT EDGE

