CHAPTER 2

FUSELAGE

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APPENDIX F

Fitting instructions for replacement components

Description

1. The fuselage is a semi-monocoque structure of balsa sandwiched between an inner and outer birch-ply skin. It is built by joining two shell halves at the centre-line, each half being complete with its respective halves of bulkheads and floors, etc. The balsa filling is replaced by spruce multi-ply at the centre-line joints, and by laminated spruce at bulkhead attachments and other places requiring reinforcement. The outer skin is covered with madapollam. The nose-wheel structure and fairings, cannon fairings, and bulkheads No. 1 and 4 are of light alloy construction.

Repair restrictions

2. Repairs to the shell, illustrated in this Part 1, are not permitted within the area shown hatched on the *Fuselage skin* illustration; nor should they be attempted in remaining areas where the minimum distance between an outer and an inner skin joint (*fig.* 2/47) cannot be maintained. In these instances, special application should be made for repair instructions.

Cracks in wooden members

3. Cracks in wooden members must not be classified as negligible damage. Cracked members must be repaired or replaced.

Gluing

4. The methods and materials quoted in ◀ A.P.2662B, Sect. 5, Chap. 5.2 ▶ should be used in conjunction with the information in fig. 2/A and 2/C, for all Marks of aircraft.

Scarf joints

5. When making scarf joints, the taper must be a minimum of 15: 1 for spruce members and 10: 1 for ply skins unless specifically instructed otherwise. Wooden packing members should always be fitted behind any ply when cutting and making a joint, to ensure an even taper.

Ply bending

6. When it is necessary to preform a plywood panel before fitting, the methods detailed in ◀ A.P.2662B, Sect. 5, Chap. 5.3 ▶ should be used. As an alternative to the use of cramps, ply strips may be used (*fig.* 2/C).

Woodscrew holes

7. Should it be necessary to utilize existing screw holes, the next larger size screw should be used or a $\frac{1}{4}$ in. longer screw inserted, depending on the distance of the hole from any edge and the thickness of the materials to be joined. Screw data is given in fig. 2/A.

Canopy

8. Should damage to a canopy exceed the limits laid down in the relevant illustration, the particular part or parts are to be replaced, e.g., portions of the cast framework or transparent panels.

Sealing of fuselage shell

9. After repair procedures which involve the edges and corners of the fuselage shell, the protective coverings for waterproofing and the materials used for pressurization sealing must be made good. Fig. 2/B illustrates the methods used on a Mk.2 aircraft. These methods are applicable to all Marks of aircraft.

Pressure testing after repair

10. A pressure test (*Vol.* 1, *Sect.* 3, *Chap.* 8) must be made after repairs, replacements or alterations to fitments affecting the cabin inner skin, including the fore and aft bulkheads, cabin floor, canopy and canopy seals.

Construction details

11. When cleaning out damage prior to repair, make a record of all construction details such as screw location, pitch, length and size. The dimensions, grain directions and relative positions of skins, packing and internal members should also be noted. ◀ When repairing areas of ply skin which have a 45 deg. grain direction, wastage can be avoided by using the correct sheet (*Chap.* 1, *Table* 1). ▶ These details may not be apparent from a study of the surrounding structure after the damage has been cleaned out and may not be illustrated in this volume. A sketch, made during the process of removal of damaged material and incorporating construction details, will save time during the repair.

Radome repairs

Neoprene repairs, Mk.2 and 3

Note . . .

The instructions for repairing the fibreglass mouldings of the radomes of Mk.2 aircraft are given with fig. 2/53.

12. The neoprene finish acts as a protective coating for the fibreglass. It is essential therefore that any damage to the neoprene should be repaired immediately on discovery to prevent secondary damage to the fibreglass moulding. There is no limitation on the area of the repair to the neoprene coating.

13. The materials required to effect repairs to the neoprene are listed in Chap. 1, Table 1, and the procedure is as follows:—

(1) Remove the damaged coating by abrading Garnet paper, exposing the fibreglass to an extent sufficient to allow a good brush application and ensuring that the edges of the sound coating maintain good adhesion. Care should be taken not to drag the sound coating and not to injure the fibreglass laminate.

(2) Lightly abrade the area to be treated, first with No. 0–80 Garnet paper and finally with No. 00–100, to give an even matt surface free from raised weave or other inequalities. Use this process to chamfer the edges of the sound coating.

(3) Brush the area with a clean camel hair brush to remove all loose particles, then wipe with a clean lint free cloth damped with toluol and allow this to evaporate completely.

(4) Brush an even coat of Boscolite primer 9252 (diluted with an equal volume of toluene) over the area including the chamfered edges, the brush strokes being made in the same direction avoiding the formation of streaks, bubbles or pinholes. Allow the primer to dry for one hour at 18 deg. C. then apply a second coat, brushing at right-angles to the first, and leave to dry for one hour as before.

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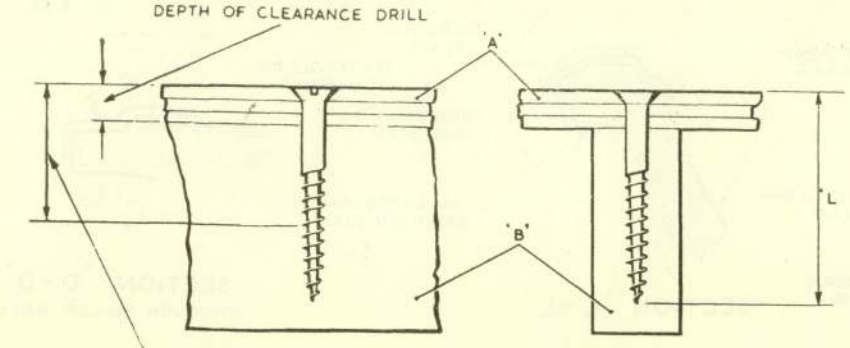
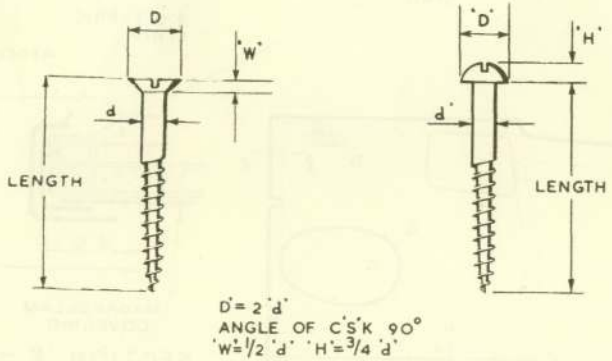
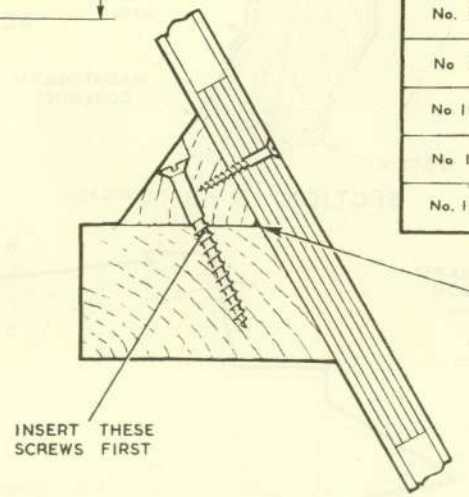






SIZE OF SCREW	DIA. OF SHANK	CLEARANCE HOLE IN 'A'	DRILL SIZE IN 'B'	DEPTH OF CLEARANCE DRILL
No 4	0·108	No. 31 0·120	No. 44 0 086	FULL DEPTH OF MEMBER 'A'
No 5	0·122	No 29 0 136	No 39 0·0995	
No. 6	0 136	No 25 0·1495	No 35 0·110	
No 7	0 15	No.19 0·166	0·125	
No. 8	0 164	No 15 0·180	No. 29 0 136	
No 9	0 178	No 9 0·196	No 26 0 147	
No 10	0·192	No 3 0·213	No 22 0·157	
No 11	0·206	No 1 0·228	11/64	
No. 12	0 22	15/64	No 14 0·182	

NOTE:-
ALL DIMENSIONS GIVEN ARE IN INCHES

INSTRUCTIONS FOR GLUING & SCREWING JOINTS IN WOODEN MEMBERS

1 THE SURFACES TO BE JOINED, PARTICULARLY THE GLAZED SURFACES OF PLYWOOD, SHOULD BE SLIGHTLY ROUGHENED WITH GLASS PAPER BEFORE APPLYING GLUE

2 ANY DUST FORMED BY THE ROUGHENING PROCESS ON PLYWOOD SURFACES SHOULD BE REMOVED WITH A DAMP CLOTH AND THE PLYWOOD ALLOWED TO LIE UNTIL WATER STAINS DISAPPEAR

3 GLUE MUST NOT BE APPLIED TO A WET SURFACE

4. GLUE TO BE APPLIED IN ACCORDANCE WITH A.P. 2662, CHAP 32

5 WOODSCREWS, WHERE CALLED FOR, ARE TO BE INSERTED WHILE GLUE IS WET TACKING STRIPS, IF USED, SHOULD CONTAIN HOLES THROUGH WHICH THE SCREWS CAN BE INSERTED

6 WHERE CORNER STRENGTHENING BLOCKS ARE ADDED WITH WOODSCREWS AT DIFFERENT ANGLES, THOSE WITH GREATER WEDGING EFFECT MUST BE INSERTED FIRST (SEE ABOVE FIGURE)

7 WHERE PRESSURE IS APPLIED TO OBTAIN GLUED JOINT ON RIGHT-ANGLED SURFACES, SUCH AS SCARF JOINTS IN STRINGERS, CARE SHOULD BE TAKEN TO ENSURE THAT ONE SURFACE IS NOT CLAMPED OR SCREWED TO THE DETRIMENT OF THE OTHER

8 ANY SURPLUS FILLETS OF GLUE SHOULD BE REMOVED WHILE STILL WET AND MUST ON NO ACCOUNT BE REMOVED WITH A CHISEL WHEN DRY

Fig. 2/A. Gluing and screwing data

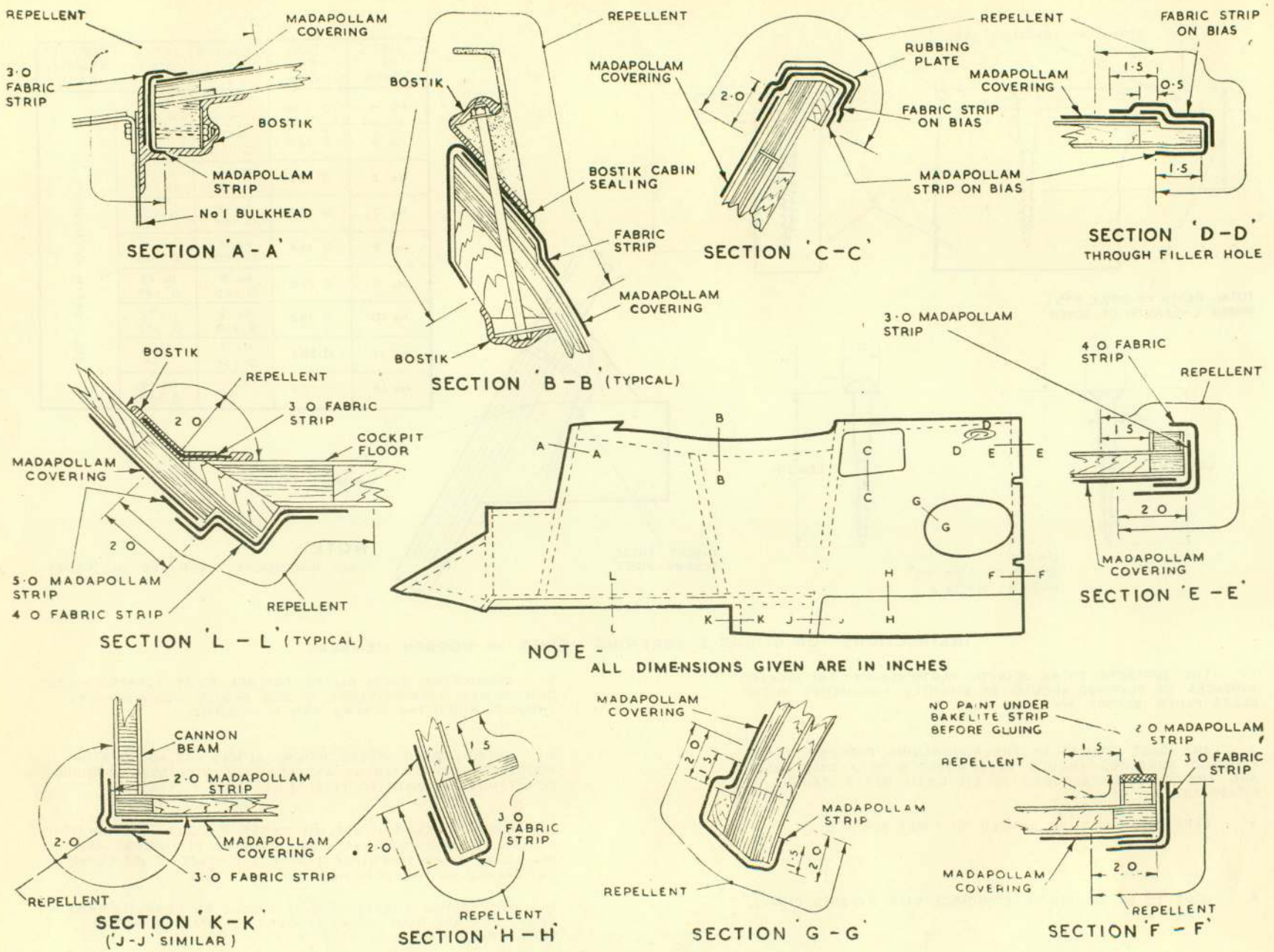


Fig. 2/B. Sealing of fuselage shell

(NOTES FOR FIG. 2/B (SEALING OF FUSELAGE SHELL)

WATERPROOFING

NON-PRESSURIZED EDGES

The procedure for waterproofing fuselage shell edges which are not subject to pressurization is as follows:—

1. Clean all grease and dirt from the surface.
2. Brush on an even coat of repellent; brush well into end grain.
3. When the repellent is thoroughly dry, dope madapollam and fabric strips and apply as shown.

Note . . .

The repellent should be a cellulose paint with good waterproofing qualities.

PRESSURE SEALING OF COCKPIT INNER SKIN

After repairs to the inner skin of the cockpit, the procedures for pressure sealing are as follows:—

Wood

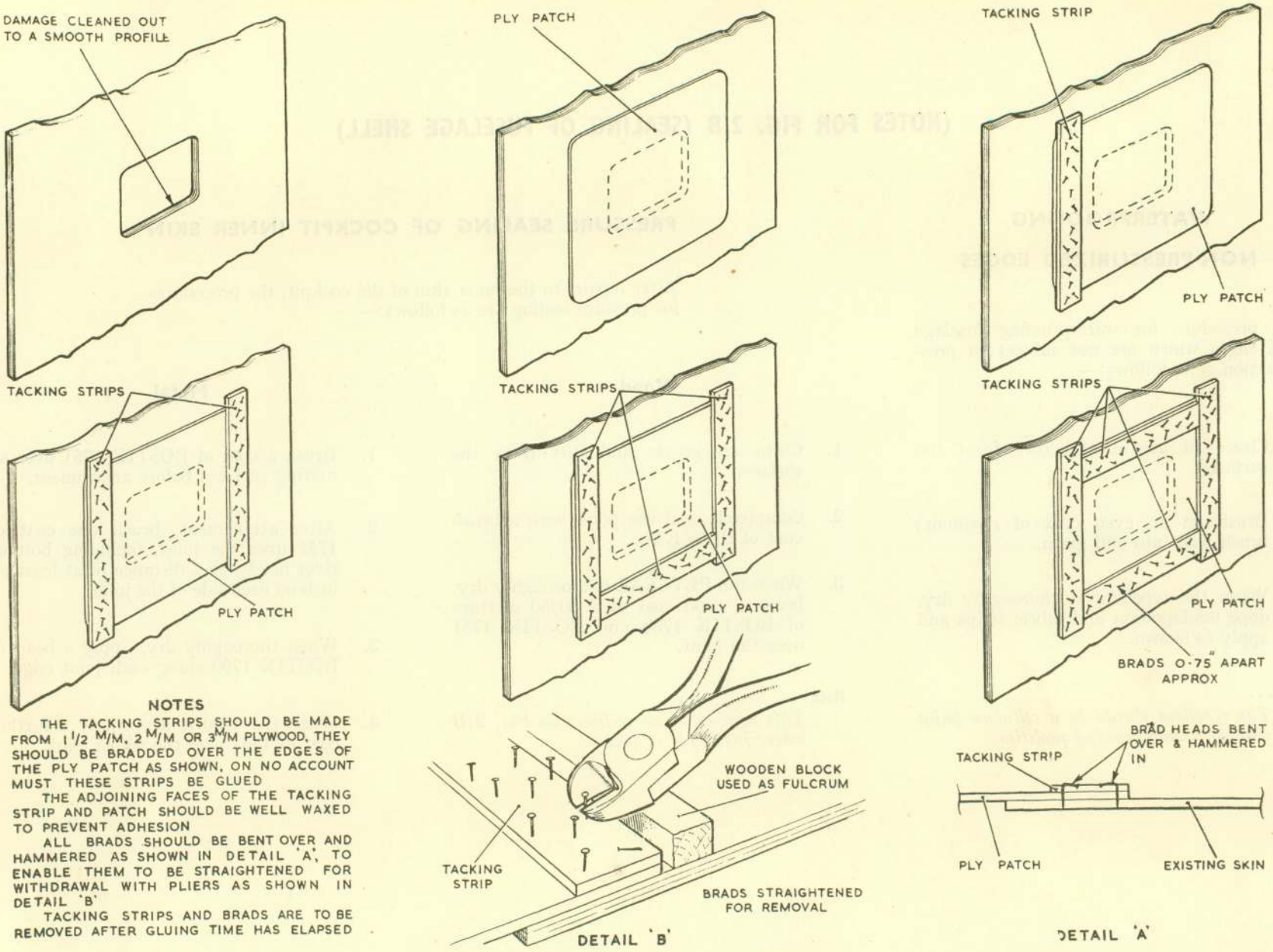
1. Clean all grease and dirt from the surface.
2. Completely seal the pores with a brush coat of PLYCEAL.
3. When the PLYCEAL is thoroughly dry, brush a good coat of a 50/50 mixture of BOSTIK 1790 and BOSTIK 1751 over the joint.

Note . . .

This applies to all sections on Fig. 2/B where BOSTIK is quoted.

Metal

1. Brush a coat of BOSTIK 1751 over all mating surfaces before attachment.
2. After attachment, brush one coat of 1751 over the joint, including bolt or rivet heads, to a distance of at least an inch on each side of the joint.
3. When thoroughly dry, apply a bead of BOSTIK 1790 along each joint edge.
4. When the 1790 is dry, apply a further coat of 1751 over the whole joint.



NOTES

THE TACKING STRIPS SHOULD BE MADE FROM 1 1/2 M/M, 2 M/M OR 3 M/M PLYWOOD, THEY SHOULD BE BRADDED OVER THE EDGES OF THE PLY PATCH AS SHOWN, ON NO ACCOUNT MUST THESE STRIPS BE GLUED

THE ADJOINING FACES OF THE TACKING STRIP AND PATCH SHOULD BE WELL WAXED TO PREVENT ADHESION

ALL BRADS SHOULD BE BENT OVER AND HAMMERED AS SHOWN IN DETAIL 'A', TO ENABLE THEM TO BE STRAIGHTENED FOR WITHDRAWAL WITH PLIERS AS SHOWN IN DETAIL 'B'

TACKING STRIPS AND BRADS ARE TO BE REMOVED AFTER GLUING TIME HAS ELAPSED

Fig. 2/C. Method of applying pressure to glued repairs

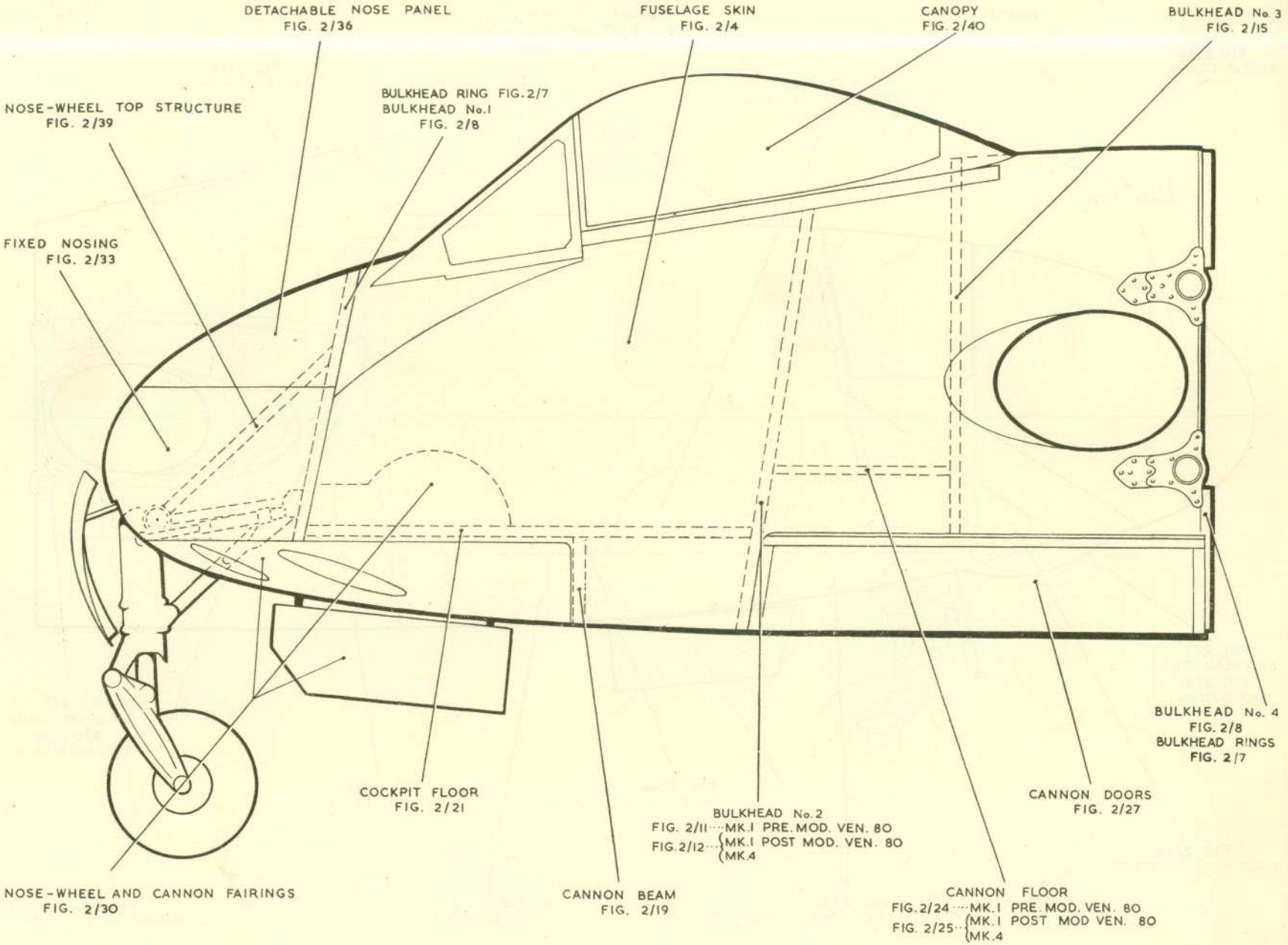


Fig. 2/1. Fuselage key diagram, Mk.1 and 4

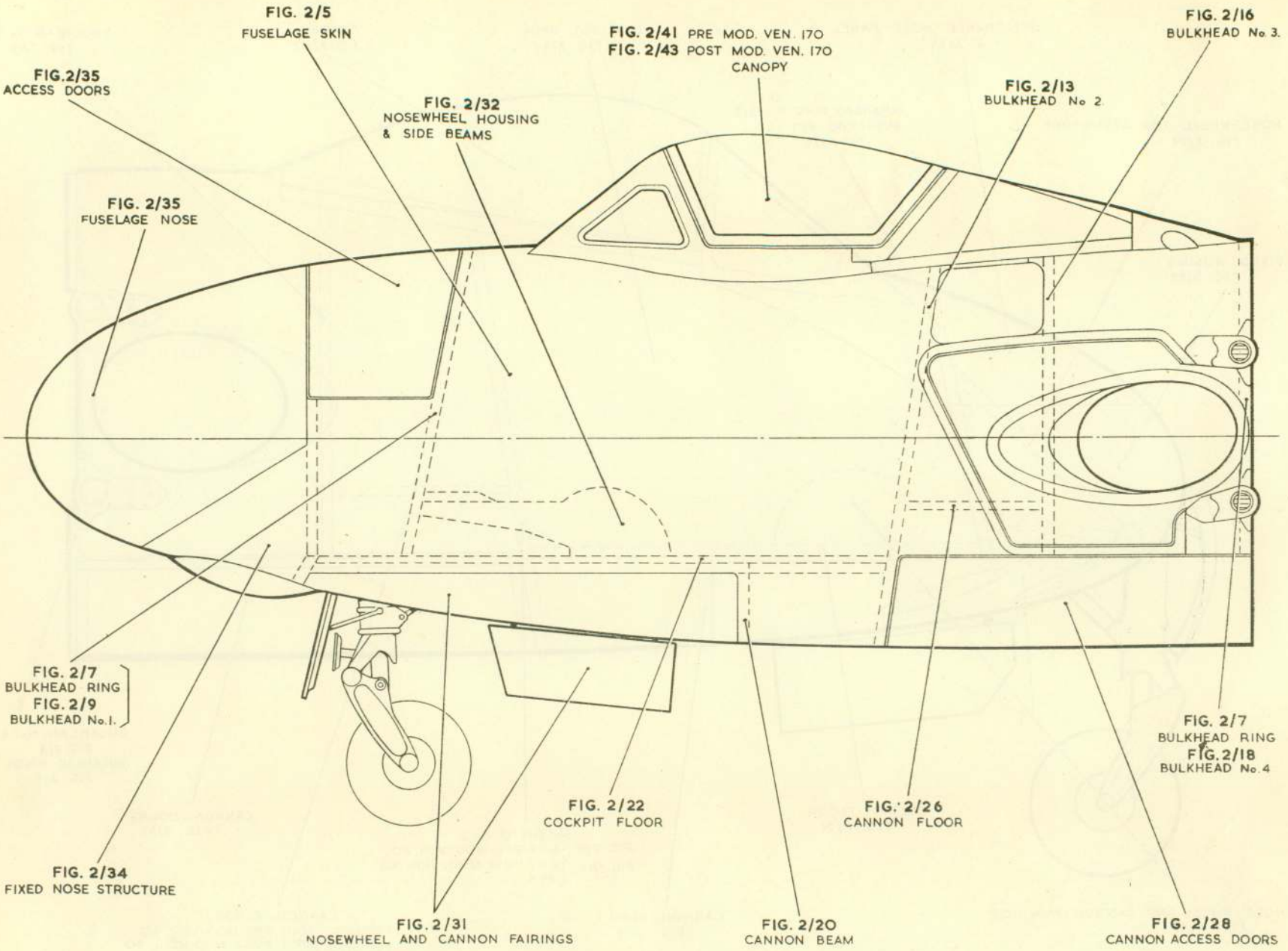


Fig. 2/2. Fuselage key diagram, Mk.2

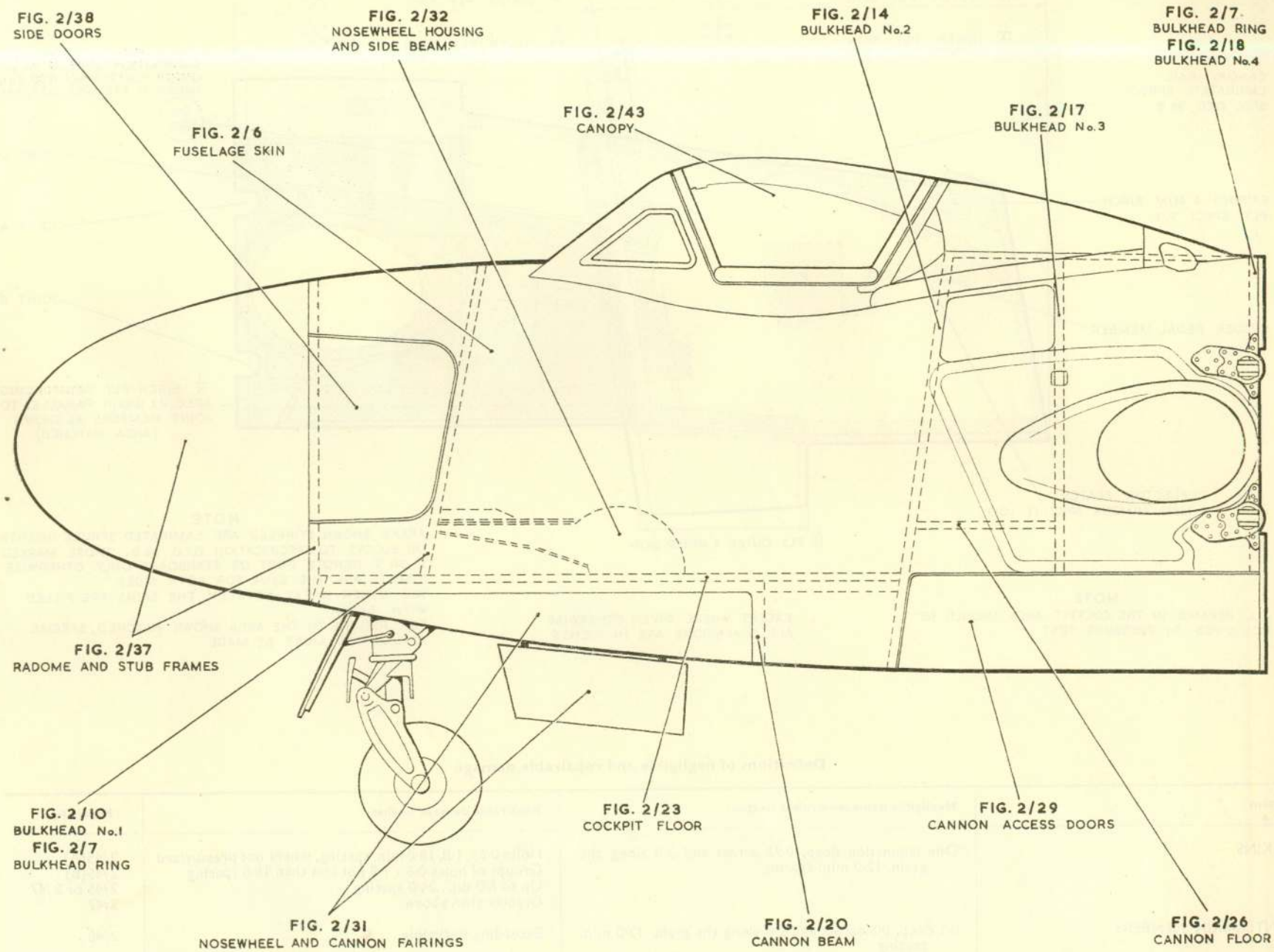
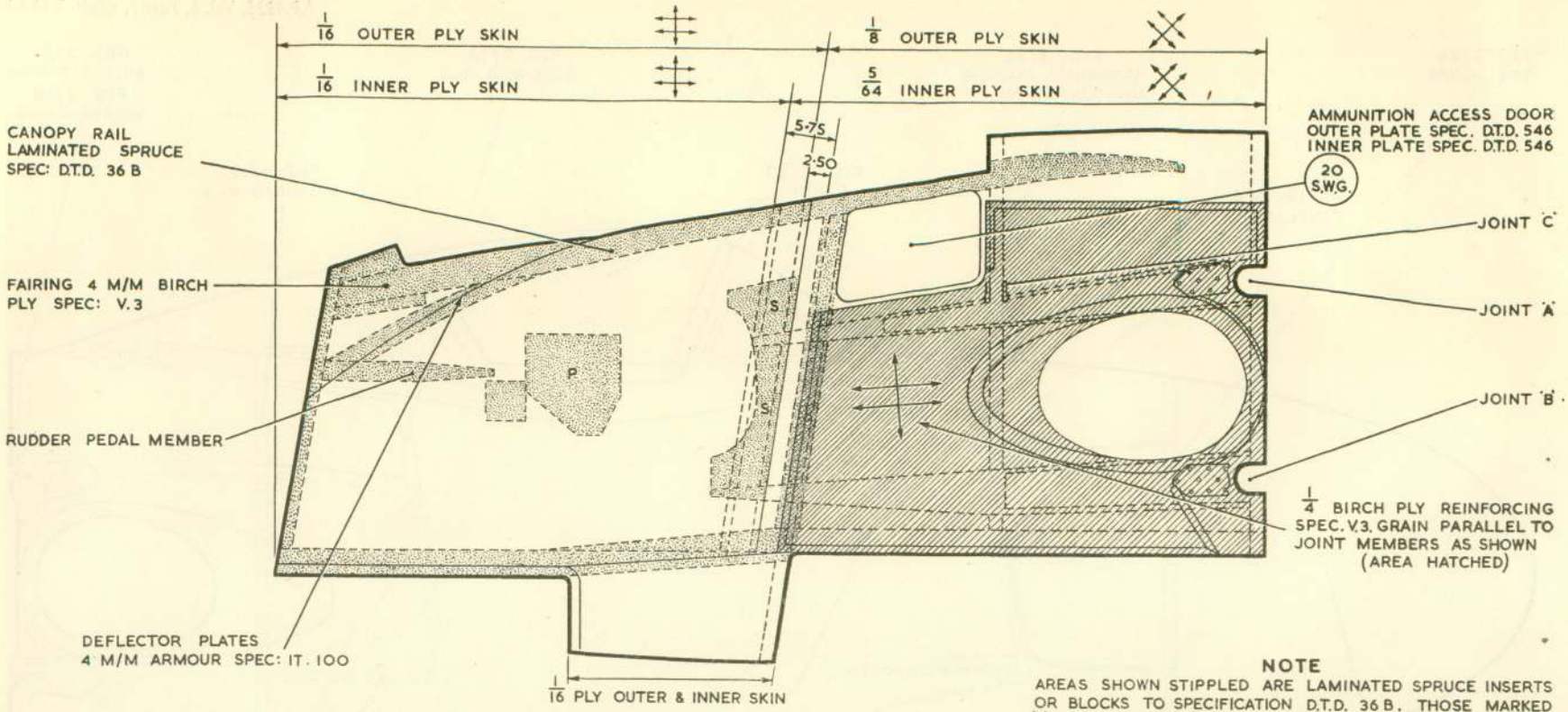


Fig. 2/3. Fuselage key diagram, Mk.3



NOTE

ALL REPAIRS IN THE COCKPIT AREA SHOULD BE FOLLOWED BY PRESSURE TEST

EXCEPT WHERE GIVEN OTHERWISE ALL DIMENSIONS ARE IN INCHES

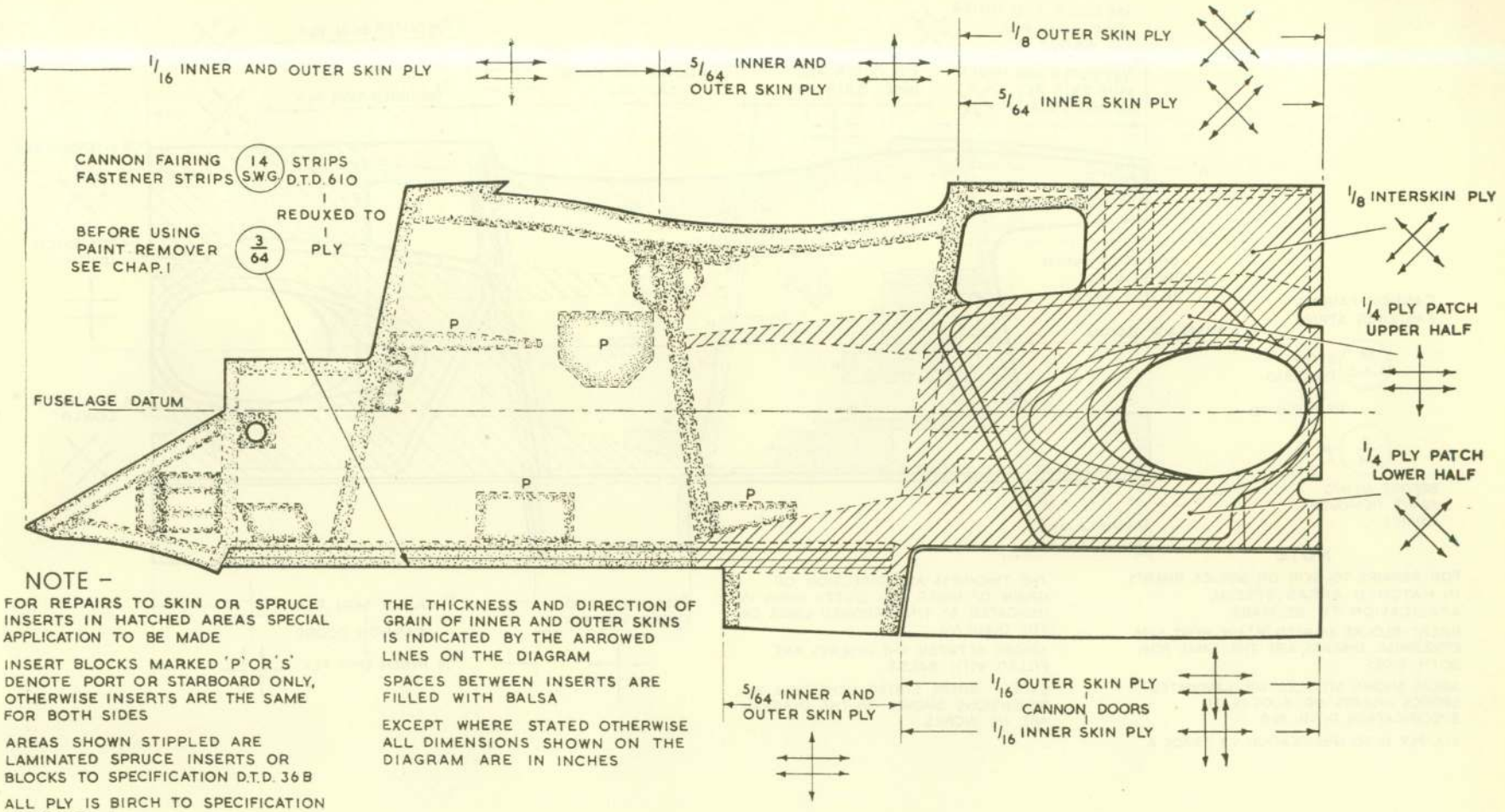
NOTE

AREAS SHOWN STIPPLED ARE LAMINATED SPRUCE INSERTS OR BLOCKS TO SPECIFICATION D.T.D. 36 B. THOSE MARKED 'P' OR 'S' DENOTE PORT OR STARBOARD ONLY. OTHERWISE INSERTS ARE THE SAME FOR BOTH SIDES.
ALL OTHER AREAS BETWEEN THE SKINS ARE FILLED WITH BALSA
FOR REPAIRS IN THE AREA SHOWN HATCHED, SPECIAL APPLICATION MUST BE MADE.

Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Holes 0·6 × 1·8, 18·0 min. spacing, where not pressurized Groups of holes 0·6 × 1·8 not less than 18·0 spacing Up to 8·0 dia., 24·0 spacing Greater than above	2/45(A) 2/45(B) 2/46 or 2/47 2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/4. Fuselage skin, Mk.1 and 4



NOTE –

FOR REPAIRS TO SKIN OR SPRUCE INSERTS IN HATCHED AREAS SPECIAL APPLICATION TO BE MADE

INSERT BLOCKS MARKED 'P' OR 'S' DENOTE PORT OR STARBOARD ONLY, OTHERWISE INSERTS ARE THE SAME FOR BOTH SIDES

AREAS SHOWN STIPPLED ARE LAMINATED SPRUCE INSERTS OR BLOCKS TO SPECIFICATION D.T.D. 36B

ALL PLY IS BIRCH TO SPECIFICATION V3 GRADE A

THE THICKNESS AND DIRECTION OF GRAIN OF INNER AND OUTER SKINS IS INDICATED BY THE ARROWED LINES ON THE DIAGRAM

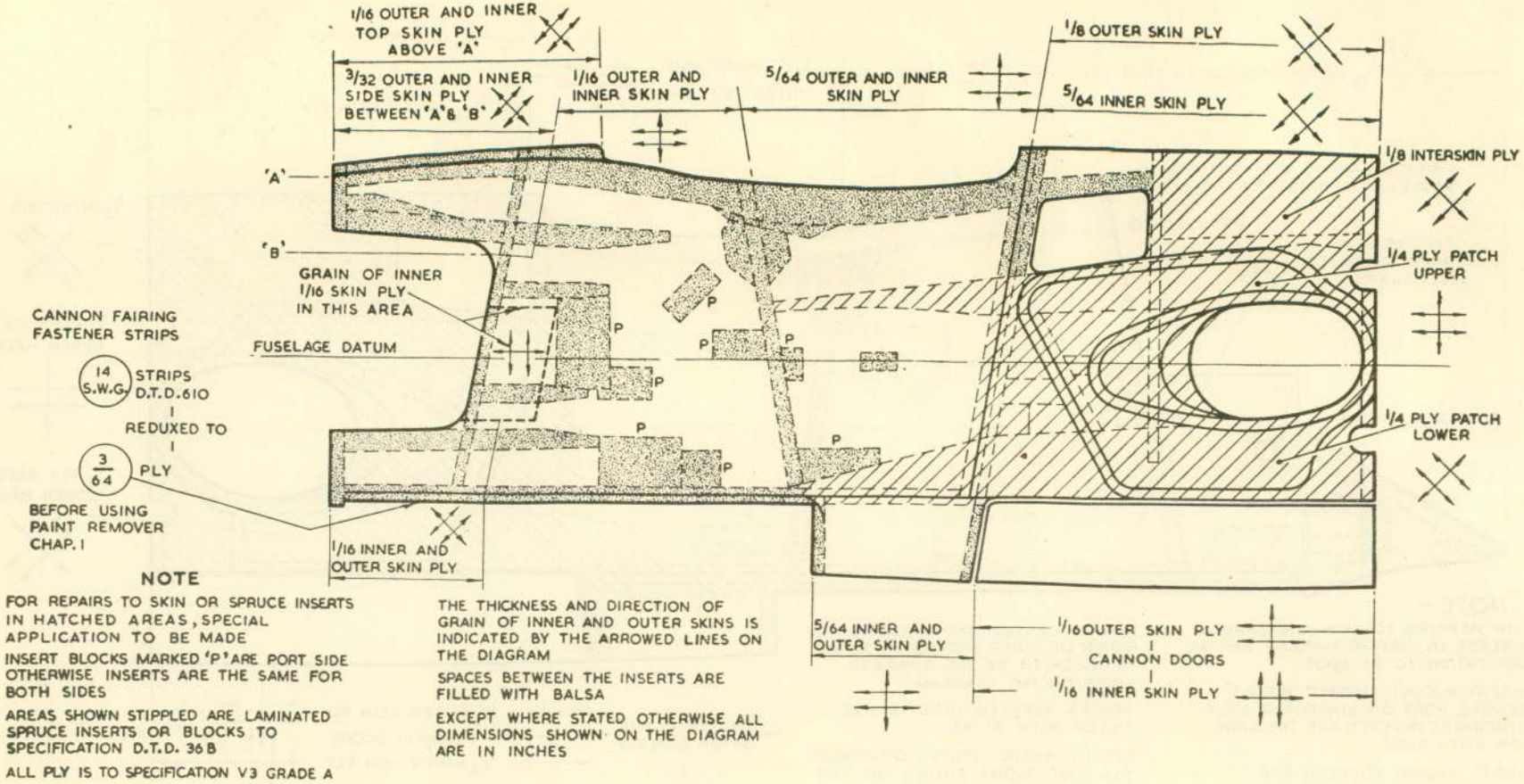
SPACES BETWEEN INSERTS ARE FILLED WITH BALSA

EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES

Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Holes 0·6 × 1·8, 18·0 min. spacing, where not pressurized Groups of holes 0·6 × 1·8 not less than 18·0 spacing Up to 8·0 dia., 24·0 spacing Greater than above	2/45(A) 2/45(B) 2/46 or 2/47 2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/5. Fuselage skin, Mk.2



NOTE

FOR REPAIRS TO SKIN OR SPRUCE INSERTS IN HATCHED AREAS, SPECIAL APPLICATION TO BE MADE

INSERT BLOCKS MARKED 'P' ARE PORT SIDE OTHERWISE INSERTS ARE THE SAME FOR BOTH SIDES

AREAS SHOWN STIPPLED ARE LAMINATED SPRUCE INSERTS OR BLOCKS TO SPECIFICATION D.T.D. 36B

ALL PLY IS TO SPECIFICATION V3 GRADE A

THE THICKNESS AND DIRECTION OF GRAIN OF INNER AND OUTER SKINS IS INDICATED BY THE ARROWED LINES ON THE DIAGRAM

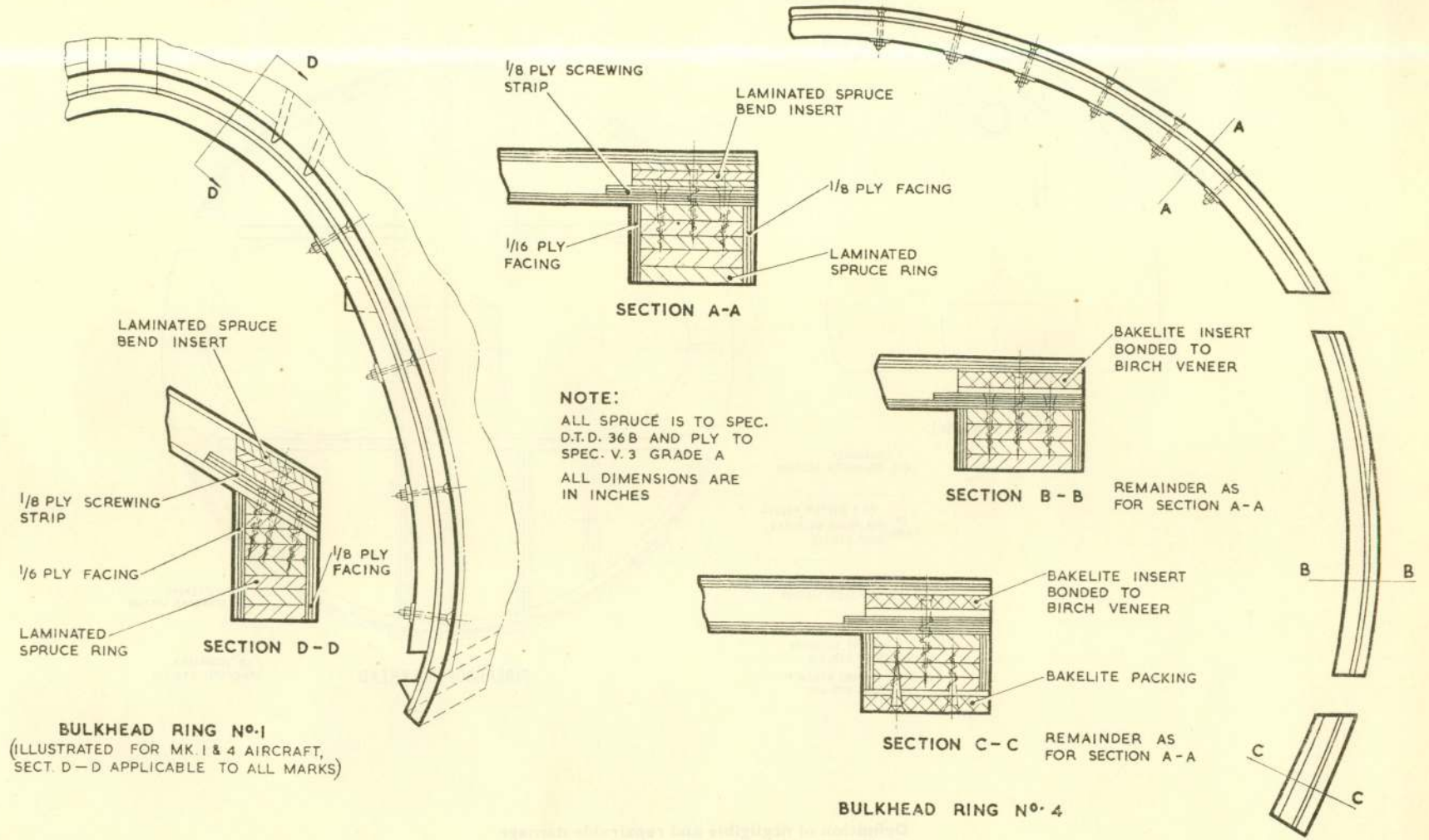
SPACES BETWEEN THE INSERTS ARE FILLED WITH BALSA

EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES

Definition of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Holes 0·6 × 1·8, 18·0 min. spacing, where not pressurized	2/45(A)
		Groups of holes 0·6 × 1·8 not less than 18·0 spacing	2/45(B)
		Up to 8·0 dia., 24·0 spacing	2/46 or 2/47
		Greater than above	2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

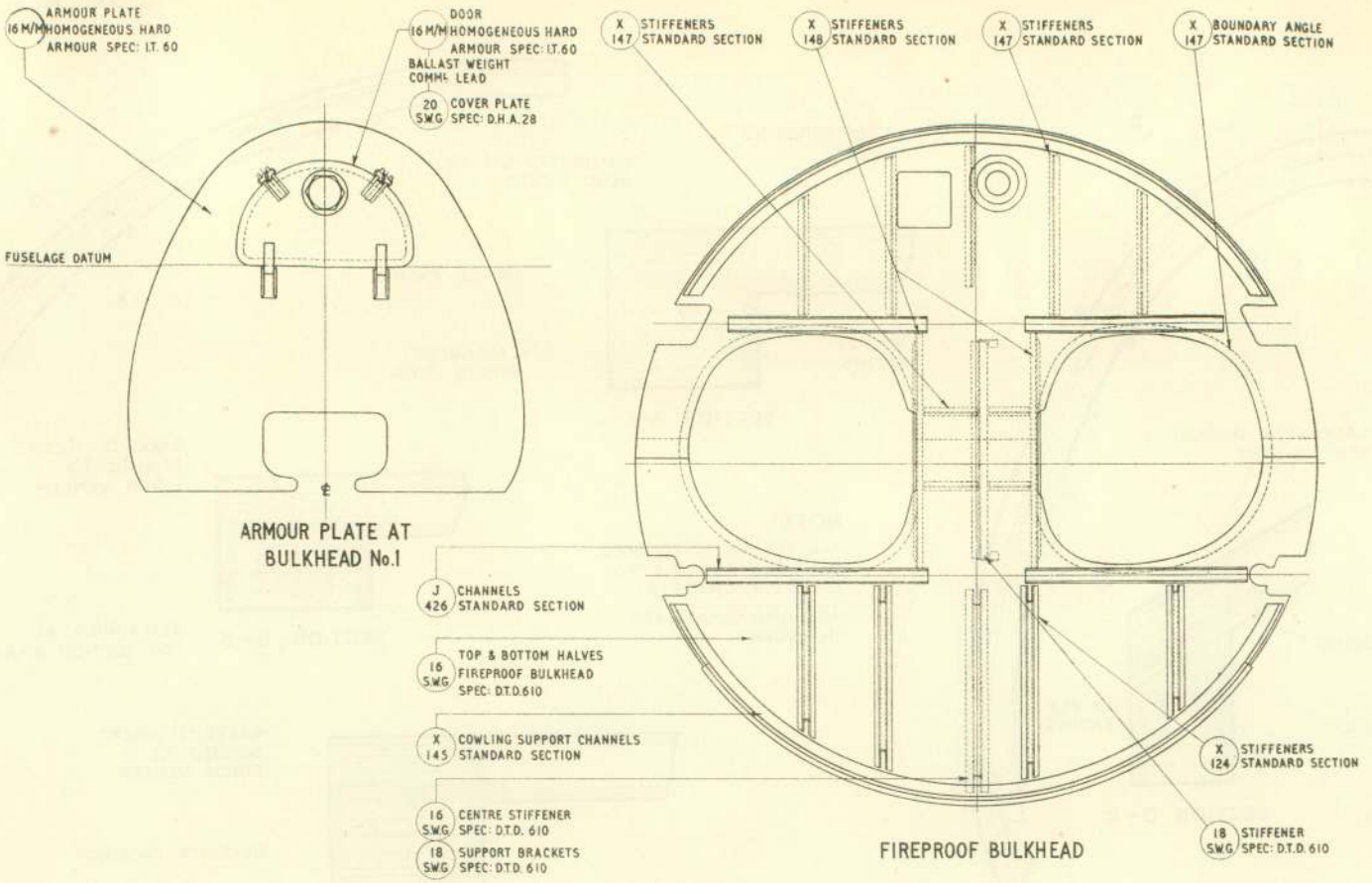
Fig. 2/6. Fuselage skin, Mk.3



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
LAMINATED RINGS	0·05 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48
FACING PLY	One lamination deep, 0·5 across and 1·0 along the grain, 10·0 min. spacing	Exceeding negligible. Insert new portion with 10 to 1 scarf	—

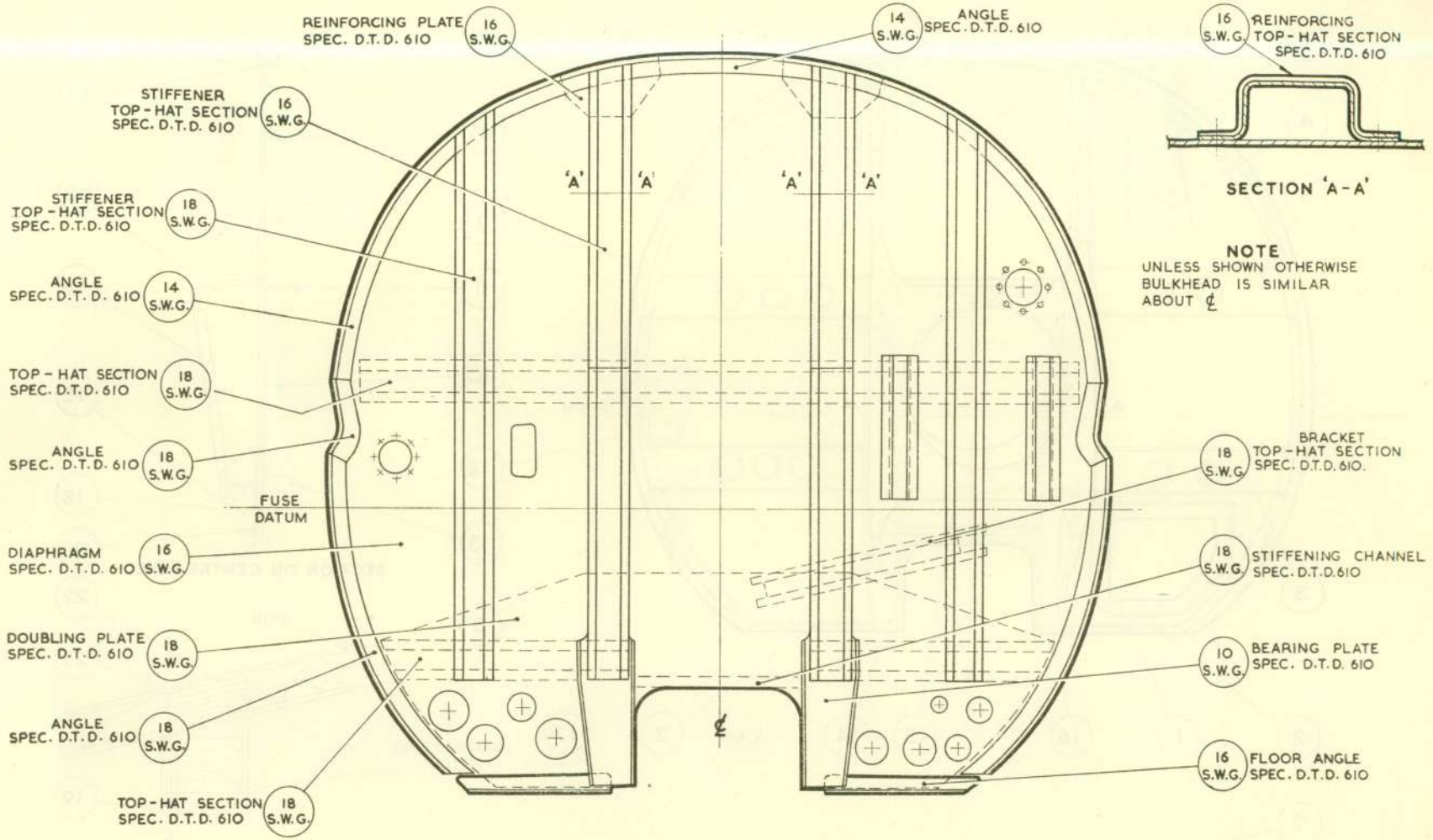
Fig. 2/7. Bulkhead rings No. 1 and 4, all Marks



Definition of negligible and repairable damage

Item		Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
FIREPROOF BULKHEAD	Diaphragms	0·1 deep, 0·75 dia., 12·0 min spacing	Up to 3·0 dia., 12·0 spacing	2/49
			Lower segment of bulkhead	2/51
	Stiffeners	0·03 deep, 0·5 dia., 6·0 min. spacing	Exceeding negligible	Replace
	Cowling support channels	0·05 deep, 1·0 dia., 12·0 min. spacing	Exceeding negligible	2/52

Fig. 2/8. Bulkheads No. 1 and 4, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
DIAPHRAGM	0·1 deep, 0·75 dia., 12·0 min. spacing	Up to 3·0 dia., 12·0 spacing	2/49
STIFFENERS Forward face	No damage can be regarded as negligible	Damaged stiffeners to be replaced	
Rear face	0·05 deep, 0·75 dia., 12·0 min. spacing	Exceeding negligible	Replace

Fig. 2/9. Bulkhead No. 1, Mk.2

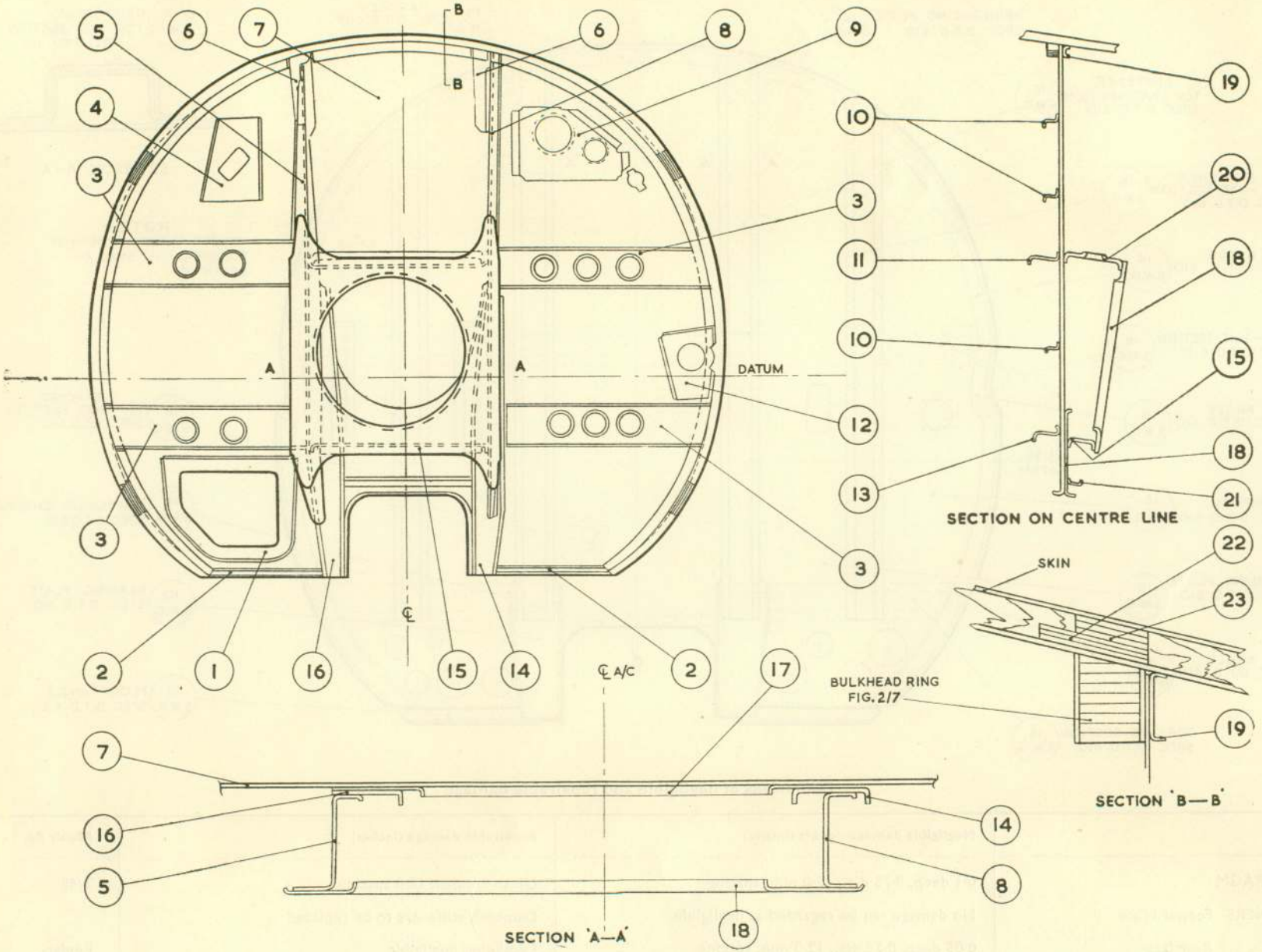


Fig. 2/10. Bulkhead No. 1, Mk.3

KEY TO FIG. 2/10 (BULKHEAD NO. 1, MK.3)

Ref. No.	Description of part	Material or section S.W.G.	Material or section Spec.	Negligible damage—dents Maximum depth	Negligible damage—dents Minimum dia.	Negligible damage—dents Minimum spacing	Repairable damage	Repair fig.
1	COAMING	20	L.72	0·05	0·5	6·0	Exceeding negligible	Replace
2	FLOOR CHANNEL	20	L.72	0·05	0·5	6·0		
3	CHANNEL MEMBERS	18	L.72	0·03	0·5	9·0		
4	DOUBLER	18	L.72	0·05	0·5	4·0		
5	VERTICAL ZED MEMBER	20	L.72	0·03	0·75	12·0	1·0×0·5, 24·0 spacing	2/50
6	BRACKET	20	L.72	0·03	0·75	6·0	Exceeding negligible	Replace
7	DIAPHRAGM	20	L.72	0·05	1·0	12·0	Up to 3·0 dia., 12·0 spacing	2/49
8	VERTICAL CHANNEL MEMBER	20	L.72	0·03	0·75	12·0	1·0×0·5, 24·0 spacing	2/50
9	PANEL	22	L.72	0·1	0·75	6·0	Exceeding negligible	Replace
10	STRINGERS, STANDARD SECTION		J.993	0·03	0·75	12·0	Exceeding negligible	S.A.
11	HORIZONTAL ZED MEMBER	18	L.72	0·03	0·75	12·0	1·0×0·5, 24·0 spacing	2/50
12	DOUBLER	20	L.72	0·05	0·5	4·0	Exceeding negligible	Replace
13	HORIZONTAL ZED MEMBER	16	L.72	0·03	0·75	12·0	1·0×0·5, 24·0 spacing	2/50
14	VERTICAL CHANNEL MEMBER	10	L.72	0·03	1·0	12·0	Exceeding negligible	S.A.
15	BOTTOM RIB	20	L.72	0·05	0·75	9·0	1·0×0·5, one only	2/50
16	VERTICAL CHANNEL MEMBER	10	L.72	0·03	1·0	12·0	Exceeding negligible	S.A.
17	DOUBLER	20	L.72	0·03	0·75	9·0		
18	TOP PLATE	22	L.72	0·03	0·5	6·0	Up to 1·0 dia., 12·0 spacing	2/49
19	RIM CHANNEL	20	L.72	0·03	0·5	9·0	Exceeding negligible	Replace
20	TOP RIB	20	L.72	0·05	0·75	9·0	1·0×0·5, one only	2/50
21	CHANNEL	22	L.72	0·05	0·5	4·0	Exceeding negligible	Replace
22	SCREWING STRIP, PLY	$\frac{3}{16}$ thick	V.3	Bruises one lamination deep 0·5 across and 1·0 along grain, 10·0 spacing			Exceeding negligible	2/48
23	SPRUCE INSERT, LAMINATED	—	D.T.D.36B	Bruises 0·05 deep, 0·5 across and 1·0 along grain, 12·0 spacing				

Note . . . *All dimensions given in this table are in inches.*

NOTE:

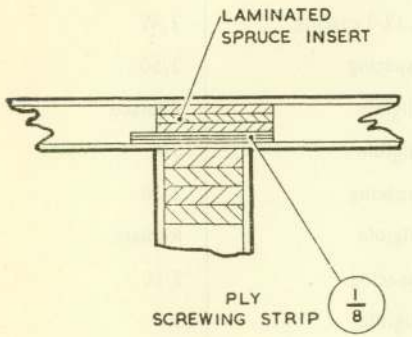
ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D. 368 UNLESS STATED OTHERWISE

AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE. THE REMAINING SPACES ARE FILLED WITH BALSA

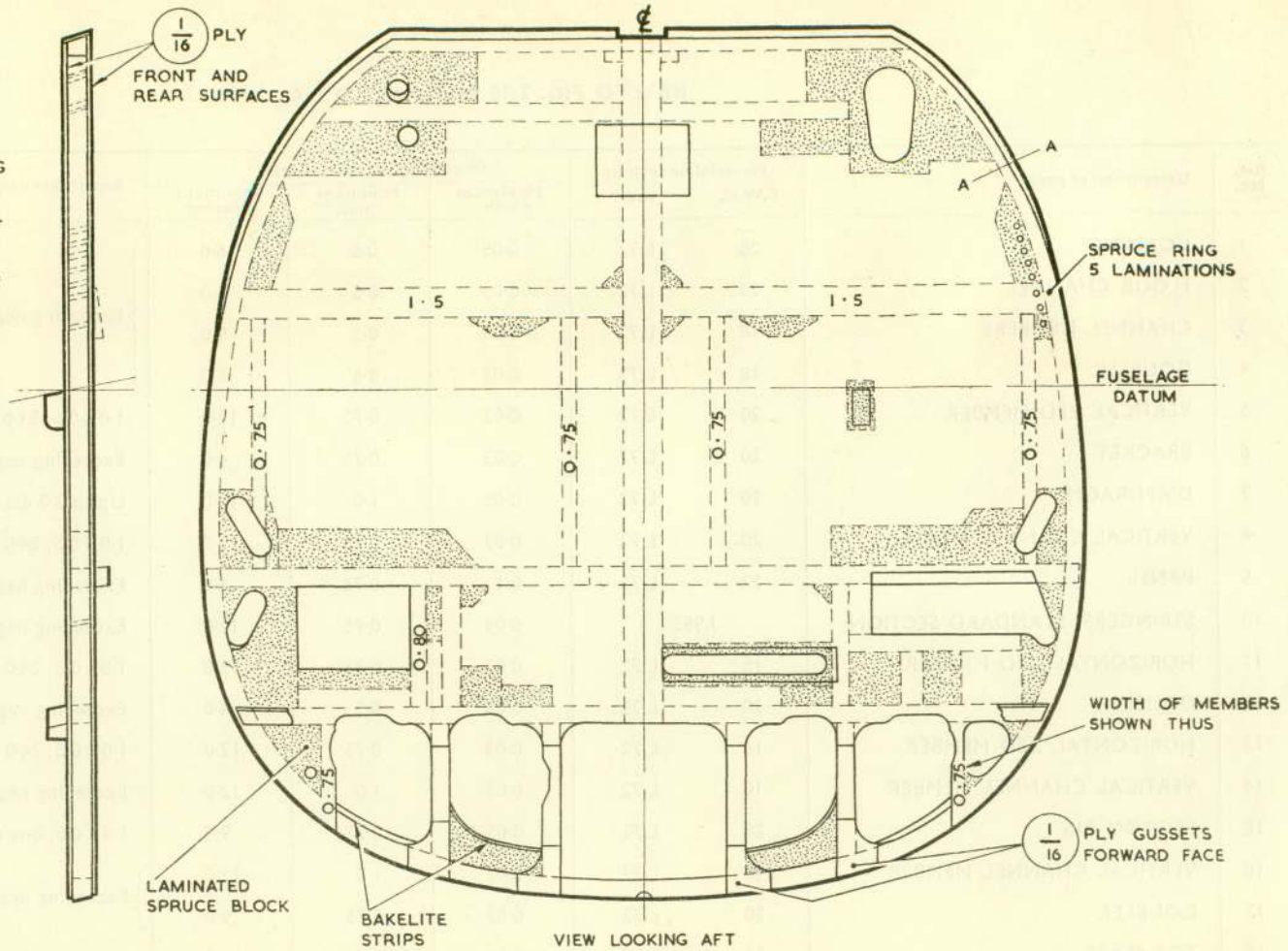
EXCEPT WHERE SHOWN OTHERWISE ALL MEMBERS ARE 1·0 IN. WIDE AND THE DEPTH BETWEEN PLYS OF 1·16 IN. IS CONSTANT THROUGHOUT THE BULKHEAD

ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE INCHES UNLESS NOTED OTHERWISE

ALL PLY IS BIRCH TO SPECIFICATION V.3



SECTION 'A-A'



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes 0·6 × 1·8, one per each half of bulkhead Up to 3·0 dia., 36·0 spacing Damage exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.

Fig. 2/11. Bulkhead No. 2, Mk.1 pre-Mod. Ven.80

NOTE:-

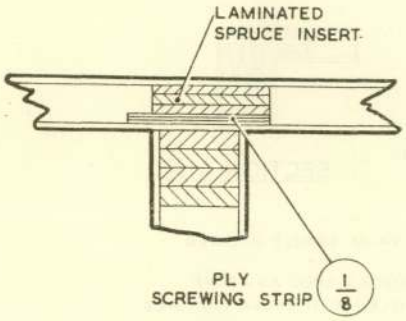
ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D 368 UNLESS STATED OTHERWISE

AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE. THE REMAINING SPACES ARE FILLED WITH BALSA

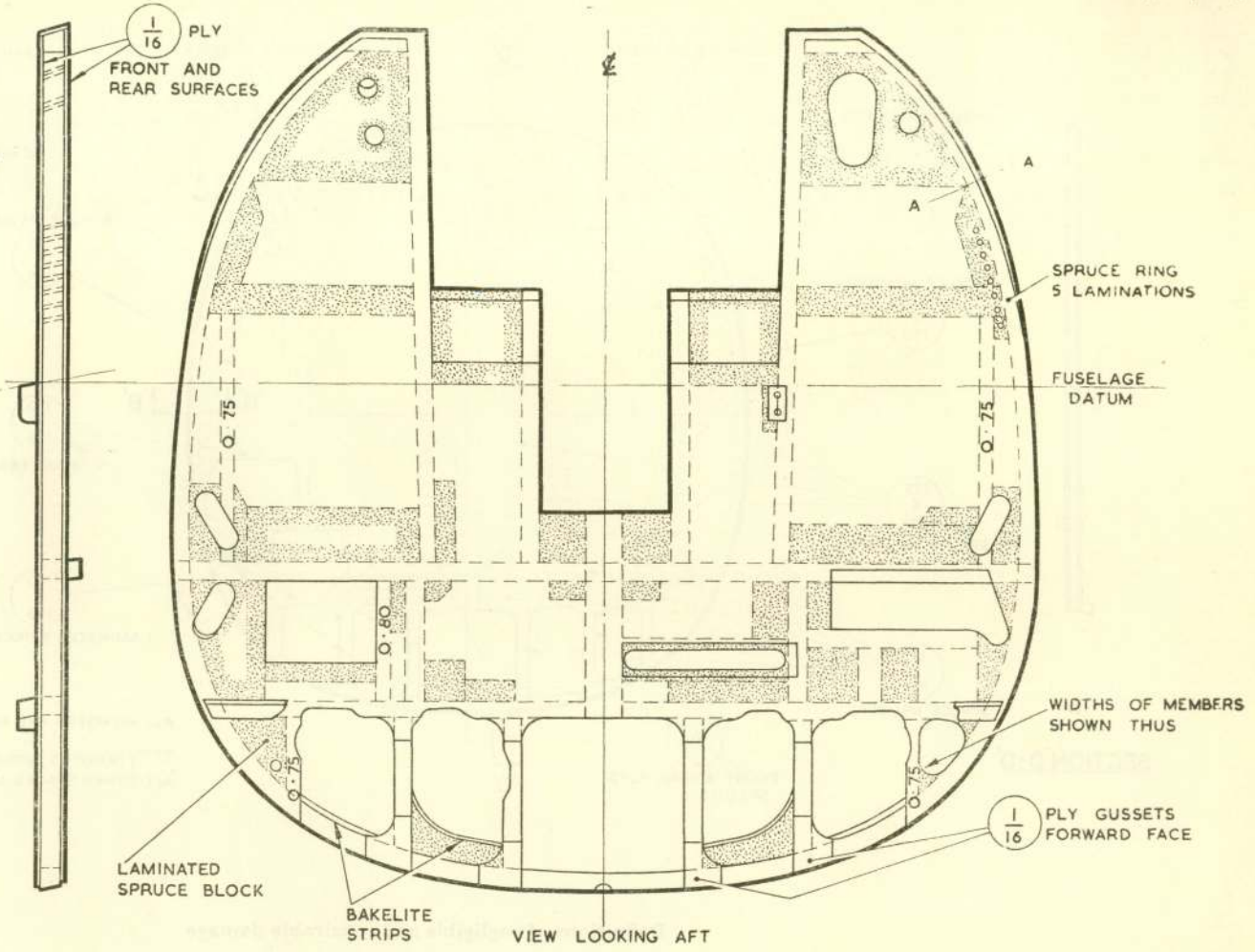
EXCEPT WHERE SHOWN OTHERWISE ALL MEMBERS ARE 1·0 IN. WIDE AND THE DEPTH BETWEEN PLYS OF 1·16 IN. IS CONSTANT THROUGHOUT THE BULKHEAD

ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES UNLESS NOTED OTHERWISE

ALL PLY IS BIRCH TO SPECIFICATION V.3



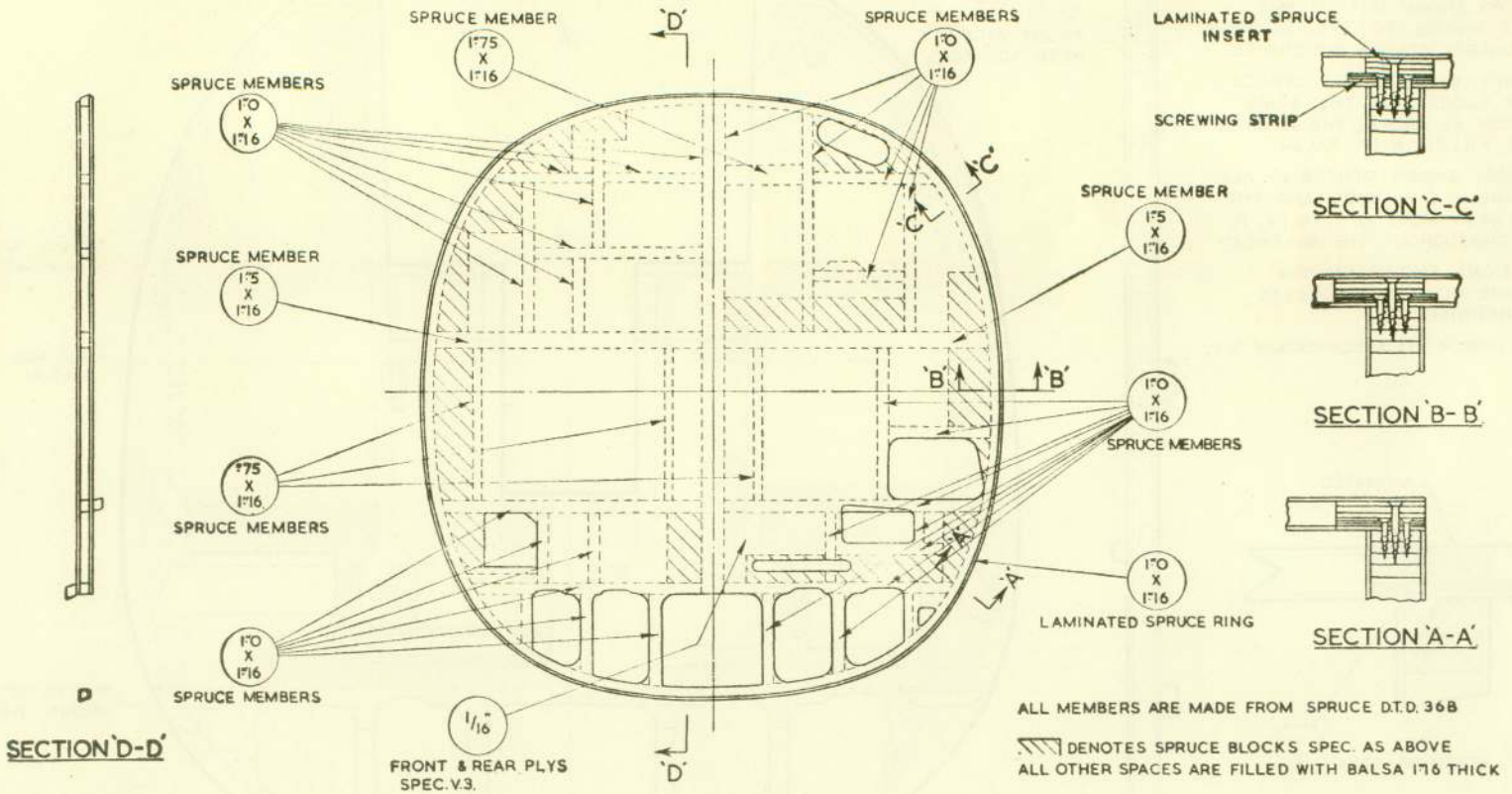
SECTION 'A-A'



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes 0·6 × 1·8, one per each half of bulkhead Up to 3·0 dia., 36·0 spacing Damage exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.

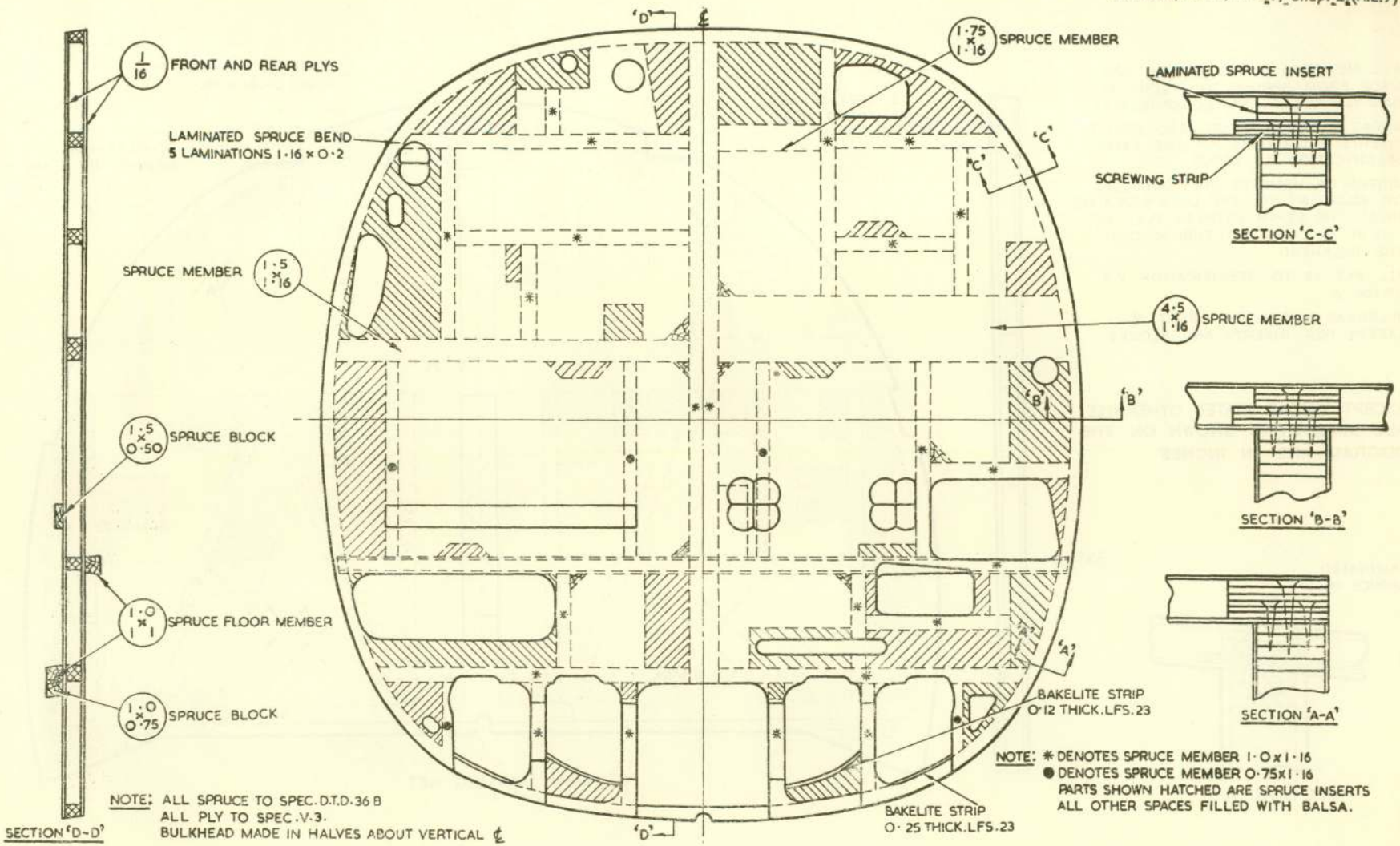
Fig. 2/12. Bulkhead No. 2, Mk.1 post-Mod. Ven.80 and Mk.4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes 0·6 × 1·8, one per each half of bulkhead Up to 3·0 dia., 36·0 spacing Damage exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.

Fig. 2/13. Bulkhead No. 2, Mk.2



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes 0·6 × 1·8, one per each half of bulkhead Up to 3·0 dia., 36·0 spacing Damage exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.

Fig. 2/14. Bulkhead No. 2, Mk.3

ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D.36 B UNLESS STATED OTHERWISE

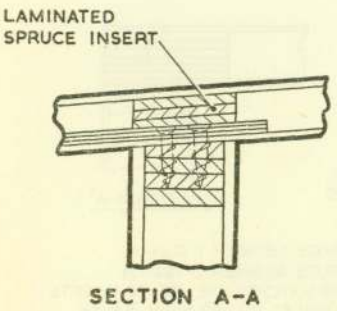
AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE

WIDTHS OF MEMBERS ARE FOUND ON OR ADJACENT TO THE LINES INDICATING THEM. THE DEPTH BETWEEN PLYS OF 1·12 IN. IS CONSTANT THROUGHOUT THE BULKHEAD

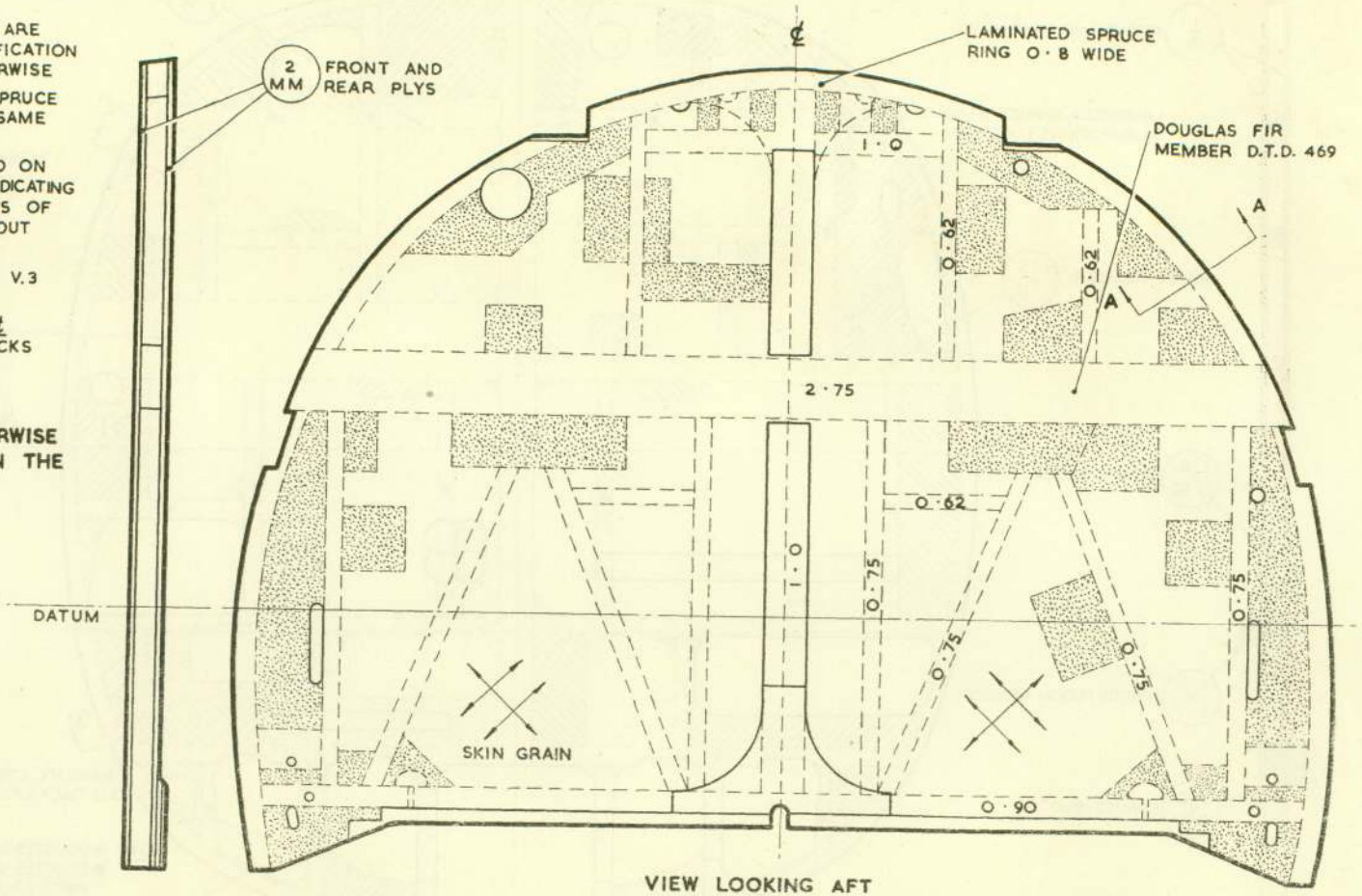
ALL PLY IS TO SPECIFICATION V.3 GRADE A

BULKHEAD IS SIMILAR ABOUT ℄ EXCEPT FOR INSERTS AND BLOCKS

EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES



SECTION A–A

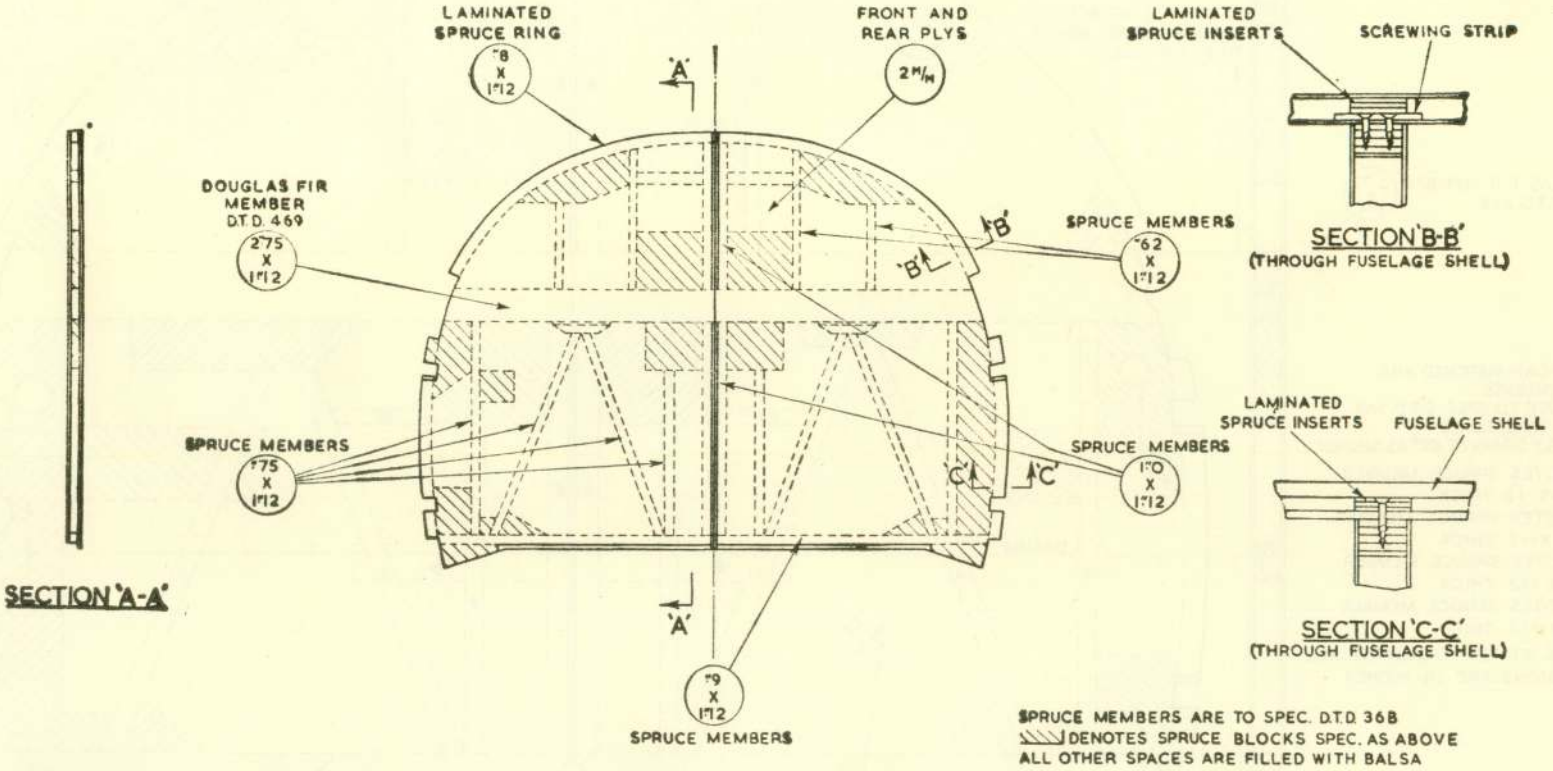


VIEW LOOKING AFT

Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing		

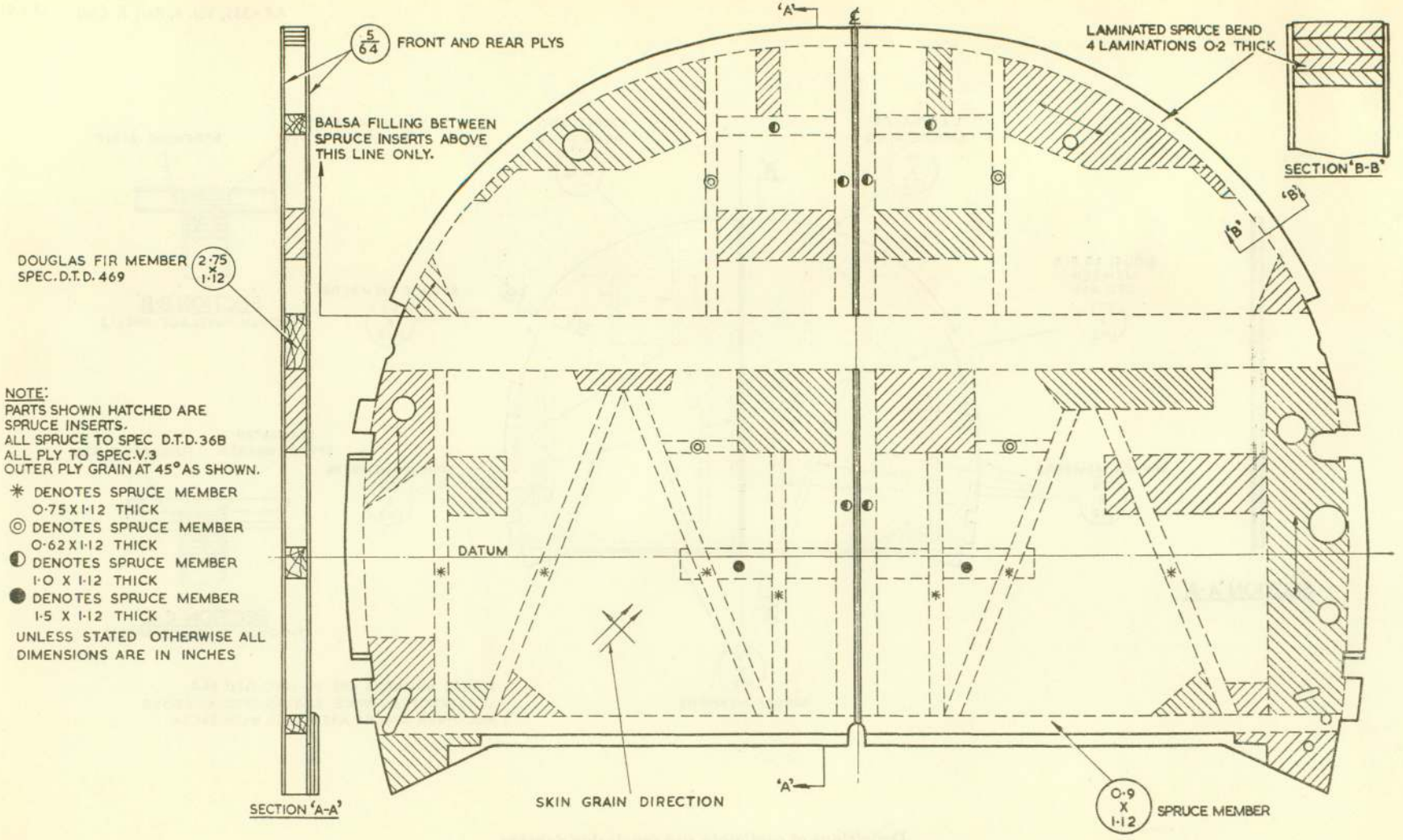
Fig. 2/15. Bulkhead No. 3, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing		

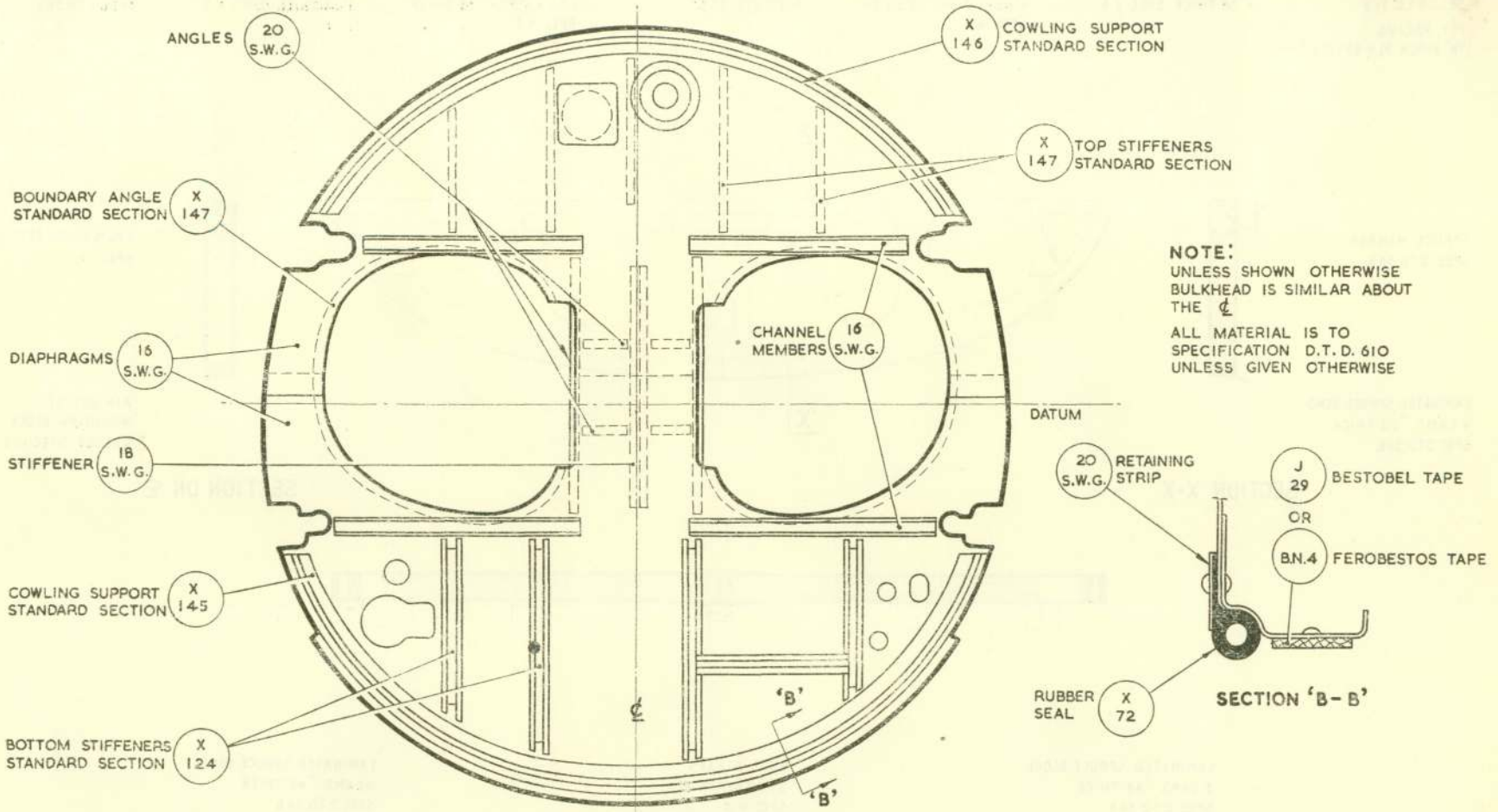
Fig. 2/16. Bulkhead No. 3, Mk.2



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKIN	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing		

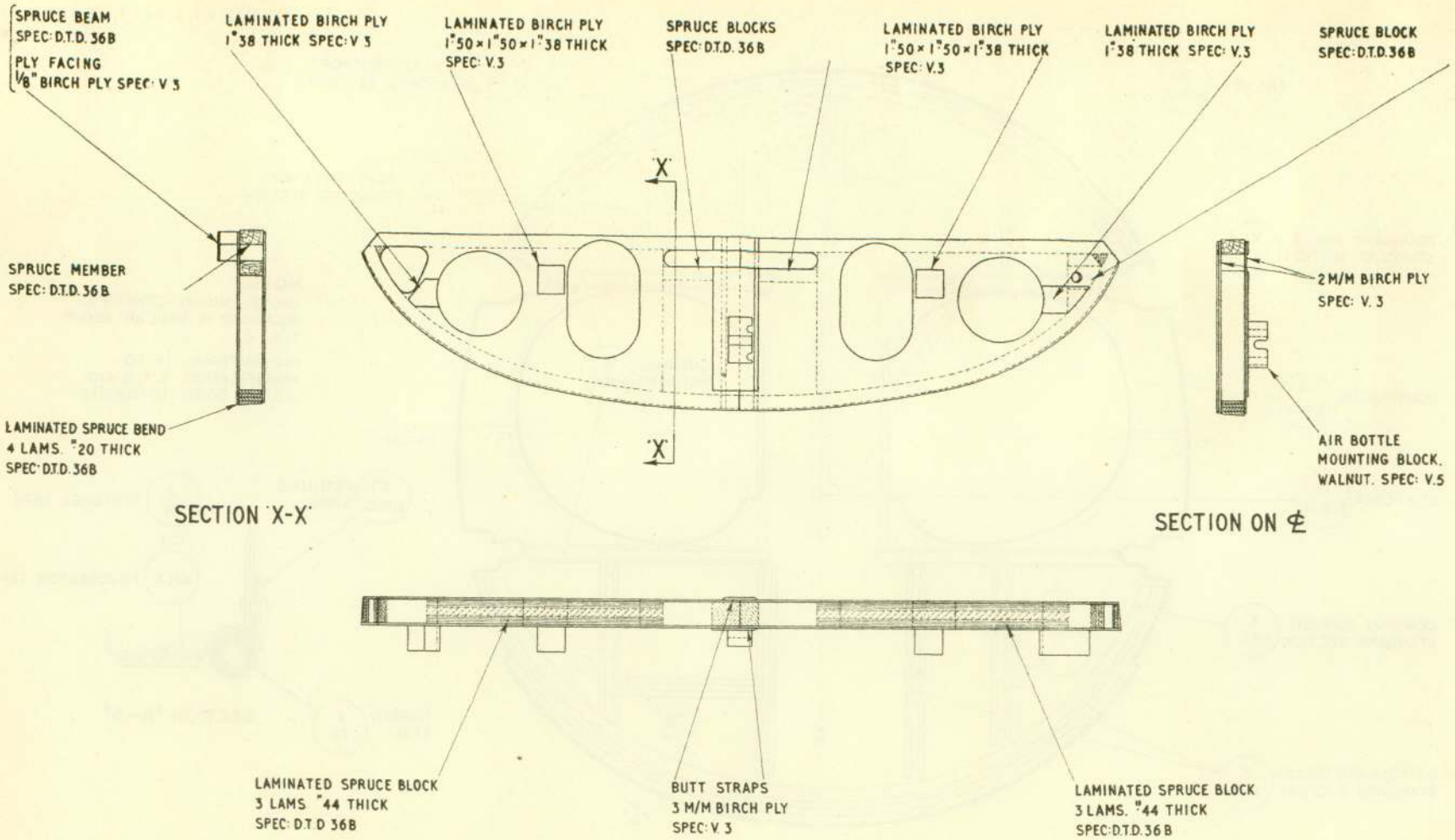
Fig. 2/17. Bulkhead No. 3, Mk.3



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
DIAPHRAGM	0·1 deep, 0·75 dia., 12·0 min. spacing	Up to 3·0 dia., 12·0 spacing Lower segment	2/49 2/51
STIFFENERS	0·05 deep, 0·5 dia., 6·0 min. spacing	Exceeding negligible	Replace
COWLING SUPPORT CHANNELS	0·05 deep, 0·5 dia., 6·0 min. spacing	Insertion repair	2/52

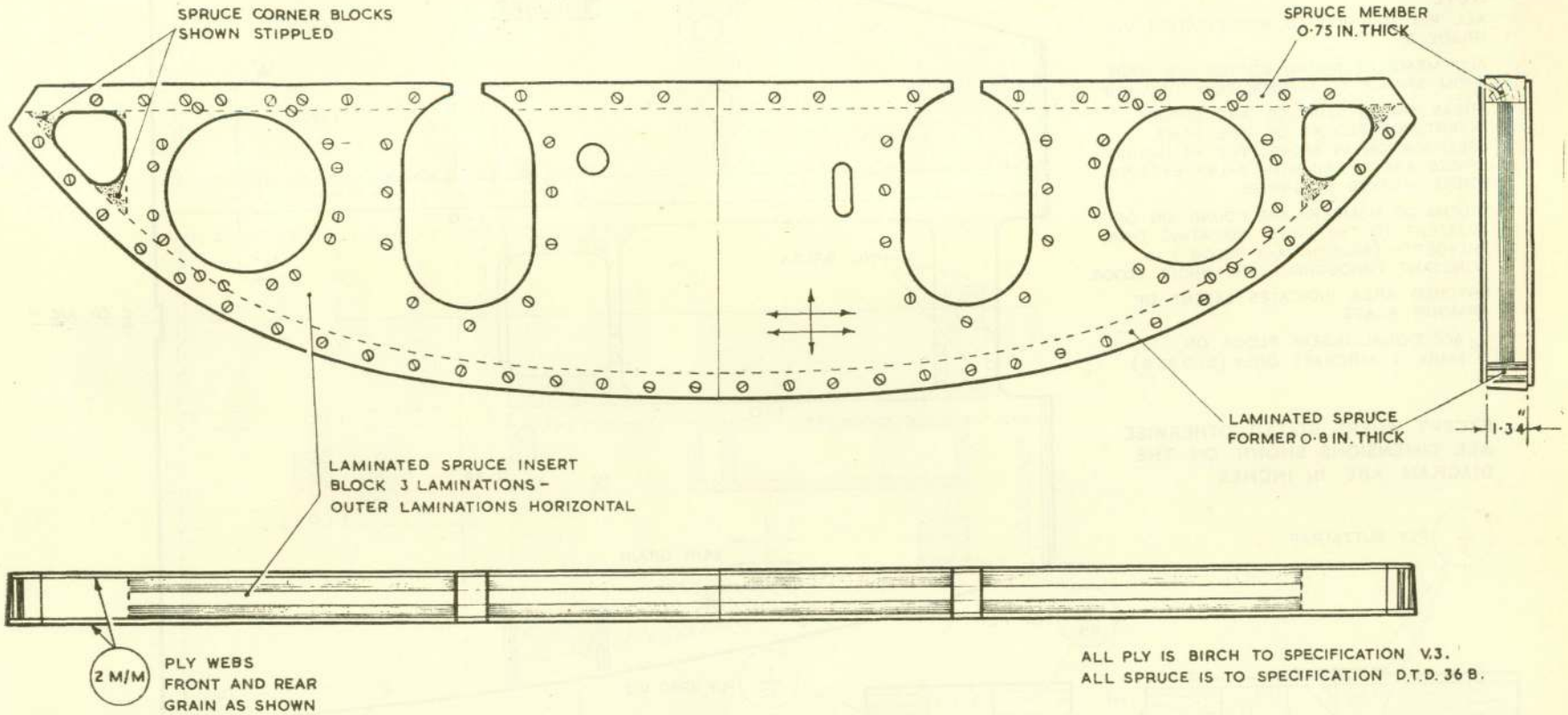
Fig. 2/18. Bulkhead No. 4, Mk.2 and 3



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.
TOP SPRUCE MEMBER AND INSERTS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing		
BOTTOM SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/19. Cannon beam, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Exceeding negligible	S.A.
TOP SPRUCE MEMBER AND INSERTS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing		
BOTTOM SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/20. Cannon beam, Mk.2 and 3

NOTE

ALL PLY IS BIRCH TO SPECIFICATION V.3 GRADE A

ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D. 36B

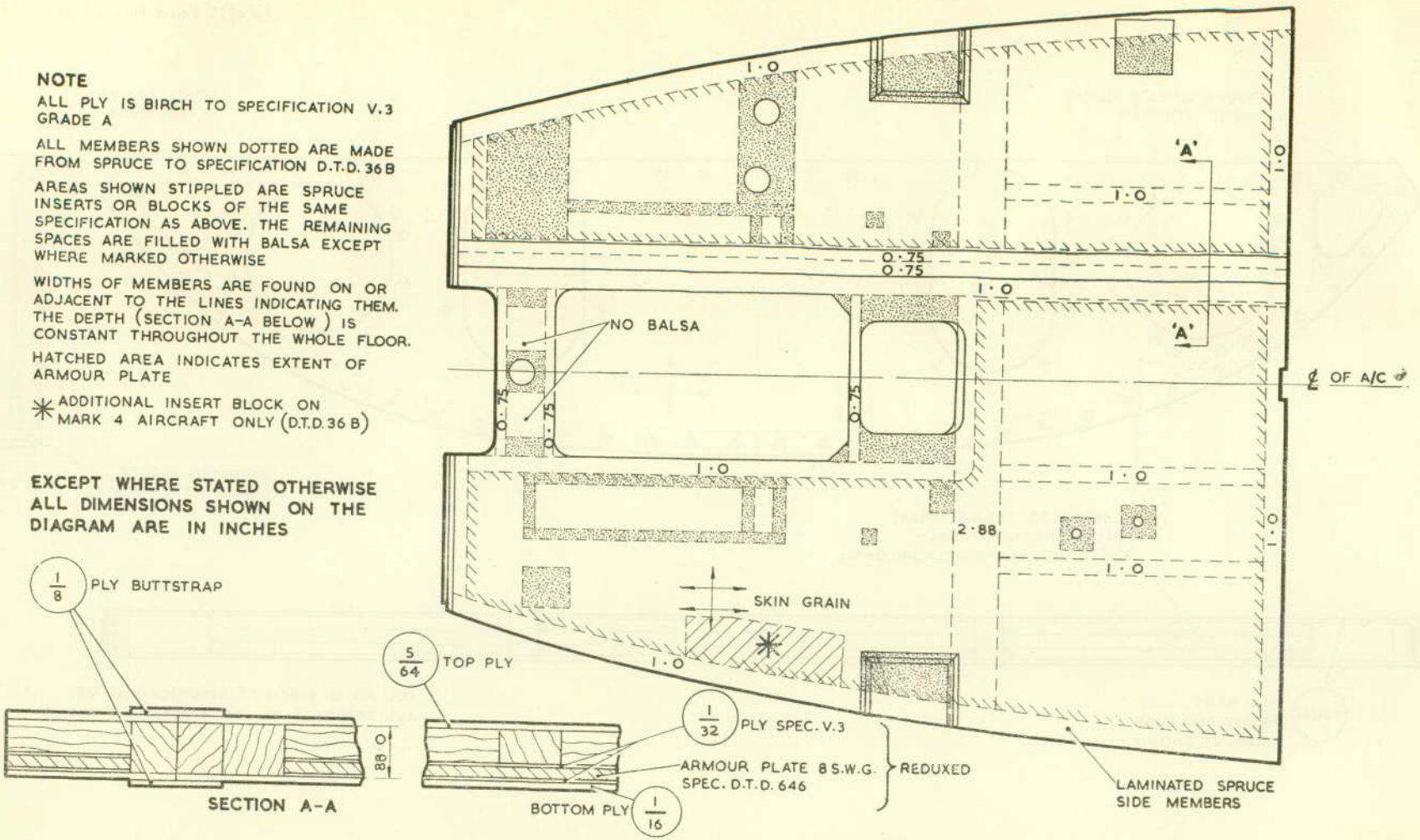
AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE. THE REMAINING SPACES ARE FILLED WITH BALSA EXCEPT WHERE MARKED OTHERWISE

WIDTHS OF MEMBERS ARE FOUND ON OR ADJACENT TO THE LINES INDICATING THEM. THE DEPTH (SECTION A–A BELOW) IS CONSTANT THROUGHOUT THE WHOLE FLOOR.

HATCHED AREA INDICATES EXTENT OF ARMOUR PLATE

✳ ADDITIONAL INSERT BLOCK ON MARK 4 AIRCRAFT ONLY (D.T.D. 36B)

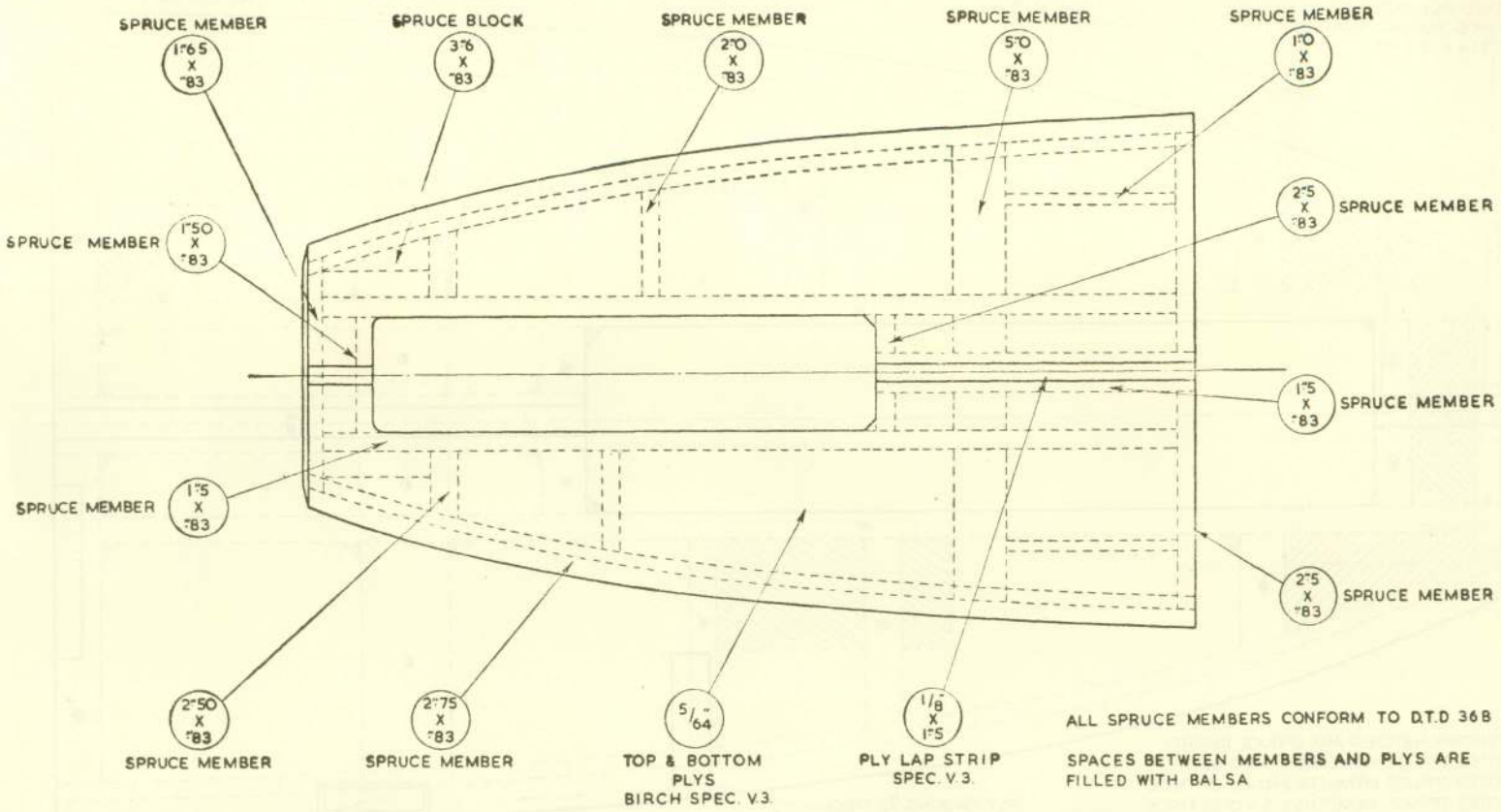
EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Up to 3·0 dia., 18·0 spacing Exceeding above	2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

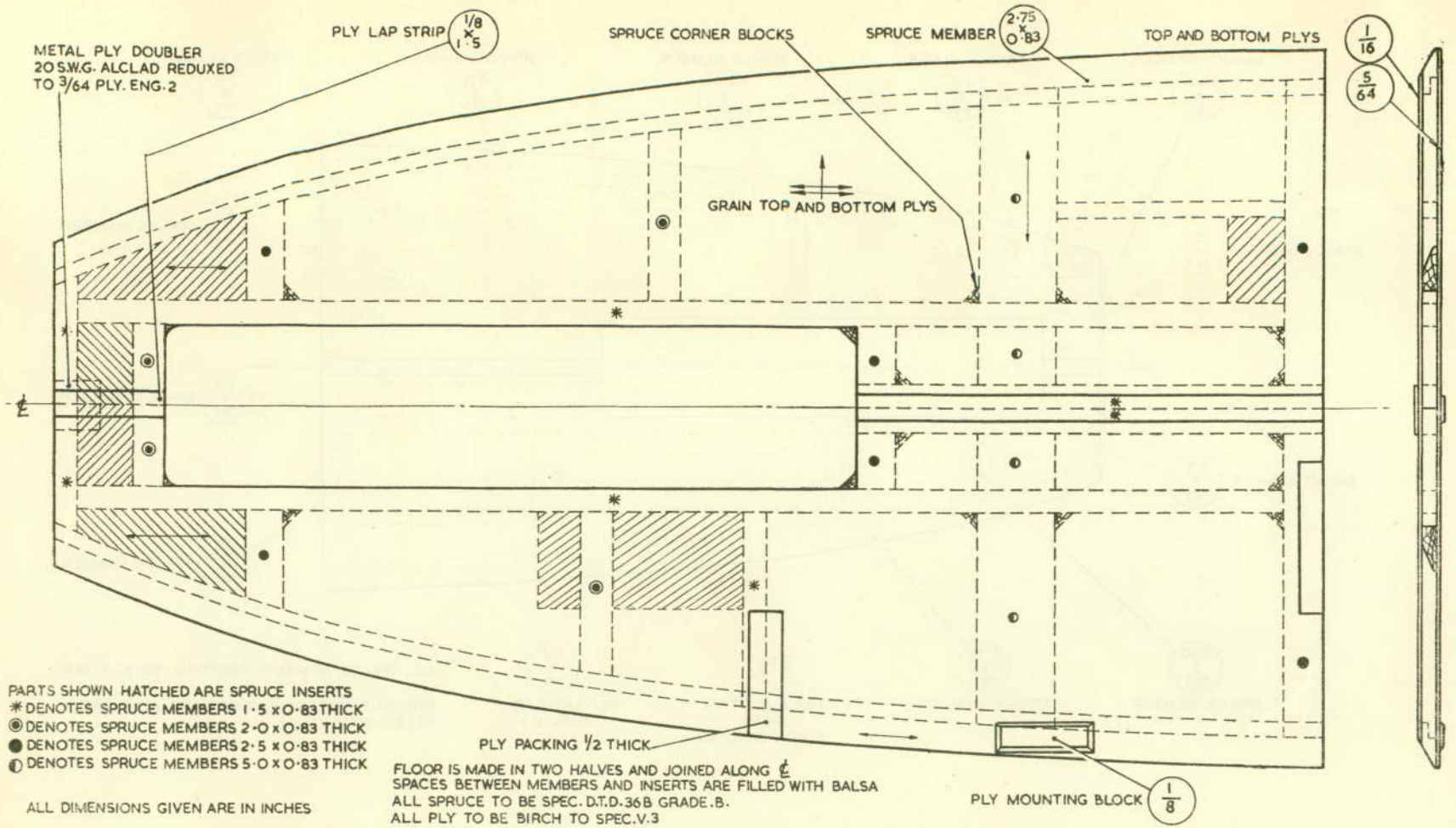
Fig. 2/21. Cockpit floor, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes, 0·6 × 1·8, 18·0 spacing Up to 3·0 dia., 18·0 spacing Exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

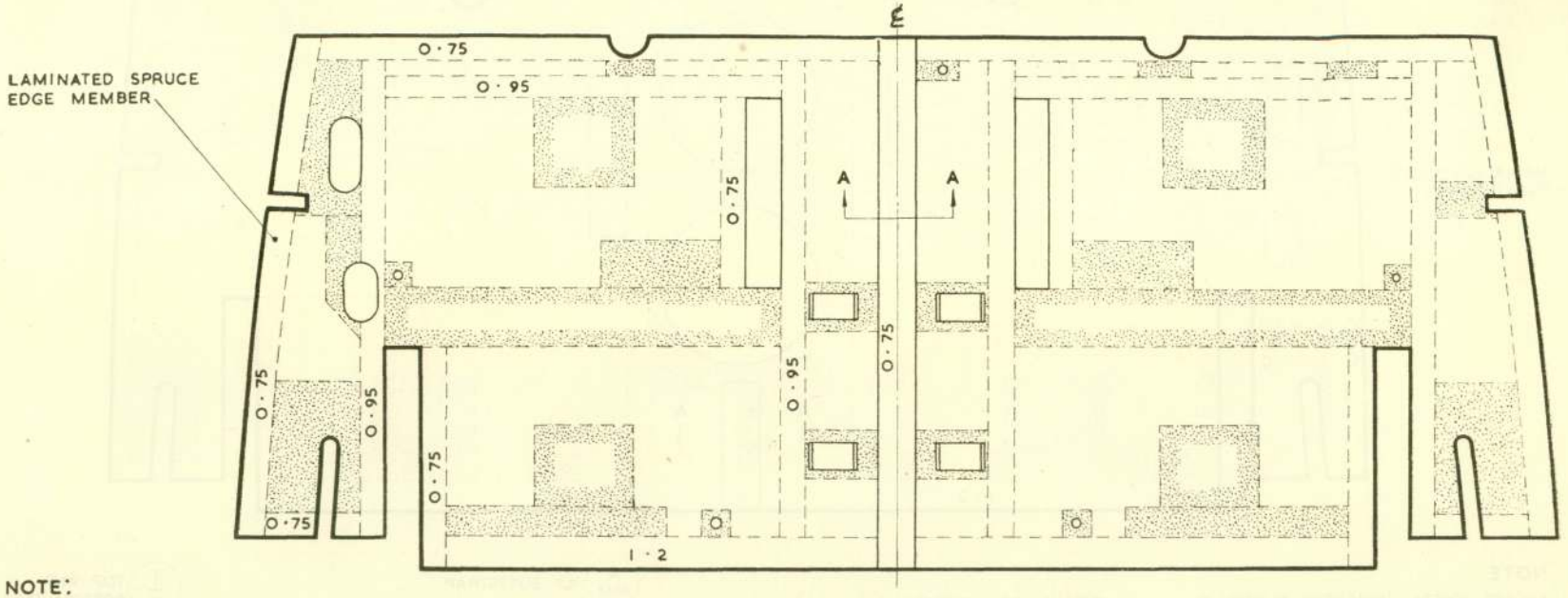
Fig. 2/22. Cockpit floor, Mk.2



Definition of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes, 0·6 × 1·8, 18·0 spacing Up to 3·0 dia., 18·0 spacing Exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/23. Cockpit floor, Mk.3



NOTE:

EXCEPT WHERE INDICATED FLOOR IS SIMILAR ABOUT ℄

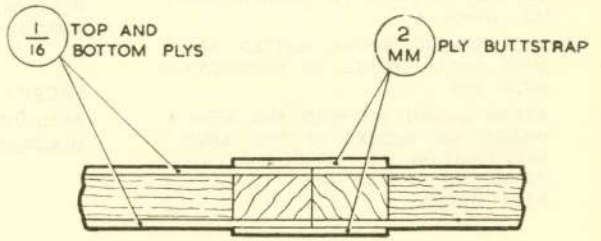
ALL PLY IS BIRCH TO SPECIFICATION V.3 GRADE A

ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D. 36 B

AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE. THE REMAINING SPACES ARE FILLED WITH BALSA

WIDTHS OF MEMBERS ARE FOUND ON OR ADJACENT TO THE LINES INDICATING THEM. THE DEPTH BETWEEN PLYS OF 0·48 IN. IS CONSTANT THROUGHOUT THE WHOLE FLOOR

EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES

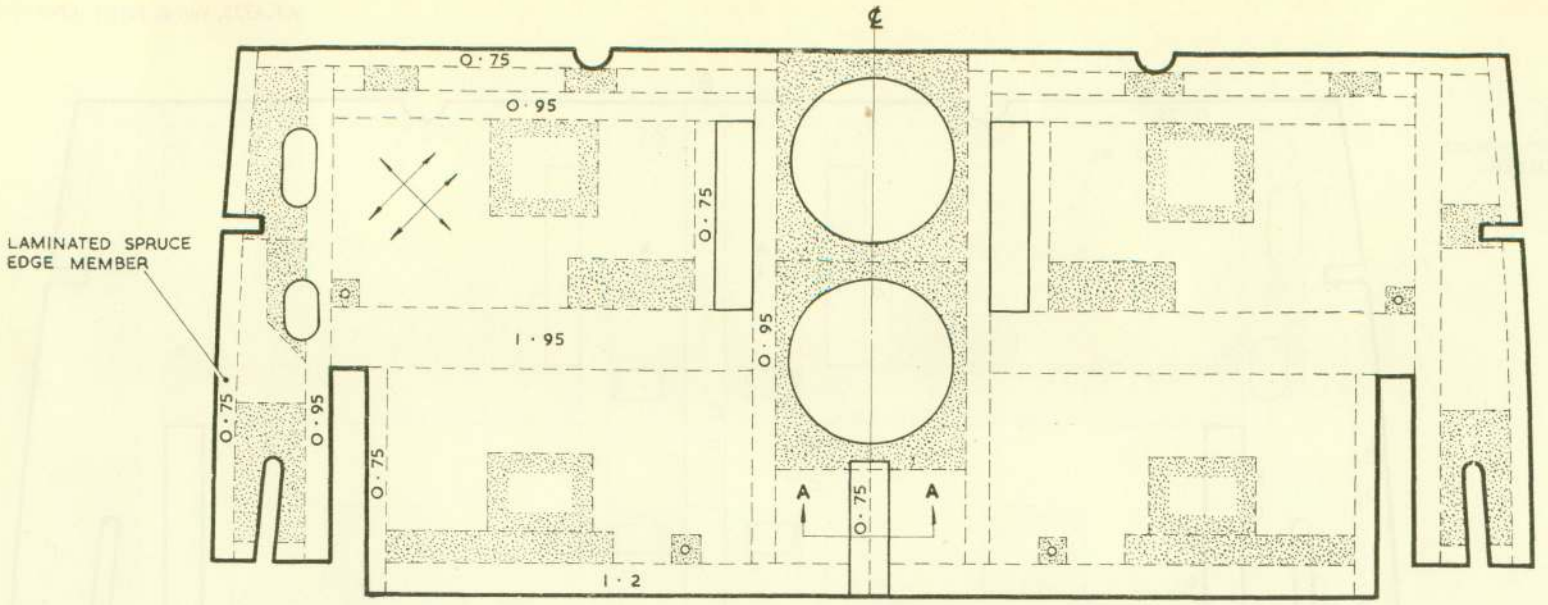


SECTION A-A

Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes, 0·6 × 1·8, 18·0 spacing Up to 3·0 dia., 18·0 spacing Exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/24. Cannon floor, Mk.1 pre-Mod. Ven. 80



NOTE

EXCEPT WHERE INDICATED FLOOR IS SIMILAR ABOUT ℄

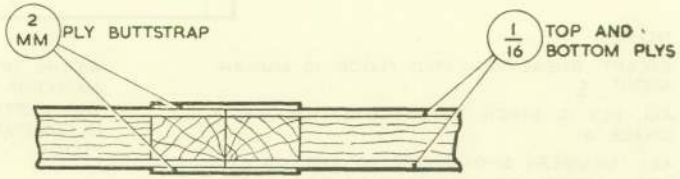
ALL PLY IS BIRCH TO SPECIFICATION V.3 GRADE A

ALL MEMBERS SHOWN DOTTED ARE MADE FROM SPRUCE TO SPECIFICATION D.T.D. 36B

AREAS SHOWN STIPPLED ARE SPRUCE INSERTS OR BLOCKS OF THE SAME SPECIFICATION AS ABOVE. THE REMAINING SPACES ARE FILLED WITH BALSA

WIDTHS OF MEMBERS ARE FOUND ON OR ADJACENT TO THE LINES INDICATING THEM. THE DEPTH BETWEEN PLYS OF 0·48 IN. IS CONSTANT THROUGHOUT THE WHOLE FLOOR

EXCEPT WHERE STATED OTHERWISE ALL DIMENSIONS SHOWN ON THE DIAGRAM ARE IN INCHES

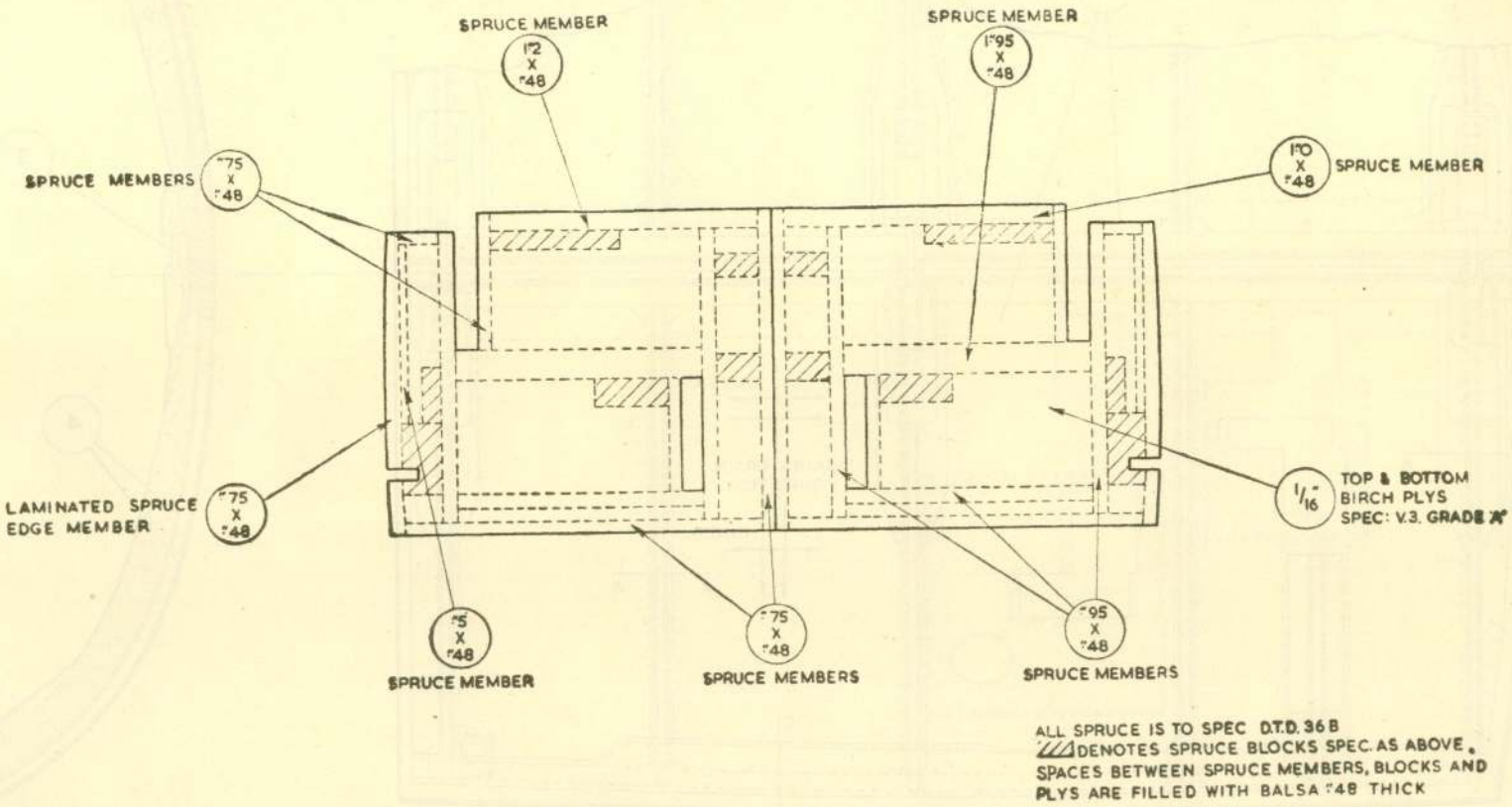


SECTION A–A

Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes, 0·6 × 1·8, 18·0 spacing Up to 3·0 dia., 18·0 spacing Exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/25. Cannon floor, Mk.1 post-Mod. Ven.80 and Mk.4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Groups of holes, 0·6 × 1·8, 18·0 spacing Up to 3·0 dia., 18·0 spacing Exceeding above	2/45(B) 2/46(A) 2/47
SPRUCE MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

Fig. 2/26. Cannon floor, Mk. 2 and 3

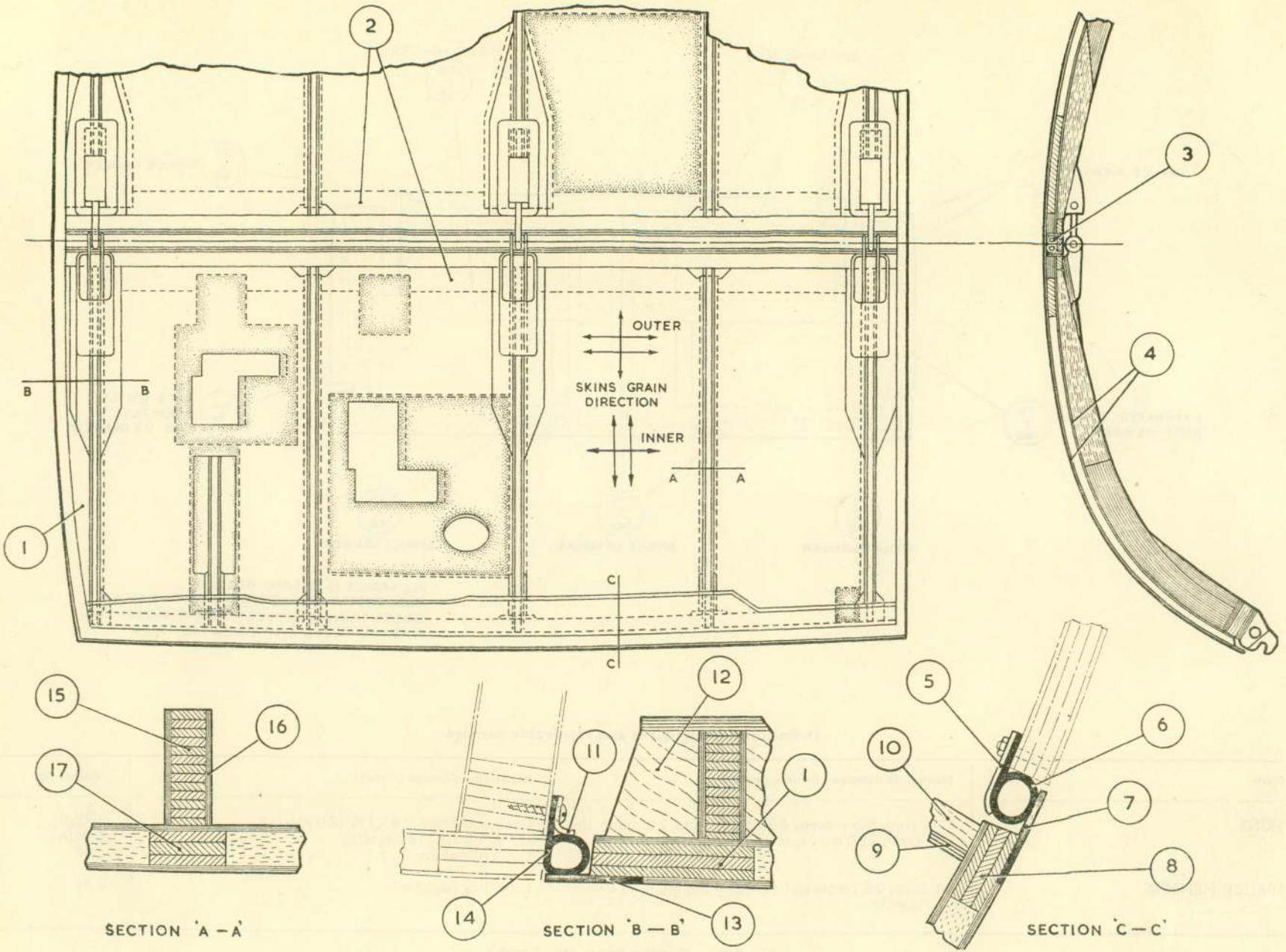


Fig. 2/27. Cannon access doors, Mk.1 and 4

KEY TO FIG. 2/27 (CANNON ACCESS DOORS, MK.I AND 4)

Ref. No.	Description	Material and sections		Ref. No.	Description	Material and sections	
		Size	Spec.			Size	Spec.
1	EDGE MEMBER, LAMINATED SPRUCE	2·5 wide	D.T.D.36B	10	HINGE RAIL	0·5 thick	D.T.D.36B
2	EDGE MEMBER, LAMINATED SPRUCE	2·5 wide	D.T.D.36B	11	RETAINING ANGLE	20 S.W.G.	D.T.D.610
3	RUBBER SEAL	X.72		12	PACKING BLOCKS	—	D.T.D.36B
4	PLY SKINS, INNER AND OUTER	1½ m.m.	V.3	13	CLOSING STRIP	16 S.W.G.	D.T.D.610
5	RETAINING STRIP	20 S.W.G.	D.T.D.610	14	RUBBER SEAL	J.915	
6	RUBBER SEAL	J.915		15	RIB MEMBERS, LAMINATED SPRUCE	0·5 thick	D.T.D.36B
7	CLOSING STRIP	16 S.W.G.	D.T.D.610	16	PLY FACINGS, ALL RIBS	4 m.m.	V.3
8	EDGE MEMBER, LAMINATED SPRUCE	1·25 wide	D.T.D.36B	17	INSERT MEMBERS, LAMINATED SPRUCE, ALL RIBS	1·0 wide	D.T.D.36B
9	PLY FACING	$\frac{3}{16}$	V.3				

Note . . . *All dimensions on Fig. 2/27, Key and Table are in inches unless stated otherwise. Areas shown stippled are spruce inserts or blocks to specification D.T.D.36B. The remaining spaces between inserts and members are filled with balsa.*

Definitions of negligible and repairable damage (Fig. 2/27)

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKINS	One lamination deep, 0·75 across and 1·0 along the grain, 12·0 min. spacing	Isolated holes 0·6 × 1·8, 24·0 spacing Groups of holes 0·6 × 1·8, 12·0 spacing Up to 3·0 dia., 12·0 spacing Exceeding above	2/45(A) 2/45(B) 2/46(A) 2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

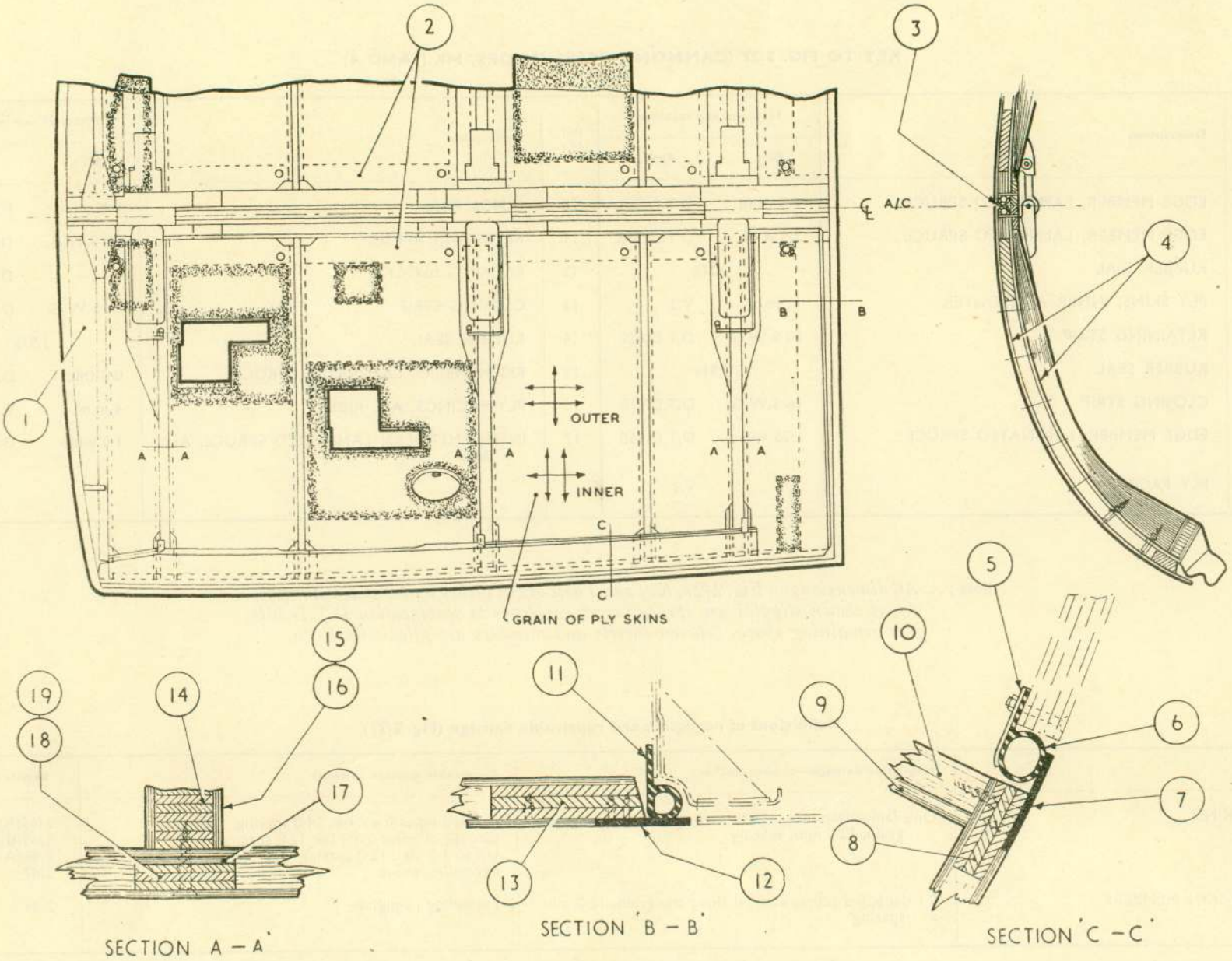


Fig. 2/28. Cannon access doors, Mk.2

KEY TO FIG. 2/28 (CANNON ACCESS DOORS, MK.2)

Ref. No.	Description	Material and sections		Ref. No.	Description	Material and sections	
		Size	Spec.			Size	Spec.
1	EDGE MEMBER, LAMINATED SPRUCE	2·6 wide	D.T.D.36B	11	RUBBER SEAL	—	—
2	EDGE MEMBER, LAMINATED SPRUCE	2·5 wide	D.T.D.36B	12	CLOSING STRIP	16 S.W.G.	D.T.D.610
3	RUBBER SEAL	X.72		13	EDGE MEMBER, LAMINATED SPRUCE	2·1 wide	D.T.D.36B
4	PLY SKINS, INNER AND OUTER	$\frac{1}{16}$	V.3	14	RIB MEMBERS, LAMINATED SPRUCE	0·5 wide	D.T.D.36B
5	RETAINING STRIP	20 S.W.G.	D.T.D.610	15	PLY FACING, HINGE RIBS	4 m.m.	V.3
6	RUBBER SEAL	J.915		16	PLY FACING, OTHER RIBS	$\frac{3}{32}$	V.3
7	CLOSING STRIP	16 S.W.G.	D.T.D.610	17	PLY SCREWING STRIP	$\frac{1}{8}$	V.3
8	EDGE MEMBER, LAMINATED SPRUCE	1·38 wide	D.T.D.36B	18	INSERT MEMBERS, LAMINATED, HINGE RIBS	1·0 wide	D.T.D.36B
9	PLY FACING	$\frac{3}{16}$	V.3	19	INSERT MEMBERS, LAMINATED, OTHER RIBS	1·0 wide	D.T.D.36B
10	HINGE RAIL	2·3×0·5	D.T.D.36B				

Note . . *All dimensions on Fig. 2/28, Key and Table are in inches unless stated otherwise. Areas shown stippled are spruce inserts or blocks to specification D.T.D.36B. The remaining spaces between inserts and members are filled with balsa.*

Definitions of negligible and repairable damage (Fig. 2/28)

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKINS	One lamination deep, 0·75 across and 1·0 along the grain, 12·0 min. spacing	Isolated holes 0·6×1·8, 24·0 spacing	2/45(A)
		Groups of holes 0·6×1·8, 12·0 spacing	2/45(B)
		Up to 3·0 dia., 12·0 spacing	2/46(A)
		Exceeding above	2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

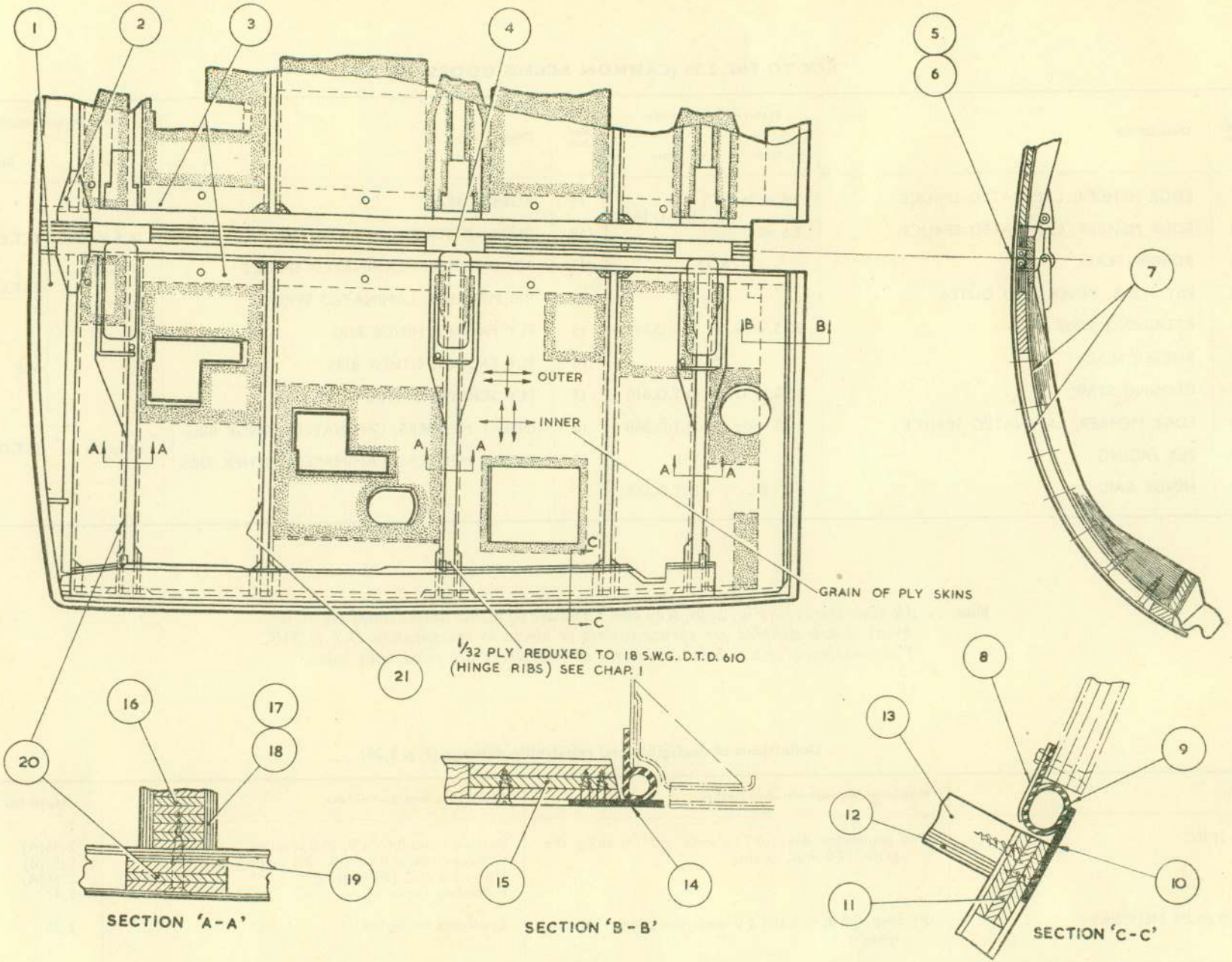


Fig. 2/29. Cannon access doors, Mk.3

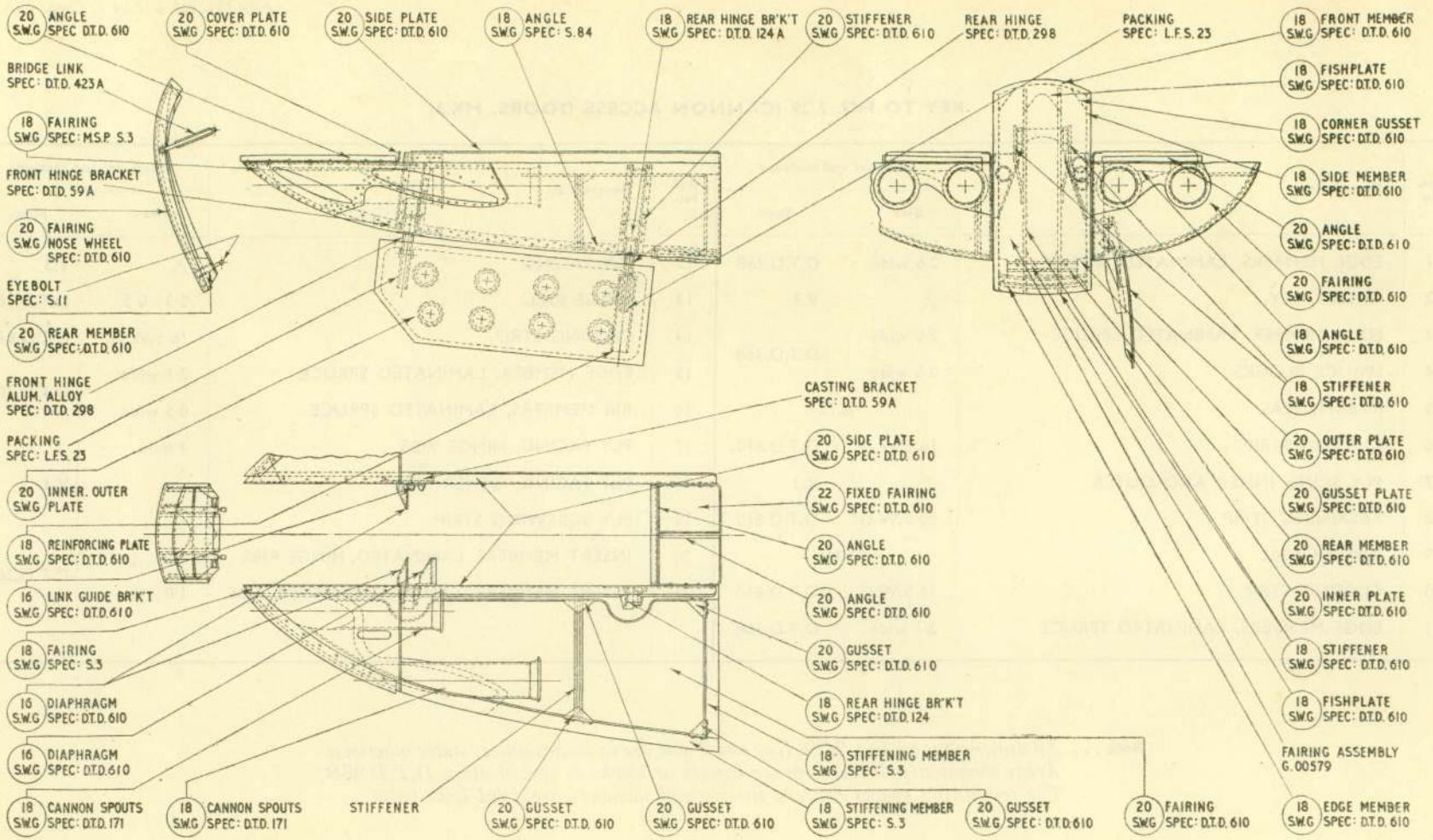
KEY TO FIG. 2/29 (CANNON ACCESS DOORS, MK.3)

Ref. No.	Description	Material and sections		Ref. No.	Description	Material and sections	
		Size	Spec.			Size	Spec.
1	EDGE MEMBERS, LAMINATED SPRUCE	2·6 wide	D.T.D.36B	12	PLY FACING	$\frac{3}{16}$	V.3
2	GUSSET, PLY	$\frac{1}{16}$	V.3	13	HINGE RAIL	2·3×0·5	D.T.D.36B
3	EDGE MEMBER, LAMINATED SPRUCE	2·5 wide	D.T.D.36B	14	CLOSING STRIP	16 S.W.G.	D.T.D.610
4	SPRUCE BLOCKS	0·5 wide		15	EDGE MEMBER, LAMINATED SPRUCE	2·1 wide	D.T.D.36B
5	RUBBER SEAL	X.72		16	RIB MEMBERS, LAMINATED SPRUCE	0·5 wide	
6	CLOSING STRIP	16 S.W.G.	D.T.D.610	17	PLY FACING, HINGE RIBS	4 m.m.	V.3
7	PLY SKINS, INNER AND OUTER	$\frac{1}{16}$	V.3	18	PLY FACING, OTHER RIBS	$\frac{3}{32}$	
8	RETAINING STRIP	20 S.W.G.	D.T.D.610	19	PLY SCREWING STRIP	$\frac{1}{8}$	
9	RUBBER SEAL	J.915		20	INSERT MEMBERS, LAMINATED, HINGE RIBS	1·0×$\frac{5}{16}$	D.T.D.36B
10	CLOSING STRIP	16 S.W.G.	D.T.D.610	21	INSERT MEMBERS, LAMINATED, OTHER RIBS	1·0×$\frac{7}{16}$	
11	EDGE MEMBERS, LAMINATED SPRUCE	2·1 wide	D.T.D.36B				

Note . . . *All dimensions on Fig. 2/29, Key and Table are in inches unless stated otherwise. Areas shown stippled are spruce inserts or blocks to specification D.T.D.36B. The remaining spaces between inserts and members are filled with balsa.*

Definitions of negligible and repairable damage (Fig. 2/29)

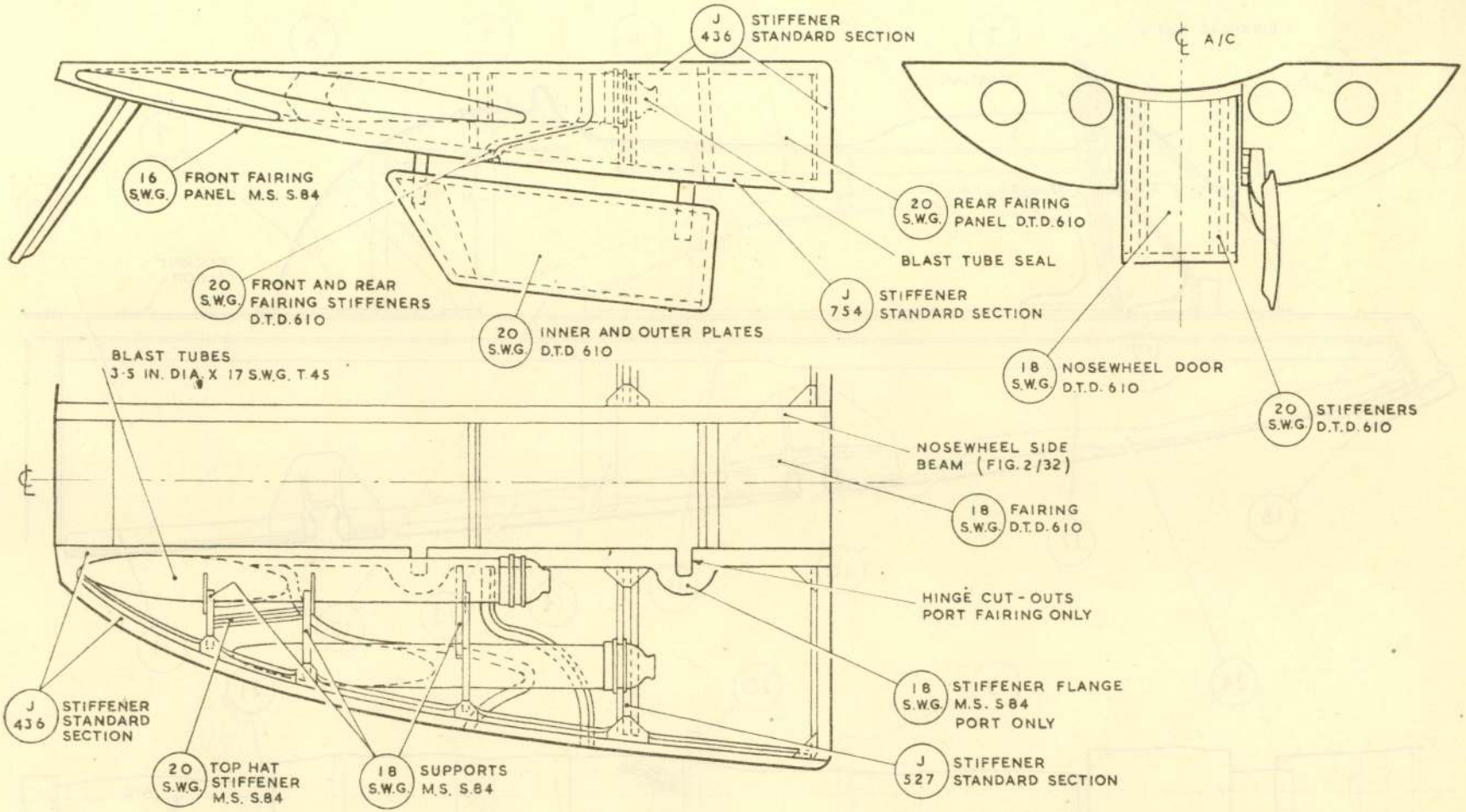
Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
PLY SKINS	One lamination deep, 0·75 across and 1·0 along the grain, 12·0 min. spacing	Isolated holes 0·6×1·8, 24·0 spacing	2/45(A)
		Groups of holes 0·6×1·8, 12·0 spacing	2/45(B)
		Up to 3·0 dia., 12·0 spacing	2/46(A)
		Exceeding above	2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
SKINS	0·1 deep, 1·0 dia., 12·0 min. spacing	Up to 5·0 dia., 18·0 spacing	2/49
SIDE PLATE	0·1 deep, 0·75 dia., 9·0 min. spacing	Web—Up to 3·0 dia., 18·0 spacing Flange—1·0 long, 18·0 spacing	2/49 2/50
STIFFENERS	0·1 deep, 0·75 dia., 8·0 min. spacing	1·0 along flange × 0·5 deep in web, 18·0 spacing	2/50

Fig. 2/30. Nose-wheel housing and cannon fairings, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
SKINS AND FAIRINGS	0·1 deep, 1·0 dia., 12·0 min. spacing	Up to 5·0 dia., 18·0 spacing	2/49
STIFFENERS	0·1 deep, 0·75 dia., 8·0 min. spacing	1·0 along flange × 0·5 deep in web, 18·0 spacing	2/50

Fig. 2/31. Nose-wheel and cannon fairings, Mk.2 and 3

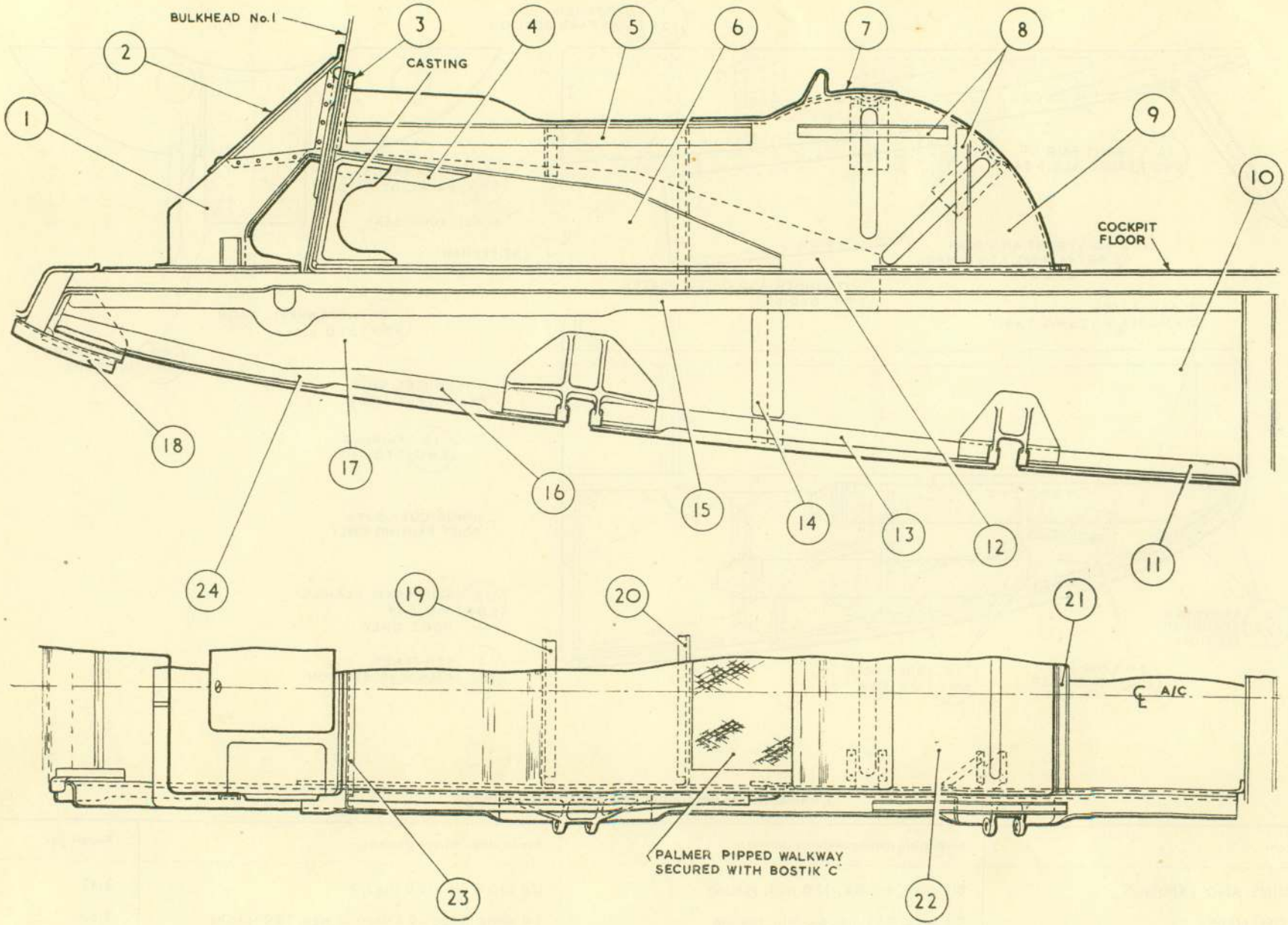


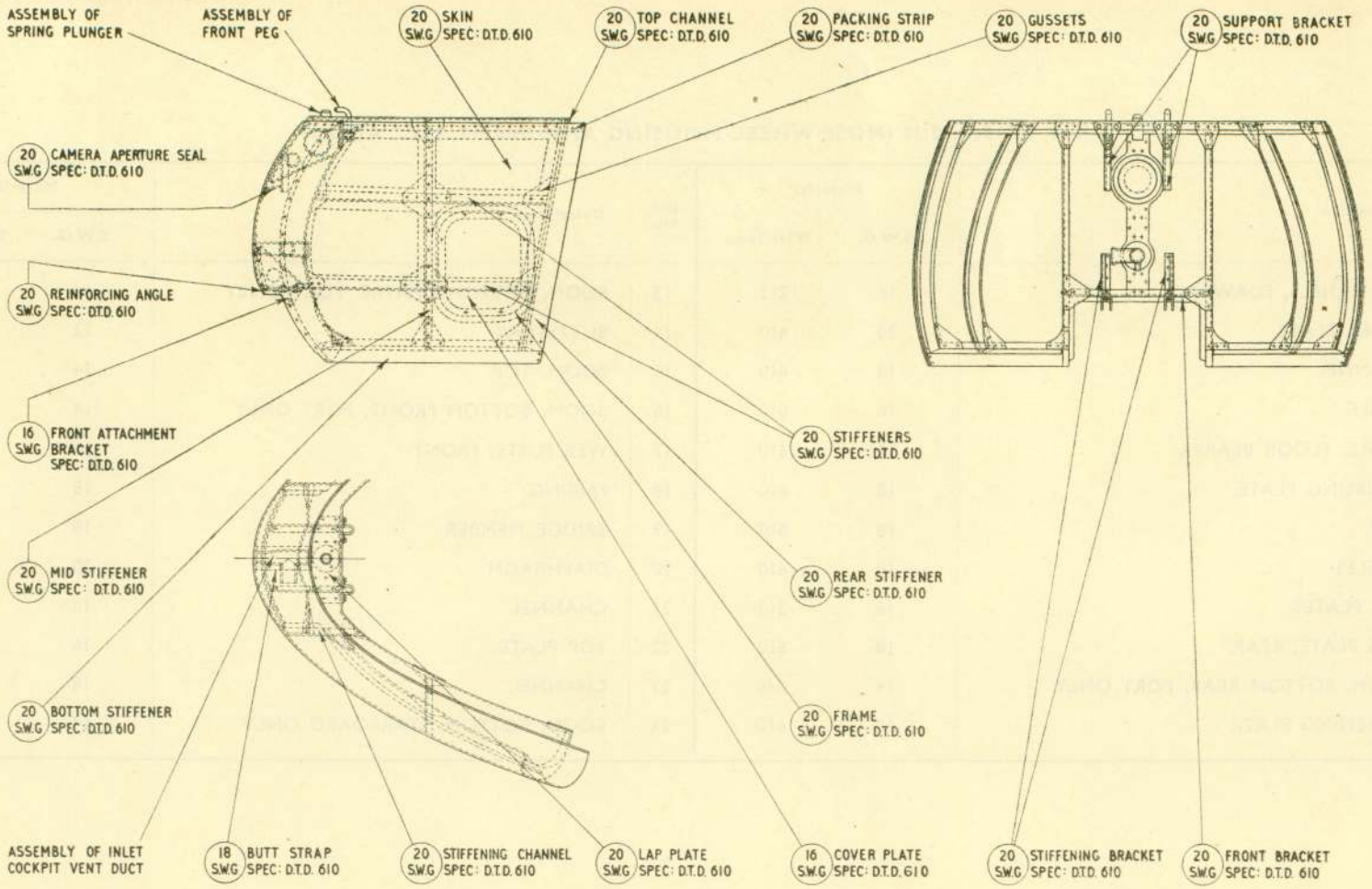
Fig. 2/32. Nose-wheel housing and beams, Mk.2 and 3

KEY TO FIG. 2/32 (NOSE-WHEEL HOUSING AND BEAMS, MK.2 AND 3)

Ref. No.	Description	Material		Ref. No.	Description	Material	
		S.W.G.	DTD Spec.			S.W.G.	DTD Spec.
1	SIDE PANELS, FORWARD	18	213	13	BOOM, BOTTOM CENTRE, PORT ONLY	14	546
2	COVER PLATE	20	610	14	BUTTSTRAP	22	610
3	CHANNEL	18	610	15	BOOM, TOP	14	610
4	ANGLE	16	610	16	BOOM, BOTTOM FRONT, PORT ONLY	14	546
5	ANGLE, FLOOR BEARER	18	610	17	WEB PLATE, FRONT	16	610
6	DOUBLING PLATE	18	610	18	FAIRING	18	610
7	STEP	18	610	19	BRIDGE MEMBER	18	610
8	ANGLES	18	610	20	DIAPHRAGM	20	610
9	SIDE PLATES	16	213	21	CHANNEL	18	610
10	WEB PLATE, REAR	18	610	22	TOP PLATE	16	213
11	BOOM, BOTTOM REAR, PORT ONLY	14	546	23	CHANNEL	18	610
12	STIFFENING PLATE	16	610	24	BOOM, BOTTOM, STARBOARD ONLY	14	546

Definitions of negligible and repairable damage (Fig. 2/32)

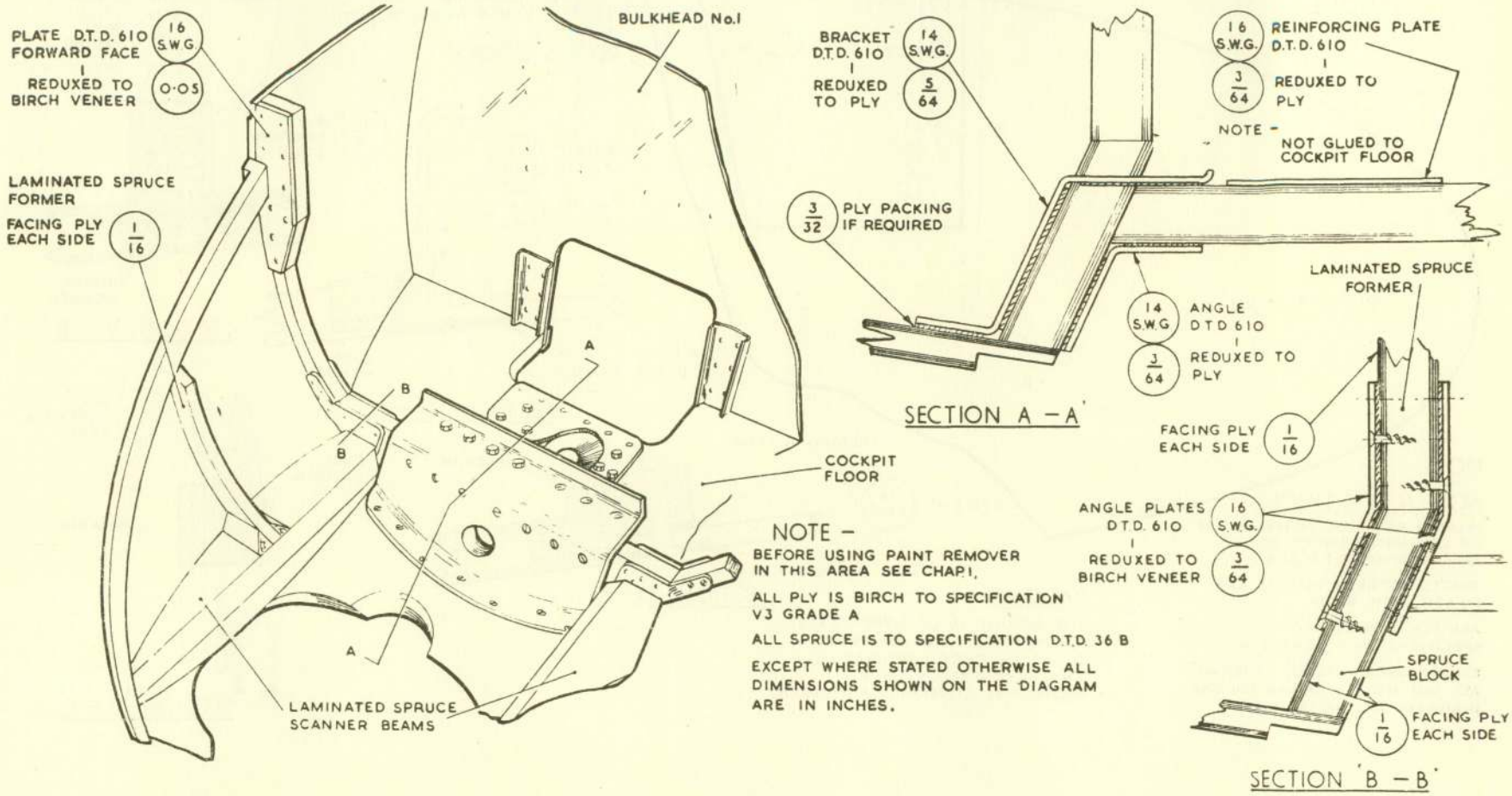
Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
TOP, SIDE AND WEB PLATES	0·1 deep, 1·0 dia., 12·0 min. spacing	0·5 dia. to 5·0 dia., 18·0 spacing	2/49
STIFFENERS AND DIAPHRAGMS	0·1 deep, 0·75 long, 8·0 min. spacing	1·0 along flange × 0·5 deep in web, 18·0 spacing	2/50
BOOMS	0·1 deep, 0·75 long, 8·0 min. spacing	Exceeding negligible	S.A.



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
SKINS	0·10 deep, 1·0 dia., 9·0 min. spacing	0·5 to 5·0 dia., 12·0 to 18·0 spacing	2/49
STIFFENERS	0·10 deep, 0·75 long, 8·0 min. spacing	Flange and web 1·0 long × 0·5 deep in web 18·0 spacing	2/50

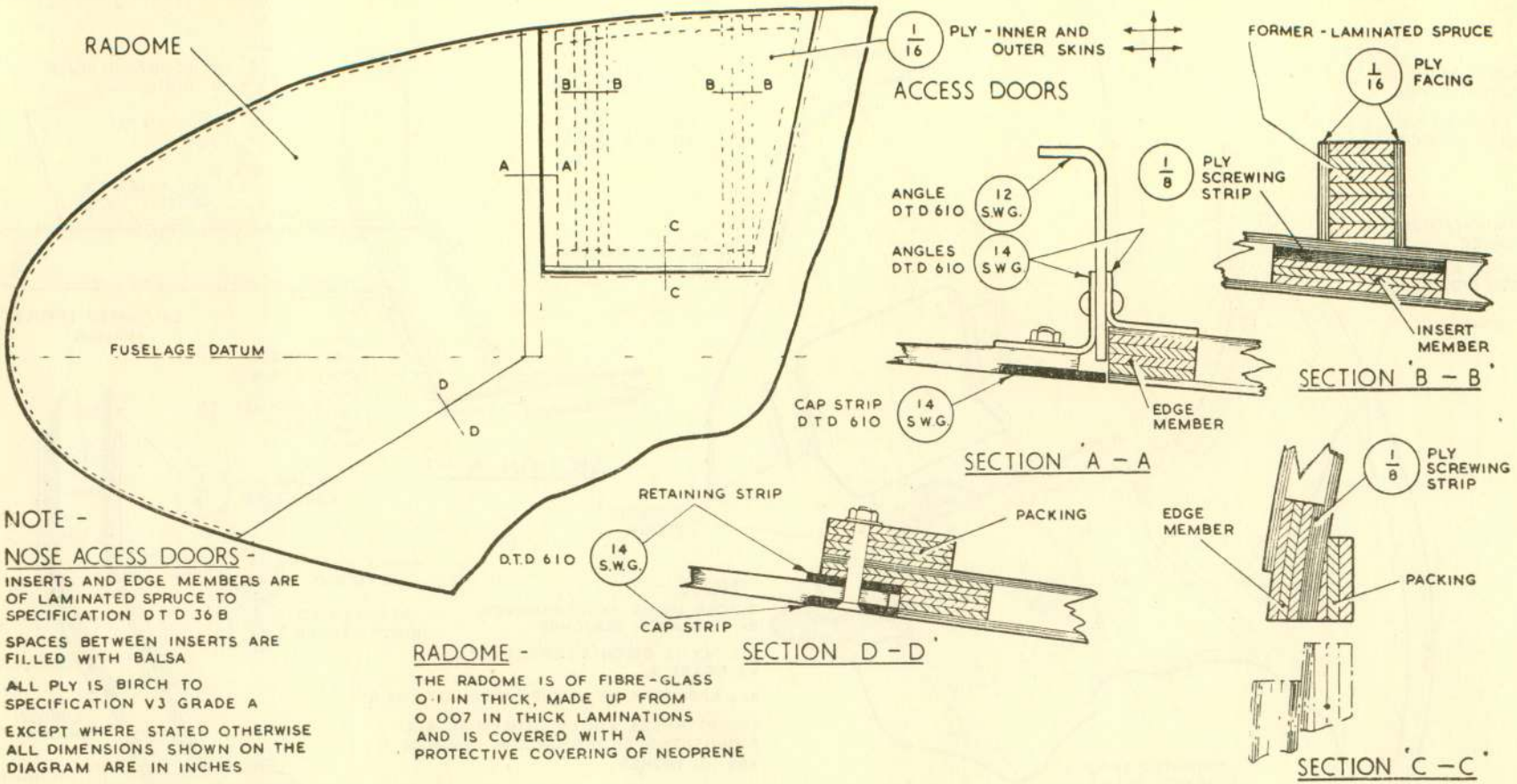
Fig. 2/33. Fixed nosing, Mk.1 and 4



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SPRUCE FORMERS	0·10 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	Replace
SCANNER BEAMS		Exceeding negligible	S.A.

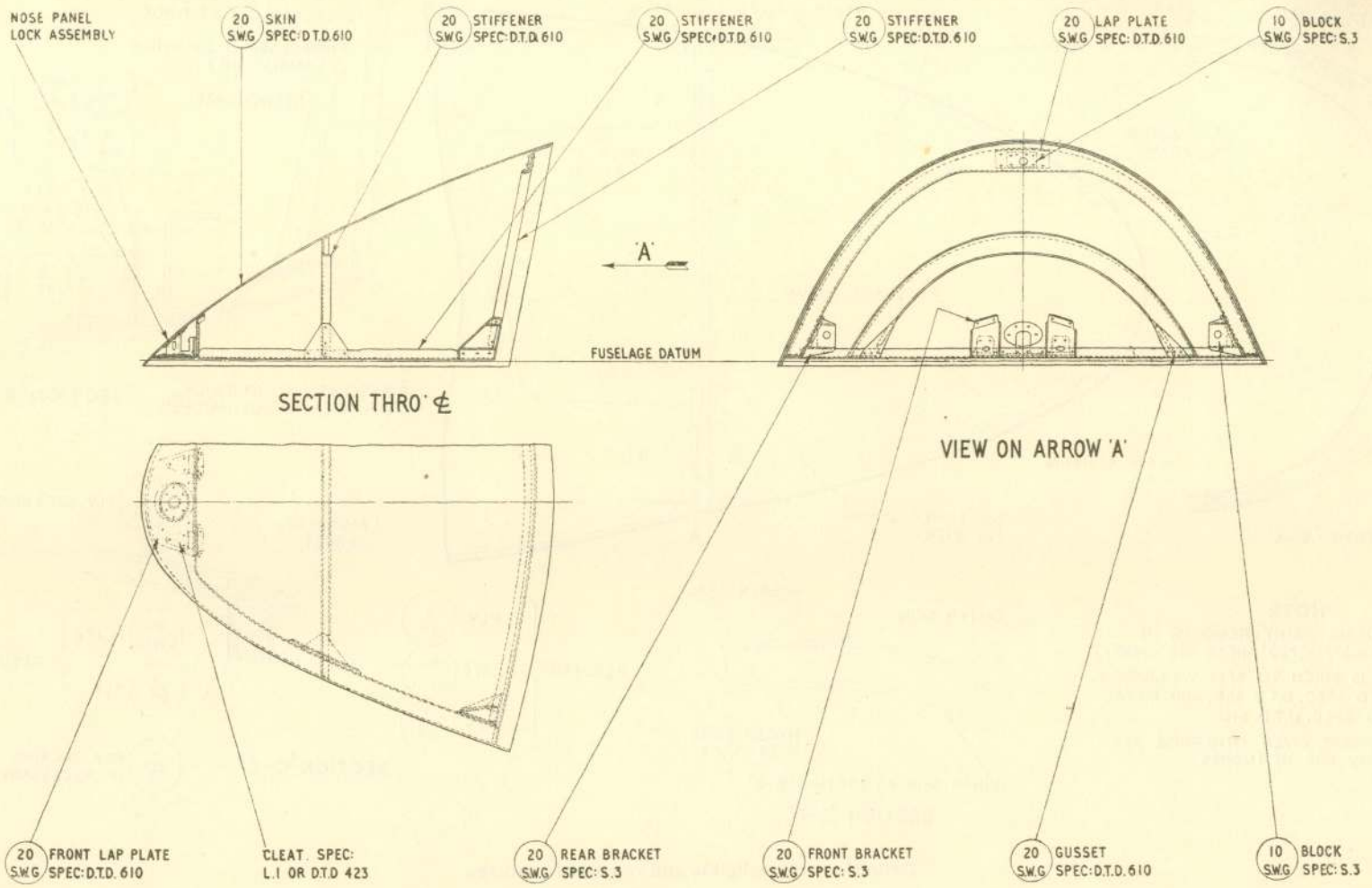
Fig. 2/34. Fixed nose structure, Mk.2



Definitions of negligible and repairable damage

Item		Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
RADOMES	Neoprene Fibreglass	No damage is negligible either to the Neoprene covering or the Fibreglass laminations	Any damage to the Neoprene ◀ Scores, scratches or pitting within the limits stated (para. 14)	◀ Para. 12 Para. 14 and fig. 2/53 ▶
ACCESS DOORS	Skins	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Isolated hole 0·6 × 1·8, or groups of holes not more than one repair (A or B) per door	2/45(A) or (B)
			Exceeding above ▶	2/47
	Inter-skin members	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

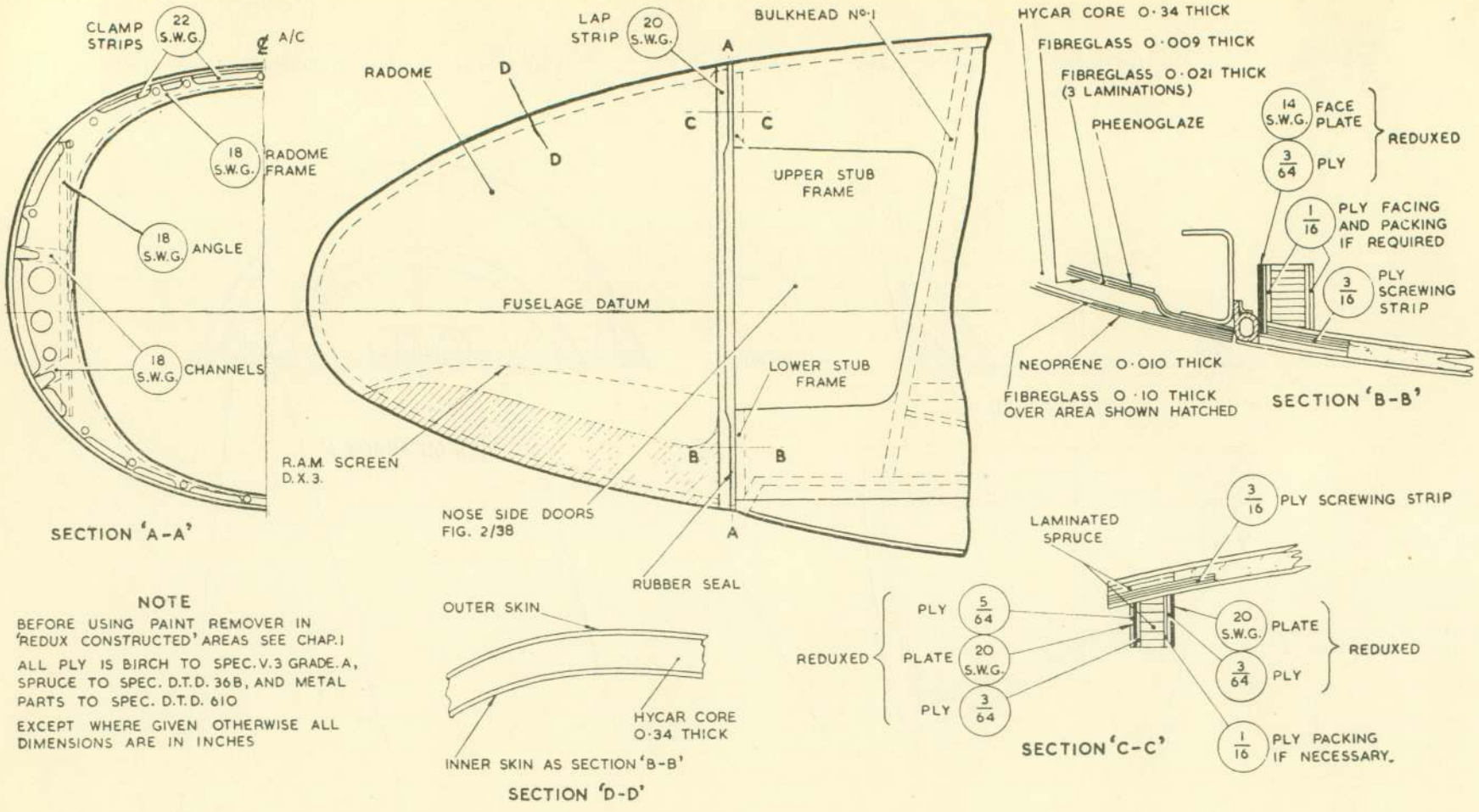
Fig. 2/35. Fuselage nose and access doors, Mk.2



Definitions of negligible and repairable damage

Item	Negligible damage—dents (inches)	Repairable damage (inches)	Repair fig.
SKINS	0·10 deep, 1·0 dia., 9·0 min. spacing	0·5 to 5·0 dia., 12·0 to 18·0 spacing	2/49
STIFFENERS	0·10 deep, 0·75 dia., 8·0 min. spacing	Flange and web 1·0 long × 0·5 deep in web, 18·0 spacing	2/50

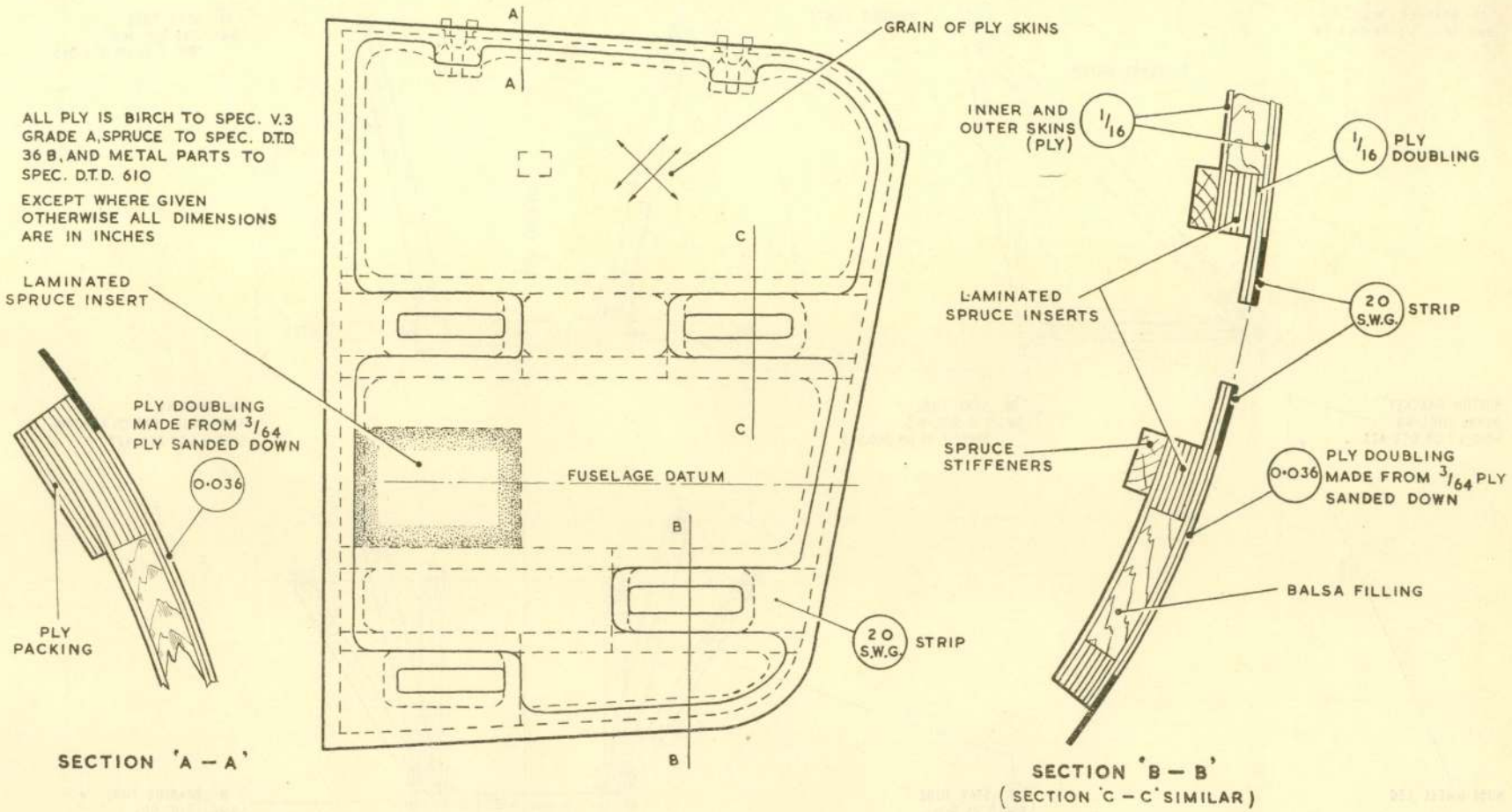
Fig. 2/36. Detachable nosing, Mk.1 and 4



Definitions of negligible and repairable damage

Item		Negligible damage (inches)	Repairable damage (inches)	Repair fig.
RADOME	Neoprene Fibreglass	No damage is negligible to either the Neoprene covering or the Fibreglass laminations	Any damage to the Neoprene Any damage to the Fibreglass	◀ Para. 12 ▶ S.A.
	Frame webs Frame flanges	Dents 0·05 deep, 1·0 dia., 12·0 min. spacing Dents 0·03 deep, 0·5 dia., 6·0 min. spacing	Up to 1·0 dia., 12·0 spacing 1·0×0·5, 18·0 spacing	2/49 2/50
STUB FRAMES	Laminations	Bruises 0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48
	Reduxed plates	Dents 0·04 deep, 1·0 dia., 12·0 min. spacing	Exceeding negligible	S.A.

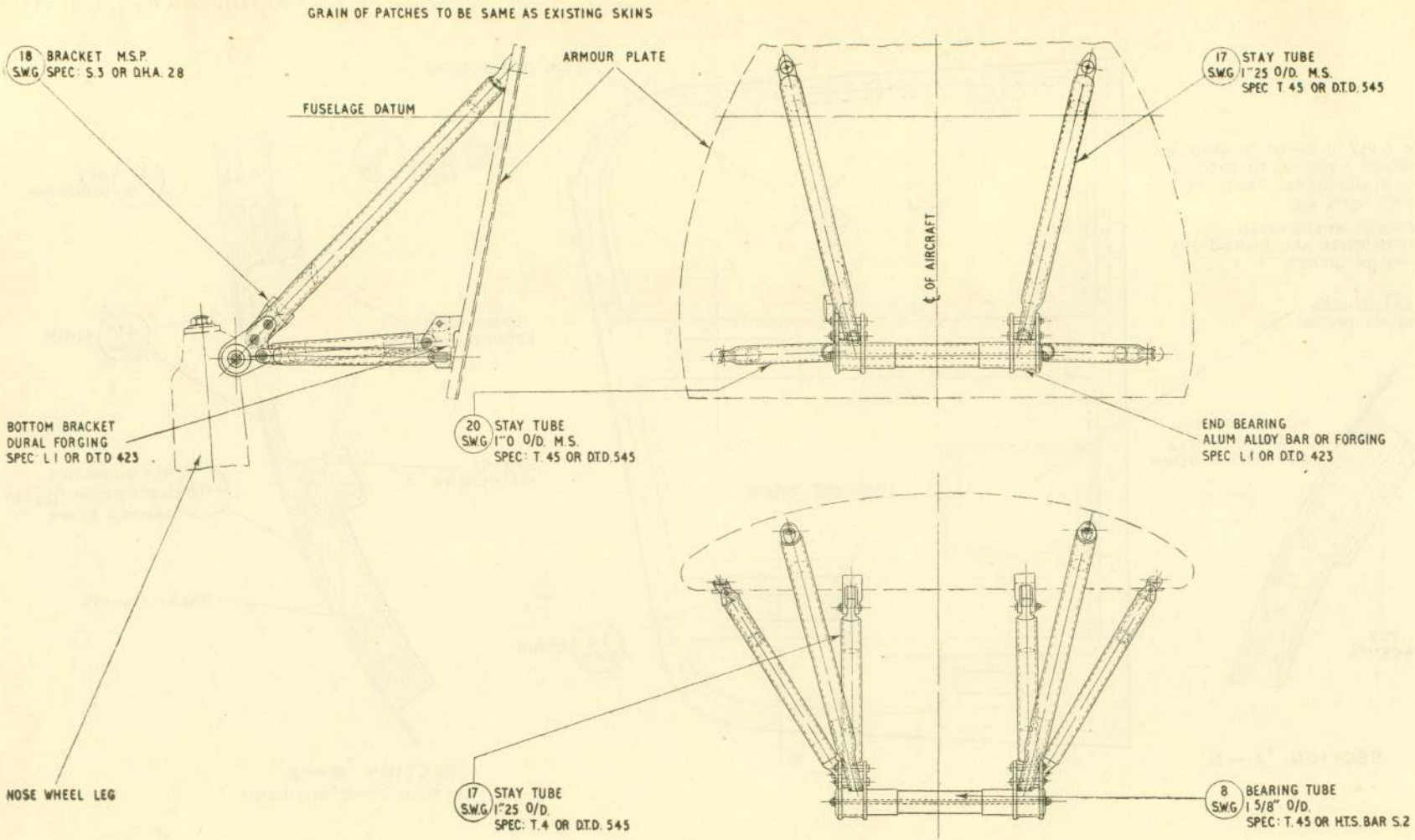
Fig. 2/37. Radome and stub frames, Mk.3



Definitions of negligible and repairable damage

Item	Negligible damage—bruises (inches)	Repairable damage (inches)	Repair fig.
SKINS	One lamination deep, 0·75 across and 2·0 along the grain, 12·0 min. spacing	Isolated hole or groups of holes 0·6 × 1·8, not more than one repair (A or B) per door	2/45(A) or (B)
		Greater than above	2/47
INTER-SKIN MEMBERS	0·1 deep, 0·5 across and 1·0 along the grain, 12·0 min. spacing	Exceeding negligible	2/48

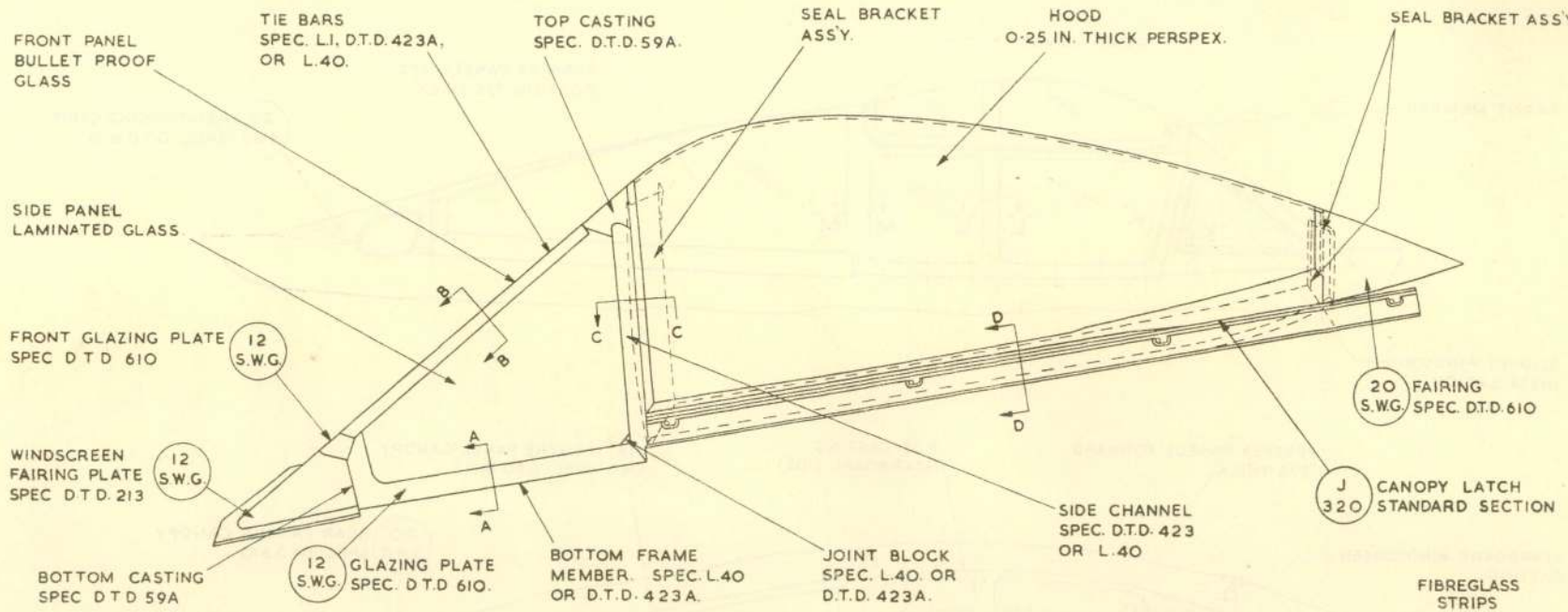
Fig. 2/38. Side doors, Mk.3

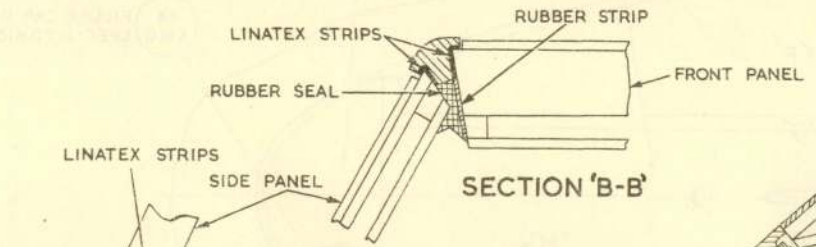


Definitions of negligible and repairable damage

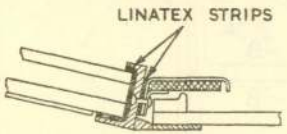
Item	Negligible Damage	Repairable Damage	Repair fig.
TUBES	Smooth isolated dents free from cracks, fractures or abrasions which do not exceed 1/40th of a tube dia. in depth may be considered negligible provided they do not occur in the middle third of the affected member. The limit of bowing which may be considered negligible is defined in Chapter 1.	Damage in excess of negligible	Replace tube

Fig. 2/39. Nose-wheel top structure, Mk.1 and 4

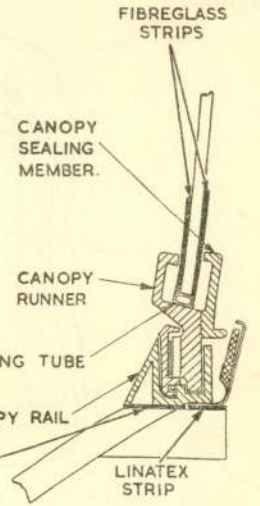




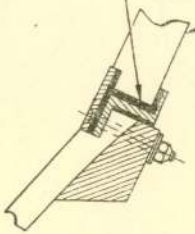
SECTION 'B-B'



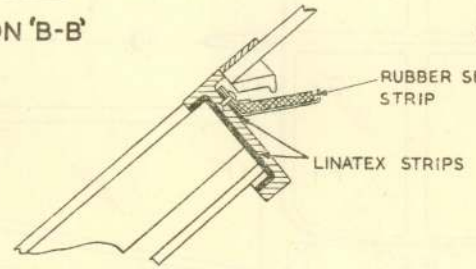
SECTION 'C-C'



SECTION 'D-D'



SECTION 'A-A'



SECTION THROUGH TOP OF WINDSCREEN

NOTE

WITH THE EXCEPTION OF THE SIDE PANELS, BOSCOPRENE 2100 (STORES REF. 33C/1281) SHOULD BE USED FOR SEALING IN ADDITION TO THE LINATEX STRIPS. PRIMER, 33C/1282, SHOULD NOT BE USED

NEGLIGIBLE DAMAGE

TRANSPARENT PANELS

NO DAMAGE EITHER TO THE GLASS OR PERSPEX IS NEGLIGIBLE.

FRAME MEMBERS

ABRASIONS 0·015 IN. DEEP, 0·50 IN. DIA., 6·0 IN. APART.

Fig. 2/40. Canopy, Mk.1 and 4

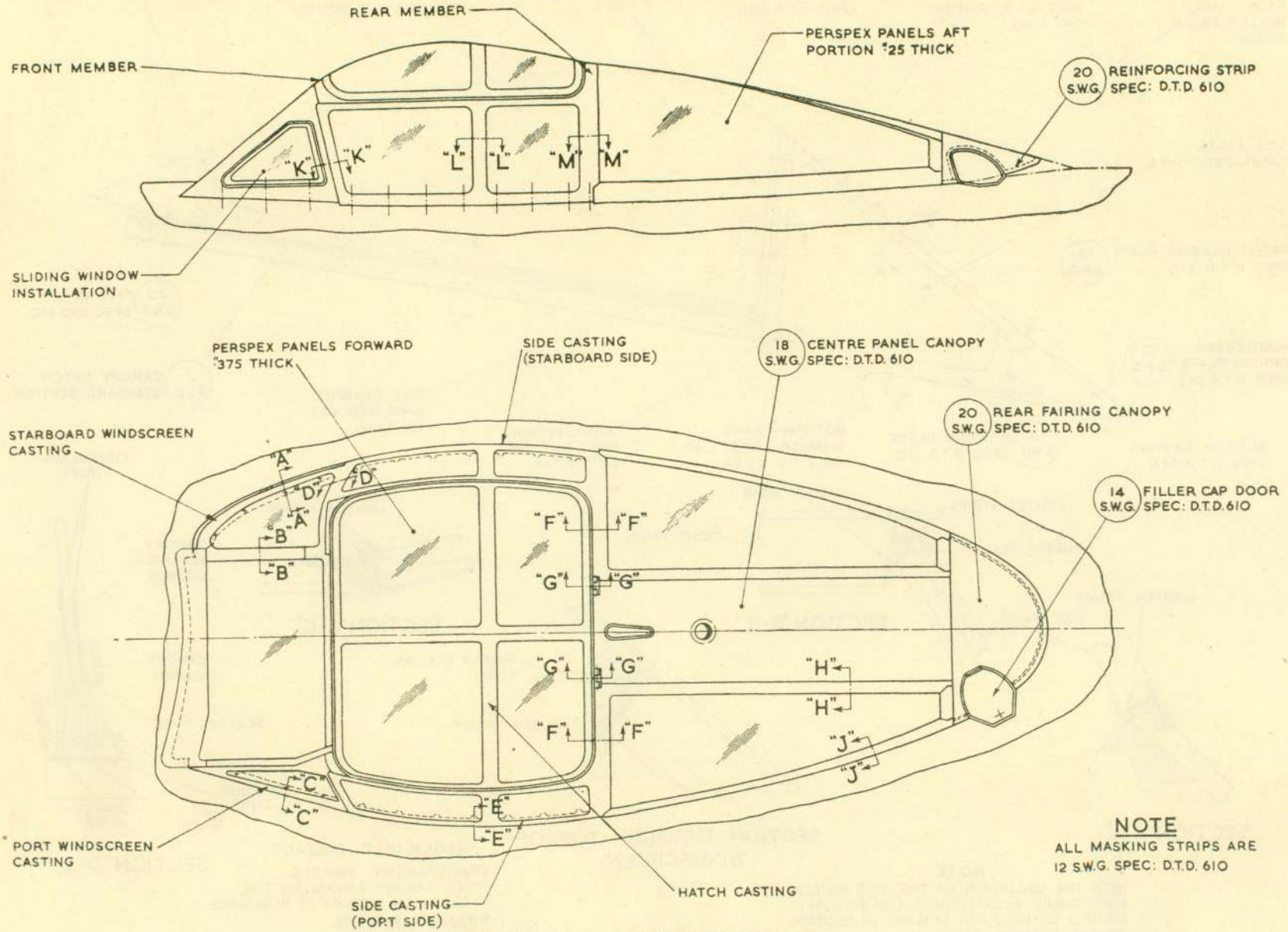
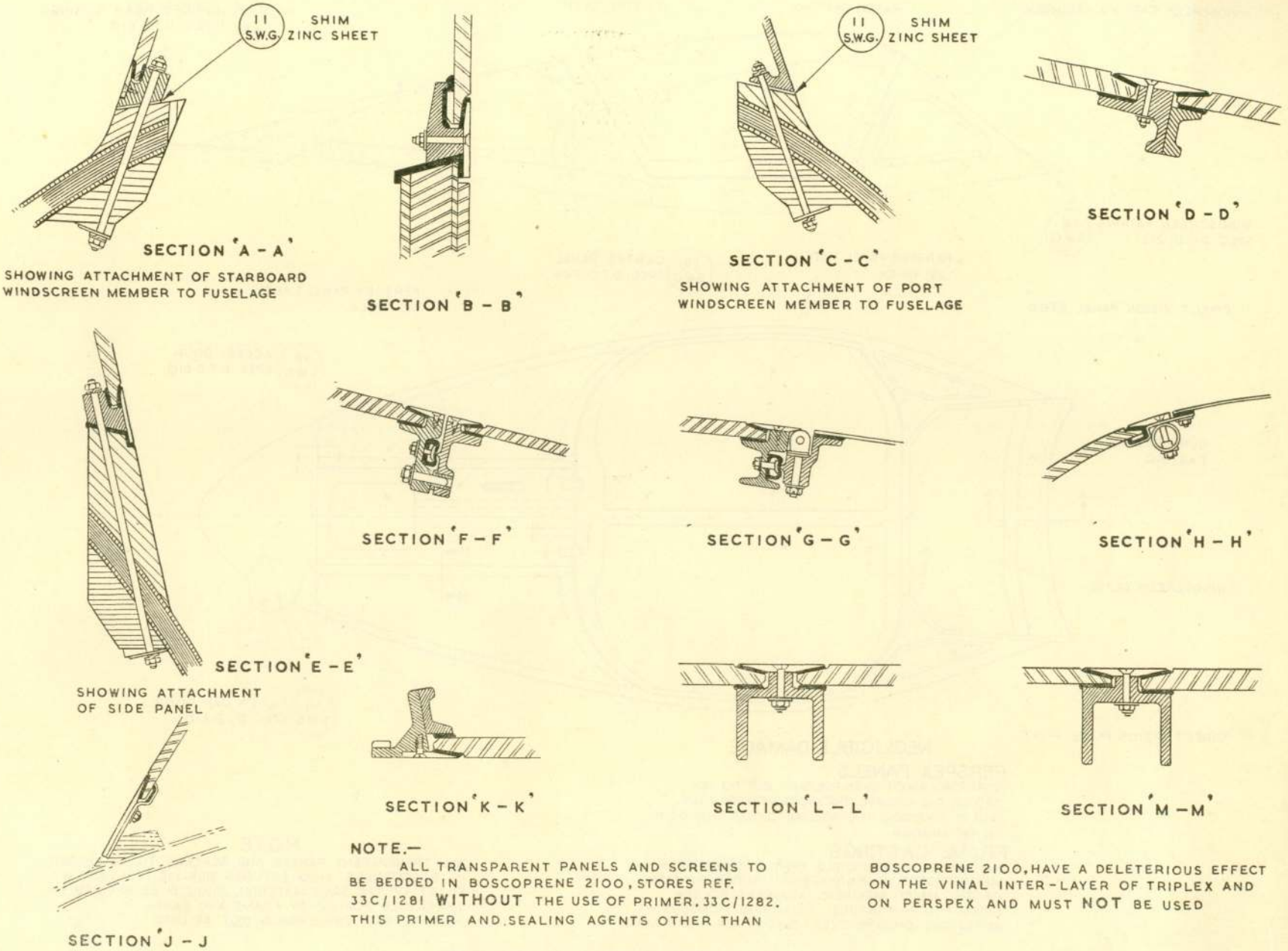
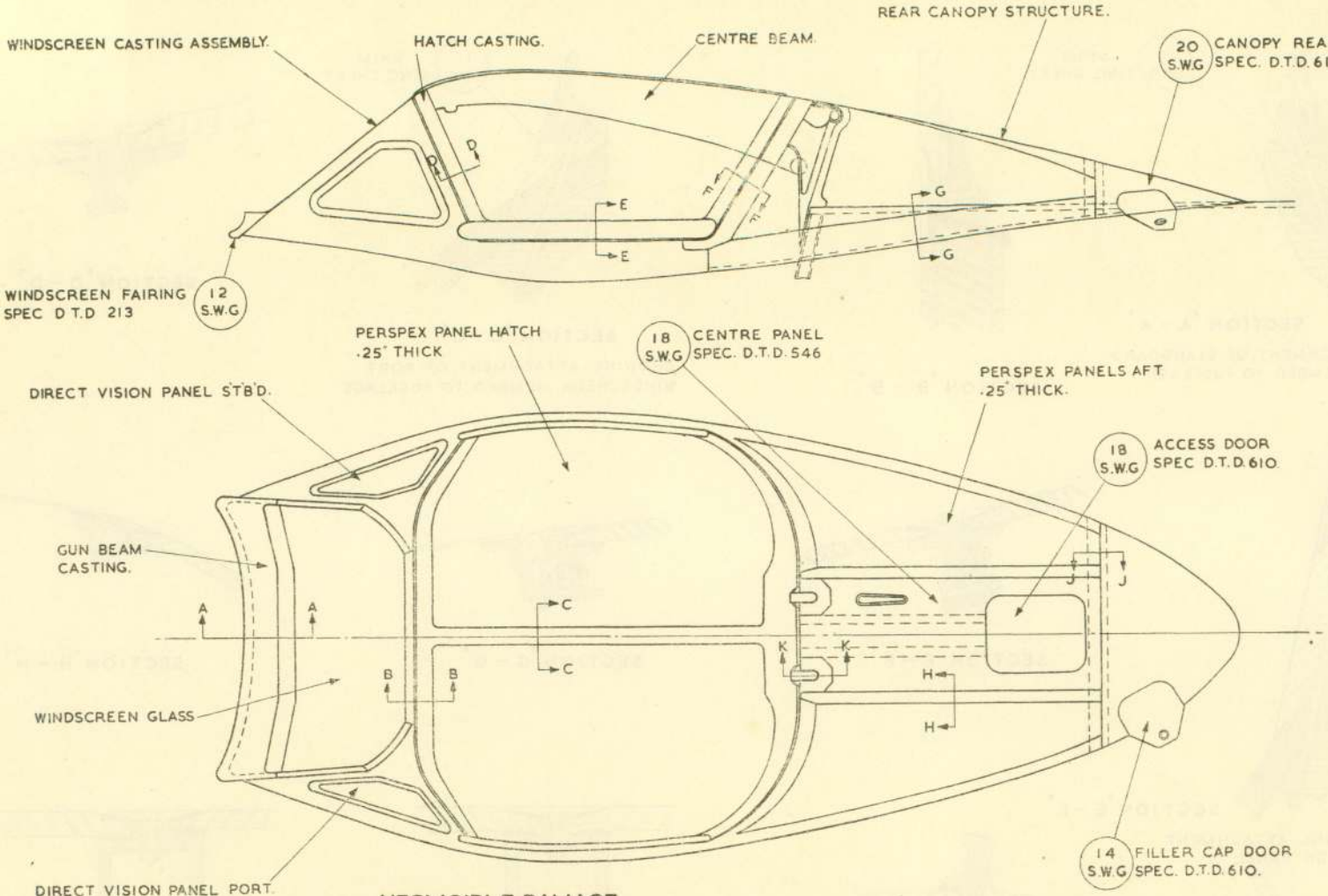


Fig. 2/41. Canopy, Mk.2 pre-Mod. Ven.170



NOTE.—
ALL TRANSPARENT PANELS AND SCREENS TO BE BEDDED IN BOSCOPRENE 2100, STORES REF. 33C/1281 **WITHOUT** THE USE OF PRIMER, 33C/1282. THIS PRIMER AND SEALING AGENTS OTHER THAN BOSCOPRENE 2100, HAVE A DELETERIOUS EFFECT ON THE VINAL INTER-LAYER OF TRIPLEX AND ON PERSPEX AND MUST **NOT** BE USED

Fig. 2/42. Canopy sections, Mk.2 pre-Mod. Ven.170



NEGLIGIBLE DAMAGE

PERSPEX PANELS

SCRATCHES WHICH WHEN POLISHED OUT DO NOT REDUCE THE ORIGINAL THICKNESS BY MORE THAN 0·01 IN., PROVIDING THEY ARE NOT CLOSER THAN 3·0 IN. TO ANY MEMBER

FRAME CASTINGS

NO DAMAGE IS NEGLIGIBLE ON THE FRONT ARCH MEMBER (SECT 'B–B' & 'D–D') AND THOSE PORTIONS OF THE HATCH MEMBERS ADJACENT TO THE LATCH PINS AND HINGES. REMAINING MEMBERS :– ABRASIONS 0·015 IN. DEEP, 0·50 IN. DIA., 6·0 IN APART

NOTE

ALL TRANSPARENT PANELS AND SCREENS TO BE BEDDED IN BOSCOPRENE 2100 (STORES REF. 33C/1281) AND A FILLET OF THE SAME MATERIAL SHOULD BE APPLIED TO THE ANGLE FORMED BY FRAME AND PANEL PRIMER, 33C/1282, SHOULD NOT BE USED.

Fig. 2/43. Canopy, Mk.2 post-Mod. Ven.170 and Mk.3

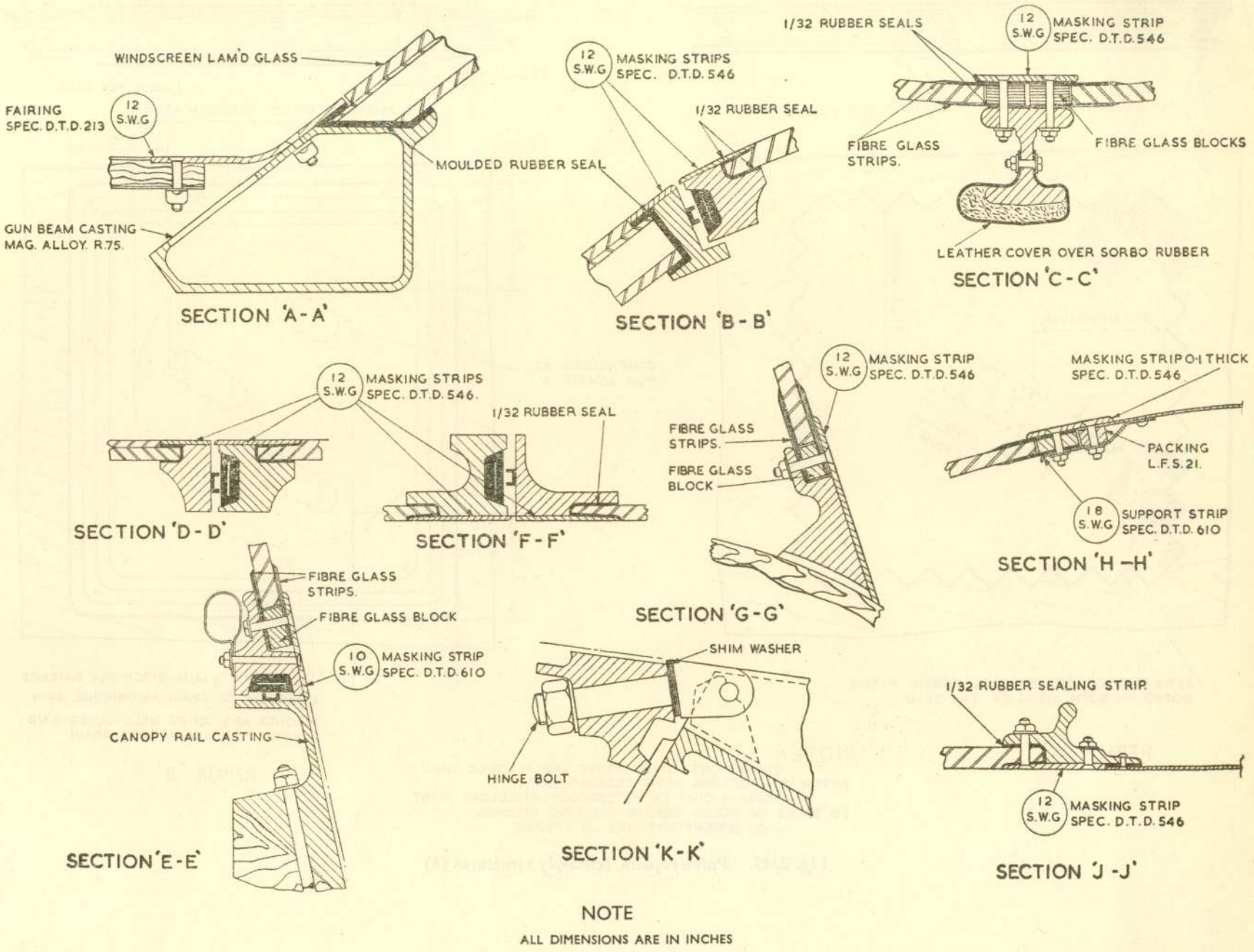
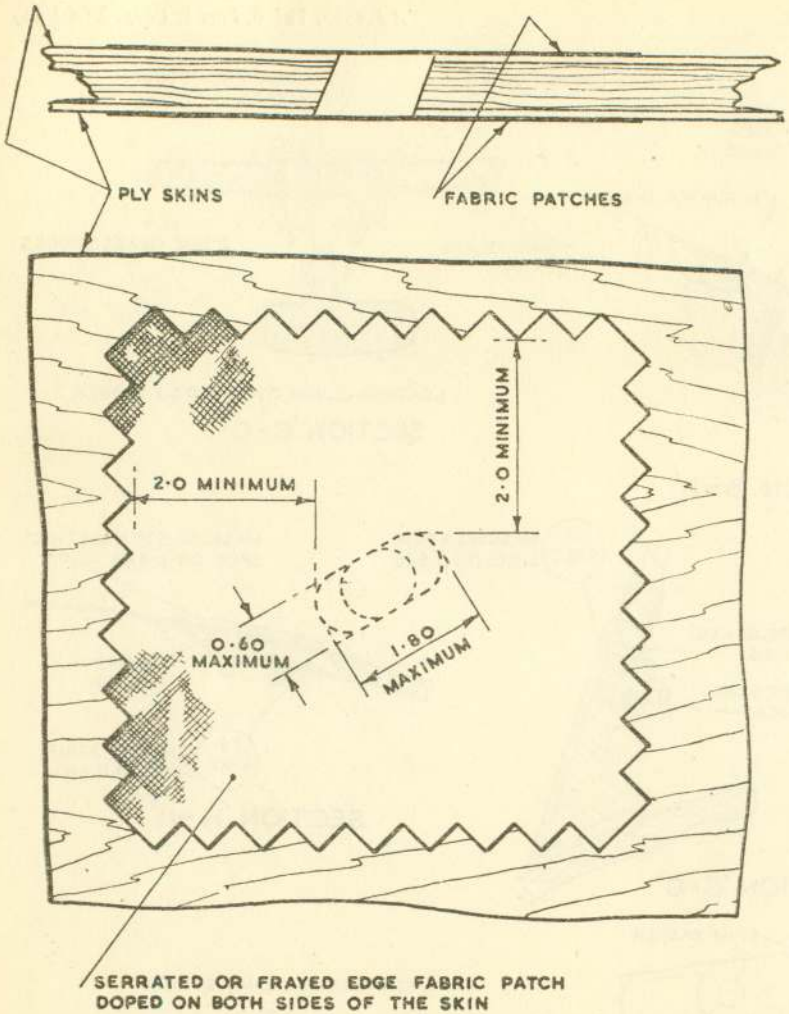
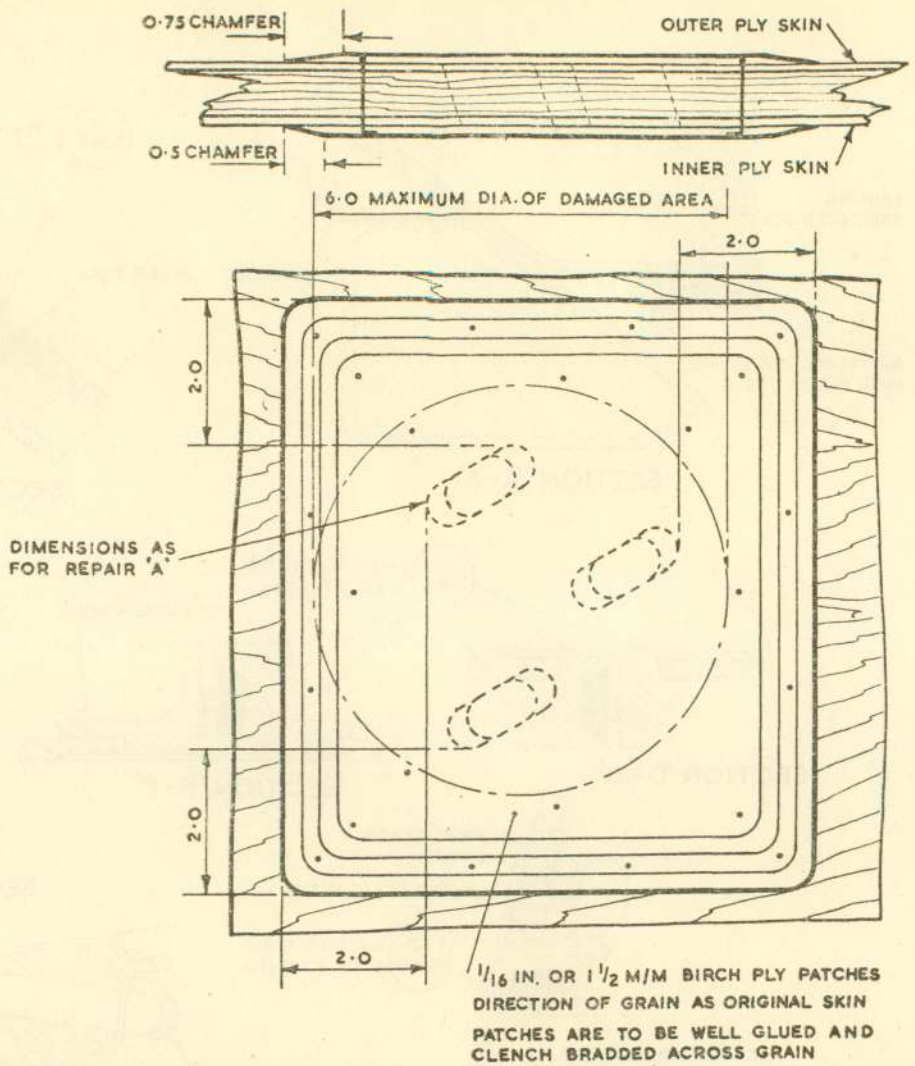


Fig. 2/44. Canopy sections, Mk.2 post-Mod. 170, and Mk.3



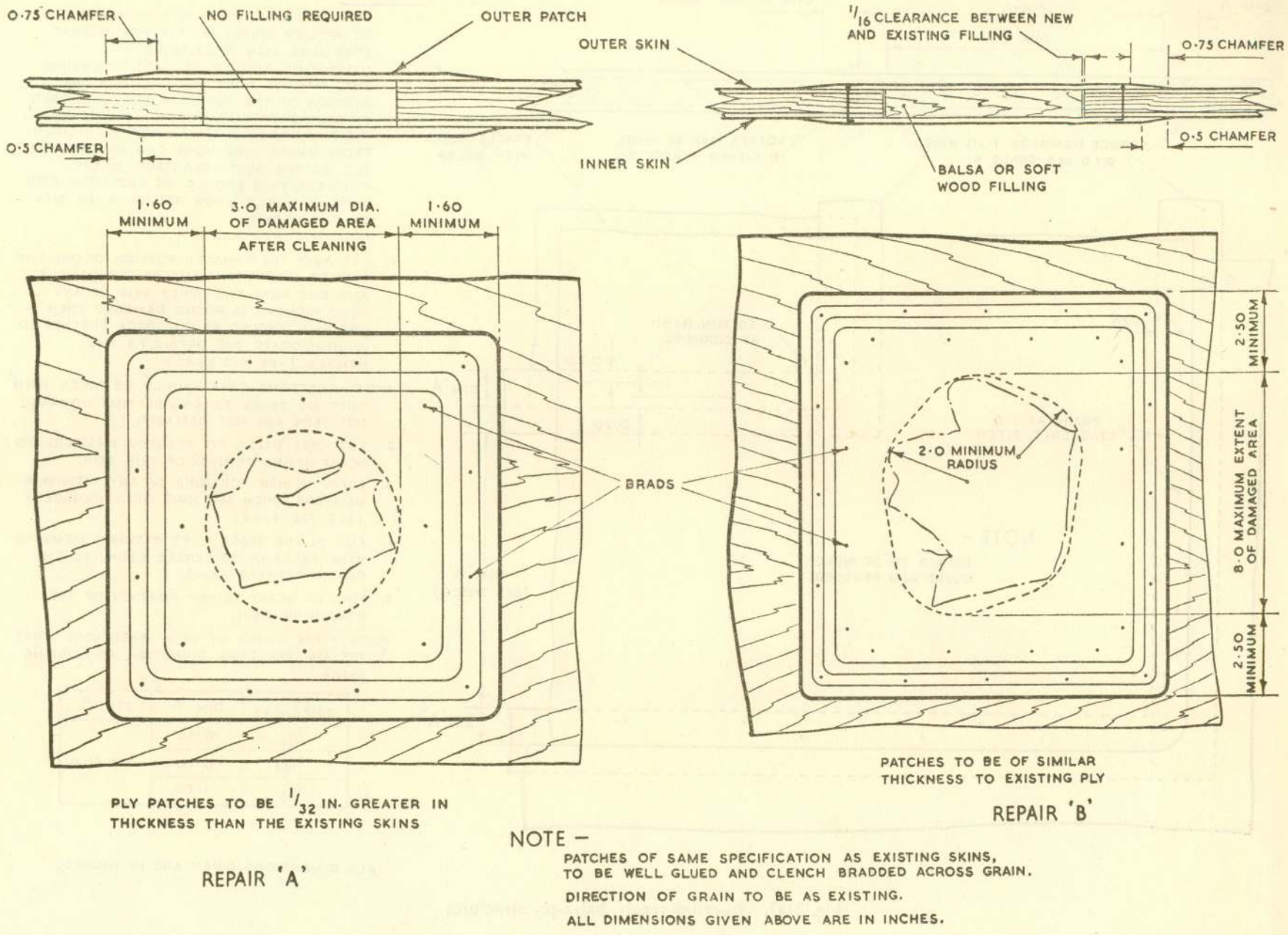
REPAIR 'A'



REPAIR 'B'

NOTE:-
DIMENSIONS GIVEN ABOVE ARE ALLOWED ONLY AFTER DAMAGE HAS BEEN CLEANED OUT.
BRUSH A COAT OF WATERPROOF CELLULOSE PAINT TO EDGES OF HOLES BEFORE APPLYING PATCHES.
ALL DIMENSIONS ARE IN INCHES.

Fig. 2/45. Patch repairs, balsa-ply structures (1)



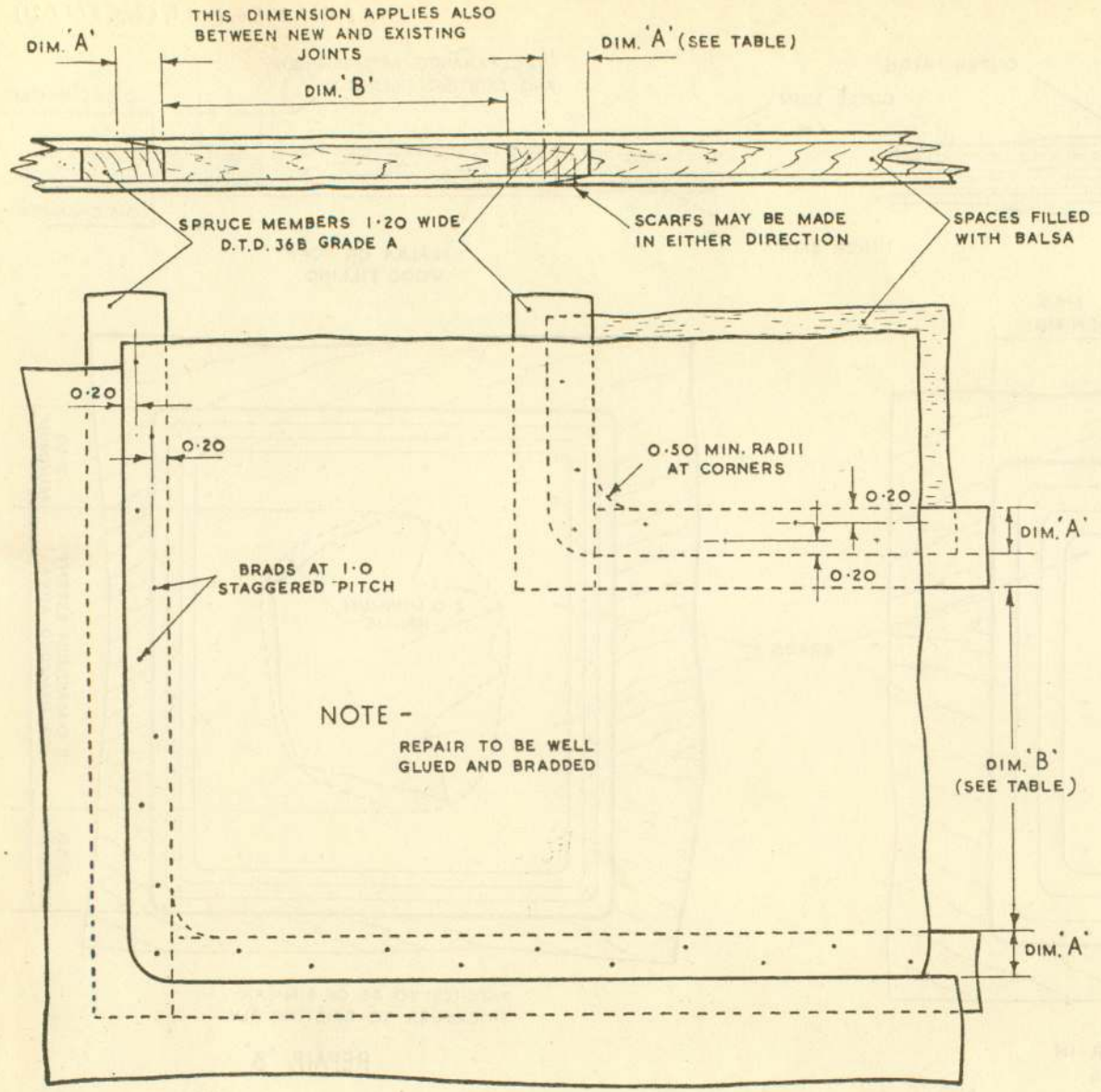
NOTE –

PATCHES OF SAME SPECIFICATION AS EXISTING SKINS, TO BE WELL GLUED AND CLENCH BRADDED ACROSS GRAIN.

DIRECTION OF GRAIN TO BE AS EXISTING.

ALL DIMENSIONS GIVEN ABOVE ARE IN INCHES.

Fig. 2/46. Patch repairs, balsa-ply structures (2)



PROCEDURE —

THE SKIN INSERTIONS IN THIS REPAIR CAN BE APPLIED SINGLY IF IT IS FOUND THAT ONLY ONE SKIN IS DAMAGED. INSPECTION SHOULD BE MADE TO ENSURE THAT DAMAGE DOES NOT OCCUR IN THE PORTION OF THE FUSELAGE SHELL COVERED BY REINFORCING AS SHOWN HATCHED ON FIG. 2/4, 2/5 OR 2/6 IT SHOULD THEN BE DECIDED FROM WHICH SIDE WORK CAN BE CARRIED OUT TO THE BEST ADVANTAGE. WHERE POSSIBLE, THIS SHOULD BE FROM THE SIDE MOST DAMAGED; THUS REDUCING THE SIZE OF THE REPAIR.
CONTINUE AS FOLLOWS —

1. CUT AWAY THE DAMAGED PORTION OF ONE SKIN. INSPECT INTERSKIN MEMBERS FOR DAMAGE AND CUT AWAY THE OTHER SKIN. IF ANY SUCH MEMBER IS FOUND DAMAGED THEN ONE SKIN SHOULD BE CUT BACK FURTHER TO ACCOMMODATE THE REPAIR TO THE MEMBER. (SEE FIG. 2/48)

NOTE — EXTREME CARE SHOULD BE TAKEN WHEN CUTTING SKINS TO ENSURE THAT INTERNAL MEMBERS ARE NOT DAMAGED.

2. CUT AWAY BALSA, FIT SCARFING MEMBERS AND SCARF IN NEW PORTION OF ONE SKIN.
3. SCARF IN NEW PORTIONS OF ANY INTERSKIN MEMBERS WHICH MAY HAVE BEEN DAMAGED. (SEE FIG. 2/48)
4. FILL IN THE SPACE LEFT BETWEEN MEMBERS WITH BALSA OF THICKNESS EQUAL TO THE DEPTH BETWEEN SKINS.
5. FINALLY SCARF IN NEW PORTION OF THE REMAINING SKIN.

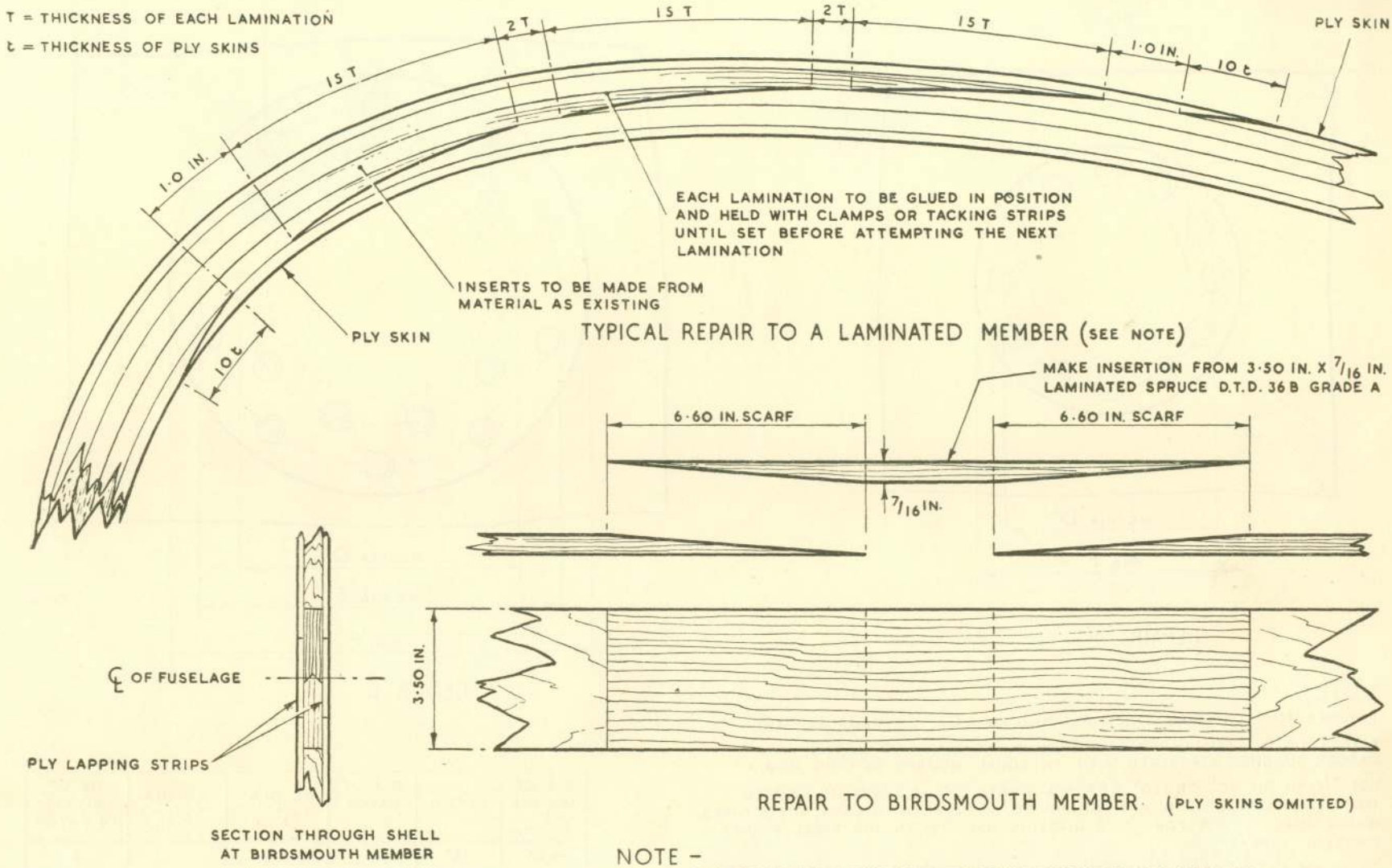
NOTE — THE GRAIN OF SKIN INSERTIONS MUST FOLLOW THE SAME DIRECTION AS EXISTING SKINS.

PLY THICKNESS	DIM. 'A'	DIM. 'B'
1/16	0·60	3·0 MIN.
5/64	0·80	
1/8	1·20	

ALL DIMENSIONS GIVEN ARE IN INCHES.

Fig. 2/47. Insertion repair, balsa-ply structures

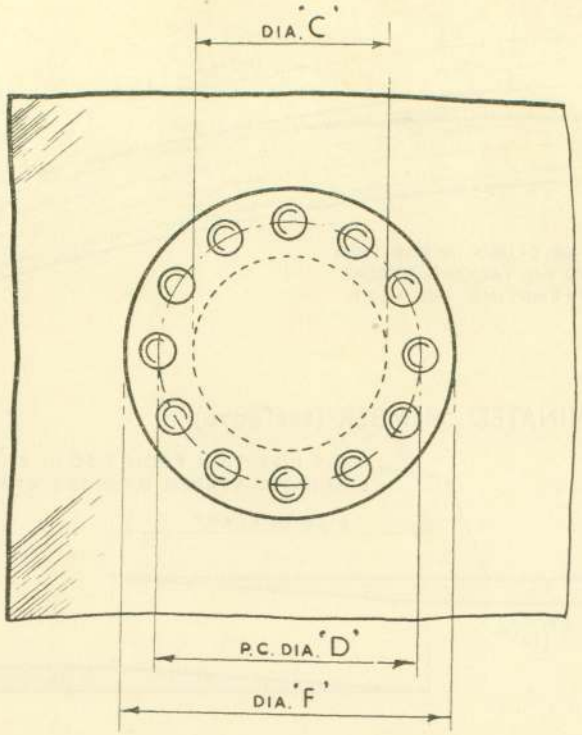
(81023) Gp.375/1. D.7361/Wt.24678/336123/L.P.S. Ltd. 375/9/58



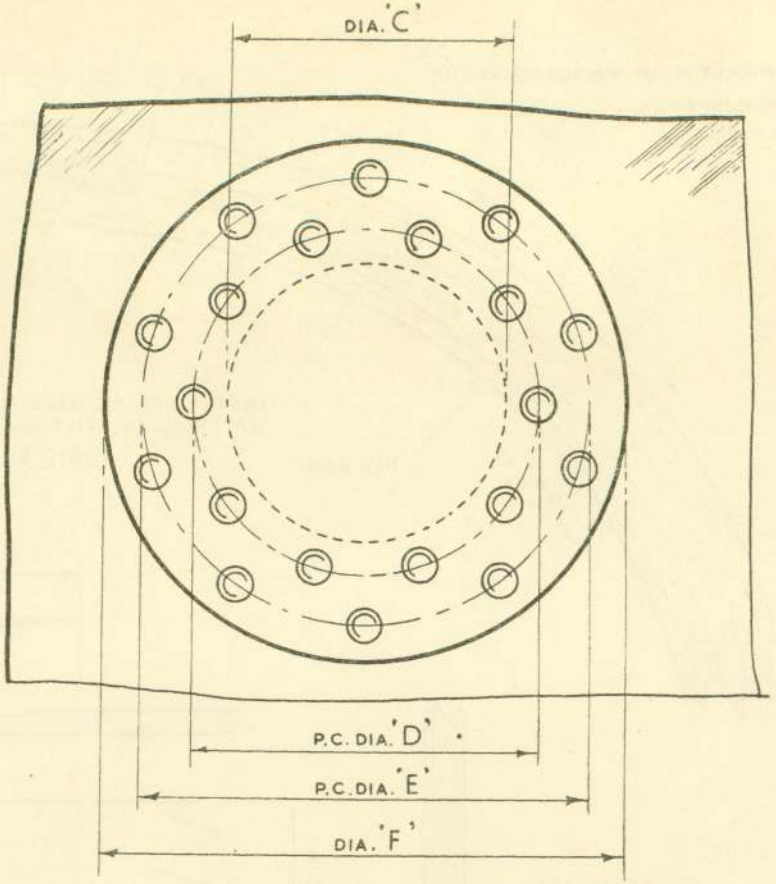
NOTE –

THE ABOVE TWO SCHEMES ILLUSTRATE METHODS OF INSERTING NEW PORTIONS OF PARTICULAR MEMBERS: OTHER MEMBERS OF PLAIN MATERIAL MAY BE REPAIRED BY INSERTING A NEW PORTION WITH A 15 : 1 SCARF
DAMAGE WHICH DOES NOT AFFECT A COMPLETE LAMINATED MEMBER MAY BE REPAIRED BY INSERTING ONLY THOSE LAMINATIONS AFFECTED

Fig. 2/48. Repairs to members, wood



REPAIR 'A'



REPAIR 'B'

NOTE –

PATCHES TO BE OF SAME THICKNESS AND MATERIAL AS DAMAGED PART.

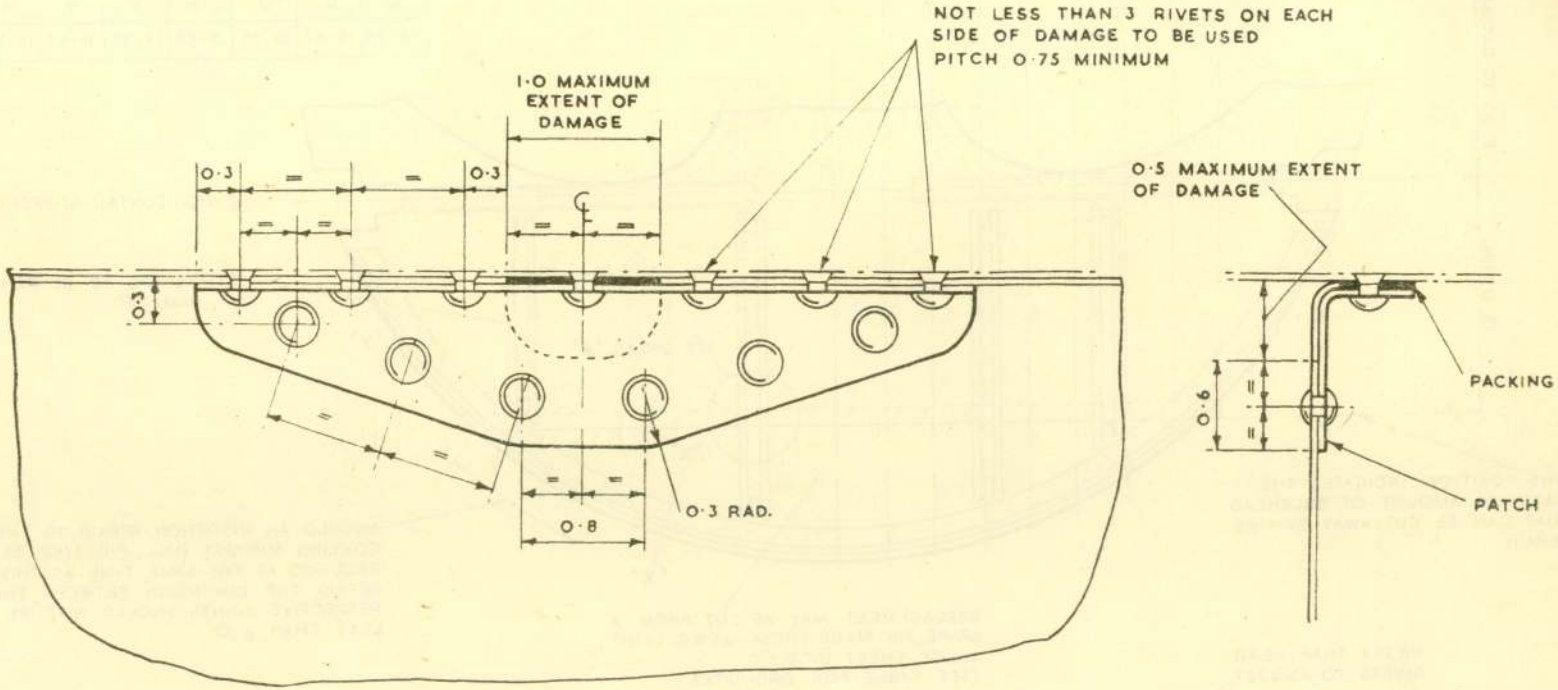
RIVETS TO BE EQUALLY SPACED AROUND P.C. DIA., AND IN THE LARGER PATCHES, STAGGERED WITH AN EQUAL NUMBER IN EACH ROW.

USE $^{5}/_{32}$ IN. DIA. 90° OR 120° C.S.K. HD. RIVETS TO A.S. 2229 OR A.S. 2230 ON EXTERNAL SURFACES AND S.N. HD TO A.S. 2227 ON INTERNAL STRUCTURES. WHERE INACCESSIBLE FOR SOLID RIVETING USE $^{5}/_{32}$ IN DIA. STEEL PINNED CHOBERT RIVETS.

SKINS OF 18 S.W.G. AND THINNER SHOULD BE DIMPLED TO SUIT C.S.K. HD.

DIA. OF DAMAGE 'C' IN.	REPAIR	DIA. OF PATCH 'F' IN.	P.C. DIA. 'D' IN.	P.C. DIA. 'E' IN.	No. OF RIVETS IN PATCH
0·50	'A'	1·90	1·20		6
1·0	'A'	2·40	1·70		8
2·0	'A'	3·40	2·70		12
3·0	'B'	5·40	3·70	4·70	20
5·0	'B'	7·40	5·70	6·70	24

Fig. 2/49. Patch repairs, metal



NOTE —

RIVETING

ATTACHED FLANGES.— UTILIZE EXISTING RIVET HOLES USING RIVETS OF ORIGINAL DIAMETER TO A.S. 2229. THE NEXT OVERSIZE MAY BE USED WHERE NECESSARY.

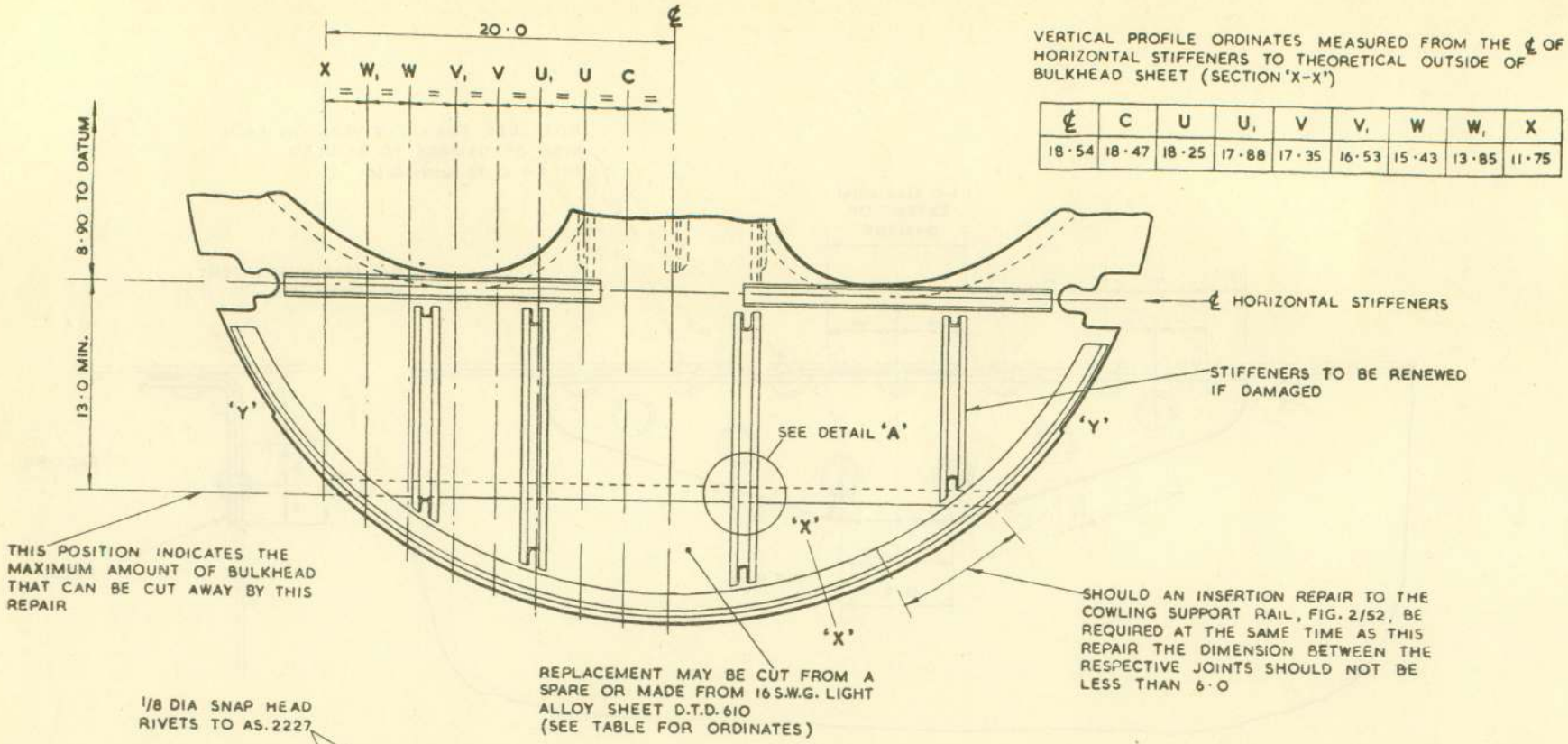
FREE FLANGES.— USE SNAP HEAD RIVETS TO A.S 2228; $^{1}/_{8}$ IN. DIAMETER WHERE MATERIAL IS 22 S.W.G OR LESS, OR $^{5}/_{32}$ IN. DIAMETER WHERE MATERIAL IS 20 S.W.G. OR GREATER.

WEB.— AS FOR FREE FLANGES.

PATCH TO BE OF THE SAME THICKNESS AND SPECIFICATION AS THE DAMAGED PART.

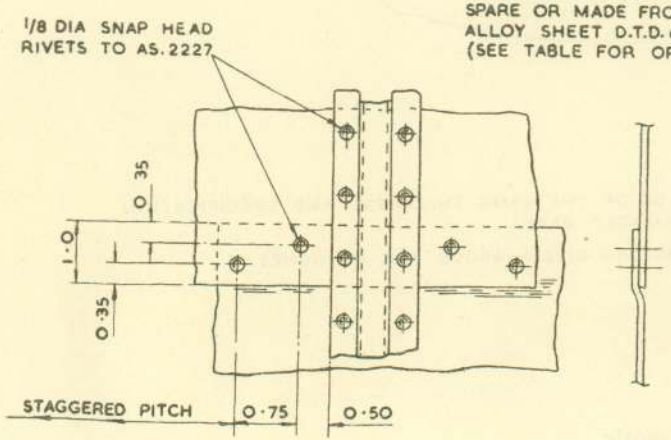
ALL DIMENSIONS GIVEN ABOVE ARE IN INCHES.

Fig. 2/50. Flange repair

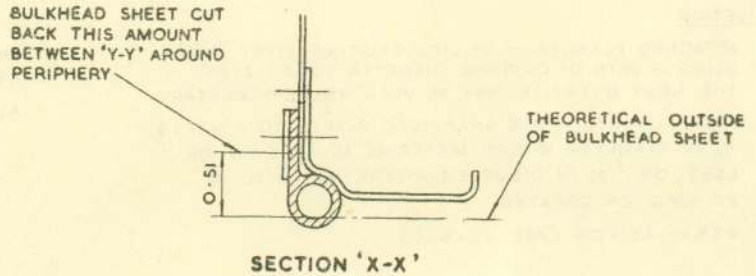


VERTICAL PROFILE ORDINATES MEASURED FROM THE ℄ OF HORIZONTAL STIFFENERS TO THEORETICAL OUTSIDE OF BULKHEAD SHEET (SECTION 'X-X')

℄	C	U	U,	V	V,	W	W,	X
18·54	18·47	18·25	17·88	17·35	16·53	15·43	13·85	11·75



DETAIL 'A'



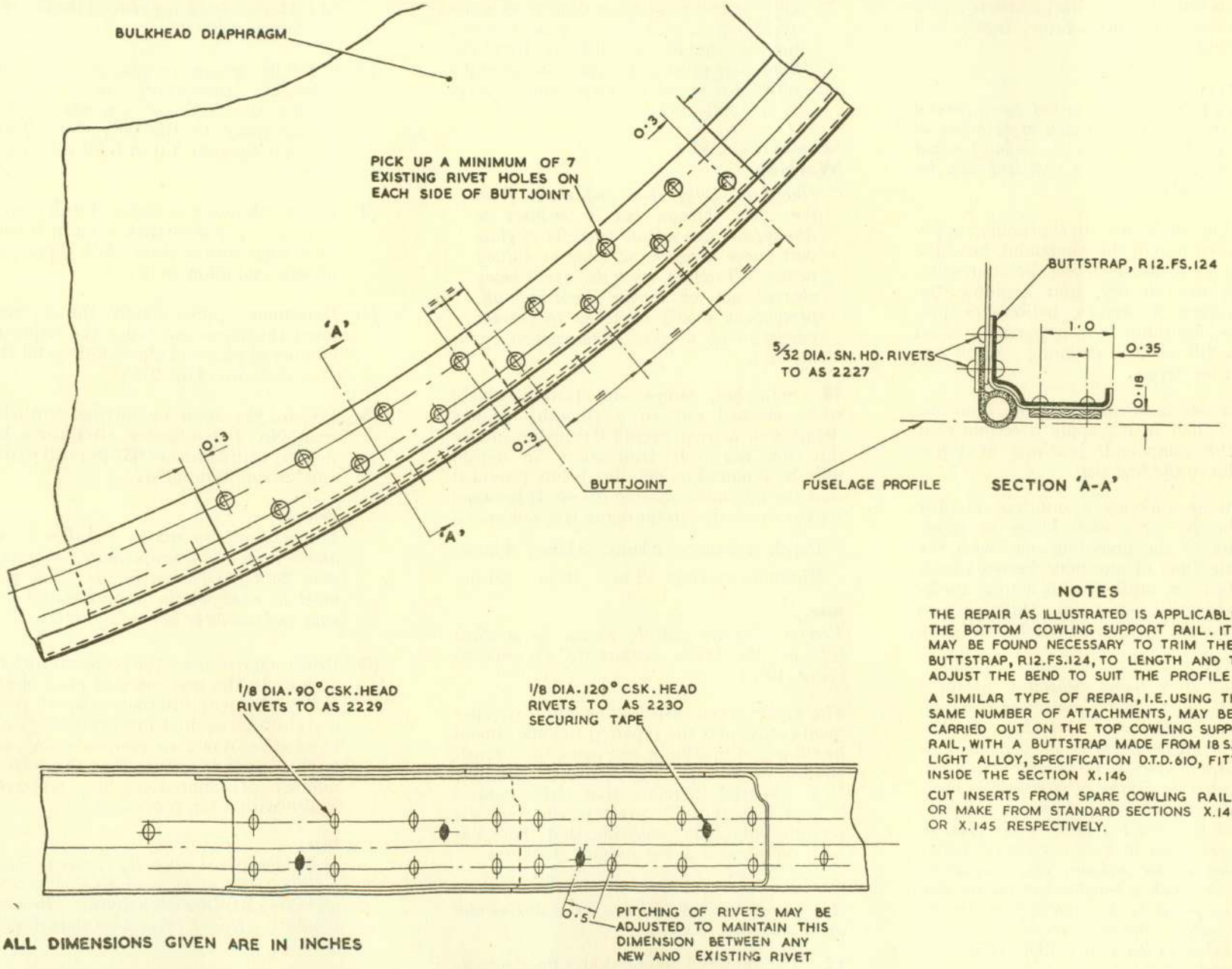
SECTION 'X-X'

NOTE

OVERSIZE RIVETS MAY BE USED WHERE NECESSARY

ALL DIMENSIONS GIVEN ARE IN INCHES

Fig. 2/51. Repair to bulkhead No. 4



NOTES

THE REPAIR AS ILLUSTRATED IS APPLICABLE TO THE BOTTOM COWLING SUPPORT RAIL. IT MAY BE FOUND NECESSARY TO TRIM THE BUTTSTRAP, R12.FS.124, TO LENGTH AND TO ADJUST THE BEND TO SUIT THE PROFILE.

A SIMILAR TYPE OF REPAIR, I.E. USING THE SAME NUMBER OF ATTACHMENTS, MAY BE CARRIED OUT ON THE TOP COWLING SUPPORT RAIL, WITH A BUTTSTRAP MADE FROM 18 S.W.G. LIGHT ALLOY, SPECIFICATION D.T.D. 610, FITTED INSIDE THE SECTION X.146

CUT INSERTS FROM SPARE COWLING RAILS, OR MAKE FROM STANDARD SECTIONS X.146 OR X.145 RESPECTIVELY.

Fig. 2/52. Repair to cowling support rails, bulkhead No. 4

(5) Prepare the Goodyear 23-56 compound by mixing twelve parts by volume of the neoprene A.C. solution 1801C, with one part of accelerator 983C, and stirring thoroughly.

Note . . .

The compound, when mixed, has a limited pot life of approximately eight hours at 25 deg. C. Therefore the amount mixed at one time should be sufficient only for six to eight coats.

(6) Within 48 hours after priming, apply an even film of the compound, brushing with a full brush in one direction only, from wet to dry, and avoiding the formation of streaks, bubbles or pinholes; brushing over a partially dried area will result in dragging. Allow one hour for drying.

(7) After one hour and not more than one and a half hours, apply a second coat of the compound, brushing at right-angles to the first coat.

(8) Continue applying a sufficient number of brush coats, each being at right-angles to the preceding one, with the drying time of one hour between each application, until there is a total thickness of 0·010 ± 0·001 in.; this thickness is obtained by approximately ten coats.

Note . . .

Should it be found difficult to obtain a smooth finish with the compound as mixed, thinner 1803C *may be added. In this way a greater number of coats will be required to arrive at the specified thickness. A control on the thickness should be made by applying the coats of primer and compound to a flat test piece of fibreglass at the same time as each successive coat is applied to the radome, and measuring carefully with a micrometer; ensure that the neoprene is not compressed by the micrometer. Brushes should be cleaned in acetone (Stores Ref.* 33C/1156) *immediately after use.*

(9) Allow the repair to dry and cure in a dust free atmosphere at a temperature of 25 deg. C ± 5 deg. C. for 7 days. In an emergency, a drying time of 48 hours at 25 deg. C. ± 5 deg. C. is permissible, but it should be realized that the hardening process continues and effective resistance is not achieved until 7 days after application.

Fibreglass repairs, Mk.2

Warning

Fibreglass, being spun and woven from fine glass threads, has a tendency to disintegrate into minute particles of glass dust under abrasive, scraping or cutting action. Therefore, when damage is being cleaned out or repairs smoothed off, precautions should be taken to prevent inhalation of, or skin contamination by, the dust.

14. Scratches, scores and pitting which, when cleaned out to a smooth, shallow depression, neither exceed 6·0 inches in any direction nor four laminations in depth, may be repaired as detailed below provided that the minimum spacing (*Chap.* 1) between repairs in relation to the depth is as follows:—

Depth of damage	2 lams.	3 lams.	4 lams.
Minimum spacing	12 in.	18 in.	24 in.

Note . . .

Previous repairs will be shown by a white line on the inside surface of the radome (*para.* 16).

The repair given satisfies structural requirements only, and the repaired radome should be subjected to a flight test using the aircraft equipment as soon as conveniently possible. It is essential therefore that strict control is kept to maintain correct profile over the repaired area, thus ensuring that there has been no increase in the radome thickness.

Note . . .

Any increase in the thickness has a detrimental affect on radar reception.

15. The material required to effect repairs to the fibreglass moulding is listed in Chap. 1, Table 1, and the procedure is as follows:—

(1) Remove the neoprene covering to an extent that will leave a minimum distance of 1·5 inches from any edge of the cleaned up damaged fibreglass.

(2) Carefully scrape or abrade away the damaged laminations to a smooth shallow depression of a regular shape, fairing away to the outer lamination at approximately 1·0 inch all round the damage.

(3) Finely abrade the area, brush away any loose particles with a clean brush, then wipe with a clean cloth dipped in toluene and allow to dry.

(4) Determine approximately the replacement thickness and tailor the requisite number of pieces of glass cloth to fill the area as shown in fig. 2/53.

(5) Prepare the resin by mixing synthetic resin No. 103 adhesive (100 parts by weight) with hardener 951 (8 to 10 parts) and stirring thoroughly.

Note . . .

It is advisable to mix in a shallow vessel and to keep it at a temperature not greater than 20 *deg. C. when in use. The mix must be used within approximately one hour and cannot be stored for future use.*

(6) Brush some resin on the prepared surface and apply the first piece of glass cloth. Follow this with alternate coats of resin and cloth as required, firmly pressing each lamination down to eliminate any air bubbles, and to ensure that the correct number of laminations are replaced. Finish with a top coat of resin.

Note . . .

It is advisable to allow the repair to stand a little proud of the surrounding area to allow for shrinkage when drying. Brushes should be cleaned in acetone immediately after use.

(7) The final pressing may be carried out with the aid of a sheet of cellophane or

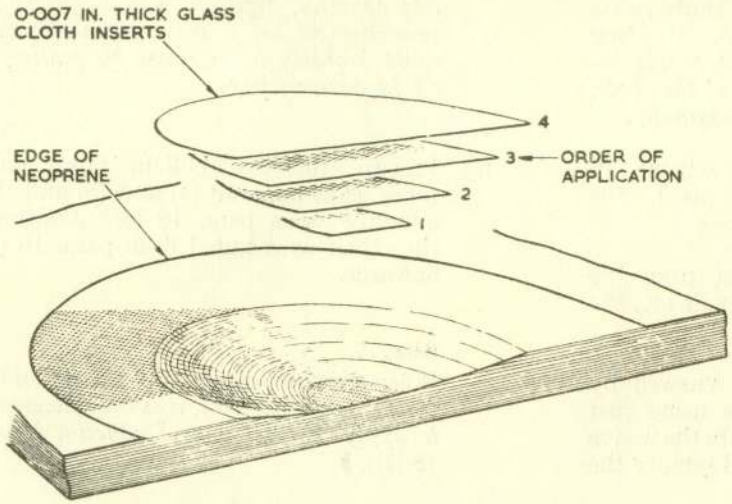


Fig. 2/53. Details of repair to fibreglass mouldings, Mk.2

polythene which can also be used to remove any excess resin.

(8) Allow to dry for 16 to 24 hours at 20 deg. C. (touch dry).

(9) Lightly abrade down the area to maintain thickness and profile and to prepare a surface for the neoprene covering.

16. An accurate record should be made in the manner given below of all repairs to fibreglass mouldings.

(1) Ring the area repaired with a painted white line $\frac{1}{8}$ in. wide approx., on the inside surface of the radome, using paint to Spec. D.T.D.772 (*Stores Ref.* 33B/1059); metallic paint, e.g., silver finish, must not be used.

(2) Within this ring, paint the number of laminations affected, e.g., "3 LAMS."

Fabric repairs

17. Madapollam fabric (D.T.D.343) is used on the fuselage as part of the external plywood protective treatment, and any damage should be repaired as soon as possible to prevent secondary damage to the ply surface. A new method of adhesion (D.T.D.900/4479), which differs from that described in A.P.2662 (D.T.D. 912A), has been used on the later aircraft; therefore, before commencing a repair, identify the scheme used from the specification stencilled on the starboard side of the fuselage. Should there be a letter "R" within a circle preceding the specification D.T.D.912A, then refer to the aircraft log book to ascertain the location of a previous repair to the fabric (*Note to para.* 18 (12)).

18. Where the scheme to D.T.D.912A has been used initially, proceed as follows:—

(1) Pull back sufficient of the fabric to clear the damaged area, and trim it squarely with a sharp knife taking extreme care not to damage the plywood.

(2) Remove all traces of paint and dope from the edges of the remaining fabric for a distance of 1·25 in., using paint remover to D.T.D.226A (*Stores Ref.* 33B/927) and dope thinners to D.T.D. 843. Cut the fabric at 45 deg. at corners to allow the edges to be lifted away from the plywood and pin the fabric back.

(3) Thoroughly clean the exposed ply skin to remove all traces of dope, and smooth the surface with fine sandpaper.

(4) Cut a new piece of madapollam fabric to butt against the existing edges.

(5) Prepare the necessary amount of serrated tape (*Stores Ref.* 32B/751) to cover the butt-joints and mitre at 45 deg. at the corners; allow at these corners an overlap of 0·25 in. away from the direction of flight.

(6) Prepare the adhesive by mixing ten parts adhesive F.1 (*Chap.* 1, *Table* 1) with approximately an equal *volume* of thinners F.T.1 to obtain the required viscosity (when taping, the adhesive should be more viscid), and then adding one part catalyst F.C.1. Stir thoroughly.

Note . . .

The pot life of the mixture is not more than four hours, and thinning after this period is inadvisable.

(7) Apply a brush coat of the mixed adhesive over the exposed area of the ply skinning and leave for a half an hour.

(8) Brush a second coat of the adhesive over the same area, leave until tacky and smooth down the free edges of the existing fabric.

(9) Lay on the new fabric starting at the top edge and spreading downward and fore and aft, ensuring that no creases or wrinkles are formed (the stretching of the fabric as the operation proceeds will probably eliminate this possibility). Cut and fit the fabric around projections, etc.

(10) Apply a further coat of the adhesive over the new area, brushing it well into the fabric.

Note . . .

During this operation, and whilst taping (sub-para. 11), *small blisters may be found where the fabric has lifted. These can be padded into position using a cloth dipped in the* F.T.1 *thinners.*

(11) As soon as possible after the operation

given in sub-para. 10, brush a coat of adhesive over the area to be covered by tape, i.e., 1·25 in. on either side of the butt-joint, and spread the tape in position ensuring that the tapes are placed in the correct sequence in order to obtain the overlap at the mitred corners (*sub-para.* 5). Apply a further coat of the adhesive brushing it well into the tape.

(12) Finally, leave the repair for 24 hours to allow the adhesive to cure before applying filler and the appropriate paint scheme.

Note . . .

When a partial replacement of the fabric has been carried out, the letter "R" within a circle should be stencilled on the starboard side of the fuselage immediately in front of the specification D.T.D.912A, *and the location of the repair entered in the aircraft log book. If the entire fabric covering has been renewed, the new specification* D.T.D.900/4479 *should replace* D.T.D.912A. *In each of the above, the stencil size should be as originally.*

19. On fuselages where the scheme to D.T.D.900/4479 has been used, the repair should be as follows:—

(1) Remove all traces of paint from the area to be covered by the repair i.e., the fabric insert and tape.

(2) Mark out the area to be renewed by cutting with a sharp knife using just sufficient pressure to penetrate the weave and not damage the ply, and remove the fabric.

Note . . .

Due to the strong adhering qualities of this adhesive, difficulty may be found in removing the large areas of fabric; this could probably be overcome by pulling it off in narrow strips.

(3) Prepare the madapollam fabric and tapes as in para. 18 (4) and (5) and the adhesive as in para. 18 (6). Continue the repair as detailed from para. 18 (8) onwards.

Note . . .

When a repair has been carried out on the fuselage plywood skin, it is only necessary to apply the first coat of adhesive (para. 18 (7)). ▶

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APPENDIX F CHAPTER 2 FUSELAGE

FITTING INSTRUCTIONS FOR REPLACEMENT COMPONENTS

APPENDIX F Chapter 2 FUSELAGE

FITTING INSTRUCTIONS FOR REPLACEMENT COMPONENTS

LIST OF CONTENTS

LIST OF ILLUSTRATIONS

Scope of Appendix F

1. The fitting instructions supplied in this appendix supplement the *assembly* information in the relevant Vol. 1 and basically apply to NEW fuselage replacement components. When reconditioned components or those transferred from other aircraft are to be fitted, the full instructions will not apply as the components will have been already trimmed when fitted to previous aircraft. Hence, only very limited trimming will be possible. If several similar replacement items are available, much time and trouble will be saved by initial selection of the most suitable item for the aircraft concerned.

Canopy hood, Venom Mk.1 and Mk.4

2. When fitting a new canopy sliding hood, proceed as follows:—

(1) Ensure that the bottom flanges of the canopy retaining brackets (12.F.913, 14 S.W.G., Spec. S.3 or S.84), attached to bulkhead No. 3 are not deformed. If they are and cannot be straightened, fit new brackets.

(2) Check that the bottom flange of the rear fairing diaphragm (12.FC.51 A.N.D.) is not out of alignment. True up if necessary.

(3) With the hood closed and locked, check that neither the perspex nor the metal fairing is rubbing against the fuselage skin. If there is contact, gently file the part to give clearance. After filing, thoroughly polish the perspex to remove all file marks.

(4) With the hood still closed, locked and unpressurized, ensure that an even gap of 0·03 in. minimum, 0·1 in. maximum exists between the flanges of the retaining brackets and the diaphragm, and that the overlap of these two flanges is 0·3 in. minimum.

Note . . .

It is essential that these dimensions are maintained as the canopy, if jettisoned, depends upon this fit to clear the tail plane. The fit may also affect safety during normal flight.

(5) If the gap between the flanges exceeds the dimensions in (4), fit a new retaining bracket.

(6) If the overlap is less than 0·3 in., pack out the retaining bracket to obtain this dimension. The flange must neither jam in the radius of the diaphragm flange, nor butt in any way. If necessary, file the edge of the retaining bracket flange to give clearance.

Note . . .

The use of plasticine may be of an advantage when carrying out the above checks.

(7) Check that the gaps between the seals and the beads on the hood, in the unpressurized condition, are as follows:—

(a) *Between hood and windscreen*—0·12 in. along the top and 0·05 in. down the sides.

(b) *Along the sides adjacent to the rails*—0·15 in.

To obtain these dimensions, it may be necessary to dress carefully the channel carrying the seal. ▶

WARNING

If the jettison mechanism is operated for any reason, it is essential that, when the jettison lever is pulled, a counter pressure is applied on the re-setting cable (Vol. 1, Sect. 3, Chap. 1, of the revelant A.P.). Failure to do this may result in bowing of the connecting-rods, bending or fracture of the adjusting screws with subsequent risk of inadvertent jettisoning of the canopy in flight. For this reason, the mechanism must only be operated when essential for servicing purposes.

Canopy hatch, Venom Mk.2 (post-Mod. Ven.170) and Mk.3

3. Refer to Vol. 1, Sect. 3, Chap. 1 of the relevant A.P. for illustrations and phraseology. The canopy hatch should be fitted as follows:—

(1) Ensure that the cartridge is removed from the hatch jettison gun.

(2) Remove the two eccentric locating pins which are situated at the rear of the hatch and remove the existing shims fitted under the hatch hinge eye-bolts.

(3) Attach the hatch to the canopy hinges by holding both hinge rockers flush with the canopy contour and pushing the hook arm upwards and rearwards to lock the hatch hinges. Now connect up the hatch beam claw mechanism and lock in position by means of the push rod.

(4) Open the hatch gently and check that the rear masking strip on the hatch does not foul the upper surface of the adjacent canopy masking strip when the hatch is opened to a position approximately at right-angles to the canopy. If necessary, file the hatch masking strip to obtain a slight clearance. (*See note.*)

Note . . .

When fitting of the hatch is completed, the gap between the hatch masking strip and the canopy over the whole hatch periphery must be between the limits of 0·20 *in. max. and* 0·050 *in. min. but should be as close as possible to the minimum limit of* 0·0500 *in. Since this gap is altered each time the hatch hinge bolt shimming is adjusted* (5)*, only enough metal should be filed from the hatch masking strip to remove the immediate foul. No specific attempt should be made to produce the minimum gap of* 0·050 *in. until the hatch is finally bedded in the symmetrical position.*

(5) In conjunction with the trimming operations, it may be necessary to adjust the hatch position relative to the canopy by shimming under the hatch hinge bolts. Laminations of shim brass should be fitted under both bolts to obtain forward movement or under one bolt to obtain symmetry of the hatch about the aircraft centre-line. The maximum permissible thickness of shim under one or both bolts is 0·050 in. If the hatch is not symmetrical about the aircraft centre-line after the maximum shim adjustment has been used, change the hatch hinge bolts over and re-shim. This is likely to make a small difference because of the manufacturing tolerances on the bolts.

(6) File round the hatch masking strip evenly on both sides, from the REAR TO THE FRONT, until the hatch seats squarely on the canopy.

(7) To ensure a good fit, it may be necessary, in addition to filing the masking strip on the forward edge of the hatch, to file back the hatch casting to a maximum of 0·050 in. to prevent the hatch casting from fouling the front windscreen bedding strip in the nearly-closed position. To do this, gently close the hatch from inside the cockpit, note any high spots on the hatch casting and file as necessary. At the same time, ensure that the two front and centre rubbing pads, which are part of the hatch casting, do not foul the rubbing pads fitted to the side of the canopy rail. If a foul, which causes the hatch to be thrown off centre, does exist, remove the laminations of brass shim from under the canopy rail pads and re-shim to produce a clearance between the hatch rubbing pads and canopy rail pads of 0·002 in. max. in the hatch-closed condition.

(8) Check that the hatch locks correctly by closing the hatch and locking by means of the internal handle. This should only require application of a gentle load on the handle over the full range of travel from unlocked to fully locked position, and no high spots should exist. If necessary, to relieve a friction load on the handle or to ensure that there is no clearance between the canopy latch pads and the latches, shim the front latch pads to a maximum of 0·062 in., using 0·003 in. thick laminations of brass shim to specification Attewell L.B.2. With the hatch closed and the latch pads correctly shimmed, it should be just possible to rotate the latch lock rollers.

(9) Check that the hatch front casting is seating squarely on the sill of the front windscreen casting by placing a piece of paper in the region of each latch pad, closing the hatch and ensuring that the hatch firmly grips both pieces. If only one piece of paper is gripped, add shims to the latch pad (8) on the free side until satisfactory. If the shimming has been altered as a result of this check, re-check the adjustments of the latches and of hatch to canopy.

(10) Close the hatch externally by means of the external handle, ensuring that the internal handle is in the fully-locked position.

Note . . .

This does not include the positive engagement of the internal handle lock lever catch, which must be manually engaged to ensure completion of the hatch locking operation. If the external handle does not fully lock the hatch, adjust the connecting-rods on the hatch centre beam until the hatch latches engage and disengage fully under the action of the handle.

(11) With the hatch in the locked position, check externally with a set of feeler gauges that there is an all-round clearance of 0·010 in. to 0·090 in. between the hatch pressure seal and the canopy rail bedding strip. If the gap exceeds 0·090 in., insert hard rubber packing under the rubber pressure seal to reduce the gap to the required clearance, and secure the pressure seal and rubber packing in position with Bostik C adhesive.

(12) Check the hatch contours relative to the canopy. At the forward end, the canopy must neither project more than 0·030 in. into the slipstream nor be recessed by more than 0·060 in. At the aft end, the rear canopy arch must neither project nor be recessed more than 0·060 in.

(13) Replace and adjust the hatch eccentric locating pins and peen over the threads to lock.

(14) Connect up the flexible tube to the union on the air valve.

(15) Check that the hatch demisting pipes line up with the fixed canopy demisting pipes.

(16) Conduct a pressure test as detailed in Vol. 1, Sect. 3, Chap. 8 of the relevant A.P. and re-check the canopy contour limits, as in (12), when the cockpit is pressurized.

(17) Clean out the cockpit and remove the protective rubber treatment from the hatch perspex panels.

(18) Restore protective finishes as necessary. If the magnesium hatch casting has been filed, the affected areas should be treated in accordance with spec. D.T.D.911 (Repair of chromate films and Painting).

(19) Refit the canopy hatch jettison gun cartridge.

Starboard windscreen panel, Venom Mk.2 (post-Mod. Ven. 170) and Mk.3

4. Remove the damaged panel, ensure that the recess in the casting is clean and free from sealant, etc., and, referring also to fig. 2/F1, fit a new panel, Part No. 12.20.FC. 413 (*Stores Ref.* 26DV/3442), in the following manner:—

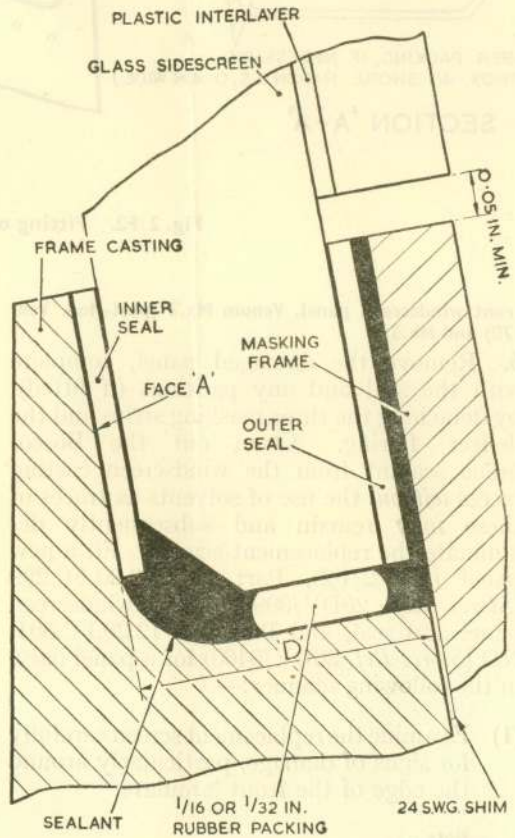

Fig. 2/F1. Attachment of starboard windscreen panel

(1) Inspect the new panel to ascertain whether or not its inner edge has been chamfered; if it has, proceed as directed in the following paragraphs, but if it has not, refer first to para. 5.

(2) Check the depth "D" of the recess in the canopy casting. If it is found that, at any position, the depth is less than 0·32 in., prepare a shim from 24 S.W.G. Alclad sheet (e.g., D.T.D.610) to fit between the casting and the masking frame; this will ensure that the seals are not under excessive pressure when the assembly is finally bolted up.

(3) Apply a film of sealant, Boscoprene 2100 (*Stores Ref.* 33C/1281), to face "A" only of the casting and secure the inner seal, Part No. 12.20.FC.453 (*Stores Ref.* 26DV/3723).

(4) Examine the corner in the recess of the new panel. If the plastic interlayer projects beyond the boundary of the outer lamination, carefully remove the surplus with a sharp knife until the interlayer is flush with the outer lamination.

(5) Offer up the panel, and position it centrally in the casting using suitable lengths of $\frac{1}{8}$ in. wide rubber packing, cut from $\frac{1}{16}$ in. (*Stores Ref.* 32C/597) or $\frac{1}{32}$ in. thick sheet (*Stores Ref.* 32C/624), placed around the edges to prevent contact between panel and casting after final assembly.

(6) Locate the masking frame using alternate bolts only and plain nuts (Stiffnuts are used on final assembly). Check that there is a minimum gap of 0·05 in. between the inside of the frame and the outer lamination of the panel all round the periphery. If necessary, file the frame to obtain the minimum gap and remove any file marks.

(7) Re-fit the masking frame, together with the outer seal (*Part No.* 12.20.FC.453), temporarily bolting as in (6) but screwing

on the nuts slightly more than finger-tight to apply only a light pressure on the screen; *do not fully tighten as for final assembly*. Check that there is even contact between the mating faces of the panel and the inner seal. Leave for twenty-four hours to allow the sealant to set between the inner seal and the cast frame.

(8) Remove the masking frame, outer seal, panel and rubber packing strips. Apply a film of sealant, Boscoprene 2100, over the whole recess in the casting including the open face of the inner seal. Replace the panel and packing strips with further applications of the sealant before and after fitting the outer seal.

Note . . .

A piece may be cut from a straight section of the outer seal to eliminate any tendency to "ruck."

(9) Cover the whole area of the masking frame seating, and the shim (if fitted, (2)), with the sealant, and finally assemble the frame using 4 B.A. bolts A.S.1242/58, 14 off, and A.S.1242/11B, 4 off, with nuts A.G.S.2001/B1 and washers S.P.13.B. Tension the sealing bolts evenly, the nuts being of such tightness that will just allow them to be turned when a screwdriver of correct blade size is applied at the bolt heads.

5. New panels not chamfered on the inner edge should be centralized in the aperture, and the gap between the casting and the edge of the glass checked; if the gap is more than 0·05 in., the panel may be fitted as described in para. 4 above. If the gap is less than 0·05 in., the inner seal must be carefully positioned so that it does not "ride" on to the 0·1 in. radius in the corner of the recess; if necessary, the seal may be cut or trimmed in order to prevent this tendency to ride, and the panel can now be fitted as described in para. 4.

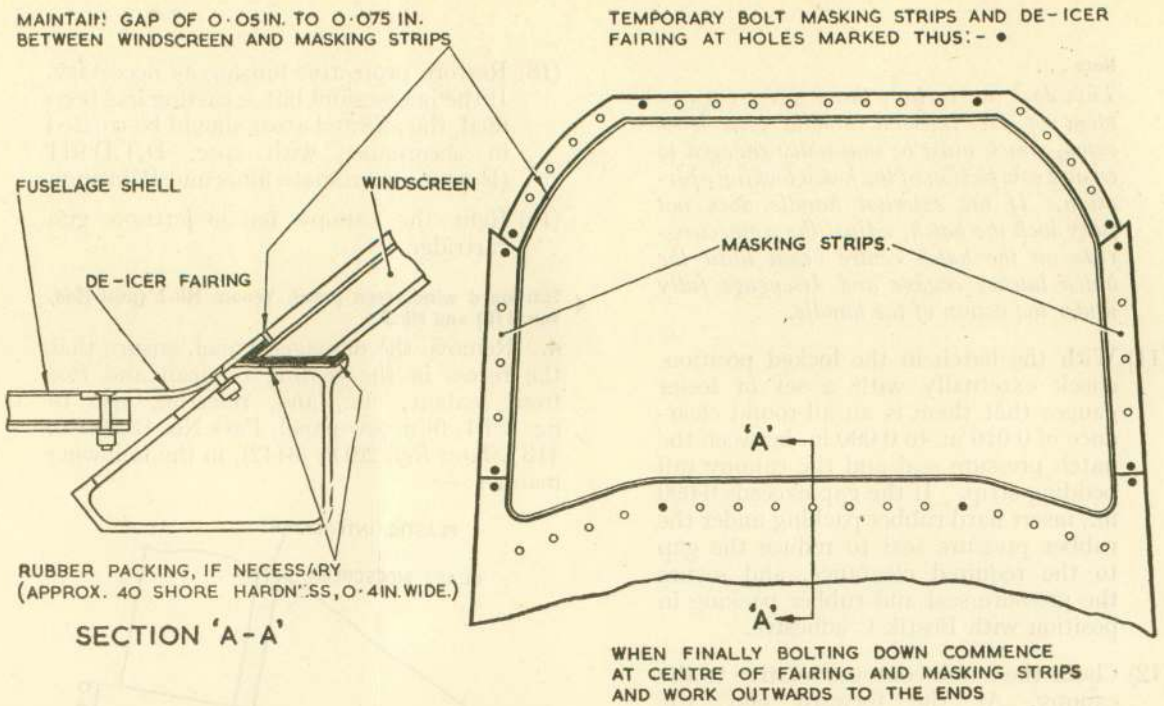

Fig. 2/F2. Fitting of replacement windscreens

Front windscreen panel, Venom Mk.2 (post-Mod. Ven. 170) and Mk.3

6. Remove the damaged panel, complete with the seal and any packings (if fitted), by detaching the three masking strips and the de-icer fairing. Clean out the Boscoprene sealant from the windscreen casting recess *without* the use of solvents as traces of these may remain and subsequently delaminate the replacement screen. Fit a new panel (*fig.* 2/F2), Part No. 12.20.FC.299 (*Stores Ref.* 26DV/3998) for a windscreen panel and seal, and Part No. 12.20.FC.301.ND (*Stores Ref.* 26DV/6460) for a panel only, in the following manner:—

(1) Examine the replacement screen carefully for signs of damage, particularly around the edge of the front laminate.

Note . . .

If damage does exist and it is decided to continue to fit the screen, the fact should be noted for future reference should the screen eventually fail.

(2) Protect both faces of the screen with cardboard (cut to within 0·75 in. of the edge of the screen) attached with masking tape (*Stores Ref.* 32B/913).

(3) If necessary, fit a new seal, Part No. 12.20.FC.303.ND (*Stores Ref.* 26DV/6058), to the replacement screen with a thin film of sealant, Boscoprene 2100 (*Stores Ref.* 33C/1281), ensuring that there is a tight fit between glass and seal.

(4) Carefully insert the screen into the casting and, if possible, push it upwards so that it seats firmly in the top recess. If necessary, insert a piece of 0·4 in. wide natural rubber packing (approx. 40 Shore hardness) of the required thickness

between the bottom edge of the screen and the casting to hold it in this position; in a similar manner, it may also be necessary to pack between the two side edges of the screen and the casting to position the screen centrally.

(5) Temporarily bolt the masking strips and the de-icer fairing in position as shown in fig. 2/F2, ensuring that a gap of 0·05 in. min. to 0·075 in. max. exists between these and the outer glass laminate of the screen. If necessary remove and file the strips and fairing to obtain this gap.

(6) In conjunction with (5), check that the forward face of the screen is in line with the forward face of the masking strips and fairing. If it is below, the screen may be packed out with rubber strips as in (4).

Note . . .

Throughout the operations (5) *and* (6), *ensure that the glass does not move and that the masking strips or fairing do not touch the edge of the front laminate causing perhaps a slight damage mark.*

(7) When the correct gaps have been obtained, remove the masking strips, fairing, windscreen and any packings. Apply a liberal coat of sealant, Boscoprene 2100, into the casting recess, over the packings and windscreen seal, and replace the windscreen.

(8) Fit the de-icer fairing and temporarily secure with bolts as shown, using sealant, Boscoprene 2100, over the area in contact with the windscreen. Apply a liberal coat of sealing compound, Bostik 1753 (*Stores Ref.* 33C/1358), at the forward end of the fairing in contact with the fuselage to ensure an air-tight seal.

(9) Assemble the three masking strips with further applications of sealant, Boscoprene 2100, adjacent to the windscreen, and bolt at the ends. Check the gaps as in (5), replace the remaining bolts and, finally, tighten each one progressively, commencing at the centre of each masking strip and fairing and working outwards to the ends.

(10) The windscreen should now be left for twenty-four hours to allow the sealant to cure, any surplus material then being removed without the use of solvents. Finally, carry out a pressure check as detailed in the relevant Vol. 1. ▶

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