

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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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

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 produce 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.

RUDDER

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

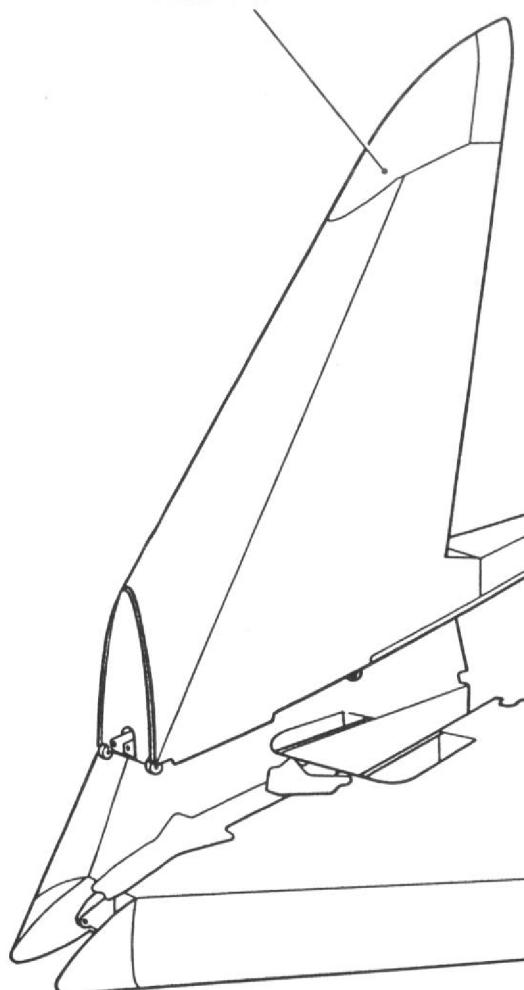
19. Repairs to the skin are given in fig.11, to skin and stiffener in fig.14, and to skin and rib in fig.15. Not more than two such repairs may be made to one rudder, and they must not be in adjacent panels in any one skin. More extensive damage will entail renewal of the rudder.

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.

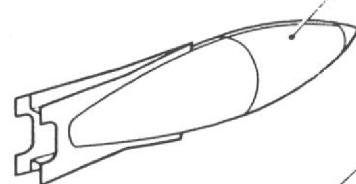
FIN

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RUDDER

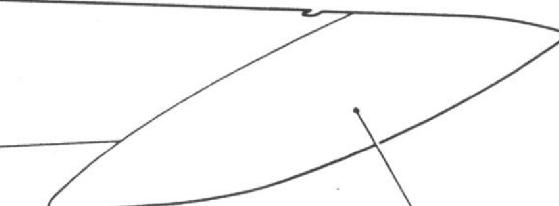
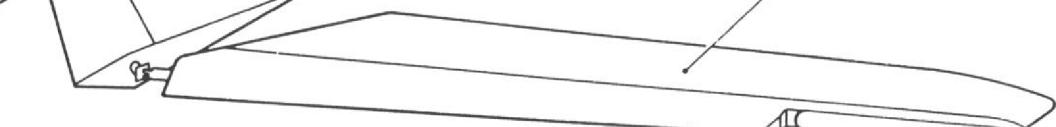
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BULLET FAIRING

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TAILPLANE

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UNLESS OTHERWISE STATED NUMBERS SHOWN
ARE FIGURE NUMBERS OF THIS CHAPTER

FIG.1. LOCATION DIAGRAM FOR TAIL UNIT

RESTRICTED

KEY TO FIG. 2
(Key diagram of tail plane)

Key No.	Part No.	Description
Nose ribs		
1	B.211558	... ... Nose rib seal, port
-	B.185499	... ... Nose rib seal, starboard
2	B.211557	... ... Skin joint nose rib port
-	B.184715	... ... Skin joint nose rib starboard
3	B.184703	... ... Nose rib OA
4	B.184704	... ... Nose rib A
5	B.184705	... ... Nose rib AB
6	B.184706	... ... Nose rib B
7	B.211556	... ... Nose rib BC port
-	B.184707	... ... Nose rib BC starboard
8	B.184708	... ... Nose rib C
9	B.184709	... ... Nose rib CD
10	B.184710	... ... Nose rib D
11	B.184711	... ... Nose rib DE
12	B.184712	... ... Nose rib E
13	A.184716	... ... Outer nose rib
Inter-spar ribs		
14	D.185657	... ... Centre-line rib
15	D.185662	... ... Hinge rib
16	B.185021	... ... Inter-spar rib A port
-	B.185022	... ... Inter-spar rib A starboard
17	B.185023	... ... Inter-spar rib B, port
-	B.185024	... ... Inter-spar rib B, starboard
18	B.185025	... ... Inter-spar rib C
19	B.185026	... ... Inter-spar rib D
20	B.185027	... ... Inter-spar rib E
Ribs aft of rear spar		
21	C.185668	... ... Inboard rib, port
-	C.185669	... ... Inboard rib, starboard

Key No.	Part No.	Description
Structure of elevator hinges		
22	B.185570	... ... Rib A
23	B.185571	... ... Rib B
24	B.185572	... ... Rib C
25	B.185573	... ... Rib D
26	B.185574	... ... Rib E
Spars		
27	B.185565	... ... Inner hinge rib
28	C.185554	... ... Inner hinge rib
29	B.185560	... ... Inner hinge rib
30	D.215687	... ... Outer hinge rib
Tail plane tip		
31	C.185624	... ... Front spar - Centre portion
32	D.185797	... ... Front spar
33	D.185779	... ... Rear spar
Miscellaneous		
34	C.185054	... ... Front former
35	C.185055	... ... Centre former
36	C.185056	... ... Rear former
37	A.185057	... ... Nose rib
38	B.185058	... ... Front intermediate rib
39	B.185059	... ... Rear intermediate rib
40	B.185060	... ... Rear rib
41	C.185061	... ... Shroud member
42	B.170899	... ... Diaphragm
43	A.185802	... ... Diaphragm
44	C.185820	... ... Shroud

RESTRICTED

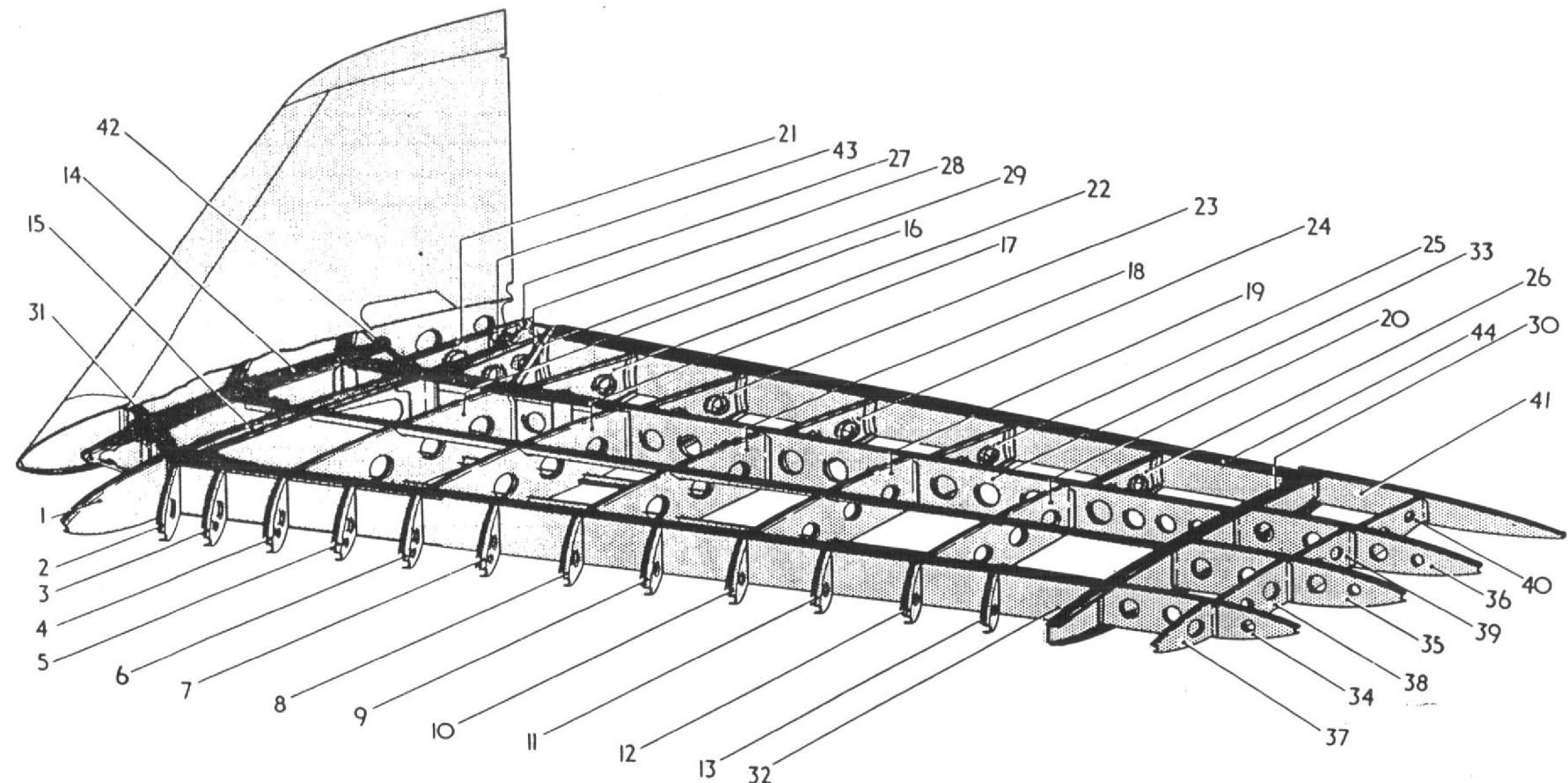


FIG. 2. KEY DIAGRAM OF TAILPLANE

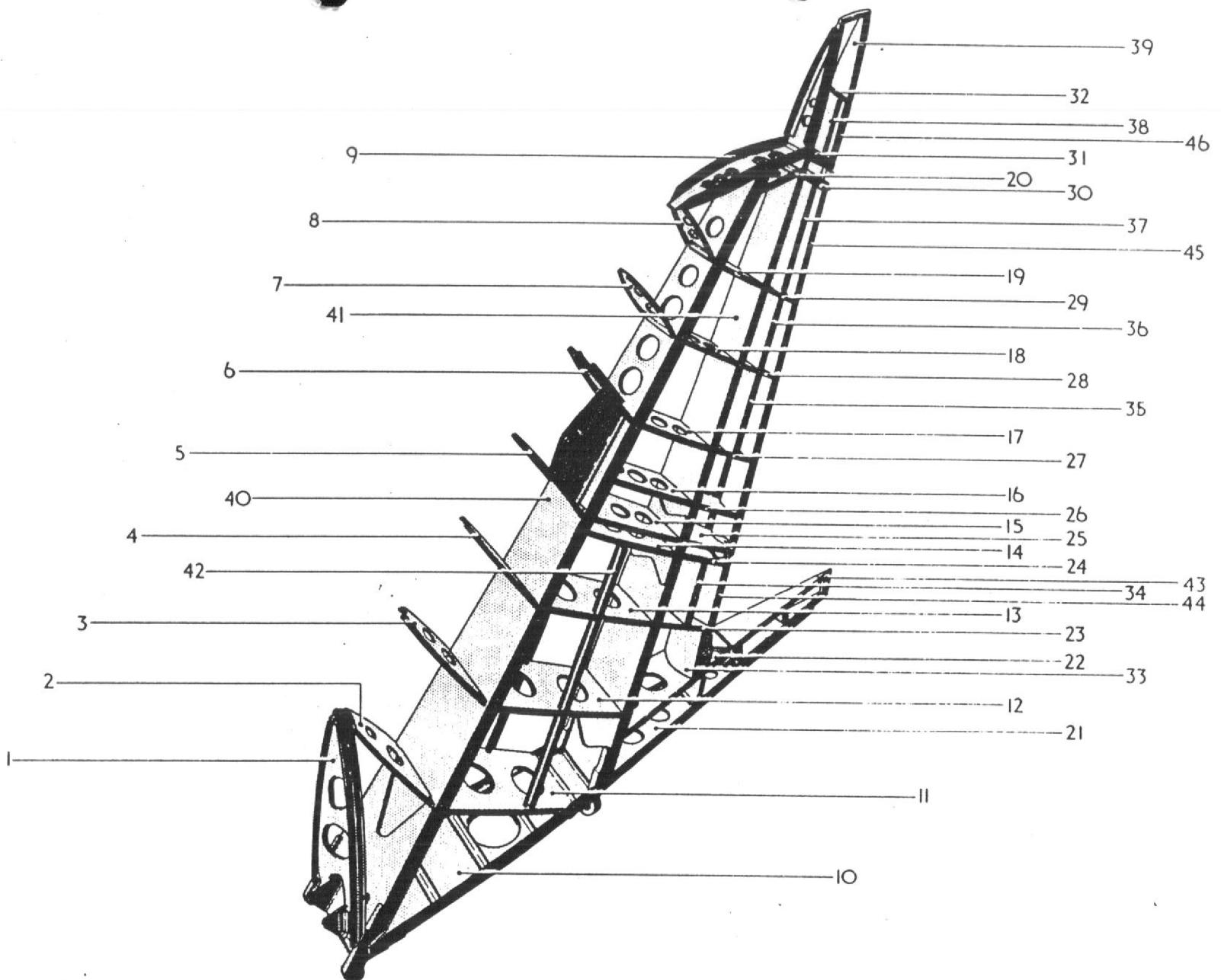


FIG.3. KEY DIAGRAM OF FIN

RESTRICTED

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	
Spars and stiffeners			
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
Miscellaneous			
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
	B.184993	B.184994	Skin stiffener, bottom
43	E.227099/4	E.227100/4	Skin stiffener, bottom
44	E.227099/5	E.227100/5	Skin stiffener, bottom
45	E.227099/6	E.227100/6	Skin stiffener, bottom
46	E.227099/7	E.227100/7	Skin stiffener, bottom
47	E.227099/8	E.227100/8	Skin stiffener, bottom
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
	B.185583	B.185584	Reinforcing, bottom
55	—	B.184989	Packing, top
	—	B.184990	Packing, bottom
56	—	A.185603	Access door
57	B.186412	B.186413	Fork end
58	B.186414	B.186415	Split lever

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

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.222455	Rib E.1
17	B.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
Tail rib E.1		
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
-	A.222457	Skin stiffener, starboard
46	F.183821	Skin stiffener

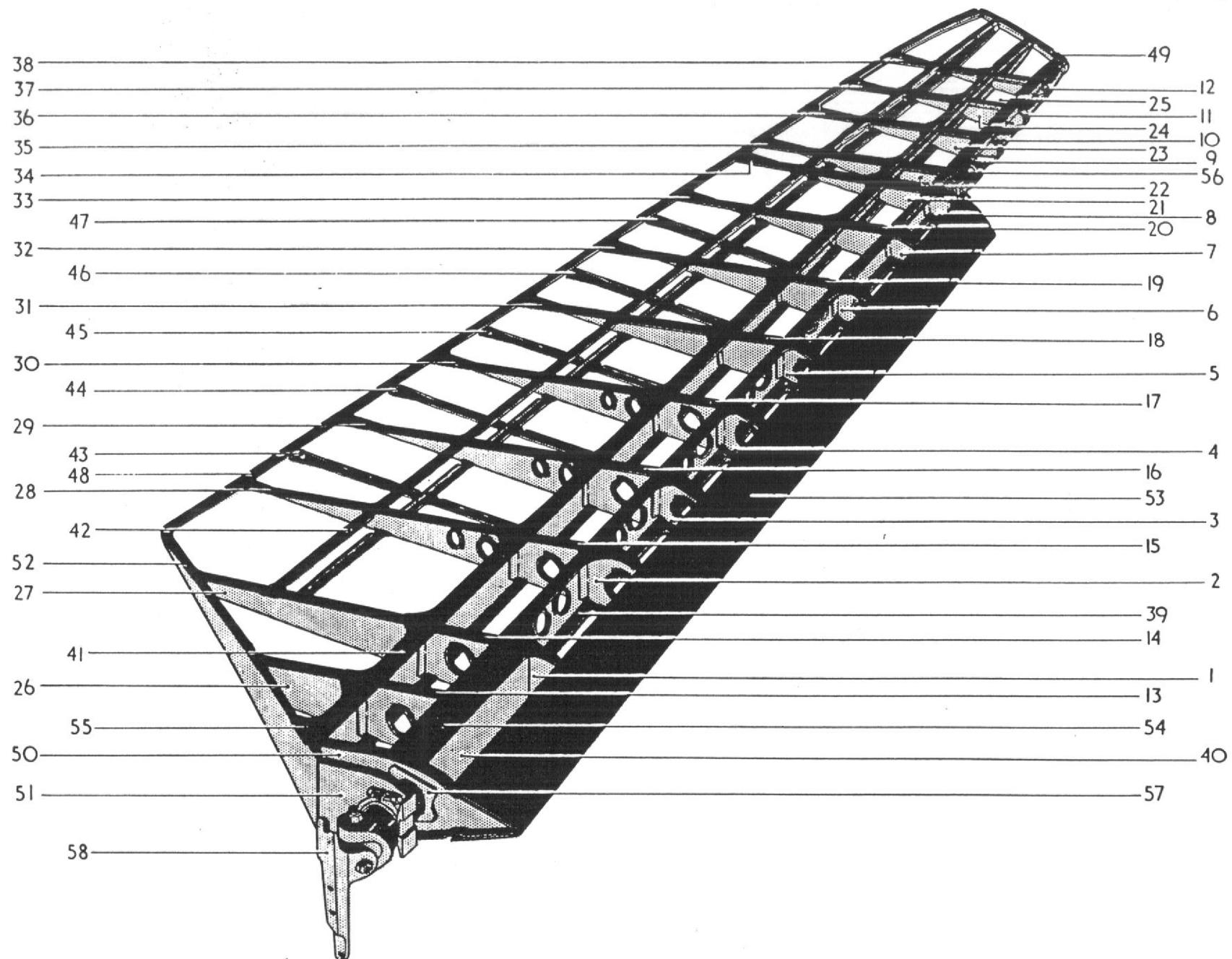


FIG. 4. KEY DIAGRAM OF ELEVATOR

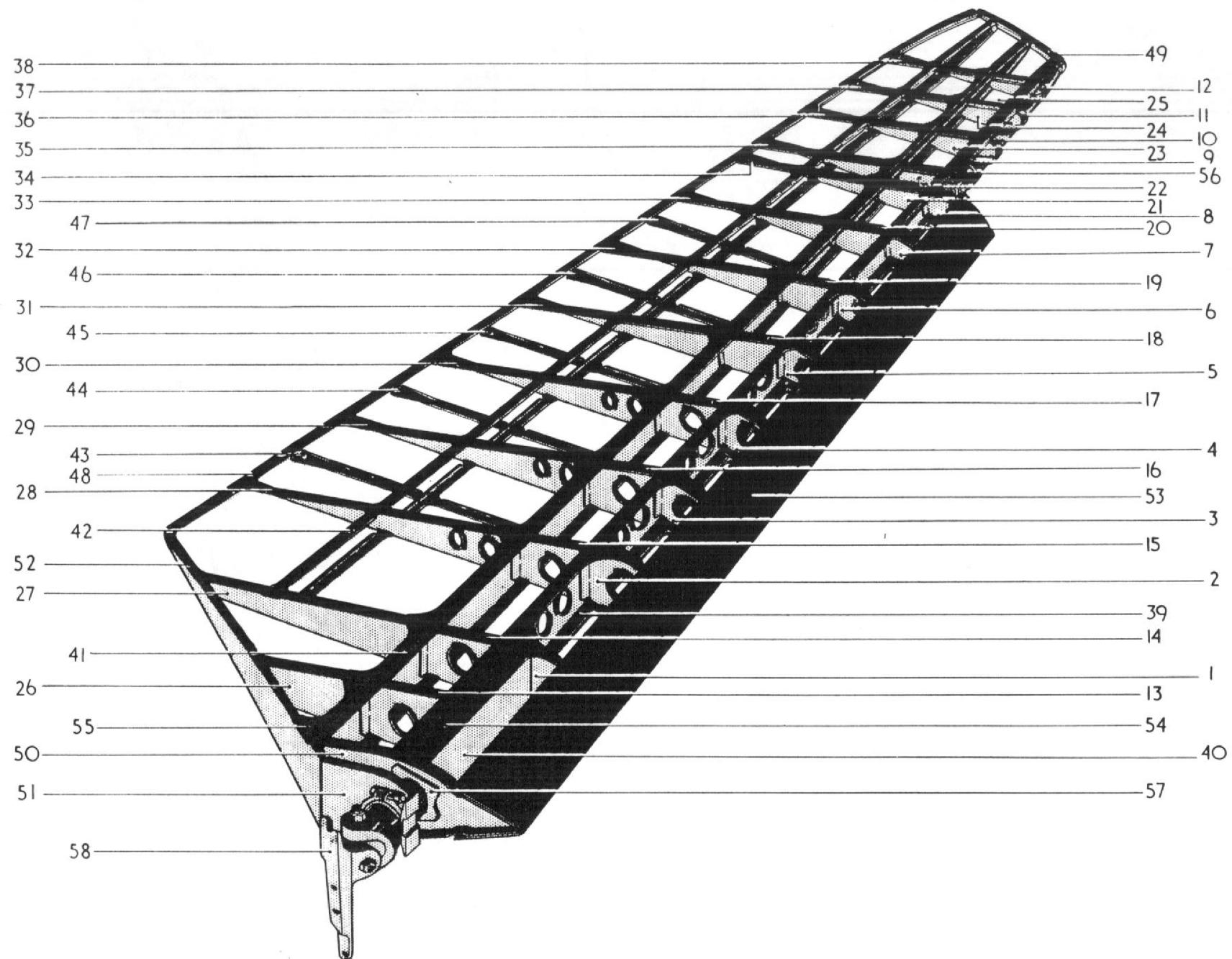
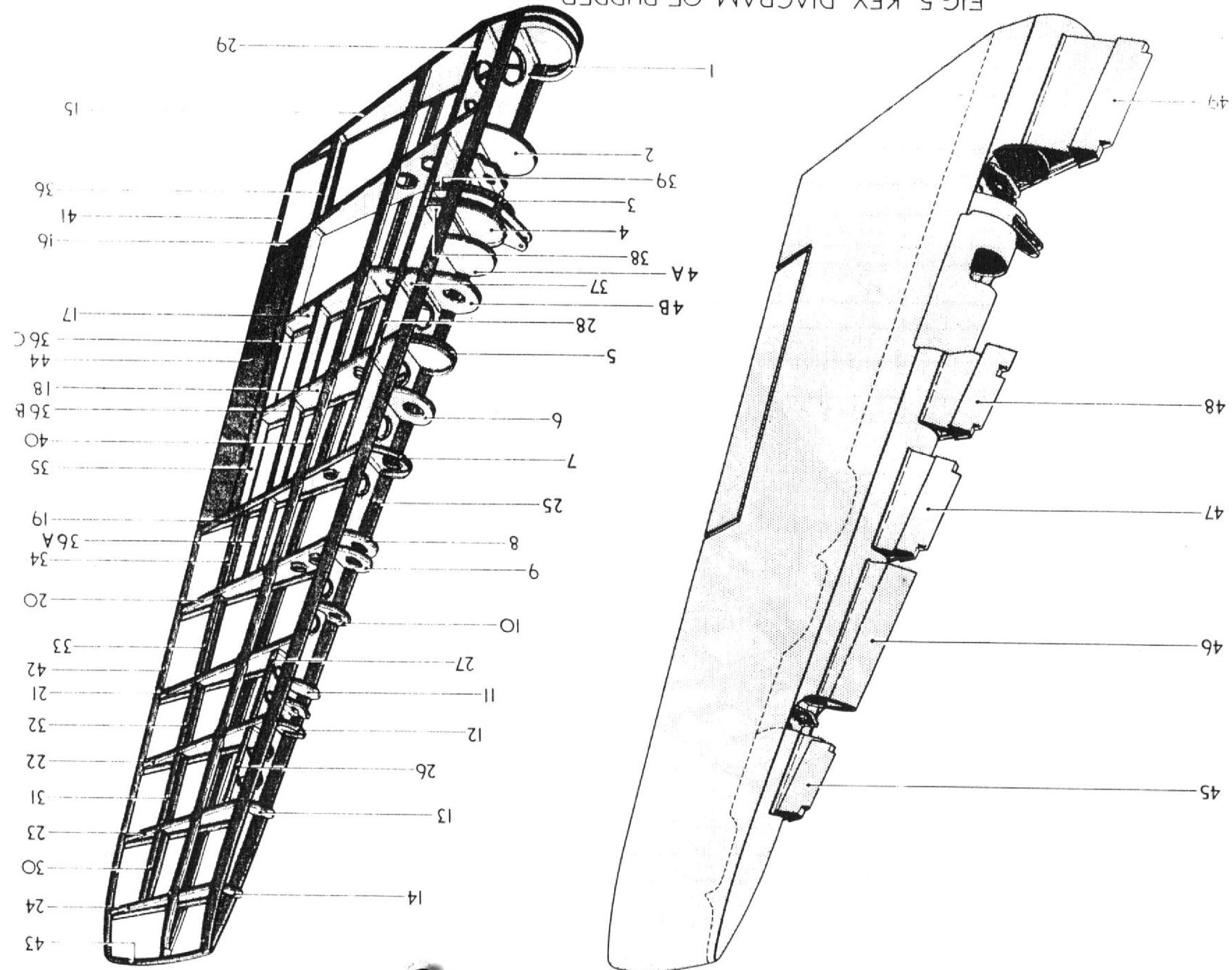


FIG. 4. KEY DIAGRAM OF ELEVATOR

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FIG. 5. KEY DIAGRAM OF RUDDER



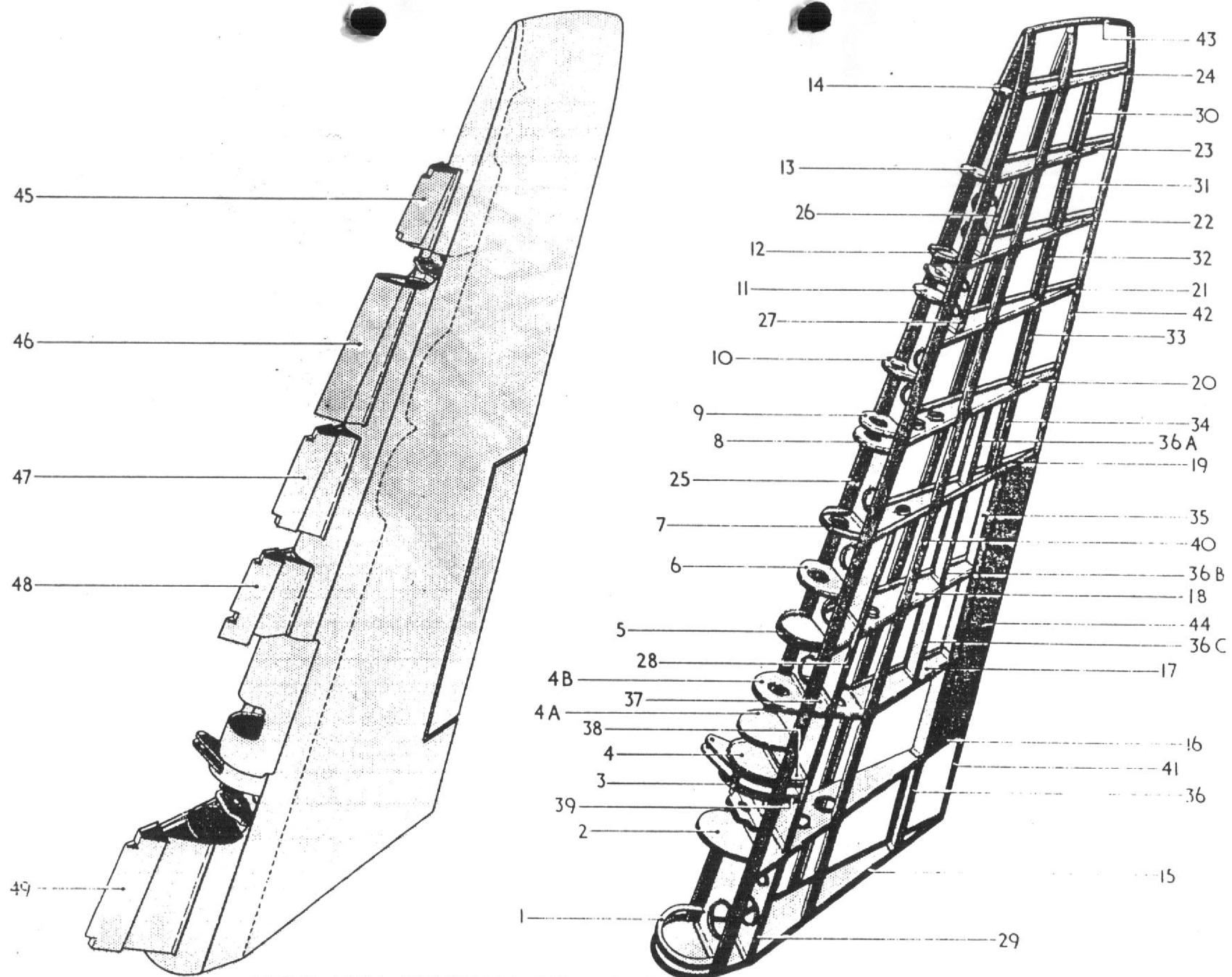
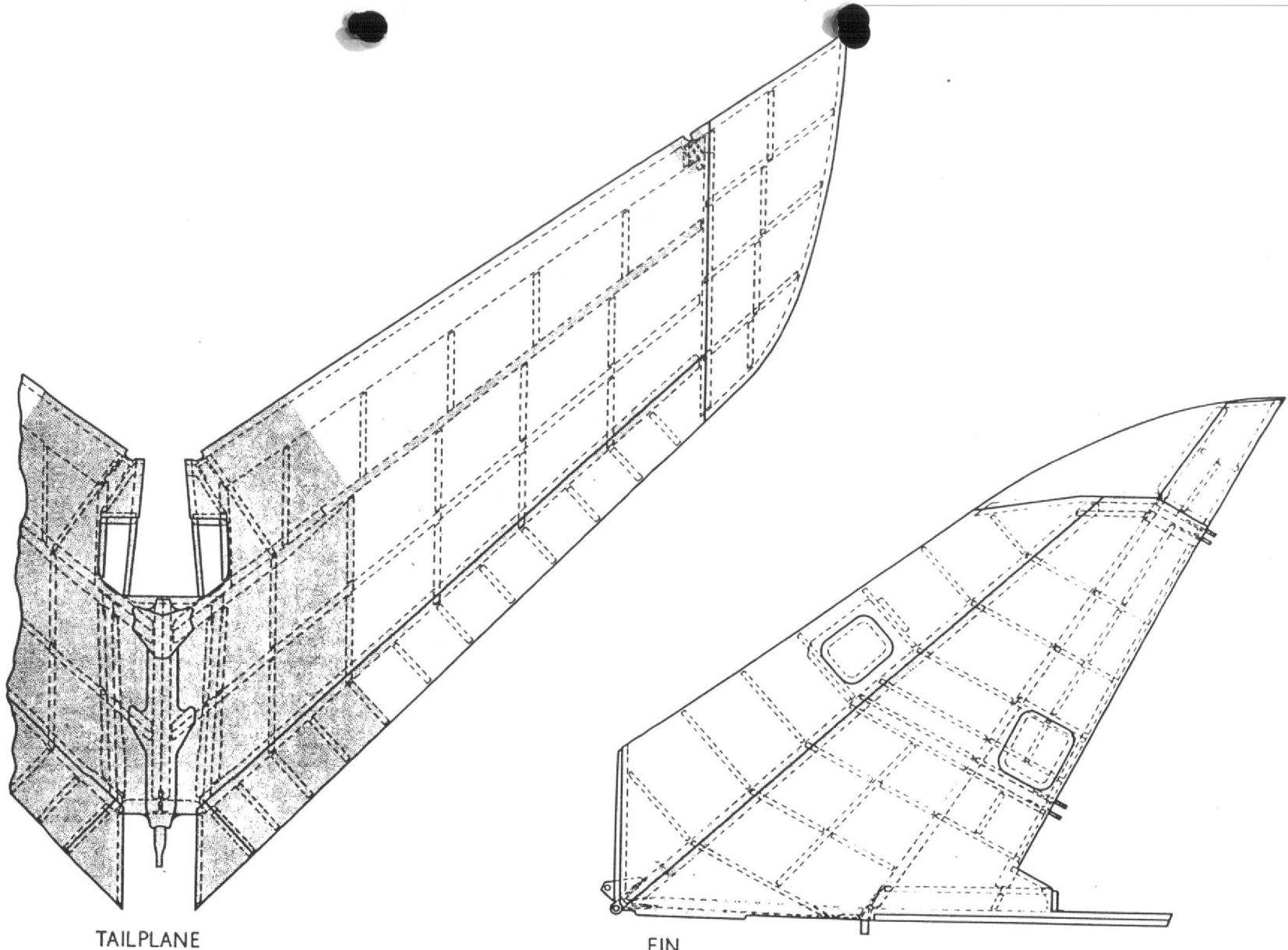


FIG. 5. KEY DIAGRAM OF RUDDER

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KEY TO FIG. 5
(Key diagram of rudder)

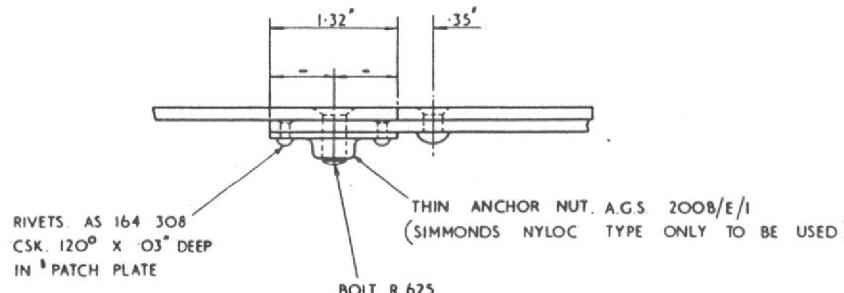
Key No.	Part No.	Description	Key No.	Part No.	Description			
Nose ribs								
1	...	F.183691	27	...	A.183571			
2	...	F.183692	28	...	C.183756			
3	...	F.183693	29	...	A.183757			
4	...	F.183694	30	...	A.183505			
4A	...	A.203278	31	...	A.183506			
4B	...	A.203277	32	...	A.183507			
5	...	F.183695	33	...	A.183508			
6	...	F.183696	34	...	A.183509			
7	...	F.183697	35	...	C.214410			
8	...	F.183698	36	...	A.183511			
9	...	F.183699	36A	...	A.207365			
10	...	F.183700	36B	...	A.207366			
11	...	F.183701	36C	...	A.207367			
12	...	F.183702	Spars and sub-spars—contd.					
13	...	F.183703	37	...	F.183758	...	...	Diaphragm
14	...	F.183704	38	...	A.183759	...	...	Diaphragm
Tail ribs			39	...	A.183760	...	...	Diaphragm
15	...	C.183466	40	...	C.183884	...	...	Stiffener—port
16	...	C.183467	—	...	C.183885	...	...	Stiffener—starboard
17	...	B.183468	41	...	A.183568	...	...	T.E. section
18	...	B.183469	42	...	B.183569	...	...	T.E. section
19	...	C.183470	43	...	B.183591	...	...	Top edge member
20	...	C.183471	44	...	C.207584	...	...	Tab
21	...	C.183472	Miscellaneous					
22	...	C.183473	37	...	F.183758	...	...	Diaphragm
23	...	B.183474	38	...	A.183759	...	...	Diaphragm
24	...	B.183475	39	...	A.183760	...	...	Diaphragm
Spars and sub-spars			40	...	C.183884	...	...	Stiffener—port
25	...	D.214411	—	...	C.183885	...	...	Stiffener—starboard
26	...	A.183570	41	...	A.183568	...	...	T.E. section
Balance weights			42	...	B.183569	...	...	T.E. section
			43	...	B.183591	...	...	Top edge member
			44	...	C.207584	...	...	Tab
			45	...	A.184125			
			46	...	C.198285			
			47	...	A.202803			
			48	...	A.202802			
			50	...	A.184130			



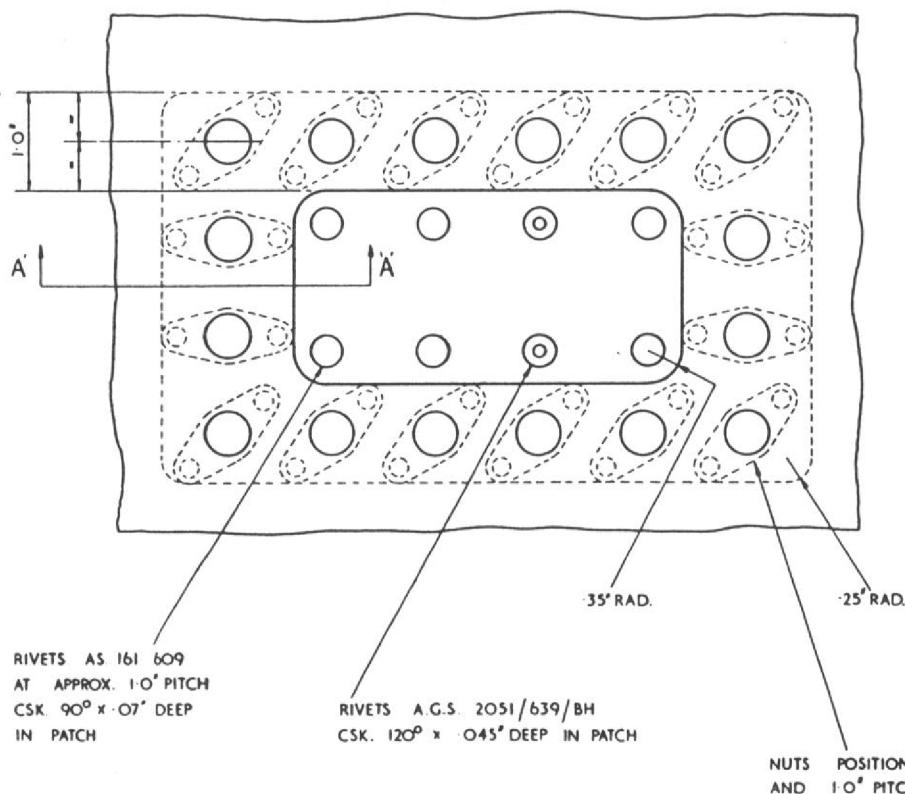
USER UNIT REPAIRS ARE NOT PERMITTED TO THE TAILPLANE
AND FIN IN THE AREAS SHOWN SHADeD

FIG.6. NON-REPAIRABLE AREAS - TAIL UNIT

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SECTION 'A-A'



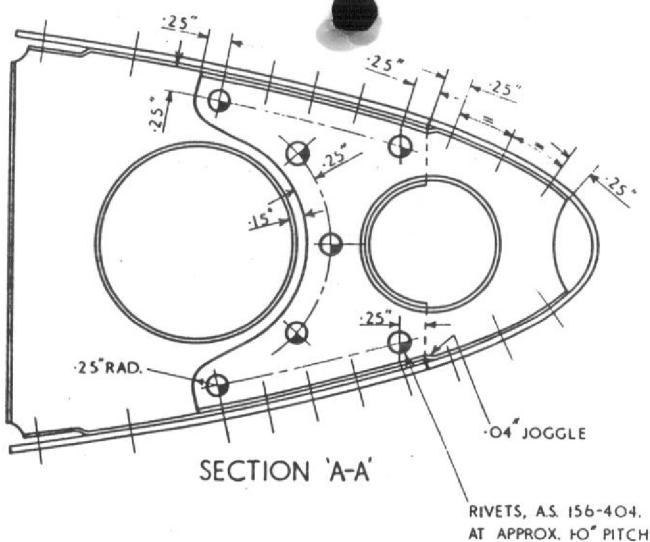
SEQUENCE OF OPERATIONS.

- CLEAN OUT DAMAGE TO SMOOTH CONTOUR AND TO SUCH A SIZE AND SHAPE AS TO ENABLE PATCH PLATE TO BE INSERTED THROUGH APERTURE.
- MAKE PATCH AND PATCH PLATE FROM 10 S.W.G. L.A. SHEET TO SPEC^M L73 (OR CUT FROM PREFORMED SKIN)
- MARK POSITIONS OF $\frac{1}{4}$ " DIA. HOLES FOR SECURING BOLTS ON SKIN.
- 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.)
- DRILL $\frac{1}{8}$ " DIA. HOLES IN ALL FOUR CORNER POSITIONS MARKED OUT IN OP. 3. PIN THE PLATE IN POSITION.
- DRILL AND REAM $\frac{1}{4}$ " DIA. NEWALL 'B' FIT HOLES IN REMAINING POSITIONS MARKED OUT IN OP. 3.
- SECURE PLATE BY MEANS OF SOME OF THE $\frac{1}{4}$ " DIA. HOLES. REMOVE PINS AND DRILL AND REAM HOLES AT ALL FOUR CORNERS.
- POSITION PATCH AND DRILL $\frac{3}{16}$ " DIA. HOLES IN PATCH AND PATCH PLATE FOR $\frac{3}{16}$ " DIA. SOLID RIVETS.
- 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.)
- RIVET PATCH TO PATCH PLATE. DRILL TWO HOLES IN PATCH TO MATCH $\frac{3}{16}$ " DIA. POP RIVET HOLES IN PATCH PLATE.
- CAREFULLY COUNTERSINK $\frac{1}{4}$ " DIA. HOLES IN SKIN .06" DEEP AT 120°.
- INSERT PATCH AND PATCH PLATE AND BOLT IN POSITION ENSURING THAT ALL BOLTS ARE FULLY TIGHTENED.
- INSERT $\frac{3}{16}$ " DIA. POP RIVETS IN VACANT HOLES IN PATCH.
- FINISH PROTRUDING HEADS OF BOLTS OFF FLUSH WITH SKIN.
- 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



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.

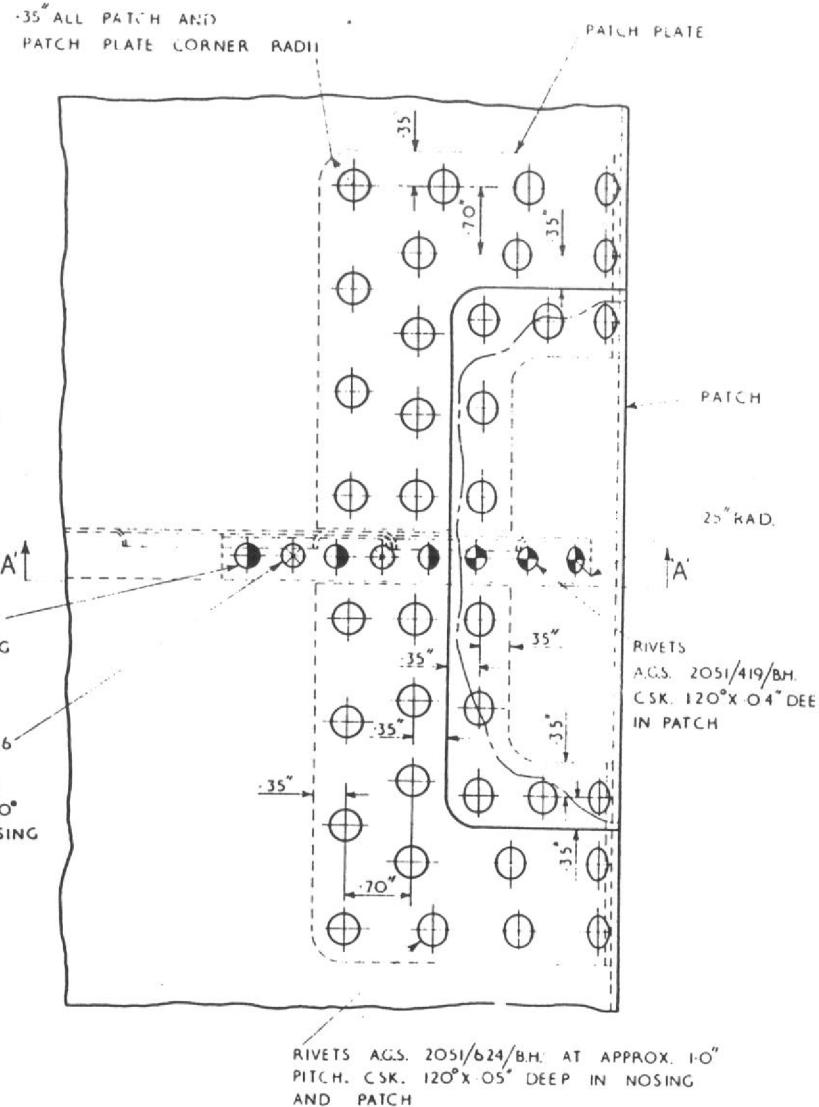
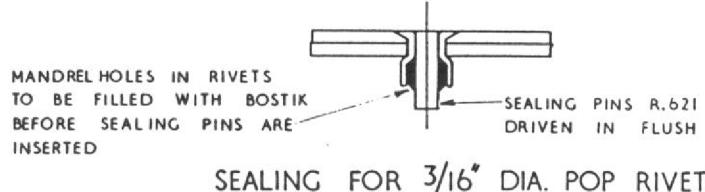
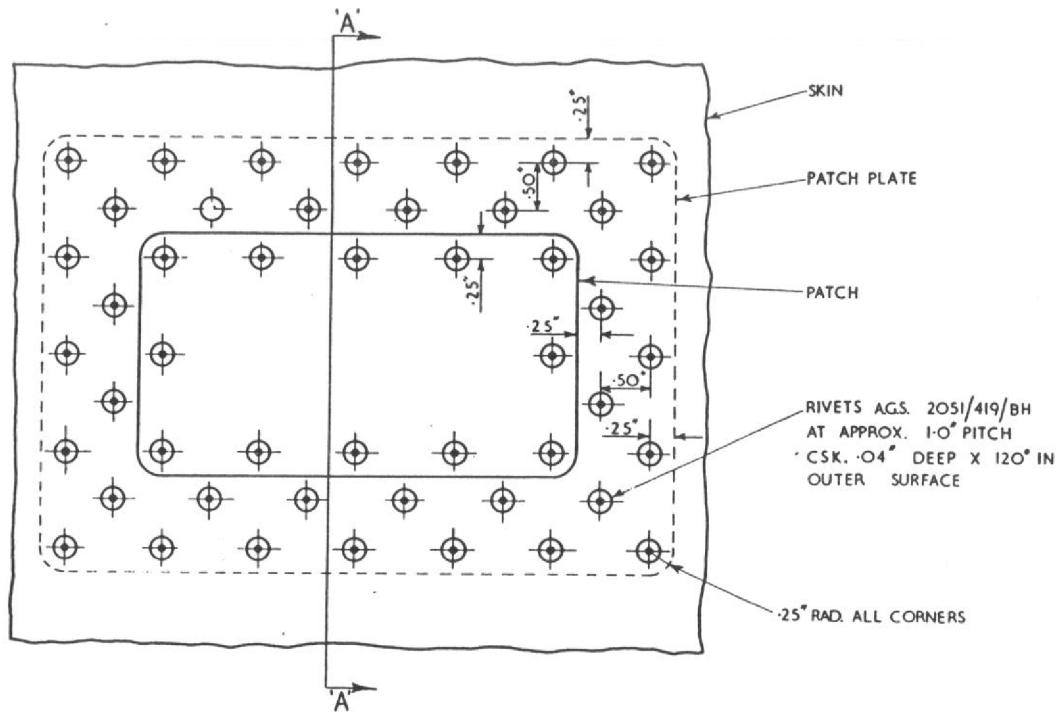


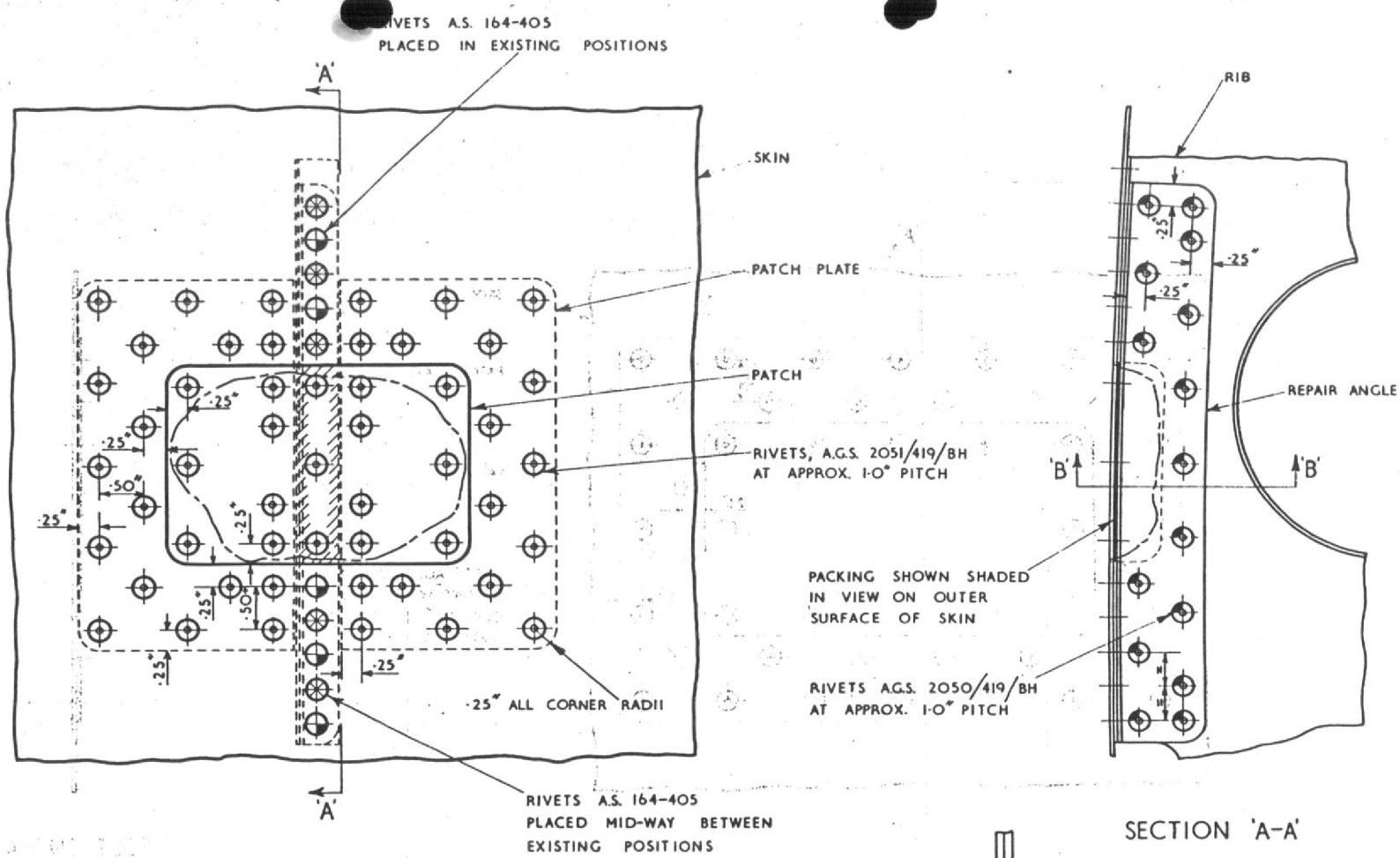
FIG.8. REPAIR TO TAILPLANE NOSING AND RIB
RESTRICTED



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 1B 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



SEQUENCE OF OPERATIONS

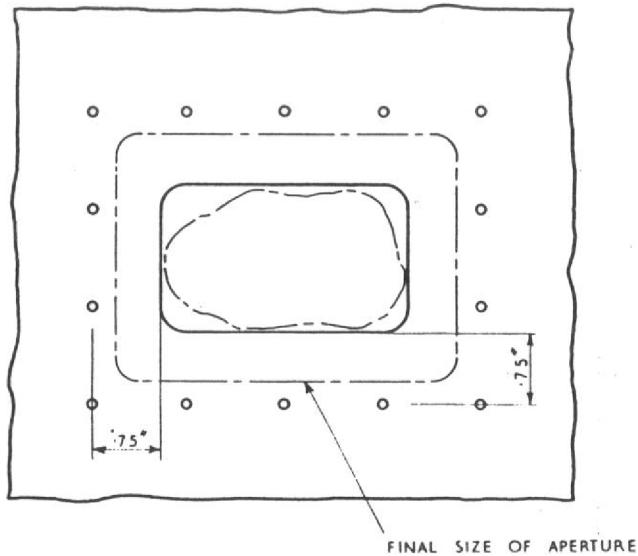
- CLEAN OUT DAMAGE IN SKIN AND RIB TO SMOOTH CONTOUR. SIZE AND SHAPE OF APERTURE SHOULD BE SUCH AS TO ALLOW REPAIR ANGLE AND PATCH PLATES TO BE INSERTED THROUGH IT.
- FROM 20 SWG. LA. TO SPEC. L.72 MAKE REPAIR ANGLE.
- INSERT AND FIT REPAIR ANGLE, DRILL AND RIVET IN POSITION.
- FROM 18 SWG. LA. TO SPEC. L.72 MAKE PACKING PATCH AND PATCH PLATES.
- INSERT AND FIT PATCH PLATES, DRILL, AND RIVET IN POSITION.
- FIT PACKING AND PATCH, DRILL, AND RIVET IN POSITION.

FIG. 10. FLUSH REPAIR TO SKIN AND RIB OF FIN

RESTRICTED
FIG. 10. FLUSH REPAIR TO SKIN OF FIN

NOTES

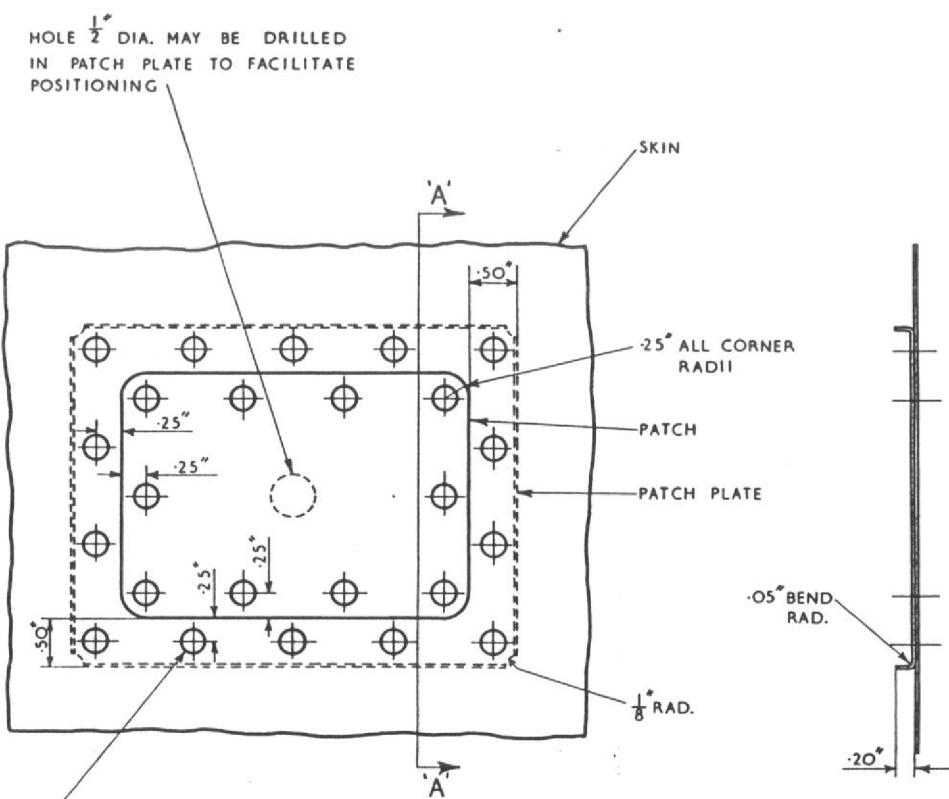
1. SIZE OF PATCH MUST NOT EXCEED 4.0" X 3.0"
2. NOT MORE THAN TWO PATCH REPAIRS ARE TO BE CARRIED OUT ON ONE RUDDER OR ELEVATOR.
3. FOR DETAILS OF ADJUSTMENT TO MASS BALANCE SEE FIG. 13 AND 16.
4. SIZE AND SHAPE OF CLEANED OUT APERTURE TO BE SUCH AS TO ALLOW PATCH PLATE TO BE INSERTED THROUGH IT.



VIEW SHOWING CLEANED-OUT DAMAGE PRIOR TO DIMPLING

SEQUENCE OF OPERATIONS

1. CLEAN OUT DAMAGE TO SMOOTH CONTOUR.
2. FROM 24.SWG. L.A. PLATE TO SPECN. L.72 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. I.
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. L.72. (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.

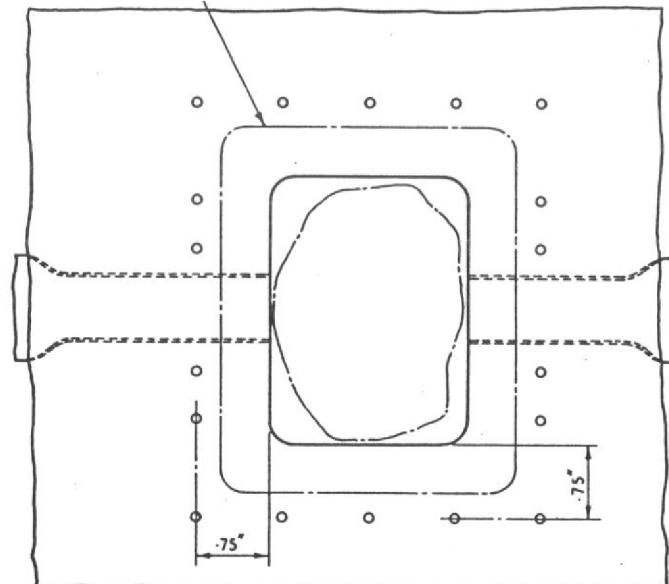


VIEW SHOWING COMPLETED REPAIR

SECTION 'A-A'

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

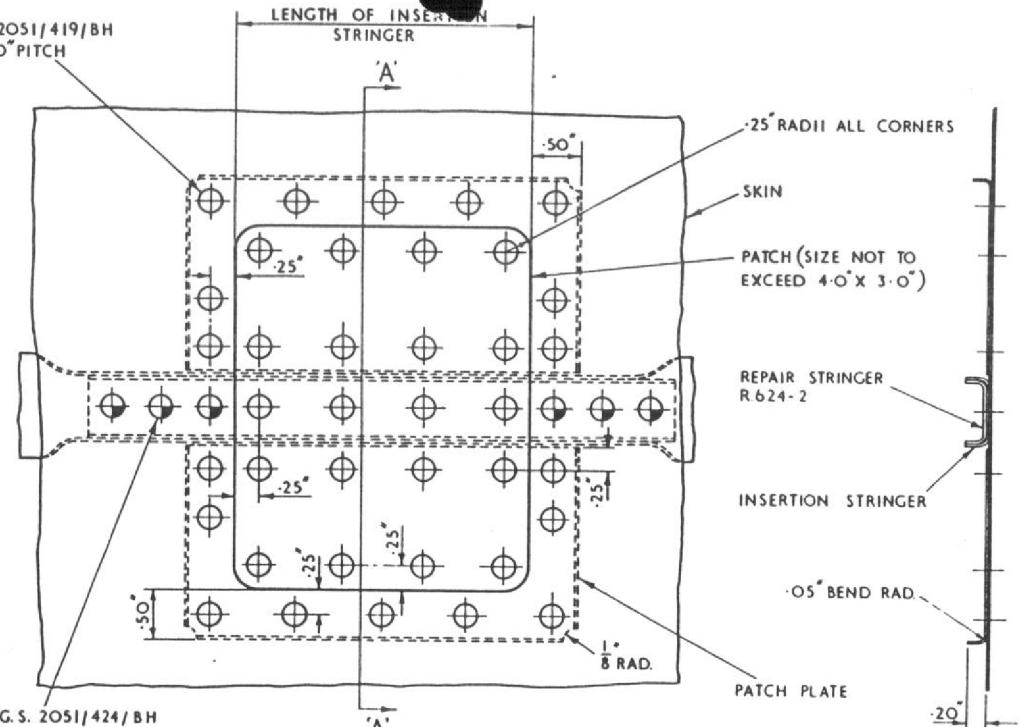


VIEW SHOWING CLEANED-OUT
DAMAGE PRIOR TO DIMPLING

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. I.
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.

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



VIEW SHOWING COMPLETED REPAIR

SECTION 'A-A'

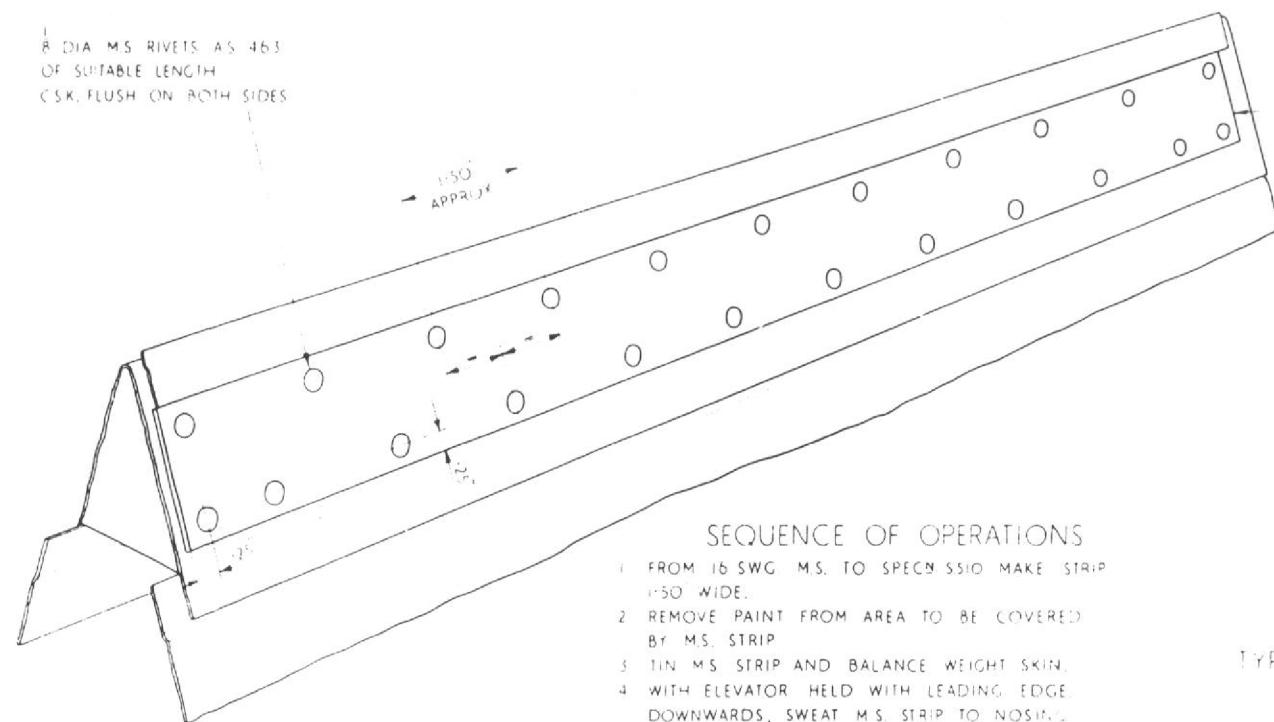
10. FIT REPAIR STRINGER, DRILL HOLES.
11. REMOVE REPAIR STRINGER AND DIMPLE HOLES.
12. FIT REPAIR STRINGER, RIVET IN POSITION.
13. FIT PATCH PLATES AND PIN IN POSITION.
14. FIT INSERTION STRINGER.
15. FROM 26 S.W.G. L.A. PLATE TO SPECN L.72. (24 S.W.G. ON BOTTOM SKIN - POST MOD. 708) MAKE PATCH.
16.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

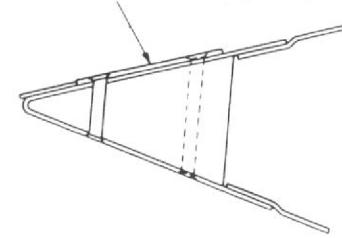
RESTRICTED

16 DIA. MS. RIVETS AS 463
OF SUITABLE LENGTH
CSK. FLUSH ON BOTH SIDES



M.S. STRIP
LENGTH TO BE DETERMINED
BY WEIGHT TO BE ADDED

M.S. STRIP TO BE POSITIONED ON
UPPER SURFACE OF NOSING AS NEAR
AS POSSIBLE DIRECTLY OPPOSITE REPAIR
AND IN CONTACT WITH SEALING STRIP

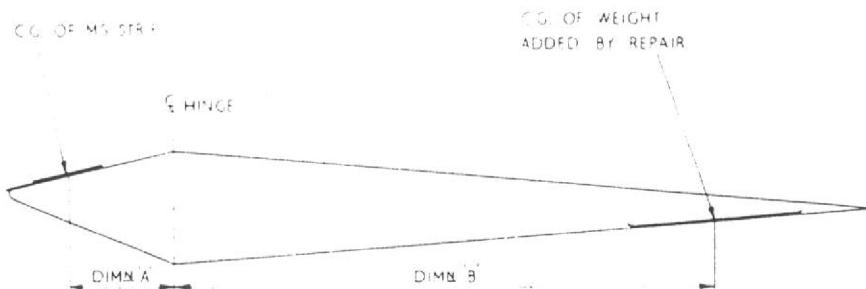


TYPICAL SECTION THROUGH NOSING

SEQUENCE OF OPERATIONS

1. FROM 16 SWG. M.S. TO SPECN SS10 MAKE STRIP 150 WIDE.
2. REMOVE PAINT FROM AREA TO BE COVERED BY M.S. STRIP
3. TIN M.S. STRIP AND BALANCE WEIGHT SKIN.
4. WITH ELEVATOR HELD WITH LEADING EDGE DOWNWARDS, SWEAT M.S. STRIP TO NOSING.
5. DRILL AND RIVET IN POSITION AS SHOWN
FILL HEADS FLUSH WITH SOLDER IF NECESSARY
6. REPAINT AREA AFFECTED BY REPAIR

METHOD OF ADDING WEIGHT



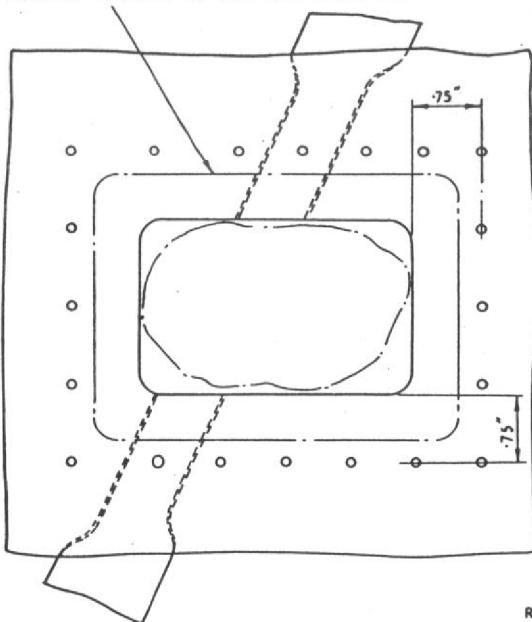
WEIGHT TO BE ADDED = $DIMN\ B \times \frac{WEIGHT\ ADDED\ BY\ REPAIR}{DIMN\ A} \times 1.33$

NOTE

NO ADJUSTMENT TO MASS BALANCE IS NECESSARY IF $DIMN\ B \times \frac{WEIGHT\ ADDED\ BY\ REPAIR}{DIMN\ A}$ DOES NOT EXCEED 8 OZ IN.

METHOD OF CALCULATING REQUIRED ADDITIONAL WEIGHT

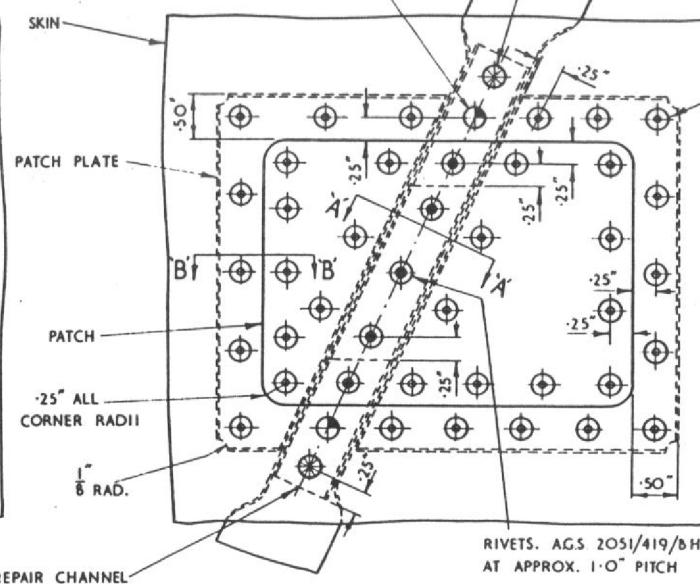
FINAL SIZE AND SHAPE OF CLEANED OUT APERTURE
MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE
INSERTED THROUGH IT. MAX. SIZE 4·0" X 3·0"



VIEW SHOWING CLEANED OUT
DAMAGE PRIOR TO DIMPLING

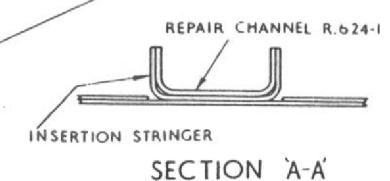
RIVETS AS. 164-404
PLACED IN EXISTING POSITIONS

RIVETS. AS. 164-404.
PLACED MID-WAY BETWEEN
EXISTING POSITIONS



VIEW SHOWING COMPLETED REPAIR

RIVETS. AS. 2051/413/BH.
AT APPROX. 1·0" PITCH



SECTION A-A'



SECTION B-B'

SEQUENCE OF OPERATIONS

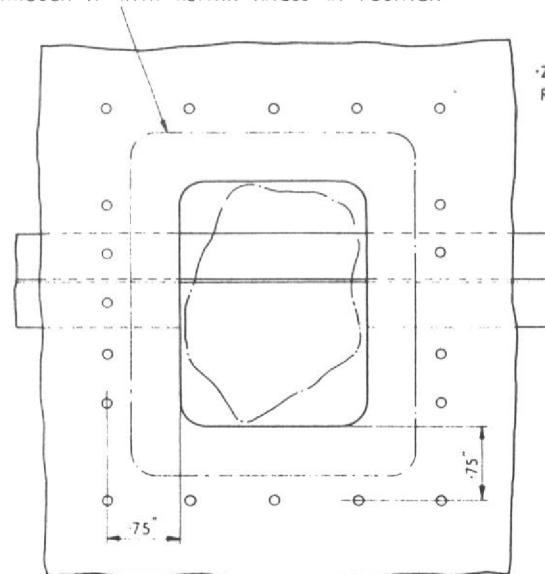
1. CLEAN OUT DAMAGE IN SKIN AND STIFFENER TO SMOOTH CONTOUR.
2. FROM 24 SWG. L.A. PLATE TO SPEC⁹ L.72. MAKE PATCH PLATES.
TEMPORARILY OMITTING TO FLANGE EDGES.
3. MARK POSITIONS OF RIVET HOLES ACCURATELY ON PATCH PLATES.
4. ON OUTSIDE OF SKIN MARK OUTLINES OF PATCH PLATES IN THEIR
CORRECT POSITION RELATIVE 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. I.
6. ENLARGE HOLE IN SKIN BY .50" ON EACH SIDE GIVING A MINIMUM
LANDING OF .25".
7. FROM 22 SWG. L.A. PLATE TO SPEC⁹ L.72. MAKE INSERTION STRINGER.
8. FROM REPAIR STRINGER SECTION R.624-1 CUT REPAIR CHANNEL.
9. FIT REPAIR CHANNEL, DRILL HOLES EXCEPTING THOSE FOR RIVETS
SECURING PATCH.
10. FROM 26 SWG. L.A. PLATE TO SPEC⁹ L.72. MAKE PATCH AND
MARK RIVET POSITIONS ACCURATELY.
11. FLANGE EDGES OF PATCH PLATE.
12. FIT PATCH PLATES, REPAIR CHANNEL, INSERTION STIFFENER, AND PATCH,
DRILL REMAINING HOLES.
13. REMOVE PATCH, INSERTION 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.

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

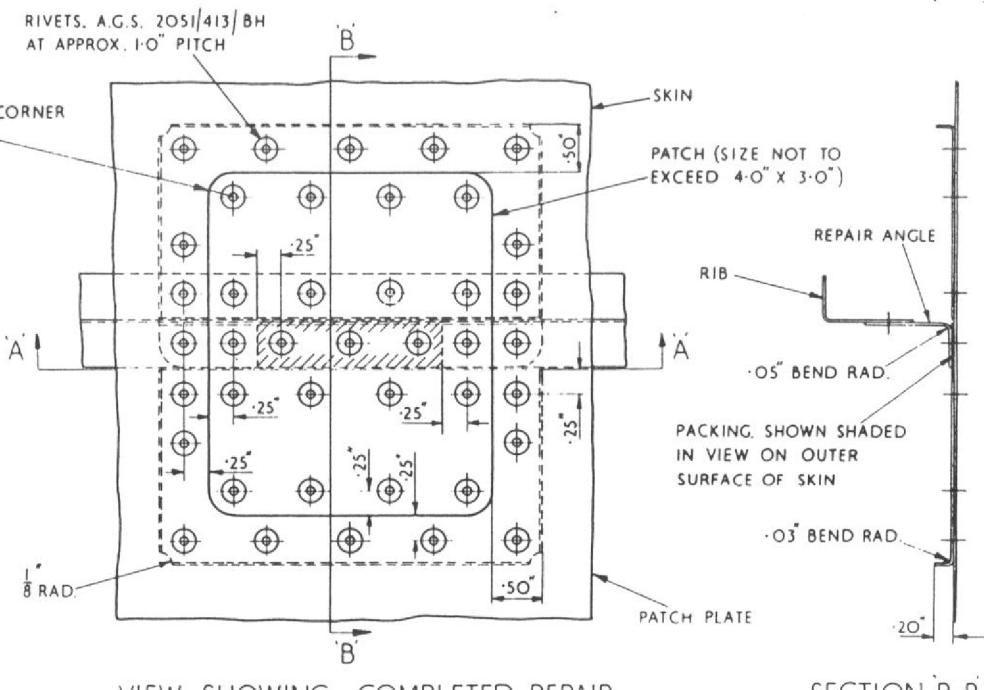
FINAL SIZE AND SHAPE OF CLEANED-OUT APERTURE
MUST BE SUCH AS TO ALLOW PATCH PLATES TO BE
INSERTED THROUGH IT WITH REPAIR ANGLE IN POSITION



VIEW SHOWING CLEANED-OUT
DAMAGE PRIOR TO DIMPLING

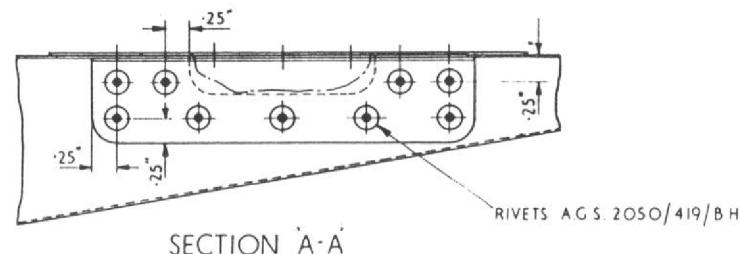
SEQUENCE OF OPERATIONS.

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



VIEW SHOWING COMPLETED REPAIR

SECTION B-B



SECTION A-A

- FLANGE EDGES OF PATCH PLATES.
- FIT PATCH PLATES, PACKING, AND PATCH AND DRILL HOLES.
- REMOVE PATCH, PACKING AND PATCH PLATES, AND DIMPLE HOLES.
- REPLACE PATCH PLATES, RIVET IN POSITION.
- REPLACE PACKING AND PATCH, RIVET IN POSITION.

NOTES

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

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

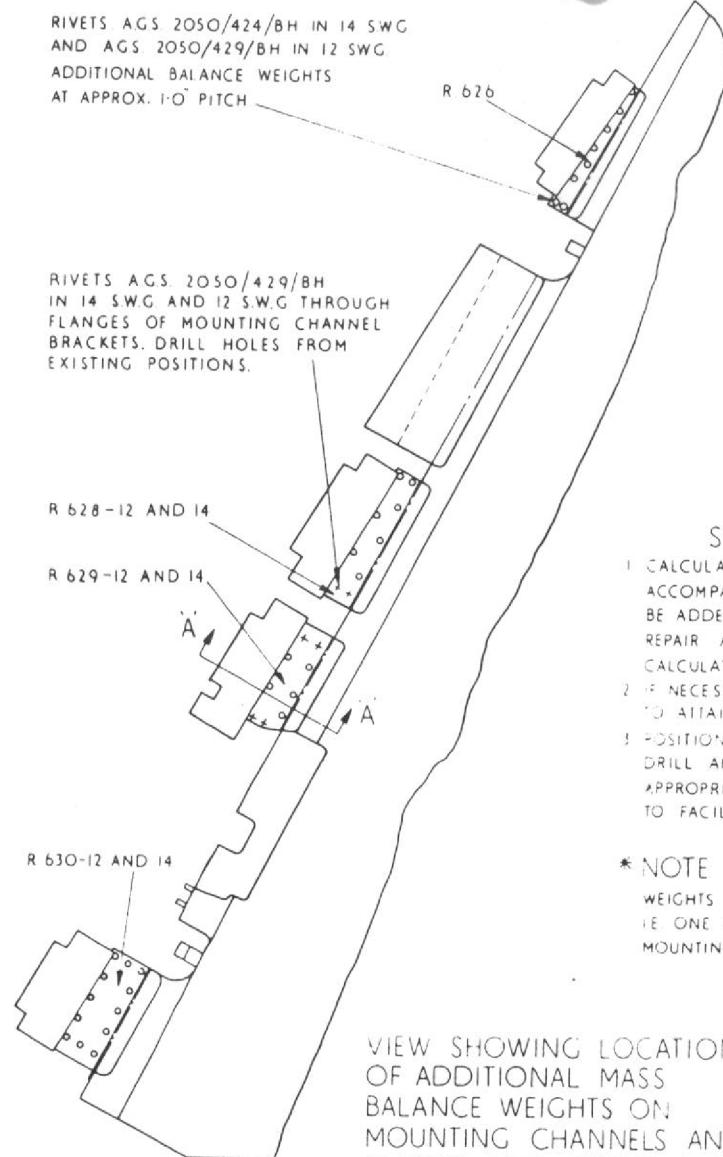
RIVETS AGS 2050/424/BH IN 14 SWG
AND AGS 2050/429/BH IN 12 SWG
ADDITIONAL BALANCE WEIGHTS
AT APPROX. 1:0 PITCH

RIVETS AGS 2050/429/BH
IN 14 SWG AND 12 SWG THROUGH
FLANGES OF MOUNTING CHANNEL
BRACKETS. DRILL HOLES FROM
EXISTING POSITIONS.

R 628-12 AND 14

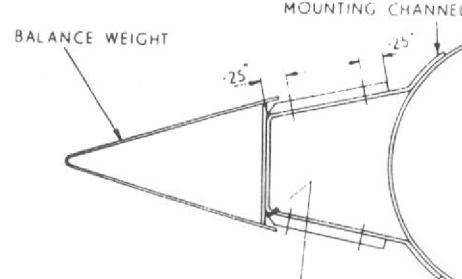
R 629-12 AND 14

R 630-12 AND 14



POSITION OF RIVETS IN EACH ADDITIONAL WEIGHT

VIEW SHOWING LOCATION
OF ADDITIONAL MASS
BALANCE WEIGHTS ON
MOUNTING CHANNELS AND
NUMBER AND APPROXIMATE
POSITION OF RIVETS IN EACH ADDITIONAL WEIGHT



ADDITIONAL BALANCE WEIGHTS
TO BE POSITIONED AS FAR
FORWARD AS POSSIBLE LEADING
EDGES OF WEIGHTS TO BE CHAN-

TYPICAL SECTION A-A

R.DRG. NO	* WEIGHT (OZ)	ARM (IN)
R 626	2.0	1.55
R 628-14	5.6	2.01
R 629-12	7.2	
R 629-14	4.5	
R 629-12	5.9	2.26
R 630-14	7.1	
R 630-12	9.2	2.61

SEQUENCE OF OPERATIONS

- 1 CALCULATE WEIGHT TO BE ADDED AS SHOWN IN ACCOMPANYING DIAGRAM. ADDITIONAL WEIGHTS SHOULD BE ADDED AS FAR AS POSSIBLE DIRECTLY OPPOSITE REPAIR AND THIS SHOULD BE CONSIDERED IN CALCULATING ADDITIONAL WEIGHT.
- 2 IF NECESSARY, FILE ADDITIONAL BALANCE WEIGHTS TO ATTAIN REQUIRED WEIGHT.
- 3 POSITION ADDITIONAL BALANCE WEIGHTS AS SHOWN, DRILL AND RIVET IN POSITION. IF NECESSARY THE APPROPRIATE BALANCE WEIGHT MAY BE REMOVED TO FACILITATE RIVETING.

* NOTE

WEIGHTS QUOTED IN TABLE ARE FOR 2 OFF
IE ONE WEIGHT ON EACH SIDE OF
MOUNTING CHANNEL

WEIGHTS TO BE ADDED = $\frac{\text{DIM B} \times \text{WEIGHT ADDED BY REPAIR}}{\text{DIM A}} \times 1.22$

NO ADJUSTMENT TO MASS BALANCE IS NECESSARY
IF $\text{DIM B} \times \text{WEIGHT ADDED BY REPAIR}$ DOES
NOT EXCEED 8 OZ IN

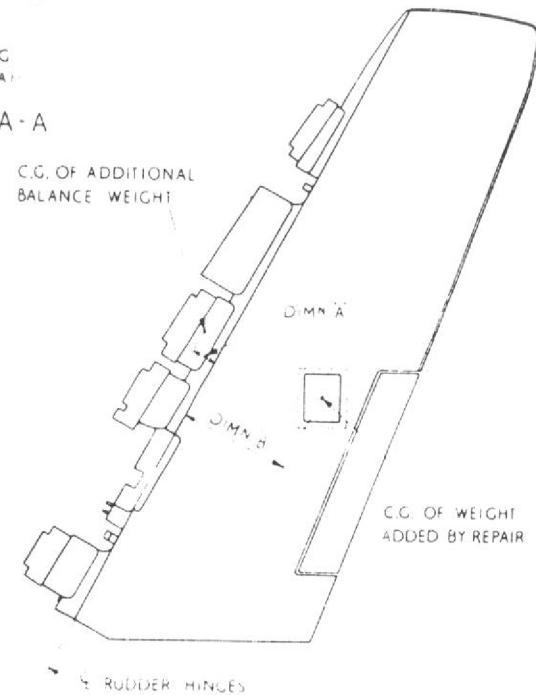


FIG.16 RESTORATION OF RUDDER MASS BALANCE

RESTRICTED

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