CHAPTER 6

MAIN PLANE

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MAIN PLANE
(Completely revised)

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Description

1. The main plane has two wing units each secured to the pick-up fittings on frame No.5 and the longerons of the fuselage. The construction of each wing is built around the main spar which, together with the nose ribs and leading edge skin, forms a D-shaped box beam. Aft of the spar the wings are fabric covered except for panels at the root which are metal covered with a rubber tread to form a walkway. The leading edge skin is reinforced with spanwise stringers, and metal ribs aft of the spar are attached to an auxiliary spar which carries the flap and aileron shrouds. The wing tips are of metal and are detachable and each is fitted with a navigation lamp assembly.

Ailerons

2. The ailerons are metal structures internally mass balanced. The starboard aileron has an adjustable tab which is adjusted when the aircraft is on the ground. The ailerons are fabric covered.

Flaps

3. The metal flaps are slotted and are manually operated into any of three positions. They extend from the wing root fillets to the inboard side of the ailerons. Like the ailerons, flaps are fabric covered except for narrow panels at the inboard end.

Definitions of negligible and repairable damage

4. Definitions of repairable damage with a description of damage which can be treated as negligible will be found in Table 1. References to appropriate repair illustrations are also included to supplement the definitions of repairable damage.

TABLE 1

Definitions of negligible and repairable damage

Component	Negligible damage	Repairable damage	Repair fig. No.	Key fig. No.	Remarks
WING STRUCTURE				6/1	
Skin, 18 s.w.g.	Dents 0.1 in. deep, 3.0 in. dia., 12.0 in. apart				
Skin, 21 s.w.g.	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 3.0 in. dia.	6/16		
		Damage in excess of above	6/15		For damage to stringers inboard of Rib 5, make special application for suitable repair.
Stringers (channel)	Dents 0.05 in. deep, 4.0 in. long, 12.0 in. apart	Damage in excess of negligible	6/17		
Stringers (angle)			6/18		
Nose ribs (except Rib 1 and undercarriage ribs)		Damage to flanges 1.0 in. x 0.75 in.	6/19		Flange repairs not to be closer than 12.0 in. apart centre to centre
Trailing ribs (except Ribs 1, 2, 6 and 16)	Dents 0.10 in. deep, 3.0 in. dia., 8.0 in. apart	Damage up to 1.5 in. dia.	6/16		For Ribs 1 and 2 see WALKWAY
		Damage to flanges 1.0 in. x 0.75 in.	6/20		
Trailing ribs No. 6 and 16		Damage up to 1.5 in. dia.	6/16		
		Damage to flanges 1.0 in. x 0.75 in.	6/21		
MAIN SPAR				6/2	
Web	Dents 0.05 in. deep, 1.5 in. dia., 18 in. apart.	Damage up to 1.0 in. dia.	6/16		Repair not applicable inboard of Rib 5
Flanges	Dents 0.05 in. deep, 3.0 in. dia., 12.0 in. apart				
NOSE SPAR				6/3	
Web	Dents 0.05 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 1.5 in. dia.	6/16		
Reinforcing	Dents 0.05 in. deep, 2.0 in. dia.				

Table 1 - continued

Component	Negligible damage	Repairable damage	Repair fig. No.	Key fig. No.	Remarks
WALKWAY ASSEMBLY				6/4	
Rib No. 1 and 2	Dents 0.5 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 2.0 in. dia. Damage to flanges 1.0 in. x 0.75 in.	6/16 6/19		
Top and bottom skins	Dents 0.1 in. deep, 3.0 in. dia., 12.0 in. apart.	Damage up to 5.0 in. dia.	6/16		
"Z" stiffener	Dents 0.1 in. deep, 2.0 in. long, 8.0 in. apart	Damage to flange 1.0 in. x 0.65 in.	6/19		Fig. 6/19 illustrates the repair on a rib. It may be adapted to suit this member
Access doors	Dents 0.25 in. deep, 5.0 in. dia.	Cracks up to 1.0 in. long			Locate damage by drilling 1/8 in. holes at extremities of cracks
TANK BAY				6/5	
Nose rib No. 1	Dents 0.05 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 1.5 in. dia.	6/16		
Formers	Dents 0.1 in. deep, 3.0 in. long				
Tank liner	Any dents up to 0.25 in. deep				
Tank liner rib	Dents 0.10 in. deep, 3.0 in. dia				
Stalling strip	Any abrasions which do not deform the strip	Damage in excess of negligible, by renewal only.			Note : It is important that this strip is not left with any deformation
UNDERCARRIAGE RIBS	No damage can be treated as negligible			6/6	
HINGE BOX ASSEMBLY				6/7	
Webs	Dents 0.05 in. deep, 1.5 in. dia., 18.0 in. apart	Damage up to 1.5 in. dia. Damage to flanges 1.0 in. x 0.75 in.	6/16 6/19		
Top and bottom plates		Damage up to 1.0 in. dia.	6/16		
Diaphragms, doors and retaining plates	Any reasonably slight damage				

Table 1 - continued

Component	Negligible damage	Repairable damage	Repair fig. No.	Key fig. No.	Remarks
FLAP				6/8	
Nose skin	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 3.0 in. dia. Damage in excess of the above	6/16 6/23		Repairs not applicable in shaded area
Ribs	Dents 0.1 in. deep, 1.5 in. dia., 12.0 in. apart	Damage in excess of negligible by renewal only			
Trailing edge	Dents 0.05 in. deep 1.0 in. dia., 18.0 in. apart	Damage up to 4.0 in. long and insertion repair	6/24		
AILERON				6/9	
Nose skin	Dents 0.1 in. deep, 2.0 in. dia., 12.0 in. apart	Damage up to 2.0 in. dia. In excess of the above	6/16 6/23		Repairs not applicable in shaded area
Ribs	Dents 0.1 in. deep, 1.5 in. dia., 12.0 in. apart.	Renew rib if damaged more than negligibly			After any repair to aileron, rebalancing must be carried out to fig. 6/25
Trailing edge	Dents 0.05 in. deep, 1.0 in. dia., 18.0 in. apart	Damage up to 4.0 in. long and insertion repair	6/24		
SHROUDS				6/10	
Aileron	Dents 0.1 in. deep, 3.0 in. dia., 12.0 in. apart	Damage up to 1.5 in. dia. Damage to flanges up to 1.0 in. width	6/16 6/22		
Flap		Damage up to 3.0 in. dia. Damage to flanges up to 1.0 in. x 0.75 in.	6/16 6/20		
WING TIP				6/11	
Skin	Dents 0.2 in. deep, 6.0 in. dia., 12.0 in. apart	Damage up to 4.0 in. dia.	6/16		
FABRIC COVERING					
Wing Flap Aileron	Any damage to the fabric should be covered with a patch and doped over	For damage and repair methods see Chapter 8		6/12 6/13 6/14	

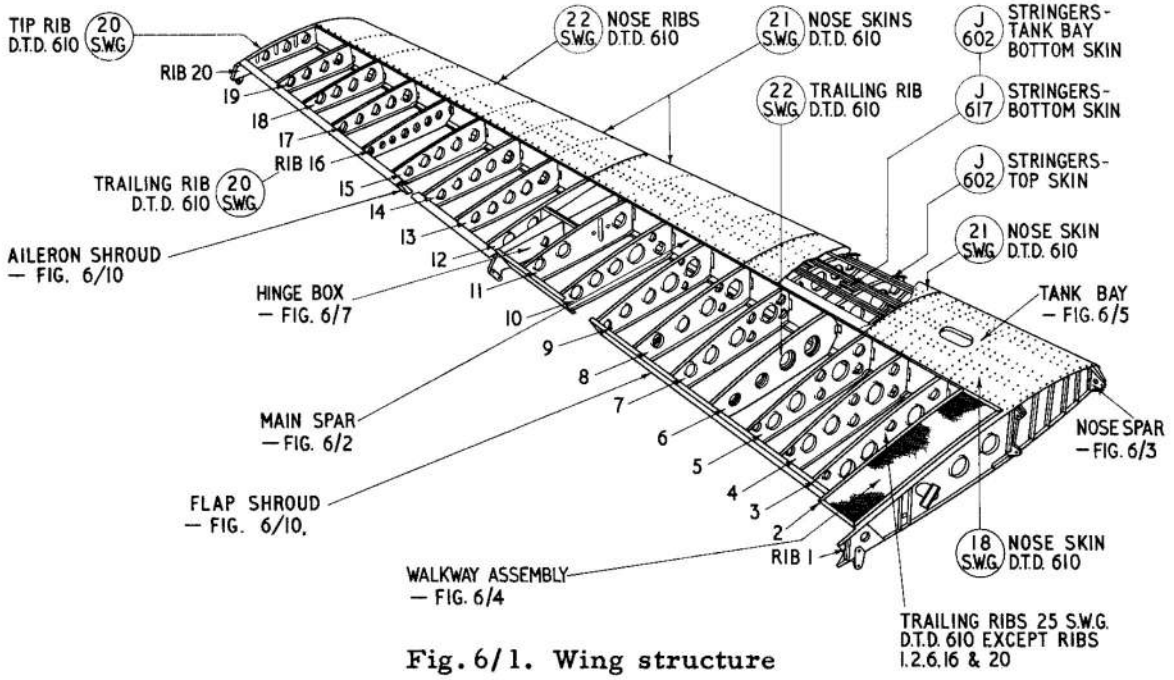


Fig. 6/1. Wing structure

Wing structure

5. Repairs to the wing structure can be effected as given in Table 1. Riveting of skin patches must always be to the pattern shown in fig. 6/15.

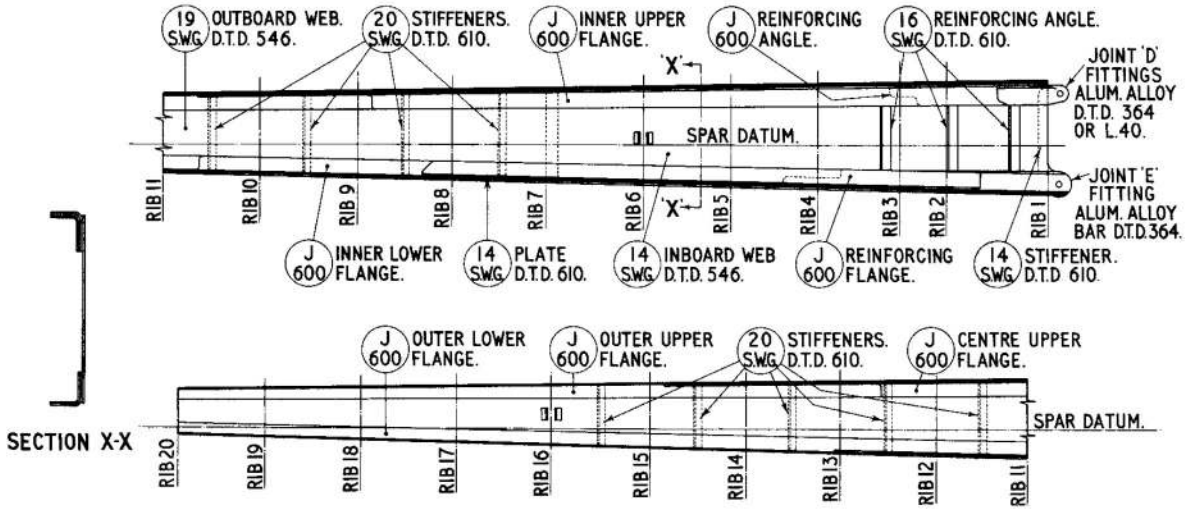


Fig. 6/2. Main spar

Main spar

6. For damage in excess of that repairable as in Table 1 refer to the instructions given on Part 1 Marker card.

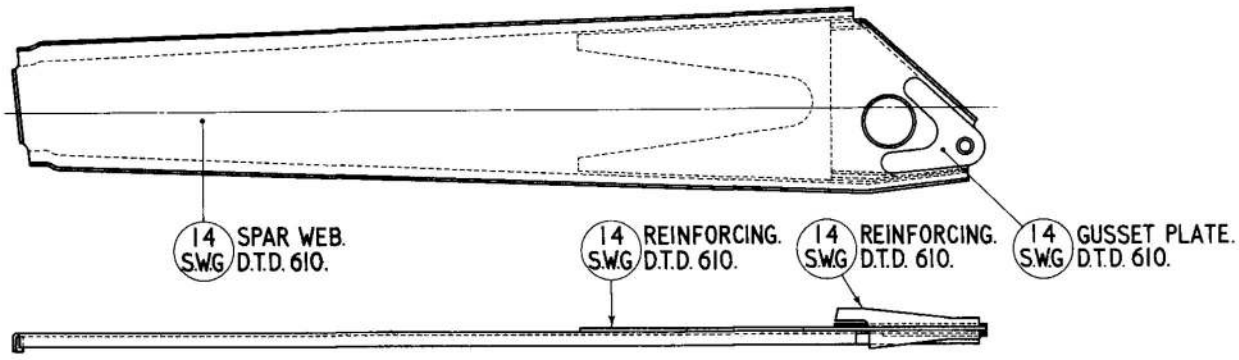


Fig.6/3. Nose spar

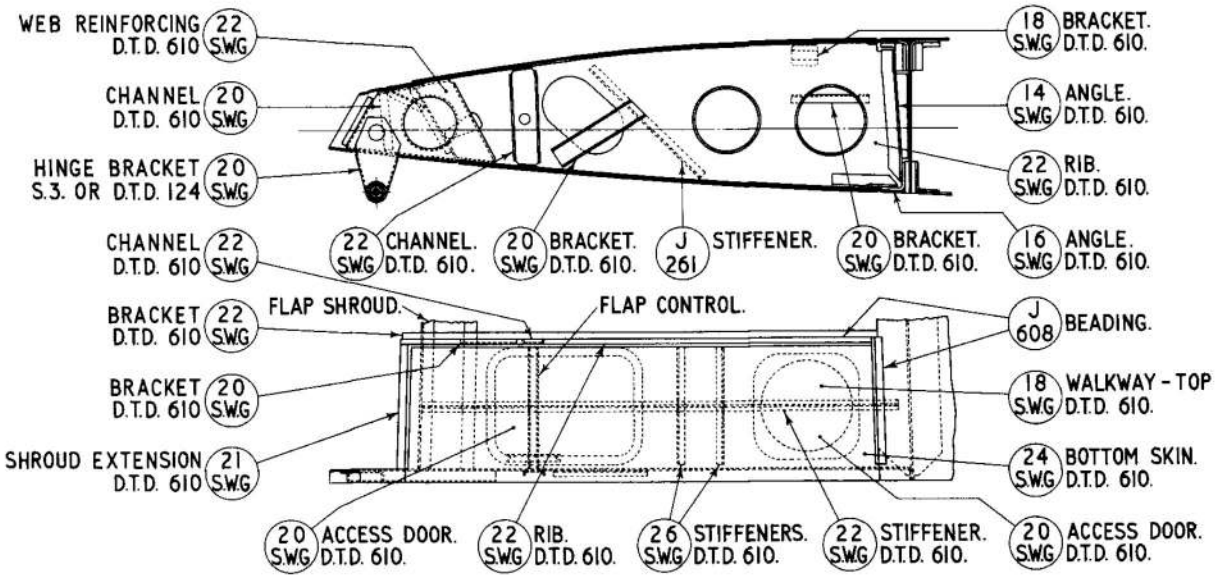


Fig.6/4. Walkway assembly

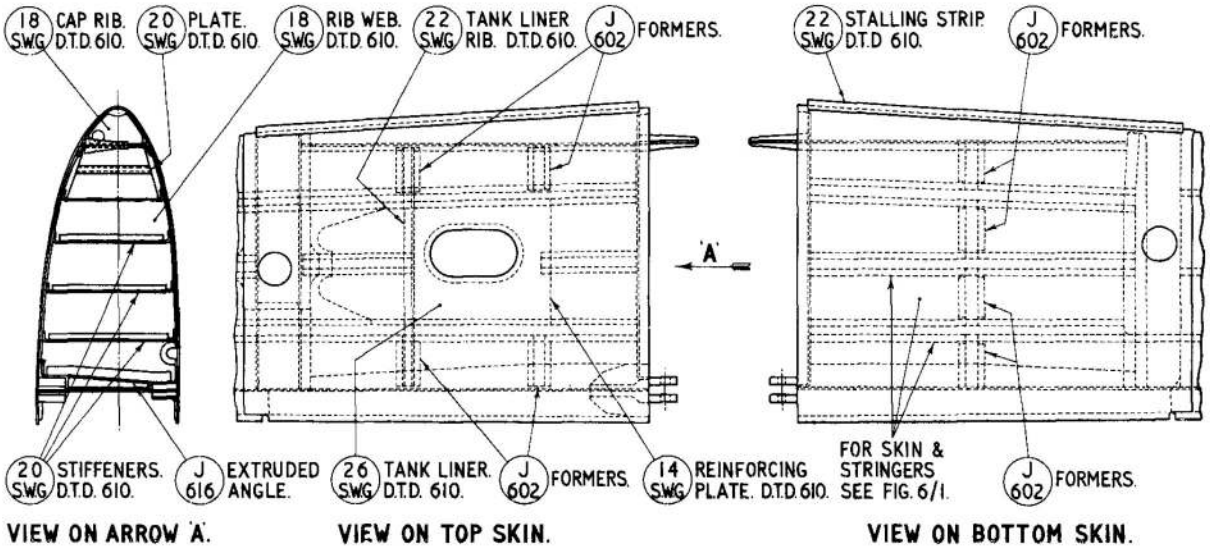


Fig.6/5. Tank bay

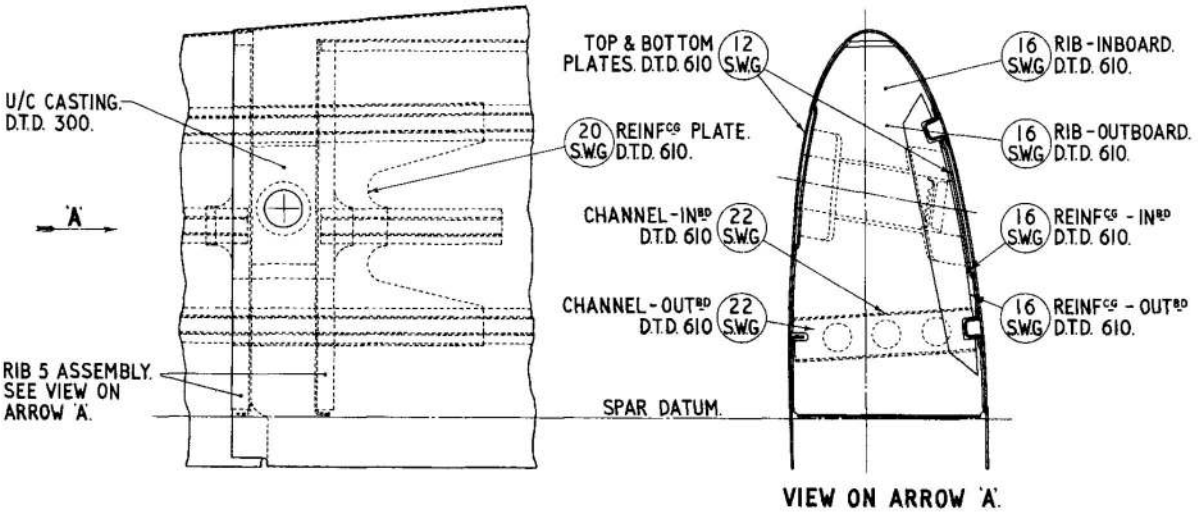


Fig.6/6 Undercarriage ribs in wing

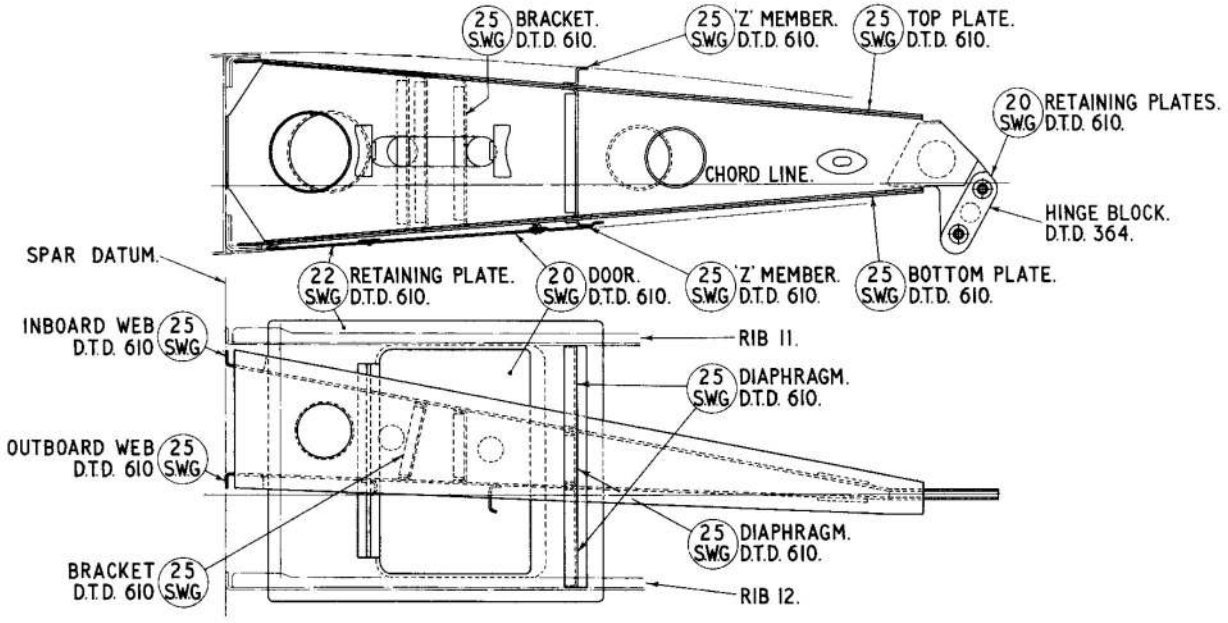


Fig.6/7. Hinge box assembly

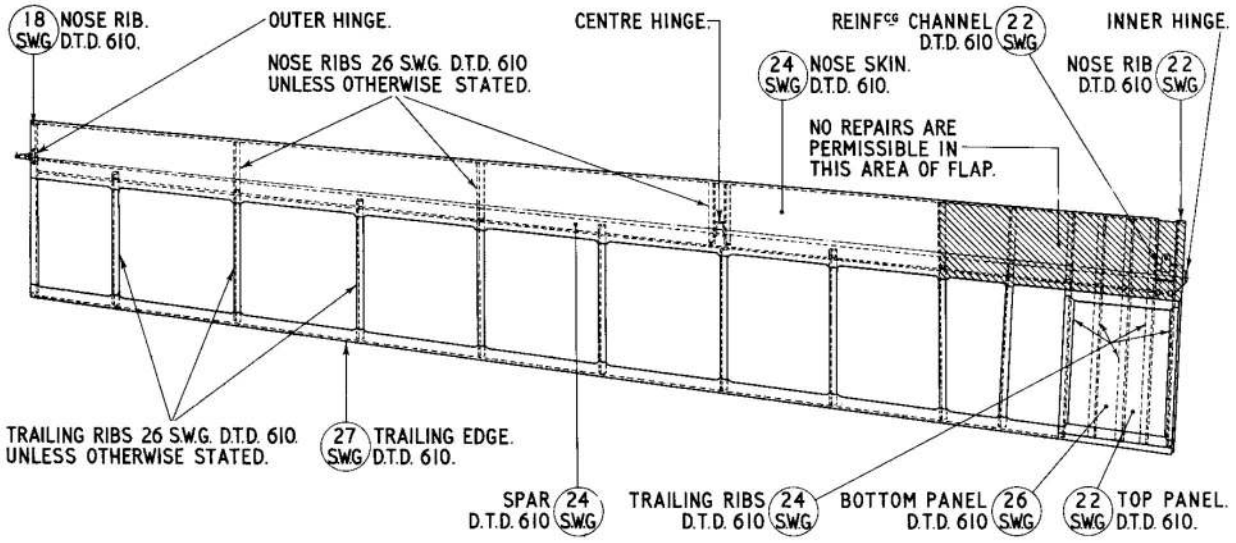


Fig.6/8. Flap

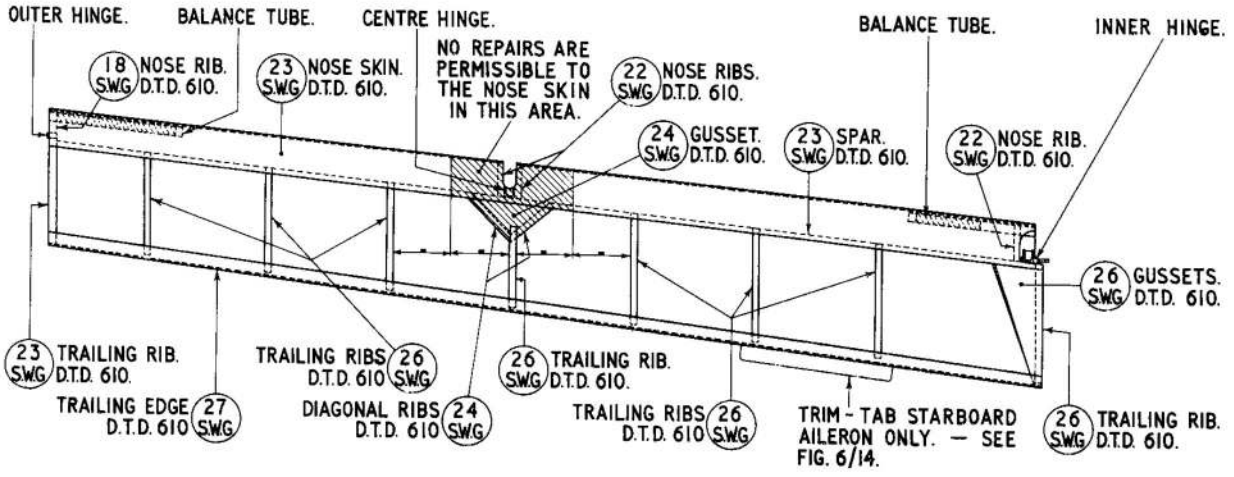


Fig. 6/9. Aileron

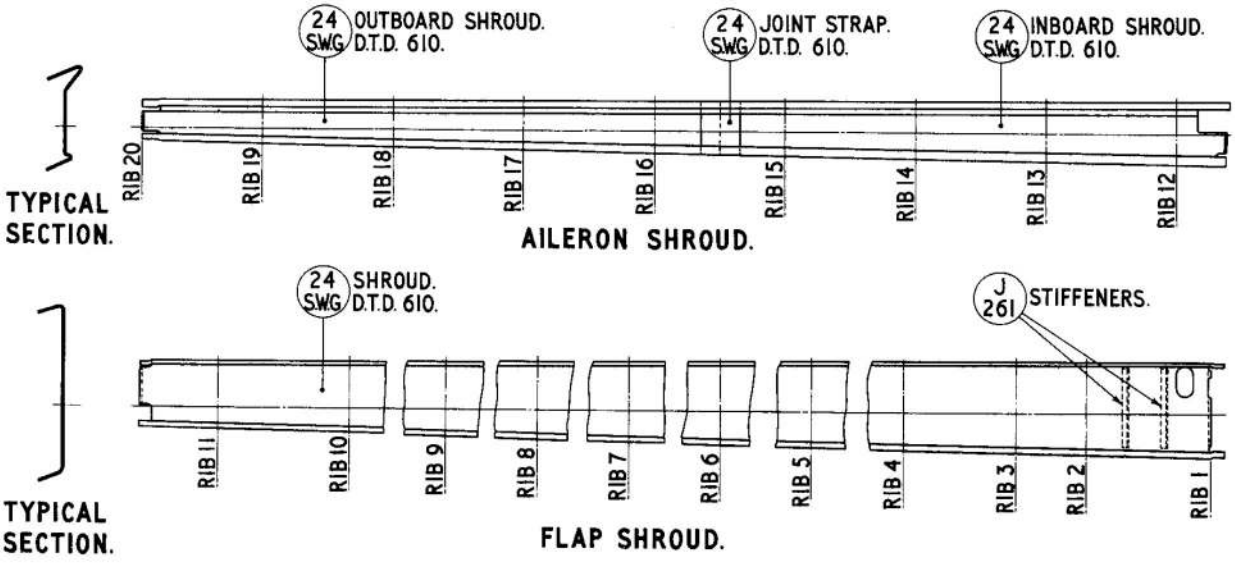


Fig. 6/10. Shrouds

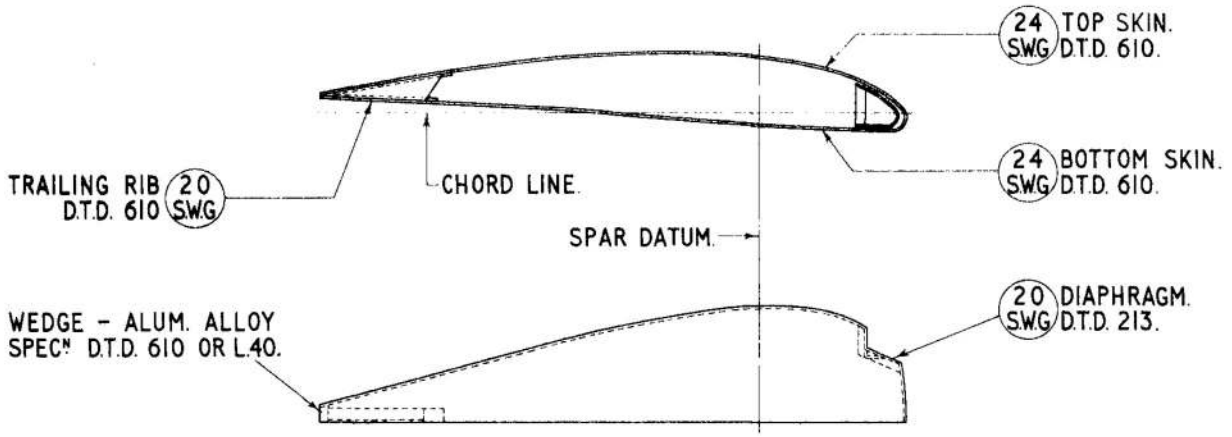


Fig.6/11. Wing tip

7. Wing tips are detachable metal structures and carry fittings for navigation lamp assemblies. Since, when the wing tip is damaged, structure inboard may also be affected, a careful inspection of the wing should be made for damage before fitting a replacement wing tip.

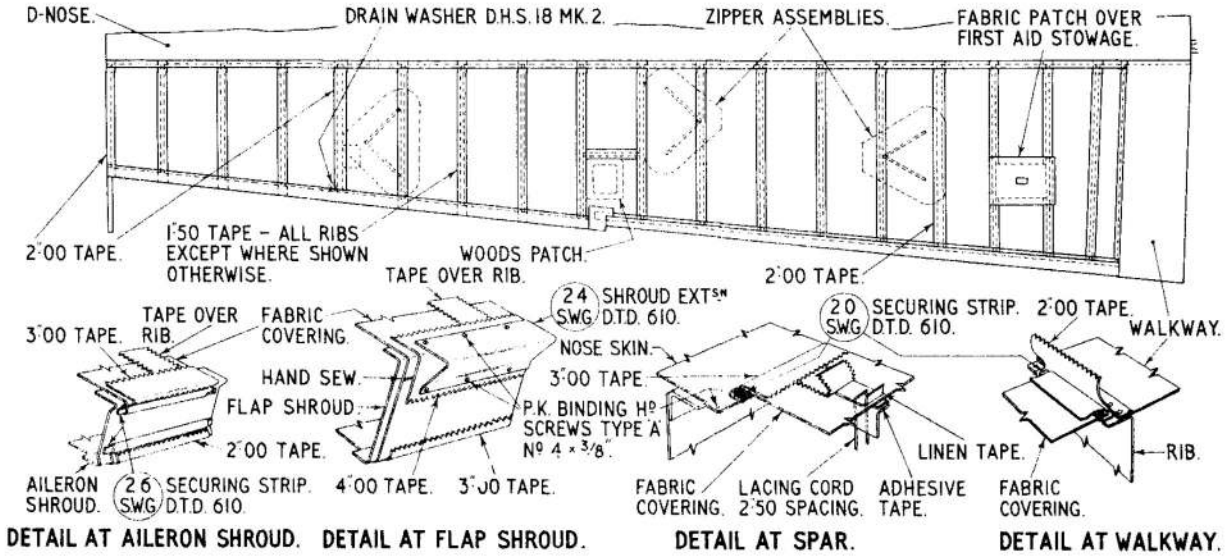


Fig.6/12. Wing - fabric covering

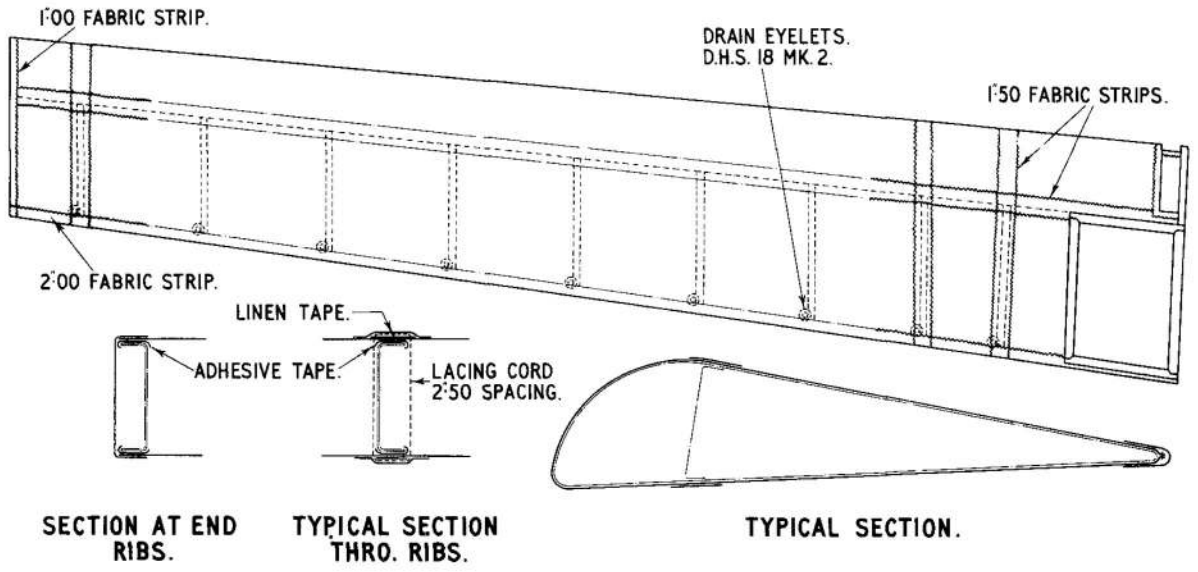


Fig. 6/13. Flap - fabric covering

Fabric covering (fig. 6/12, 6/13 and 6/14)

8. The fabric covering of the wing should be to Specification D.T.D.540 with the warp spanwise and the serrated fabric strips should also be to this specification. The stringing for the fabric attachment to the ribs should be No. 3 braided nylon cord to specification D. T. D. 786. No. 40 linen thread is used doubled and well waxed for hand sewing. On the flap and aileron, fabric to Specification F. 1 is used with the warp spanwise.

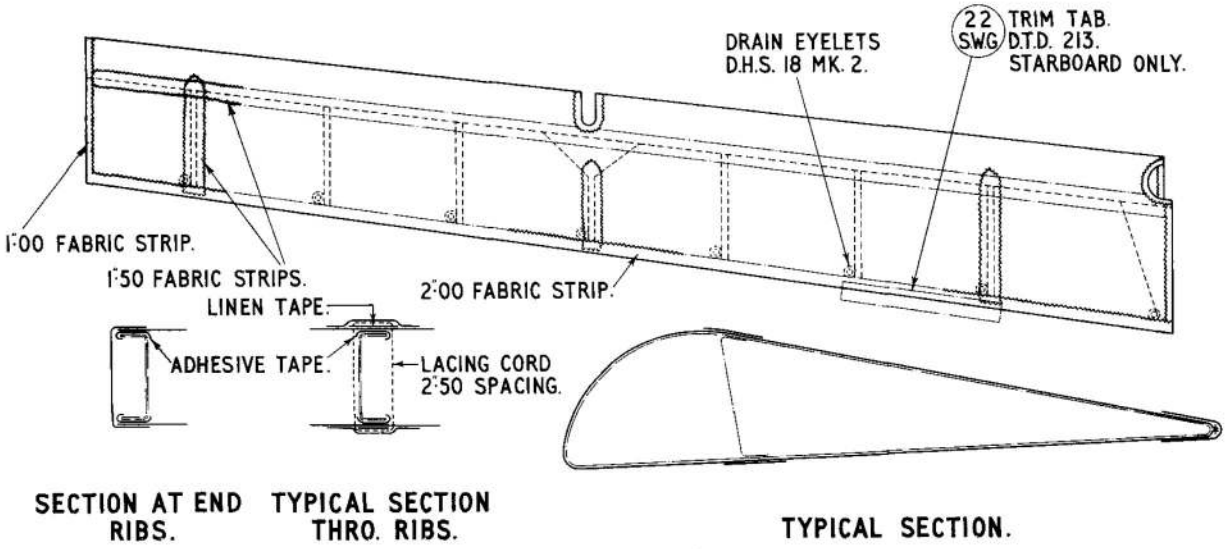


Fig. 6/14. Aileron - fabric covering

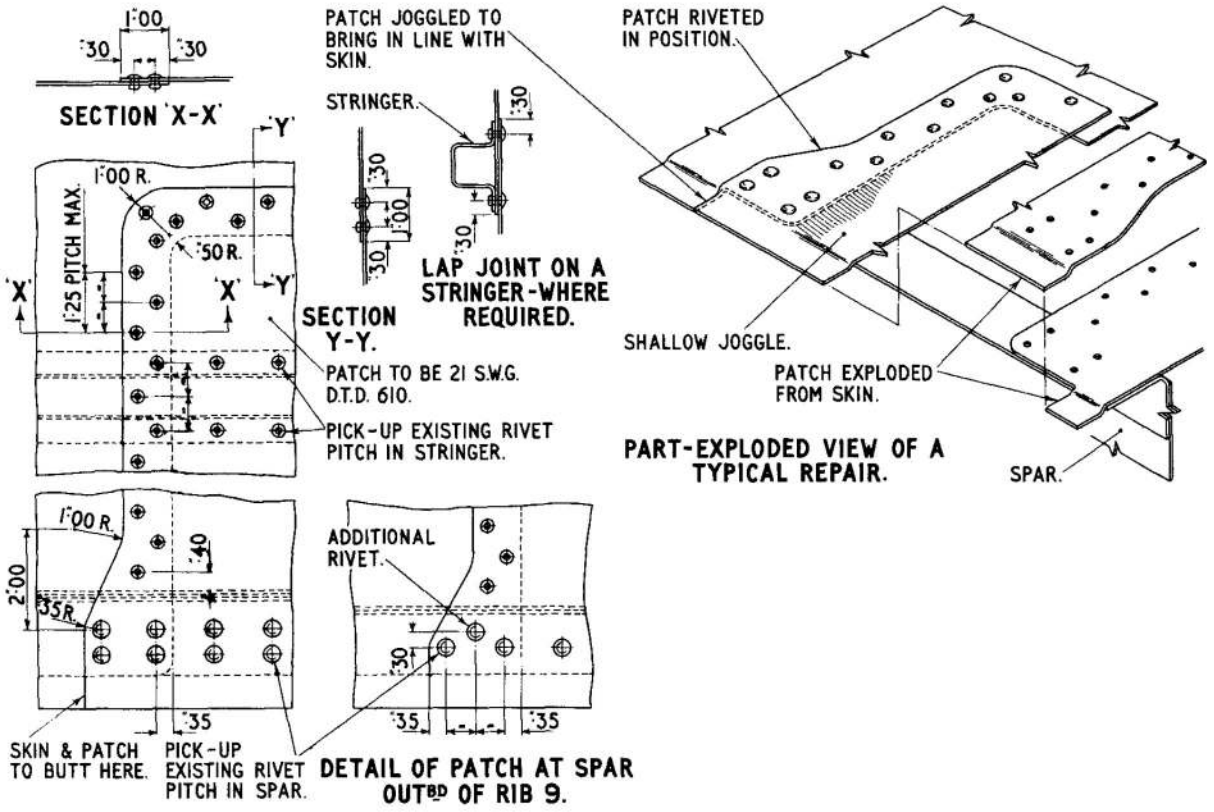
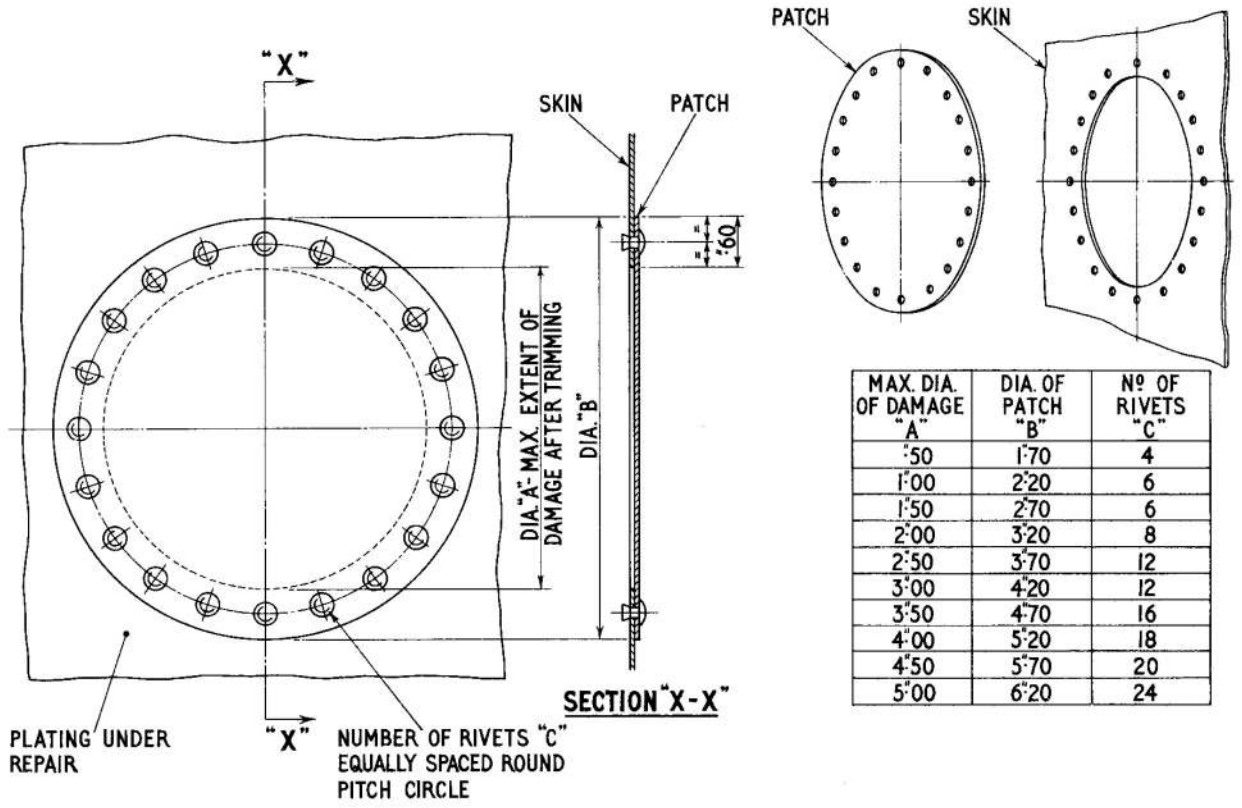


Fig.6/15. Riveting of skin patches

Skin patch riveting

9. Rivets in patch and skin only to be Monel pop break-stem type AGS.2050, 1/8 in. dia. outboard and 5/32 in. dia. inboard of Rib 12. Rivets picking up existing holes in rib and stringer flanges to be snap head steel Choberts, 1/8 in. dia. TK3SS outboard and 5/32 in. dia. TL3SS inboard of Rib 12. Rivets through patch and spar to be 5/32 in. dia. mushroom head type AS.2228, length to suit total thickness.



MAX. DIA. OF DAMAGE "A"	DIA. OF PATCH "B"	Nº OF RIVETS "C"
.50	1.70	4
1.00	2.20	6
1.50	2.70	6
2.00	3.20	8
2.50	3.70	12
3.00	4.20	12
3.50	4.70	16
4.00	5.20	18
4.50	5.70	20
5.00	6.20	24

Fig.6/16. Patch repairs

Patch repairs

10. The illustration shows a repair which can be used in areas free from internal members. Patch material must be similar in gauge and specification to the damaged skin under repair. Rivets used for attachment should be as follows :-

14 to 18 s.w.g. skin - 5/32 in.dia., AS.2228/505 or 5/32 in.dia., Chobert TL.4.SNA.

19 and 20 s.w.g. skin - 1/8 in.dia., AS.2228/404 or 1/8 in.dia., Chobert TK.3.SNA.

21 to 25 s.w.g. skin - 3/32 in.dia., AS.2228/303 or 1/8 in.dia., pop AGS.2050/419/BS

The Chobert or pop rivets should only be used under conditions making solid riveting impossible.

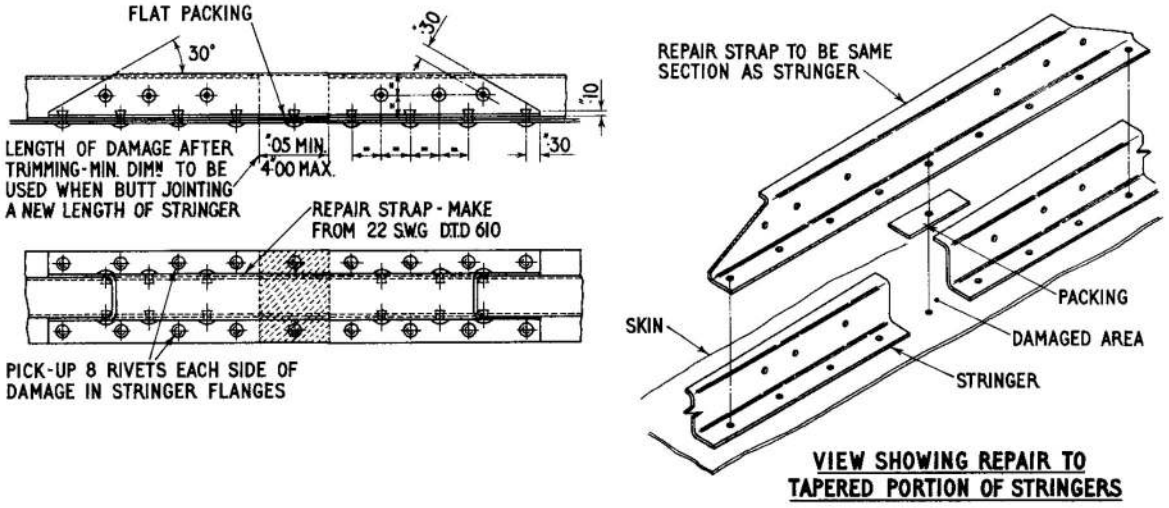


Fig.6/17. Repair to channel stringers

Channel stringers

11. The channel stringers are fined out towards the wing tip into Z section. The illustration shows repair methods to both sections of stringer. Rivets should be mushroom head solid rivets AS.2228/404 wherever possible and elsewhere 1/8 in.dia.break stem pop rivets type A.G.S.2050 should be used. Where damage exceeds 4.0 in.long repair by insertion of a new length of stringer J.602 with butt joint at ends as shown.

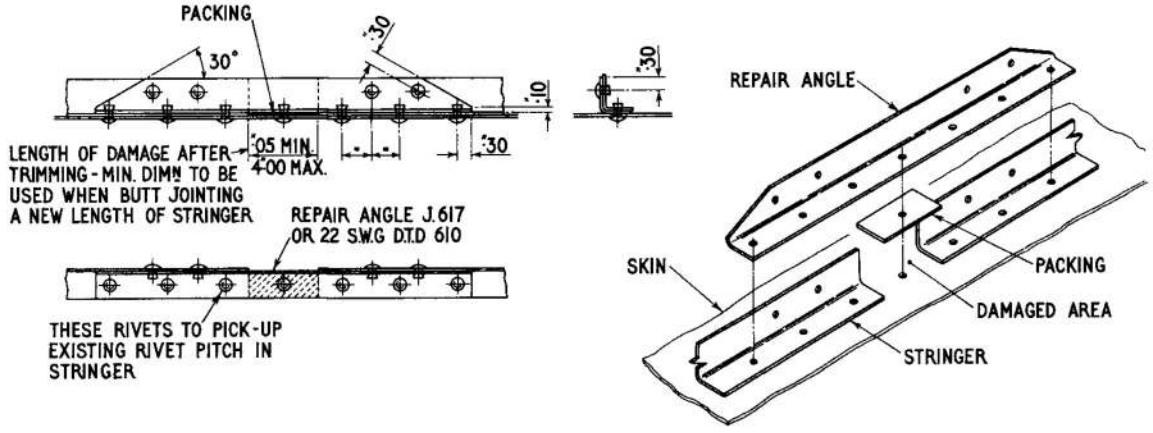
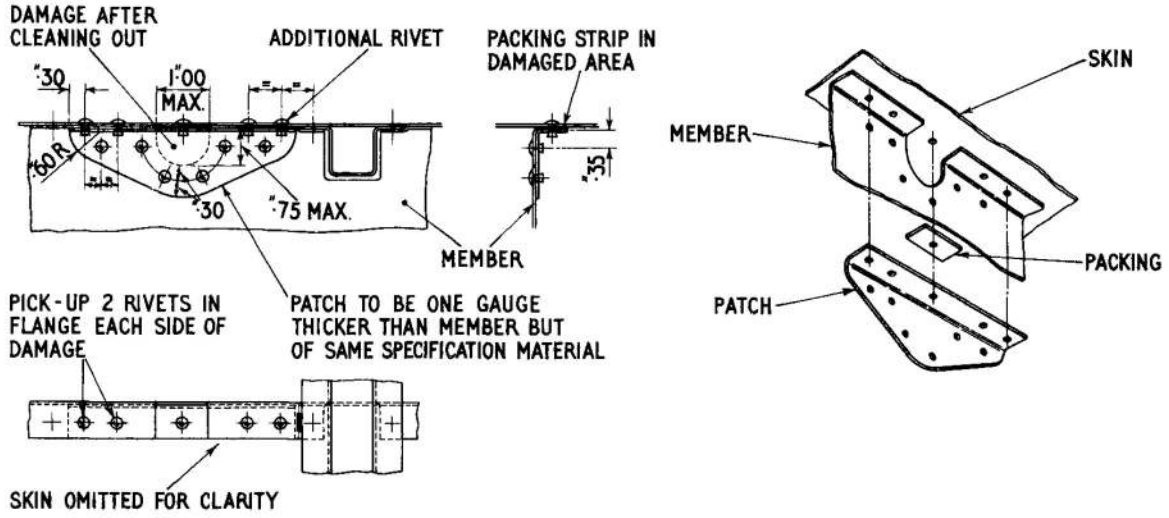


Fig.6/18. Repair to angle stringers

Angle stringers

12. Rivets used in repair must be 1/8 in.dia. mushroom head AS.2228/404 where possible and elsewhere 1/8 in.dia.Monel dome head pop rivets (Chap.1, para.11) should be used. Buckles up to 4.0 in.are repaired as illustrated; damage in excess of this should be repaired by insertion of a new length of stringer J.617 with butt joints at ends as shown (.05 in.gaps).



Rivets used are AS.2228/404 mushroom head solid rivets or, where inaccessible, 1/8 in.dia. steel Chobert rivets, TK.3.SS.

Fig.6/19. Flange repair at metal skin

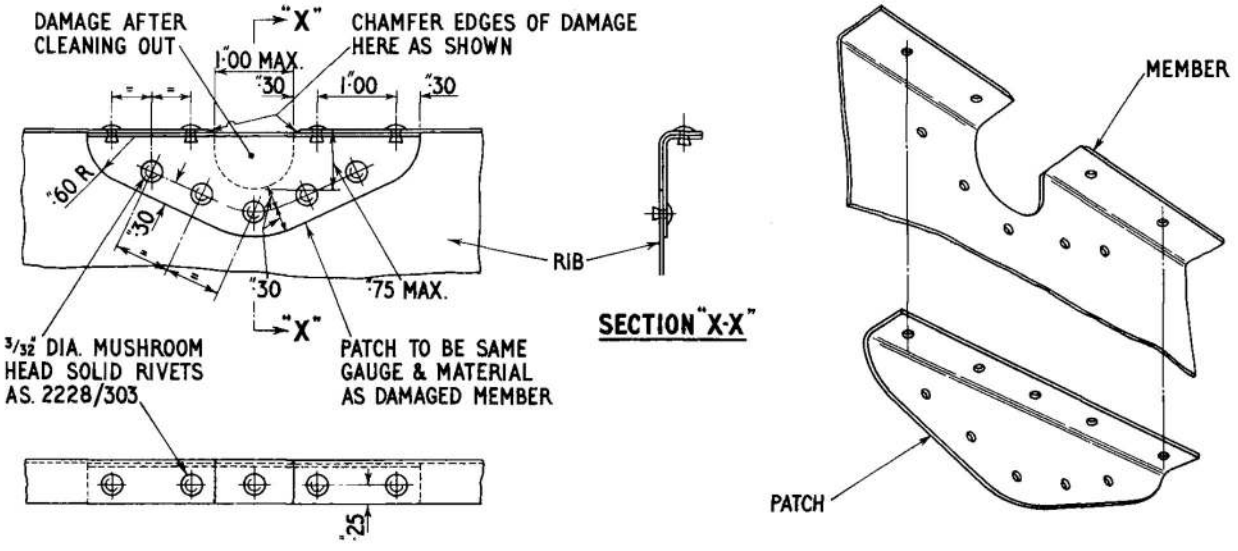


Fig.6/20. Flange repair - at fabric covering

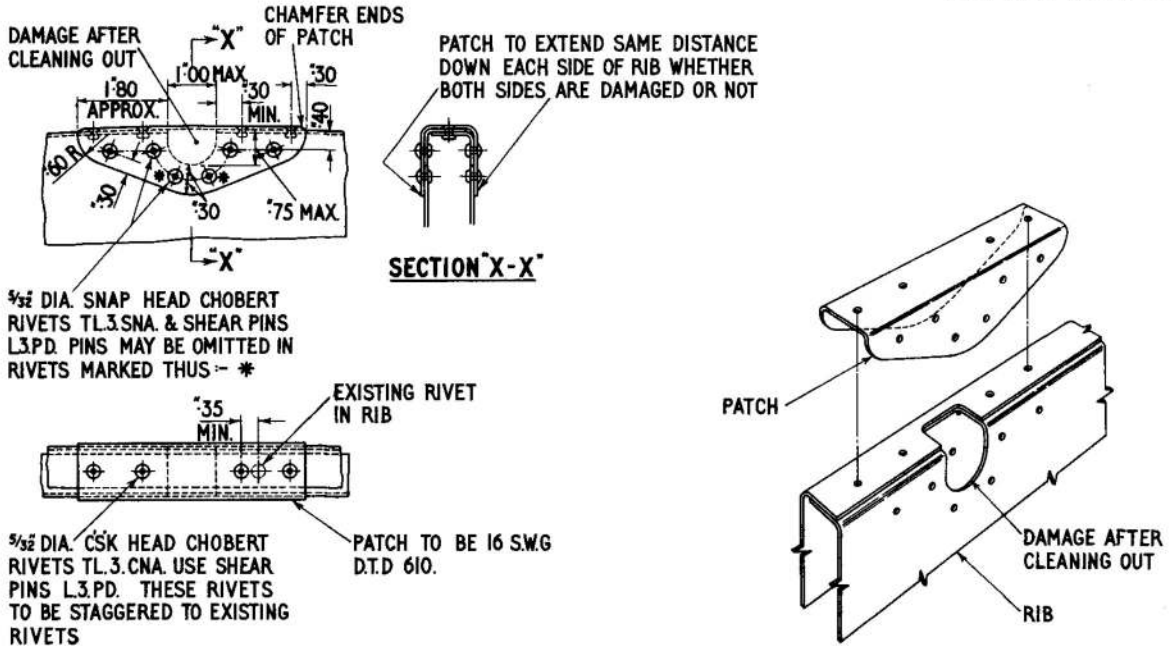
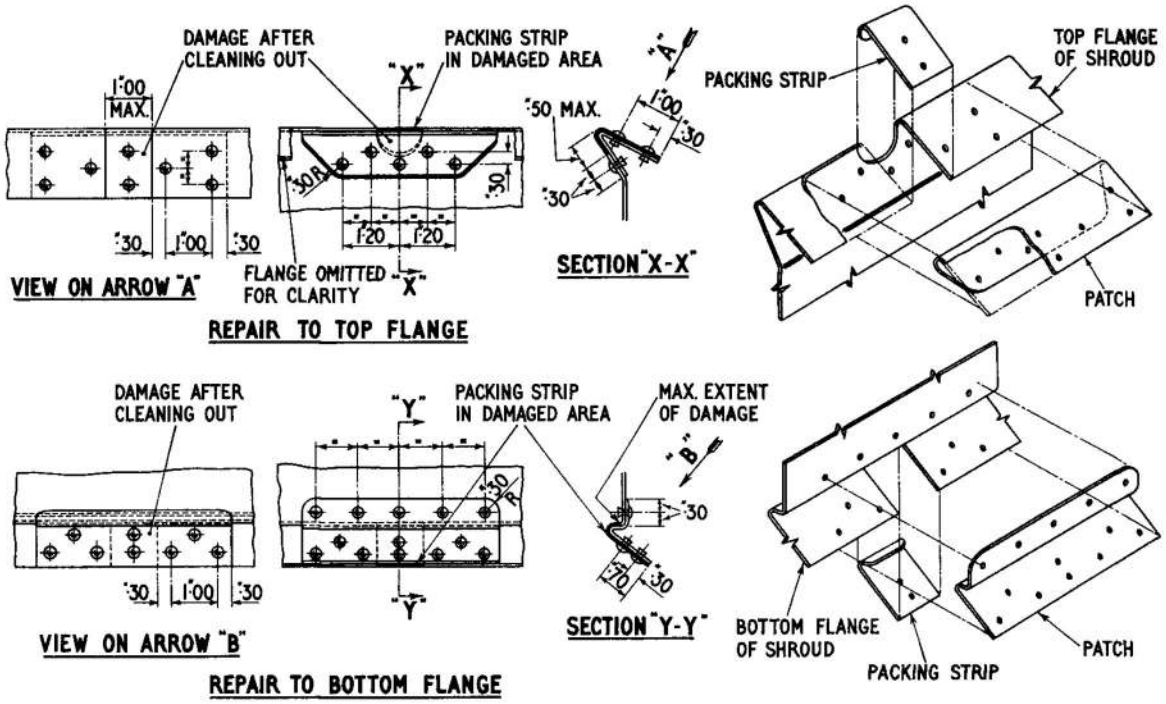
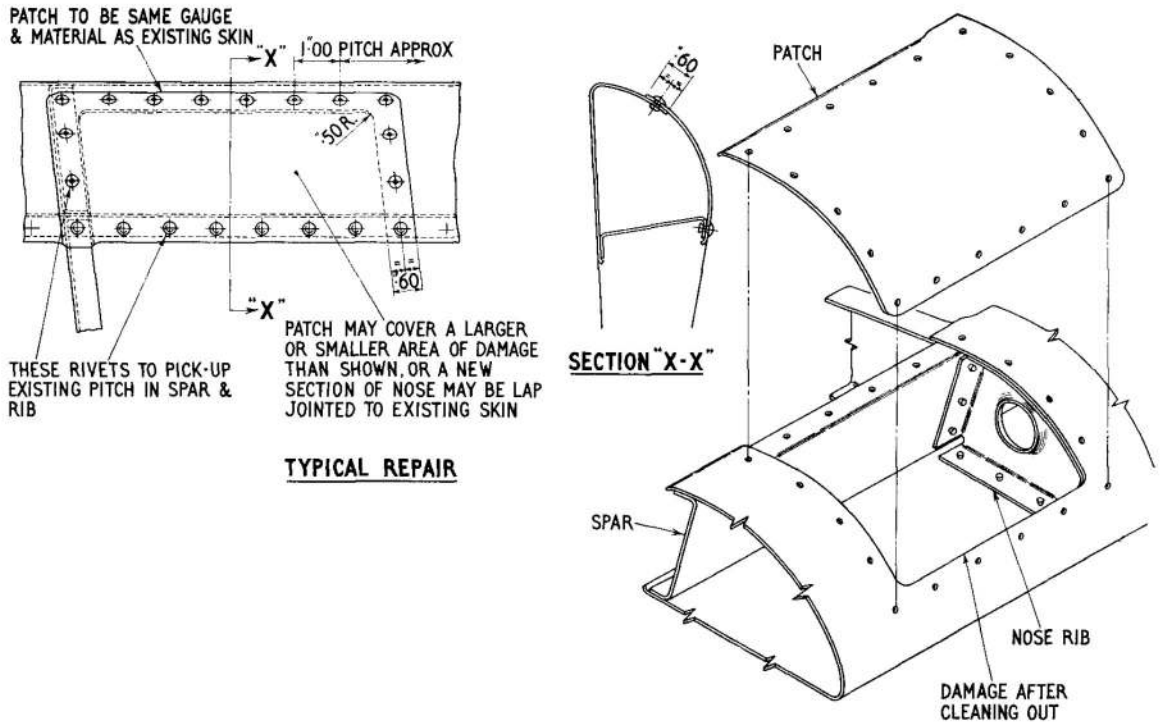


Fig.6/21. Repair to ribs No.6 and 16



Patch material to be same gauge and material as shroud.
All rivets to be 3/32 in.dia. mushroom head light alloy rivets, AS.2228/303.

Fig.6/22. Repair of aileron shroud



Rivets through spar to be 3/32 in.dia. mushroom head light alloy, AS.2228/303. Rivets through skin lap to be 1/8 in.dia. dome head monel pop rivets AGS.2050/419/BS.

Fig. 6/23. Repair to skin of flap and aileron

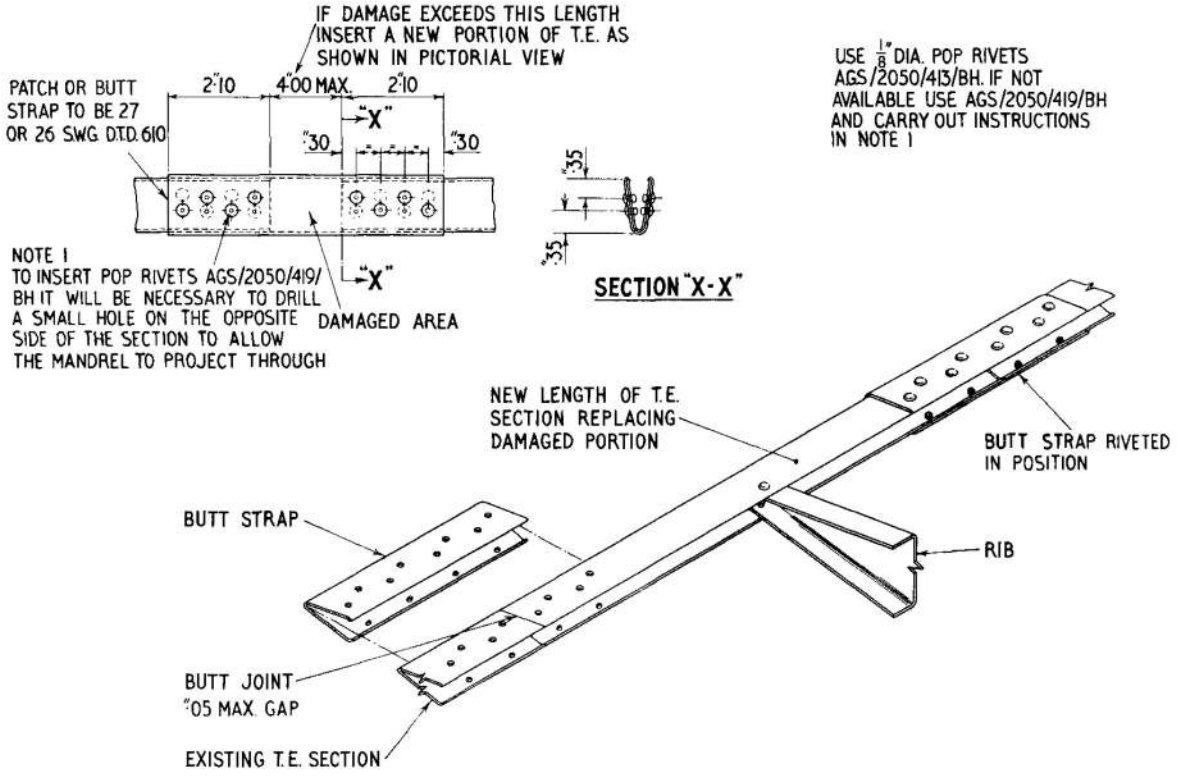


Fig. 6/24. Repair to T. E. section - flap and aileron

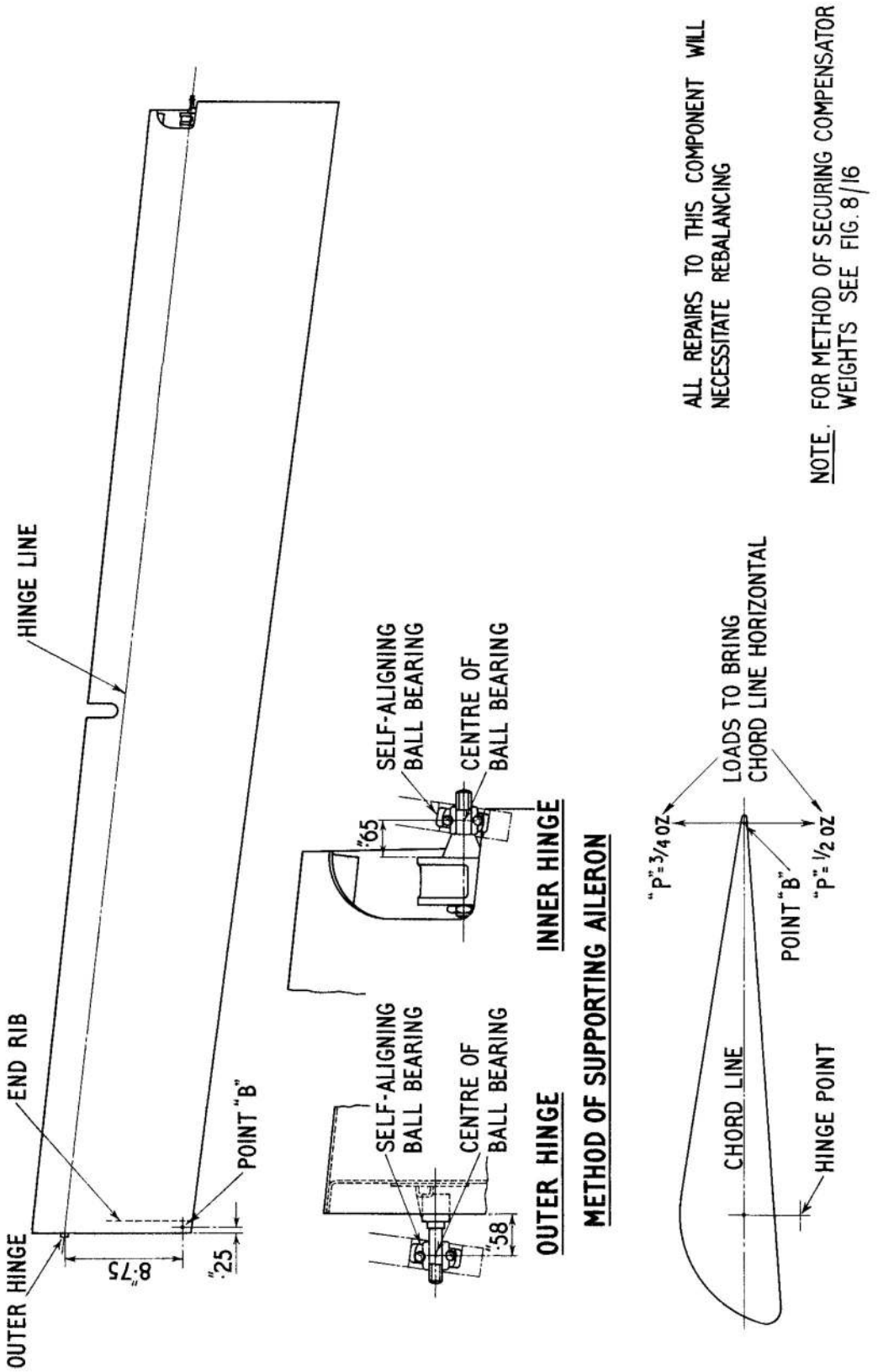


Fig. 6/25. Aileron rebalancing diagram