

CHAPTER 4

TAIL UNIT

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CHAPTER 4 TAIL UNIT

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General

1. The tail unit consists of the tail plane, the upper portion of the fin, the elevators, rudder, and the bullet fairing. The lower portion of the fin, being integral with the rear fuselage, is dealt with in Chap.2.

Repair prohibitions

2. User Unit repairs to the tail plane and fin are not permitted in the areas shown shaded in fig.6. The bullet fairing is not repairable. Restrictions on repair of the rudder and elevators are given in the relevant text.

TAIL PLANE

General

3. The electrically-operated, variable-incidence, swept-back tail plane is of one-piece cantilever construction, consisting of two main spars joined by a heavy central rib. A 10 s.w.g. light alloy skin to Specification L.73 covers the majority of the component, but the nosing forward of the

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main spar is covered with a 16 s.w.g. skin to Specification L.72. The main skin is reinforced with extruded T-section stringers. The tail plane is attached to, and pivots about, a fitting built in to frame No.55 on the rear fuselage; this fitting also carries the rear attachments of the upper portion of the fin.

Negligible damage

Skin and stringers

4. Smooth, isolated dents in free areas of the skin may be neglected provided they are not deeper than 0.015 in.

Spars and ribs

5. Negligible damage to spar webs and all flanged plate members is restricted to smooth, isolated dents, free from cracks and abrasions, not exceeding 0.020 in. deep. Slight deformation of the plate flanges may be neglected provided there are no cracks and adjacent fixings have not been strained.

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Flush repair to skin and rib of rudder	15
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Repairs

6. Cracks, perforations or other damage greater than negligible to the 10 s.w.g. skin may be repaired as shown in fig.7. Damage to the 16 s.w.g. nosing skin and rib should be repaired as shown in fig.8.

UPPER PORTION OF FIN

General

7. The main structure consists of two vertical members to which are attached the steel fittings which connect with those on the rear fuselage. Between the vertical members a number of transverse flanged ribs are fitted the bottom rib forming a diaphragm. The framework is covered by light alloy sheets joined at the forward vertical member.

Negligible damage

8. Smooth isolated dents in the skin, free from cracks and sharp corners, may be neglected provided they are not deeper than

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 NON-REPAIRABLE AREAS 6
 REPAIR TO SKIN 9
 REPAIR TO SKIN AND RIB 10

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TAILPLANE
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 REPAIR TO SKIN 7
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UNLESS OTHERWISE STATED NUMBERS SHOWN
 ARE FIGURE NUMBERS OF THIS CHAPTER

FIG.1. LOCATION DIAGRAM FOR TAIL UNIT

RESTRICTED

0.020 in. Negligible damage to members is as defined in para.5.

Repairs

9. The upper portion of the fin is a reasonably small and easily detachable component so that complete renewal may be preferable to repair. User unit repairs are confined to those shown in fig.9 and 10.

Skin riveting

10. Should the existing 1/8 in. dia. skin rivets at the base of the fin show signs of lifting they should be replaced by 5/32 in. dia. A.G.S.2051 pop rivets countersunk flush.

ELEVATORS

General

11. Each elevator consists of a channel - section spar, nose ribs, flanged plate main ribs, and a skin covering of 26 s.w.g. light alloy sheet (24 s.w.g. on bottom skin - Post Mod.708) stiffened by channel section stringers.

Repair prohibitions

12. The mass balance weight is in the nosing, which is of mild steel plate, and any damage in this area will necessitate complete renewal of the nosing. The trim tabs are also non-repairable.

Negligible damage

13. Smooth, isolated dents in the skin and stringers may be neglected provided they are in free areas and do not exceed 0.015 in. deep.

Repairs

14. Repairs to skin are shown in fig.11, and to both skin and stringers in fig.12. Not more than two such repairs may be made to one elevator, and they must not be on

adjacent panels in any one skin. More extensive damage will entail renewal of the elevator.

Mass balance (fig.13)

15. Repairs forward of the hinge centre-line will not necessitate any adjustment of the mass balance. Aft of the hinge centre-line one repair may be made without adjustment of mass balance provided that the product of the weight added by the repair and the distance "B" does not exceed 8 oz. in. The weight added by the repair and the arm "B" should, however, be recorded on the serial number plate with a note to the effect that the elevator has not been re-balanced. If the product of the first repair made aft of the hinge centre-line exceeds 8 oz. in., or when a second repair is made, it will be necessary to adjust the mass balance weight. In the latter instance the weight added by the first repair must also be taken into account when making the adjustment. The method of fitting the additional weight is shown in fig.13.

General

16. The rudder is of light alloy with a 26 s.w.g. skin covering aft of the front spar and mass balance weights forward of the spar. A light alloy trim tab is inset in the trailing edge.

Repair prohibitions

17. No repairs to the trim tab are permitted. The tab must be renewed if damaged in any way.

Negligible damage

18. (1) Skin and stringers - Smooth, isolated dents in free areas may

be neglected provided they are not deeper than 0.015 in.

- (2) Nosing, spars and ribs. - Smooth isolated dents in plate flanges and booms of the webs may be neglected provided they are not deeper than 0.020 in. Slight deformations of the plate flanges may be neglected provided there are no cracks and adjacent fixings have not been strained.

Repairs

19. Repairs to the skin are given in fig. 11, to skin and stiffener in fig.14, and to skin and rib in fig.15. Not more than two such repairs may be made to one rudder, and they must not be in adjacent panels in any one skin. More extensive damage will entail renewal of the rudder.

Mass balance (fig.16)

20. Repairs forward of the hinge centre-line will not necessitate adjustment of the mass balance. Aft of the hinge centre-line, one repair may be made without adjustment of the mass balance provided the product of the weight added by the repair and the distance "B" does not exceed 8 oz. in. The weight of the repair and the arm "B" should, however, be recorded on the serial number plate together with a note to the effect that the rudder has not been rebalanced. If the product of the first repair made aft of the hinge centre-line exceeds 8 oz. in. or when a second repair is made, it will be necessary to adjust the mass balance weight. In the latter instance the weight added by the first repair must also be taken into account when making the adjustment. The method of fitting the additional weights is shown in fig.16.

KEY TO FIG. 2

(Key diagram of tail plane)

Key No.	Part No.	Description	Key No.	Part No.	Description
Nose ribs			22	B.185570	Rib A
1	B.211558	Nose rib seal, port	23	B.185571	Rib B
-	B.185499	Nose rib seal, starboard	24	B.185572	Rib C
2	B.211557	Skin joint nose rib port	25	B.185573	Rib D
-	B.184715	Skin joint nose rib starboard	26	B.185574	Rib E
3	B.184703	Nose rib OA	Structure at elevator hinges		
4	B.184704	Nose rib A	27	B.185565	Inner hinge rib
5	B.184705	Nose rib AB	28	C.185554	Inner hinge rib
6	B.184706	Nose rib B	29	B.185560	Inner hinge rib
7	B.211556	Nose rib BC port	30	D.215687	Outer hinge rib
-	B.184707	Nose rib BC starboard	Spars		
8	B.184708	Nose rib C	31	C.185624	Front spar - Centre portion
9	B.184709	Nose rib CD	32	D.185797	Front spar
10	B.184710	Nose rib D	33	D.185779	Rear spar
11	B.184711	Nose rib DE	Tail plane tip		
12	B.184712	Nose rib E	34	C.185054	Front former
13	A.184716	Outer nose rib	35	C.185055	Centre former
Inter-spar ribs			36	C.185056	Rear former
14	D.185657	Centre-line rib	37	A.185057	Nose rib
15	D.185662	Hinge rib	38	B.185058	Front intermediate rib
16	B.185021	Inter-spar rib A port	39	B.185059	Rear intermediate rib
-	B.185022	Inter-spar rib A starboard	40	B.185060	Rear rib
17	B.185023	Inter-spar rib B, port	41	C.185061	Shroud member
-	B.185024	Inter-spar rib B, starboard	Miscellaneous		
18	B.185025	Inter-spar rib C	42	B.170899	Diaphragm
19	B.185026	Inter-spar rib D	43	A.185802	Diaphragm
20	B.185027	Inter-spar rib E	44	C.185820	Shroud
Ribs aft of rear spar					
21	C.185668	Inboard rib, port			
-	C.185669	Inboard rib, starboard			

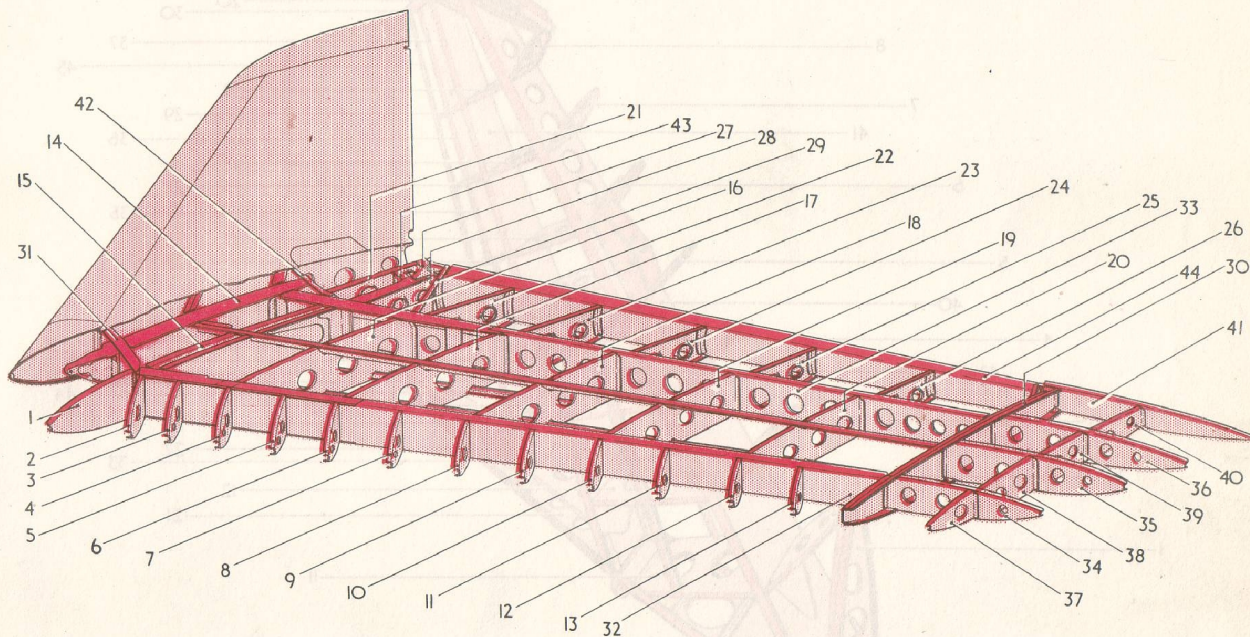


FIG. 2. KEY DIAGRAM OF TAILPLANE

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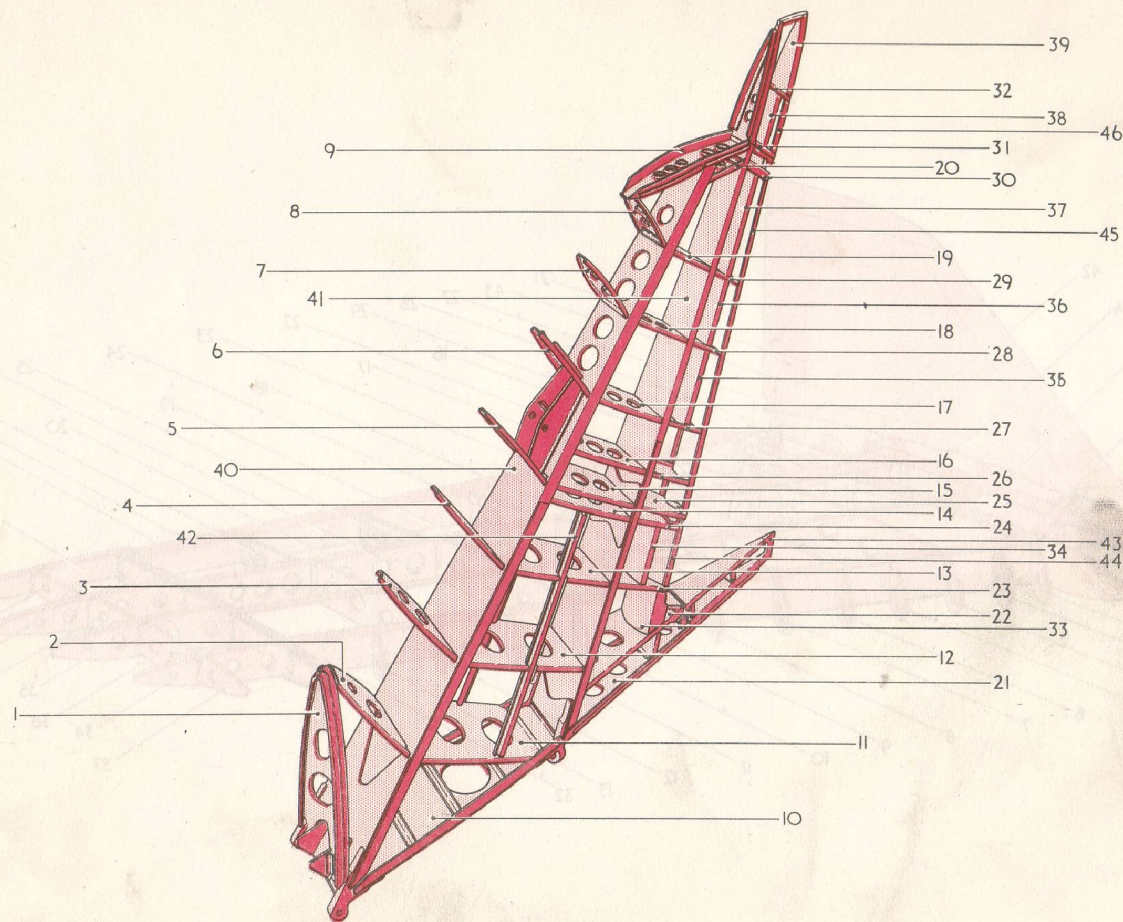


FIG.3. KEY DIAGRAM OF FIN

RESTRICTED

KEY TO FIG. 3
(Key diagram of fin)

Key No.	Part No.	Description
Nose ribs		
1	C.172170 ...	Former
2	B.183579 ...	Nose rib B
3	B.183580 ...	Nose rib C
4	B.183581 ...	Nose rib D
5	B.183582 ...	Nose rib E
6	B.183583 ...	Nose rib F
7	B.183584 ...	Nose rib G
8	B.183148 ...	Nose rib H
9	C.183034 ...	Top rib
Inter-spar ribs		
10	D.222456 ...	Rib A
11	B.183362 ...	Rib B
12	B.183363 ...	Rib C
13	B.183364 ...	Rib D
14	B.183365 ...	Rib D.1
15	B.183366 ...	Rib E
16	B.222458 ...	Rib E.1
17	F.222454 ...	Rib F
18	B.183369 ...	Rib G
19	B.183370 ...	Rib H
20	B.183035 ...	Top inter-spar rib
Tail ribs		
21	C.185845 ...	Bottom rib
22	B.185416 ...	Rib
23	B.182978 ...	Tail rib D
24	B.182990 ...	Tail rib D.1
25	B.183260 ...	Tail rib E

Key No.	Part No.	Description
26	B.222453 ...	Tail rib E.1
27	B.222460 ...	Tail rib F
28	B.182998 ...	Tail rib G
29	B.182999 ...	Tail rib H
30	B.183143 ...	Bracket, upper
31	B.183142 ...	Bracket, lower
32	A.183037 ...	Tail rib J
Shrouds		
33	B.183216 ...	Shroud
34	B.183040 ...	Shroud
35	B.183042 ...	Shroud
36	B.183043 ...	Shroud
37	B.183044 ...	Shroud
38	B.183045 ...	Shroud
39	B.183229 ...	Top shroud
Spars		
40	D.183316 ...	Front spar
41	D.183317 ...	Rear spar
Miscellaneous		
42	F.183835 ...	Stiffener
43	C.186356 ...	Detachable rear portion
44	F.183820 ...	Skin stiffener
45	A.183823 ...	Skin stiffener, port
46	A.222457 ...	Skin stiffener, starboard
46	F.183821 ...	Skin stiffener

KEY TO FIG. 4
(Key diagram of elevator)

Key No.	Part No.		Description
	Port	Starboard	
Nose ribs			
1	A.185088	A.185089	Nose rib A
2	A.185090	A.185091	Nose rib B
3	A.185092	A.185093	Nose rib C
4	A.185094	A.185095	Nose rib D
5	A.185096	A.185097	Nose rib E
6	A.185098	A.185099	Nose rib F
7	A.185100	A.185101	Nose rib G
8	A.185102	A.185103	Nose rib H
9	—	F.185208	Nose rib J.1
10	—	F.185209	Nose rib K
11	—	F.173708	Nose rib L
12	—	F.185210	Nose rib M
Inter-spar ribs			
13	A.185421	A.185422	Inter-spar rib A.1
14	B.185423	B.185424	Inter-spar rib A
15	B.185425	B.185426	Inter-spar rib B
16	B.185427	B.185428	Inter-spar rib C
17	B.185429	B.185430	Inter-spar rib D
18	B.185431	B.185432	Inter-spar rib E
19	B.185433	B.185434	Inter-spar rib F
20	B.185435	B.185436	Inter-spar rib G
21	A.185437	A.185438	Inter-spar rib H
22	A.185439	A.185440	Inter-spar rib J
23	A.185441	A.185442	Inter-spar rib K
24	A.185443	A.185444	Inter-spar rib L
25	A.185445	A.185446	Inter-spar rib M
Tail ribs			
26	B.191873	B.191874	Tail rib A.1
27	B.192023	B.192024	Tail rib A
28	C.185110	C.185111	Tail rib B
29	C.185112	C.185113	Tail rib C
30	C.185114	C.185115	Tail rib D
31	C.185116	C.185117	Tail rib E

Key No.	Part No.		Description
	Port	Starboard	
32	C.185118	C.185119	Tail rib F
33	C.185120	C.185121	Tail rib G
34	C.185122	C.185123	Tail rib H
35	C.185124	C.185125	Tail rib J
36	C.185126	C.185127	Tail rib K
37	C.185128	C.185129	Tail rib L
38	C.185130	C.185131	Tail rib M
Spars and stiffeners			
39	—	D.171571	Main spar
40	B.171747	B.171748	Sub-spar
41	D.184987	D.184988	Sub-spar
42	B.184991	B.184992	Skin stiffener, top
43.	E.227099/4	B.184994	Skin stiffener, bottom
44.	E.227100/5	E.227100/4	Skin stiffener, bottom
45.	E.227099/6	E.227100/5	Skin stiffener, bottom
46.	E.227099/7	E.227100/6	Skin stiffener, bottom
47.	E.227099/8	E.227100/7	Skin stiffener, bottom
Miscellaneous			
48	B.190154	B.190155	Trailing edge
49	—	B.190156	Edge member
50	B.191927	B.191928	Hinge spool rib
51	A.185317	A.185318	Inboard end rib, forward portion
52	C.191889	C.191890	Inboard end rib, aft portion
53	C.185034	C.185035	Assembly of nosing
54	B.185581	B.185582	Reinforcing, top
55	—	B.185584	Reinforcing, bottom
56	—	B.184989	Packing, top
57	B.186412	E.184990	Packing, bottom
58	B.186414	A.185603	Access door
		B.186413	Fork end
		B.186415	Split lever

Items that are not 'handed' are shown in the centre column

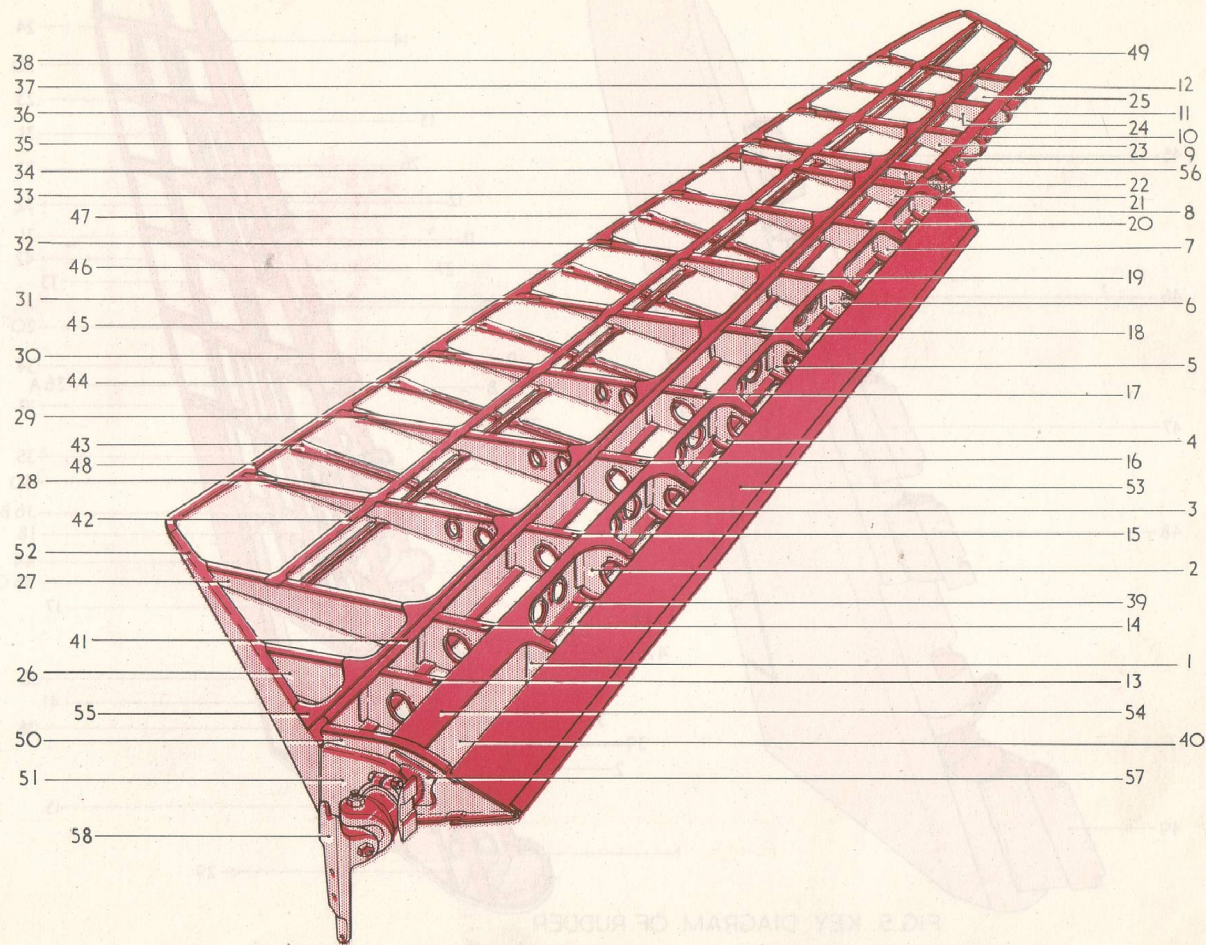


FIG. 4. KEY DIAGRAM OF ELEVATOR
RESTRICTED

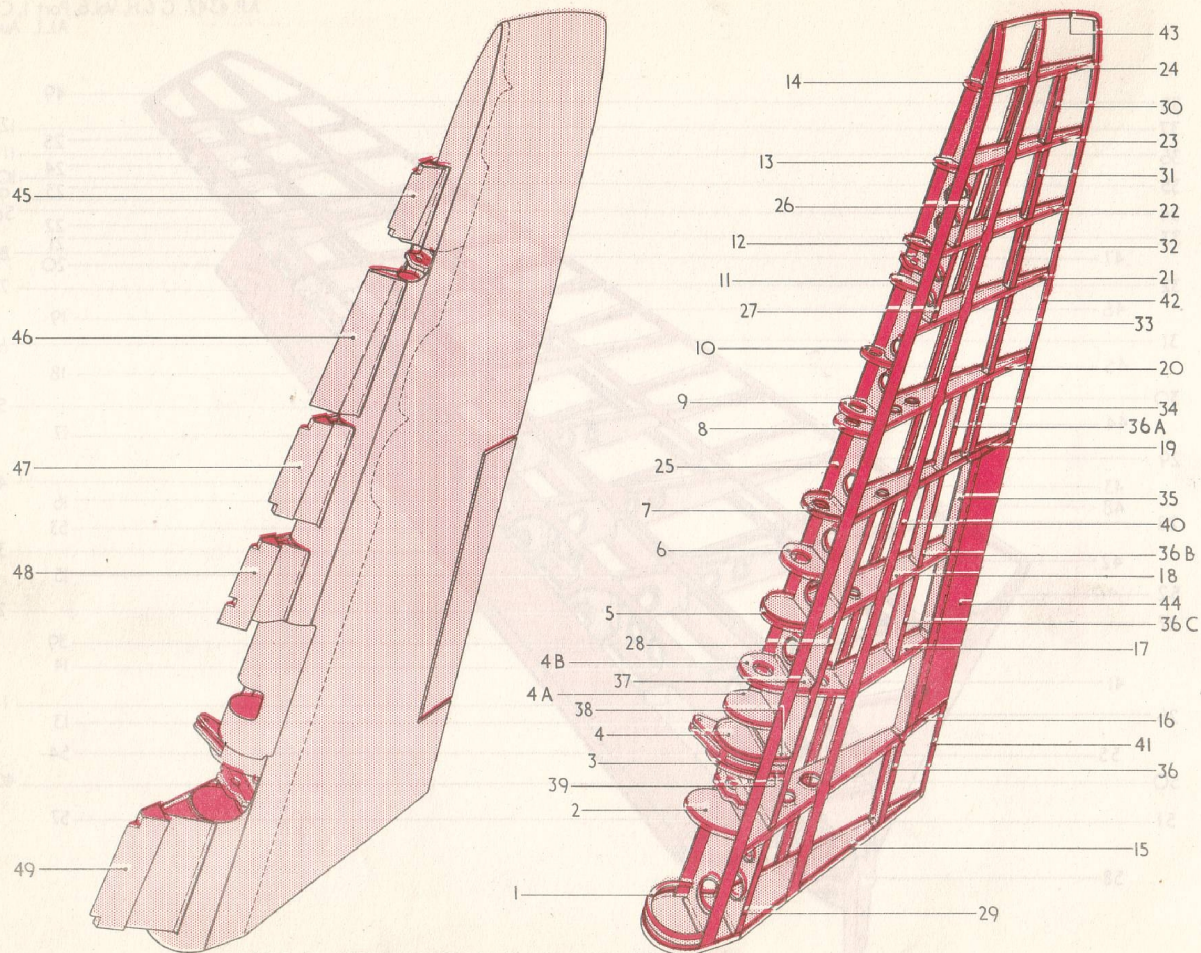


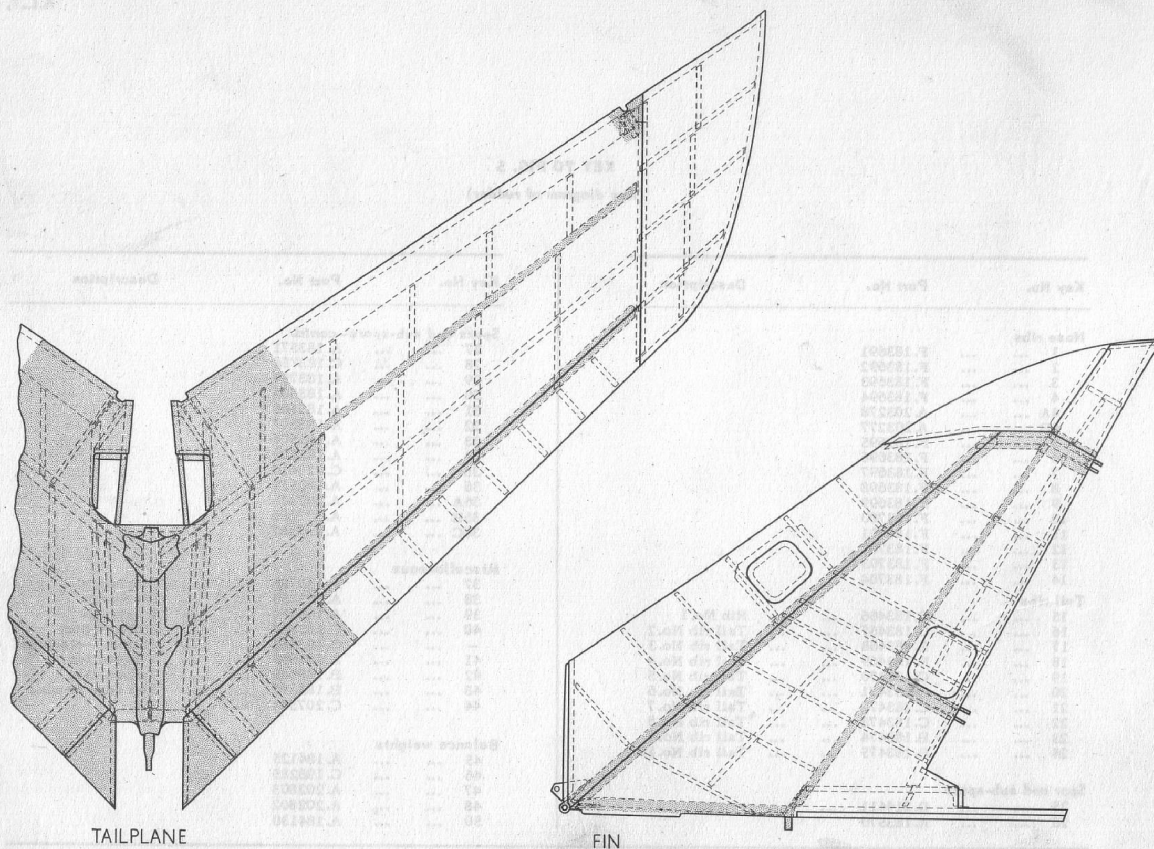
FIG. 5. KEY DIAGRAM OF RUDDER

RESTRICTED

KEY TO FIG. 5
(Key diagram of rudder)

Key No.	Part No.	Description
Nose ribs		
1 ...	F.183691	
2 ...	F.183692	
3 ...	F.183693	
4 ...	F.183694	
4A ...	A.203278	
4B ...	A.203277	
5 ...	F.183695	
6 ...	F.183696	
7 ...	F.183697	
8 ...	F.183698	
9 ...	F.183699	
10 ...	F.183700	
11 ...	F.183701	
12 ...	F.183702	
13 ...	F.183703	
14 ...	F.183704	
Tail ribs		
15 ...	C.183466	Rib No.1
16 ...	C.183467	Tail rib No.2
17 ...	B.183468	Tail rib No.3
18 ...	B.183469	Tail rib No.4
19 ...	C.183470	Tail rib No.5
20 ...	C.183471	Tail rib No.6
21 ...	C.183472	Tail rib No.7
22 ...	C.183473	Tail rib No.8
23 ...	B.183474	Tail rib No.9
24 ...	B.183475	Tail rib No.10
Spar and sub-spars		
25 ...	D.214411	
26 ...	A.183570	

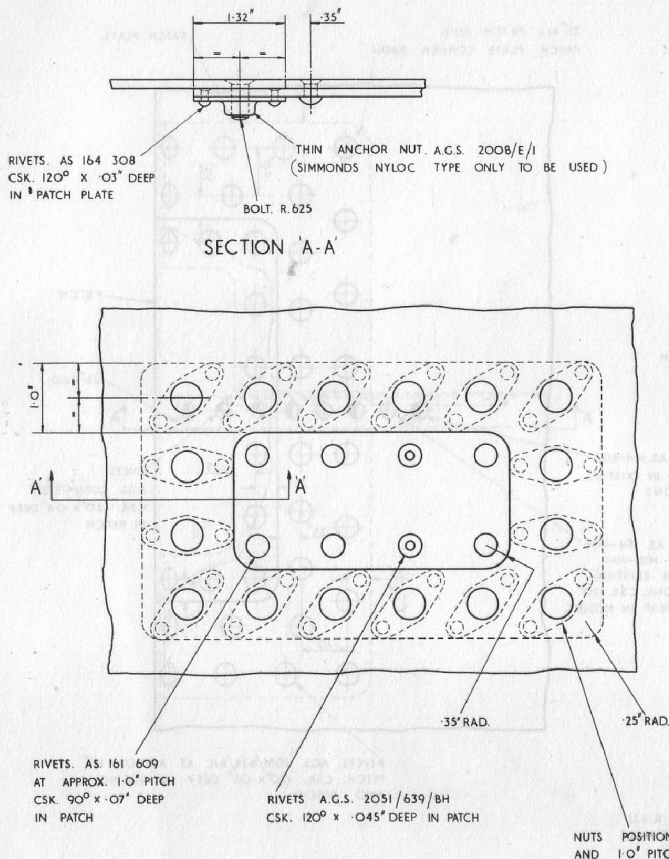
Key No.	Part No.	Description
Spars and sub-spars—contd.		
27 ...	A.183571	
28 ...	C.183756	
29 ...	A.183757	
30 ...	A.183505	
31 ...	A.183506	
32 ...	A.183507	
33 ...	A.183508	
34 ...	A.183509	
35 ...	C.214410	
36 ...	A.183511	
36A ...	A.207365	
36B ...	A.207366	
36C ...	A.207367	
Miscellaneous		
37 ...	F.183758	Diaphragm
38 ...	A.183759	Diaphragm
39 ...	A.183760	Diaphragm
40 ...	C.183884	Stiffener—port
— ...	C.183885	Stiffener—starboard
41 ...	A.183568	T.E.section
42 ...	B.183569	T.E.section
43 ...	B.183591	Top edge member
44 ...	C.207584	Tab
Balance weights		
45 ...	A.184125	
46 ...	C.198285	
47 ...	A.202803	
48 ...	A.202802	
50 ...	A.184130	



USER UNIT REPAIRS ARE NOT PERMITTED TO THE TAILPLANE
AND FIN IN THE AREAS SHOWN SHADED

FIG.6. NON-REPAIRABLE AREAS - TAIL UNIT

RESTRICTED



SEQUENCE OF OPERATIONS.

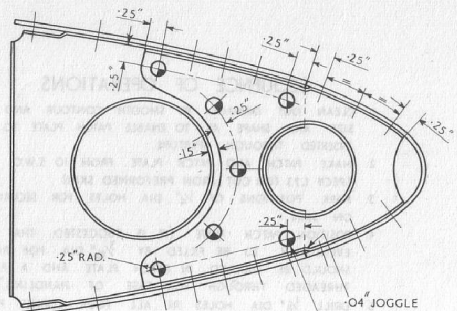
1. CLEAN OUT DAMAGE TO SMOOTH CONTOUR AND TO SUCH A SIZE AND SHAPE AS TO ENABLE PATCH PLATE TO BE INSERTED THROUGH APERTURE.
2. MAKE PATCH AND PATCH PLATE FROM 10 S.W.G. L.A. SHEET TO SPEC. L73 (OR CUT FROM PREFORMED SKIN)
3. MARK POSITIONS OF $\frac{1}{4}$ " DIA. HOLES FOR SECURING BOLTS ON SKIN.
4. POSITION PATCH PLATE (IT IS SUGGESTED THAT TWO HOLES EVENTUALLY TO BE FILLED BY $\frac{3}{16}$ " DIA. POP RIVETS SHOULD BE DRILLED IN PATCH PLATE AND A PIECE OF WIRE THREADED THROUGH FOR EASE OF HANDLING.)
5. DRILL $\frac{1}{8}$ " DIA. HOLES IN ALL FOUR CORNER POSITIONS MARKED OUT IN OP. 3. PIN THE PLATE IN POSITION.
6. DRILL AND REAM $\frac{1}{4}$ " DIA. NEWELL 'B' FIT HOLES IN REMAINING POSITIONS MARKED OUT IN OP. 3.
7. SECURE PLATE BY MEANS OF SOME OF THE $\frac{1}{4}$ " DIA. HOLES. REMOVE PINS AND DRILL AND REAM HOLES AT ALL FOUR CORNERS.
8. POSITION PATCH AND DRILL $\frac{3}{16}$ " DIA. HOLES IN PATCH AND PATCH PLATE FOR $\frac{3}{16}$ " DIA. SOLID RIVETS.
9. REMOVE PATCH AND PATCH PLATE AND RIVET ANCHOR NUTS TO PATCH PLATE AS SHOWN. (TO OBTAIN EXACT ALIGNMENT IT WILL BE FOUND ADVISABLE TO POSITION NUTS WITH THE AID OF A BOLT BEFORE RIVETING.)
10. RIVET PATCH TO PATCH PLATE. DRILL TWO HOLES IN PATCH TO MATCH $\frac{3}{16}$ " DIA. POP RIVET HOLES IN PATCH PLATE.
11. CAREFULLY COUNTERSINK $\frac{1}{4}$ " DIA. HOLES IN SKIN .06" DEEP AT 120°.
12. INSERT PATCH AND PATCH PLATE AND BOLT IN POSITION ENSURING THAT ALL BOLTS ARE FULLY TIGHTENED.
13. INSERT $\frac{3}{16}$ " DIA. POP RIVETS IN VACANT HOLES IN PATCH.
14. FINISH PROTRUDING HEADS OF BOLTS OFF FLUSH WITH SKIN.
15. APPLY SUITABLE PROTECTIVE COATING TO PREVENT CORROSION AS SOON AS REPAIR IS COMPLETED.

NOTE:-

IT IS IMPORTANT THAT THE SKIN CONTOUR SHOULD BE ACCURATELY MAINTAINED WHEN EFFECTING PATCH REPAIRS

FIG. 7. REPAIR TO 10 S.W.G. TAILPLANE SKIN

RESTRICTED



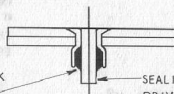
SECTION 'A-A'

RIVETS, A.S. 156-404.
AT APPROX. 10\"/>

SEQUENCE OF OPERATIONS.

1. CLEAN OUT DAMAGE IN SKIN AND RIB TO SMOOTH CONTOUR. THE SKIN APERTURE MUST BE OF SUFFICIENT SIZE TO ENABLE THE PATCH PLATES TO BE INSERTED THROUGH IT.
2. FROM 16 SWG. L.A. PLATE TO SPECN. L.72 MAKE PATCH AND PATCH PLATES.
3. PASS PATCH PLATES THROUGH SKIN APERTURE. IT WILL BE FOUND NECESSARY TO SPRING ARMS OF PATCH PLATES TOGETHER SLIGHTLY AND CARE MUST BE TAKEN TO SEE THAT THIS DOES NOT CAUSE PATCH PLATES TO TAKE A PERMANENT SET. WHEN INSERTED, PLATES MAY BE PUSHED ASIDE UNTIL NEEDED.
4. FROM 20 SWG. L.A. TO SPECN. L.72 MAKE REPLACEMENT PORTION OF RIB.
5. FIT REPLACEMENT PORTION OF RIB, DRILL AND RIVET IN POSITION.
6. POSITION PATCH PLATES, DRILL AND RIVET IN PLACE.
7. FIT PATCH, DRILL, AND RIVET IN POSITION.
8. SEAL ALL POP RIVETS.

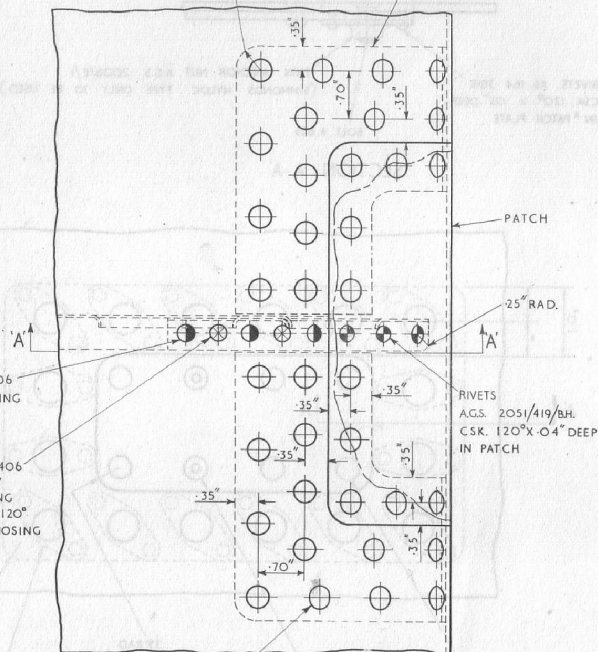
MANDREL HOLES IN RIVETS
TO BE FILLED WITH BOSTIK
BEFORE SEALING PINS ARE
INSERTED



SEALING FOR 3/16\"/>

.35\"/>

PATCH PLATE



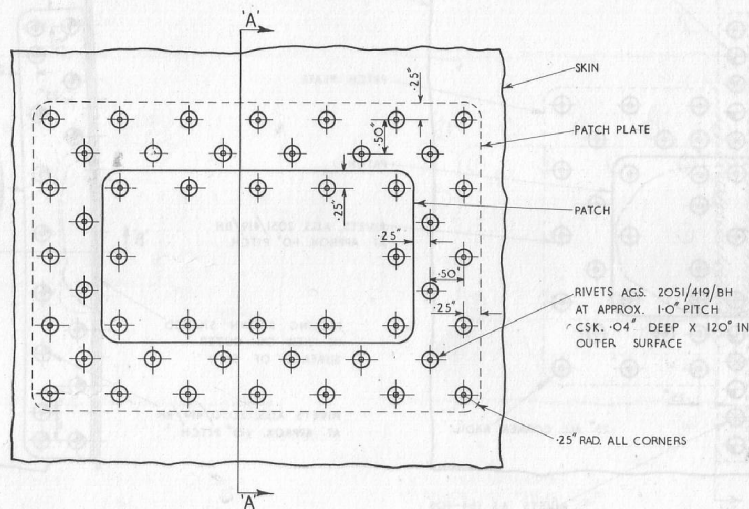
RIVETS A.S. 164-406
PLACED IN EXISTING
POSITIONS

RIVETS A.S. 164-406
PLACED MID-WAY
BETWEEN EXISTING
POSITIONS. CSK. 120\"/>

RIVETS
A.G.S. 2051/419/B.H.
CSK. 120\"/>

RIVETS A.G.S. 2051/624/B.H. AT APPROX. 10\"/>

FIG.8. REPAIR TO TAILPLANE NOSING AND RIB
RESTRICTED



SECTION 'A-A'

SEQUENCE OF OPERATIONS

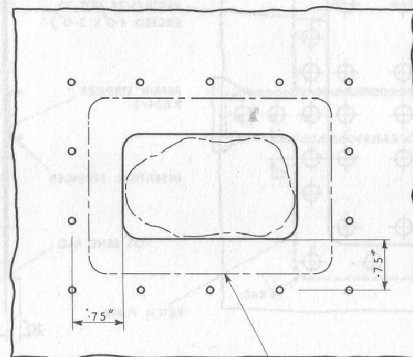
1. CLEAN OUT DAMAGE IN SKIN TO SMOOTH CONTOUR.
SIZE AND SHAPE OF APERTURE SHOULD BE SUCH AS
TO ALLOW PATCH PLATE TO BE INSERTED THROUGH IT.
2. FROM 18 SWG. L.A. PLATE TO SPEC. L.72 MAKE
PATCH AND PATCH PLATE.
3. FIT PATCH PLATE, DRILL, AND RIVET IN POSITION.
4. FIT PATCH, DRILL, AND RIVET IN POSITION.

FIG. 9. FLUSH REPAIR TO SKIN OF FIN

RESTRICTED

NOTES

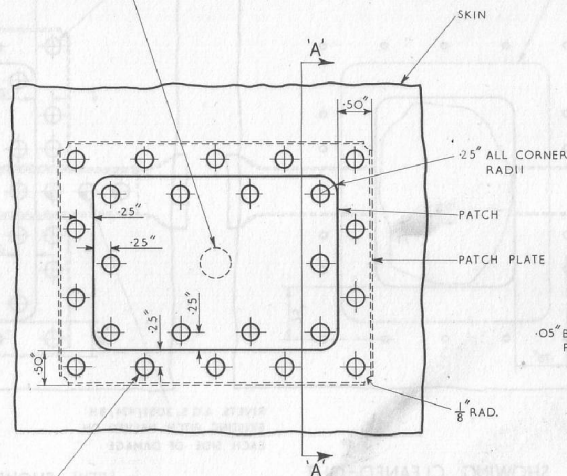
1. SIZE OF PATCH MUST NOT EXCEED 4'-0" X 3'-0"
2. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER OR ELEVATOR.
3. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 13 AND 16.
4. SIZE AND SHAPE OF CLEANED OUT APERTURE TO BE SUCH AS TO ALLOW PATCH PLATE TO BE INSERTED THROUGH IT.



FINAL SIZE OF APERTURE

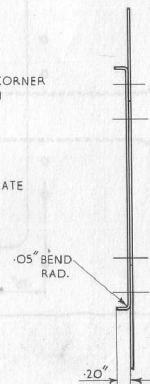
VIEW SHOWING CLEANED-OUT
DAMAGE PRIOR TO DIMPLING

HOLE $\frac{1}{2}$ " DIA. MAY BE DRILLED
IN PATCH PLATE TO FACILITATE
POSITIONING



RVETS AGS. 2051/419/BH.
AT APPROX. 1'-0" PITCH

VIEW SHOWING COMPLETED REPAIR



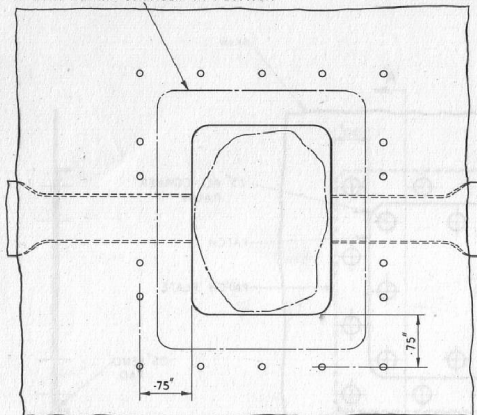
SECTION 'A-A'

SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE TO SMOOTH CONTOUR.
2. FROM 24.SWG. L.A. PLATE TO SPECN. L72 MAKE PATCH PLATE. TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITION OF RIVET HOLES ON PATCH PLATE.
4. ON OUTSIDE SKIN MARK OUTLINE OF PATCH PLATE IN ITS CORRECT POSITION RELATIVE TO CLEANED-OUT DAMAGE.
5. POSITION PATCH PLATE ON OUTSIDE OF SKIN, DRILL RIVET HOLES IN PATCH PLATE AND SKIN.
6. REMOVE PATCH PLATE, DIMPLE HOLES DRILLED IN PATCH PLATE AND SKIN AS SHOWN IN CHAP. I, FIG. 1.
7. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM LANDING OF .25"
8. FIT PATCH PLATE AND PIN IN POSITION.
9. FROM 26.SWG. L.A. PLATE TO SPECN. L72. (24. S.W.G. ON ELEVATOR BOTTOM SKIN - POST MOD. 708.) MAKE PATCH.
10. FIT PATCH, DRILL RIVET HOLES IN PATCH AND PATCH PLATE.
11. REMOVE PATCH AND PATCH PLATE, DIMPLE HOLES, AND FLANGE EDGES OF PATCH PLATE.
12. FIT PATCH PLATE AND RIVET IN POSITION.
13. FIT PATCH AND RIVET IN POSITION.

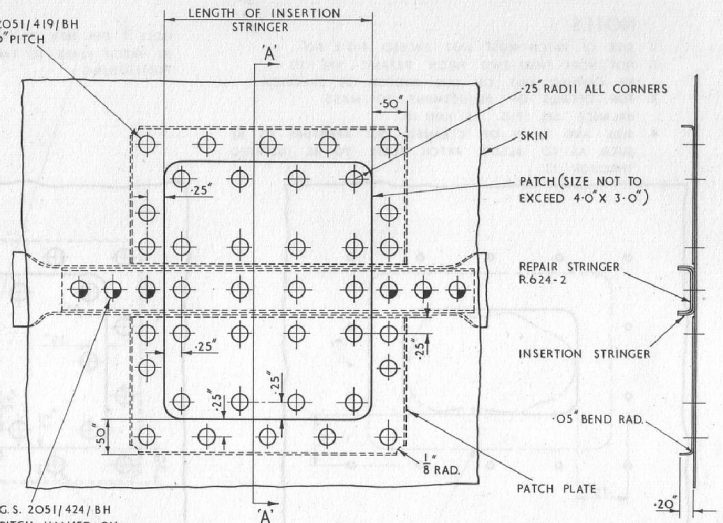
FIG. II. FLUSH REPAIR TO RUDDER AND ELEVATOR SKIN

FINAL SIZE AND SHAPE OF CLEANED-OUT APERTURE MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE INSERTED THROUGH IT WITH REPAIR STRINGER IN POSITION



VIEW SHOWING CLEANED-OUT DAMAGE PRIOR TO DIMPLING

RIVETS A.G.S. 2051/419/BH AT APPROX. 1-0" PITCH



RIVETS A.G.S. 2051/424/BH EXISTING PITCH HALVED ON EACH SIDE OF DAMAGE

VIEW SHOWING COMPLETED REPAIR

SECTION 'A-A'

SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE IN SKIN AND STIFFENER TO SMOOTH CONTOUR.
2. FROM 24 SW.G. L.A. PLATE TO SPECN L.72 MAKE PATCH. PLATES TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITIONS OF RIVET HOLES ON PATCH PLATES.
4. ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR CORRECT POSITIONS RELATIVE TO CLEANED-OUT DAMAGE.
5. POSITION PATCH PLATES ON OUTSIDE OF SKIN, DRILL HOLES IN PATCH PLATES AND SKIN.
6. REMOVE PATCH PLATES, DIMPLE HOLES IN PATCH PLATES AND SKIN AS SHOWN IN CHAP. I, FIG.1.
7. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM LANDING OF .25". CUT BACK DAMAGED STIFFENER FLUSH WITH EDGES OF HOLE.
8. FROM 22 SW.G. L.A. PLATE TO SPECN L.72 MAKE INSERTION STRINGER.
9. FROM REPAIR STRINGER SECTION R.624-2 CUT REPAIR STRINGER.

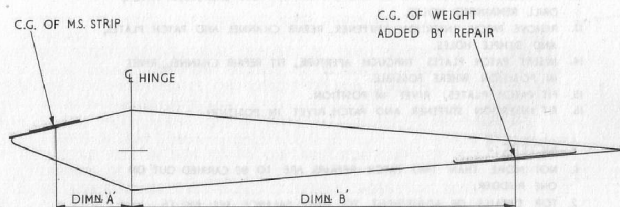
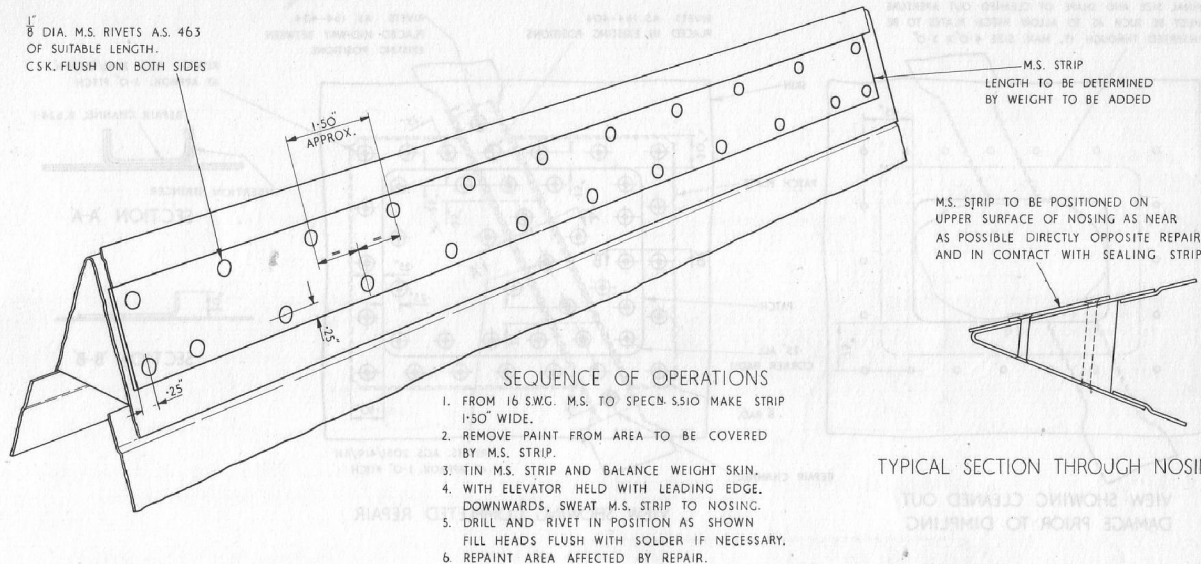
10. FIT REPAIR STRINGER, DRILL HOLES.
11. REMOVE REPAIR STRINGER AND DIMPLE HOLES.
12. FIT REPAIR STRINGER, RIVET IN POSITION.
13. FIT PATCH PLATES AND PIN IN POSITION.
14. FIT INSERTION STRINGER.
15. FROM 26 SW.G. L.A. PLATE TO SPECN L.72. (24 SW.G. ON BOTTOM SKIN - POST MOD. 708) MAKE PATCH.
16. FIT PATCH, DRILL HOLES IN PATCH, PATCH PLATES, INSERTION STRINGER AND REPAIR STRINGER.
17. REMOVE PATCH, PATCH PLATES AND INSERTION STRINGER, DIMPLE HOLES AND FLANGE EDGES OF PATCH PLATES.
18. FIT PATCH PLATES, RIVET IN POSITION.
19. FIT INSERTION STRINGER AND PATCH, RIVET IN POSITION.

NOTE

1. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE ELEVATOR.
2. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG.13.

FIG.12. FLUSH REPAIR TO ELEVATOR SKIN AND STRINGER

RESTRICTED



METHOD OF ADDING WEIGHT

$$\text{WEIGHT TO BE ADDED} = \frac{\text{DIMN B} \times \text{WEIGHT ADDED BY REPAIR} \times 1.33}{\text{DIMN A}}$$

NOTE

NO ADJUSTMENT TO MASS BALANCE IS NECESSARY IF DIMN B X WEIGHT ADDED BY REPAIR DOES NOT EXCEED 8 OZ. IN.

METHOD OF CALCULATING REQUIRED ADDITIONAL WEIGHT

FIG.13. RESTORATION OF ELEVATOR MASS BALANCE

VIEW SHOWING COMPLETED REPAIR

REPAIR CHANNEL R.624-

INSERTION STRINGER

SECTION 'A-A'

SECTION 'B-B'

2. CLEAN OUT DAMAGE IN SKIN AND STIFFENER TO SMOOTH CONTOUR.
3. FROM 24 S.W.G. LA. PLATE TO SPEC# L.72. MAKE PATCH PLATES.
TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITIONS OF RIVET HOLES ACCURATELY ON PATCH PLATES.
4. ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR
CORRECT POSITION RELATIVE TO CLEANED OUT DAMAGE.
5. POSITION PATCH PLATES ON OUTSIDE OF SKIN, DRILL HOLES IN PATCH
PLATES AND SKIN AND DIMPLE HOLES AS SHOWN IN CHAP. I. FIG.1.
6. ENLARGE HOLE IN SKIN BY ".50" ON EACH SIDE GIVING A MINIMUM
LANDING OF ".25"
7. FROM 22 S.W.G. LA. PLATE TO SPEC# L.72. MAKE INSERTION STRINGER.
8. FROM REPAIR STRINGER SECTION R.624-I CUT REPAIR CHANNEL.
9. FIT REPAIR CHANNEL, DRILL HOLES EXCEPTING THOSE FOR RIVETS
SECURING PATCH.
10. FROM 26 S.W.G. LA. PLATE TO SPEC# L.72. MAKE PATCH AND
MARK RIVET POSITIONS ACCURATELY.

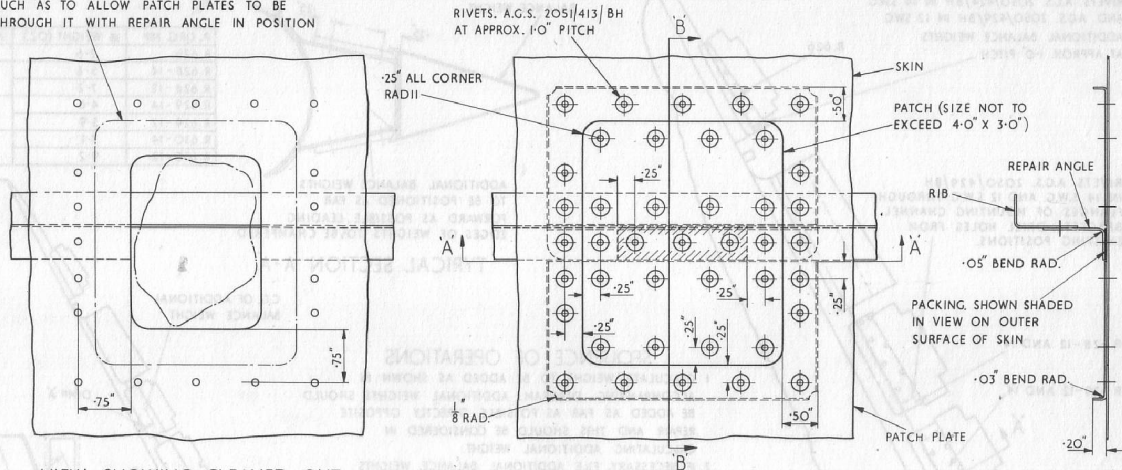
11. FLANGE EDGES OF PATCH PLATE.
12. FIT PATCH PLATES, REPAIR CHANNEL, INSERT STIFFENER, AND PATCH, DRILL REMAINING HOLES.
13. REMOVE PATCH, INSERT STIFFENER, REPAIR CHANNEL AND PATCH PLATES, AND DIMPLE HOLES.
14. INSERT PATCH PLATES THROUGH APERTURE, FIT REPAIR CHANNEL, RIVET IN POSITION WHERE POSSIBLE.
15. FIT PATCH PLATES, RIVET IN POSITION.
16. FIT INSERTION STIFFENER AND PATCH, RIVET IN POSITION.

1. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER.
2. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 16.

FIG. 14. FLUSH REPAIR TO SKIN AND STIFFENER OF RUDDER

RESTRICTED

FINAL SIZE AND SHAPE OF CLEANED-OUT APERTURE MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE INSERTED THROUGH IT WITH REPAIR ANGLE IN POSITION



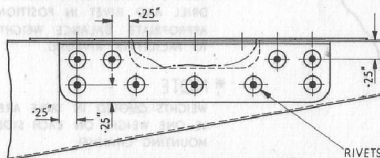
VIEW SHOWING CLEANED-OUT
 DAMAGE PRIOR TO DIMPLING

VIEW SHOWING COMPLETED REPAIR

SECTION B-B

SEQUENCE OF OPERATIONS.

1. CLEAN OUT DAMAGE IN SKIN AND RIB TO SMOOTH CONTOUR
2. FROM 24 SWG. L.A. PLATE TO SPEC. L.72 MAKE REPAIR ANGLE, PACKING, AND PATCH PLATES, TEMPORARILY OMITTING TO FLANGE EDGES OF PATCH PLATES.
3. MARK ACCURATELY POSITIONS OF RIVET HOLES ON PATCH PLATES.
4. ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR CORRECT POSITION RELATIVE TO CLEANED-OUT DAMAGE.
5. POSITION PATCH PLATES ON OUTSIDE OF SKIN, DRILL HOLES IN PATCH PLATES AND SKIN.
6. REMOVE PATCH PLATES, DIMPLE HOLES IN SKIN AND PATCH PLATES AS SHOWN IN CHAP. I, FIG. 1.
7. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM LANDING OF .25".
8. FIT REPAIR ANGLE, DRILL HOLES EXCEPTING THOSE FOR RIVETS SECURING PATCH, DIMPLE HOLES IN SKIN.
9. RIVET REPAIR ANGLE IN POSITION.
10. FROM 26 SWG. L.A. PLATE TO SPEC. L.72. MAKE PATCH.



SECTION A-A

11. FLANGE EDGES OF PATCH PLATES.
12. FIT PATCH PLATES, PACKING, AND PATCH AND DRILL HOLES.
13. REMOVE PATCH, PACKING AND PATCH PLATES, AND DIMPLE HOLES.
14. REPLACE PATCH PLATES, RIVET IN POSITION.
15. REPLACE PACKING AND PATCH, RIVET IN POSITION.

NOTES

1. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER.
2. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 16.

FIG. 15. FLUSH REPAIR TO SKIN AND RIB OF RUDDER

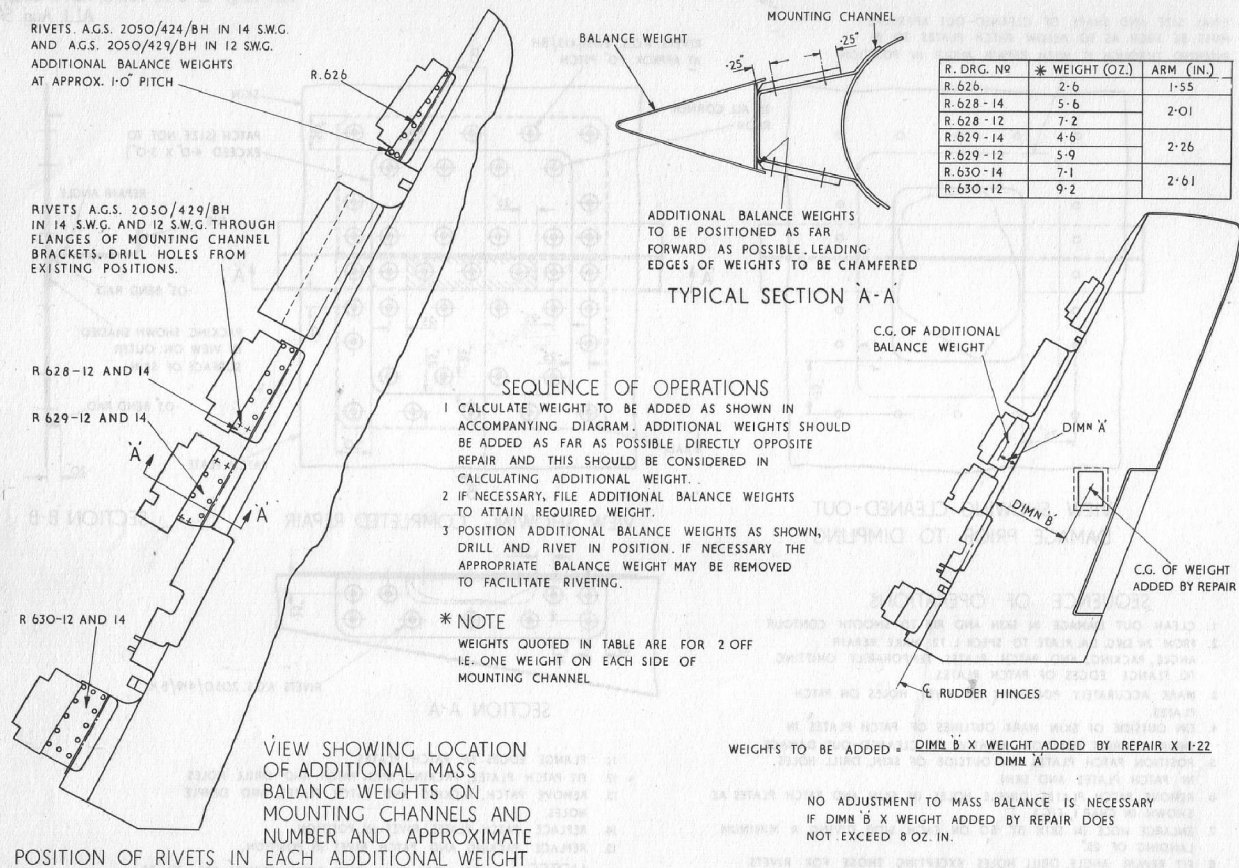


FIG.16 RESTORATION OF RUDDER MASS BALANCE

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