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(USAF) T.O. 1C-47-3
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(NAVY) AN 01-40NC-3

HANDBOOK
STRUCTURAL REPAIR INSTRUCTIONS

USAF SERIES

NAVY MODELS

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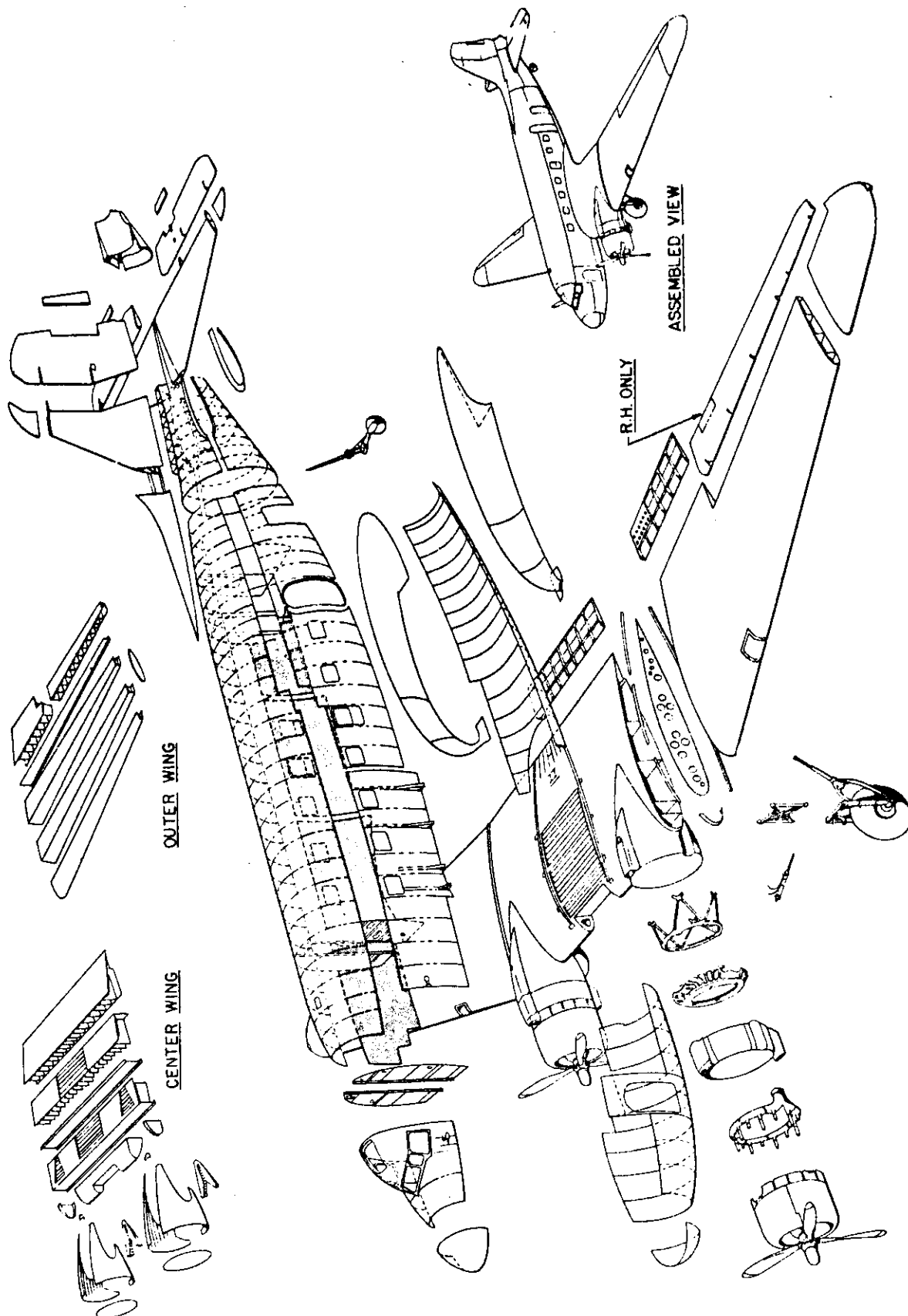
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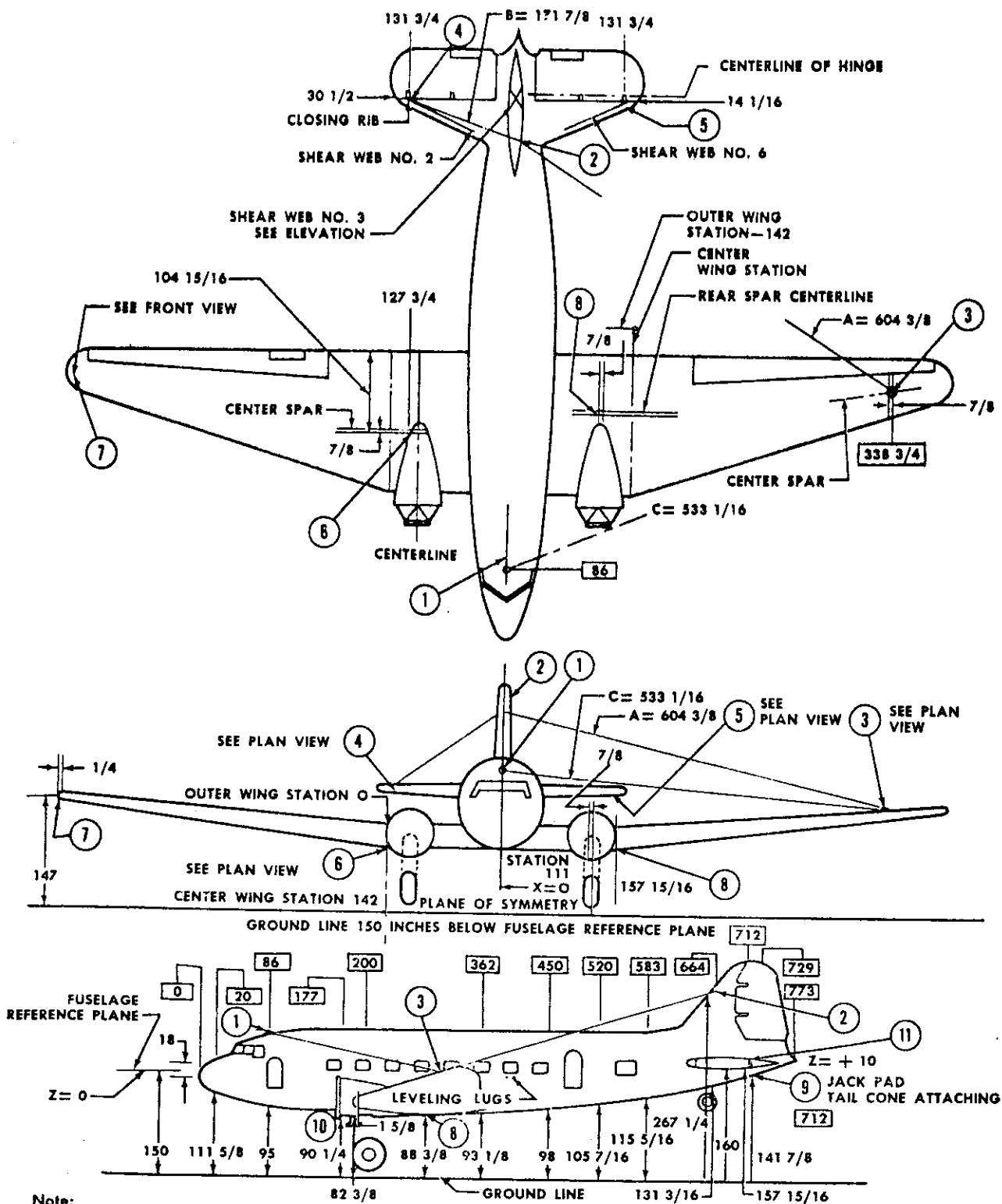
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Exploded View of C-117 Airplane

Revised 15 September 1945



Note:
Boxed numbers are
fuselage stations.

(Sheet 1 of 2 Sheets) Symmetry Rigging

15.814

vised 1 August 1954

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SECTION I

INTRODUCTION

1. General

This Technical Order is the Structural Repair Instruction for the C-47, C-47A, C-47B, C-47D, (Navy Models R4D-1, R4D-5, R4D-6) AC-47, C-117A and C-117B airplanes. It includes all necessary information for the repair of these airplanes.

2. Key to Illustrations.

To become familiar with the method of repair in the shortest time possible the following method should be used:

a. Refer to the following plating or structure diagrams:

- (1) Wing plating. (See figure 1.)
- (2) Wing structure. (See figure 2.)
- (3) Fuselage plating. (See figures 3, 3A and 3B.)
- (4) Fuselage structure. (See figures 3C and 4.)
- (5) Nacelle structure and plating. (See figure 5.)
- (6) Empennage structure and plating. (See figure 6.)

b. With the above diagrams as a key, locate the position and extent of the damage. Then on the plating or structure diagram find the figure number of the repair to be made. Turn to this figure and repair the damage as outlined. If a reference can't be made from the plating or structure diagrams, the repair figure can be determined from the list of illustrations. This is possible because all of the diagrams are complete in themselves.

Note

If a damage occurs to the control surfaces they should be rebalanced according to section V. Photographs and their respective keys are included to familiarize one with the type of structure, gage and material used.

c. Example. - If any damage occurs to the skin in the wing, turn to the plating diagram. (See figure 1.) Locate the extent and position of the damage according to station numbers and spars. On the plating diagram (figure 1) locate "Wing Skin Repair". (See figure 7.) Then, turn to figure 7 and repair the skin as noted. By knowing the exact location the rivet schedule can be determined from the table.

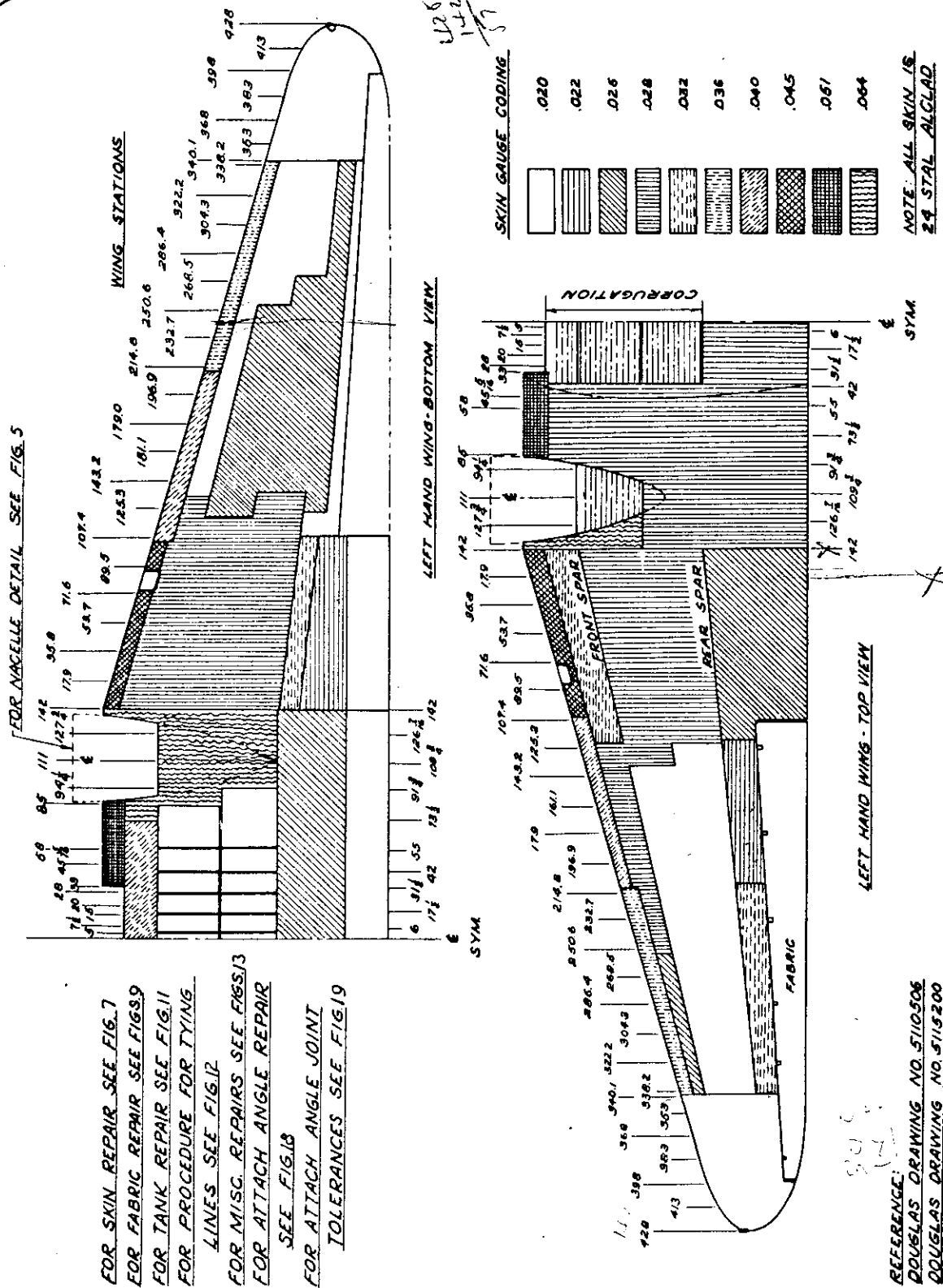


Figure 1-Wing Plating

8. Fiberglas Radome.

a. Classification of Damage to Laminated Fiberglass Radome.

(1) Negligible Damage: There is no damage to the radome that may be considered negligible.

(2) Repairable Damage: Fractures and breakthroughs in the Fiberglas will be visible. Delaminations, soft spots, or blisters may not be readily visible and therefore must be detected by lightly tapping the surface of the Fiberglas laminated part with a large coin or light metal object. A "dead" sound will indicate the damaged area. Small holes, abrasions or scuff marks will be readily visible. When the damaged area has been ascertained, isolate the damaged section with tape to form a square or rectangular pattern. The inside edge of the outline must be at least one inch plus 1/2-inch for each ply of the lamination from the perimeter of the damaged section.

b. Materials and Equipment. The following materials are required for repair of the laminated Fiberglass radome.

(1) Resins: Selectron No. 5016, Specification MIL-R-7575, Pittsburg Plate Glass Company.

(2) Catalysts:

(a) Peroxide catalyst No. 10A, Talco Glass Fiber Products Company, Los Angeles, California.

(b) Garako No. 100 Cobalt Drier, Garan Chemical Company, Los Angeles, California.

(c) Benzoyl peroxide paste catalyst, Commercial.

(3) Fillers:

(a) 1/2-inch Fiberglass chopped fiber.

(b) 1/8-inch milled Fiberglass fiber.

(c) 1/32-inch milled Fiberglass fiber.

(4) Fiberglass Materials:

(a) Fiberglass cloth 181 Volan A, Specification MIL-P-8013.

(b) Fiberglass cloth 120 Volan A, Specification MIL-P-8013.

(5) Honeycomb Materials: Core material laminated glass fabric honeycomb, Specification MIL-P-8073.

(6) Repair Materials:

(a) Acetone, Federal Specification 0-A-51B.

(b) Cellophane sheet 600 PT 0.0016 inch clear, E.I. Dupont de Nemours and Company, Incorporated.

(c) Polyvinyl alcohol sheet 0.003 inch clear, Reynolds Metal Company, Incorporated.

(d) Wet-or-Dri abrasive paper Grit 60, Federal Specification P-P-101a.

(e) Plews oil can, No. 1150.

(f) Hypodermic needle, No. 15 Gage.

(g) Methyl ethyl ketone, Federal Specification TT-M-261(2).

(h) Toluene, Federal Specification TT-T-548.

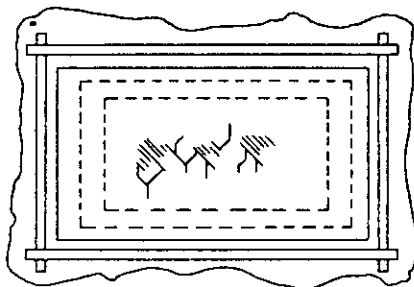
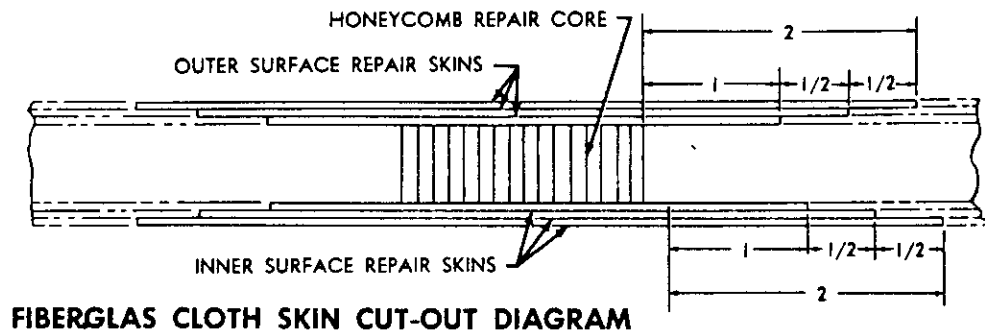
c. Preparation.

(1) Resin Selectron No. 5016 for heat or sunlight cure: This liquid resin is used to impregnate Fiberglass cloth to form a structural lamination, bonded over the area to be repaired. The resin must be catalyzed by mixing with 2 percent (by weight) of benzoyl peroxide paste catalyst. The catalyzed resin has a normal working life of eight hours if protected from sunlight. The resin is cured by heating repair area to 93°C (200°F) - 107°C (225°F) with an infrared heat lamp, hot air blower or in an oven for 20 to 30 minutes. Surface repairs may be cured by exposing resin to direct sunlight for approximately 30 minutes. This resin will bond only to bare (sanded) Fiberglass lamination, thoroughly cleaned with acetone or solvent.

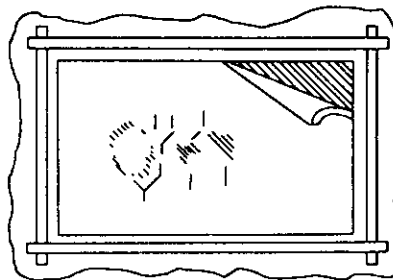
(2) Resin, Selectron No. 5016 for room temperature cure: This resin mixture may be used when only a small area is to be repaired. The resin must be catalyzed by mixing with 1/2 percent (by weight) of Garako No. 100 cobalt drier followed by 1/2 percent (by weight) of peroxide catalyst No. 10A. The catalyzed resin has a normal working life of three to five minutes (protected from sunlight) and when used to impregnate Fiberglass cloth, will set hard within one hour. Maximum strength of a lamination is obtained in 16 to 24 hours. Maximum strength may be obtained quicker by direct exposure to sunlight or heating the lamination to 93°C (200°F) for five to ten minutes with an infrared lamp or hot air blower.

(3) Polyester resin glass fiber mixture: A polyester glass filler mixture may be used for quick repair of holes less than 1/8-inch square in such non-critical areas as the radome attaching holes where misalignment is caused by removal and replacement of the radome. This putty-like mixture is prepared by using a catalyzed resin mixture and slowly blending in the glass fiber filler. The ratios of the mixes found to have worked satisfactorily are as follows:

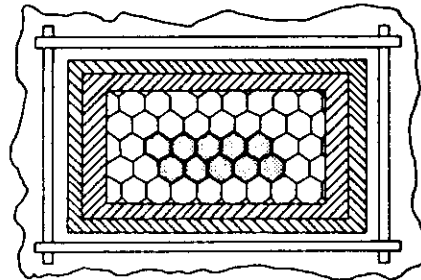
Glass Fiber	Glass Fiber Part/Wt	Catalyzed Resin Part/Wt
1/2-inch Fiberglass chopped fibers	20	80
1/8-inch milled Fiberglass fibers	20	80
1/32-inch milled Fiberglass fibers	25	75



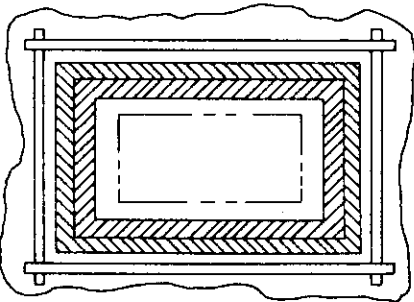
A FIRST CUT-OUT PATTERN
AROUND DETERMINED DAMAGED
AREA



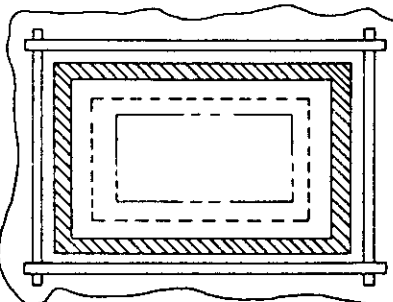
B REMOVE (3RD) OUTER CLOTH
SKIN



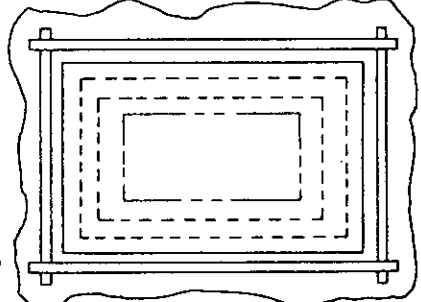
C CLOTH SKINS REMOVED WITH
DAMAGED HONEYCOMB REPLACED



D REPLACING (1ST) RESIN
IMPREGNATED REPAIR SKIN



E REPLACING (2ND) RESIN
IMPREGNATED REPAIR SKIN



F REPLACING (3RD) RESIN
IMPREGNATED REPAIR SKIN

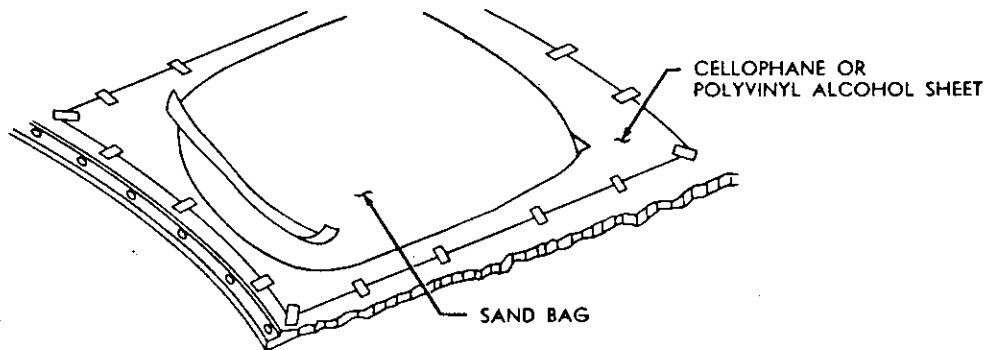


Figure 10A—Laminated Fiberglass Radome Repair

(4) Stripping: For stripping paint or Neoprene coating from radome, apply toluene or methyl ethyl ketone to the coated surface with a clean cloth to soften the Neoprene coating. A fiber bristle brush may be used to agitate and loosen the Neoprene coating. Several applications of toluene or methyl ethyl ketone and agitation may be necessary. To speed removal of the Neoprene coating, place the saturated cloth on the coated surface for intervals of several minutes prior to each brush agitation.

d. Detail Procedures.

(1) Rupture with core or honeycomb undamaged:

(a) Cut away skin from damaged area with a knife or razor, allowing 1/2-inch stagger or step between successive plies (use a metal straight edge for a guide. Be careful not to cut through successive plies).

(b) Lift plies with a knife blade by inserting the blade between the plies starting at the edge and working to the center.

(c) Scuff sand the area with 60 grit Wet-or-Dri abrasive paper.

(d) Wash thoroughly with acetone solvent and wipe dry with a clean lint-free cloth.

(e) Cut patch from the same type of Fiberglas cloth as used for plies removed (normally 181 Volan A cloth for all skin plies except outside ply which is 120 Volan A cloth) allowing for butt joint of each ply.

(f) Impregnate cloth with a thin coat of catalyzed resin and scrape off excess.

(g) Brush a thin coat of catalyzed resin in the repair area. Position the impregnated cloth as shown in figure 10A.

(h) Place a cellophane or polyvinyl alcohol sheet over the repaired area and tape taut at the edges. Remove air pockets and excess resin by rolling from the center to the edges with a rubber roller or hose. If additional pressure is required, repair area may be covered with a sand bag (exercise care to ensure that contour is maintained).

(i) Fair the repaired area with the adjoining structure with 60 grit Wet-or-Dri abrasive paper.

Note

Radome contour must be maintained to ensure satisfactory aerodynamic properties. Careful control of resin contents and skin thickness must be exercised to prevent interference with radar transmission.

(2) Small holes of 1/8-inch square or less:

(a) Sand out cavity, wash with acetone solvent and dry with a lint-free clean cloth.

(b) Fill cavity with a polyester resin glass fiber mixture.

(c) Tape a piece of cellophane or polyvinyl alcohol sheet over the repaired area and smooth out the surface.

(d) Allow to cure and refinish as required.

(3) Delamination of skin or soft spots:

(a) Drill 1/32-inch diameter hole through the skin into the soft or blistered area.

(b) Use a 15 gage hypodermic needle attached to a Plews oil can to force resin through the hole into the cavity until the cavity is filled.

CAUTION

Clean hypodermic needle and Plews oil can with acetone immediately after using; otherwise the needle will have to be discarded.

(c) Wipe off excess resin and cure.

(4) Damaged honeycomb "Breakthrough":

(a) Cut out each ply of the laminated skin in a 1/2-inch overlap or step arrangement, and remove damaged honeycomb.

(b) Scuff sand the damaged area with 60 grit Wet-or-Dri abrasive paper.

(c) Wash out thoroughly with acetone solvent and wipe dry with a lint-free clean cloth.

(d) Cut a section of honeycomb material slightly larger in area and of the same thickness as that removed.

(e) Brush a thin coat of catalyzed resin in the repair area, and on the edges of the honeycomb; position the honeycomb section in place as shown in figure 10A (do not allow the catalyzed resin to enter the cores of the honeycomb section).

(f) Replace Fiberglas lamination as described in paragraph 8. d (1).

(5) Minor ruptures of 1/8-inch square or less:

(a) Sand area lightly with 60 grit Wet-or-Dri abrasive paper and wash with acetone; dry with a lint-free clean cloth.

(b) Work a coating of room temperature curing resin into the ruptured area.

(c) Allow to cure and fair into the adjoining surface.

(d) Refinish as required.

(6) Abrasion:

(a) Lightly sand any scuff marks and clean with acetone; dry with a lint-free clean cloth.

(b) Apply a very thin coat of catalyzed resin mixture.

(c) Allow to cure and refinish as required.

(7) Major ruptures (both inner and outer skin and honeycomb is damaged): Repair procedure is the same as paragraph 8. d (4), except it may be neces-

sary to make a form of plaster or wood for sharply contoured areas in order to maintain the original aerodynamic shape. Repair one side and cure before proceeding with the repair of the honeycomb section and opposite skin.

(8) Finish with Rain Erosion Resistant Coating: For detail instructions refer to the applicable technical order on Neoprene coating for laminated glass fabric aircraft parts.

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(f) Measure the horizontal distance in inches from the cord to the center line of the hinge.

(g) Multiply the length as noted above in inches times the weight on the cord in pounds which will give the moment of unbalance of the aileron in inch pounds.

(h) If the moment of unbalance of the left-hand aileron is less than 130 inch pounds tail heavy and the right-hand aileron is less than 130 inch pounds tail heavy (the maximum allowable moments as noted in paragraph 1. c., preceding) no corrective measures are necessary. The moments for the two ailerons are different because the right-hand aileron has a tab on it. This tab is left installed when this surface is balanced which contributes to the tail-heavy condition of the surface.

(i) If the moment of unbalance is larger than the allowable maximum moment it will be necessary to add balance weights.

(j) Find the total number of inch pounds moment necessary to bring the surface into the allowable limits and add three (3) inch pounds moment to determine the amount of corrective moment necessary.

(k) Using the chart in figure 79, determine the size and weight lead necessary. In calculating this chart, the difference in the location of the center of gravity of the various size weights was taken into consideration. They are based on the forward edge of the weights always being 1/4 inch from the leading edge of the aileron.

(l) Install the weight as detailed in figure 78 with the forward edge of the weight within 1/4 inch of the leading edge of the aileron.

d. Example: For the convenience of the operating personnel, the following set of sample calculations for balancing the rudder based on arbitrary figures, set up for example only.

(1) The rudder rests with the center line of the end rib horizontal with an average weight of 15.9 pounds on the cord.

(2) The horizontal distance from the cord to the center line of the rudder axis = 17 inches.

(3) Moment of unbalance = 15.9 pounds x 17 inches = 270 inch pounds tail heavy.

(4) Moment of unbalance over allowable = 270 inch pounds 250 inch pounds = 20 inch pounds.

(5) Corrective moment necessary = 20 inch pounds + 3 inch pounds = 23 inch pounds.

(6) Weight of balance lead necessary = $\frac{23}{16}$ inch pounds = 1.437 pounds of lead. (16 inches being the distance of the center of gravity of the lead from the hinge line of the rudder.)

(7) Using 1/4 inch lead sheet $1.437 \times 9.74 = 13.9$ sq. in. of lead. (9.74 being the number of square inches of 1/4 inch lead sheet per pounds.)

(8) Maximum length of lead for rudder = 5 inch (figure 75) therefore $\frac{13.9}{5}$ inch = 2.78 inch wide lead.

(9) Size of balance lead: 1/4 inch x 5 inch x 2.78 inch. Fasten with two rows of screws as noted in figure 80.

(10) By using the direct reading charts on figure 74 the size of the weight could have been found without the calculations in paragraphs (f) to (i), inclusive.

e. Assembly. - Rigging instructions and tensions of control cables are given in the Handbook of Erection and Maintenance Instructions, AN 01-40NC-2 (C-47 Model Airplanes) and AN 01-40NE-2 (C-117A Model Airplane).

SECTION VI

REPAIR OF THE WINGS

Construction.

The wings are a full cantilever design. Both the left and right wings are assembled in two main sections. They consist of the inboard wing, and an outboard wing which incorporates a removable wing tip. The center wing consists of three spars, which is built up of extruded sections of aluminum alloy and webs of alclad sheet. The ribs are formed from alclad sheet and are heat-treated. The skin of the rear section (aft of the rear spar) and the lower skin of the forward section are reinforced by longitudinal extruded aluminum alloy sections. The upper surface of the forward section between spars incorporates a compression structure of corrugated 24SRT alclad sheet, corrugations running laterally. The covering of both upper and lower surfaces are of alclad sheet. The outer wing is similar in construction to the inner wing except that bulb angles and zee sections of aluminum alloy are used on the upper surface in place of the corrugated alclad sheet. (See figure 1 to figure 48.)

2. Negligible Damage.

a. Wing Skin Webs and Wing Ribs. - Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

b. Wing Stringers and Extrusions. - Smooth indentations and scratches that are not over 10 percent of the thickness after being rounded out and carefully inspected for cracks may be neglected.

c. Wing Spar Caps. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

d. Wing Corrugations. - Smooth indentations and scratches that are not through the alclad after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Wing, Refer to:

a. Wing plating (figure 1) or wing structure (figure 2) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

c. It is optional to use a 1-inch radius on the outside corner of all skin doublers. Whenever possible a clevis bolt should be used in the attachment of spar cap to skin. (See figure 24.)

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

d. For repair of the center section lower skin, see figure 10A.

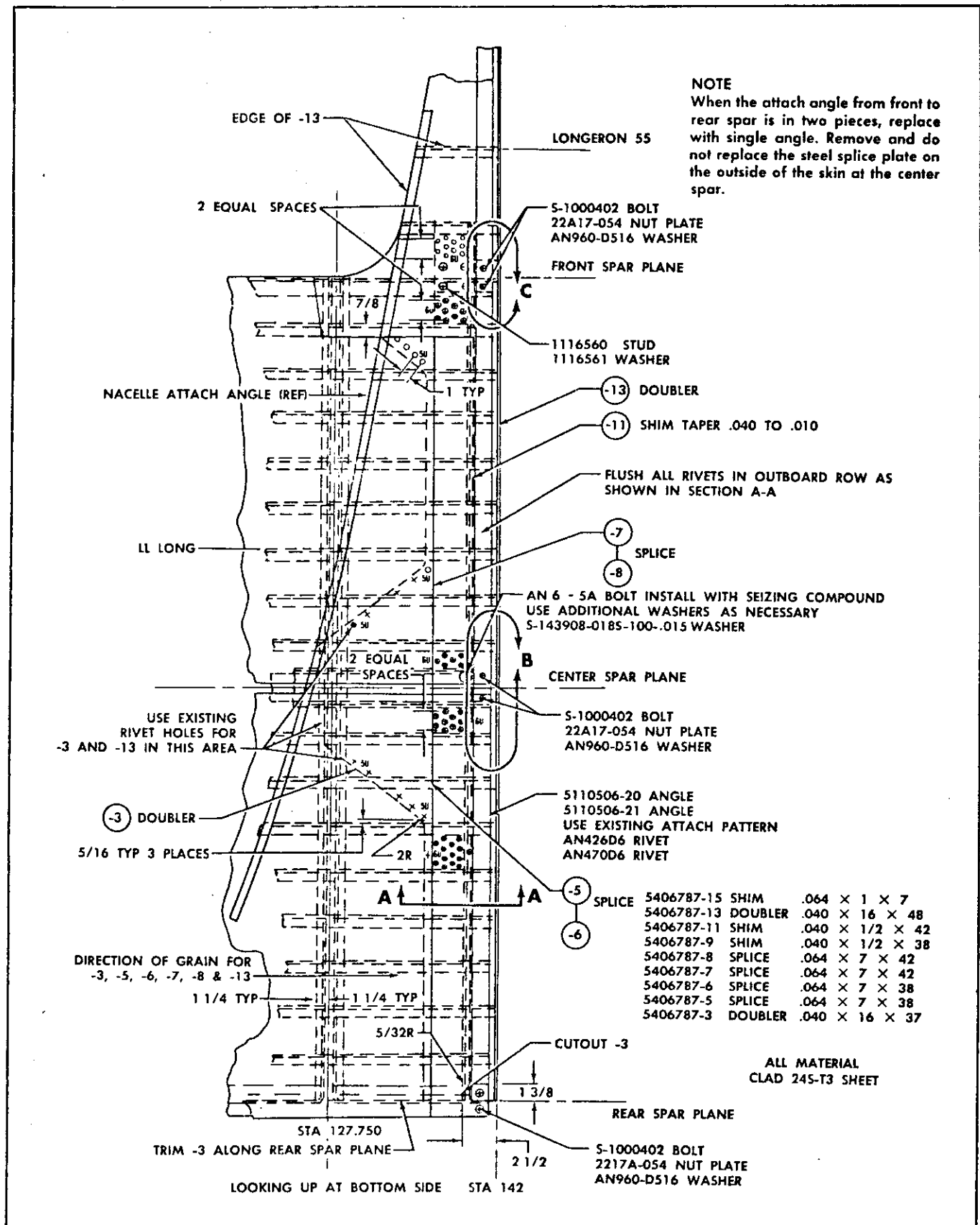


Figure 10A (Sheet 1 of 4) - Repair of Center Section Lower Skin

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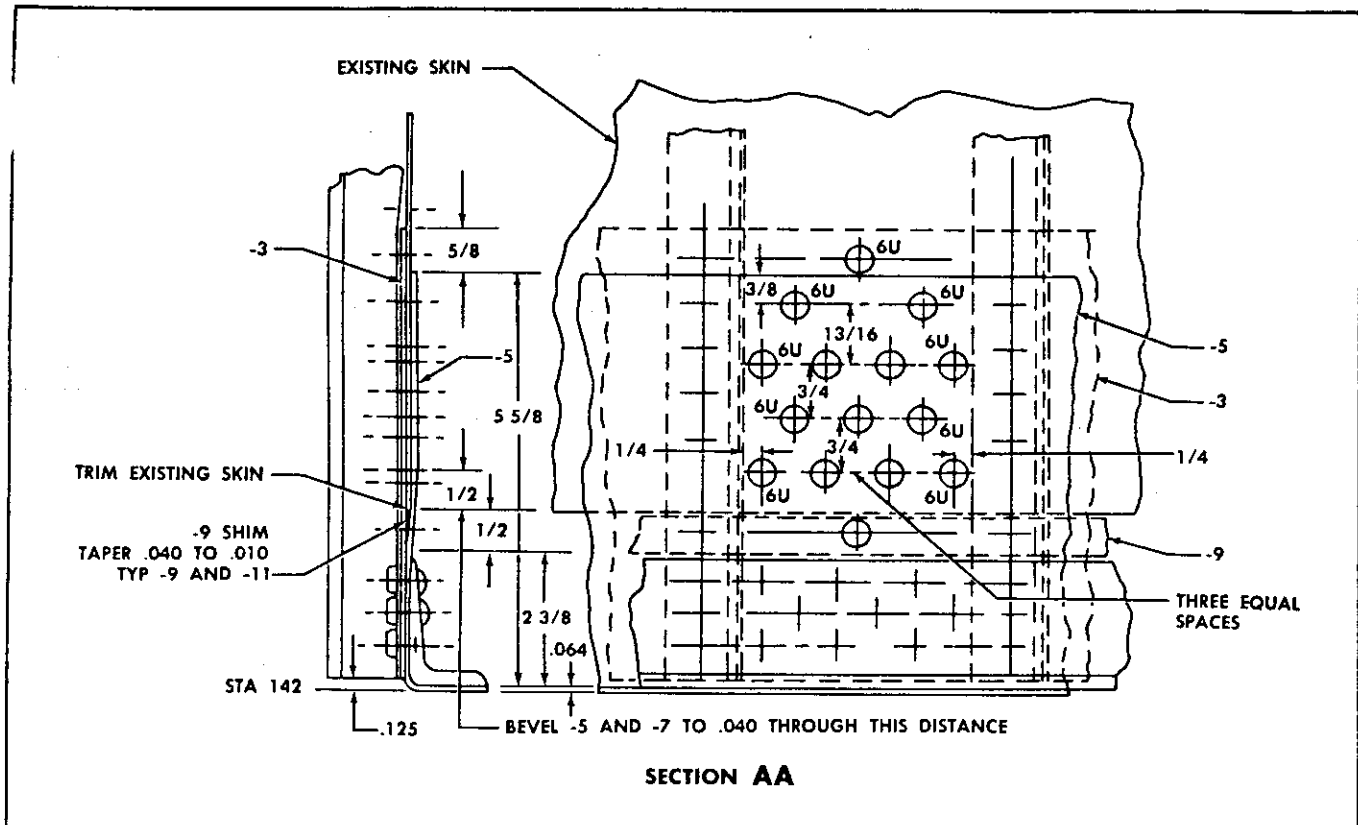


Figure 10A (Sheet 2 of 4) — Repair of Center Section Lower Skin

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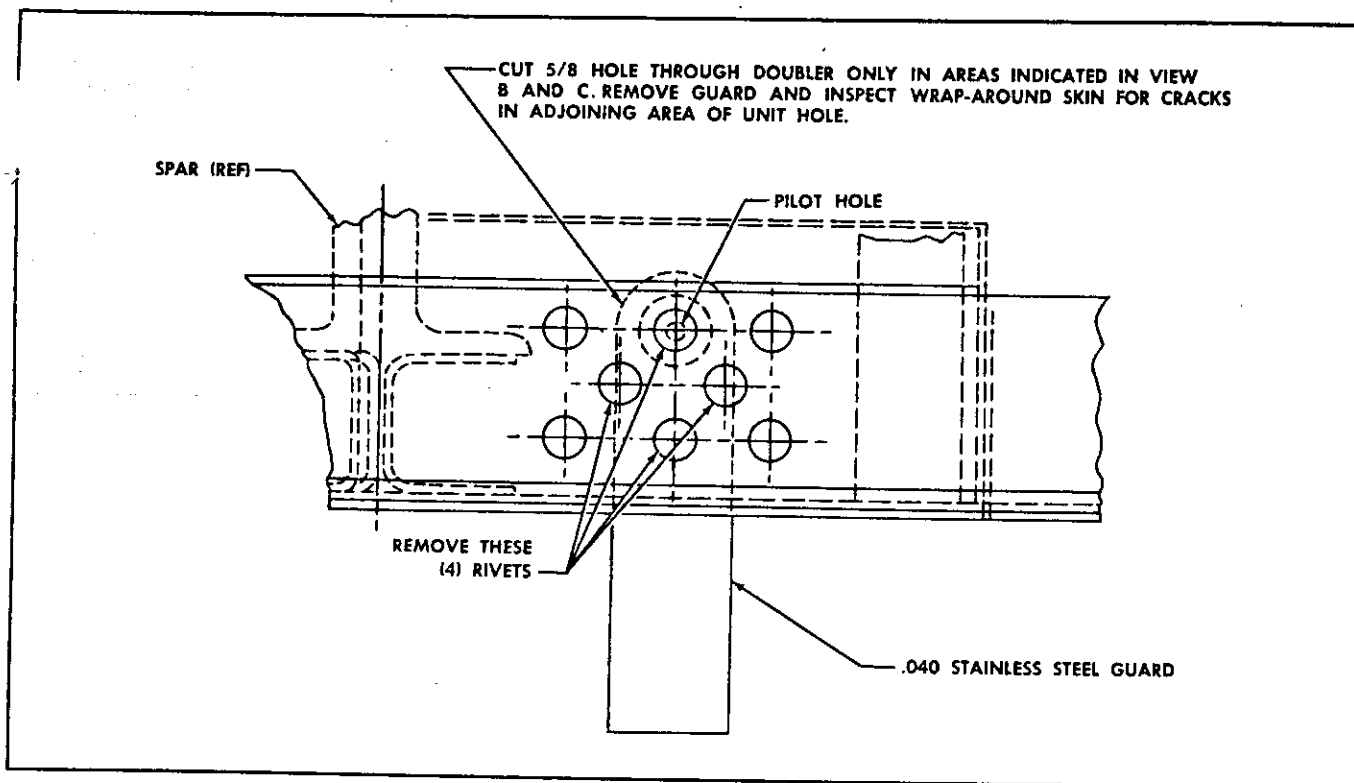


Figure 10A (Sheet 4 of 4) — Repair of Center Section Lower Skin

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SECTION VII

REPAIR OF THE FUSELAGE1. Construction.

The fuselage is a semi-monocoque construction consisting essentially of transverse frames made of formed 24ST alclad sheet, longitudinal members of 24ST extruded bulb angles, and some special longitudinal members of 24ST alclad sheet formed as channels. The fuselage covering is 24ST alclad sheet. (See figure 48 to figure 59.)

2. Negligible Damage.a. Fuselage Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half inch diameter or less, where edges show no cracks or abrasions and which

are not within one inch of any other hole or structure and not in the same cross section as the stringer cut-out may be neglected.

b. Fuselage Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Fuselage, Refer to:

a. Fuselage plating (figures 3, 3A and 3B) or fuselage structure (figures 3C and 4) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

c. It is optional to use a 1-inch radius on the outside corner of all skin doublers.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

Also 24SO material must be heat-treated.

SECTION VIII

REPAIR OF THE NACELLE1. Construction.

The engine nacelles are metal monocoque of aluminum alloy and steel. The firewalls are of corrosion resistant steel. Recesses are provided in the nacelles into which the landing gear wheels retract. (See figure 59 to figure 63.)

2. Negligible Damage.a. Nacelle Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half diameter or less, where edges show no cracks or abrasions and which

are not within one inch of any other hole or structure and not in the same cross section as the stringer cut-out may be neglected.

b. Nacelle Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Nacelle, Refer to:

a. Nacelle structure and plating (figure 5) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

SECTION IX

REPAIR OF THE EMPENNAGE AND CONTROL SURFACES

Construction of Empennage.

It is of multicellular construction employing alclad sheet and aluminum alloy extrusions. The skin is 24ST alclad. (See figure 6.)

2. Construction of Control Surfaces.

It is of aluminum alloy frame construction with 24ST alclad sheet protective covering on the leading edge. They are fabric covered. (See figure 63 to figure 70.)

3. Negligible Damage.

a. Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half inch diameter or less, where edges show no cracks or abrasions and which are not within one inch of any other hole or structure and

not in the same cross section as the stringer cut-out may be neglected.

b. Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

4. For Repair of Any Section in the Empennage or Control Surfaces, Refer to:

a. Empennage structure and plating. (See figure 6 for key to repairs.)

b. If the repair doesn't appear on these diagrams refer to the list of illustrations.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

5. Horizontal Stabilizer.

a. Elongated holes in the horizontal stabilizer to fuselage attach brackets may be reamed to 1/4-inch diameter and AN4 bolts used for installation.

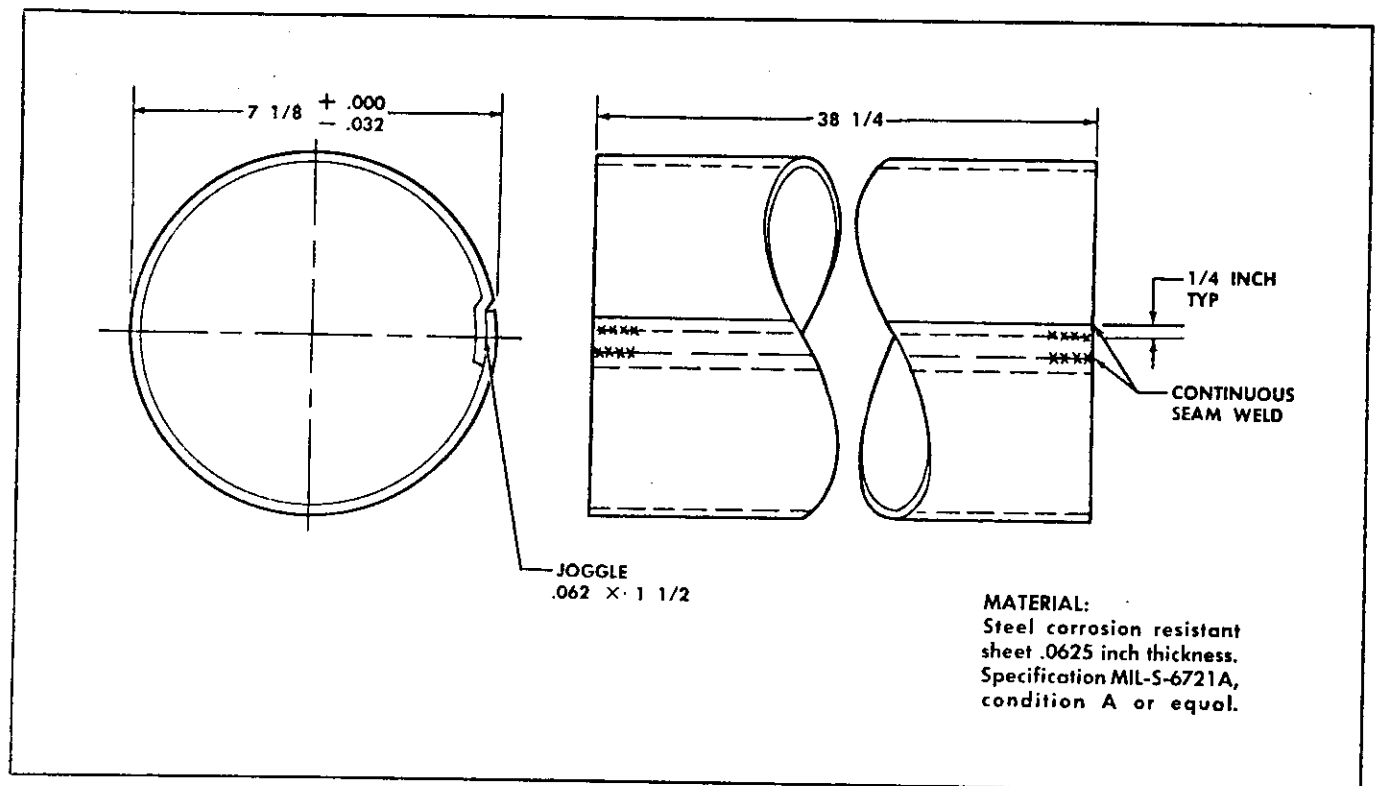


Figure 10B - Tail Pipe Insert

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8. Muff Heat Exchanger Assembly.

a. Muff heat exchanger assemblies, Part Nos. 5171474, 5171474-1, 4143131, and 4143131-1, which contain damaged tail pipe, Part No. 5173076, will be repaired as follows:

- (1) The muff, Part No. 5172439, and end assembly, Part No. 4171835, will be marked across seam to assure proper alignment of these two items when reassembled.
- (2) Remove end assembly, Part No. 4171835.
- (3) Any damaged bell assembly, Part No. 4175380, which requires replacement will be removed.
- (4) Using .0625 inch corrosion and heat resistant steel, Specification MIL-S-6721A (condition A) or equal, fabricate a tail pipe insert in accordance with figure 10-B.
- (5) Place the tail pipe insert into the muff assembly, Part No. 5172439. Scribe each end of the tail pipe to conform with the muff assembly.

(6) Remove the tail pipe insert and trim to the scribe lines.

(7) Reposition the tail pipe insert into the muff assembly and weld in place at both ends.

(8) Pressure-test the tail pipe insert and muff assembly at approximately 20 psi. There will be no allowable internal leakage.

(9) Reposition end assembly, Part No. 4171835, exercising care to realign the mark applied in accordance with paragraph (1), and weld in place.

(10) Reposition bell assembly, Part No. 4175380, removed in accordance with paragraph (3), and weld it in place.

(11) Muff heat exchanger assembly will be pressure-tested at approximately 20 psi. There will be no allowable internal leakage.

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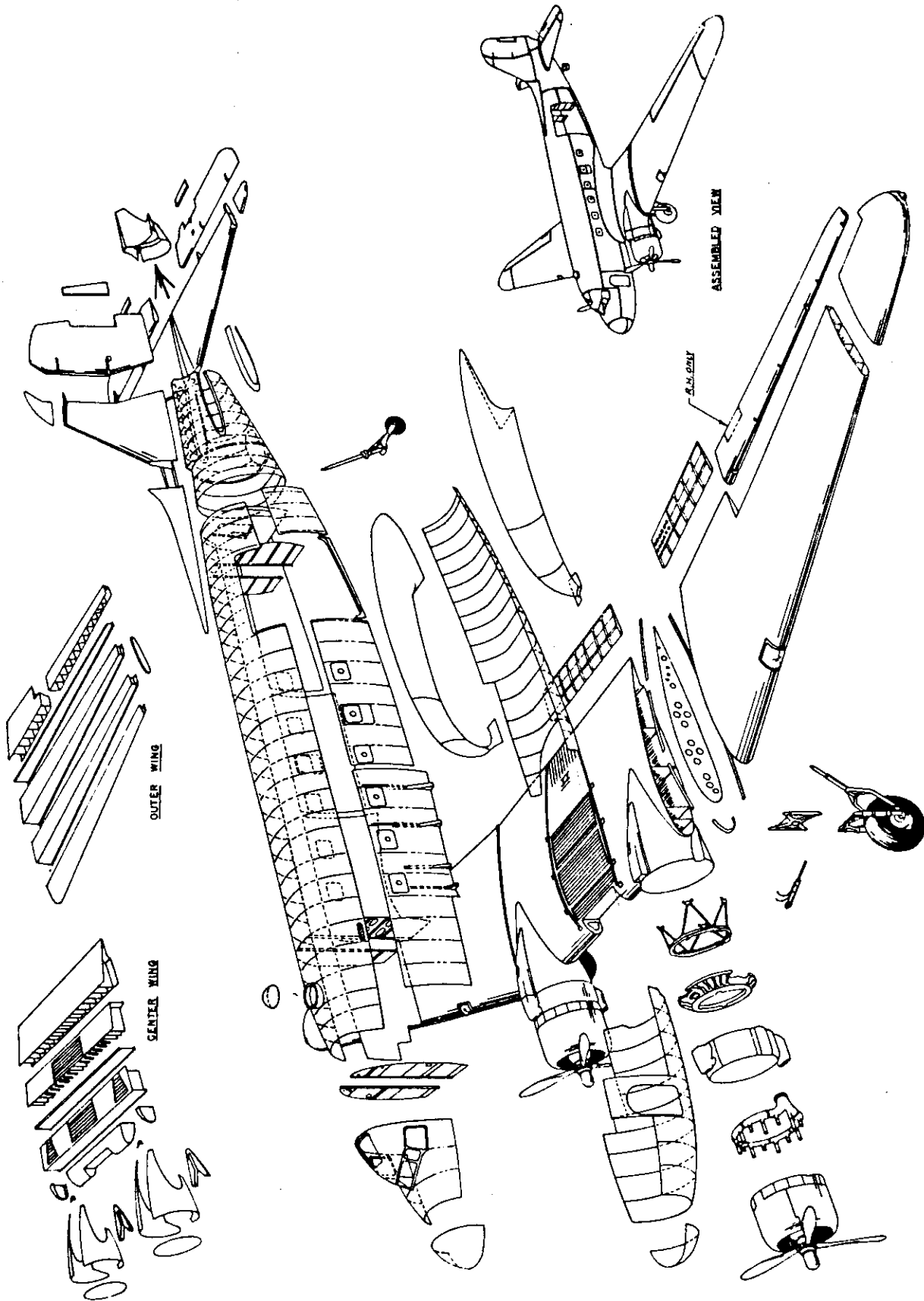
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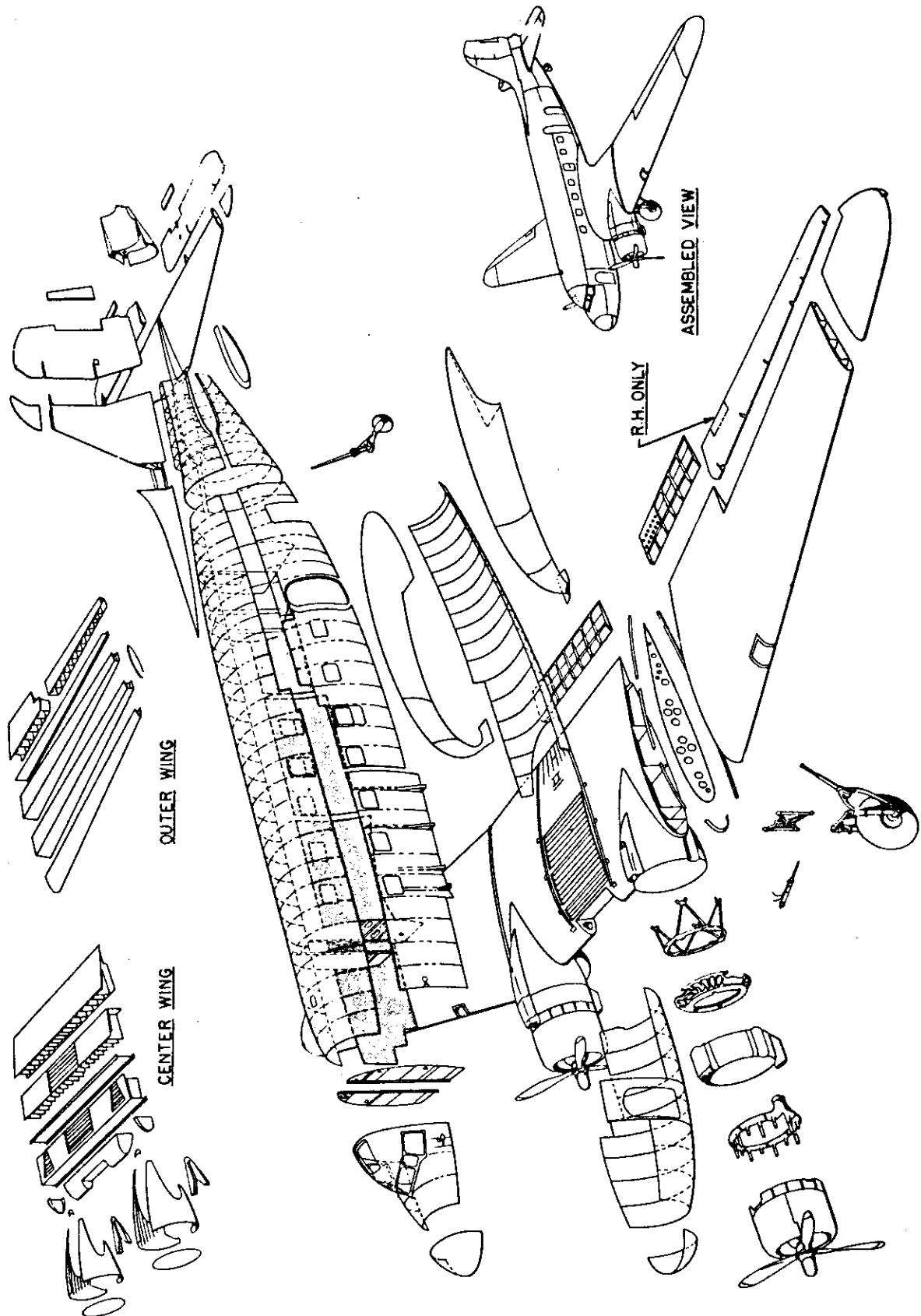
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Exploded View of Airplane



Exploded View of C-117A Airplane

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SECTION I

INTRODUCTION

1. General.

This Technical Order is the Structural Repair Instructions for the C-47, C-47A, C-47B (Navy Models R4D-1, R4D-5, R4D-6) and C-117A airplanes. It includes all necessary information for the repair of these airplanes. Personnel will read and be familiar with information contained in AN 01-40NC-1 and AN 01-40NC-2 (C-47 Models), and in AN 01-40NE-1 and AN 01-40NE-2 (C-117A Model).

2. Key to Illustrations.

To become familiar with the method of repair in the shortest time possible the following method should be used:

a. Refer to the following plating or structure diagrams:

- (1) Wing plating. (See figure 1.)
- (2) Wing structure. (See figure 2.)
- (3) Fuselage plating. (See figures 3, 3A and 3B.)
- (4) Fuselage structure. (See figures 3C and 4.)
- (5) Nacelle structure and plating. (See figure 5.)

(6) Empennage structure and plating. (See figure 6.)

b. With the above diagrams as a key, locate the position and extent of the damage. Then on the plating or structure diagram find the figure number of the repair to be made. Turn to this figure and repair the damage as outlined. If a reference can't be made from the plating or structure diagrams, the repair figure can be determined from the list of illustrations. This is possible because all of the diagrams are complete in themselves.

NOTE: If a damage occurs to the control surfaces they should be rebalanced according to section V. Photographs and their respective keys are included to familiarize one with the type of structure, gage and material used.

c. Example. - If any damage occurs to the skin in the wing, turn to the plating diagram. (See figure 1.) Locate the extent and position of the damage according to station numbers and spars. On the plating diagram (figure 1) locate "Wing Skin Repair". (See figure 7.) Then, turn to figure 7 and repair the skin as noted. By knowing the exact location the rivet schedule can be determined from the table.

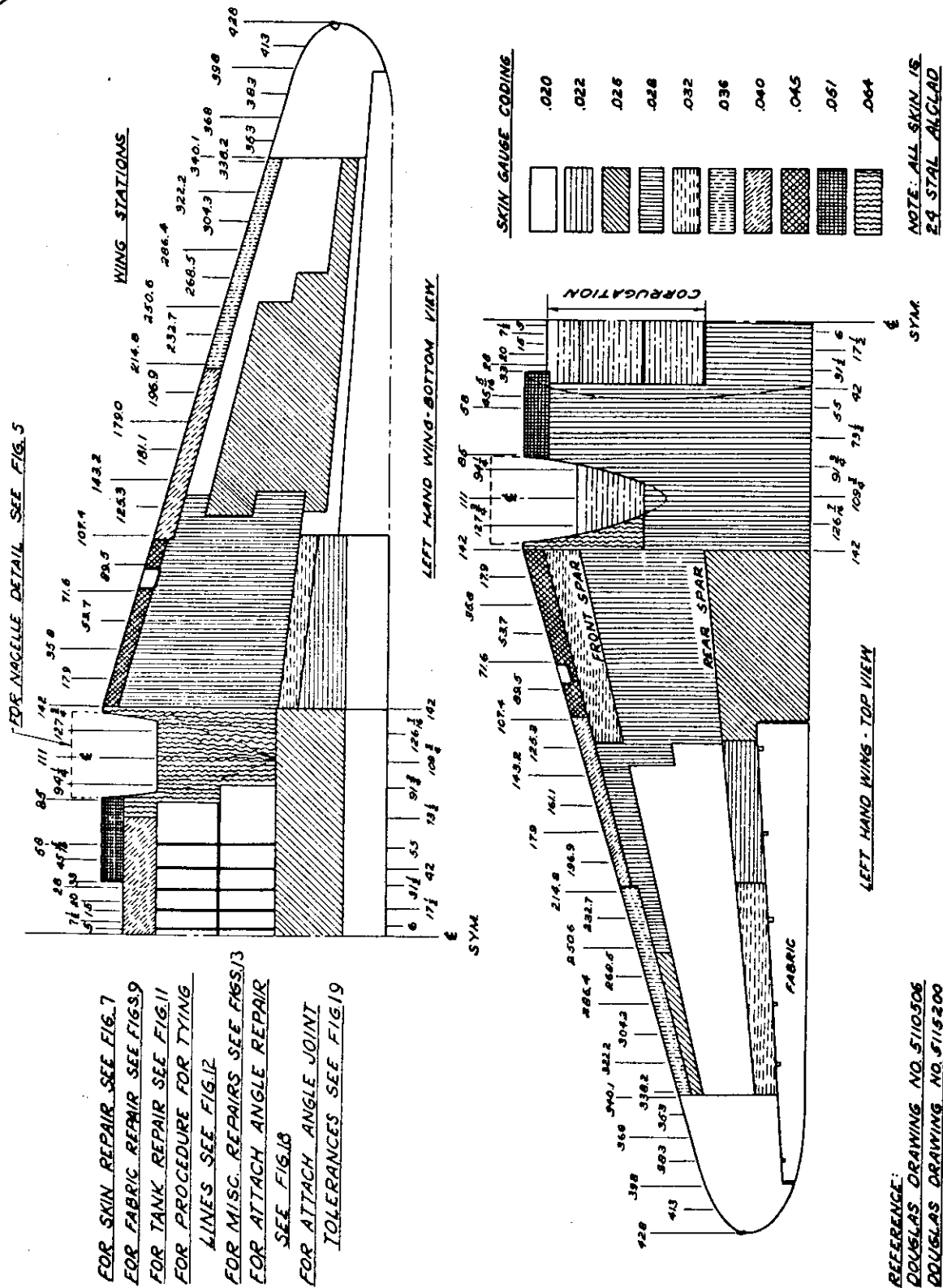


Figure 1 - Wing Plating

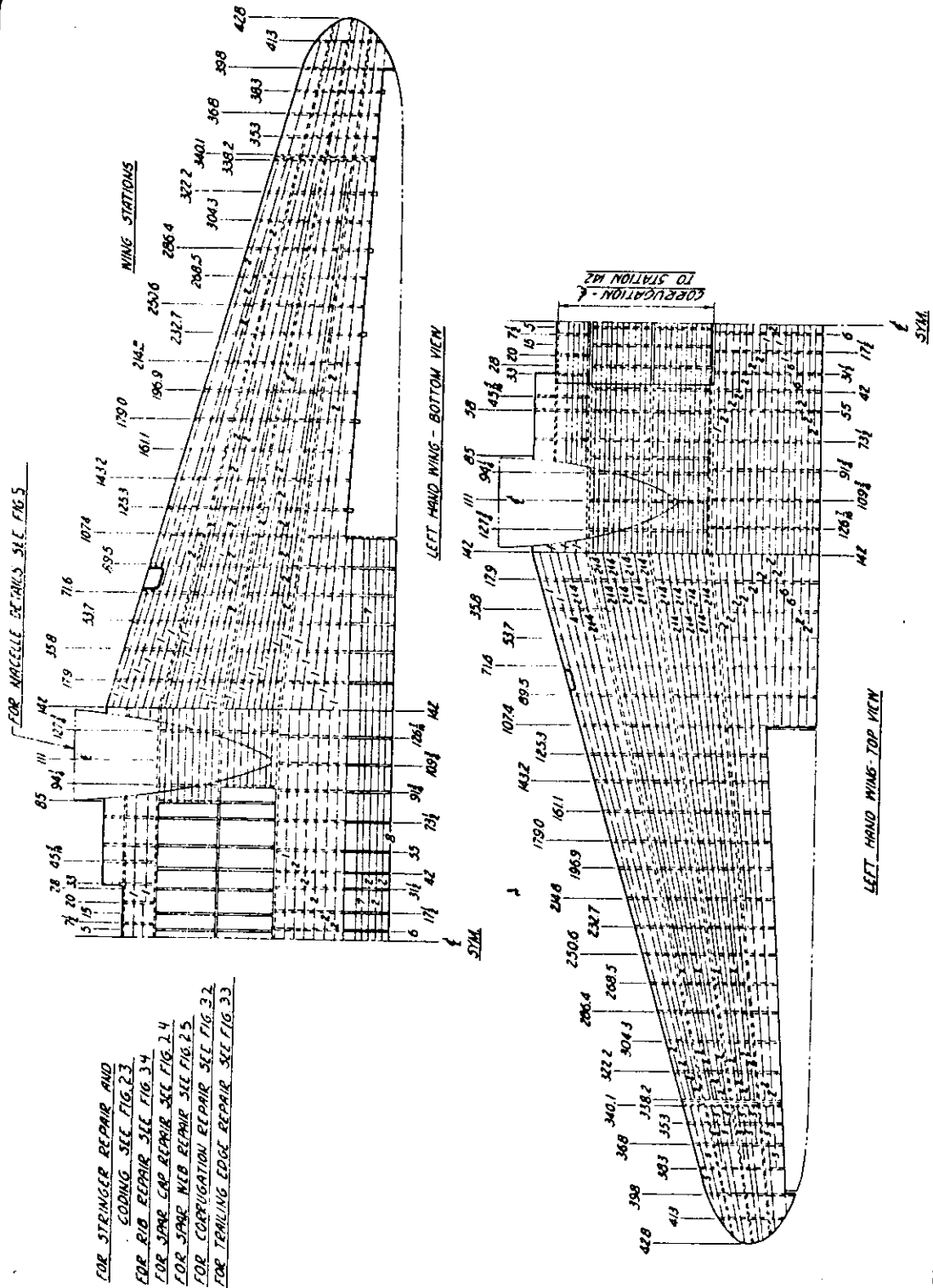


Figure 2 - Wing Structure

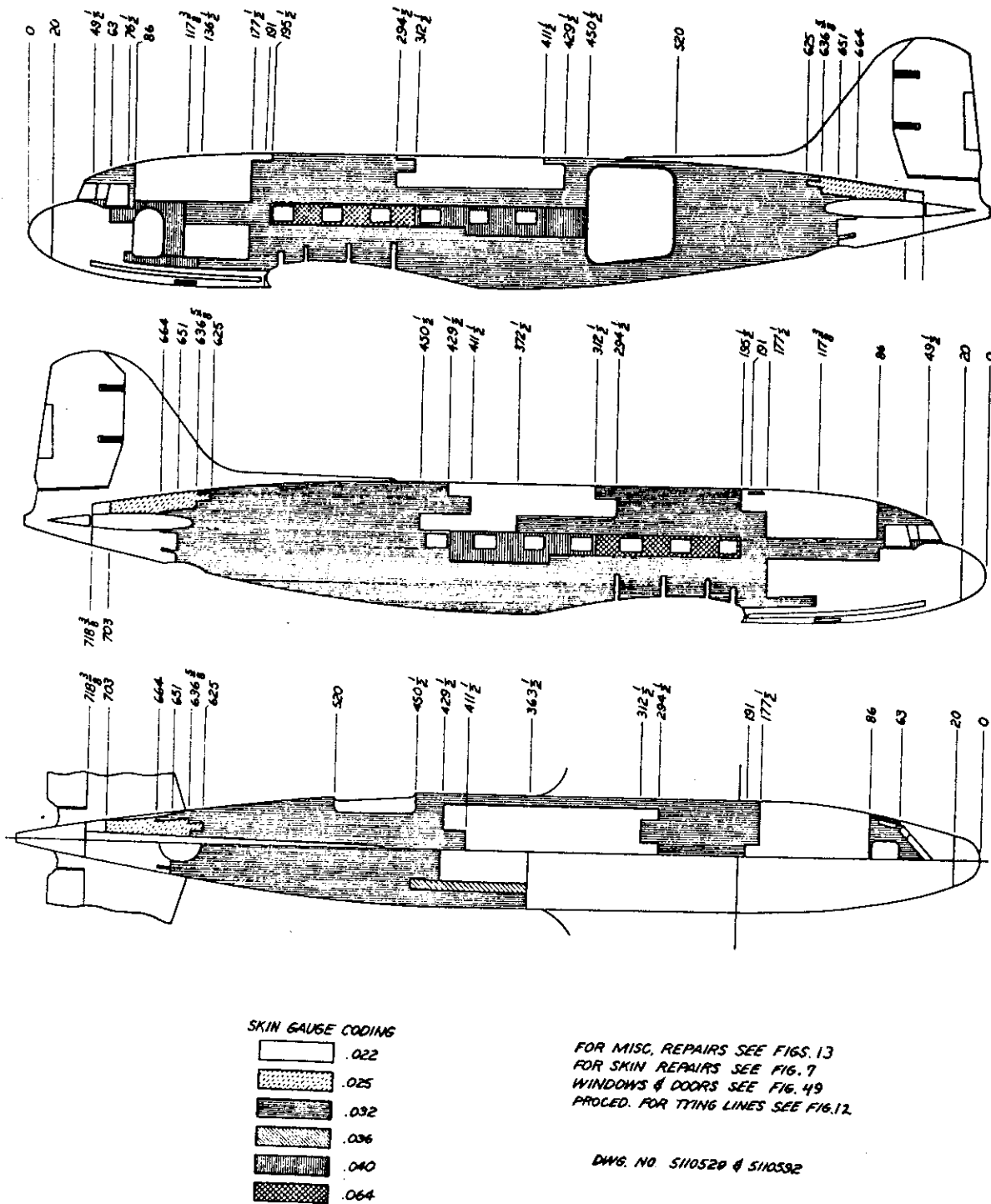


Figure 3 - Fuselage Plating (C-47 Model)

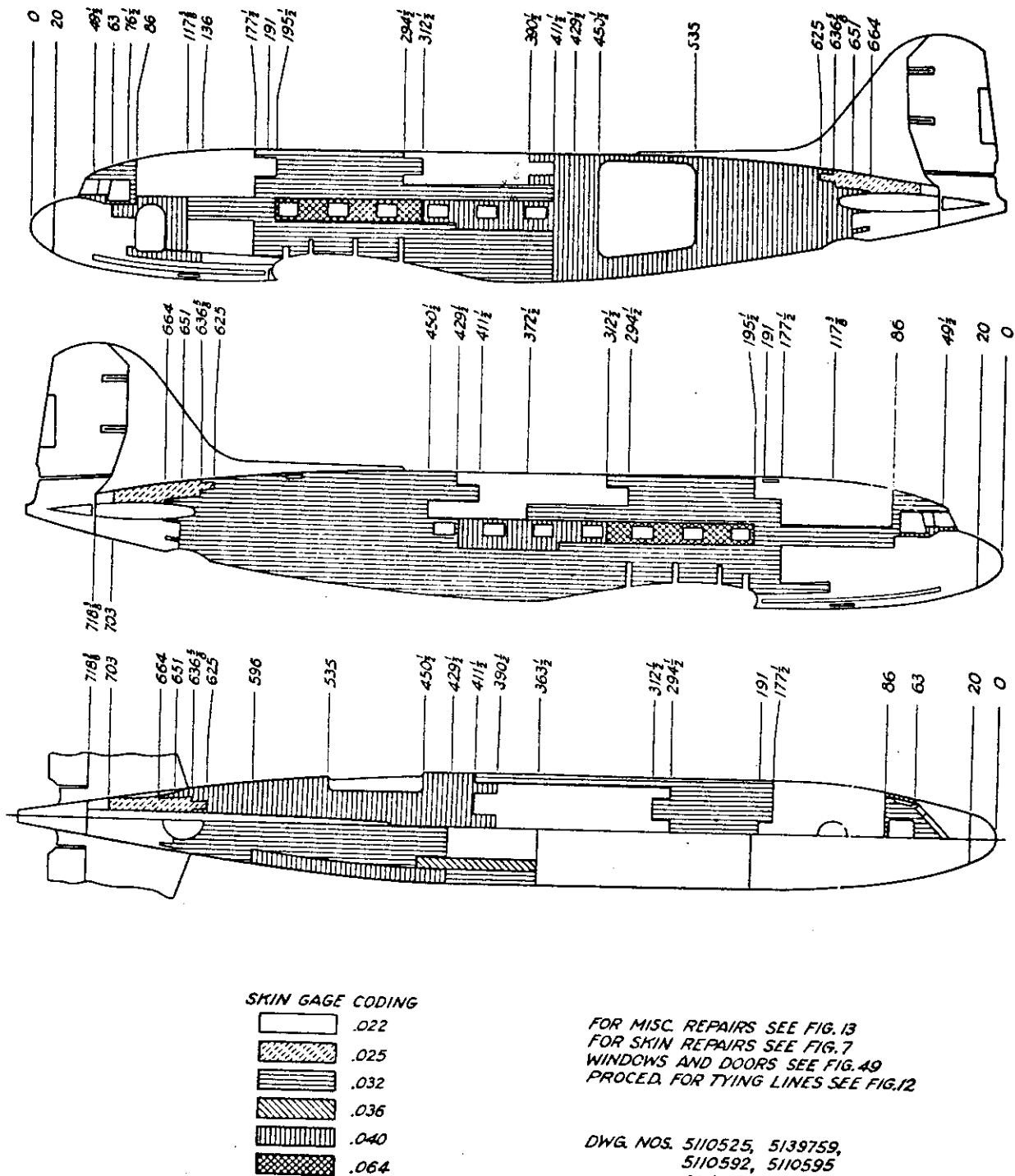


Figure 3A - Fuselage Plating (C-47A and C-47B Models)

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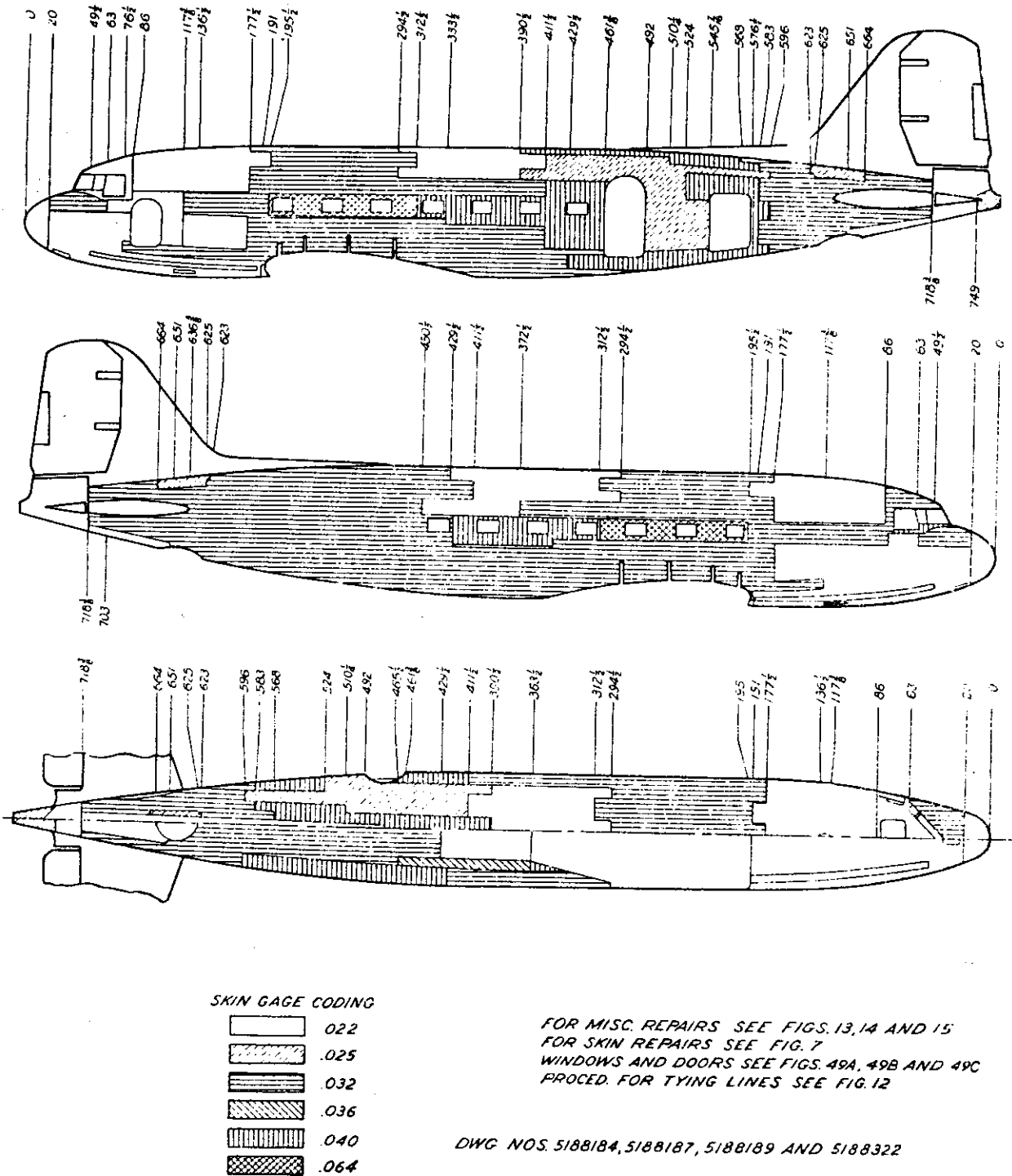
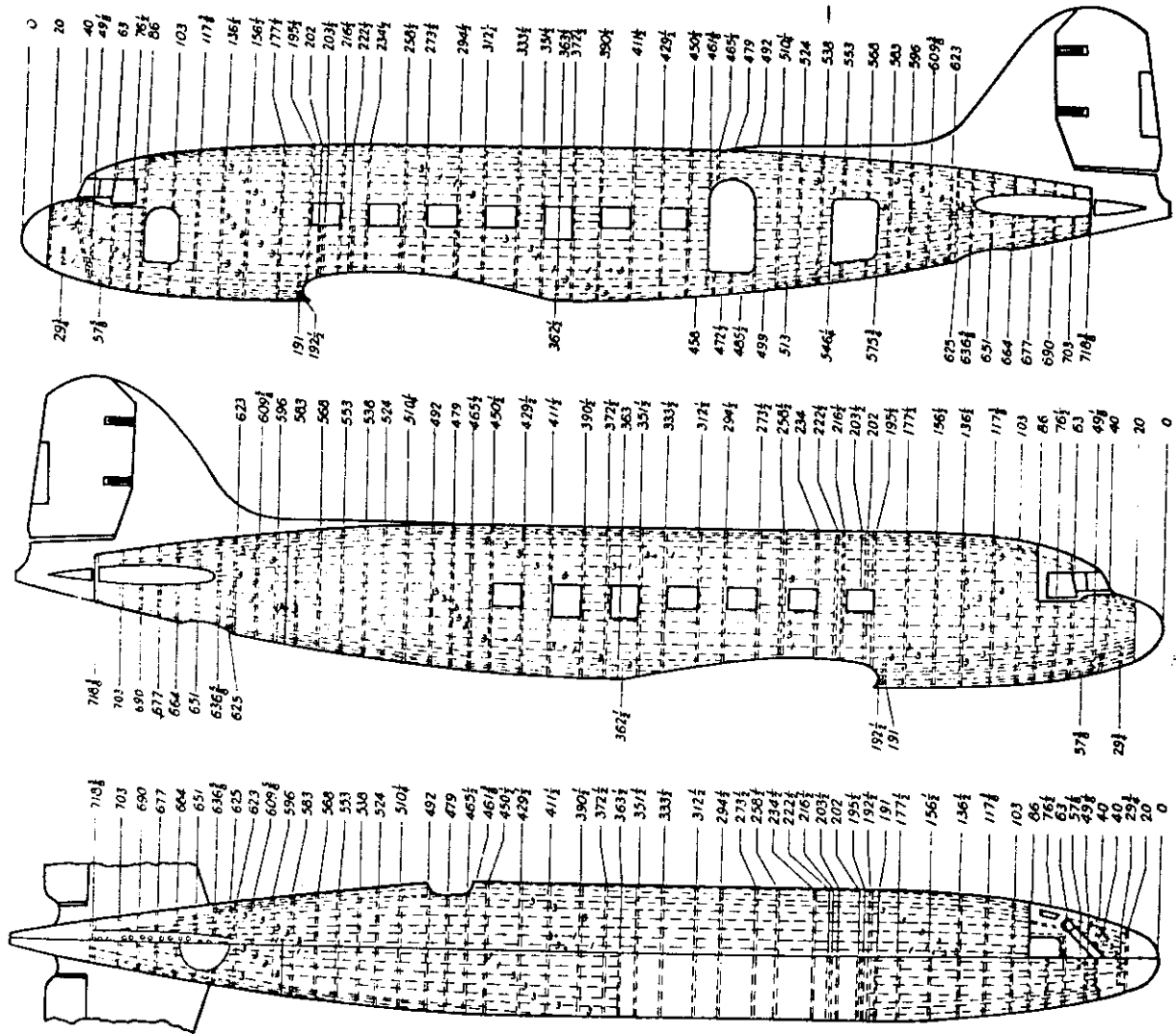


Figure 3B - Fuselage Plating (C-117A Model)

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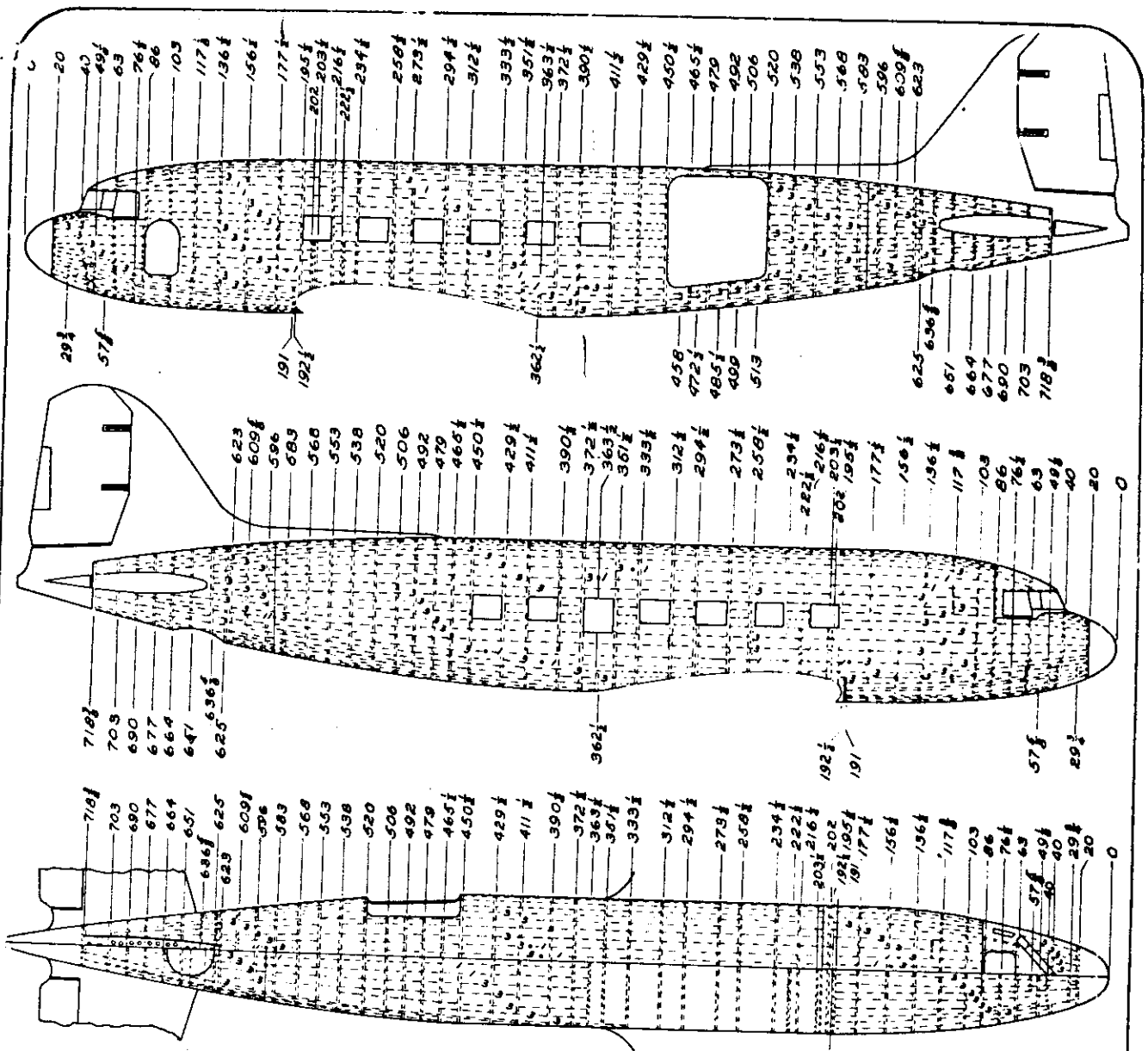
FOR STRINGER REPAIR & CODING SEE FIG. 50

REFERENCE DOUGLAS DRAWINGS

5110524, 5188167, 5118168, 5188321, 5188182

Figure 3C - Fuselage Structure (C-117A Model)

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FOR FRAME REPAIR SEE FIG.50

FOR STRINGER REPAIR & CODING SEE FIG.23

FOR FLOOR BEAM REPAIR SEE FIG.58

REFERENCE: DOUGLAS DRAWINGS
5110524, 5111164, 5110594, 5110591
AND 5110533

Figure 4 - Fuselage Structure

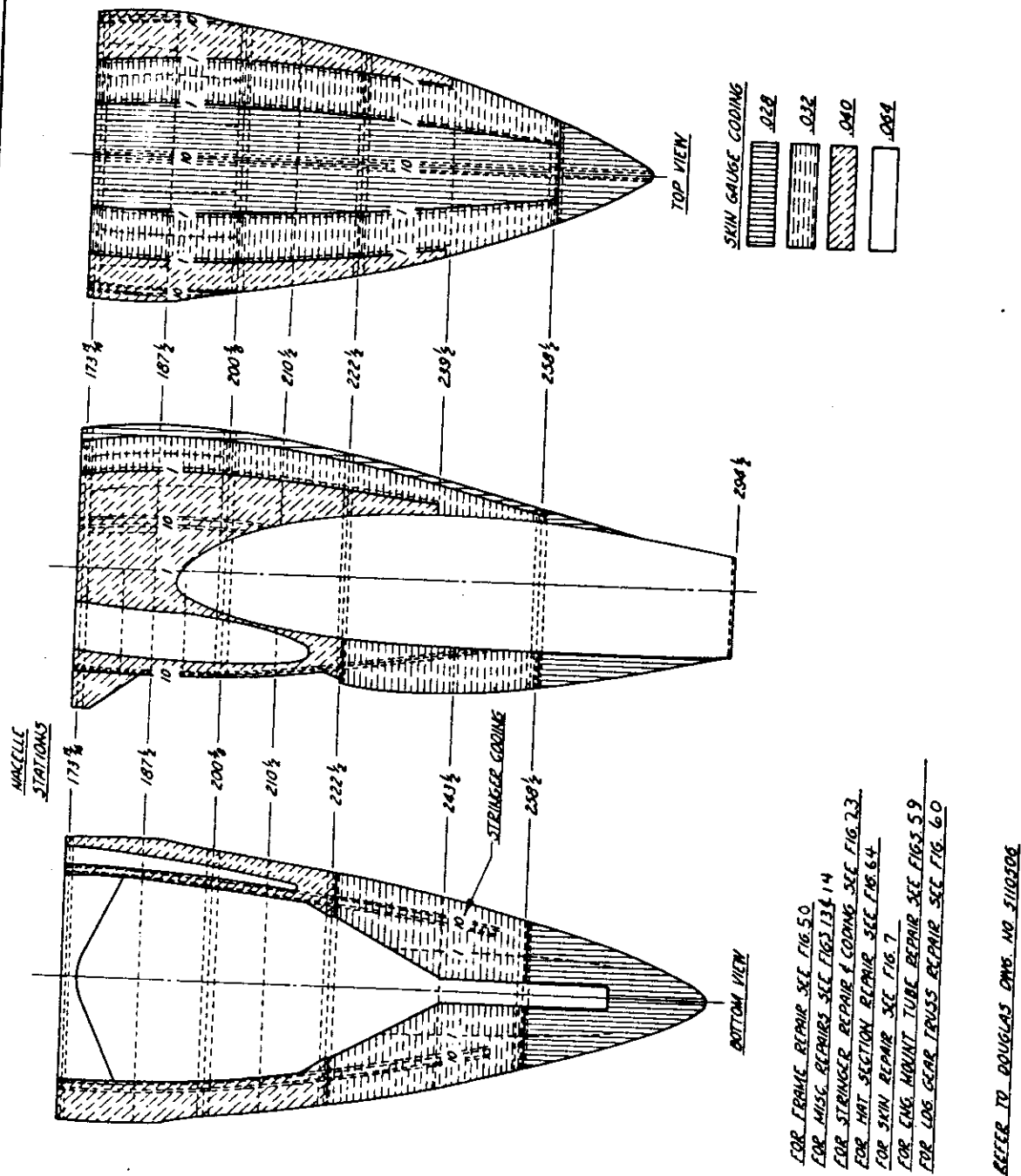


Figure 5 - Nacelle Structure and Plating

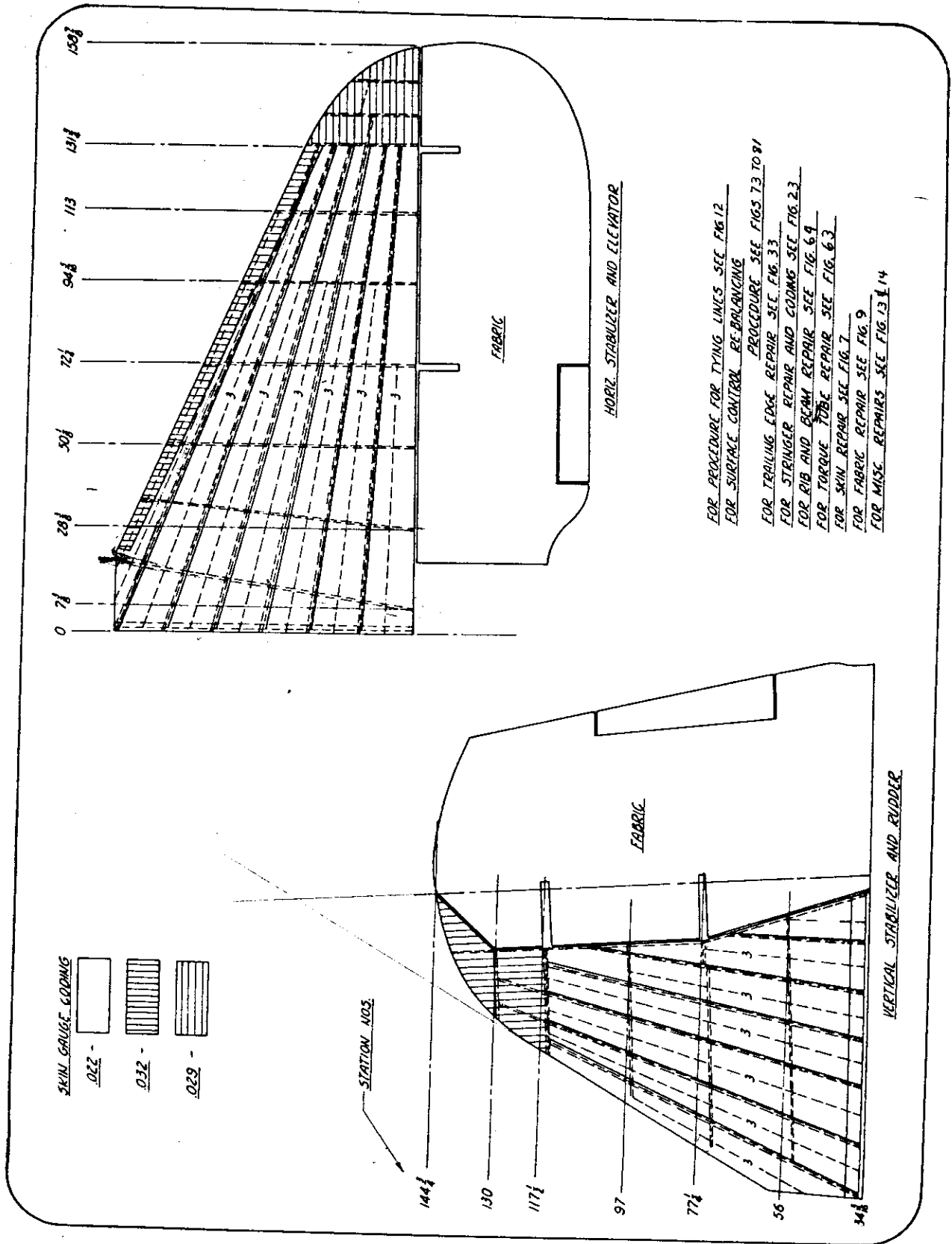


Figure 6 - Empennage Structure and Plating

SECTION IIREPAIR OF FABRIC COVERING1. Fabric Covered Ailerons.a. Materials:

- (1) Airplane cloth, cotton (AN-C-121).
- (2) Cord - Specification No. AN-C-122 - braided cord for lacing and rib stitching (beeswaxed lightly) and cotton braided cord, special lacing, U. S. Army Specification No. 6-27.
- (3) Thread - Federal Specification No. V-T-276 - cotton - left twist, type III - 804-ply.
- (4) Reinforcing tape - Specification No. AN-DDD-T-91 - cotton 3/8-inch or 7/16-inch.
- (5) Needles - Upholsterers needles - 10-inch No. 901, 13G, Julius Berbecker and Sons, Inc., New York and Ellis Klatcher No. 1 needles.
- (6) Pinked surface tape - 2-1/4 inch tape and 4-inch tape, U. S. Army Specification No. 8-62 (Navy Aero 27-T-14 (Int)).
- (7) Bank pins, No. 00 nickel plated brass.
- (8) Nitrate dope, Specification No. AN-TT-D-514.
- (9) Camouflage enamel, Specification No. AN-E-7.
- (10) Grommets, Douglas standard part No. 1011863-2.
- (11) Camouflage dope, Specification No. AN-D-8.

b. Procedure:

- (1) Tie cord at the top center of the second rib on the small end of the aileron. Carry the cord over and under each rib looping the cord around the outside and through the lightening hole of each rib, as the cord is passed down the center of the aileron throughout its entire length. Return in the opposite manner.
- (2) Small patches of airplane cloth 2 x 2-1/2 inches are cut and sewn around the frame at the trailing edge of the aileron at each rib station, as shown in figure 9, I; these patches serve to protect the cloth over the rivet heads and as a convenience to pin on the cover prior to sewing.
- (3) Cover each hinge support with masking tape to prevent cloth from being torn. Also, place two (2) strips of one inch masking tape immediately in front of tab hinge on the top side of the aileron and one strip on the bottom.
- (4) Cut two (2) patches as illustrated in figure 9, V,

approximately 12 inches long and 5 inches wide. Cut two (2) smaller patches 2-1/4 x 5-3/4 inches, as shown in figure 9, V. Sew the larger patches over each end of the tab cut-out. Place narrow part of the large patch on the bottom side of the aileron so that it covers the rib well past the tab cut-out. Sew the small rectangular patch correspondingly over the edge of the same rib on the top side of the aileron.

c. Covering (Fitting). (See figure 9, VI.)

(1) Airplane cloth of sufficient width to wrap around the aileron is cut long enough to extend the full length of the aileron including the ends.

(2) Cover is placed over the frame, pulled taut, equally stressed all around and pinned.

(3) Trim cover at the top of each end to 3/8-inch seam allowance and fold bottom cover ends across the aileron ends to meet the top.

(4) Trim off all excess material allowing 3/8 inch of material all around aileron for seams.

d. Sewing. (See figure 9, IV.)

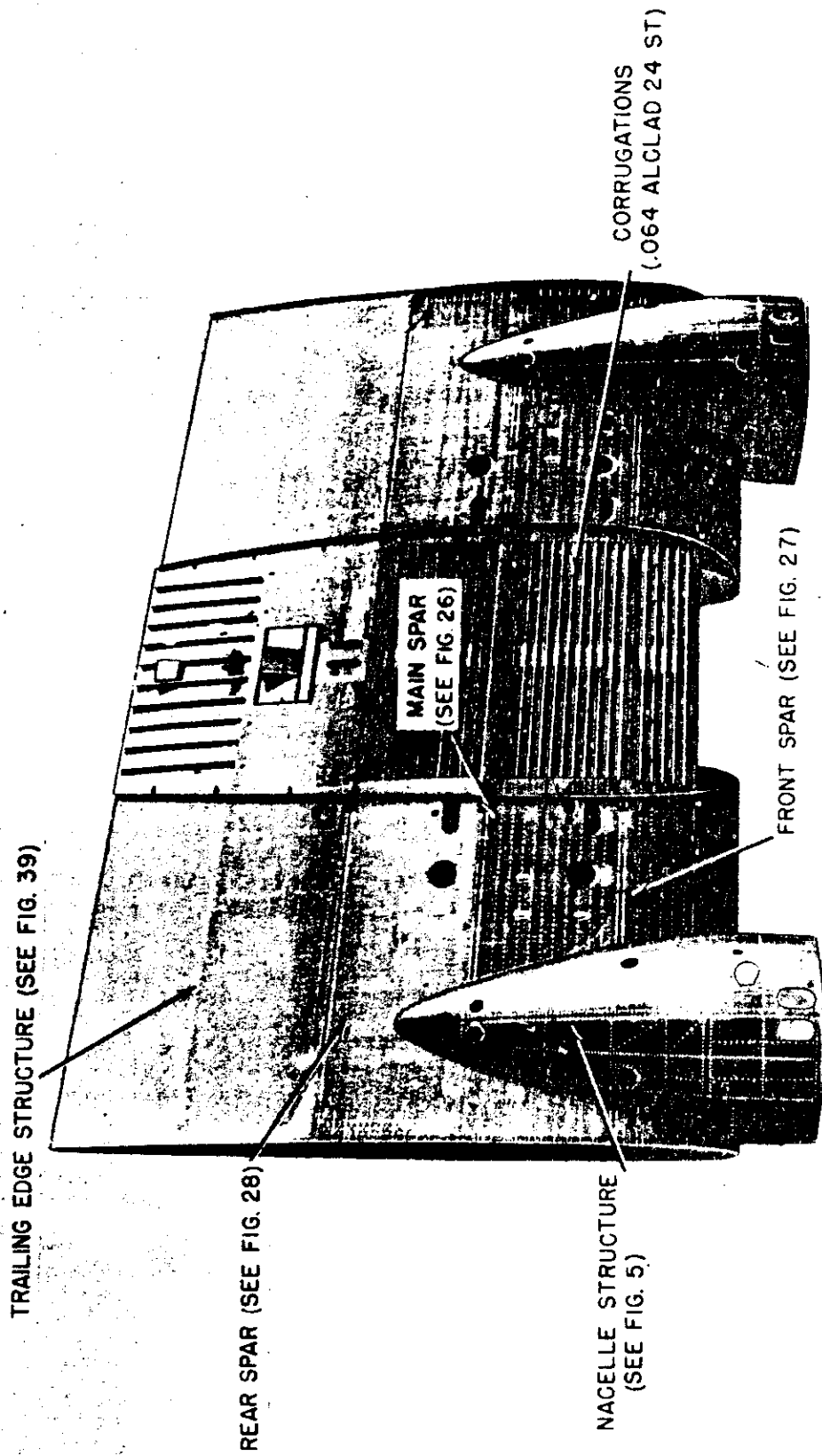
(1) Turn the edges of the material under and sew, removing the pins as you go. The baseball stitch is used on all seam sewing. A slip knot is tied in the thread every five inches to prevent total unraveling in case of thread breakage.

NOTE: Leave base of tab cut-out on right aileron pinned, as shown in figure 9, IV.

(2) Cut reinforcing tape to wrap completely around the aileron and pin at each rib station (figure 9, IV) except where the rib runs into the leading edge cut-out. At these stations extend tape 1/2 inch from the trailing edge to 1/2 inch from the metal fillets behind hinge cut-outs and pin, as illustrated in figure 9, IV.

(3) Sew tape to ribs using the conventional rib stitching of one inch spacing. (See figure 9, IV.)

NOTE: Number of stitches and length of cord per rib station is indicated in figure 9, IV. Hold aileron with leading edge down and begin rib stitching at the top outboard side of rib, one inch from the trailing edge. Tie slip knot to begin the stitching and a knot in every stitch thereafter. The rib stitching knot is the seine knot as shown in figure 9, IV. Pull knot very tight alongside the rib. End stitching 1-1/2 inches from the metal of the leading edge.



DWG. NO. 4205213
(C-47 AIRPLANES)
DWG. NO. 4188293
(C-117A AIRPLANE)

Figure 8 - Center Wing and Nacelle (C-47 and C-117A Models)

(4) Dope the aileron with one brush coat of nitrate dope.

e. Cut-outs. (See figure 9, VI.)

(1) Split each cut-out, rivet and screw where necessary a 3/8-inch .025 aluminum strip (fabric strip) across the base of the tab cut-out and around each hinge cut-out. Trim cloth from the hinge cut-outs to approximately one inch and dope back over the fabric strip to the aileron surface. (See figure 9, VI.)

(2) Mask with masking tape the exposed surfaces of hinge cut-outs. (See figure 9, II.)

f. Surface Taping. (See figure 9, II.)

(1) Apply a 2-1/4 inch pinked edge tape with nitrate dope over rib stitching at each short rib (ribs behind hinge cut-outs) running tape from the trailing edge of the aileron to the metal fillet of the leading edge.

(2) Cut and dope in place all leading edge 2-1/4 inch pinked edge tapes at each side of the hinge cut-out extending tape around the leading edge of the aileron to the edge of the metal underneath exclusive of the fillets.

(3) Apply with dope the pinked edge trapezoid shaped patches at the base of each hinge cut-out. (See figure 9, II.)

NOTE: Lay patch so that it extends just to the leading edge and does not lap over it.

(4) Lay 2-1/4 inch pinked edge spar tape between each rib except at patches. In laying the tape extend over the edge of the metal of the leading edge and dope down. (See figure 9, VI.)

NOTE: Cut spar tape so that it does not pass over rib stitching, except where there are patches. At patches extend tape over the patch to the next rib.

(5) Dope in place the remaining 2-1/4 inch rib tapes extending tape completely around aileron beginning at the trailing edge. It will be necessary to trim a small "V" from the side of the tape at the leading edge, after the tape is applied, to make it fit. At the ends of the aileron extend tape halfway over the edge and fold down over the ends, laying the top tape over the bottom, at the trailing edge. "V" the tape on the leading edge to fit the aileron. (See figure 9, VI.)

(6) Apply a 2-1/4 inch tape over the trailing edge running the full length of the aileron. Lap and trim the ends letting the top half of the tape extend over the bottom.

(7) Apply a 3-3/4 inch tape over the leading edge, lapping over each end of the aileron. Trim tape off flush at each hinge cut-out as shown in figure 9, VI.

(8) Dope the end patches over that portion of the aileron ends exposing the "V" of the tape at the leading edge, as shown in figure 9, VI.

(9) Apply four (4) brush coats of nitrate dope, allowing a sufficient drying period between each coat.

(10) Brush the spot where the grommet is to be applied with another coat of dope and immediately press the grommet in place maintaining it in position with finger pressure for about 30 seconds.

NOTE: Grommets to be placed one inch from grommet center to trailing edge of aileron on the outboard side and 3/4 of an inch from grommet center to the rib. (See figure 9, III.)

g. Finish. (See figure 9, II and III.)

(1) Finish bottom surface of aileron with two (2) spray coats of gray pigmented nitrate dope and the top surface with two (2) spray coats of olive drab nitrate dope.

(2) Attach with Parker Kalon screws the hinge cut-out clips around the hinge support at the base of the cut-out on the underside of the aileron as shown on the blueprint. (See figure 9, III.)

(3) Attach metal trim tab to trailing edge of left wing as shown on blueprint.

(4) Remove the masking tape from cut-outs and paint the exposed metal with camouflage enamel.

2. Fabric Covered Control Surfaces.

The following procedure should be followed:

a. Lay strips of reinforcing tape across top of rib and cloth and attach securely under moderate tension to the forward and rear ends of the fabric.

b. The lacing must be done completely around the rib, reinforcing tape and covered fabric and must be tied with a seine knot at the top surface. The knot should then be covered with surface tape. (See figure 10.) Repeat the above procedure from the leading edge to the trailing edge. Spacing of knots should be more than one inch. For additional information refer to U. S. Army Specification No. 98-24108K (Navy Aero SR-63).

3. Bonding.

The electrical conduits and connections should be bonded in accordance with the instructions outlined in figure 71.

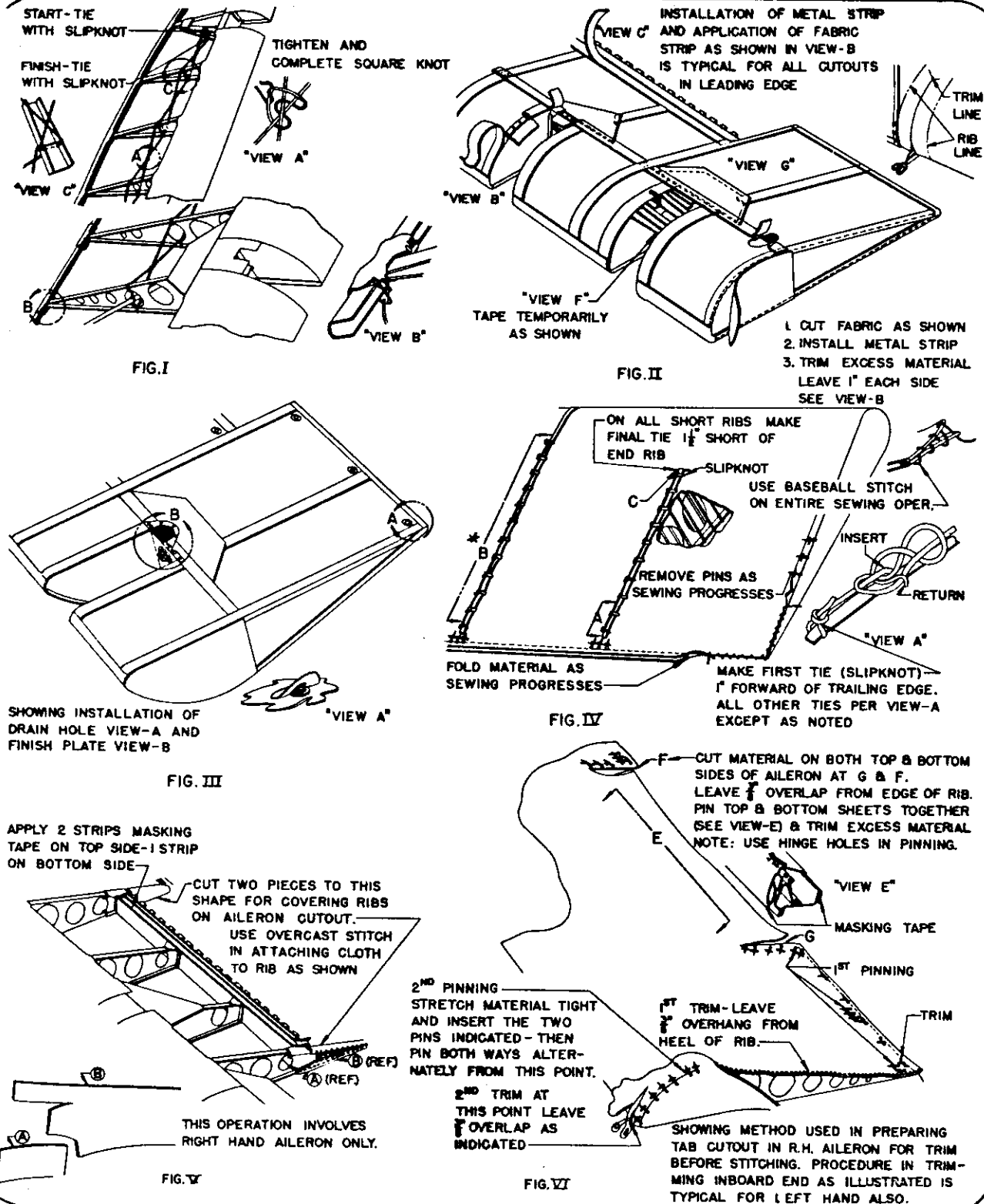


Figure 9 - Repair of Fabric Control Surface

TABLE I
(SEE FIGURE
9, IV, B)

NUMBER OF STITCHES PER RIB			
STATION	STITCHES		STATION
120.29	20		277.25
132	12 R.H.	23 L.H.	288.14
143.2	5 R.H.	22 L.H.	296.75
155.85	12 R.H.	22 L.H.	305.5
167.3	12 R.H.	21 L.H.	314.25
180.3	17		323.5
190.5	20		331.5
201.25	20		339
212	19		348.25
222.75	18		357.5
234	14		366.75
244.5	17		376
255.25	16		381.16
266.25	16		384.76

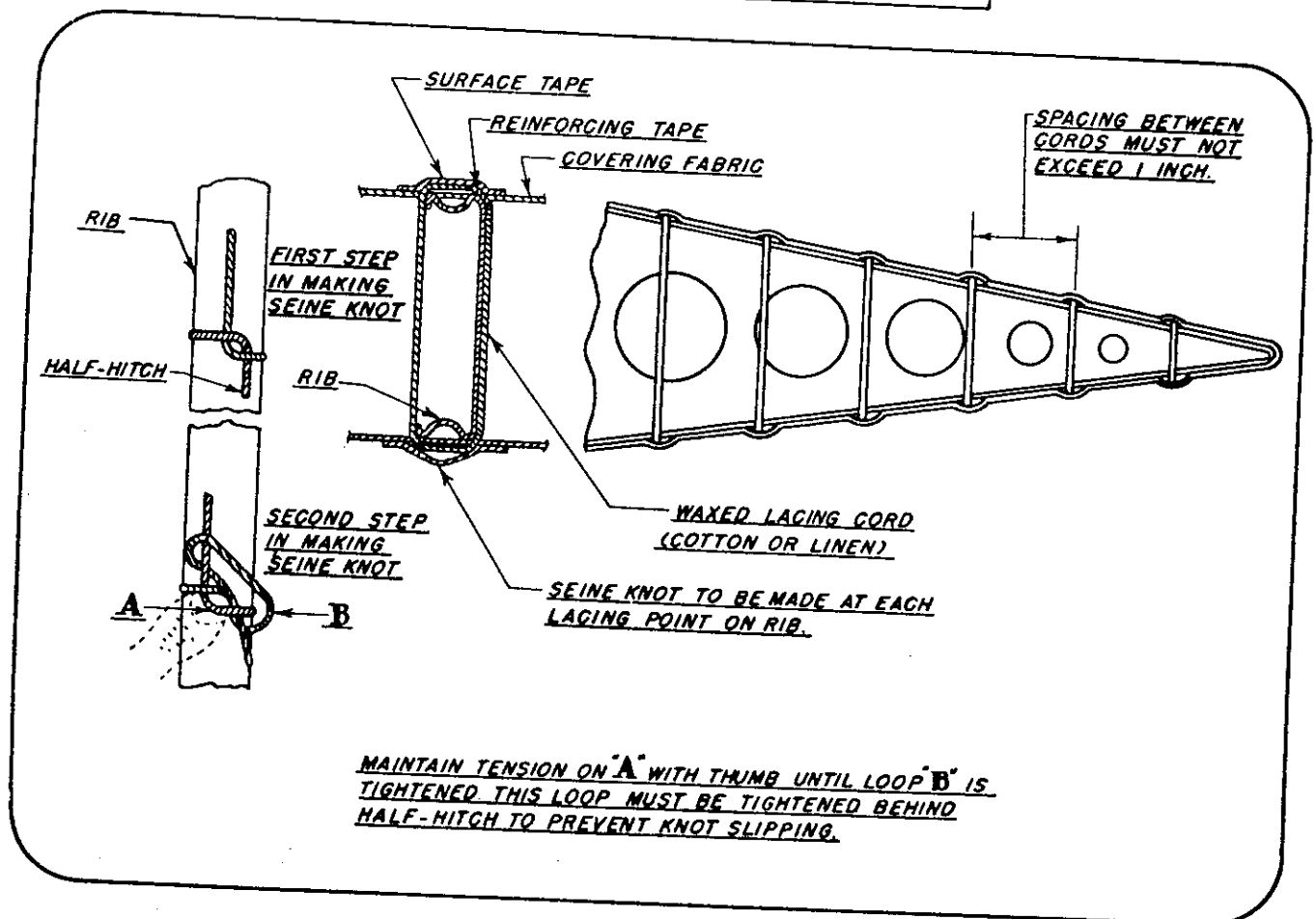


Figure 10 - Alternate Method of Repairing Fabric Control Surfaces

SECTION IIIDISMANTLING, CLEANING AND INSPECTION1. General.

a. The work outlined in this section consists of preparing the airplane for overhaul and repair. The inspections accomplished should be as complete as possible at this stage of disassembly. Major sub-assemblies which can not be inspected should be marked "Repairable" and routed to the sub-assembly groups for repair.

b. A list of special airplane tools furnished by the contractor for use in connection with the maintenance of the C-47 Model Airplanes is given in section III, paragraph 5 of AN 01-40NC-2, and for the C-117A Model Airplane in section III, paragraph 5 of AN 01-40NE-2.

2. Dismantling.

a. General. - Instructions for removing major assemblies for the C-47 Model Airplanes are given in section IV, AN 01-40NC-2, and for the C-117A Model Airplane are given in section IV, AN 01-40NE-2 (Handbooks of Erection and Maintenance Instructions) as follows:

- | | | |
|------------------|---|------------------|
| (1) Wing | - | Paragraph 1. b. |
| (2) Empennage | - | Paragraph 2. b. |
| (3) Landing Gear | - | Paragraph 4. b. |
| (4) Tail Gear | - | Paragraph 4. c. |
| (5) Engines | - | Paragraph 6. b. |
| (6) Fuel Tanks | - | Paragraph 10. b. |
| (7) Oil Tanks | - | Paragraph 9. d. |

b. Precautions.

(1) Wing Center Panel. - During or after removal of the wing center panel from the fuselage, it is desirable to have the least possible weight in the nose section of the airplane as the removal of the wing center panel leaves an unsupported area of the fuselage subject to bending under an appreciable load.

(2) Empennage. - The tab operating drum cables should be taped to prevent their unwinding before removing the rudder or elevators.

(3) Landing Gear. - As the tension in the landing gear bungee is approximately 9000 pounds, extreme care should be used when removing the landing gear. When the bungee is removed, the landing gear will drop violently unless some method of retarding is used. Do not attempt this operation with pressure in the hydraulic system. The hydraulic system pressure should always be relieved before working on the landing gear. The tire should be deflated before removing the wheel from the axle and brake drums as rims are some times cracked from hard landings, which may cause disintegration if the wheel is removed with the tire fully inflated.

(4) Tail Wheel. - As the tail gear is extremely heavy, not less than two men should attempt to lower it after it has been disconnected from the fuselage. The tail wheel tire should be deflated before disassembling to avoid injury to personnel by cracked rims disintegrating.

(5) Engines. - When the ignition plug on the fire-wall is disconnected, the magnetos are not grounded. The engines should not be pulled through when this plug is out.

3. Cleaning.

a. General. - As soon as possible after cleaning, the entire airplane should be checked for corrosion. Some spots may be noted by a discoloration of the paint together with a blister effect. At the same time a general check for breaks and cracks can be made. Cracks make a pencil line effect. The following inspections should be accomplished at this stage of disassembly.

(1) Wings. - The trailing sections of the wing should be checked for corrosion around corners of the bulb angles, the rib flanges, and the skin adjacent to the angles and ribs. After 3,000 hours or four years have elapsed, the center wing section should be cleaned and refinished. The following special items should be thoroughly checked:

(a) Outer wing attaching angles both on the outer and center panels. Cracks and elongated holes.

(b) Outer panel nose ribs inboard of the landing light bay. Cracks and canning.

(c) Wing spars near ends. "Canning" and breaks.

(d) Wing ribs adjacent to longitudinal cut-outs. Cracked or broken.

(e) Clips attaching longitudinals to ribs. Cracked or broken. Exterior inspection for this condition can be made by pressing in on the skin covering at each longitudinal and rib connection. Damaged clips will allow an appreciable movement of the skin.

(f) Center panel ribs in trailing section adjacent to flap hinge plates. Cracks.

(g) Flap push rod rollers. Frozen or flattened.

(h) Aileron hinges and hinge ribs immediately upon entering wing structure. Cracks.

(i) Wing flap hinges on flaps. Worn spots and play.

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(j) Wing and flap skin to the rear of the nacelles. Scratches, dents, and holes.

(k) Skin beneath corrosion resistant steel plates adjacent and aft of the tail pipe. Corrosion.

(l) Fuel tank compartment cover attaching angles. Cracks and elongated holes.

(m) Remove outer wing panels and inspect ribs, skin, spars, etc. for cracks and corrosion.

(2) Empennage. - The lower ends of the vertical stabilizer tabs should be inspected for cracks along the rivet holes in the flanges. The leading edges and

the lower surfaces of the horizontal stabilizer should be checked for scratches and dents.

(3) Fuselage. - The fuselage should be thoroughly inspected for dents, scratches, and wrinkled skin sheets. Dents are likely to be found in the vicinity of the propeller plane and below the cargo loading door. Structural parts should be checked for deep scratches and cracks. The lower part of the fuselage interior should be checked for corrosion.

(4) Landing Gear. - Inspect all welds for cracks. A straightedge should be used to test the upper truss for bent tubes.

(5) Tail Wheel. - Inspect spindle and fork for cracks and deep scratches. Permanent set in the spindle should be checked.

SECTION IV

REPAIR PROCEDURES

1. General.

Authorized repair depot personnel should be familiar with the following procedures to insure that all repair work is properly assembled, and the materials used have the required strength.

2. Procedure.

a. Buck Riveting Roundhead Rivets. - Buck riveting is to be used for making all repairs of the skin plate or of the airplane structure. If blind riveting is necessary, refer to figure 6. Buck riveting procedure should conform to the following instructions:

(1) The head of the rivet should be on the outside surface in the case of skin repair. The riveting of the internal structure should be governed entirely by ease of access.

(2) To insure a sufficiently strong head, the shank of the rivet that protrudes beyond the materials to be repaired should be at least one and one-half (1-1/2) times the diameter of the shank. This is only applicable to joints where the combined material to be riveted measures less than one-half (1/2) inch in depth. For a joint of one-half (1/2) inch or more, add one-sixteenth (1/16) inch for each one-half (1/2) additional inch of joint thickness.

(3) The cup on the driving set should be slightly wider and more shallow than the manufactured heads of the rivet so that the initial contact of the driving force, supplied by either a heavy hand hammer or a riveting machine, will be at the center of the head and directly in line with the rivet shank. This will keep the shank from being driven under the manufactured head, and greatly facilitate the upsetting of the shank into a flat head on the opposite end. The opposite end

of the rivet should be supported against a bucking bar. This bar need be of no certain shape, but should have a flat surface to be held against the end of the rivet, and of sufficient mass to withstand the driving action and form a flat head.

b. Buck Riveting 100° Flush-Head Rivets. - The driving of 100° flush-head rivets follows the working procedure as described under buck riveting with the following exceptions:

(1) The edges of the hole drilled for a flush type rivet should be punched lightly inward. This forms a natural cup, allowing the rivet head to be set flush with the skin and not to be forced.

(2) The driving set in the case of flush rivets should be slightly convex and about two or three times the diameter of the rivet head. Care should be taken to keep the peen from slipping off the head of the rivet and marring the adjacent skin.

c. Rivet Edge, Pitch and Row Distances. - The edge distance for all rivets in alclad aluminum-alloy sheet should be at least twice the diameter of the rivet; the pitch of the rivets in a single row should be at least three times the diameter of the rivet, and where a rivet schedule calls for more than a single row, the rivets should be staggered so that those in adjacent rows do not appear in the same cross-section of the material. The distance between rows should be at least two and one-half (2-1/2) times the diameter of the rivets used.

d. Identification of Rivets. - The three types of aluminum-alloy rivets used throughout the structure are the 17ST (designation D), the A17ST (designation AD) and the 24ST (designation DD). The A17ST (AD) type is used for structure repairs. The 17ST (D) and

24ST (DD) type are used in the more highly stressed parts. The "AD" type may be identified by an indentation in the center of the manufactured head; the "DD" type by two indented lines on each side of the manufactured head; the "D" type by a raised tit in the center of the manufactured head. The physical properties of these rivets are given in section XIII.

e. Removal of Solid Rivets.

(1) When it becomes necessary to replace old rivets, great care should be employed in their removal, to insure, if possible that the rivet hole retains its original size and does not require replacement with a larger size rivet.

CAUTION: If a cold chisel is employed in the removal of old rivets, without previously taking the precaution of drilling out the rivet head, the rivet hole is very apt to become enlarged or torn. The flush-type rivet makes this caution note of great importance since there is a great possibility of tearing the material.

(2) Following is the correct procedure for the removal of solid rivets of the round head and the flush type.

(a) Removal of Round Head Rivets.

1. With a centerpunch, indent the surface so that the drill may be correctly centered.

2. With a drill of the same size or smaller as the rivet shank, drill the head to a depth that is near the level of the skin surface. Be careful not to drill skin and enlarge the rivet hole. Watch that the rivet shank does not turn with the drill, causing the skin to tear.

3. Normally the head will come off by drill but if not, carefully shear off the drilled head with a sharp chisel.

4. Drill in about 3/4 of the depth of the rivet and then drive out rivet with a punch small enough to eliminate touching the skin plate, meanwhile bracing the skin plate by fitting from the opposite side to insure that the rivet plate, fitting, or attaching parts will not be forced or bent.

(b) Removal of Flush Head Rivets. - The previous explanation for the removal of the round-head type rivet is adequate for the removal of the flush type.

f. Elongated Rivet Holes. - If sufficient pitch, edge and row distance exists, enlarged rivet holes may be replaced with a size larger rivet, or new rivets may be driven between the damaged holes. Holes, enlarged beyond this type of repair, should be considered an open tear, and treated with a doubler or patch accordingly.

g. Heat Treatment of Material.

(1) The A17ST (AD) type rivets noted for repairs

are in the hard-temper (heat-treated) condition, and are driven cold. (See section XIII.)

(2) Refer to AN 01-40NC-2 (C-47 Model Airplanes) and to AN 01-40NE-2 (C-117A Model Airplane) for the treatment that should be used for all replaced parts, repairs, and materials so that they may be similar to the original construction of the airplane.

h. Prevention of Corrosion.

(1) To prevent corrosion, it is necessary to keep the metal surfaces of the airplane dry under any of the various climatic conditions, since corrosion may be defined as the resulting chemical reaction of metal when exposed to moisture. Corrosive action is aided by the presence of high temperatures and humidity.

(2) Aluminum corrosion, detected by a white crystalline deposit, will attack exposed material regardless of thickness, though the percentage of effect upon thinner sections is correspondingly greater. Alclad sheet has a highly corrosion resistant surface, but is subject to corrosive conditions, the most important being exposure to salt moisture.

(3) Since dry aluminum will not corrode, a daily inspection of the lowest edges of all surfaces of the entire airplane should be made for moisture that has not drained away. This applies to any portion of the structural design which forms a natural container for moisture.

(4) Refer to AN 01-40NC-2 (C-47 Model Airplanes) and to AN 01-40NE-2 (C-117A Model Airplane) for the preparation of aluminum surface before coating with a moisture-proof paint.

(5) After making repairs to any portion of the airplane it should be refinished as noted in AN 01-40NC-2 (C-47 Model Airplanes) and in AN 01-40NE-2 (C-117A Model Airplane), or coated with an approved type of corrosion preventive.

i. Straightening and Working of Alclad Sheet and Stainless Steel.

(1) Alclad Sheet. Alclad aluminum alloy may be shaped with a soft faced hammer over hard wood forms. The practice of applying a torch to alclad sheet members for the purpose of straightening or forming is very dangerous as it will destroy the hard temper properties and weaken the structure. Also, the effect of a torch flame deteriorates the aluminum protective coating on alclad aluminum alloy by fusing it into the base metal and renders it more susceptible to corrosion. Protection may be obtained by the use of asbestos when such structure is subjected to heated conditions.

(a) After straightening a bent member, all of the structure adjacent to it should be inspected for loose rivets.

(2) Stainless Steel. - The straightening of stainless steel, such as is used in the construction of the nacelle firewalls, may be aided by the use of a torch if the material is not heated beyond the dark red stage. Caution must be used that adjacent aluminum structure is protected from the heat created by this procedure, as noted in paragraph 1. (1), preceding.

1. Inspection.

(1) In addition to the inspection listed under section III, it is imperative to remember the following:

(a) The strength-developing components of the wing in the order of their importance are:

1. Spars.
2. Stringers and Skin.
3. Shear Webs.
4. Ribs.
5. Corrugations.

(b) The strength-developing components of the fuselage in the order of their importance are:

1. Fuselage Frames.
2. Stringers and Skin.

(c) The strength-developing components of the tail surface in the order of their importance are:

1. The Spar.
2. Skin and Ribs.

(2) No rivets should be overlooked. A rivet may be strained or its head sheared off, and not be apparent. For this reason, a feeler gage should be used when inspecting for possible loose rivets.

(3) All bolts, screws, fitting, castings, and forgings should be replaced if damaged or bent.

(4) All tension bolts should be installed with a torque wrench. The tightening torque limits are given in table 5.

SECTION V

CONTROL SURFACE REBALANCE

1. General.

To balance the control surfaces, it will be necessary to have two balance stands (figure 73), a strong cord, a scale for linear measurements and a set of weights. The following set of weights is satisfactory as any weight up to 30 pounds may be obtained to the nearest 1/10 pound. The weights are 10, 10, 5, 2, 2, 1, 1/2, 1/5, 1/5 and 1/10 pounds. The most accurate method for determining the unbalance of the control surfaces is to apply the weight to a cord fastened at the rear of the surface and suspended over the leading edge. This places the weight as far as possible from the hinge axis (figure 73), allowing the distance to be measured with the smallest percentage of error. The following is the recommended procedure for rebalancing control surfaces.

a. Rudder. - Correct balancing weight of the rudder should be 250 inch pounds tail heavy including rudder tab, the tab operating mechanism, the cables within the rudder and the rudder stock. The moments of unbalance are maximum and if exceeded, the surface should be rebalanced as follows:

(1) The control drum should be bound with friction tape or secured with some other type of lock to prevent the cables from twisting and then the tab con-

trol cables should be disconnected.

(2) The rudder, without the stock should be removed from the airplane and suspended on two balance stands. (See figure 74.) These stands should be located where there is no likelihood of encountering moving air.

(3) Coil the tab control cables within the rudder with the center of gravity of the coil of cable on the hinge line of the rudder.

(4) Secure the cord in the tab cut-out and hang it over the leading edge of the surface. Hold the surface by hand with the center line of the end rib in a horizontal position.

(5) Gradually add weight to the cord until the surface will remain balanced when released with the center line of the cord rib in a horizontal position. Note the weight on the cord.

(6) Measure the horizontal distance of the string from the hinge line and multiply this distance in inches by the weight in pounds necessary to balance the surface. This will give the moment of unbalance in inch pounds.

(7) Add 14 inch pounds to unbalance found in the preceding paragraph which will give the total moment unbalance of the rudder and the stock attached. This figure is used in finding the number of pounds balance weight required.

(8) If the moment of unbalance of this surface is less than 250 inch pounds maximum allowable as shown in paragraph 1. a., preceding, no corrective measures are necessary. If the moment of unbalance is larger than the maximum allowable moment, it will be necessary to add balance weights.

(9) Find the total number of inch pounds moment necessary to bring the surface into the allowable limits and add three (3) inch pounds moment to determine the amount of corrective moment necessary.

(10) Using the chart as shown in figure 75, determine the size and weight of lead necessary. In calculating the chart, the distance from the center of gravity of the lead to the hinge line was taken as 16 inches, which is the distance the center of gravity of the lead will be from the hinge line if the lead is installed as detailed above.

b. Elevator. - Correct balancing weight of the elevator should be 165 inch pounds tail heavy for each elevator including all tab mechanism, the tab, the tab control cables within the elevator and one-half of the elevator stock, or, 330 inch pounds tail heavy including both elevators, the tabs, the tab control mechanism, and the entire elevator stock. The moments of unbalance are maximum and if exceeded, the surface should be rebalanced as noted in the following paragraphs.

(1) The elevator may be balanced on the airplane if a location can be found where there is a minimum movement of air. The inside of a hangar is the most satisfactory location.

(2) Detach all of the elevator control cables from the elevator stock. It is not necessary to detach the tab control cables as they will have no effect on the balance of the entire surface.

(3) Suspend a cord over the leading edge of one of the elevators. Hold the surface by hand with the center line of the end rib in a horizontal position.

(4) Gradually add weight to the cord until the surface will remain balanced when released with the center line of the end rib in a horizontal position. Note the weight on the cord.

(5) It may be necessary to balance the elevators when they are removed from the airplane. This may be done on the balance stands much in the same manner as the rudder. (See figure 76.) If the elevators are balanced when removed from the airplane, a moment of nine (9) inch pounds should be added to each elevator to allow for the moment of unbalance of the elevator stock.

(6) If the moment of unbalance of this surface is less than 165 inch pounds tail heavy for each elevator or less than 330 inch pounds tail heavy for both elevators, (the allowable limits as referred to in paragraph 1. b., preceding) no corrective measures are necessary. If the moment of unbalance is larger than the maximum allowable moment it will be necessary to add balance weights.

(7) Find the total number of inch pounds moment necessary to bring the surface into the allowable limits and add three (3) inch pounds moment to determine the amount of corrective moment necessary.

(8) Using the charts in figure 77, determine the size and weight of lead necessary and install as shown on figures 76 and 80. In calculating the chart, the distance from the center of gravity of the lead to the hinge line was taken as 10.6 inches which is the distance the center of gravity of the lead will be from the hinge line if the lead is installed as shown in figure 76.

c. Aileron. - Correct balancing weight for the left hand aileron should be 130 inch pounds tail heavy as balanced on the airplane with the surface in normal flight position. The push rod should be disconnected at the aileron end of the rod and pulled forward until it does not interfere with the movement of the aileron. The right hand aileron should be 130 inch pounds tail heavy including tab and tab operating mechanism within the aileron, but not the push rods when the surface is in the normal flight position. The aileron and tab push rods are disconnected at the aileron end of the rods and then pulled forward until they do not interfere with the movement of the aileron. The moment of unbalance as noted above are maximum and if exceeded, the surfaces should be rebalanced as follows:

(1) The aileron must be balanced while suspended from the wing as the surface is too long to be suspended from two hinge stands on the floor without warping.

(a) Disconnect the aileron control rod and aileron tab control rod at the aileron end of the rod. Pull both rods forward until they no longer interfere with the surface.

(b) Attach a guide to the edge of the wing at the inboard end of the aileron cut-out on which the position of the aileron may be noted.

(c) Using a spirit level place the lower surface of the aileron in a horizontal position and mark the point on the guide where the trailing edge falls.

(d) Measure 1-1/2 inches above this point and mark this new location on the guide as the reference point. Hold the trailing edge of the aileron by hand opposite the reference point.

(e) Fasten a cord around one of the aileron hinges and wrap it around the aileron and allow it to hang over the leading edge. Gradually add weight to this cord until the surface will remain balanced with the trailing edge opposite the reference point. Note the weight on the cord.

(f) Measure the horizontal distance in inches from the cord to the center line of the hinge.

(g) Multiply the length as noted above in inches times the weight on the cord in pounds which will give the moment of unbalance of the aileron in inch pounds.

(h) If the moment of unbalance of the left-hand aileron is less than 130 inch pounds tail heavy and the right-hand aileron is less than 130 inch pounds tail heavy (the maximum allowable moments as noted in paragraph 1. c., preceding) no corrective measures are necessary. The moments for the two ailerons are different because the right-hand aileron has a tab on it. This tab is left installed when this surface is balanced which contributes to the tail-heavy condition of the surface.

(i) If the moment of unbalance is larger than the allowable maximum moment it will be necessary to add balance weights.

(j) Find the total number of inch pounds moment necessary to bring the surface into the allowable limits and add three (3) inch pounds moment to determine the amount of corrective moment necessary.

(k) Using the chart in figure 79, determine the size and weight lead necessary. In calculating this chart, the difference in the location of the center of gravity of the various size weights was taken into consideration. They are based on the forward edge of the weights always being 1/4 inch from the leading edge of the aileron.

(l) Install the weight as detailed in figure 78 with the forward edge of the weight within 1/4 inch of the leading edge of the aileron.

d. Example: For the convenience of the operating personnel, the following set of sample calculations for balancing the rudder based on arbitrary figures, set up for example only.

(1) The rudder rests with the center line of the end rib horizontal with an average weight of 15.9 pounds on the cord.

(2) The horizontal distance from the cord to the center line of the rudder axis = 17 inches.

(3) Moment of unbalance = 15.9 pounds x 17 inches = 270 inch pounds tail heavy.

(4) Moment of unbalance over allowable = 270 inch pounds 250 inch pounds = 20 inch pounds.

(5) Corrective moment necessary = 20 inch pounds + 3 inch pounds = 23 inch pounds.

(6) Weight of balance lead necessary = $\frac{23}{16}$ inch pounds = 1.437 pounds of lead. (16 inches being the distance of the center of gravity of the lead from the hinge line of the rudder.)

(7) Using 1/4 inch lead sheet $1.437 \times 9.74 = 13.9$ sq. in. of lead. (9.74 being the number of square inches of 1/4 inch lead sheet per pounds.)

(8) Maximum length of lead for rudder = 5 inch (figure 75) therefore $\frac{13.9}{5}$ inch = 2.78 inch wide lead.

(9) Size of balance lead: 1/4 inch x 5 inch x 2.78 inch. Fasten with two rows of screws as noted in figure 80.

(10) By using the direct reading charts on figure 74 the size of the weight could have been found without the calculations in paragraphs (f) to (i), inclusive.

e. Assembly. Rigging instructions and tensions of control cables are given in the Handbook of Erection and Maintenance Instructions, AN 01-40NC-2 (C-47 Model Airplanes) and AN 01-40NE-2 (C-117A Model Airplane).

SECTION VIREPAIR OF THE WINGS1. Construction.

The wings are a full cantilever design. Both the left and right wings are assembled in two main sections. They consist of the inboard wing, and an outboard wing which incorporates a removable wing tip. The center wing consists of three spars, which is built up of extruded sections of aluminum alloy and webs of alclad sheet. The ribs are formed from alclad sheet and are heat-treated. The skin of the rear section (aft of the rear spar) and the lower skin of the forward section are reinforced by longitudinal extruded aluminum alloy sections. The upper surface of the forward section between spars incorporates a compression structure of corrugated 24SRT alclad sheet, corrugations running laterally. The covering of both upper and lower surfaces are of alclad sheet. The outer wing is similar in construction to the inner wing except that bulb angles and zee sections of aluminum alloy are used on the upper surface in place of the corrugated alclad sheet. (See figure 1 to figure 48.)

2. Negligible Damage.

a. Wing Skin Webs and Wing Ribs. - Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

b. Wing Stringers and Extrusions. - Smooth indentations and scratches that are not over 10 percent of the thickness after being rounded out and carefully inspected for cracks may be neglected.

c. Wing Spar Caps. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

d. Wing Corrugations. - Smooth indentations and scratches that are not through the alclad after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Wing, Refer to:

a. Wing plating (figure 1) or wing structure (figure 2) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

c. It is optional to use a 1-inch radius on the outside corner of all skin doublers. Whenever possible a clevis bolt should be used in the attachment of spar cap to skin. (See figure 24)

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

SECTION VIIREPAIR OF THE FUSELAGE1. Construction.

The fuselage is a semi-monocoque construction consisting essentially of transverse frames made of formed 24ST alclad sheet, longitudinal members of 24ST extruded bulb angles, and some special longitudinal members of 24ST alclad sheet formed as channels. The fuselage covering is 24ST alclad sheet. (See figure 48 to figure 59.)

2. Negligible Damage.a. Fuselage Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half inch diameter or less, where edges show no cracks or abrasions and which

are not within one inch of any other hole or structure and not in the same cross section as the stringer cut-out may be neglected.

b. Fuselage Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Fuselage, Refer to:

a. Fuselage plating (figures 3, 3A and 3B) or fuselage structure (figures 3C and 4) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

c. It is optional to use a 1-inch radius on the outside corner of all skin doublers.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

Also 24SO material must be heat-treated.

SECTION VIIIREPAIR OF THE NACELLE1. Construction.

The engine nacelles are metal monocoque of aluminum alloy and steel. The firewalls are of corrosion resistant steel. Recesses are provided in the nacelles into which the landing gear wheels retract. (See figure 59 to figure 63.)

2. Negligible Damage.a. Nacelle Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half diameter or less, where edges show no cracks or abrasions and which

are not within one inch of any other hole or structure and not in the same cross section as the stringer cut-out may be neglected.

b. Nacelle Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

3. For Repair of Any Section in the Nacelle, Refer to:

a. Nacelle structure and plating (figure 5) for key to repairs.

b. If the repair doesn't appear on these diagrams, refer to the list of illustrations.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

SECTION IX

REPAIR OF THE EMPENNAGE AND CONTROL SURFACES

1. Construction of Empennage.

It is of multicellular construction employing alclad sheet and aluminum alloy extrusions. The skin is 24ST alclad. (See figure 6.)

2. Construction of Control Surfaces.

It is of aluminum alloy frame construction with 24ST alclad sheet protective covering on the leading edge. They are fabric covered. (See figure 63 to figure 70.)

3. Negligible Damage.

a. Skin and Frames.

(1) Smooth dents that have caused no rivets to be sheared or structure distorted and which show no trace of cracks or abrasions may be considered negligible; however, care must be taken during inspection to insure that they are not stress wrinkles caused by the failure of the structure.

(2) Isolated holes in frames of one-half inch diameter or less, where edges show no cracks or abrasions and which are not within one inch of any other hole or structure and not in the same cross section as the stringer cut-out may be neglected.

b. Stringers and Extrusions. - Smooth indentations and scratches that are not over 1/16 inch in depth after being rounded out and carefully inspected for cracks may be neglected.

4. For Repair of Any Section in the Empennage or Control Surfaces, Refer to:

a. Empennage structure and plating. (See figure 6 for key to repairs.)

b. If the repair doesn't appear on these diagrams refer to the list of illustrations.

NOTE: If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

SECTION XCONSTRUCTION OF LANDING GEAR1. Construction of Landing Gear.

The main landing gear consists of two independent units - one mounted under each nacelle. The two units are so arranged so that they fold into the nacelles, leaving only the bottom of the wheels projecting. Each wheel is mounted between two oleo pneumatic shock absorber struts which are solidly clamped to the axle and which are connected together at their upper ends by rigid trusses. Attached to the axle at each side of the wheel is a triangular link, the upper corner is attached to a rod hinged to the oleo at the lower point of the cross bracing. The aft corner of the triangular link is attached to a yoke type brace strut which runs aft and upward, hinging between the center and rear wing spars. The upper end of the shock absorber and wheel assembly is hinged to a movable truss rotative about its upper fittings which are attached to the front wing spar. The retracting mechanism is hydraulically operated. The hydraulic retracting strut is attached to the movable truss in such a manner that when the strut is retracted it will rotate the truss forward and up into the nacelle. A mechanical lock is installed to lock the landing gear in a down position. (See figure 61.)

2. Construction of Tail Wheel.

The tail wheel is mounted in a fork (aluminum alloy casting) which connected to a spindle shaft made of heat-

treated chrome molybdenum steel tubing. The spindle shaft is attached to the fuselage structure through two ball bearing fittings. An oleo pneumatic shock absorber is provided for the tail wheel. The tail wheel can swivel 360 degrees. A lock is provided to lock the wheel in the trailing position. The lock is operated from the pilot's compartment. The tail wheel is not retractable.

3. General Repair.

No repairs are allowed on any part of the main landing gear or tail wheel. Replacement of parts must be made, and a complete list of parts are given in AN 01-40NC-2 (C-47 Model Airplanes) and AN 01-40NE-2 (C-117A Model Airplane); however, small dents and cracks not over 1/32 inch in depth occurring in the web of the upper truss (figure 61) may be oxyacetylene or arc welded. For repair of the tubes in the upper truss see figure 60.

4. Rebushing.

It will be necessary to completely rebush the landing gear due to hard landings and wear caused by operation.

NOTE: If steel is used for repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

SECTION XI

REPAIR OF THE ENGINE MOUNT

Construction.

The engine mount is detachably mounted to the front face of the nacelles (at the firewalls). Rubber bushings are provided at the attachment points of the engines to the mounts. (See figure 62.)

2. Negligible Damage.

Small dents, not over 1/32 inch in depth, having smooth edges, showing no cracks or abrasions.

3. Repair to Damage.

Small cracks not over 1/32 inch in depth occurring in the web of the engine mount ring (figure 62) may be oxyacetylene or arc welded. For repair to the tubes refer to figure 59.

4. Check of Alignment.

All repairs to the engine mount should be governed by accurate means of alignment taken from the measurement of good structure or engineering drawings.

5. Pressure Testing of Repaired Engine Mounts Tubes.

a. Upon completion of repair, the structure should be pressure tested as follows:

- (1) Weld all oil holes.
- (2) Redrill one oil hole in the tube to be used for an air inlet while testing.
- (3) Apply forty pounds per square inch air pressure, using oil hole drilled in tube for air outlet.
- (4) Submerge tube in a tank of water and mark any leaks.
- (5) If the leaks are apparent repair as shown in figures 59 and 60 and then repeat procedure.

CAUTION If an engine mount tube shows severe leakage, it is usually better to replace the tube.

NOTE If steel is used for a repair, it should be cadmium plated before using.

All 24SO material must be heat-treated.

6. Final Inspection and Tests.

Engine mounts will be magnafluxed and Rockwell hardness tests will be performed after repairs, prior to return to serviceable stock.

SECTION XII

MISCELLANEOUS REPAIRS

1. Windows.

Window panels should be replaced if damaged. The part numbers are given on figures 49 and 49A.

2. Cables.

Replace any 7 x 19 cable that shows more than six wires broken in any 1-inch length or any 7 x 7 cable that shows more than three wires broken in any 1-inch length. Watch particularly for breakages occurring in that length of a cable normally passing over a pulley or through a fairlead.

3. Fittings, Bolts, and Fairleads.

All fittings, bolts, screws, and fairleads should be replaced if damaged.

4. Systems Operating Units.

Any damage to the operating units of all systems requires repair according to the manufacturer's recommendations, or a replacement. A complete list of parts for the units is given in their respective sections in AN 01-40NC-2 (Model C-47 Airplanes) and AN 01-40NE-2 (Model C-117A Airplanes).

5. Hydraulic System.

a. Lines. - In cases of slight scratches in lines, they may be removed with a burnishing tool or a fine grade of emery cloth and oil. After burnishing, finish with smooth cloth and oil to leave a clear, smooth surface. Oil lines should be annealed.

b. Operating Units. - All packing in the operating valves and actuating struts should be replaced in accordance with information given in AN 01-40NC-2 (C-47 Model Airplanes) and AN 01-40NE-2 (C-117A Model Airplane) if parts are worn appreciably.

6. Firewalls, Fairings, Engine Cowling, and Fillets.

All nonstressed sheets may be repaired according to figure 14.

7. Elongated Holes.

All elongated holes may be repaired according to figures 14 and 15.

All 24SO material must be heat-treated.

SECTION XIIIREPAIR OF THE FUEL AND OIL TANKS AND LINES1. Construction.

a. The metallic fuel tanks are constructed of 3S one-half hard aluminum alloy sheet, welded together to form the shell. The oil tanks are of the same construction and strengthened with internal baffles.

b. Refer to figure 11C for typical construction of the non-metallic fuel tanks.

2. Repair of Tanks.

a. Metallic Tanks. - Repair metallic tanks in accordance with figures 11A and 11B.

b. Non-Metallic Tanks. (See figure 11C.)

(1) Expose the fibre layer by removing the outer fabric layer a distance of three inches from all sides of the damaged areas.

(2) With a knife, scrape all the old cement from the exposed fibre, buff this surface with a medium weight sand or emery paper, then fill the hole or tear with zinc chromate paste.

(3) To repair a damaged area four inches long, cut a patch, from 1/16 inch vulcanized fibre sheet, that will extend a distance two inches from all sides of the damaged area. Cut a piece proportionately larger for damaged areas longer than four inches.

(4) Buff the under surface of the patch, soak the patch in water, then bend it to any desired curve.

(5) Apply a heavy coating of plywood glue to both of the buffed surfaces (on the tank and on the patch).

(6) Place the patch over the damaged area, then apply pressure evenly by the use of a padded wood block held down with a heavy weight or by means of a wire or rope wound around the tank and over the block several times.

(7) Allow the repair to dry for 12 hours (four hours if a hot air blower is used).

(8) When the fibre patch has dried, cut a patch from 14 ounce fabric that will extend two inches from all sides of the area from which the fabric layer was removed (i.e., (1), above).

(9) Treat the fabric patch and adjacent tank inner surface area with a coating of cellulose acetate dope, then apply the patch.

(10) Apply four coats of dope over the patch, allowing 15 minutes drying time between each application of dope.

(11) After the fourth application of dope has dried for one hour, treat the inside surface damaged area with a sloshing compound (preferably Fuller's No. T.L. 284).

(12) Temporary repairs may sometimes be accomplished by the use of a wooden plug or cork, coated with zinc chromate paste, held in place with narrow strips of 14 ounce fabric, and cemented with dope.

3. Repair of Lines.

Deep scratches or deformed lines necessitate replacement. Light scratches may be removed by the use of a burnishing tool or a fine grade of emery cloth with oil. Before installing new 1/4 inch diameter lines attach the fittings, then test them under water by subjecting them to 80-100 pounds per square inch air pressure.

4. Reinstallation of Lines. (See figure 12.)

When binding two or more lines together between supports, during line installation, adhere to the following procedure:

a. First Operation.

(1) Tie Koroseal strip temporarily to or near an outside line, leaving about six inches free.

NOTE: Use number 12100 Koroseal Strip 3/32 x 5 - 3/32 B. F. Goodrich Rubber Company.

(2) Make three turns, under tension, around all of the lines being tied, bringing the third turn between the two lines farthest from the start.

(3) For tying two lines only, proceed with the final operation.

b. Second Operation. - Use the free end (i.e., a., (1), above) to bind, under tension, the lacings between the lines.

c. Final Operation.

(1) Loosen the temporary tie, tie the two ends in a square knot, then trim the ends to 1/2 inch lengths.

(2) Use no finish on completed ties.

NOTE: Make a sufficient number of binding turns between lines to assure proper spacing. Application for Koroseal strips is limited to temperature under 65.6 degrees C (150 degrees F).

All 24SO material must be heat-treated.

TABLE NO. 2DESIGN PROPERTIES
(*Values in 1000 p.s.i.)

<u>NON-FERROUS METALS</u>	<u>% Elong.</u>	<u>Des. Tens*</u>	<u>Ult. Tens*</u>	<u>Y. P. Tens*</u>	<u>Bear- ing*</u>	<u>Shear*</u>	<u>Block Comp*</u>	<u>"E" (Million)</u>
24SO - Sheet (H.T. After Form)		54	60	36	85	28	60	10.3
24SO - Tube (H.T. After Form)		60	62	40	90	37	62	10.3
24ST - Bar, to 4 Inch, Long Grain	14	60	62	40	90	37	62	10.3
24ST - Bar, 1.501 to 4 Inch Cross Gr.		55	55	38	82.5	33	55	10.3
24ST - Extruded Shapes	14	58	58	42	83	34	57	10.3
24ST - Sheet and Plate, to 1 Inch Cross Gr.	11	60	62	40	90	37	62	10.3
24ST - Sheet and Plate 1.001- 1.50 Cross Gr.		60	60	40	90	36	60	10.3
24ST - Sheet and Pit. 1.501- 2.00 Cross Gr.		58	58	40	87	35	58	10.3
24ST - Sheet and Pit. 2.001 3.00 Cross Gr.		56	56	40	84	33.5	56	10.3
24ST - Tube (Stretched)		62	62	42	90	37	62	10.3
24STAL - Sheet, Alclad	11	55.5	56	37	82	34	56	10
24STAL - Sheet, Alclad (H.T. After Form)		46.5	54	31	75	25	54	10
24SRT - Sheet	10	65	65	50	93	39	65	10.3
24SRTAL - Sheet, Alclad	8	62	62	46	83	35	58	10

TABLE NO. 3ALLOWABLE SHEAR STRENGTH OF ALUMINUMALLOY RIVETS (LBS.)

Dia. of Rivet or Pin (In.)	1/16	3/32	1/8	5/32	3/16	1/4	5/16	3/8
A17ST Ad(F _{SU} 25,000PSI)	83	186	331	518	745	1325	2071	2984
17ST D(F _{SU} 30,000 PSI)	92	206	368	573	828	1472	2300	3313
24ST DD(F _{SU} 35,000 PSI)	107	241	429	670	966	1718	2684	3865

ALLOWABLE BEARING STRENGTH OF24ST ALCLAD ALUMINUM ALLOY SHEET (LBS.)(F_{BR} 82,000 PSI)

Dia. of Rivet or Pin (In.)	1/16	3/32	1/8	5/32	3/16	1/4	5/16	3/8
.014	71	107	143					
.016	82	123	164					
.018	92	138	184					
.020	102	153	205	256	307			
.022	113	169	225	282	338			
.025	128	192	256	320	384			
.028	143	215	287	358	430			
.032	164	245	328	409	492	656	820	984
.036	184	276	389	461	553	738	922	1107
.040	205	307	410	512	615	820	1025	1230
.045	230	345	461	576	691	922	1153	1383
.051		391	522	653	784	1045	1306	1568
.064		491	656	819	984	1312	1640	1968
.072			738	922	1107	1476	1845	2214
.081			830	1037	1245	1660	2075	2490
.091			932	1165	1399	1865	2331	2798
.102				1306	1568	2091	2613	3136
.114				1460	1753	2337	2921	3505
.128				1639	1968	2624	3280	3936
5/32					2401	3202	4002	4803
3/16					2882	3843	4804	5765

TABLE NO. 4
MINIMUM BEND RADII FOR
FORMING OF SHEET

<u>ALUMINUM ALLOY</u>				<u>CORROSION-RESISTANT STEEL</u>			
2SO 3SO	24SO 2S 1/2 H 3S 1/2 H	24ST	24SRT	GAGE	ANNEALED STAB. and UNSTAB.	1/4 HARD UNSTAB.	HARD UNSTAB.
				.005	1/32	1/32	1/16
				.010	1/32	1/32	3/32
				.015	1/32	1/32	3/32
				.016			
1/32	1/32	3/32	3/32	.018	1/32	1/32	1/8
				.020			
1/32	1/32	3/32	3/32	.022	1/32	1/32	5/32
1/32	1/32	3/32	3/32	.025	1/32	1/16	5/32
1/32	1/32	1/8	1/8	.028	1/32	1/16	5/32
				.029			
1/32	1/32	1/8	1/8	.032			
1/32	1/32	1/8	1/8	.034	1/32	1/16	5/32
				.036			
1/32	1/32	5/32	5/32	.038	1/32	1/16	3/16
				.040			
1/16	1/16	5/32	5/32	.044	1/32	1/16	3/16
				.045			
1/16	1/16	3/16	3/16	.050	1/32	3/32	3/16
				.051			
1/16	1/16	3/16	3/16	.063	1/16	3/32	7/32
				.064			
1/16	3/32	3/16	1/4	.072			
1/16	1/8	7/32	9/32	.078	3/32	1/8	1/4
				.081			
1/32	1/8	5/16	7/16	.091			
3/32	5/32	3/8	15/32	.094	1/8	5/32	5/16
				.109	5/32	3/16	3/8
				.125	3/16	7/32	
				.128			
1/8	7/32	1/2	5/8	.128			
5/32	9/32	21/32	3/4	5/32			
3/16	3/8	27/32	29/32	3/16			

TABLE NO. 5

WRENCH TORQUE ON BOLTS

<u>ITEM</u>	<u>NAME</u>	<u>REF DWG</u>	<u>BOLT</u>	<u>TORQUE (INCH LBS.)</u>
A	Inspection Covers (C/L of Airplane)	5116643 5113541	AN5-11A	110 (+10)
B	Fuel Tank Cover Attach Angles	5110506 5114634 5116315	AN5-11A	110 (+10)
*C	Fuselage Attachment to Center Wing at Spars	5110501	AN6-22, -23, -25	175 (+100, -0)
D	Attach Upper and Lower Sides of Horizontal Stabilizer Together at C/L of Airplane	5115207	AN3-6A	40 (+5)
E	Tail Stud Attach to Main Fuselage	5142179	AN5-7A, -10A, -12A	110 (+10)
**F	Attach Angle - Inner to Outer Wing	5110501	AN4-7A, -10A	100 (+0, -5)
G	Axle Clamp Bolt	Bendix 53926	7/8 Special	2160 (+240)
†H	Engine to Ring Attach at Lord Shock Mounts	5110572	AN8-41, -47	250 (+25, -0)
I	Engine Mount Attach to Fire Wall	1116576 1116575	AN5-35	125 (+15)
	Engine Mount Tube Attach to Engine Ring; Ring Halves Attachment	5110599	S-2076907, -15, -17, -20	400 (+40, -0)

*The excessive amount of plus tolerance on item "C" enables the cotter key to be installed in the fuselage pad stud bolt to safety the castellated nut and still stay within the torque tolerance.

**The specified torque for item "F" should be applied regardless of type of finish of nuts or bolts. Stenciled instructions to the contrary on upper wing surface of some airplanes should be disregarded.

†The torque value of item "H" will have to be checked by lifting the weight of the engine from the engine mount bolts.

NOTE

Bolts should be absolutely clean of all grease and oil before they are torqued or tightened, as a bolt may be caused to yield at a very low torque if it is lubricated in any fashion.

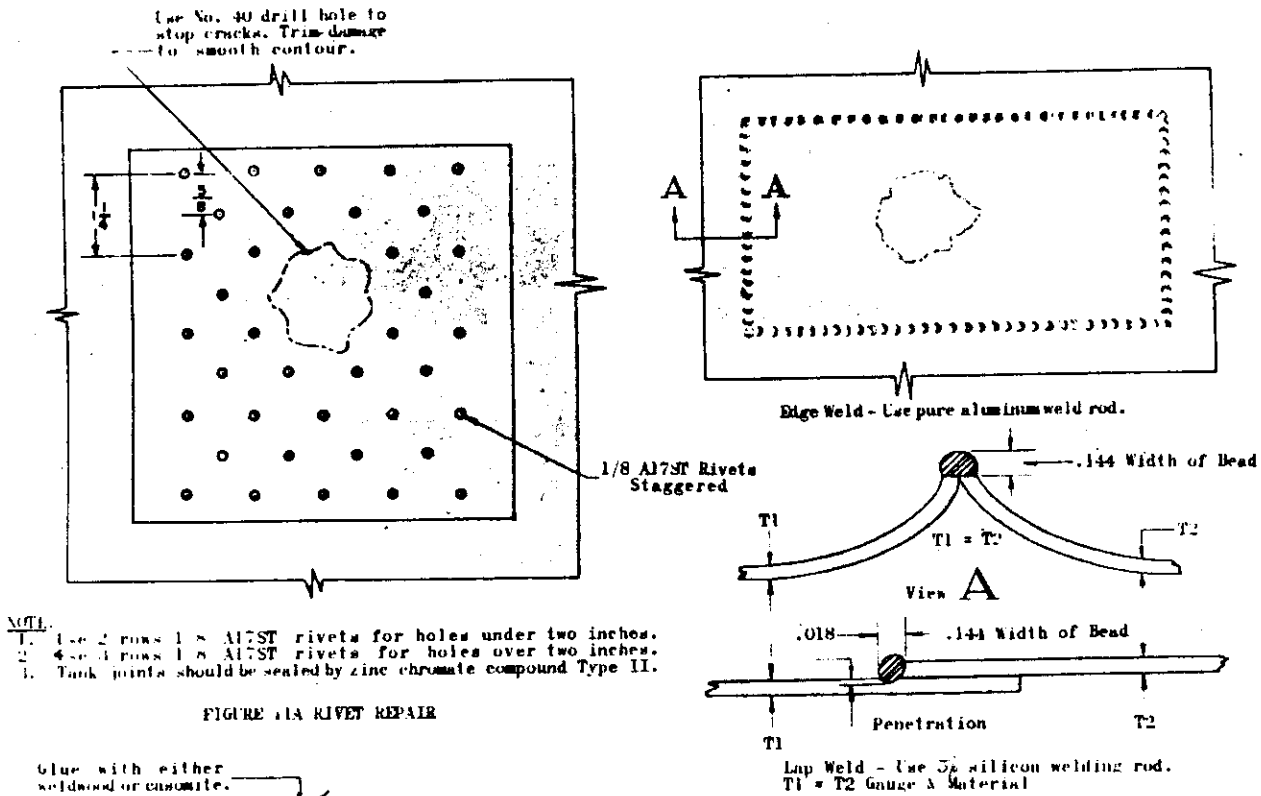


FIGURE 11A RIVET REPAIR

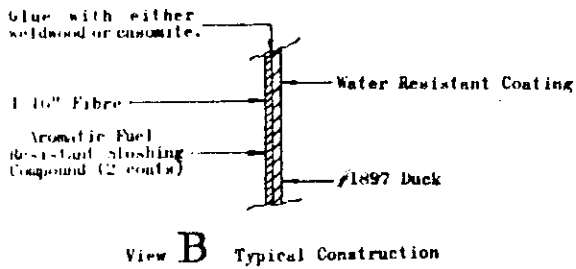


FIGURE 11B GAS WELD REPAIR

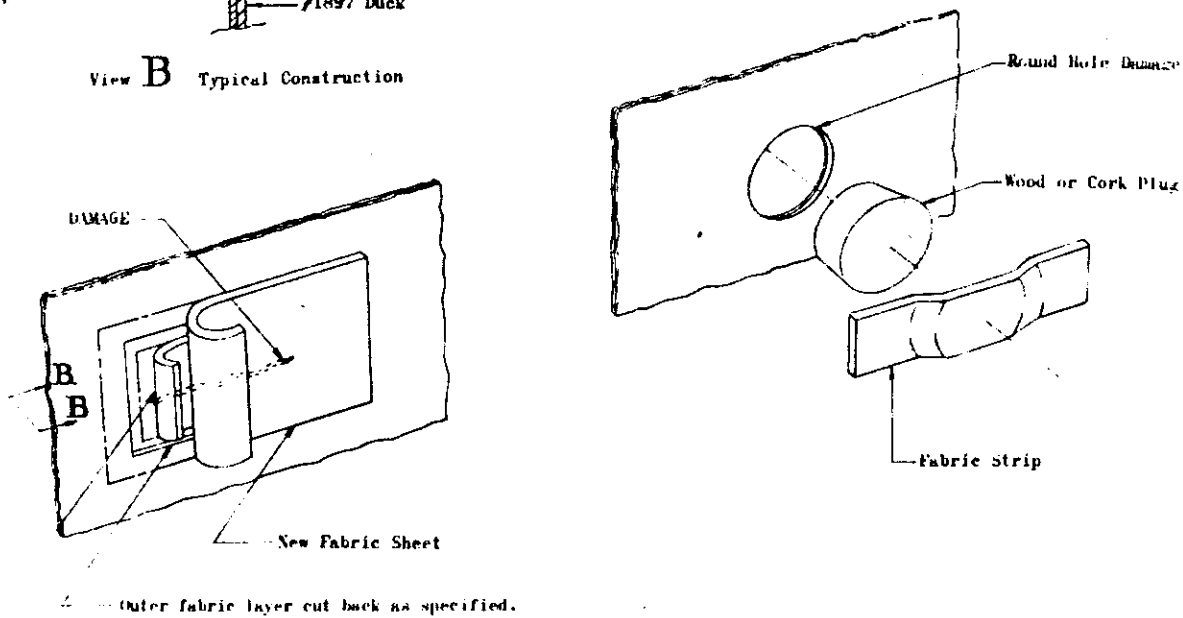


FIG. 11C REPAIR OF NON-METALLIC TANKS

Figure 11 - Fuel and Oil Tank Repair

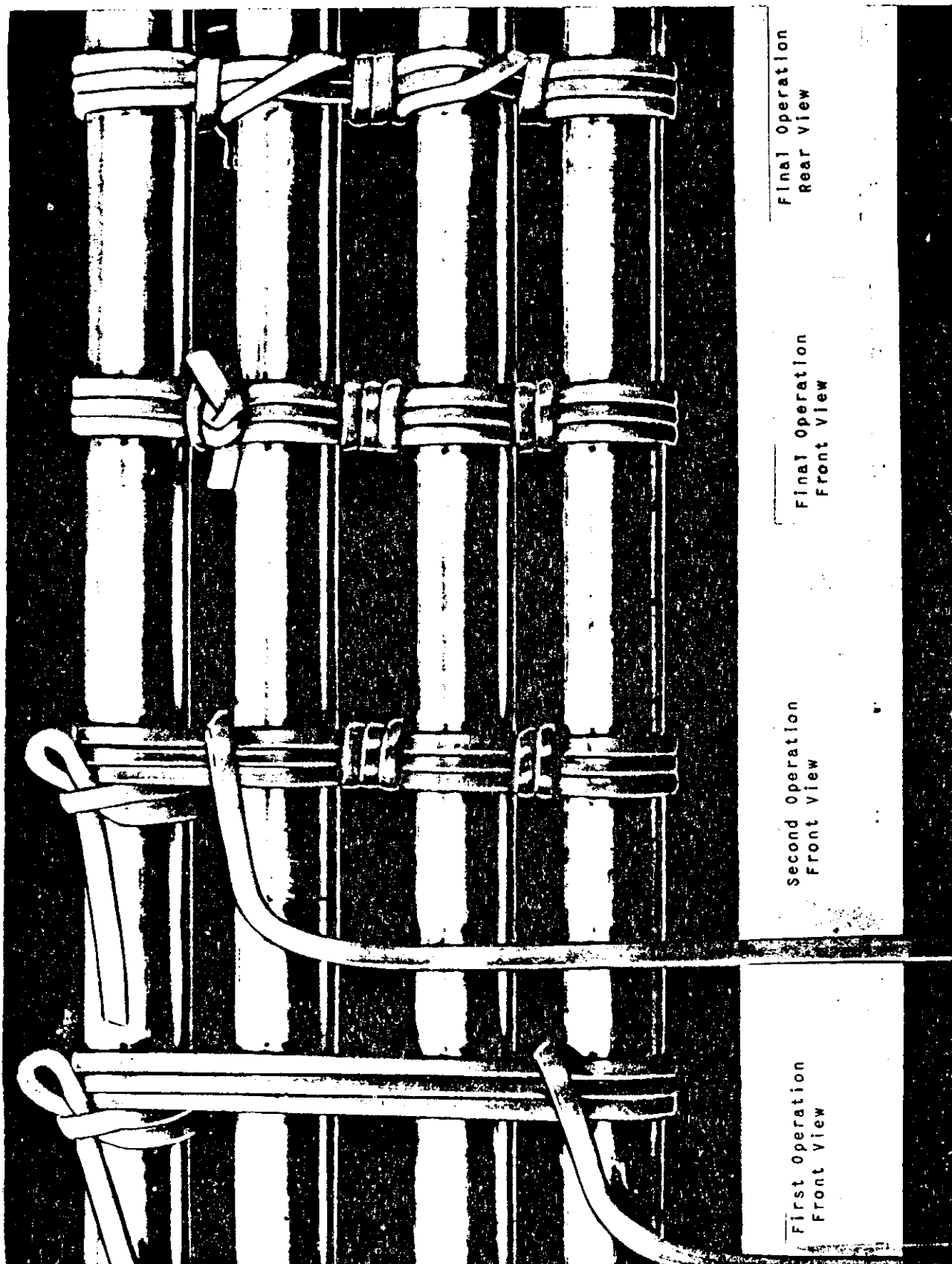


Figure 12-Procedure for Tying Lines

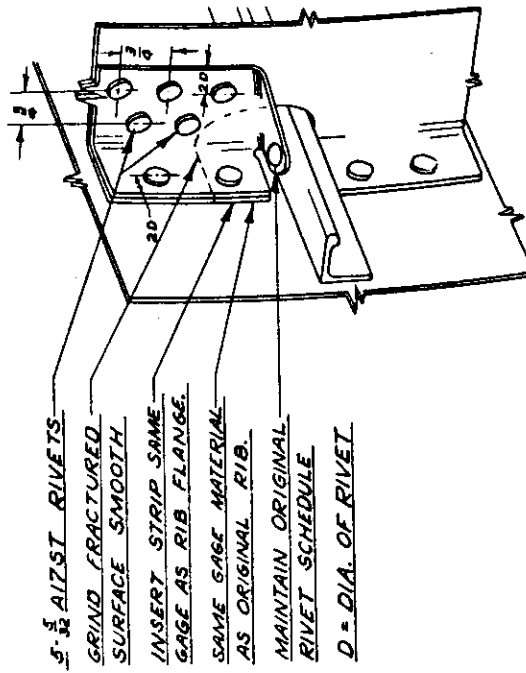
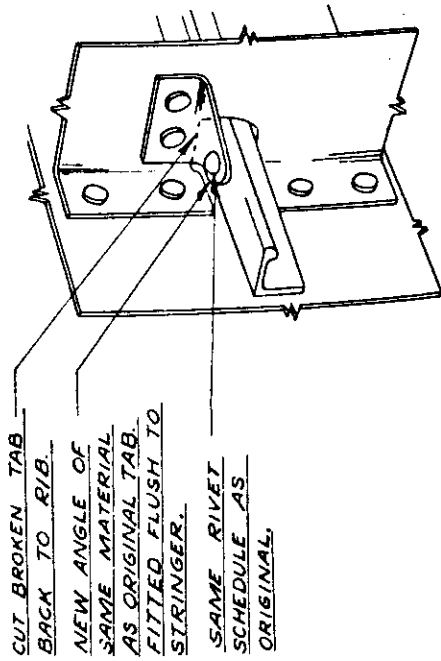


FIG 13C
REPAIRS FOR STRINGER TAB

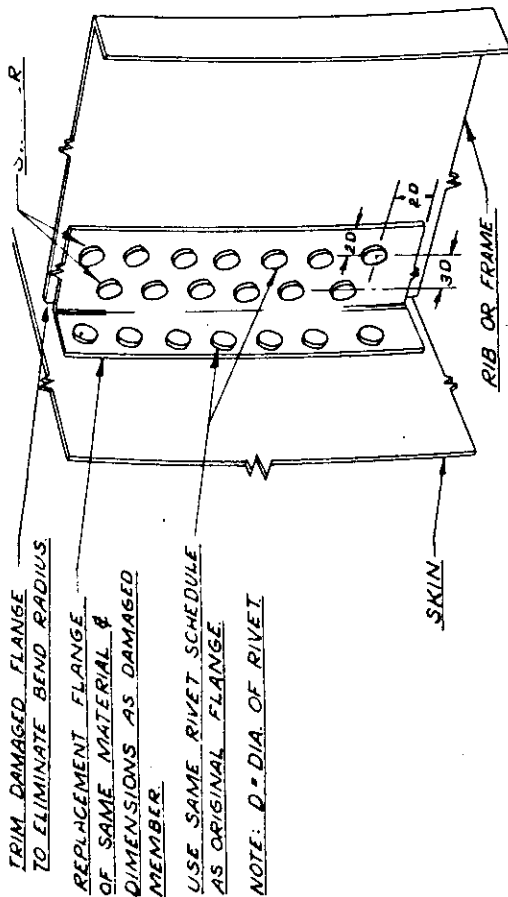


FIG 13A
REPLACEMENT OF DAMAGED FLANGE

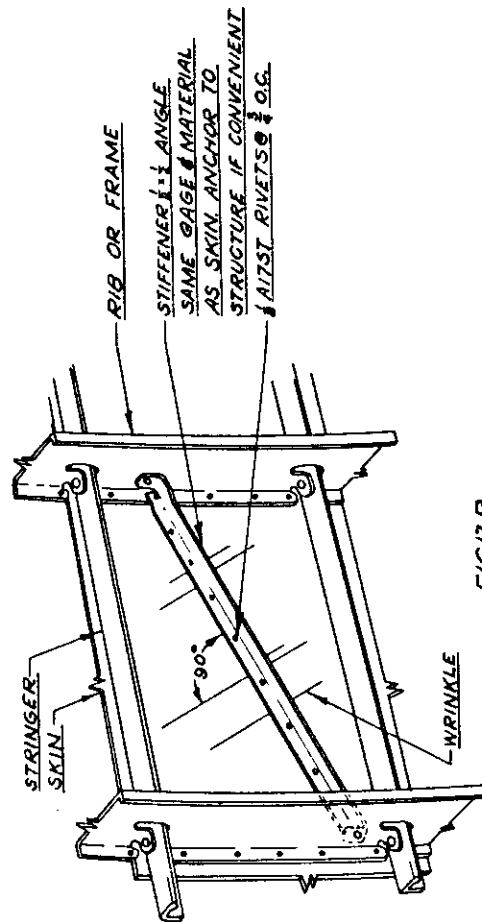
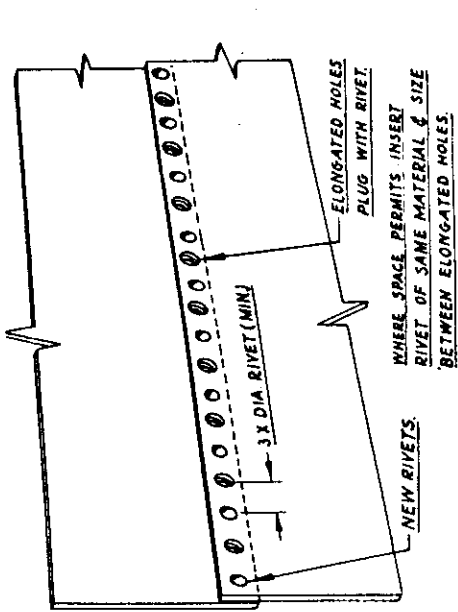


FIG 13B
REPAIR OF SKIN WRINKLES OR OIL CANS

Figure 13-Miscellaneous Repairs - Flanges, Skin Wrinkles and Stringer Tabs



RIVET SCHEDULE BELOW.
ORIGINAL SHEET.
PATCH SAME GAGE & MATERIAL AS ORIGINAL SHEET.

24 ST ALCLAD	GAGE INCH	RIVET SCHEDULE
020	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
035	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
032	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
040	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
051	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
064	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.
072	2 ROWS	$\frac{1}{8}$ A173T @ 1 O.C.

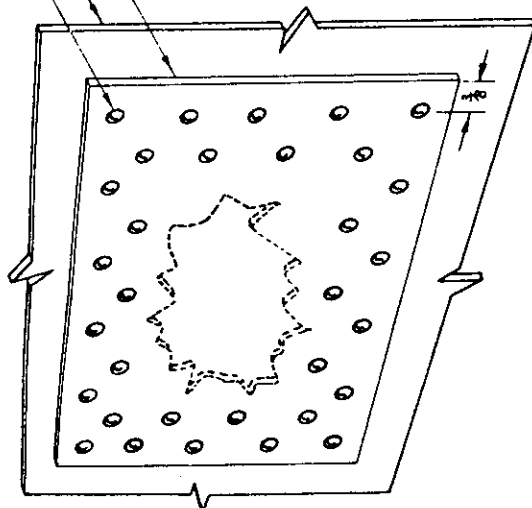
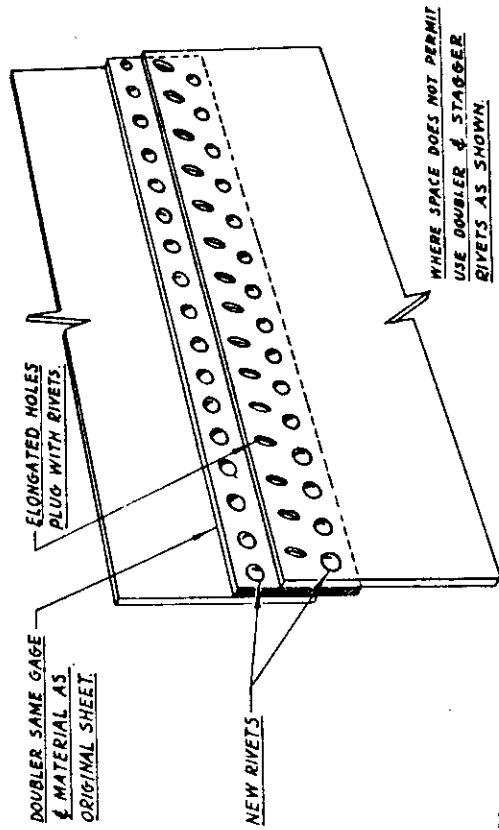


FIG 14A REPAIR OF DAMAGED SHEET



DOUBLER SAME GAGE & MATERIAL AS ORIGINAL SHEET.

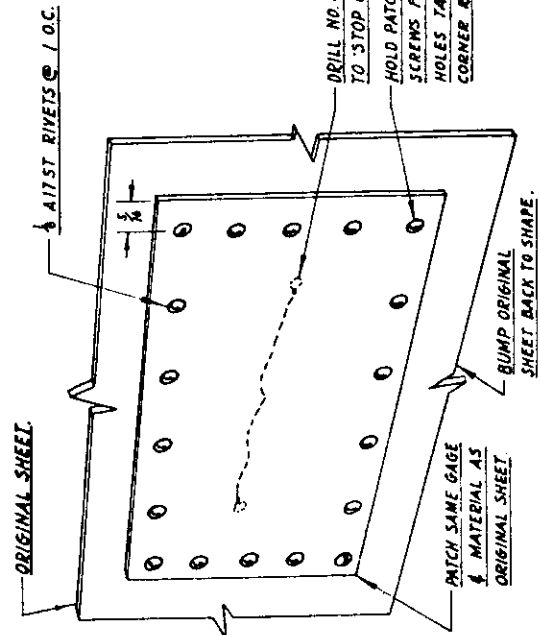


FIG 14B REPAIR OF CRACK IN SHEET

FIG 14C REINFORCEMENT FOR RIVET HOLE ELONG

Figure 14-Miscellaneous Repair of Sheet and Elongation Holes

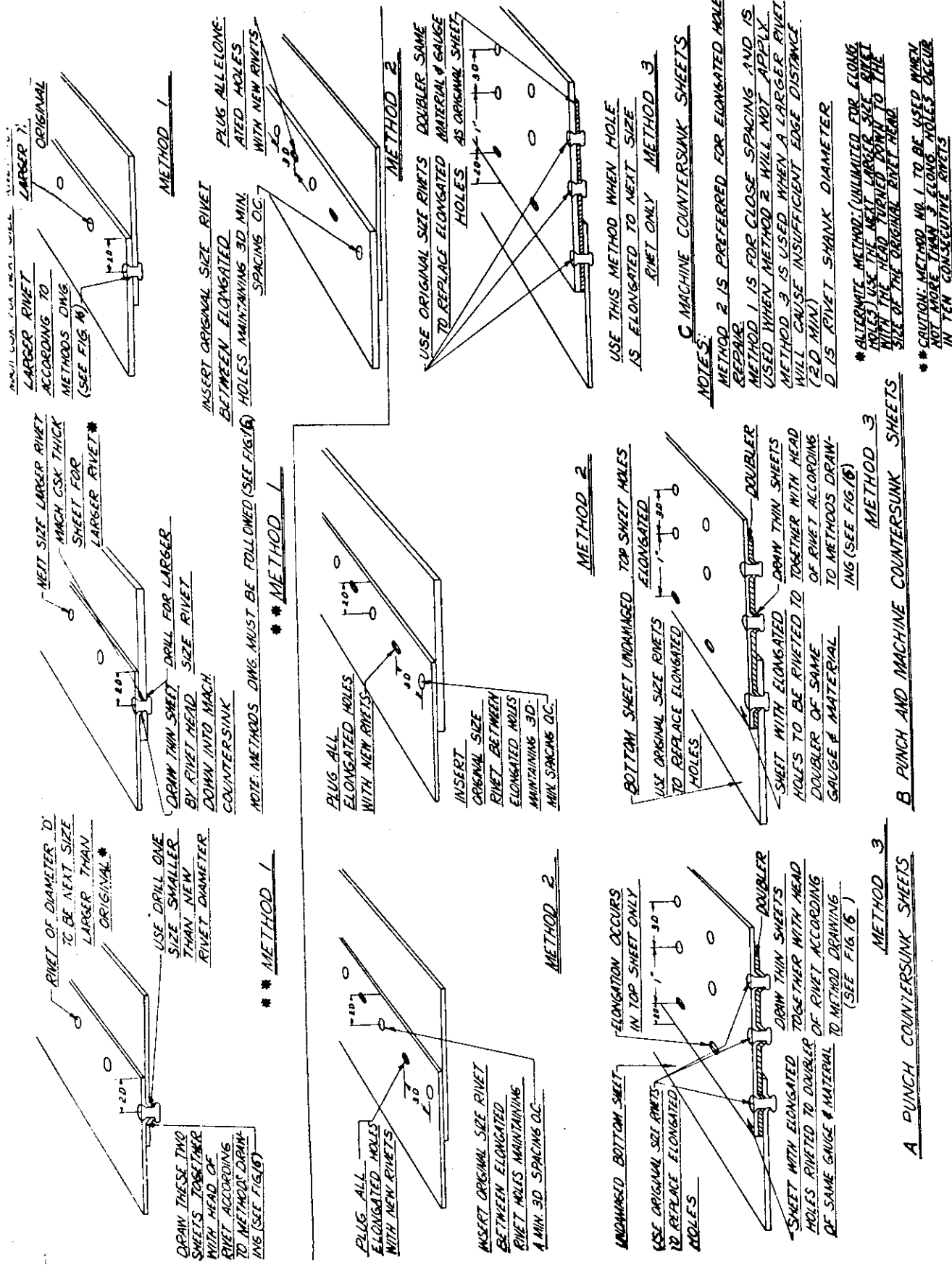
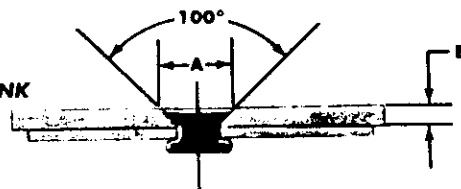


Figure 15-Repair Methods for Elongated Rivet Holes

METHOD 1 — MACHINE C'SINK

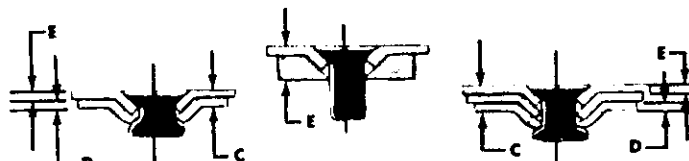


Use this method where "B" thickness is great enough to conform with figures given in table.

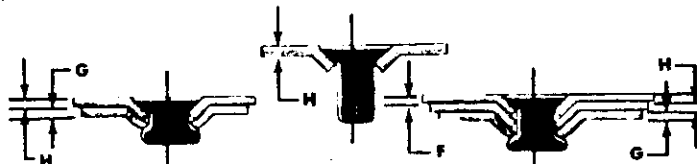
RIVET SIZE	A	B MIN.	DRILL NO.	DRILL SIZE
1/16		.032	51	.067
3/32	.191	.040	40	.098
1/8	.238	.051	30	.128
5/32	.302	.064	20	.161
3/16	.368	.072	11	.191
1/4	.493	.091	F	.257
5/16		.128	O	.316
3/8		.144	W	.386

Use "Method 2" when "C" thickness is below "B" thickness specified in "Method 1". Form C'Sink by using rivet head as a form punch.

RIVET SIZE	C MAX.	D MIN. MAX.	E MAX.	DRILL NO.	DRILL SIZE
1/16	.065	.032	.032	51	.067
3/32	.073	.025-.036	.036	40	.098
1/8	.093	.032-.051	.051	30	.128
5/32	.101	.040-.064	.064	20	.161



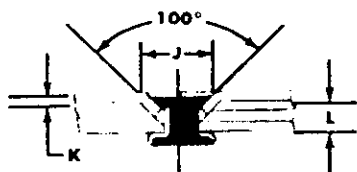
METHODS 2 & 3 — FORM C'SINK



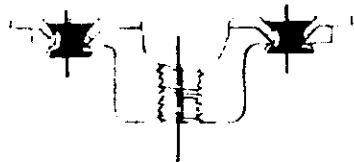
Use "Method 3" whenever skin thicknesses exceed those specified in "Method 2". Form C'Sink by punch and die.

RIVET SIZE	F MAX.	G MIN. MAX.	H MIN. MAX.	DRILL NO.	DRILL SIZE
1/16		.032		51	.067
3/32	.064	.020-.064	.020-.064	40	.098
1/8	.081	.025-.081	.020-.081	30	.128
5/32	.081	.032-.081	.020-.081	20	.161
3/16	.081	.040-.081	.020-.081	11	.191
1/4	.093	.051-.093	.020-.093	F	.257
5/16				O	.316
3/8				W	.386

Use this method where "L" thickness is below "B" thickness as in "Method 1" and "L" thickness is great enough to conform to figures in table.



METHOD 4 — COMBINATION FORM C'SINK AND MACHINE C'SINK



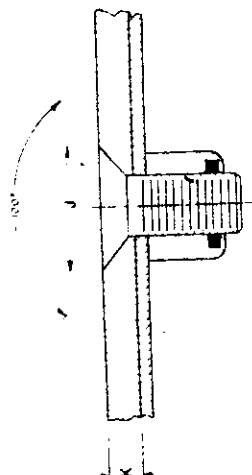
Use 3/32 rivets for anchor nuts. Form C'Sink skin to .032; machine C'Sink skin .042 and over.

RIVET SIZE	DRILL NO. & SIZE	C'SINK DIAMETERS FOR VARIOUS "K" THICKNESSES							
		.020 & .025		.032 & .040		.051 & .064		.072 & .081	
		C'SINK DIA. J	L MIN.	C'SINK DIA. J	L MIN.	C'SINK DIA. J	L MIN.	C'SINK DIA. J	L MIN.
1/16	51-.067								
3/32	40-.098	.200	.051	.204	.051	.208	.051	.208	.051
1/8	30-.128	.250	.064	.258	.064	.265	.064	.265	.064
5/32	20-.161	.291	.093	.312	.093	.312	.093	.312	.093
3/16	11-.191	.382	.125	.386	.125	.390	.125	.390	.125
1/4	F-.257	.500	.187	.512	.187	.525	.187	.525	.187
5/16	O-.316								
3/8	W-.386								

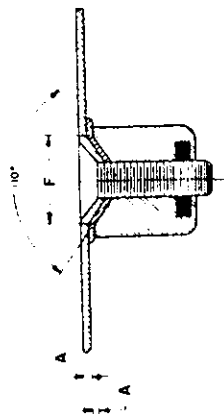
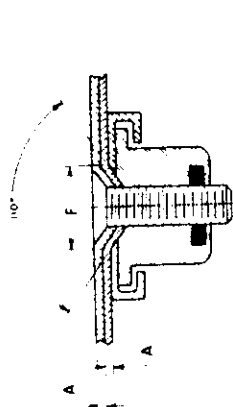
NOTE: "L" minimum may consist of one solid part, or may be divided into several different thicknesses. "K" may consist of one thickness or more, provided any individual thickness does not exceed the maximum figures specified in table.

Refer to this drawing to obtain the correct method for the installation of 100° rivets

Figure 16—Methods Drawing for Rivets

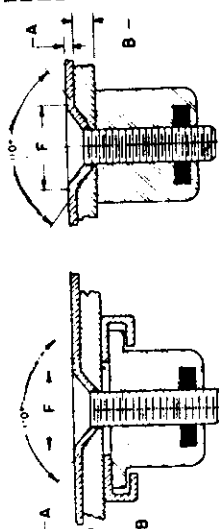
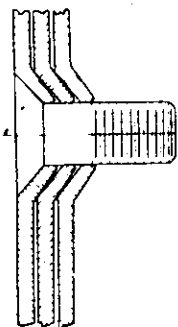
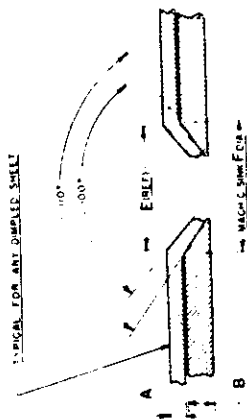
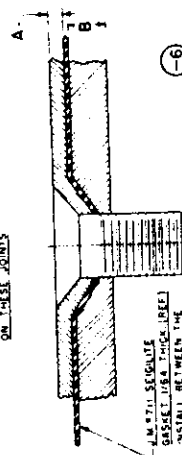
[illegible]

SIZE	MIN	K	ORILL	NOTES
FOR NON-STRESSED JOINTS ONLY				
4-40	225	331	131	
6-32	273	384	28	400
8-32	325	472	81	561
10-32	385	590	100	630
12-30	450	710	120	700
14-24	515	840	140	790
16-22	580	970	160	890
18-20	645	1100	180	990
20-18	710	1230	200	1090
22-16	775	1360	220	1190
24-14	840	1490	240	1290
26-12	905	1620	260	1390
28-10	970	1750	280	1490
30-8	1035	1880	300	1590
32-6	1100	2010	320	1690
34-5	1165	2140	340	1790
36-4	1230	2270	360	1890
38-3	1295	2400	380	1990
40-2	1360	2530	400	2090
42-1	1425	2660	420	2190
44-0	1490	2790	440	2290
46-0	1555	2920	460	2390
48-0	1620	3050	480	2490
50-0	1685	3180	500	2590
52-0	1750	3310	520	2690
54-0	1815	3440	540	2790
56-0	1880	3570	560	2890
58-0	1945	3700	580	2990
60-0	2010	3830	600	3090
62-0	2075	3960	620	3190
64-0	2140	4090	640	3290
66-0	2205	4220	660	3390
68-0	2270	4350	680	3490
70-0	2335	4480	700	3590
72-0	2400	4610	720	3690
74-0	2465	4740	740	3790
76-0	2530	4870	760	3890
78-0	2595	5000	780	3990
80-0	2660	5130	800	4090
82-0	2725	5260	820	4190
84-0	2790	5390	840	4290
86-0	2855	5520	860	4390
88-0	2920	5650	880	4490
90-0	2985	5780	900	4590
92-0	3050	5910	920	4690
94-0	3115	6040	940	4790
96-0	3180	6170	960	4890
98-0	3245	6300	980	4990
100-0	3310	6430	1000	5090
102-0	3375	6560	1020	5190
104-0	3440	6690	1040	5290
106-0	3505	6820	1060	5390
108-0	3570	6950	1080	5490
110-0	3635	7080	1100	5590
112-0	3700	7210	1120	5690
114-0	3765	7340	1140	5790
116-0	3830	7470	1160	5890
118-0	3895	7600	1180	5990
120-0	3960	7730	1200	6090
122-0	4025	7860	1220	6190
124-0	4090	7990	1240	6290
126-0	4155	8120	1260	6390
128-0	4220	8250	1280	6490
130-0	4285	8380	1300	6590
132-0	4350	8510	1320	6690
134-0	4415	8640	1340	6790
136-0	4480	8770	1360	6890
138-0	4545	8900	1380	6990
140-0	4610	9030	1400	7090
142-0	4675	9160	1420	7190
144-0	4740	9290	1440	7290
146-0	4805	9420	1460	7390
148-0	4870	9550	1480	7490
150-0	4935	9680	1500	7590
152-0	5000	9810	1520	7690
154-0	5065	9940	1540	7790
156-0	5130	10070	1560	7890
158-0	5195	10200	1580	7990
160-0	5260	10330	1600	8090
162-0	5325	10460	1620	8190
164-0	5390	10590	1640	8290
166-0	5455	10720	1660	8390
168-0	5520	10850	1680	8490
170-0	5585	10980	1700	8590
172-0	5650	11110	1720	8690
174-0	5715	11240	1740	8790
176-0	5780	11370	1760	8890
178-0	5845	11500	1780	8990
180-0	5910	11630	1800	9090
182-0	5975	11760	1820	9190
184-0	6040	11890	1840	9290
186-0	6105	12020	1860	9390
188-0	6170	12150	1880	9490
190-0	6235	12280	1900	9590
192-0	6300	12410	1920	9690
194-0	6365	12540	1940	9790
196-0	6430	12670	1960	9890
198-0	6495	12800	1980	9990
200-0	6560	12930	2000	10090
202-0	6625	13060	2020	10190
204-0	6690	13190	2040	10290
206-0	6755	13320	2060	10390
208-0	6820	13450	2080	10490
210-0	6885	13580	2100	10590
212-0	6950	13710	2120	10690
214-0	7015	13840	2140	10790
216-0	7080	13970	2160	10890
218-0	7145	14100	2180	10990
220-0	7210	14230	2200	11090
222-0	7275	14360	2220	11190
224-0	7340	14490	2240	11290
226-0	7405	14620	2260	11390
228-0	7470	14750	2280	11490
230-0	7535	14880	2300	11590
232-0	7600	15010	2320	11690
234-0	7665	15140	2340	11790
236-0	7730	15270	2360	11890
238-0	7795	15400	2380	11990
240-0	7860	15530	2400	12090
242-0	7925	15660	2420	12190
244-0	7990	15790	2440	12290
246-0	8055	15920	2460	12390
248-0	8120	16050	2480	12490
250-0	8185	16180	2500	12590
252-0	8250	16310	2520	12690
254-0	8315	16440	2540	12790
256-0	8380	16570	2560	12890
258-0	8445	16700	2580	12990
260-0	8510	16830	2600	13090
262-0	8575	16960	2620	13190
264-0	8640	17090	2640	13290
266-0	8705	17220	2660	13390
268-0	8770	17350	2680	13490
270-0	8835	17480	2700	13590
272-0	8900	17610	2720	13690
274-0	8965	17740	2740	13790
276-0	9030	17870	2760	13890
278-0	9095	18000	2780	13990
280-0	9160	18130	2800	14090
282-0	9225	18260	2820	14190
284-0	9290	18390	2840	14290
286-0	9355	18520	2860	14390
288-0	9420	18650	2880	14490
290-0	9485	18780	2900	14590
292-0	9550	18910	2920	14690
294-0	9615	19040	2940	14790
296-0	9680	19170	2960	14890
298-0	9745	19300	2980	14990
300-0	9810	19430	3000	15090
302-0	9875	19560	3020	15190
304-0	9940	19690	3040	15290
306-0	10005	19820	3060	15390
308-0	10070	19950	3080	15490
310-0	10135	20080	3100	15590
312-0	10200	20210	3120	15690
314-0	10265	20340	3140	15790
316-0	10330	20470	3160	15890
318-0	10395	20600	3180	15990
320-0	10460	20730	3200	16090
322-0	10525	20860	3220	16190
324-0	10590	20990	3240	16290
326-0	10655	21120	3260	16390
328-0	10720	21250	3280	16490
330-0	10785	21380	3300	16590
332-0	10850	21510	3320	16690
334-0	10915	21640	3340	16790
336-0	10980	21770	3360	16890
338-0	11045	21900	3380	16990
340-0	11110	22030	3400	17090
342-0	11175	22160	3420	17190
344-0	11240	22290	3440	17290
346-0	11305	22420	3460	17390
348-0	11370	22550	3480	17490
350-0	11435	22680	3500	17590
352-0	11500	22810	3520	17690
354-0	11565	22940	3540	17790
356-0	11630	23070	3560	17890
358-0	11695	23200	3580	17990
360-0	11760	23330	3600	18090
362-0	11825	23460	3620	18190
364-0	11890	23590	3640	18290
366-0	11955	23720	3660	18390
368-0	12020	23850	3680	18490
370-0	12085	23980	3700	18590
372-0	12150	24110	3720	18690
374-0	12215	24240	3740	18790
376-0	12280	24370	3760	18890
378-0	12345	24500	3780	18990
380-0	12410	24630	3800	19090
382-0	12475	24760	3820	19190
384-0	12540	24890	3840	19290
386-0	12605	25020	3860	19390
388-0	12670	25150	3880	19490
390-0	12735	25280	3900	19590
392-0	12800	25410	3920	19690
394-0	12865	25540	3940	19790
396-0	12930	25670	3960	19890
398-0	12995	25800	3980	19990
400-0	13060	25930	4000	20090
402-0	13125	26060	4020	20190
404-0	13190	26190	4040	20290
406-0	13255	26320	4060	20390
408-0	13320	26450	4080	20490
410-0	13385	26580	4100	20590
412-0	13450	26710	4120	20690
414-0	13515	26840	4140	20790
416-0	13580	26970	4160	20890
418-0	13645	27100	4180	20990
420-0	13710	27230	4200	21090
422-0	13775	27360	4220	21190
424-0	13840	27490	4240	21290
426-0	13905	27620	4260	21390
428-0	13970	27750	4280	21490
430-0	14035	27880	4300	21590
432-0	14100	28010	4320	21690
434-0	14165	28140	4340	21790
436-0	14230	28270	4360	21890
438-0	14295	28400	4380	21990
440-0	14360	28530	4400	22090
442-0	14425	28660	4420	22190
444-0	14490	28790	4440	22290
446-0	14555	28920	4460	22390
448-0	14620	29050	4480	22490
450-0	14685	29180	4500	22590
452-0	14750	29310	4520	22690
454-0	14815	29440	4540	22790
456-0	14880	29570	4560	22890
458-0	14945	29700	4580	22990
460-0	15010	29830	4600	23090
462-0	15075	29960	4620	23190
464-0	15140	30090	4640	23290
466-0	15205	30220	4660	23390
468-0	15270	30350	4680	23490
470-0	15335	30480	4700	23590
472-0	15400	30610	4720	23690
474-0	15465	30740	4740	23790
476-0	15530	30870	4760	23890
478-0	15595	31000	4780	23990
480-0	15660	31130	4800	24090
482-0	15725	31260	4820	24190
484-0	15790	31390	4840	24290



FOR GAS TIGHT JOINTS

SCREWS THREADED TO HEAD CANNOT BE USED
ON THESE JOINTS



WHEN THICKNESS IS BELOW TIME
FOR ADULTED THICKNESS SEE
ADULTATION BLOCK FOR USE OF
SPACE TYPES OR MORE DESIRABLE METHOD

Flon

- when value of outer sheet is 25% or less and the total thickness is 0.12 or less use one channel as a liner. Steel sheets intended to be used as a gauge material with metal steel sheets from the same gauge material should be used when channeling under the existing bottom sheet of sheet when channeling under the existing sheet of sizes 4, 6 and 8. Steel may be used to non stress 340 parts and joints only.
4. Steel sheet must only be stressed joints
5. A single sheet must be applied to give a min. total thickness of 100' this sheet to be the wider channel to be with 3/32 and clamp head rivets every other sheet to be 1/16" thick with the same rivets and channel sheet to be 1/16" thick with same rivets
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				WHEN THICKNESS IS BELOW THE MIN *GRADED THICKNESS - SEE FOLLOWING APPLIES		E		PILOT HOLE C/SMM FOR SHEET DIA		DRILL REAM SIZE AFTER DIA DOWLING		NOTES
A	B	SURE SIZE MAX	MIN	*REF	A	REF	A	WHOLE SHEET DIA	WHOLE SHEET DIA	WHOLE SHEET DIA		
4.4	.64	4	.4	2.5	33	2.5	33	2.5	33	33	FOR NON-SWELLED JOINTS ONLY	
6.35	.26	6	.26	2.5	78	2.5	78	2.5	78	2.5		
8.52	.28	8	.28	2.5	78	2.5	78	2.5	78	2.5		
10.32	.28	10	.28	2.5	78	2.5	78	2.5	78	2.5		
12.2	.28	12	.28	2.5	78	2.5	78	2.5	78	2.5		
14.1	.28	14	.28	2.5	78	2.5	78	2.5	78	2.5		
16.0	.28	16	.28	2.5	78	2.5	78	2.5	78	2.5		
17.8	.28	18	.28	2.5	78	2.5	78	2.5	78	2.5		
19.6	.28	20	.28	2.5	78	2.5	78	2.5	78	2.5		
21.5	.28	22	.28	2.5	78	2.5	78	2.5	78	2.5		
23.3	.28	24	.28	2.5	78	2.5	78	2.5	78	2.5		
25.2	.28	26	.28	2.5	78	2.5	78	2.5	78	2.5		
27.0	.28	28	.28	2.5	78	2.5	78	2.5	78	2.5		
28.9	.28	30	.28	2.5	78	2.5	78	2.5	78	2.5		
30.8	.28	32	.28	2.5	78	2.5	78	2.5	78	2.5		
32.6	.28	34	.28	2.5	78	2.5	78	2.5	78	2.5		
34.5	.28	36	.28	2.5	78	2.5	78	2.5	78	2.5		
36.4	.28	38	.28	2.5	78	2.5	78	2.5	78	2.5		
38.3	.28	40	.28	2.5	78	2.5	78	2.5	78	2.5		
40.2	.28	42	.28	2.5	78	2.5	78	2.5	78	2.5		
42.1	.28	44	.28	2.5	78	2.5	78	2.5	78	2.5		
44.0	.28	46	.28	2.5	78	2.5	78	2.5	78	2.5		
45.9	.28	48	.28	2.5	78	2.5	78	2.5	78	2.5		
47.8	.28	50	.28	2.5	78	2.5	78	2.5	78	2.5		
49.7	.28	52	.28	2.5	78	2.5	78	2.5	78	2.5		
51.6	.28	54	.28	2.5	78	2.5	78	2.5	78	2.5		
53.5	.28	56	.28	2.5	78	2.5	78	2.5	78	2.5		
55.4	.28	58	.28	2.5	78	2.5	78	2.5	78	2.5		
57.3	.28	60	.28	2.5	78	2.5	78	2.5	78	2.5		
59.2	.28	62	.28	2.5	78	2.5	78	2.5	78	2.5		
61.1	.28	64	.28	2.5	78	2.5	78	2.5	78	2.5		
63.0	.28	66	.28	2.5	78	2.5	78	2.5	78	2.5		
64.9	.28	68	.28	2.5	78	2.5	78	2.5	78	2.5		
66.8	.28	70	.28	2.5	78	2.5	78	2.5	78	2.5		
68.7	.28	72	.28	2.5	78	2.5	78	2.5	78	2.5		
70.6	.28	74	.28	2.5	78	2.5	78	2.5	78	2.5		

Figure 17—Methods Drawing for Screws

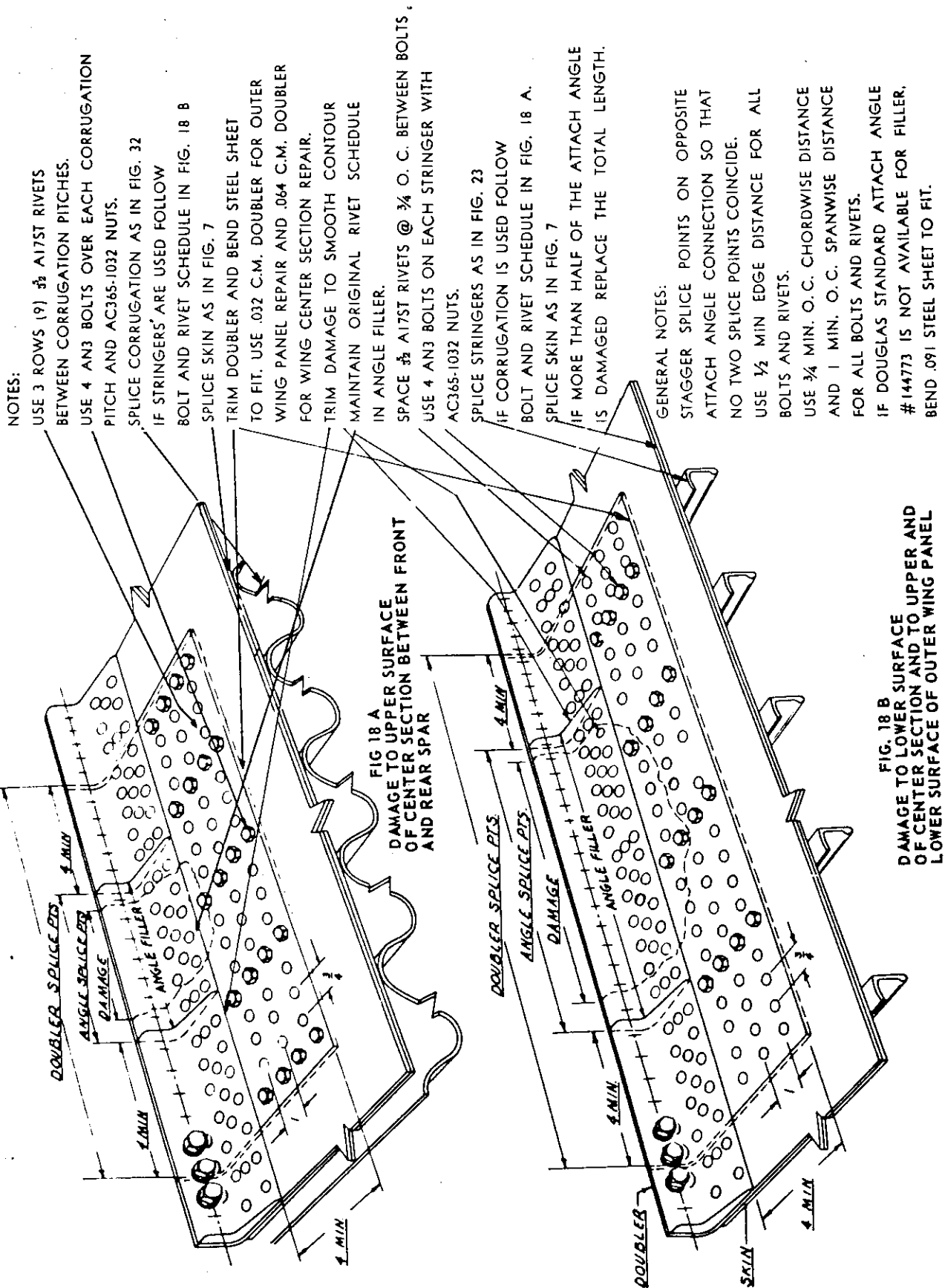


Figure 18-Attach Angle Repairs

THE TANK COVER JOINTS AND THE CENTER-OUTER WING JOINTS SHOULD BE A CLOSE FIT WITHIN THE TOLERANCES LISTED BELOW. CUT STRINGERS AND WAFFLE PLATES TO FIT EXACTLY AND IF TOLERANCES ARE EXCEEDED, SHIM TO PROPER TOLERANCES WITH DURAL STRIPS. A METAL STRAIGHT EDGE AND FEELER GAUGE SHOULD BE USED TO DETERMINE THE AMOUNT OF SHIM. (SEE FIGURE 20)

<u>POSITION</u>	<u>PART</u>	<u>TOLERANCE</u>
INNER WING JOINTS	STRINGERS & COMPRESSION PLATE	.002 .000
OUTER WING JOINTS	STRINGERS & WAFFLE PLATES	.008 .000
TANK COVER JOINTS	STRINGERS	FLUSH TO F1)

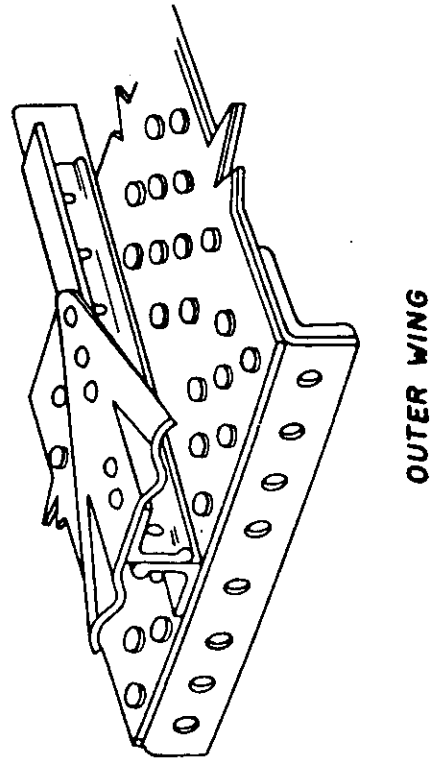
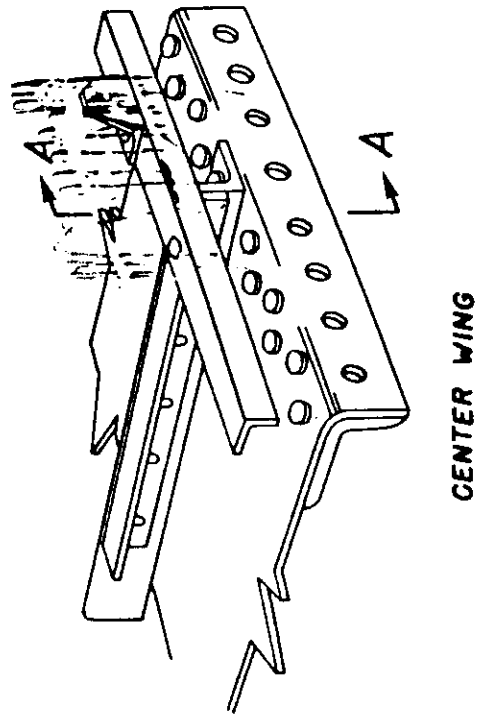
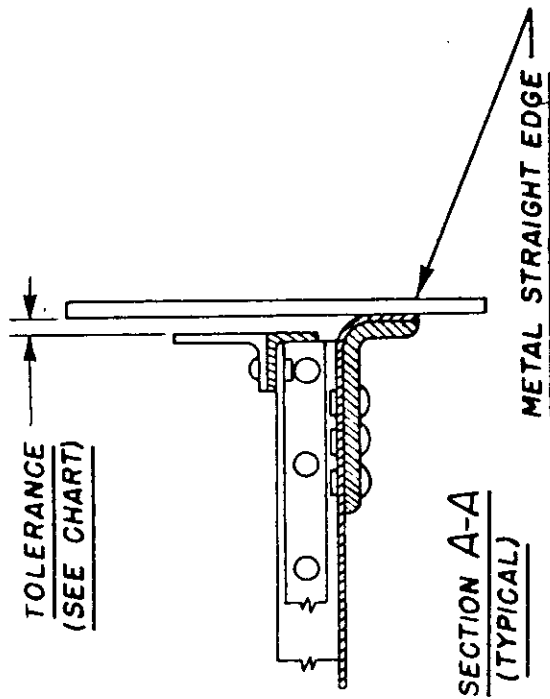


Figure 19—Tank Cover and Wing Joint Attachment

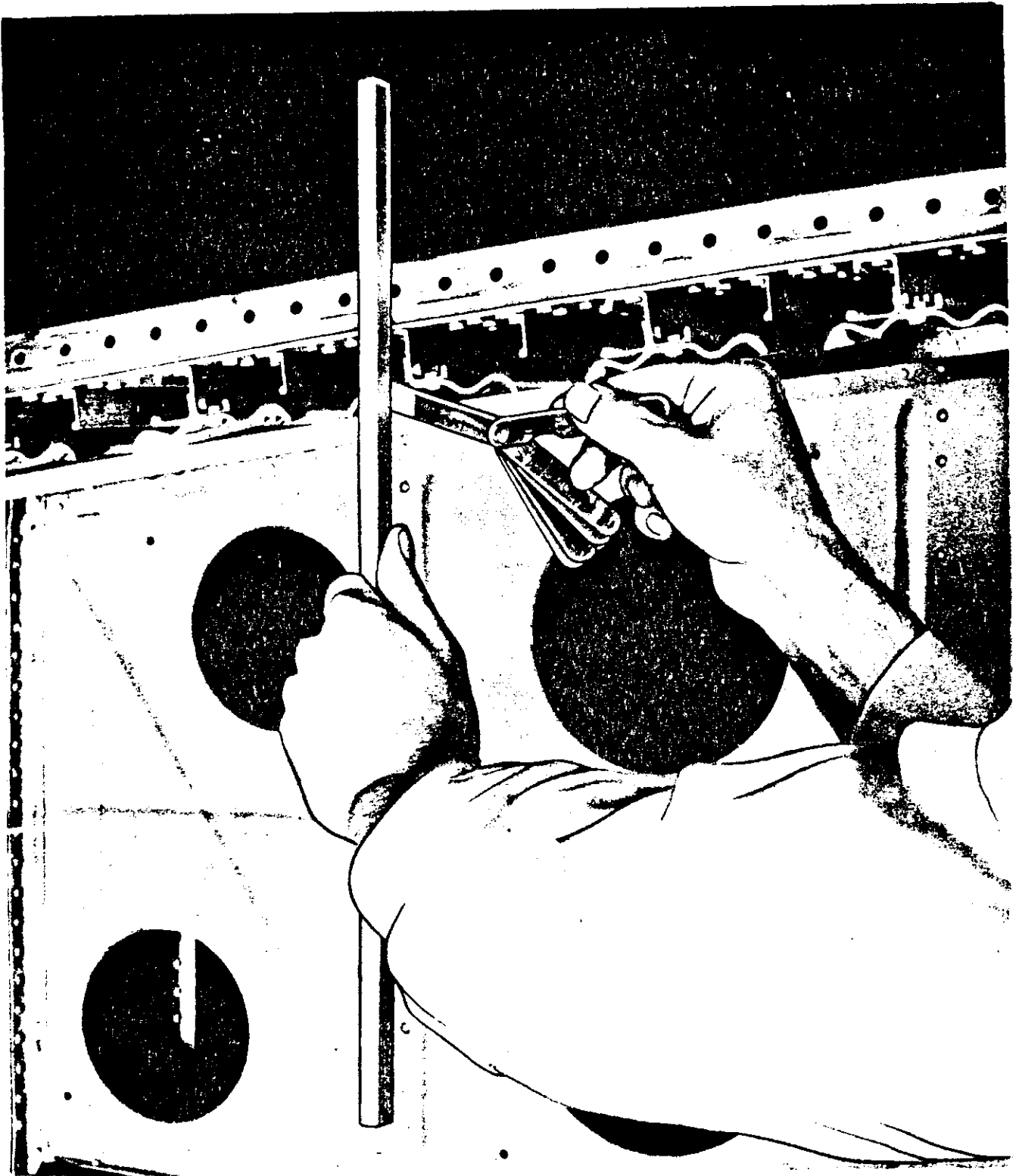


Figure 20—Wing Joint Attachment

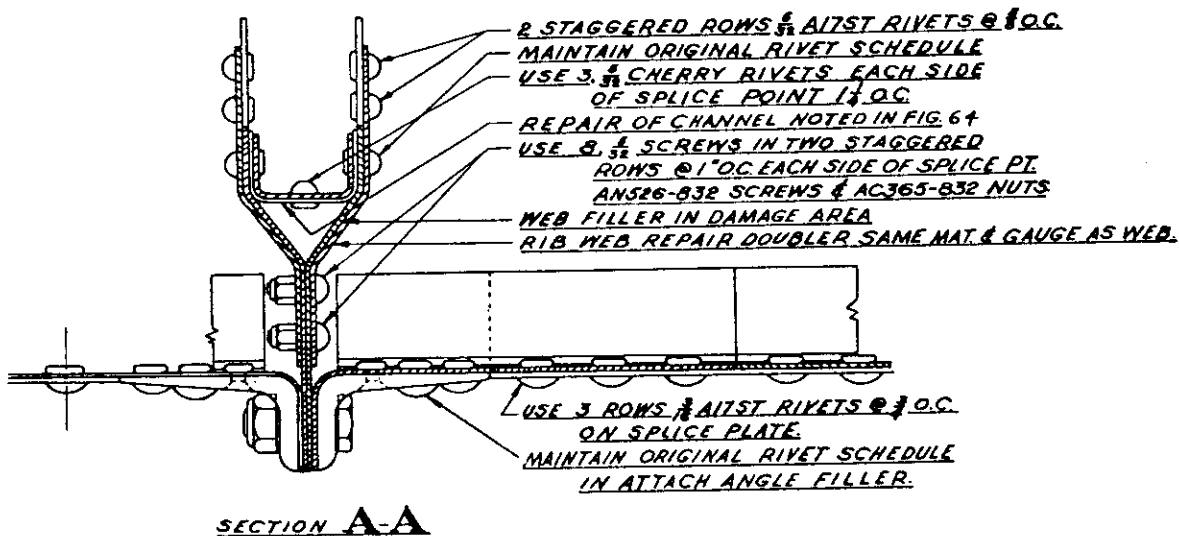
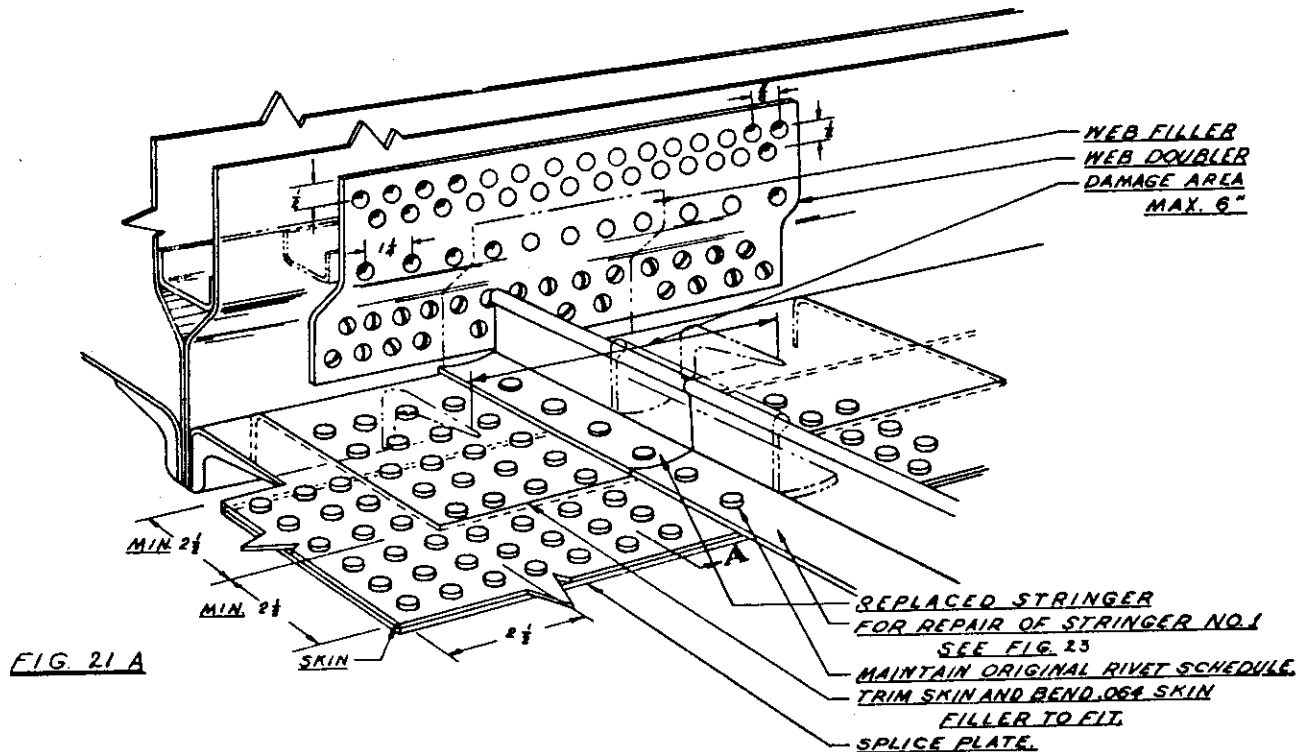


FIG. 21 B

GENERAL NOTES:
 THIS REPAIR SHOWN IS FOR MAXIMUM
 DAMAGE OF 6"
 FOR DAMAGE EXCEEDING 6" USE
 DOUBLE SPLICE
 3/4" MIN. O.C. DISTANCE IN BOTH DIRECTIONS
 FOR ALL SKIN SPLICES.
 1/4" MIN. EDGE DISTANCE.

Figure 21 - Tank Cover Attach Angle Repair

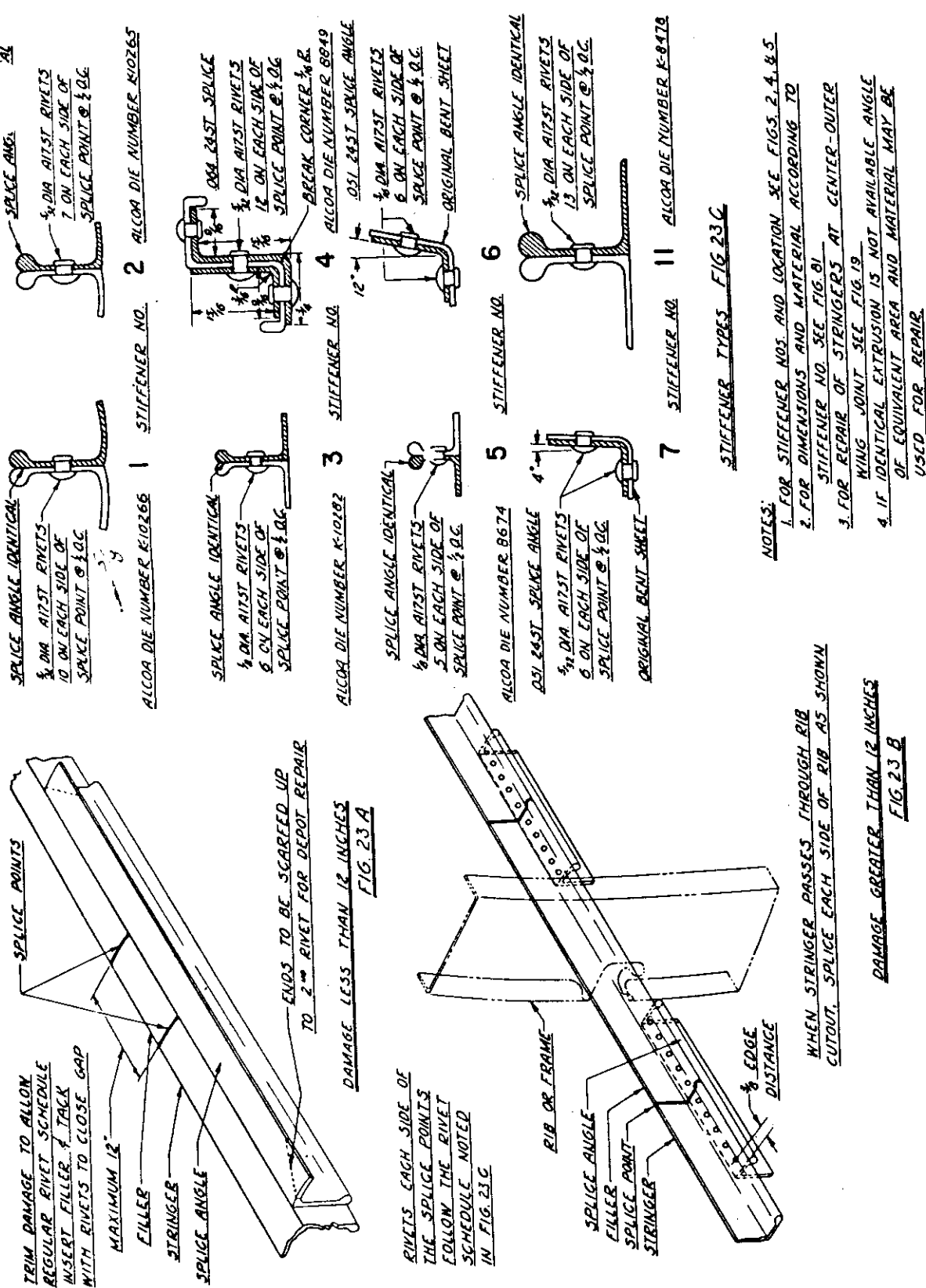
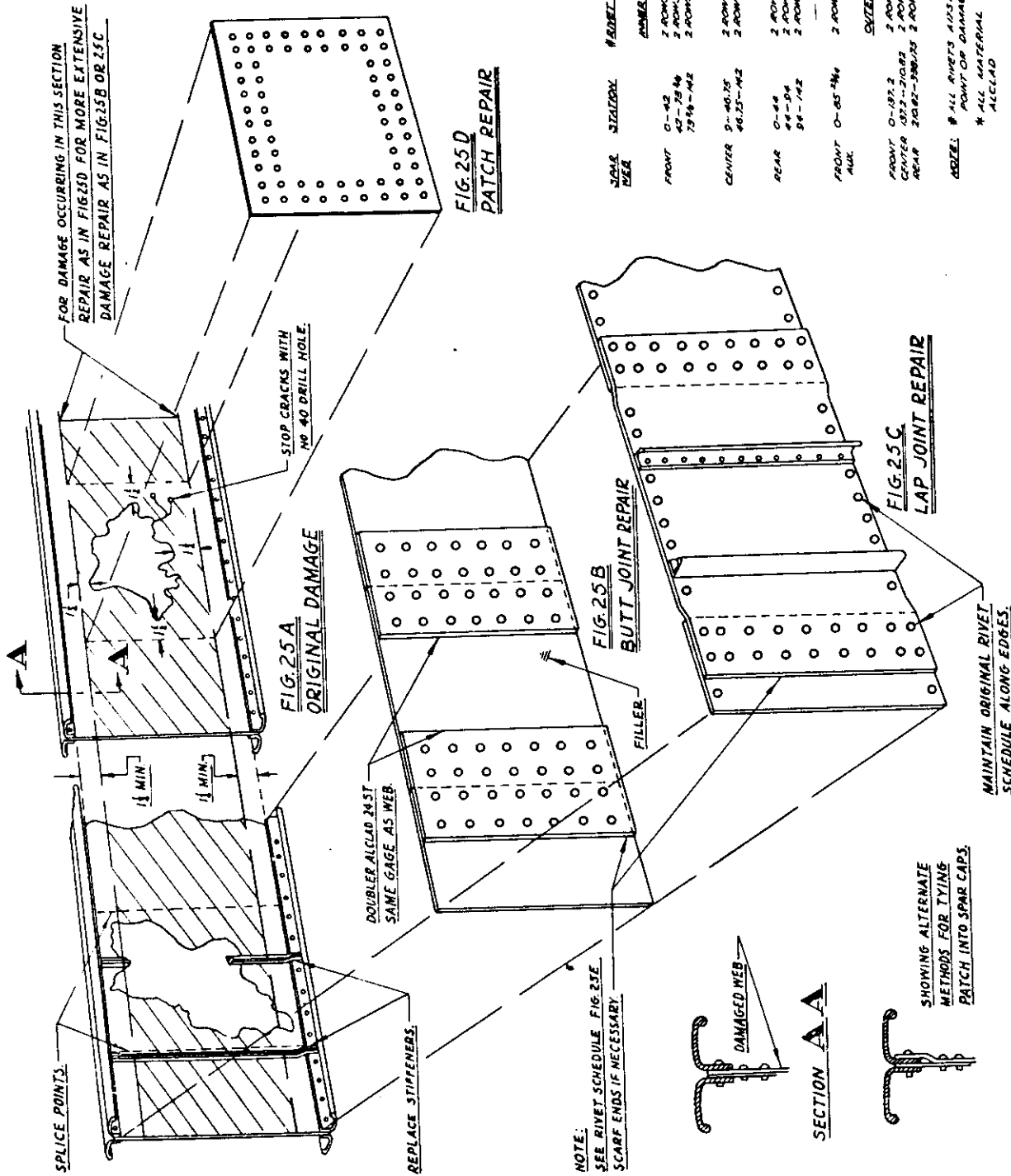


Figure 23—Stringer Repair

Figure 24 - Spar Cap Repair



SPAR TYPE	SIZE/TYPE	# RIVET SCHEDULE	* GAGE
FRONT			
0-42	5/16" D @ 7" O.C.	2 ROWS	.040
42-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142	5/16" D @ 7" O.C.	2 ROWS	.120
CENTER			
0-42	5/16" D @ 7" O.C.	2 ROWS	.040
42-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142	5/16" D @ 7" O.C.	2 ROWS	.120
REAR			
0-42	5/16" D @ 7" O.C.	2 ROWS	.040
42-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142	5/16" D @ 7" O.C.	2 ROWS	.120
FRONT ALCLAD			
0-42 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
42 1/2-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
CENTER			
0-42 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
42 1/2-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
REAR			
0-42 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
42 1/2-75 1/2	5/16" D @ 7" O.C.	2 ROWS	.040
75 1/2-142 1/2	5/16" D @ 7" O.C.	2 ROWS	.040

FIG.25E

Figure 25—Spar Web

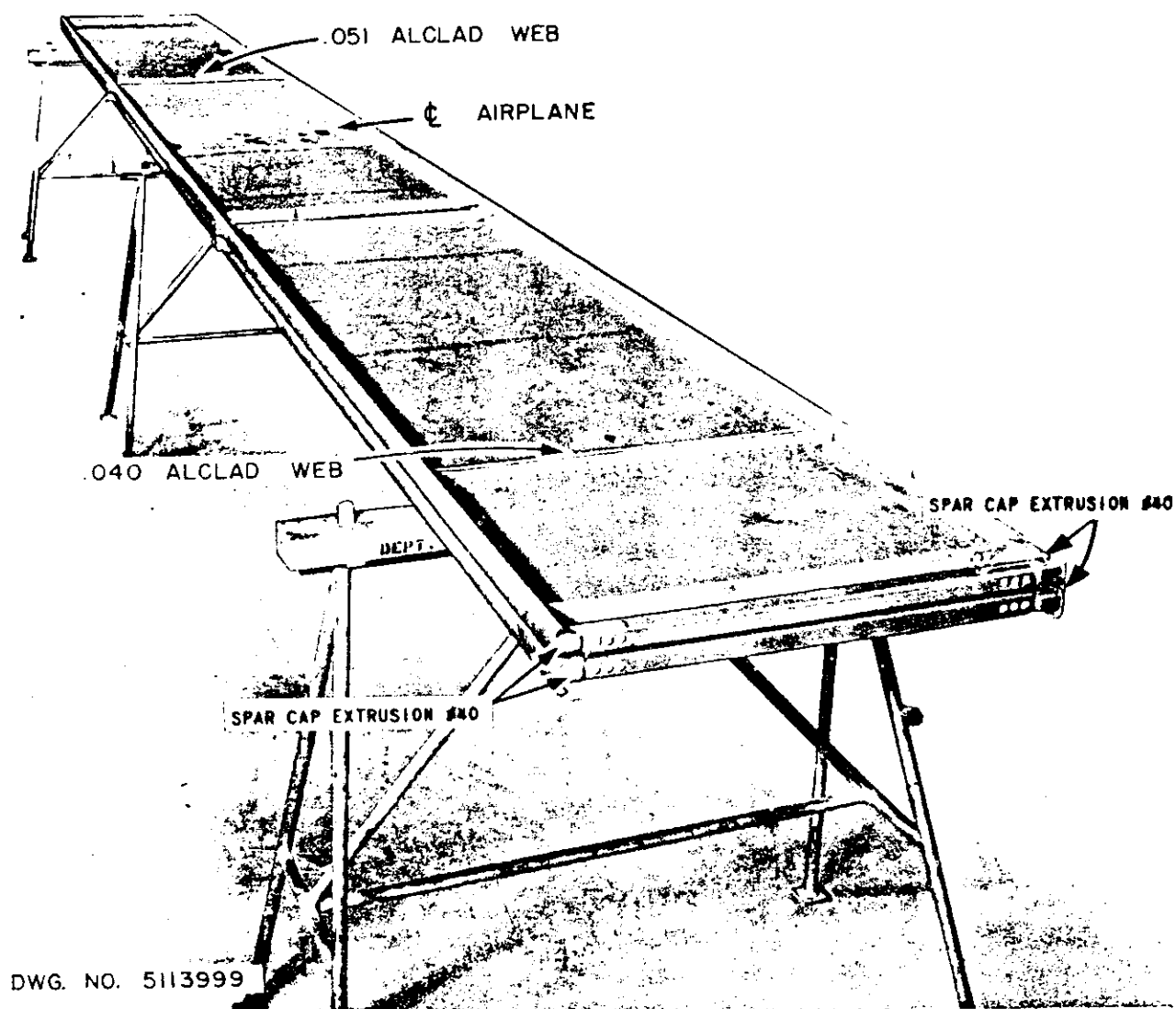
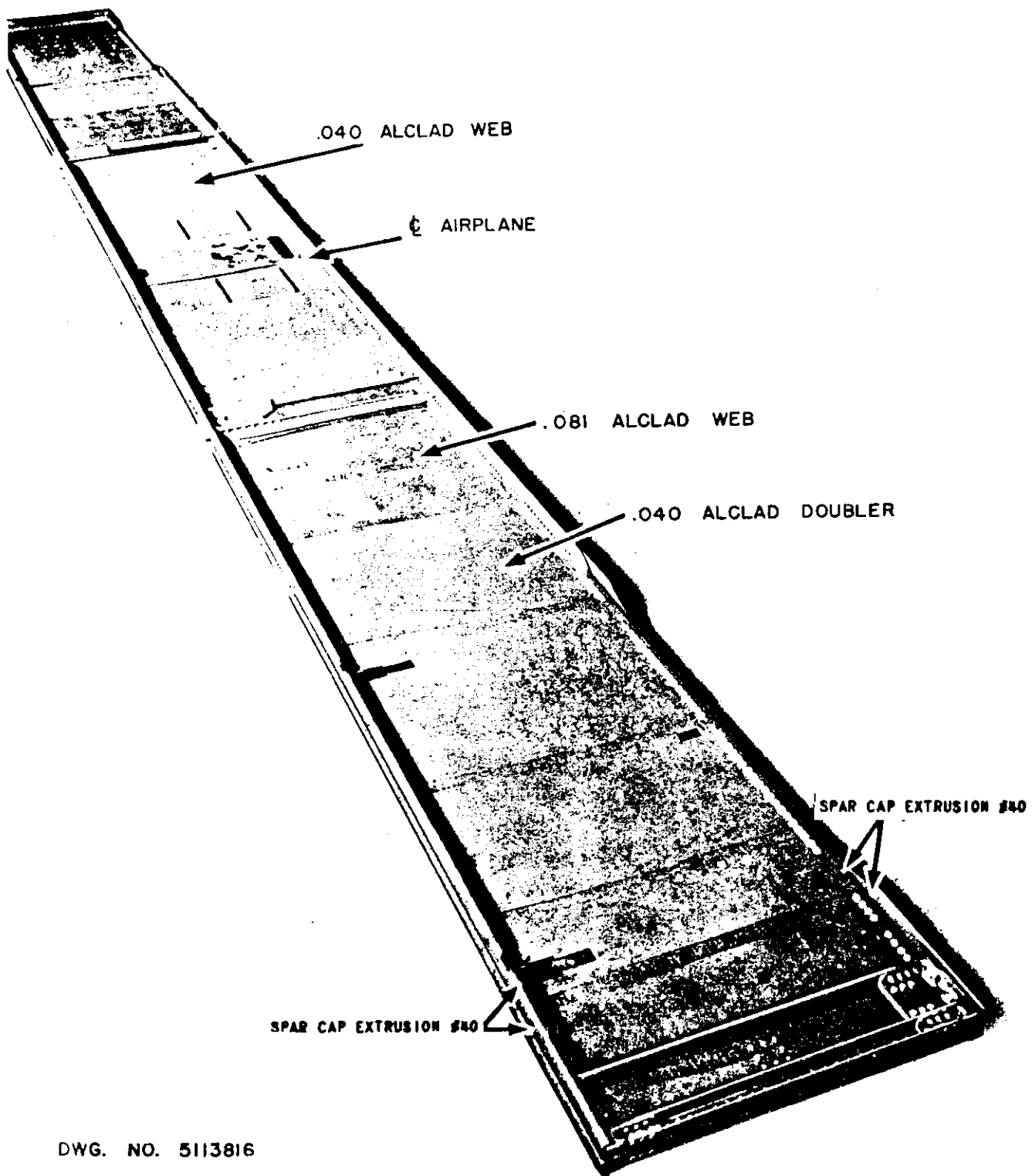


Figure 26 - Center Wing Center Spar



DWG. NO. 5113816

Figure 27 - Center Wing, Front Spar

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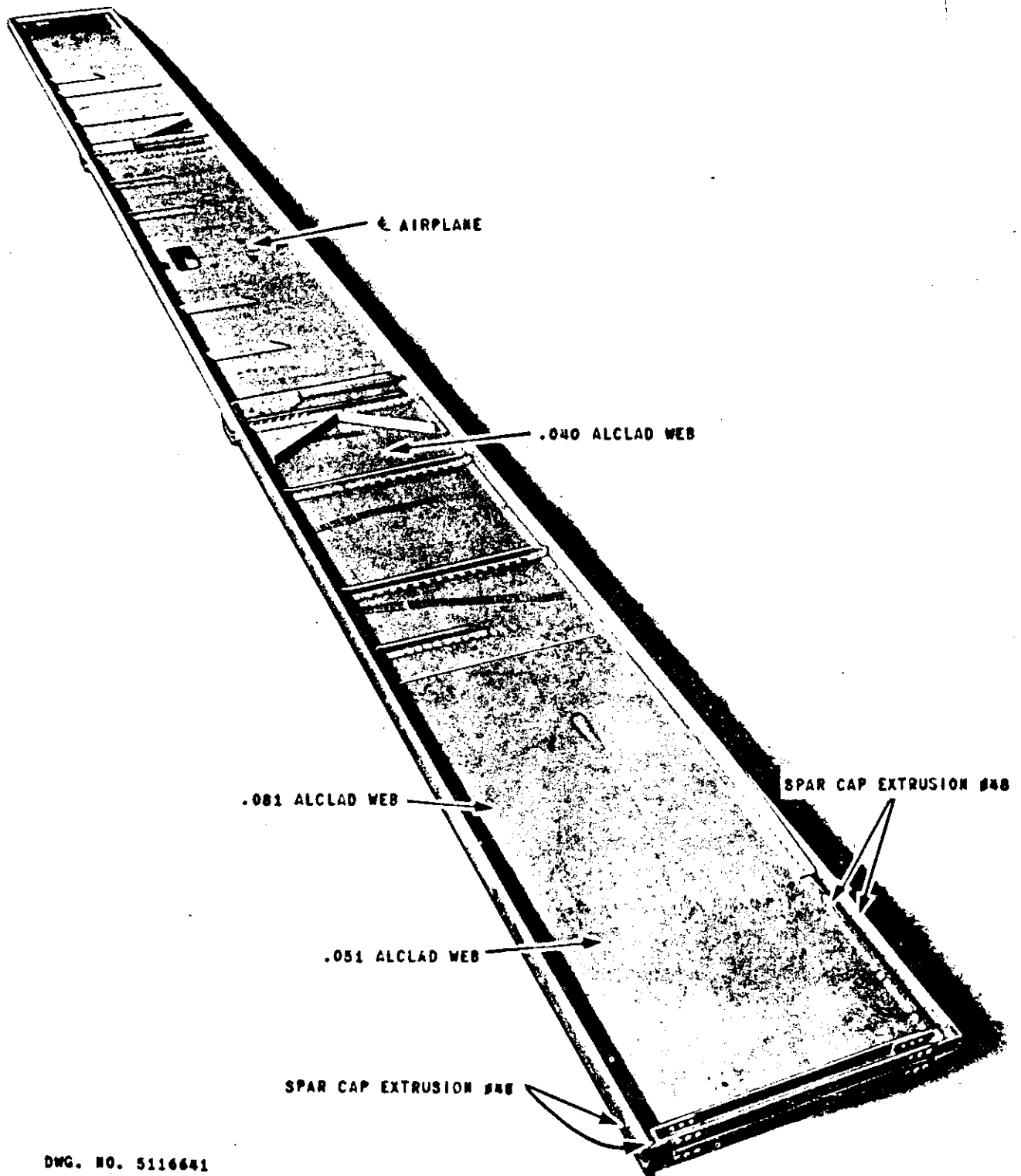


Figure 28 - Center Wing Rear Spar

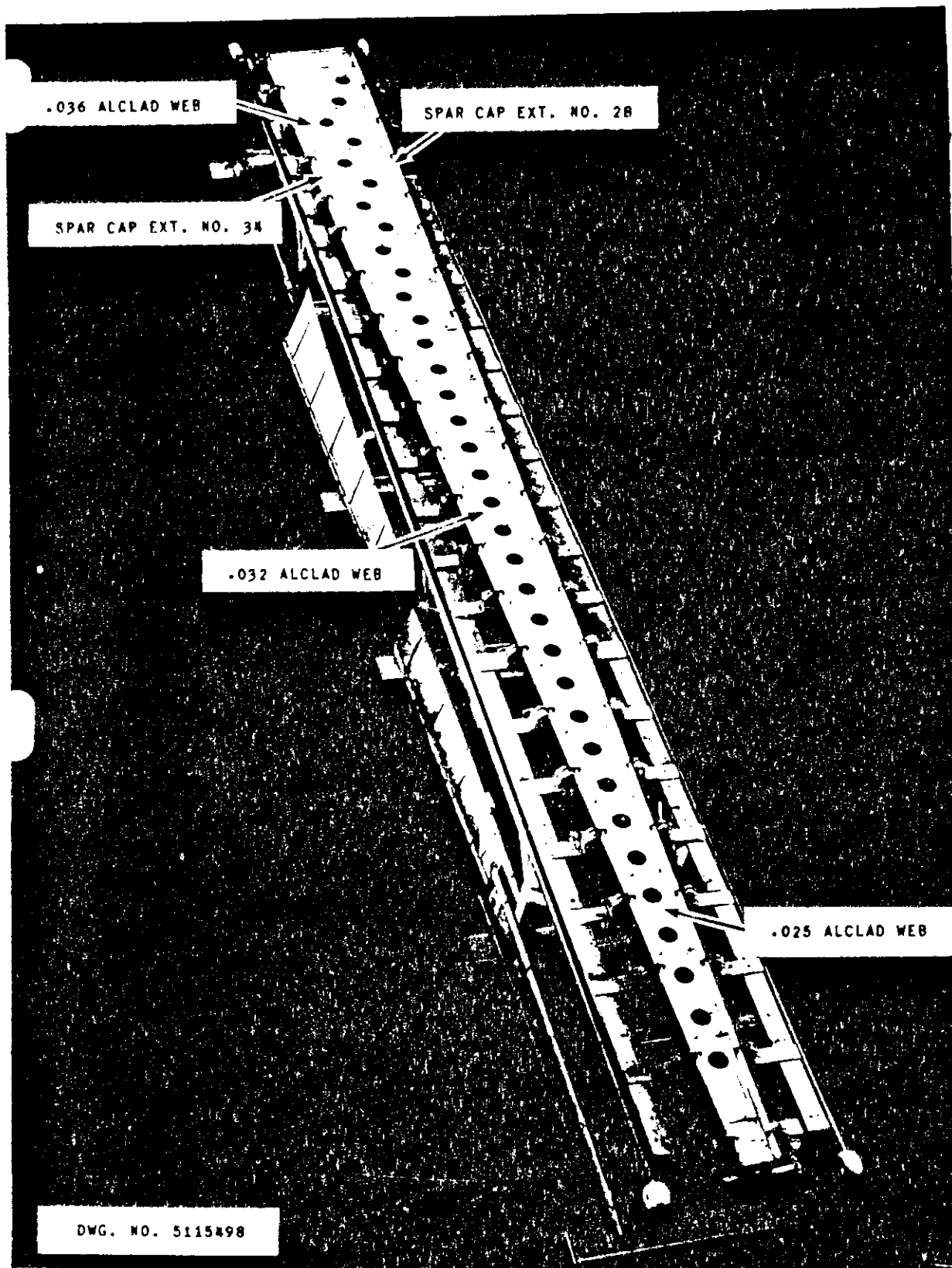


Figure 29 - Outer Wing Front Spar

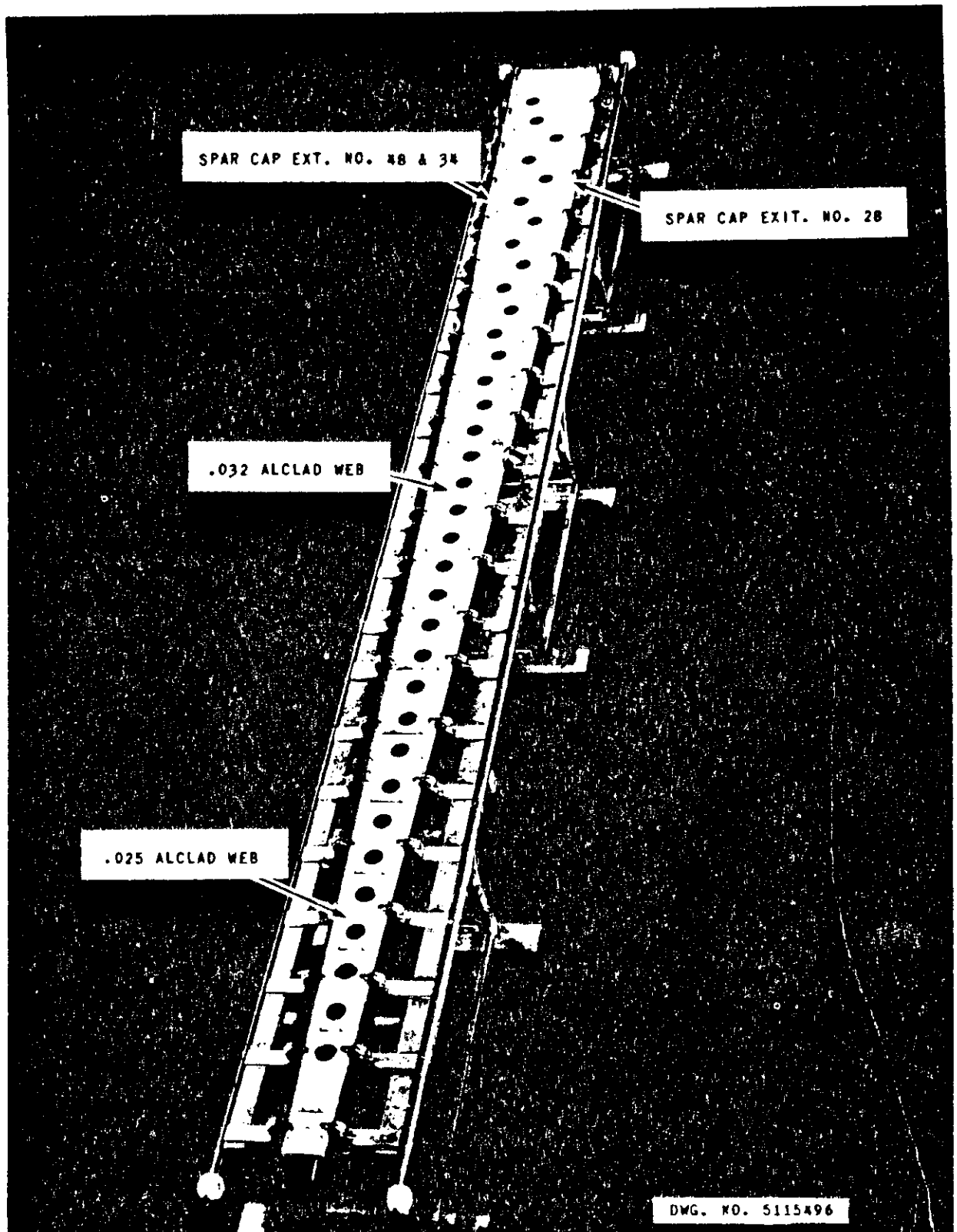


Figure 30 - Outer Wing Main Spar

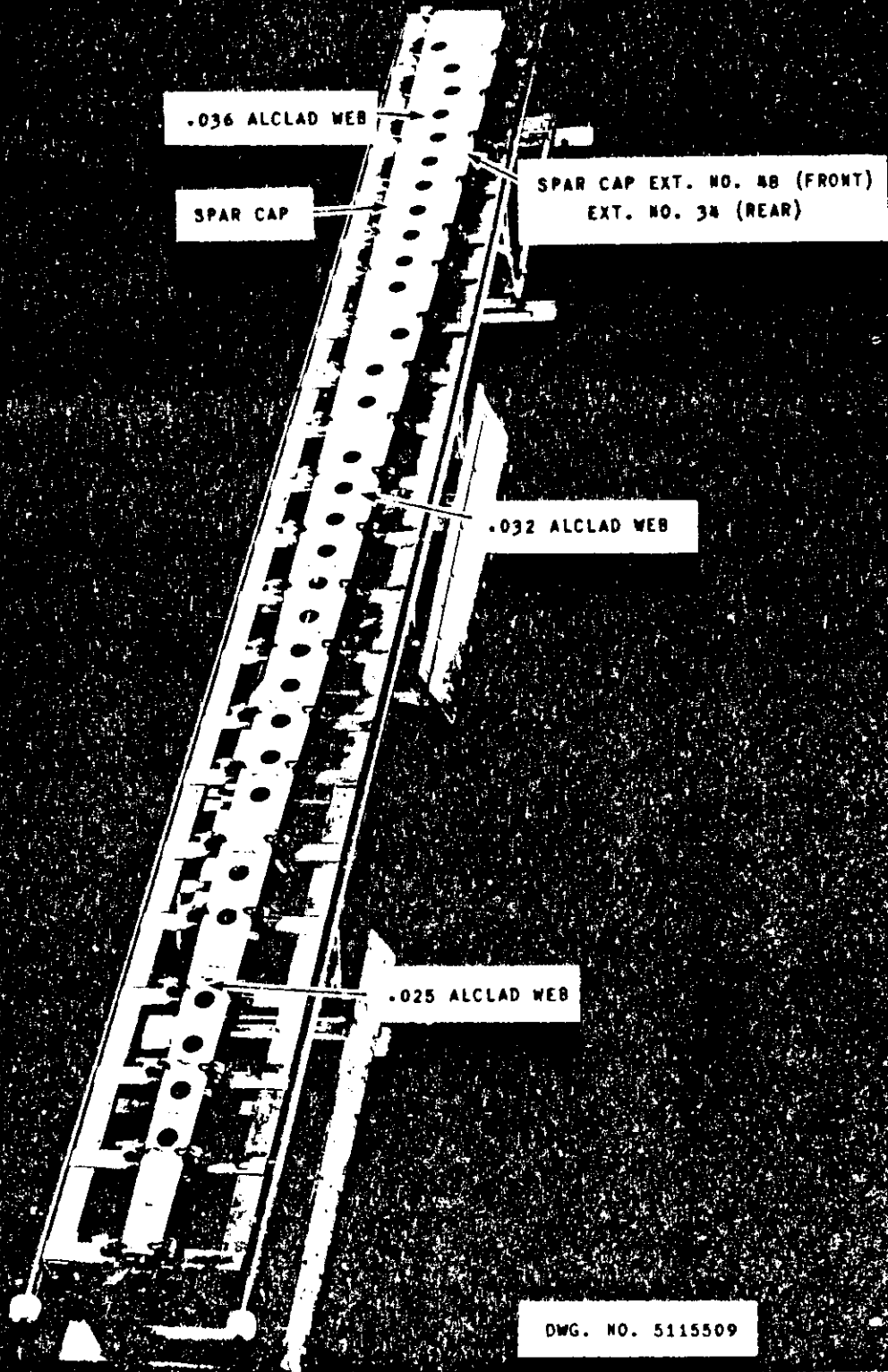


Figure 31 - Outer Wing Rear Spar

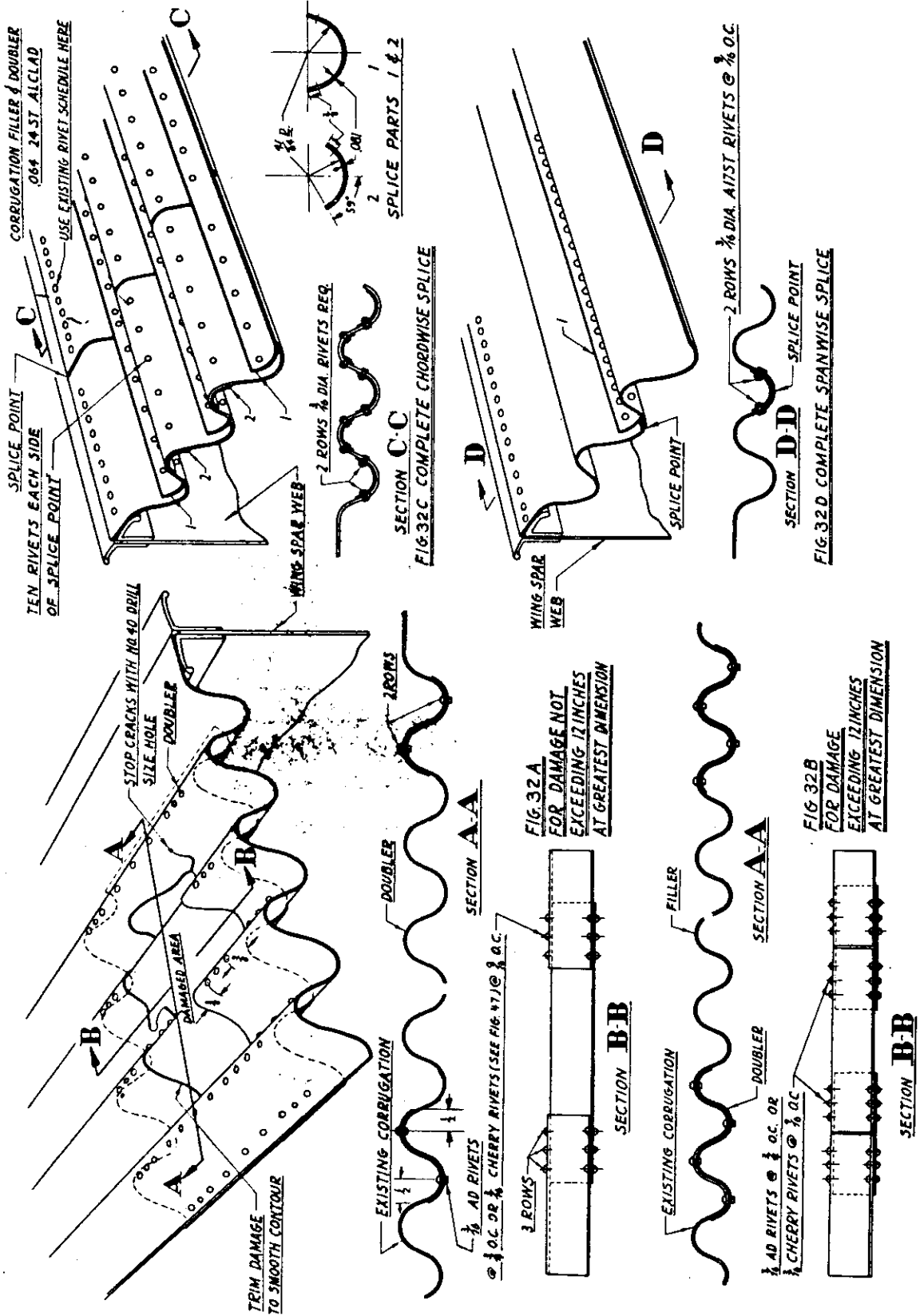


Figure 32 - Corrugation Repair & Splice

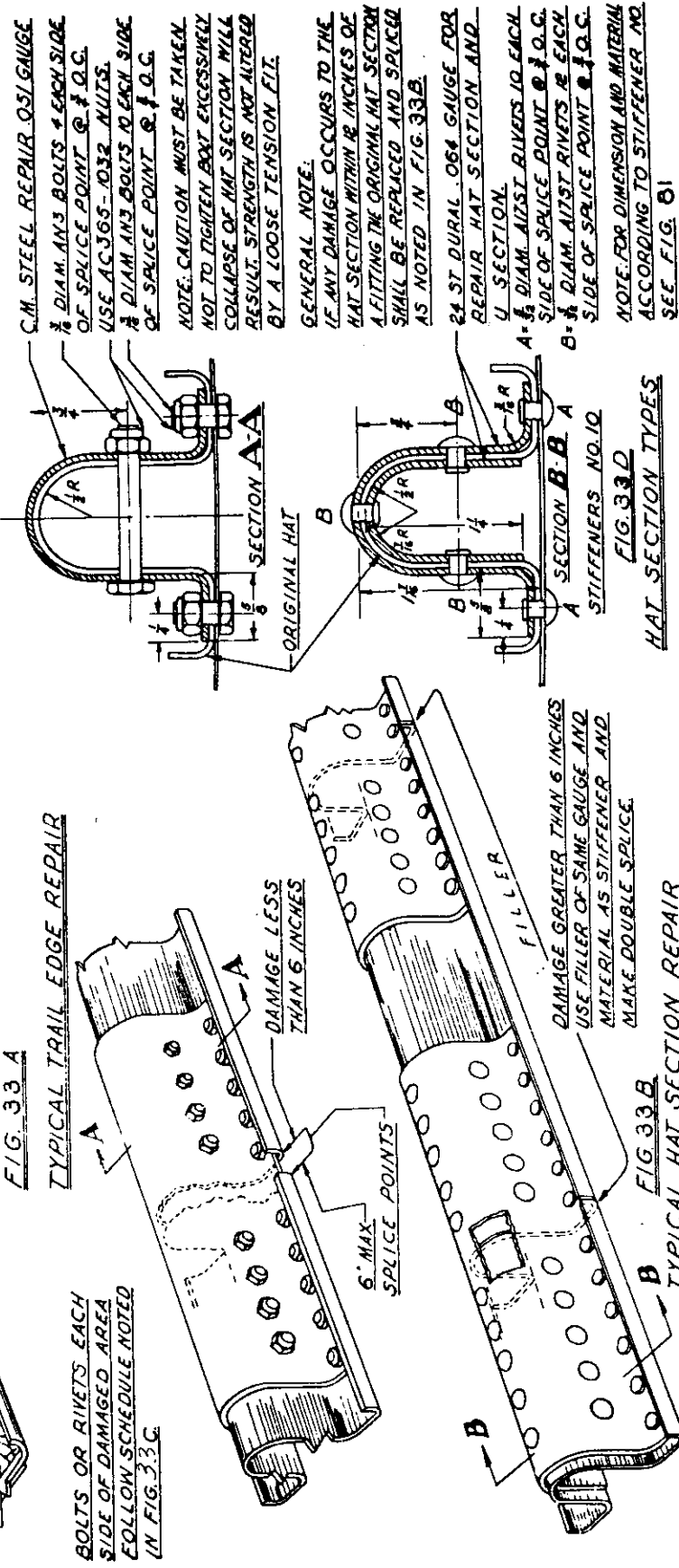
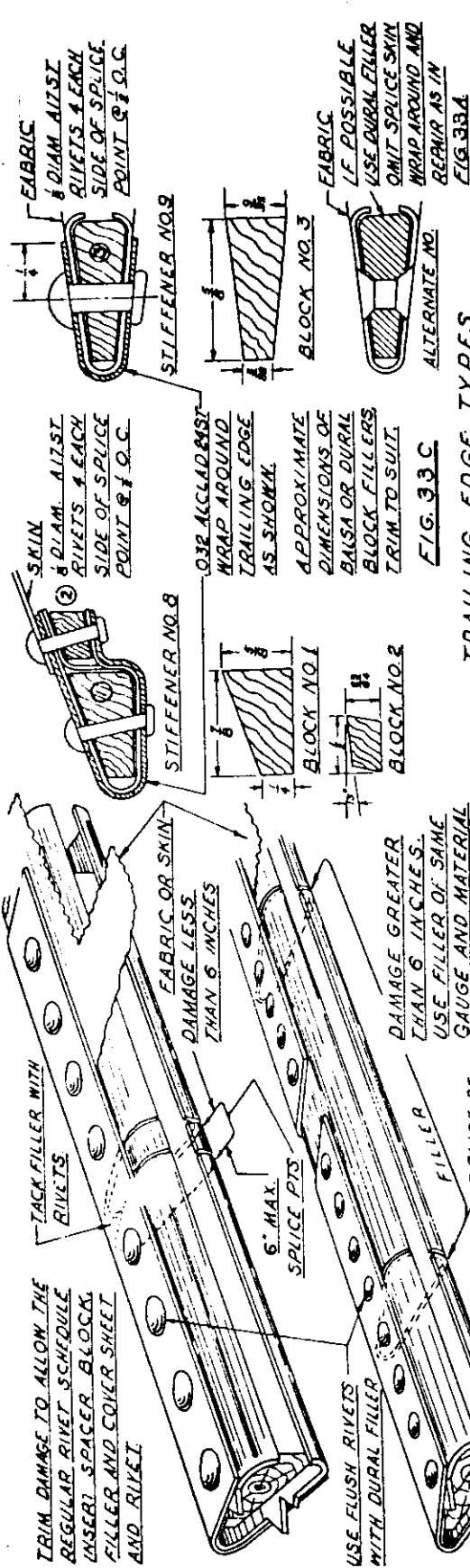


Figure 33 - Trailing Edge & Hat Section Repair

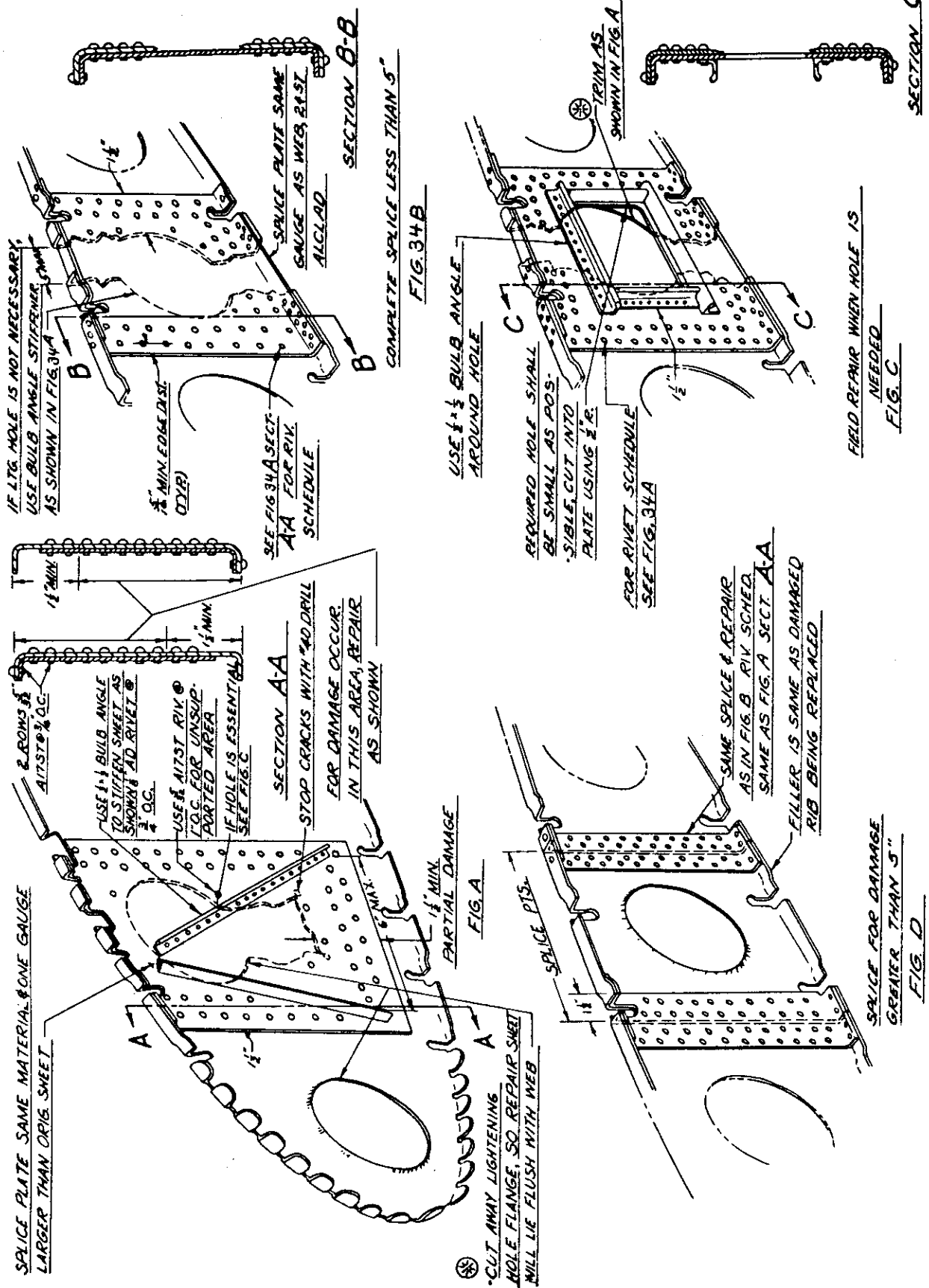


Figure 34 - Wing Rib Repair.

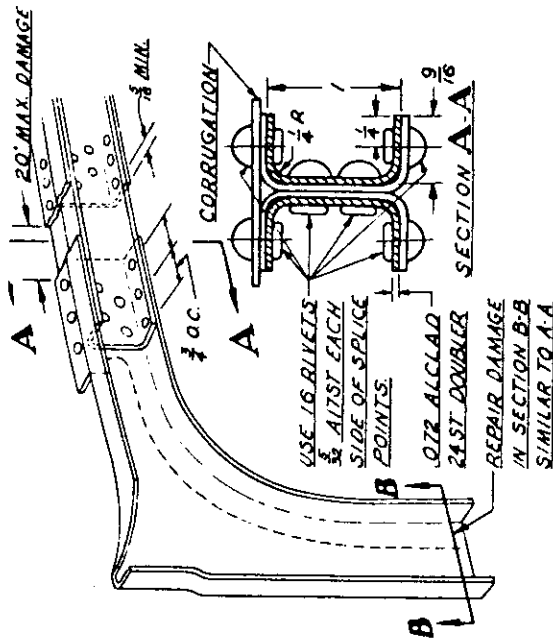


FIG. 35 D PARTIAL REPAIR
TANK SUPPORT RIB

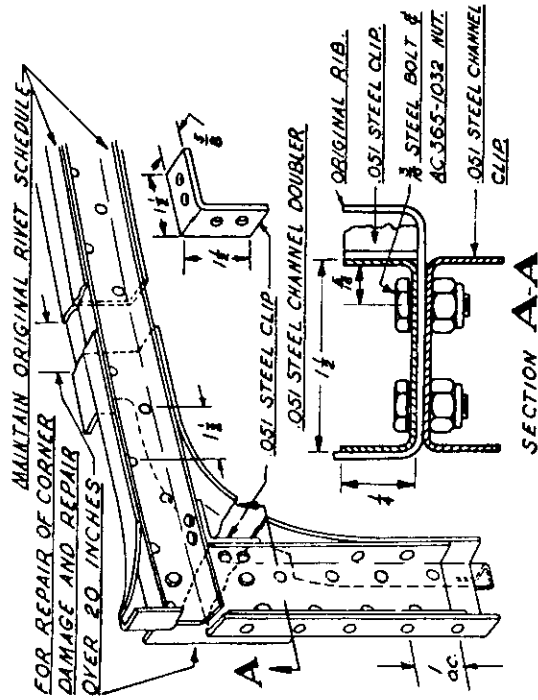
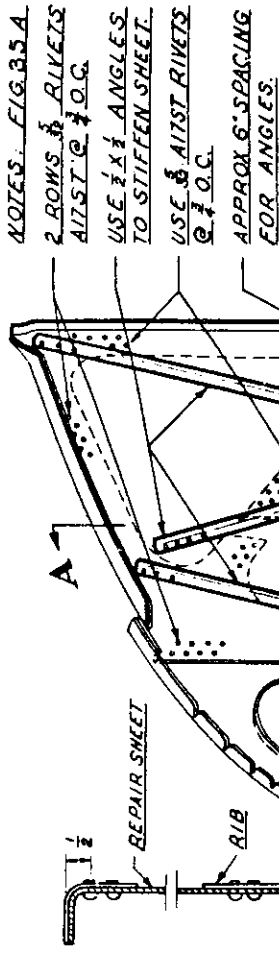


FIG. 35 C TOTAL REPAIR
TANK SUPPORT RIB



GENERAL NOTES:
MAINTAIN ORIGINAL RIVET SCHEDULE IN THE FLANGE.
REPAIR SHEET TO BE THE SAME GAUGE AND MATERIAL AS WEB.
CUT AWAY LIGHTENING HOLE FLANGE SO THE REPAIR SHEET WILL LIE FLUSH WITH WEB.

NOTES: FIG. 35 B.
USE FILLER WHERE NECESSARY.
CUT HOLE IN REPAIR SHEET AS SMALL AS POSSIBLE TO ALLOW CLEARANCE.
1/2\"/>

USE ONE 1/2\"/>

NOTE: TYPICAL REPAIR FOR ANY BREAK OR SERIES OF BREAKS NOT TO EXCEED 3 IF MORE THAN 3, REPLACE COMPLETE RIB.

FIG. 35 B NOSE RIB
REPAIR WHERE HOLE IS ESSENTIAL

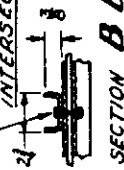


Figure 35 - Rib Repairs in Inner Wing

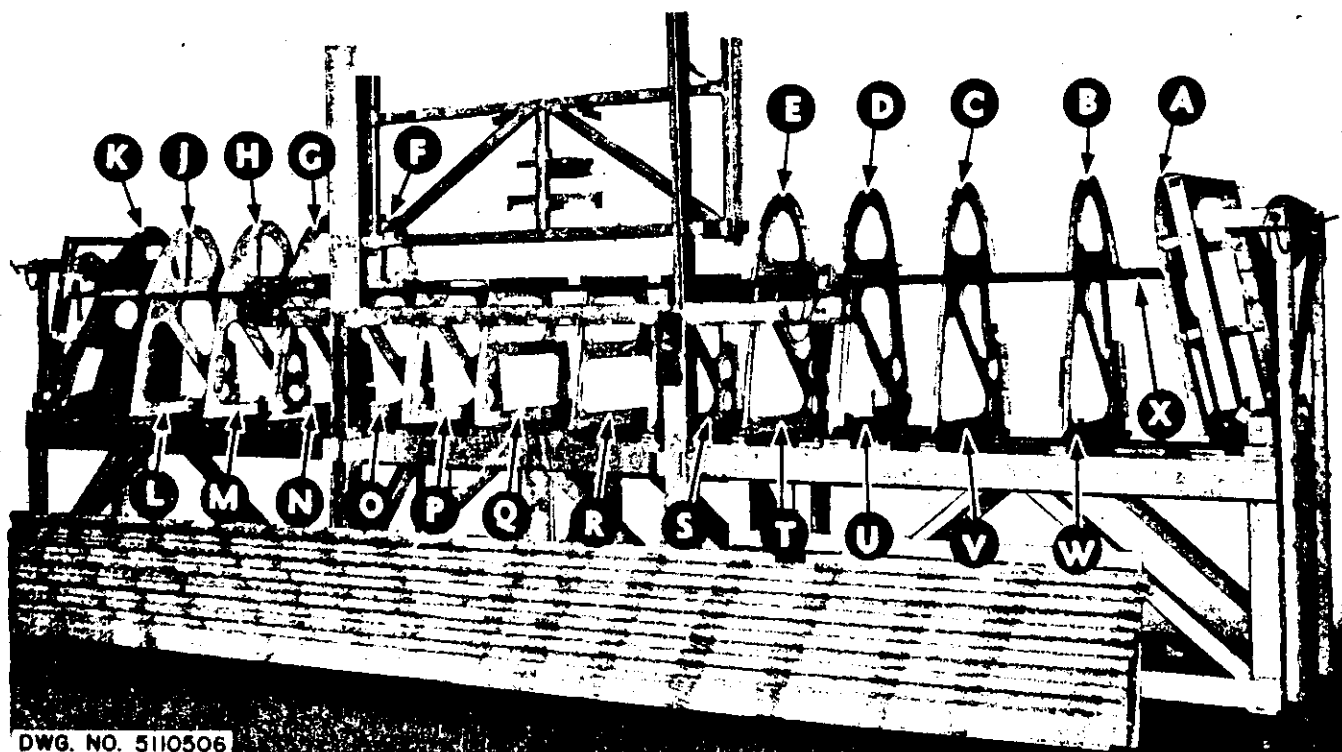


Figure 36 - Center Wing - Nose Section Frames

Key to Figure 36

<u>REF</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	85	Cant. Rib	5112403-1 R.H.	.064 Alclad 24SO
B	73-5/16	Rib	5113026-9 R.H.	.040 Alclad 24SO
C	58	Nose Rib	5113026-9 R.H.	.040 Alclad 24SO
D	45-5/16	Nose Rib	5113027-1 R.H.	.064 Alclad 24SO
E	33	Nose Rib	5113026-11 R.H.	.040 Alclad 24SO
F	33	Nose Rib	5113026-10 L.H.	.040 Alclad 24SO
G	45-5/16	Nose Rib	5113027- L.H.	.064 Alclad 24SO
H	58	Nose Rib	5113026-8 L.H.	.040 Alclad 24SO
J	73-1/2	Rib	5113026-8 L.H.	.040 Alclad 24SO
K	85	Cant. Rib	5112403- L.H.	.064 Alclad 24SO
L	73-1/2	Rib	5113026-8 L.H.	.040 Alclad 24SO
M	58	Rib	5113026-8 L.H.	.040 Alclad 24ST
N	45-5/16	Channel	5113027- L.H.	.064 Alclad 24SO
O	58	Rib	5113026-10 L.H.	.040 Alclad 24SO
P	20	Rib	4113025- L.H.	.010 Alclad 24SO
Q	7-1/2	Rib	4113437- L.H.	.040 Alclad 24SO
R	7-1/2	Rib	4113437-1 R.H.	.040 Alclad 24SO
S	20	Rib	4113025-1 R.H.	.040 Alclad 24SO
T	58	Rib	5113026-11 R.H.	.040 Alclad 24SO
U	45-5/16	Channels	5113027-1 R.H.	.064 Alclad 24SO
V	58	Rib	5113026-9 L.H.	.040 Alclad 24SO
W	73-1/2	Rib	5113026-9 R.H.	.040 Alclad 24SO
X		Angle	5110506-172	.064 Alclad 24ST

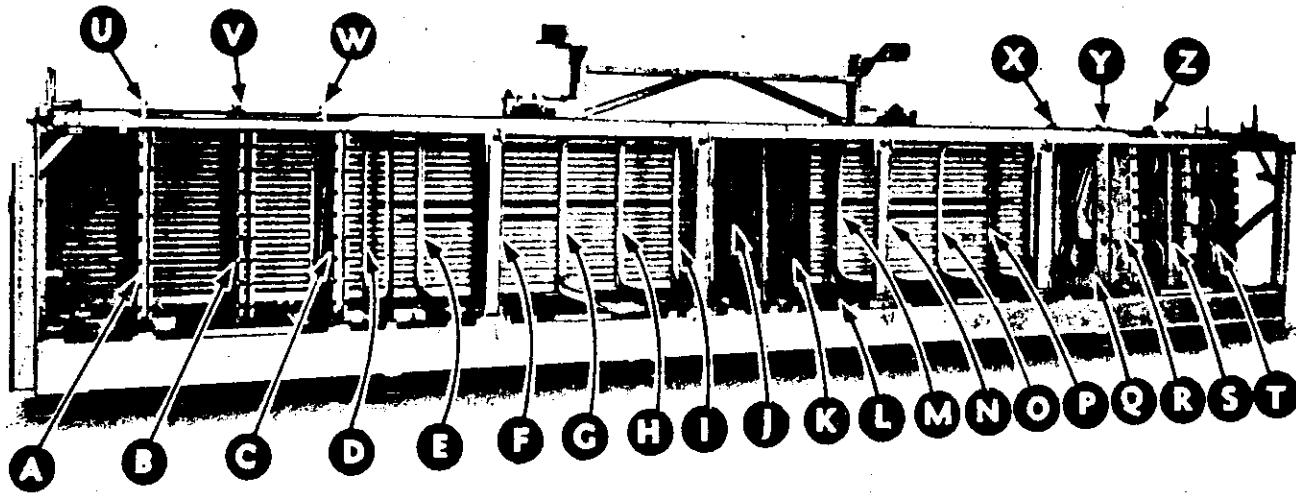


Figure 37 - Center Wing - Front Section Frames

KEY TO FIGURE 37

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	127-3/4	Frame (Front)	5116763 L.H.	.040 Alclad 24SO
B	111	Frame (Front)	5113288 L.H.	.051 Alclad 24SO
C	94-1/4	Frame (Front)	5116763 L.H.	.040 Alclad 24SO
D	85	Frame (Front)	5118508 L.H.	.064 Alclad 24SO
E	73-1/2	Frame (Front)	5117614 L.H.	.064 Alclad 24SO
F	58	Frame (Front)	5117614 L.H.	.064 Alclad 24SO
G	42	Frame (Front)	5117614 L.H.	.064 Alclad 24SO
H	28-1/2	Frame (Front)	5117614 L.H.	.064 Alclad 24SO
I	15	Frame (Front)	5117614 L.H.	.064 Alclad 24SO
J	5	Frame (Front)	5113311 L.H.	.040 Alclad 24SO
K	5	Frame (Front)	5113311-1 R.H.	.040 Alclad 24SO
L	15	Frame (Front)	5117614-1 R.H.	.064 Alclad 24SO
M	28-1/2	Frame (Front)	5117614-1 R.H.	.064 Alclad 24SO
N	42	Frame (Front)	5117614-1 R.H.	.064 Alclad 24SO
O	58	Frame (Front)	5117614-1 R.H.	.064 Alclad 24SO
P	73-1/2	Frame (Front)	5117614-1 R.H.	.064 Alclad 24SO
Q	85	Frame (Front)	5118508-1 R.H.	.064 Alclad 24SO
R	94-1/4	Frame (Front)	5116763 R.H.	.040 Alclad 24SO
S	111	Frame (Front)	5113288 R.H.	.051 Alclad 24SO
T	127-3/4	Frame (Front)	5116763-1 R.H.	.040 Alclad 24SO
U	127-3/4	Fitting	5117828	
V	111	Fitting	2116628	
W	94-1/4	Fitting	5117828	
X	94-1/4	Fitting	5117828	
Y	111	Fitting	2116628	
Z	127-3/4	Fitting	5117828	

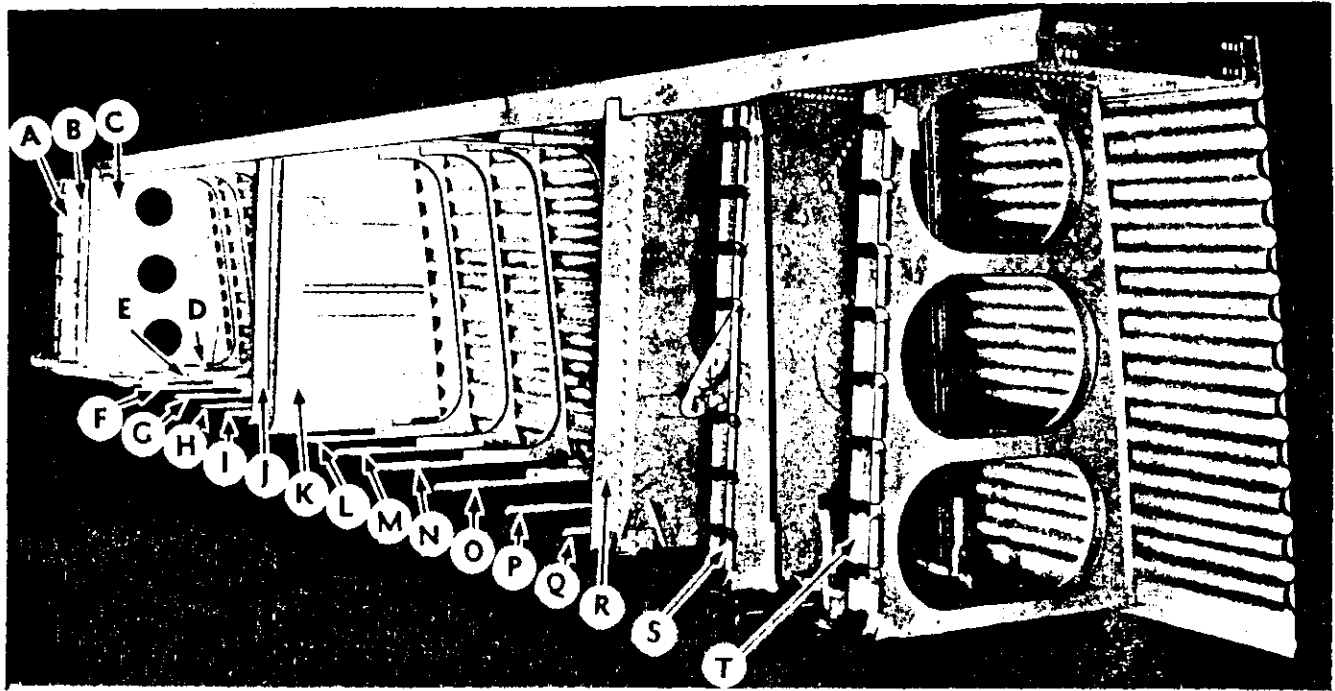


Figure 38 - Center Wing Center Section Frames

KEY TO FIGURE 38

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	127-3/4	Frame (Rear)	5116642	.040 Alclad 24SO
B	111	Frame (Rear)	5113730	.051 Alclad 24SO
C	94 1/4	Frame (Rear)	5116640	.040 Alclad 24SO
D	85	Frame (Rear)	5117613	.064 Alclad 24SO
E	73-1/2	Frame (Rear)	5117613	.064 Alclad 24SO
F	58	Frame (Rear)	5117613	.064 Alclad 24SO
G	42	Frame (Rear)	5117613	.064 Alclad 24SO
H	28-1/2	Frame (Rear)	5117613	.064 Alclad 24SO
I	15	Frame (Rear)	5117613	.064 Alclad 24SO
J	5	Frame (Rear)	5113599	.040 Alclad 24SO
K	5	Frame (Rear)	5113599-1 R.H.	.040 Alclad 24SO
L	15	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
M	28-1/2	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
N	42	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
O	58	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
P	73-1/2	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
Q	85	Frame (Rear)	5117613-1 R.H.	.064 Alclad 24SO
R	94-1/4	Frame (Rear)	5116640-1 R.H.	.040 Alclad 24SO
S	111	Frame (Rear)	5113730	.051 Alclad 24SO
T	127-3/4	Frame (Rear)	5116642	.040 Alclad 24SO

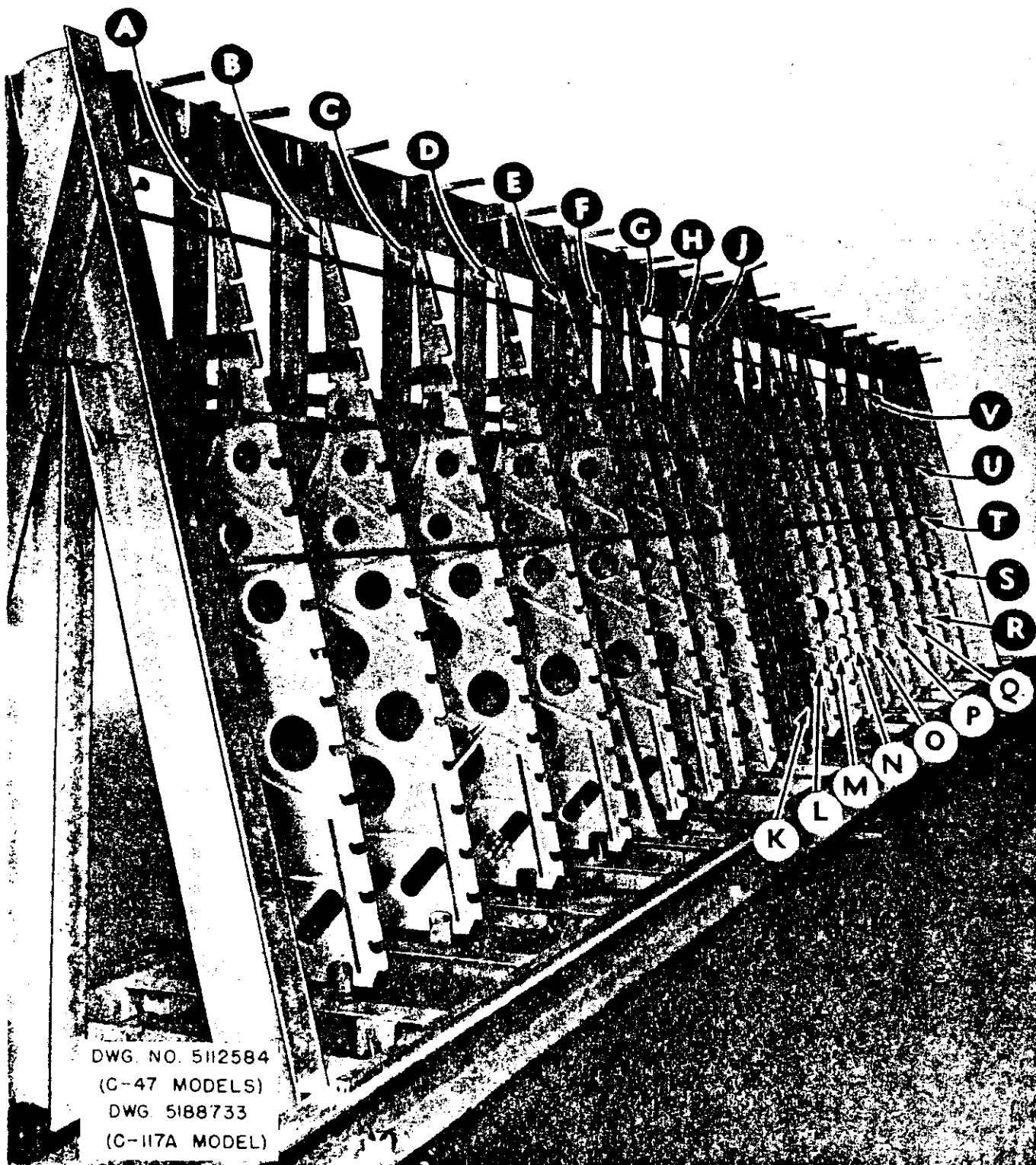


Figure 39 - Center Wing Trailing. Section Frames (C-47 and C-117A Models)

Revised 15 September 1945

Key To Figure 39

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	126-7/16	Rib	5115988-3 R.H.	.036 Alclad 24SO
B	109-3/4	Rib	5115988-3 R.H.	.036 Alclad 24SO
C	91-3/4	Rib	5115988-5 R.H.	.036 Alclad 24SO
D	73-1/2	Rib	5115988-3 R.H.	.036 Alclad 24SO
E	55	Rib	5115988-3 R.H.	.036 Alclad 24SO
F	42	Rib	5115988-3 R.H.	.036 Alclad 24SO
G	31-1/2	Rib	5115988-3 R.H.	.036 Alclad 24SO
H	17-1/2	Rib	5115988-17 R.H.	.036 Alclad 24SO
J	6	Rib	5115986-1 R.H.	.036 Alclad 24SO
K	6	Rib	5115986 L.H.	.036 Alclad 24SO
L	17-1/2	Rib	5115988-16 L.H.	.036 Alclad 24SO
M	31-1/2	Rib	5115988-2 L.H.	.036 Alclad 24SO
N	42	Rib	5115988-2 L.H.	.036 Alclad 24SO
O	55	Rib	5115988-2 L.H.	.036 Alclad 24SO
P	73-1/2	Rib	5115988-2 L.H.	.036 Alclad 24SO
Q	91-3/4	Rib	5115988-4 L.H.	.036 Alclad 24SO
R	109-3/4	Rib	5115988-2 L.H.	.036 Alclad 24SO
S	126-7/16	Rib	5115988-2 L.H.	.036 Alclad 24ST
T		Angle	5112584-40	.028 Alclad 24ST
U		Angle	5112584-47	.028 Alclad 24SO
V		Angle	5112584-56	Ext. No. 2

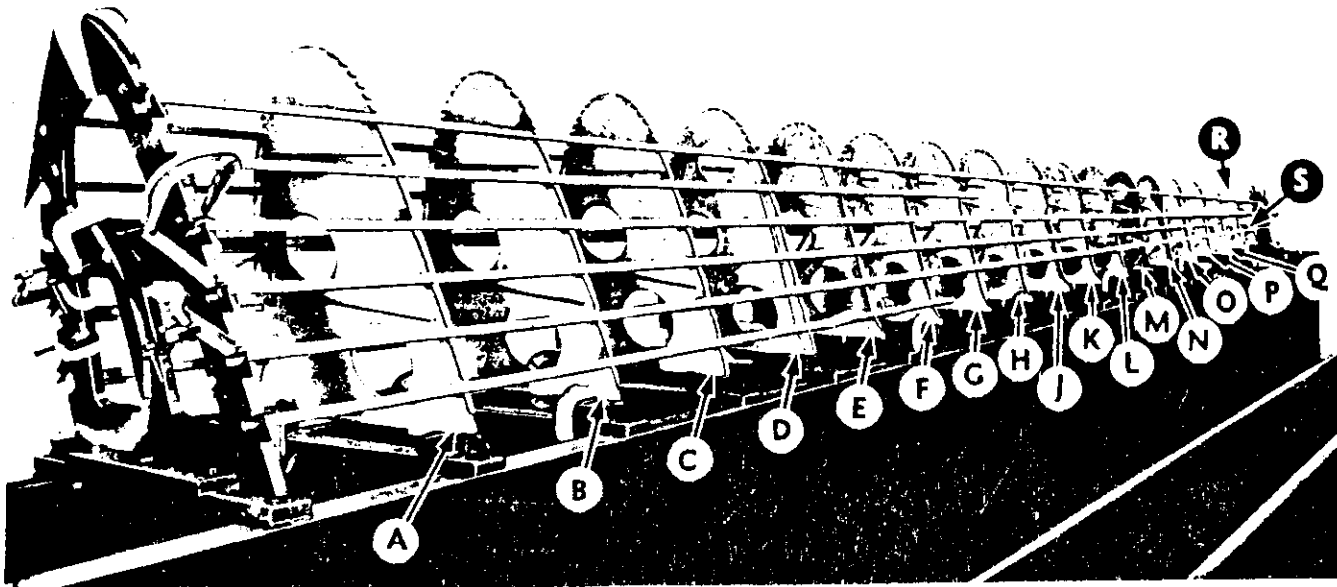


Figure 40 - Outer Wing Nose Section Frames

KEY TO FIGURE 40

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	17.9	Nose Rib	5115490 L.H. & -1 R.H.	.032 Alclad 24SO
B	35.8	Nose Rib	5132976 L.H. & -1 R.H.	.032 Alclad 24SO
C	53.7	Nose Rib	5135123 L.H. & -1 R.H.	.032 Alclad 24ST
D	71.6	Nose Rib	5115876 L.H. & -1 R.H.	.032 Alclad 24SO
E	89.5	Nose Rib	5115486-8 L.H. & -9 R.H.	.028 Alclad 24SO
F	107.4	Nose Rib	5115486-10 L.H. & -11 R.H.	.028 Alclad 24SO
G	125.3	Nose Rib	5115486-12 L.H. & -13 R.H.	.028 Alclad 24SO
H	143.2	Nose Rib	5115486-14 L.H. & -15 R.H.	.028 Alclad 24SO
J	161.1	Nose Rib	5115486-16 L.H. & -17 R.H.	.028 Alclad 24SO
K	179	Nose Rib	5115486-18 L.H. & -19 R.H.	.028 Alclad 24SO
L	196.9	Nose Rib	5115486-20 L.H. & -21 R.H.	.028 Alclad 24SO
M	214.8	Nose Rib	5115486-22 L.H. & -23 R.H.	.028 Alclad 24SO
N	232.7	Nose Rib	5115486-24 L.H. & -25 R.H.	.028 Alclad 24SO
O	250.6	Nose Rib	5115486-26 L.H. & -27 R.H.	.028 Alclad 24SO
P	268.5	Nose Rib	5115486-28 L.H. & -29 R.H.	.028 Alclad 24SO
Q	286.4	Nose Rib	5115486-30 L.H. & -31 R.H.	.028 Alclad 24SO
R	304.3	Nose Rib	5115486-32 L.H. & -33 R.H.	.028 Alclad 24SO
S	322.2	Nose Rib	5115486-34 L.H. & -35 R.H.	.028 Alclad 24SO

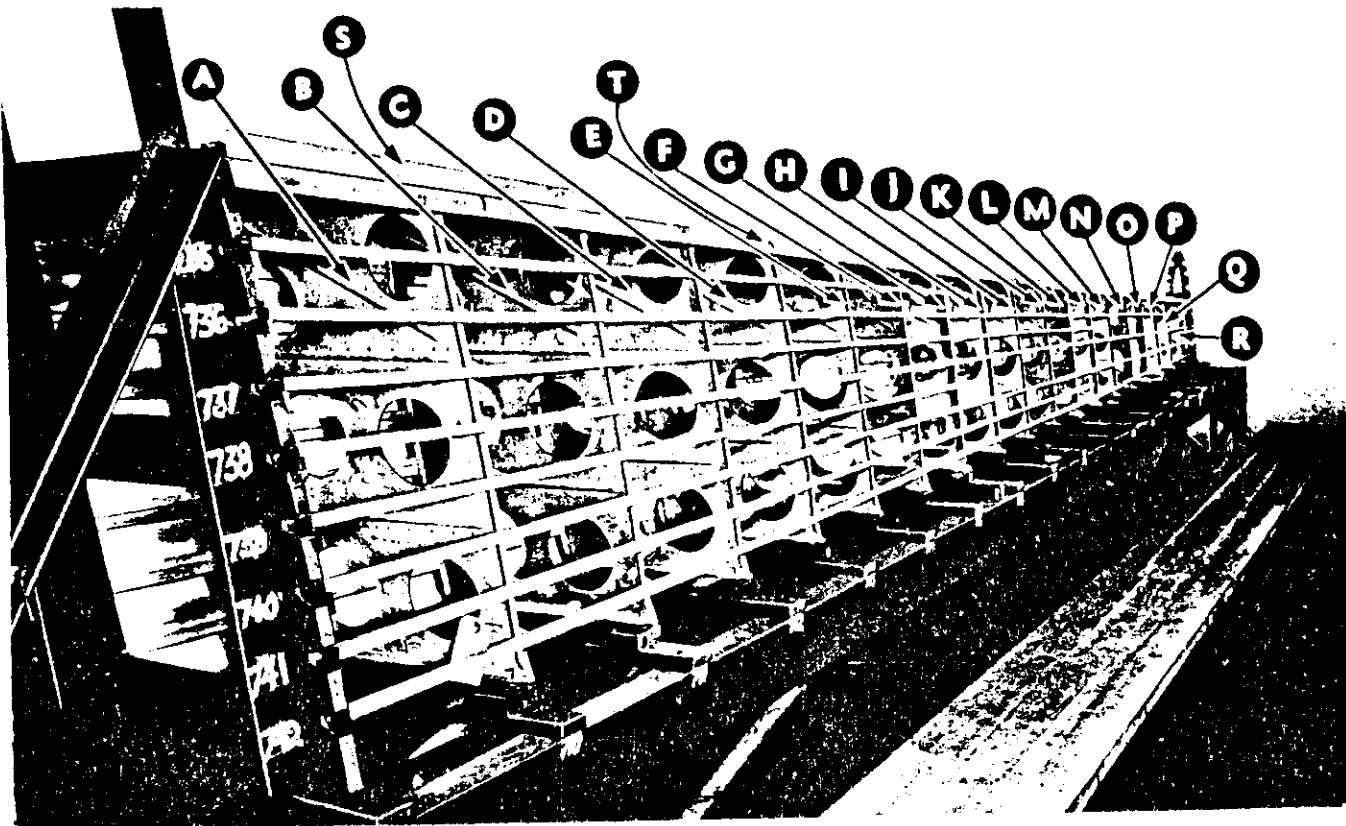


Figure 41 - Outer Wing Front Section Frames

KEY TO FIGURE 41

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	17.9	Rib	5115497 L.H. & -1 R.H.	.022 Alclad 24SO
B	35.8	Rib	5115497-2 L.H. & -3 R.H.	.022 Alclad 24SO
C	53.7	Rib	5115497-4 L.H. & -5 R.H.	.022 Alclad 24SO
D	71.6	Rib	5115497-6 L.H. & -7 R.H.	.022 Alclad 24SO
E	89.5	Rib	5115497-8 L.H. & -9 R.H.	.022 Alclad 24SO
F	107.4	Rib	5115497-10 L.H. & -11 R.H.	.022 Alclad 24SO
G	125.3	Rib	5115497-12 L.H. & -13 R.H.	.022 Alclad 24SO
H	143.2	Rib	5115497-14 L.H. & -15 R.H.	.022 Alclad 24SO
I	161.1	Rib	5115497-16 L.H. & -17 R.H.	.022 Alclad 24SO
J	179.0	Rib	5115497-18 L.H. & -19 R.H.	.022 Alclad 24SO
K	196.9	Rib	5115497-20 L.H. & -21 R.H.	.022 Alclad 24SO
L	214.8	Rib	5115497-22 L.H. & -23 R.H.	.022 Alclad 24SO
M	232.7	Rib	5115497-24 L.H. & -25 R.H.	.022 Alclad 24SO
N	250.6	Rib	5115575 L.H. & -1 R.H.	.022 Alclad 24SO
O	268.5	Rib	5115575-2 L.H. & -3 R.H.	.022 Alclad 24SO
P	286.4	Rib	5115575-4 L.H. & -5 R.H.	.022 Alclad 24SO
Q	304.3	Rib	5115575-6 L.H. & -7 R.H.	.022 Alclad 24SO
R	322.2	Rib	5115575-8 L.H. & -9 R.H.	.022 Alclad 24SO
S		Front Spar Cap	5115498-2 L.H. & -3 R.H.	Ext. No. 34
T		Rear Spar Cap	5115498-4 L.H. & -5 R.H.	Ext. No. 34

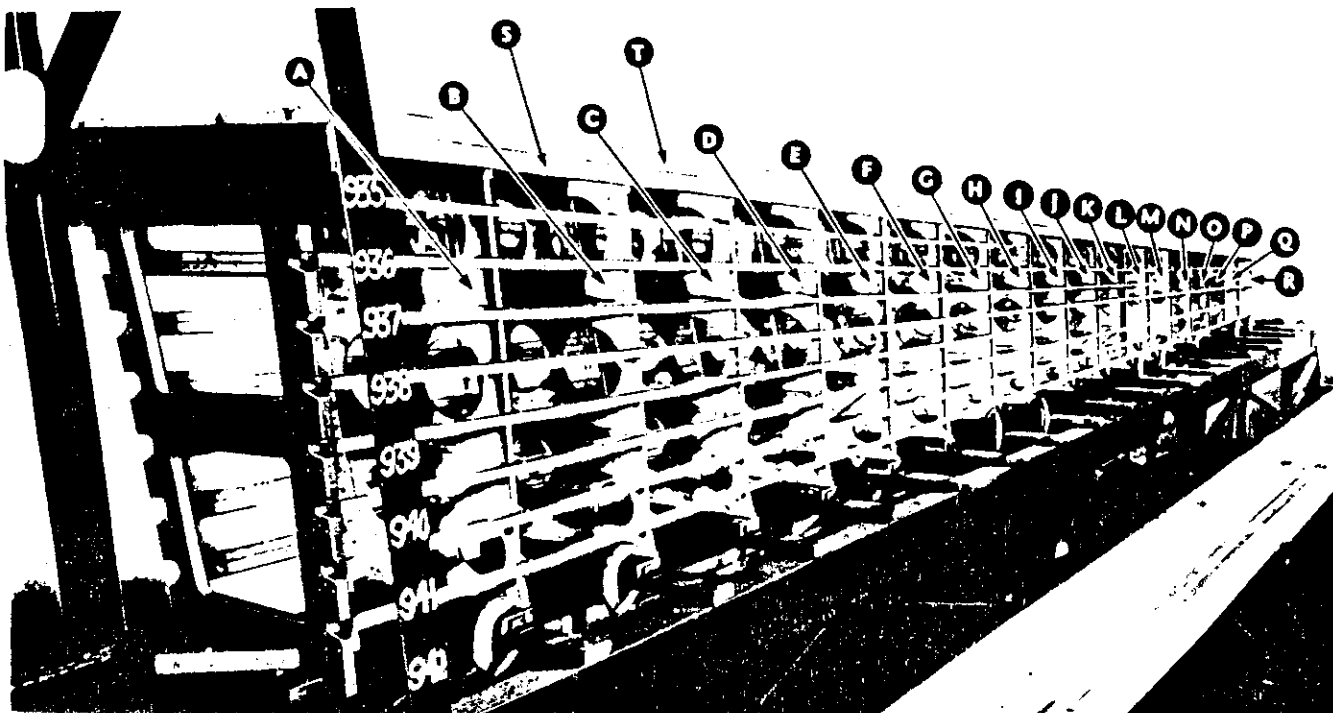


Figure 42 - Outer Wing Center Section Frames

KEY TO FIGURE 42

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	17.9	Rib	5115489 L.H. & -1 R.H.	.022 Alclad 24SO
B	35.8	Rib	5115489-2 L.H. & -3 R.H.	.022 Alclad 24SO
C	53.7	Rib	5115489-4 L.H. & -5 R.H.	.022 Alclad 24SO
D	71.6	Rib	5115489-6 L.H. & -7 R.H.	.022 Alclad 24SO
E	89.5	Rib	5115489-8 L.H. & -9 R.H.	.022 Alclad 24SO
F	107.4	Rib	5115489-10 L.H. & -11 R.H.	.022 Alclad 24SO
G	125.3	Rib	5115489-12 L.H. & -13 R.H.	.022 Alclad 24SO
H	143.2	Rib	5115489-14 L.H. & -15 R.H.	.022 Alclad 24SO
I	161.1	Rib	5115489-16 L.H. & -17 R.H.	.022 Alclad 24SO
J	179.0	Rib	5115489-18 L.H. & -19 R.H.	.022 Alclad 24SO
K	196.9	Rib	5115489-20 L.H. & -21 R.H.	.022 Alclad 24SO
L	214.8	Rib	5115489-22 L.H. & -23 R.H.	.022 Alclad 24SO
M	232.7	Rib	5115489-24 L.H. & -25 R.H.	.022 Alclad 24SO
N	250.6	Rib	5115574 L.H. & -1 R.H.	.022 Alclad 24SO
O	268.5	Rib	5115574-2 L.H. & -3 R.H.	.022 Alclad 24SO
P	286.4	Rib	5115574-4 L.H. & -5 R.H.	.022 Alclad 24SO
Q	304.3	Rib	5115574-6 L.H. & -7 R.H.	.022 Alclad 24SO
R	322.2	Rib	5115574-8 L.H. & -9 R.H.	.022 Alclad 24SO
S		Rear Cap	5115496-4 L.H. & -5 R.H.	Ext. No. 34
T		Front Cap	5115496-2 L.H. & -3 R.H.	Ext. No. 48

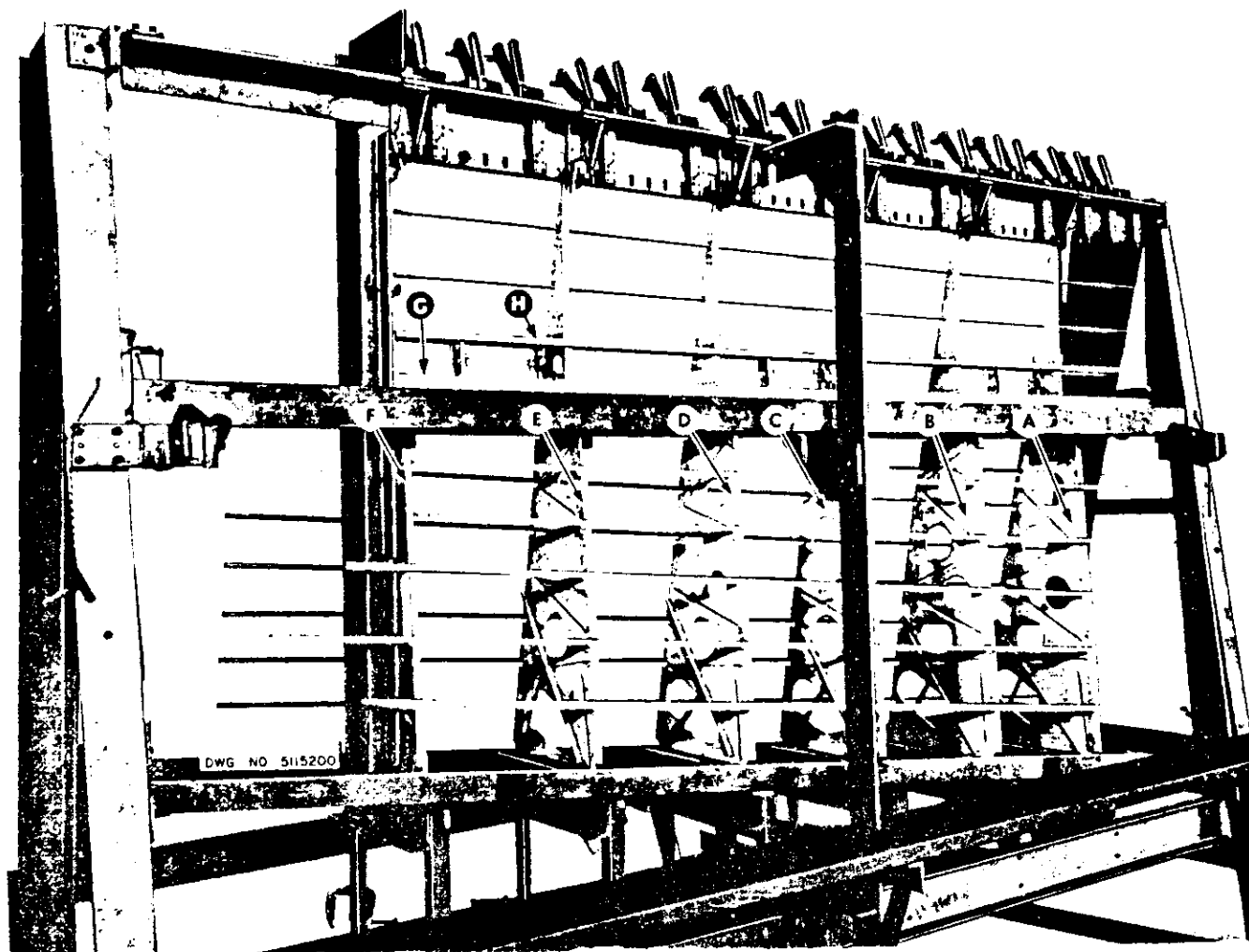


Figure 43 - Outer Wing Inboard Trailing Section

KEY TO FIGURE 43

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	17.9	Rib	5115508-100 L.H. 5115508-101 R.H.	.028 Alclad 24SO
B	35.8	Rib	5115508-102 L.H. 5115508-103 R.H.	.028 Alclad 24SO
C	53.7	Rib	5115508-104 L.H. 5115508-105 R.H.	.028 Alclad 24SO
D	71.16	Rib	5115508-106 L.H. 5115508-107 R.H.	.028 Alclad 24SO
E	89.5	Rib	5115508-108 L.H. 5115508-109 R.H.	.028 Alclad 24SO
F	107.4	Rib	5115505 L.H. 5115505-1 R.H.	.029 Alclad 24SO
G		Intercostal	5115200-128 L.H. 5115200-127 R.H.	.051 Alclad 24ST
H		Intercostal	5115200	.028 Alclad 24ST

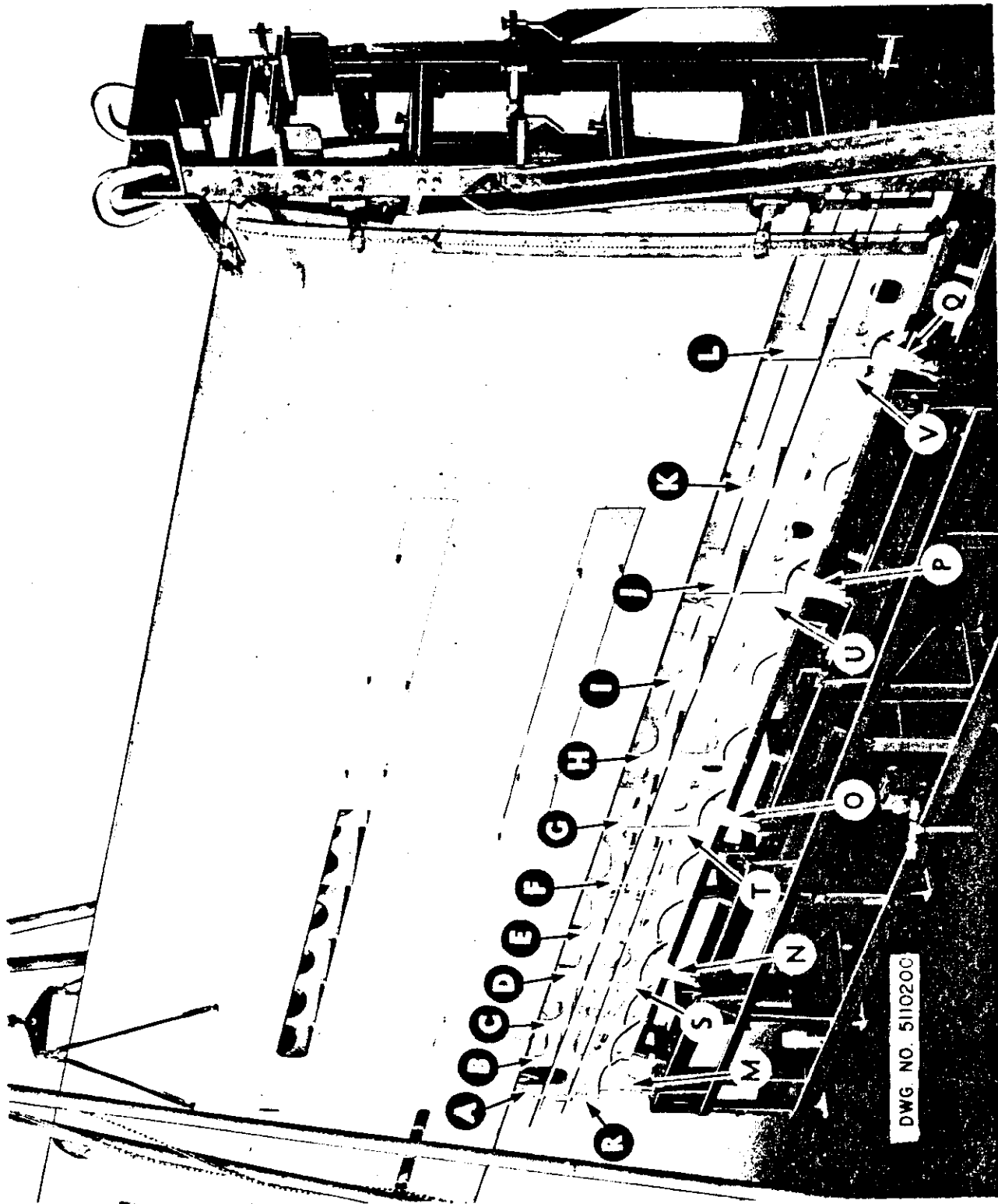


Figure 44--Outer Wing Outboard Trailing Section Frames

KEY TO FIGURE 44

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	125.3	Rib	5115502-2 L.H. & -3 R.H.	.045 Alclad 24SO
B	143.2	Rib	5115494 L.H. & -1 R.H.	.022 Alclad 24SO
C	161.1	Rib	5115485 L.H. & -1 R.H.	.022 Alclad 24SO
D	179.0	Rib	5115510-2 L.H. & -3 R.H.	.040 Alclad 24SO
E	196.9	Rib	5115504 L.H. & -1 R.H.	.022 Alclad 24SO
F	214.8	Rib	5115491 L.H. & -1 R.H.	.022 Alclad 24SO
G	232.7	Rib	5115503-2 L.H. & -3 R.H.	.040 Alclad 24SO
H	250.6	Rib	5115507 L.H. & -1 R.H.	.022 Alclad 24SO
I	268.5	Rib	5115488 L.H. & -1 R.H.	.022 Alclad 24SO
J	286.4	Rib	5115492-2 L.H. & -3 R.H.	.045 Alclad 24SO
K	304.3	Rib	4115453 L.H. & -1 R.H.	.020 Alclad 24SO
L	322.2	Rib	5115495-2 L.H. & -3 R.H.	.040 Alclad 24SO
M	125.3	Hinge	270944 L.H. & -1 R.H.	Alum. Alloy
N	179.0	Hinge	270944 L.H. & -1 R.H.	Alum. Alloy
O	232.7	Hinge	270944 L.H. & -1 R.H.	Alum. Alloy
P	286.4	Hinge	270944 L.H. & -1 R.H.	Alum. Alloy
Q	322.2	Hinge	270944 L.H. & -1 R.H.	Alum. Alloy
R	125.3	Aux. Rib	5115502-4 L.H. & -5 R.H.	.036 Alclad 24SO
S	179.0	Aux. Rib	5115510-4 L.H. & -5 R.H.	.036 Alclad 24SO
T	232.7	Aux. Rib	5115503-4 L.H. & -5 R.H.	.036 Alclad 24SO
U	286.4	Aux. Rib	5115492-4 L.H. & -5 R.H.	.036 Alclad 24SO
V	322.2	Aux. Rib	5115495-4 L.H. & -5 R.H.	.029 Alclad 24SO

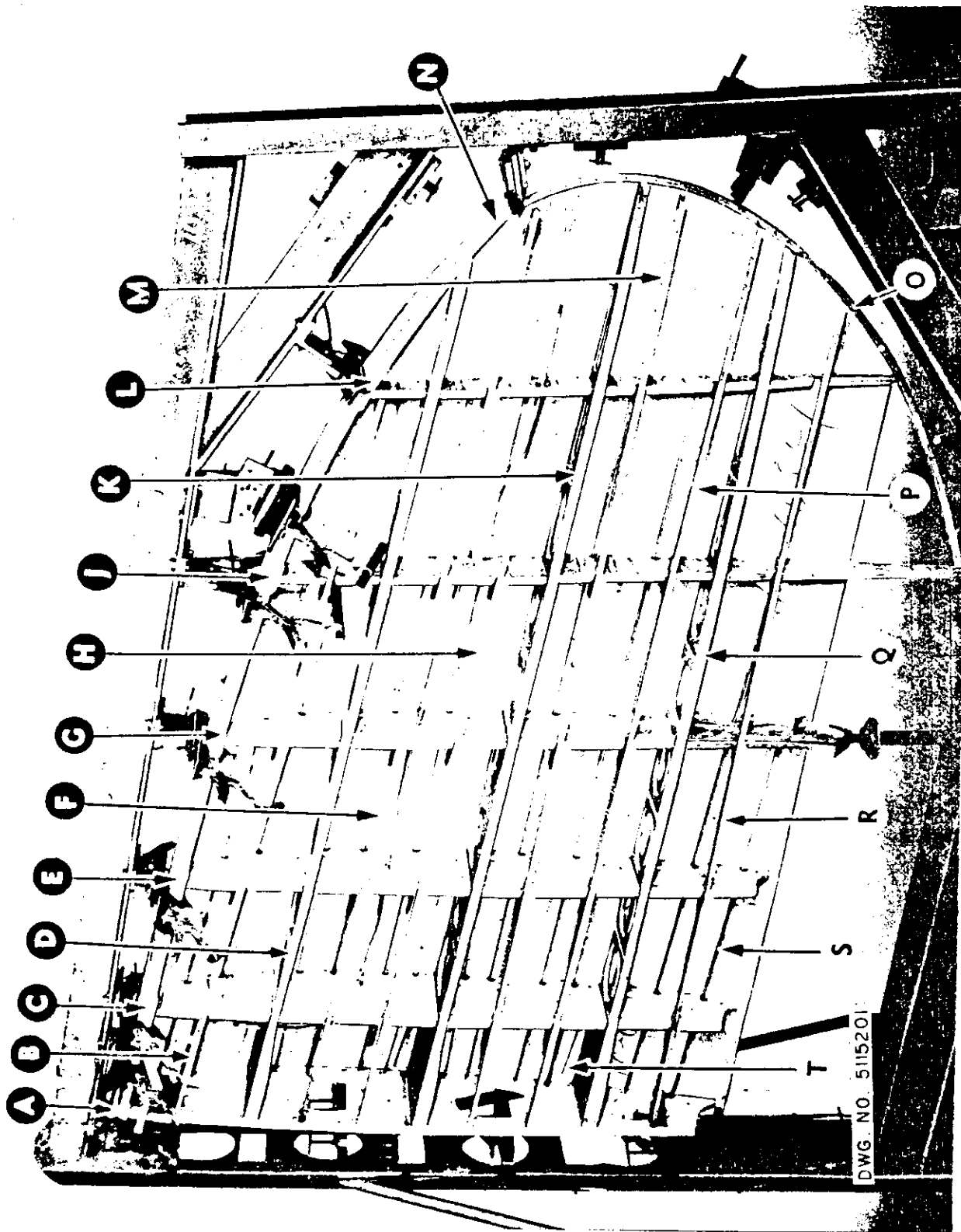


Figure 45 - Outer Wing-Tip Frames

DWG NO 5115201

KEY TO FIGURE 45

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	338-3/4	Rib	511527 L.H. & -1 R.H.	.032 Alclad 24SO
B		Stringer	5115201-22 L.H. & -23 R.H.	Ext. No. 5
C	353	Rib	4114993 L.H. & -1 R.H.	.025 Alum. Alloy 24SO
D		Doubler	5115201-78	.025 Alclad 24ST
E	368	Rib	4114997 L.H. & -1 R.H.	.025 Alclad 24SO
F		Stringer	5115201-24 L.H. & -25 R.H.	Ext. No. 5
G	383	Rib	4114986 L.H. & -1 R.H.	.020 Alclad 24SO
H		Stringer	5115201-26 L.H. & -27 R.H.	Ext. No. 5
J	398	Rib	4114987 L.H. & -1 R.H.	.025 Alclad 24SO
K		Stringer	5115201-10 L.H. & -11 R.H.	Ext. No. 5
L	413	Rib	2114978 L.H. & -1 R.H.	.020 Alclad 24SO
M		Stringer	5115201-28 L.H. & -29 R.H.	Ext. No. 5
N		Nose Skin	5115201-58 L.H. & -59 R.H.	.032 Alclad 24SO
O		Bow Sector	5115201-62 L.H. & -63 R.H.	Ext. No. 13
P		Stringer	5115201-30 L.H. & -31 R.H.	Ext. No. 5
Q		Stringer	5115201-32 L.H. & -33 R.H.	Ext. No. 5
R		Stringer	5115201-64 L.H. & -65 R.H.	Ext. No. 5
S		Stringer	5115201-20 L.H. & -21 R.H.	Ext. No. 5
T		Clip	1114976 L.H. & -1 R.H.	.032 Alclad 24ST

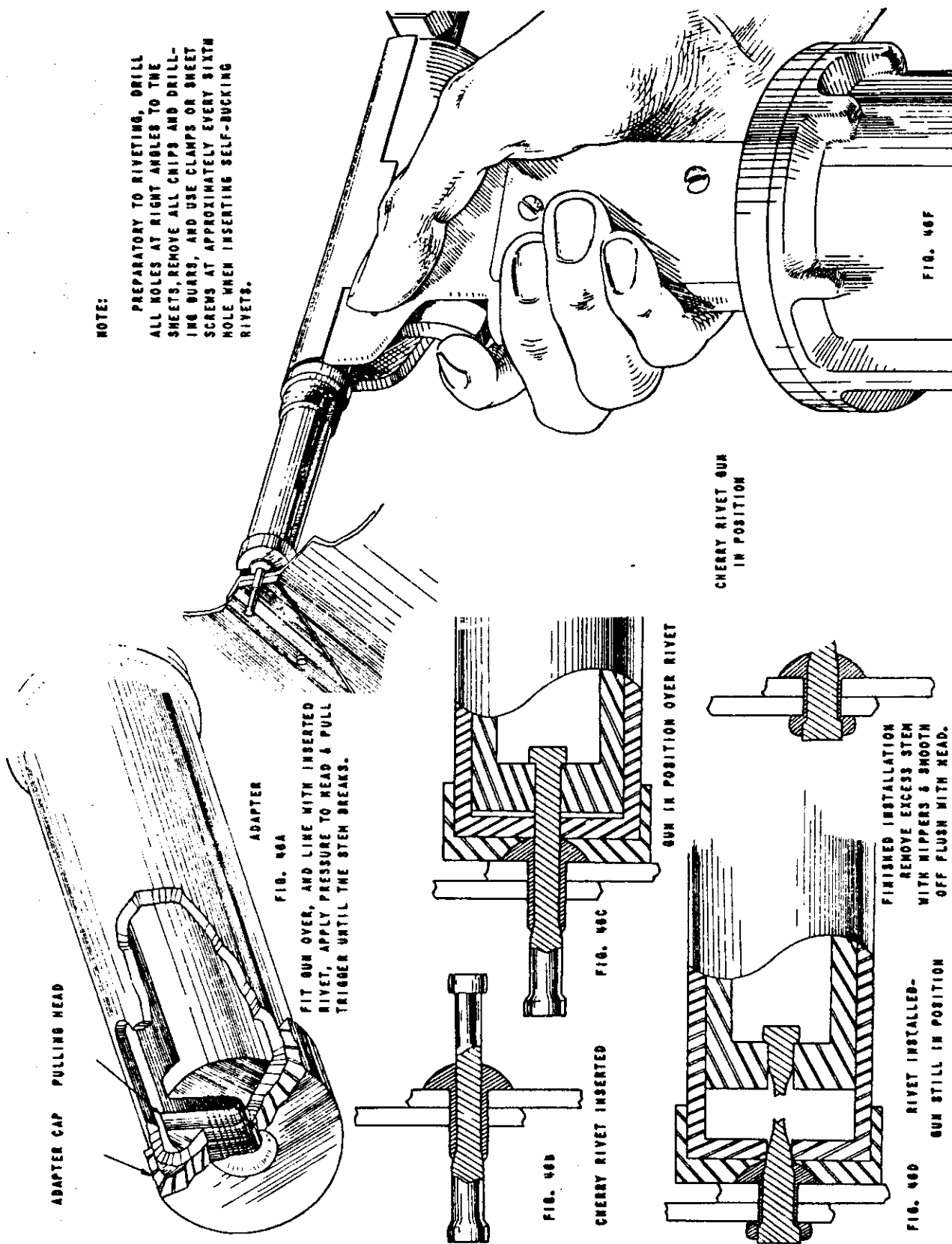
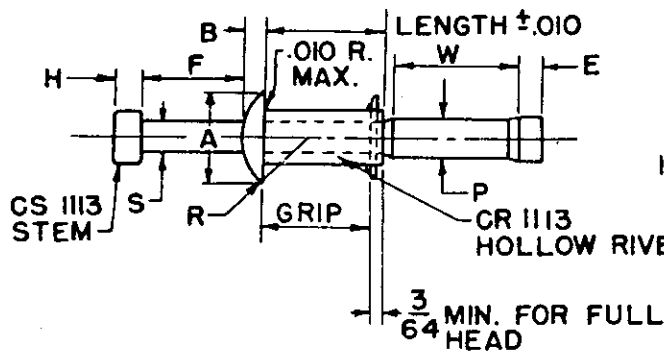
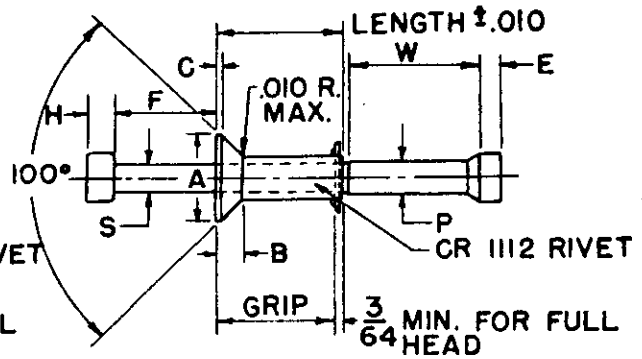


Figure 46 - Cherry Rivet Installation

LS 1127 BRAZIER HEAD ASSEM.



LS 1126 100° COUNTERSUNK HEAD ASSEM.



DIM.	1/8	.0035 .0010	5/32	.004 .001	3/16	.004 .001
A	15/64	.005	6/16	.005	25/64	.020
B	3/64	.0025	1/16	.003	5/64	.005
R	.170	.0025	.227	.003	.283	.010
E	3/64	MIN.	3/64	MIN.	1/16	MIN.
F	1/4	"	1/4	"	3/8	"
H	3/32	"	3/32	"	7/64	"
P	.102	.001	.127	.001	.152	.001
W	9/32		9/32		9/32	
S	.085	.002 .001	.109	.002 .001	.128	.002 .001

DIM.	1/8	.0035 .0010	5/32	.004 .001	3/16	.004 .001
A	.219	.004	.281	.004	.344	.005
B	.042	.002	.055	.002	.070	.003
C	.003	.002	.003	.002	.004	.002
E	3/64	MIN.	3/64	MIN.	1/16	MIN.
F	1/4	"	1/4	"	3/8	"
H	3/32	"	3/32	"	7/64	"
P	.102	.001	.127	.001	.152	.001
W	9/32		9/32		9/32	
S	.085	.002 .001	.109	.002 .001	.128	.002 .001

GRIP	LENGTH	DASH NUMBERS	FOR LS-1127, CR-1113 & CS-1127
1/16	1/8	4-2 (1160)	5-2 (635)
1/8	3/16	4-4 (1045)	5-4 (590)
3/16	1/4	4-6 (985)	5-6 (550)
1/4	5/16	4-8 (920)	5-8 (520)

GRIP	LENGTH	DASH NUMBERS	FOR LS-1126, CR-1112 & CS-1126
1/16	1/8	4-2 (1240)	5-2 (690)
1/8	3/16	4-4 (1130)	5-4 (640)
3/16	1/4	4-6 (1040)	5-6 (595)
1/4	5/16	4-8 (960)	5-8 (555)

NOTES:

- CHERRY RIVETS SHOULD NOT BE USED TO REPLACE SOLID RIVETS UNLESS ABSOLUTELY NECESSARY. THE SELF-PLUGGING RIVET, WHEN PROPERLY INSTALLED, MAY BE USED TO REPLACE A17ST SOLID RIVETS, SIZE FOR SIZE. WHEN USED TO REPLACE 17ST RIVETS DRIVEN IN THE HEAT-TREATED AND AGED CONDITION, OR 24ST SOLID RIVETS, THE NEXT SIZE CHERRY RIVET SHALL BE USED. IN REPLACEMENT OF SOLID RIVETS, THE SIZE OF THE HOLE SHOULD BE CHECKED. IF THE HOLE DIAMETER, AFTER REMOVAL OF THE SOLID RIVET, EXCEEDS THE MAXIMUM ALLOWABLE HOLE SIZE, THEN THE NEXT SIZE LARGER CHERRY RIVET SHOULD BE USED.

- TOOL G-6 AND G-7 CHERRY RIVET GUN. CHERRY RIVET CO.
1819 BARRANCA STREET LOS ANGELES, CALIFORNIA

EXAMPLE: IN SELECTING RIVET OF PROPER LENGTH, ALLOW MINIMUM OF $\frac{3}{64}$ OF SHANK EXTENSION FOR UPSETTING: THUS LS-1126-4-4 AND LS-1127-4-4 ARE $\frac{1}{8}$ IN. DIA. RIVETS X $\frac{3}{16}$ IN. LONG FOR USE IN TOTAL STOCK THICKNESS OF FROM $\frac{5}{64}$ IN. TO $\frac{9}{64}$ IN.

MATERIAL: CR-1113 & CR-1112 RIVETS ARE A17ST ALUM. ALLOY A.S. SPEC. 25526
CS-1127 & CS-1126 STEMS ARE 17ST ALUM. ALLOY A.S. SPEC. 25526

FINISH: NONE. (MAY BE ANODIZED ON SPECIAL ORDER)

HEAT TREAT: DO NOT RE-HEAT TREAT LS-1127 & LS-1126

LIMITS: UNLESS OTHERWISE SPECIFIED
ANGULAR $\frac{1}{2}$ DEGREES
FRACTIONAL $\frac{1}{64}$
DECIMAL .008

Figure 47 - Cherry Rivet Assembly

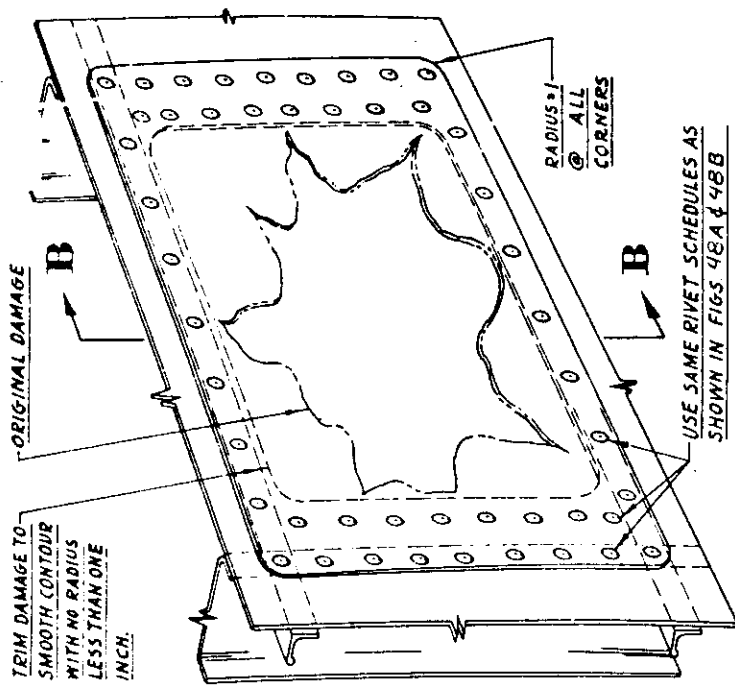


FIG 48C REPAIR OF EXTENSIVE DAMAGE

FIG 48B REPAIR OF MINOR DAMAGE FOR .064 SKIN

SPLICE SAME AS IN FIG. A
EXCEPT FOR THE FOLLOWING
RIVET SCHEDULE:
VERTICAL USE TWO STAGGERED
ROWS OF 1/2\"/>

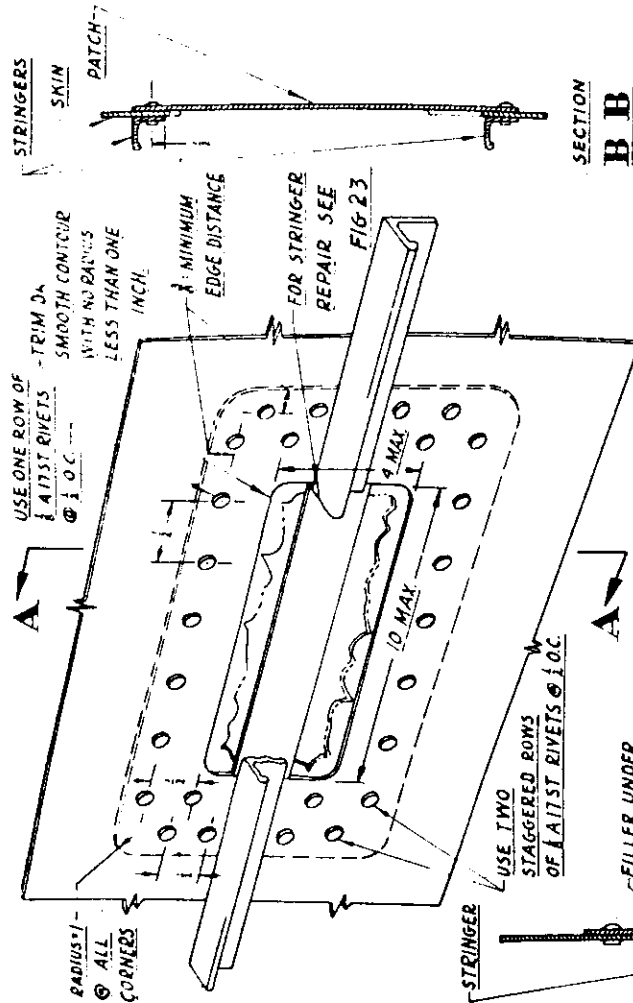


FIG 48A REPAIR OF MINOR DAMAGE FOR SKIN UP TO GAGE .040

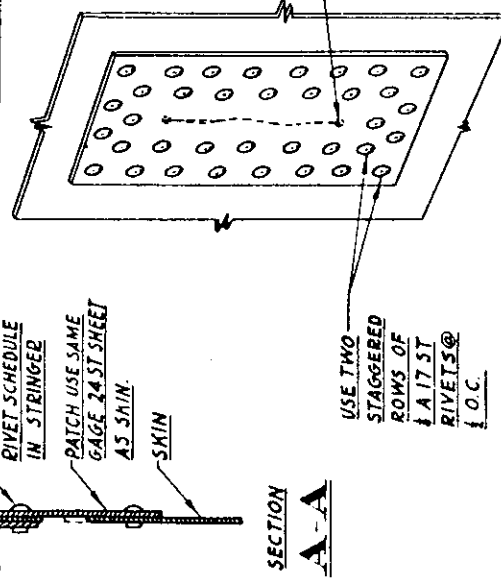


FIG 48D PATCH FOR VERTICAL CRACK

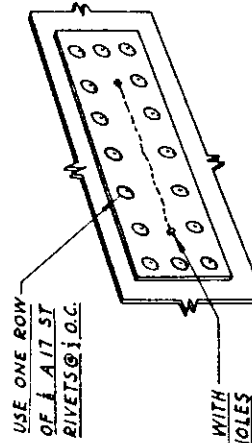


FIG 48E PATCH FOR HORIZONTAL CRACK

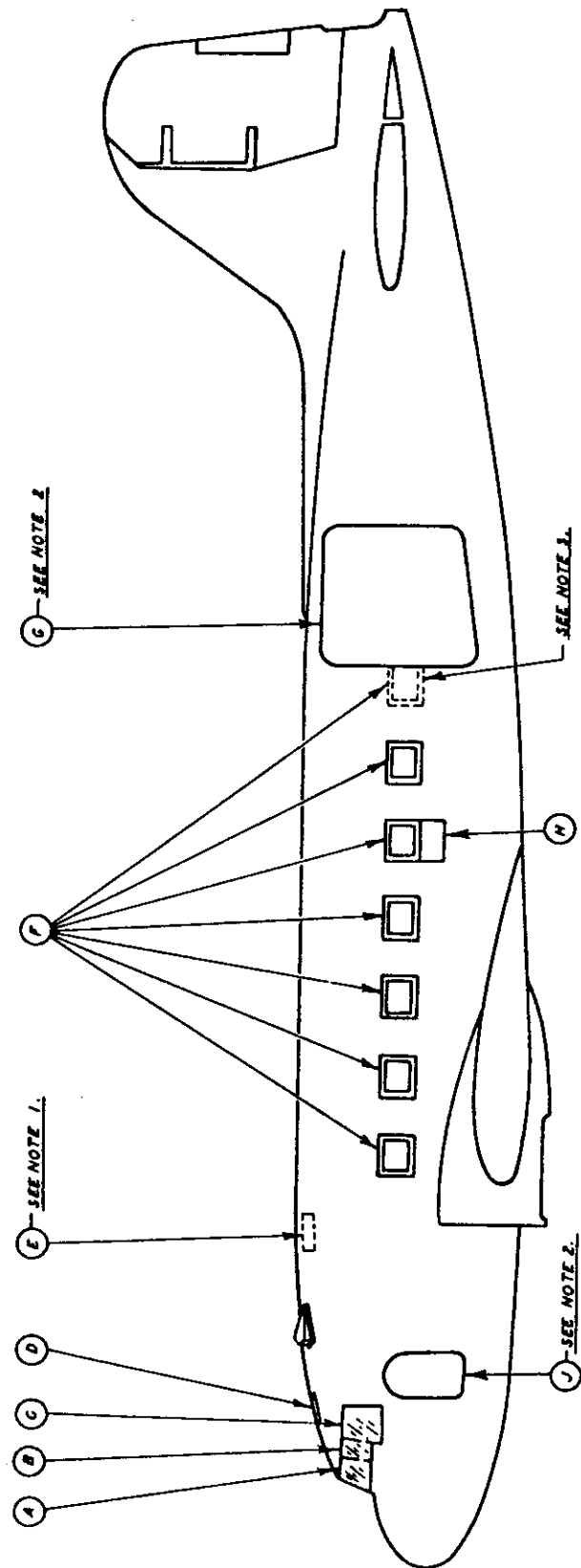
Figure 48 - Fuselage Skin Repair

REF	PART NO.	PART NAME	REQ.
A	511799A-1	L.H. & R.H. WINDOW ASSEM.	1
	4115409	GLASS	2
	2115401	BLIND	2
B	5115405A-1	L.H. & R.H. WINDOW ASSEM.	2
C	4115404	GLASS	2
	5112889-40	SEALING STRIP	2
	5112889-41	SEALING STRIP	2
	5112889-87	SEALING STRIP	2
	5112889-48	SEALING STRIP	2
	5112889-89	SEALING STRIP	2
D	5117886	EMERGENCY HATCH	1
	5112889-50	SEALING STRIP	1
E	2114493	WINDOW PANE	1
	2114498	SEALING STRIP	1

REF	PART NO.	PART NAME	REQ.
F	5114382	PANEL ASSEMBLY	1
	2114378	GAP	1
	2114497	SEALING STRIP	1
G	5110530	MAIN CARGO LOADING DOOR	1
	5110530	MAIN CARGO LOADING DOOR ASSEMBLY	1
H	5113191	AUXILIARY EXIT ASSEMBLY	1
J	5115216	CARGO LOADING DOOR ASSEM.	1

NOTE:
 1. RADIO COMPARTMENT WINDOW INSTALLED ON R.H. SIDE OF FUSELAGE ONLY.
 2. MAIN CARGO LOADING DOOR AND NOSE SECTION CARGO LOADING DOOR INSTALLED ON L.H. SIDE OF FUSELAGE ONLY.
 3. WINDOW INSTALLED ON R.H. SIDE OF FUSELAGE ONLY.

REFER TO DOUGLAS DWGS. 511799, 5114083, 5110530, 5112889, 5110542 & 5110523



VIEW SHOWING L.H. SIDE OF FUSELAGE

Figure 49 - Fuselage Windows And Doors

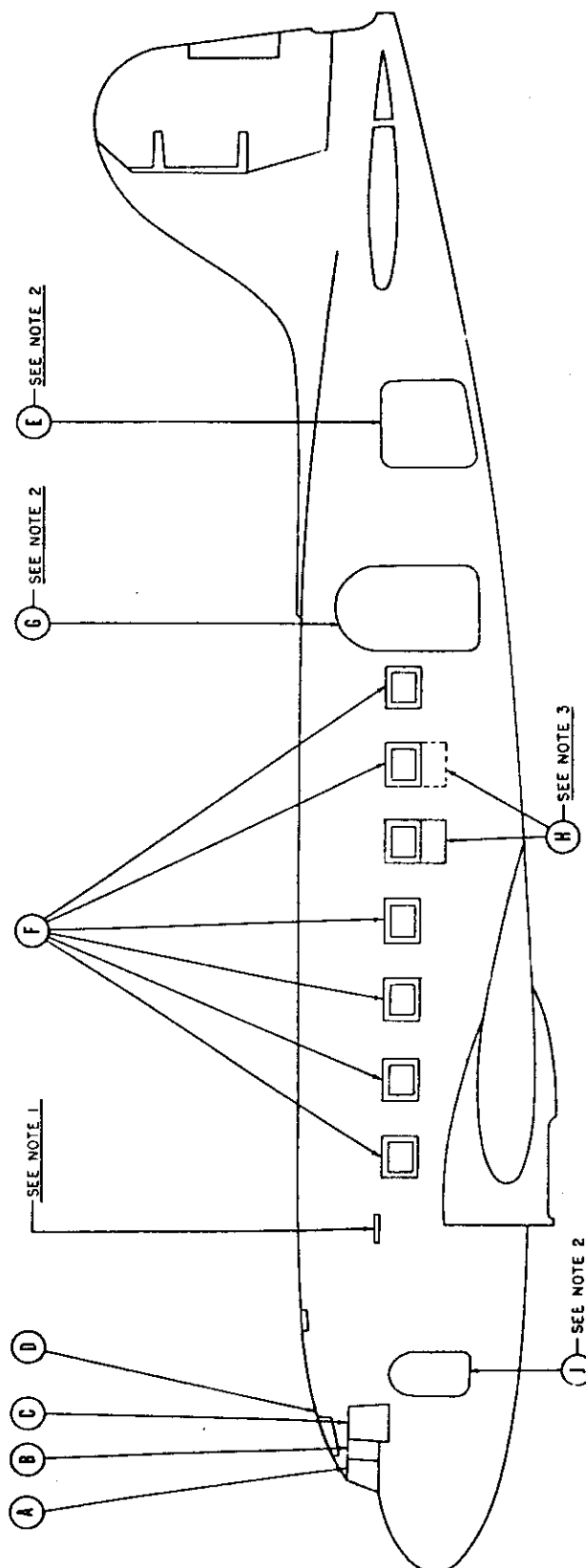
REF.	PART NO.	PART NAME	REQ.
A	5117199 B-1	L.H. & R.H. WINDOW ASSEM.	1
	4115409	GLASS	2
	2115401	RING	2
B	5115405 B-1	L.H. & R.H. WINDOW ASSEM.	2
	4115404	GLASS	2
	5112869-40	SEALING STRIP	2
C	5112869-41	SEALING STRIP	2
	5112869-87	SEALING STRIP	2
	5112869-88	SEALING STRIP	2
D	5112869-89	SEALING STRIP	2
	5117186	EMERGENCY HATCH	1
	5112869-50	SEALING STRIP	1
E	5188517	REAR LUGGAGE DOOR ASSEMBLY	1

REF.	PART NO.	PART NAME	REQ.
F	4114362	PANEL ASSEMBLY	14
	2114738	CAP	14
	2114497	SEALING STRIP	13
G	5148185	MAIN CABIN DOOR ASSEMBLY	1
H	5113191	AUXILIARY EXIT ASSEMBLY	3
J	5115216	FRONT CARGO DOOR ASSEM.	1

NOTE:

1. LUGGAGE COMPARTMENT WINDOW INSTALLED ON L.H. SIDE ONLY.
2. MAIN CABIN DOOR, FRONT CARGO DOOR & REAR LUGGAGE DOOR INSTALLED ON L.H. SIDE ONLY.
3. 2 AUXILIARY EXIT ASSEMBLIES REQ. ON R.H. SIDE - 1 ON L.H. SIDE.

REFER TO DOUGLAS DWGS. 5117199, 5188183, 5148767, 5112869, 5188241, & 5110523



VIEW SHOWING L.H. SIDE OF FUSELAGE

Figure 49A - Fuselage Windows and Doors (C-117A Model)

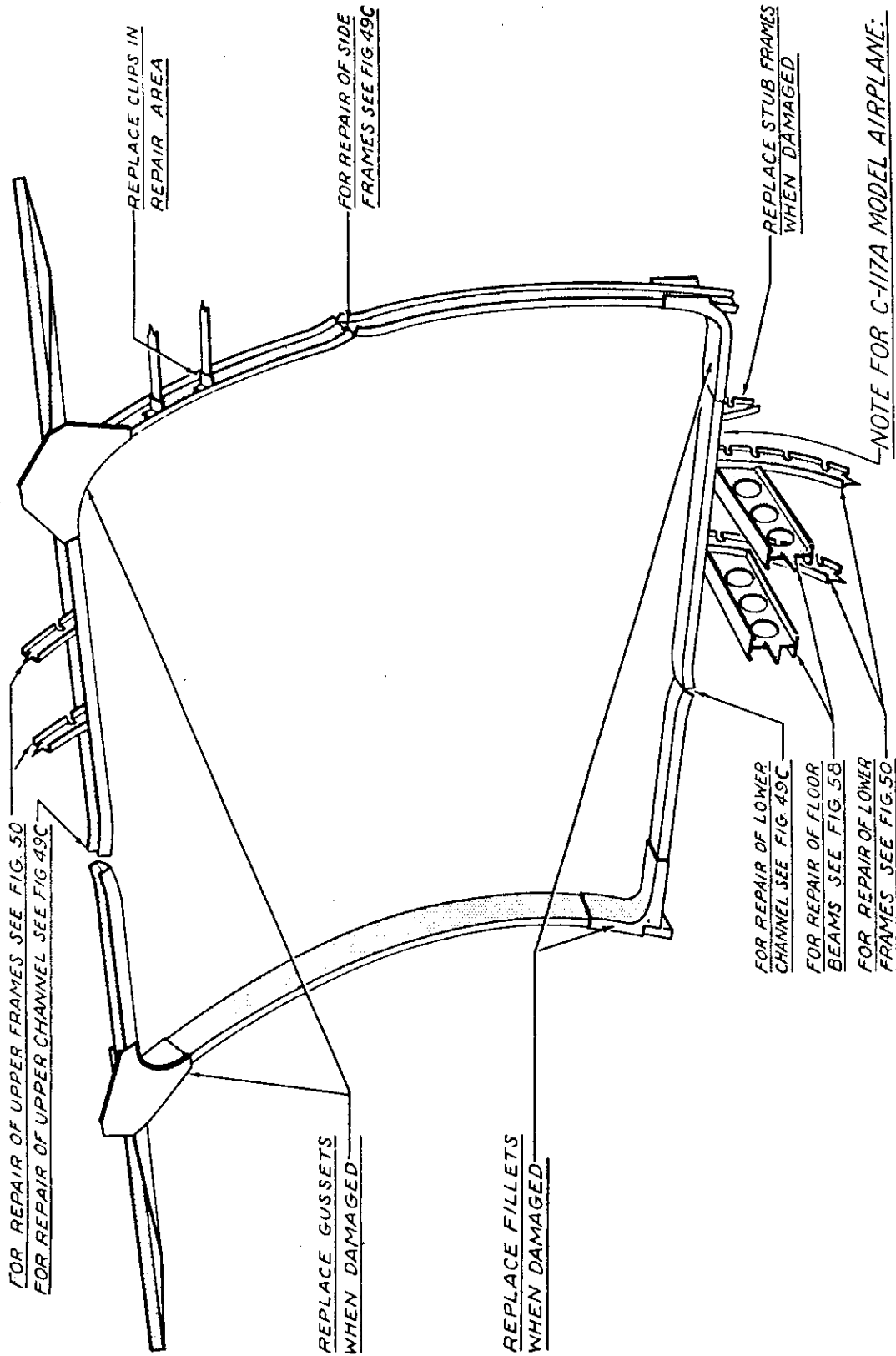


Figure 49B - Key Damage Drawing of Main Cargo Door Jamb (C-47 and C-117A Models)

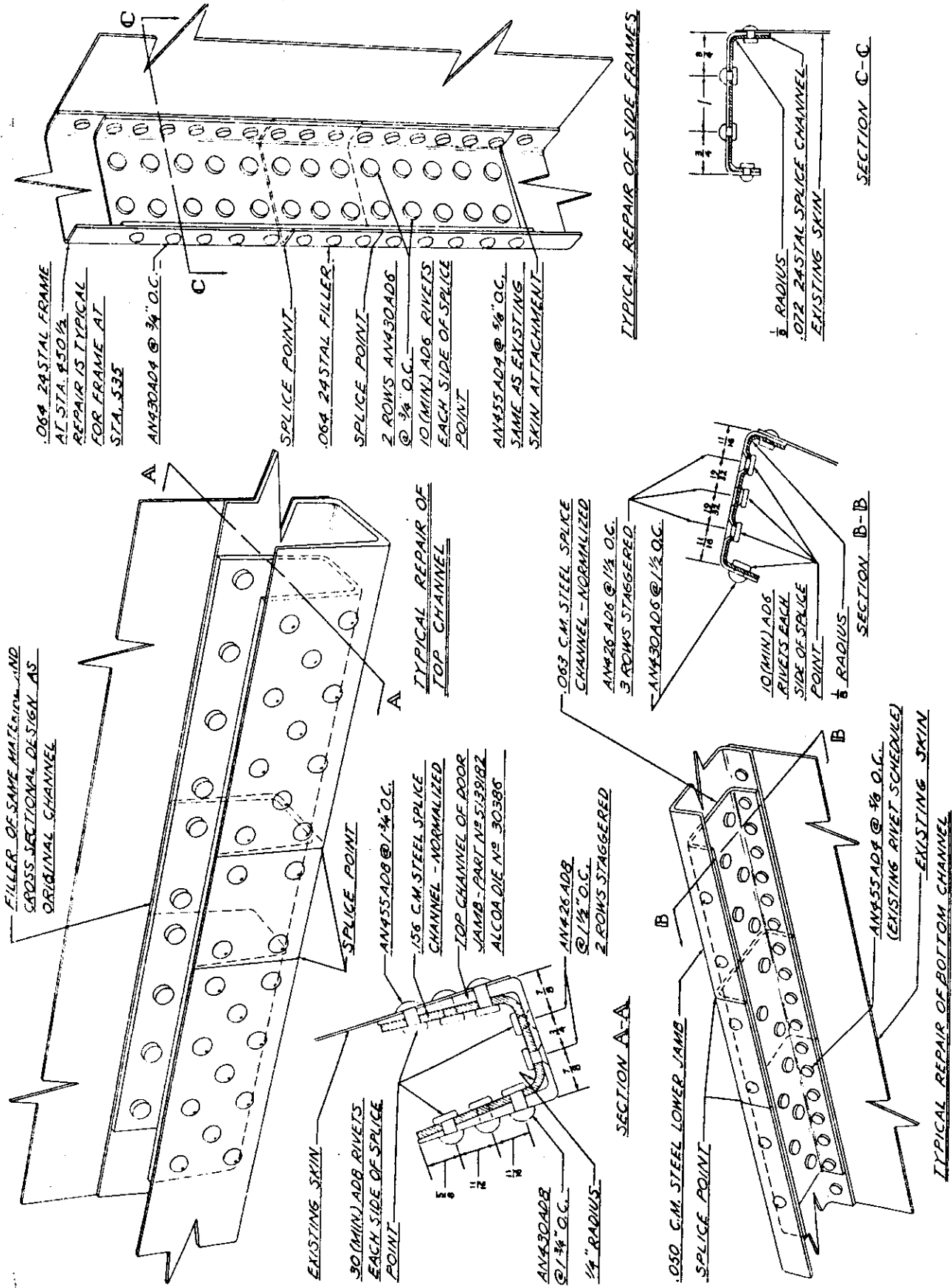
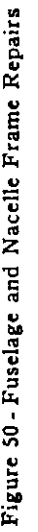


Figure 49C - Main Cargo Door Jamb Repairs



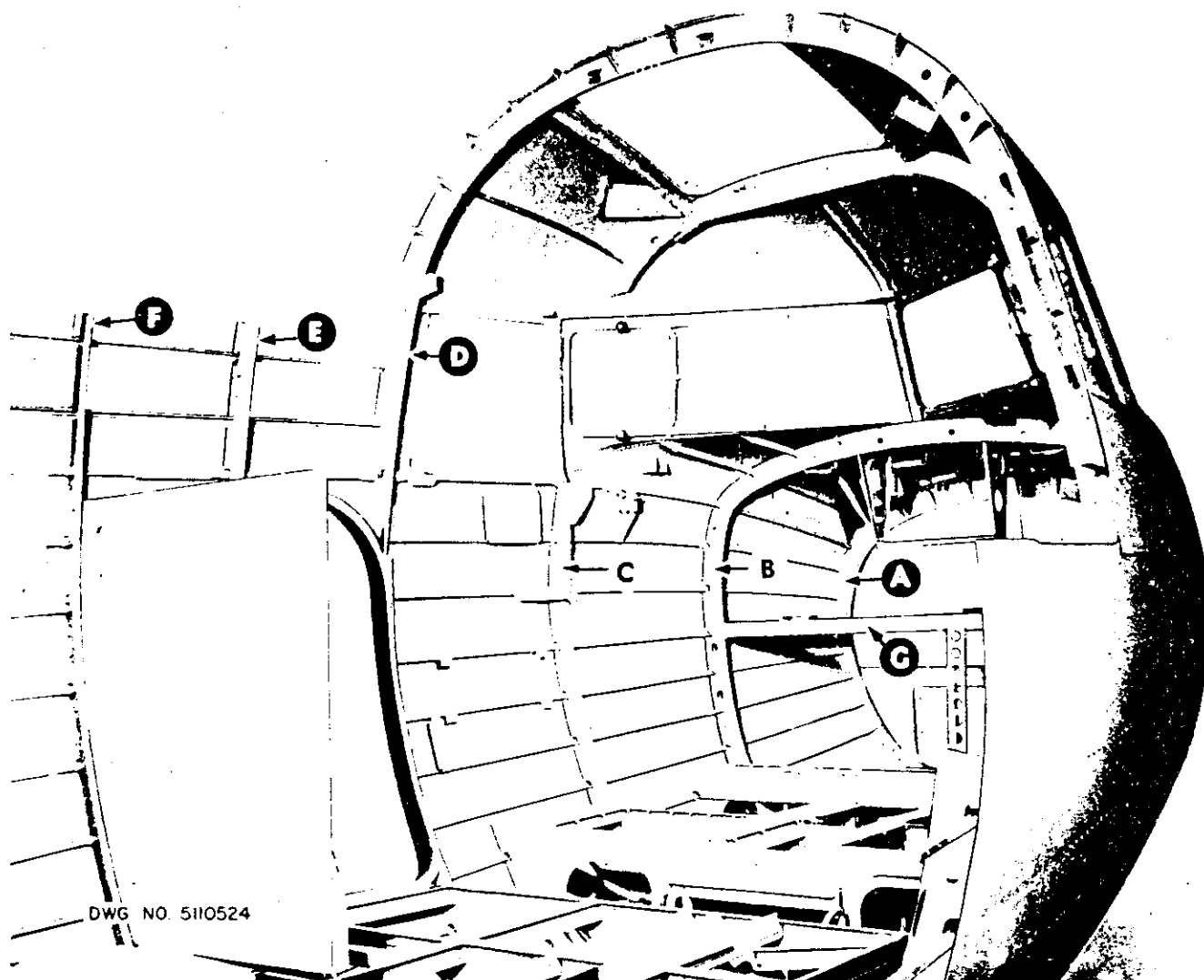


Figure 51 - Fuselage Nose Frames

KEY TO FIGURE 51

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	20	Frame	5111485	.040 Alclad 24SO
B	40	Upper Frame	5111530	.040 Alclad 24SO
		Lower Frame	5111530	.051 Alclad 24SO
C	63	Frame	5111480-4	.051 Alclad 24SO
		Frames	5111480-2-3-40-41	.040 Alclad 24SO
D	86	Frames	5112375-2-4-14	.040 Alclad 24SO
		Frames	5112375-22-26-30	.051 Alclad 24SO
E	103	Frame	2113939	.040 Alclad 24SO
F	117-3/8	Frame	5113078	.040 Alclad 24SO
		Frame	5112374	.040 Alclad 24SO
G		Channel	5111530	.051 Alclad 24ST

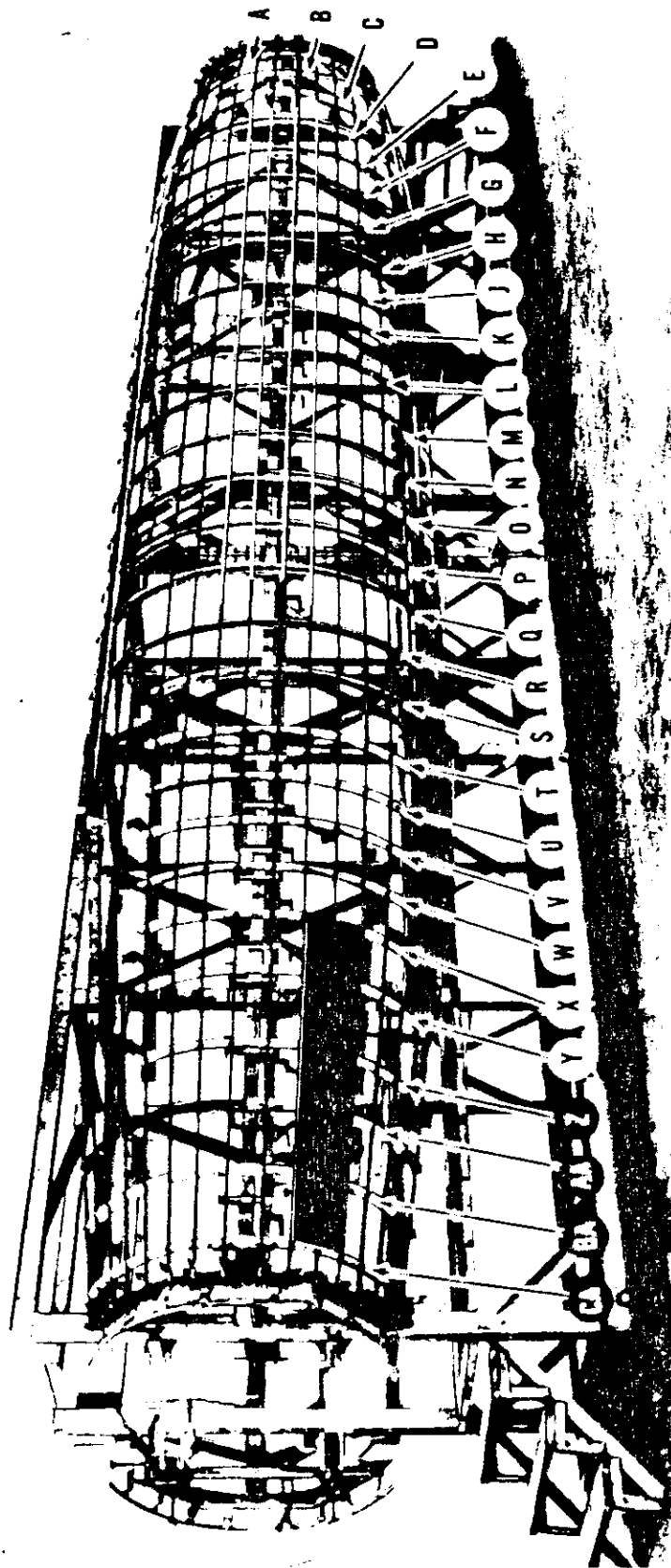


Figure 52 - Fuselage Structure

KEY TO FIGURE 52

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	103	Frame	5112376 R.H.	.040 Alclad 24ST
		Frame	4113042 L.H.	.040 Alclad 24ST
B	117-3/8	Frame	5113079 R.H.	.040 Alclad 24ST
		Frame	5113921 L.H.	.040 Alclad 24ST
C	136-1/2	Frame	5112373 R.H.	.040 Alclad 24ST
		Frame	5112301 L.H.	.040 Alclad 24ST
D	156-1/2	Frame	5111277 R.H.	.040 Alclad 24ST
		Frame	5111278 L.H.	.040 Alclad 24ST
E	177-1/2	Frame	5111377 R.H.	.040 Alclad 24ST
		Frame	5111376 L.H.	.040 Alclad 24ST
F	195-1/2	Frame	5111394 R.H.	.040 Alclad 24ST
		Frame	5111395 L.H.	.040 Alclad 24ST
G	216-1/2	Frame	5111641 R.H.	.040 Alclad 24ST
		Frame	5111642 L.H.	.040 Alclad 24ST
H	234-1/2	Frame	5111986 R.H.	.040 Alclad 24ST
		Frame	5111985 L.H.	.040 Alclad 24ST
J	258-1/2	Frame	5111426 R.H.	.091 Alclad 24ST
		Frame	5111425 L.H.	.091 Alclad 24ST
K	273-1/2	Frame	5112031 R.H.	.064 Alclad 24ST
		Frame	5112030 L.H.	.040 Alclad 24ST
L	294-1/2	Frame	5112045 R.H.	.091 Alclad 24ST
		Frame	5112046 L.H.	.091 Alclad 24ST
M	312	Frame	5111836 R.H.	.040 Alclad 24ST
		Frame	5111835 L.H.	.040 Alclad 24ST
N	333-1/2	Frame	5111763 R.H.	.040 Alclad 24ST
		Frame	5111762 L.H.	.040 Alclad 24ST
O	351-1/2	Frame	5111735 R.H.	.040 Alclad 24ST
		Frame	5111734 L.H.	.040 Alclad 24ST
P	372-1/2	Frame	5111599 R.H.	.040 Alclad 24ST
		Frame	5111598 L.H.	.040 Alclad 24ST
Q	390-1/2	Frame	5111555 R.H.	.040 Alclad 24ST
		Frame	5111553 L.H.	.040 Alclad 24ST
R	411-1/2	Frame	5111463 R.H.	.040 Alclad 24ST
		Frame	5111464 L.H.	.040 Alclad 24ST
S	429-1/2	Frame	5111611 R.H.	.051 Alclad 24ST
		Frame	5111610 L.H.	.051 Alclad 24ST
T	450-1/2	Frame	5111907 R.H.	.051 Alclad 24ST
		Frame	5111909 L.H.	.064 Alclad 24ST
U	465-1/2	Frame	5112054 R.H.	.051 Alclad 24ST
		Frame	5112053 L.H.	.051 Alclad 24ST
V	479	Frame	5112100 R.H.	.051 Alclad 24ST
		Frame	5112099 L.H.	.051 Alclad 24ST
W	492	Frame	5112205 R.H.	.051 Alclad 24ST
		Frame	5112202 L.H.	.051 Alclad 24ST
X	506	Frame	5112126 R.H.	.051 Alclad 24ST
		Frame	5112127 L.H.	.051 Alclad 24ST
Y	520	Frame	5112270 R.H.	.051 Alclad 24ST
		Frame	5112268 L.H.	.051 Alclad 24ST
Z	538	Frame	5112391 R.H.	.040 Alclad 24ST
		Frame	5112563 L.H.	.040 Alclad 24ST
AA	553	Frame	5111224 R.H.	.040 Alclad 24ST
		Frame	5111223 L.H.	.040 Alclad 24ST
BA	568	Frame	5111284 R.H.	.040 Alclad 24ST
		Frame	5111285 L.H.	.040 Alclad 24ST
CA	583	Frame	5111365 R.H.	.040 Alclad 24ST
		Frame	5111364 L.H.	.040 Alclad 24ST

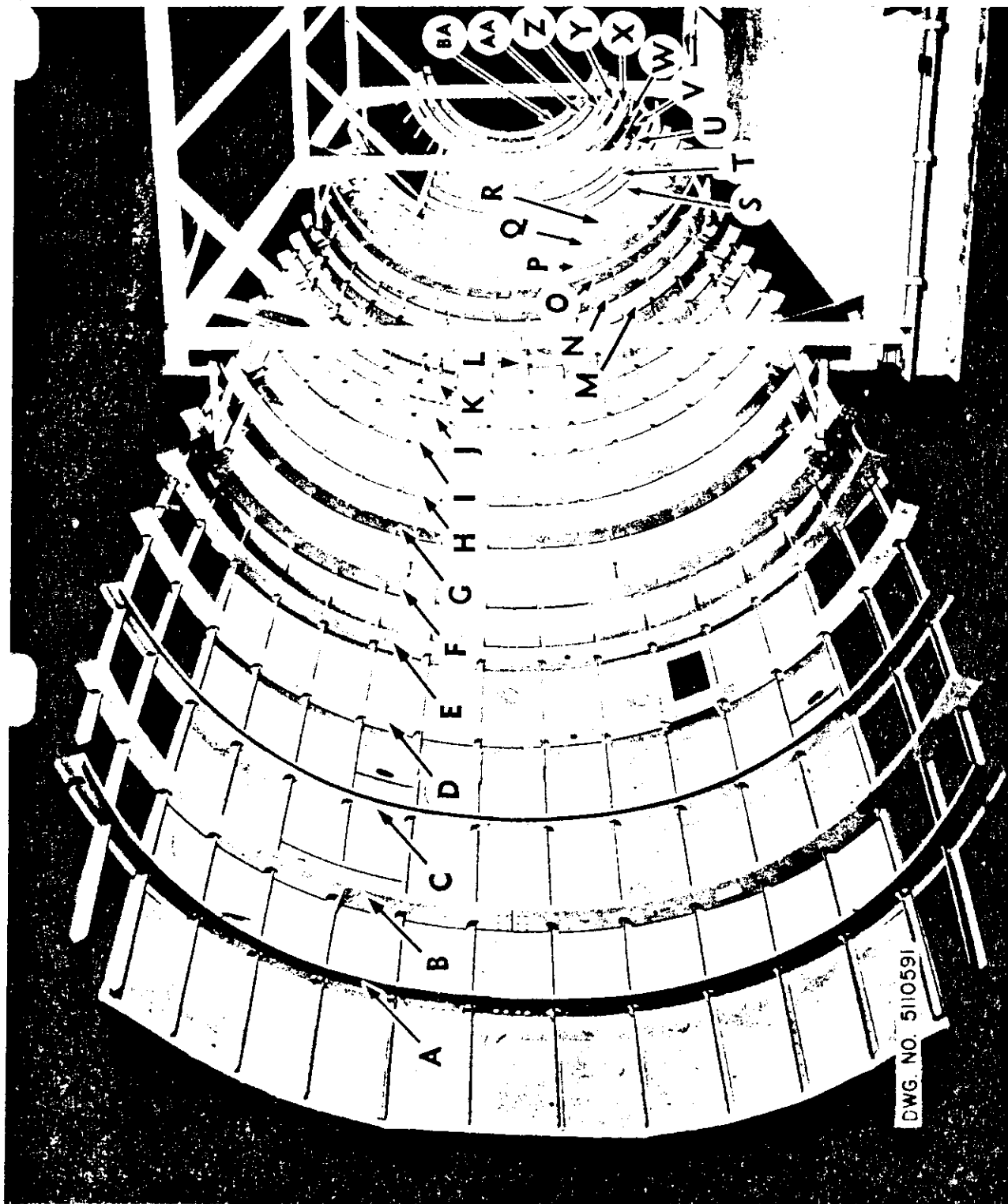


Figure 53 - Fuselage Frames Upper Section

KEY TO FIGURE 53

REF.	STATION	NAME	PART NO.	MATERIAL
A	103	Frame	5112376 R.H.	.040 Alclad 24SO
		Frame	4113042 L.H.	.040 Alclad 24SO
B	117-3/8	Frame	5113079 R.H.	.040 Alclad 24SO
		Frame	5113921 L.H.	.040 Alclad 24SO
C	136-1/2	Frame	5112373 R.H.	.040 Alclad 24SO
		Frame	5112301 L.H.	.040 Alclad 24SO
D	156-1/2	Frame	5111277 R.H.	.040 Alclad 24SO
		Frame	5111278 L.H.	.040 Alclad 24SO
E	177-1/2	Frame	5111377 R.H.	.040 Alclad 24SO
		Frame	5111376 L.H.	.040 Alclad 24SO
F	195-1/2	Frame	5111394 R.H.	.040 Alclad 24SO
		Frame	5111395 L.H.	.040 Alclad 24SO
G	216-1/2	Frame	5111641 R.H.	.040 Alclad 24SO
		Frame	5111642 L.H.	.040 Alclad 24SO
H	234-1/2	Frame	5111986 R.H.	.040 Alclad 24SO
		Frame	5111985 L.H.	.040 Alclad 24SO
I	258-1/2	Frame	5111426 R.H.	.040 Alclad 24SO
		Frame	5111425 L.H.	.040 Alclad 24SO
J	273-1/2	Frame	5112031 R.H.	.040 Alclad 24SO
		Frame	5112030 L.H.	.040 Alclad 24SO
K	294-1/2	Frame	5112045 R.H.	.040 Alclad 24SO
		Frame	5112046 L.H.	.040 Alclad 24SO
L	312-1/2	Frame	5111836 R.H.	.040 Alclad 24SO
		Frame	5111835 L.H.	.040 Alclad 24SO
M	333-1/2	Frame	5111763 R.H.	.040 Alclad 24SO
		Frame	5111762 L.H.	.040 Alclad 24SO
N	351-1/2	Frame	5111735 R.H.	.040 Alclad 24SO
		Frame	5111734 L.H.	.040 Alclad 24SO
O	372-1/2	Frame	5111599 R.H.	.040 Alclad 24SO
		Frame	5111598 L.H.	.040 Alclad 24SO
P	390-1/2	Frame	5111555 R.H.	.040 Alclad 24SO
		Frame	5111553 L.H.	.040 Alclad 24SO
Q	411-1/2	Frame	5111463 R.H.	.040 Alclad 24SO
		Frame	5111464 L.H.	.040 Alclad 24SO
R	429-1/2	Frame	5111611 R.H.	.040 Alclad 24SO
		Frame	5111610 L.H.	.051 Alclad 24SO
S	450-1/2	Frame	5111907 R.H.	.051 Alclad 24SO
		Frame	4112057 L.H.	.051 Alclad 24SO
T	465-1/2	Frame	5112054 R.H.	.051 Alclad 24SO
		Frame	4112053 L.H.	.051 Alclad 24SO
U	479	Frame	5112100 R.H.	.051 Alclad 24SO
		Frame	5112099 L.H.	.051 Alclad 24SO
V	492	Frame	5112205 R.H.	.051 Alclad 24SO
		Frame	4112202 L.H.	.051 Alclad 24SO
W	506	Frame	5112126 R.H.	.051 Alclad 24SO
		Frame	5112127 L.H.	.051 Alclad 24SO
X	520	Frame	5112270 R.H.	.051 Alclad 24SO
		Frame	5112268 L.H.	.051 Alclad 24SO
Y	538	Frame	5112391 R.H.	.040 Alclad 24SO
		Frame	5112563 L.H.	.040 Alclad 24SO
Z	553	Frame	5111224 R.H.	.040 Alclad 24SO
		Frame	5111223 L.H.	.040 Alclad 24SO
AA	568	Frame	5111284 R.H.	.040 Alclad 24SO
		Frame	5111285 L.H.	.040 Alclad 24SO
BA	583	Frame	5111365 R.H.	.040 Alclad 24SO
		Frame	5111364 L.H.	.040 Alclad 24SO

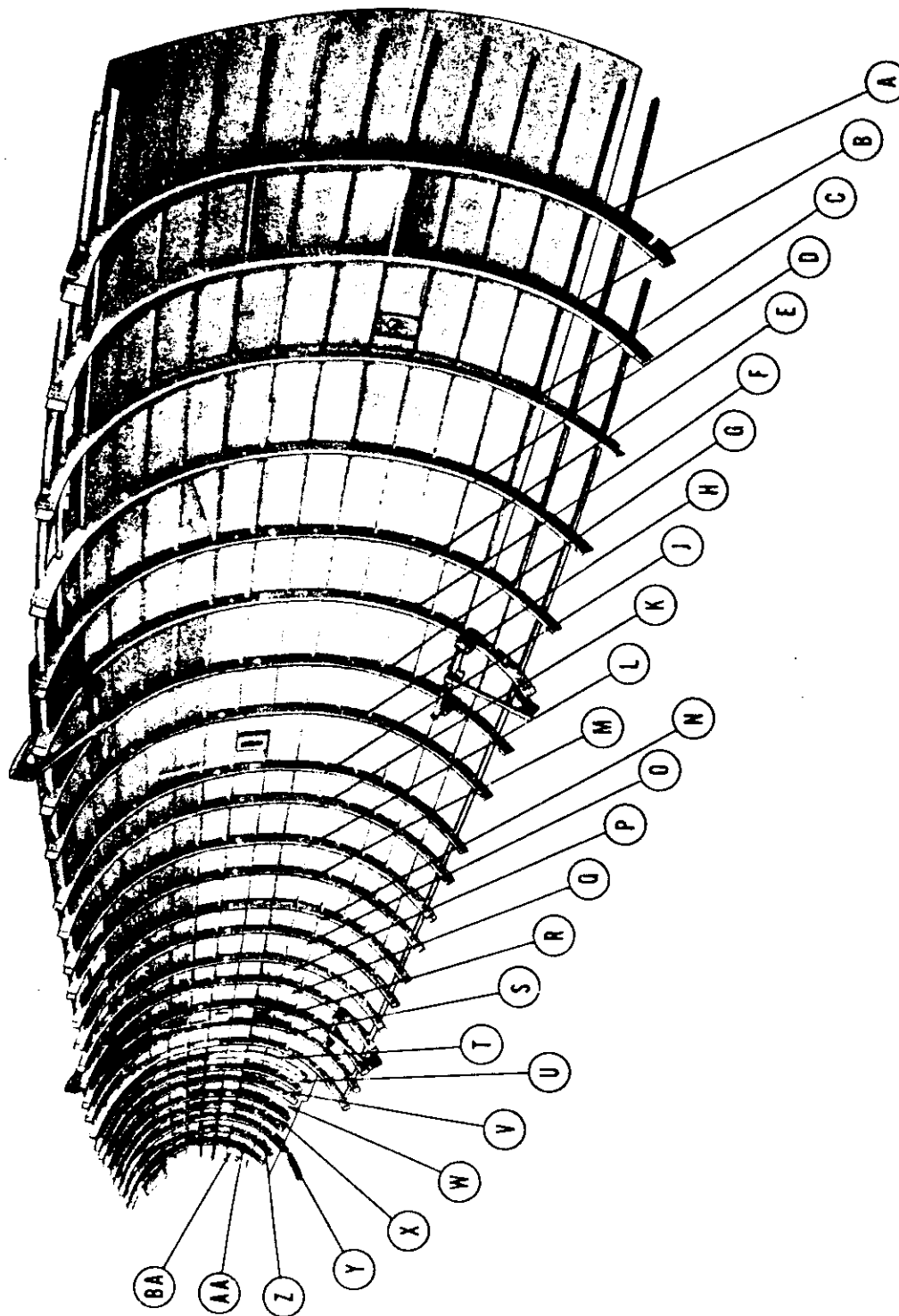


Figure 53A - Fuselage Frames Upper Section (C-117A Airplane)

KEY TO FIGURE 53A

REF.	STATION	NAME	PART NO.	MATERIAL
A	103	Frame	5112376 R.H.	.040 24ST AL
		Frame	4113042 L.H.	.040 24ST AL
B	117-3/8	Frame	5188194 R.H.	.040 24ST AL
		Frame	5188230 L.H.	.040 24ST AL
C	136-1/2	Frame	5188195 R.H.	.040 24ST AL
		Frame	5188231 L.H.	.040 24ST AL
D	156-1/2	Frame	5111277 R.H.	.040 24ST AL
		Frame	5111278 L.H.	.040 24ST AL
E	177-1/2	Frame	5111377 R.H.	.040 24ST AL
		Frame	5111376 L.H.	.040 24ST AL
F	195-1/2	Frame	5111394 R.H.	.040 24ST AL
		Frame	5111395 L.H.	.040 24ST AL
G	216-1/2	Frame	5111641 R.H.	.040 24ST AL
		Frame	5111642 L.H.	.040 24ST AL
H	234-1/2	Frame	5111986 R.H.	.040 24ST AL
		Frame	5111985 L.H.	.040 24ST AL
J	258-1/2	Frame	5111426 R.H.	.040 24ST AL
		Frame	5111425 L.H.	.040 24ST AL
K	273-1/2	Frame	5112031 R.H.	.040 24ST AL
		Frame	5112030 L.H.	.040 24ST AL
L	294-1/2	Frame	5112045 R.H.	.040 24ST AL
		Frame	5112046 L.H.	.040 24ST AL
M	312-1/2	Frame	5111836 R.H.	.040 24ST AL
		Frame	5111835 L.H.	.040 24ST AL
N	333-1/2	Frame	5111763 R.H.	.040 24ST AL
		Frame	5111762 L.H.	.040 24ST AL
O	351-1/2	Frame	5111735 R.H.	.040 24ST AL
		Frame	5111734 L.H.	.040 24ST AL
P	372-1/2	Frame	5111599 R.H.	.040 24ST AL
		Frame	5111598 L.H.	.040 24ST AL
Q	390-1/2	Frame	5188191 R.H.	.040 24ST AL
		Frame	5111553 L.H.	.040 24ST AL
R	411-1/2	Frame	5188192 R.H.	.040 24ST AL
		Frame	5139820 L.H.	.040 24ST AL
S	429-1/2	Frame	5111611 R.H.	.040 24ST AL
		Frame	5188176 L.H.	.040 24ST AL
T	450-1/2	Frame	5004450 R.H. L.H.	.040 24ST AL
U	461-1/2	Frame	5148387 L.H.	.040 24ST AL
V	465-1/2	Frame	5188716 R.H. L.H.	.040 24ST AL
W	479	Frame	5188717 R.H. L.H.	.040 24ST AL
X	492	Frame	5188718 R.H. L.H.	.040 24ST AL
Y	510-1/4	Frame	5188719 R.H. L.H.	.040 24ST AL
Z	524	Frame	5188720 R.H. L.H.	.040 24ST AL
AA	538	Frame	5160862 R.H. L.H.	.040 24ST AL
BA	553	Frame	5111224 R.H.	.040 24ST AL
		Frame	4188181 L.H.	.040 24ST AL
CA	568	Frame	5111284 R.H.	.040 24ST AL
		Frame	5188178 L.H.	.040 24ST AL
DA	583	Frame	5111365 R.H.	.040 24ST AL
		Frame	5111364 L.H.	.040 24ST AL

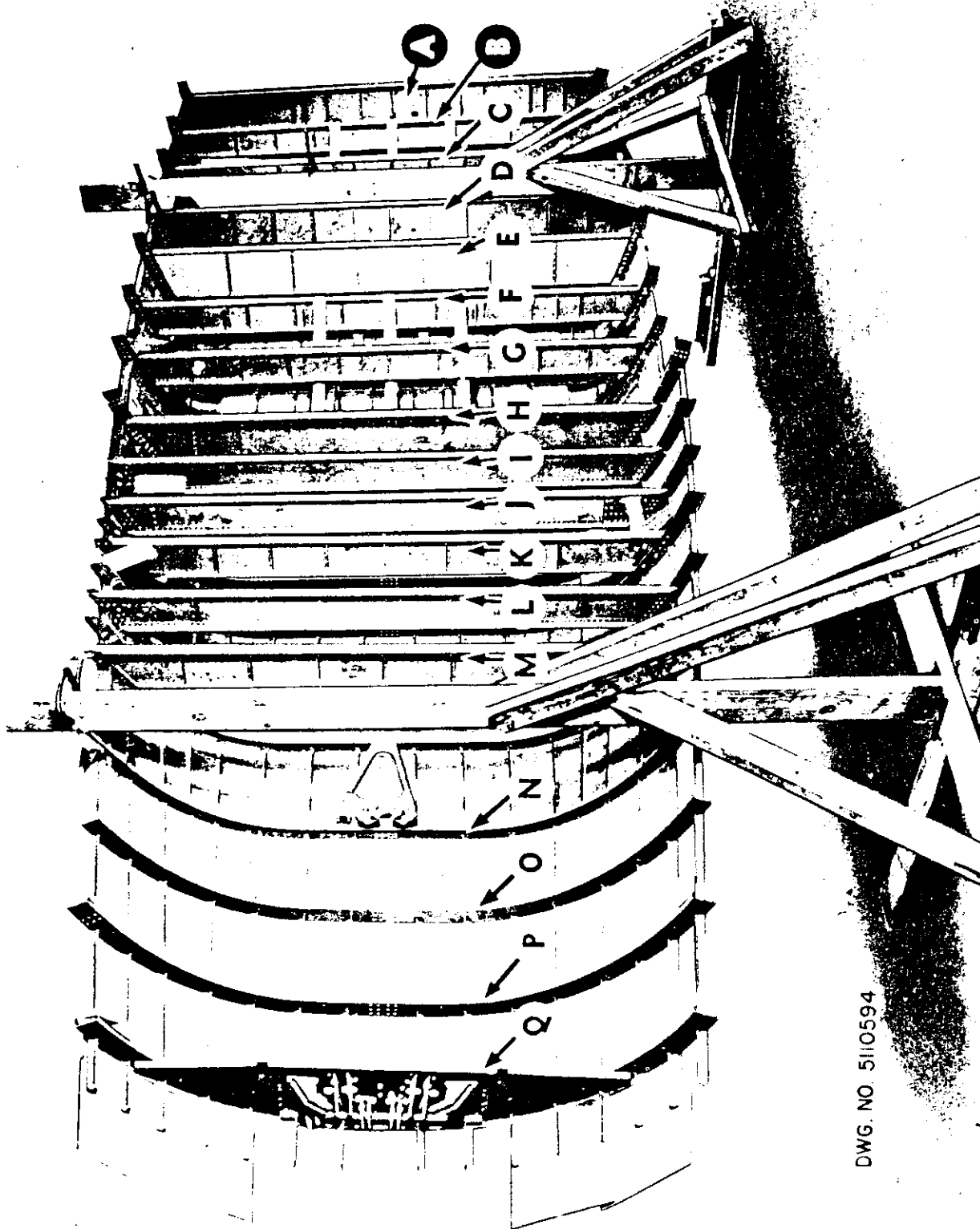


Figure 54 - Fuselage Frames Lower Section

DWG. NO. 5110594

KEY TO FIGURE 54

REF.	STATION	NAME	PART NO.	MATERIAL
A	312-1/2	Frame	5111093	.040 Alclad 24SO
		Floor Beam	5111124	Ext. No. 54
		Floor Beam Web		.032 Alclad 24ST
B	333-1/2	Frame	5111761	.040 Alclad 24SO
		Floor Beam	5110892	Ext. No. 24
		Floor Beam Web		.025 Alclad 24ST
C	351-1/2	Frame	5111122	.040 Alclad 24SO
		Floor Beam	5111125	Ext. No. 54
		Floor Beam Web		.051 Alclad 24ST
D	372-1/2	Frame	5111109	.040 Alclad 24SO
		Floor Beam	5111125	Ext. No. 54
		Floor Beam Web		.051 Alclad 24ST
E	390-1/2	Frame	5111554	.040 Alclad 24SO
		Floor Beam	5111222	Ext. No. 24
		Floor Beam Web		.025 Alclad 24ST
F	411-1/2	Frame	5111165	.040 Alclad 24SO
		Floor Beam	5114377	Ext. No. 24
		Floor Beam Web		.025 Alclad 24ST
G	429-1/2	Frame	5111167	.040 Alclad 24SO
		Floor Beam	5114247	Ext. No. 24
		Floor Beam Web		.025 Alclad 24ST
H	450-1/2	Frame	5111906	.051 Alclad 24SO
		Floor Beam	5111913	Ext. No. 54
		Floor Beam Web		.051 Alclad 24ST
I	465-1/2	Frame	5112052	.051 Alclad 24SO
		Floor Beam	5112084	Ext. Nos. 24 and 12
		Floor Beam Web		.032 Alclad 24ST
J	479	Frame	5112064	.051 Alclad 24SO
		Floor Beam	5112085	Ext. Nos. 24 and 12
		Floor Beam Web		.032 Alclad 24ST
K	492	Frame	5112204	.051 Alclad 24SO
		Floor Beam	5112086	Ext. Nos. 24 and 12
		Floor Beam Web		.032 Alclad 24ST
L	506	Frame	5112125	.051 Alclad 24SO
		Floor Beam	5112087	Ext. Nos. 24 and 12
		Floor Beam Web		.032 Alclad 24ST
M	520	Frame	5112269	.051 Alclad 24SO
		Floor Beam	5112088	Ext. Nos. 24 and 12
		Floor Beam Web		.032 Alclad 24ST
N	538	Frame	5112392	.040 Alclad 24SO
O	553	Frame	5111090	.040 Alclad 24SO
P	568	Frame	5111048	.040 Alclad 24SO
Q	583	Frame	5111363	.040 and .051 Alclad 24SO

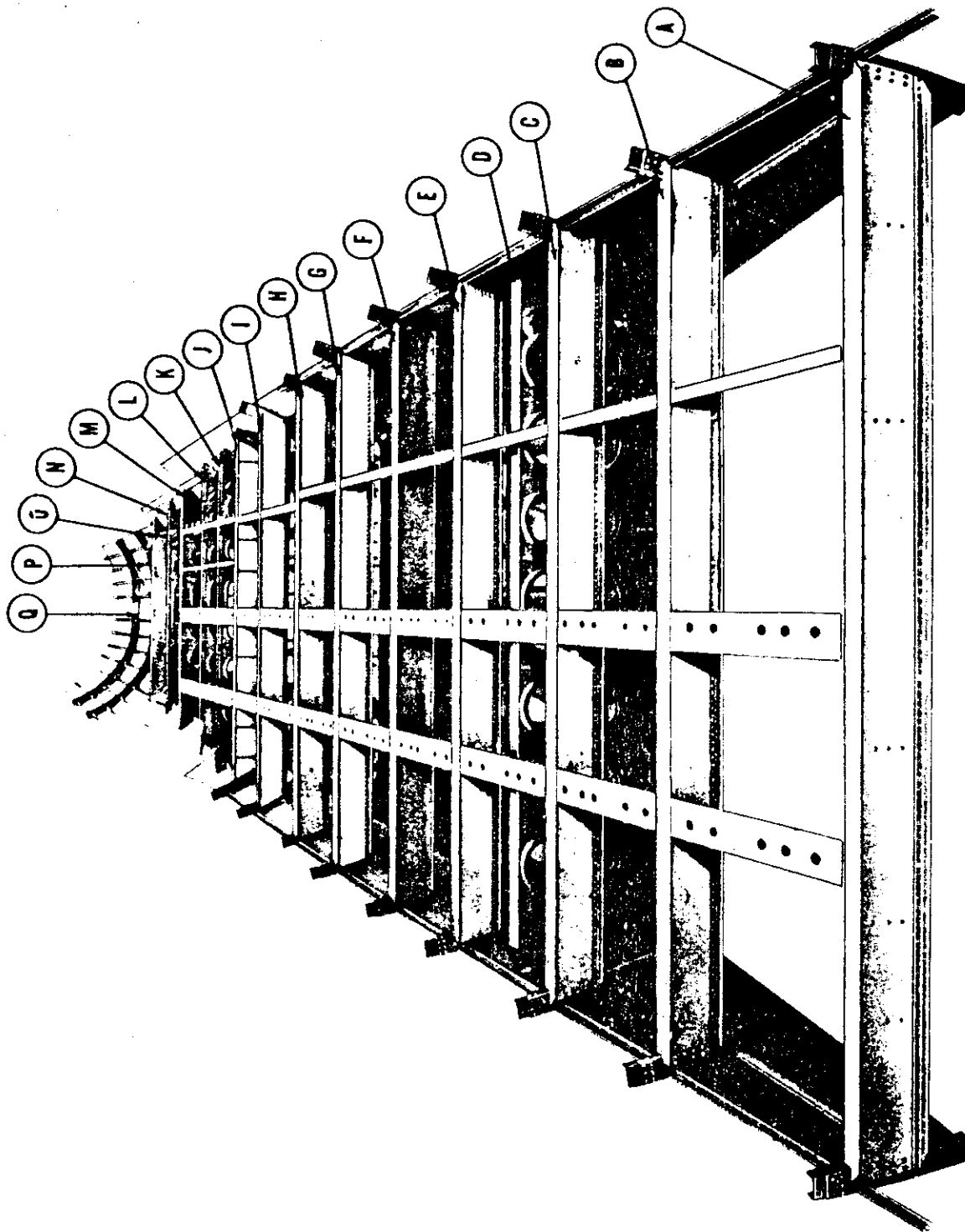


Figure 54A - Fuselage Frames Lower Section (C-117A Model)

ised 15 September 1945

KEY TO FIGURE 54A

REF.	STATION	NAME	PART NO.	MATERIAL
A	312-1/2	Frame	5188169	.040 24ST AL
		Floor Beam	5012100-3	Ext. S-1003807
		Floor Beam Web		.032 24ST AL
B	333-1/2	Frame	5188166	.040 24ST AL
		Floor Beam	5012100-3	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
C	351-1/2	Frame	5188170	.040 24ST AL
		Floor Beam	5012100-3	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
D	372-1/2	Frame	5188171	.032 24ST AL
		Floor Beam	5012100-4	Ext. S-1003807
		Floor Beam Web		.032 24ST AL
E	390-1/2	Frame	5188163	.040 24ST AL
		Floor Beam	5012100-5	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
F	411-1/2	Frame	5188175	.040 24ST AL
		Floor Beam	5012100-6	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
G	429-1/2	Frame	5188162	.040 24ST AL
		Floor Beam	5012100-7	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
H	450-1/2	Frame	5004450	.040 24ST AL
		Floor Beam	5012100-8	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
I	465-1/2	Frame	5188716	.040 24ST AL
		Floor Beam	5012100-9	Ext. S-1003807
		Floor Beam Web		.025 24ST AL
J	479	Frame	5188717	.040 24ST AL
K	492	Frame	5188718	.051 24ST AL
L	510-1/4	Frame	5188719	.040 24ST AL
M	524	Frame	5188720	.040 24ST AL
N	538	Frame	5160862	.051 24ST AL
O	553	Frame	5188172	.040 24ST AL
P	568	Frame	5188174	.040 24ST AL
Q	583	Frame	5111363	.040 and .051 24ST AL

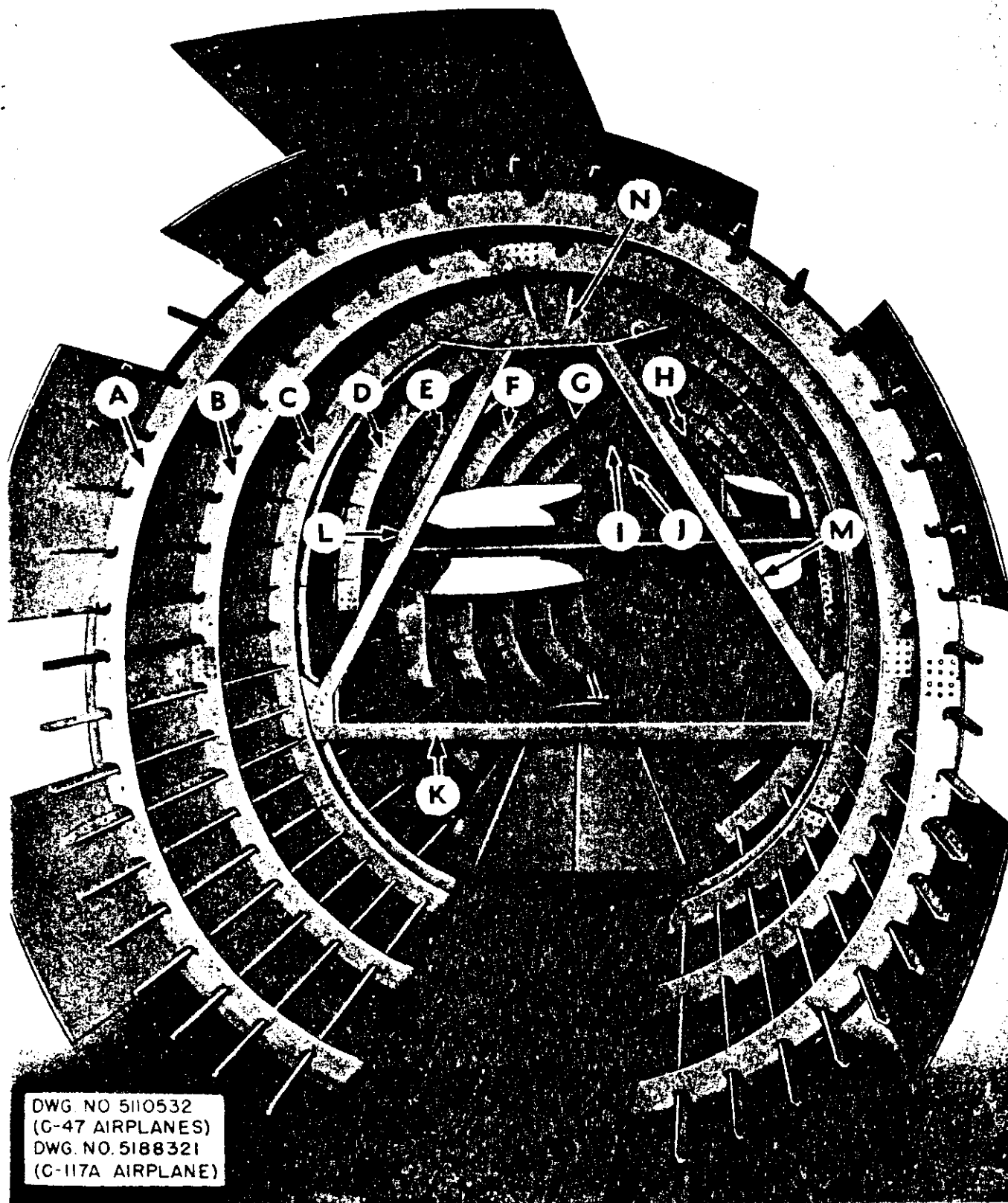


Figure 55 - Fuselage Rear Section Frames (C-47 and C-117A Models)

KEY TO FIGURE 55

REF.	STATION	NAME	PART NO.	MATERIAL
A	596	Frame	5111252	.040 24ST AL
B (C-47)	609-5/8	Frame	5111252	.040 24ST AL
B (C-117A)	609-5/8	Frame	5188398	.040 24ST AL
C	623-625	Frame	5116314	.040 24ST AL
D	636-5/8	Frame (Upper)	5116387-4 L.H. & -5 R.H.	.064 24ST AL
		Frame (Lower)	5116387-6 L.H. & -7 R.H.	.040 24ST AL
E	651	Frame (Upper)	5116364-8	.064 24ST AL
		Frame (Lower)	5116364-6 L.H. & -7 R.H.	.051 24ST AL
F	664	Frame (Upper)	5116868-8	.064 24ST AL
		Frame (Lower)	5116868-6	.051 24ST AL
G	677	Frame (Upper)	5116388-8	.064 24ST AL
		Frame (Lower)	5116388-6	.051 24ST AL
H	690	Frame (Upper)	5116145-6	.064 24ST AL
		Frame (Lower)	5116145-8	.051 24ST AL
I	703	Frame (Upper)	5118108-12	.064 24ST AL
		Frame (Lower)	5118108-10	.051 24ST AL
J (C-47)	718-3/8	Frame (Upper)	5116362-2	.051 24ST AL
		Frame (Lower)	5116362-4	.064 24ST AL
J (C-117A)	718-3/8	Frame (Upper)	5188399-2	.051 24ST AL
		Frame (Lower)	5116362-4	.064 24ST AL
K		Channel	5116314-20	.051 24ST AL
L		Channel	5116314-10 L.H.	.051 24ST AL
M		Channel	5116314-11 R.H.	.051 24ST AL
N		Fitting	5116317	



DWG. NO. 5115214 (C-47 MODELS)
DWG. NO. 5188236 (C-117A MODELS)

Figure 56 - Fuselage Tail Cone Frames (C-47 and C-117A Models)

revised 15 September 1945

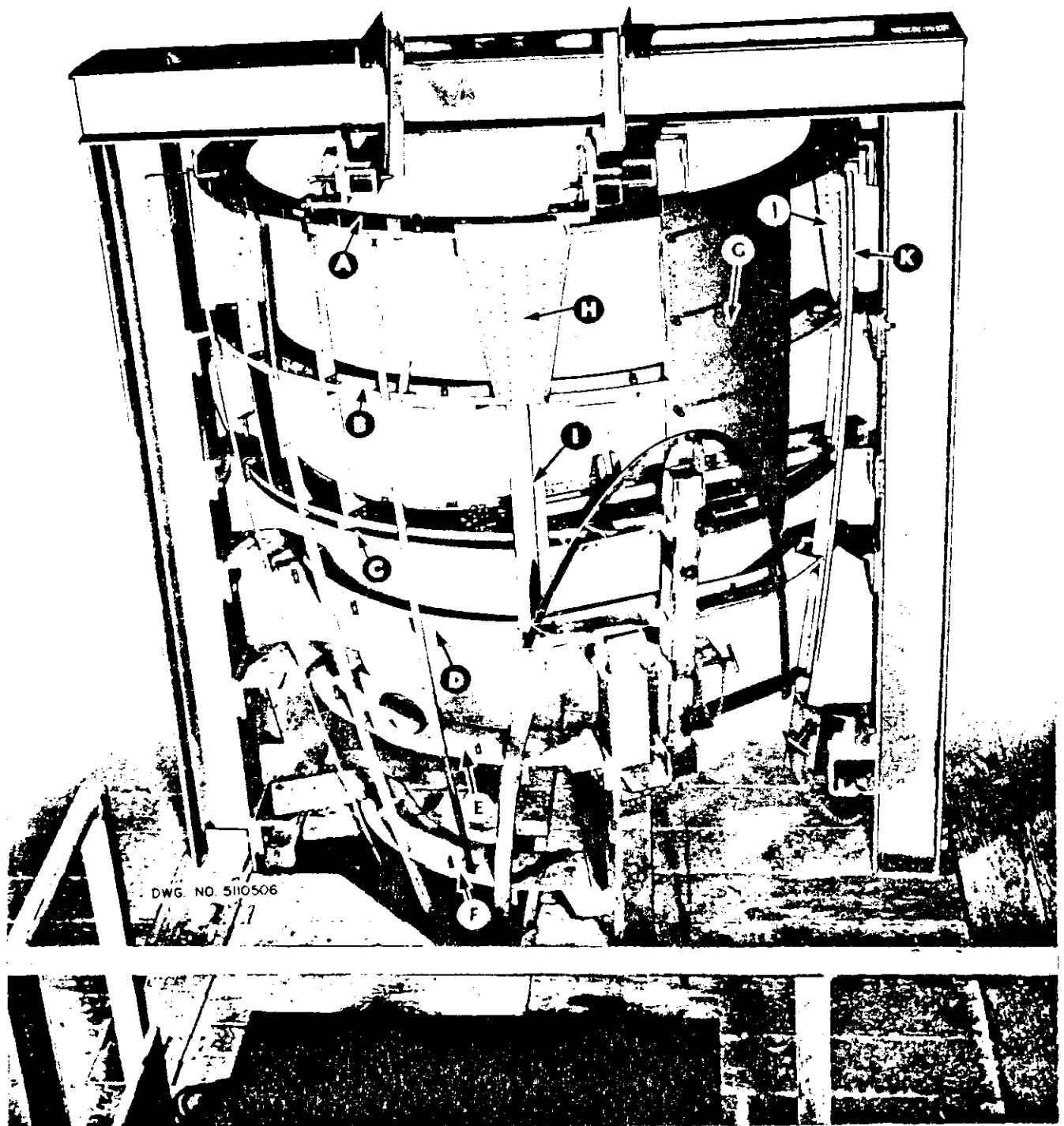


Figure 57 - Nacelle Structure

KEY TO FIGURE 57

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>REMARKS</u>
A	0	Firewall	5112950 L.H. & -1 R.H.	.064 Alclad 24SO
B	187-1/2	Frame	5117597 L.H. & -1 R.H.	.064 Alclad 24SO
C	200-3/8	Frame	5113947 L.H. & -1 R.H.	.045 Alclad 24SO
D	210-1/2	Frame	5118663 L.H. & -1 R.H.	.045 Alclad 24SO
E	223-1/2	Frame	4116518	.045 Alclad 24SO
F	239-1/2	Frame	4116519	.045 Alclad 24SO
G		Skin	5110506-204 L.H. & -205 R.H.	.040 Alclad 24SO
H	187-1/2	Gusset	5110506-212	.040 Alclad 24ST
I		Hat Section	5110509-94 L.H. & -95 R.H.	Ext. No. 10
J	7	Doubler	2116627	.072 Alclad 24SO
K	7	Hat Section	5110506-100 L.H. & -101 R.H.	Ext. No. 10

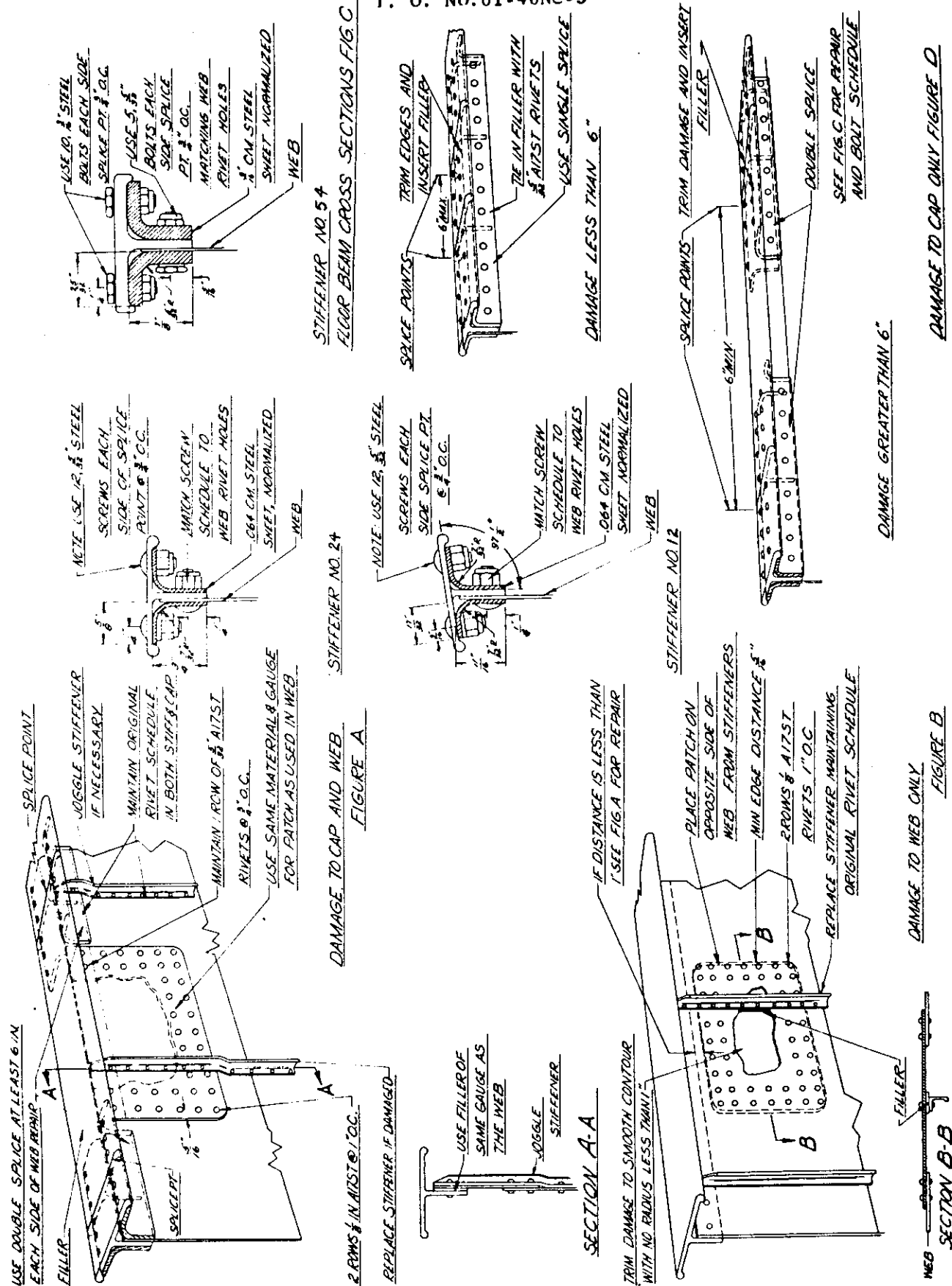
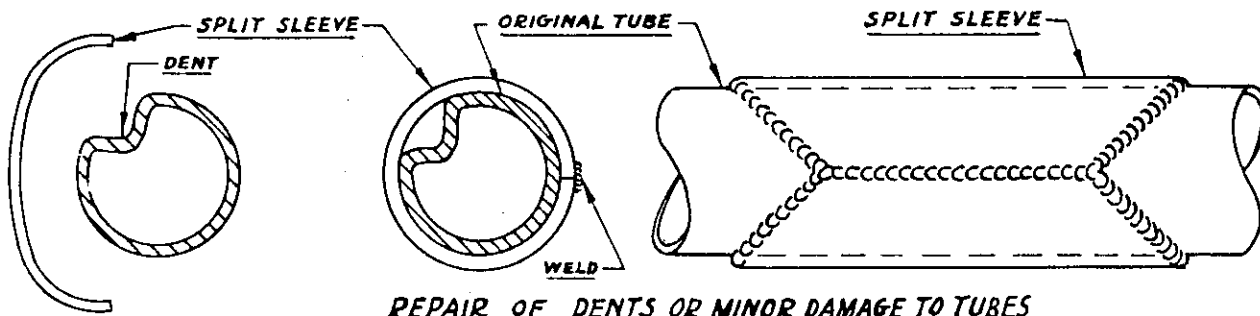
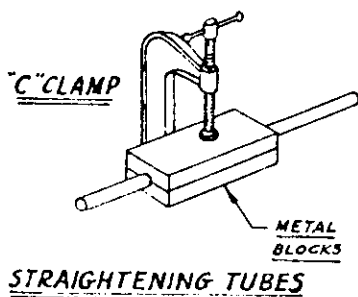
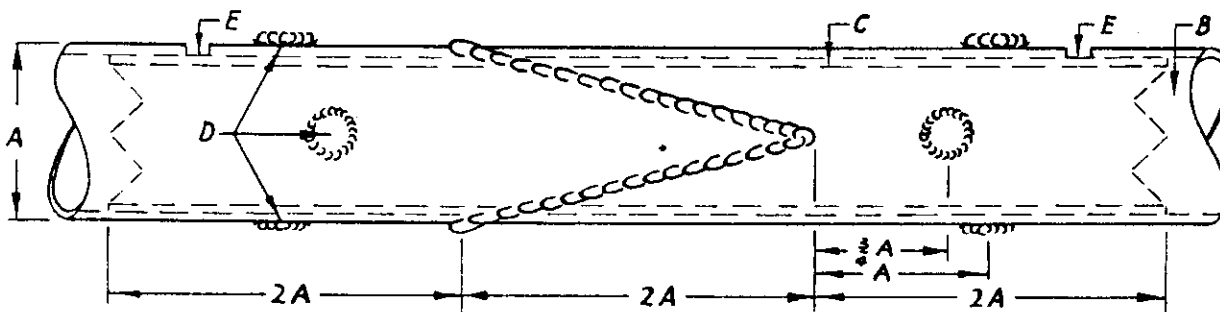
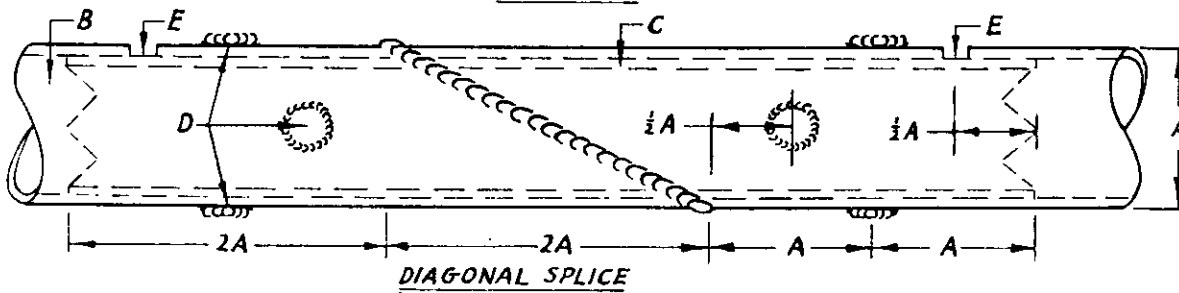
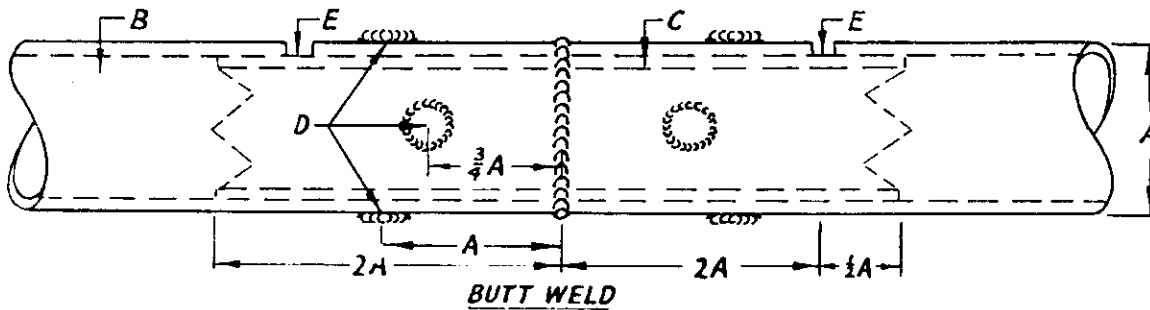


Figure 58 - Fuselage Floor Beam Repair



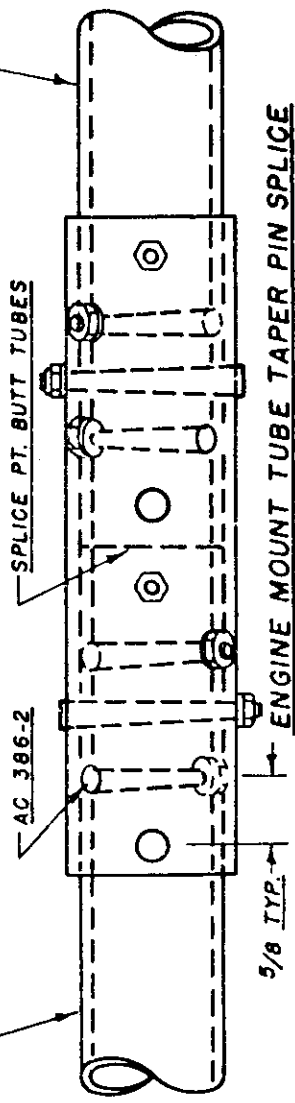
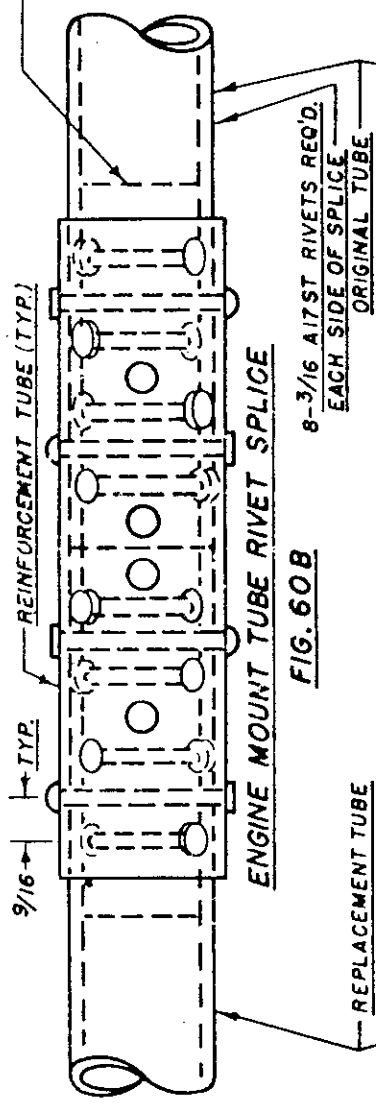
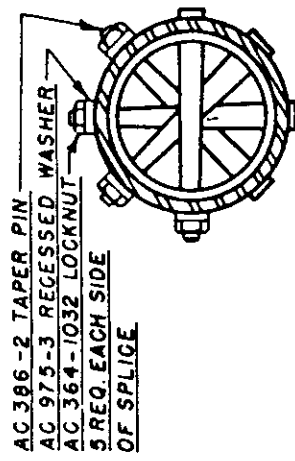
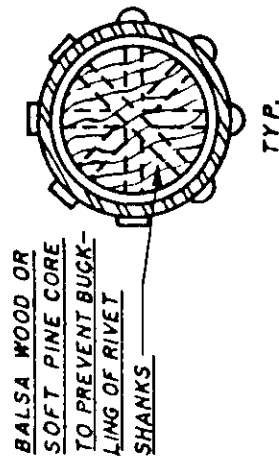
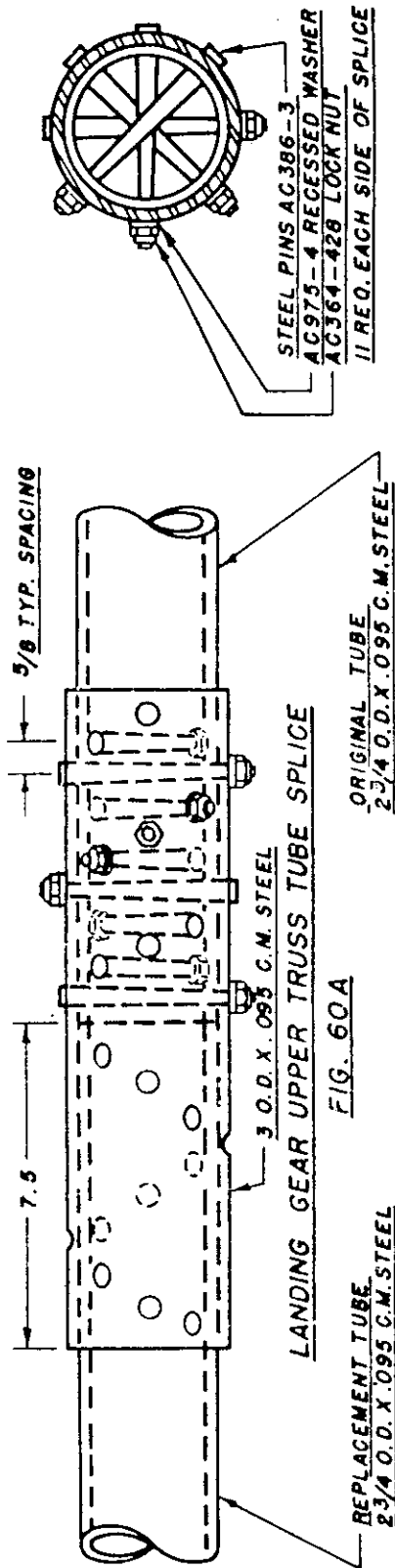
REPAIR OF DENTS OR MINOR DAMAGE TO TUBES



APPLY HEAT TO AREA OF BEND AND STRAIGHTEN AS SHOWN. AFTER STRAIGHTENING HEAT TREAT TUBE TO ORIGINAL TENSILE STRENGTH. (NORMALIZE)

A	DIA OF ORIGINAL TUBE				
B	REPLACEMENT TUBE	1 1/8 X .065	1 1/8 X .065	1 1/8 X .058	1 1/8 X .058
C	REINFORCEMENT TUBE	1 X .065	1 1/4 X .065	1 X .058	1 1/4 X .058
D	DRILL 1/8 MAX. HOLE IN OUTER TUBE; WELD THROUGH TO INNER TUBE				
E	DRILL 1/8 INSPECTION HOLE				

Figure 59 - Engine Mount Tube Weld Repair



NOTES: (TAPER PINS) USE NEXT STANDARD DRILL
UNDER "A" DIMENSION.
REAM HOLES SO SMALL END OF TAPER PIN IS
VIG OVER TO FLUSH WITH SURFACE OF SLEEVE
PEEN SMALL END OVER LOCKNUT

ORIG. TUBE	1 1/8 x .065	1 3/8 x .065	1 1/8 x .058	1 3/8 x .058
REPLACEMENT TUBE	1 1/4 x .065	1 1/2 x .065	1 1/4 x .058	1 1/2 x .058
REINFORCEMENT TUBE	1 1/4 x .065	1 1/2 x .065	1 1/4 x .058	1 1/2 x .058

Figure 60 - Engine Mount Tube & Landing Gear Truss Tube Repair

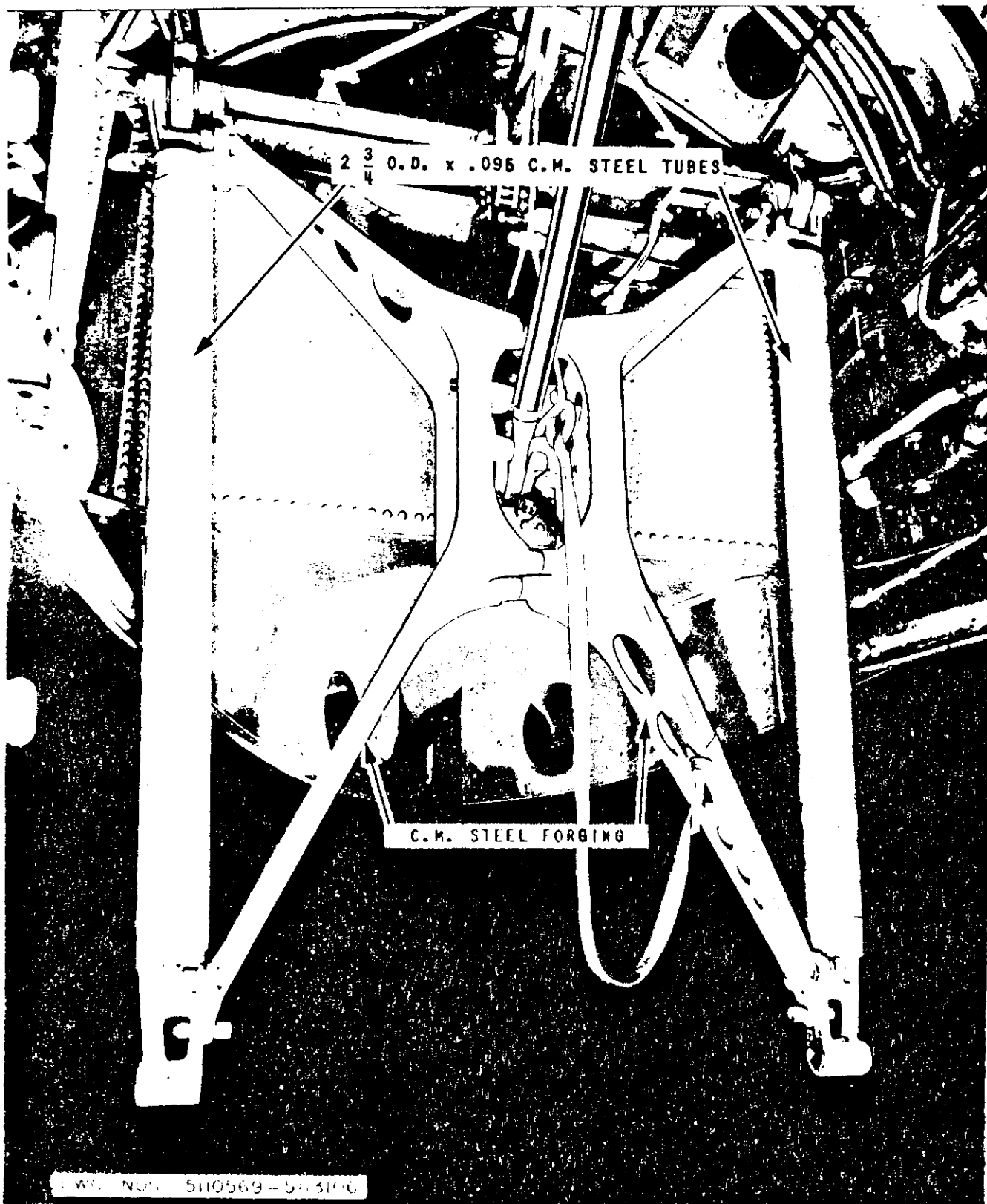


Figure 61 - Upper Landing Gear Truss

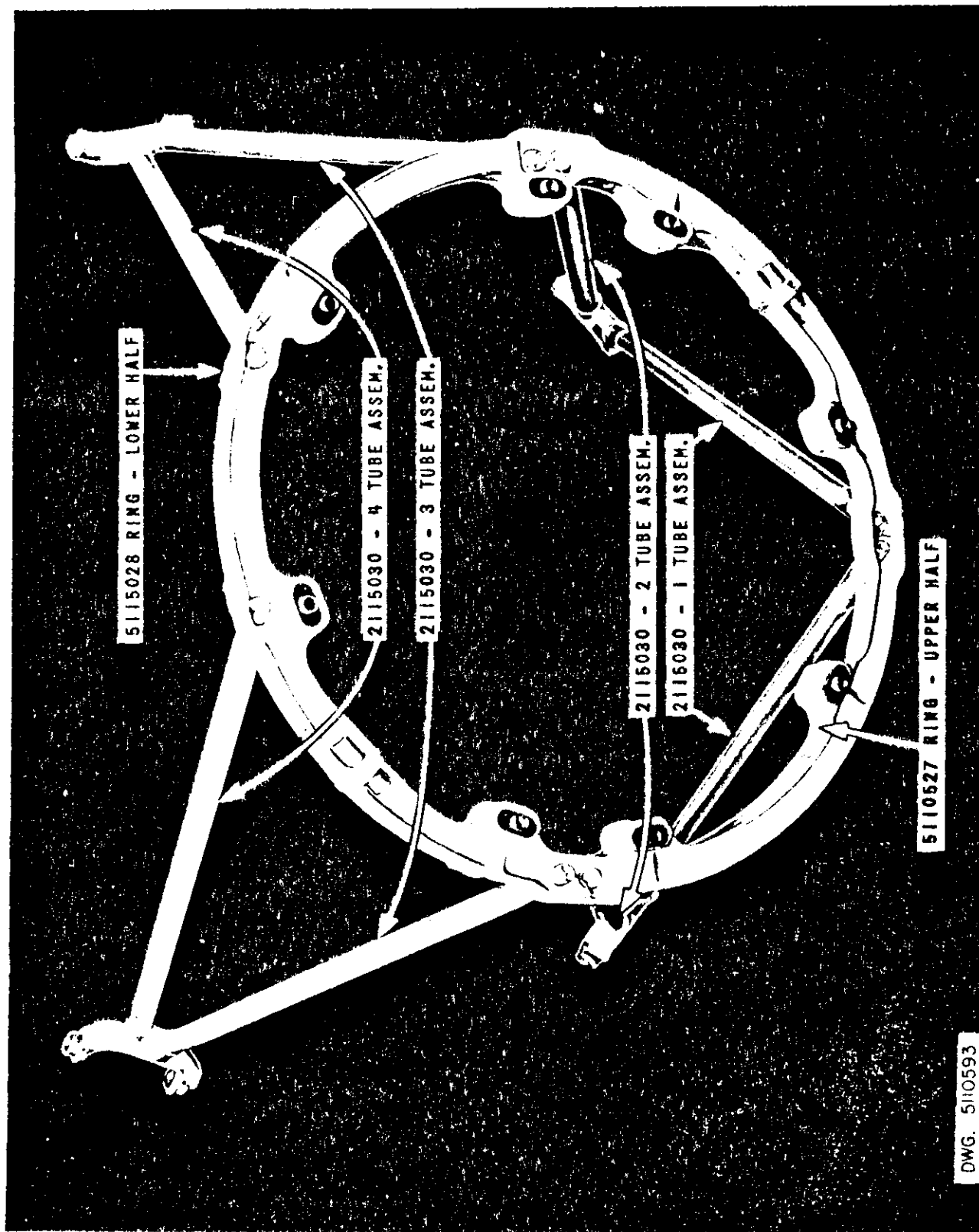
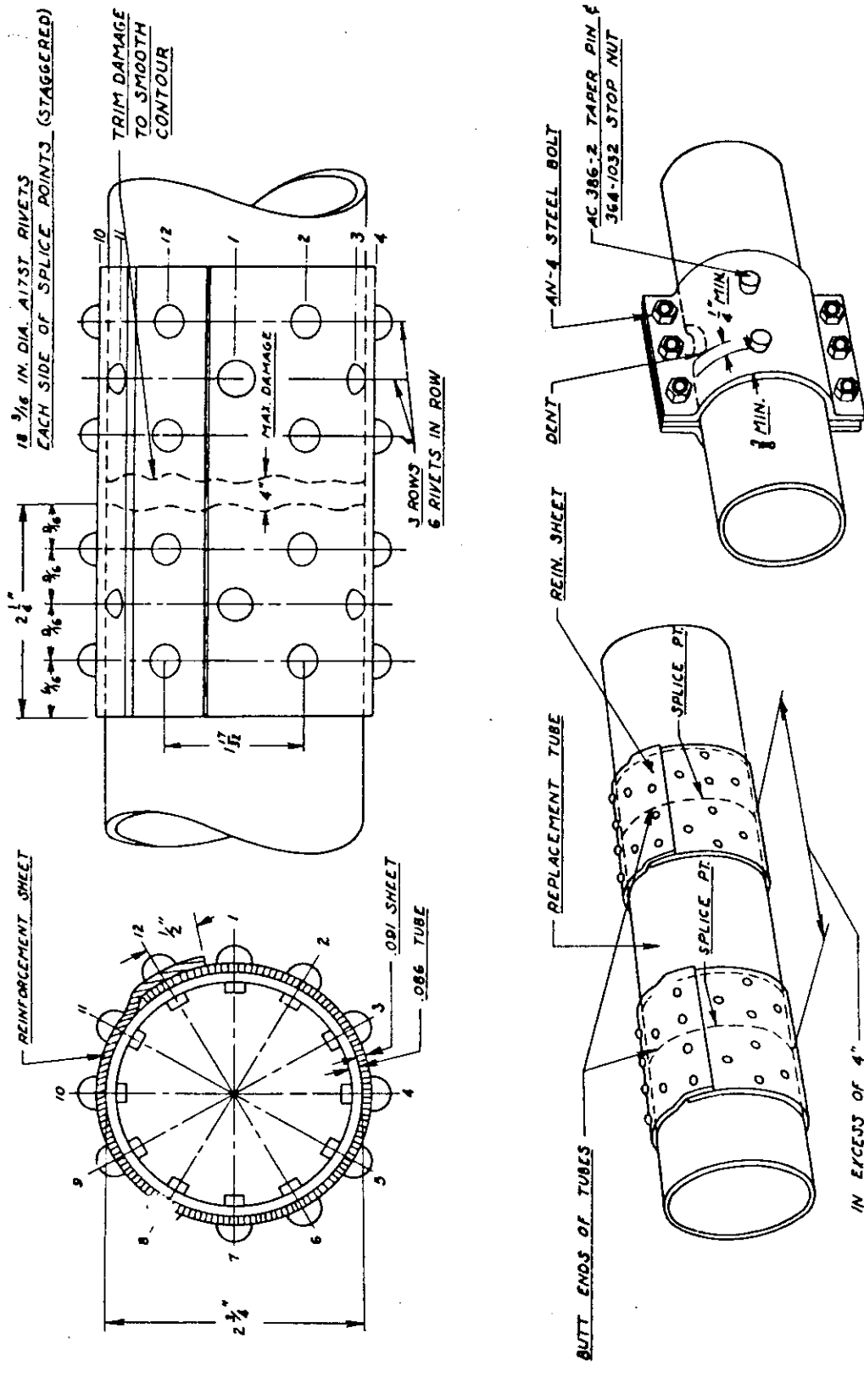


Figure 62 - Engine Mount Assembled



- NOTES:
1. REINFORCEMENT CUT TO SIZE AND PRE-FORMED.
 2. RIVET ROW 1 FIRST, 2 NEXT; 12 LAST.
 3. MAKE ALL FILLERS & REINFORCEMENT SHEETS SAME GAUGE & MATERIAL AS ORIGINAL TUBE.

REPAIR OF DENT TO TUBE, FOR MORE EXTENSIVE DAMAGE USE COMPLETE SPLICE.

NOTE: FOR BUCKING RIVETS INSIDE TUBE USE TOOL NO. LG5-8-1149-67X. PURCHASE FROM DOUGLAS AIRCRAFT CO.

Figure 63 - Torque Tube Repair

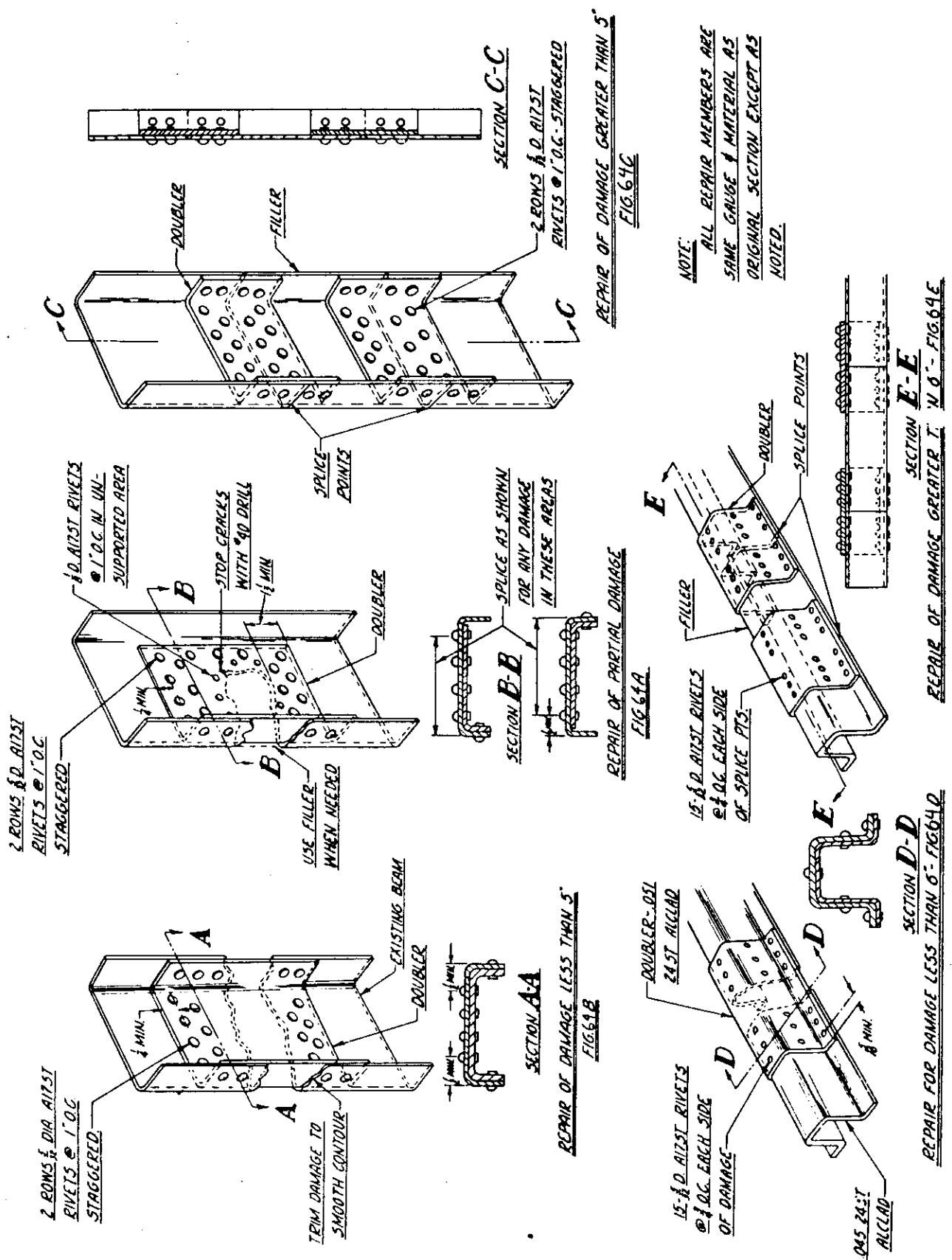


Figure 64 - Empennage & Wing Flap Rib, Beam & Hat Section Repair

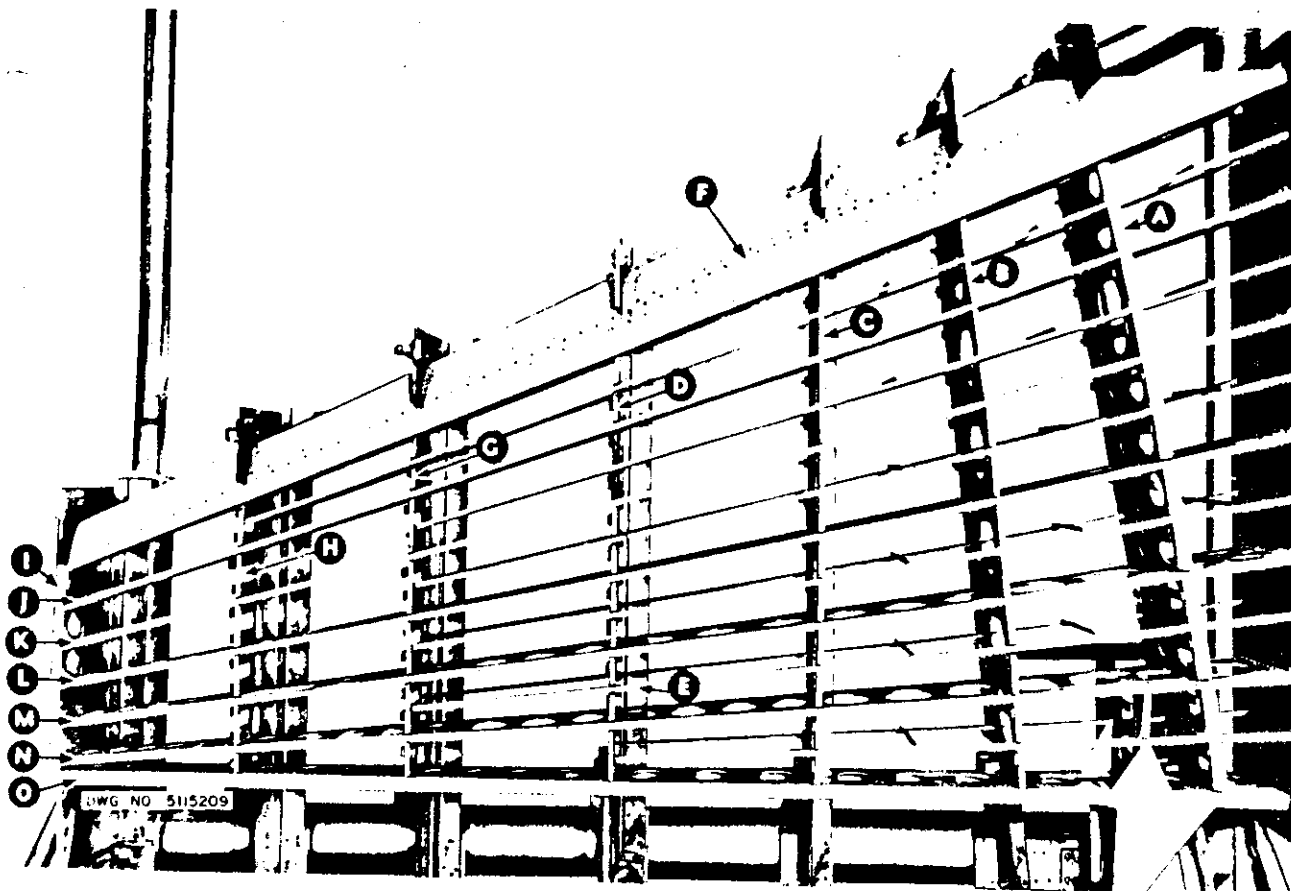


Figure 65 - Horizontal Stabilizer Assembly

KEY TO FIGURE 65

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	7.375	Ribs	5115209	.064 Alclad 24SO
B	28-3/8	Ribs	5115209	.022 Alclad 24SO
C	50-1/8	Ribs	5115209	.022 Alclad 24SO
D	72-1/4	Ribs	5115209	.022 Alclad 24SO
E	72-1/4	Rib	5115209-57	.040 Alclad 24SO
F		Skin Nose	5115209-17	.032 Alclad 24ST
G	94-5/16	Ribs	5115209	.022 Alclad 24ST
H	113	Ribs	5115209	.022 Alclad 24SO
I	113	Rib	5115209-43	.032 Alclad 24SO
J		Shear Web	5115209-42	.022 Alclad 24ST
K		Shear Web	5115209-41	.022 Alclad 24ST
L		Shear Web	5115209-40	.022 Alclad 24ST
M		Shear Web	5115209-39	.022 Alclad 24ST
N		Shear Web	5115209-38	.022 Alclad 24ST
O		Shear Web	5115209-37	.022 Alclad 24ST

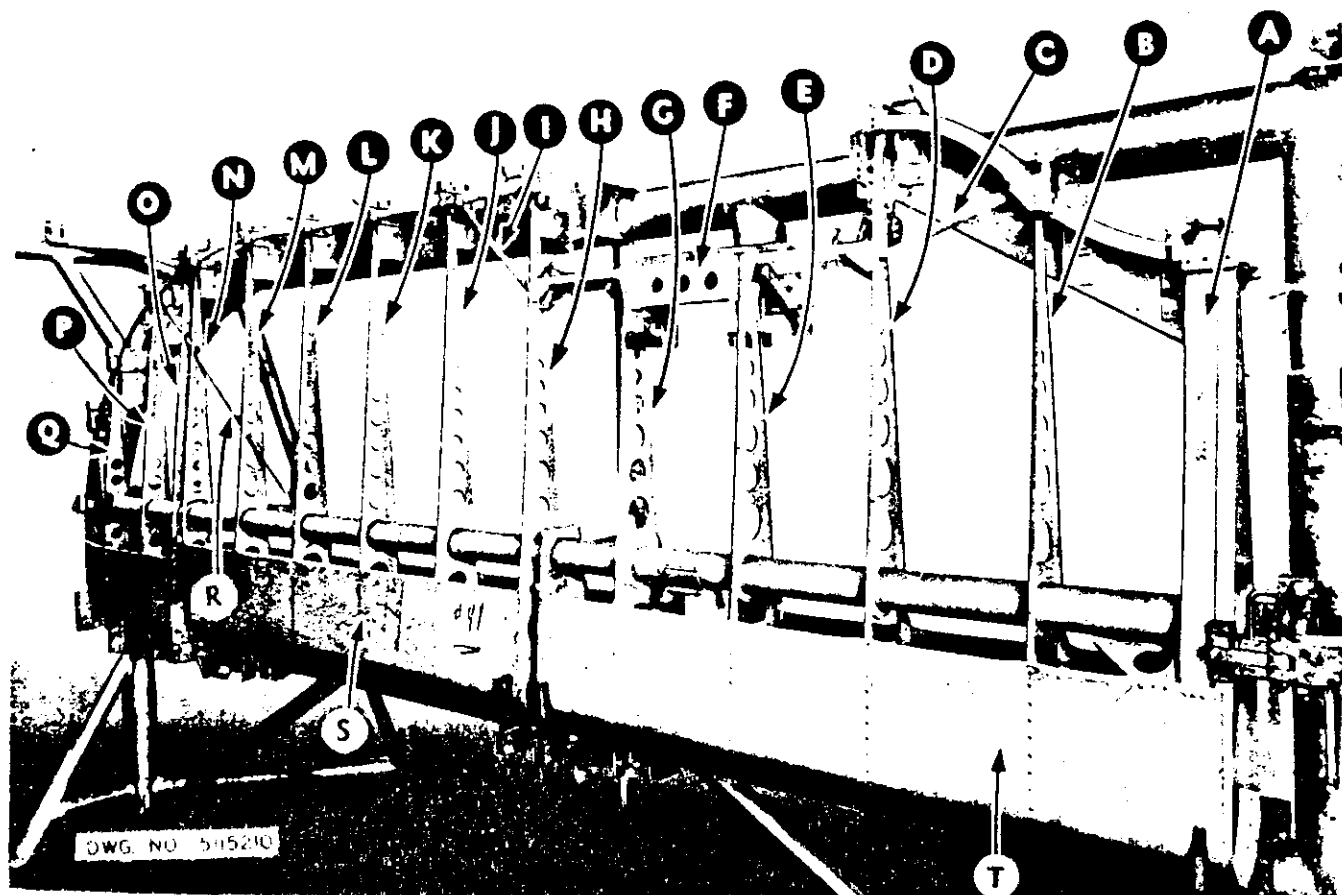


Figure 66 - Elevator Assembly

KEY TO FIGURE 66

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	19 1/2-30	Rib	5115210-3	.051 Alclad 24SO
B	30-41	Rib	5115210-4	.020 Alclad 24SO
C		Brace	2115102	
D	41-52	Rib	5115210-5	.020 Alclad 24SO
E	52-62 1/2	Rib	5115210-6	.020 Alclad 24SO
F		Plate	5115210-110	.025 Alclad 24ST
G	62-1/2-71 7/16	Rib	5115210-7	.020 Alclad 24SO
H	71 7/16-84 1/2	Rib	5115210-9	.020 Alclad 24SO
I		Brace	1115092	
J	84 1/2-96 1/2	Rib	5115210-10	.020 Alclad 24SO
K	96 1/2-108	Rib	5115210-11	.020 Alclad 24SO
L	108-119 1/2	Rib	5115210-12	.020 Alclad 24SO
M	119 1/2-131	Rib	5115210-13	.020 Alclad 24SO
N	131-133	Rib	5115210-14	.020 Alclad 24SO
O	133-141	Rib	5115210-15	.032 Alclad 24SO
P	141-151	Rib	5115210-16	.032 Alclad 24SO
Q	151-160	Rib	5115210-17	.032 Alclad 24SO
R		Brace	2115103	
S		Nose Cover	5115210-22	.032 Alclad 24SO
T		Nose Cover	5115210-20	.025 Alclad 24ST

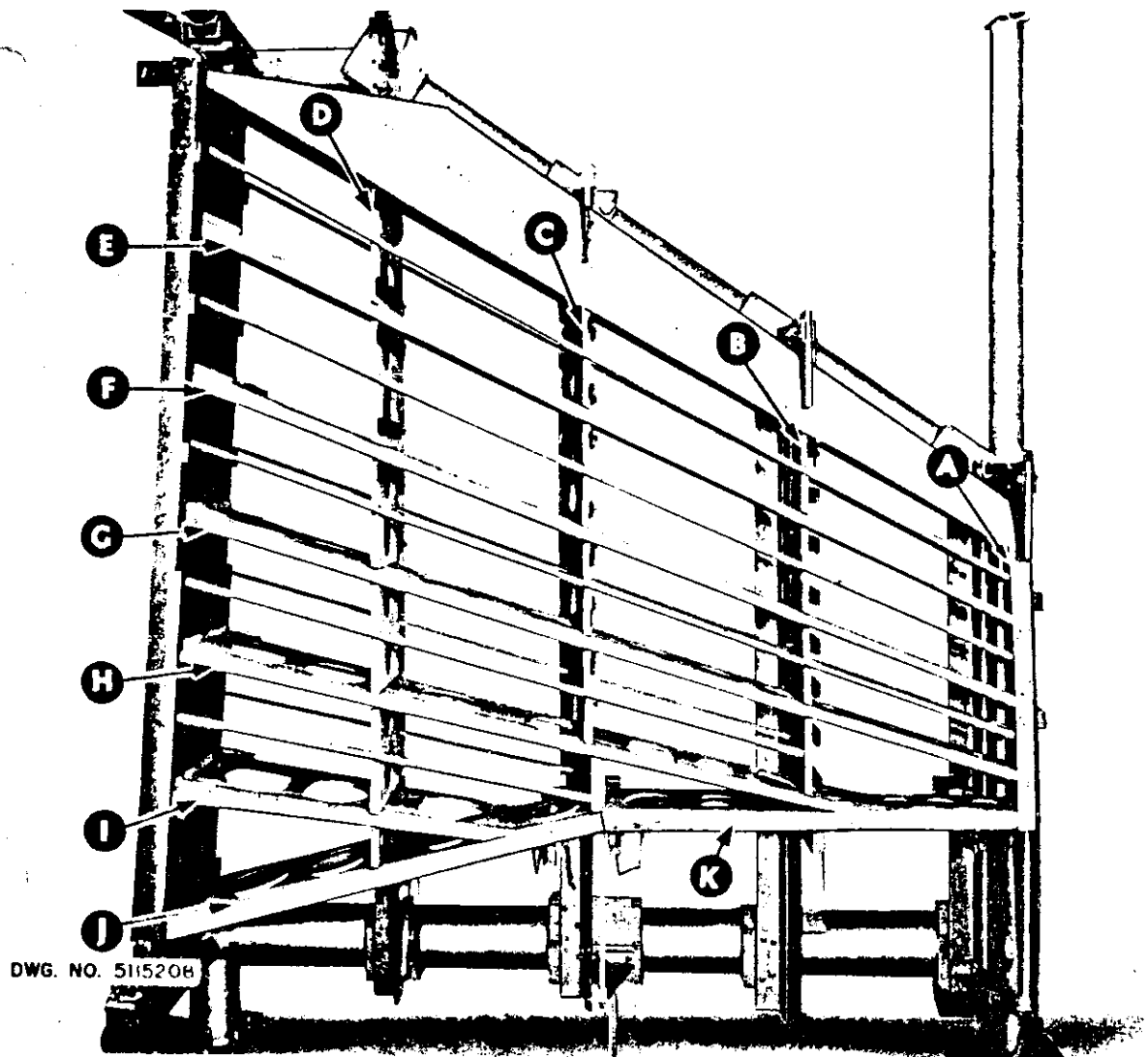
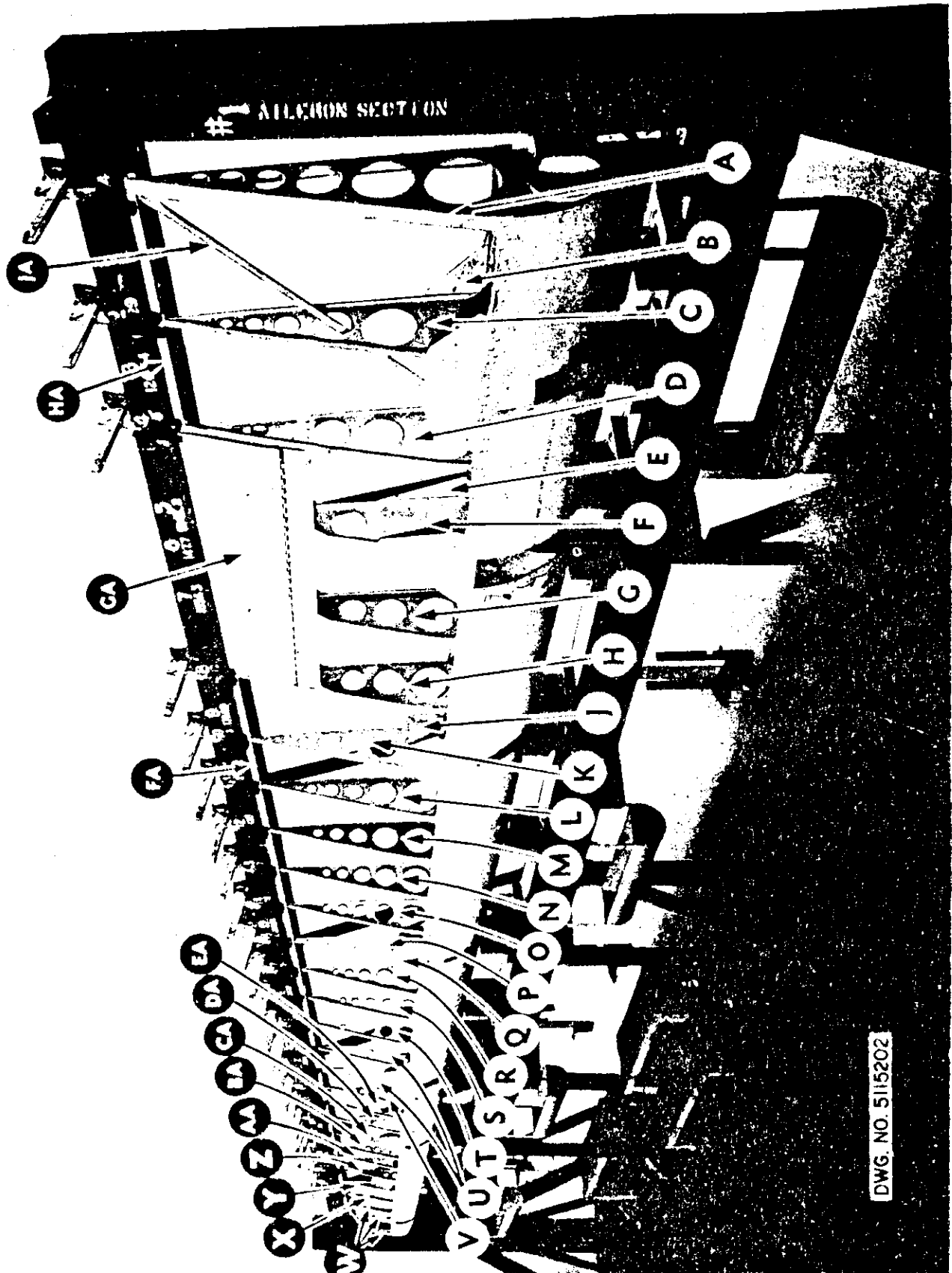


Figure 67 - Vertical Stabilizer

KEY TO FIGURE 67

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	117-1/4	Ribs	5115208-10 5115208-11	.051 Alclad 24SO
B	97	Ribs	5115208	.022 Alclad 24SO
C	42-15/16	Ribs	5115208	.022 Alclad 24SO
D	21-11/16	Rib	5115208	.022 Alclad 24SO
E		Beam	5115208-9	.022 Alclad 24SO
F		Beam	5115208-8	.022 Alclad 24SO
G		Beam	5115208-7	.022 Alclad 24SO
H		Beam	5115208-6	.022 Alclad 24SO
I		Beam	5115208-5	.022 Alclad 24SO
J		Beam	5115208-3	.051 Alclad 24SO
K		Beam	5115208-4	.051 Alclad 24SO



DWG. NO. 5115202

Figure 68 - Aileron Frames With Tab

KEY TO FIGURE 68

<u>EF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A	107.4	Rib	5115202-110 L.H. & -111 R.H.	.020 Alclad 24SO
B		Gusset	5115202-150 L.H. & -151 R.H.	.040 Alclad 24ST
C	120.29	Rib	5115202-8 L.H. & -9 R.H.	.020 Alclad 24SO
D	132	Rib	5115202-16 L.H. & -17 R.H.	.020 Alclad 24SO
E		Gusset	5115202-202 L.H. & -203 R.H.	.040 Alclad 24ST
F	143.2	Rib	5115202-20 L.H. & -21 R.H.	.020 Alclad 24SO
	to			
	147.7			
G	155.85	Rib	5115202-24 L.H. & -25 R.H.	.020 Alclad 24SO
H	167.3	Rib	5115202-28 L.H. & -29 R.H.	.020 Alclad 24SO
J		Gusset	5115202-146 L.H. & -147 R.H.	.040 Alclad 24ST
K	180.3	Rib	5115202-36 L.H. & -37 R.H.	.020 Alclad 24SO
L	190.05	Rib	5115202-40 L.H. & -41 R.H.	.020 Alclad 24SO
M	201.25	Rib	5115202-44 L.H. & -45 R.H.	.020 Alclad 24SO
N	212	Rib	5115202-48 L.H. & -49 R.H.	.020 Alclad 24SO
O	222.75	Rib	5115202-100 L.H. & -101 R.H.	.020 Alclad 24SO
P	234	Rib	5115202-56 L.H. & -57 R.H.	.020 Alclad 24SO
Q		Gusset	5115202-146 L.H. & -147 R.H.	.040 Alclad 24ST
R	244.5	Rib	5115202-60 L.H. & -61 R.H.	.020 Alclad 24SO
S	255.25	Rib	5115202-64 L.H. & -65 R.H.	.020 Alclad 24SO
T	266.25	Rib	5115202-68 L.H. & -69 R.H.	.020 Alclad 24SO
U	277.25	Rib	5115202-108 L.H. & -109 R.H.	.020 Alclad 24SO
V	288.14	Rib	5115202-76 L.H. & -77 R.H.	.020 Alclad 24SO
W	296.75	Rib	5115202-220 L.H. & -219 R.H.	.020 Alclad 24SO
W	396.5	Rib	5115202-218 L.H. & -217 R.H.	.020 Alclad 24SO
W	384.78	Rib	5115202-198 L.H. & -199 R.H.	.020 Alclad 24SO
W	376	Rib	5115202-186 L.H. & -187 R.H.	.020 Alclad 24SO
W	366.75	Rib	5115202-158 L.H. & -159 R.H.	.020 Alclad 24ST
	357.5	Rib	5115202-144 L.H. & -145 R.H.	.020 Alclad 24SO
	348.25	Rib	5115202-96 L.H. & -97 R.H.	.020 Alclad 24SO
A	339	Rib	5115202-154 L.H. & -155 R.H.	.020 Alclad 24SO
BA	331.5	Rib	5115202-92 L.H. & -93 R.H.	.020 Alclad 24SO
CA	323.5	Rib	5115202-138 L.H. & -139 R.H.	.020 Alclad 24SO
DA	314.25	Rib	5115202-84 L.H. & -85 R.H.	.020 Alclad 24SO
EA	305.5	Rib	5115202-80 L.H. & -81 R.H.	.020 Alclad 24SO
FA		Trailing Edge	5115202-133	Ext. No. 9
GA		Tab	5115203	.020 Alclad 24ST
		Assembly		
HA		Trailing Edge	5115202-131	Ext. No. 9
JA		Brace Tube	5115202-184 L.H.	.035 Alloy 17ST
		Brace Tube	5115202-185 R.H.	.035 Alloy 17ST

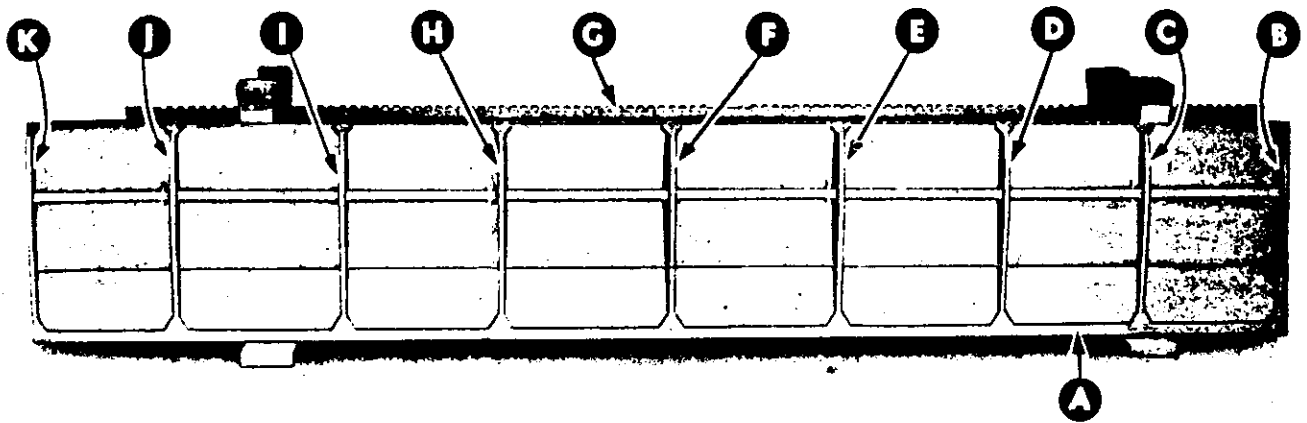
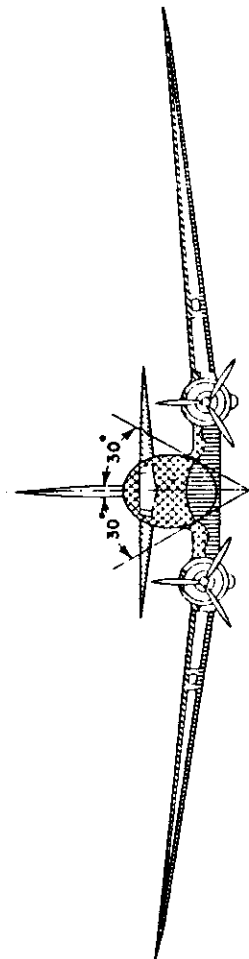
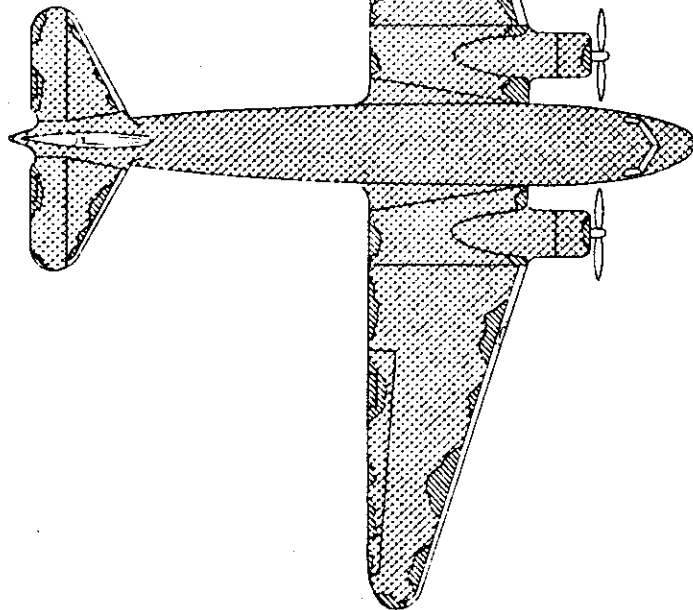
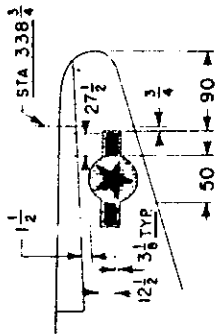


Figure 69 - Center and Outer Wing Flap

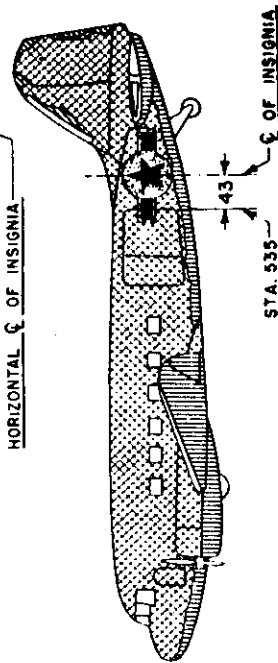
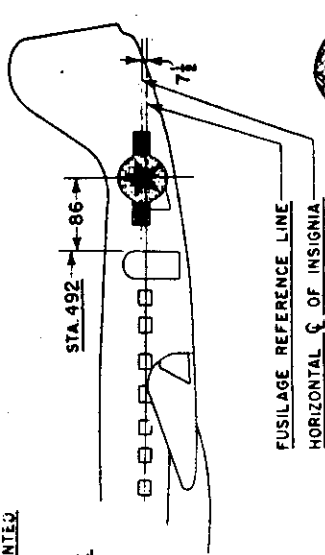
KEY TO FIGURE 69

<u>REF.</u>	<u>STATION</u>	<u>NAME</u>	<u>PART NO.</u>	<u>MATERIAL</u>
A		Trailing Edge	2115275	.032 Alclad 24ST
B	0	Rib	3115117	.036 Alclad 24SO
C	20	Rib	3115115	.036 Alclad 24SO
D	35-3/4	Rib	3115116	.036 Alclad 24SO
E	54	Rib	3115115	.036 Alclad 24SO
F	72-1/4	Rib	3115116	.036 Alclad 24SO
G		Hinge	1000760	
H	90-5/8	Rib	3115115	.036 Alclad 24SO
I	107-1/2	Rib	3115116	.036 Alclad 24SO
J	125-1/4	Rib	3115115	.036 Alclad 24SO
K	142	Rib	3115117	.036 Alclad 24SO



COLOR CHART

NEUTRAL GRAY
OLIVE DRAB
MEDIUM GREEN
UNPAINTED
BLUE
WHITE



REFER TO DOUGLAS DWG. 5115230 (C-47) 5189155 (C-117A)

NOTE:

1. LINE OF DEMARKATION BETWEEN TOP AND BOTTOM COLORS.

TOP AND BOTTOM COLORS TO BLEND IN ORDER TO

ELIMINATE SHARP CONTRAST.

2. OUTER PANEL INSIGNIA APPEARS ON UPPER SIDE OF L.H.

WING AND LOWER SIDE OF R.H. WING ONLY. FUSILAGE

INSIGNIA APPEARS ON BOTH SIDES OF AIRPLANE.

3. C-117A AIRPLANES HAVE INSIGNIA APPLIED, BUT ARE

NOT CAMOUFLAGED.

Figure 70 - Camouflage Diagram (C-47 and C-117A Models)

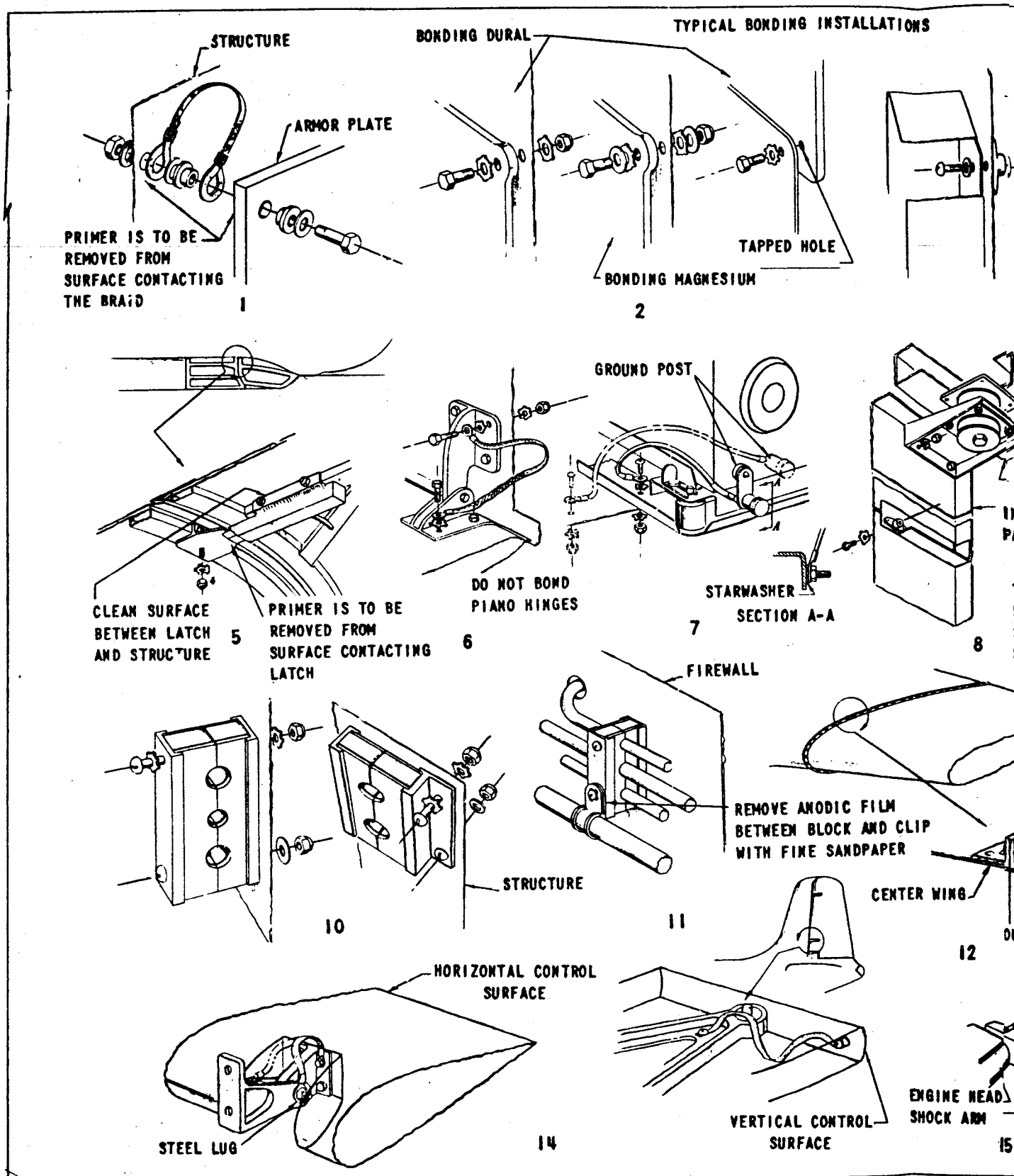
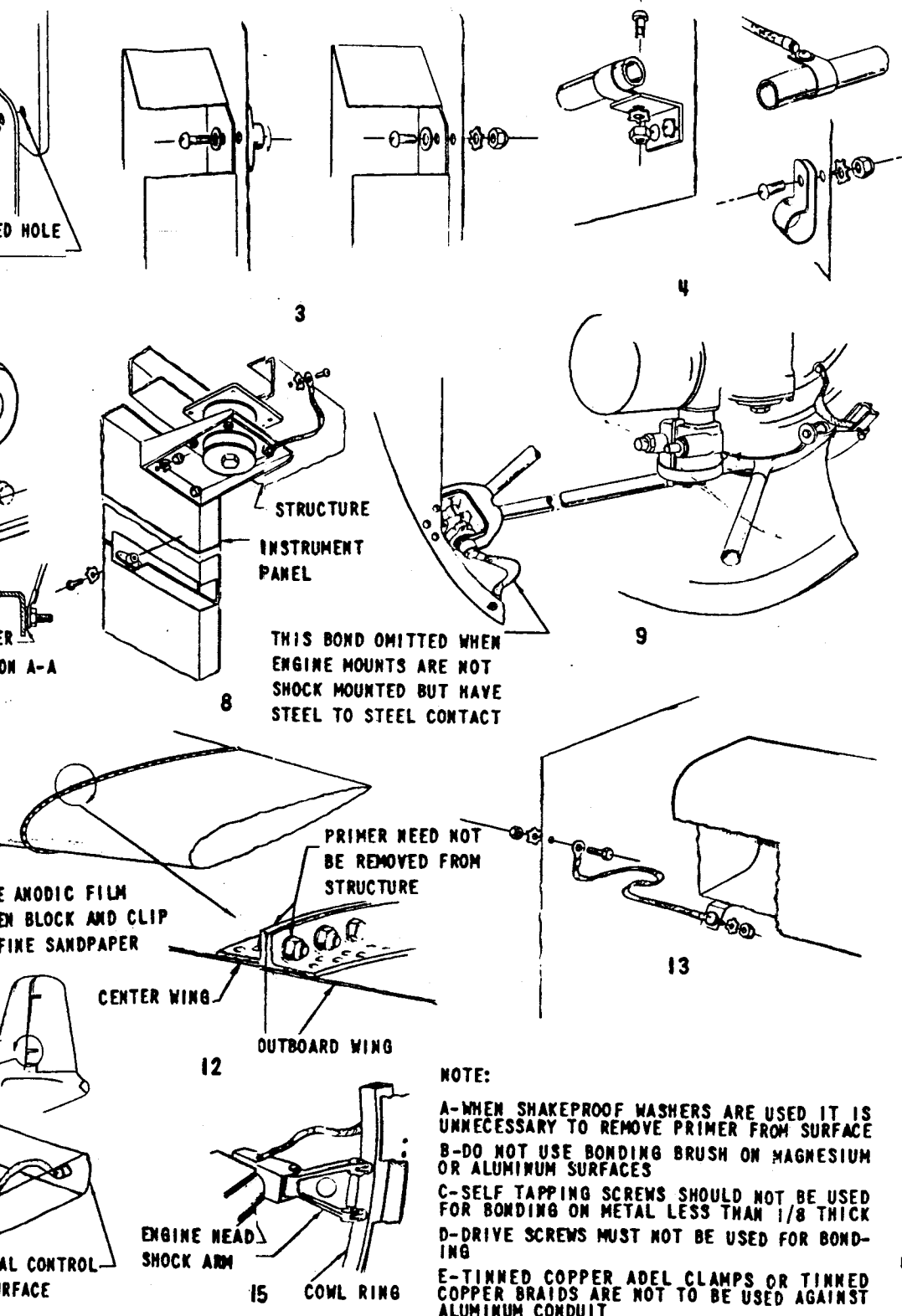


Figure 71 - Bonding Procedure

GENERAL BONDING PROCEDURE



1. ARMOR PLATE IS TO BE BONDED TO THE STRUCTURE IN ONE (1) PLACE (BRAID SHALL BE 1/4" MINIMUM).
2. A. BONDING MAY BE ACCOMPLISHED THROUGH BOLTS AND NUTS OR BOLTS AND TAPPED HOLES OVER 1/8" DEEP.
B. CADMIUM PLATED STEEL BOLTS ARE TO BE USED IN PREFERENCE TO ALUMINUM ALLOY BOLTS FOR BONDING WITH SHAKEPROOF WASHERS.
WHEN BONDING MAGNESIUM WITH STAR WASHERS ARE TO BE USED BETWEEN THE TURNING PART (BOLT HEAD OR NUT) AND THE SHAKE-PROOF WASHER.
D. ALUMINUM BONDING BRAID IS PREFERRED ALTHOUGH TINNED COPPER BRAID CAN BE USED. THE ENDS OF BONDING BRAID ARE TO BE FASTENED INTO APPROPRIATE CONNECTING LUGS OR TREATED IN SUCH A WAY AS TO PREVENT FRAYING. IF IT IS NECESSARY TO SOLDER A BONDING JUMPER TO A PART, SOLDERING MUST BE DONE ACCORDING TO D.P.S. 10.903.
E. JUMPERS MUST BE AS SHORT AS POSSIBLE, BUT THEY MUST BE SUFFICIENTLY SLACK AND FLEXIBLE TO PREVENT STRAINING OR DISTURBING THE CONTACT, OR BREAKING THE CONDUCTOR.
3. ALL ELECTRICAL JUNCTION BOXES MUST BE BONDED.
4. CONDUIT IS TO BE BONDED AT OR NEAR EACH END OF THE CONDUIT RUN. (ADDITIONAL BONDS MAY BE CALLED FOR ON ENGINEERING DRAWINGS).
5. COCKPIT ENCLOSURES ARE TO BE BONDED IN THE CLOSED POSITION ONLY.
6. HINGED PARTS ARE TO BE BONDED. DOORS ARE TO BE BONDED ACROSS ONE (1) HINGE ONLY.
7. ALL RADIO EQUIPMENT IS TO BE BONDED TO THE STRUCTURE.
8. INSTRUMENT PANELS ARE TO BE BONDED TO THE PANEL MOUNT AND THEN TO THE STRUCTURE.
9. MOTOR BLOCKS MUST BE BONDED TO THE ENGINE MOUNT AND THE ENGINE MOUNTS BONDED TO THE FIREWALL AT FOUR (4) EQUIDISTANT POINTS ACROSS THE SHOCK MOUNTS USING BONDING BRAID OF 40 AMPERE CAPACITY (3/8" BRAID OR GREATER). NO BONDING IS REQUIRED ON ENGINE MOUNTS WHICH ARE NOT SHOCK MOUNTED.
10. LONG FIXED LINES (GAS AND LIQUIDS) SHALL BE BONDED AND SUPPORTED BY GROUNDING TYPE CLAMPS AT SUITABLE POINTS WHERE THEY CROSS THE STRUCTURE.
11. METAL LINES PASSING THROUGH THE FIREWALL MUST BE BONDED TO THE FIREWALL.
12. WINGS SHALL BE BONDED ACROSS THE WING CONNECTIONS THROUGH THE USE OF TWO OR MORE THOROUGHLY CLEANED BOLTS.
13. TANKS SHALL BE BONDED IN ONE OR MORE PLACES, PREFERABLY ON LOWER CORNERS. TANKS SHALL HAVE ACCESSIBLE POINTS FOR THE CONNECTION OF BONDS.
14. ALL CONTROL SURFACES, WITH THE EXCEPTION OF TRIM TABS, SHALL BE BONDED ACROSS AT LEAST TWO HINGE BRACKETS.
15. ENGINE COWLING SHALL BE BONDED TO THE ENGINE BY THE USE OF NOT LESS THAN FOUR (4) SYMMETRICALLY LOCATED BONDS. BONDS ARE TO BE MADE AS SHOWN OR BY AN APPROVED METHOD.

NOTE: WHEN IT IS NECESSARY TO BOND BOMB RACKS, THE BOND SHALL BE AS SHOWN ON THE PRODUCTION ILLUSTRATION FOR THE INSTALLATION OF THE RACK.

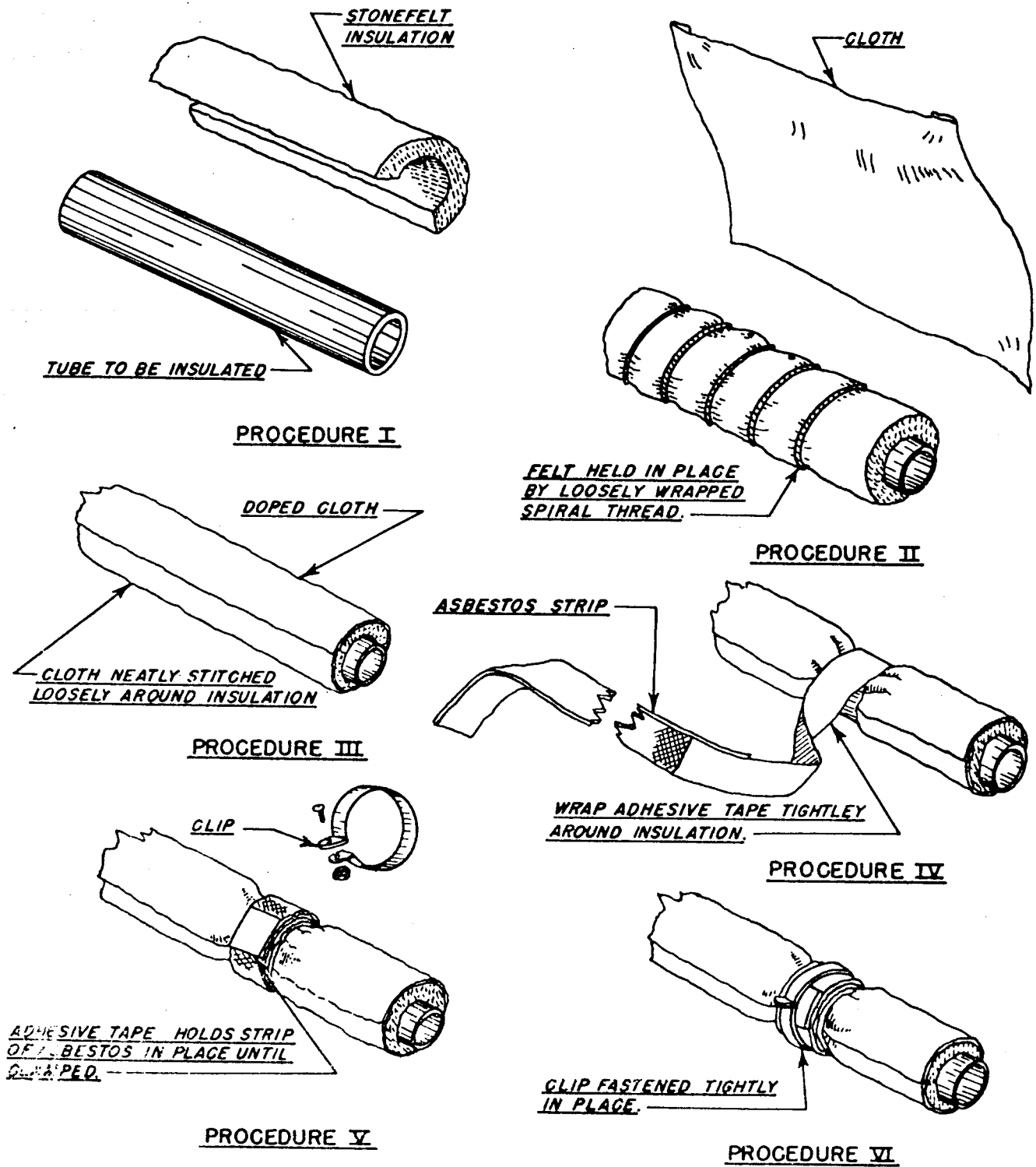


Figure 72 - Warm Air Duct Insulation

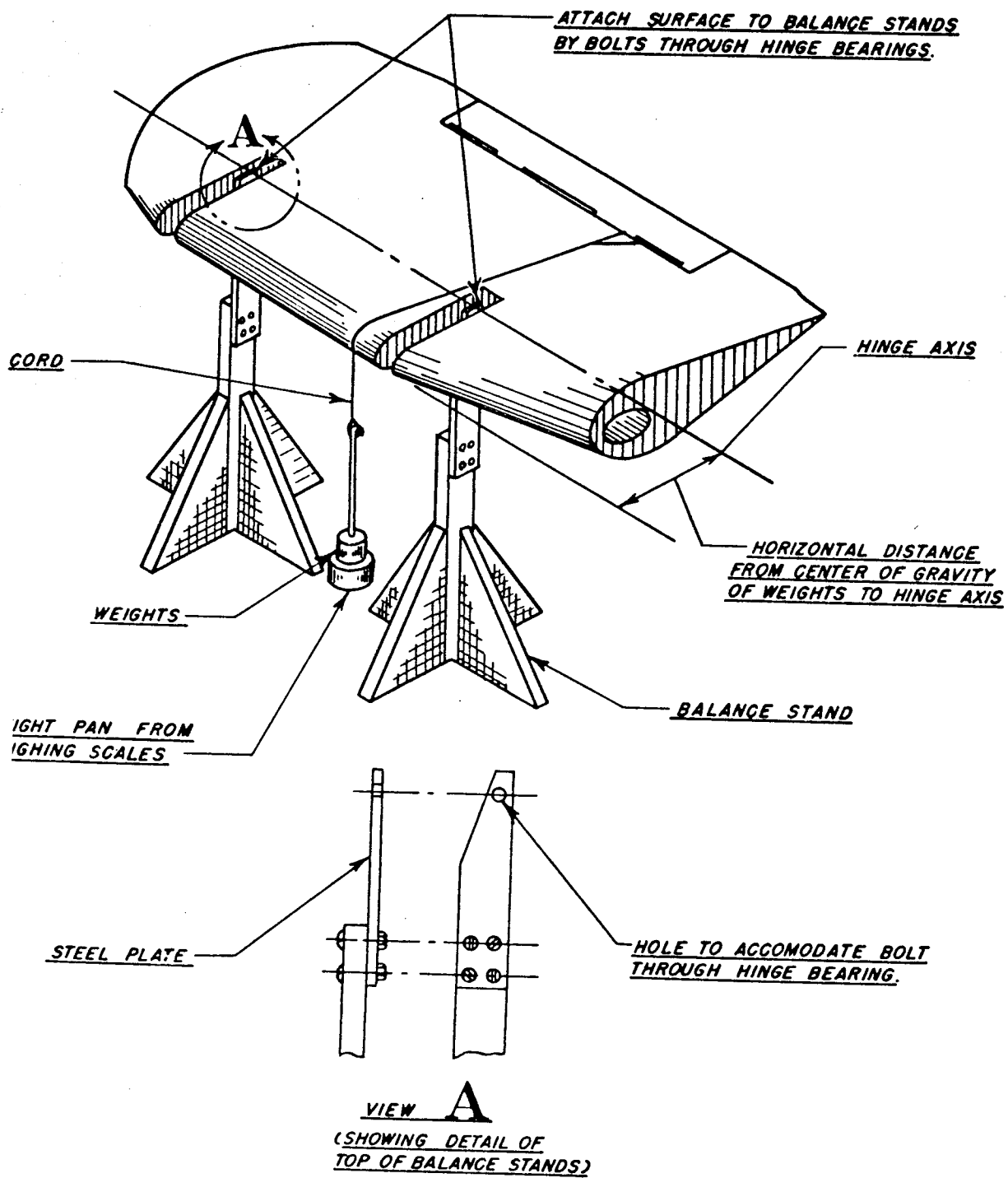
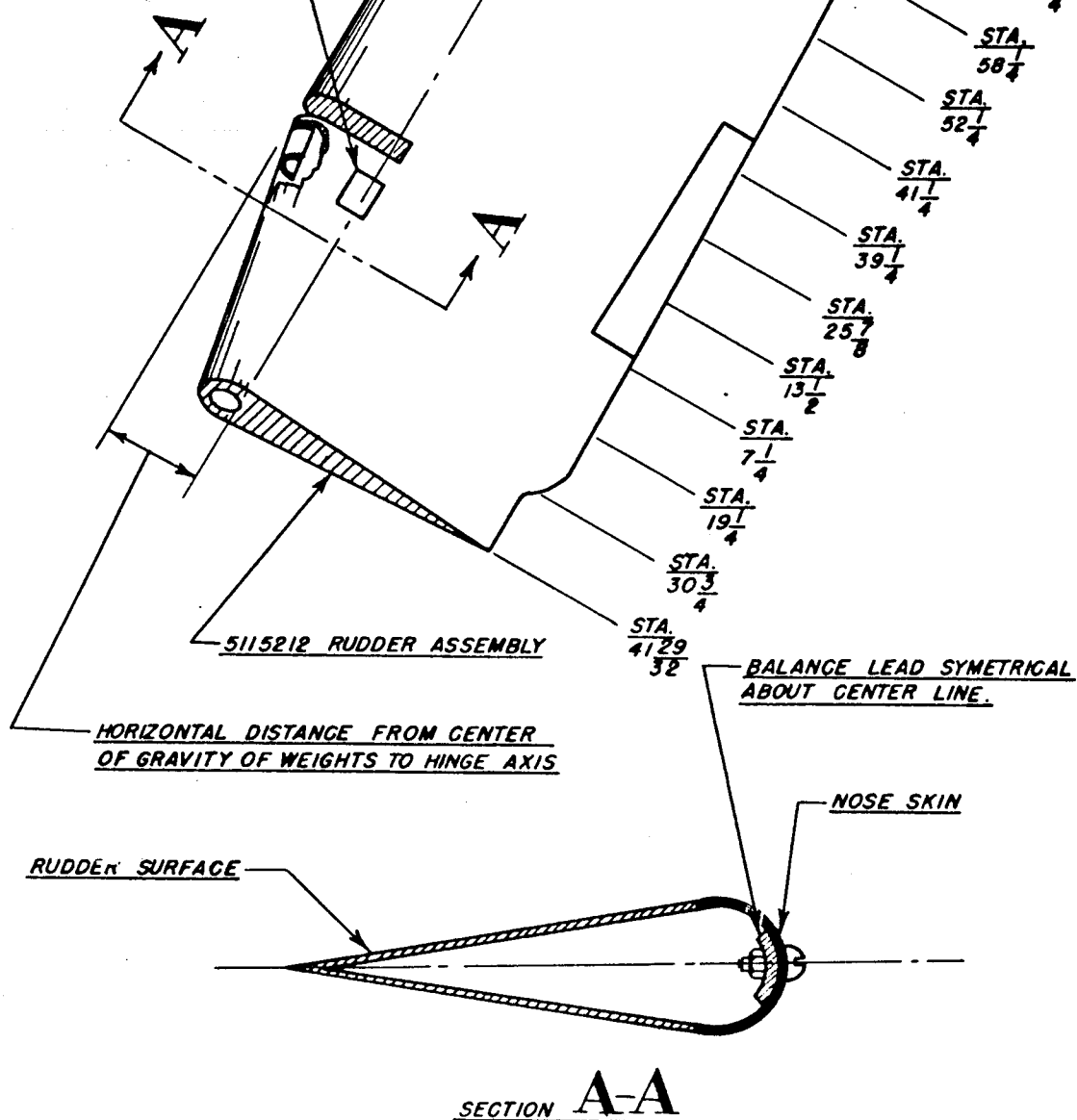


Figure 73 - Surface Control Balance Stand

LEAD BALANCE WEIGHT
= $11\frac{1}{4}$ LBS. - 1 REQ.

INSERT REBALANCING LEAD
THROUGH RUDDER TAB ACCESS



NOTE:
FOR COMPUTATION OF RUDDER REBALANCE WEIGHT
REFER TO FIG. 75

Figure 74 - Rudder Rebalance Procedure

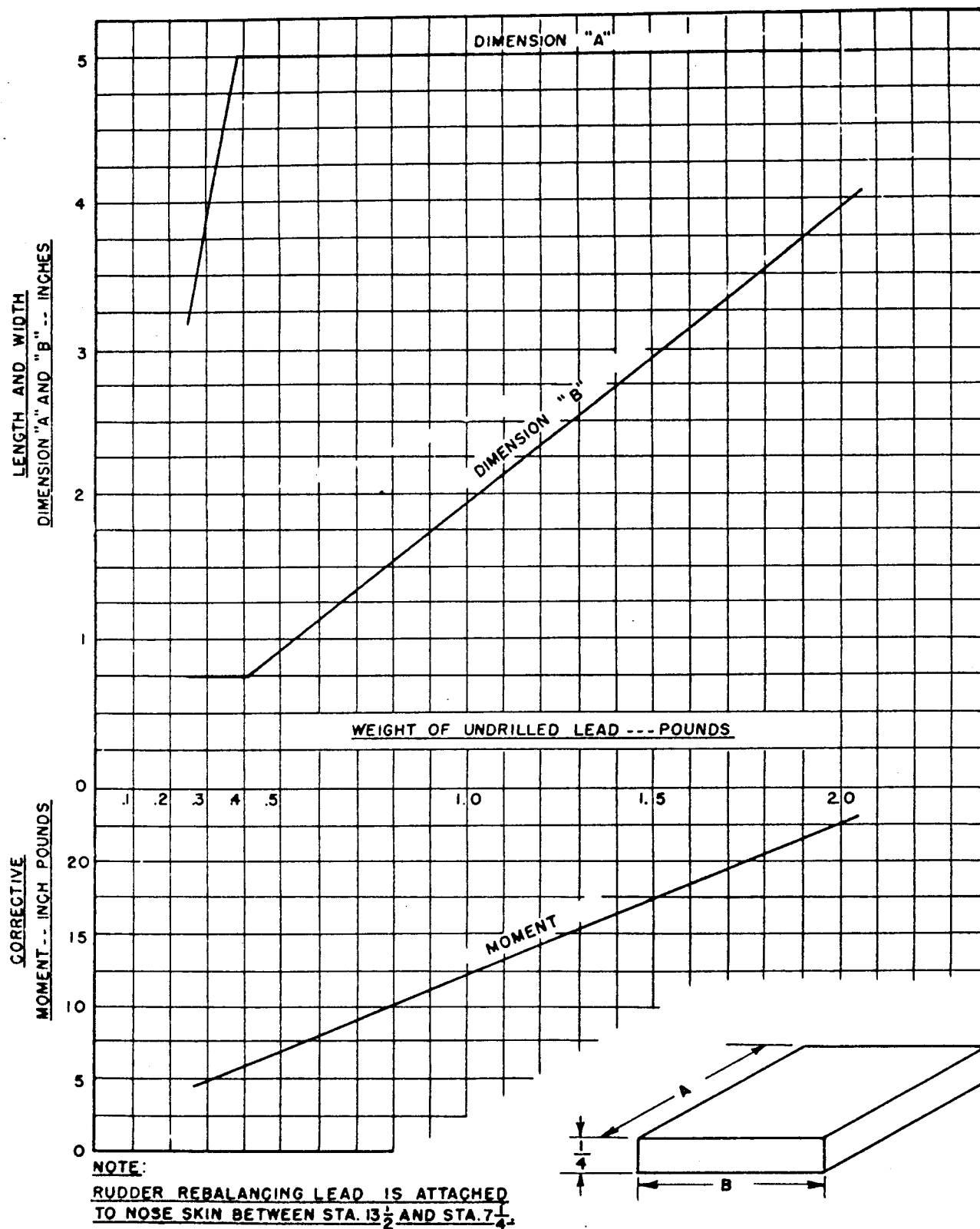
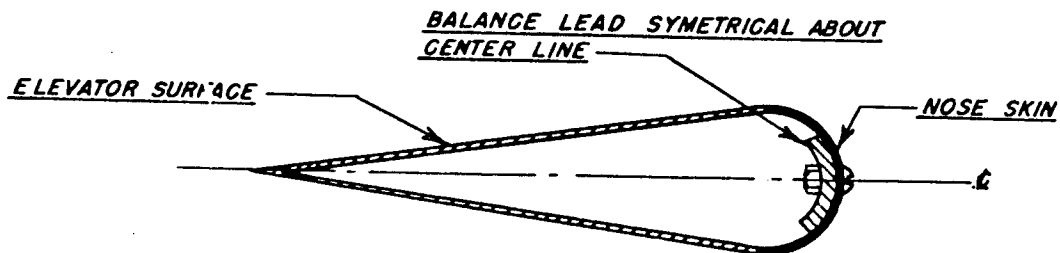
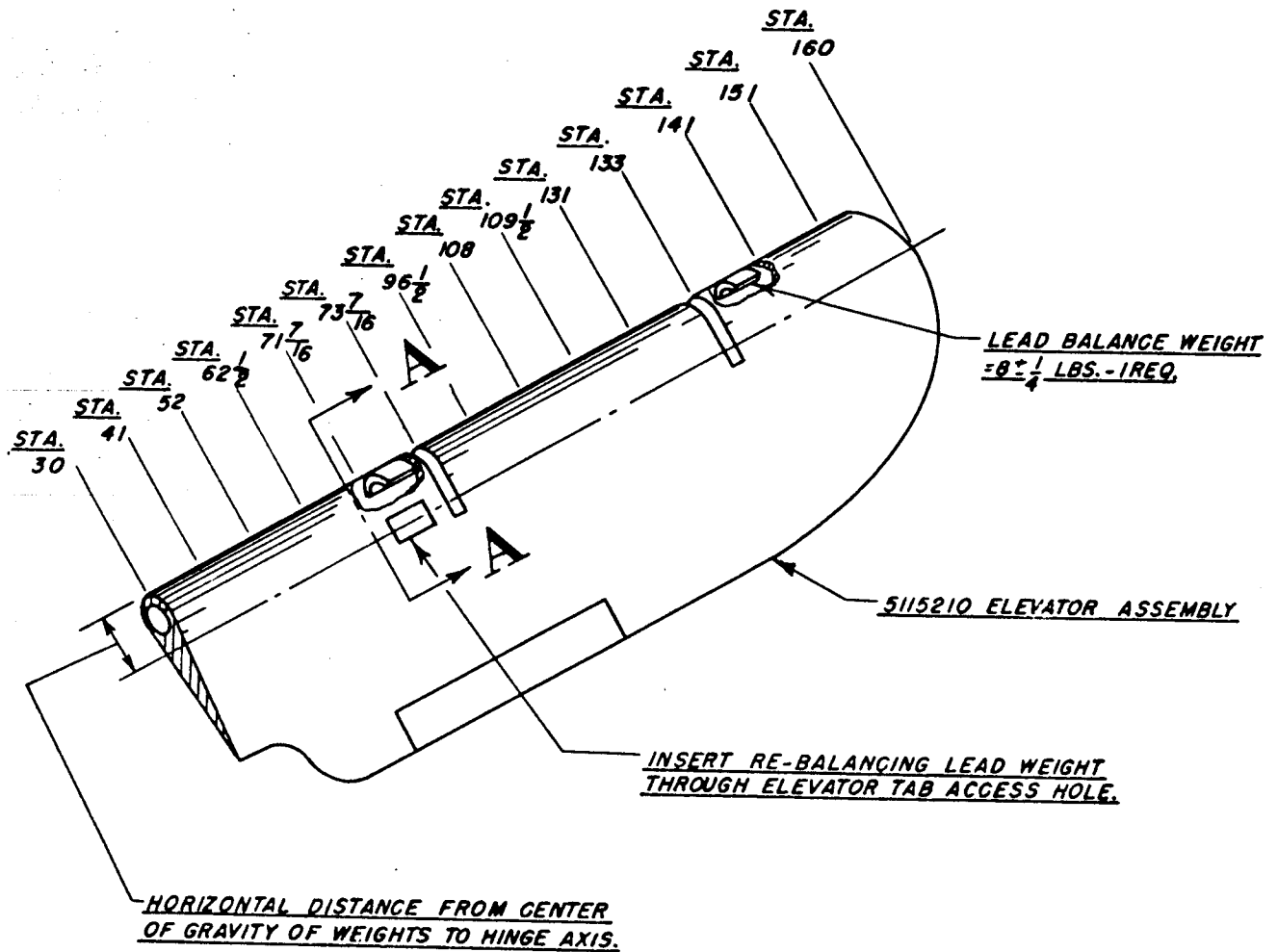


Figure 75 - Rudder Rebalance Computation Chart



SECTION A-A

NOTE:
FOR COMPUTATION OF ELEVATOR RE-BALANCE WEIGHT REFER TO FIG. 77.

Figure 76 - Elevator Rebalance Procedure

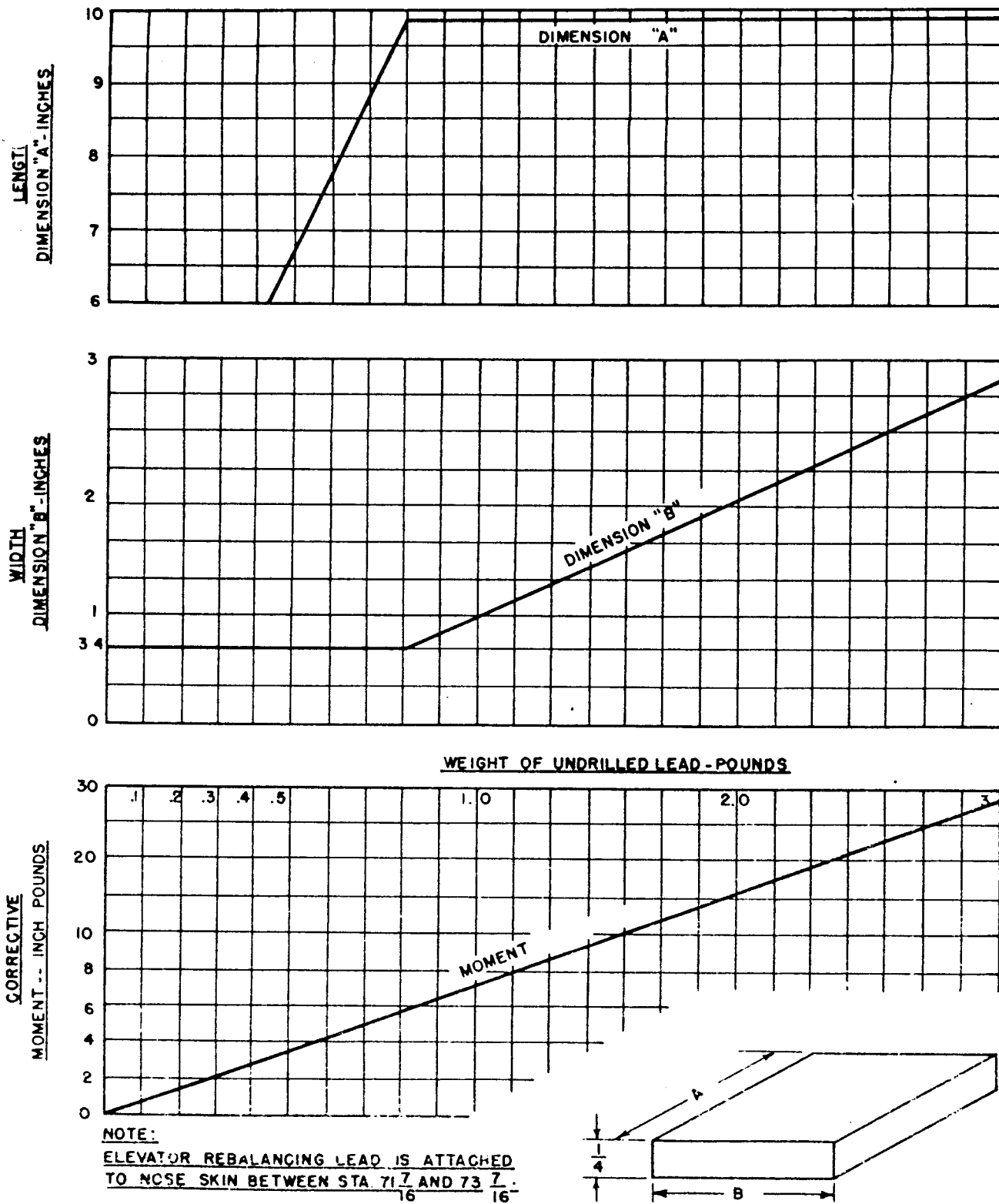


Figure 77 - Elevator Rebalance Computation Chart

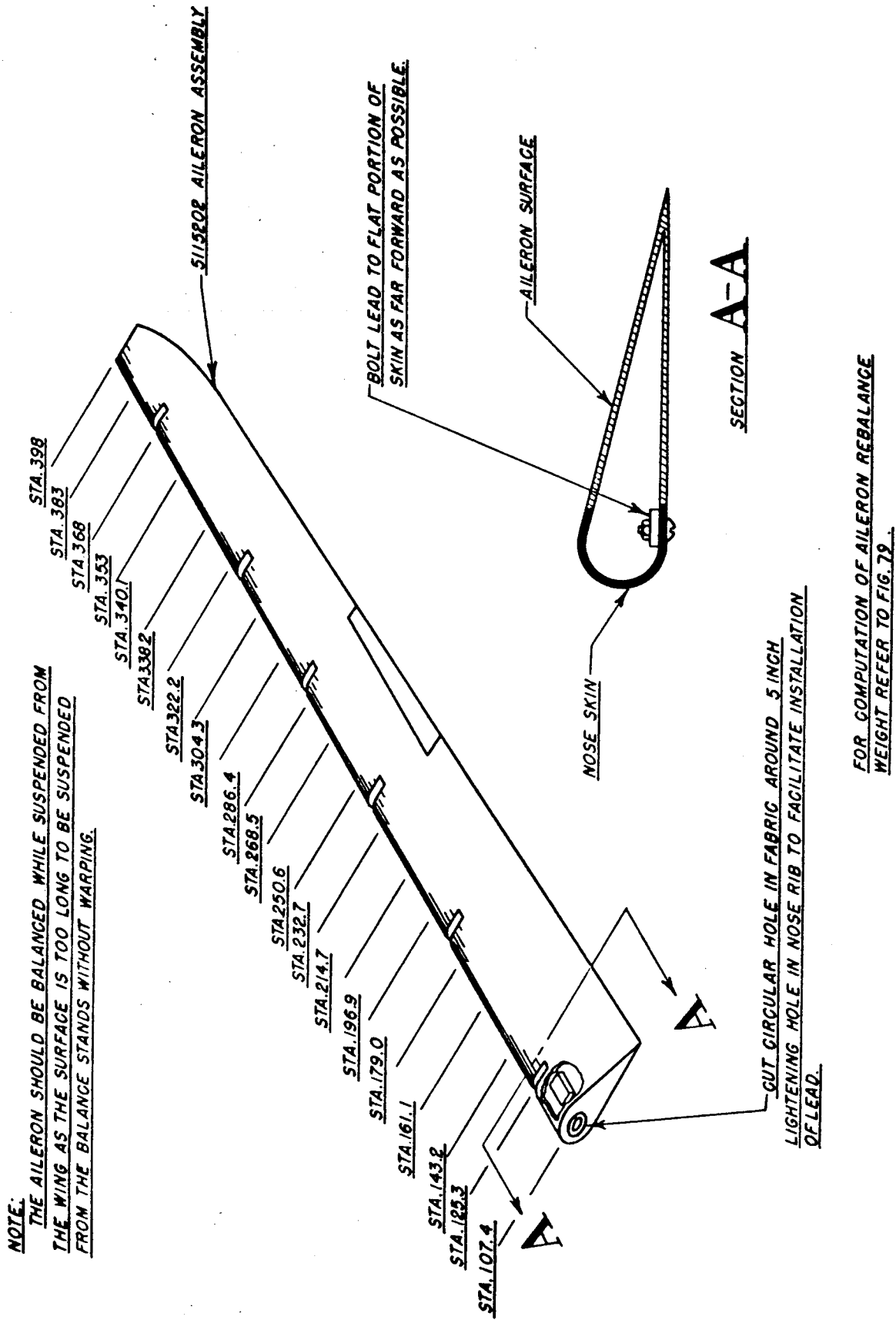


Figure 78 - Aileron Rebalance Procedure

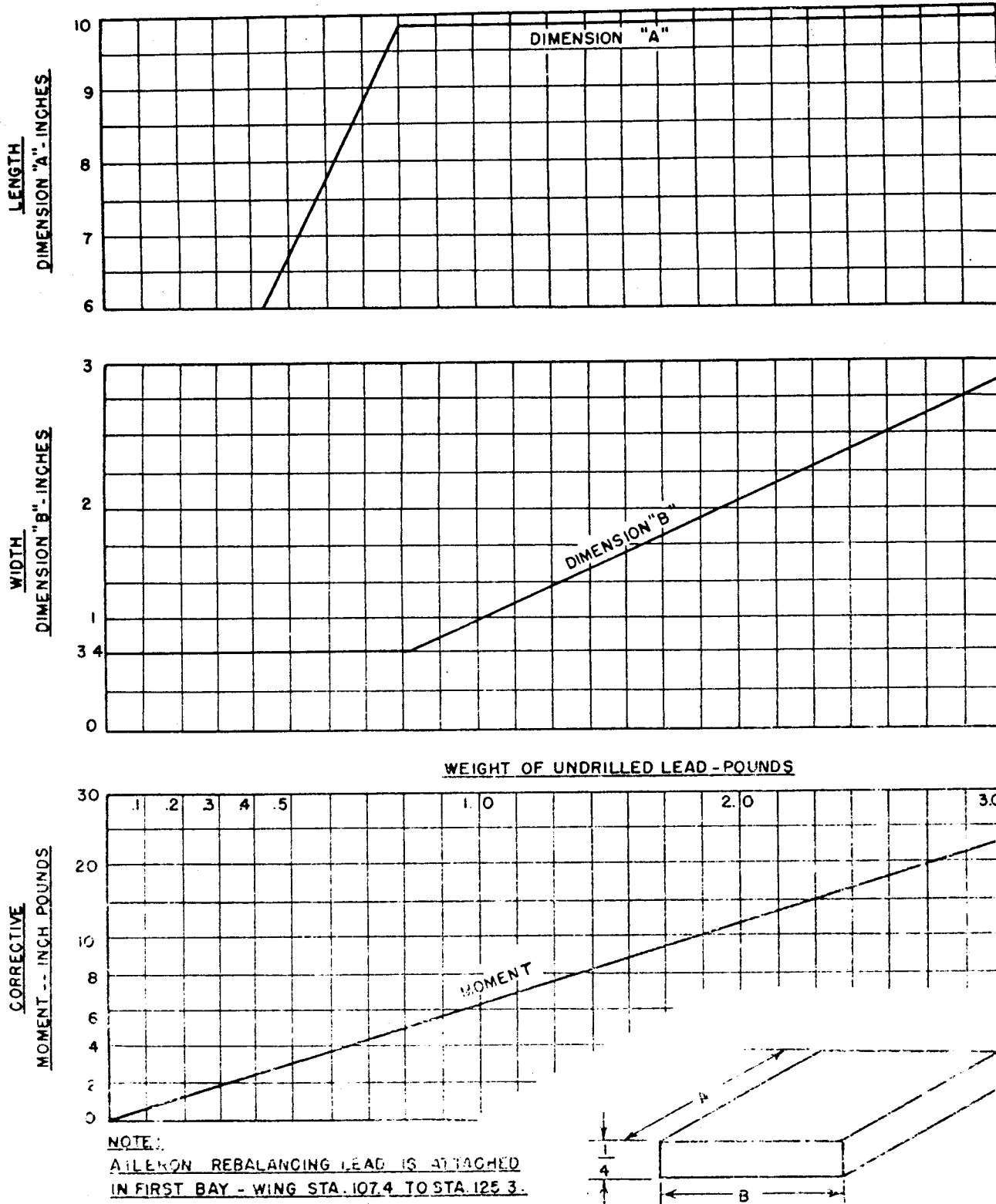


Figure 79 - Aileron Rebalance Computation Chart

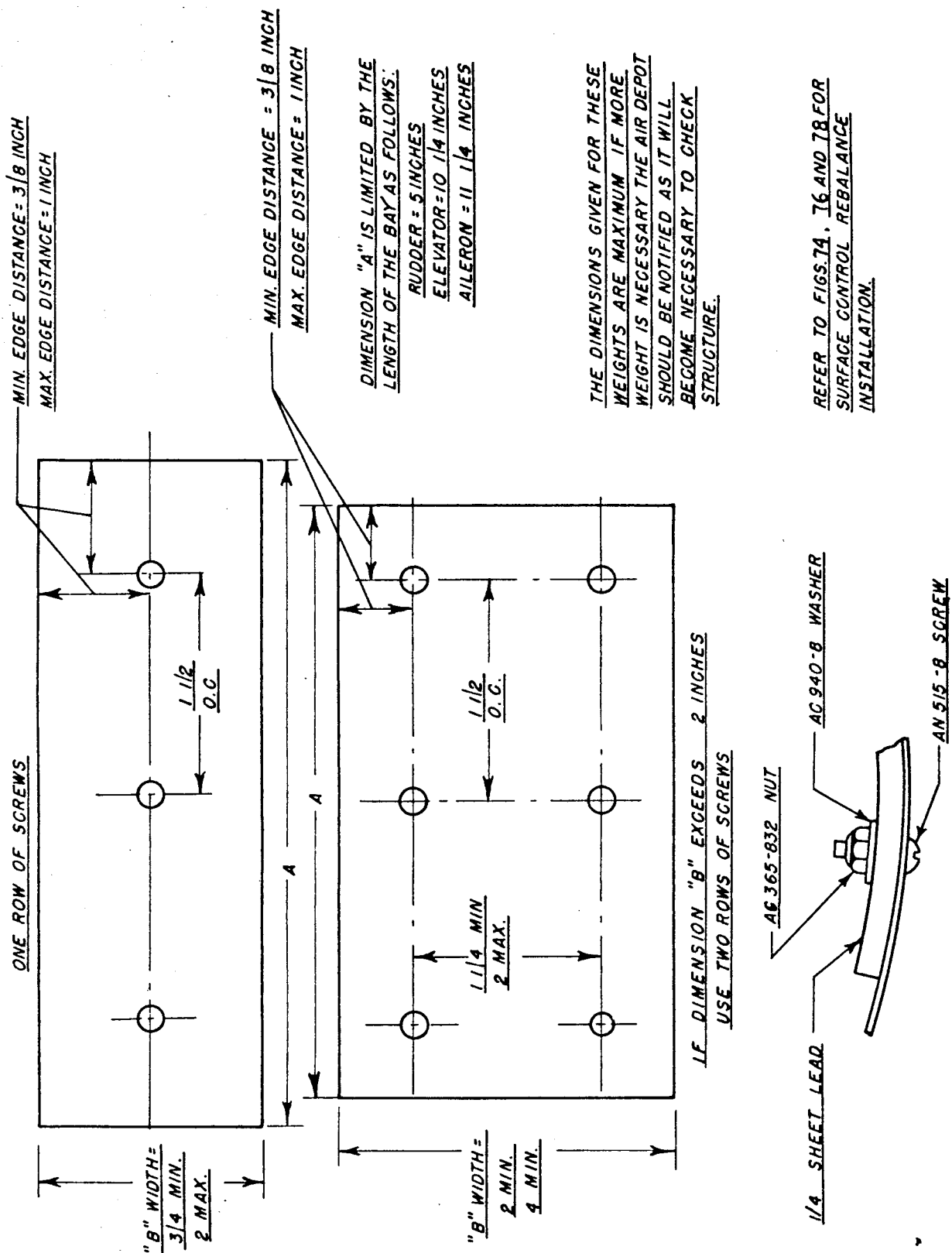
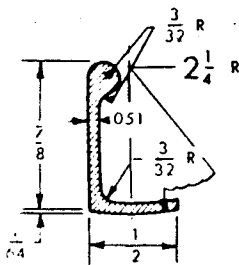
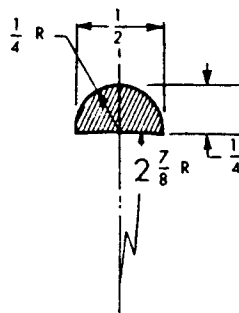


Figure 80 - Surface Control Balance Weight Detail

**ALTERNATE**

Material 2450
H.T. to 245T
Gage .064
Min. Radii 3/32
Area .1096 Sq. In.



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-130892

ALCOA DIE NUMBER K-10265

AREA .091 SQ. IN.

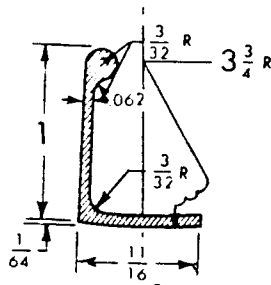
MATERIAL 245

S-130909

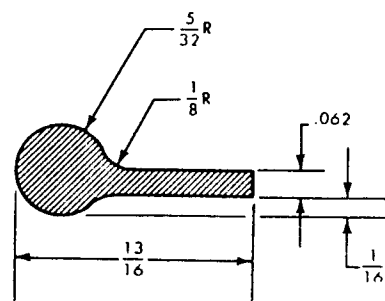
ALCOA DIE NUMBER D-919

AREA .098 SQ. IN.

MATERIAL 245

**ALTERNATE**

Material 2450
H.T. to 245T
Gage .072
Min. Radii 1/8
Area .1475 Sq. In.



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-130893

ALCOA DIE NUMBER K-10266

AREA .122 SQ. IN.

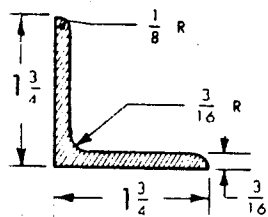
MATERIAL 245

S-130910

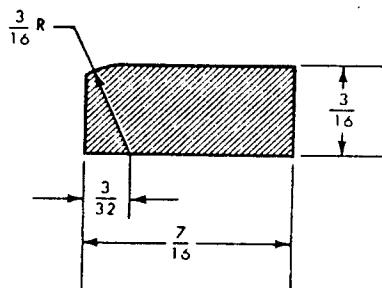
ALCOA DIE NUMBER 6207

AREA .110 SQ. IN.

MATERIAL 245



NO
ALTERNATE
FOR
THIS
EXTRUSION



NO
ALTERNATE
THIS
THIS
EXTRUSION

S-130907

ALCOA DIE NUMBER K-77-U

AREA .620 SQ. IN.

MATERIAL 245

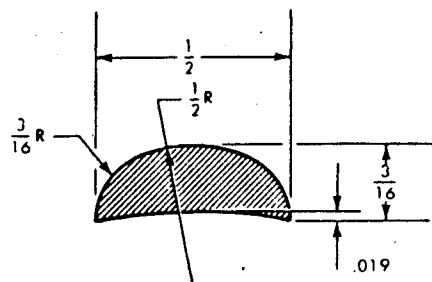
S-130918

ALCOA DIE NUMBER 1169

AREA .087 SQ. IN.

MATERIAL 245

Figure 81 (Sheet 1 of 21) — Extrusion Charts



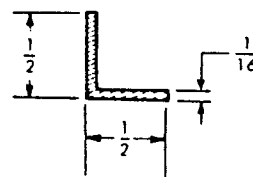
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-130919

ALCOA DIE NUMBER 74-C

AREA .071 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Area .072 Sq. In.

Min. Radii 1/8

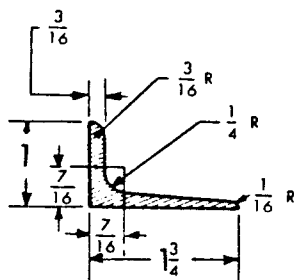
Area .0618 Sq. In.

S-132965

ALCOA DIE NUMBER K-1312

AREA .059 SQ. IN.

MATERIAL 24S



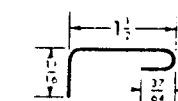
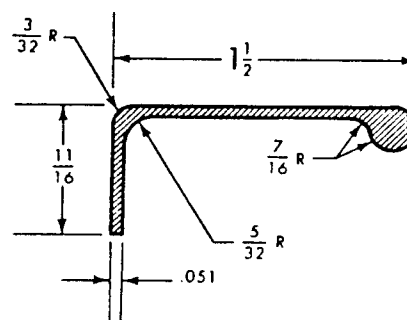
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-130985

ALCOA DIE NUMBER D-7868

AREA .395 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .064

Min. Radii 3/32

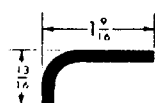
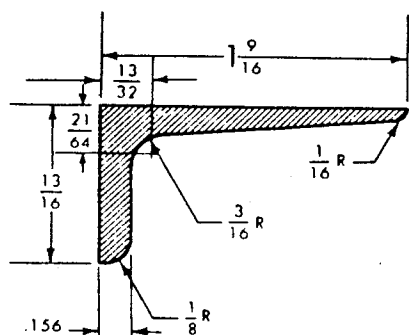
Area .1735 Sq. In.

S-134903

ALCOA DIE NUMBER 8476

AREA .144 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .188

Min. Radii 3/8

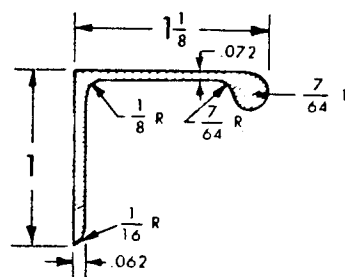
Area .370 Sq. In.

S-131004

ALCOA DIE NUMBER 14867

AREA .280 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .091

Min. Radii 5/32

Area .212 Sq. In.

S-135311

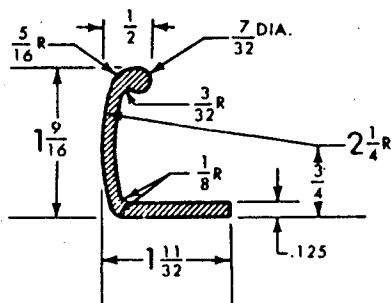
ALCOA DIE NUMBER K-8478

AREA .168 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 2 of 21) — Extrusion Charts

Revised 15 September 1945



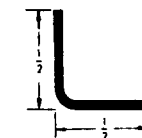
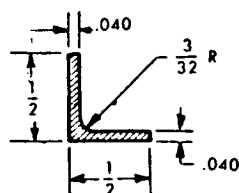
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-135407

ALCOA DIE NUMBER 8672

AREA .378 SQ. IN.

MATERIAL 24S



ALTERNATE

Material 24SO

H.T. to 24ST

Gage .051

Min. Radii 1/16

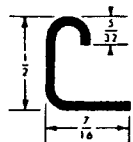
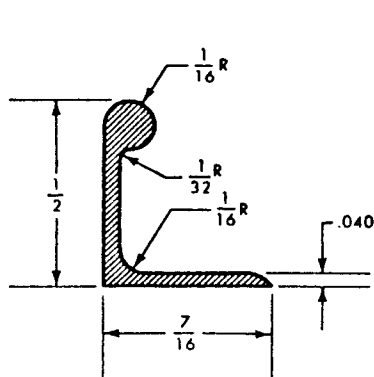
Area .0464 Sq. In.

S-136555

ALCOA DIE NUMBER K-8848

AREA .03925 SQ. IN.

MATERIAL 24S



ALTERNATE

Material 24SO

H.T. to 24ST

Gage .051

Min. Radii 1/16

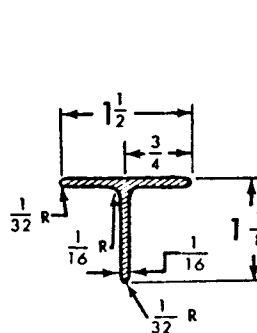
Area .053 Sq. In.

S-135989

ALCOA DIE NUMBER 8674

AREA .044 SQ. IN.

MATERIAL 24S



ALTERNATE

Material 24SO

H.T. to 24ST

Gage .064

Min. Radii 3/32

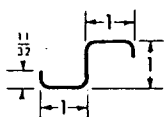
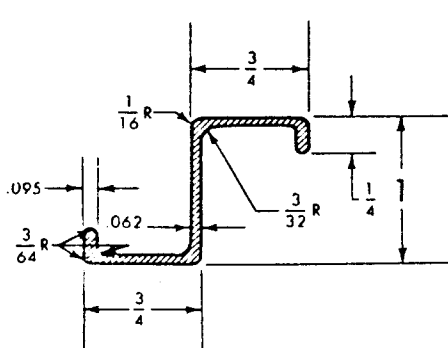
Area .2047 Sq. In.

S-137058

ALCOA DIE NUMBER 2499

AREA .160 SQ. IN.

MATERIAL 24S



ALTERNATE

Material 24SO

H.T. to 24ST

Gage .072

Min. Radii 1/8

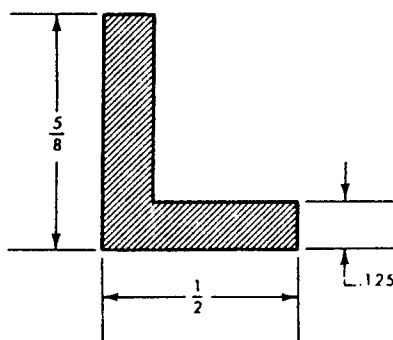
Area .223 Sq. In.

S-136493

ALCOA DIE NUMBER 8849

AREA .184 SQ. IN.

MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

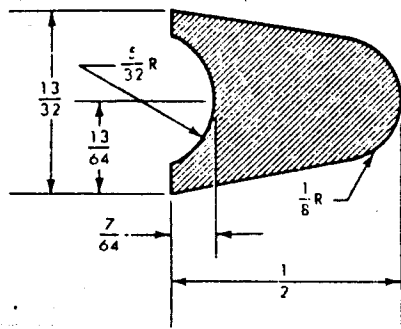
S-137073

ALCOA DIE NUMBER 8881

AREA .125 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 3 of 21) — Extrusion Charts



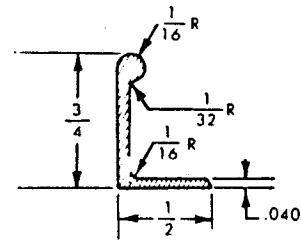
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-137932

ALCOA DIE NUMBER 9032

AREA .122 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .051

Min. Radii 1/16

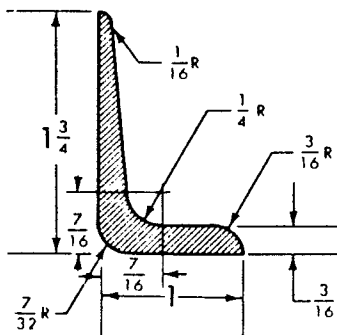
Area .0689 Sq. In.

S-164577

ALCOA DIE NUMBER 10282

AREA .057 SQ. IN.

MATERIAL 24S



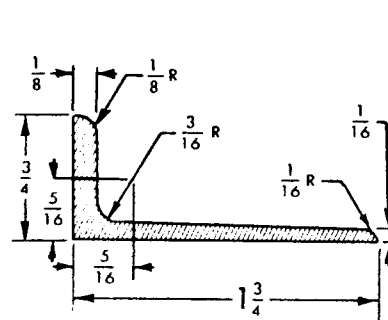
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-144773

ALCOA DIE NUMBER 9667

AREA .396 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .188

Min. Radii 3/8

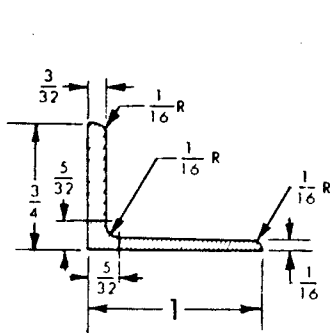
Area .3965 Sq. In.

S-165186

ALCOA DIE NUMBER 10480

AREA .250 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .156

Min. Radii 9/32

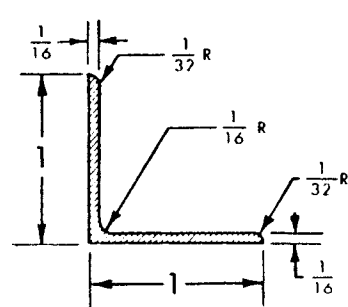
Area .2242 Sq. In.

S-151776

ALCOA DIE NUMBER K-7621

AREA .140 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .072

Min. Radii 1/8

Area .134 Sq. In.

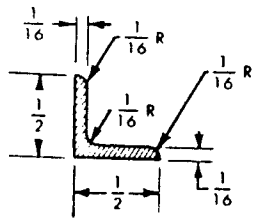
S-167881

ALCOA DIE NUMBER 78-J

AREA .121 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 4 of 21) — Extrusion Charts



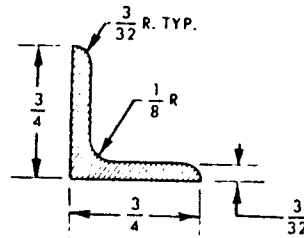
NO
ALTERNATE
FOR
THIS
EXTRUSION

ALCOA DIE NUMBER 78-P
OR 10133-0401

S-167882

AREA .059 SQ. IN.

MATERIAL 24S



ALTERNATE

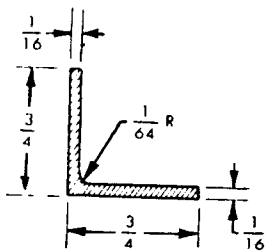
Material 24SO
H.T. to 24ST
Gage .102
Min. Radii 3/16
Area .132 Sq. In.

S-167889

ALCOA DIE NUMBER 78-C

AREA .130 SQ. IN.

MATERIAL 24S



ALTERNATE

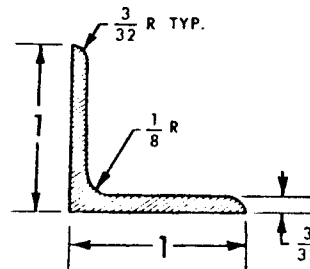
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .0978 Sq. In.

-167883

ALCOA DIE NUMBER 472

AREA .090 SQ. IN.

MATERIAL 24S



ALTERNATE

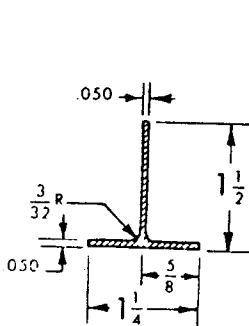
Material 24SO
H.T. to 24ST
Gage .102
Min. Radii 3/16
Area .183 Sq. In.

S-167890

ALCOA DIE NUMBER 78-F

AREA .180 SQ. IN.

MATERIAL 24S



ALTERNATE

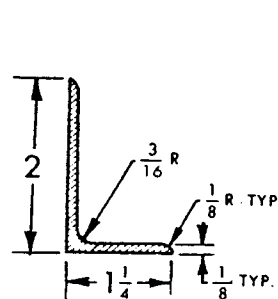
Material 24SO
H.T. to 24ST
Gage .051
Min. Radii 1/16
Area .2076 Sq. In.

S-167887

ALCOA DIE NUMBER 3094

AREA .141 SQ. IN.

MATERIAL 24S



ALTERNATE

Material 24SO
H.T. to 24ST
Gage .156
Min. Radii 9/32
Area .458 Sq. In.

S-167892

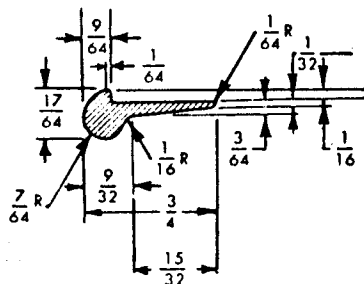
ALCOA DIE NUMBER 734-P

AREA .390 SQ. IN.

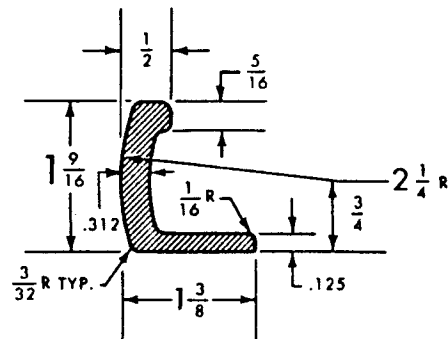
MATERIAL 24S

Figure 81 (Sheet 5 of 21) — Extrusion Charts

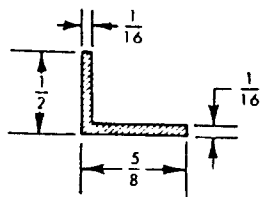
ed 15 September 1945



S-168854 ALCOA DIE NUMBER K-14618
AREA .060 SQ. IN. MATERIAL 24S

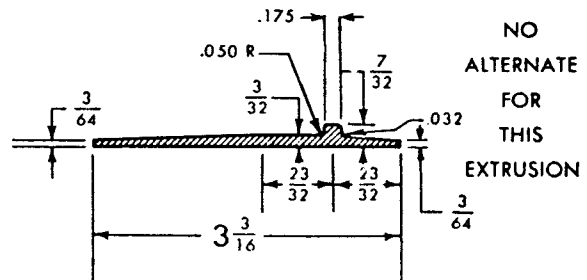


S-170855 ALCOA DIE NUMBER 10085
AREA .638 SQ. IN. MATERIAL 24S

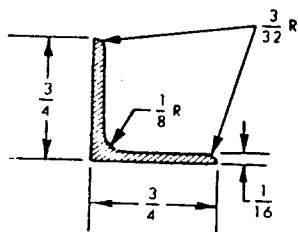


S-169096 ALCOA DIE NUMBER K-5456
AREA .067 SQ. IN. MATERIAL 24S

ALTERNATE
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .0708 Sq. In.

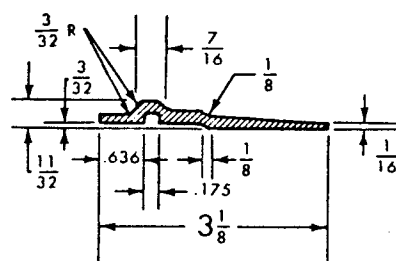


S-174491 ALCOA DIE NUMBER 9067
AREA .274 SQ. IN. MATERIAL 24S



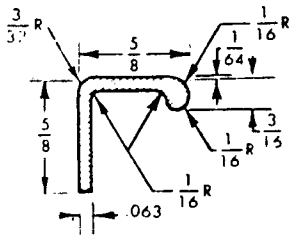
S-169097 ALCOA DIE NUMBER K-78-K
AREA .090 SQ. IN. MATERIAL 24S

ALTERNATE
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .0978 Sq. In.



S-174492 ALCOA DIE NUMBER 9068
AREA .380 SQ. IN. MATERIAL 24S

Figure 81 (Sheet 6 of 21) — Extrusion Charts

**ALTERNATE**

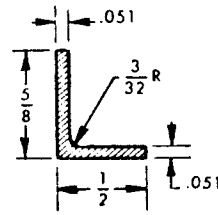
Material 2450
H.T. to 245T
Gage .072
Min. Radii 1/8
Area .1082 Sq. In.

S-179064

ALCOA DIE NUMBER 12673

AREA .090 SQ. IN.

MATERIAL 245

**ALTERNATE**

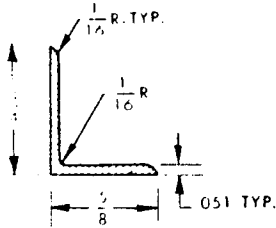
Material 2450
H.T. to 245T
Gage .064
Min. Radii 3/32
Area .0644 Sq. In.

S-1000142

ALCOA DIE NUMBER K-10660

AREA .057 SQ. IN.

MATERIAL 245

**ALTERNATE**

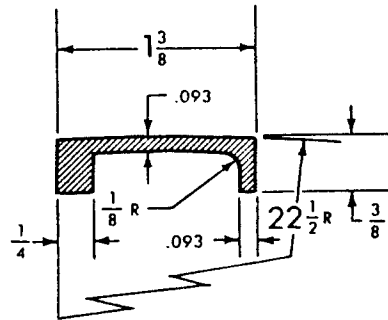
Material 2450
H.T. to 245T
Gage .064
Min. Radii 3/32
Area .0805 Sq. In.

S-179364

ALCOA DIE NUMBER 12883

AREA .067 SQ. IN.

MATERIAL 245



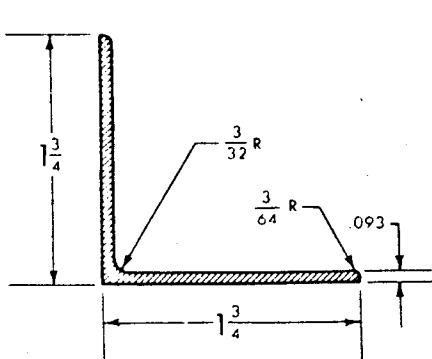
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1001730

ALCOA DIE NUMBER 11446

AREA .219 SQ. IN.

MATERIAL 245

**ALTERNATE**

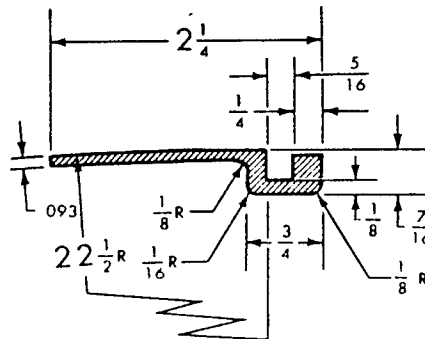
Material 2450
H.T. to 245T
Gage .102
Min. Radii 3/16
Area .335 Sq. In.

S-180947

ALCOA DIE NUMBER 78L

AREA .320 SQ. IN.

MATERIAL 245



NO
ALTERNATE
FOR
THIS
EXTRUSION

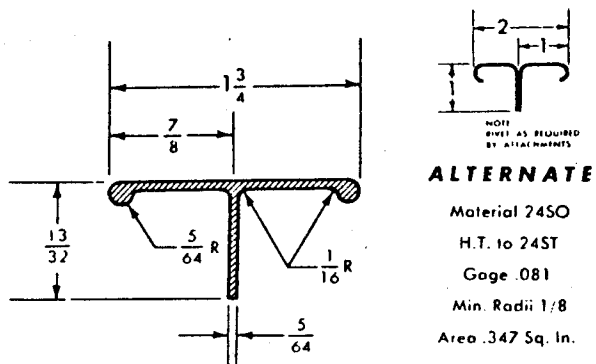
S-1001731

ALCOA DIE NUMBER 11447

AREA .354 SQ. IN.

MATERIAL 245

Figure 81 (Sheet 7 of 21) — Extrusion Charts

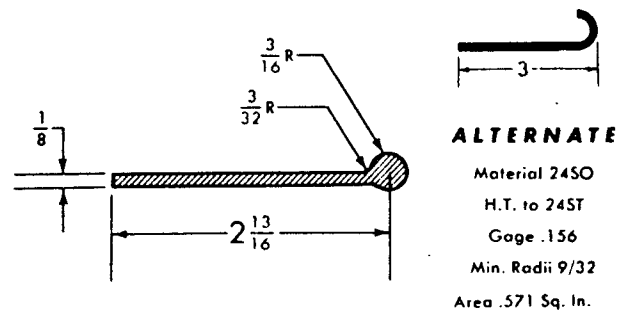


S-1003807

ALCOA DIE NUMBER 11224

AREA .213 SQ. IN.

MATERIAL 24S

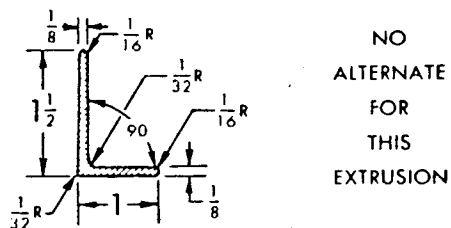


S-1008660

ALCOA DIE NUMBER 11693

AREA .444 SQ. IN.

MATERIAL 24S

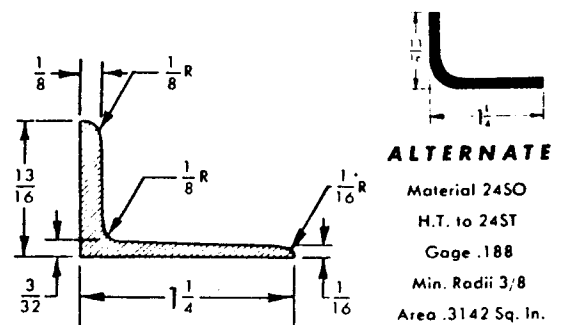


S-1007015

ALCOA DIE NUMBER K-985

AREA .296 SQ. IN.

MATERIAL 24S

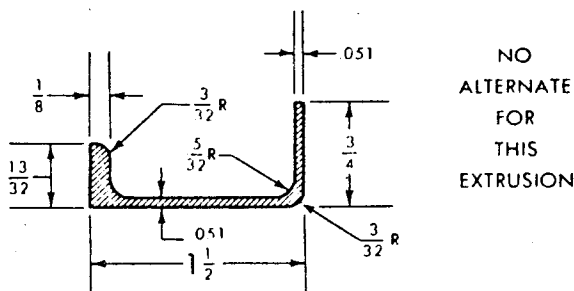


S-1016616

ALCOA DIE NUMBER K-17696

AREA .189 SQ. IN.

MATERIAL 24S

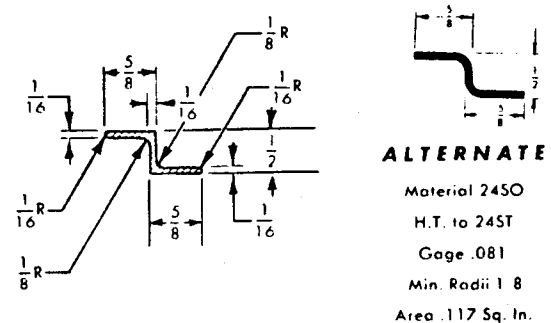


S-1008504

ALCOA DIE NUMBER 11692

AREA .163 SQ. IN.

MATERIAL 24S



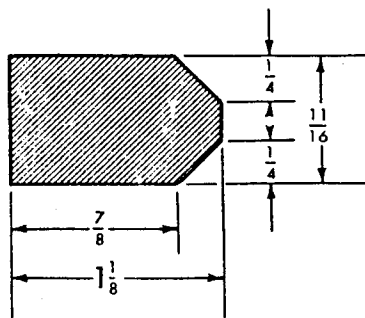
S-1018327

ALCOA DIE NUMBER K-12862

AREA .107 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 8 of 21) — Extrusion Charts



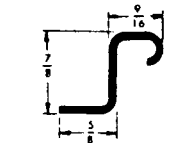
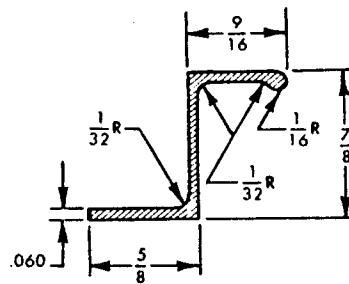
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1019274

ALCOA DIE NUMBER 14817

AREA .711 SQ. IN.

MATERIAL 24S

**ALTERNATE**

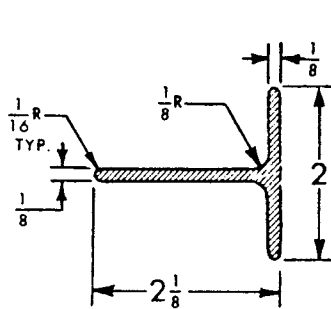
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .1505 Sq. In.

S-1022235

ALCOA DIE NUMBER K-13412

AREA .123 SQ. IN.

MATERIAL 24S

**ALTERNATE**

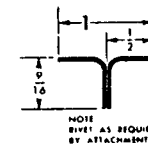
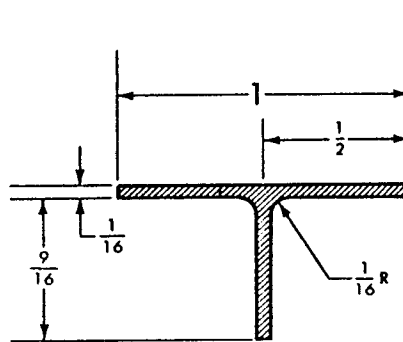
Material 24SO
H.T. to 24ST
Gage .125
Min. Radii 7/32
Area .679 Sq. In.

S-1020195

ALCOA DIE NUMBER K-14662

AREA .502 SQ. IN.

MATERIAL 24S

**ALTERNATE**

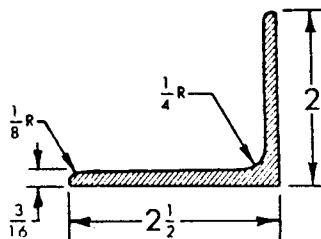
Material 24SO
H.T. to 24ST
Gage .064
Min. Radii 3/32
Area .120 Sq. In.

S-1023480

ALCOA DIE NUMBER 2647

AREA .094 SQ. IN.

MATERIAL 24S



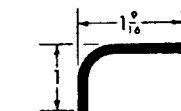
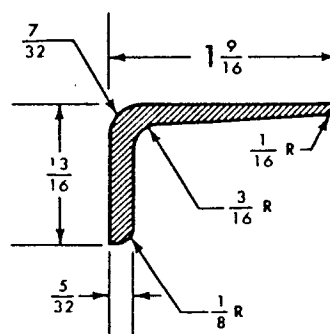
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1020679

ALCOA DIE NUMBER 734-U

AREA .82 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO
H.T. to 24ST
Gage .188
Min. Radii 3/8
Area .406 Sq. In.

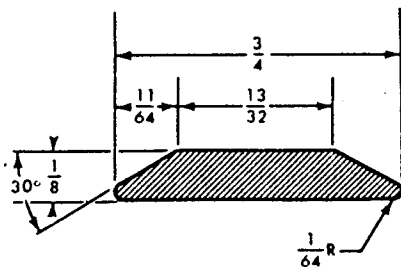
S-1024008

ALCOA DIE NUMBER 14866

AREA .270 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 9 of 21) — Extrusion Charts



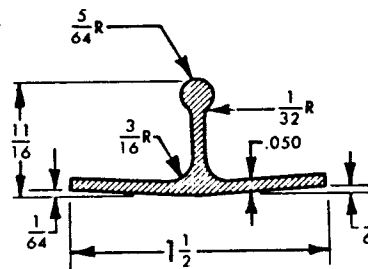
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1024024

ALCOA DIE NUMBER 14683

AREA .076 SQ. IN.

MATERIAL 24S



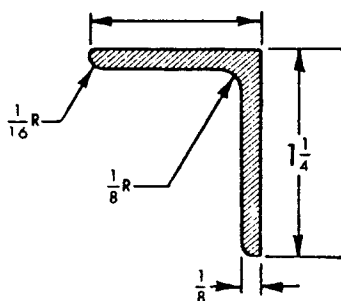
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1028381

ALCOA DIE NUMBER K-13666

AREA .134 SQ. IN.

MATERIAL 24S



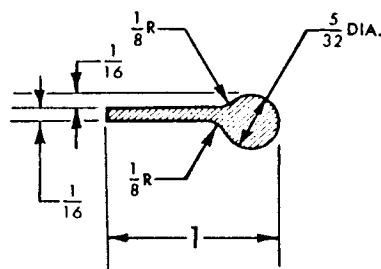
ALTERNATE
Material 24SO
H.T. to 24ST
Gage .156
Min. Radii 9/32
Area .3025 Sq. In.

S-1025503

ALCOA DIE NUMBER K-734-HH

AREA .267 SQ. IN.

MATERIAL 24S



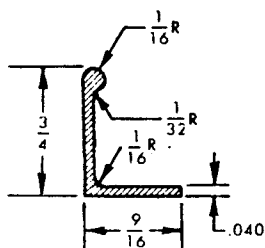
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1029111

ALCOA DIE NUMBER K-13647

AREA .128 SQ. IN.

MATERIAL 24S



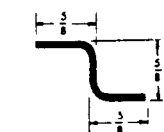
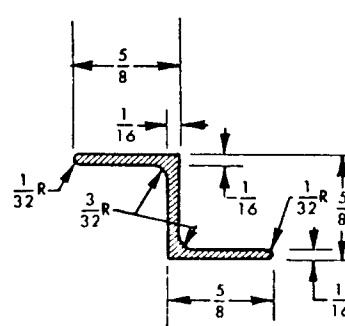
ALTERNATE
Material 24SO
H.T. to 24ST
Gage .051
Min. Radii 1/16
Area .0721 Sq. In.

S-1027673

ALCOA DIE NUMBER K-13608

AREA .060 SQ. IN.

MATERIAL 24S



ALTERNATE
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .1147 Sq. In.

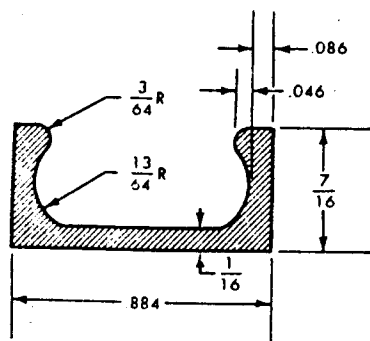
S-1030509

ALCOA DIE NUMBER K-13821

AREA .113 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 10 of 21) — Extrusion Charts



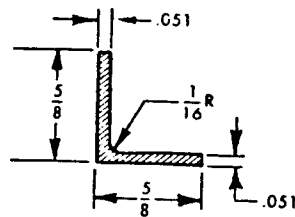
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1033420

ALCOA DIE NUMBER 14097

AREA .151 SQ. IN.

MATERIAL 24S

**ALTERNATE**

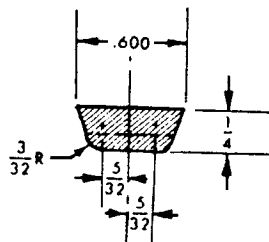
Material 24SO
H.T. to 24ST
Gage .064
Min. Radii 3/32
Area .072 Sq. In.

S-1045544

ALCOA DIE NUMBER K-15607

AREA .062 SQ. IN.

MATERIAL 24S



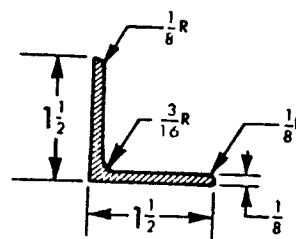
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1039966

ALCOA DIE NUMBER K-14661

AREA .130 SQ. IN.

MATERIAL 24S

**ALTERNATE**

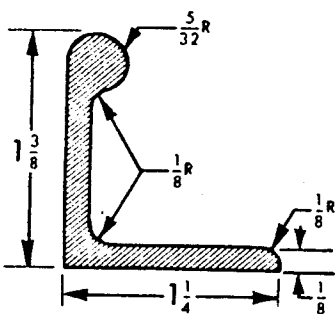
Material 24SO
H.T. to 24ST
Gage .156
Min. Radii 9/32
Area .4195 Sq. In.

S-1046482

ALCOA DIE NUMBER K-77-R

AREA .36 SQ. IN.

MATERIAL 24S

**ALTERNATE**

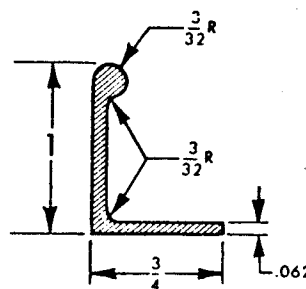
Material 24SO
H.T. to 24ST
Gage .156
Min. Radii 9/32
Area .4686 Sq. In.

S-1045540

ALCOA DIE NUMBER K-15418

AREA .358 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .153 Sq. In.

S-1047299

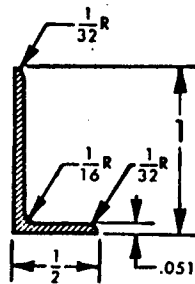
ALCOA DIE NUMBER K-15644

AREA .127 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 11 of 21) — Extrusion Charts

vised 15 September 1945

**ALTERNATE**

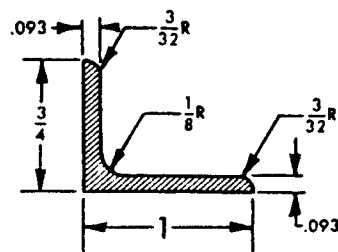
Material 2450
H.T. to 245
Gage .064
Min. Radii 3/32
Area .0881 Sq. In.

S-1059614

ALCOA DIE NUMBER L-23792

AREA .074 SQ. IN.

MATERIAL 245

**ALTERNATE**

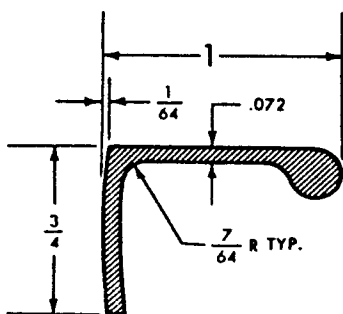
Material 2450
H.T. to 245
Gage .102
Min. Radii 3/16
Area .1567 Sq. In.

S-1059659

ALCOA DIE NUMBER L-24183

AREA .154 SQ. IN.

MATERIAL 245

**ALTERNATE**

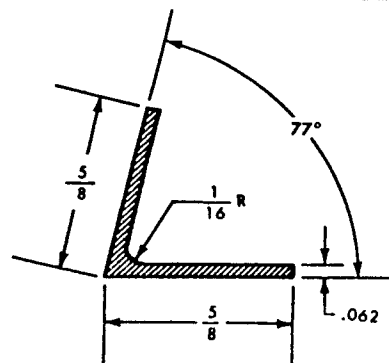
Material 2450
H.T. to 245T
Gage .081
Min. Radii 1/8
Area .0746 Sq. In.

S-1059652

ALCOA DIE NUMBER L-24127

AREA .1493 SQ. IN.

MATERIAL 245

**ALTERNATE**

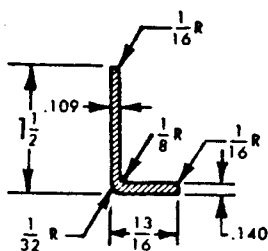
Material 2450
H.T. to 245T
Gage .072
Min. Radii 1/8
Area .1794 Sq. In.

S-1059668

ALCOA DIE NUMBER L-24289

AREA .073 SQ. IN.

MATERIAL 245

**ALTERNATE**

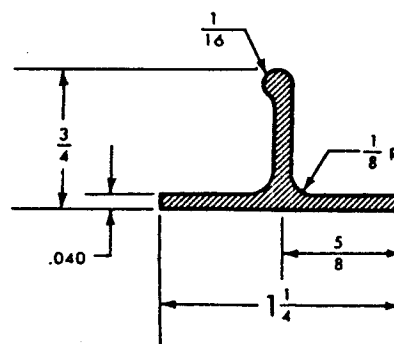
Gage .156
Material 2450
H.T. to 245T
Min. Radii 9/32
Area .3105 Sq. In.

S-1059653

ALCOA DIE NUMBER L-24182

AREA .262 SQ. IN.

MATERIAL 245



NO
ALTERNATE
FOR
THIS
EXTRUSION

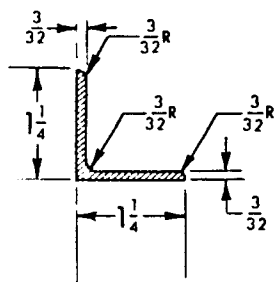
S-1073341

ALCOA DIE NUMBER L-23852

AREA .094 SQ. IN.

MATERIAL 245

Figure 81 (Sheet 12 of 21) — Extrusion Charts

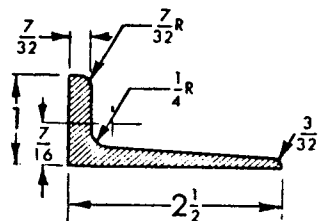


S-1073342

ALCOA DIE NUMBER 78-Y

AREA .230 SQ. IN.

MATERIAL 245



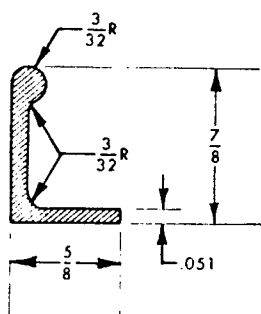
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1081131

ALCOA DIE NUMBER K-22434

AREA .548 SQ. IN.

MATERIAL 245

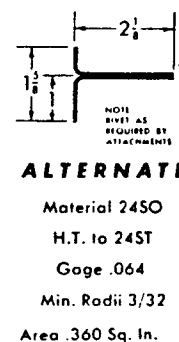
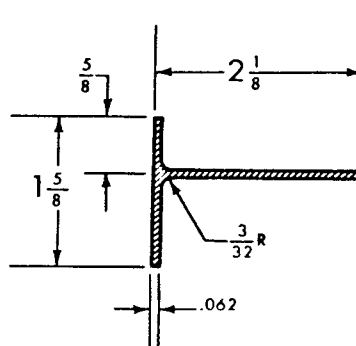


S-1075769

ALCOA DIE NUMBER K-16692

AREA .097 SQ. IN.

MATERIAL 245

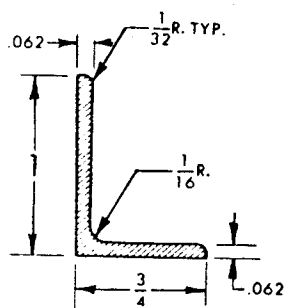


S-1082271

ALCOA DIE NUMBER 22519

AREA .232 SQ. IN.

MATERIAL 245

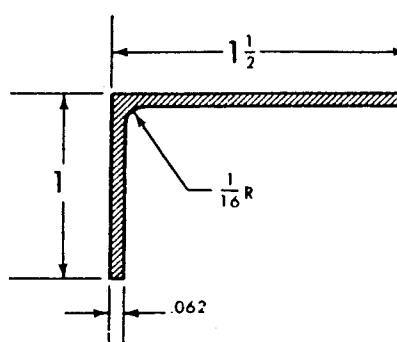


S-1081111

ALCOA DIE NUMBER K-22385

AREA .105 SQ. IN.

MATERIAL 245



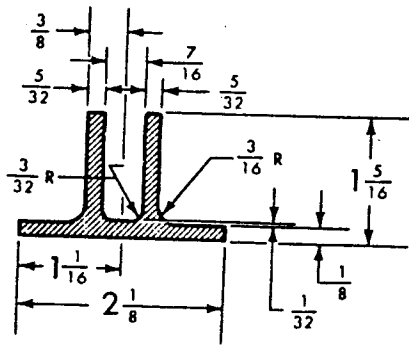
S-1093719

ALCOA DIE NUMBER 30934

AREA .152 SQ. IN.

MATERIAL 245

Figure 81 (Sheet 13 of 21) — Extrusion Charts



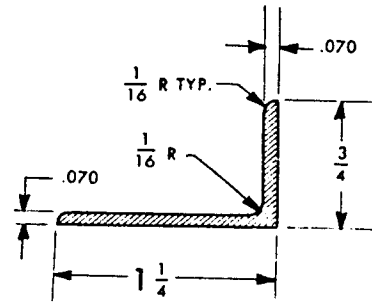
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1093731

ALCOA DIE NUMBER L-29125

AREA .669 SQ. IN.

MATERIAL 24S



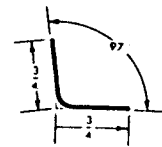
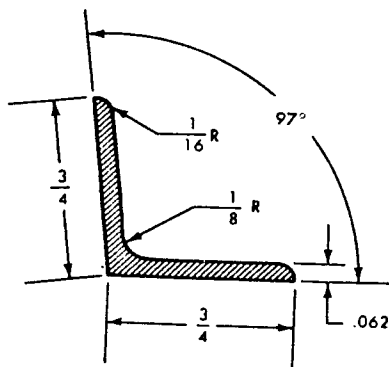
ALTERNATE
Material 24SO
H.T. to 24S
Gage .081
Min. Radii 1/8
Area .149 Sq. In.

S-1109685

ALCOA DIE NUMBER K-13689

AREA .134 SQ. IN.

MATERIAL 24S



ALTERNATE

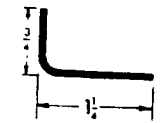
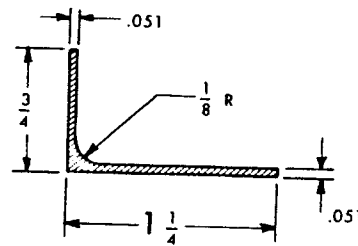
Material 24SO
H.T. to 24S
Gage .072
Min. Radii 1/8
Area .0993 Sq. In.

S-1104497

ALCOA DIE NUMBER L-28556

AREA .091 SQ. IN.

MATERIAL 24S



ALTERNATE

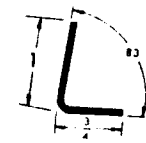
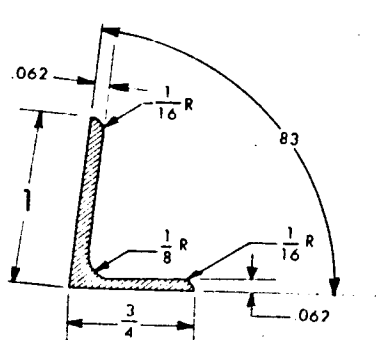
Material 24SO
H.T. to 24ST
Gage .064
Min. Radii 3/32
Area .121 Sq. In.

S-1111225

ALCOA DIE NUMBER L-28827

AREA .0995 SQ. IN.

MATERIAL 24S



ALTERNATE

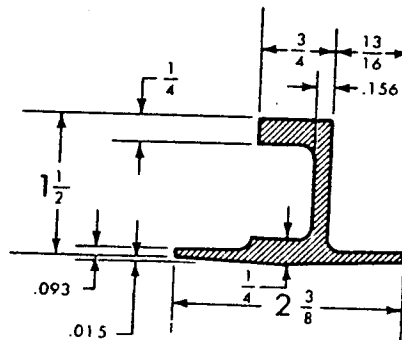
Material 24SO
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .113 Sq. In.

S-1104751

ALCOA DIE NUMBER L-28557

AREA .107 SQ. IN.

MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1111709

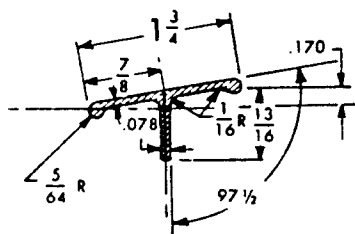
ALCOA DIE NUMBER L-28876

AREA .690 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 14 of 21) — Extrusion Charts

Revised 15 September 1945



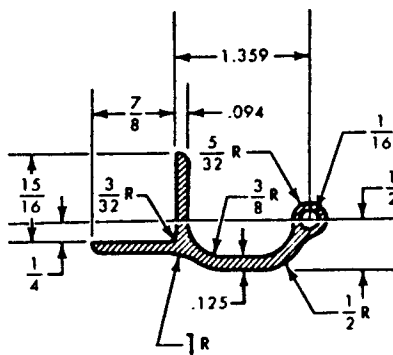
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1111710

ALCOA DIE NUMBER L-28877

AREA .213 SQ. IN.

MATERIAL 245

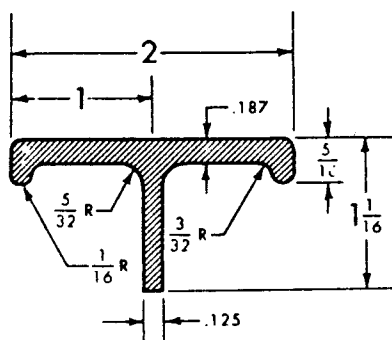


NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1113240

BOHN DIE NUMBER 8776

MATERIAL 245



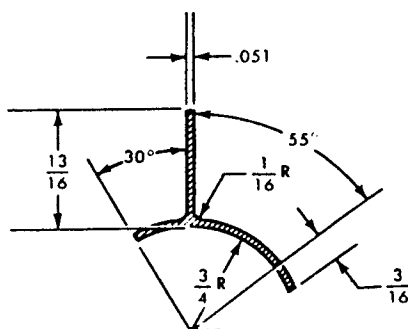
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1111827

ALCOA DIE NUMBER L-28878

AREA .523 SQ. IN.

MATERIAL 245



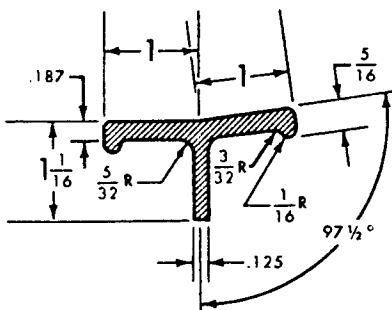
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1113243

BOHN DIE NUMBER 8773

AREA .110 SQ. IN.

MATERIAL 245



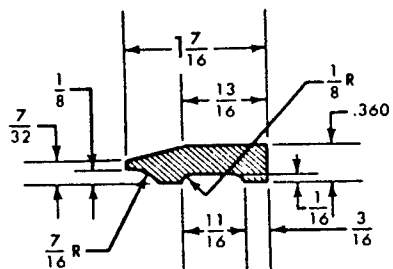
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1111828

ALCOA DIE NUMBER L-28879

AREA .523 SQ. IN.

MATERIAL 245



NO
ALTERNATE
THIS
THIS
EXTRUSION

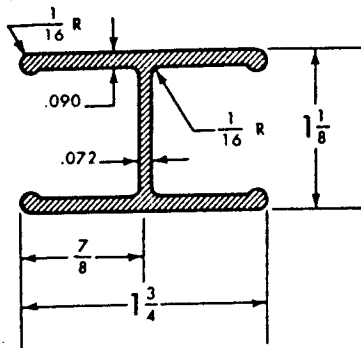
S-1113476

BOHN DIE NUMBER 8774

AREA .425 SQ. IN.

MATERIAL 245

Figure 81 (Sheet 15 of 21) — Extrusion Charts



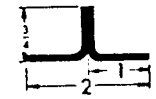
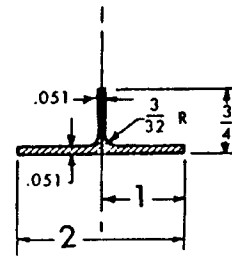
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1113848

BOHN DIE NUMBER 8777

AREA .375 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .051

Min. Radii 1/16

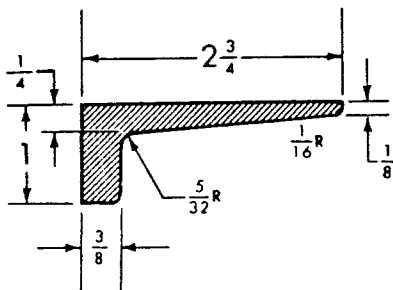
Area .169 Sq. In.

S-1114110

ALCOA DIE NUMBER 30674

AREA .141 SQ. IN.

MATERIAL 24S



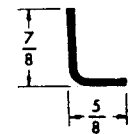
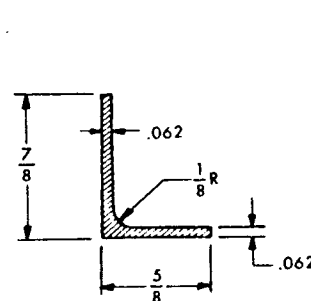
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1113882

BOHN DIE NUMBER 8775

AREA .900 SQ. IN.

MATERIAL 24S

**ALTERNATE**

Material 24SO

H.T. to 24ST

Gage .072

Min. Radii 1/8

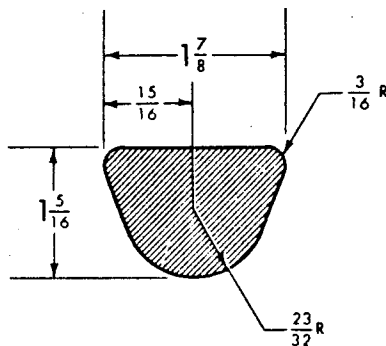
Area .0974 Sq. In.

S-1114111

ALCOA DIE NUMBER 22891

AREA .089 SQ. IN.

MATERIAL 24S



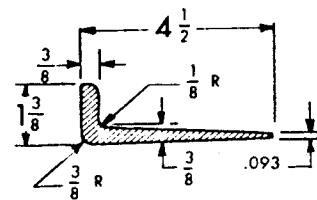
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1114107

BOHN DIE NUMBER 8790

AREA 1.750 SQ. IN.

MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

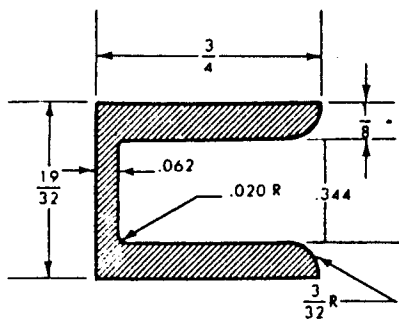
S-1114163

ALCOA DIE NUMBER 30924

AREA 1.445 SQ. IN.

MATERIAL 24S

Figure 81 (Sheet 16 of 21) — Extrusion Charts



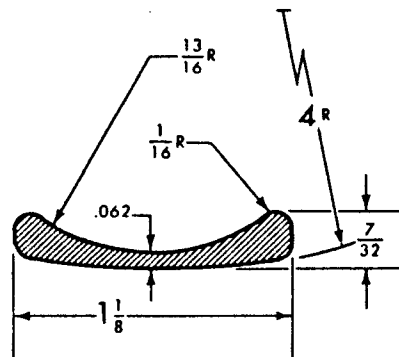
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1114438

ALCOA DIE NUMBER 30046

AREA .205 SQ. IN.

MATERIAL 24S



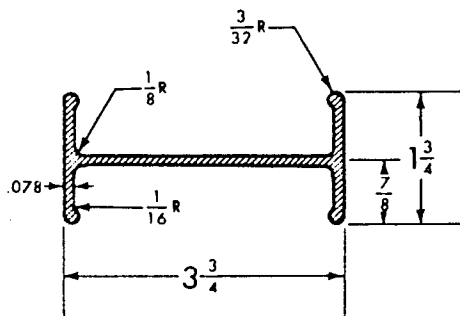
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1117317

ALCOA DIE NUMBER 30050

AREA .123 SQ. IN.

MATERIAL 24S



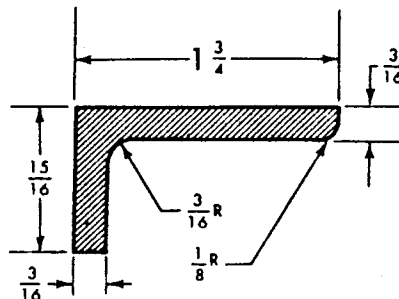
NO
ALTERNATE
THIS
THIS
EXTRUSION

S-1114603

ALCOA DIE NUMBER 29003

AREA .629 SQ. IN.

MATERIAL 24S



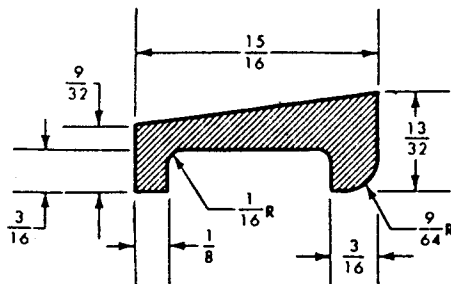
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1117543

ALCOA DIE NUMBER 30760

AREA .473 SQ. IN.

MATERIAL 24S



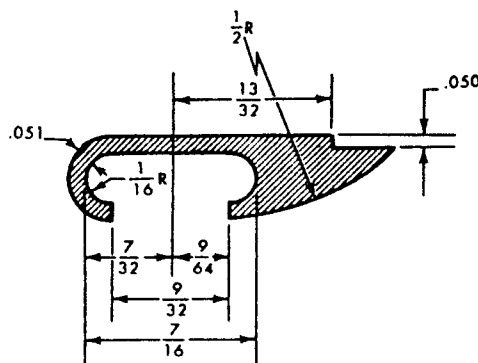
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1116276

ALCOA DIE NUMBER 30048

AREA .202 SQ. IN.

MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

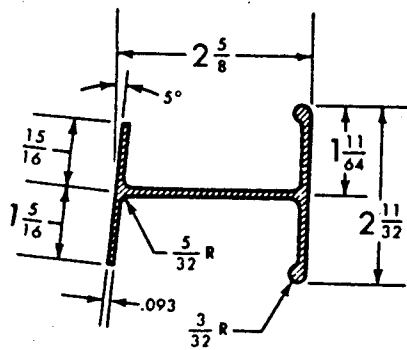
S-1118078

ALCOA DIE NUMBER L-29150

AREA .082 SQ. IN.

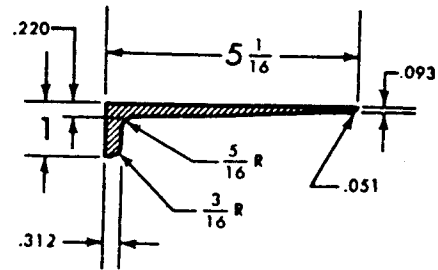
MATERIAL 24S

Figure 81 (Sheet 17 of 21) — Extrusion Charts



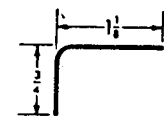
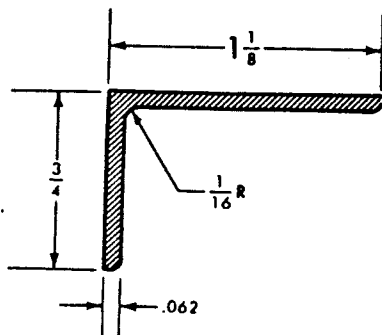
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1118650 ALCOA DIE NUMBER L-29130
AREA .700 SQ. IN. MATERIAL 24S



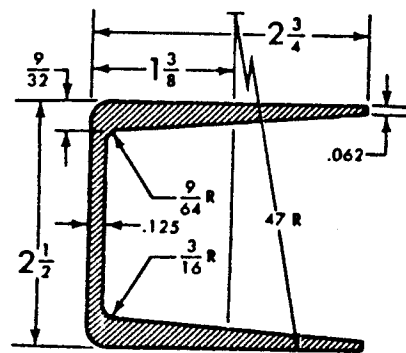
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1139121 ALCOA DIE NUMBER 30625
AREA 1.065 SQ. IN. MATERIAL 24S



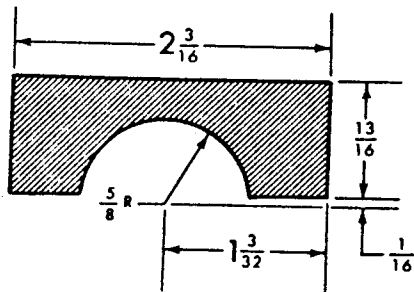
ALTERNATE
Material 24S0
H.T. to 24ST
Gage .072
Min. Radii 1/8
Area .1243 Sq. In.

S-1119206 ALCOA DIE NUMBER C-30022
AREA .113 SQ. IN. MATERIAL 24S



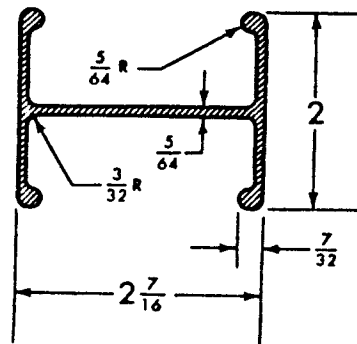
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1139159 ALCOA DIE NUMBER 30386
AREA 1.21 SQ. IN. MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

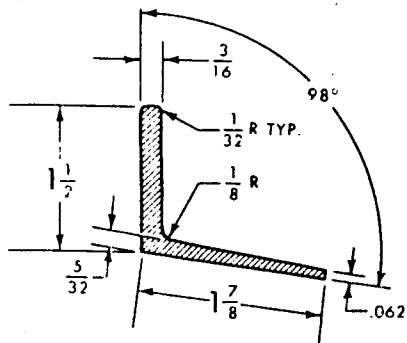
S-1131637 ALCOA DIE NUMBER 30864
AREA 1.242 SQ. IN. MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1141061 DOW DIE NUMBER 541
AREA .575 SQ. IN. MATERIAL MAG. ALLOY

Figure 81 (Sheet 18 of 21) — Extrusion Charts

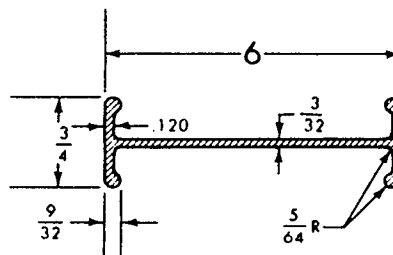


NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1141921

AREA .478 SQ. IN.

MATERIAL 245

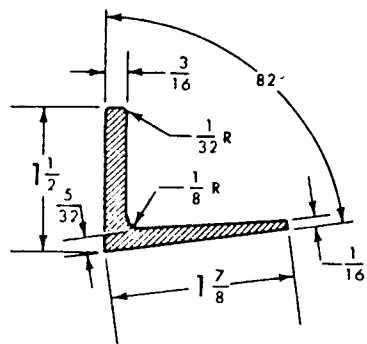


NO
ALTERNATE
FOR
THIS
EXTRUSION

S-2130802

AREA 1.05 SQ. IN.

MATERIAL MAG. ALLOY

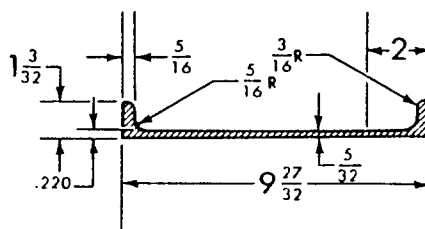


NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1141922

AREA .478 SQ. IN.

MATERIAL 245



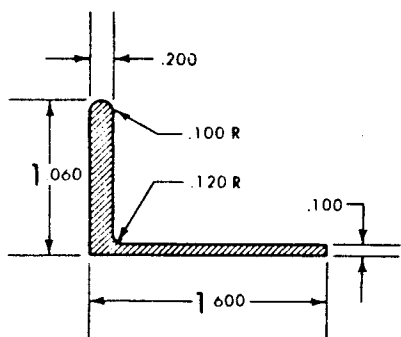
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-2139120

ALCOA DIE NUMBER 29909

AREA 2.256 SQ. IN.

MATERIAL 245



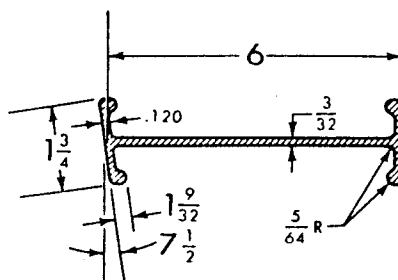
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1141933

ALCOA DIE NUMBER 29370

AREA .351 SQ. IN.

MATERIAL 245



NO
ALTERNATE
FOR
THIS
EXTRUSION

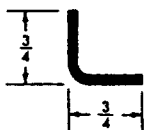
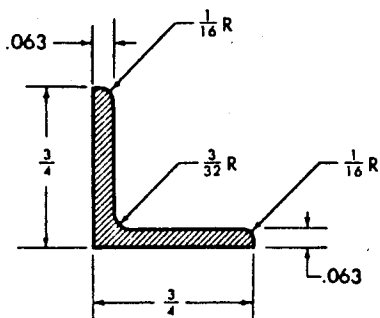
S-2140204

AREA 1.05 SQ. IN.

DOW DIE NUMBER 466

MATERIAL MAG. ALLOY

Figure 81 (Sheet 19 of 21) — Extrusion Chart

**ALTERNATE**

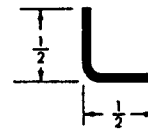
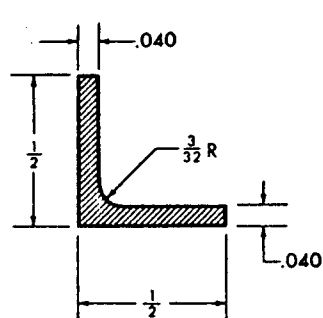
Material 2450
H. T. to 24ST
Gage .072
Min. Radii 1/8
Area .0974 Sq. in.

S-1072155

DIE NUMBER AND10133-0601

AREA .0908 SQ. IN.

MATERIAL MAG. ALLOY

**ALTERNATE**

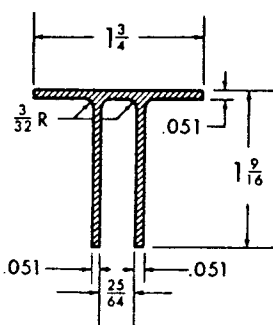
Material 2450
H. T. to 24ST
Gage .051
Min. Radii 1/16
Area .0574 Sq. in.

S-1049426

ALCOA DIE NUMBER M-679

AREA .0403 SQ. IN.

MATERIAL DOW METAL M



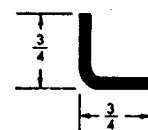
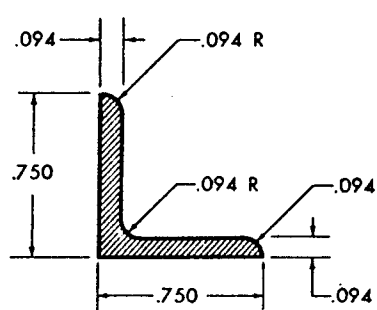
NO
ALTERNATE
FOR
THIS
EXTRUSION

S-137449

ALCOA DIE NUMBER 6400

AREA .251 SQ. IN.

MATERIAL 245

**ALTERNATE**

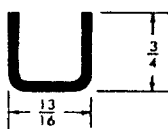
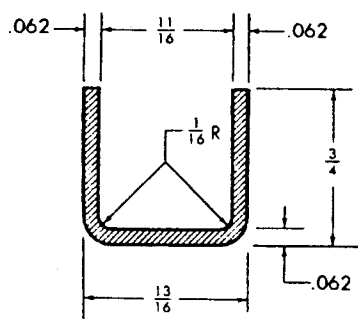
Material 2450
H. T. to 24ST
Gage .102
Min. Radii 3/16
Area .1425 Sq. in.

S-1199970

DIE NUMBER AND10133-0602

AREA .130 SQ. IN.

MATERIAL 245

**ALTERNATE**

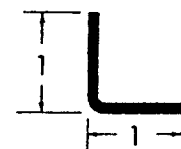
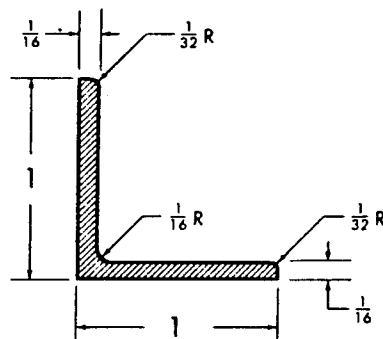
Material 2450
H. T. to 24ST
Gage .072
Min. Radii 1/8
Area .1516 Sq. in.

S-1105429

ALCOA DIE NUMBER L-28631

AREA .123 SQ. IN.

MATERIAL 245

**ALTERNATE**

Material 2450
H. T. to 24ST
Gage .072
Min. Radii 1/8
Area .1388 Sq. in.

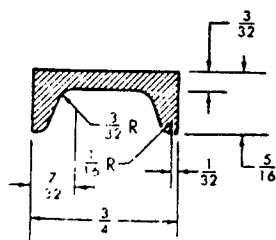
S-1084337

ALCOA DIE NUMBER 78-J

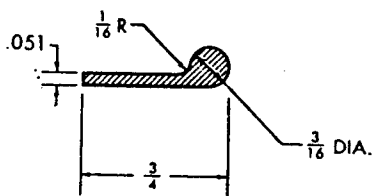
AREA .121 SQ. IN.

MATERIAL MAG. ALLOY

Figure 81 (Sheet 20 of 21) — Extrusion Charts



NO
ALTERNATE
FOR
THIS
EXTRUSION



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1018734

AREA .117 SQ. IN

ALCOA DIE NUMBER K-2096

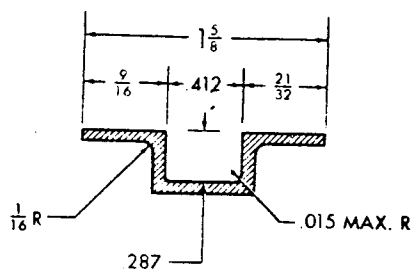
MATERIAL 24S

S-1002772

AREA .0563 SQ. IN.

ALCOA DIE NUMBER K-11069

MATERIAL 24S



NO
ALTERNATE
FOR
THIS
EXTRUSION

S-1002001

AREA .114 SQ. IN

ALCOA DIE NUMBER K-11067

MATERIAL 24S

Figure 81 (Sheet 21 of 21) — Extrusion Charts