

MOONEY AIRCRAFT, INC.

SERVICE LETTER 20-67

(This Service Letter is FAA Approved)

DATE: : 2-15-60

SUBJECT: WHEEL WELL AREA INSPECTION AND/OR REPAIR

MODELS AFFECTED: M-20 & M-20A SERIAL NUMBERS ~~1002-1578~~

TIME OF COMPLIANCE: IT IS RECOMMENDED THAT THE INSPECTION CALLED FOR BELOW BE CONDUCTED ONCE EACH YEAR ON THE AIRPLANES NOTED ABOVE.

INTRODUCTION

Some reports have been received concerning separation of skin from ribs and spars in the wheel well areas. This separation is probably due on the right hand side to overloading of the wing walk area and on the left hand side to people climbing on the wing to fill the rear tank or clean the windows.

INSPECTION

It is therefore necessary that the right and left wheel well areas be inspected for the condition of glue joints and wood.

If a joint shows a crack, exert a slight upward pressure on the skin and check depth of crack with a feeler gage. Ribs and spars are made with a spruce core and yellow poplar plywood webs. The joints between the wing skin and vertical webs are not structural and separation to this depth is allowable. See Fig. 1 for thickness of plywood vertical webs on ribs and spars. Web thickness may be measured at drain and vent holes. Fig. 1 also shows possible areas of separation. Inspection of trailing edge will be facilitated by removal of the inboard flap gap strip and examining joints by pressing or tapping. If separations are found, repairs may be made in accordance with the following instructions.

REPAIR INSTRUCTIONS:

1) Forward

The Following instructions cover the entire wheel well area on both right and left wing. Any part of these areas may be repaired by selective use of the information given in Fig. 2 and item 3 thru 7. For directions on good wood work practice, use should be made of Civil Aeronautics Manual 18 (C.A.M. 18), copies of which are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C., at a price of \$1.50.

2) General Woodworking Procedure

This item contains recommendations concerning materials and good woodworking practice. For more detail see C.A.M. 18, Section 18.30-2.

a) Solid Wood. Sitka spruce, Douglas fir, or Western hemlock may be used for lagging and stiffeners.

- b) Lagging and Stiffeners. The grain direction of lagging and stiffeners should be parallel to the long dimension. Take care to see that the outer surfaces of lagging and stiffeners match the wing contour and that they are trimmed to the proper length.
- c) Plywood. Skin may be yellow poplar or mahogany plywood. The face grain direction and thickness of new skin should be the same as the original.
- d) Joint surfaces. Surfaces to be glued should be smooth, true, and clean. (Free of dust, wax, varnish, etc.) parts must fit together accurately on these surfaces since maximum joint strength depends on maximum contact area. Take care to see that the outer surface of lagging and wing walk stiffeners match wing contour.
- e) Glue. Borden's Cascophen RS-216 (or RS-224) or weldwood or equivalent may be used. See manufacturer's directions and exercise care with regard to mixing, working time and temperature, spreading and application of pressure.
- f) Glue Joints. Glue should be spread evenly on both of the surfaces to be joined. Pressure on the glue joint is obtained by the use of nails. These nails should be long enough to penetrate approximately 1/2 inch into the supporting structure. A bucking bar or other suitable tool should be used to back up structure when nailing.

Use one row of 16 or 18 gage flathead cement coated nails to hold lagging, except use two rows where lagging is more than one inch wide. Stagger nails and space them about one inch apart. Cement coated nails through lagging should not be removed.

For pressure on plywood joints, nail basswood or soft pine strips 3/16" thick by 1/2" wide over full length of joint. Use one row of 18 gage flathead bright nails per strip with about one inch spacing between nails. Use enough strips to cover the full width of the joint. Remove strips and nails when glue is dry.

- g) Replacing Skin. Remove old skin in area affected by sawing out a section slightly smaller than the final cut out (approximately 1/4 inch inside of inside edge of lagging to be installed).

Install lagging by glueing it to adjacent ribs, stringers, and skin. After glue has dried trim skin flush with edge of lagging and scarf edge of plywood on a 12 to 1 slope.

- h) Interior finish. Interior areas of the wing should be given two coats of spar varnish. It is recommended that the wheel well area be given an additional coat of aluminized sealer consisting of 16 ounces of aluminum paste or one half pound of aluminum powder to each gallon of spar varnish.
- i) Exterior Finish. Sand plywood and apply one coat of clear dope and allow to dry for 45 minutes. Apply second coat of dope and lay fabric on wet film, working out air bubbles. Apply pinked tape with one coat of clear dope. Then apply two cross coats of clear dope, sanding between each coat. Apply two cross coats of aluminum pigmented dope. Wet sand. Apply two cross coats of pigmented dope to match adjacent area. Cover the wingwalk area with two coats of glidair wingwalk black, non-skid or equivalent.

Separation at the trailing edge may be repaired by replacing the skin from trailing edge to the rear spar for one bay or two bays. Repairs outboard of wing sta. 59.25 may be made in a similar manner using p/n 2145-21 and 2145-17 lagging shown in the second bay. If the glue joint between the trailing edge skin and the rib at wing sta. 18.781 is good, the skin may be cut just outboard of the fuselage by using 2145-11 and 2145-13 lagging. Addition of new ribs shown (p/n 2132, 2134, 2031-10(2)) is recommended for the right wing to add stiffness to the wing walk area. If these ribs are not installed (as would be the case on the left wing) than a lagging similar to p/n 2145-21 should be installed along the trailing edge if the skin is replaced.

Separation at the rear spar may be repaired by replacing the skin (for one bay or two bays) from the trailing edge to a point ahead of the rear spar where spanwise lagging may be conveniently installed. For example p/n 2145-9 lagging may be installed adjacent to the first existing wing walk stiffener ahead of the rear spar in the same way it is installed ahead of the main spar (see Fig. 2). P/n 2145-7 lagging may be installed forward of the rear spar in the second bay (Sta. 42.75 to 59.25) in the same way it is installed ahead of the main spar (see Fig. 2). See item 3 for recommendations regarding the area between trailing edge and rear spar.

However, it is recommended that on the right wing, the skin be replaced from the trailing edge to the main spar and that the old wingwalk stiffeners be removed so that the new type wingwalk stiffeners (P/n 2136, 2137, 2138(2), 2140, 2141) can be installed. The new stiffeners will increase the wing walk stiffness considerably. See item 7 for recommendations regarding the left wing in this area.

CAUTION: A gear retraction check is necessary to check clearance between main landing gear and any lagging or stiffeners added in the wheel well area.

5) Separation at the 1st rib (Wing Sta. 22.875) on the right hand side should be repaired by the method given in the second paragraph of item 4.

Separation at the 1st rib (Wing Sta. 22.875) on the left hand side or the outboard ribs (Wing Sta. 42.75 and 59.25) on either side may be repaired by adding lagging (p/n 2054-12, 2143, and 2144) shown in Fig. 2, if open joint does not extend into spar areas. This repair will replace the original glue joint at the rib without the necessity of removing the skin. If this repair method is used on the right wing, install p/n 2143 lagging on the outboard side of the 2nd rib.

Separation at the main spar may be repaired by replacing the skin (for one bay or two bays) from a point approximately 11/16 inches ahead of the main spar as shown in Fig. 2, to a point aft of the main spar where spanwise lagging may be conveniently installed. For example, p/n 2145-9 lagging may be installed adjacent to the first existing wingwalk stiffener aft of the main spar in the same way it is installed ahead of the main spar. P/n 2145-7 lagging may be installed aft of the main spar in the second bay (sta. 42.75 to 59.25) in the same way it is installed ahead of the main spar. In order to replace skin ahead of the main spar, it is necessary to remove the wing tanks. However, it is recommended that the skin be replaced all the way to the trailing edge or at least to the rear spar and the old wingwalk stiffeners removed so that the new type wingwalk stiffeners (P/n 2136, 2137, 2138(2), 2140, 2141) can be installed. The new stiffeners will increase the wingwalk stiffness considerably. See item 3 for detailed recommendations in the area between trailing edge and rear spar. See item 7 for left wing in this area.

- 7) It is recommended that the first bay (Wing Sta. 22.875 to 42.75) on the left hand side be stiffened, whether or not the skin is repaired, by adding two chordwise stiffeners in the following manner. Locate P/N 2138 against outboard edge of scupper box support. Locate P/N apx $4\frac{1}{2}$ inches from inboard face of second rib. If no skin repair is necessary, these stiffeners may be attached by means of glue blocks to the faces of the main and rear spars, while pressing stiffeners tightly against skin, without necessarily gluing the stiffeners to the skin itself.

CAUTION: A gear retraction check is necessary to check clearance between main landing gear and any lagging or stiffeners added in the wheel well area.

- 8) Parts will be furnished at no cost. Order parts desired by part number shown in Fig. 2, starting required quantity of each part. Place order with Spare Parts Department, Mooney Aircraft, Inc., P.O. Box 72, Kerrville, Texas. State airplane

COMPLIANCE

Please fill out enclosed compliance card and return to Mooney Aircraft upon completion of compliance.

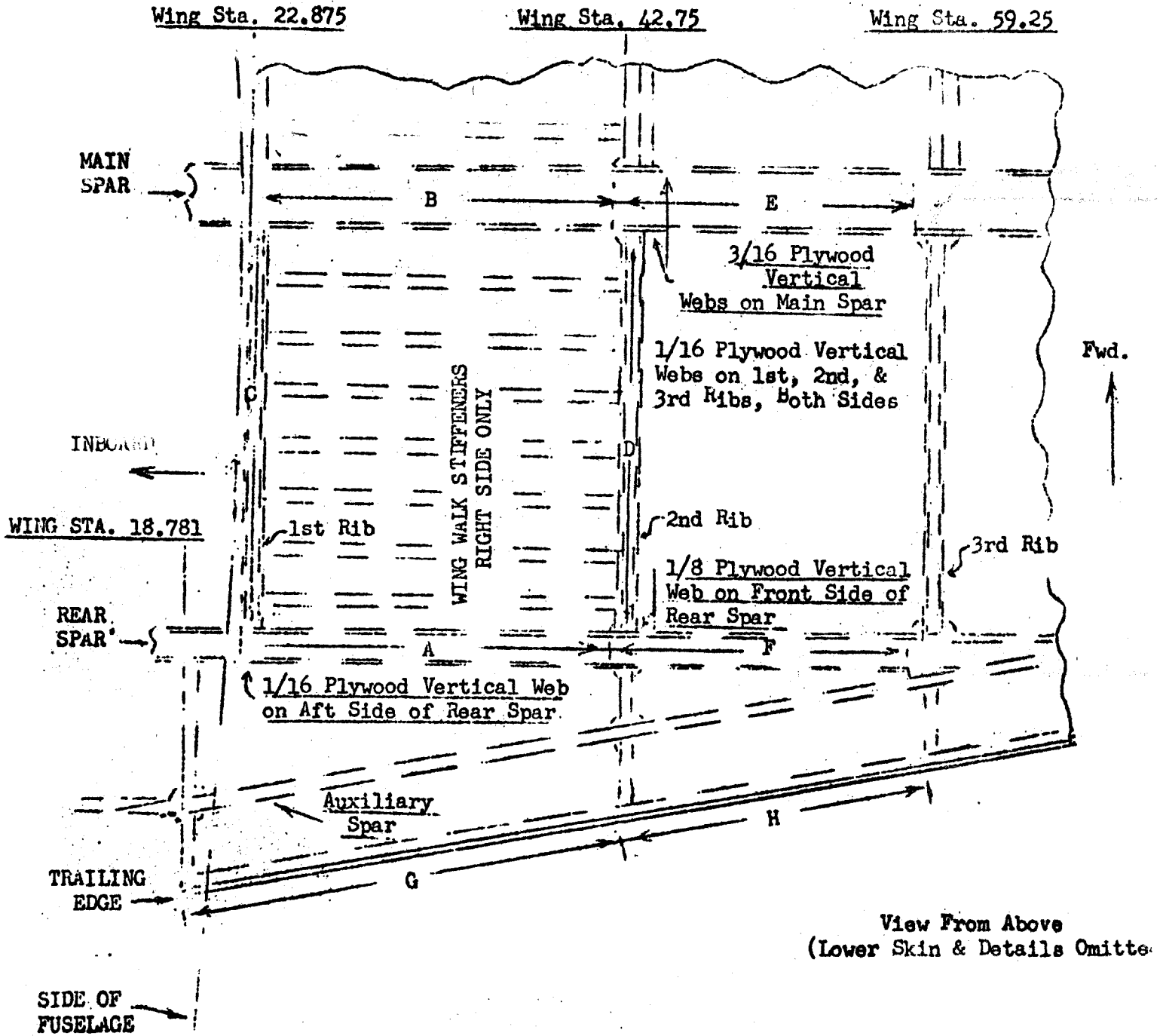
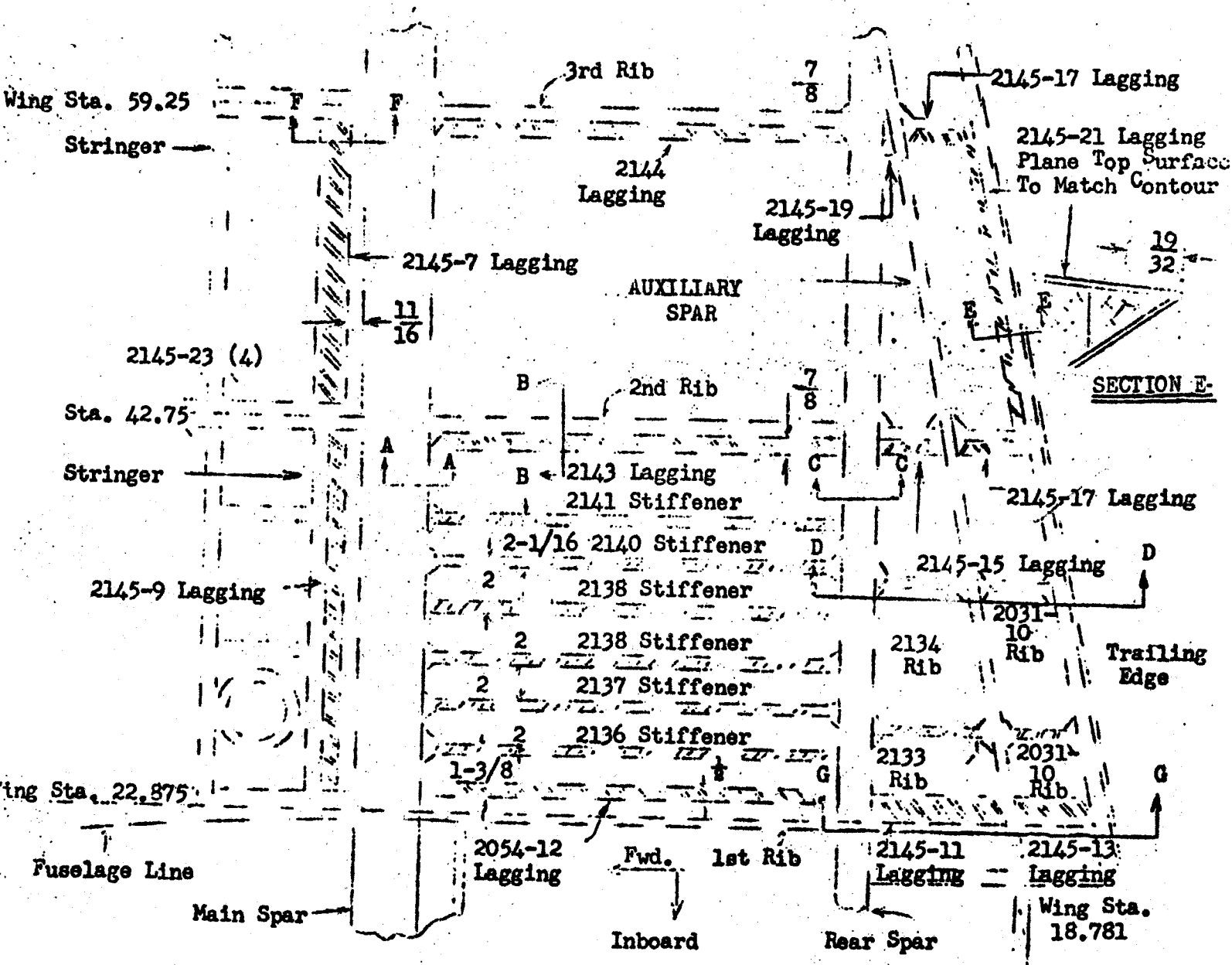


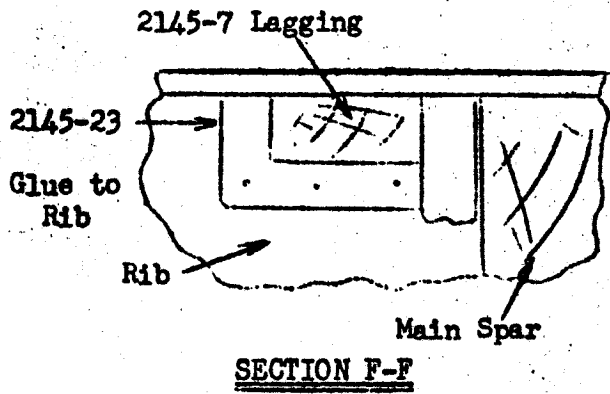
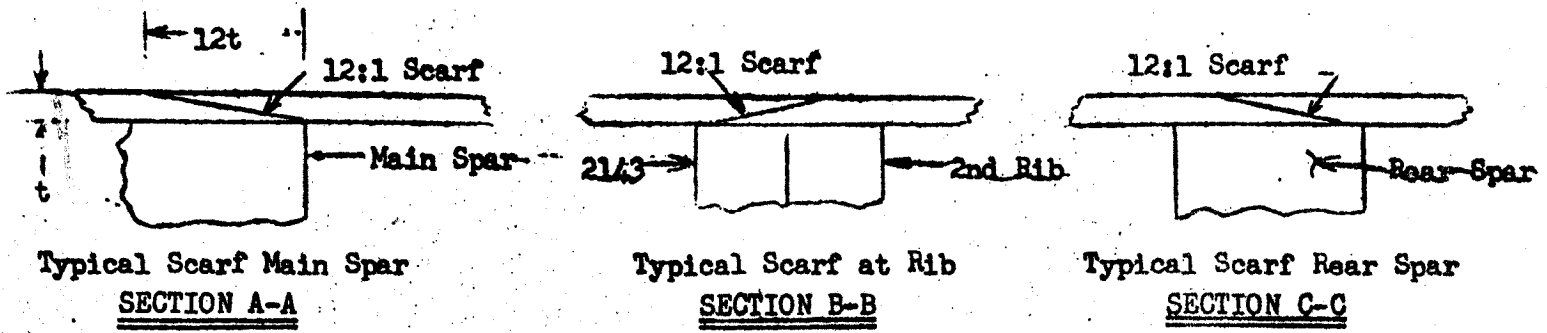
FIGURE 1

POSSIBLE GLUE SEPARATION AREAS

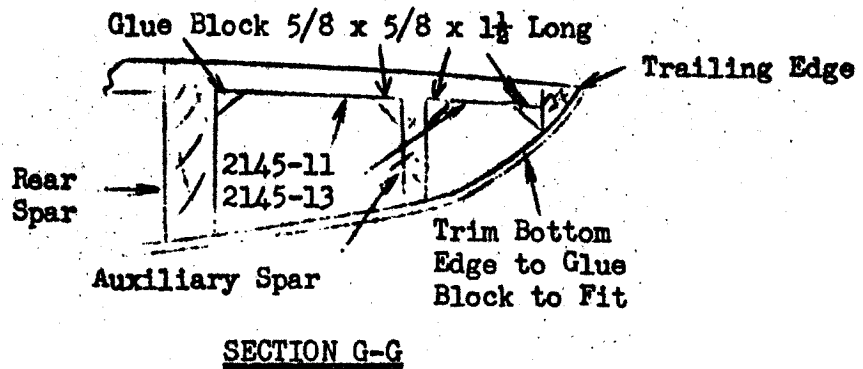
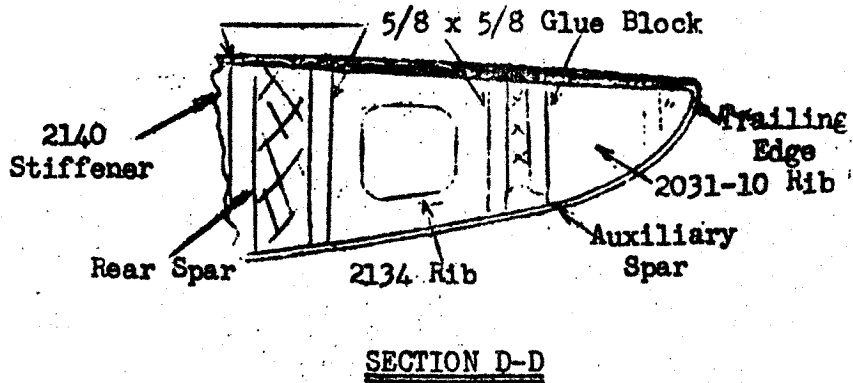
Present Structure. Right Wing Shown
 Left Wing Similar

FIGURE 2
RIGHT WING SHOWN
LEFT WING SIMILAR





Typical 2 Places for
2145-7 & 2145-9 Lagging



Typical for Installation
of 2145-11 & 2145-13 Lagging

Figure 2 (continued)