SUPER-SCALE MODEL BY Centuri ENGINEERING COMPANY

PLEASE PLEASE PLEASE PLEASE be very careful on step 21 (sanding coupler), and step 23 (contact cementing wrappers). it's up to

SATURN V

ASSEMBLY INSTRUCTIONS

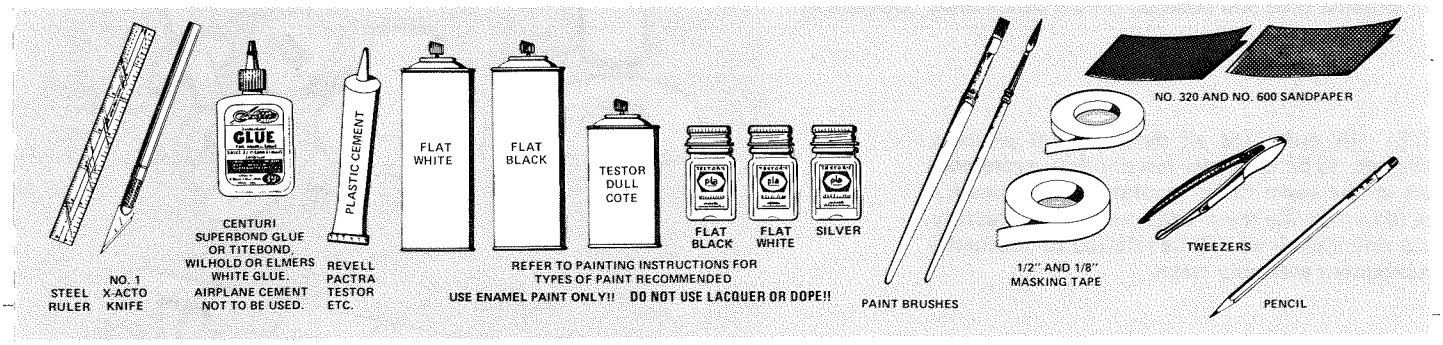
FOR BEST RESULTS . . . FOLLOW DIRECTIONS CAREFULLY!

This is a real flying scale model kit of the famous SATURN 5 space booster with its APOLLO payload. Standing over 3½ ft. tall, this model is an accurately detailed 1/100th scale replica of the real, full-sized SATURN 5 (as tall as a 34 story building). Despite its big size, the model weighs under 13 ounces at lift-off. Using a three-engine cluster, it will reach altitudes of 500 feet.

This precision engineered kit uses many new materials and construction methods. New hollow core stabilizer fins are faster and easier to attach and finish, and will withstand 10 times as much landing shock as balsa. Formed plastic body wrappers include full depth corrugations and all external details. Its molded plastic APOLLO capsule is fast to assemble and finish.

It is very important that you read and follow each construction step exactly. Pay very careful attention to the type of cement or glue required in the various construction areas. There is only one correct way to build this model – – our way, as shown in these instructions. Take your time and read the instructions carefully. It will assure you a finished model which will look great and fly well.

YOU WILL NEED THE FOLLOWING MATERIALS TO COMPLETE YOUR SATURN V.



A small bottle of contact cement is included in this kit for bonding the corrugated wrappers to the body. The contact cement is not a substitute for either wood or plastic cement, both of which are needed for construction of the Saturn 5. Model airplane cement is not recommended for use as a "wood glue" for this kit.

NOTE: NO ENGINES, LAUNCHING PLATFORMS OR FIRING DEVICES ARE INCLUDED IN THIS KIT.

A - ENGINE MOUNT

Note: Wood cement is used for all assembly in sections A & B.

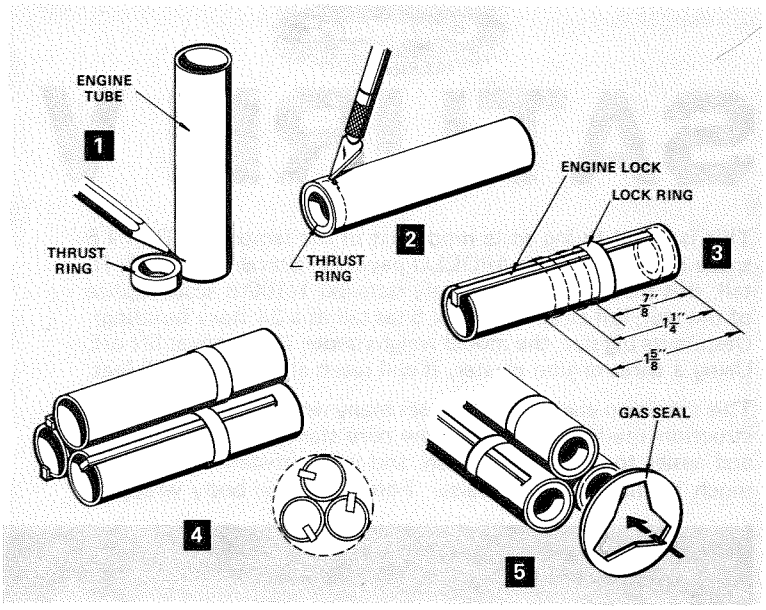
1 Place a thrust ring against each engine tube in turn and mark the tubes at the top of the thrust ring.

2 Cement the thrust rings into the engine tubes, flush with the ends which were previously marked. Cut a short slit in each engine tube on the pencil mark.

3 Insert one end of an engine lock into the slit in each engine tube. Slip the mylar lock retainer rings over the tubes and cement in place at the respective distances shown.

4 Cement the engine tubes together, rotating the tubes so the engine locks will not give interference when the engine "cluster" is slipped into the exhaust tube.

5 Cement the gas seal in place on the top of the cluster.



B - BASIC BODY

6 Using the template ruler, mark the locations of the balsa bulkheads on the exhaust tube.Write the word "bottom" on the end of the tube as indicated on the template.

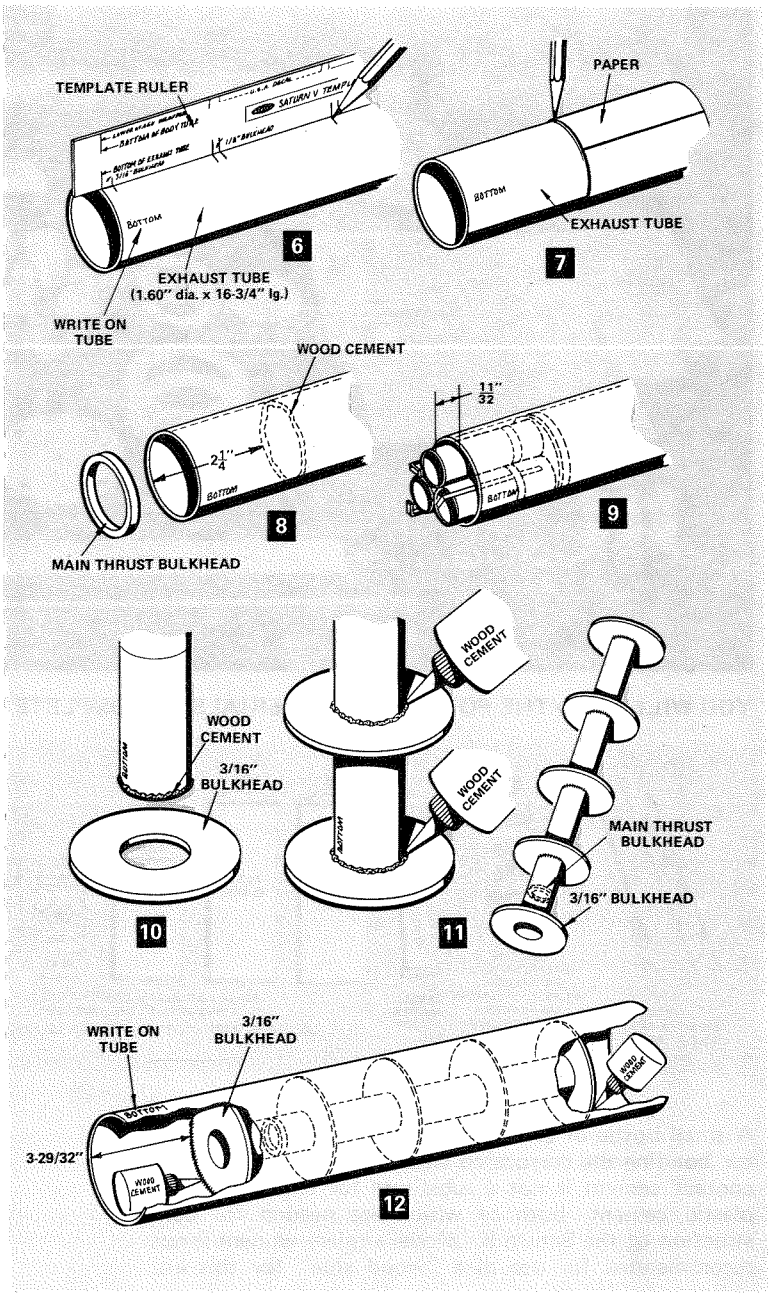
7 With a piece of paper wrapped around the tube for a guide, draw a line around the tube at each mark.

8 Using a stick, pencil, etc., place a generous bead of cement inside the exhaust tube at a point about 2" from the bottom end. Insert the main thrust bulkhead into this end of the tube.

9 Place the engine cluster into the tube and push forward until only 11/32" of the cluster projects from the end of the exhaust tube. This will position the thrust bulkhead at the correct depth of 2-13/32". Remove the engine cluster immediately so it will not be accidentally cemented in place.

10 There are five balsa bulkheads in the kit. Four are made of 1/8" thick balsa, one of 3/16" thick balsa. Cement the 3/16" thick bulkhead to the bottom end of the exhaust tube.

11 Slip the four 1/8" thick bulkheads over the top of the exhaust tube and position on the pencil lines. Cement in place.



NOTE: In order for all details, paint patterns, decals, etc. to be in proper relationship, a reference point in the form of an accurate vertical line has been drawn on the three body tubes at the factory. These reference lines will be referred to constantly in subsequent assembly steps.

12 When the bulkhead– exhaust tube glue joints are thoroughly dry, push the "core assembly" into the main body tube. Position it so the bottom bulkhead is exactly 3-29/32"from the end of the body tube. Run a generous fillet of cement around the top and bottom bulkhead–body tube joints. Write the word "bottom" on the appropriate end of the body tube.

13 Double the 6" piece of red string, loop thru holes in one die cut ring and tie securely. Cement this ring to the coupler tube with the knot to the inside. Cement the other ring to the opposite end of the coupler tube.

14 Using a stick, pencil, etc. run a fillet of cement around the inside of both ring–tube joints.

15 Push the 3rd stage body tube into the coupler with the end of the tube extending 1/32" from the bottom of the coupler (red string projects from bottom of coupler). Rotate the tube until the reference line is lined up with the string. Run a fillet of cement around both body tube–coupler ring joints. Cement the disc (which was punched from the center of one of the rings) to the bottom of the body tube. This forms a pressure seal for the parachute compartment.

16 Carefully cut the 3rd stage reduction wrapper and its gluing tab from the printed cardstock sheet. Curl the wrapper with your fingers until, when released it holds the desired shape. Be careful not to crease the wrapper.

17 Temporarily secure the ends of the wrapper with masking tape. Make sure the ends are even at the top and bottom and are tightly butted together.

18 Smear cement on the gluing tab and place it on the inside of the wrapper joint. Position the tab 1/32" below the top of the wrapper, with a larger gap at the bottom. Press the tab down firmly, allow to dry and remove the masking tape.

19 Place the reduction wrapper over the 3rd stage body and slide it down until it fits over the top of the coupler. Draw a line around the body tube along the top of the wrapper.

20 Remove the reduction wrapper and apply cement on the pencilled line around the body and to the inside bottom of the wrapper. Replace the wrapper, fitting it firmly down over the coupler with the seam in the wrapper lined up with the reference line on the body tube.

21 Slip the third stage coupler into the top of the main body tube. If necessary, lightly sand the edges of the die cut ring to obtain a good slip fit. Any bind could cause improper parachute ejection during flight.

22 The LEM–SM (Lunar Excursion Module–Service Module) body is composed of parts similar to but smaller than those of the 3rd stage body. Assemble the LEM–SM stage exactly as you did the 3rd stage (steps 13-20) except the attachment string and gas seal disc are not required.

C - CORRUGATED WRAPPERS

23 **IMPORTANT: The cement included with this kit is a contact type cement. It is the only type of cement that will permanently bond the plastic wrappers to the body tubes. If used incorrectly, it can damage the plastic parts. Follow these instructions carefully.**

a Be sure you have the wrappers turned face down before applying cement.

b Brush cement on evenly over the back of the wrappers, making sure you have cement along all edges.

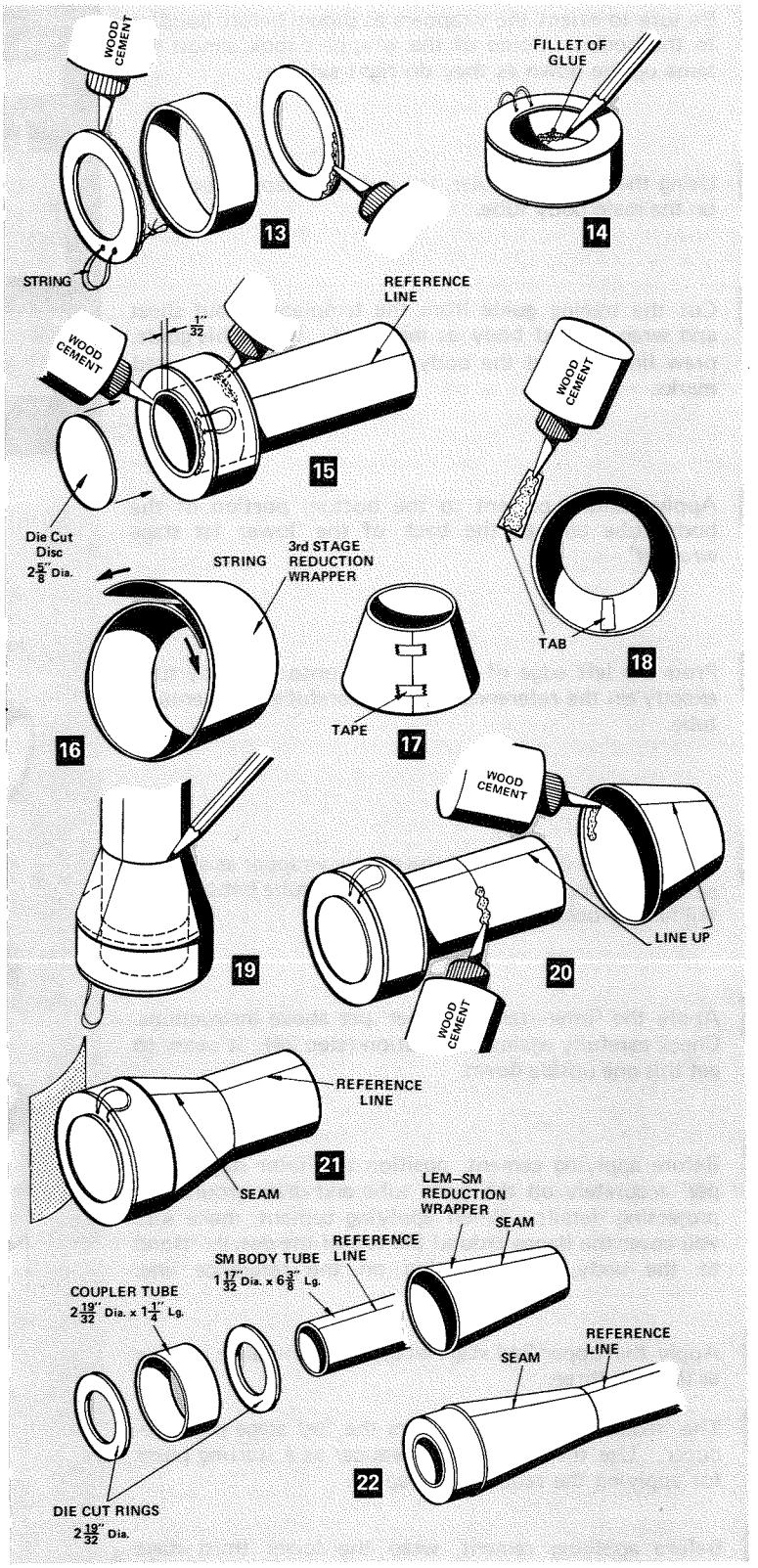
c Do not brush cement into the detail depressions of the wrappers.

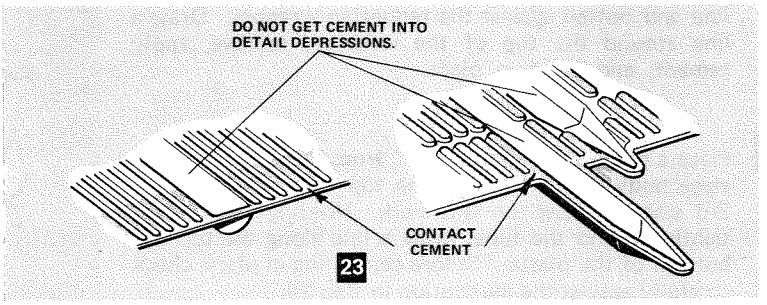
d Apply cement to the body tubes exactly in the areas to which the wrappers are applied.

e Allow the cement to dry completely before attaching the wrappers.

f Position the wrappers exactly before allowing them to touch the body tubes.

g Work from left to right, smoothing the wrappers onto the tubes with a firm, even pressure.





24 Be sure to orient the wrappers as shown before bonding to the bodies. Some of the wrappers look almost the same upside down as they do right side up.

25 Using the template–ruler, lay out the wrapper locations on the main body tube.

26 Cut the tracing guide from the template cutout sheet and wrap around body as indicated. Using this guide, draw lines around the body on the previously located marks.

27 Apply contact cement to the bottom portion of the body tube and to the back of the 'lower 1st stage wrapper'.

28 Press the left edge of the wrapper onto the body tube exactly on the reference line and carefully wrap around tube.

29 Using the die cut edges of the plastic wrapper as a guide, cut out the four areas of exposed body tube between the tail fairing locations.

30 Apply the 'inter–tank wrapper' per above instructions. Check carefully against illustration (step 24). It's easy to get this one upside down.

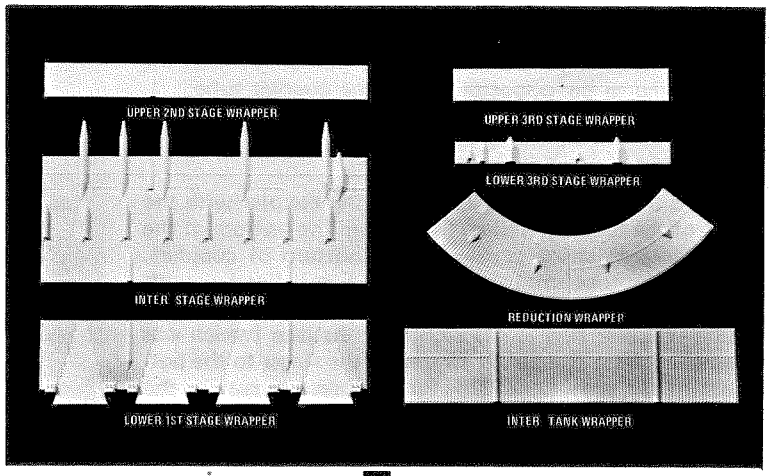
31 Before applying cement, position the 'inter stage wrapper' accurately on the body tube and draw around the projecting details. When applying cement, make sure you cover the flange around the top of the details. Bond to the body, again starting on the reference line.

32 Apply the 'upper 2nd stage wrapper' in the same manner as the first three.

33 The 'reduction wrapper' covers the 3rd stage paper reducer. Use the seam of the reducer as a starting point for applying the reduction wrapper.

34 Before applying cement, wrap the lower third stage wrapper around the body, positioned on the reference line and butted against the reduction wrapper. Draw a line around the top of the wrapper, remove, apply cement, and bond in place.

35 Place a mark at a point 11/32" from the top of the 3rd stage body tube. Position the top edge of the 'upper 3rd stage wrapper' on this mark. Holding the wrapper tightly around the tube, draw a line along the top and bottom of the plastic. Before cementing in place, check carefully against the illustration in step 24.



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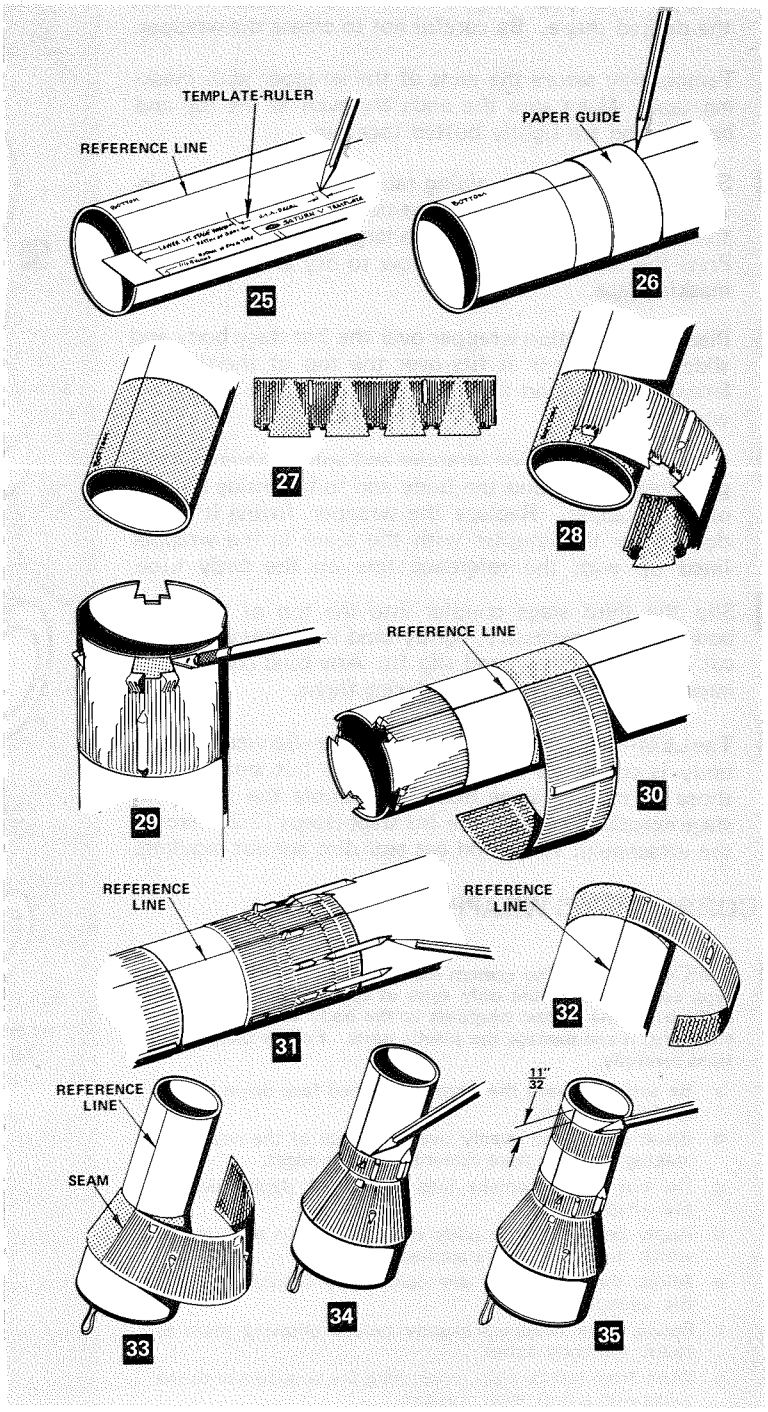


D - BODY DETAILS

Note: Wood Cement is used for assembly in this section.

36 Included in this kit is a 24" long piece of halfround basswood used to make sections of the systems tunnels that lie between the corrugated wrappers. Before cutting the wood apart, sand lightly with very fine (#600) sandpaper. Place the halfround against the top of one of the tunnel sections molded into the 'lower 1st stage wrapper'. Mark the halfround where it intersects the tunnel section of the 'inter–tank wrapper'. Cut the halfround and cement in place between the molded sections of tunnel. Repeat this process for the tunnel portion between the inter–tank and inter–stage sections of the body and for equivalent areas on the opposite side of the body. Cut and fit the last piece of halfround between the tunnel sections of the 'inter–stage' and 'upper 2nd stage wrappers' (one side only).

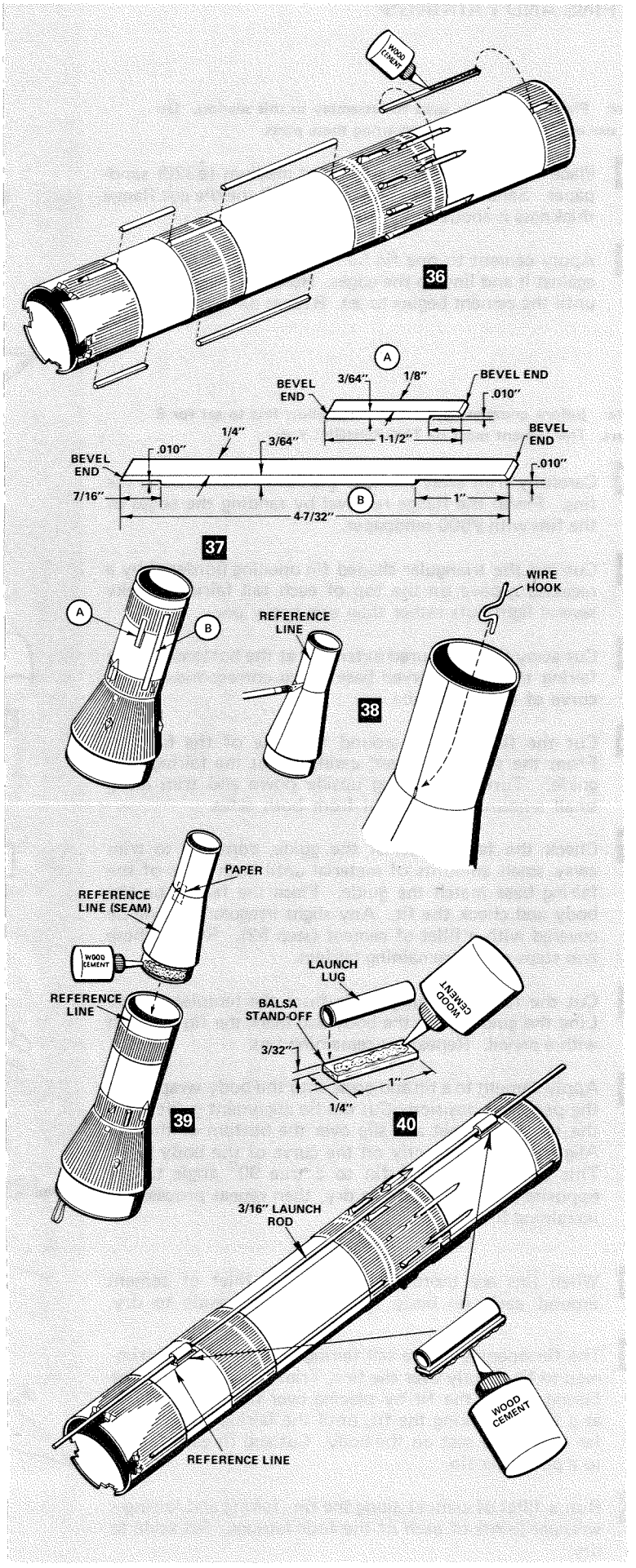
37 The rectangular tunnels on the 3rd stage body are cut from the two short pieces of stripwood enclosed. Cut the wood to the shape shown, sand lightly with #600 sandpaper, and cement to the body with the tops (and bottom of one) positioned in the flat areas on the wrappers.

38 Cut a 1/8" long slit in the LEM–SM body, just above the paper reducer. Insert the wire hook from the inside, with the loop protruding thru the slit. Cement a scrap of paper behind the wire to hold it in place.

39 Cement the LEM–SM stage into the top of the third stage. Be sure to line up the reference lines.

40 From the 3/32" thick sheet of balsa, cut two pieces ¼" wide by 1" long. Seal and sand the balsa, then cement to the two mylar launch lugs. Slip the launch lugs over a 3/16" diameter launch rod, * apply cement to the backs of the balsa strips, and cement to the body tube with the right hand edge of the balsa on the reference line. Check to see that the launch rod does not touch any of the detail parts. If it does, adjust the position of the launch lugs accordingly. Allow the cement to dry thoroughly before removing the launch rod.

*If you do not have a 3/16" x 36" launch rod, you should purchase one now. You will need it for launching the Saturn 5. The standard 1/8" launch rod is too light for a ship this large.



E - FINS AND FAIRINGS

Note: Plastic cement is used for assembly in this section. Do not use contact cement for cementing these parts.

41 Place each fin half on a piece of medium (#320) sandpaper. Sand the backs of the fins until the die cut flange thickness is about half as thick as it was.

42 Apply cement to one fin half. Press a matching fin half against it and line up the edges. Hold the pieces together until the cement begins to set. Repeat on remaining fins.

Note: Before completing the next step, allow fins to set for 8 hours. The cement must be THOROUGHLY dry.

43 Carefully trim away most of the flange from around the fins. Finish the flange removal by sanding the edges of the fins with #600 sandpaper.

44 Cut out the triangular shaped fin opening bordered by a recessed groove on the top of each tail fairing. Make several light cuts rather than one heavy one.

45 Cut away the contoured extention at the bottom of each fairing to form a curved base which corresponds to the curve of the body tube.

46 Cut the flange from around the base of the fairings. From the template sheet, carefully cut the fairing trim guide. Turn one fairing upside down and trim away small amounts of material from both sides.

47 Check the fairing against the guide, continue to trim away small amounts of material until both sides of the fairing base match the guide. Place the fairing on the body and check the fit. Any slight irregularities will be covered with a fillet of cement (step 52). Repeat these two steps on the remaining fairings.

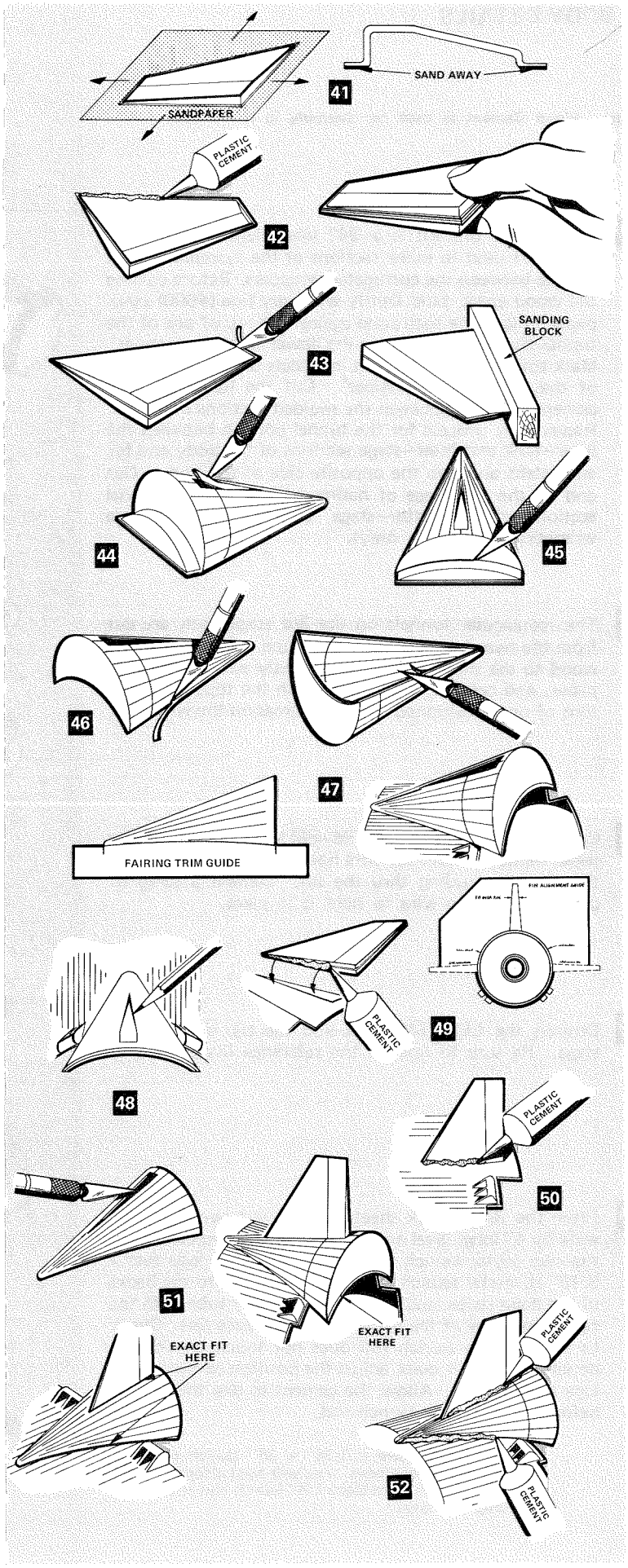
48 Cut the fin positioning guide from the template sheet. Line the guide up on the body and mark the fin position with a pencil. Repeat for remaining fins.

49 Apply cement to a fin and press onto the body wrapper in the pencilled position. Cut the fin alignment guide from the template sheet and slip over the bottom of the fin. Align the guide exactly on the curve of the body tube. This will position the fin to a true 90^{o} angle to the opposite axis. Set aside to dry, then repeat process for remaining fins.

50 When fins are thoroughly set, run a fillet of cement around each fin body tube joint. Set aside to dry.

51 The fin opening in the tail fairings will have to be trimmed to fit exactly over the fins. Trim the opening of one fairing, check the fit by placing over fin. Trim a little at a time, checking the fit, until the fairing slides down far enough to seat on the body. Cut and fit each fairing to a particular fin.

52 Run a fillet of cement along the fin–fairing and fairing–wrapper joints of each of the four fairings. Set aside to dry.



F - ENGINE NOZZLE UNIT

Note: Use wood, plastic or contact cement as indicated.

53 Using wood glue, cement the five engine core tubes into the die cut nozzle rings.

54 Lightly sand the back of each nozzle half to reduce the flange thickness to about half its original thickness.

55 Trim away the flange at the top of each nozzle half and cut out the top of each main nozzle tube.

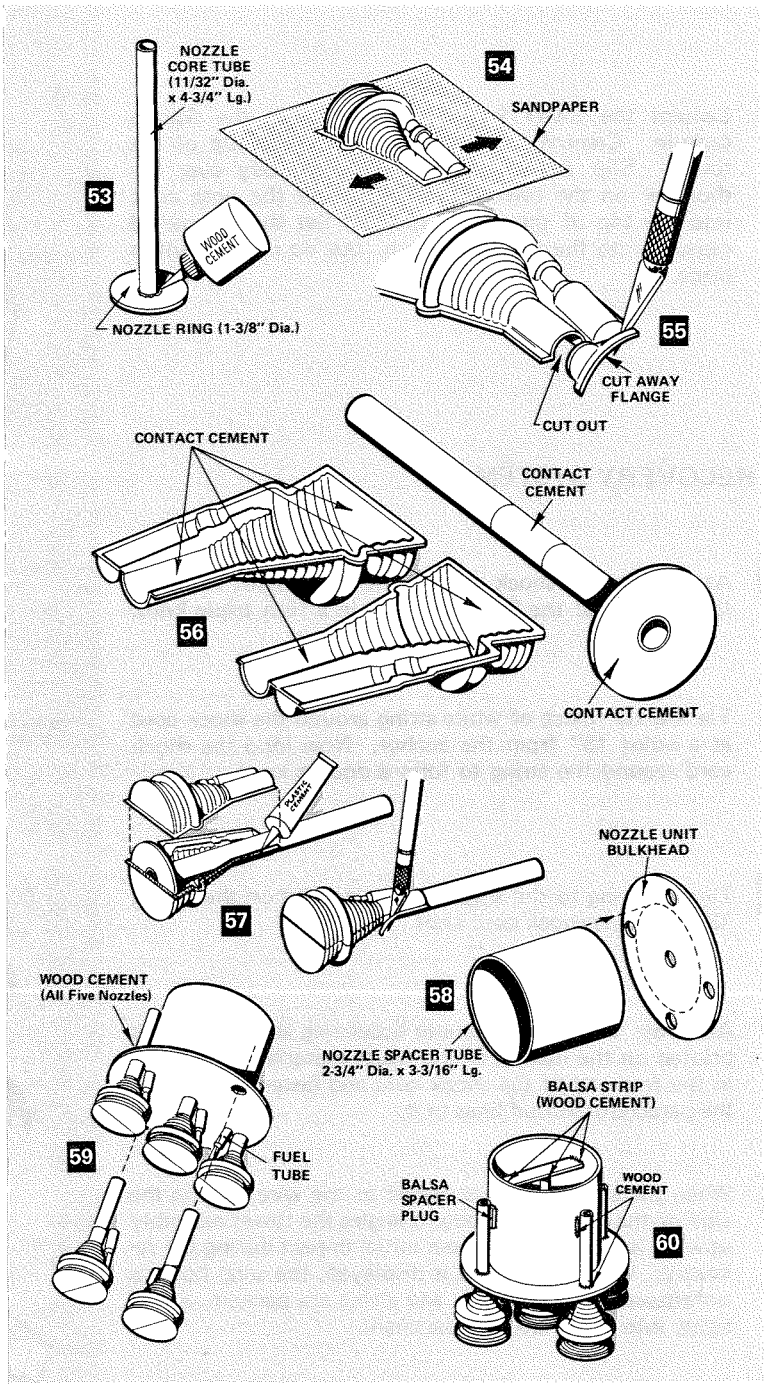
56 Apply contact cement, in the areas shown, to the inside of two matching nozzle halves and to a core unit.

57 Press the core unit into one nozzle half. Run a bead of plastic cement around the flange of the nozzle and set the other nozzle half in place. Press the nozzle halves together and hold until cement begins to set. Repeat this proceedure on remaining nozzles. Allow the assemblies to set for eight hours, then carefully trim away the flanges with an X-Acto knife.

58 Using wood glue, cement the nozzle spacer tube to the die cut nozzle bulkhead. Center the spacer tube between the holes in the bulkhead.

59 Insert the core tubes into the holes in the bulkhead and push forward until the tops of the plastic nozzles fit against the bulkhead. Rotate the four outside nozzle units so the fuel injection tubes point toward the center nozzle. Rotate the center nozzle so its fuel injection tube points toward one of the outside nozzles. Run a fillet of wood glue around all five core tube–bulkhead joints.

60 From the 3/32" thick balsa sheet, cut a strip ¼" wide by 2-3/4" long. Trim the ends for a snug fit inside the spacer tube. Run a bead of wood cement around the top of the center core tube and push the balsa strip down until it rests on top of the tube. Cement the balsa to the inside of the spacer tube. Before the cement sets, line up the center nozzle so that it projects from the bulkhead at a 90° angle. Cut and trim strips of balsa to fit between the spacer tube and the core tubes of the outside nozzles. Cement the strips to the spacer and core tubes, checking the vertical alignment of each before the cement sets.

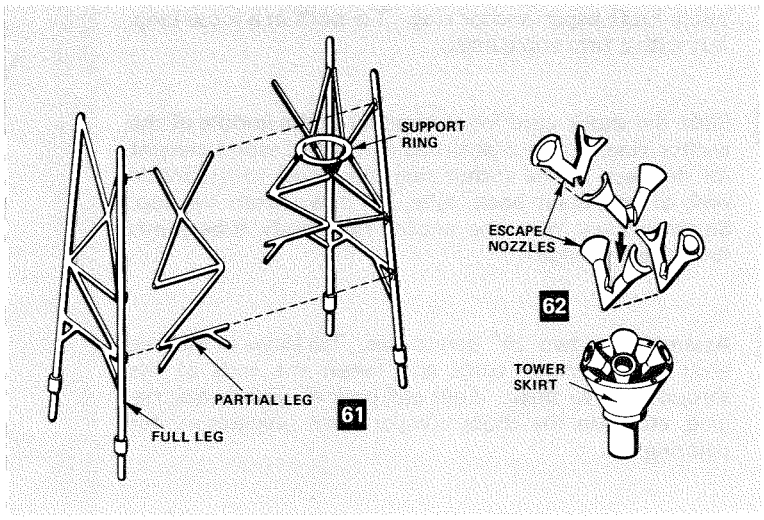


G - APOLLO CAPSULE ASSEMBLY

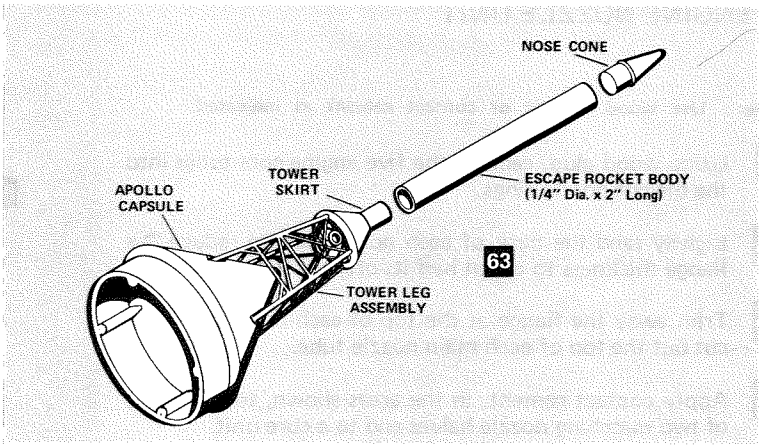
Note: Use plastic cement for this section.

61 Cut, do not break, the tower and capsule parts from the plastic runners. Cement one full and one partial tower section together, making sure the 'X' members are angled to the inside. Cement the support ring to the center of the two 'X' members. Cement the other full and partial section together, allow glue to dry, then cement to the previously assembled section. Make sure the assembly is squared up and set aside to dry.

62 Cement the matching escape nozzle halves together to form two sub-assemblies. Enlarge the slots, if necessary to socket the two sub-assemblies together. Cement the completed nozzle assembly into the tower skirt, rotating the nozzles so they extend at an angle of 45° to the socketing holes for the tower legs.



63 Cement the tower legs into the holes in the Apollo capsule. Cement the tower skirt onto the top of the tower. Slip the mylar escape rocket body over the shoulder on the tower skirt and socket the nose cone into the top of the escape rocket. Set the completed capsule onto the LEM–SM body, but do not cement in place.



H - RECOVERY SYSTEM

64 Attach the 22" shock cord to the attachment string on the bottom of the 3rd stage. Tie in a firm triple knot.

65 Tie the 16" piece of white string around the shock cord at a point 15" from the anchor. Now loop the shock cord around the string to form a double knot.

66 Tie the string to the snap hook at a point on the string 13" from the shock cord knot.

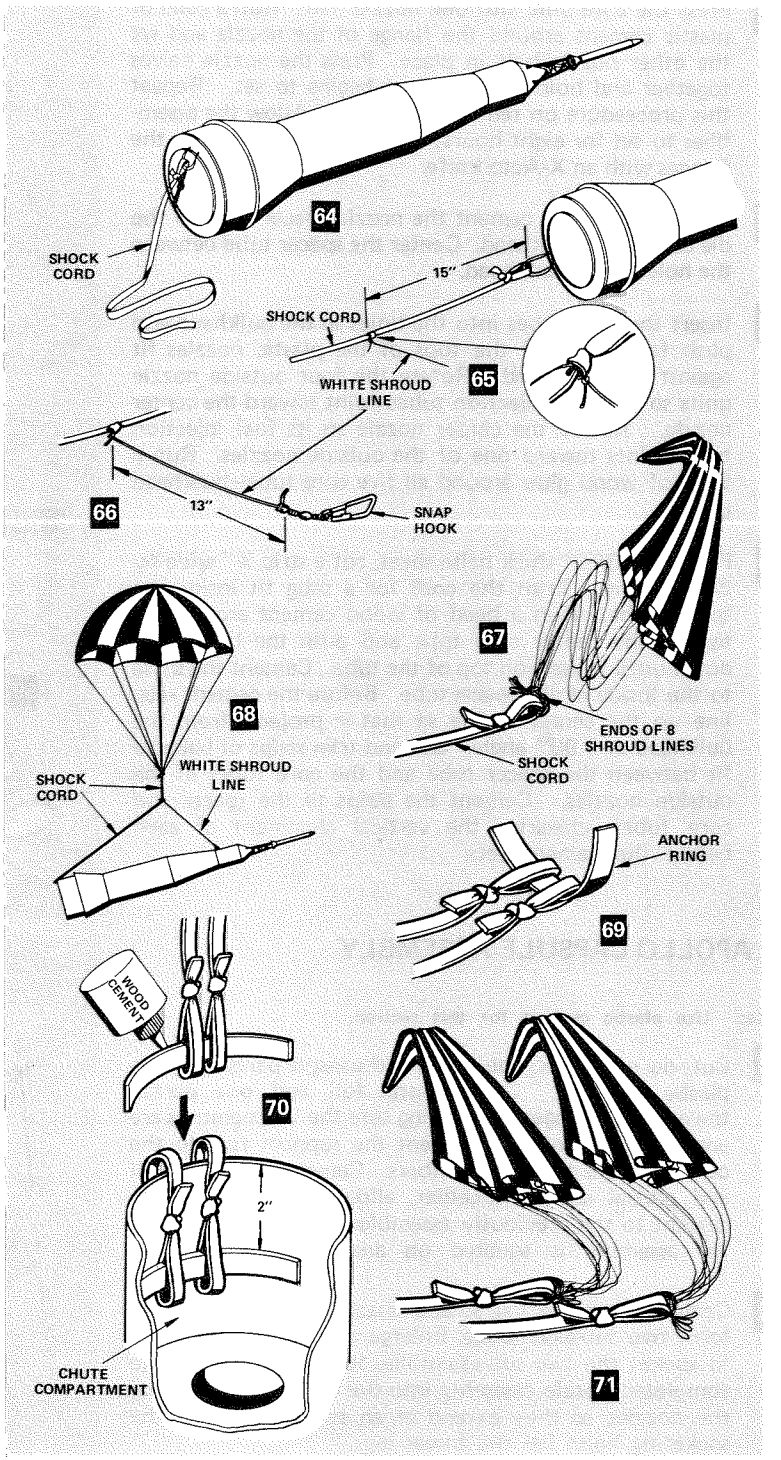
67 Assemble the 20" parachute according to instructions printed on the margin of the chute material. Tie a loop in the free end of the shock cord and fasten the ends of the parachute shroud lines to it.

68 When the snap hook is attached to the wire loop in the side of the LEM–SM body, it angles the tower assembly upward and protects it from initial impact during the recovery. When the model is displayed, the snap hook is unfastened and the hook and string are packed, out of sight, into the chute compartment.

69 The two 18" long shock cords are fastened to the half circle kraft paper anchor ring. Tie both in a loose loop, but with a firm triple knot.

70 Slide the shock cord loops together in the middle of the anchor ring. Place a generous amount of wood cement on the back of the anchor ring and fasten to the inside wall of the main body tube, 2" down from the top. Smear cement over the anchor ring–body tube joints for added strength.

71 Assemble the two 24" parachutes. Tie loops in the free ends of the shock cords and fasten the ends of the shroud lines to them. Fold and pack all parachutes, rigging, etc. into the chute compartment preparatory for painting.



PAINTING

Our models here at Centuri were painted with Krylon flat black and flat white aerosol spray cans. Careful masking was required to obtain the correct paint pattern. The models were oversprayed with Testors Dullcote, a clear flat spray, to kill the decal shine and preserve the finish.

If you do not wish to mask the model, you may spray the basic white and brush paint the black areas. In any case, do not use regular laquer base paints, either spray or brush type. The laquer will attack and melt the plastic wrappers and tower. If you are in doubt about the paint you wish to use, try it first on the piece of scrap plastic enclosed in the kit. If the paint softens or crinkles the surface, do not use it on the model.

MATERIALS

Flat black and flat white paint in aerosol spray cans for basic body.
Flat black and flat white paint in small bottles for touch up and small details.
Silver paint in small bottle for fins, details, and engine nozzles.
Testors Dullcote for a clear flat finish coat.
Paint brushes – #0 or #1 round and ¼" flat.
Masking tape – 1/8" and 1/2" wide.

72 Study the painting diagram for location of paint pattern changes. The external details will help pinpoint exact color change lines. Before painting, wipe the rocket with a slightly damp cloth to remove oily fingerprints.

Spray the body first with flat black paint, completely covering all areas where the black paint is shown in the diagram. We realize this is contrary to the standard practice of painting the lightest color first; there are, however, two very good reasons for doing it this way:

1 It is much easier to mask around the projecting details than to mask off the details themselves.
2 In the case with Krylon (and most paints we've experimented with) the black paint does not peel when the masking tape is removed, while the white paint has an occasional tendency to lift.

73 After allowing the paint to dry overnight, you are ready to mask the black areas. The accompanying illustration shows a few masking techniques used on the Saturn V.

a A typical section of the interstage wrapper shows how small pieces of masking tape are cut and applied around projecting details. Mask around all edges with 1/8" tape, making sure it is pressed firmly to the body. Fill in large areas with ½" tape as required.

b Mask along the center of the horizontal separation ridges formed into the plastic wrappers.

c Mask along the top outside edge of the corrugation for vertical separation lines. Press the tape down firmly along ridges formed by the wrapper–body tube joints.

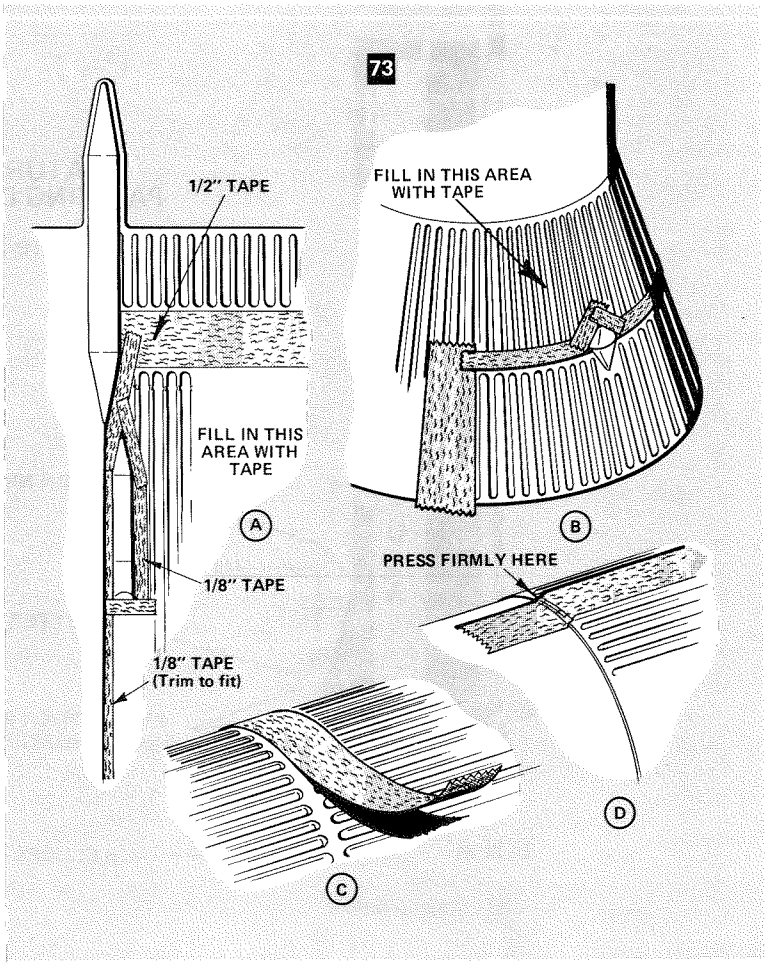
d Mask the edges of the reduction wrapper with 1/8" tape, carefully stretching it to match the contour of the wrapper.

74 Spray the white paint in several light "dust" coats. In this way, the paint will not build up in ridges along the edge of the tape. When the paint is dry, carefully remove the masking tape. Touch up any overspray areas or irregular separation lines with flat black or flat white paint and a small brush. At this time, paint the escape rocket nozzles flat black. The silver areas of the rocket should be shiny in contrast to the rest of the body. Since the Testors Dullcote tends to flatten and darken the silver paint, the decalling and final spraying steps must be completed before painting the silver portions of the ship.

75 Apply all decals except the fin letter decals and the small United States decals that go on the Service Module. The paint pattern locations and the template ruler will aid in positioning the decals. Follow the directions on the back of the decal sheet for proper application.

76 After the decals have been applied, allow 1 hour for the moisture to evaporate from the decal surface, then spray the entire rocket with a couple of light coats of Testor's Dullcote. Allow 30 minutes drying time before proceeding.

77 The areas so designated in figure 72 are painted silver at this time. The body details and fins are best done with a brush, outlining the area with a small brush and filling in with the ¼" brush. The engine nozzle unit may be either brush or spray painted.



78 Temporarily remove the Apollo capsule. Cut out the silver self-adhesive Service Module wrapper, remove the backing material and apply the wrapper to the body, using the wire hook as a reference point.

79 Before cutting the R.C.S. nozzles from the plastic runners, paint as shown.

80 Cut the nozzle positioning guide from the template sheet, wrap around the Service Module and mark the nozzle locations.

81 Carefully cut the nozzle units from the runners and touch up the cutoff points with black paint. Using a sharp object, punch small holes in the S.M. body on the four nozzle location marks. Insert the cementing lugs of the nozzles in the holes. Line up the nozzles and apply plastic cement to the cementing lugs where they protrude inside the body tube.

82 Apply the United States decals to the S.M. wrapper in the positions indicated in figure 72.

83 Cut the fin decal guide from the template sheet. Apply the fin letter decals with the aid of this guide.

84 Press the clay nose weight firmly into the cavity of the Apollo Capsule. Replace the capsule on the S.M. body. If necessary, wrap a short piece of tape around the base of the capsule to socket it snugly into the S.M. tube. DO NOT cement the capsule into the tube.

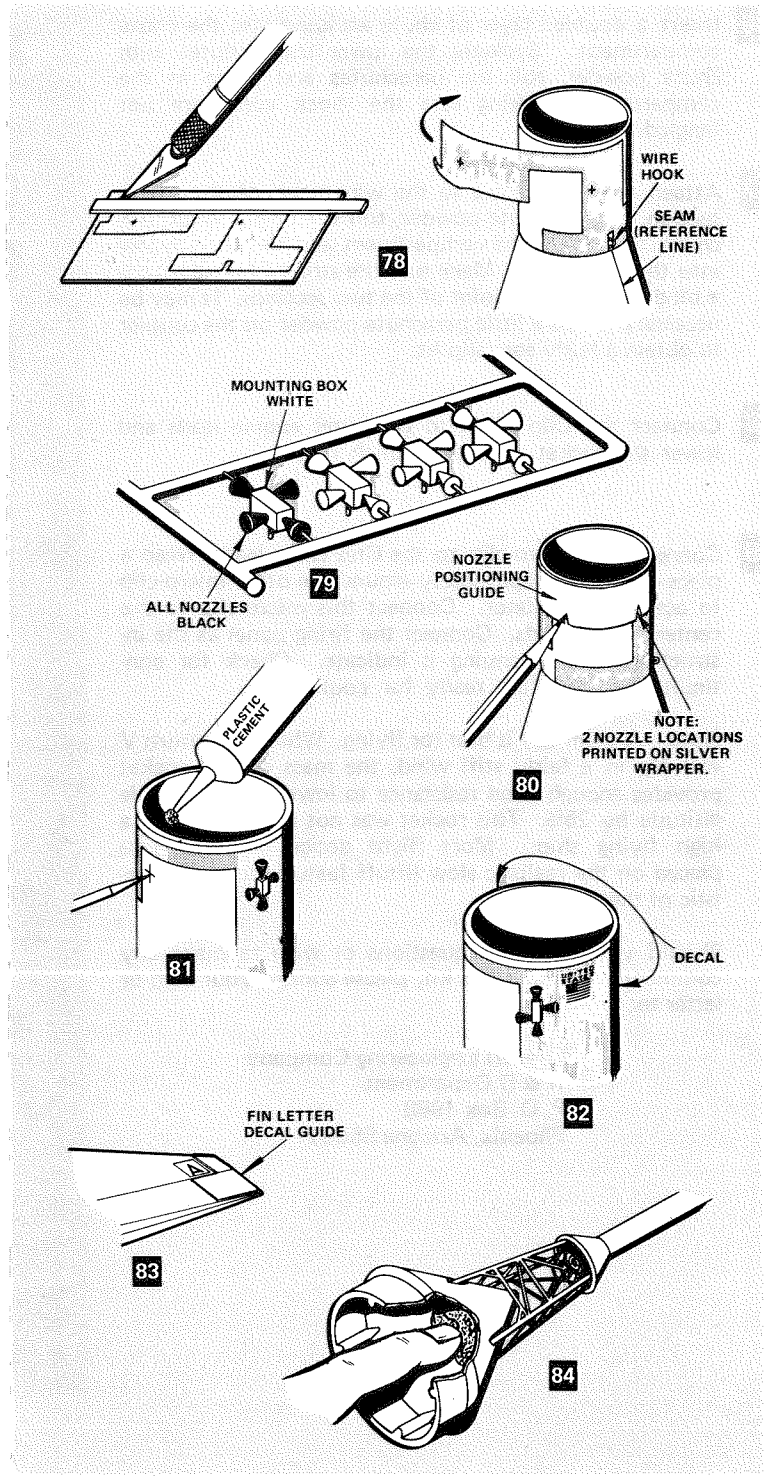
FLIGHT PREPARATION AND LAUNCHING

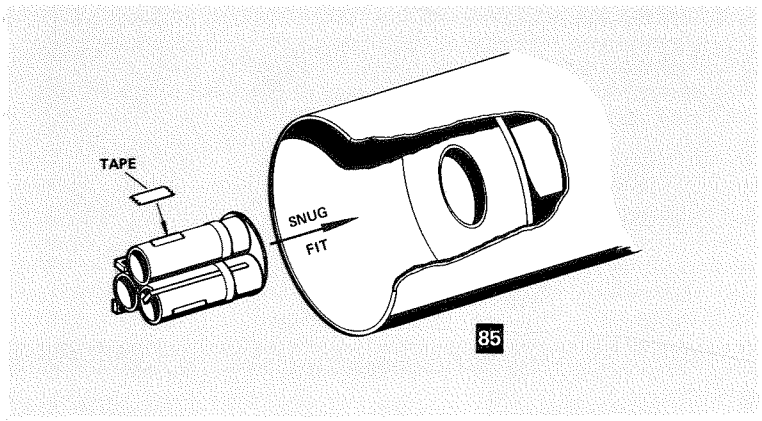
The following items will be required to fly the Saturn V.*

1. Engines: 3 B4-2's for altitudes of 300-400 feet.
   or: 3 C6-5's for altitudes of 500-600 feet.
2. Sure Shot Igniters (Centuri IG-12)
3. Parachute Powder (Centuri PDR-17)
4. Flameproof Wadding (Centuri PW-19)
5. Clip Whip/Less TIR-52 (Centuri ECW–1A)
6. Heavy Duty Launcher (Centuri LIA-100)
7. Firing Panel (Centuri EFC-2 or EP-612)

*See your local hobby dealer first. If he cannot supply the materials, they may be ordered direct from Centuri.

85 Read TIR-52 thoroughly before wiring the engines. Remove the dummy nozzle unit from the base of the rocket and set aside. This unit is for diaplay only and cannot be used in actual flight. Set the "live" engine cluster unit on your workbench and insert the engines with igniters in place. Wire up as indicated in TIR-52. Apply short pieces of masking tape to the cluster unit as shown and slip the unit into the exhaust tube. Use as much tape as required to obtain a good snug fit. This is important, since the engine's ejection charge could push a loose fitting cluster out the bottom of the tube instead of pushing the upper "stage" from the top of the tube.





86 Insert a doubled layer of chute wadding into the chute compartment. Sprinkle the lower stage chutes with chute powder, roll the parachutes and place in the compartment, making sure the shock cords are not tangled.

87 Attach the snap hook to the wire hook of the upper section. Apply chute powder, roll the upper stage parachute, insert into the compartment and slip the coupler into the main tube. Make sure the string does not cause a bind in the slip fit joint of the two sections. It may be necessary to rub a little parachute powder on the coupler to obtain a fairly easy slip fit.

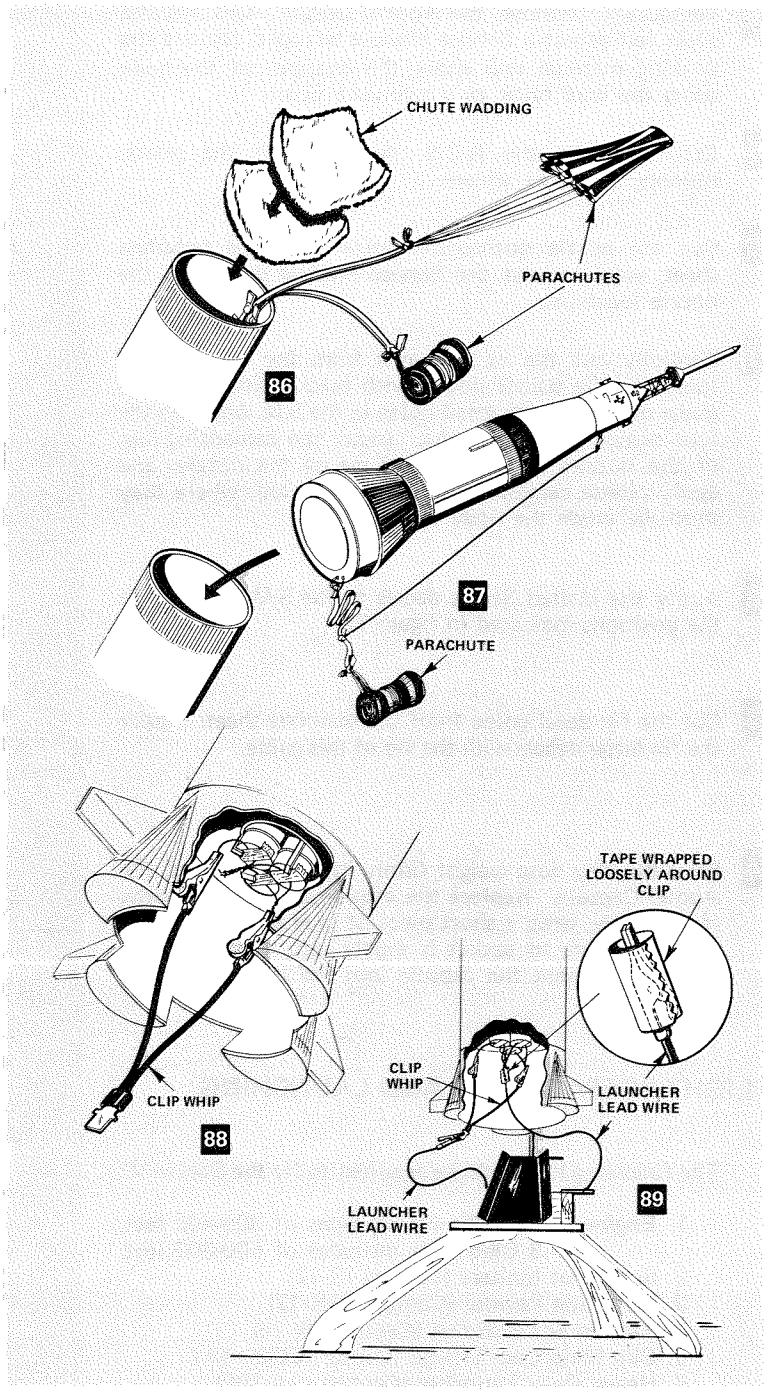
88 Connect the Clip Whip to the outer engine leads and lower the rocket onto the launch rod.

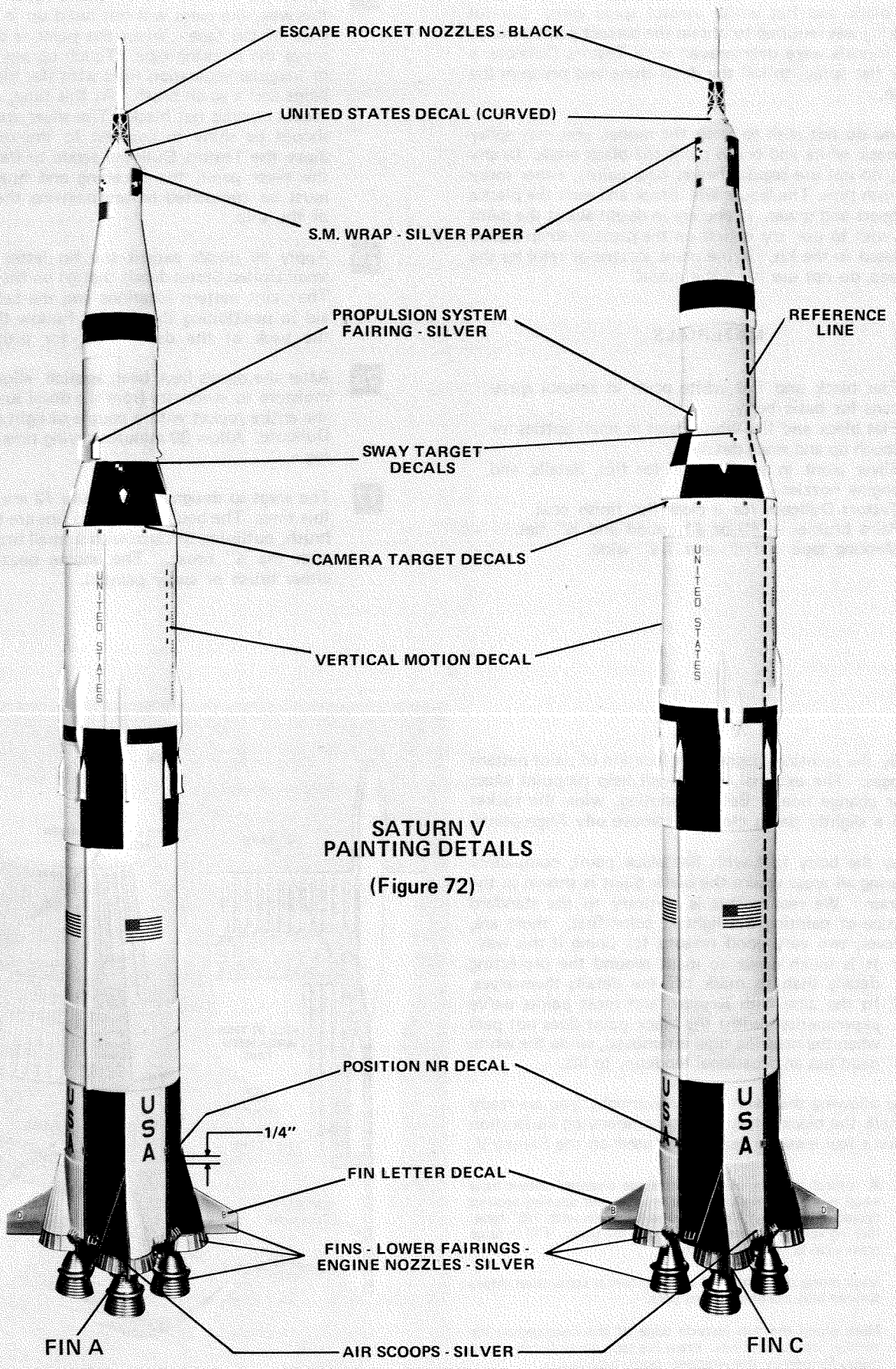
89 Connect one micro-clip to the Clip Whip lead. Wrap a piece of masking tape loosely around the other micro-clip to act as an insulator. Connect this micro-clip to the center engine leads. Connect the firing panel as the instructions accompanying it indicate. Check for continuity and you are ready for countdown.

Note: A calm day is best for flying. While the Saturn V will fly in a fairly stiff wind, the mass of this rocket provides enough wind resistance to lower the attainable altitude by 25%. This rocket was not designed to be a high flying ship. More flight design emphasis was placed on the realistic slow liftoff features so characteristic of the real Saturn.

Should you have any questions or wish to make any comments regarding this kit, please address your card or letter to:

Centuri Engineering Company
R & D Department
P. O. Box 1988
Phoenix, Arizona 85001





SATURN V PAINTING DETAILS

(Figure 72)

A. Engine Mount.

Note: In section A & B, cement refers to wood cement such as Superbond, Titebond, etc.

1. Place a thrust ring against an engine tube and put a pencil mark on the tube along the top of the ring. Repeat for the other two engine tubes.

2. Cement the thrust rings into the tubes, flush with the ends which were marked with the pencil. Cut a short slit in each tube, on the pencil mark.

3. Insert one end of an engine lock into the slot. Slip a mylar engine lock ring over it and cement in place 7/8" from end of tube. On the second tube, cement the lock ring 1¼" from the end and on the third tube, 1⅝" from the end.

4. Cement the tubes together. Position engine locks as shown so they will not interfere when the engine cluster is slipped into the exhaust tube.

5. Cement gus seal in place on top of cluster.

B. Basic Body.

6. Using the template-ruler, mark the bulkhead location on the exhaust tube. Write the word "bottom" on the end of the tube indicated on the template.

7. Using a piece of paper wrapped around the tube as a guide, draw a line around the tube on each mark.

8. With the end of a pencil, place a generous bead of cement inside the tube about 2¼" from the bottom end. Insert main thrust bulkhead into end of tube.

9. Place the engine cluster into the end of the tube and push forward until only .35" (11/32") projects from the end of the exhaust tube. This will position the thrust bulkhead the correct distance (2¼") inside the tube. Remove the cluster immediately so it will not be accidentally cemented in place.

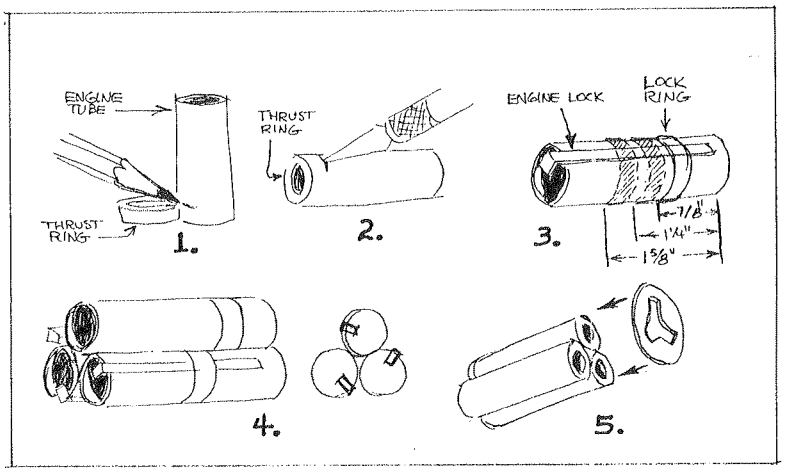
10. There are five balsa bulkheads in the kit. Four are made of 1/8" balsa, one is 3/16" balsa. Cement the 3/16" bulkhead to the bottom of the exhaust tube.

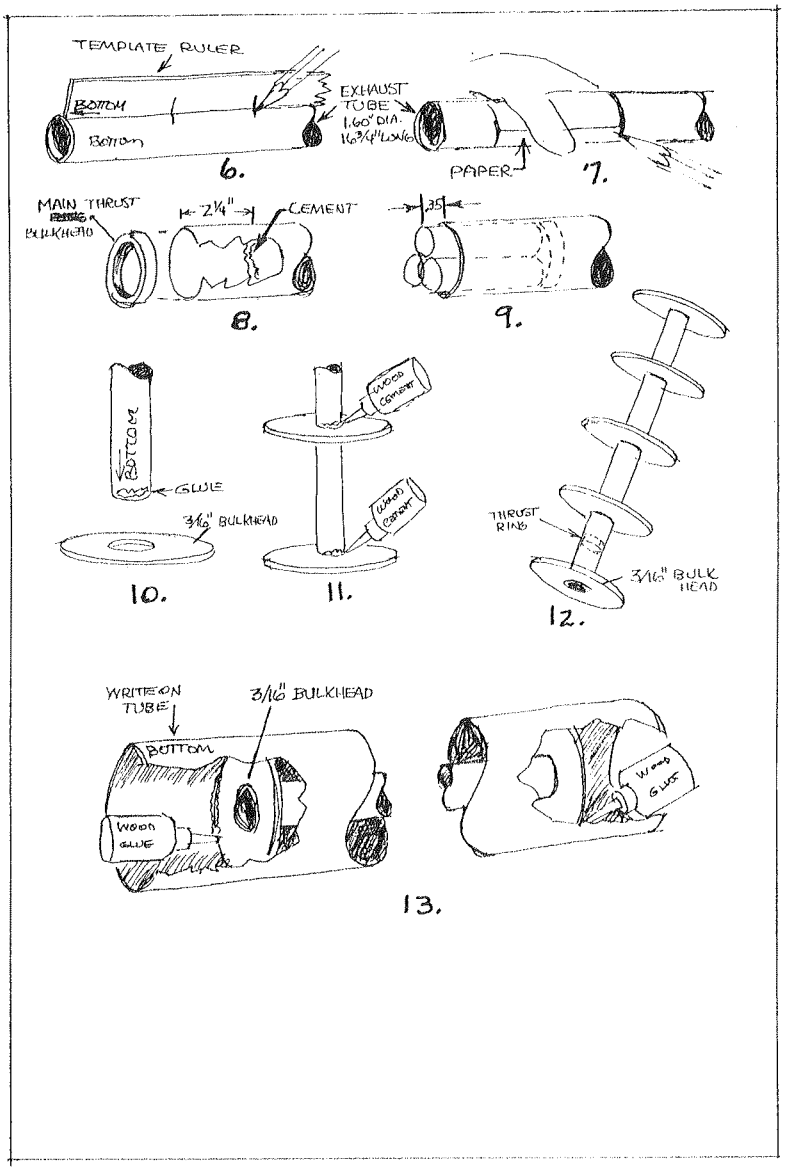
11. Slip the four 1/8" bulkheads over the top of the exhaust tube, position the top of each bulkhead even with the pencil marks and cement in place.

12. The finished assembly will look like this.

Note: In order for all details, paint patterns, decals, etc. to be in proper relation, skip a reference point in the form of a vertical line has been drawn on the three body tubes at the factory. These reference lines will be referred to in subsequent assembly steps.

13. When the cement has thoroughly dried, push the core assembly into the main body tube. Position it so the bottom bulkhead is exactly 3.09" (3 3/32") from the end of the body tube. Run a generous fillet of cement around the top and bottom bulkhead-body tube joints. Write the word "bottom" on the appropriate end of the body tube.





14. The second-third stage coupler is made up of 2 die cut rings (3.93" O.D. x 2.62" I.D.), one coupler tube (3.93" O.D. x 1.25" long) and a short piece of red string. Double the string, loop thru holes in one die cut ring and tie securely. Cement this ring to the coupler tube with the knot to the inside. Cement the other ring in place and let dry.

15. With the end of a pencil, run a fillet of cement around the inside of both ring joints.

16. Push the 3rd stage body tube (2.62" O.D. x 8.67" long) into the coupler. One end of the tube should be flush with the bottom of the coupler (end to which string is attached). Run a fillet of cement around top and bottom body tube - ring joints. (Cement the die cut disc (center of one of the rings) to the bottom of the body tube. This will serve as a gas seal for the parachute compartment.

17. Carefully cut the third stage reducer wrapper and its gluing tab from the printed cardstock sheet. Curl the wrapper with your fingers until, when released, it holds the desired shape. Be careful not to wrinkle the cardstock.

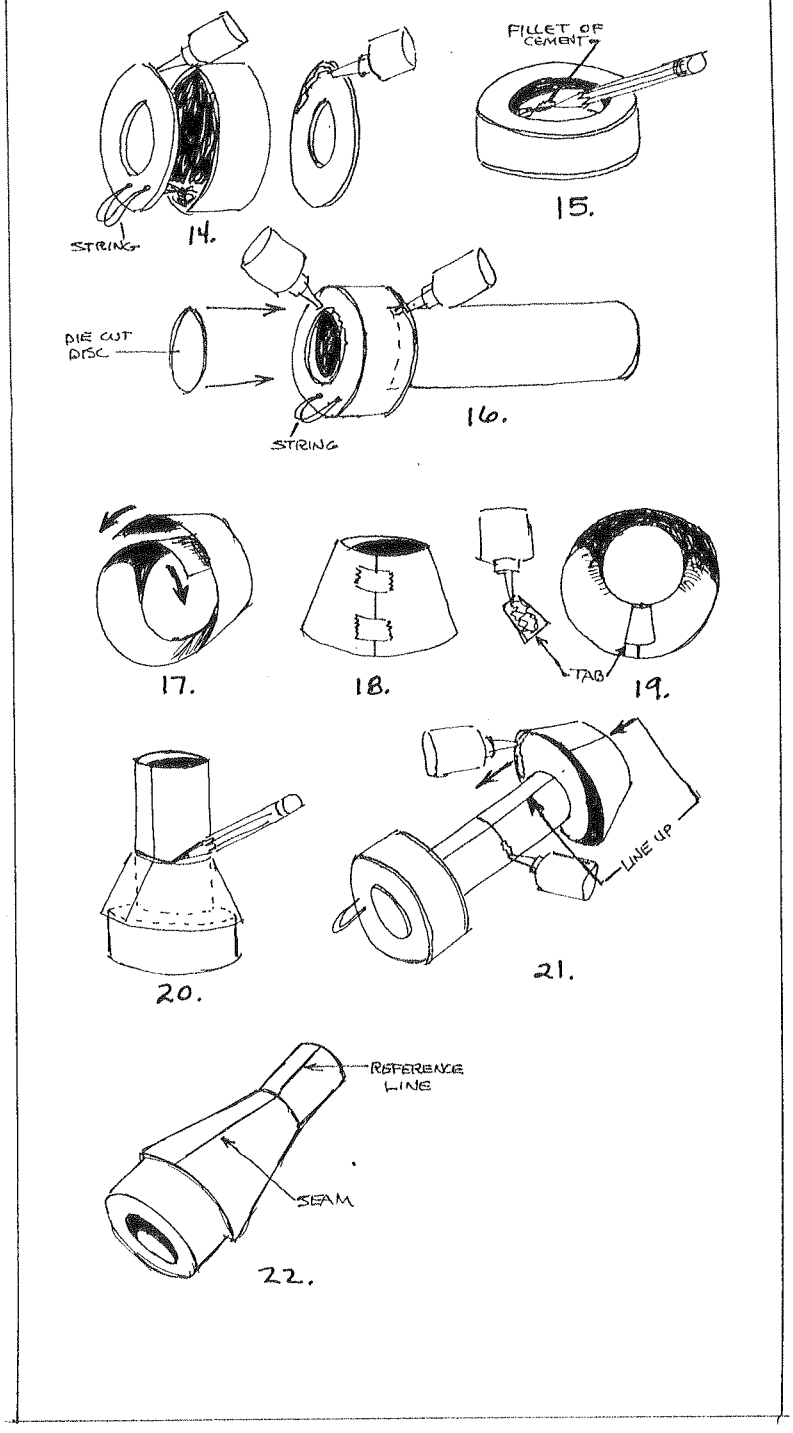
18. Using masking tape, temporarily secure the ends. Make sure they are even at the top and bottom and are tightly butted together.

19. Smear cement on the gluing tab and place it on the inside of the reducer joint. Position the tab 1/32" below the top of the reducer with the larger gap at the bottom. Press the tab down firmly. After the cement is dry, remove the masking tape.

20. Place the reducer over the third stage body and slide it down until it fits over the coupler. Draw a line on the body tube around the top of the reducer.

21. Remove the reducer, apply cement to the bottom inside of the reducer and on the pencilled line on the body tube. Replace the reducer, sliding it down over the coupler, with the seam of the reducer lined up with the reference line on the body tube.

22. The L.E.M.-S.M. (Lunar Excursion module - Service Module) body is composed of two die cut rings (2.59" O.D. x 1.54" I.D.), one coupler tube (2.54" O.D. x 1.25" long) one body tube (1.54" O.D. x 6.4" long) and one L.E.M. reducer wrapper & gluing tab. Assemble the (LEM-SM) body exactly as you did the third stage body (14 thru 21) except the attachment string and gas seal are not required.



C. Corrugated Wrappers

23. Important: The cement enclosed with this kit is a contact type cement. It is the only type cement that will permanently bond the plastic wrappers to the body tubes. Under certain conditions it can attach and melt the plastic parts. Follow these instructions carefully.
a. Be sure you have the wrappers turned face down before applying cement.
b. Brush the cement on evenly around all edges and across the middle of each wrapper.
c. Do not brush cement into the lengthdetail depressions of the wrappers.
d. Apply cement to the body tubes exactly in the areas to which the wrappers will be applied.
e. Allow cement to dry before cementing the wrappers to the bodies.
f. Position the wrappers exactly before allowing them to touch the body tubes.
g. Work from left to right, smoothing the wrapper onto the tubes with an even pressure.
h. You must have cement on both surfaces for any particular area to bond.

24. Be sure to orient the wrappers as shown before bonding to the body. Some wrappers look almost the same upside down as they do right side up. It will make a difference if you get them on wrong, since there are systems fins, decals, etc. that must be applied later.

25. Use the template-ruler to lay out wrapper locations on the main body tube.

26. With a piece of paper wrapped around the body for a guide, draw lines around the body tube on the previously located marks.

27. Apply contact cement to the bottom portion of the body tube and the back of the bottom 1st stage wrapper.

28. Press the left hand edge of the wrapper onto the body tube exactly on the reference line and carefully wrap around the tube.

29. Using the die cut bottom edges of the wrapper as a guide, cut out the four exposed areas of the body tube between the tail fairing locations.

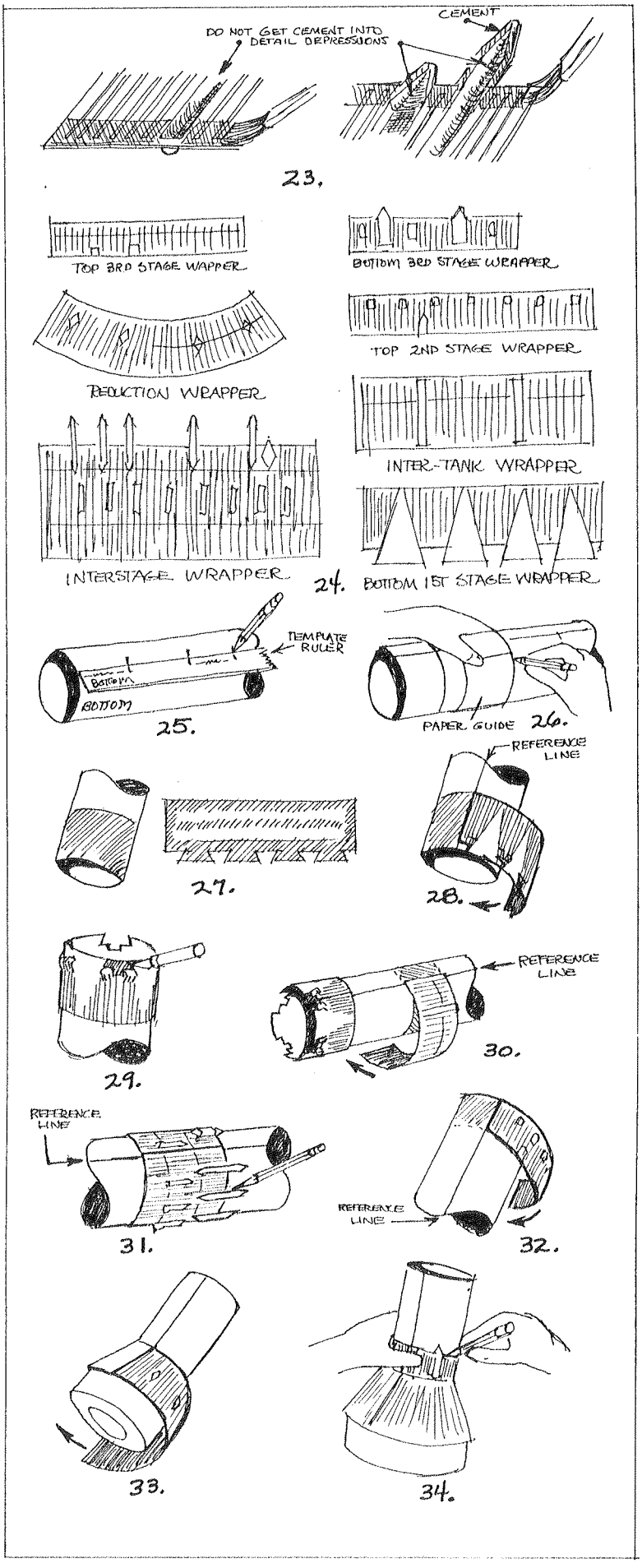
30. Apply the inter-tank wrapper in the same manner. Check carefully against step 24. This is an easy one to get upside down.

31. Before applying cement, wrap the inter-stage wrapper around body tube and draw a line around the projection details. When applying cement, make sure you have a film of cement on the flange around the top wrapper details and in this area on the body tube. When bonding the wrapper to the body, don't press too hard against the protruding details.

32. Apply the top 2nd stage wrapper in the same manner as the first three.

33. The reduction wrapper covers the paper ~~attachment~~ of the 3rd stage. Use the seam of the reducer as a starting point for applying the reduction wrapper.

34. Wrap the bottom 3rd stage wrapper around the body, butted against the reducer section. Draw a line around the top of the wrapper. Apply cement and fasten to body as previously outlined.



Corrugated Wrappers (Cont'd)

35. Measure down and mark .36" (3/8") from the top of the 3rd stage body tube. Place the top edge of the upper 3rd stage wrapper on this mark. Hold the wrapper around the tube and draw a line along the top and bottom of the wrapper. Apply cement and fasten in place. Check carefully against ~~step~~ illustration in step 34. This is another wrapper that looks almost the same upside down.

D. Body Details

Note: for this section, cement refers to wood cement.

36. Included in the kit is a half round piece of basswood - 24" long. This is used to form the sections of the system's tunnels that lie between the corrugated wrappers. Before doing any cutting, sand the wood lightly with very fine (#000) sandpaper. Place the strip against the top of one of the plastic tunnels moulded into the bottom 1st stage wrapper. If you applied the wrappers exactly on the referenced line, a tunnel section on the inter tank wrapper should be directly above. Mark the half round strip where it intersects this tunnel. Cut the wood on the mark and cement in place between the two tunnel sections. Another section of tunnel must be fitted between the inter tank and inter stage wrappers. Do this in the same manner. Turn the body over and apply the two tunnel sections to the other side. One segment of tunnel must be cut and cemented between the inter-stage and top 2nd stage wrappers.

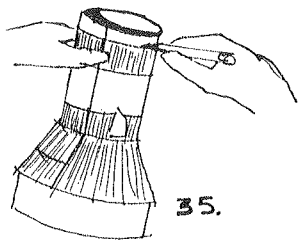
37. The ~~sqa~~ rectangular tunnels on the 3rd stage are cut from the short pieces of strip wood enclosed. Cut the wood to the dimensions shown and sand lightly with #000 sandpaper. Cement the tunnels in place with the tops in the plank areas provided on the corrugated wrapper.

38. Cement the LEM-SM stage into the top of the 3rd stage. Be sure to line up the reference lines.

39. Cut a 1/8" slit in the side of the LEM-SM body just above the reduction wrapper. Insert the wire hook from the inside with the loop protruding through the slot. Cement a scrap of paper behind the wire to hold it in place. This hook forms an attachment point for a portion of the parachute rigging.

40. From the 1/16" sheet of balsa, cut two pieces 1/4" wide by 1" long. Sand the balsa and sand lightly. Cement the two launch lugs to the balsa "stand offs". Slip the launch lugs over a 3/16" steel launch rod, apply cement to the bottom of the balsa stand offs and cement to the body tube ~~at the~~ with the right hand edge of the balsa on the reference line. Check to see that the launch rod does not touch any of the detail parts. Allow the cement to dry thoroughly before removing the launch rod.

Note: If you do not have a 3/16" launch rod, you may as well buy one now. You will need it for launching your saturn 5 anyway. The standard 1/8" launch rod is too light for this large a ship.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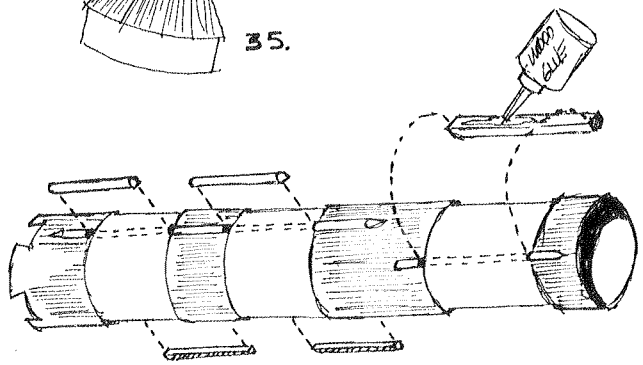

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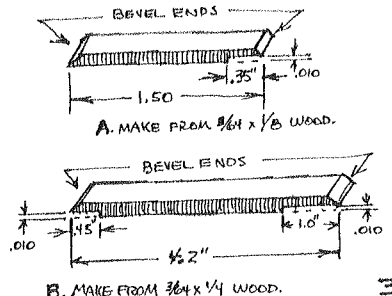

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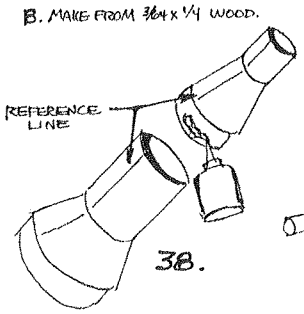

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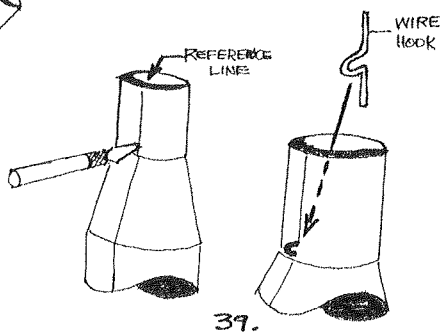

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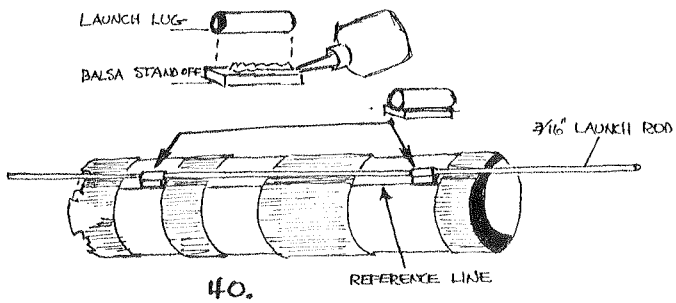


40.

E. Fins and Fairings

Note: Styrene plastic cement is required for assembly of parts in sections E & F. Do not use contact cement for assembling these parts.

41. Place each fin half on a piece of medium sand-paper (#320 grit). Roll back and forth several times to thin down the flange as shown in the cross section view. This allows a cleaner fit and facilitates removal of the flange in step 43.

42. Apply cement to one fin half. Press a matching fin half against it and line up the edges. Hold the pieces together until the cement begins to set. Repeat on the remaining fins.

Note: Before completing the next step, allow the fins to dry for 8 hours. The cement softens and weld the plastic and time must be allowed for the plastic to completely reharden.

43. Carefully trim away most of the flange around the fin center line joint. Finish removal of the flange by sanding with fine sand paper.

44. The tail fairings must be hand cut and fitted to the body and fins. Begin by cutting out the triangular shaped area defined by the depressed lines in the top center of one fairing. This forms the fin opening which will be enlarged later to fit exactly over the fins.

45. Cut along the contoured extention at the bottom of the fairings. This forms a curved base that matches the curve of the body tube.

46. Cut away the flange around the base of the fairing. Use the fairing trim guide from the template sheet. Carefully trim away small amounts of material from both sides of the fairing, checking often against the template.

47. Place the fairing in the proper position on the body and check the fit. Lightly trim or sand the edges of the fairing until it fits exactly to the body. Repeat steps 44 - 47 on the remaining 3 fairings.

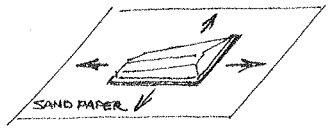
48. Cut the fin positioning guide from the template sheet. Place the guide on the body lined up with the bottom of the fairing locations. Mark the fin locations with a pencil.

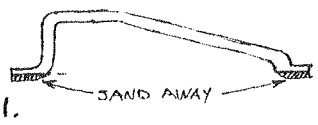
49. Apply cement to one fin. Press against body tube in the proper location. Use the fin alignment guide from the template sheet and slip over the bottom of the fin. Align the fin so the guide fits exactly on the body tube. Set the assembly aside to dry. Apply the remaining fins in the same manner.

50. Run a fillet of cement around each fin-body tube joint. Set aside to dry.

51. Place a tail fairing over one of the fins and slip it down to where it will go. Approximate the amount of material to be cut away. Remove the fairing and carefully trim the fin opening. Replace the fairing, check the fit and trim some more until the fairing slides over the fin far enough to properly seat against the body tube.

52. Run a bead of cement along the base of the fairing and cement it to the body. Run a fillet of cement along the fairing-body joints and along the fairing-fin joints. Repeat the above steps on the remaining fairings.





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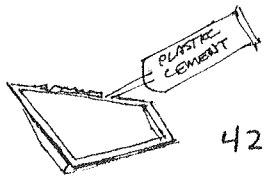

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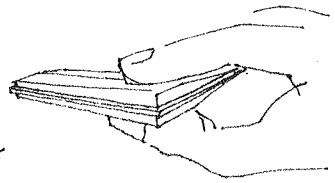

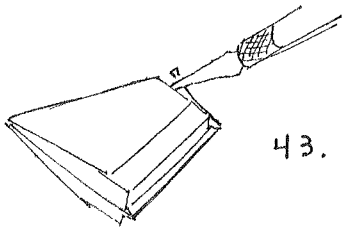

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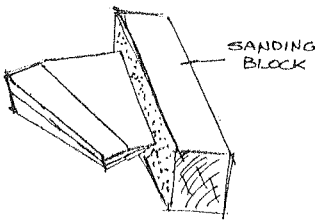

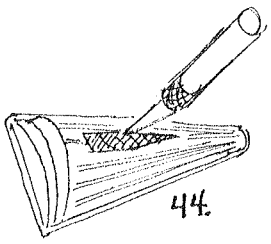

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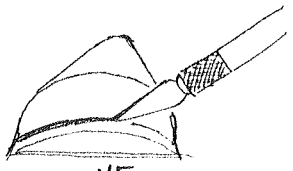

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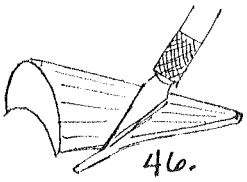

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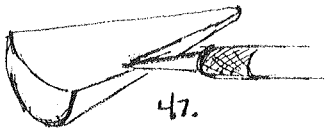

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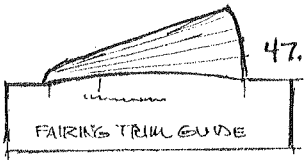

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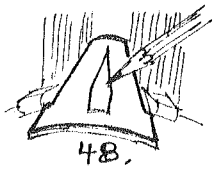

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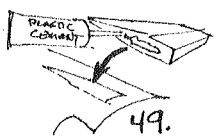

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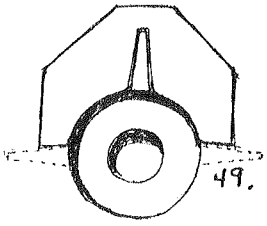

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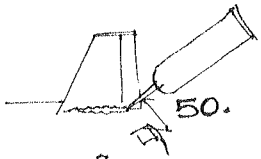

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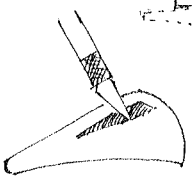

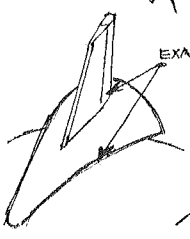

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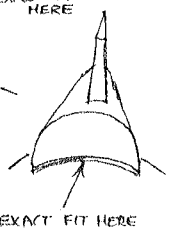

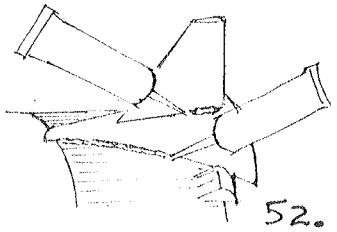

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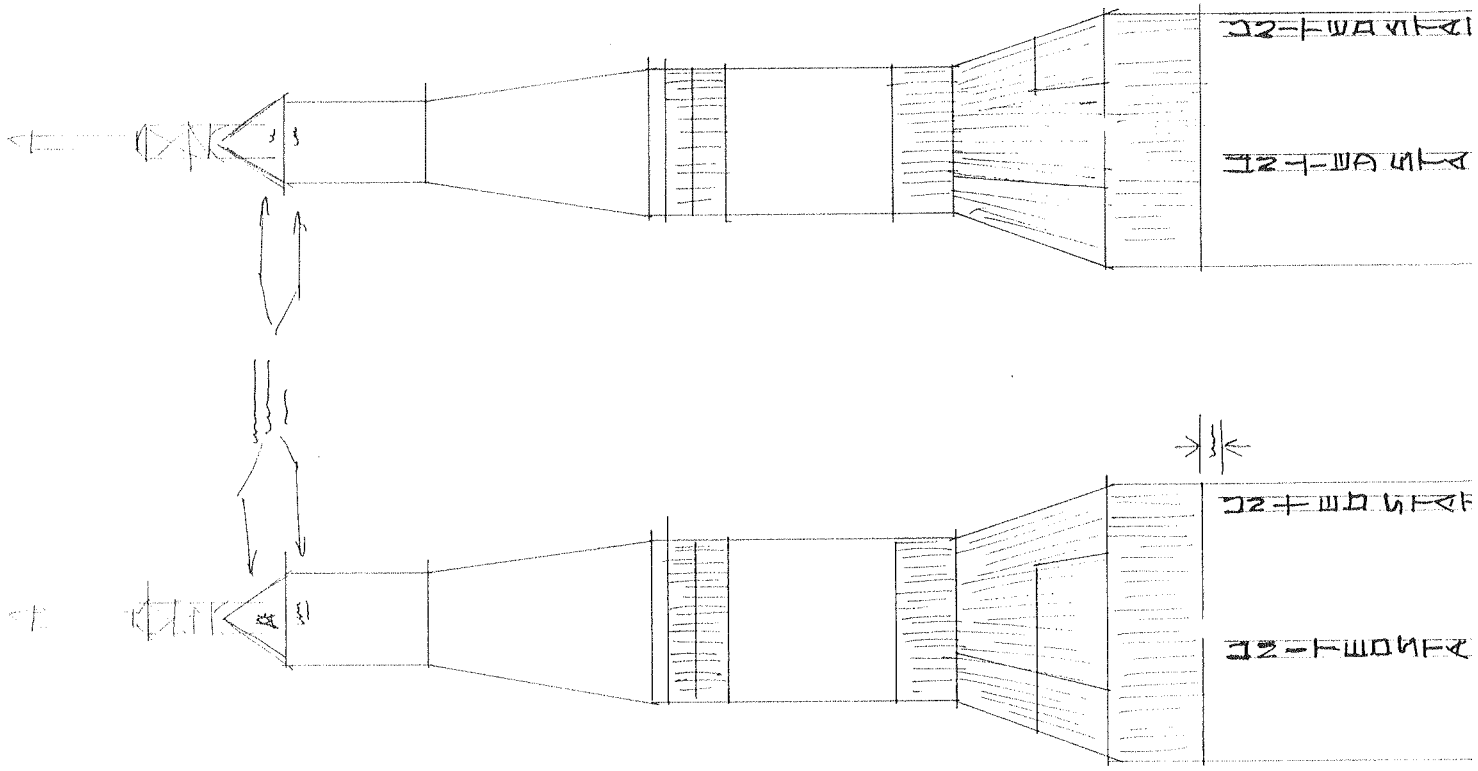


603. Painting & Decal Diagram

H. Painting

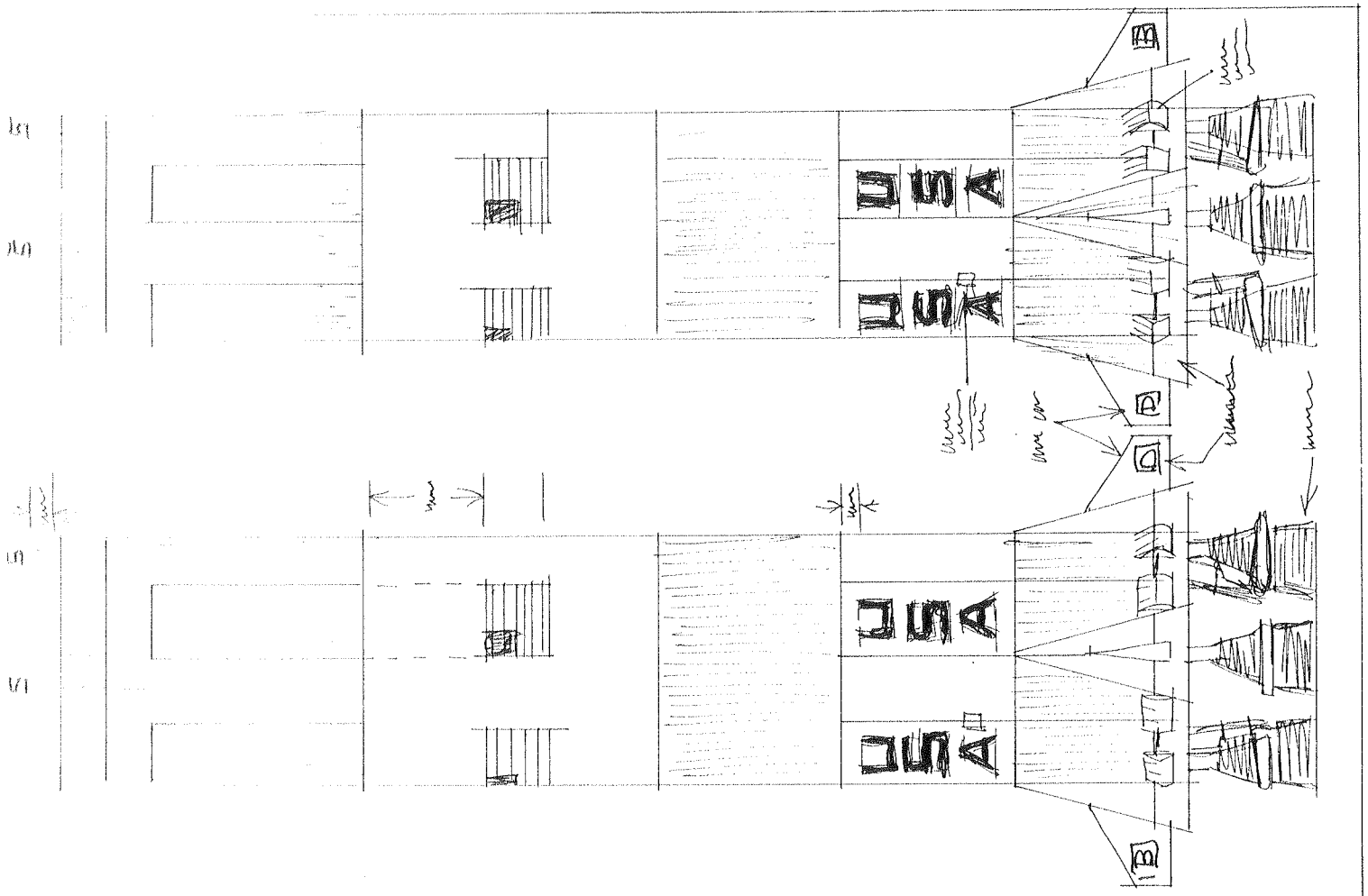
Painting the Saturn correctly is a very important step toward the final overall appearance of the model. Our models here at Centuri were painted with Krylon lacquer-based enamel. We used flat white and flat black to achieve a degree of reflectiveness more in keeping with that of the prototype bird. The flat paints have other advantages: (1) They mask better, do not peel like gloss colors. (2) They spray on in lighter coats, do not fill in details. (3) The corrugations and details have better shadow definition. After decal application our models were sprayed with Testors Dull Coat to kill the decal shine and to help preserve the finish.

As we said, Krylon is a lacquer-based enamel. However, ordinary spray or brush lacquer will not do. Lacquer will attack the plastic and cause crazing and even melting of the corrugated areas. If Krylon is not available, or if you elect to use some other brand, choose an enamel. Enamels will not harm the plastic. A small piece of scrap plastic is included with the kit. Try the paint on this before applying it to the model. Both Testors and Pactra market flat enamels in bottles and spray cans. These are available at most hobby shops.

Spraying and masking provides a smoother finish, however, you may brush paint the model if you desire. In addition to the basic black and white, you will need silver for the fins and lower portions of fairing and engine nozzles.

Where there are paint pattern color changes across the corrugated areas, you will find the space between the raised portion of the corrugations filled in. This aids in masking the model by providing a reference line and by preventing the second color from over spraying under the masking tape.

If you use the recommended method of spray painting, spray the black first, in all areas where black is shown on the diagram. We realize this is contrary to the standard practice of painting the lightest color first, however, there are two very good reasons for doing it our way. (1) It is much easier to mask around the projecting details (see interstage section on diagram) than to try to mask off the details themselves. (2) In the case with Krylon (and we suspect most other paints are likewise) the black will mask with no peeling, while the white has a tendency to lift occasionally.



64. After the black paint has been allowed to dry for 3-4 hours (longer if air is humid) you are ready to mask for spraying the white. A few masking techniques are given here.

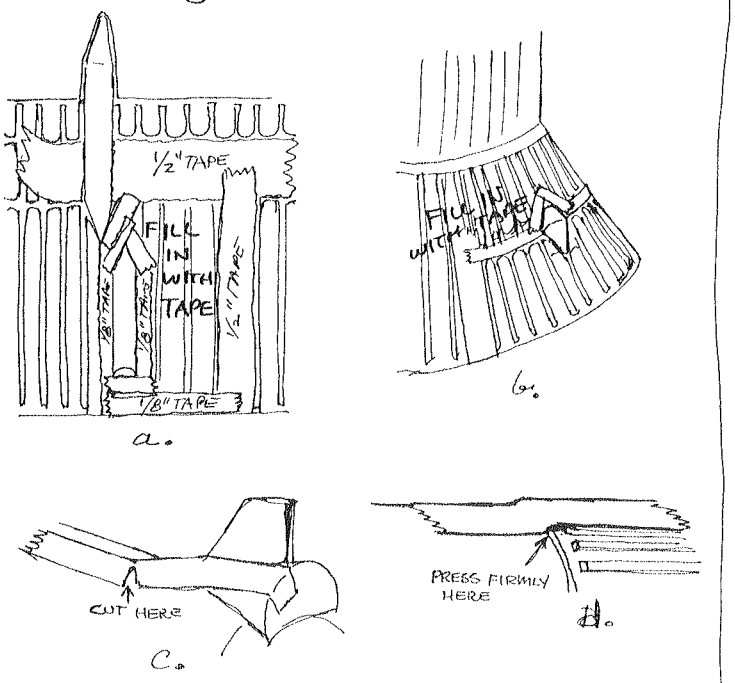
a. A typical section of the inter-stage wrapper shows how small pieces of masking tape are applied around projecting details. Mask around all edges first, then fill in the center with tape as required. Make sure tape is pressed down firmly along all edges.

b. Use 1/8" tape to mask along curved areas. Wider tape will not stretch enough to assume the correct contours.

c. In areas where there is a surface change, the tape can be applied in a strip, then cut to allow the tape to assume the surface shapes.

d. Be sure to press tape down firmly along all ridges. Mask along the top edges of the corrugations.

64. Masking procedures



64 (Cont'd) Before masking off the black areas, study the painting diagrams. The relationship of the external details will aid in locating the exact paint change points.

After masking, spray the ship with flat white, allow to dry, and remove the masking tape — one piece at a time.

The escape rocket nozzles may be painted flat black with a small brush. Any locked up to the paint pattern should be done at this time.

The fins, lower portion of the tail fairings and the air scoops are silver. They may be sprayed, however we have found that an easier job to do by brush painting. Use a small brush to trim around the silver areas, then use a large brush to fill in. A second coat of paint may be necessary.

The nozzle unit, including bulkhead is painted silver. Brush or spray as you prefer. You may paint the bottom of the nozzles bright red to represent dust covers which are kept over the nozzle openings until launch.

I. Decals

The painting diagram shows the location of all the decals. The United States and USA decals can be "eyeballed" in place fairly easily. Very light pencil lines should be drawn for positioning the flag decals. The thin letter decals are positioned with the aid of the positioning template located on the template sheet. There are target squares on the corrugated area provided for positioning the camera targets and silver targets. In applying the decals, smooth out all air bubbles with a soft cloth. After the water has been allowed to completely evaporate from the decals, spray the entire ship with Testors dullcote. This is a flat finish spray that will kill the decal shine and hide the edges of the decals. It also acts as a preserving finish, facilitating "wiping down" the ship after firing.

J. Recovery System

65. One of the 3 shock cords is longer than the other two (23"). Attach this shock cord to the attachment string on the bottom of the third stage. Tie in a firm triple knot. ~~Tie the~~ One piece of black shroud line is tied around the shock cord.

66. Tie the black shroud line (~~to the~~) around the shock cord. Now loop the shock cord around the shroud line knot to form a double knot so the shroud line will not slip.

67. Tie the shroud line to the snap hook leaving exactly 13" extended length to the shroud line.

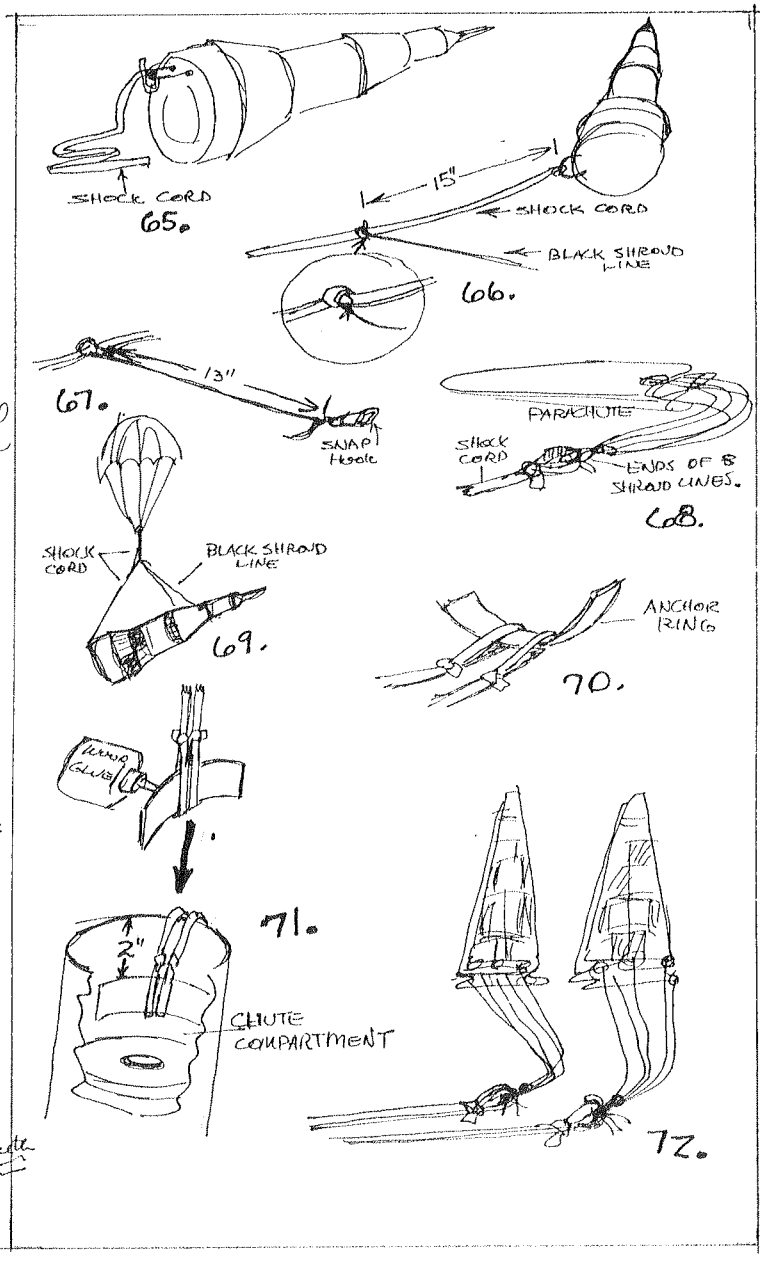
68. Assemble the 20" parachute according to instructions printed on the perimeter of the chute material. Tie a loop in the free end of the shock cord and tie the parachute shroud lines to this.

69. By attaching the snap hook to the small wire loop (see step ___), and holding the unit by the parachute, you can see how the upper section will float to earth with the delicate lower struts angled upward from the initial impact point.

70. The two 18" long shock cords are attached to the lower station of the rocket. Loop the two shock cords around the 1/2 section of tubing anchor rings. Tie both in a loose loop, but with a firm triple knot.

71. Slide the shock cord loops together in the middle of the anchor ring, place a generous amount of cement on the back of the anchor ring and attach to the inside of the main body tube approx. 2" down from the top.

72. Tie loops in the ends of each shock cord. Assemble the two 24" parachutes according to the instructions on the plastic. Tie the ends of the shroud lines of each parachute to the respective shock cords. This completes the recovery system assembly. Temporarily pack the chutes into the chute compartment. Detach the shroud lines from the LEM-SM umbilical and pack the 2nd upper section chute & lines into the chute compartment. Now the model is ready for launch, with the recovery system completely installed in the rocket body.



F. Engine Nozzles

53. Cement the five engine core tubes into the die cut nozzle rings.

54. Trim away the flange at the top of each nozzle half and cut out the top of the main exhaust tube.

55. Apply contact cement to the inside of the nozzle halves and to the core unit in the areas shown.

56. Press a core unit into one nozzle half. Run a bead of plastic cement around the flange of the nozzle and set the other nozzle half in place. Press the nozzle halves together until cement begins to set. Repeat on remaining nozzle units.

using wood glue,

57. Cement the nozzle spacer tube to the die cut nozzle bulkhead. Center the spacer tube between the holes in the bulkhead.

58. Insert the nozzle ~~tubes~~ core tubes in the holes in the bulkhead and push forward until the plastic nozzle tubes fit firmly against the bulkhead. Rotate the outside nozzles so the fuel feeding tubes point directly towards the center nozzle. Rotate the center nozzle so its fuel feeding tube points towards one of the outside nozzles. Run a generous fillet of wood cement around the top of the bulkhead — ~~tube~~ core tube joints.

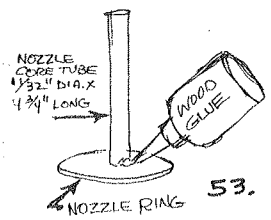
59. Cut a strip of balsa from the enclosed sheet ¼" wide x 2 3/4" long. Trim the ends for a snug fit inside the spacer tube. Run a bead of cement on the top of the center nozzle core tube and push the strip down until it rests on the tube. Making sure the center nozzle is lined up vertically, cement the ends of the strip to the sides of the spacer tube. Cut scraps of balsa to fit between the ~~tube~~ spacer tube and the core tubes of the outside nozzles. Cement in place. Rotate on the vertical alignment of the nozzles. Set the bulkhead aside to dry.

G. Tower Assembly

60. With plastic cement, cement one full and one partial tower leg together making sure the X members align to the inside. Cement the other full & partial legs together. Cement the tower support ring to the center of the X members of the subassembly. Cement the two subassemblies together. Make sure the tower unit is squared up and set aside to dry.

61. Cement the escape nozzle halves together. Socket one nozzle set into the other and cement the nozzle unit into the tower skirt with the nozzles set at a 45° angle to the holes provided for the tower legs.

62. Cement the tower legs into the sockets in the capsule. Cement the skirt-nozzle assembly onto the tops of the tower legs. Socket the smaller escape rocket tube onto the skirt and socket the nose cone into the top of the rocket tube. Do not cement the capsule unit into the main rocket body.



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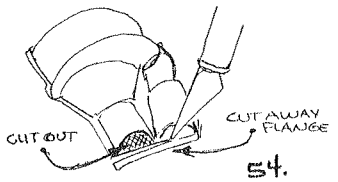

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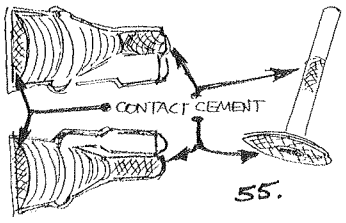

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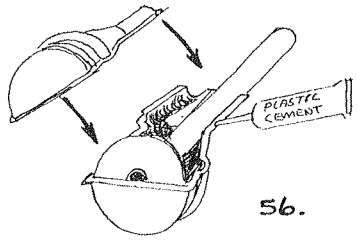

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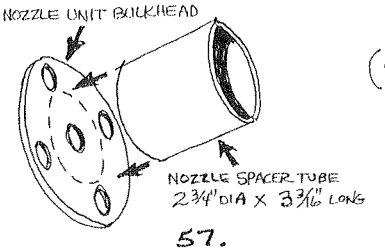

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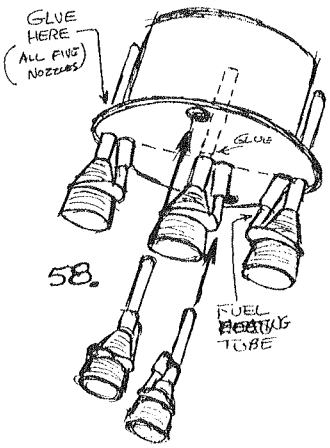

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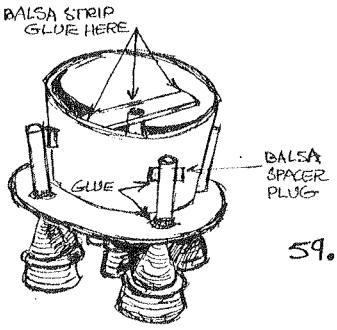

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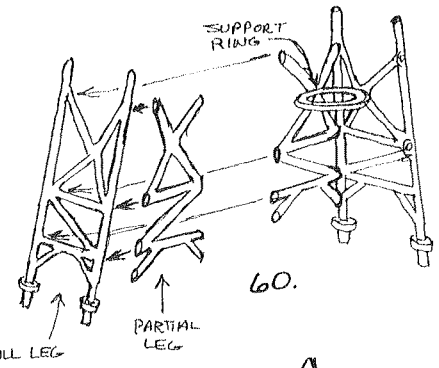

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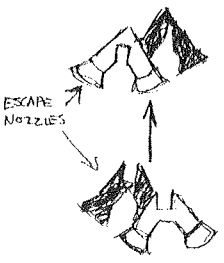

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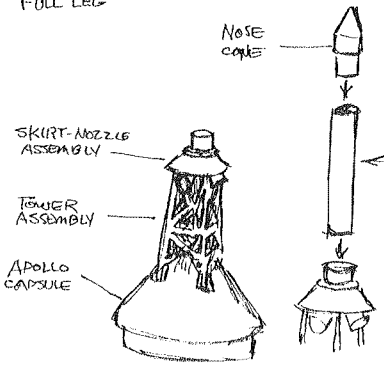

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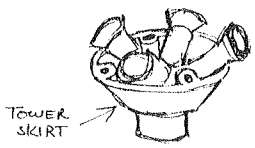

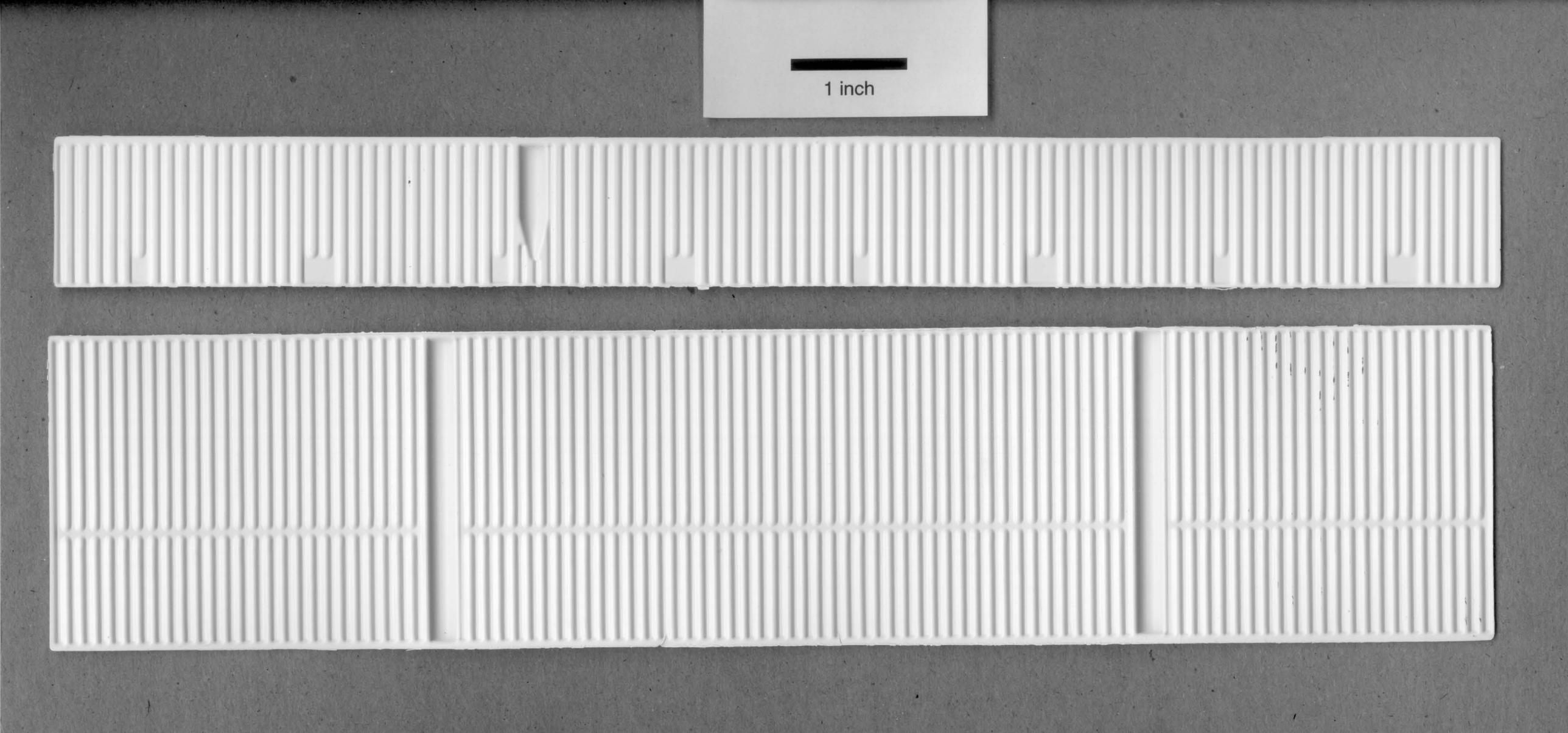
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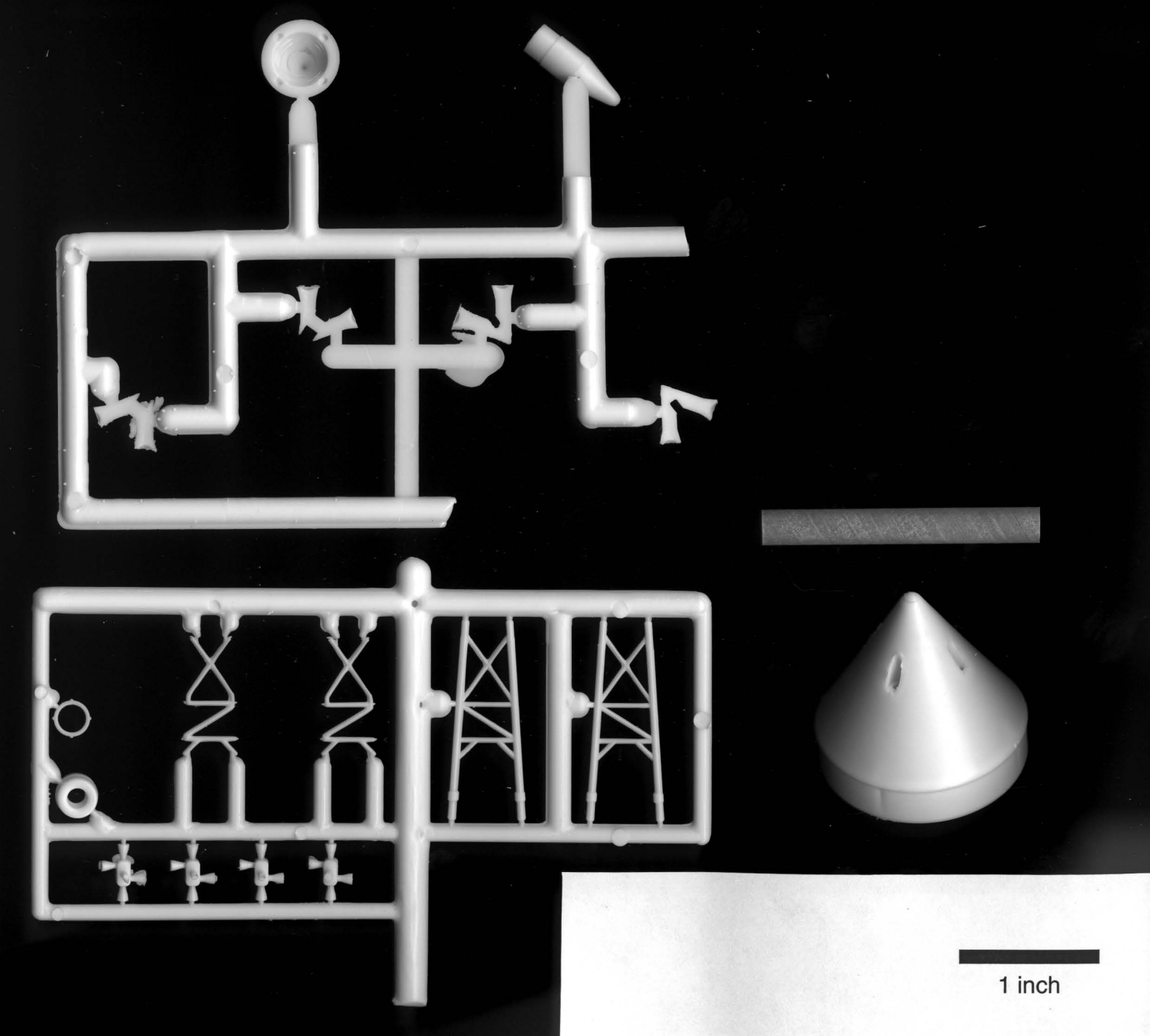
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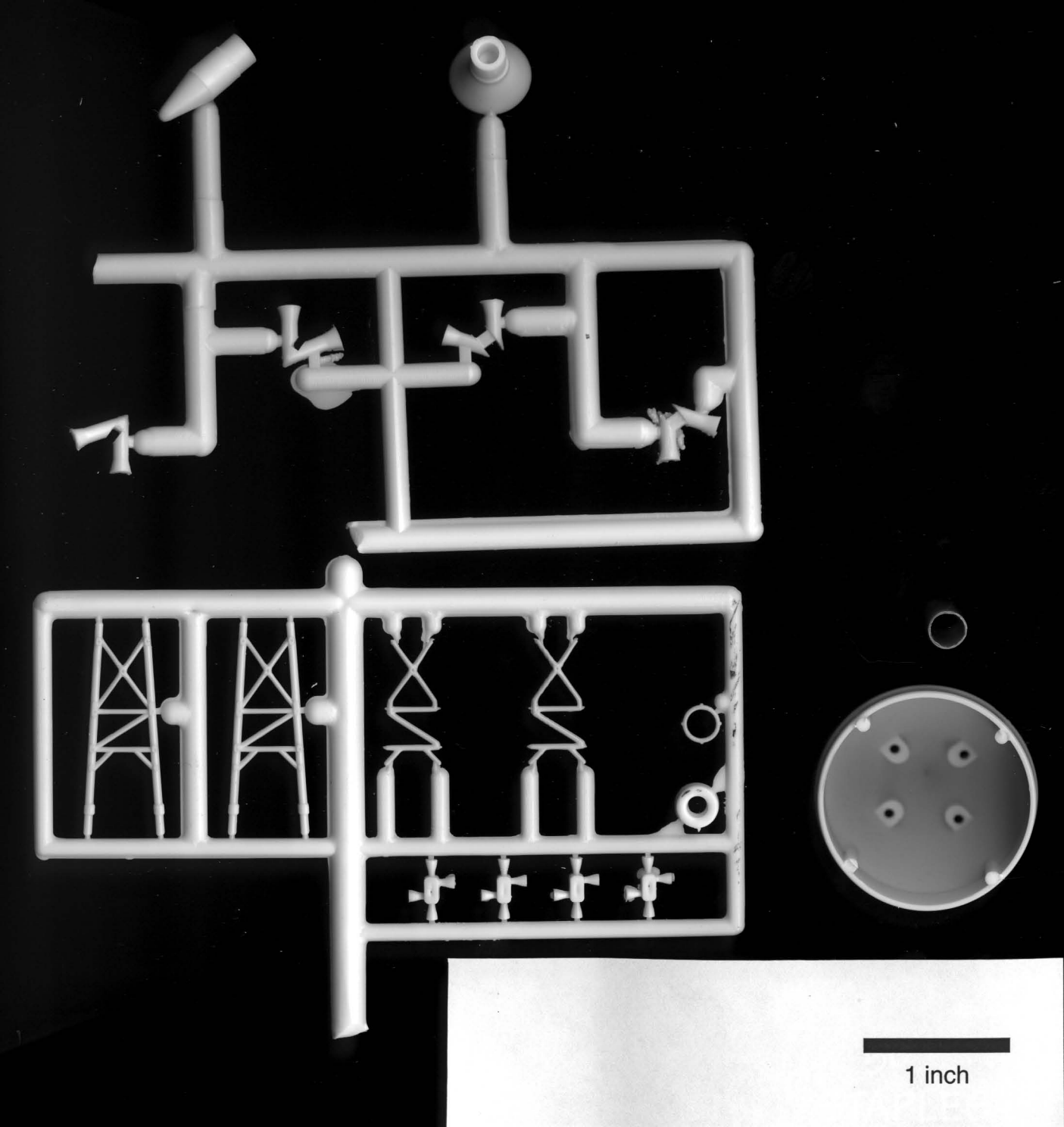
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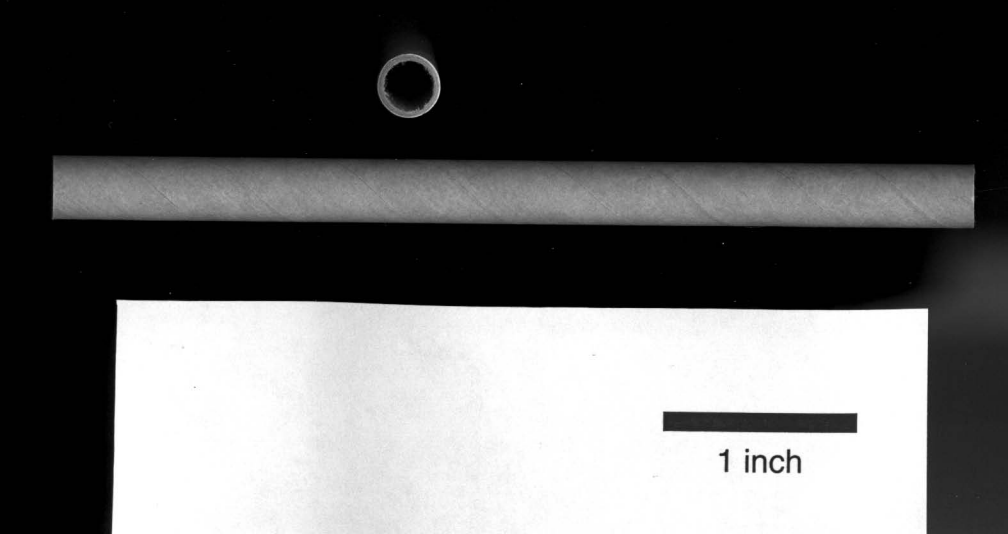
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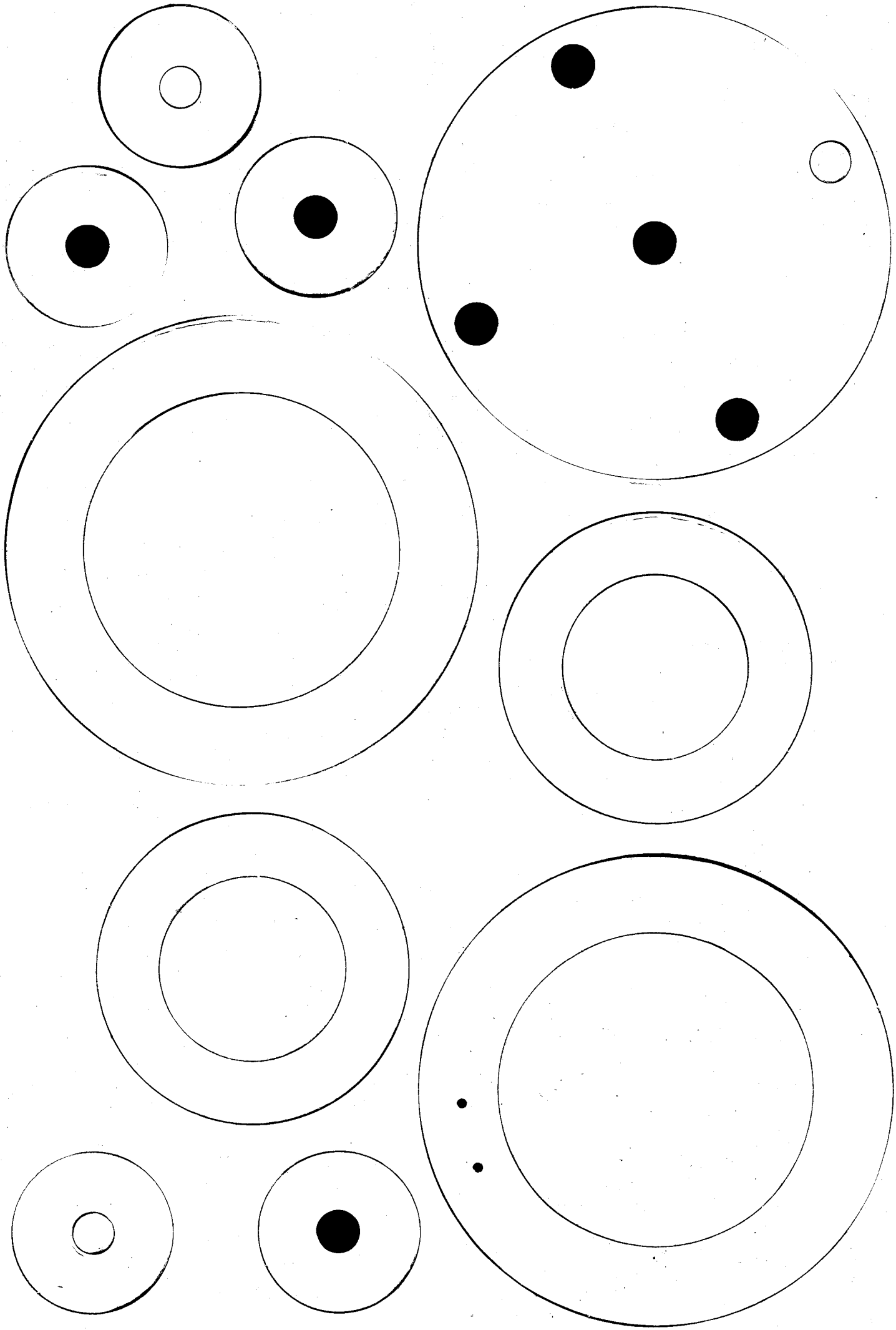
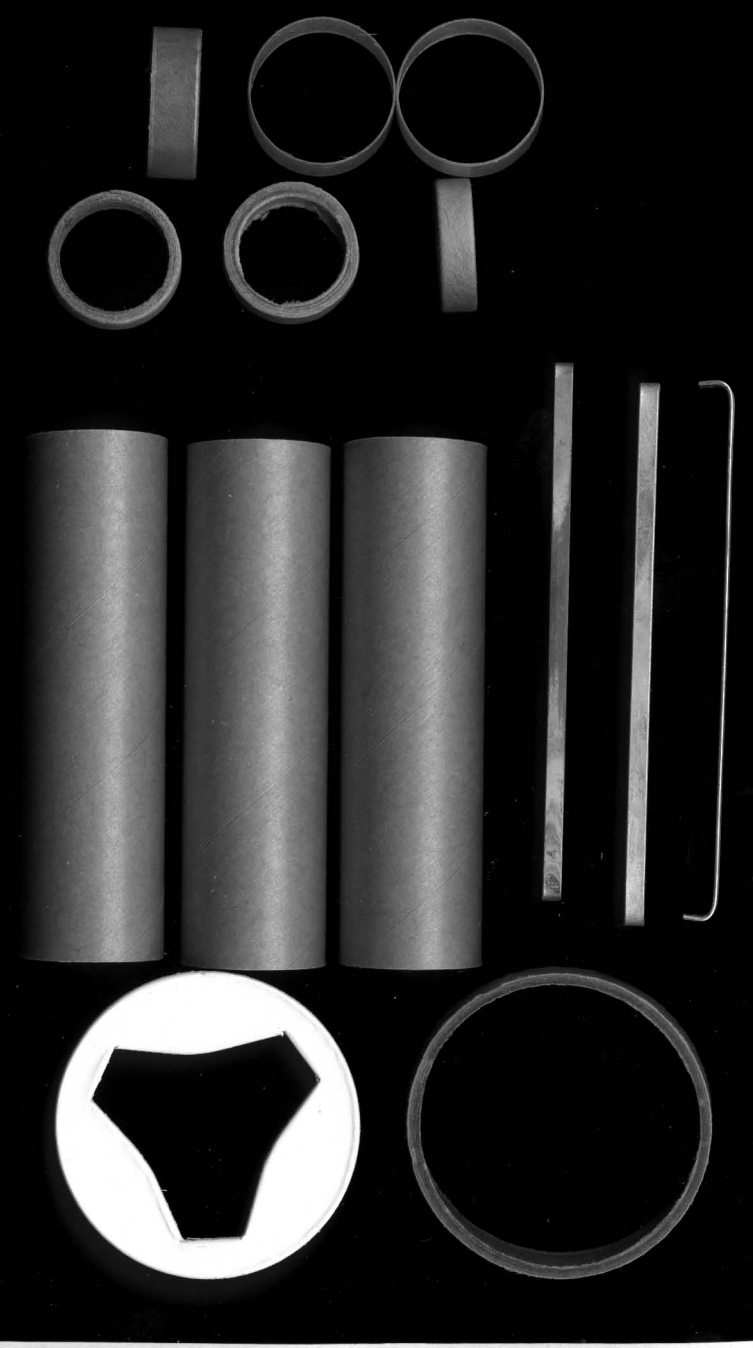
Century
SUPER-SCALE MODEL BY
Century
ENGINEERING COMPANY

Century
Engineering Co.
1/100 SCALE SATURN 5 DECALS -504
Cat. No. DC-5

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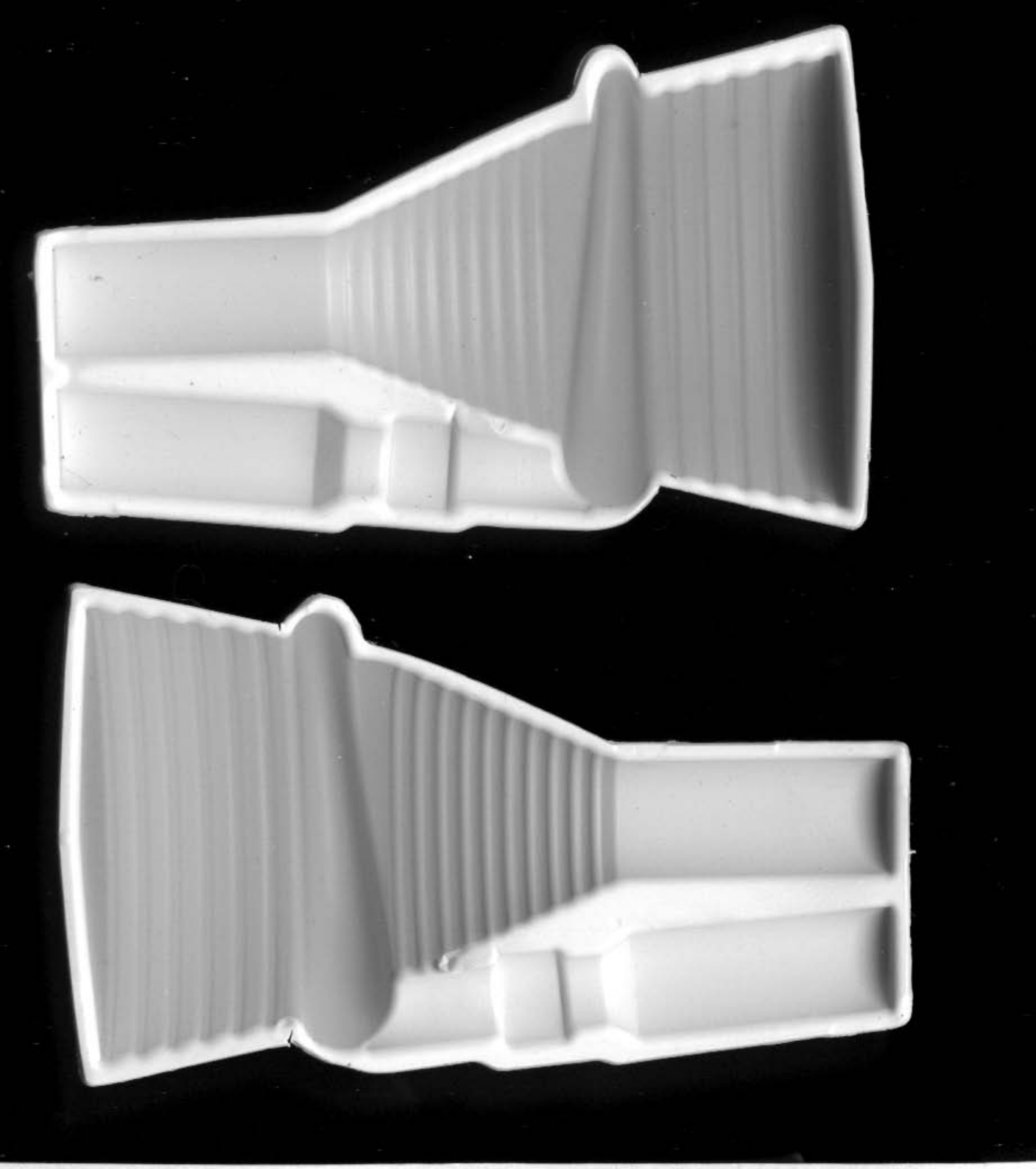

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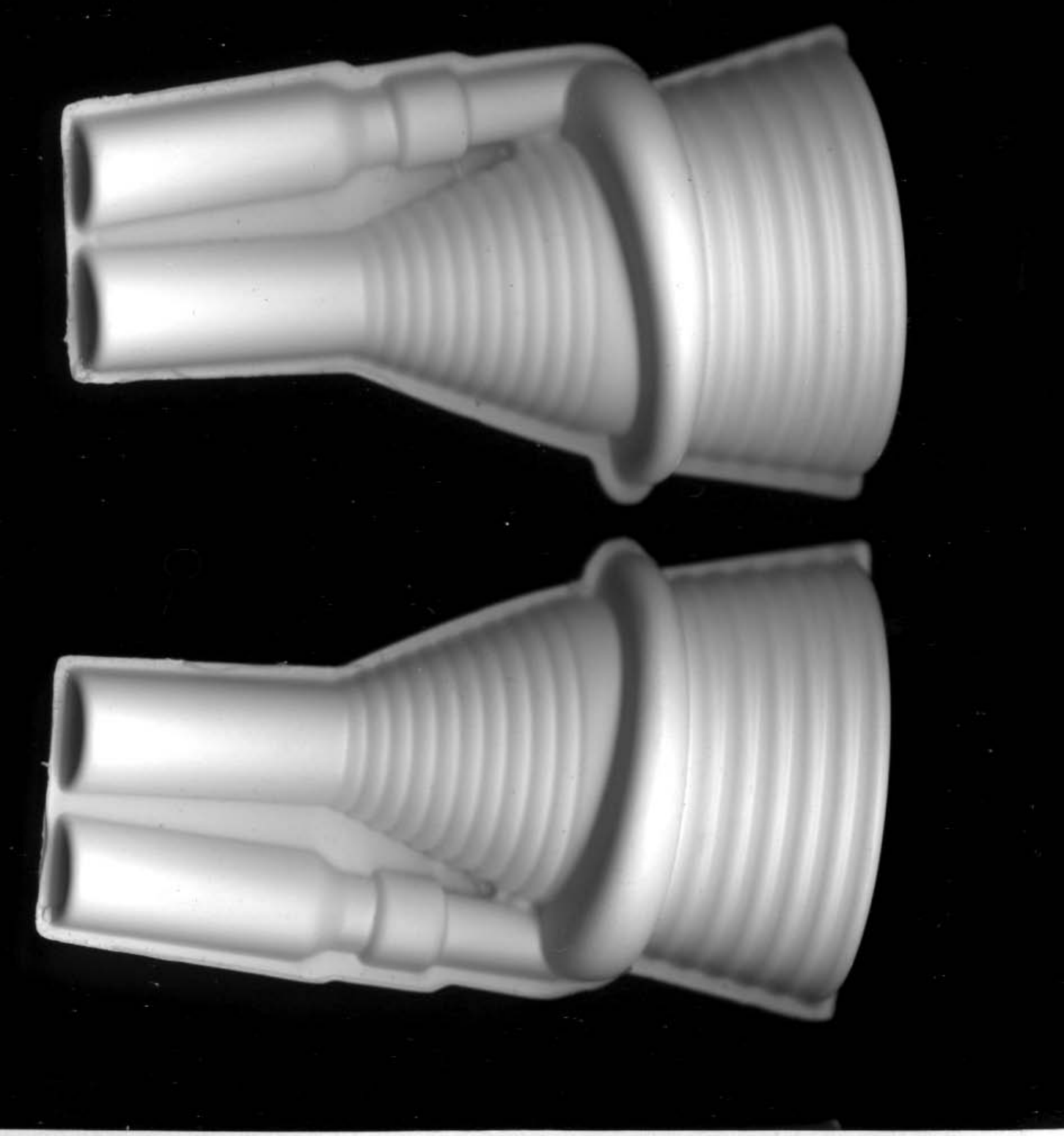

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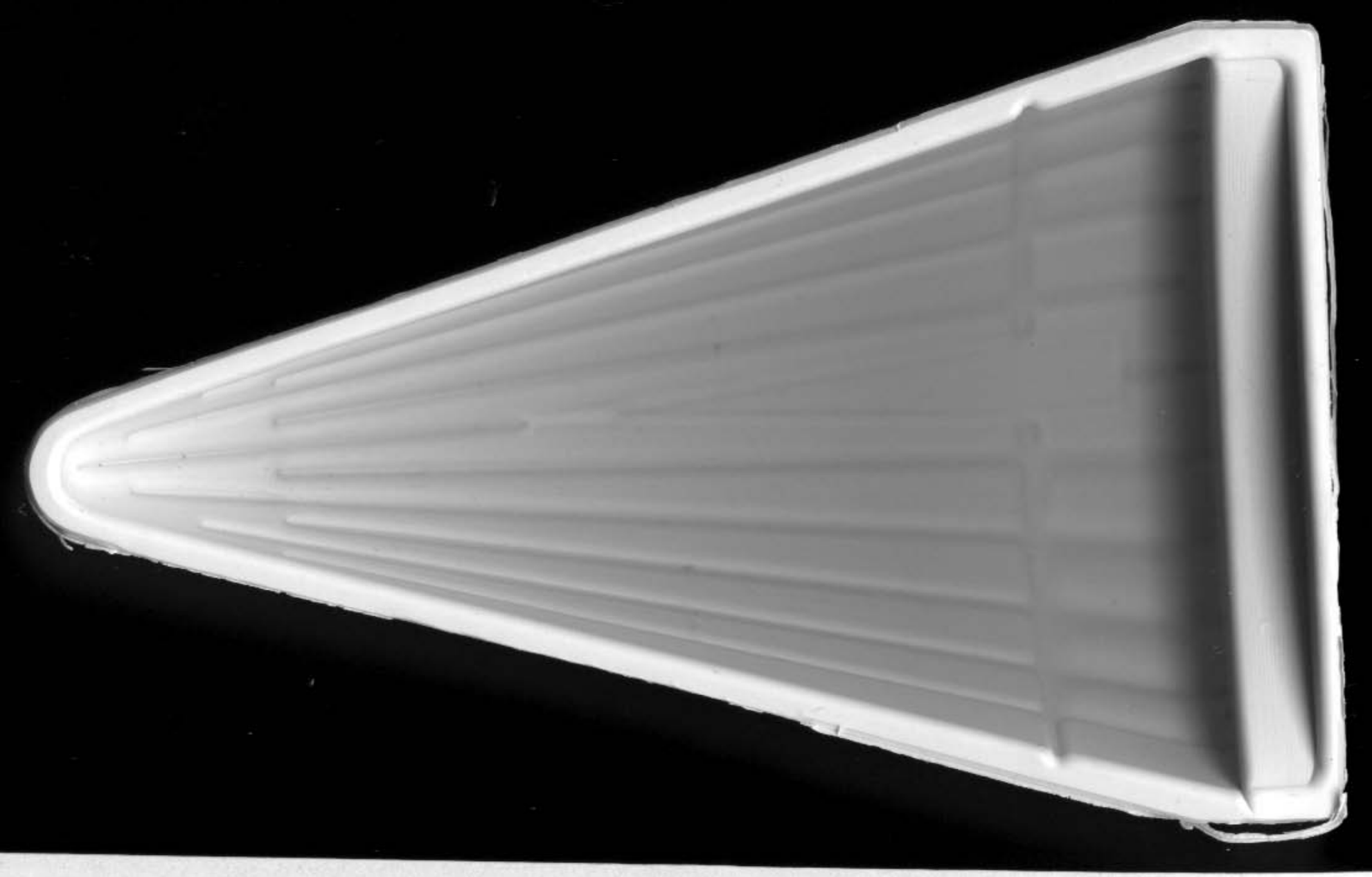

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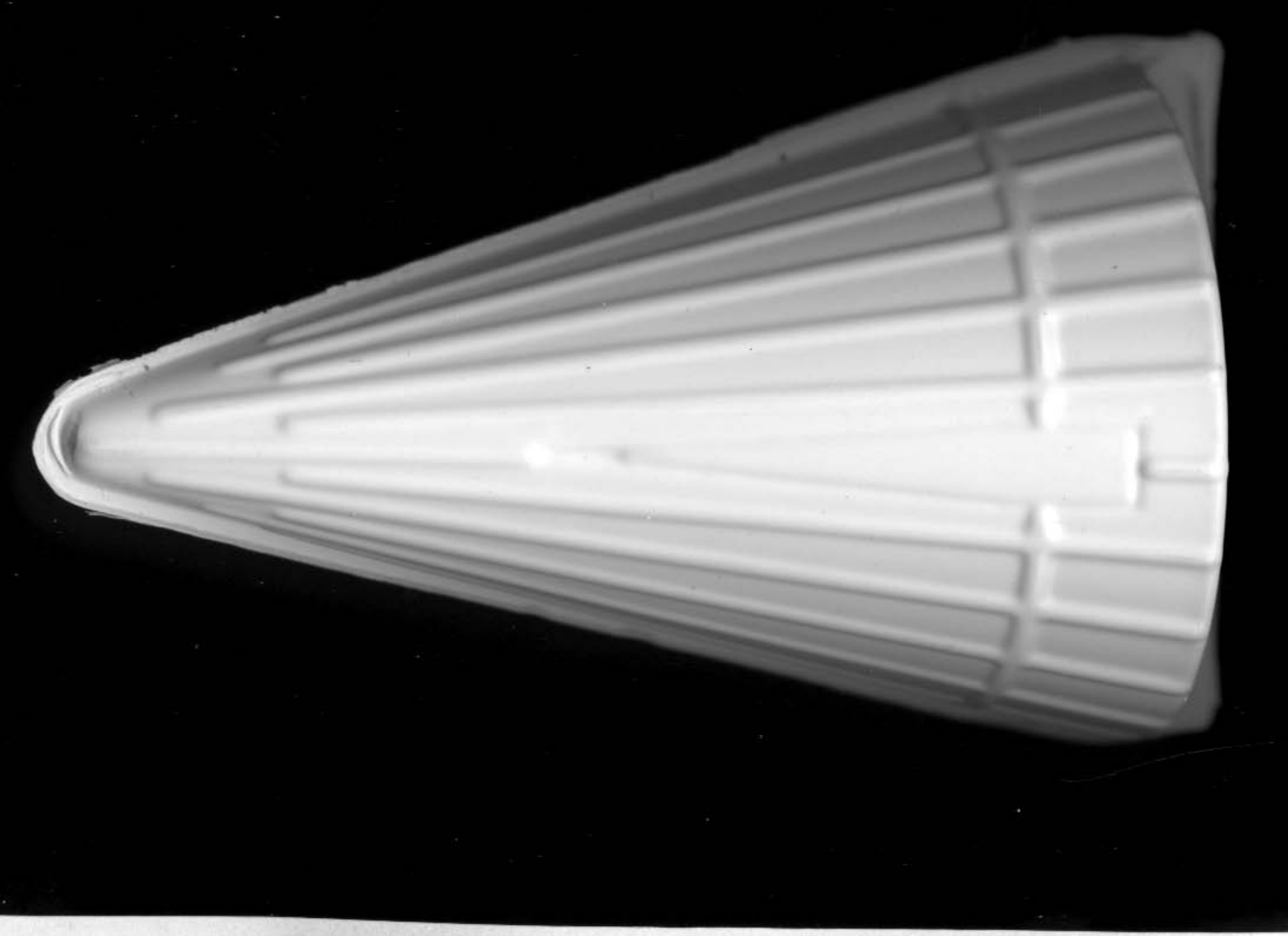

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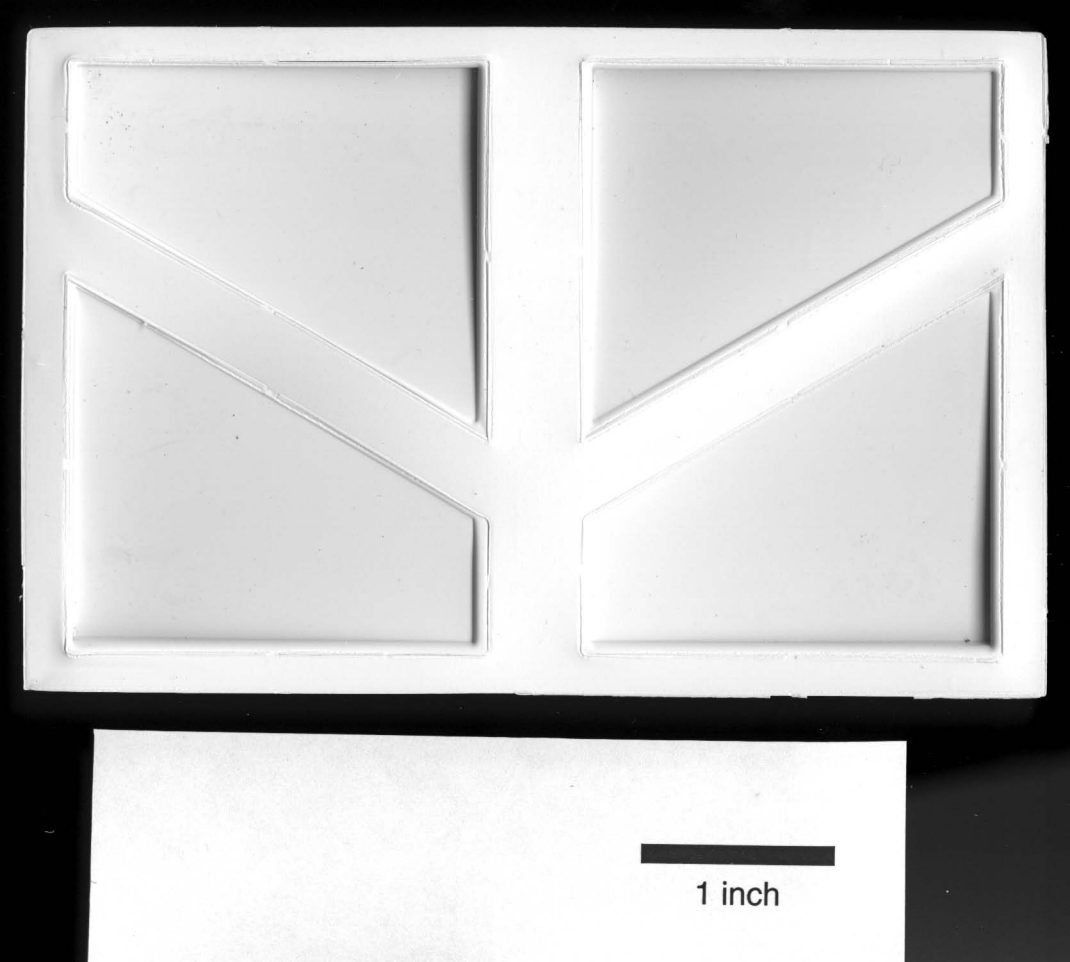
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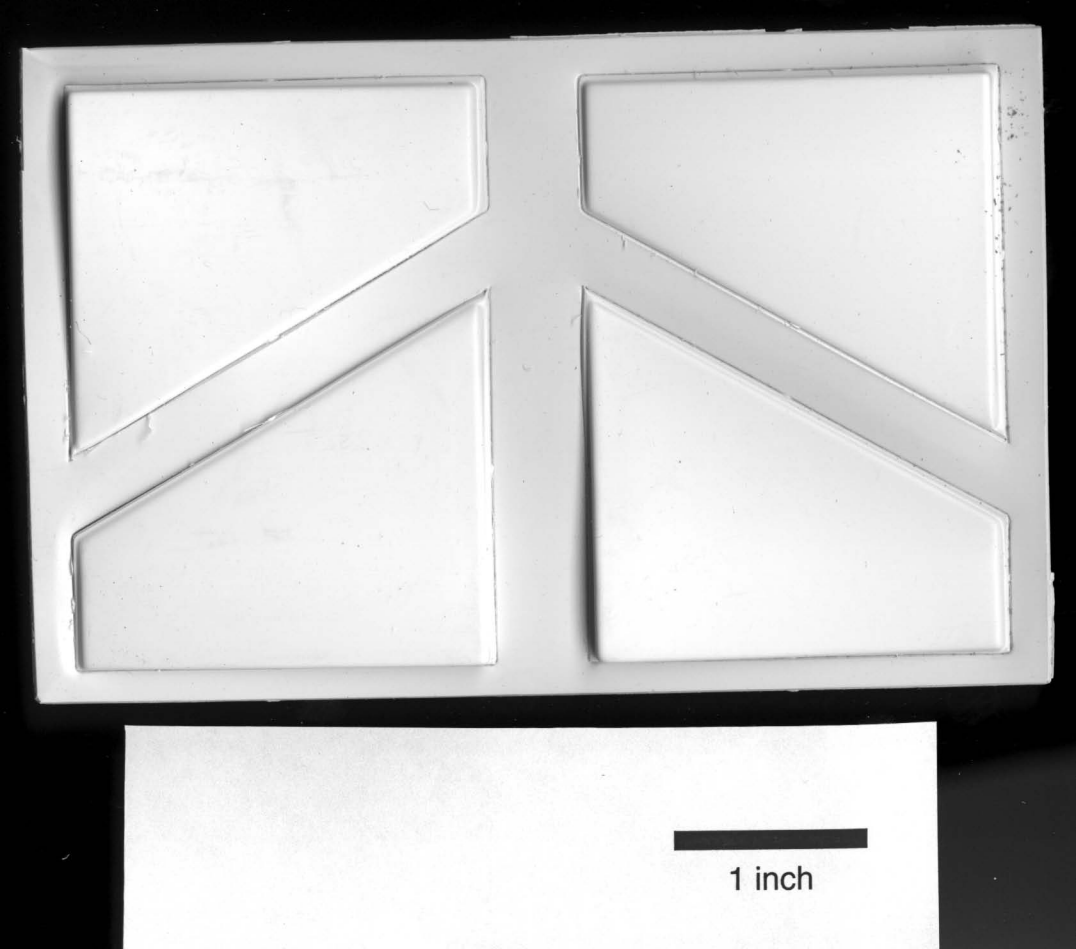
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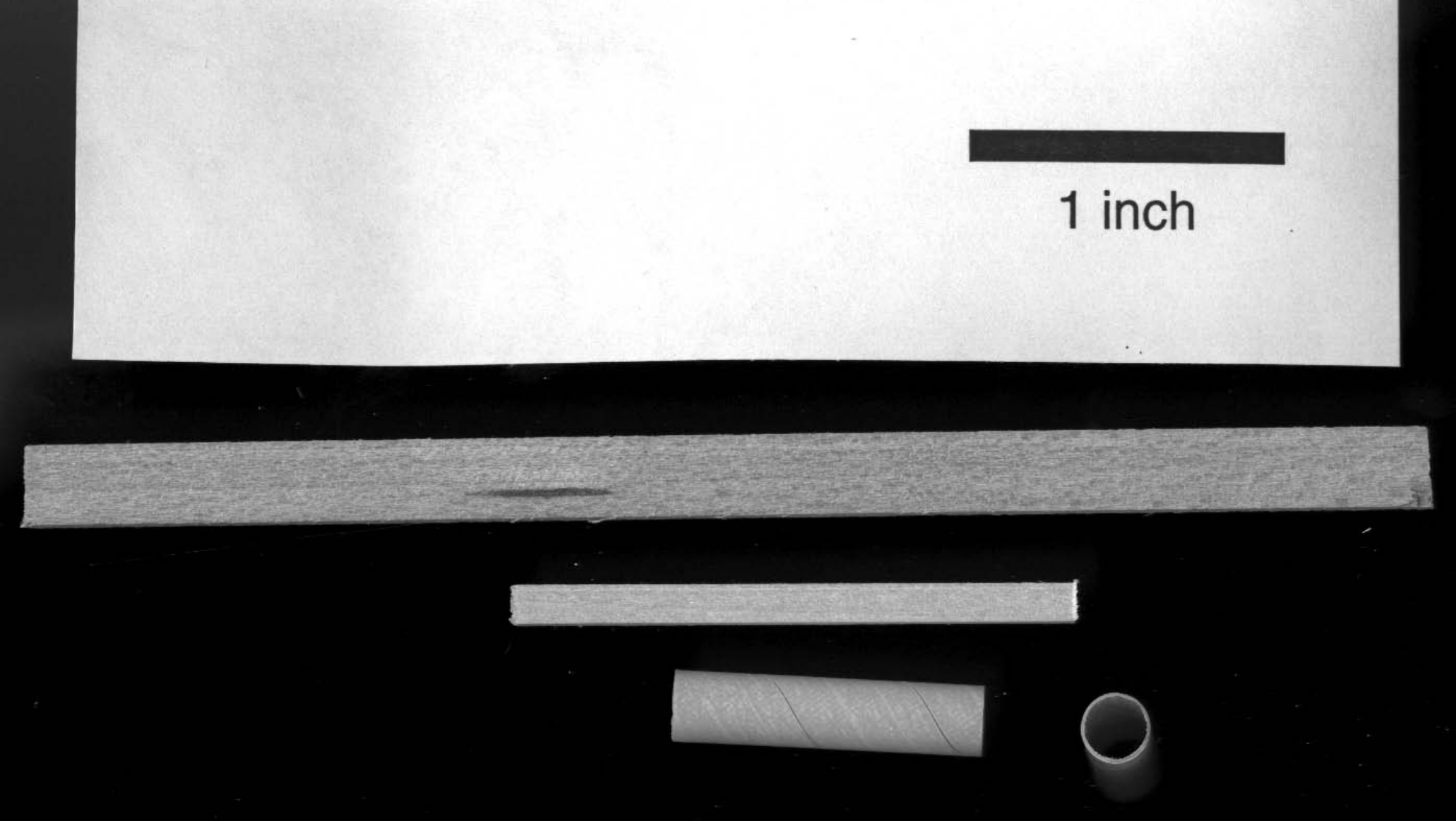
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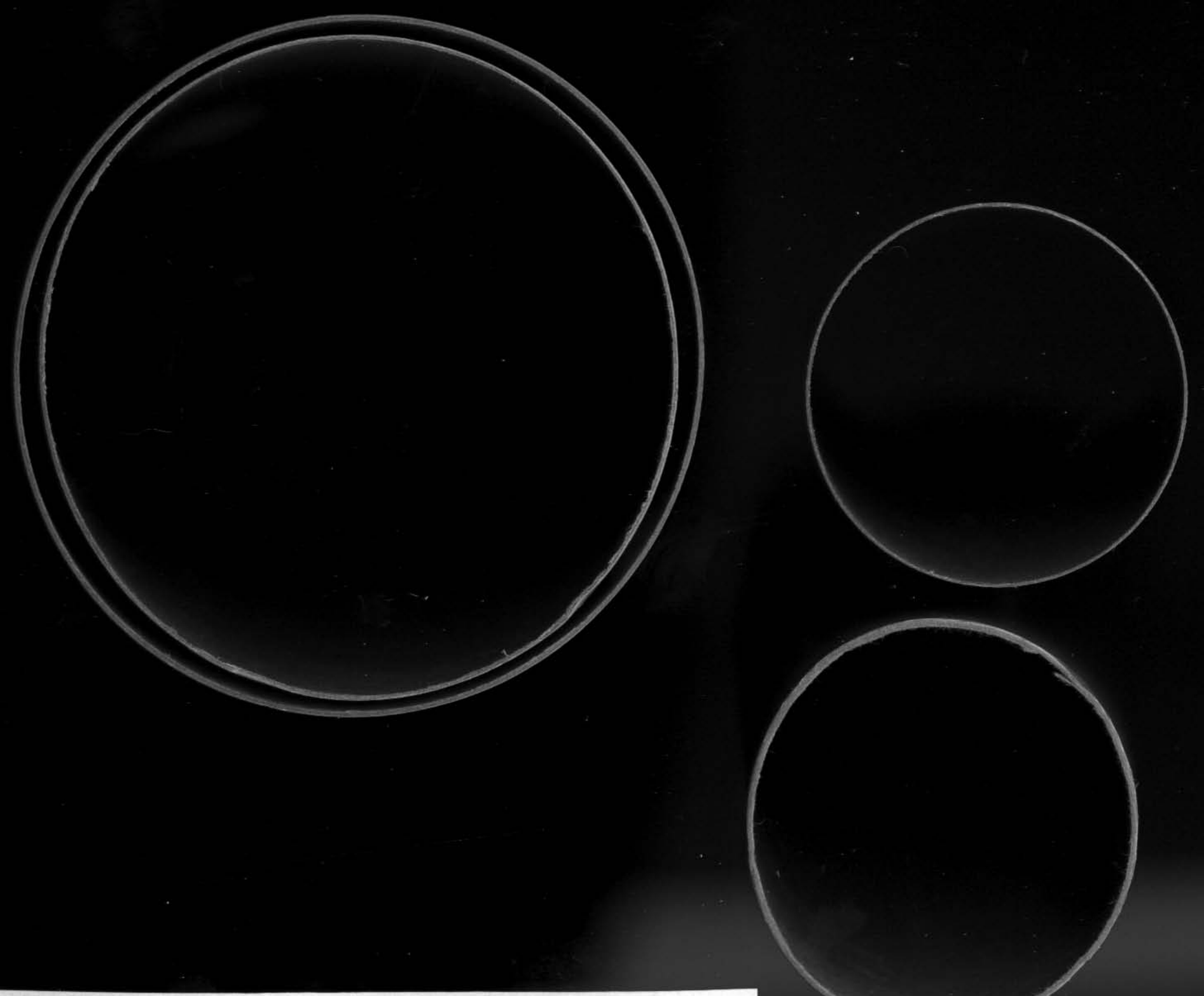
L.E.M. REDUCTION WRAPPER
SATURN V & SATURN 1-B

CUT OUT CAREFULLY

Century

IP-263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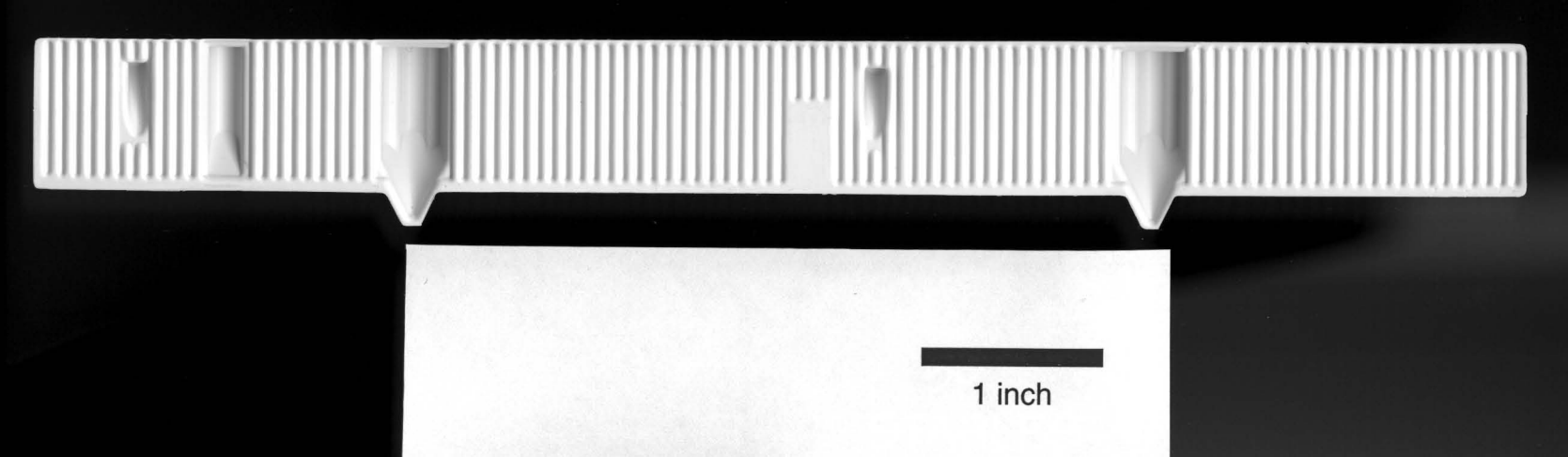
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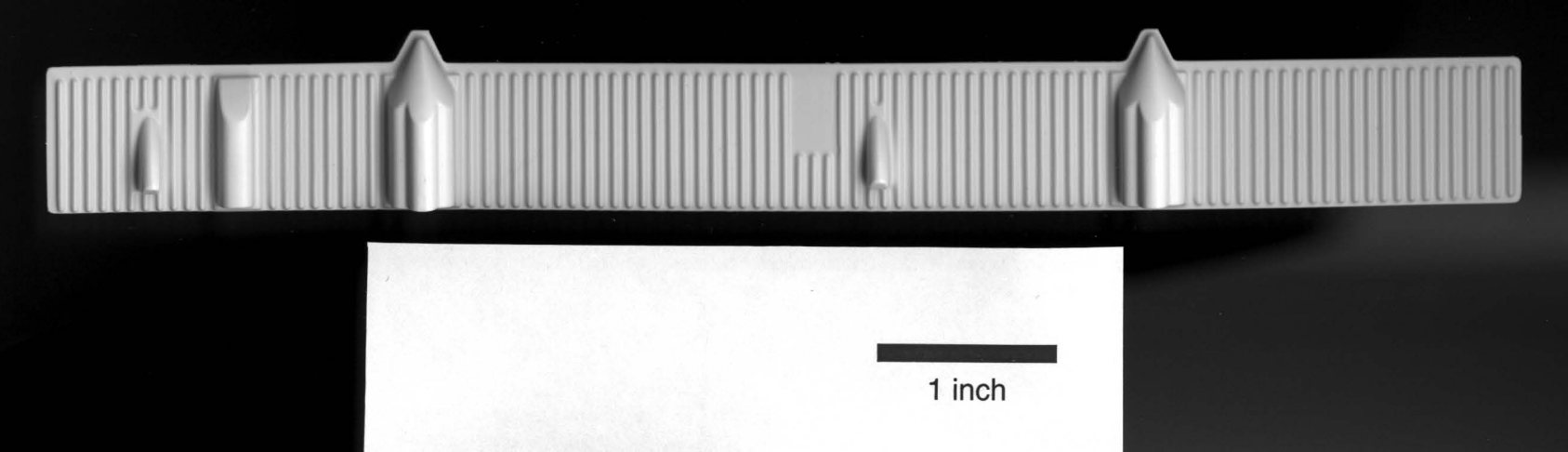
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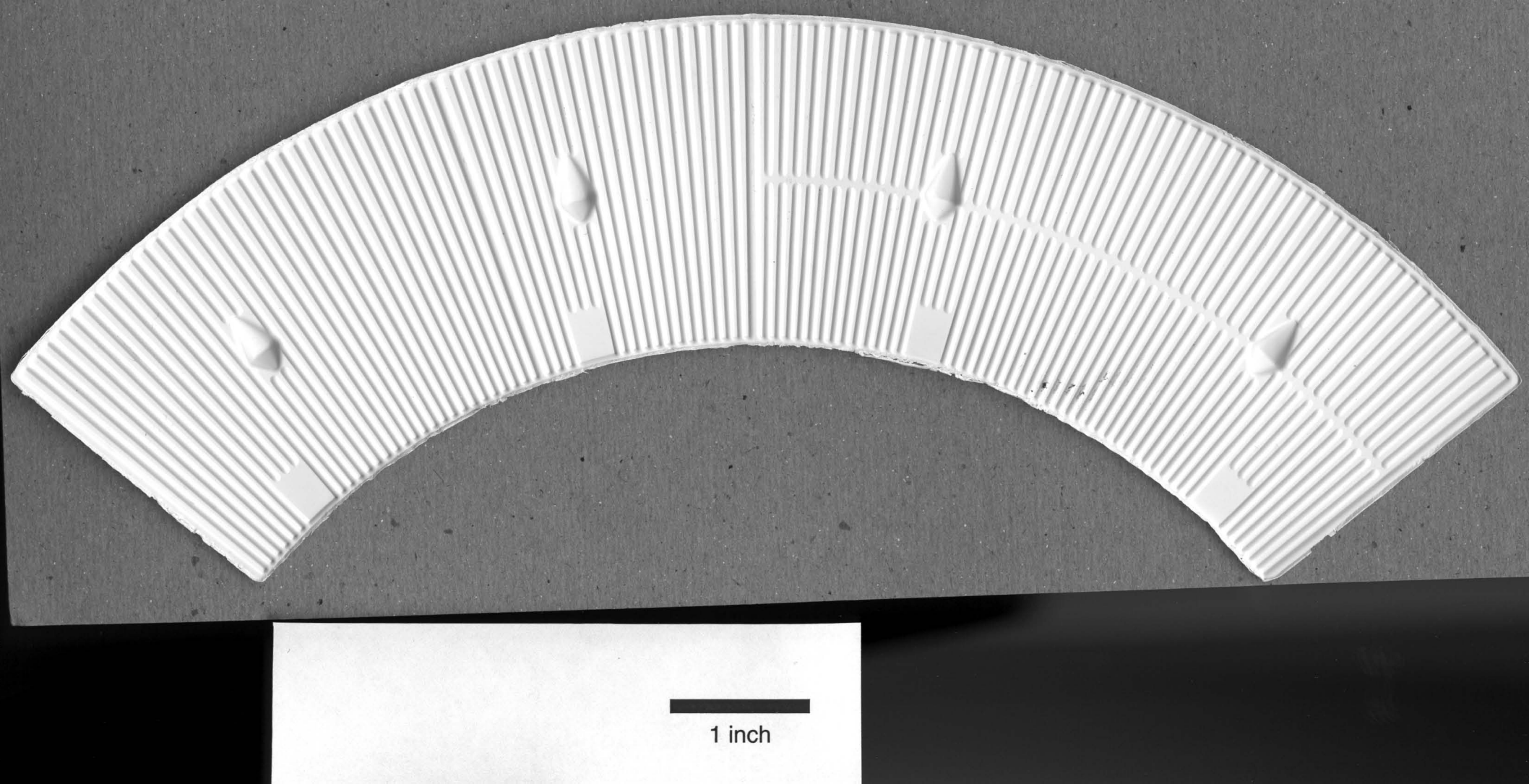
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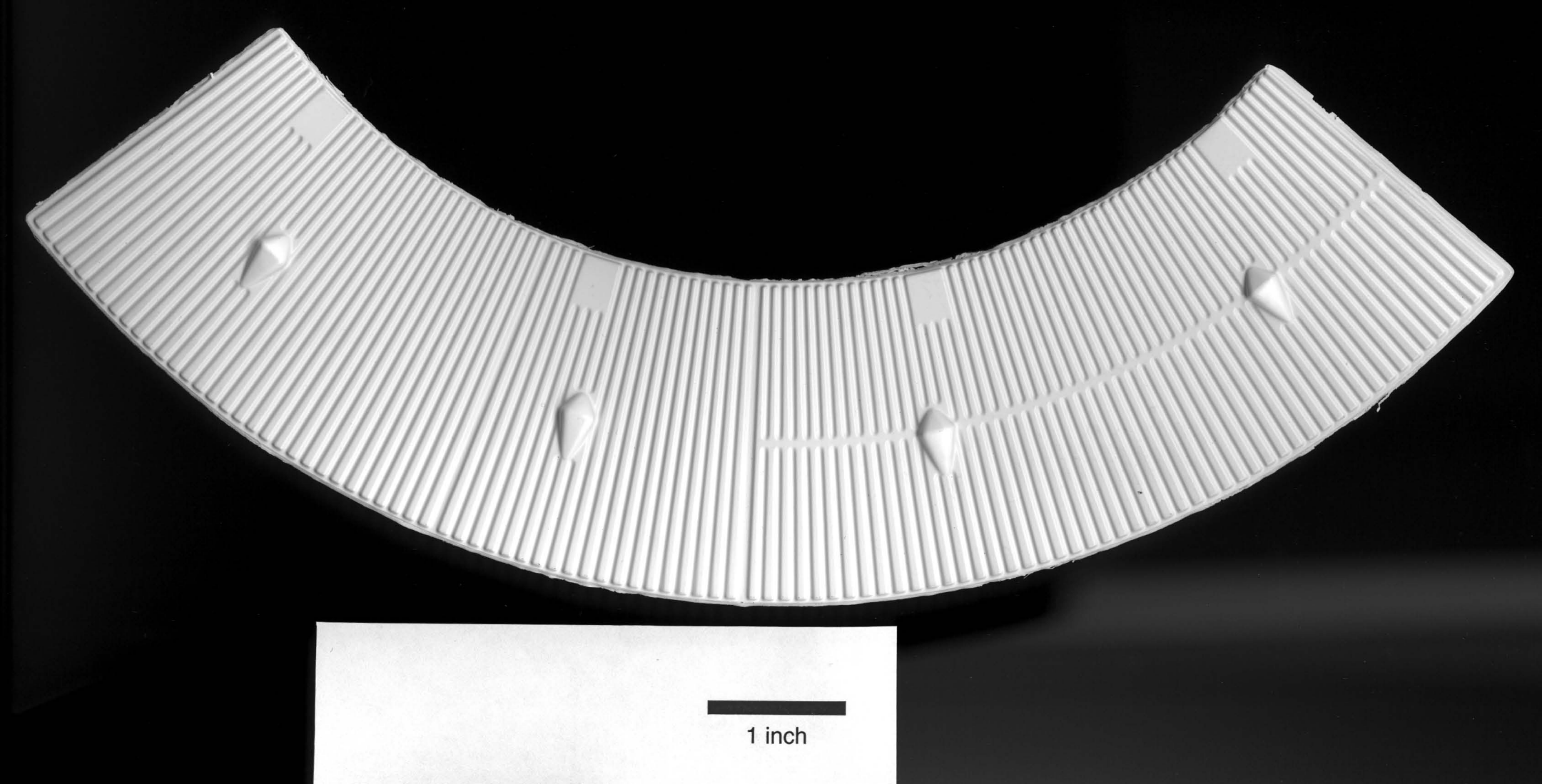
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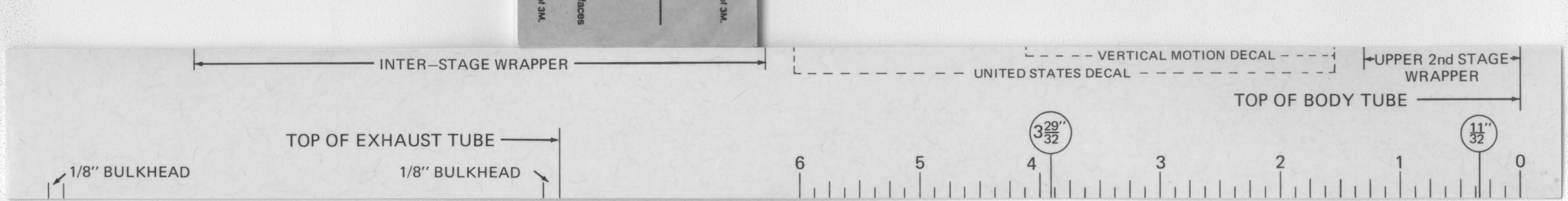
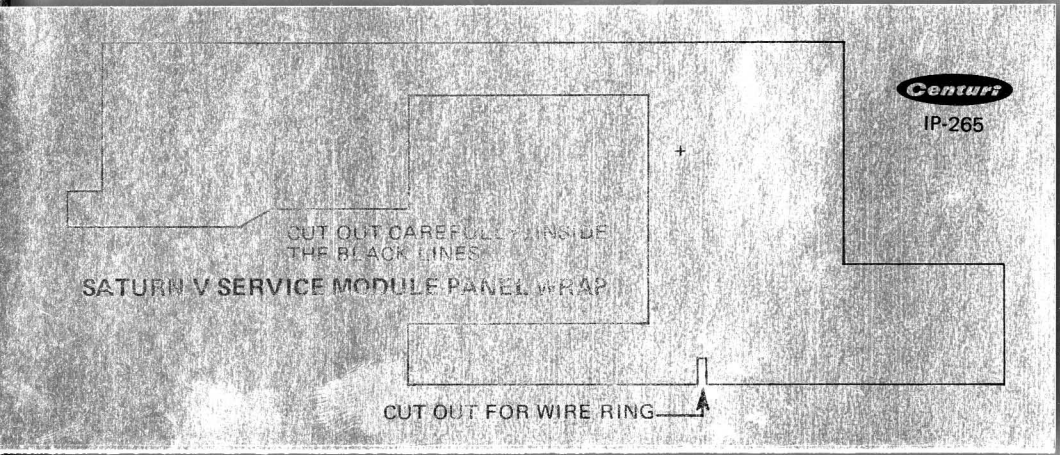
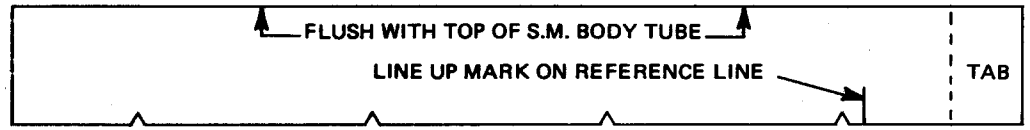

INTER–STAGE WRAPPER
VERTICAL MOTION DECAL
UNITED STATES DECAL
UPPER 2nd STAGE WRAPPER
TOP OF BODY TUBE
TOP OF EXHAUST TUBE
1/8" BULKHEAD
1/8" BULKHEAD
3 29/32"
11/32"
6
5
4
3
2
1
0

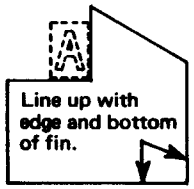

LOWER 1st STAGE WRAPPER
U.S.A. DECAL
INTER–TANK WRAPPER
FLAG DECAL
BOTTOM OF BODY TUBE
Centuri
SATURN V TEMPLATE-RULER
IP-267
BOTTOM OF EXHAUST TUBE
3/16" BULKHEAD
1/8" BULKHEAD
1/8" BULKHEAD


Centuri
IP-265
+
CUT OUT CAREFULLY INSIDE THE BLACK LINES
SATURN V SERVICE MODULE PANEL WRAP
CUT OUT FOR WIRE RING

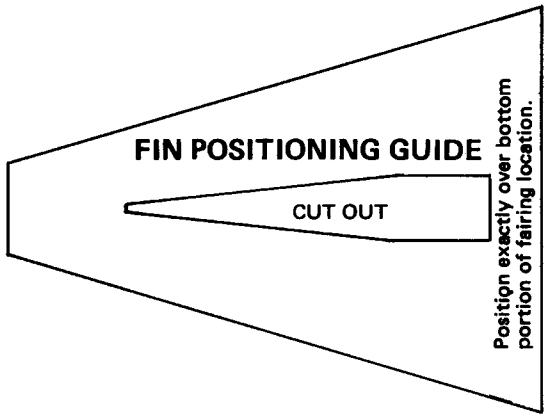
SATURN V TEMPLATE CUTOUT SHEET

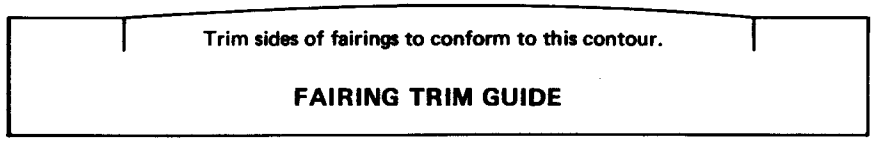


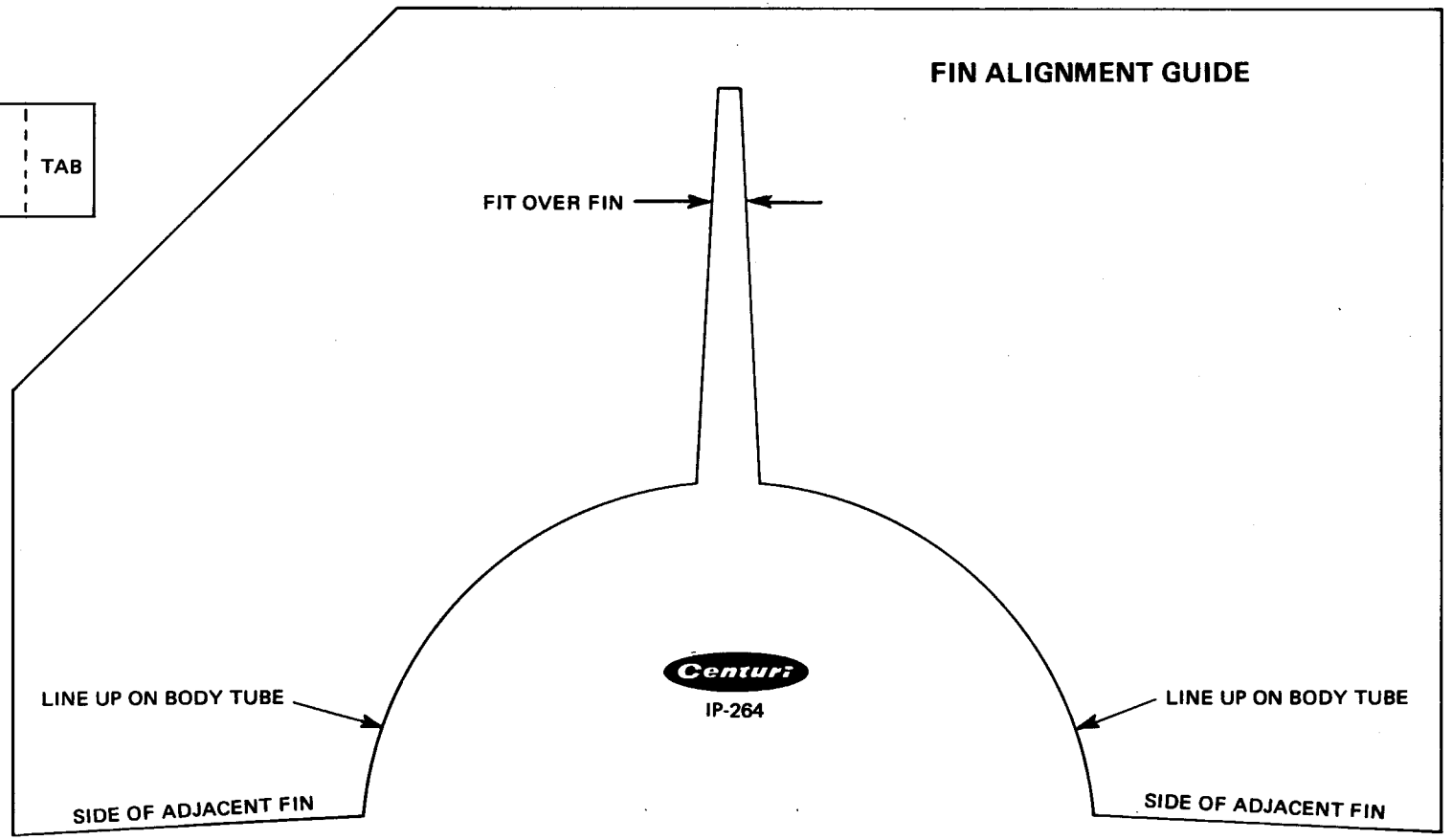
R.C.S. NOZZLE PLACEMENT GUIDE



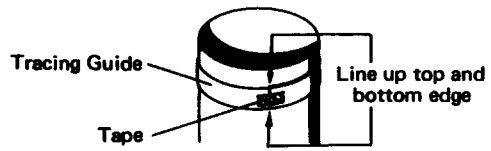
FIN LETTER DECAL GUIDE

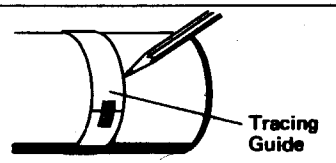






TRACING GUIDE (FOR MAIN BODY TUBE)





1. WRAP GUIDE AROUND BODY AND TAPE ENDS TIGHTLY TOGETHER.
2. SLIDE THE GUIDE ALONG TUBE, POSITIONING EDGE ON MARKS.
3. MARK ALONG EDGE OF GUIDE FOR HORIZONTAL BODY TUBE LINES.

TAB

SATURN V

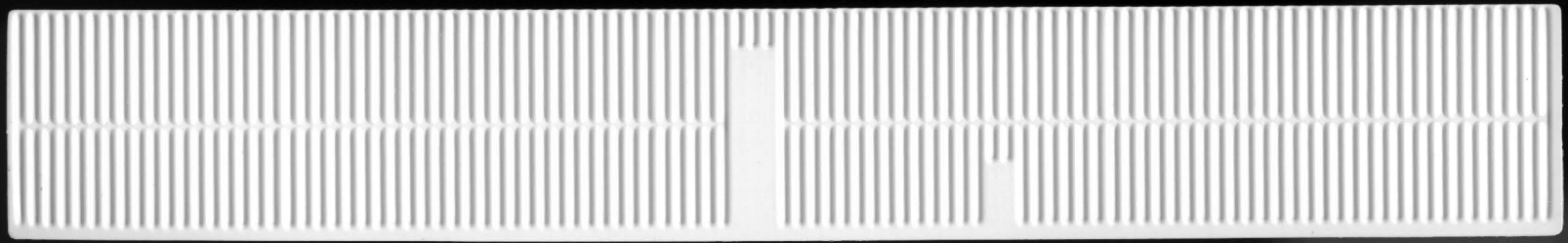
THIRD STAGE
REDUCTION WRAPPER

GLUING TAB

Centuri

IP-262

CUT OUT CAREFULLY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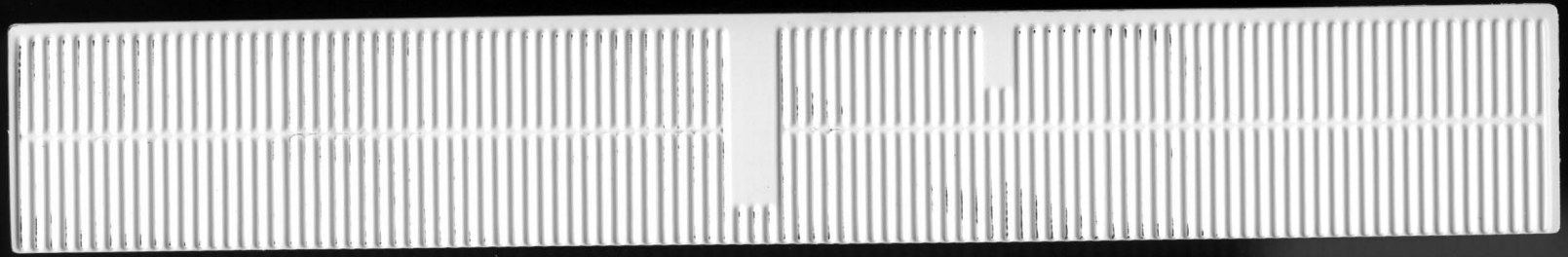
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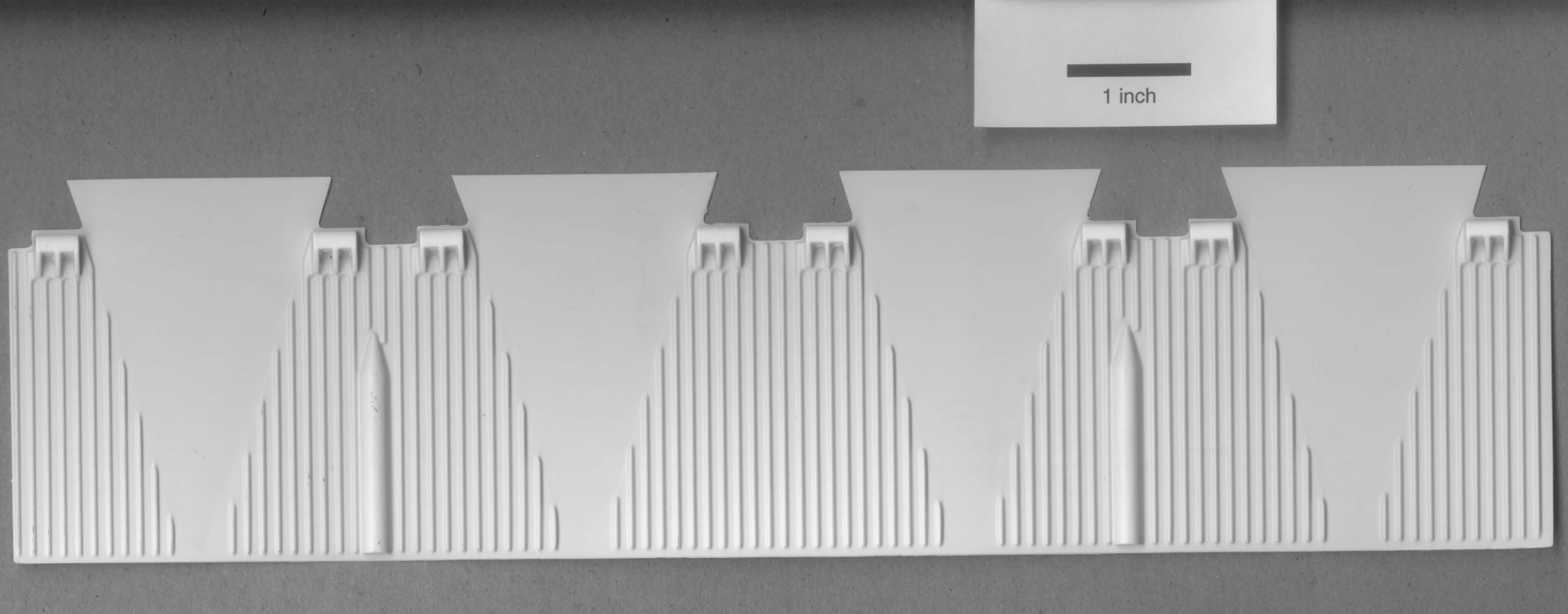
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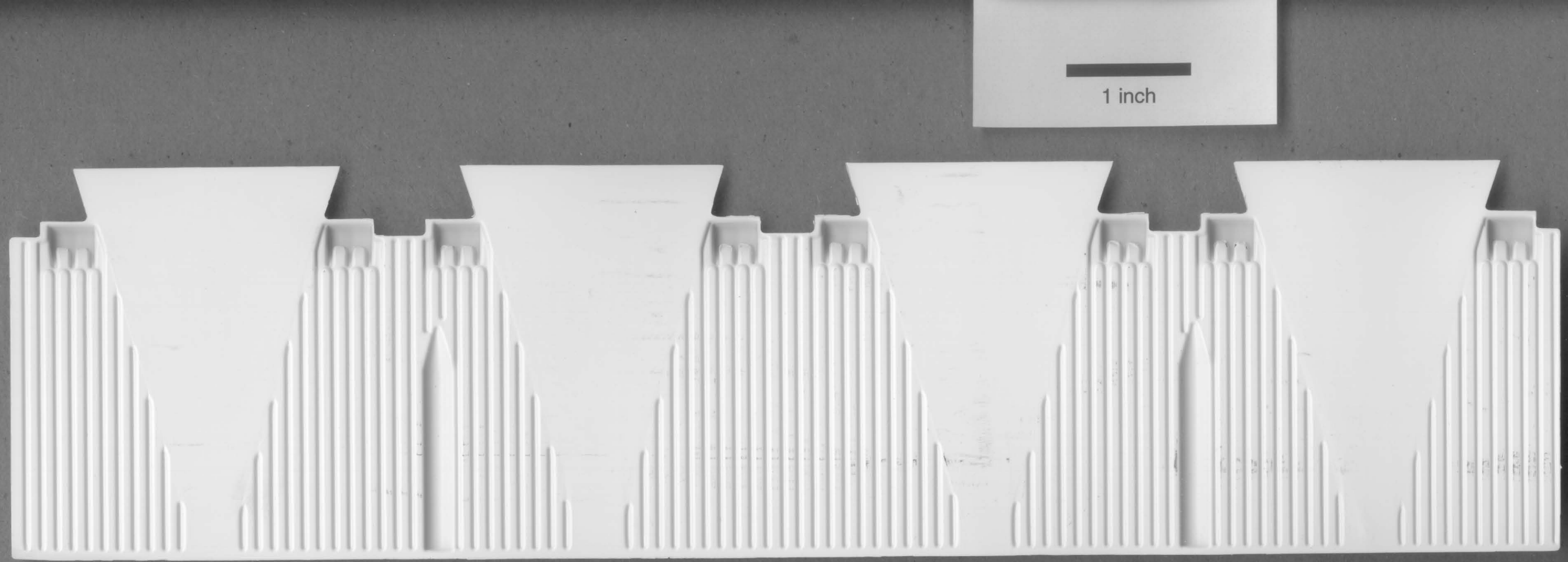
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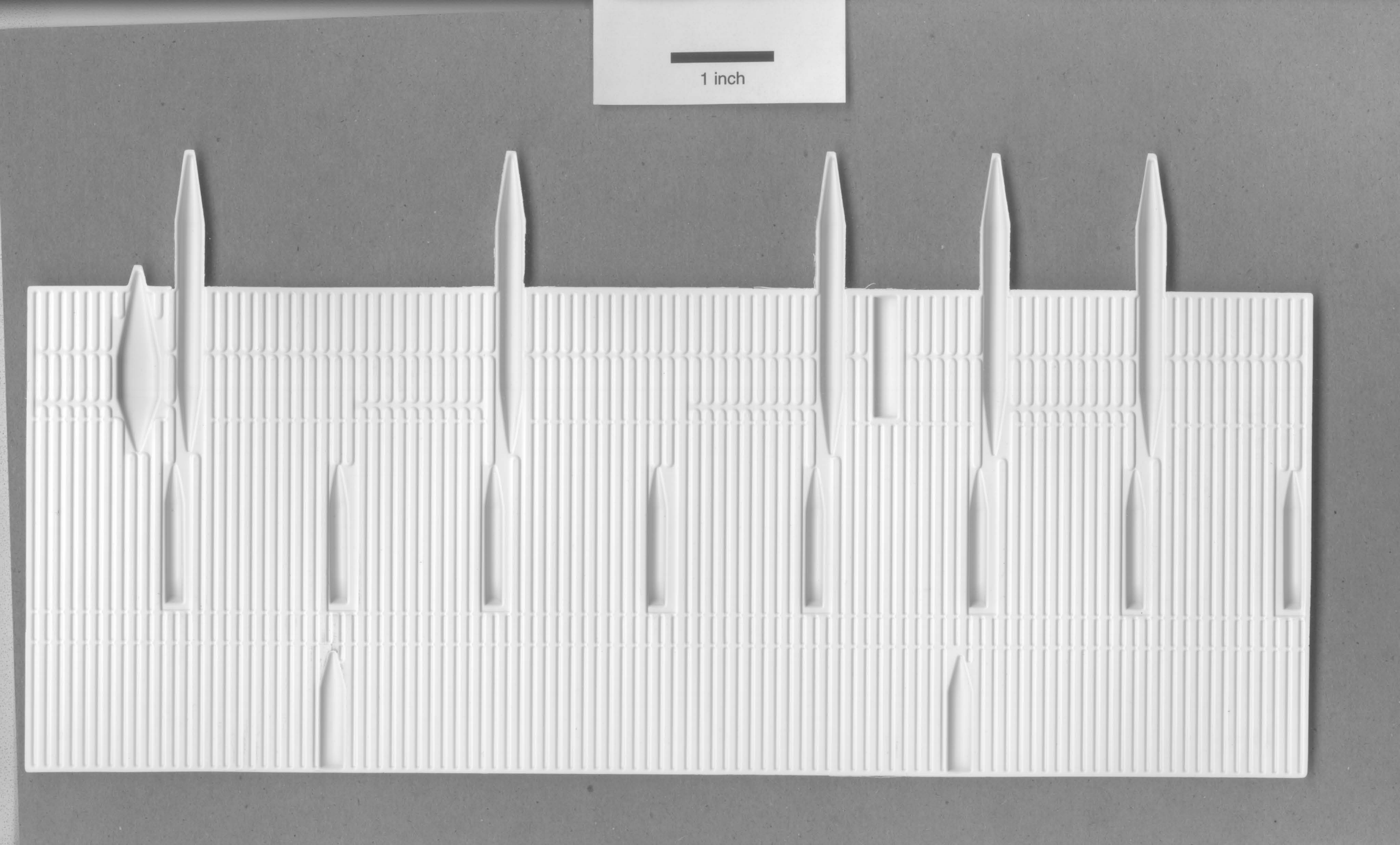
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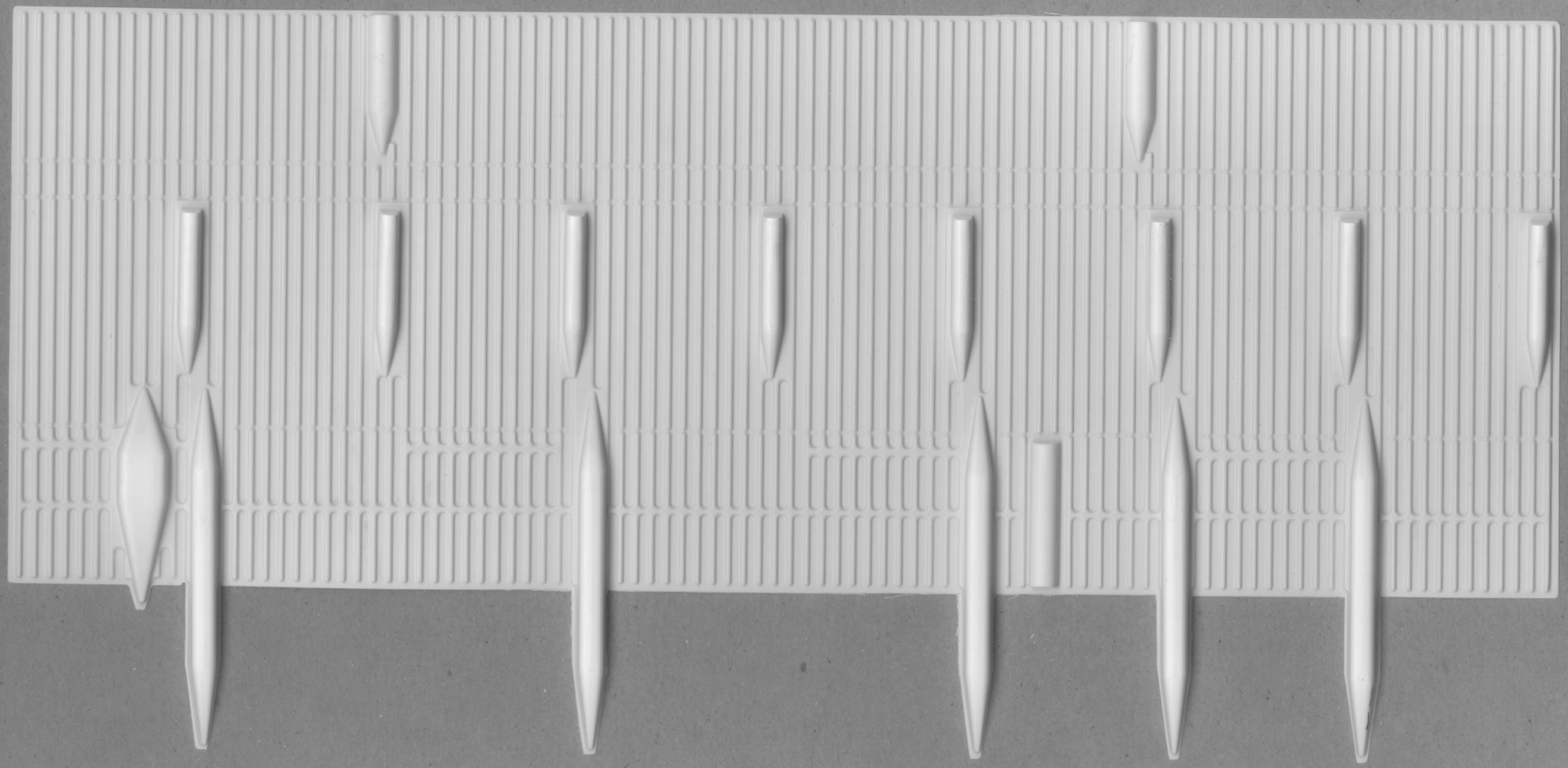
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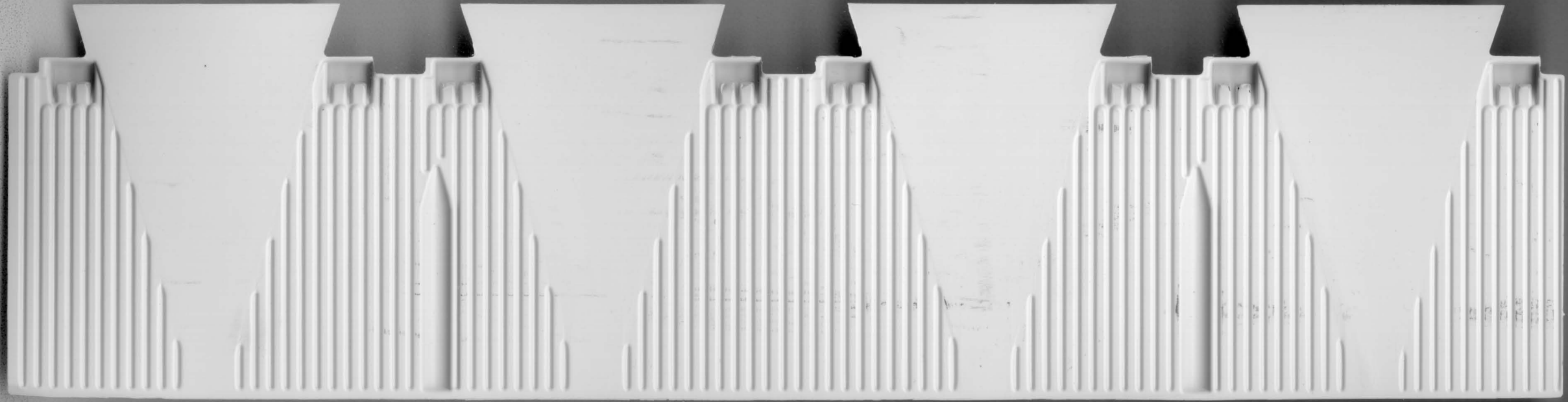

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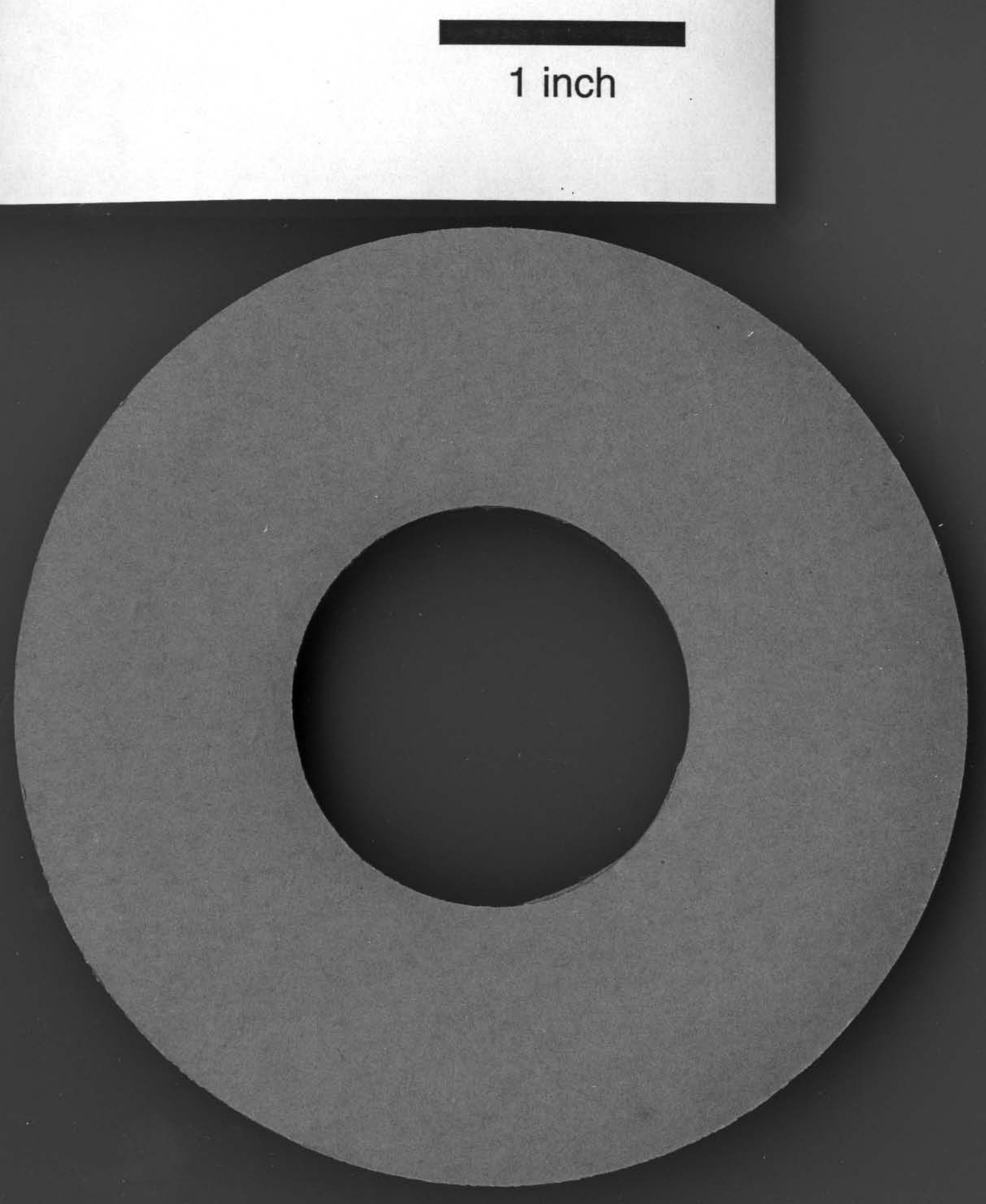
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