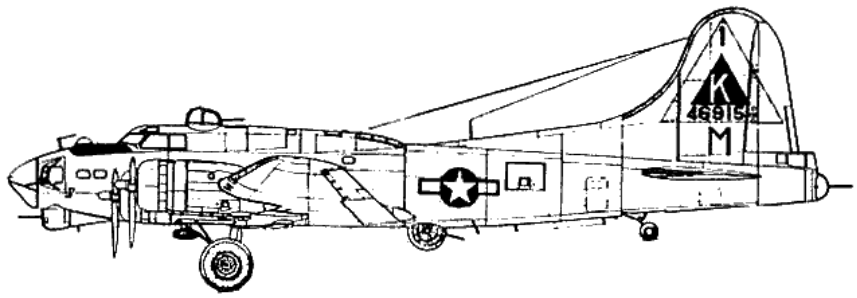
B-17



BUILDING INSTRUCTIONS

ROYAL
PRODUCTS CORP.

INTRODUCTION

Congratulations on having just purchased one of the finest scale model kits available today.

There is a great deal of individual detail to be taken care of prior to gluing A to B so sit back, relax and consider the following preliminaries.

Your choice of this kit was initially motivated by some prior experience or preference for this particular model. Perhaps it is a real plane of the same design you have flown or maybe own now. The point is, right now, only you are familiar with that feeling. Haven't you noticed that when you speak of this beautiful scale job there is the casual indifferent look on your companion's face? Would you believe the same indifferent feeling could be in the judge's mind as he inspects this beauty you will create? 'Tis possible, isn't it?

The absolute first thing you must do at this very time is determine whether this is to be the "ultimate scale job" or an "eyeball scale". If you choose "eyeball scale" which is judged from 25 feet away, then you may as well turn to construction techniques and start building! However, if your choice is "ultimate scale" , then your project has not yet begun.

The next decision you must make is which particular type, model and series you intend to duplicate to the Nth degree. The type (that is Bomber, Fighter, etc.) has already been decided as you bought the kit. The model (that is 24-25-26 etc) may need to be your choice as for instance, there is no easily recognizable difference between a B-44 and a B-50. The series vary widely and you will need to make this decision yourself. For instance there is very little difference between a B-52B, B-52C, B-52D and B-52E to the casual observer, but to the trained eye of a competition scale judge this makes the first great difference.

Once your choice has been made as to exactly which type, model and series you will build, your next task will be to comply with the "Scale Presentation". By this I mean you must assemble and arrange the "proof" you intend to use, to thoroughly convince the judge that yours is the best of the bunch! Keep in mind that you can't "talk" him into it so extra effort spent at this stage reaps great benefits later.

Start with an accurate, authentic 3-view drawing preferably from the manufacturer, and which gives dimensions of the real plane. If not available, then such great works as the commercial scale 3-views by Nieto, Nye, Wylam, Superscale, etc. are acceptable. I know this because I just read it in the current AMA Model Aircraft Regulations book which incidentally is THE book by which your effort will be rated. Needless to say, before you go any further, get real familiar with the rules for scale.

One more word of advice about the "Scale Presentation". The better it looks, the better your score will be so don't cut corners or go second class! 'Nuff said?

Now that you've assembled the 3-view, tech data, pictures and references and constructed a well organized, well planned, eye appealing presentation, you must study, compare, measure and carefully plan the model you will build.

First, select the scale ratio you will use. This has been <u>approximated</u> in our kits because there are so many variants between each different series of the basic air plane. You may choose the series which is closest to our kit - still you will have to make adjustments, perhaps an inch in wingspan, 1/2 inch in length or so on. The point is--this is the time to plan for these adjustments and they must all be the <u>same ratio</u> for maximum points.

The easiest way to do this is to obtain a pair of "proportional" dividers. This is a tool with a moveable pivot in the middle and when open looks like an "X" with needle points at each tip. With these you may set the "ratio" so that measuring with one end off the 3-view will give the desired measurement at the other end. Carefully adjust the drawings we've provided to <u>exactly</u> match the 3-view you will use.

Next, carefully study the material you've gathered and make note of exactly which details you will include on your model and where and how they will be incorporated. For instance, do you plan on flaps? retractable gear? lights? Thousands of techniques are included in magazines and columns which are devoted to scale construction techniques so I'll leave you to hunt up all that for yourself.

We will now consider the Basic Airplane and then it's construction.

GENERAL NOTES

I.D. all parts prior to punching them out of the die cut sheets. Note top and bottom on all formers. If ply parts warp slightly, soak in hot water and assemble while wet. Use regular model cement to double glue all joints--this cuts weight down.

Use of keel type fuselage construction insures a straight true fuselage with minimum construction time. Plywood keel parts forward of CG and balsa aft.

Please follow our construction sequence, to insure easy building.

When sanding, use a block.

Exclusive tongue and groove Nacelle installation makes engine alignment a simple chore on the B-17. In addition, the construction ties the Nacelles solidly into the wing, greatly reducing the vibration problems which are ever-present on multi-engined airplanes.

The built-up construction of the model means a light, strong frame work and a light wing-loading on the finished model.

B-17 WING CONSTRUCTION

1. The wing construction of the B-17 is not at all difficult, but does take some time and, above all, it must be straight--no warps. The airfoil section is quite thick, which makes for easier building.

2. Separate and mark all wing parts. Where possible, place them over the plans and check for proper size.

3. Make up four each main wing spars from 3/16x3/8 balsa. Splice as shown on plans.

4. Do the same for the four each 1/8x3/16 rear spars.

5. Please follow the instructions as written, to insure a straight true wing.

6. Pin the plans to the workbench and cover with waxed paper.

7. Pin the 3/16x3/8 lower main spar only in place.

8. Drill holes in W-2, W-3, W-4, W-5 and W-6 for throttle cables. (See plans for proper location). Also drill aileron pushrod holes at this time.

9. Glue W-2A to W-2, make a right and left.

10. Glue W-3A to W-3, W-4A to W-4. Make two sets of these, a right and left.

11. Do the same for W-6A and W-6 and W-7A and W-7. These plywood parts form the basic Nacelle tie-in. Use epoxy.

12. Glue W-12A and W-12 together. Again, a right and left.

13. Add ribs W-2 to W-13, to lower main spar. Note proper placement of all double ribs.

14. Pin upper main spar in place.

15. Fit W-24 and W-25 in place.

16. Drill hole for aileron bellcrank bolt in W-20, and pin in place.

17. When everything is straight, glue ribs in place.

18. Pin lower 1/8x3/16 spar in place over the plans. Slide it in under the ribs.

19. Unpin lower main spar and rock assembly back onto lower rear spar. Pin in place.

20. Install upper rear 1/8x3/16 spar. Pin in place.

21. Glue upper and lower spars in place.

22. Add 3/16 square rear upper sub-spar.

23. While still pinned to plans, add 3/8 balsa leading edge.

24. Glue 3/16x3/8 front top sub-spar.

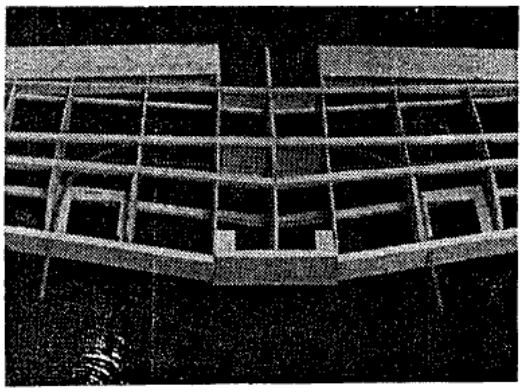
25. Remove from plans when dry and add remaining lower sub-spars.

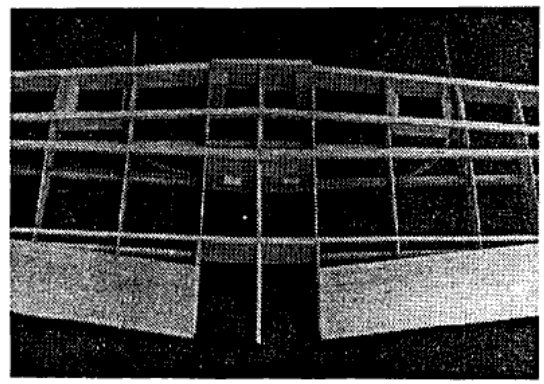
26. Double glue all joints at this point.

27. Drill holes in LE for throttle cables.

28. Add 3/16 square to W-20 and install bell crank.

29. Snake throttle cable through ribs. Leave excess out of the LE. Remember, it has to extend out past the Nacelle, about 5" is enough.





30. Unpin plans and waxed paper.

31. Oil the back of the plans slightly, so that they can be read from the rear.

32. Pin plans down again and add waxed paper.

33. Repeat steps 7 to 29. Check for proper routing of throttle cable on left wing.

34. Using a straight edge, trim four sheets of 3/32x3 balsa, so that they can be edge glued to the wing sheeting later on. We want nice straight seams on all of the sheeting.

35. Sand any irregularities off the wing frames in preparation for sheeting.

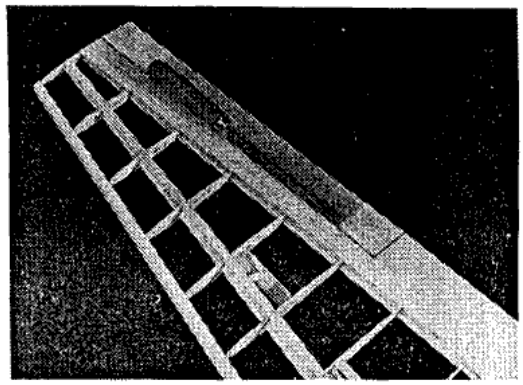
36. Pin the lower TE sheeting in place over the plans. Note sheeting stops at W-2A inboard. Pin ribs in place and glue. (Prop up front of wing). When dry, bevel TE of the sheeting slightly. Also bevel upper TE sheeting, so that you will get a good joint at the T.E. Glue upper sheeting in place while still pinned down.

37. Repeat step #36 for other panel.

38. With TE sheeting in place, we are ready for the ailerons.

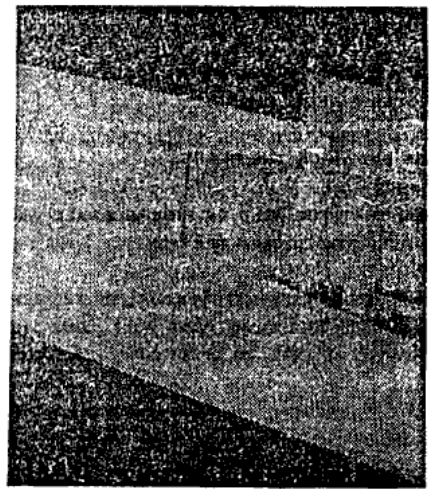
39. Draw aileron cut lines on both wing panels. Don't forget to allow for W-21's. Also note angle at LE of aileron.

40. Use a razor saw to cut ailerons out. Work slow and easy.



41. When ailerons have been separated, add W-23 to wing structure, then W-21.

42. Mount aileron control horn to plywood W-22 and slide into aileron, glue.



43. Add scrap (3/32 balsa) to inboard section of aileron.

44. Glue W-21 in place on ailerons.

45. Notch aileron and wing for hinges. Install, but do not glue.

46. Hook up aileron pushrod to bell crank and install pushrod to servo.

47. Check aileron for freedom of movement and correct throw. No binding on that long pushrod.

48. Temporarily install W-1's to each panel. Prop up each wing tip 3-9/16 for proper dihedral over the plans. Sand spar ends as needed.

49. Temporarily install W-15 and TE 3/32 sheet splice.

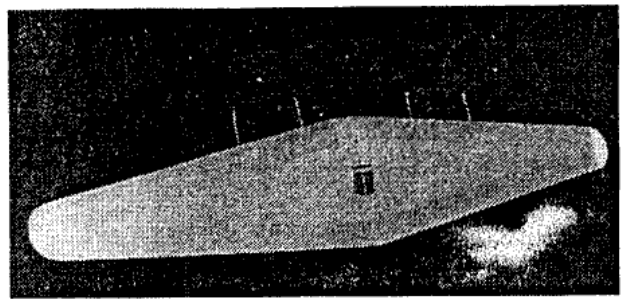
50. Fit W-18 and W-19 in place.

51. When assembly is straight, glue all parts in place.

52. Add W-16's.

53. Make up 4-3/32" sheet wing panels, as shown on the plans. Note grain and splices. Sand both sides smooth.

54. Sheet wing. Do the bottom first.



55. Mark and cut out center section of the wing for the throttle and aileron servo. Check for freedom of movement of aileron and throttle pushrod and cable.

56. Glue W-14's in place. Carve to rough shape.

57. With the ailerons installed and tack glued in neutral, sand the wing with a sanding block. Check the plans for the proper airfoil shape.

58. Cut TE of center section as shown on the plans.

59. At this point it is suggested that the wing be fiberglassed with light weight cloth and resin. Use 6" heavy cloth over the center section.

60. Measure and mark wing for Nacelle cut-outs--four, remember! The throttle cables will be sticking out the leading edge. The right wing will have the cable on the outboard side and the left wing side then will be inboard of the Nacelle cut-out.

61. Use a sharp knife and cut out Nacelle openings--work slow at this point. Trial fit each Nacelle as you make the cut-outs.

62. Glue F-21 in place on the LE and drill holes for the wing dowels. Install dowels.

53. Glue W-26 in place on the bottom of the wing. Drill holes for the wing bolts.

54. Join wing to fuselage. Use nylon bolts to attach wing to fuselage.

65. Glue F-22, 23, 24, 25, 26, 27 and 28 in place on the bottom of the fuselage, using F-40 as a keel.

66. Sheet the section with 3/32 balsa, as shown on the plans. Don't forget the holes for the wing bolts.

67. Sand section to shape.

68. At this point, refer to Nacelle installation for completion of the wing.

NACELLES - BUILDING

1. We have quite a few parts for the four Nacelles and the inboard and outboard are different, so lay out all the parts first. Identify each part and number.

2. Start with the inboard Nacelles.

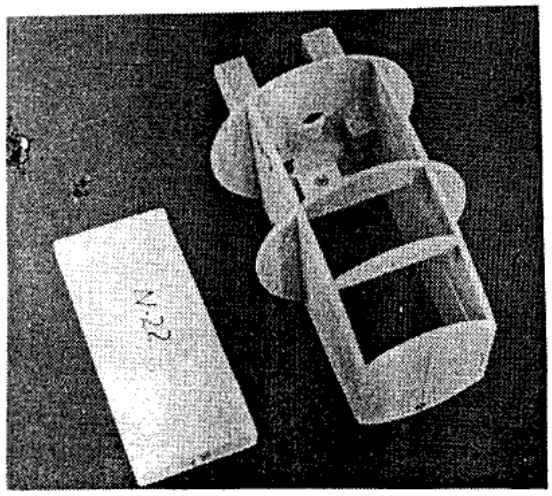
3. Mark all former locations on four N-8's.

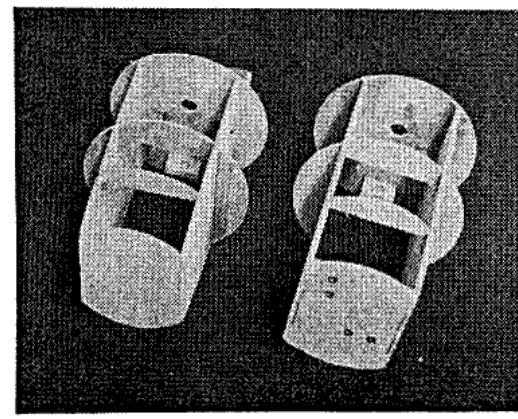
4. Glue N-7 to N-5 former and drill holes for landing gear wire clips. See N-5 section on plans. Make a left and a right. Note correct position of landing gear wire and wheel. If retracts are desired, refer to detail view and relieve these two bulkheads to fit retract gear.

5. Bolt landing gear in place.

6. Add N-1, N-2, N-3, N-5 and N-7 assembly to N-8 sides. Slip Em's in place - no glue yet!

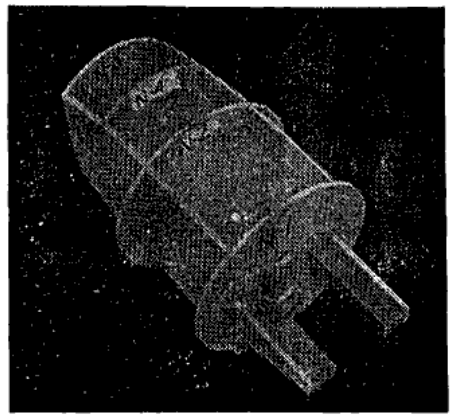
7. When sure that everything is square and straight, epoxy components in place. Use masking tape to act as a clamp.





8. Glue N-23A and N-23B together and add to the Nacelle assembly.

9. Check fit of fuel tanks and drill necessary holes for fuel lines. (.6 oz. tanks fit just) If retracts are used, it may be necessary to use 4 oz. tanks, due to space restrictions.



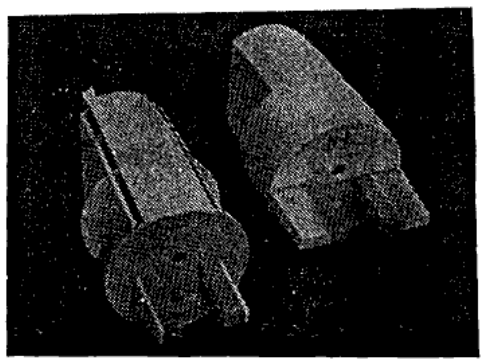
10. Trial fit engines and drill holes for throttle cable (see plans). Use flexible cable in plastic housing.

11. Sheet Nacelle with 3/32 balsa, as shown. Add N-24's

12. N-21, lower hatch is fit in place with dowel key at the rear, and bolt and nut at the front into N-23A and N-23B.
An extension of N-21 is recommended if retracts are used. This will allow easy retract removal, when necessary.

13. Fuel proof fuel tank section.

14. Sand inboard Nacelles to shape. Doesn't seem like there is much to them at this point, due to the tongue and groove construction.



15. Slightly round N-1 so that when the cowl is installed, some air will get through all around to aid in cooling.

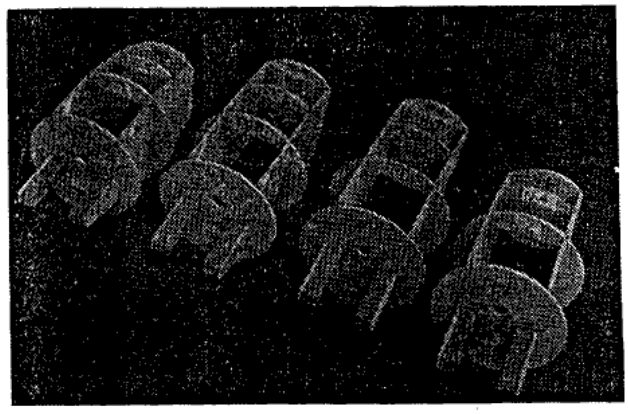
16. The outboard Nacelles are next.

17. Mark all former locations on the four N-9's.

18. Add N-6, N-4, N-2 and N-1.

19. Slip in Em's.

20. When straight and true, glue everything in place.



21. Fit fuel tank and drill necessary holes.

22. Fit engine and drill holes for throttle cable.

23. Repeat Steps 11, 12, 13, 14, and 15.

24. At this point fiberglass all Nacelle assemblies with lightweight (.6 oz.) cloth and resin. Sand smooth.

25. Check fit of cowls and drill necessary holes for hold-down screws, two on each side.

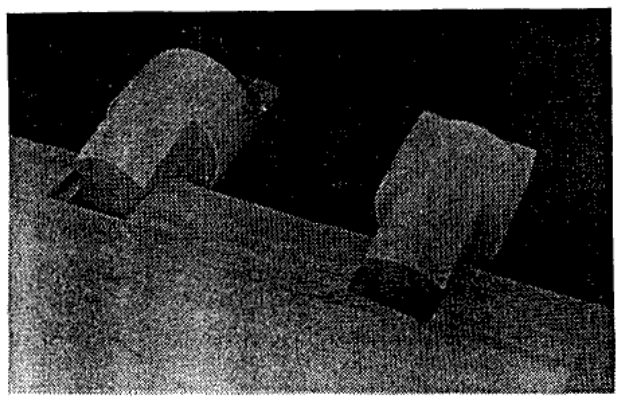
26. Do not drill engine mount holes yet--that comes when we measure and set thrust lines.

27. Put the Nacelles aside for now, we will get back to them later.

NACELLES-INSTALLATION

1. Remove cowls from Nacelles. Mark a number on the inside of the cowls to correspond to the Nacelle- #1 is normally the left outboard and runs to #4, right outboard, sitting in the cockpit.

2. Slip #1 Nacelle into place on the wing, threading the throttle cable through the formers. You might have to do a little enlarging of the holes, so that the Nacelle assembly slides all the way back into the tongue and groove. The ends of the tubing will stick out well past N-1.



3. Add #2,3 and 4 Nacelles in the same manner. No glue yet.

4. With all four Nacelles in place, block up the wing and measure so that the incidence angle is zero or use an incidence meter. Weight the wing so that it will not shift or move during this operation. All measurements are in relation to the wing.

5. Throughout this mating of Nacelle to wing, we will make mention of measuring proper thrust lines. Use care in these measurements to insure proper thrust lines.

6. With the tongue and groove method of Nacelle installation, things should be right on and should require little, if any, shifting, but we will double-check everything, just in case.

7. Using a long, straight edge, check Nacelle #2 and #3 N-1's (firewalls) to insure that they are parallel to each other. Do the same for #1 and #4. A 36" yardstick does the job just fine. Adjust Nacelles as necessary. This insures that all four Nacelles are parallel.

8. Install engines. Left side engines have 1^{o} left thrust and right side engines a 1^{o} right thrust. This is rather difficult to measure, but can be done by use of a template. Trace and cut out a template from scrap balsa, using the top view of a Nacelle. Locate the thrust line. Pin this to N-1 and align the engine shaft with the c/l. Reverse template for left engines. 1^{o} is not much, remember.

9. With the incidence meter, measure each engine for 2^{o} down thrust. Wing is still at zero.

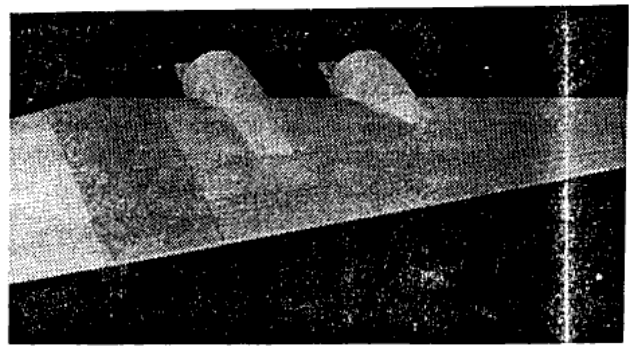
10. Double-check all your measurements.

11. When satisfied, epoxy Nacelles in place.

12. Add N-10's and N-12's to inside Nacelles. Use epoxy for all Nacelle to wing parts. Remove engines.

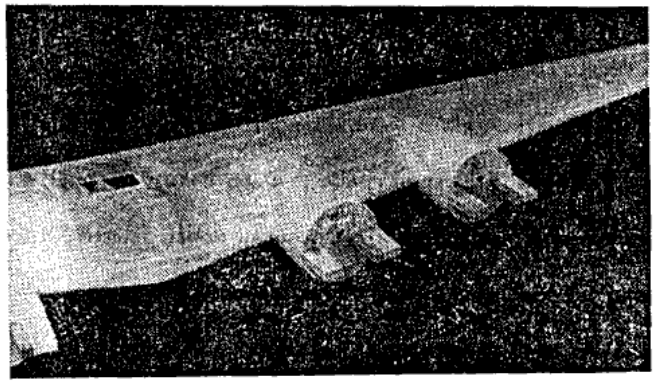
13. Glue N-14's and N-16's in place.

14. Fit N-18 (inside Nacelle) and N-20 (outside Nacelle) in place. Shape so that they conform to wing airfoil.



15. Turn wing over and add lower fairing blocks. N-11, N-13, N-19 to inside Nacelles. N-15, N-17 and N-20 to outside Nacelles.

16. Carve and sand fairing blocks to shape indicated on plans. Re-install engines.



17. The wing is starting to get heavy at this point, with the engines installed.

18. Hook up the throttles, cutting off the excess cable. Check to see that the throttle cables are free, with no binding.

19. Cut necessary access holes in the cowls, depending on engine type.

20. Check fuel tank fit and fuel line connections.

21. Using 1 oz. fiberglass cloth and resin, lay a 2" wide piece around the Nacelles where they mate with the wing, both top and bottom.

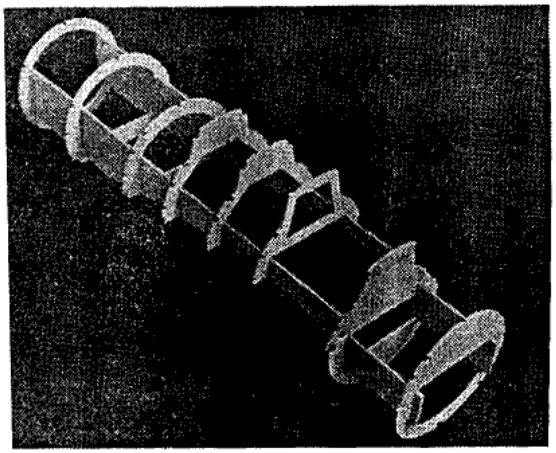
22. Sand complete wing assembly, filling in any knicks, dings, etc.

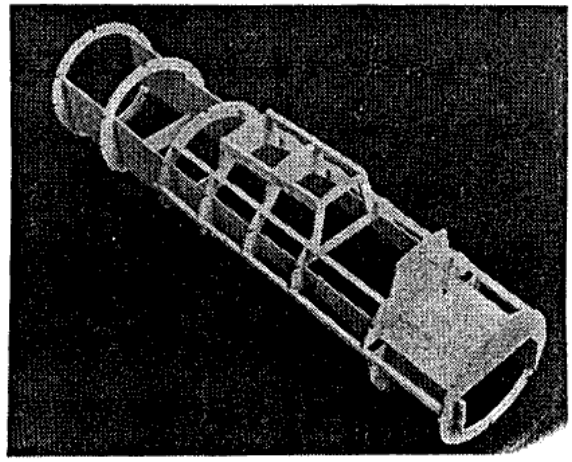
FUSELAGE

1. Mark all plywood parts prior to punching them out. Make sure you mark top and bottom on the formers.

2. We will start with the basic fuselage box construction first. Take both fuselage plywood box sides and add formers F-4, F-10, F-11 and F-13 in that order. Use masking tape to keep it straight and square.

3. Add F-6, F-9, F-7, F-8 and F-5 next.





4. GLUE TOP STRINGERS IN PLACE BETWEEN

5. CUT AND FIT COCKPIT FLOOR IN PLACE.

6. LOWER STRINGERS BETWEEN F-4 AND F-10 ARE NEXT.

7. UPPER 3/16x3/8 STRINGER IS GLUED BETWEEN F-4 AND F-10. WE WILL SHAPE LATER.

8. GO BACK AND DOUBLE GLUE ALL JOINTS. USE REGULAR MODEL CEMENT.

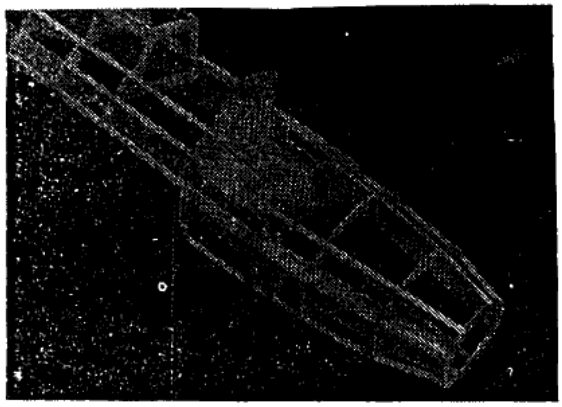
9. FIT F-44, LOWER PLYWOOD NOSE KEEL INTO PLACE--NO GLUE!

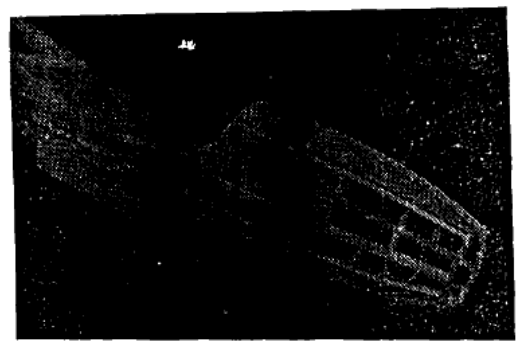
10. F-42, F-3, F-2 AND F-1, IN THAT ORDER, ARE NEXT. STILL NO GLUE, USE TAPE OR PINS.

11. ADD SIDE KEELS, F-43'S. WHEN EVERYTHING IS SQUARE, GLUE THE ASSEMBLY IN PLACE.

12. MEASURE AND CUT TO LENGTH ALL FORWARD FUSELAGE STRINGERS. SOAK IN WATER, SO THAT THEY WILL BEND EASIER.

13. GLUE STRINGERS IN PLACE, STARTING WITH LONG SIDE STRINGERS. THEN, TOP AND BOTTOM. FINISH OFF WITH THE INTERMEDIATE ONES.





14. DOUBLE GLUE.

15. TEMPORARILY FIT F-47 IN PLACE ON F-13. ADD F-12 TO LOWER F-11 AND F-47.

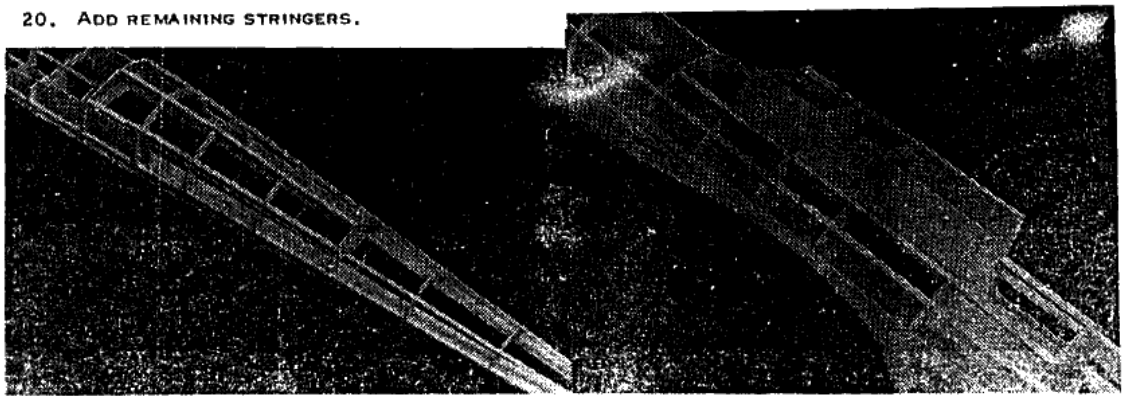
16. ADD F-45 TO F-10, 11 AND 13. USE MASKING TAPE--NO GLUE.

17. ADD F-46'S AND THE REMAINDER OF FUSELAGE FORMERS, F-14, 15, 16, 17, 18 AND 19. STILL NO GLUE.

18. ADD STRINGERS OVER ALL KEEL MEMBERS--TOP, SIDES, BOTTOM. STILL NO GLUE!

19. SQUARE UP THE ASSEMBLY AND GLUE ALL THE PARTS IN PLACE.

20. ADD REMAINING STRINGERS.



21. Re-glue everything.

22. Glue F-30 and F-31 in place. Sand to shape. Fuselage sheeting will go over these parts.

23. At this point, you no doubt will have a problem with the fuselage rolling around the work table. We suggest you fabricate a stand of some sort.

24. Epoxy F-6A's in place on forward part of F-6.

25. Epoxy F-32's in place with hardwood wing bolt blocks installed.

26. Install tail wheel assembly on F-39, F-16. Epoxy nuts in place. When dry, remove tail wheel wire. We will install after sheeting.

27. Notch formers F-5, 7, 8, 9 for F-29. A razor saw makes the job easier. Bevel F-29's and glue in place.

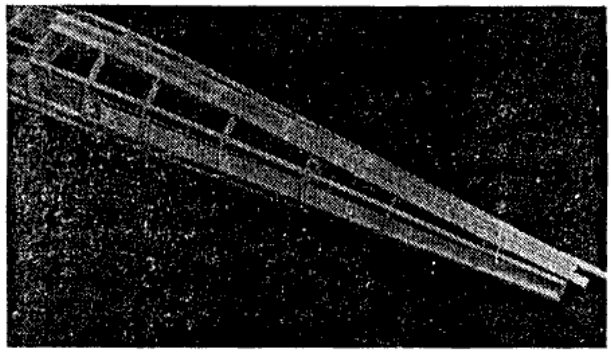
28. Sand and shape F-29's as shown on plans.

29. Glue top sheeting in place over F-5,7,8,9.

30. Sand fuselage, using a block.

31. Rip 3/32 sheet balsa into 3/8 strips. Makes for very easy fuselage sheeting around the fuselage compound curves.

32. Start sheeting at rear bottom of fuselage, from F-12 to F-19, over the 3/16 stringer. F-38 will be added later.



33. Bevel each strip so that they fit flush. Work up the fuselage equally on both sides and then towards the front.

34. When fuselage is fully sheeted, add F-37 and F-20.

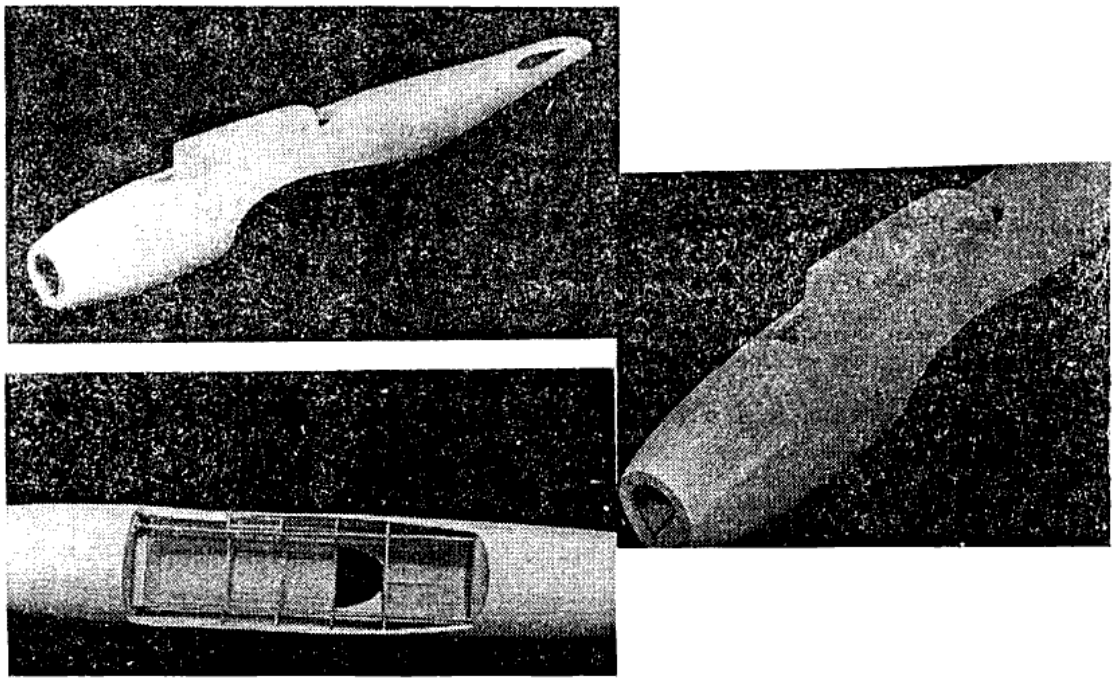
35. Build up stab assembly with F-33's, F-34's and F-35's. Add triangle balsa.

36. Glue F-36's in place.

37. Tack glue stab assembly in place on F-36.

38. Cut out rear sheeting for F-38 and fit in place.

39. Carve and sand fuselage to shape. Use a sanding block for this.



40. Place waxed paper over center section of wing and bolt in place. Make wing fillers, as shown on the plans from Micro Balloons and Resin. Blend the fillets into the wing over the waxed paper. Take your time with this and it will save a lot of sanding. Keep your finger wet with water as you work--not soaking, just damp. When dry, remove wing and sand, as necessary.

41. Fiberglass cloth and resin go on now, if you are using that finishing method.

42. Cut away stab assembly and F-38.

43. Install tailwheel assembly.

44. Make up the elevator and rudder pushrods and install. Hook up the tailwheel steering.

45. Add horizontal and vertical surfaces. Make sure incidence angles are correct and everything is square. Bolt wing on when doing this. Hook up the pushrods also, and check for freedom of movement. When satisfied, glue in place.

46. Glue stab blocks in place and use fillets as necessary.

47. Looks like a B-17 now, doesn't it!

48. Add F-41 assembly.

49. Install all the other external goodies that you care to--there are quite a few.

50. Cut and fit the turrets and canopies. Do not glue yet.

51. If you are going to cut out the windows, now is the time. It will not weaken the structure to do so, it's your choice.

52. Finish as desired.

CANOPY & TURRET NOTES

1. Trim all canopy and turrets to proper size, using a sharp pair of scissors and knife.

2. As you cut material away, keep checking for proper fit.

3. The tail turret forms a fillet on the vertical fin. Take your time back there and you will be able to get by with little or no filler.

4. Liquid masking film is excellent for the canopy and turret frames.

5. The B-17 has a lot of windows and it is up to the individual as to either cutting them out (no harm to the structure) or painting them on. If you do cut them out, do so after the fuselage has been glass-coated and sanded. Don't forget to paint the inside of the fuselage so that bare balsa doesn't show. Use a dark green paint.

6. Blow the fuselage out with air, prior to installing the windows and canopies, so that dust does not stick to them.

VERTICAL FIN & RUDDER

1. Glue F-6 and F-7 plywood together to form vertical fin framework.

2. Mark all rib positions on the assembly.

3. Draw a center line on R-8 and glue in place on the bottom of R-6, R-7 assembly.

4. Add R-13, R-14, R-15 and R-16 in that order.

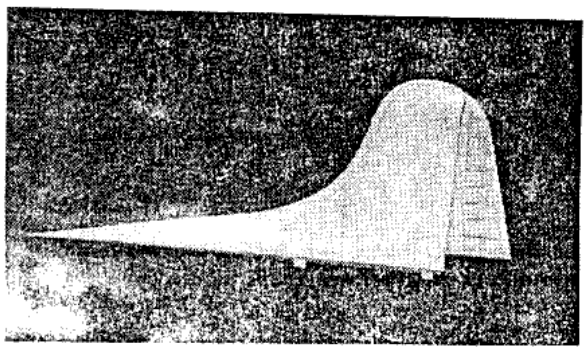
5. R-10, R-11 and R-12 go on next.

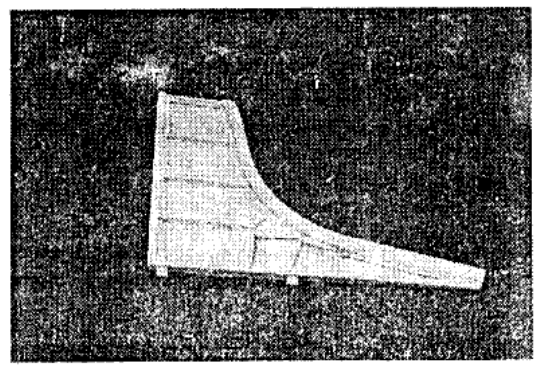
6. As we are building this in our hands, so to speak, keep checking and insure everything is straight and square prior to gluing.

7. R-9, R-17 and R-18 are now glued in place.

8. Sand assembly as needed.

9. Add 3/32 sheeting in this order: R-21, R-22, R-20A, R-20B and last R-19. Wet outside of sheeting with water to aid in bending around airfoil. R-22 sheeting goes over R-17, TE.





10. Glue LE R-1 to R-5 in place.

11. Add scrap balsa filler at TE of fin and R-5.

12. Glue R-25A and R-25B together. Mark all rib locations on both sides of R-25A and R-25B.

13. Glue R-26's in place on LE.

14. Add R-27's.

15. Glue ribs (3/32 x 3/8) in place.

16. Add 3/16 x 3/8 scrap balsa end ribs.

17. Bevel LE of rudder as shown on plans, so that it will hinge properly.

18. Mark and notch fin and rudder for hinges.

19. Drill hole in rudder for control horn, notch lower part so that wire is flush with LE. Do not glue in place.

20. Temporarily install hinges and tack glue rudder to vertical fin.

21. Carve and sand with a sanding block the entire assembly to shape. Check with plans for correct airfoil shape. Elevator ribs taper into R-25A and R-25B assembly and will be covered with fabric.

22. Remove rudder and cover. We use dope and fabric.

23. Fiberglass vertical fin with resin and light (.6 oz.) glass cloth.

24. Keep entire assembly light.

25. Temporarily re-install hinges and horn and check for freedom of movement of the rudder. Sand as necessary.

HORIZONTAL STAB & ELEVATOR

1. Mark all stab ribs (S-6 to S-12). Check TE's of ribs to insure 1/8 x 3/16 balsa sub-spar fits correctly. Should be flush with TE of the ribs. Also sand rib's upper and lower camber, if necessary.

2. Mark a centerline on S-3 lengthwise. Also mark rib locations on S-3. We will build the stab frame vertical.

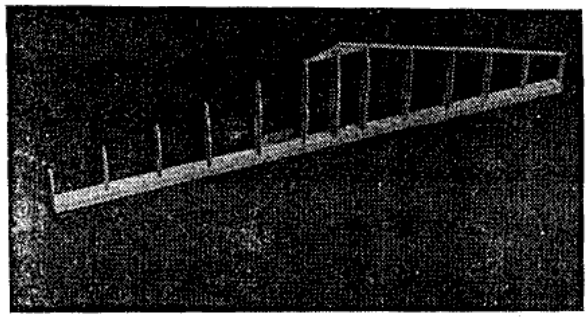
3. Pin S-3 to your work table with the C/L and rib locations facing up.

4. Glue 1/8 x 3/16 sub-spar in place on the C/L.

5. Add ribs S-6 to S-12, keeping them vertical to S-3.

6. Add S-4.

7. Using the plan view, cut 1/8 x 3/16 sub leading edge. Glue in place on LE of the ribs. Take your time here, and make sure everything is straight and true.



8. Add S-5's.

9. While that is drying, cut and edge glue 3/32 sheeting as shown on the plans. Sand both sides. Remember, you need two. Observe sheeting grain direction.

10. Remove frame work from the table and sheet top and bottom of stab. Sheeting should be flush with the LE of the sub-spar. Sand as necessary when dry.

11. Glue S-1's in place.

12. Sand tip section and glue S-13's in place.

13. Put the stab aside for now. We will sand and carve to shape with the elevator installed.

14. Mark all rib locations on both sides of S-17's.

15. Glue S-18's in place on S-17. Add S-19's, 9/32 x 3/8 elevator hornribs and remaining 3/32 x 9/32 ribs. Don't forget the 3/16 sq. tip ribs.

16. Put this aside for now, also.

17. Locate and mark TE of S-3 for S-15's and S-16's.

18. Check S-14's for proper size over the plans. Mark rib locations for S-15's and S-16's.

19. Glue ribs in place on sheeting. Bevel TE for proper fit.

20. Notch ribs S-15's and S-16's so that the elevator horn can be installed (see plans). Also notch S-3 as necessary (see plans). Glue this assembly in place on rear of S-3.

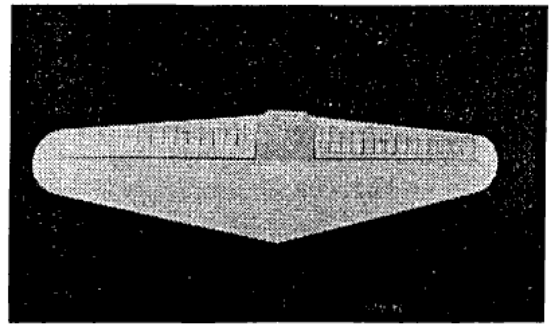
21. Taper LE of elevators, as shown on the plans, so that they can be hinged. Mark hinge locations and notch out. Do the same on S-3.

22. Drill holes in elevators for control horn wire legs. Note that wire is flush with the end of the elevators. This is O.K.

23. Temporarily fit elevators with hinges installed. Sand as needed; we want a good fit with no gaps and 1/32" clearance at tips and center section.

24. Tack glue elevators in place.

25. Using a sanding block, sand and carve stab assembly to shape. Watch that you do not sand through the stab sheeting. Elevator ribs should taper down into S-17 at the TE. The elevator will be covered with fabric.



26. Remove elevators and add covering. We use the dope and fabric method.

27. Finish stab with fiberglass resin and lightweight (.6 oz.) cloth. No need to add heavy cloth over the center section.

28. Remember to keep the tail section as light as possible.

29. Re-install elevators with hinges (no glue yet) and check assembly for freedom of movement; sand as necessary.

THE FINISH WORK

The construction phase concluded with the remaining parts being stuck one to another and/or "shape" sanded. This pile of parts which may resemble an airplane depending on arrangement must now be finished to satisfy the goal.

One of the keys to a good finish is sand, sand, sand, dust it off and sand once more. Remember that, as it's important. The first sanding is done with rougher open coat sand paper (I prefer aluminum oxide or garnet paper) 280-320 range. I glue mine to 1"x4"x12" blocks with spray contact adhesive or "sticky back" by Scotch. It's best to sand all components <u>prior</u> to final assembly and is also much easier.' The next sand is done with 320-400 grit paper. After this step take a good rest, then come back and sand until tired again. Now wipe the plane down with a clean soft rag and check it for seams, low spots, and symmetry. Then sand once more with the 400 grit.

If you plan to "MonoKote" your eyeball scale, it is done at this stage on bare wood and in accordance with the directions furnished with the "MonoKote". After it's all monokoted, go to the final assembly step.

If you plan an ultimate scale job finish you must paint it 'cause no real airplanes are monokoted. (Too bad, though!) You must decide what type hinges you will use now because it makes a difference. If you are going to use hinges with removable hinge pins, then install all hinges and control rods, linkage, radio gear, (according to manufacturers instructions) etc., at this time. Then dismantle it and cover it individually. If you are to use "hidden" hinges (like the no glue molded nylon ones) then cover all the separate pieces and then assemble them.

To prepare the model for covering, you dope the balsa with at least a 50 50 dope-thinner mixture. After each coat sand lightly and continue until no "fuzz" occurs after doping. (Usually 3 or 4 coats). Now cover with the material of your choice (for instance, silk, silron, nylon etc. check the grain (look at a corner of the material to discover the grain is parallel to the heaviest or most dense threads whichever the case The grain must go lengthwise on each piece.

To apply the covering, cut it oversize, hold in place and spray with a FINE FINE mist water sprayer carefully working out all the wrinkles and dope it while still wet with the brush nearly parallel to the surface and lightly, lightly stroking it. If done while wet, the dope will "float" on the damp surface and dry "white or cloudy" but will require far fewer coats and the cloudy look will disappear after the 2nd or 3rd coat.

Carefully trim (with a double edge razor blade) and sand the "rough" areas but be careful not to "cut" or "sand" out the fibers over a "high" place like a rib.

When surface remains smooth after a coat of dope (3rd or 4th coat) it's time to thin the mixture and add talc or cornstarch for filler "body". Sand after each coat until desired smoothness is acheived. Then assemble the parts and spray paint the final colors to suit. Just remember alot of planes modeled are glossy when the prototype was not. This mistake costs points. As I mentioned earlier, I won't presume to advise on achieving the "ultimate scale" finish, but if in doubt, there are volumes written on the subject. There may even be a "scale nut" in your area who can help. Don't forget the plastic modeler who knows finishes. Remember also, the plastic model is an excellent source of scale detail as well.

BALANCE & FLIGHT

There before you, is the result of these many efforts. All of the work is done, you say. Nay, say I. All of what is done, anyone could do. What lies ahead is important for it makes an almighty difference.

This phase begins with the model ready for flight and ends with a successful landing. Begin with the airplane assembled as if to fly. Set it on a smooth surface with a plain unbroken background and go around behind the craft and "eyeball" it. Very carefully check to see that the rudder and vertical fin are perfectly aligned. In the case of twin rudders, measure them accurately. Is the horizontal stabilizer parallel to the wing? Are there any warps in any of the flying surfaces? Is the fuselage straight? If the answer is yes to all these questions, you are in great shape. If not, adjust it so it is. You know what must be done to align surfaces but wait awhile to do that while we consider warps.

Warps are crooked or "bent" surfaces. They cause most accidents. It isn't necessary as they can be fixed. On any wood airplane which has been doped or painted with any of several different paints the problem is to soften the paint and twist the surface opposite the warp, then let it harden again.

The paint can generally be softened two ways. It can be heated or dissolved. To heat it, use steam. If a small surface is the problem, a teakettle over a stove does nicely. If a large surface is warped, the outlet behind a steam cleaning plant will do the job. You apply both sides of the warped surface to the steam until good and hot, then hold opposite warp, remove from steam and allow to cool well. Wait awhile, then check again. Do this until the warp is gone.

To dissolve the paint, use more coats of paint over both sides of the warp. This doesn't work on all paint, but has been done successfully with dope and lacquer. I have also seen guys fasten the surface down in proper position and paint and paint until it will stay. That's the hard way.

Now that all the warps are gone, reassemble the plane, put it on a true flat surface and measure the distance from that surface to leading edge of wing, then from the surface to trailing edge of wing at same station (chord point) and verify that it agrees with the incidence shown on the plans. Do the same for the tail. If it doesn't agree, do whatever is necessary to make it agree.

Next check the thrust. Fasten a string to the centerline of the plane back near the tail and compare the distance to each prop tip with the prop horizontal insuring that the offset agrees with that shown on the plans. Then vertical for downthrust.

Now, check the balance point to be sure it is exactly as shown on the plan. If not, add weight or relocate the radio in such a manner that it agrees with that shown.

Lastly, turn the radio on and operate all the surfaces one at a time to insure that they move in the proper direction, do not bind, do not interact with other controls and do run smoothly. When you have satisfied all these requirements, put the outfit on charge all night before you go fly.

When you get to the field, don't be afraid to ask an expert to fly your plane for you if you are a novice or if you haven't flown in awhile.

If you decide to fly it yourself, plan your flight from takeoff, through climb, turns, pattern, approach and landing with careful consideration given to wind direction, runway orientation, other traffic and relative position of the sun.

I have seen everything mentioned in this chapter cause a scale job to crash when not done properly, so if you will carefully tend each one of these points, your odds will be much much better. Don't you agree?

Good luck and happy landing!

AIRCRAFT ALIGNMENT

This sheet is included as an addition to the normal instructions in hopes that you may benefit from the information it contains. The time it takes to accurately align an airplane is repayed many, many times by the superior performance of the aircraft.

All alignment information is included on the plans. Note that wing and stab angles, thrust angles, etc., appear near their component locations. Generally, the angles are referenced to a fuselage centerline which is also drawn on the plans.

Most angles are expressed in degrees of angular offset. Don't let this stop you from using them! The least expensive conversion method is to borrow an algebra book which has trigonometry sections. Use the formulas to convert the degrees to fractions of an inch of offset. The easiest method is to use a Robart incidence meter. This device is calibrated in degrees and allows direct readings of the incidence angles.

The first step in aligning the aircraft is to transfer the centerline to the fuse sides. Usually the centerline runs parallel to a major piece of the fuse such as the top edge of the side. Use a felt tip pen and draw a line parallel to the centerline above the wing saddle and below the stab saddle.

Next, mark the centerlines of the leading and trailing edges on the stab and wing. Make a template from the plans to transfer this location.

Place the fuse on the workbench and block up so that the centerline is parallel to the table top. Now place the stab in its saddle and trim and skim it until the leading and trailing edges are at the required different angles. Let's say the plans call for 1/16" positive incidence. That means the center of the leading edge is 1/16" higher (referenced to the top) than the center of the trailing edge. It makes no difference how far up the trailing edge is from the work surface--just make the leading edge 1/16" higher. The stab may have positive, negative, or no incidence depending on the design.

Align the wing the same way. A method to use, where dowels are employed on the leading edge, is to drill the dowel holes in the bulkhead higher than necessary (toward the top of the fuse in a low wing design). Now, when the wing is put in place, the trailing edge will stick up off the wing saddle. Using a rat tail file, elongate the holes downward until the wing is at the correct incidence. If there is a gap along the wing saddle use balsa, ply, or filler to close. If you want to use wing seating tape, be sure to make all your measurements with the tape in place.

The wing and stab must also be checked to be sure they have the same length extending out from the fuselage. Use a balsa stick or yardstick and be sure that if the total wingspan is 70" that 35" minus 1/2 the fuse width, extend on each side of the fuselage.

Next, be sure the wing and stab are not skewed on the fuselage or to each other. Use a piece of non-stretchable string and tie a loop in one end. Pin through the loop attaching the string in the exact center of the fuselage. For the wing attach near the tail. (near nose for stab) Measure out to one tip and then go to the other tip. It must be the same distance. Do this for the wing and stab.

The last thing to check is that the wing and stab are not tilted. Carefully sight from the front and be sure that one tip of the stab does not droop lower than the other.

As you can see, these 5 parameters must be completed taking into account the other 4 as one is being worked upon. Usually, we establish the stab incidence, equal extension, skewness first, and then glue the stab in position while sighting from the front with a straight rod resting on the wing saddle.

The last difficult area is the fin and rudder. Be sure the fin is perpendicular to the stab. A large right triangle is necessary for this step. Also, sight carefully from the front to be sure that the fin is inline with the top centerline. Sight from the front and make sure you see the same amount of each side of the fin.

Motor offset is difficult to measure. If the Robart gauge is used, it is easy. Incase you don't use the gauge, about the best method is to draw the thrust line on the nose or nacelle and then extend this line with a stick. Measure from the crankshaft to the stick and compare with what the plans call for. Remember that thrust angles may be altered with skims or oversize motor mount holes. When you verify that the thrust is correct, fill the unneeded part of the hole with epoxy to maintain strength.

We are sure that if you take the time to complete the above steps you will have much more satisfaction from your new model.

FLYING

Four engines are a thrill, both for you the pilot and the people watching with open mouths. Please read these notes prior to flying.

The CG must be as shown. If not, add weight. The B-17 can handle it, so don't worry. Remember, better a little nose heavy than an aft CG. Use weight as necessary to balance!!! Balance all the props that you use on the B-17, as vibration can become a factor on a 4-engine airplane.

Fill all the tanks and the start engines. Adjust high-speed so that engines are all at the same RPM--use a tach! Your ears will be able to tell you, but don't trust them. Start outboard engines first, as you want the inboards to quit last if you run out of fuel. Don't

worry about the midrange; make sure all engines will idle at idle! Use low trim to kill the engines. Don't forget to hold the B-17 nose high with all engines running at full throttle, --an easy quick way to catch a lean needle setting. Back off on the needles if any engine shows signs of sagging. You have more than enough power.

When satisfied, fill the tanks and go to it. Add power slowly, so you don't lose any engines on take-off. Steer with the rudder as needed. Allow the tail to come up and the B-17 will be accelerating rather fast (4 engines, remember). Fly the airplane off the runway--do not horse it off. Climb out at a shallow angle straight ahead. The '17 will pick up airspeed quite fast, so increase the angle of climb and start a turn. Level off and throttle back slightly; flies nice, doesn't it? Try some turns; remember to use rudder with the ailerons to coordinate turns. This is not a pattern or sport bird. Throttle back a little more and try some slow flight, no 90^{o} banks when doing this. Remember, this is a bomber and should be flown as such.

Heart in mouth, we must try a landing. No sweat! Fly a rectangular pattern and control your rate of descent with the throttles --<u>not the elevator.</u> Set up a landing attitude on final and use the throttles to control vertical speed. If you are going to be short, add power, not up elevator. Keep power on until over the runway, then come to idle. Flare the airplane as required; do not try for a 3-point landing, just slightly tail low, mains first then the tail-wheel. Use low idle trim to kill the engines, if needed.

Engine loss in flight is not a panic situation. Plan for an immediate landing, as the B-17 doesn't do good as a glider. One engine out is not a problem, but why push it! Trim as required and land normally. The reason behind landing ASAP is, why ask for trouble. Better to trouble-shoot the problem on the ground than to have an instant kit, if more engines quit. Keep airspeed up whenever you lose an engine in flight; push the nose down and bring it back home. With two out on one side, use a very shallow angle of bank in turns and keep full power on with the good engines until landing is assured.

That's about it. No deep dark secrets on 4-engine flying. Common sense is the order of the day, with a project such as this.

Happy bombing!

REFERENCE SOURCES

1. PROFILE PUBLICATIONS NO. 77.... THE BOEING B-17E & F FLYING FORTRESS

2. ARCO-AIRCAM AVIATION SERIES NO. 17..... B-17B-H FLYING FORTRESS

3. SQUADRON SIGNAL PUBLICATIONS NO. 12....B-17 IN ACTION

4. AERO PUBLICATIONS FAMOUS AIRCRAFT SERIES BY STEVE BIRDSALL.....THE B-17 FLYING FORTRESS

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ROYAL DECALS

General

Your Royal decal sheet uses a special catalytic ink which is more durable than traditional solvent-based inks. This feature is especially advantageous to the modeler because the end product is stronger, thinner, and is not bothered by raw model fuel or any model airplane dope. Despive a superior chemical resistance, we still recommend that you paint the entire finished model (decals and all) with a gloss or matte clear. This will keep the fuel from working under and lifting the decals, as well as giving a consistent sheen between decals and model finish. Due to the wide variety of paints available, we do recommend that you test for paint compatibility, using some non-essential lettering on the decal sheet. Let the paint set for about four minutes to see if it curls or wrinkles the decal. If it doesn't, the paint is compatible.

When applying the decals to the model, use the same spacing that is now on the decal sheet. Handle the numbers gently to avoid tearing. The numbers have not been joined for you because the clear backing that is used to do this is still visible after application and tends to detract from the finished job. Extra work and care in application is required, but the end result is far more professional and appealing to the eye. Refer to the markings placement sheet for positioning the decals on your model.

Application Instructions

1. Plan layout of decals on model.

2. If laying out numbers, masking tape makes a helpful reference border for obtaining a straight bottom line. Mark position of the numbers on the tape before lifting the decal in water. Remove the tape, once you have reached the squeegee portion of the instructions.

3. Cut sheet into convenient application-oriented sections.

4. Make sure surface of the model is clean and free of dirt or grease.

5. If using flat paint, it is necessary to overspray with a gloss clear (polyurethane works well); then, after dry, apply decals and respray with flat clear. This step is necessary, as the clear decal base (where it shows around the colors) will frost when applied on flat surface. This happens because air is trapped beneath and cannot be removed with

squeegee because of the irregular surface that comes with a flat finish. The gloss clear stops this frosting and renders the clear borders invisible. Flat clear can then be applied to achieve a consistent flat finish with professional-looking decals. You cannot cover a frosted clear decal base with flat clear, as it will not cover up problem, but only make it look worse.

6. Dip decal section you intend to apply into likewarm water. Hold it there until decal begins to loosen from paper backing (usually 20 - 30 seconds). Remove from water when decal can be slid freely back and forth on its paper backing.

7. After removing from water, allow to stand momentarily. Meanwhile, moisten area of model which is to receive decal with lukewarm water. Make sure surface to receive decal is near room temperature and not exceedingly cold.

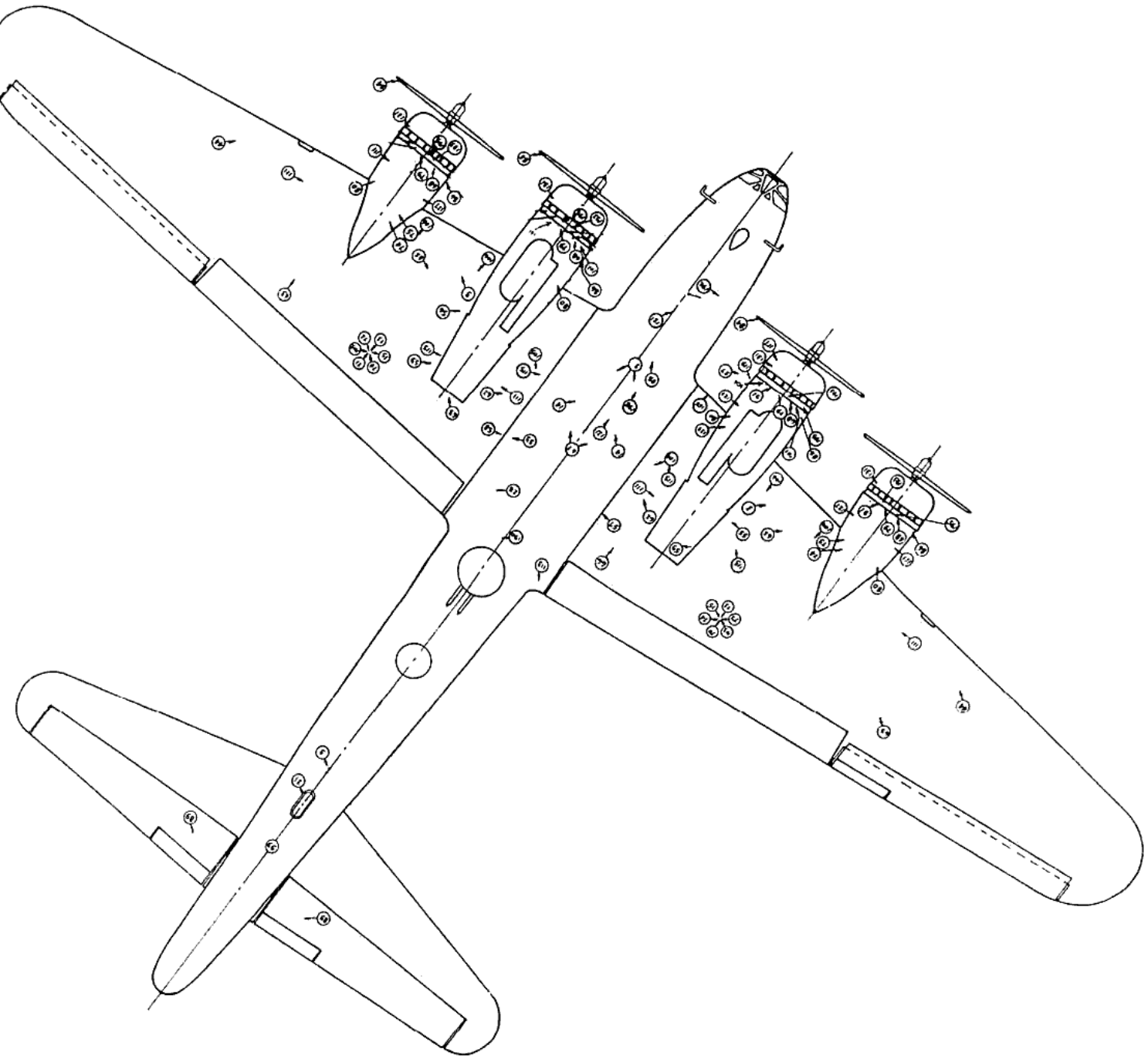
8. Place soaked paper backing with decal still in place in approximate position on model and then slide decal, face up, from backing into position on model. Be careful not to tear numbers.

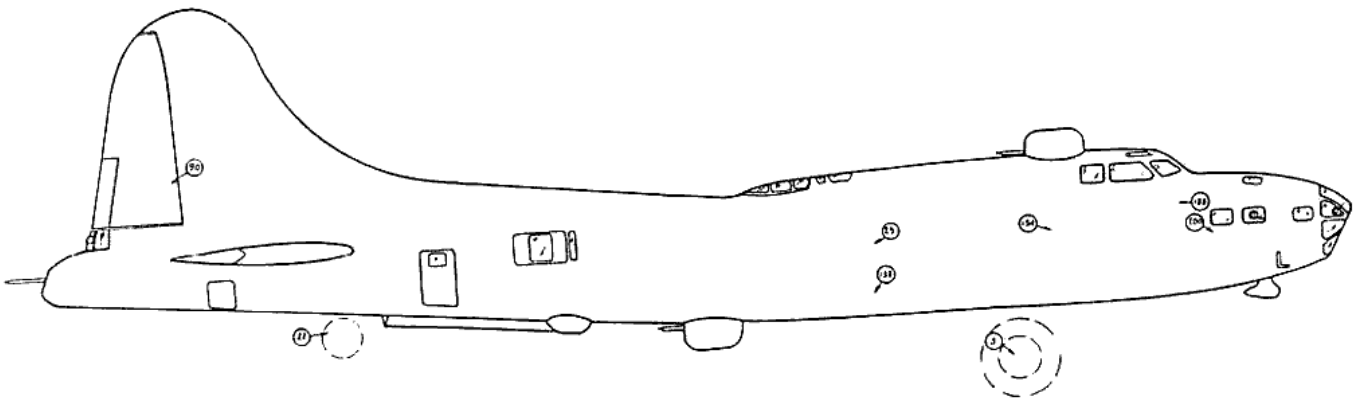
9. Do not touch the side of decal which will adhere to the model.

10. Once in desired position, gently smooth out wrinkles or bubbles with a credit card, or better yet, a piece of 1/16" balsa sheet with straight edge. Decal should rest flush with surface, and all air bubbles, etc., squeegeed out from beneath. Use a very light touch with squeegee and apply very, very little pressure. Try to work from middle of decal out, with one light stroke each direction. Repeated squeegee action is not necessary and can cause the clear border on some of the decals to frost, as air is trapped beneath surface. The water will be pulled out from beneath decal naturally with capillary action as the water evaporates from decal's edge.

11. Allow applied decals to dry overnight before painting model with clear overcoat. Polyurethane flat or gloss works well here.

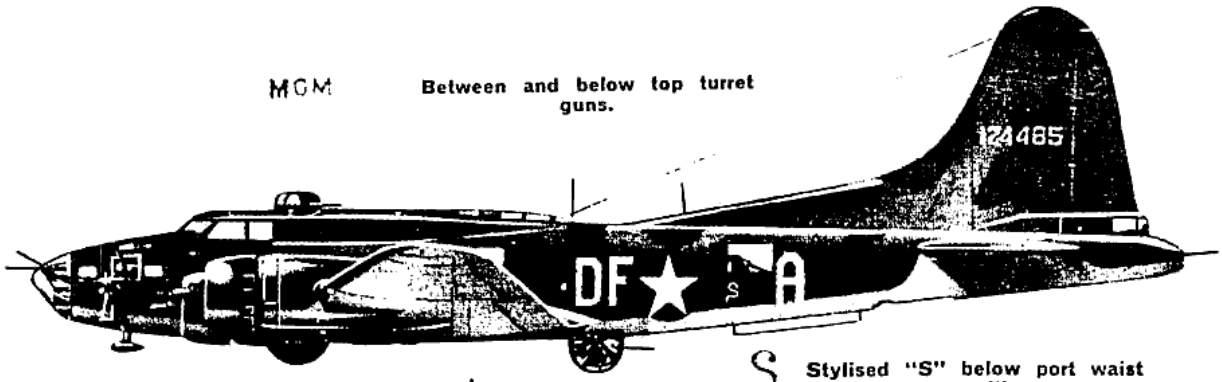
12. Decals furnished with military models have a special flat finish. Although impervious to clear model airplane dope, it will tend to "bead-up" and not adhere properly to the decal surface. For this reason, we recommend the use of a flat polyurethane clear coat to entire model (decals and all) to produce a consistent matte finish. Gloss decals may be sprayed with clear dope or gloss polyurethane.





MGM

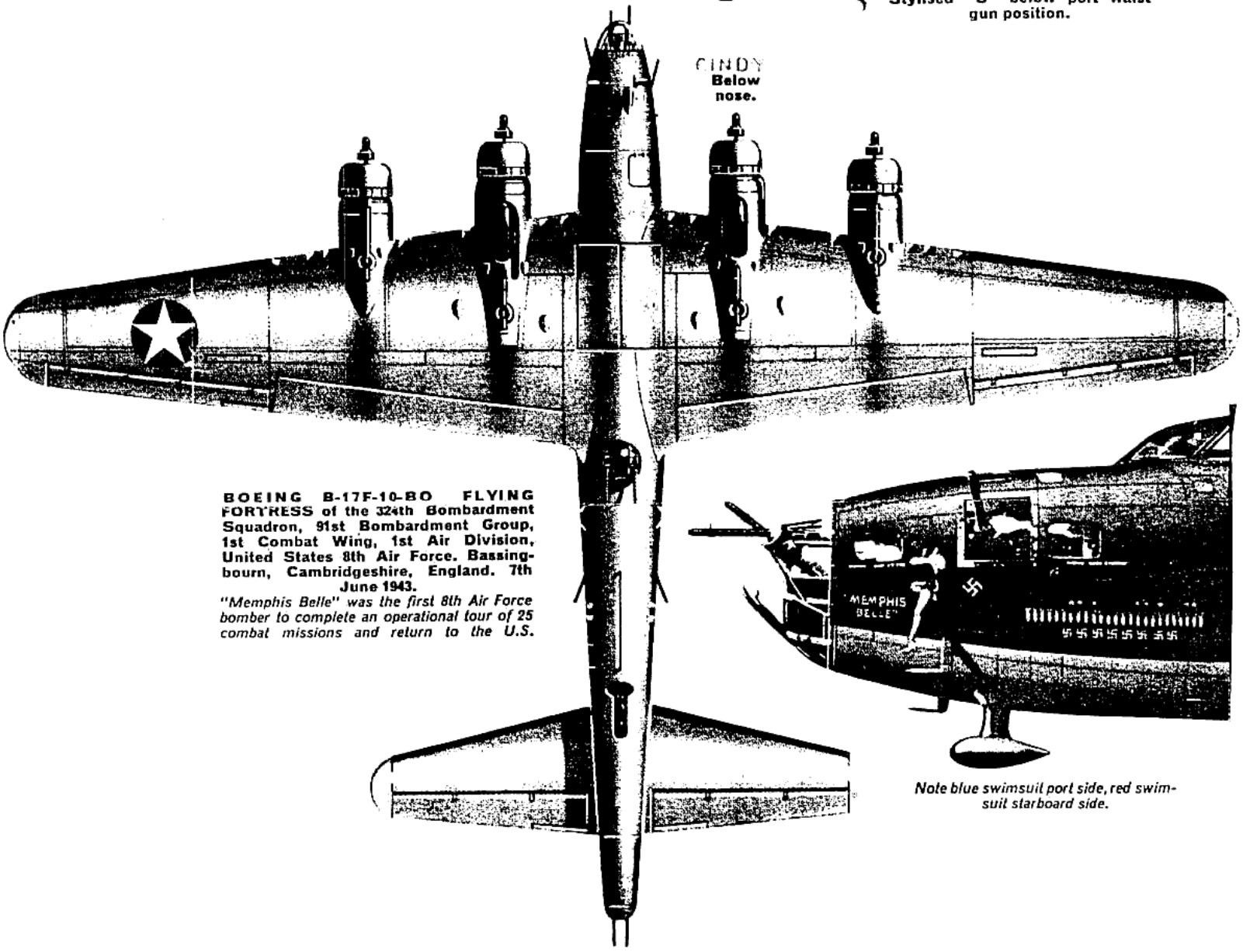
Between and below top turret guns.



Stylised "S" below port waist gun position.

CINDY

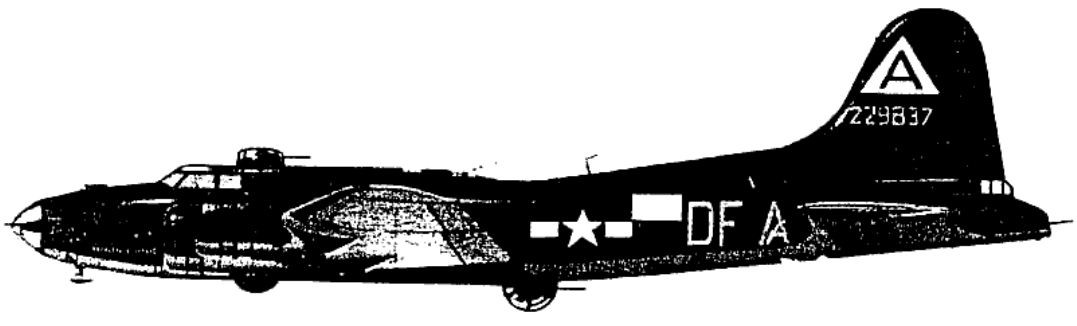
Below nose.



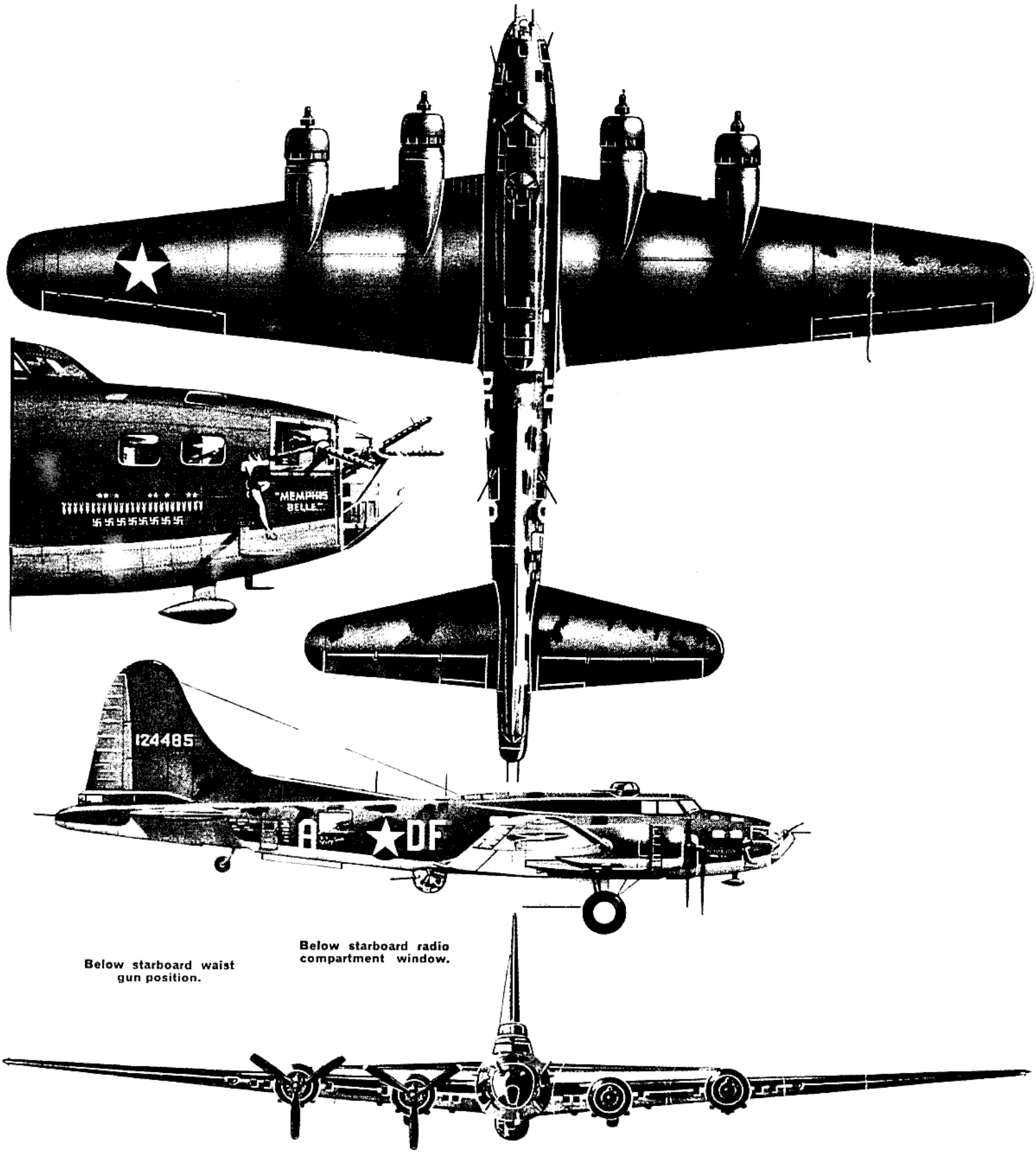
BOEING B-17F-10-BO FLYING FORTRESS of the 324th Bombardment Squadron, 91st Bombardment Group, 1st Combat Wing, 1st Air Division, United States 8th Air Force. Bassingbourn, Cambridgeshire, England. 7th June 1943.

"Memphis Belle" was the first 8th Air Force bomber to complete an operational tour of 25 combat missions and return to the U.S.

Note blue swimsuit port side, red swimsuit starboard side.



B-17 MARKING PLACEMENT SHEET



Below starboard waist gun position.

Below starboard radio compartment window.

B-17
STENCIL PLACEMENT SHEET KEY

257 – SLOSHED FOR AROMATIC FUEL (DATE OF SLOSHING)

258 – SERVICE THIS AIRPLANE WITH 100 OCTANE FUEL ONLY

259 – FUEL CELL TREATED WITH SLOSHING COMPOUND FOR USE WITH FUEL CONTAINING AROMATIC

249 – WARNING SCRIBE ALL FOLLOW-UP CABLES WITH SHOCK CORD WHEN REMOVING AUTOMATIC FLIGHT EQUIPMENT

248 – START CONN. SHIELD NO. 585

247 – START CONN. SHIELD NO. 584

246 – INBD. IGN. SHIELD NO. 583

245 – OUTBD. IGN. SHIELD NO. 582

244 – START CONN. SHIELD NO. 314

243 – LDG. GEAR LIMIT SW. SHIELD NO. 309

242 – LDG. GEAR LIMIT SW. SHIELD NO. 307

241 – STA. 6 FUSE SHIELD NO. 305

240 – THROTTLE WARN SHIELD NO. 304

239 – THROTTLE WARN SHIELD NO. 303

237 – GEN. VOLT. REG. SHIELD NO. 253

236 – FLAP SOLENOIDS NO. 250

235 – ...GR. RELAY SHIELD NO. 222

234 – GEN. RELAY SHIELD NO. 221

233 – GEN. CONN. SHIELD NO. 219

232 – GEN. RELAY SHIELD NO. 218

231 – GEN. RELAY SHIELD NO. 214

230 – BOMB RACK JUNCT. SHIELD NO. 180

229 – BOMB RACK JUNCT. SHIELD NO. 183

228 – BOMB DOOR LIMIT SWITCH SHIELD NO. 182 DOWN

227 – BOMB DOOR LIMIT SW. UP SHIELD NO. 182

226 – BOMB DOOR SOLENOID SHIELD NO. 181

225 – EXT. POWER SOLENOID NO. 156

224 – STA. 4 FUSE SHIELD NO. 146

223 – EXT. POWER RECEPTACLE NO. 140

222 – GEN. WING JB. SHIELD #0. 139

221 – GEN. WING JB. SHIELD NO. 140

220 – GEN. CONN. SHIELD NO. 132

219 – GEN. CONN. SHIELD NO. 131

218 – GEN. CONN. SHIELD NO. 130

217 – A.C. POWER SHIELD NO. 128

216 – WING JUNCT. SHIELD NO. 83

214 – NO. 1 NAC. JUNCT. SHIELD NO. 81

213 – NO. 2 NAC. JUNCT. SHIELD NO. 80

212 – NO. 3 NAC. JUNCT. SHIELD NO. 79

211 – NO. 4 NAC. JUNCT. SHIELD NO. 78

210 – RIB. WING SHIELD NO. 77

209 – IGN. WING SHIELD NO. 76

208 – TAIL GEAR WARN S.W. NO. 76

207 – IGN. SHIELD NO. 74

206 – IGN. SHIELD NO. 73

205 – START CONN. SHIELD NO. 71

204 – INBD. IGN. SHIELD NO. 70

203 – OUTBD. IGN. SHIELD NO. 65

202 – TO FILL GLYCOL TANK

201 – SUPCHG. REG. SUPT.

201 – SUPCHG. REG. SUPT.

201 – SUPCHG. REG. SUPT.

201 – SUPCHG. REG. SUPT.

200 – BOMB SIGHT STOWAGE

199 – MARKER BEACON

198 – VAC. SEL. VALVE

197 – RETRACTING MOTOR SHIELD NO. 204

196 – SUPCHG. ... LUB. TANK

196 – SUPCHG. ... UP. TANK

195 – PROP. FEA...ERING MOTOR

195 – PROP. FEATHERING MOTOR

195 – PROP. FEATHERING MOTOR

195 – PROP. FEATHERING MOTOR

194 – HYD. BRAKE LINES

194 – HYD. BRAKE LINES

193 – TURBO. REG. LINES

193 – TURBO. REG. LINES

193 – TURBO. REG. LINES

193 – TURBO. REG. LINES

192 – DROP SIGNAL DOOR

191 – OPERATION OF THE NORMAL SALVO. BOMB RELEASE

191 – OPERATION OF THE NORMAL SALVO. BOMB RELEASE

190 – HYD. ACCUMULATOR DIRECTIONS

188 – HYD. PRES. WARN. SW.

187 – FUEL SHUT OFF VALVE

187 – FUEL SHUT OFF VALVE

187 – FUEL SHUT OFF VALVE

187 – FUEL SHUT OFF VALVE

186 – FWD. CARB HEAT SHUTTER VALVE LOCATED IN BOTTOM CENTER OF DUCT. SEE T.O. 01-20EE-2 FOR ADJ.

185 – REAR CARB HEAT SHUTTER VALVE LOCATED IN BOTTOM CENTER OF DUCT. SEE T.O. 01-20EE-2 FOR ADJ.

172 – OIL SER VENT

172 – OIL SER VENT

167 – OIL DILUTION VALVE

167 – OIL DILUTION VALVE

167 – OIL DILUTION VALVE

167 – OIL DILUTION VALVE

166 – GLYCOL BY-PASS RELEASE VALVE

160 – GLYCOL FILTER

155 – OUTSIDE AIR TEMP.

154 – DE-ICER DISTRIB. VALVE ACCESS DOOR

143 – ANTI-CREEP ADJ. SCREW

136 – PULL IN EMERGENCY ONLY

136 – PULL IN EMERGENCY ONLY

133 – 3 SCREWS

133 – 3 SCREWS

131 – FUEL PUMP DRAIN

131 – FUEL PUMP DRAIN

131 – FUEL PUMP DRAIN

131 – FUEL PUMP DRAIN

127 – FUEL STRAINER

127 – FUEL STRAINER

127 – FUEL STRAINER

127 – FUEL STRAINER

123 – GLYCOL TANK VENT

121 – FUEL TRANSFER PUMP DRAIN

119 – GLYCOL OVERFLOW

117 – GLYCOL PUMP DRAIN

115 – BOOSTER PUMP DRAIN

115 – BOOSTER PUMP DRAIN

115 – BOOSTER PUMP DRAIN

115 – BOOSTER PUMP DRAIN

114 – BATTERY VENT

114 – BATTERY VENT

114 – BATTERY VENT

113 – RELIEF DRAIN

112 – GLYCOL TANK

111 – WATER DRAIN

111 – WATER DRAIN

111 – WATER DRAIN

111 – WATER DRAIN

111 – WATER DRAIN

111 – WATER DRAIN

106 – OIL COOLER DRAIN

106 – OIL COOLER DRAIN

106 – OIL COOLER DRAIN

106 – OIL COOLER DRAIN

105 – ENG. NO. 3 TANK FILLER OVERFLOW

104 – ENG. NO. 2 TANK FILLER OVERFLOW

103 – ENG. NO. 4 TANK FILLER OVERFLOW

102 – ENG. NO. 1 TANK FILLER OVERFLOW

101 – CAUTION-DO NOT OPERATE ENGINE WITHOUT ACCESS COVER & ALL SCREWS TIGHTLY IN PLACE

101 – CAUTION-DO NOT OPERATE ENGINE WITHOUT ACCESS COVER & ALL SCREWS TIGHTLY IN PLACE

101 – CAUTION-DO NOT OPERATE ENGINE WITHOUT ACCESS COVER & ALL SCREWS TIGHTLY IN PLACE

101 – CAUTION-DO NOT OPERATE ENGINE WITHOUT ACCESS COVER & ALL SCREWS TIGHTLY IN PLACE

100 – STARTER MOTOR ROTATED 180° ON STARTER GEAR CASING

100 – STARTER MOTOR ROTATED 180° ON STARTER GEAR CASING

100 – STARTER MOTOR ROTATED 180° ON STARTER GEAR CASING

100 – STARTER MOTOR ROTATED 180° ON STARTER GEAR CASING

99 – CAUTION-UNLOCK TAILWHEEL BEFORE USING THIS BAR

91 – HYD. PUMP DRAIN

91 – HYD. PUMP DRAIN

90 – RUDDER TRIM TAB

90 – RUDDER TRIM TAB

89 – ELEVATOR TRIM TAB

89 – ELEVATOR TRIM TAB

89 – ELEVATOR TRIM TAB

89 – ELEVATOR TRIM TAB

86 – ENGINE SUPPORT

86 – ENGINE SUPPORT

86 – ENGINE SUPPORT

86 – ENGINE SUPPORT

85 – EXTERNAL POWER PLUG

85 – EXTERNAL POWER PLUG

84 – PART NO. 1722 AF 41-2363 T.O. NO. 03-20A-1 ANGLE AT 42 1-8-17-42

84 – PART NO. 1722 AF 41-2360 T.O. NO. 03-20A-1 ANGLE AT 42 1-8-17-42

84 – PART NO. 1722 AF 41-2363 T.O. NO. 03-20A-1 ANGLE AT 42 1-8-17-42

84 – PART NO. 1722 AF 41-2363 T.O. NO. 03-20A-1 ANGLE AT 42 1-8-17-42

82 – ENGINE OIL

82 – ENGINE OIL

82 – ENGINE OIL

82 – ENGINE OIL

80 – OIL DRAIN

80 – OIL DRAIN

80 – OIL DRAIN

80 – OIL DRAIN

79 – STARTER PULL

79 – STARTER PULL

79 – STARTER PULL

79 – STARTER PULL

75 – SUPCHG. LUB. TANK VENT

75 – SUPCHG. LUB. TANK VENT

74 – SUPCHG. LUB. TANK DRAIN

74 – SUPCHG. LUB. TANK DRAIN

73 – FEEDER TANK VENT

73 – FEEDER TANK VENT

72 – FEEDER TANK FILLER OVERFLOW

72 – FEEDER TANK FILLER OVERFLOW

71 – ENG. NO. 4 TANK VENT

70 – ENG. NO. 2 TANK VENT

69 – BATTERY

69 – BATTERY

69 – BATTERY

68 – FEATHERING PUMP DRAIN

68 – FEATHERING PUMP DRAIN

68 – FEATHERING PUMP DRAIN

68 – FEATHERING PUMP DRAIN

67 – TANK VENT

67 – TANK VENT

66 – VACUUM PUMP EXHAUST

65 – AILERON TRIM TAB

65 – AILERON TRIM TAB

62 – CAUTION-DO NOT REMOVE DOOR WITHOUT ENGINE SUPPORT IN PLACE. DO NOT OVER TIGHTEN SCREWS. SERIAL NO. 41-2393

62 – CAUTION-DO NOT REMOVE DOOR WITHOUT ENGINE SUPPORT IN PLACE. DO NOT OVER TIGHTEN SCREWS. SERIAL NO. 41-2391

62 – CAUTION-DO NOT REMOVE DOOR WITHOUT ENGINE SUPPORT IN PLACE. DO NOT OVER TIGHTEN SCREWS. SERIAL NO. 41-2394

62 – CAUTION-DO NOT REMOVE DOOR WITHOUT ENGINE SUPPORT IN PLACE. DO NOT OVER TIGHTEN SCREWS. SERIAL NO. 41-2393

61 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING BEFORE REMOVING WING TIP.

61 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING BEFORE REMOVING WING TIP

60 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING OUTER WING

60 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING OUTER WING

59 – FEEDER FUEL DRAIN

59 – FEEDER FUEL DRAIN

58 – ENGINE NO. 3 FUEL DRAIN

57 – ENGINE NO. 2 FUEL DRAIN

56 – ENGINE NO. 4 FUEL DRAIN

55 – ENGINE NO. 1 FUEL DRAIN

49 – FEEDER FUEL

49 – FEEDER FUEL

48 – ENGINE NO. 3 FUEL

47 – ENGINE NO. 2 FUEL

46 – ENGINE NO. 4 FUEL

45 – ENGINE NO. 1 FUEL

44 – MOOR

44 – MOOR

43 – HOIST OUTER WING ONLY

43 – HOIST OUTER WING ONLY

43 – HOIST OUTER WING ONLY

43 – HOIST OUTER WING ONLY

42 – HOIST WING ONLY WITHOUT ENGINES

41 – HOIST WING ONLY WITHOUT ENGINES

42 – HOIST WING ONLY WITHOUT ENGINES

40 – (WING WALKWAYS)

40 – (WING WALKWAYS)

37 – ACCESS CASE DRAIN

37 – ACCESS CASE DRAIN

33 – OIL SEPARATOR DRAIN

29 – PROP ANTI-ICER TANK VENT

29 – PROP ANTI-ICER TANK DRAIN

21 – 50 LBS.

17 – CAUTION DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING STABILIZER

17 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING STABILIZER

16 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING WING

16 – CAUTION-DISCONNECT ALL ELECTRICAL WIRING, TUBING, & CONTROL CABLES BEFORE REMOVING WING

15 – TAIL HOIST

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

14 – NO STEP-KEEP OFF

4 – LEVEL

4 – LEVEL

4 – LEVEL

4 – LEVEL

3 – JACK

3 – JACK

3 – JACK

3 – JACK

3 – JACK

3 – JACK

3 – JACK

2 – HOIST AIRPLANE

2 – HOIST AIRPLANE

1 – U.S. ARMY MODEL B-17F AIR CORPS SERIAL NO. 41-2393 CREW WEIGHT 2200 LBS.