CHAPTER 3

# MAIN PLANE

# Chapter 3 MAIN PLANE

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## LIST OF ILLUSTRATIONS



## APPENDIX

**Description**

**1.** The main planes are of light alloy construction with top and bottom surface stressed skins riveted to main and false spars, intercostal ribs between spars, and leading edge ribs. The flaps and ailerons are mounted on hinges attached to the false spars and are also of light alloy construction. Unless stated otherwise in their titles, the structure illustrations apply to all marks of aircraft.

**Aileron mass balance**

**2.** After any repair to an aileron is completed and the protective finish has been restored, the mass balance should be checked and, if necessary, adjusted. Fig. 3/57 shows the methods to be used for checking and adjustment.

**Definition of negligible and repairable damage**

**3.** Illustrations of each assembly carry definitions of the damage which can be repaired or treated as negligible. In earlier issues of these definition tables, *dents or bruises, deep, dia.* and *apart,* should read *dents, max. depth, min. dia.* and *min. spacing* respectively, as described in Chap. 1. The column giving the repair material item numbers should be ignored.

**Repair limitations**

**4.** Chobert rivets must not be used in repairs to bottom surface skins and internal members if the rivet sealing pins would project into a flexible-tank bay.

**Repair precautions, tank bay top skids**

**5.** When repairing top surface skins over tank bays, the following precautions should be adhered to:—

(1) Remove the tank.

(2) Take care not to damage the tank screening when drilling the skin.

(3) Prevent swarf from straying over the top surface of the tank screen and ensure that it is all removed before completing the repair.

(4) Ensure that the mandrels of Chobert rivets will not damage the screen when riveting finally.

(5) Examine the tank bay carefully prior to replacing the tank.

**Internal finish of tank bays**

**6.** Flexible fuel tanks must be protected, by tape or felt, from chafing due to direct contact with protrusions such as rivets, bolts and edges of flanges, plates or butt-straps. The tape or felt is attached to the structure in the following manner:—

(1) Remove all sharp edges of patches, butt-straps, etc., by forming a radius equal to the material thickness.

(2) Remove all swarf and grit from the bay and degrease the metal surface to a distance of at least 3·0 in. from any edge or rivet to be covered.

(3) Stick one layer of felt over all bolts and rivets and also over any edges which cannot be adequately padded with tape alone, using Bostik No. ◀ 1410 adhesive (*Stores Ref.* 33C/1372). ▶ The felt should be $\frac{1}{16}$ in. thick to Specification D.T.D.590, R.S.7 (*Stores Ref.* 32B/942) treated ◀ to B.S.2087. ▶

(4) Apply waterproof self-adhesive tape ◀ (*Stores Ref.* 32B/849 856 or 896) ▶ over areas covered with felt and also over remaining edges, ensuring that no wrinkles or air pockets are formed. When applied over felt, the tape should overlap on to the structure. No more than two layers of tape should be used in any position.

(5) Brush a coat of Bostik S.23/95 ◀ (*Stores Ref.* 33C/1335) ▶ evenly over the tape and to a distance of at least $\frac{1}{2}$ in. from the edges of the tape on the surrounding structure; allow five minutes for drying and apply a second coat. Bostik S.23/95 should be thoroughly stirred and applied quickly to prevent the possibility of dragging by successive strokes.

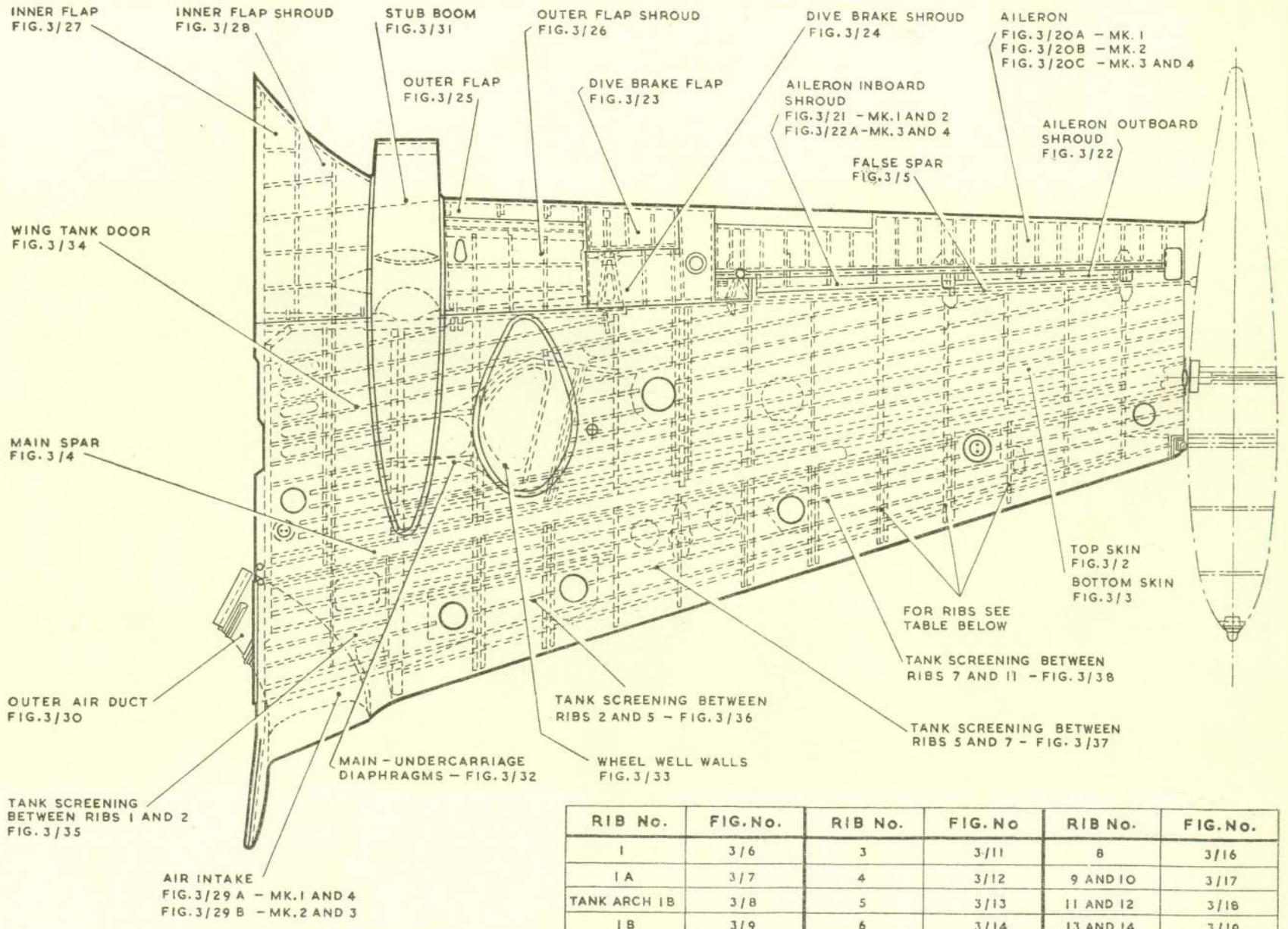
**Note . . .**

*Ensure that no swarf, grit or other foreign matter becomes embedded in the wet Bostik.*

(6) Allow a period of at least two hours for the Bostik to dry and dust the affected area with french chalk.

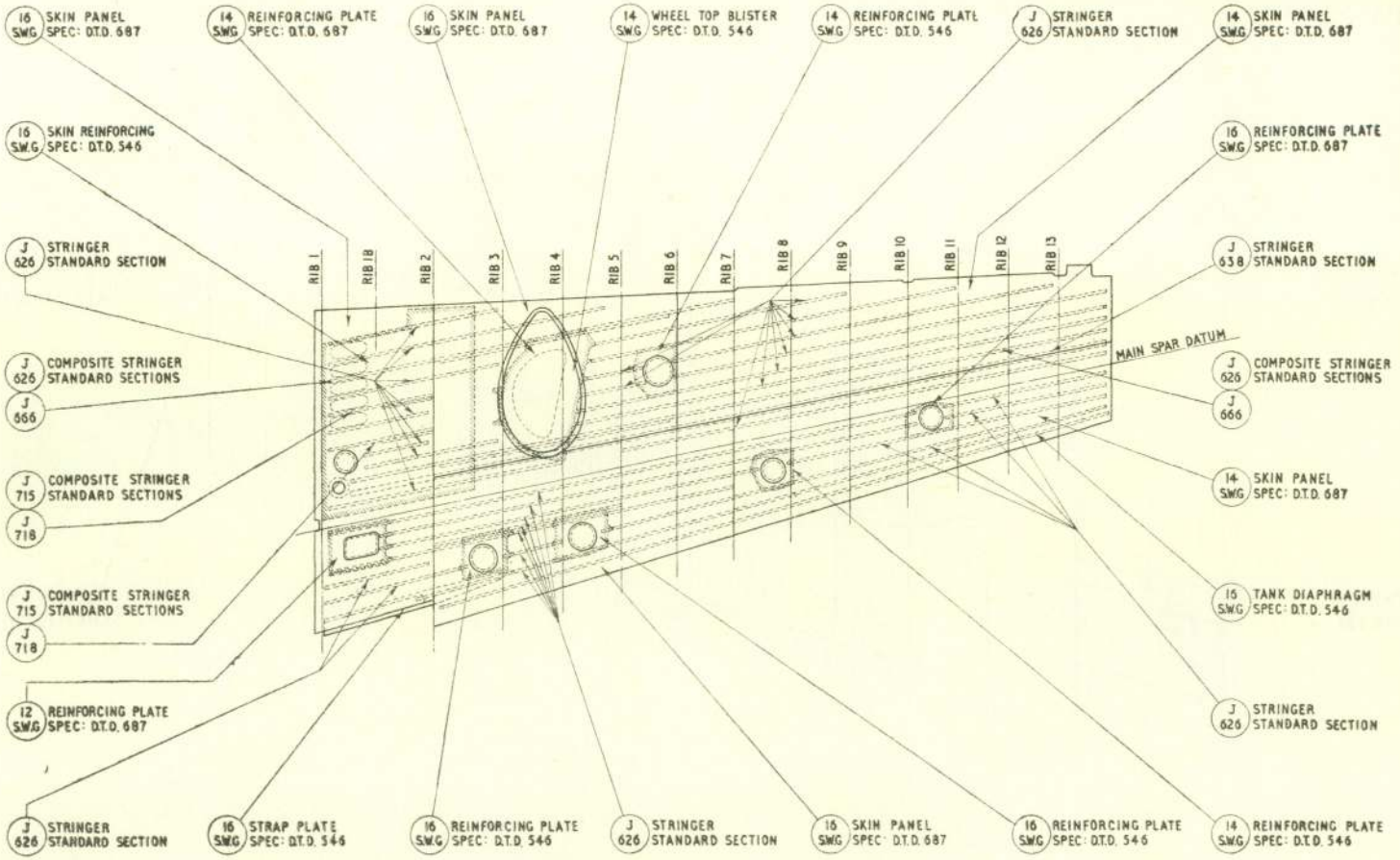
**WARNING**

*The materials used in the protective covering scheme are inflammable; the vapours emitted, particularly if concentrated in a confined space, could be injurious to health. Precautions, similar to those applicable to cellulosing operations in confined spaces, should be taken.*




| RIB No. | FIG. No. | RIB No. | FIG. No | RIB No. | FIG. No. |
|---|---|---|---|---|---|
| 1 | 3/6 | 3 | 3/11 | 8 | 3/16 |
| 1A | 3/7 | 4 | 3/12 | 9 AND 10 | 3/17 |
| TANK ARCH 1B | 3/8 | 5 | 3/13 | 11 AND 12 | 3/18 |
| 1B | 3/9 | 6 | 3/14 | 13 AND 14 | 3/19 |
| 2 | 3/10 | 7 | 3/15 | | |

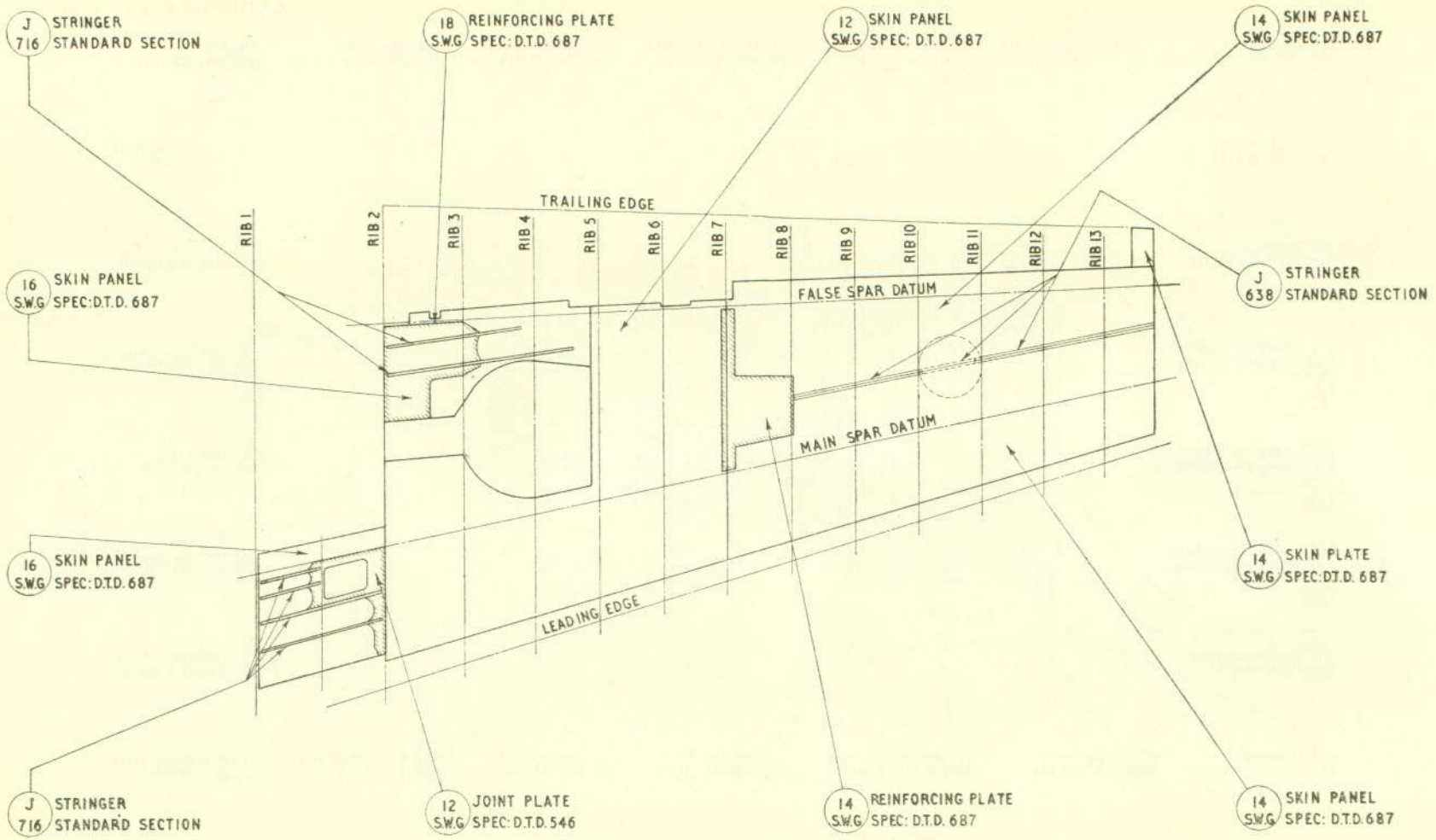
**Fig. 3/1. Main plane key diagram**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| TOP SKIN | 0·05 | 2·0 | 18·0 | 4·0 dia., 24·0 spacing<br>Larger insertions<br>At highly stressed areas (*fig.* 3/39) | 3/56<br>3/39, 3/40, 3/41 and 3/52<br>S.A. |
| STRINGERS | 0·02 | 0·5 | 18·0 | Exceeding negligible | 3/42, 3/43 |

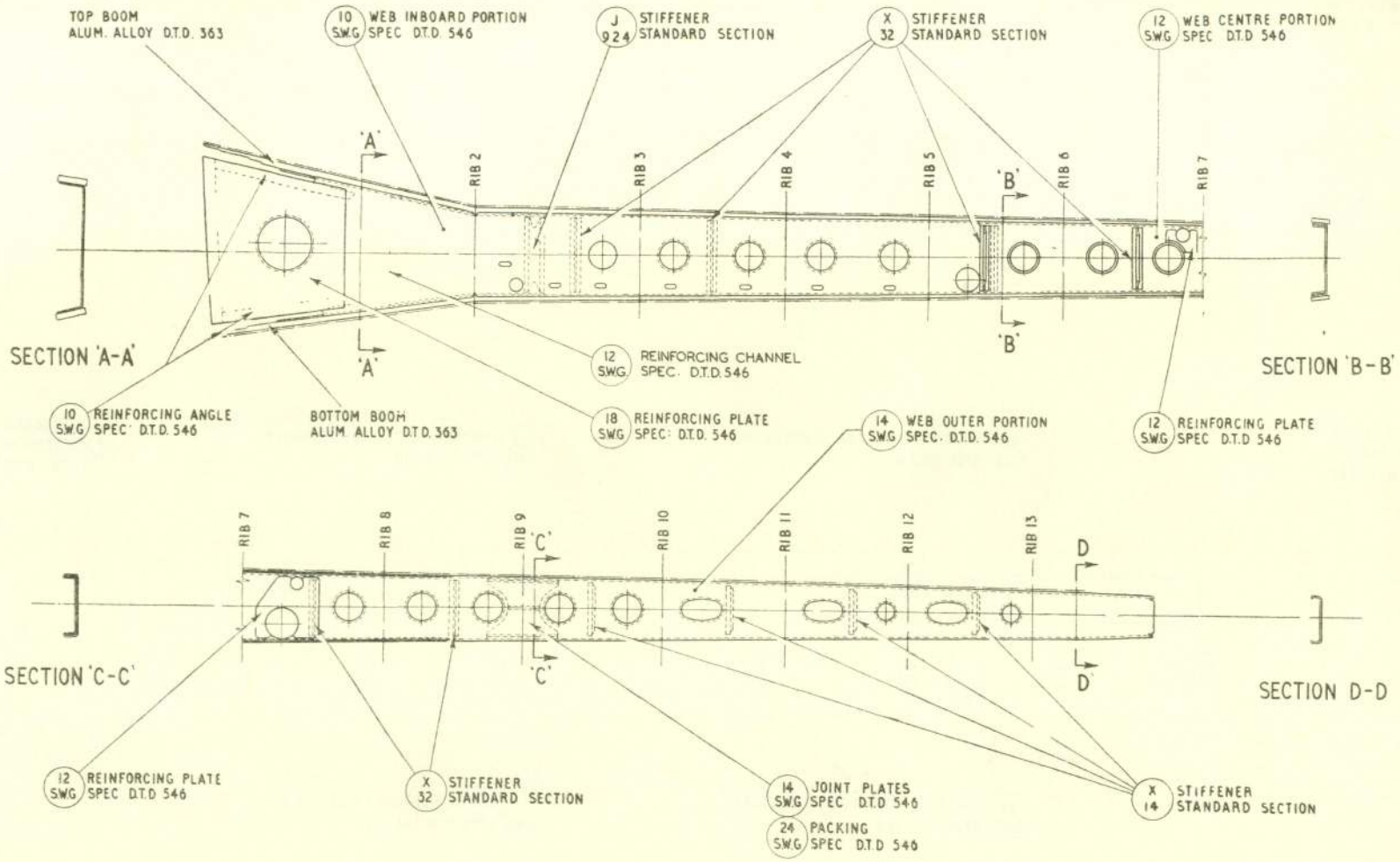
**Fig. 3/2. Top skin**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| TOP SKIN | 0·05 | 2·0 | 18·0 | 4·0 dia., 24·0 spacing<br>Larger insertions<br>At highly stressed areas (*fig.* 3/39) | 3/56<br>3/39, 3/40, 3/41 and 3/52<br>S.A. |
| STRINGERS | 0·02 | 0·5 | 18·0 | Exceeding negligible | 3/43 |

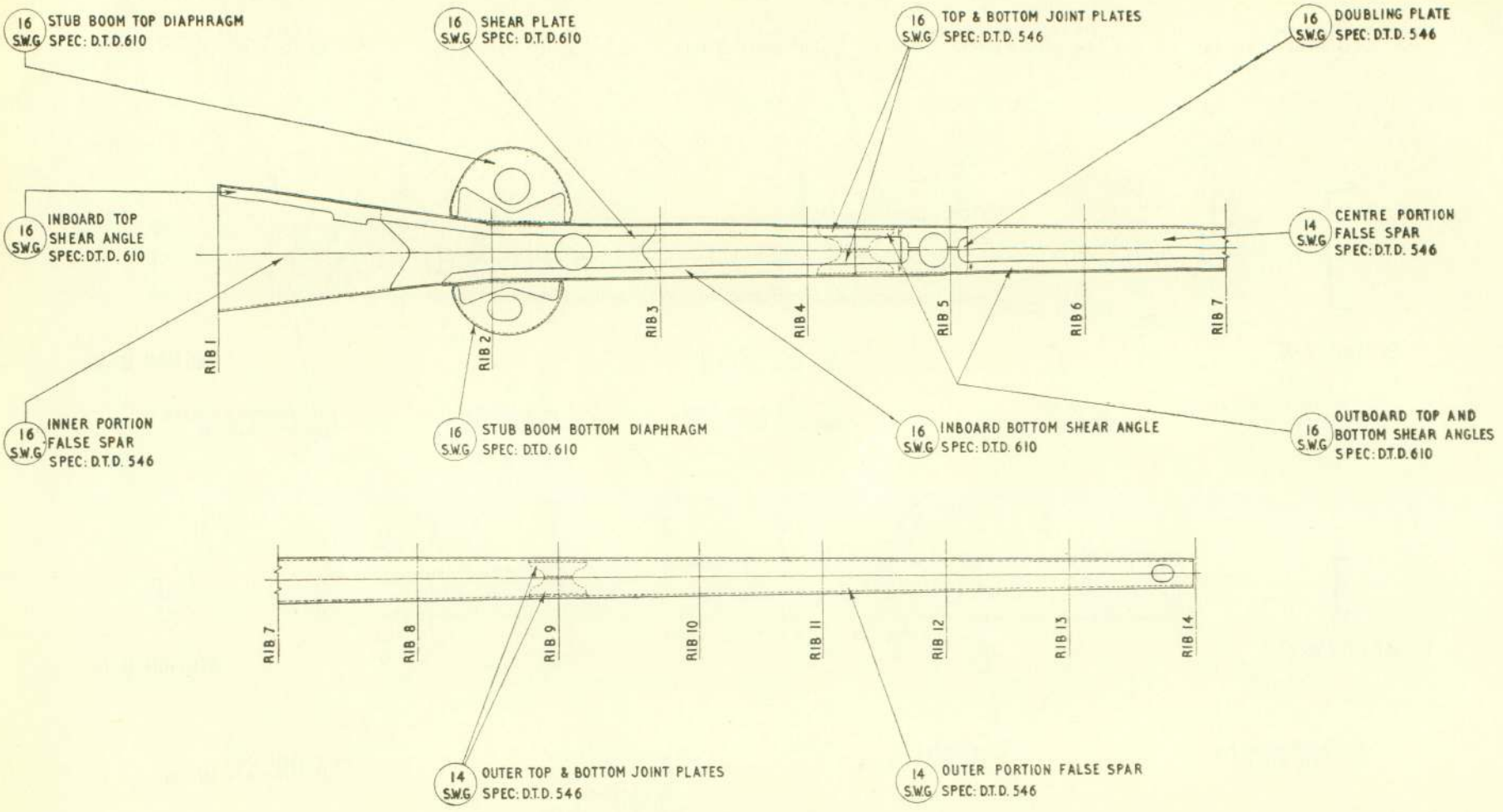
**Fig. 3/3. Bottom skin**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| WEB | 0·03 | 2·0 | 18·0 | 0·5 dia., 12·0 spacing<br>1·0 dia., 18·0 spacing<br>2·0 × 2·0, and damage at lightening holes<br>2·0 × 3·0 | 3/44<br>3/44<br>3/45<br>3/46 |
| STIFFENERS | 0·03 | 0·25 | 6·0 | Exceeding negligible | Replace |
| TOP AND BOTTOM BOOMS | 0·05 | 1·5 | 18·0 | Exceeding negligible | S.A. |

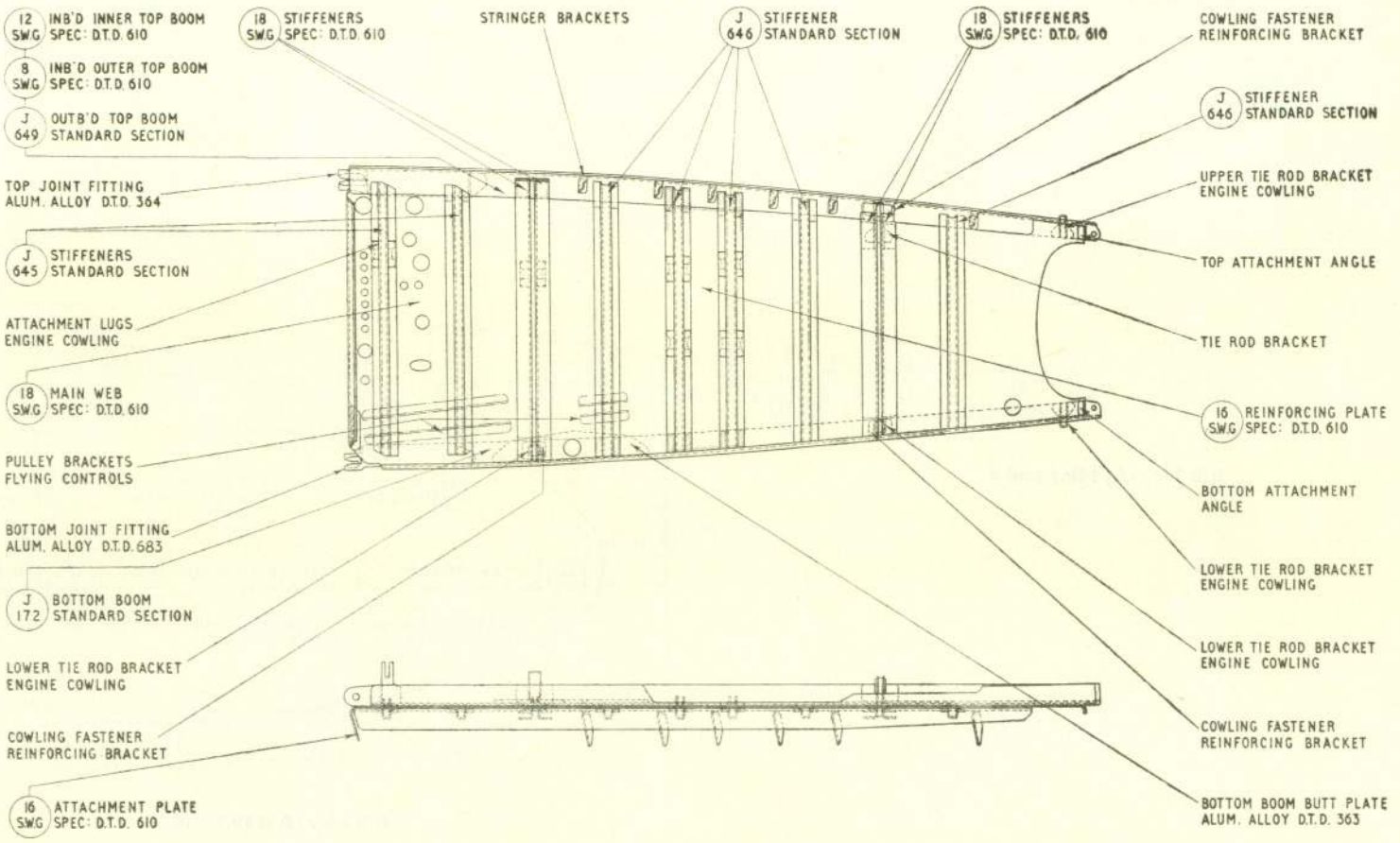
**Fig. 3/4. Main spar**




**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | |
|---|---|---|---|---|
| WEB | Dents or bruises 0·03 in. deep 2·00 in. dia. 18·00 in. apart | 0·50 in. dia. 12·00 in. apart<br>1·00 in. dia. 18·00 in. apart<br>2·00 in. × 2·00 in. and damage at lightening hole | 3/44<br>3/44<br>3/45 | |
| SHEAR ANGLES | Dents or bruises 0·05 in. deep 0·50 in. dia. 12·00 in. apart | Damage in excess of negligible | Special instruction to be obtained | |

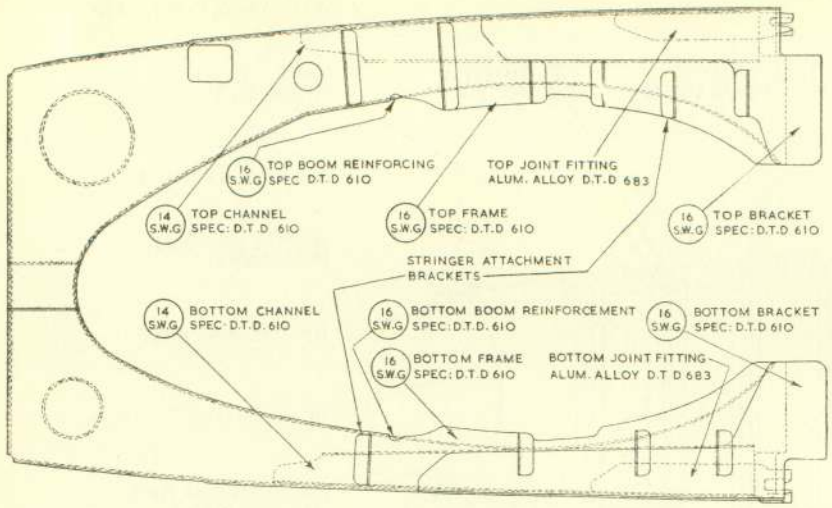
**Fig. 3/5. False spar**



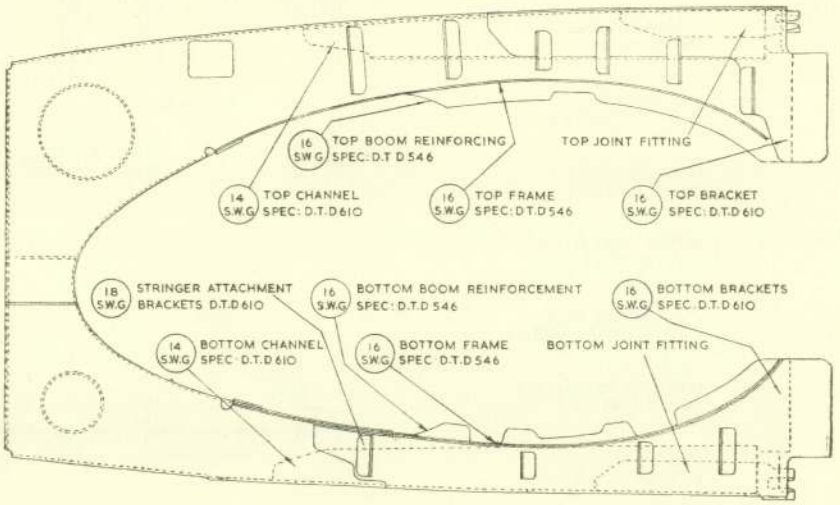

**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | |
|---|---|---|---|---|
| Web | Dents or bruises 0·03 in. deep 2·00 in. dia. 12·00 in. apart | 1·00 in. dia., 12·00 in. apart | 3/47 | |
| Flanges | Dents or bruises 0·03 in. deep 0·50 in. dia., 12·00 in. apart | Damage in excess of negligible | Special instruction to be obtained | |
| Booms | Dents or bruises 0·05 in. deep 0·50 in. dia., 12·00 in. apart | Damage in excess of negligible | Special instruction to be obtained | |
| Stiffeners | Dents or bruises 0·03 in. deep 0·25 in. dia., 6·00 in. apart | Damage in excess of negligible | Replace | |

**Fig. 3/6. Rib No. 1**




**Rib No. 1A, Mk.1 and 4**

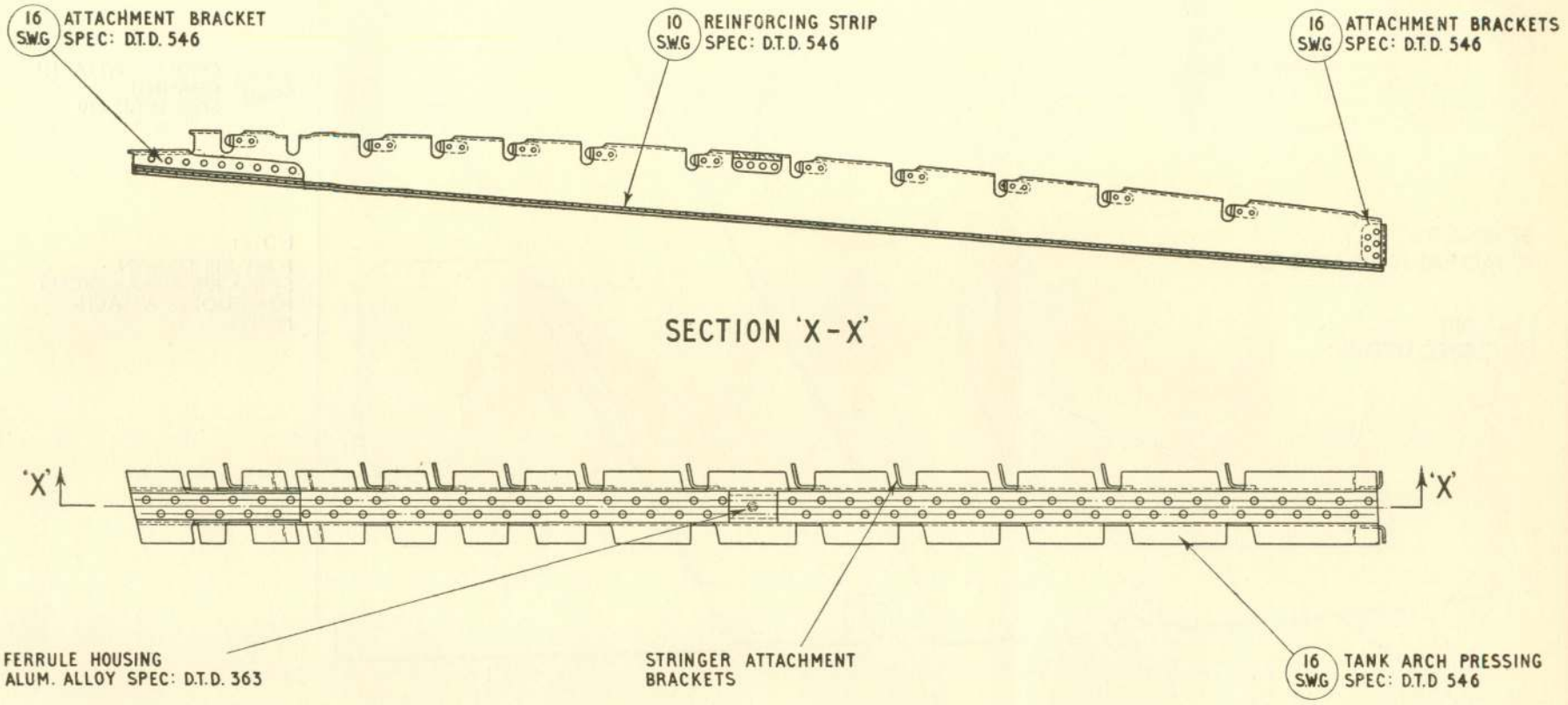



**Rib No. 1A, Mk.2 and 3**

**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| FRAME AND BOOM REINFORCINGS | 0·03 | 2·0 | 12·0 | 1·0 dia., 12·0 spacing | 3/47(C) |
| CHANNELS AND BRACKETS | 0·03 | 1·0 | 9·0 | Exceeding negligible | Replace |

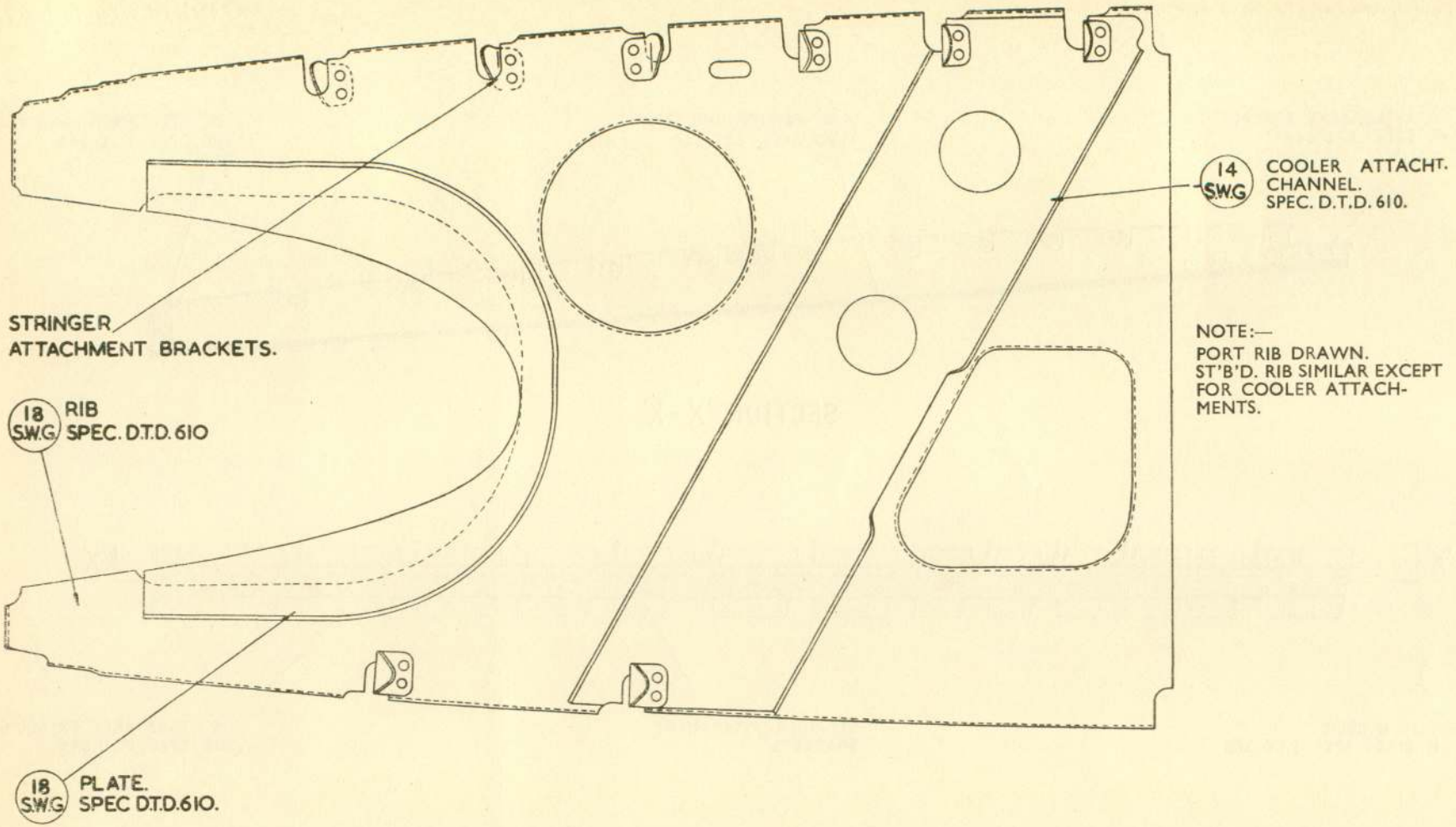
**Fig. 3/7. Rib No. 1A**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| Pressing | Dents or bruises 0·03 in. deep, 2·00 in. dia., 12·00 in. apart | Two repairs only per side of pressing | 3/47 | 37, 50 |
| Reinforcing | Dents or bruises 0·03 in. deep, 1·00 in. dia., 12·00 in. apart | Damage in excess of negligible | Replace | |

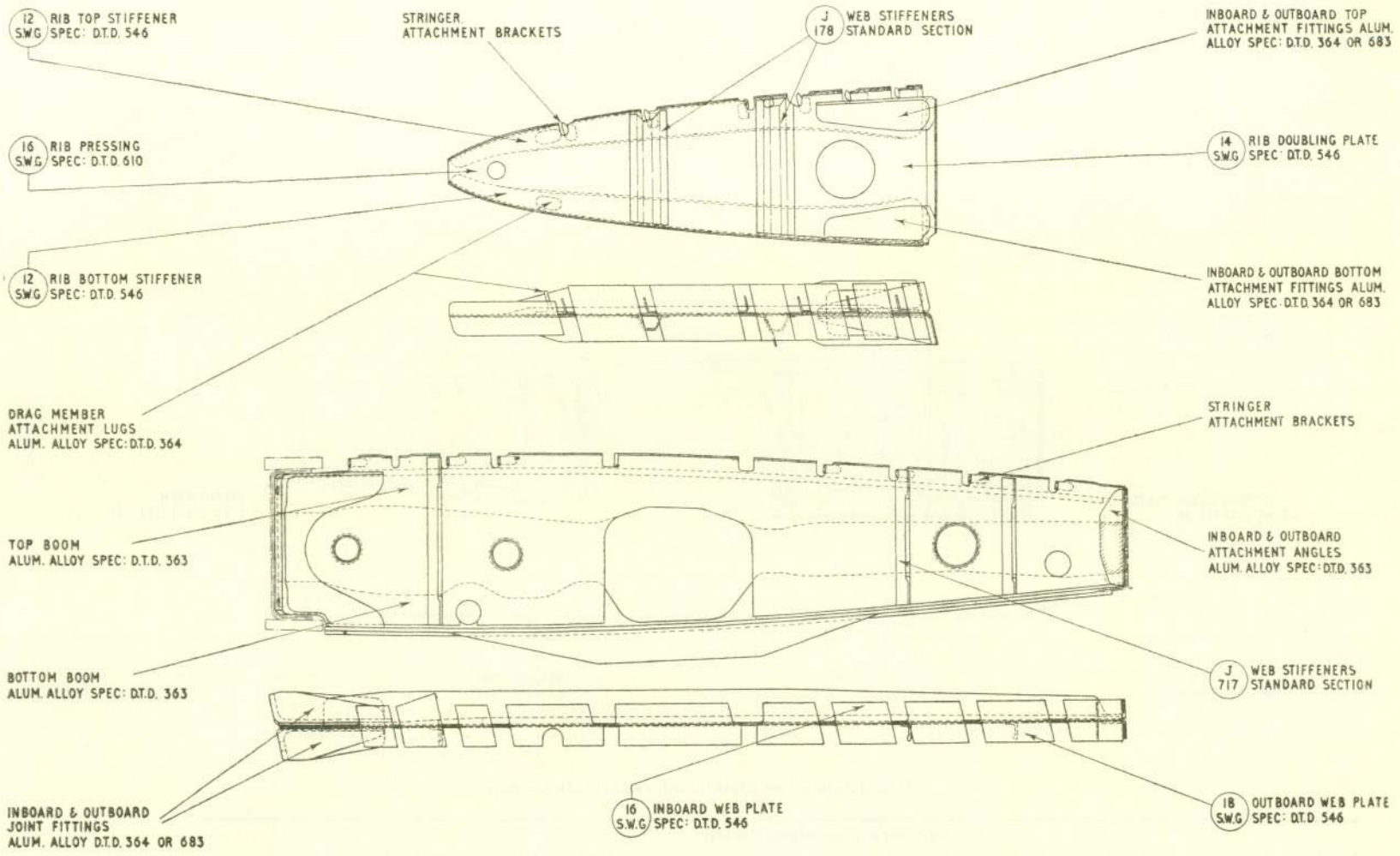
**Fig. 3/8. TANK ARCH RIB 1B**




**Definition of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| Rib | Dents or bruises 0·03 in. deep 2·00 in. dia., 12·00 in. apart | 1·00 in. dia. four only per rib<br>Damage at lightening holes one only per rib | 3/47<br>3/47 | 25, 50<br>25, 50 |

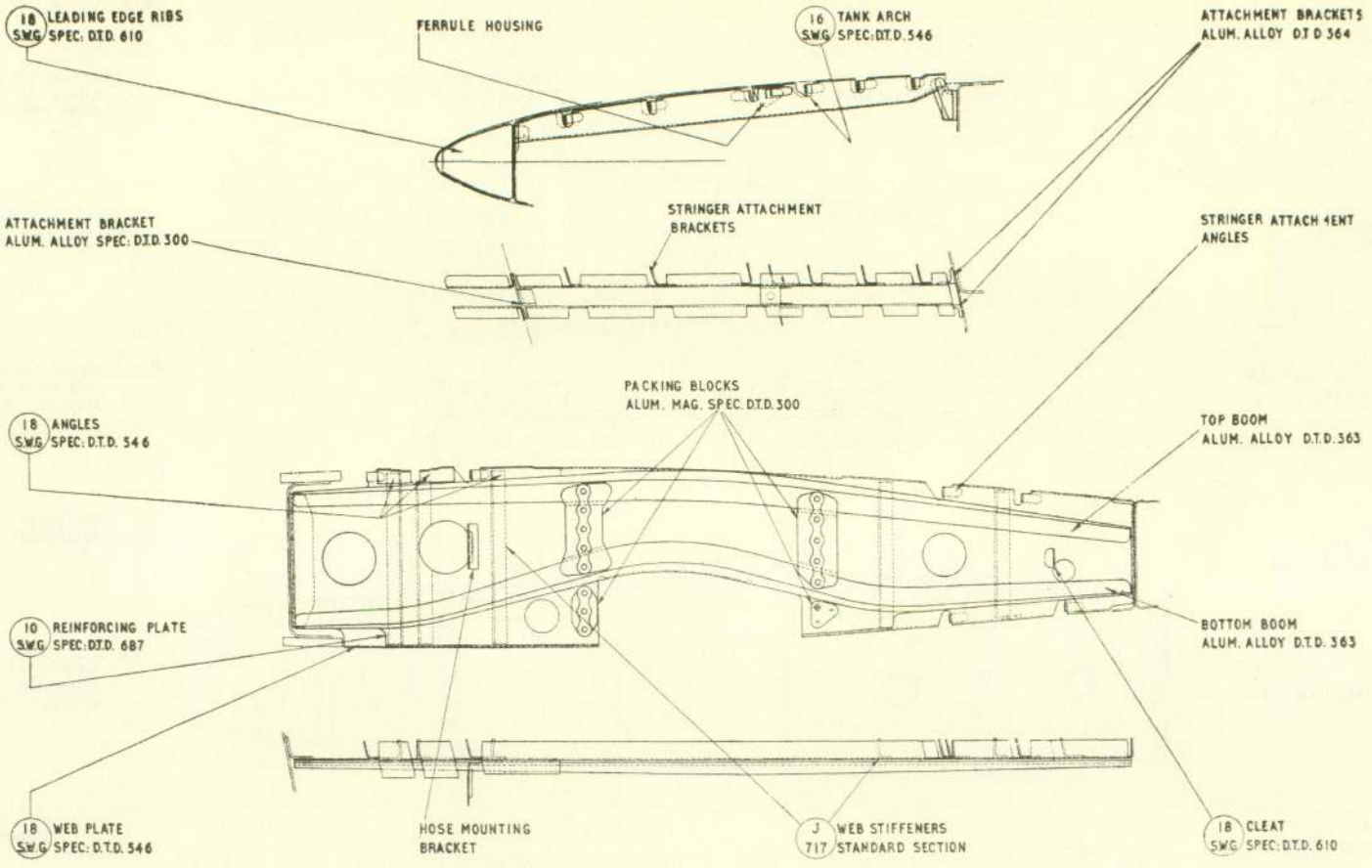
**Fig. 3/9. RIB No. 1B**




**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | |
|---|---|---|---|---|
| NOSE RIB | | | | |
| Web | Dents or bruises 0·05 in. deep 2·00 in. dia. 9·00 in. apart | 1·00 in. dia. 9·00 in. apart | 3/47 | |
| Web stiffeners | Dents or bruises 0·03 in. deep 0·25 in. dia. one only per stiffener | Damage in excess of negligible | Replace | |
| Top and bottom stiffeners | Dents or bruises 0·03 in. deep 0·50 in. dia. 6·00 in. apart | Damage in excess of negligible | Replace | |

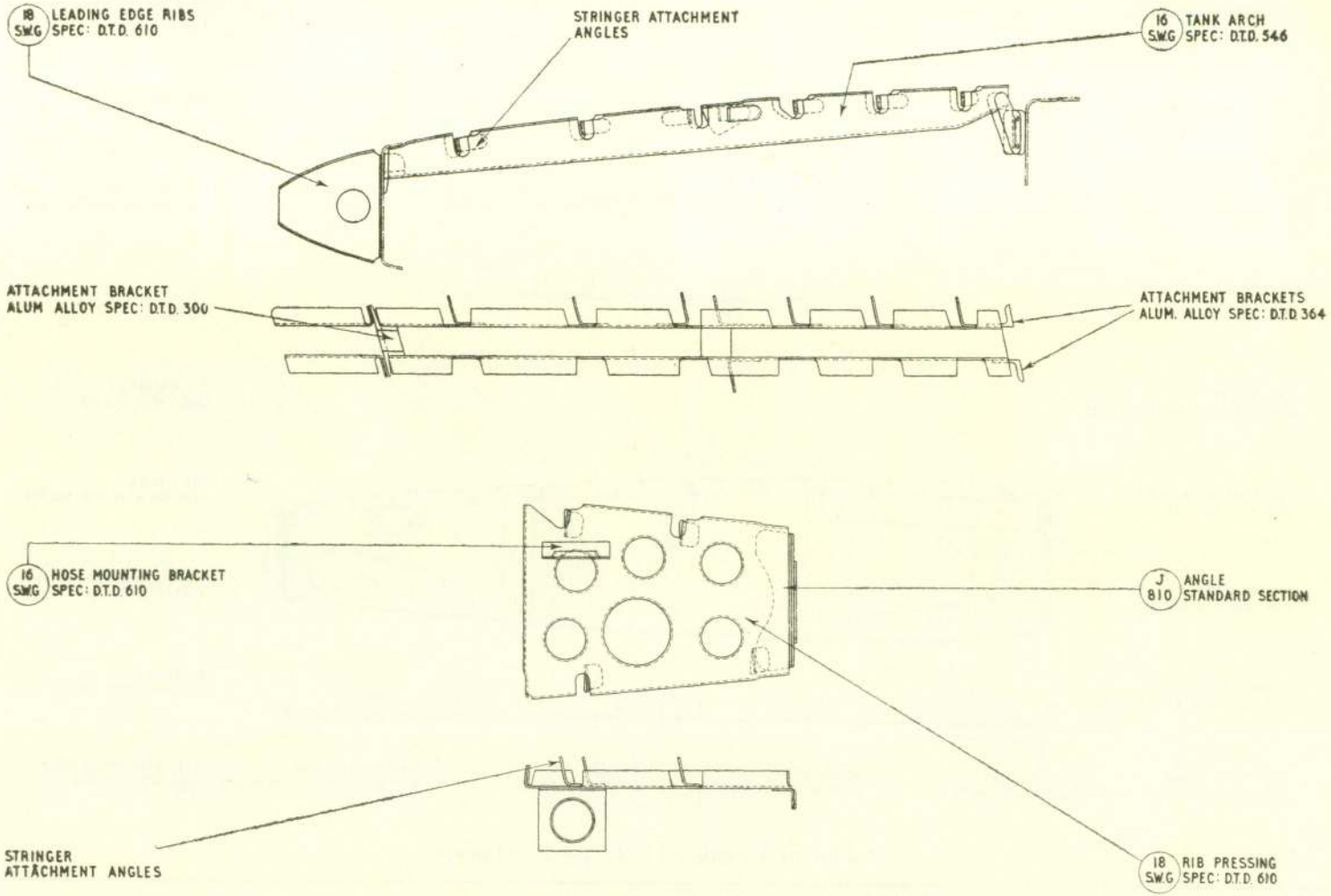
**Fig. 3/10. Nose and centre ribs No. 2**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| LEADING EDGE RIB | 0·03 | 0·5 | One per rib | 1·0 dia., one per rib | 3/47(C) |
| TANK ARCH | 0·03 | 1·0 | 9·0 | 1·5 max. between cut-outs<br>Flange replacements, four per arch | 3/47(A)<br>3/47(B) |
| CENTRE RIB Web | 0·05 | 2·0 | 12·0 | 1·0 dia., 9·0 spacing | 3/47(C) |
| Booms | 0·05 | 0·5 | 12·0 | Exceeding negligible | S.A. |
| Stiffeners | 0·05 | 0·5 | Two per stiffener | Exceeding negligible | Replace |

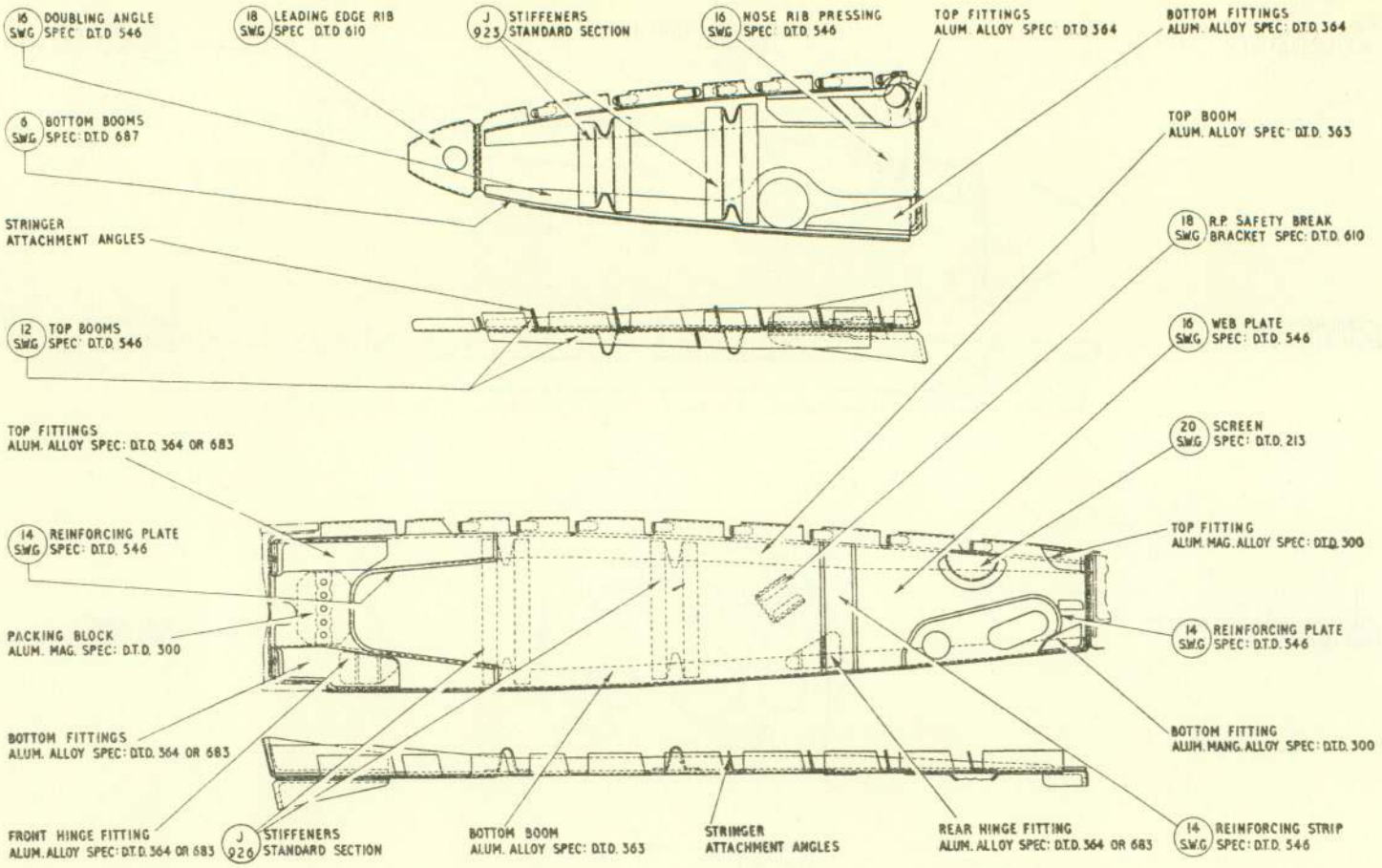
**Fig. 3/11. Leading edge, tank arch and centre ribs No. 3**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| LEADING EDGE RIB | 0·03 | 0·5 | One per rib | 1·0 dia., one per rib | 3/47(C) |
| TANK ARCH | 0·03 | 1·0 | 9·0 | 1·5 max. between cut-outs | 3/47(A) |
| | | | | Flange replacements, four per arch | 3/47(B) |
| CENTRE RIB | 0·03 | 1·0 | Three per rib | 1·0 dia., one per rib | 3/47(C) |
| | | | | 1·5 max. between cut-outs | 3/47(A) |
| | | | | Damage at lightening holes | 3/47(D) and (E) |

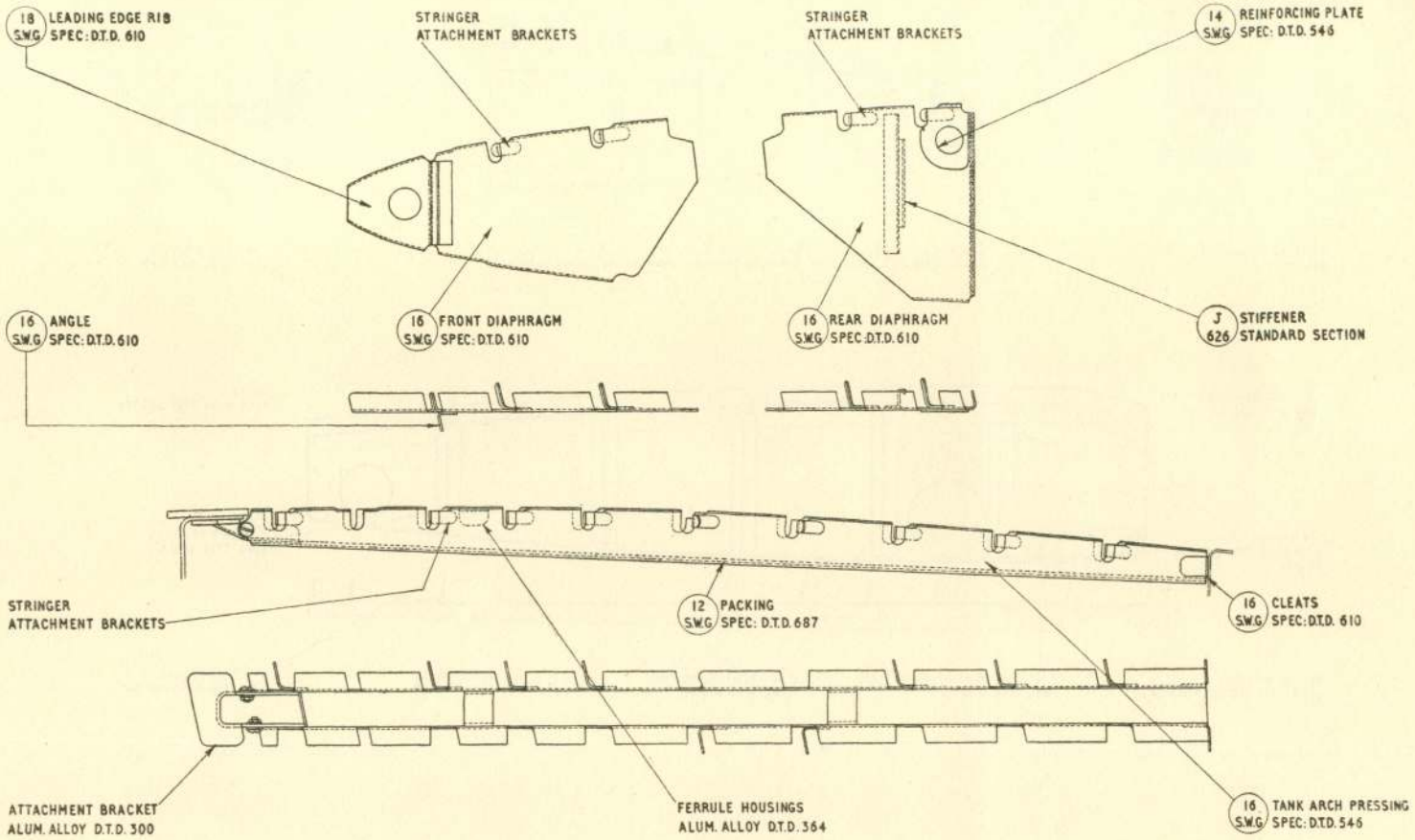
**Fig. 3/12. Leading edge, tank arch and centre ribs No. 4**




**Definitions of negligible and repairable damage**

| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| LEADING EDGE RIB | | 0·03 | 0·5 | One per rib | 1·0 dia., one per rib | 3/47(C) |
| NOSE RIB | Web | 0·03 | 2·0 | 9·0 | 1·0 dia., three per rib | 3/47(C) |
| | Booms | 0·05 | 0·5 | 9·0 | Exceeding negligible | S.A. |
| CENTRE RIB | Web | 0·03 | 2·0 | 12·0 | 1·0 dia., 9·0 spacing | 3/47(C) |
| | Booms | 0·05 | 0·5 | 12·0 | Exceeding negligible | S.A. |
| STIFFENERS | | 0·05 | 0·25 | Two per stiffener | Exceeding negligible | Replace |

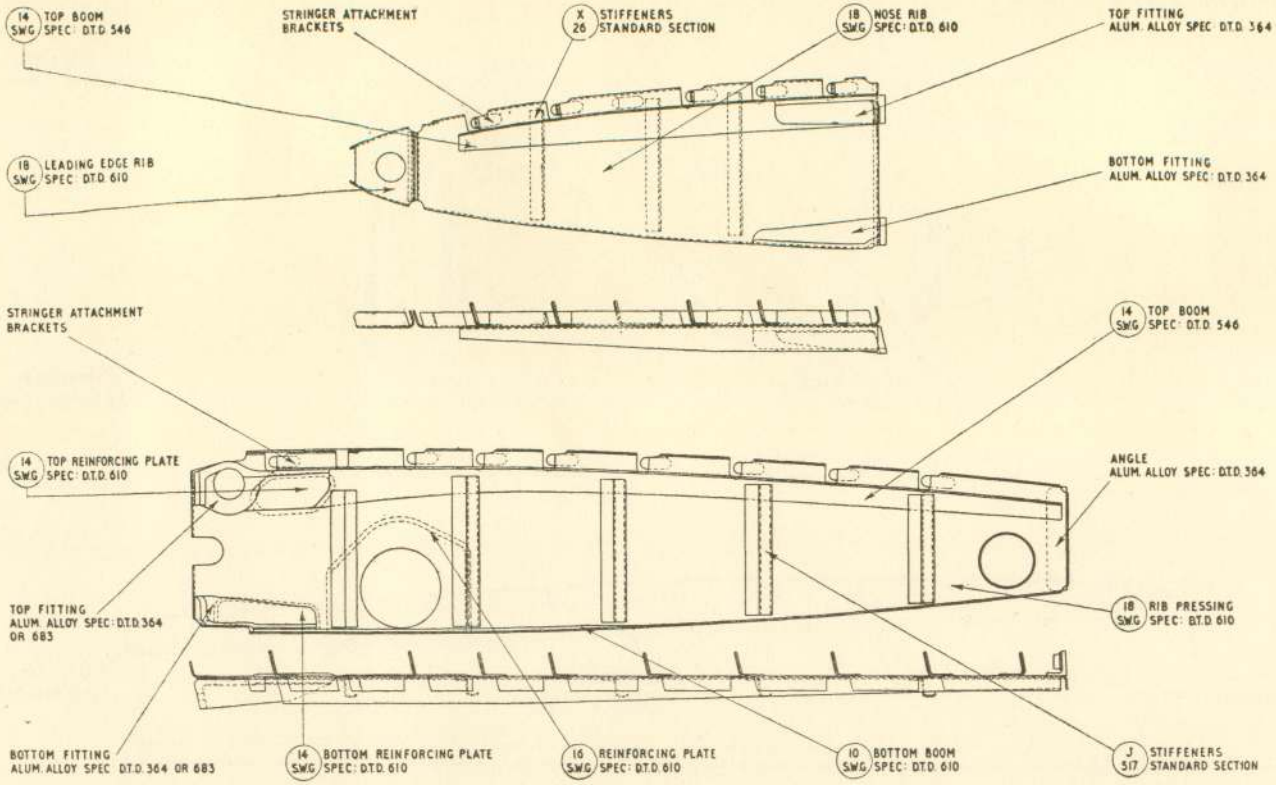
**Fig. 3/13. Leading edge, nose and centre ribs No. 5**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| LEADING EDGE RIB | One dent or bruise 0·03 in. deep 0·50 in. dia. | 1·00 in. dia. one only per rib | 3/47 | 25, 50 |
| DIAPHRAGMS Webs | Dents or bruises 0·03 in. deep 2·00 in. dia. two only per diaphragm | 1·00 in. dia. two only per rib | 3/47 | 24, 50 |
| Stiffener | Dents or bruises 0·05 in. deep 0·25 in. dia. one only per stiffener | Damage in excess of negligible | Replace | |
| TANK ARCH | Dents or bruises 0·03 in. deep 1·00 in. dia. 12·00 in. apart | 1·50 in. max. between cut-outs<br>Flange replacements, four only per arch | 3/47<br>3/47 | 37, 50<br>37, 50 |

**Fig. 3/14. LEADING EDGE RIB, PYLON CASTING DIAPHRAGMS AND TANK ARCH AT RIB No. 6**

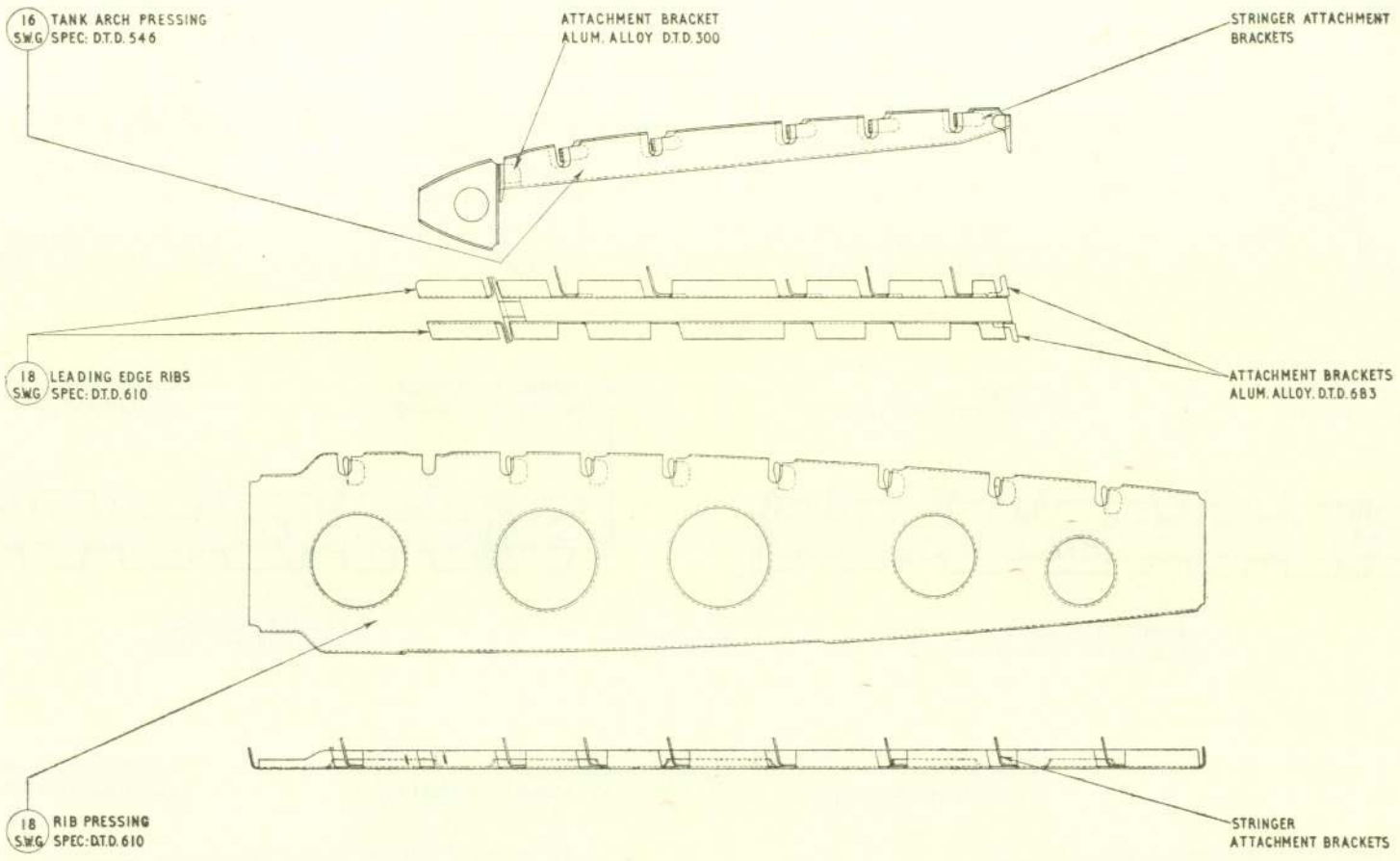



## Definitions of Negligible and Repairable Damage

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item |
|---|---|---|---|---|
| L/E RIB | One dent or bruise 0·03 in. deep 0·50 in. dia. | Damage in excess of neg. | Replace | |
| NOSE RIB | | | | |
| Web | Dents or bruises 0·03 in. deep 2·00 in. dia. 9·00 in. apart | 1·00 in. dia. 9·00 in. apart | 3/47 | 25, 50 |
| Flanges | Dents or bruises 0·03 in. deep 0·50 in. dia. 9·00 in. apart | 1·50 in. max. two only per flange | 3/47 | 25, 50 |
| Reinforcing plate | Dents or bruises 0·03 in. deep 0·50 in. dia. 6·00 in. apart | Damage in excess of neg. | Special instruction to be obtained Replace | |
| Stiffeners | Dents or bruises 0·03 in. deep 0·25 in. dia. one only per stiffener | Damage in excess of neg. | | |

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item |
|---|---|---|---|---|
| CENTRE RIB | | | | |
| Web | Dents or bruises 0·03 in. deep 2·00 in. dia. 12·00 in. apart | 1·00 in. dia. 9·00 in. apart | 3/47 | 25, 50 |
| Flanges | Dents or bruises 0·03 in. deep 0·50 in. dia. 12·00 in. apart | 1·50 in. max. two only per flange | 3/47 | 25, 50 |
| Boom | Dents or bruises 0·05 in. deep 0·50 in. dia. 9·00 in. apart | Damage in excess of neg. | Special instruction to be obtained Replace | |
| Stiffeners | Dents or bruises 0·03 in. deep 0·25 in. dia. one only per stiffener | Damage in excess of neg. | | |

**Fig. 3/15. LEADING EDGE, NOSE AND CENTRE RIBS No. 7**




**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. |
|---|---|---|---|
| L/E RIBS | | | |
| Webs | Dents or bruises 0·03 in. deep 1·50 in. dia. one only per rib | Damage in excess of neg. | Replace |
| Flanges | Dents or bruises 0·03 in. deep 0·50 in. dia. one only per flange | Damage in excess of neg. | Replace |
| TANK ARCH | Dents or bruises 0·03 in. deep 1·00 in. dia. 6·00 in. apart | 1·50 in. maximum at cut-outs two only per flange | 3/47 |
| | | Flange replacements one only per flange | 3/47 |

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. |
|---|---|---|---|
| CENTRE RIB | | | |
| Webs | Dents or bruises 0·03 in. deep 2·00 in. dia. 9·00 in. apart | 1·00 in. dia. 9·00 in. apart | 3/47 |
| | | Partial replacements | 3/48 |
| | | Damage at lightening holes | 3/47 |
| Flanges | Dents or bruises 0·03 in. deep 0·50 in. dia. 9·00 in. apart | 1·50 in. max. at cut-outs two only per flange | 3/47 |
| | | Flange replacements one only per flange | 3/47 |

Fig. 3/16. Leading edge, tank arch and centre ribs No. 8

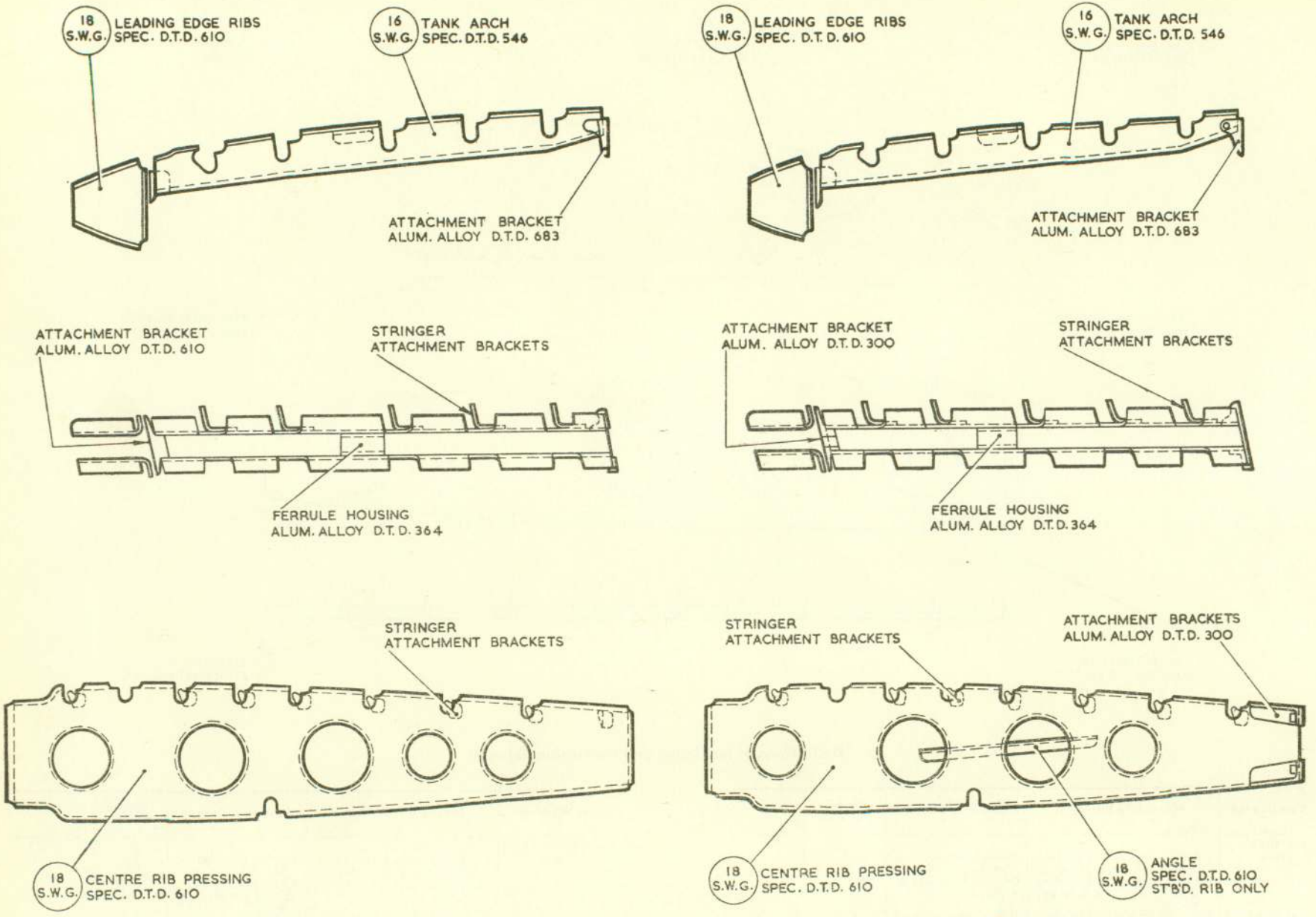



**Fig. 3/17. Leading edge, tank arch and centre ribs No. 9 and 10**

**Definitions of negligible and repairable damage (Fig. 3/17)**

**Leading edge, tank arch and centre ribs No. 9 and 10**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| LEADING EDGE RIB No. 9 Webs | 0·03 | 1·0 | One per rib | Exceeding negligible | Replace |
| Flanges | 0·03 | 0·5 | One per rib | | |
| TANK ARCH RIB No.9 | 0·03 | 1·0 | 6·0 | 1·5 max. between cut-outs, two per flange<br>Flange replacements, one per flange | 3/47(A)<br>3/47(B) |
| CENTRE RIBS No.9 AND 10 Webs | 0·03 | 2·0 | 9·0 | 1·0 dia., 9·0 spacing<br>Damage at lightening holes<br>Partial replacements | 3/47(C)<br>3/47(D) and (E)<br>3/48 |
| Flanges | 0·03 | 0·5 | 9·0 | 1·5 max. between cut-outs, two per flange<br>Flange replacements, one per flange | 3/47(A)<br>3/47(B) |
| LEADING EDGE RIB No. 10 Webs | 0·03 | 0·75 | One per rib | Exceeding negligible | Replace |
| Flanges | 0·03 | 0·5 | One per rib | | |
| TANK ARCH RIB No. 10 | 0·03 | 1·0 | 6·0 | 1·5 max. between cut-outs, one per flange<br>Flange replacements, one per flange | 3/47(A)<br>3/47(B) |

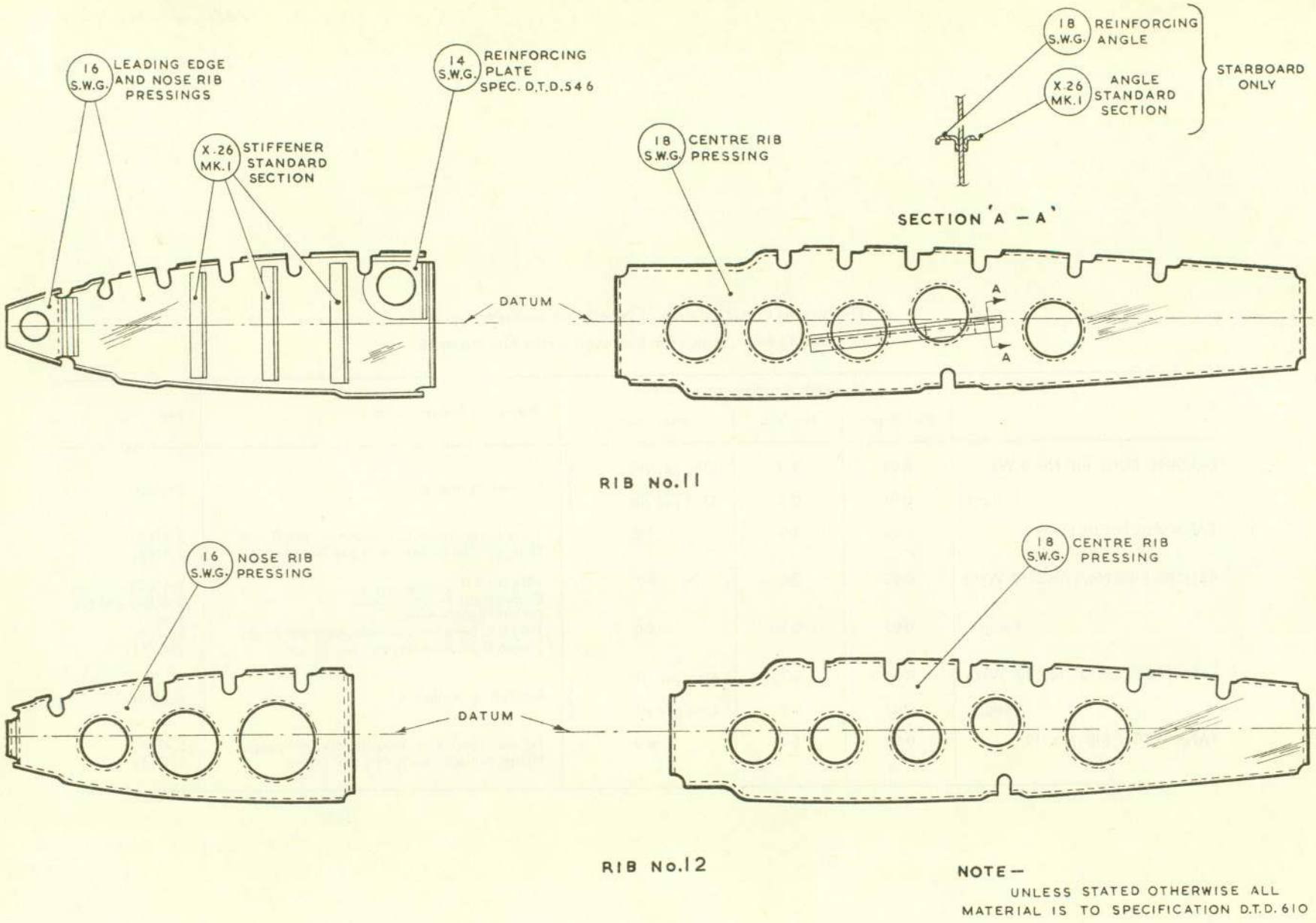
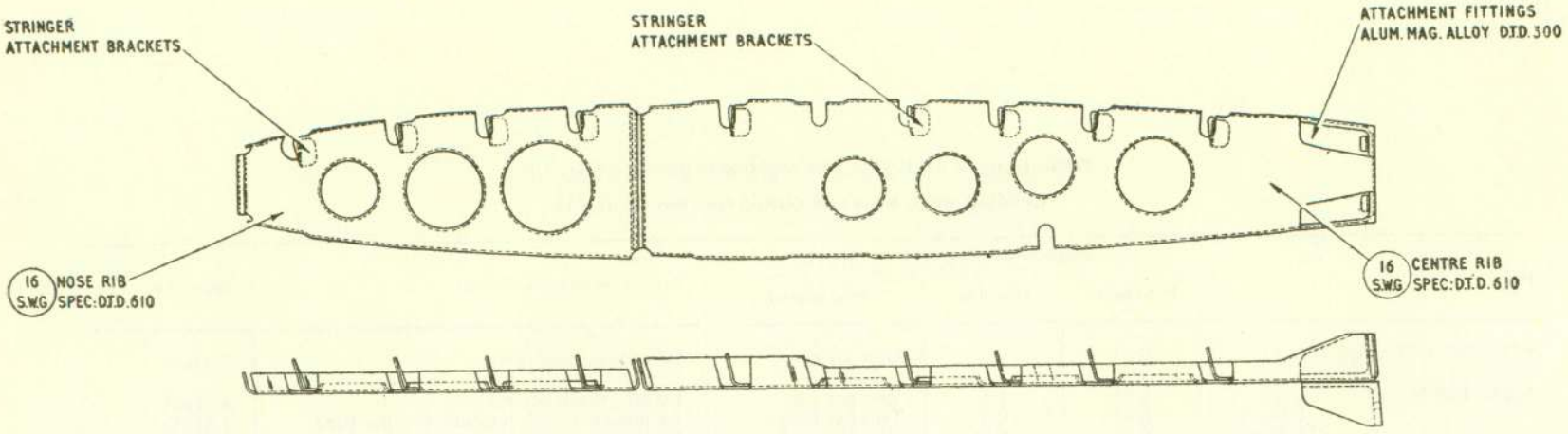



**Fig. 3/18. Leading edge, nose and centre ribs No. 11 and 12**

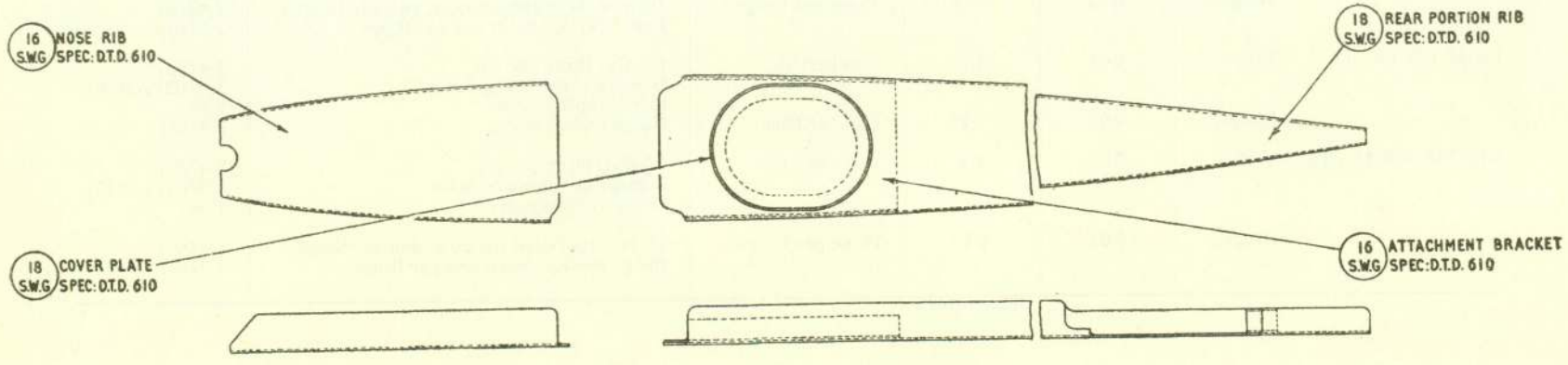
**Definitions of negligible and repairable damage (Fig. 3/18)**

**Leading edge, nose and centre ribs No. 11 and 12**

| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| LEADING EDGE RIB No. 11 | | 0·03 | 0·5 | One per rib | Exceeding negligible | Replace |
| NOSE RIB No. 11 | Web | 0·03 | 1·5 | Two per rib | 1·0 dia., three per rib | 3/47(C) |
| | Flanges | 0·03 | 0·5 | Two per flange | 1·5 max. between cut-outs, one per flange | 3/47(A) |
| | Stiffeners | 0·03 | 0·25 | One per item | Exceeding negligible | Replace |
| CENTRE RIB No. 11 | Web | 0·03 | 2·0 | Three per rib | 1·0 dia., 6·0 spacing | 3/47(C) |
| | | | | | Damage at lightening holes | 3/47(D) and (E) |
| | | | | | Partial replacements | 3/48 |
| | Flanges | 0·03 | 0·5 | Three per flange | 1·5 max. between cut-outs, two per flange | 3/47(A) |
| | | | | | Flange replacement, one per flange | 3/47(B) |
| NOSE RIB No. 12 | Web | 0·03 | 1·0 | Two per rib | 1·0 dia., three per rib | 3/47(C) |
| | | | | | Damage at lightening holes | 3/47(D) and (E) |
| | | | | | Partial replacements | 3/48 |
| | Flanges | 0·03 | 0·25 | Two per flange | Flange replacements | 3/47(B) |
| CENTRE RIB No. 12 | Web | 0·03 | 1·5 | Three per rib | 1·0 dia., three per rib | 3/47(C) |
| | | | | | Damage at lightening holes | 3/47(D) and (E) |
| | | | | | Partial replacements | 3/48 |
| | Flanges | 0·03 | 0·5 | Three per flange | 1·5 max. between cut-outs, one per flange | 3/47(A) |
| | | | | | Flange replacements, one per flange | 3/47(B) |




RIB 13



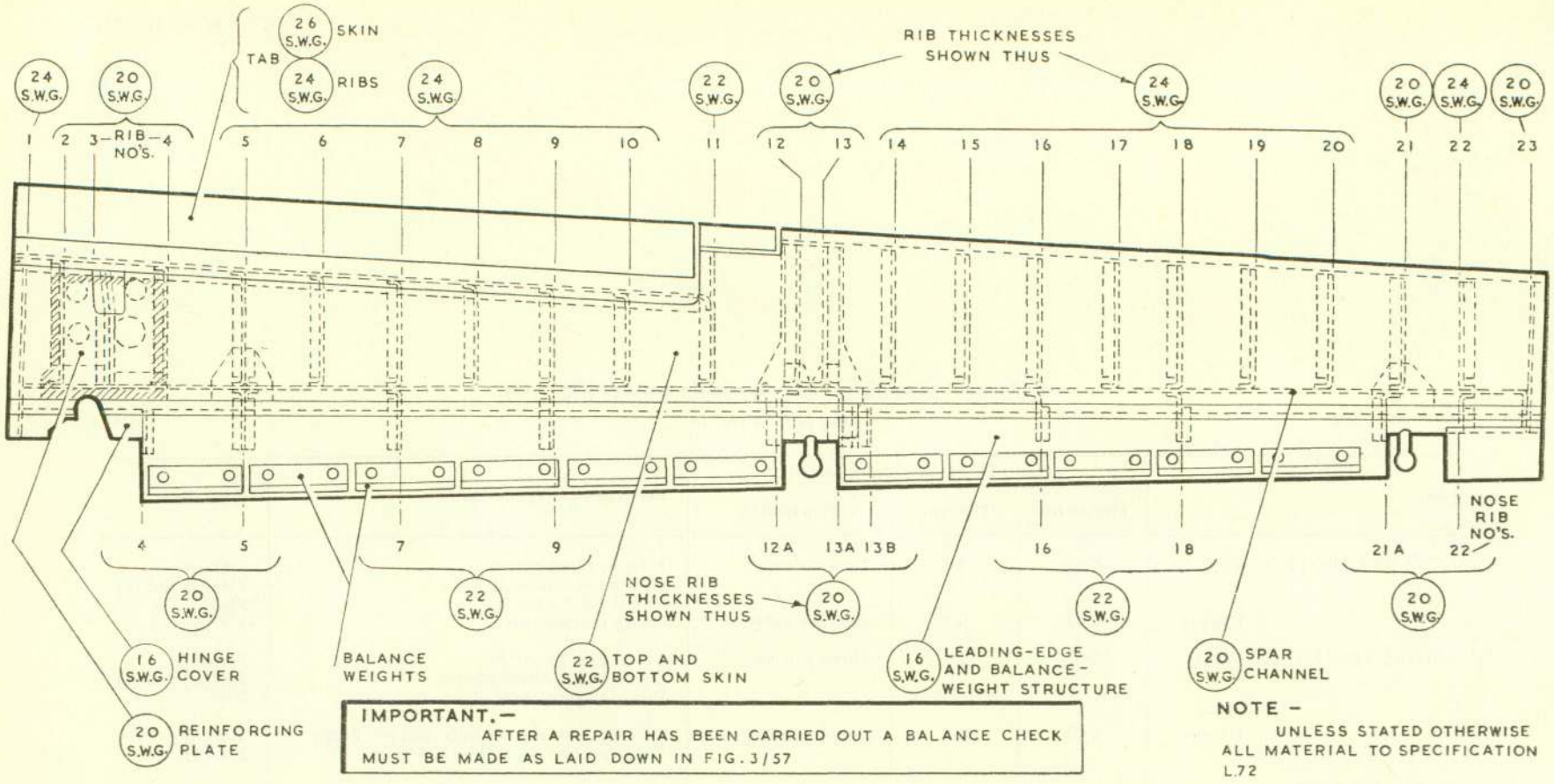

RIB 14

Fig. 3/19. Ribs No. 13 and 14

## Definitions of negligible and repairable damage (Fig. 3/19)

### Ribs No. 13 and 14

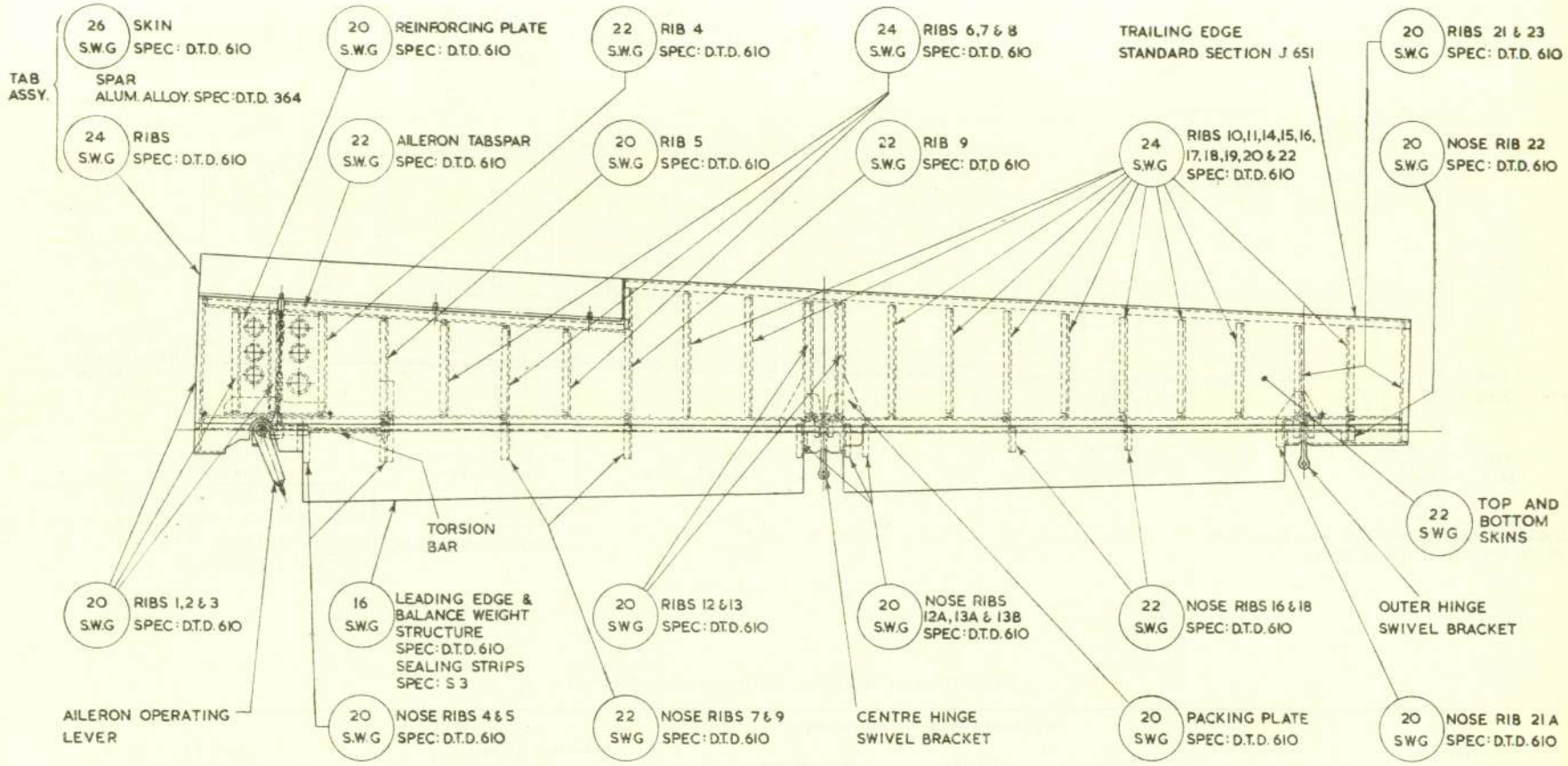
| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| NOSE RIBS No. 13 | Webs | 0·03 | 1·0 | Two per rib | 1·0 dia., three per rib<br>Damage at lightening holes<br>Partial replacements | 3/47(C)<br>3/47(D) and (E)<br>3/48 |
| | Flanges | 0·03 | 0·5 | Two per flange | Flange replacements | 3/47(B) |
| CENTRE RIBS No. 13 | Webs | 0·03 | 1·5 | Three per rib | 1·0 dia., three per rib<br>Damage at lightening holes<br>Partial replacements | 3/47(C)<br>3/47(D) and (E)<br>3/48 |
| | Flanges | 0·03 | 0·5 | Three per flange | 1·5 max. between cut-outs, one per flange<br>Flange replacements, one per flange | 3/47(A)<br>3/47(B) |
| NOSE AND REAR RIB No. 14 | Webs | 0·03 | 1·5 | Three per rib | 1·0 dia., two per rib | 3/47(C) |
| | Flanges | 0·03 | 0·5 | Two per flange | 1·5 max., one per flange | 3/47(A) |




**Definitions of negligible and repairable damage, Mk.1 (Fig. 3/20A) and Mk.2 (Fig. 3/20B)**

| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | | 0·02 | 1·5 | 12·0 | 2·0 dia., 12·0 spacing<br>Insertions | 3/50<br>3/55 |
| SPAR | Webs | 0·03 | 1·0 | 9·0 | 1·0 dia., 9·0 spacing | 3/47(C) |
| | Flanges | 0·02 | 0·5 | 9·0 | 0·35 × 1·0, 12·0 spacing<br>1·0 × 1·0, 12·0 spacing | 3/49<br>3/49 |
| RIBS | Webs | 0·03 | 0·75 | Two per rib | | |
| | Flanges | 0·02 | 0·5 | Two per flange | Exceeding negligible | Replace |
| TAB | Skin | 0·03 | 1·0 | 9·0 | | |
| | Spar and ribs | 0·02 | 0·5 | 9·0 | | |

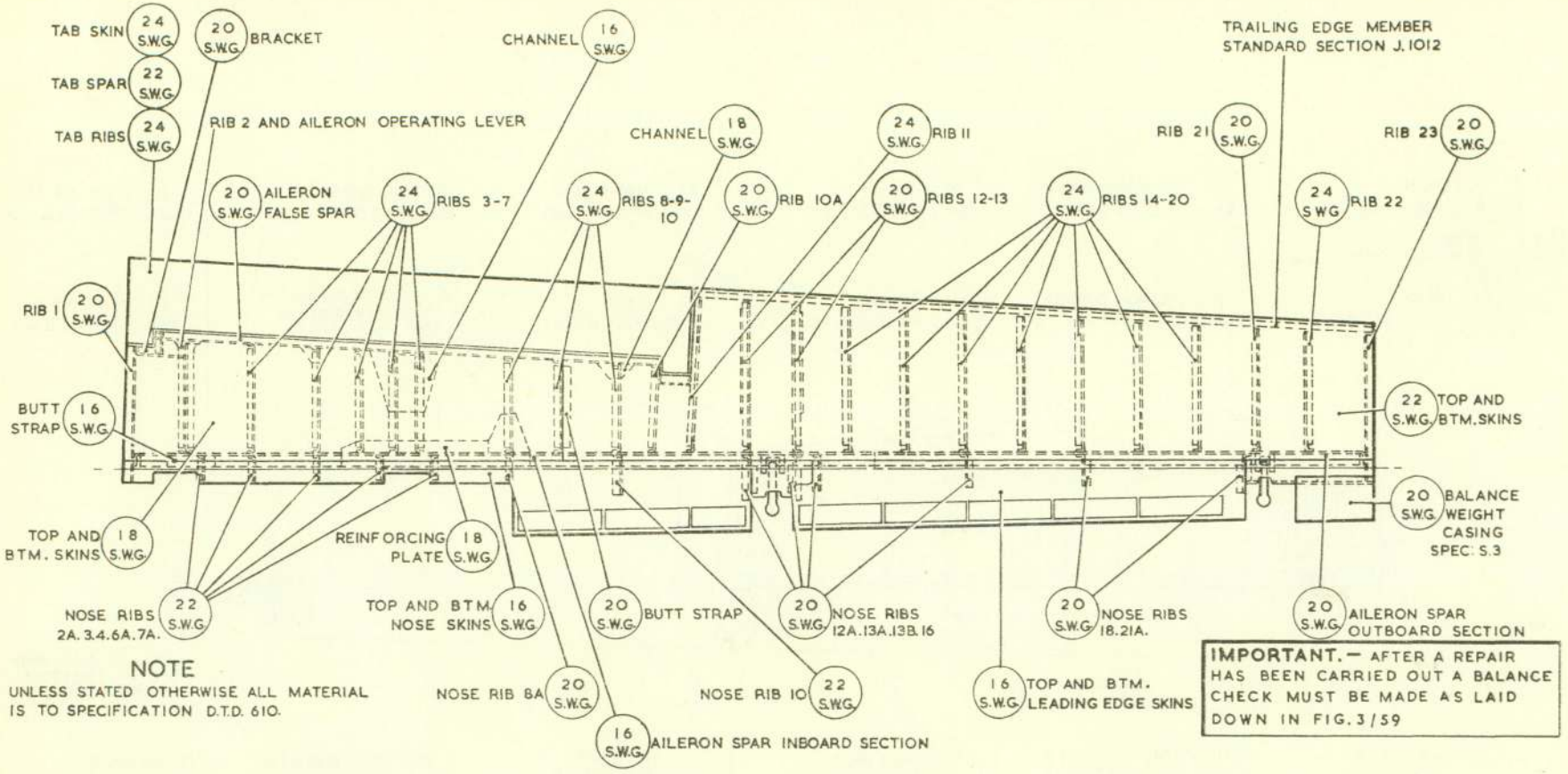
**Fig. 3/20A. Aileron, Mk.1**




**Note.**—*When a repair is effected on the aileron assembly, the aileron must be re-balanced as instructed in fig.* **3/55**

**For definitions of negligible and repairable damage, see table on Fig. 3/20A**

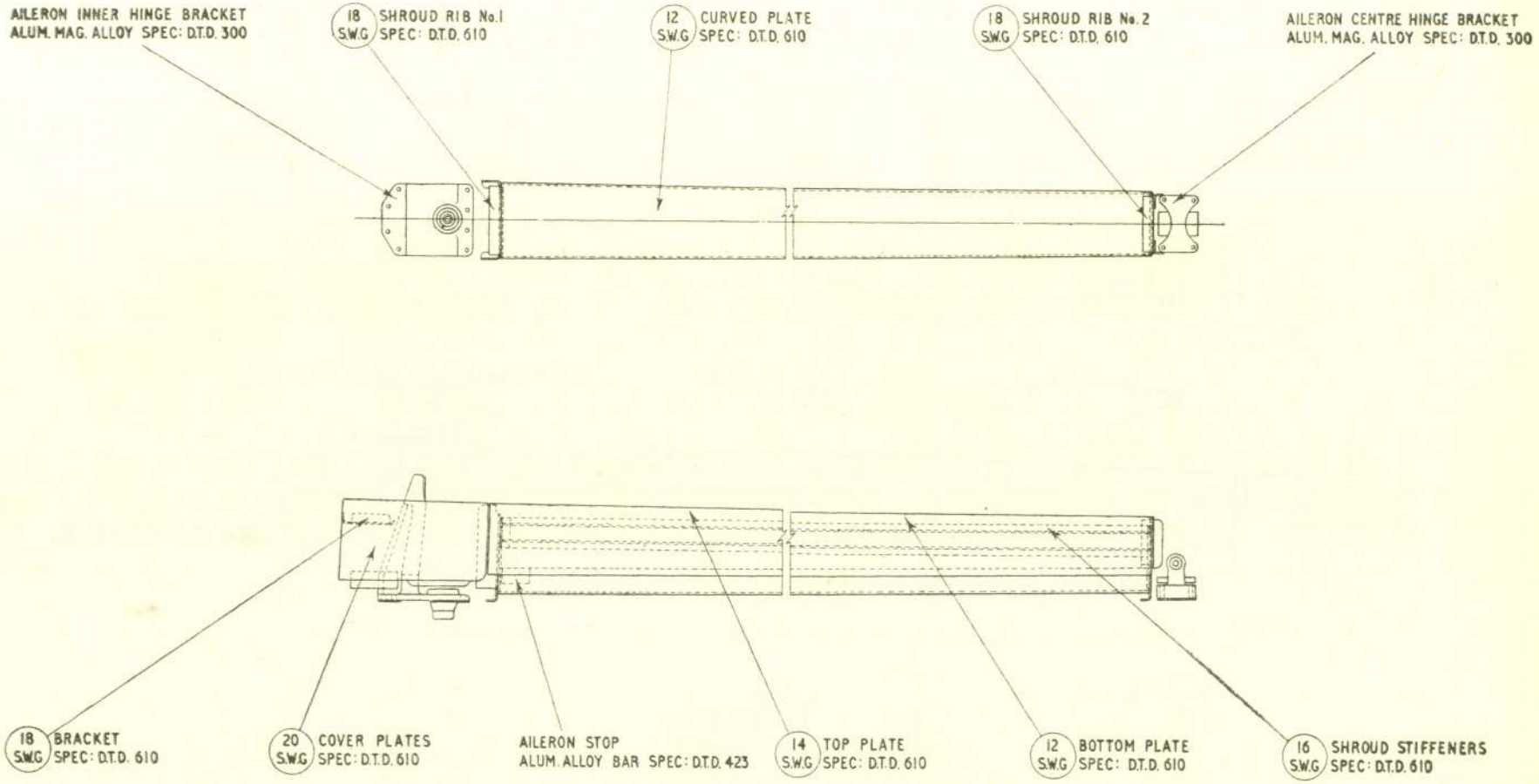
**Fig. 3/20B. Aileron, Mk.2**




**Definitions of negligible and repairable damage**

| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | | 0·02 | 1·5 | 12·0 | 2·0 dia., 12·0 spacing<br>Insertions | 3/50<br>3/55 |
| SPAR | Webs | 0·03 | 1·0 | 9·0 | 1·0 dia., 9·0 spacing | 3/47(C) |
| | Flanges | 0·02 | 0·5 | 9·0 | 0·35 × 1·0, 12·0 spacing<br>1·0 × 1·0, 12·0 spacing | 3/49<br>3/49 |
| RIBS | Webs | 0·03 | 0·75 | Two per rib | | |
| | Flanges | 0·02 | 0·5 | Two per flange | Exceeding negligible | Replace |
| TAB | Skin | 0·03 | 1·0 | 9·0 | | |
| | Spar and ribs | 0·02 | 0·5 | 9·0 | | |

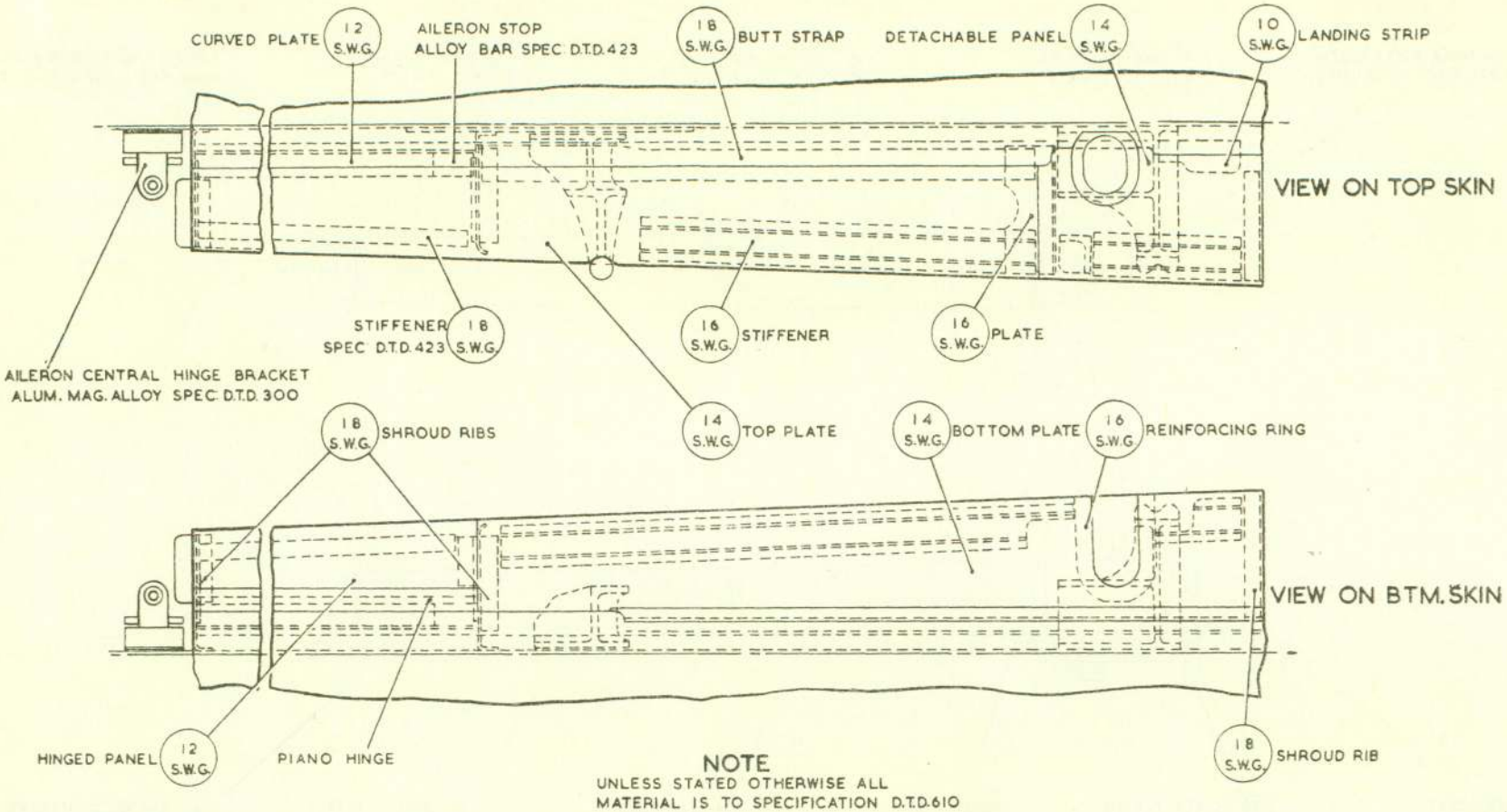
**Fig. 3/20C. Aileron, Mk.3 and 4**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| TOP AND BOTTOM PLATES<br>CURVED PLATE | 0·02 | 1·5 | 12·0 | Exceeding negligible | S.A. |
| RIBS Web | 0·03 | 1·0 | One per rib | Exceeding negligible | Replace |
| Flange | 0·02 | 0·25 | One per flange | | |
| STIFFENERS | 0·02 | 0·25 | 9·0 | Exceeding negligible | S.A. |

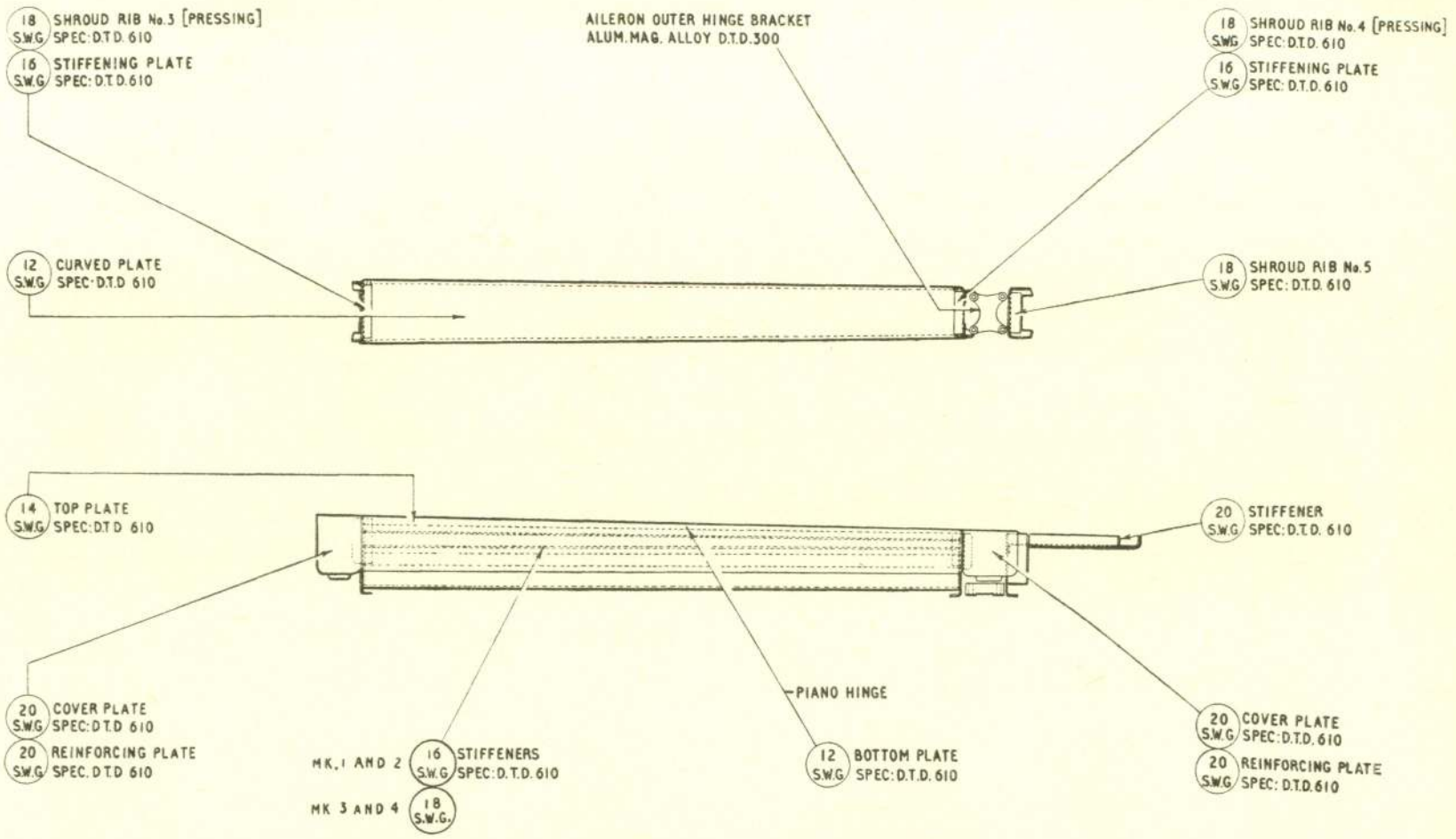
Fig. 3/21. Aileron inboard shroud, Mk.1 and 2




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| TOP AND BOTTOM PLATES<br>CURVED PLATE | 0·02 | 1·5 | 12·0 | Exceeding negligible | S.A. |
| RIBS Web | 0·03 | 1·0 | One per rib | Exceeding negligible | Replace |
| Flange | 0·02 | 0·25 | One per flange | | |
| STIFFENERS | 0·02 | 0·25 | 9·0 | Exceeding negligible | S.A. |

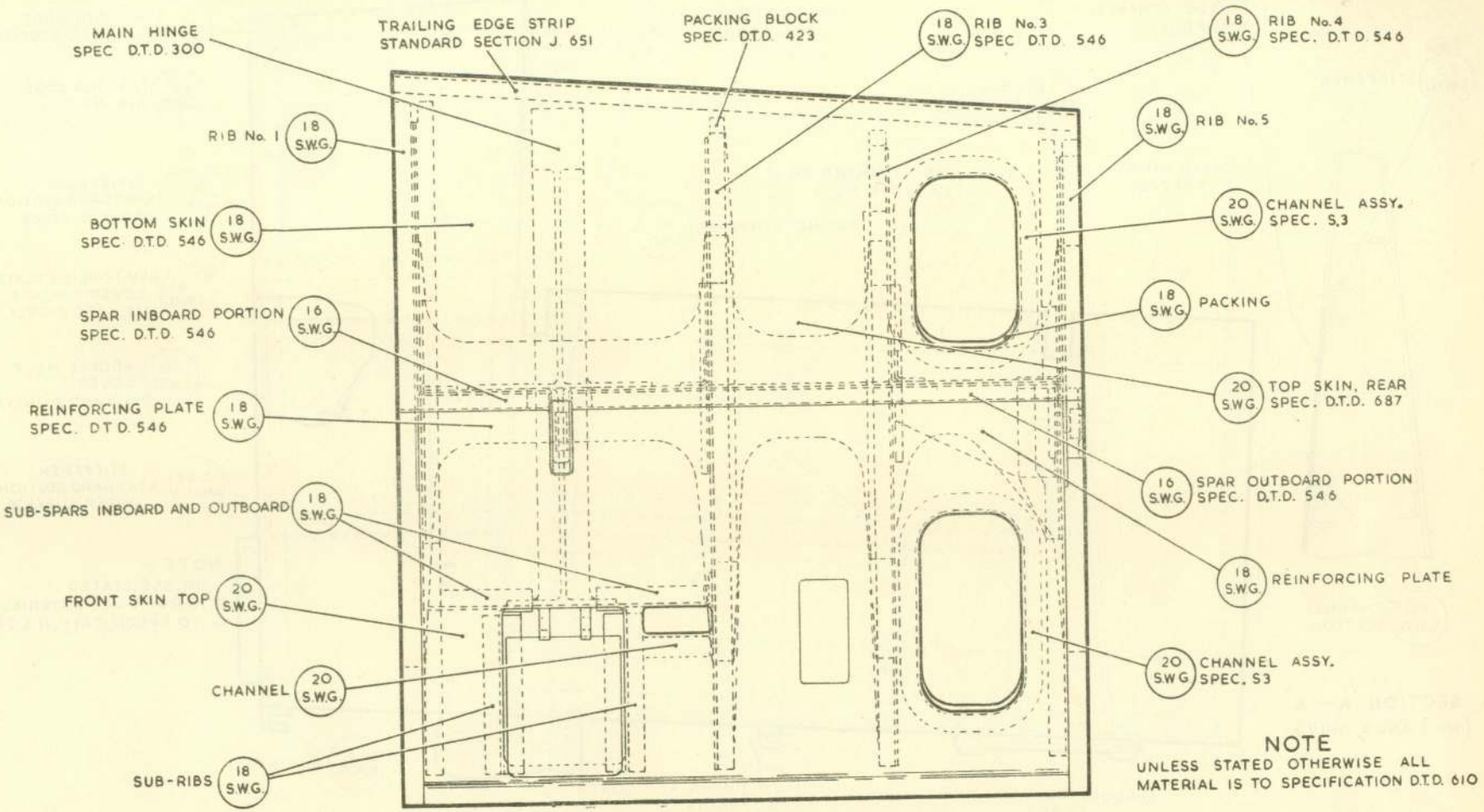
**Fig. 3/21A. Aileron inboard shroud, Mk.3 and 4**




**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| TOP AND BOTTOM PLATES<br>CURVED PLATE | 0·02 | 1·5 | 12·0 | Exceeding negligible | S.A. |
| RIBS Web | 0·03 | 1·0 | One per rib | Exceeding negligible | Replace |
| Flange | 0·02 | 0·25 | One per flange | | |
| STIFFENERS | 0·02 | 0·25 | 9·0 | Exceeding negligible | S.A. |

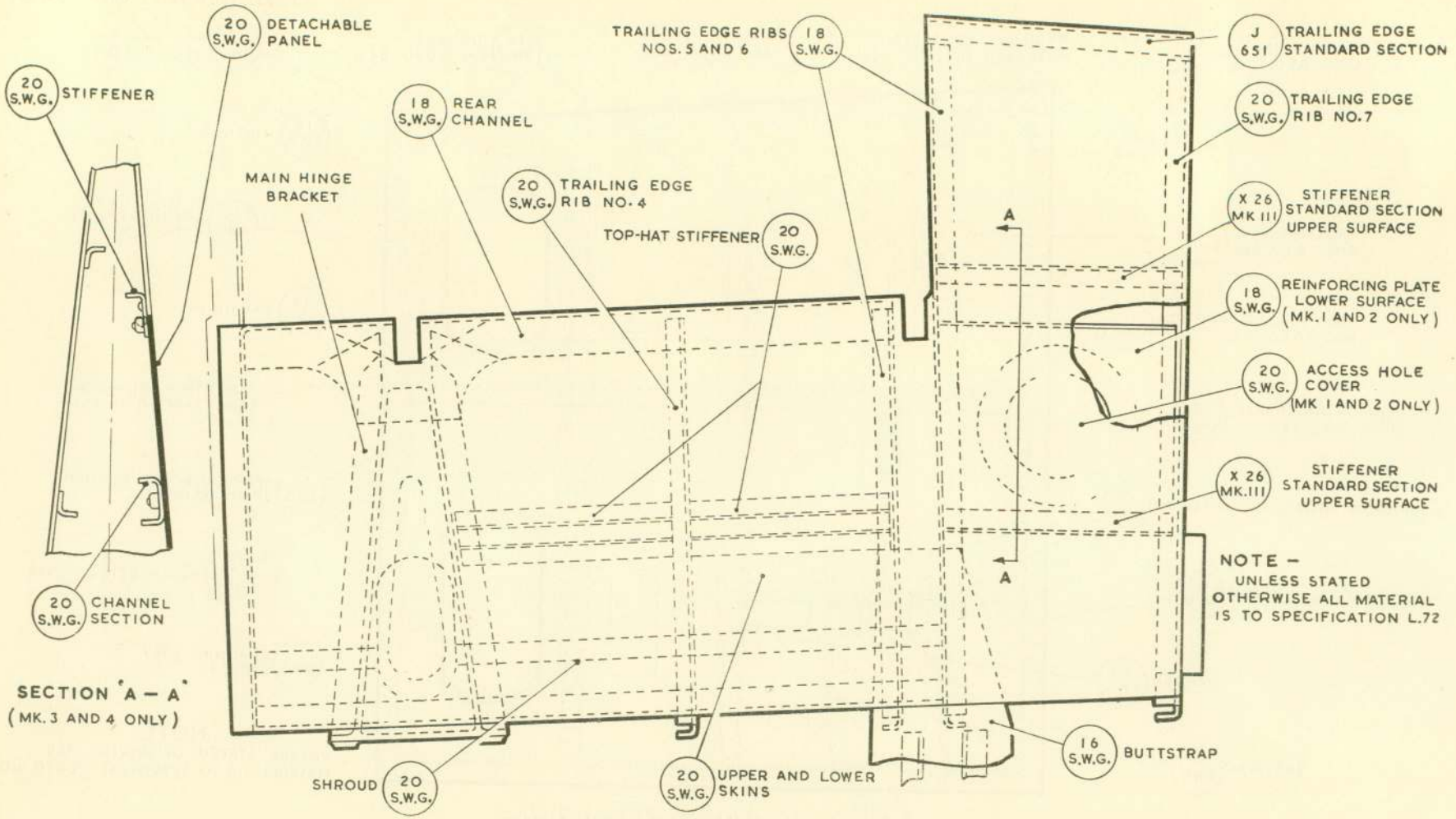
**Fig. 3/22. Aileron outboard shroud**




**Definitions of negligible and repairable damage**

| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | | 0·05 | 1·0 | 9·0 | 2·0 dia., three per flap | 3/50 |
| SPARS | Webs | 0·03 | 0·5 | Three per spar | 1·0 dia., three per web | 3/47(C) |
| | Flanges | 0·02 | 0·25 | Three per flange | 1·0 × 0·35, one per flange | 3/49 |
| | | | | | 1·0 × 1·0, one per flange | 3/49 |
| RIBS | Webs | 0·02 | 0·5 | Three per rib | Exceeding negligible | S.A. |
| | Flanges | 0·02 | 0·25 | Three per flange | | |

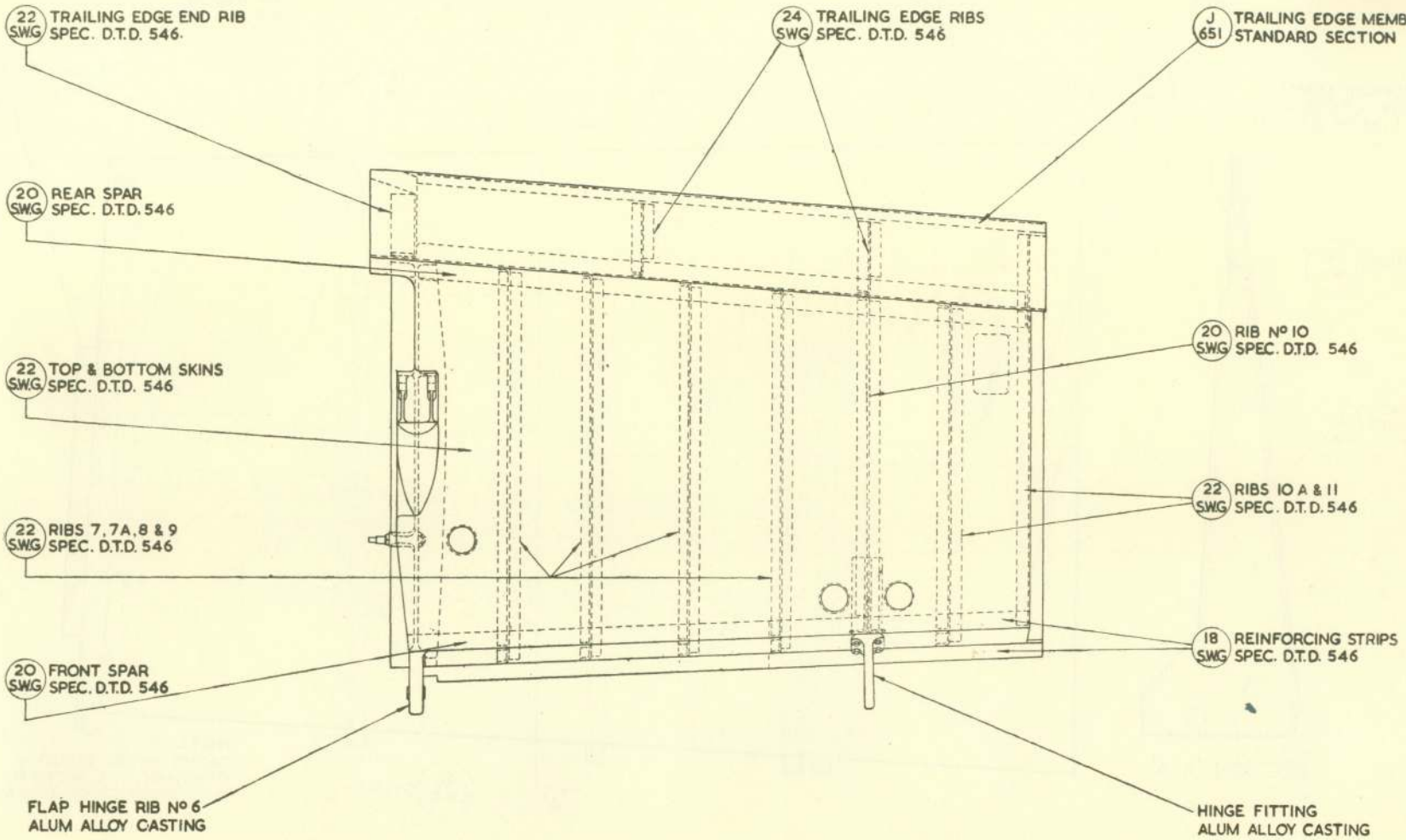
**Fig. 3/23. Dive-brake flap**




**Definitions of negligible and repairable damage**

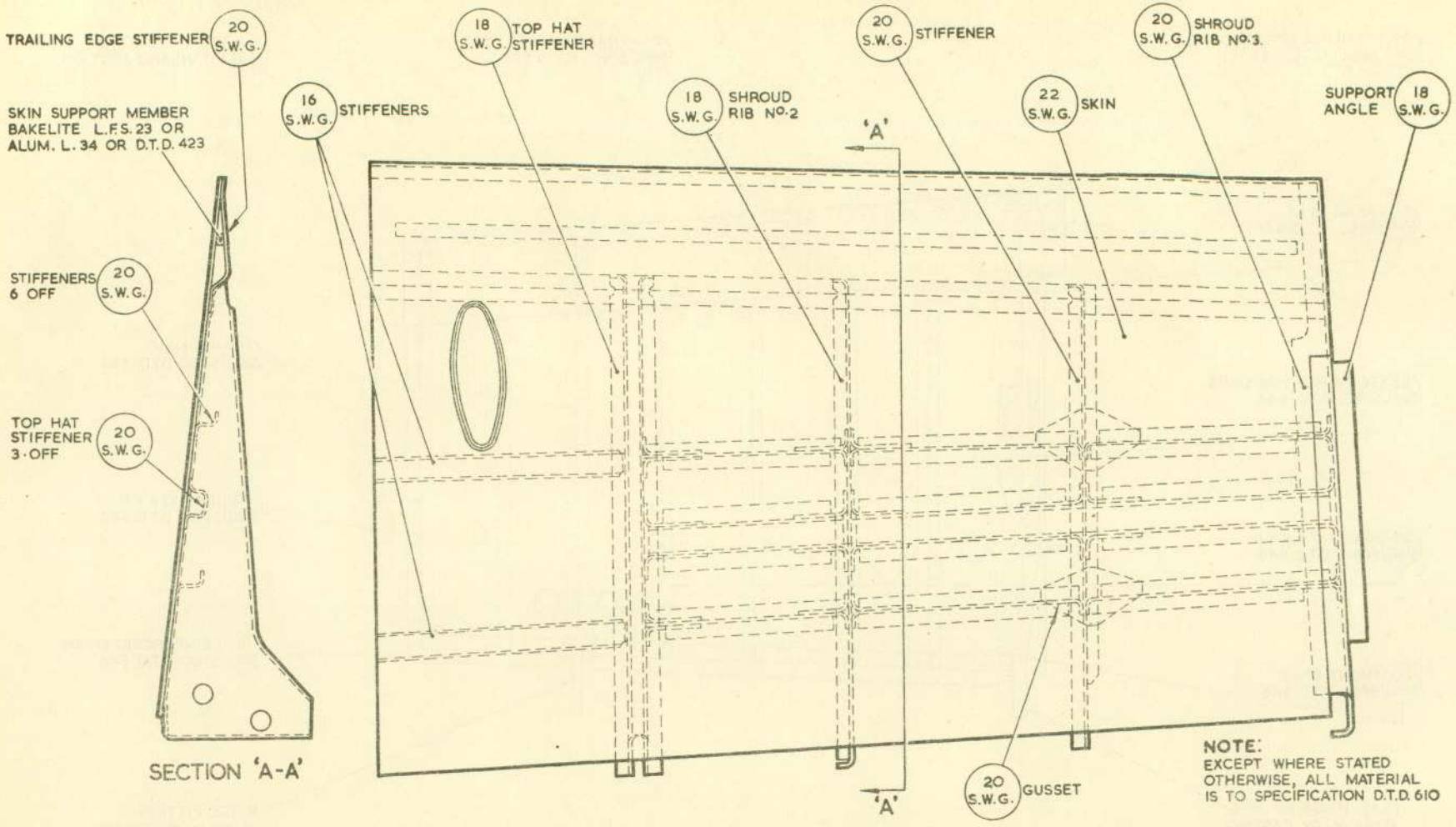
| Item | | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|---|
| | | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | | 0·02 | 1·0 | 9·0 | 2·0 to 4·0 dia., 12·0 to 18·0 spacing<br>Insertion repairs | 3/50<br>3/51 |
| REAR CHANNEL | Web | 0·03 | 1·0 | Three per item | 1·0 dia., two per item | 3/47(C) |
| | Flanges | 0·02 | 0·25 | Three per flange | Exceeding negligible | Replace |
| RIBS | Webs | 0·03 | 1·0 | Two per rib | 1·0 dia., one per rib | 3/47(C) |
| | Flanges | 0·02 | 0·25 | Two per flange | 1·0×0·35, one per flange | 3/49 |
| STIFFENERS | | 0·02 | 0·25 | Two per item | Exceeding negligible | Replace |

**Fig. 3/24. Dive-brake shroud**




| Component | Negligible Damage | Repairable Damage | Repair Fig. No. |
|---|---|---|---|
| SKINS | Dents or bruises 0·05 in. deep 1·00 in. dia. 9·00 in. apart | 2·00 in.–4·00 in. dia. 12·00 in.–18·00 in. apart | 3/50 |
| SPARS | | | |
| Webs | Dents or bruises 0·03 in. deep 0·50 in. dia. three only per spar | 1·00 in. dia. three only per spar | 3/47 |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per flange | 1·00 in. × 0·35 in. one only per flange<br>1·00 in. × 1·00 in. one only per flange | 3/49<br>3/49 |
| RIBS | | | |
| Webs | Dents or bruises 0·02 in. deep 0·50 in. dia. three only per rib | Damage in excess of negligible | Replace |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per flange | Damage in excess of negligible | Replace |

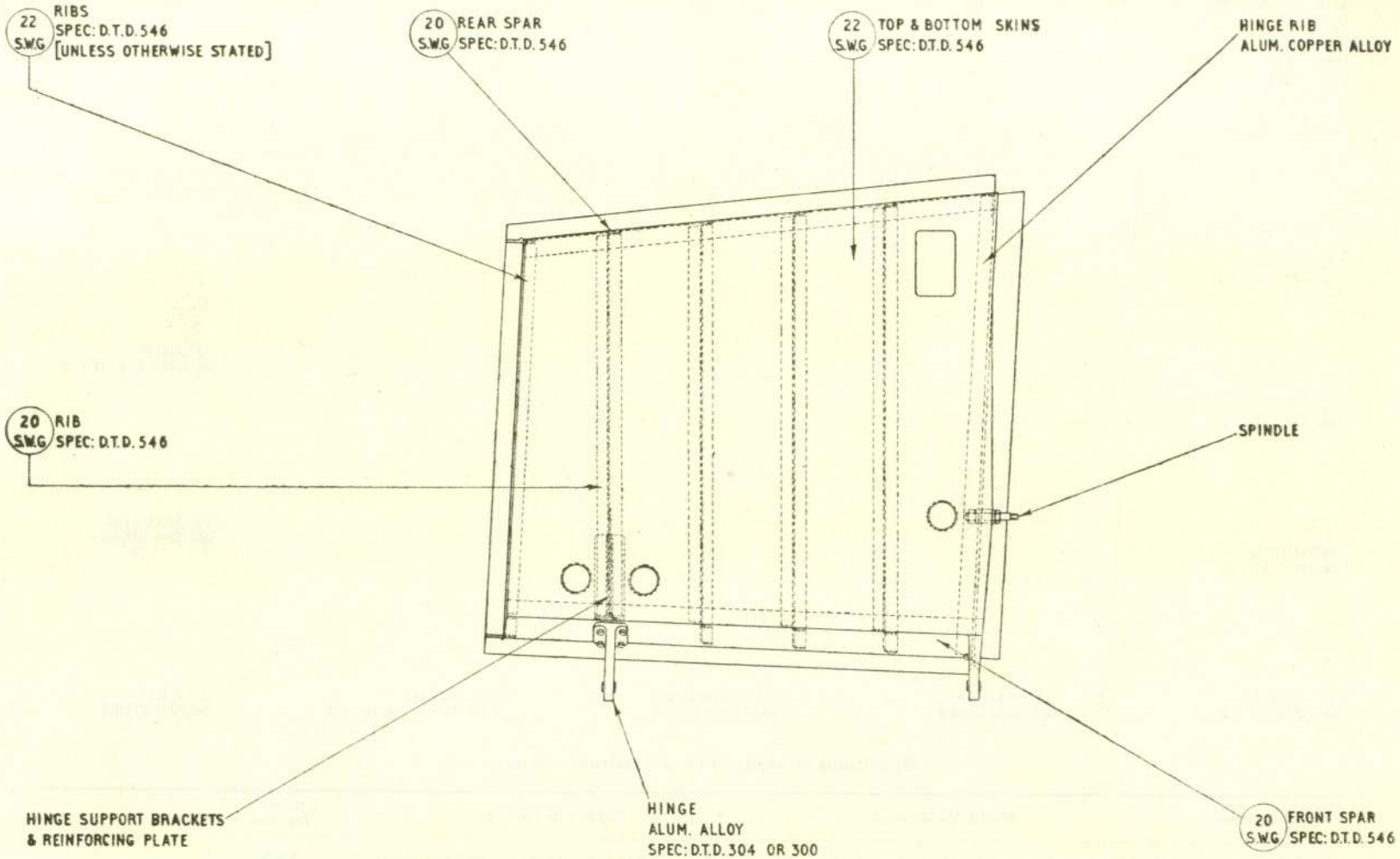
Fig. 3/25. Outer flap




**Definitions of negligible and repairable damage**

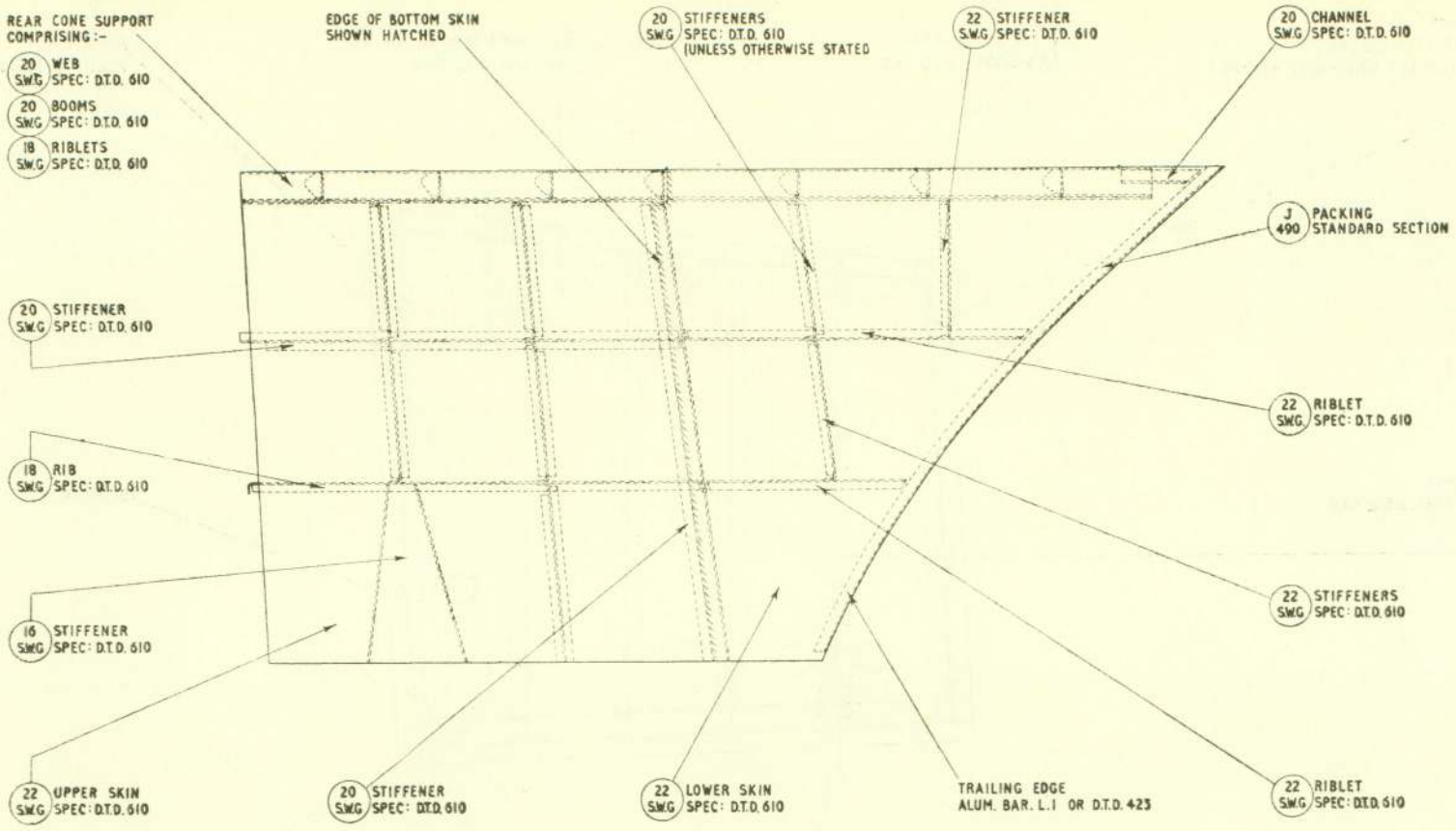
| Component | Negligible Damage | Repairable Damage | Repair Fig. No. |
|---|---|---|---|
| SKINS | Dents or bruises 0·02 in. deep 1·00 in. dia. 9·00 in. apart | 2·00 in.–4·00 in. dia. 12·00 in.–18·00 in. apart<br>Insertion repairs | 3/50<br>3/51 |
| RIBS | | | |
| Webs | Dents or bruises 0·03 in. deep 1·00 in. dia. two only per rib | 1·00 in. dia. two only per rib | 3/47 |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. two only per flange | 1·00 in. × 0·35 in. one only per flange | 3/49 |
| STIFFENERS | Dents or bruises 0·02 in. deep 0·25 in. dia. two only per stiffener | Damage in excess of negligible | Replace |

**Fig. 3/26. Outer flap shroud**




| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | |
|---|---|---|---|---|
| SKINS | Dents or bruises 0·05 in. deep 1·00 in. dia. 9·00 in. apart | 2·00 in. and 3·00 in. dia. 12·00 in.–14·00 in. apart | 3/50 | |
| SPARS | | | | |
| Webs | Dents or bruises 0·03 in. deep 0·50 in. dia. three only per spar | 1·00 in. dia. three only per spar | 3/47 | |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per flange | 1·00 in. × 0·35 in. one only per flange<br>1·00 in. × 1·00 in. one only per flange | 3/49<br>3/49 | |
| RIBS | | | | |
| Webs | Dents or bruises 0·02 in. deep 0·50 in. dia. three only per rib | Damage in excess of negligible | Replace | |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per flange | Damage in excess of negligible | Replace | |

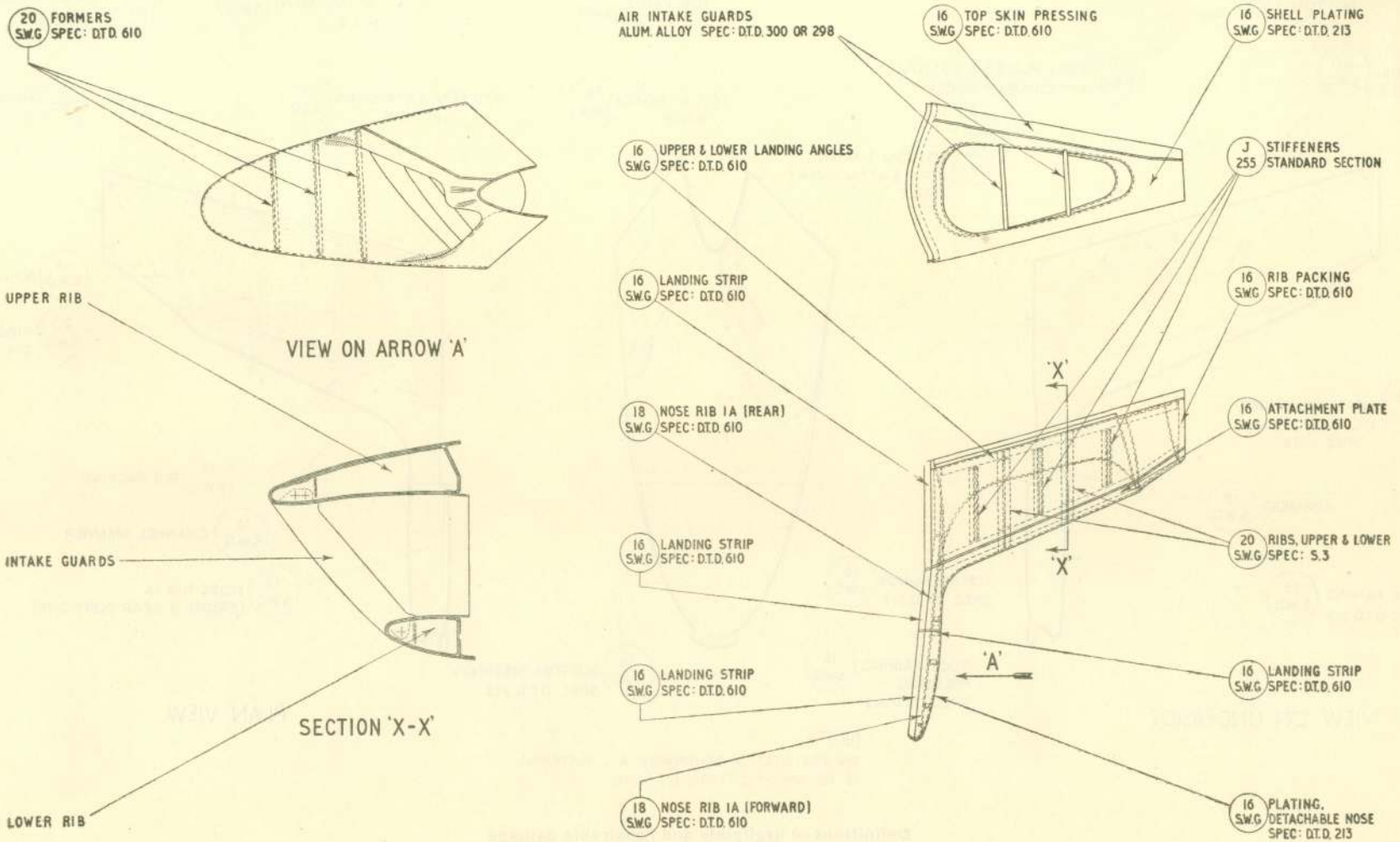
Fig. 3/27. Inner flap




**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. |
|---|---|---|---|
| SKINS | Dents or bruises 0·02 in. deep 1·00 in. dia. 9·00 in. apart | 2·00 in.–4·00 in. dia. 12·00 in.–18·00 in. apart<br>Insertion repair | 3/50<br>3/51 |
| RIBS | | | |
| Webs | Dents or bruises 0·03 in. deep 1·00 in. dia. two only per rib | 1·00 in. dia. two only per rib | 3/47 |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. two only per flange | 1·00 in. × 0·35 in. one only per flange | 3/49 |
| RIBLETS | | | |
| Webs | Dents or bruises 0·02 in. deep 1·00 in. dia. two only per rib | 1·00 in. dia. one only per rib | 3/47 |
| Flanges | Dents or bruises 0·02 in. deep 0·25 in. dia. one only per flange | Damage in excess of negligible | Replace |
| STIFFENERS | Dents or bruises 0·02 in. deep 0·25 in. dia. two only per stiffener | Damage in excess of negligible | Replace |

Fig. 3/28. Inner flap shroud

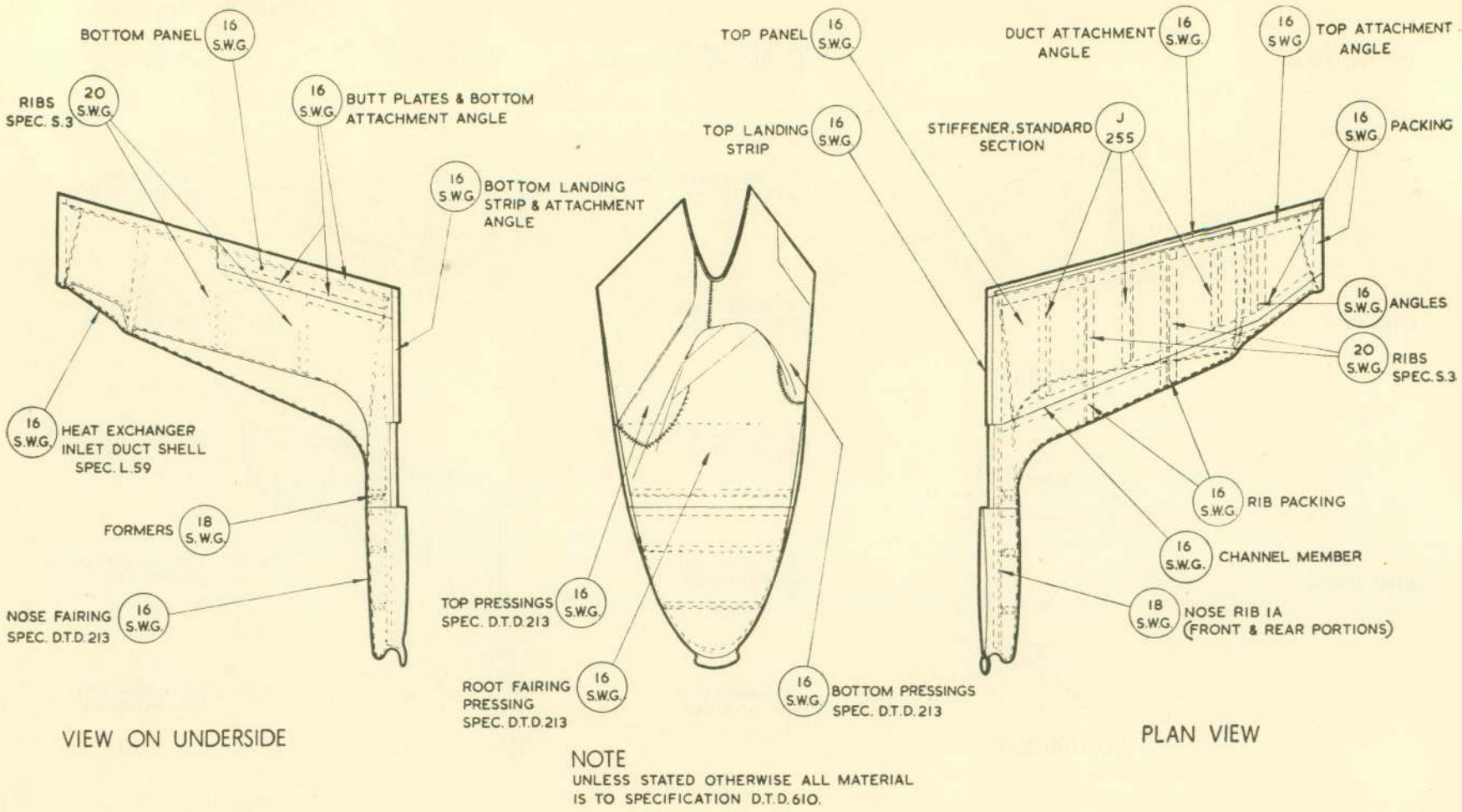



**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | 0·03 | 2·0 | 12·0 | 2·0 dia., 12·0 spacing | 3/50 |
| DUCT SKIN | 0·03 | 2·0 | 12·0 | Exceeding negligible | S.A. |
| RIBS AND FORMERS | 0·03 | 0·5 | Two per item | Exceeding negligible | Replace |
| STIFFENERS | 0·03 | 0·5 | One per stiffener | Exceeding negligible | Replace |

**Fig. 3/29A. Air intake, Mk.1 and 4**

**RESTRICTED**

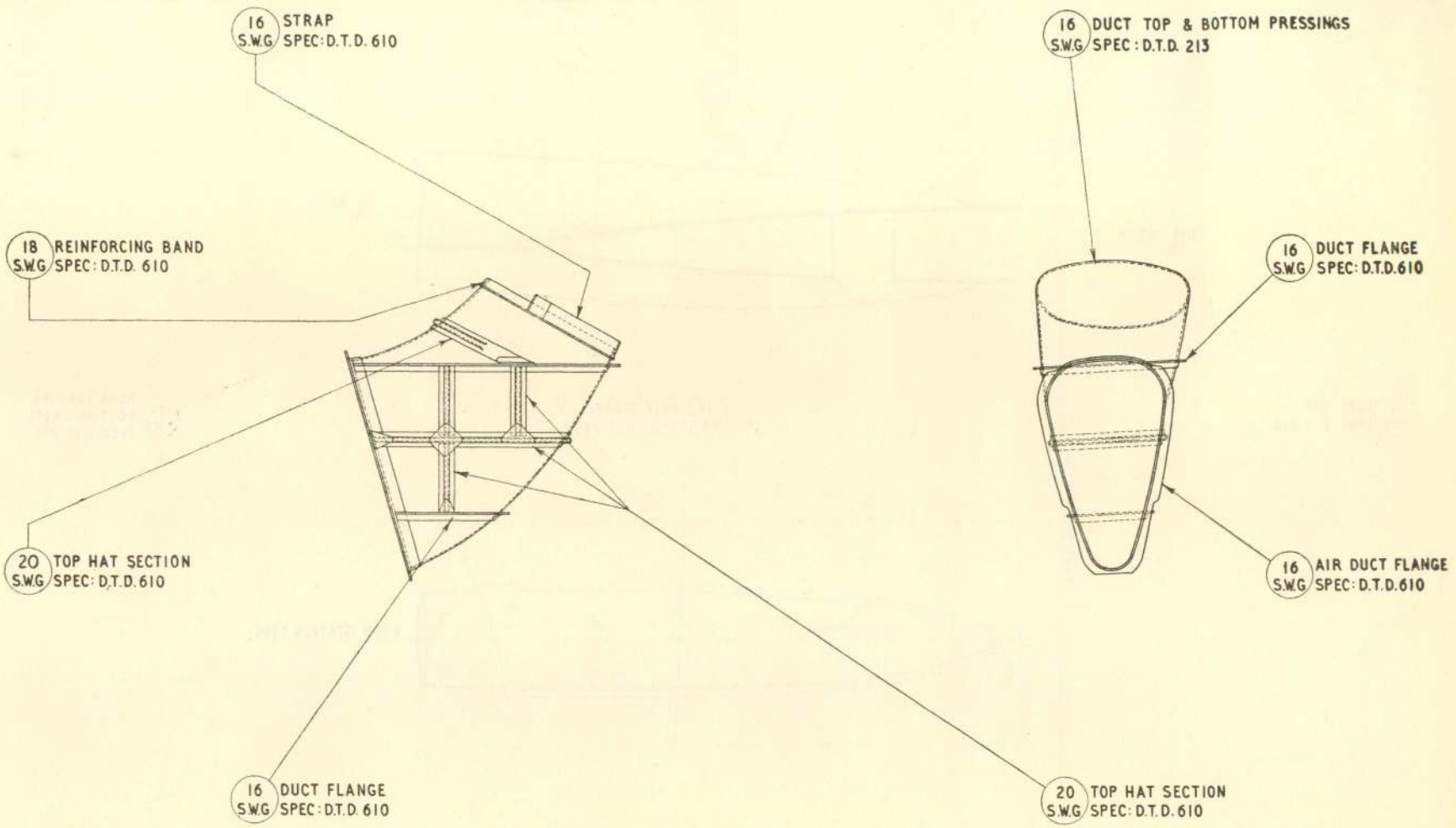



NOTE
UNLESS STATED OTHERWISE ALL MATERIAL IS TO SPECIFICATION D.T.D.610.

**Definitions of negligible and repairable damage**

| Item | Negligible damage—dents (inches) | | | Repairable damage (inches) | Repair fig. |
|---|---|---|---|---|---|
| | Max. depth | Min. dia. | Min. spacing | | |
| SKINS | 0·03 | 2·0 | 12·0 | 2·0 dia., 12·0 spacing | 3/50 |
| DUCT SKIN | 0·03 | 2·0 | 12·0 | Exceeding negligible | S.A. |
| RIBS AND FORMERS | 0·03 | 0·5 | Two per item | Exceeding negligible | Replace |
| STIFFENERS | 0·03 | 0·5 | One per stiffener | Exceeding negligible | Replace |

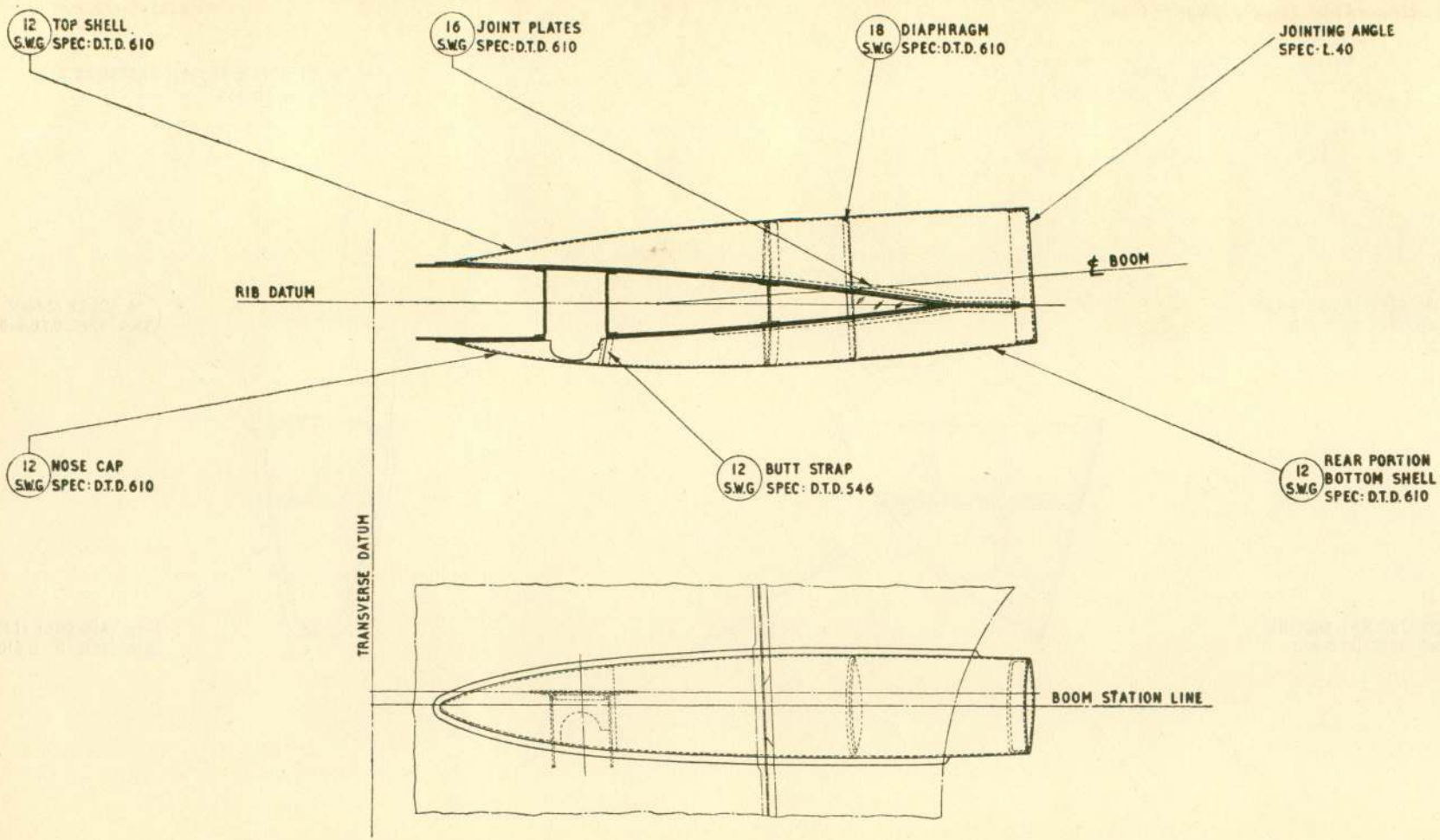
**Fig. 3/29B. Air intake, Mk.2 and 3**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig No. | Repair Material Item No. |
|---|---|---|---|---|
| SKINS | Dents up to 0·20 in. deep, free from cracks with smooth contour | Damage in excess of negligible | Replace duct complete | |
| FLANGES AND STIFFENERS | Dents or bruises 0·03 in. deep 0·50 in. dia. 6·00 in. apart | Damage in excess of negligible | Replace duct complete | |

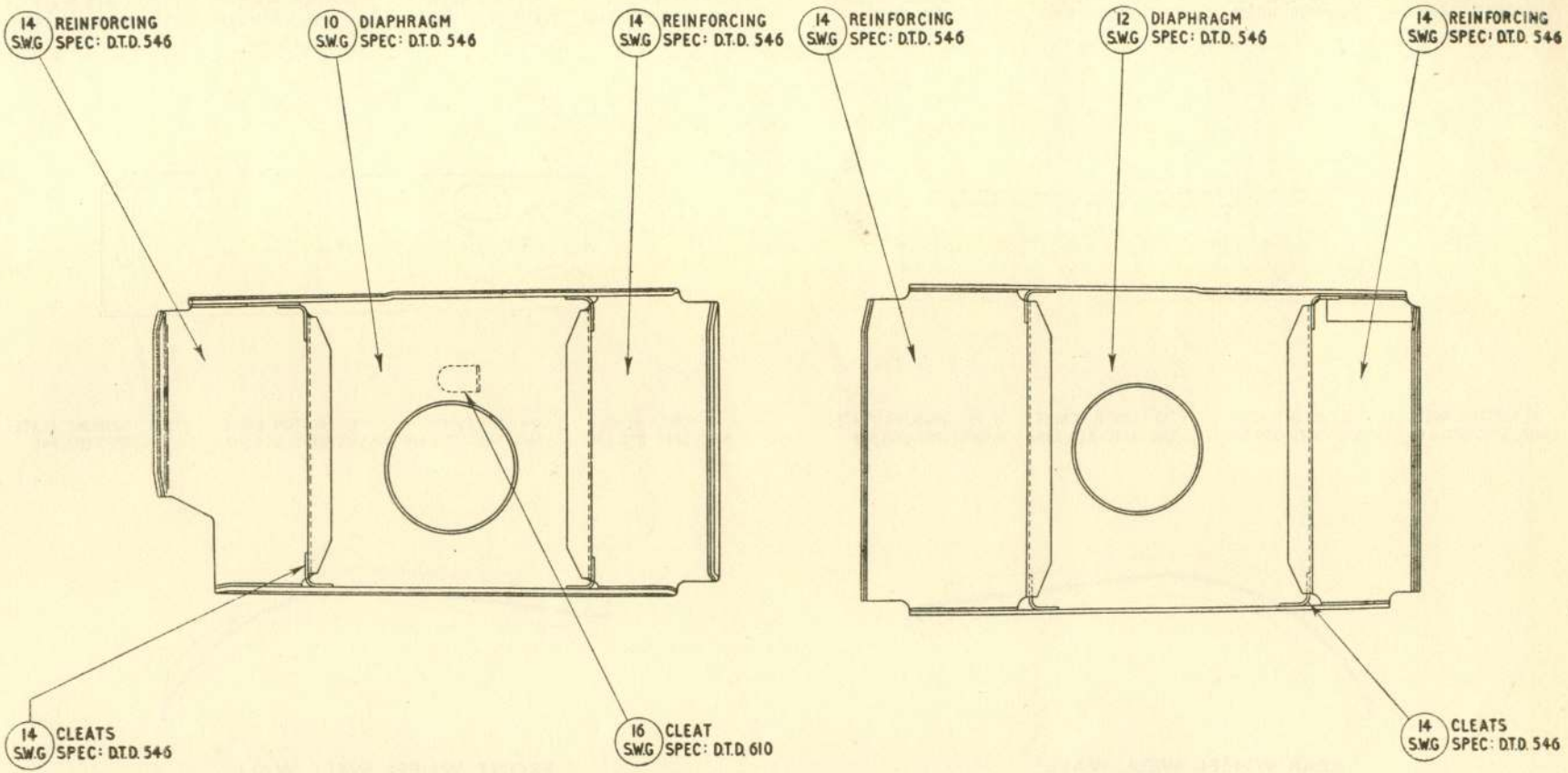
**Fig. 3/30. OUTER AIR DUCT**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repair Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| SKINS | Dents or bruises 0·03 in. deep 2·00 in. dia. 12·00 in. apart | 2·00 in.–3·00 in. dia. 18·00 in. apart | 3/50 | 22, 121, 147, 178 |
| DIAPHRAGMS<br>Webs | Dents or bruises 0·10 in. deep 1·50 in. dia. 9·00 in. apart | Damage in excess of negligible | Replace | |
| Flanges | Dents or bruises 0·05 in. deep 0·50 in. dia. 9·00 in. apart | | | |

Fig. 3/31. STUB BOOM



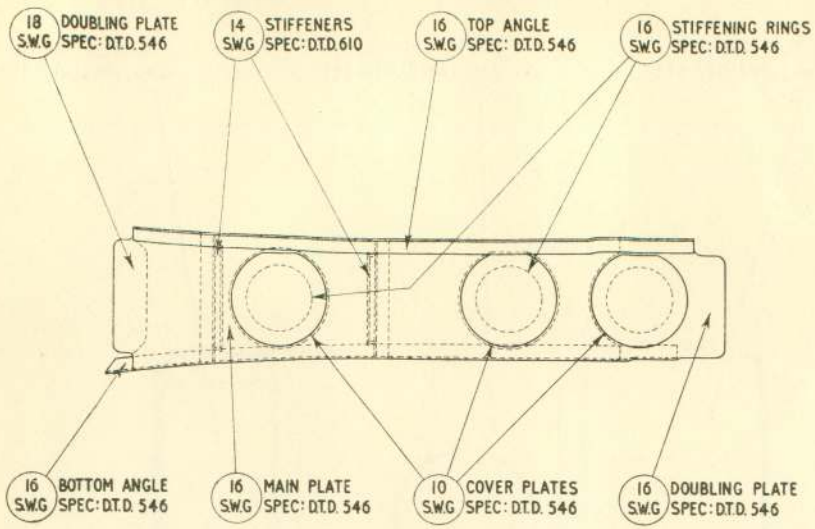

REAR DIAPHRAGM

FRONT DIAPHRAGM

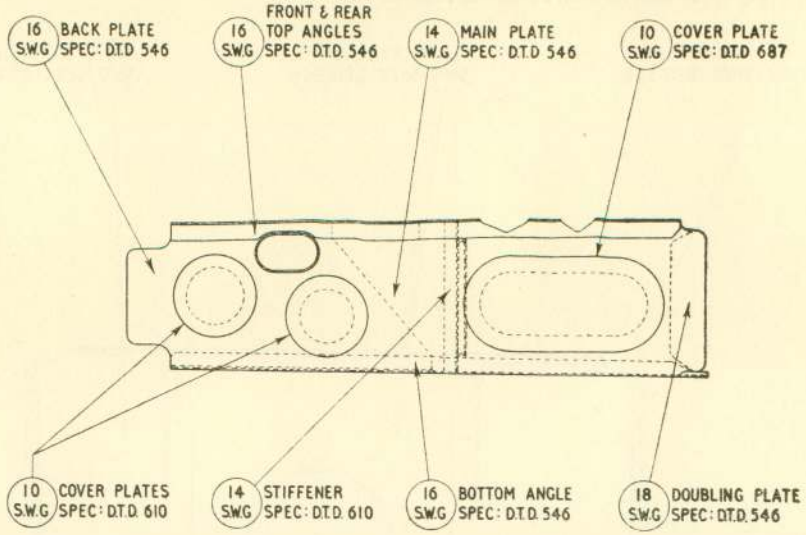
**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| DIAPHRAGMS<br>Webs | Dents or bruises 0·03 in. deep 1·00 in. dia. 9·00 in. apart | 1·00 in. dia. 9·00 in. apart<br>2·00 in. dia. two only per diaphragm | 3/47<br>— | 34, 35, 53<br>Special application to be made |
| REINFORCINGS<br>Webs | Dents or bruises 0·03 in. deep 1·00 in. dia. one only per reinforcing | 1·00 in. dia. one only per web<br>2·00 in. dia. one only per web | 3/47<br>— | 36, 52<br>Special application to be made |

**Fig. 3/32. MAIN UNDERCARRIAGE DIAPHRAGMS**




REAR WHEEL WELL WALL

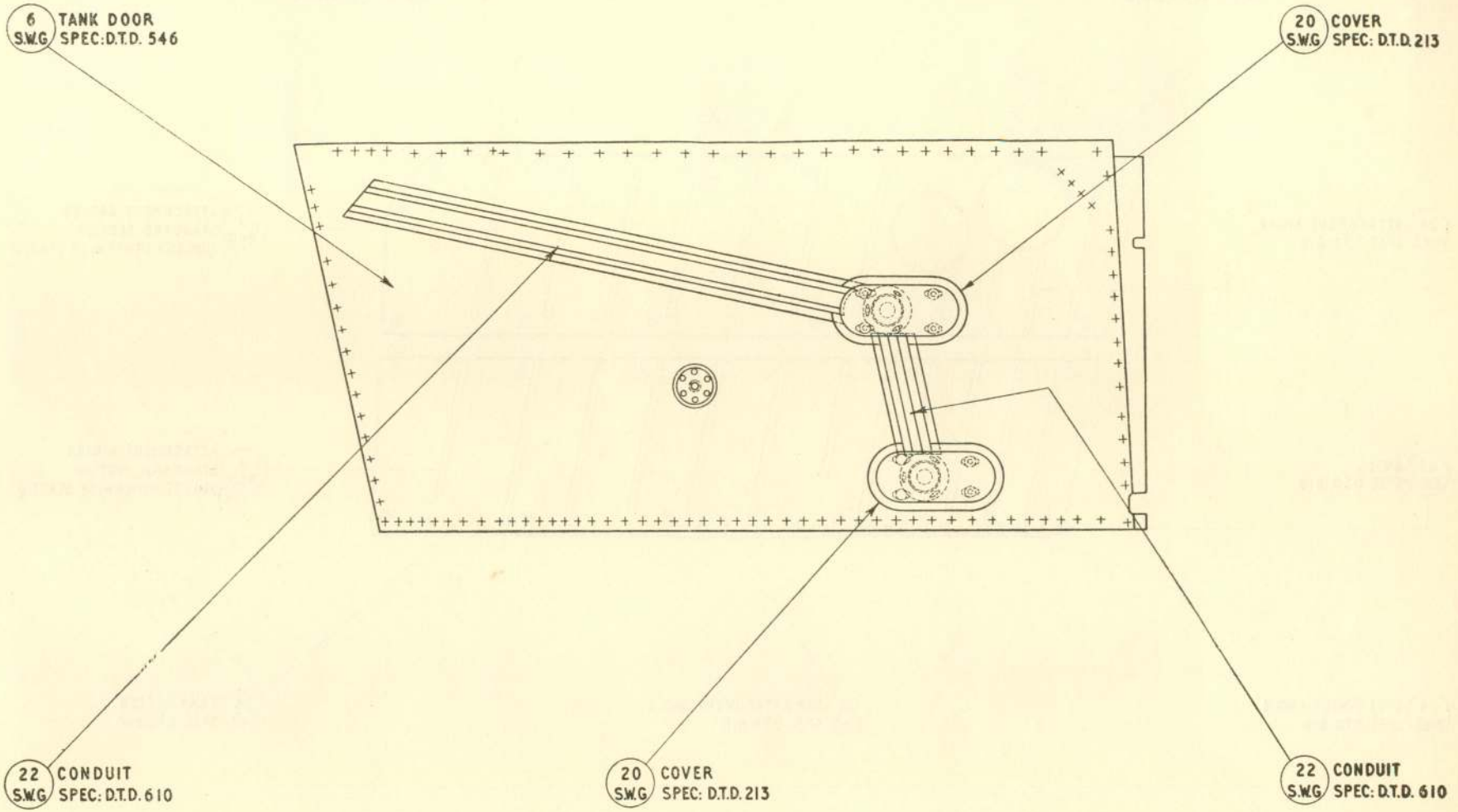



FRONT WHEEL WELL WALL

**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| MAIN PLATES | Dents or bruises 0·03 in. deep 1·00 in. dia. 9·00 in. apart | 1·00 in. dia. 9·00 in. apart | 3/47 | 36, 37, 50, 52 |
| BACK PLATE | Dents or bruises 0·03 in. deep 1·00 in. dia. two only per plate | Damage in excess of negligible | Replace | |
| DOUBLING PLATE | Dents or bruises 0·03 in. deep 0·75 in. dia. one only per plate | Damage in excess of negligible | Replace | |
| TOP AND BOTTOM ANGLES | Dents or bruises 0·02 in. deep 0·50 in. dia. 9·00 in. apart | Damage in excess of negligible | Replace | |
| STIFFENERS | Dents or bruises 0·02 in. deep | Damage in excess of negligible | Replace | |
| COVER PLATES | Dents or bruises 0·03 in. deep 1·00 in. dia. one only per plate | Damage in excess of negligible | Replace | |

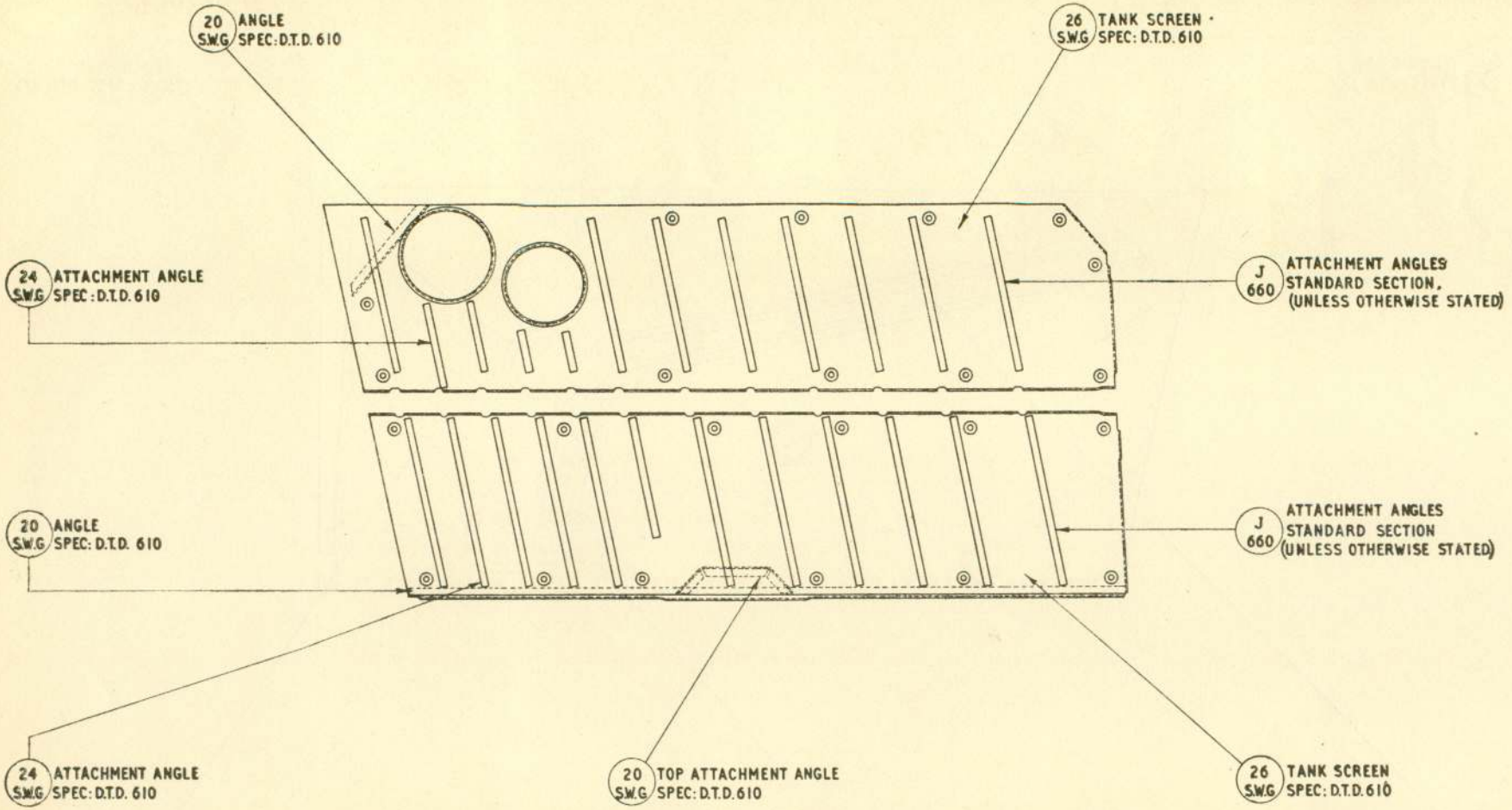
Fig. 3/33. WHEEL WELL WALL




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| TANK DOOR | Dents or bruises 0·03 in. deep 2·00 in. dia. 18·00 in. apart | Damage up to 3·00 in. dia. | 3/53 | 39B, 112 |
| CONDUITS | Dents or bruises 0·02 in. deep 0·50 in. dia. 6·00 in. apart | Damage in excess of negligible | Replace | |
| COVERS | Dents or bruises 0·03 in. deep 1·00 in. dia. one only per cover | Damage in excess of negligible | Replace | |

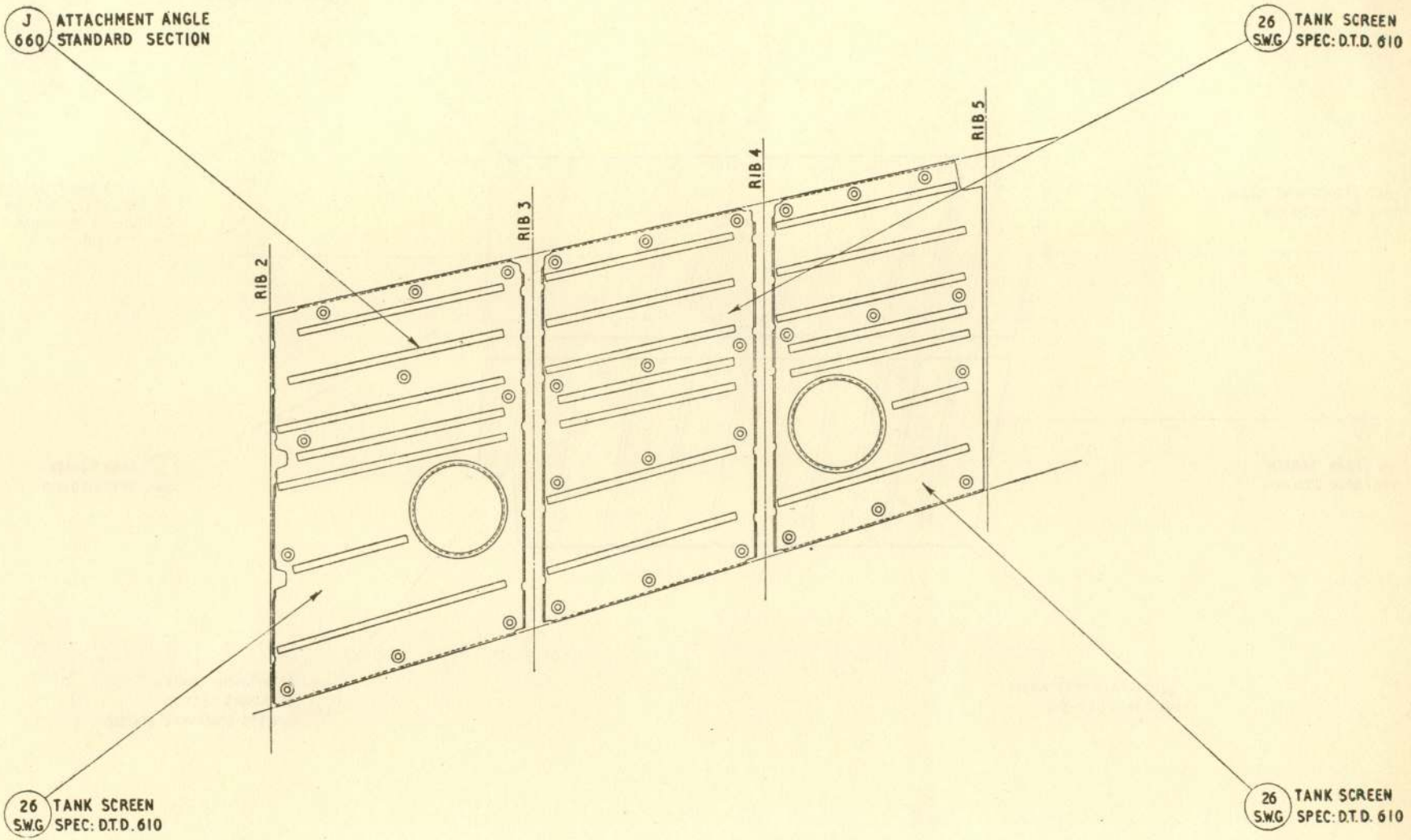
**Fig. 3/34. WING TANK DOOR**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| TANK SCREENS | Dents or bruises 0·02 in. deep 2·00 in. dia. 12·00 in. apart | Damage up to 3·50 in. dia. | 3/54 | 28A, 181 |
| | | Large patches | 3/54 | 28A, 181 |
| ATTACHMENT ANGLES | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per angle | Butt joint repair | 3/54 | 40, 50 |
| ANGLES | Dents or bruises 0·02 in. deep 0·25 in. dia. 6·00 in. apart | Damage in excess of negligible | Replace | |

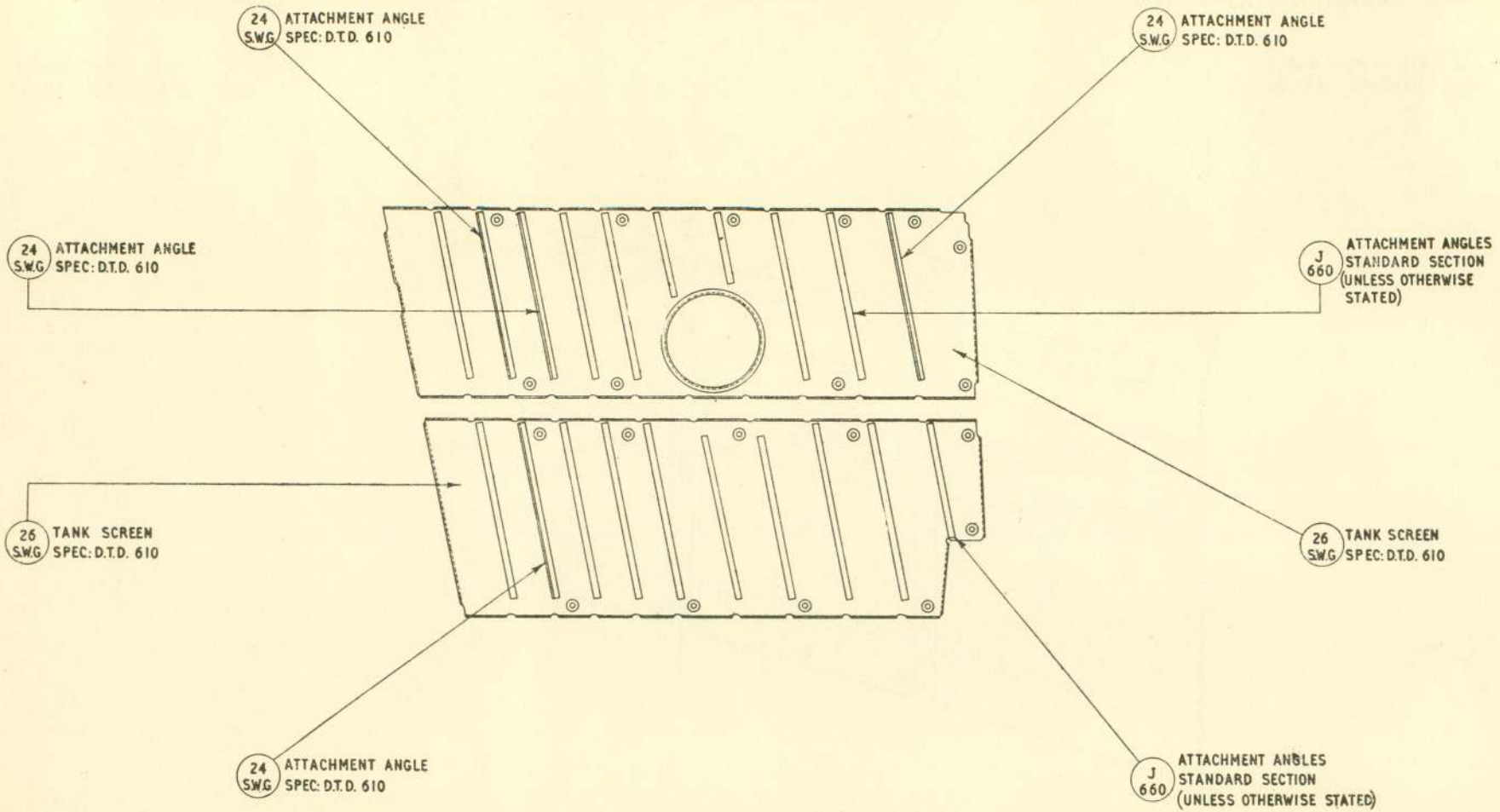
Fig. 3/35. TANK SCREENING BETWEEN RIBS No. 1 AND 2




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| TANK SCREENS | Dents or bruises 0·02 in. deep 2·00 in. dia. 12·00 in. apart | Damage up to 3·50 in. dia.<br>Large patches | 3/54<br>3/54 | 28A, 181<br>28A, 181 |
| ATTACHMENT ANGLES | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per angle | Butt joint repair | 3/54 | 40, 50 |

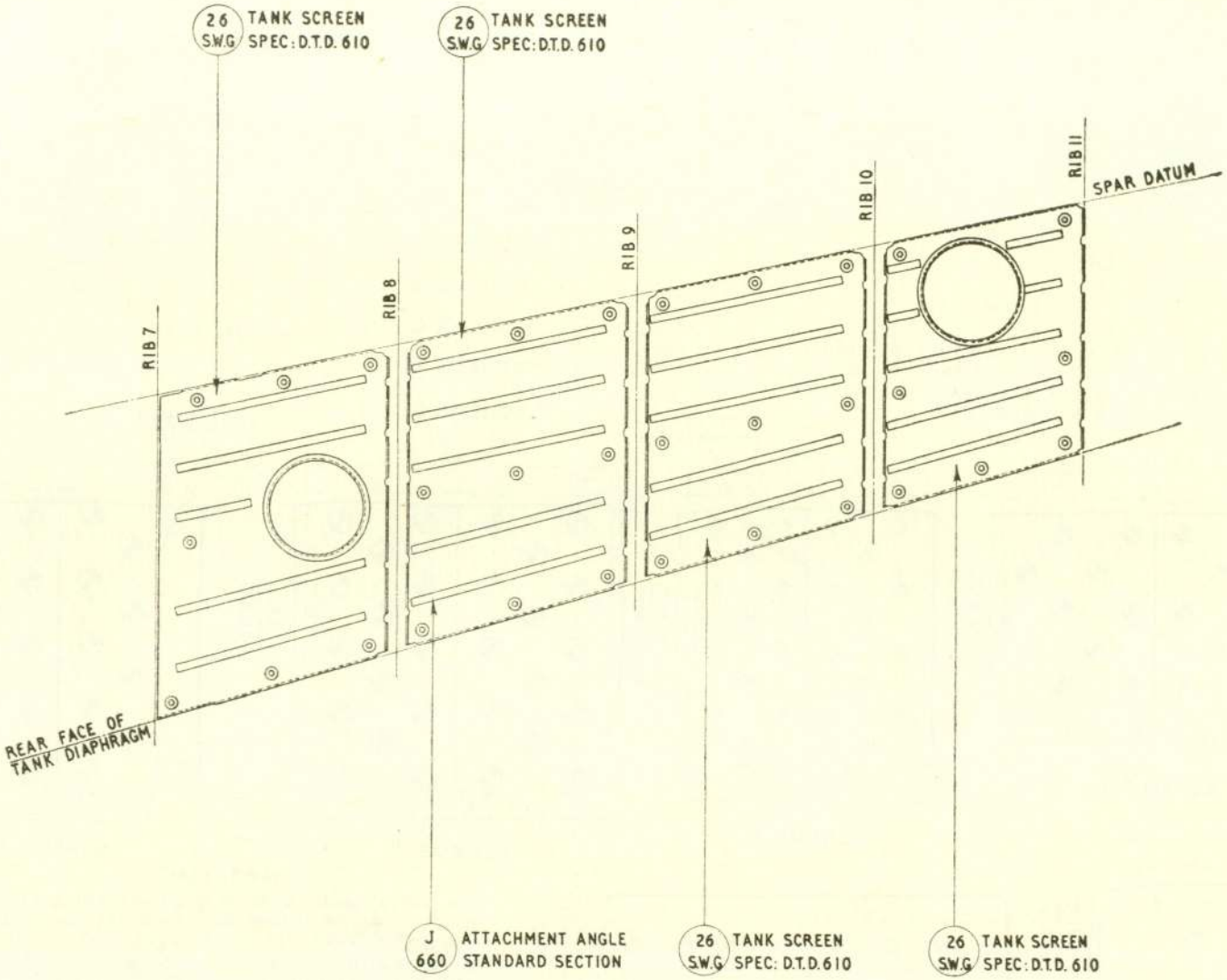
**Fig. 3/36. TANK SCREENING BETWEEN RIBS No. 2 AND 5**




**Definitions of Negligible and Repairable Damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | Repair Material Item No. |
|---|---|---|---|---|
| TANK SCREENS | Dents or bruises 0·02 in. deep 2·00 in. dia. 12·00 in. apart | Damage up to 3·50 in. dia. | 3/54 | 28A, 181 |
| | | Large patches | 3/54 | 28A, 181 |
| ATTACHMENT ANGLES | Dents or bruises 0·02 in. deep 0·25 in. dia. three only per angle | Butt joint repair | 3/54 | 40, 50 |

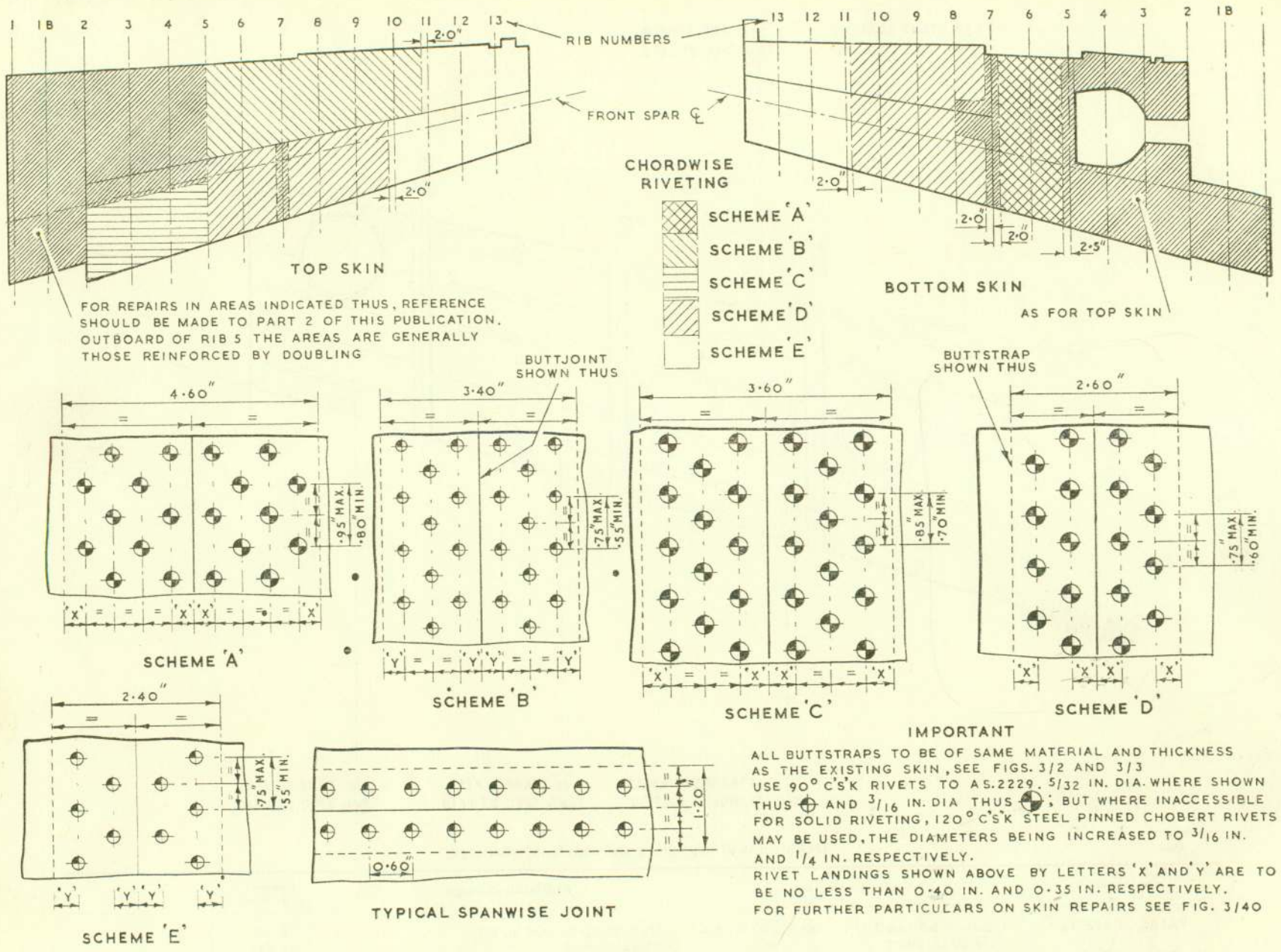
**Fig. 3/37. TANK SCREENING BETWEEN RIBS No. 5 AND 7**




**Definitions of negligible and repairable damage**

| Component | Negligible Damage | Repairable Damage | Repair Fig. No. | |
|---|---|---|---|---|
| TANK SCREENS | Dents or bruises 0·02 in. deep, 2·00 in. dia. 12·00 in. apart | Damage up to 3·50 in. dia.<br>Large patches | 3/54<br>3/54 | |
| ATTACHMENT ANGLES | Dents or bruises 0·02 in. deep, 0·25 in. dia. three only per angle | Butt joint repair | 3/54 | |

**Fig. 3/38. Tank screening between ribs No. 7 and 11**




IMPORTANT

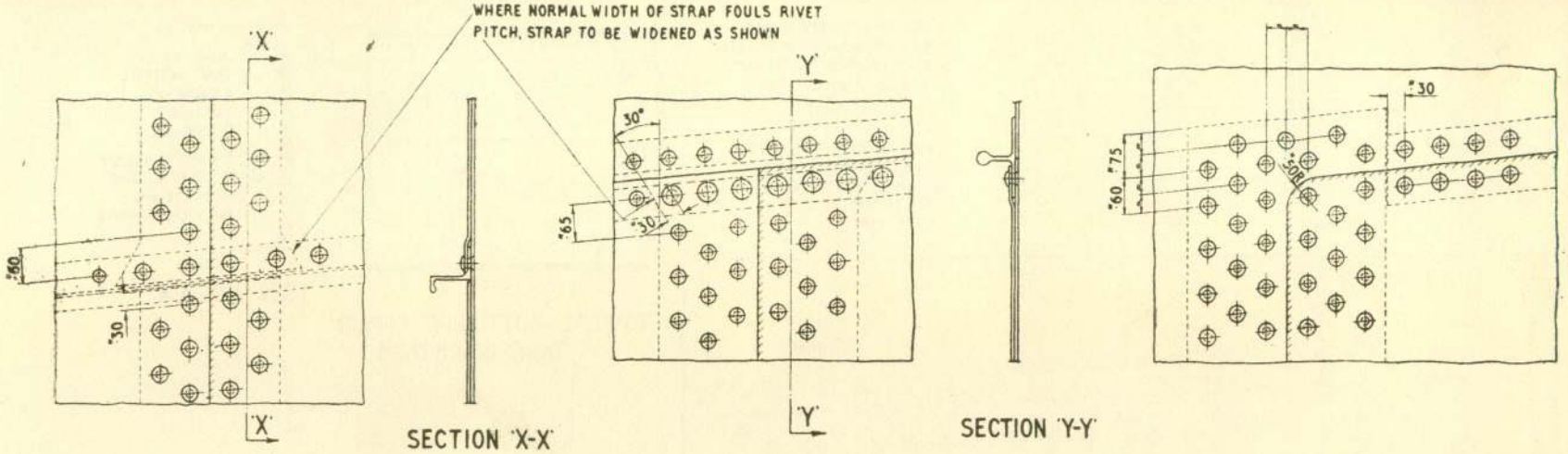
ALL BUTTSTRAPS TO BE OF SAME MATERIAL AND THICKNESS AS THE EXISTING SKIN, SEE FIGS. 3/2 AND 3/3

USE 90° C'S'K RIVETS TO A.S.2229. 5/32 IN. DIA. WHERE SHOWN THUS ⊕ AND 3/16 IN. DIA THUS ⊕; BUT WHERE INACCESSIBLE FOR SOLID RIVETING, 120° C'S'K STEEL PINNED CHOBERT RIVETS MAY BE USED, THE DIAMETERS BEING INCREASED TO 3/16 IN. AND 1/4 IN. RESPECTIVELY.

RIVET LANDINGS SHOWN ABOVE BY LETTERS 'X' AND 'Y' ARE TO BE NO LESS THAN 0·40 IN. AND 0·35 IN. RESPECTIVELY.

FOR FURTHER PARTICULARS ON SKIN REPAIRS SEE FIG. 3/40

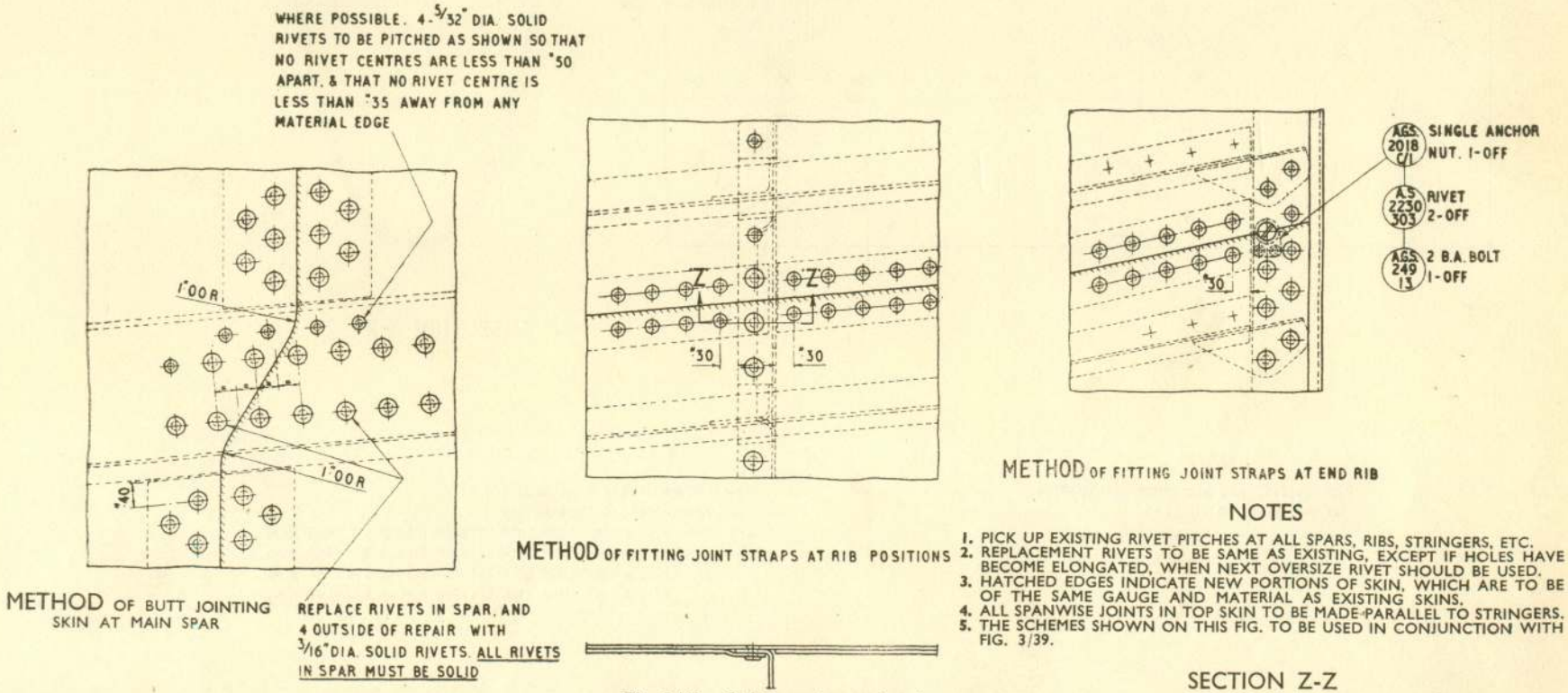
**Fig. 3/39. Skin repairs main plane**




**METHOD** OF FITTING JOINT STRAPS AT J 626 STANDARD SECTION, STRINGER POSITIONS

**METHOD** OF FITTING JOINT STRAPS AT J 638 STANDARD SECTION, STRINGER POSITIONS

**METHOD** OF RIVETING AT CORNER OF REPAIR




**METHOD** OF BUTT JOINTING SKIN AT MAIN SPAR

**METHOD** OF FITTING JOINT STRAPS AT RIB POSITIONS

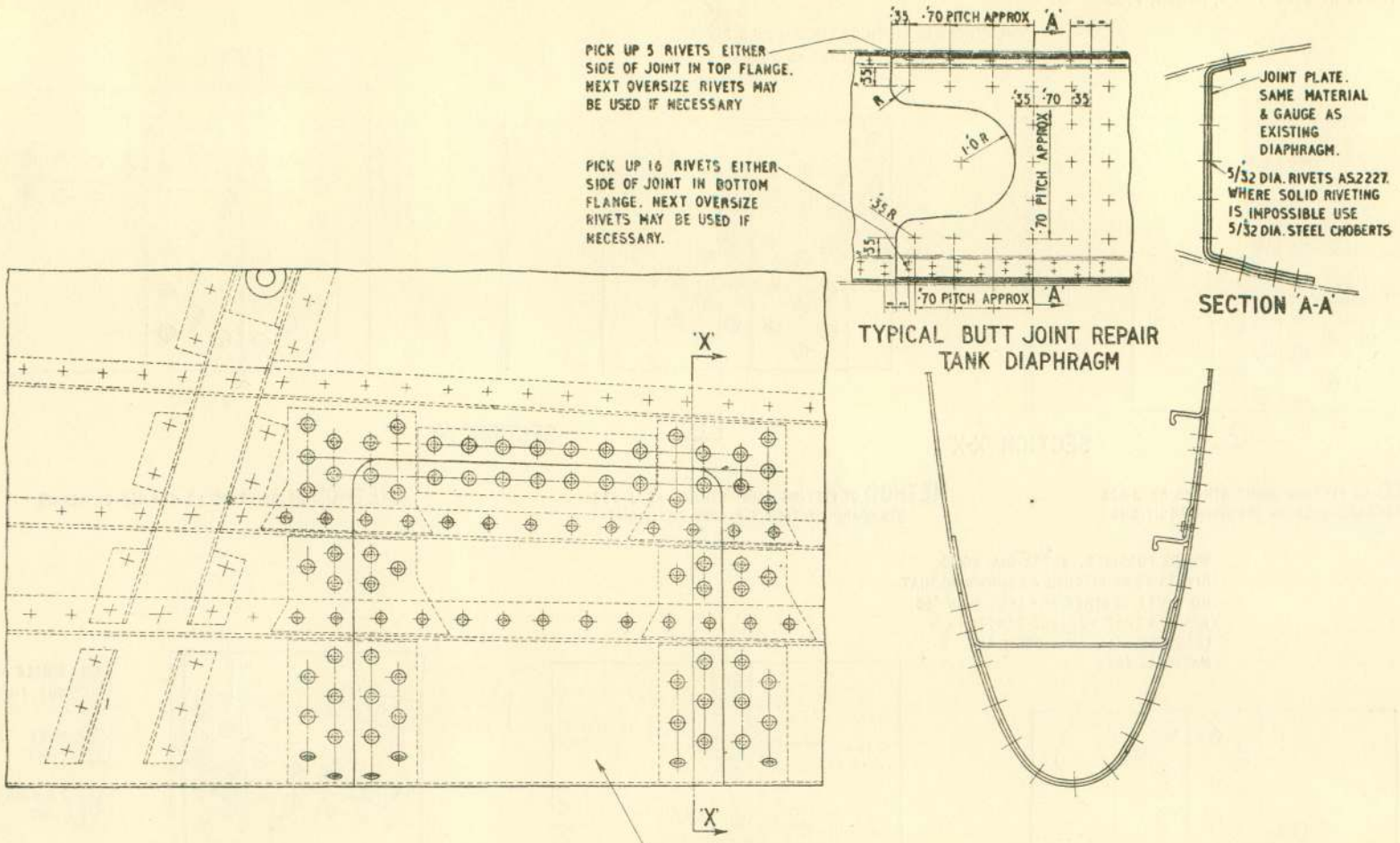
**METHOD** OF FITTING JOINT STRAPS AT END RIB

SECTION Z-Z

## NOTES

1. PICK UP EXISTING RIVET PITCHES AT ALL SPARS, RIBS, STRINGERS, ETC.
2. REPLACEMENT RIVETS TO BE SAME AS EXISTING, EXCEPT IF HOLES HAVE BECOME ELONGATED, WHEN NEXT OVERSIZE RIVET SHOULD BE USED.
3. HATCHED EDGES INDICATE NEW PORTIONS OF SKIN, WHICH ARE TO BE OF THE SAME GAUGE AND MATERIAL AS EXISTING SKINS.
4. ALL SPANWISE JOINTS IN TOP SKIN TO BE MADE PARALLEL TO STRINGERS.
5. THE SCHEMES SHOWN ON THIS FIG. TO BE USED IN CONJUNCTION WITH FIG. 3/39.

**Fig. 3/40. Skin repairs main plane**



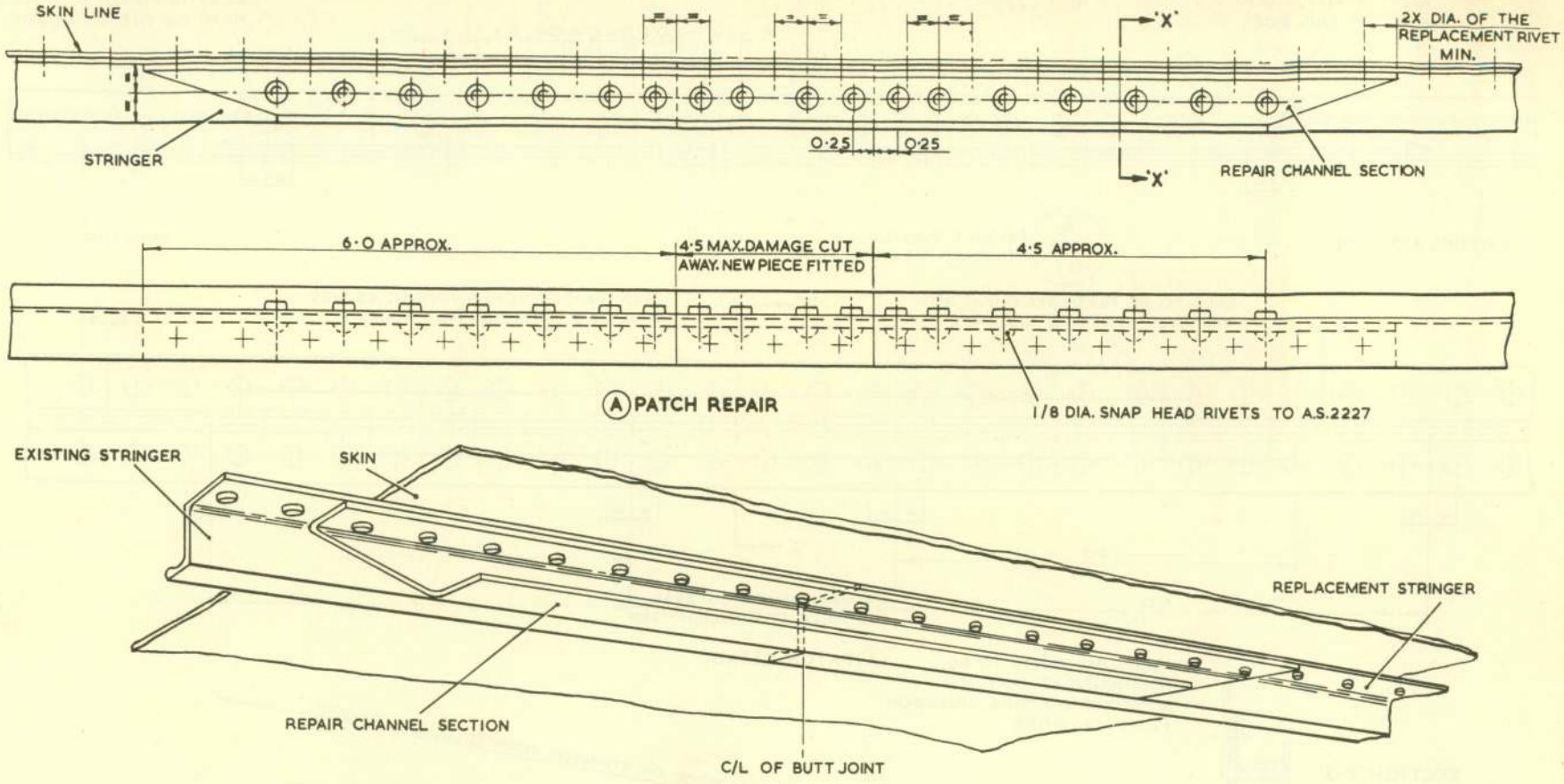

NOTE

FOR RIVETING AND ALL OTHER INFORMATION SEE FIG. 3/39 AND FIG. 3/40

NEW PORTION OF L/E SKIN TO BE CUT FROM APPROPRIATE SECTION OF SPARE

| | | |
|---|---|---|
| L/E SKIN | R.12.W.126. | FOR SKIN BETWEEN RIBS 2 & 7 PORT WING |
| | R.12.W.127. | FOR SKIN BETWEEN RIBS 2 & 7 ST'BD WING |
| | R.12.W.128. | FOR SKIN BETWEEN RIBS 7 & 14 PORT WING |
| | R.12.W.129. | FOR SKIN BETWEEN RIBS 7 & 14 ST'BD WING |

**Fig. 3/41. Typical leading edge repair**




**NOTE**

ALL DIMENSIONS ARE IN INCHES
A MINIMUM OF EIGHT EXISTING RIVETS TO BE PICKED UP IN THE FLANGE EITHER SIDE OF CUT-AWAY IN THE PATCH REPAIR AND EITHER SIDE OF BUTT JOINT IN THE INSERTION REPAIR
DIMENSIONS FOR REPAIR CHANNEL ARE SIMILAR FOR BOTH REPAIRS

Fig.3/42. Stringer repairs (J.626 section)

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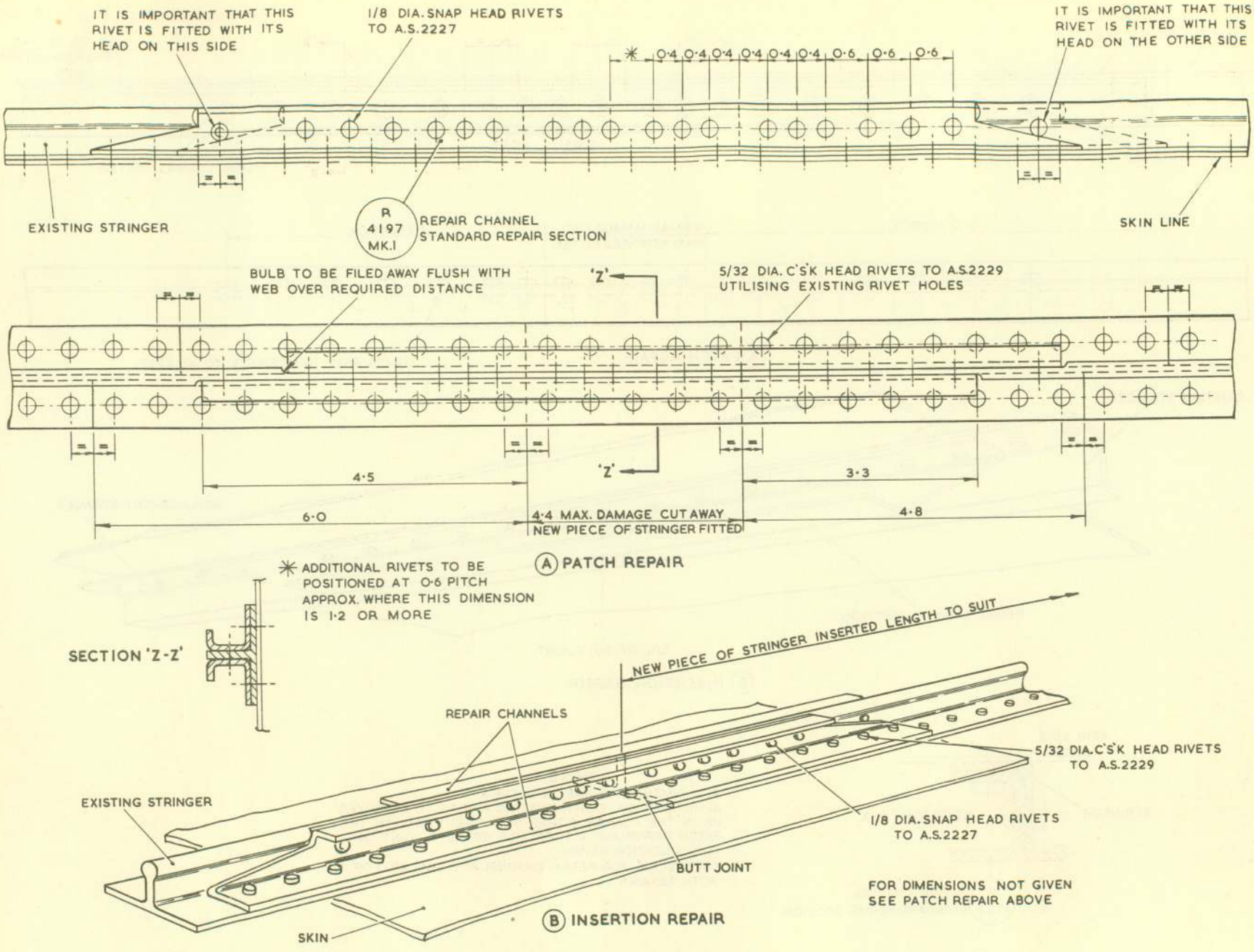
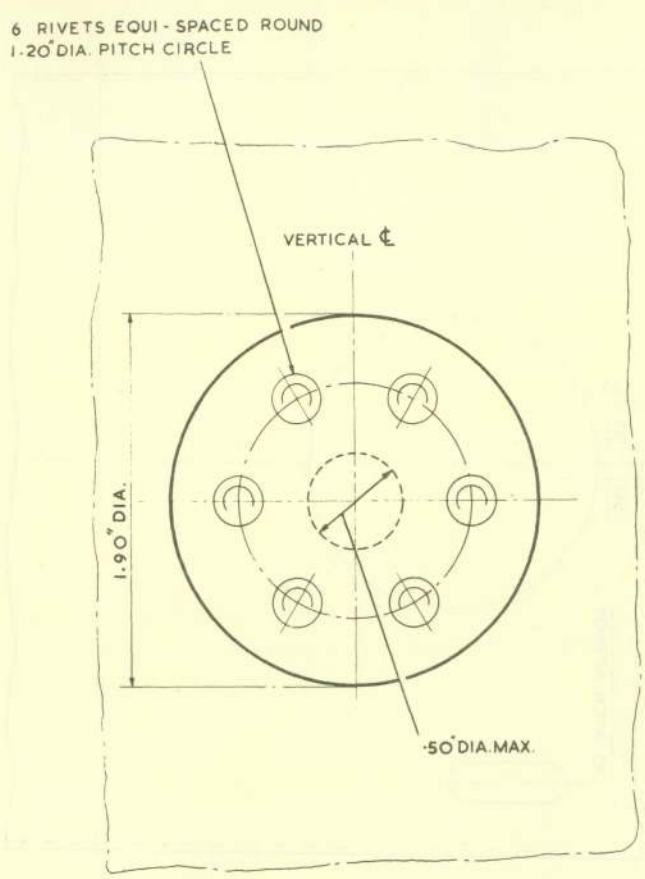


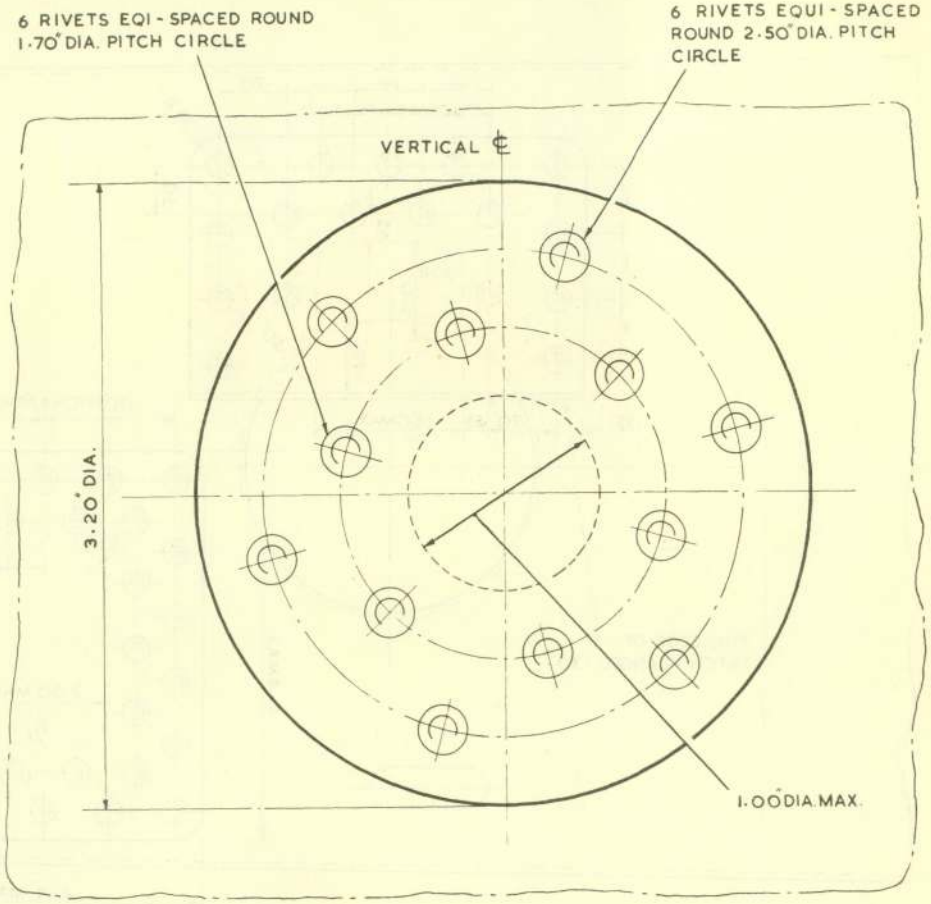

NOTE ALL DIMENSIONS ARE IN INCHES

Fig.3/43. Stringer repairs (tee section)




NOTE

THESE REPAIRS ONLY APPLY TO CLEAR AREAS OF THE SPAR.
PATCHES TO BE OF SAME THICKNESS AND MATERIAL AS THE EXISTING WEB.




RIVETING

USE 5/32 IN. DIA. SNAP HEAD RIVETS WHERE THE SPAR IS 12 S.W.G. AND THINNER, AND 3/16 IN. DIA. WHERE THICKER; BOTH BEING TO AS.2227. WHERE IT IS INACCESSIBLE FOR SOLID RIVETING, STEEL PINNED CHOBERT RIVETS OF THE SAME DIAMETER MAY BE USED. CARE SHOULD BE TAKEN NOT TO POSITION RIVETS ON THE VERTICAL CENTRE LINE.

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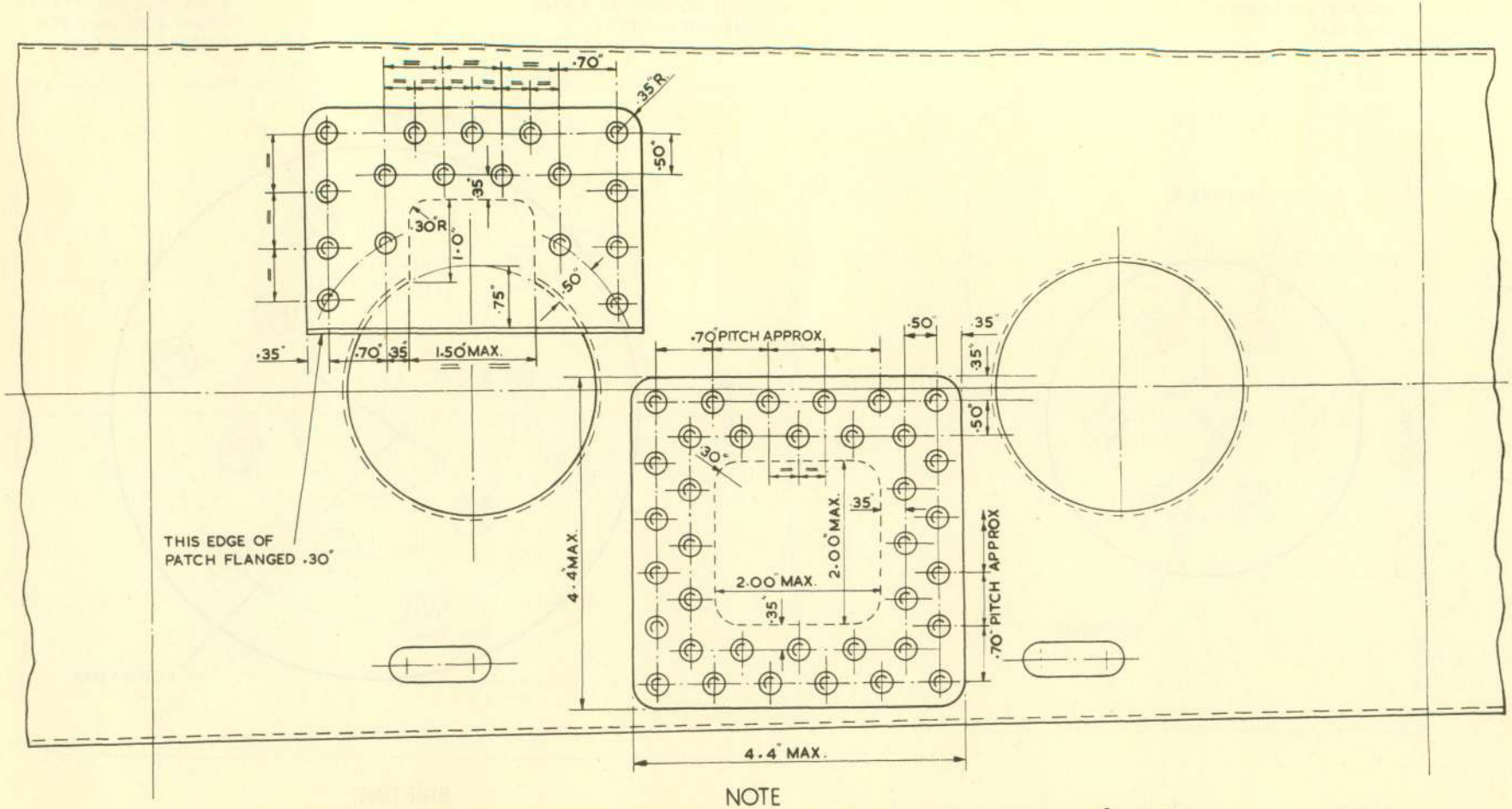
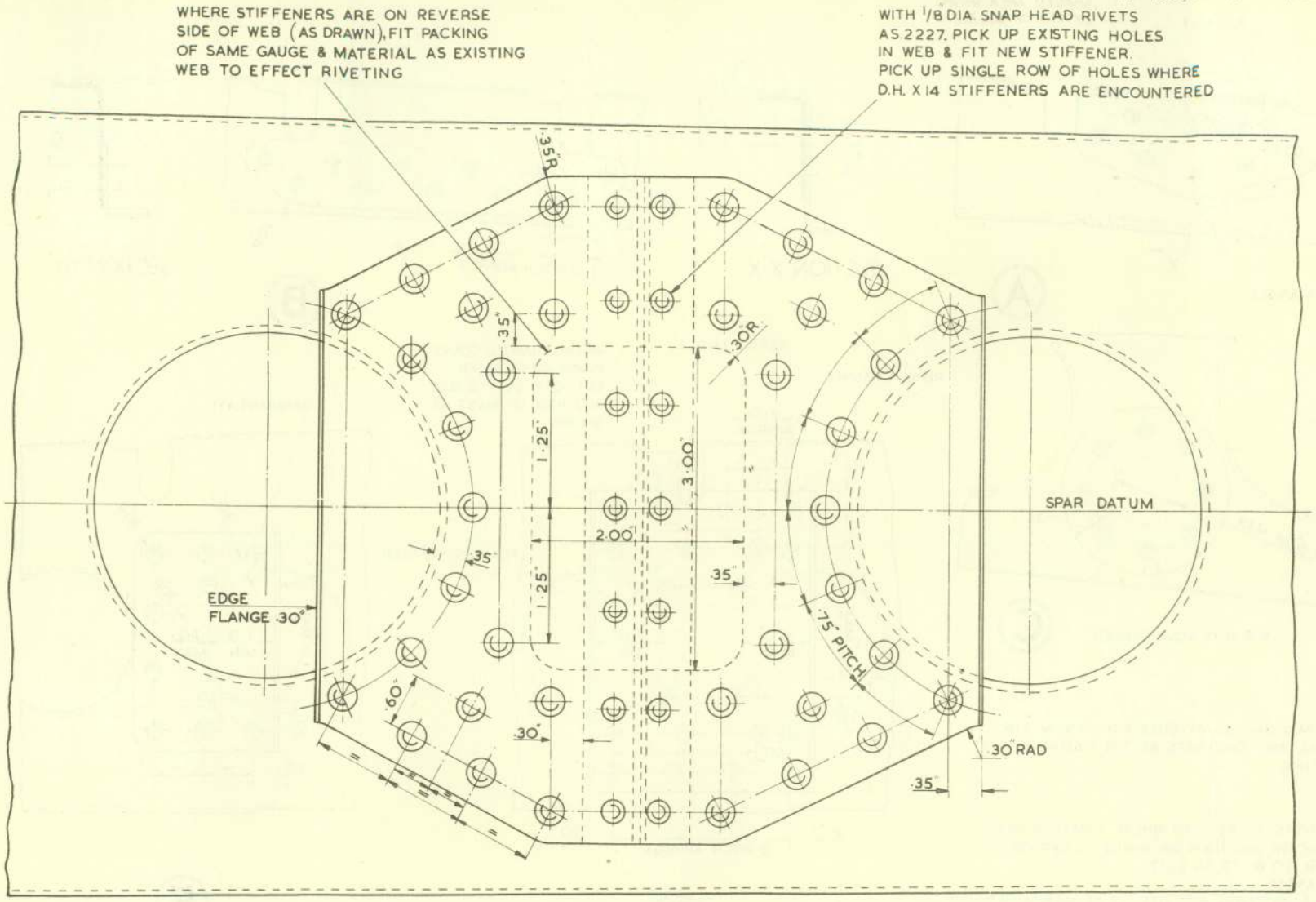
Fig. 3/44. Spar web repair




NOTE

THESE REPAIRS ARE ONLY APPLICABLE WHERE THE WEB IS UNREINFORCED.
PATCHES TO BE OF THE SAME THICKNESS AND MATERIAL AS THE EXISTING SPAR WEB.
USE 5/32 IN. DIA. SNAP HEAD RIVETS WHERE THE SPAR IS 12 SWG. AND THINNER. AND 3/16 IN. DIA. WHERE THICKER; BOTH BEING TO AS.2227.
WHERE IT IS INACCESSIBLE FOR SOLID RIVETING, STEEL PINNED CHOBERT RIVETS OF THE SAME DIAMETER MAY BE USED.

**Fig. 3/45. Spar web repair**




NOTE

PATCH TO BE OF SAME THICKNESS AND MATERIAL AS THE EXISTING SPAR WEB.
USE 5/32 IN. DIA. SNAP HEAD RIVETS WHERE THE SPAR IS 12 SWG. AND THINNER, AND 3/16 IN. DIA. WHERE THICKER; BOTH BEING TO AS.2227.
WHERE IT IS INACCESSIBLE FOR SOLID RIVETING, STEEL PINNED CHOBERT RIVETS OF THE SAME DIAMETER MAY BE USED.

**Fig.3/46. Spar web repair**



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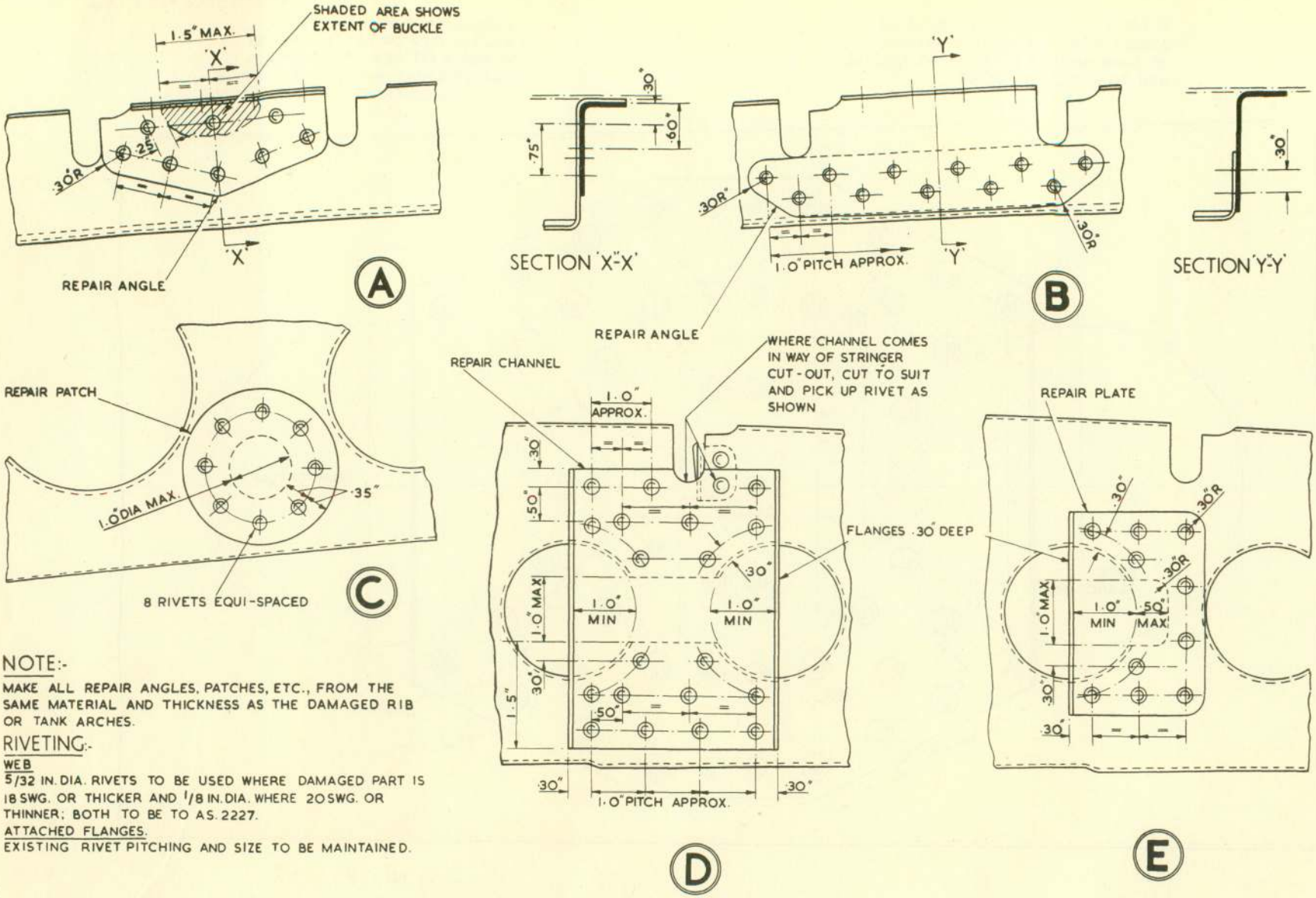



NOTE:-

MAKE ALL REPAIR ANGLES, PATCHES, ETC., FROM THE SAME MATERIAL AND THICKNESS AS THE DAMAGED RIB OR TANK ARCHES.

RIVETING:-

WEB

5/32 IN. DIA. RIVETS TO BE USED WHERE DAMAGED PART IS 18 SWG. OR THICKER AND 1/8 IN. DIA. WHERE 20 SWG. OR THINNER; BOTH TO BE TO A.S. 2227.

ATTACHED FLANGES.

EXISTING RIVET PITCHING AND SIZE TO BE MAINTAINED.

Fig. 3/47. Repairs to ribs and tank arches

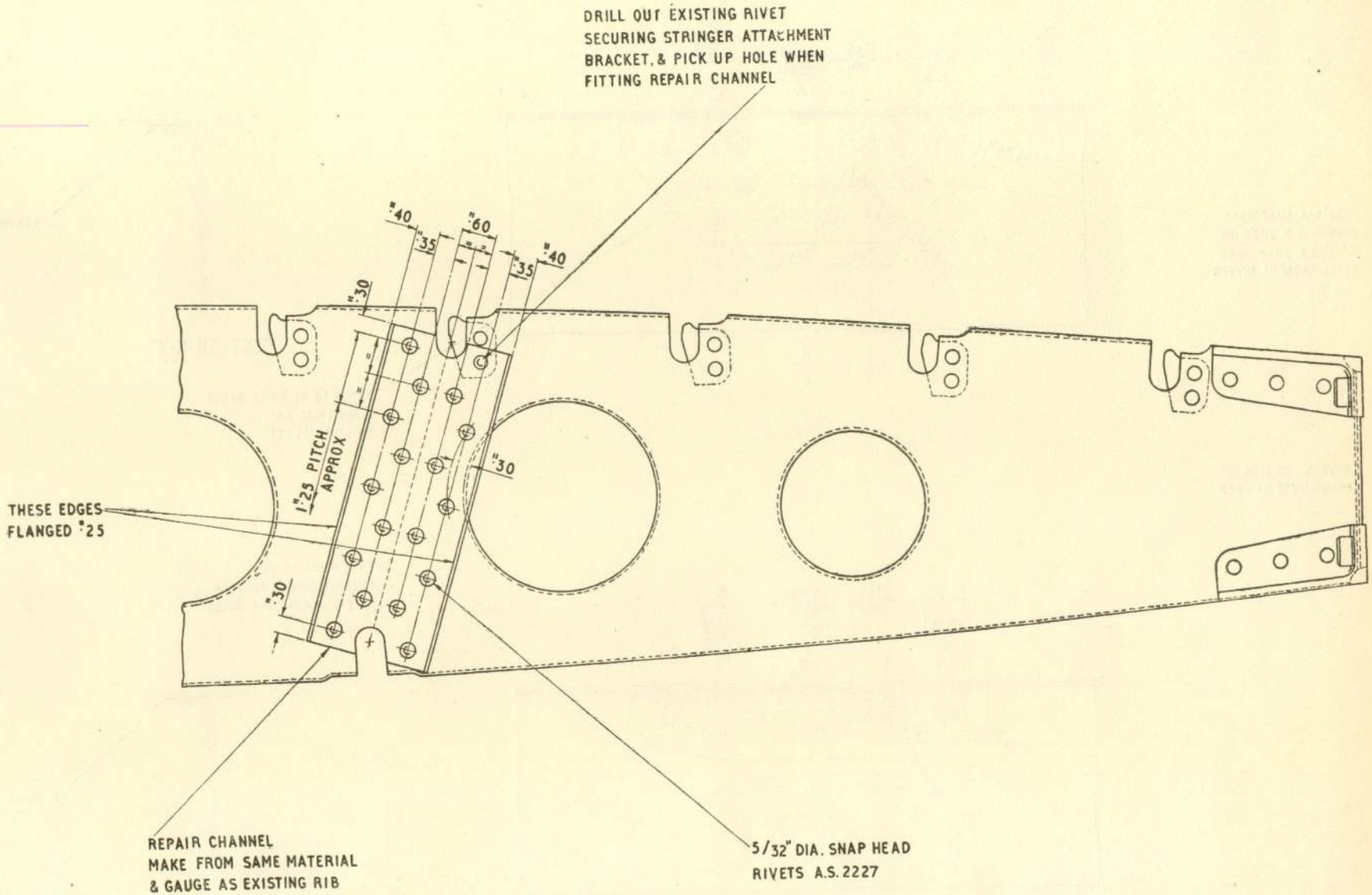
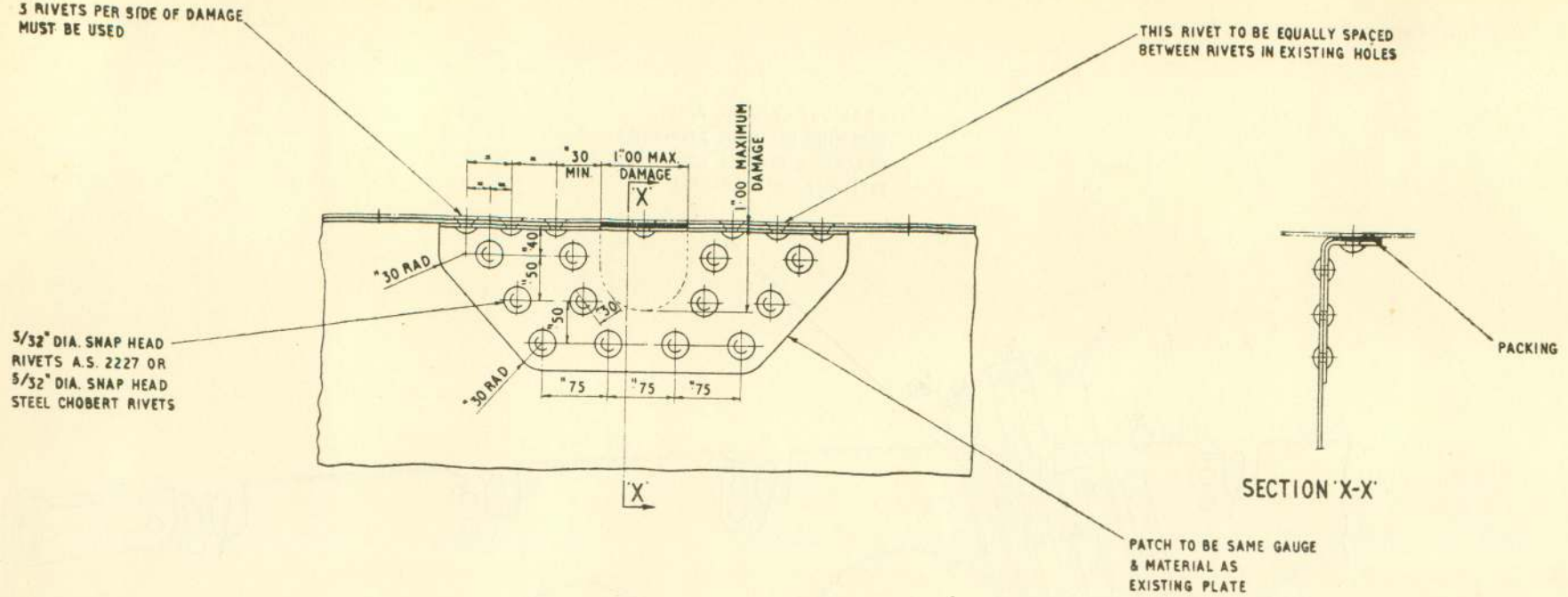



**Fig. 3/48. Replacement of damaged section of wing rib**



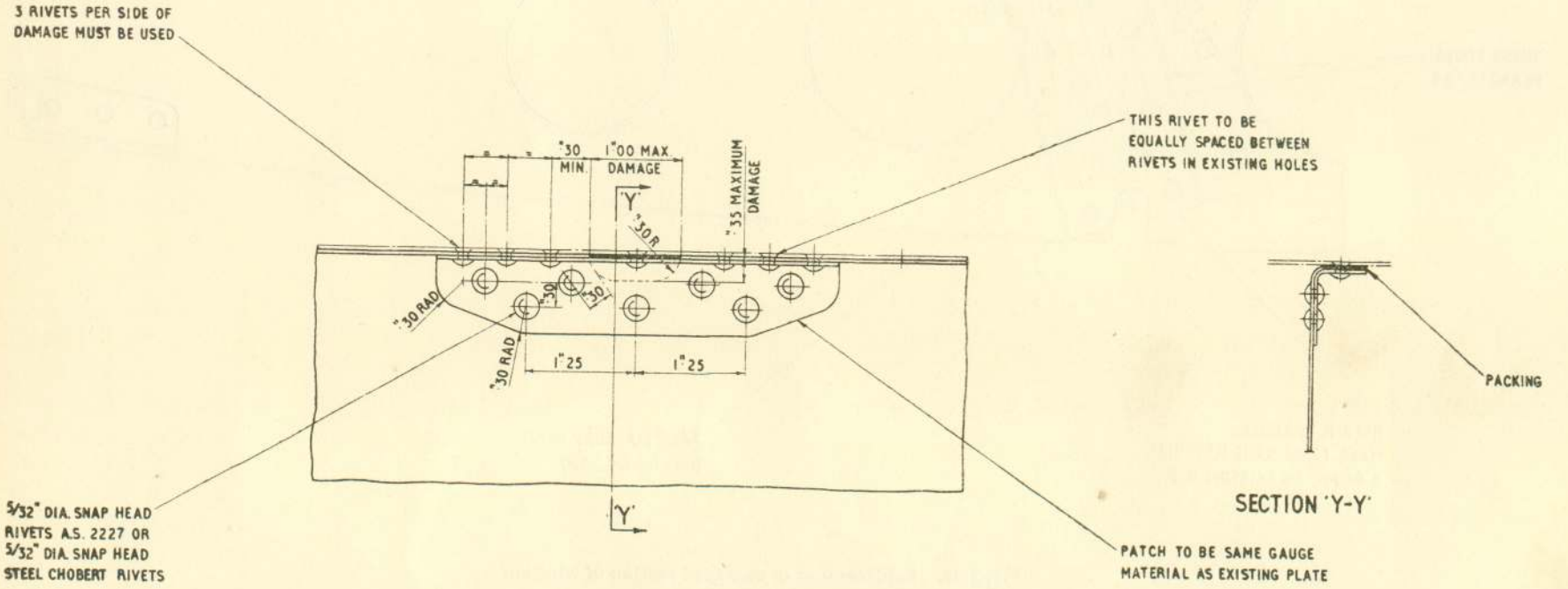
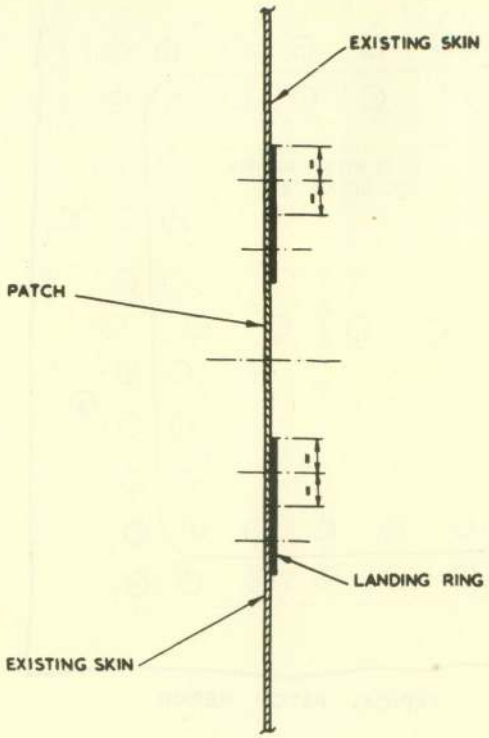
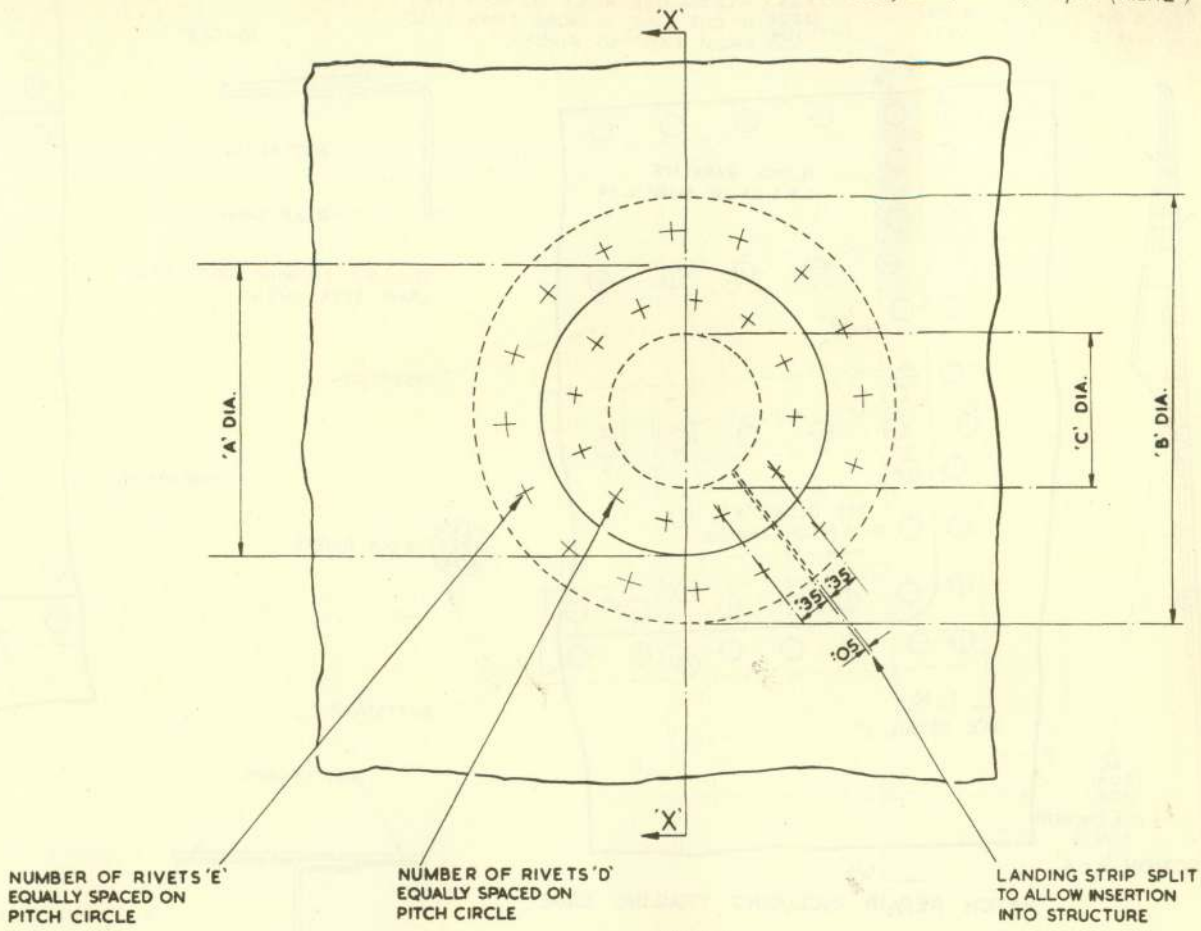




**Fig. 3/49. Standard flange repair**




SECTION 'X-X'




| MAX. DIA. OF PATCH 'A' | DIA. 'B' | DIA. 'C' | No. OF RIVETS 'D' | No. OF RIVETS 'E' |
|---|---|---|---|---|
| 2.00 | 3.40 | .60 | 8 | 12 |
| 3.00 | 4.40 | 1.60 | 12 | 16 |
| 4.00 | 5.40 | 2.60 | 16 | 20 |

NOTE.

THIS REPAIR IS ONLY APPLICABLE WHERE IT IS POSSIBLE TO FIT THE LANDING RING CLEAR OF STRINGERS, RIBS ETC. PATCH AND LANDING RING TO BE OF SAME THICKNESS AND SPECIFICATION AS EXISTING SKIN.
FOR SKINS OF THICKNESS 20 SWG. AND LESS USE 1/8 IN. DIA. 90° CSK HEAD RIVETS, DIMPLING THE MATERIAL TO ACCOMODATE THE RIVET HEAD.
WHERE SKIN THICKNESS IS 18 SWG. AND THICKER, 5/32 IN. DIA. 90° CSK. HEAD RIVETS MUST BE USED, CUT COUNTERSINKING ONLY WHEN MATERIAL IS 16 SWG. OR THICKER.
STEEL CSK HEAD PINNED CHOBERT RIVETS MAY BE USED WHERE INACCESSIBLE FOR SOLID RIVETING.

Fig.3/50. Skin insertion repair



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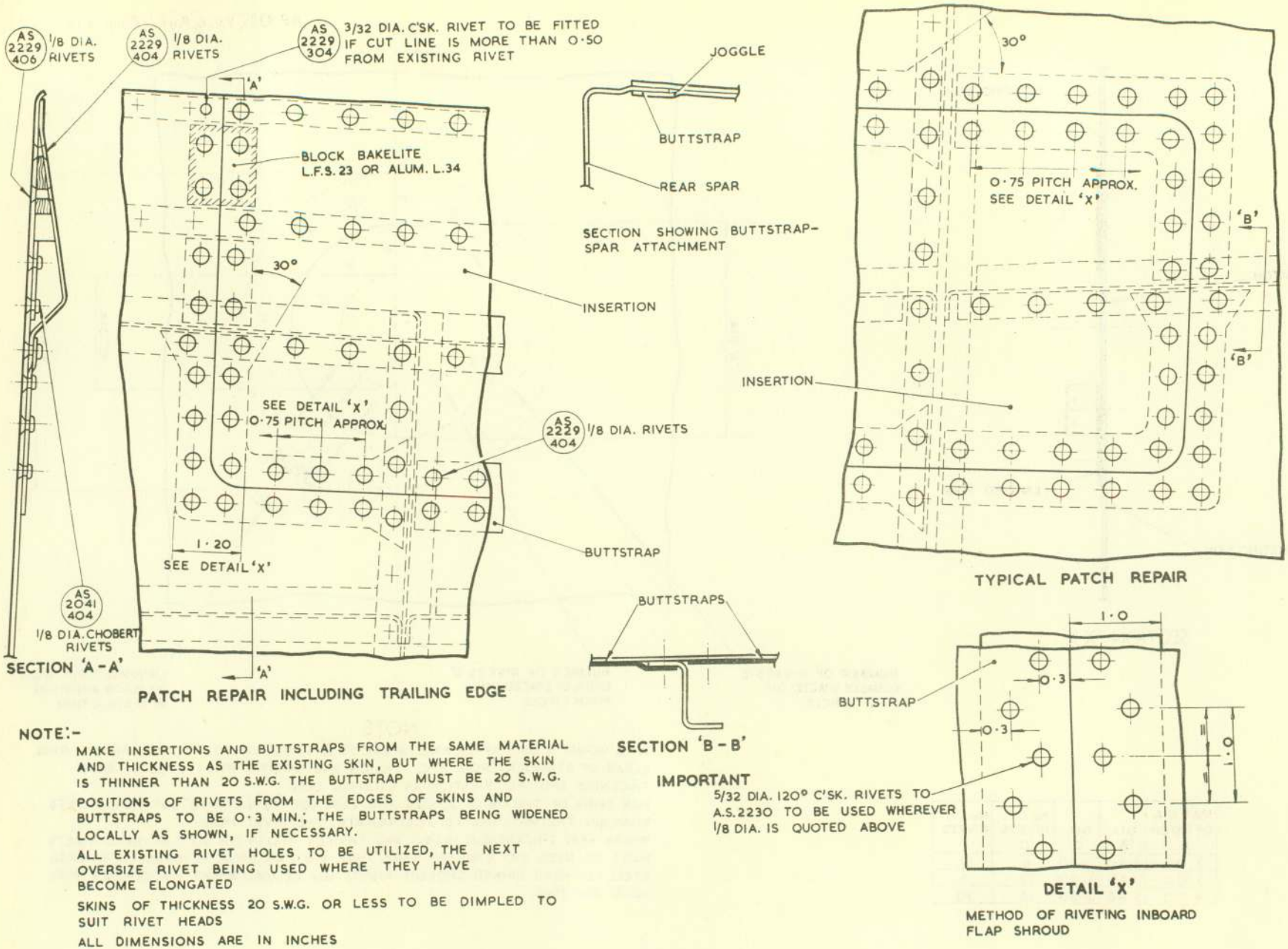



**NOTE:-**

MAKE INSERTIONS AND BUTTSTRAPS FROM THE SAME MATERIAL AND THICKNESS AS THE EXISTING SKIN, BUT WHERE THE SKIN IS THINNER THAN 20 S.W.G. THE BUTTSTRAP MUST BE 20 S.W.G.

POSITIONS OF RIVETS FROM THE EDGES OF SKINS AND BUTTSTRAPS TO BE 0·3 MIN.; THE BUTTSTRAPS BEING WIDENED LOCALLY AS SHOWN, IF NECESSARY.

ALL EXISTING RIVET HOLES TO BE UTILIZED, THE NEXT OVERSIZE RIVET BEING USED WHERE THEY HAVE BECOME ELONGATED

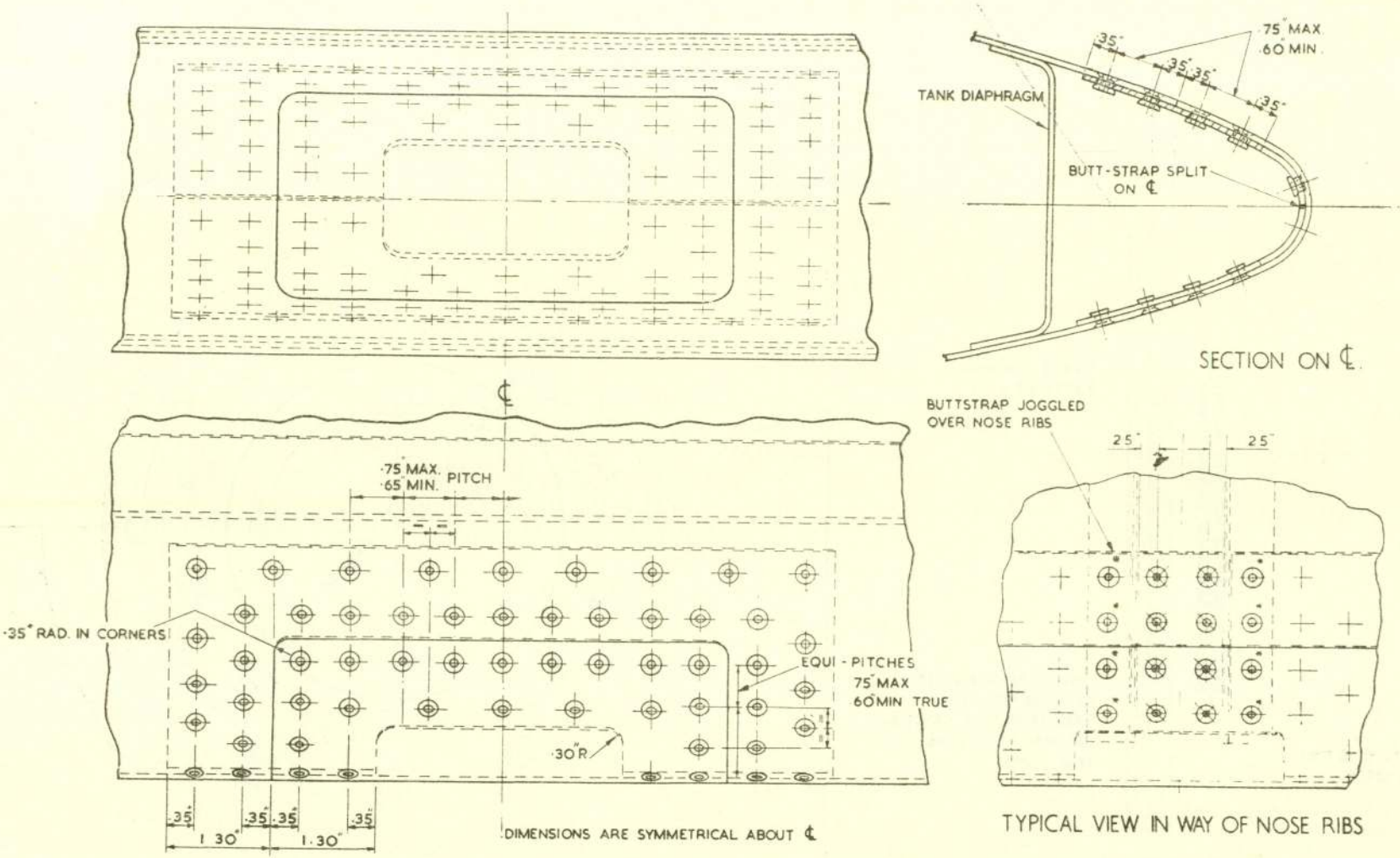
SKINS OF THICKNESS 20 S.W.G. OR LESS TO BE DIMPLED TO SUIT RIVET HEADS

ALL DIMENSIONS ARE IN INCHES

**IMPORTANT**

5/32 DIA. 120° C'SK. RIVETS TO A.S.2230 TO BE USED WHEREVER 1/8 DIA. IS QUOTED ABOVE

Fig.3/51. Skin repairs, flap and dive-brake shrouds




NOTE.

MAKE BUTTSTRAPS AND INSERTS FROM SAME MATERIAL AND THICKNESS AS THE EXISTING SKIN.

RIVETING:-
ALL RIVETS ARE TO BE STEEL PINNED CHOBERT TO AGS.2401.
WHERE SHOWN THUS ⊛ DIAMETER TO BE 5/32 IN.

WHERE SHOWN THUS ⊕ DIAMETER TO BE NEXT SIZE UP ON EXISTING RIVET DIAMETER
REMAINDER TO BE 5/32 IN. DIAMETER FOR 16 SWG SKIN AND 3/16 IN. DIAMETER FOR 14 SWG. SKIN.

**Fig. 3/52. Leading edge repair forward of tank diaphragm**

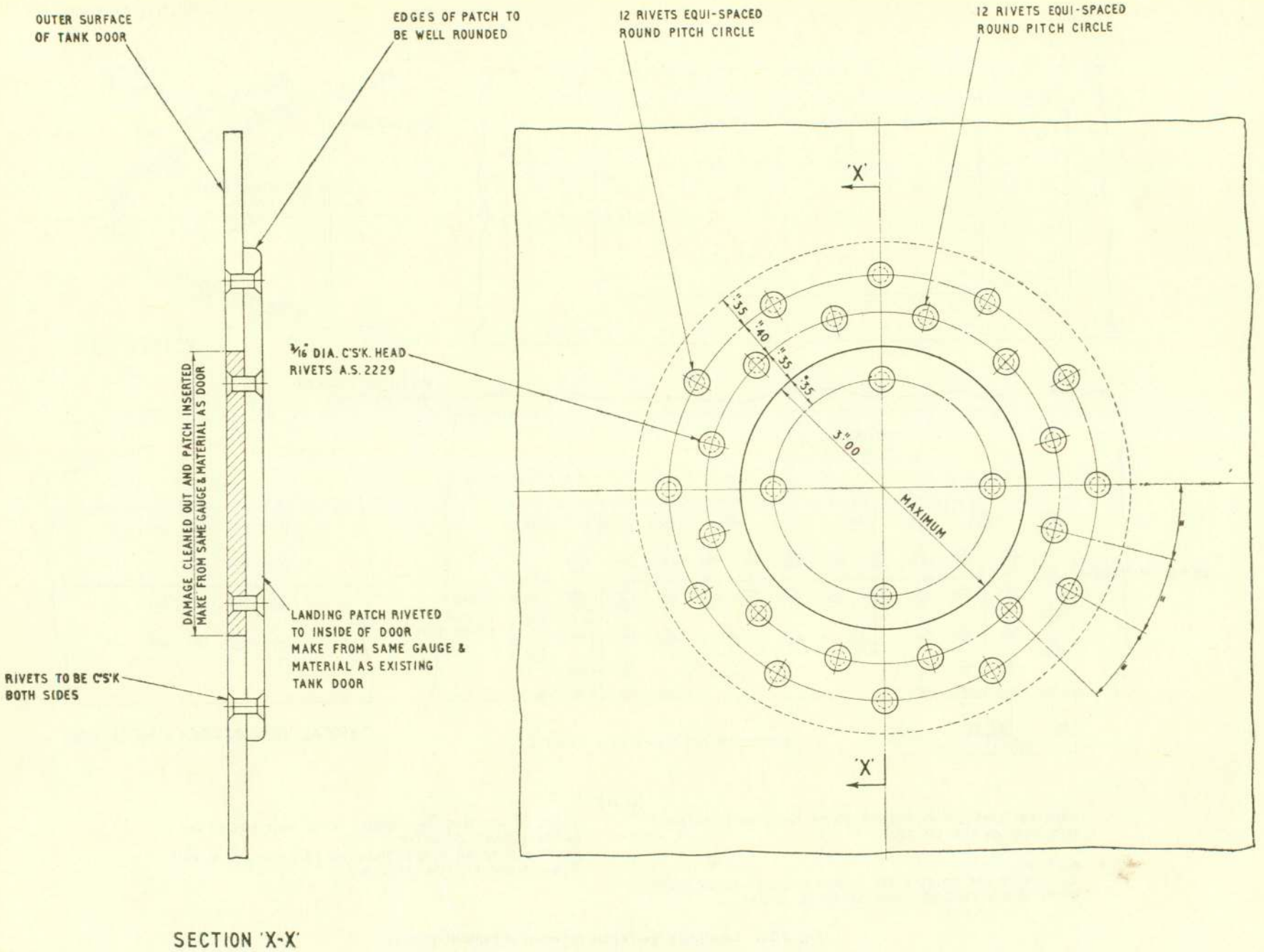
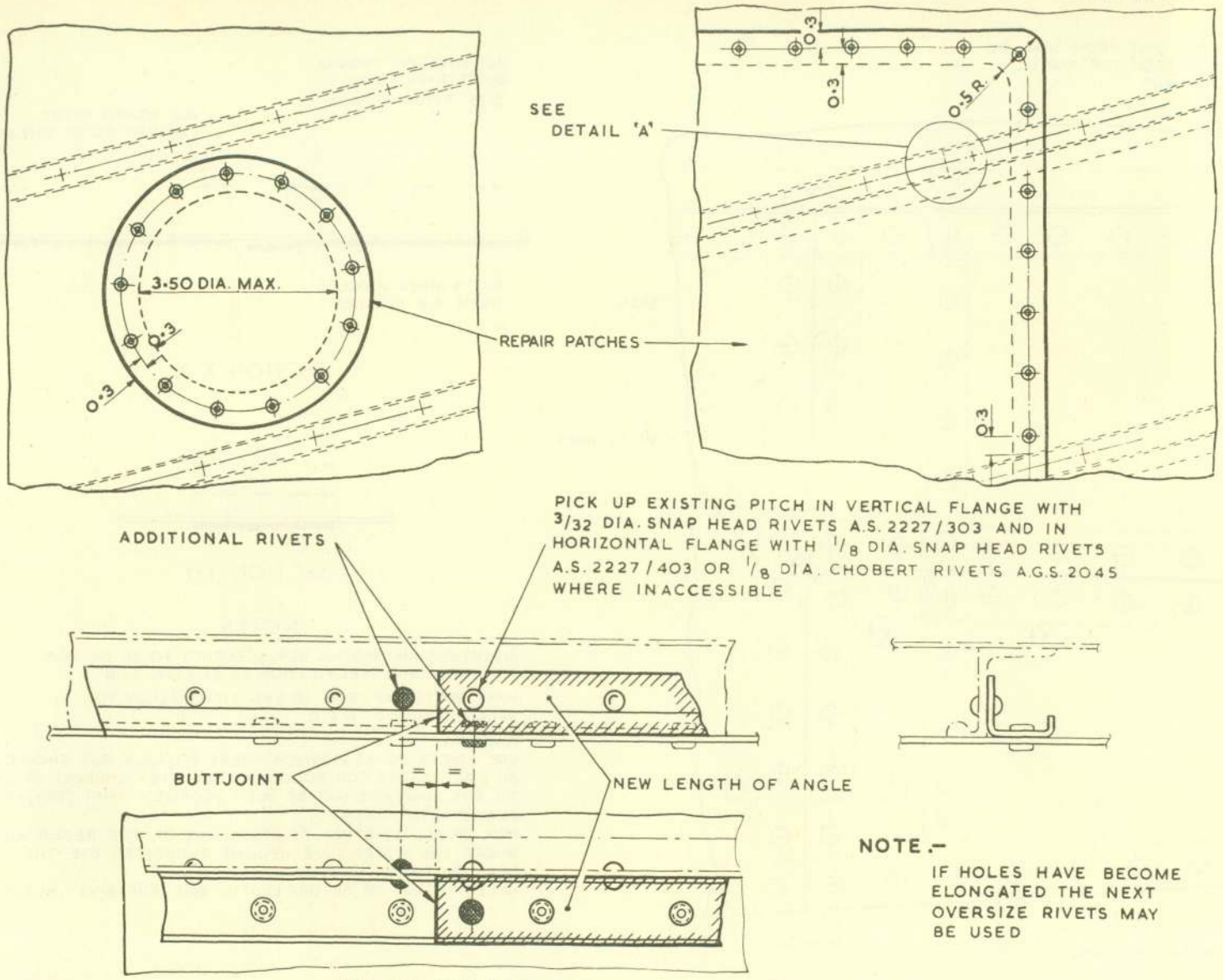



**Fig. 3/53. Repair to tank door**




**NOTE.–**

IF HOLES HAVE BECOME ELONGATED THE NEXT OVERSIZE RIVETS MAY BE USED

**DETAIL 'A'** ( REPAIR TO TANK SCREEN ATTACHMENT ANGLES )

**NOTES.–**

MAKE THE REPAIR PATCHES FROM THE SAME MATERIAL AND THICKNESS AS THE EXISTING TANK SCREENS.

USE 1/8 IN. DIA. DOME HEAD POP RIVETS, A.G.S. 2048/420 BS AT APPROXIMATELY 1·0 IN. PITCH.

IF WING STRINGER IS DAMAGED AS WELL AS TANK SCREEN ATTACHMENT ANGLE, THE LATTER NEED ONLY BE CUT AWAY, AS THE REPAIR TO THE STRINGER (SHOWN IN FIG 3/42) WILL PROVIDE A SEATING FOR THE TANK SCREEN, BY MEANS OF THE SECTION USED. ALL RIVET HEADS AND EDGES OF MATERIAL THAT COME IN CONTACT WITH THE TANK MUST BE ADEQUATELY COVERED WITH BLACK ADHESIVE WATERPROOF FABRIC TAPE. (SEE PARA. 6 – INTERNAL FINISH OF TANK BAYS).

ALL DIMENSIONS ARE IN INCHES

**Fig.3/54. Repairs to tank screens**



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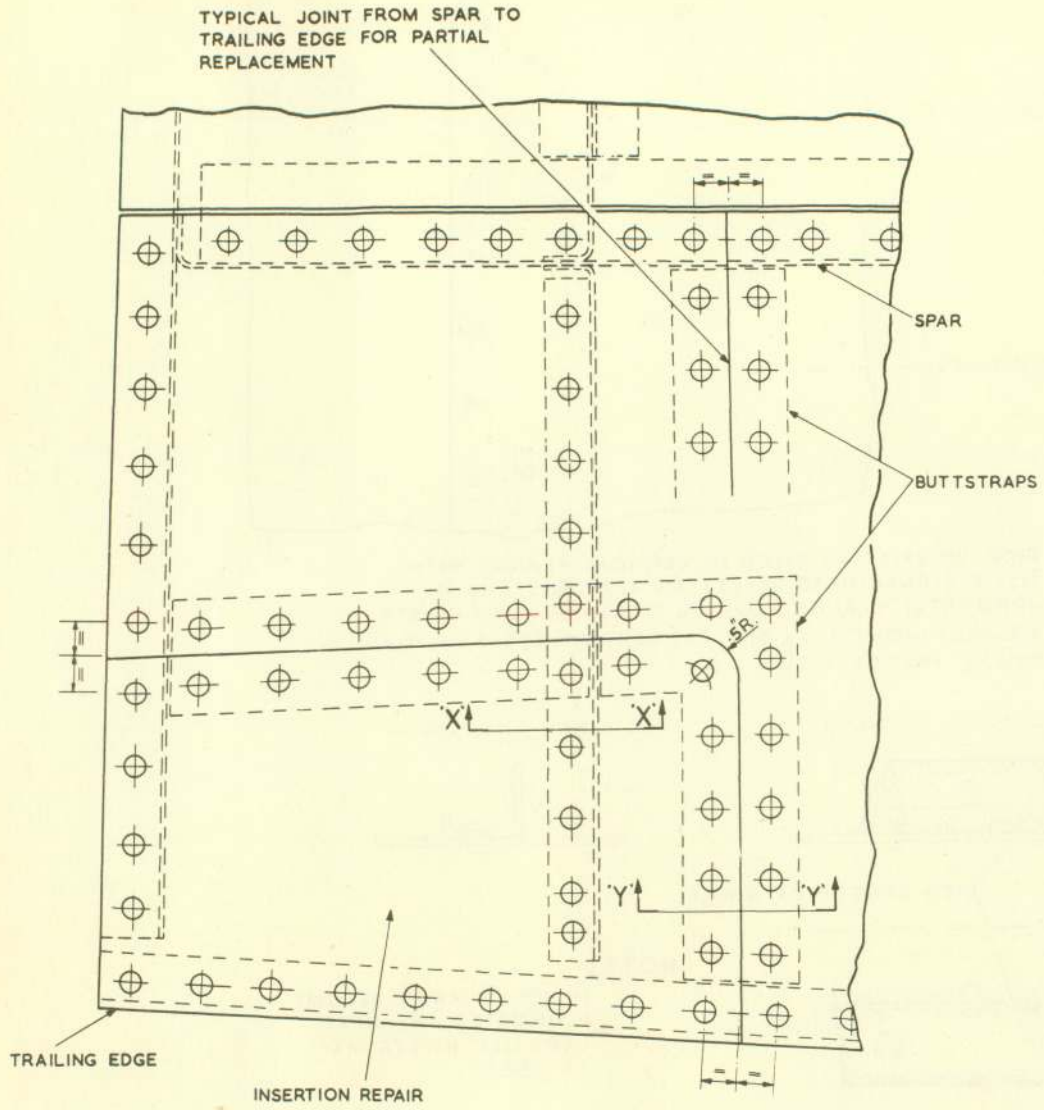
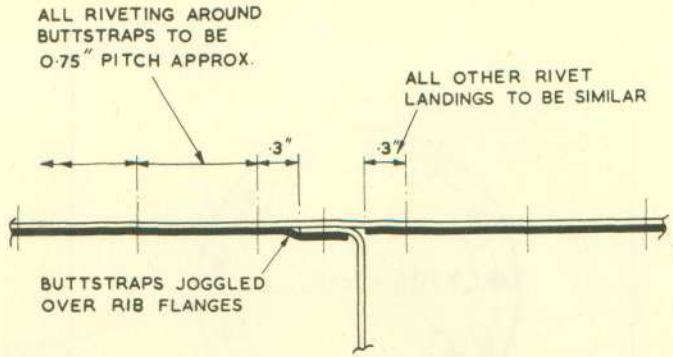
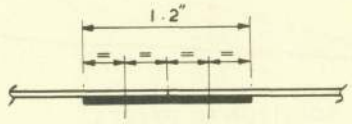



SECTION 'X-X'




SECTION 'Y-Y'

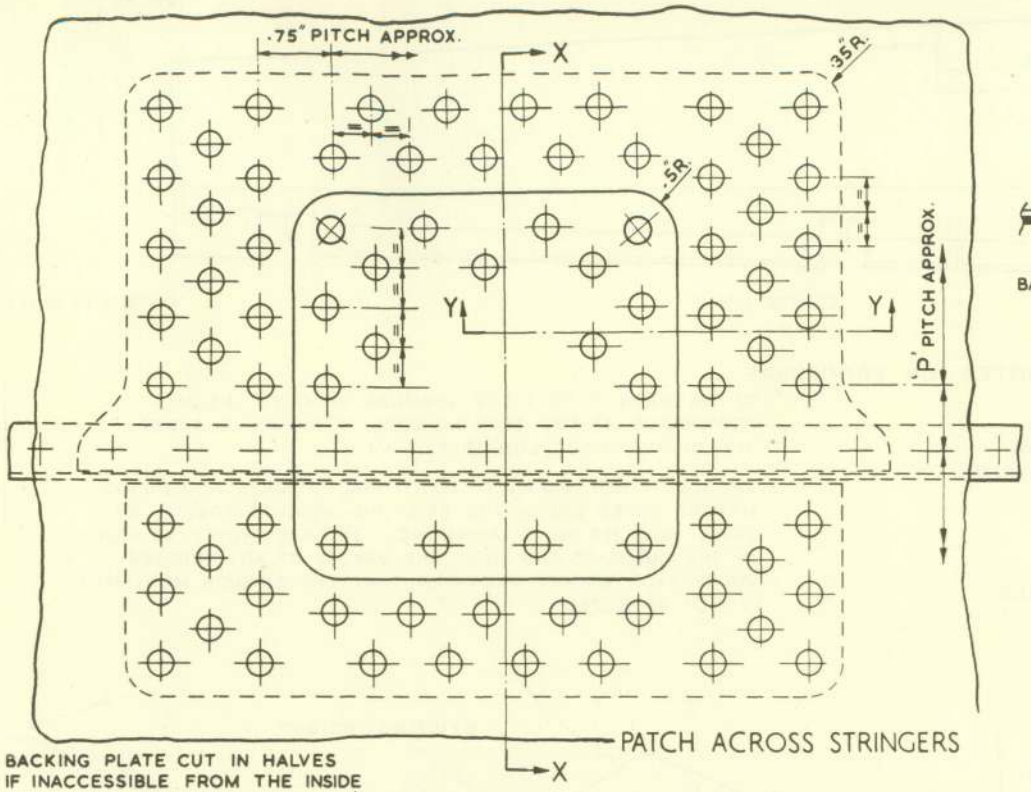
NOTES.

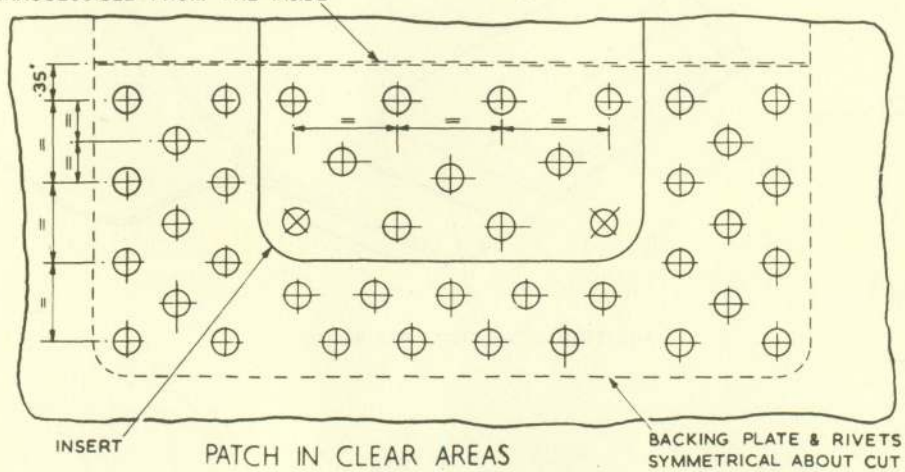
INSERTIONS AND PARTIAL REPLACEMENTS TO BE OF SAME THICKNESS AND SPECIFICATION AS EXISTING SKIN.

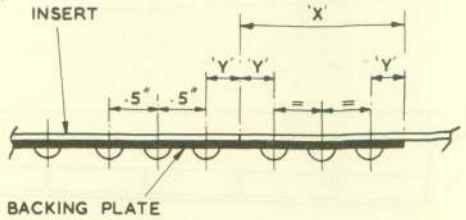
MAKE BUTTSTRAP FROM 20 SWG. LIGHT ALLOY TO SPECIFICATION D.T.D. 610.

RIVETING.
USE RIVETS TO AS.2229/404 WHERE POSSIBLE BUT SHOULD IT BE INACCESSIBLE FOR SOLID RIVETING THEN CHOBERT RIVETS TO AGS.2041/404 MAY BE USED PROVIDED THAT THEY ARE SEALED WITH FILLER.
PICK UP ALL EXISTING RIVETS IN WAY OF THE REPAIR, AND WHERE THE HOLES HAVE BECOME ELONGATED USE THE NEXT OVERSIZE.
HOLES IN SKIN TO BE DIMPLED TO SUIT THE RIVET HEADS.

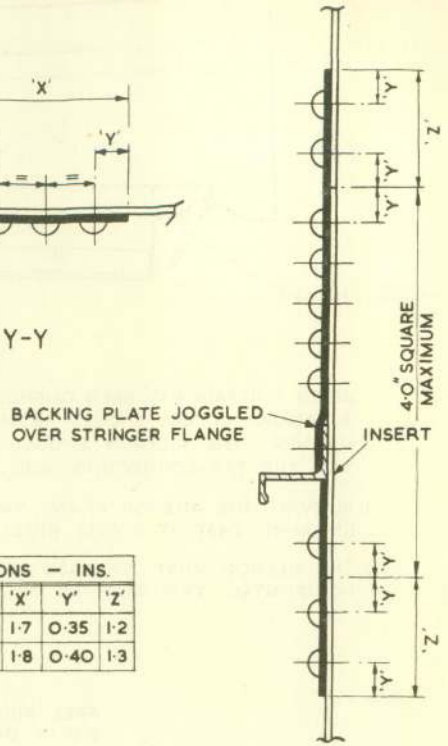
Fig.3/55. Skin insertion and partial replacement, aileron




SECTION Y-Y




SECTION X-X

| RIVETING DIMENSIONS – INS. | | | | |
|---|---|---|---|---|
| SKIN THICKNESS | 'P' | 'X' | 'Y' | 'Z' |
| 14 SWG & LESS | 0·7 | 1·7 | 0·35 | 1·2 |
| OVER 14 SWG. | 0·8 | 1·8 | 0·40 | 1·3 |

## NOTES

THESE REPAIRS CAN ONLY BE APPLIED TO SKIN SURFACES NOT REINFORCED BY DOUBLING.

IT IS IMPORTANT THAT THE TREBLE ROW OF RIVETING OUTSIDE THE INSERT SHOULD BE CHORDWISE.

MAKE THE INSERTS AND BACKING PLATES FROM LIGHT ALLOY SHEET OF SAME THICKNESS AND SPECIFICATION AS THE DAMAGED SKIN.

USE 90° COUNTERSUNK RIVETS TO A.S.2229; BUT WHERE IT IS INACCESSIBLE FOR SOLID RIVETING, 120° C'SK STEEL PINNED CHOBERT RIVETS OF THE SAME DIAMETER MAY BE USED.

RIVETS PICKING UP EXISTING HOLES IN STRINGERS SHOULD BE OF THE ORIGINAL DIAMETER; BUT WHERE THESE HOLES HAVE BECOME ELONGATED, OR THE FITTING OF CHOBERT RIVETS IS NECESSARY, THE NEXT OVERSIZE MUST BE USED.

**Fig.3/56. Skin insertion repair**



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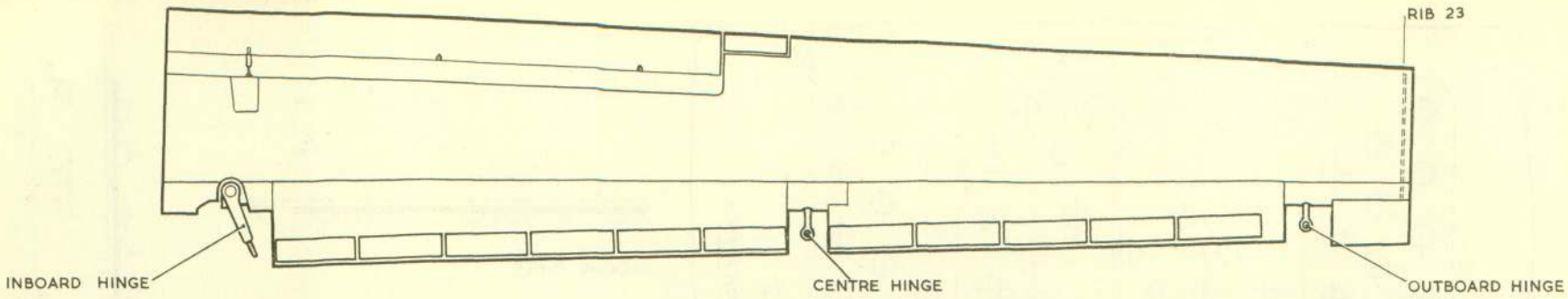
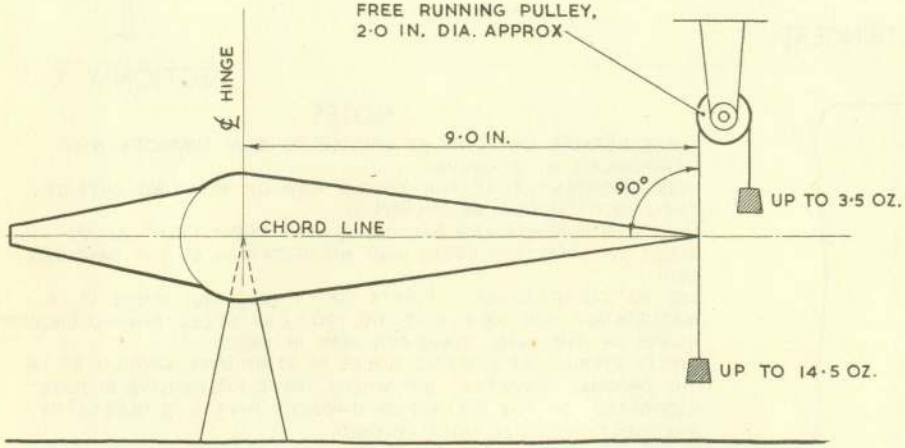



## NOTES ON PROCEDURE

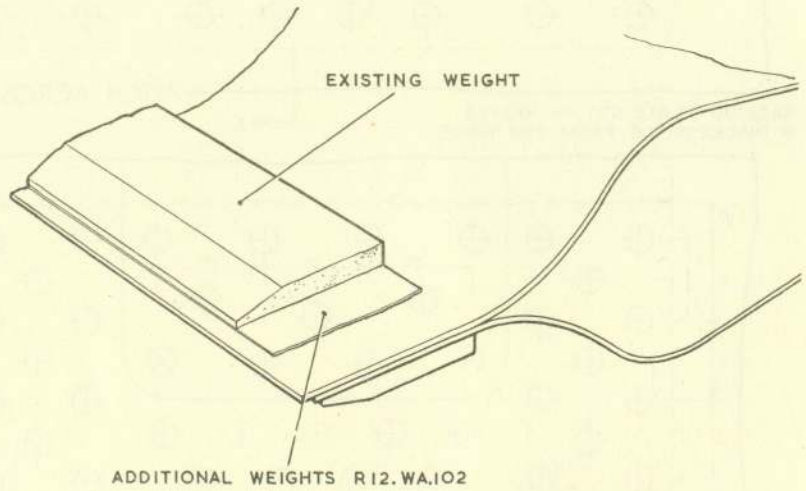
AFTER A REPAIR HAS BEEN CARRIED OUT TO THE AILERON, A BALANCE CHECK SHOULD BE MADE IN THE FOLLOWING MANNER. THE AILERON SHOULD BE COMPLETE WITH THE TAB, THE TAB CONNECTING ROD AND THE FINAL PAINT SCHEME

1. SUPPORT THE AILERON AT ANY TWO HINGE POINTS ONLY, ENSURING THAT IT PIVOTS FREELY
2. THE AILERON MUST BALANCE WITH ITS CHORD LINE HORIZONTAL. THIS MAY BE OBTAINED BY APPLYING LOADS OF BETWEEN O TO 3·5 OZ. UPWARDS OR O TO 14·5 OZ. DOWNWARDS AT THE TRAILING EDGE OF RIB 23, I.E. 9·0 IN. AFT OF THE HINGE LINE (DETAIL 'A')
3. SHOULD IT NOT BALANCE, ADDITIONAL WEIGHTS R.12 WA 102 MAY BE ADDED UNDER THE EXISTING WEIGHTS (DETAIL 'B') UNTIL EQUILIBRIUM IS MAINTAINED. WEIGHTS SHOULD BE ADDED AT THE OUTBOARD END FIRST AND MAY BE OF ANY NUMBER UNDER EACH WEIGHT PROVIDED THAT THE AILERON MOVEMENT IS NOT AFFECTED.



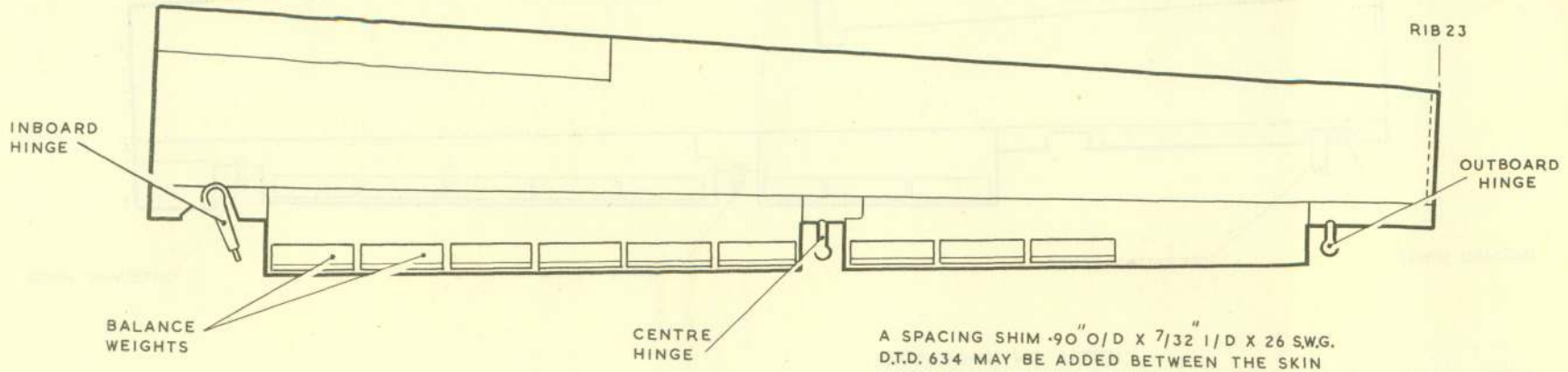

THE ABOVE IS AN ALTERNATIVE METHOD TO THAT GIVEN IN A.P. 2662

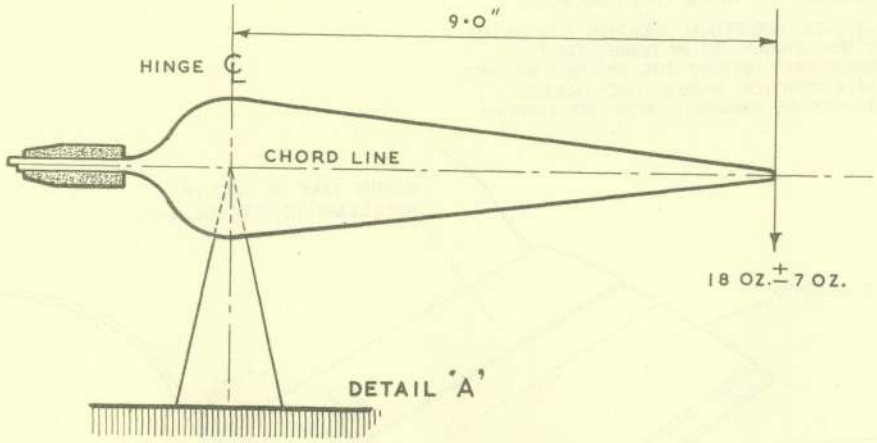
DETAIL 'A'

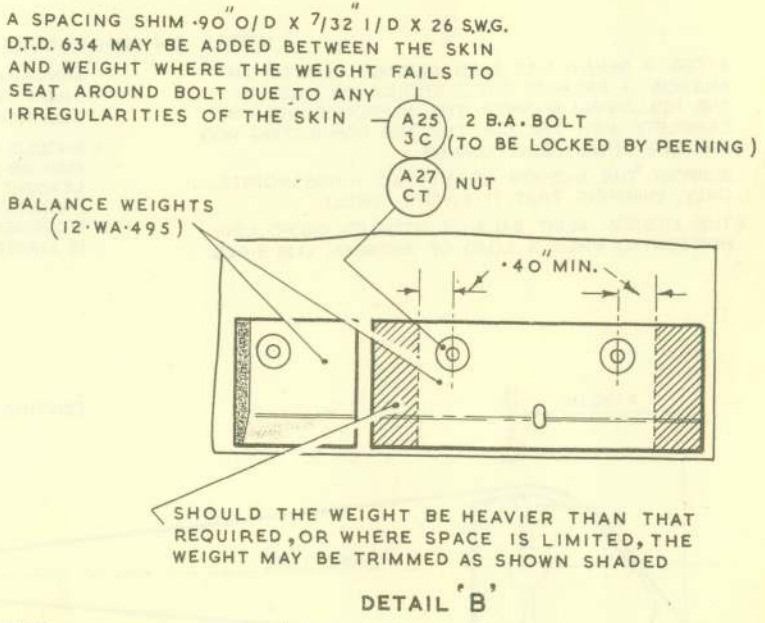



DETAIL 'B'

Fig. 3/57. Re-balancing of aileron, Mk. I




## NOTES ON PROCEDURE

AFTER A REPAIR HAS BEEN CARRIED OUT TO AN AILERON, A BALANCE CHECK SHOULD BE MADE IN THE FOLLOWING MANNER. THE AILERON SHOULD BE COMPLETE WITH THE TAB, THE TAB CONNECTING ROD AND THE FINAL PAINT SCHEME

1. SUPPORT THE AILERON AT ANY TWO HINGE POINTS **ONLY**, ENSURING THAT IT PIVOTS FREELY
2. THE AILERON MUST BALANCE WITH ITS CHORD LINE HORIZONTAL WHEN A LOAD OF 18 OZ. ± 7 OZ. IS APPLIED AT THE TRAILING EDGE OF RIB 23 i.e. 9·0 IN. AFT OF THE HINGE LINE (DETAIL 'A')
3. SHOULD IT NOT BALANCE, ADDITIONAL WEIGHTS 12·WA·495 MAY BE ADDED, EITHER SINGLY OR IN PAIRS, TO THE LEADING EDGE IMMEDIATELY OUTBOARD OF THE EXISTING BALANCE WEIGHTS (SEE DETAIL 'B') UNTIL EQUILIBRIUM IS MAINTAINED

Fig. 3/58. Re-balancing of aileron, Mk.2

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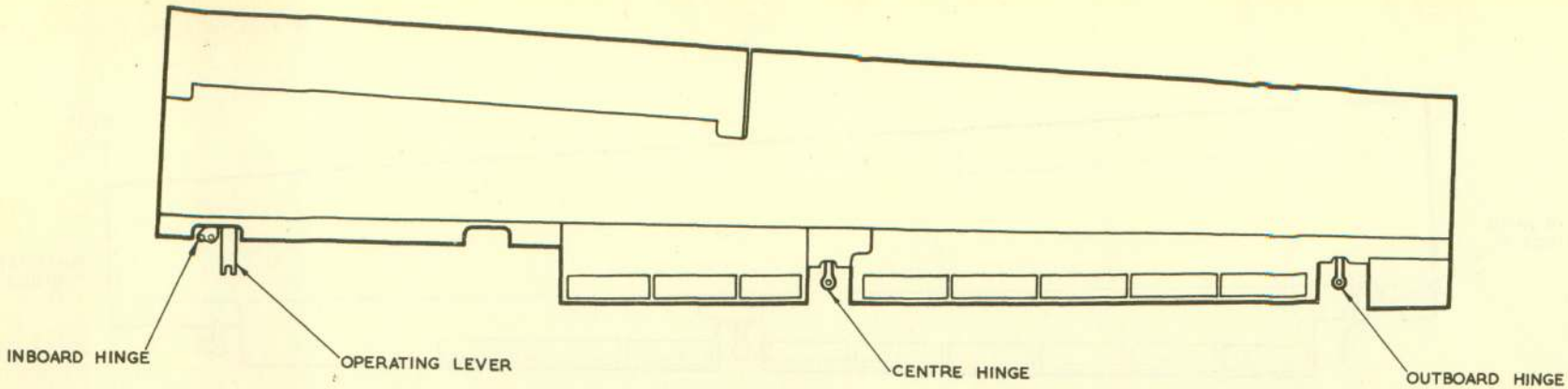
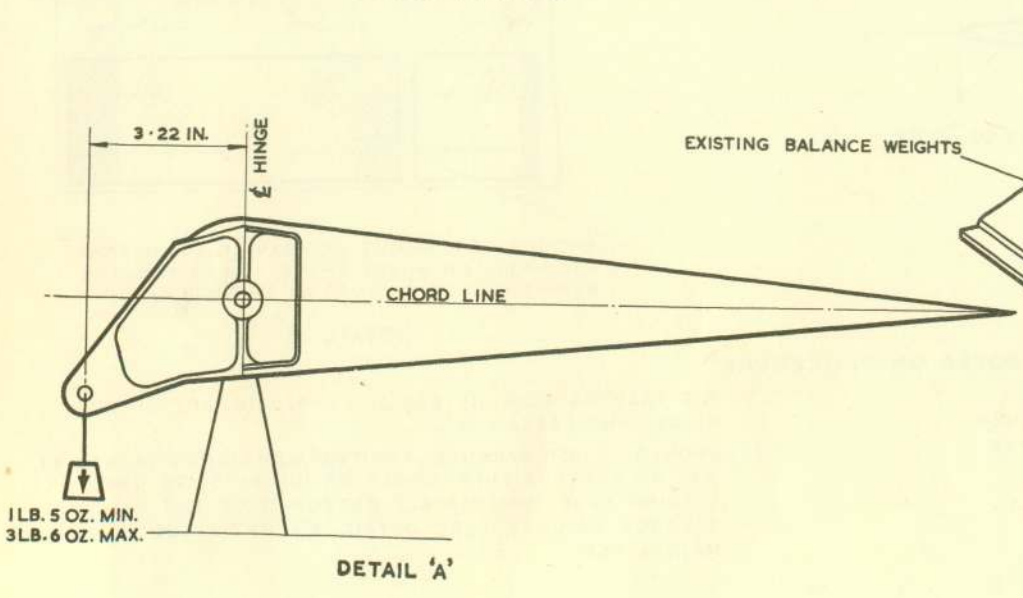


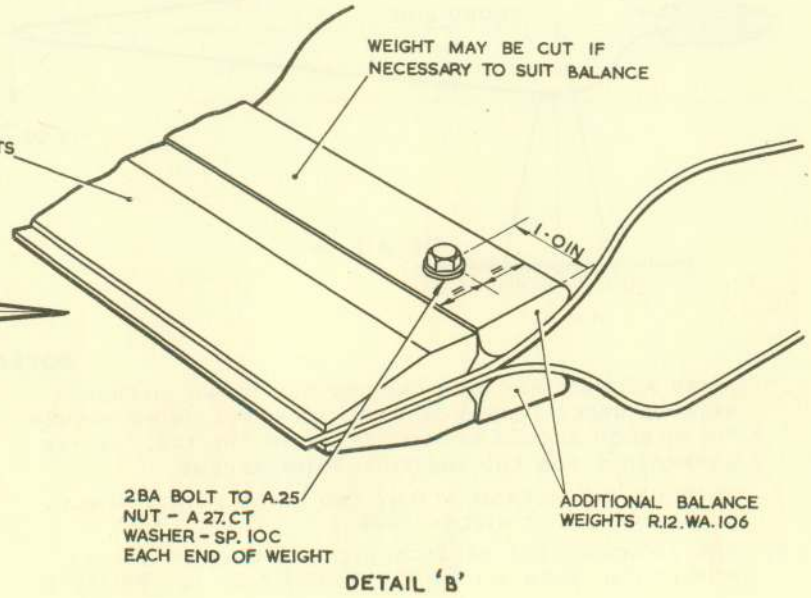

## NOTES ON PROCEDURE

AFTER A REPAIR HAS BEEN CARRIED OUT TO AN AILERON, A BALANCE CHECK SHOULD BE MADE IN THE FOLLOWING MANNER. THE AILERON SHOULD BE COMPLETE WITH THE TAB, THE TAB CONNECTING ROD AND THE FINAL PAINT SCHEME

1. SUPPORT THE AILERON AT ANY TWO HINGE POINTS ONLY, ENSURING THAT IT PIVOTS FREELY
2. THE AILERON MUST BALANCE WITH ITS CHORD LINE HORIZONTAL WHEN A LOAD OF BETWEEN 1 LB. 5 OZS. MINIMUM AND 3 LB. 6OZ. MAXIMUM IS APPLIED DOWNWARDS FROM THE BOLT HOLE OF THE OPERATING LEVER I.E. 3·22 INCHES FORWARD OF THE HINGE LINE (DETAIL 'A')
3. SHOULD IT NOT BALANCE, ADDITIONAL WEIGHTS R.12.WA.106 MAY BE ADDED, EITHER SINGLY OR IN PAIRS, TO THE LEADING EDGE IMMEDIATELY BEHIND THE EXISTING WEIGHTS (DETAIL 'B') AND IN A POSITION WHERE THE AILERON MOVEMENT WOULD NOT BE IMPAIRED, UNTIL EQUILIBRIUM IS MAINTAINED




DETAIL 'A'




DETAIL 'B'

Fig. 3/59. Re-balancing of aileron, Mk. 3 and 4

# APPENDIX F CHAPTER 3 MAIN PLANE

# FITTING INSTRUCTIONS FOR REPLACEMENT COMPONENTS

# APPENDIX F Chapter 3 MAIN PLANE

## FITTING INSTRUCTIONS FOR REPLACEMENT COMPONENTS

### LIST OF CONTENTS



### ILLUSTRATION



**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 main plane 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.

**Fig. numbers**

**2.** Fig. numbers for illustrations in this Appendix F have the prefix "3/" to identify the Chapter. To distinguish between Appendix F illustrations and those in the basic chapter, the sequence numbers in the Appendix will be preceded by the letter "F", e.g. 3/F.1.

**Main plane**

**3.** Instructions for *dismantling and assembly* are given in Vol. 1, Sect. 3, Chap. 2 of the relevant A.P. However, when a new or reconditioned replacement main plane is fitted to an aircraft, trimming of the main-plane skins and possibly the fuselage side may be necessary to produce the *minimum* permissible gap of 0·030 in. between these items. The *maximum* permissible trimming allowances are indicated on *fig.* 3/F.1 by heavy black on the edges of the root-end skin and by heavy black and hatching for the fuselage. Before commencing trimming, ensure that the fuselage has not been previously trimmed and that any trimming of the root-end skin will not reduce the landing, between the trimmed edge and corresponding datum, below the minimum value shown on *fig.* 3/F.1—e.g., 0·2 *in. min.* from the trimmed-edge to the centre-line of the anchor nuts on *Section B-B*.

NOTE

TRIMMING MAY BE CARRIED OUT WITHIN THE MAXIMUM DIMENSIONS SHOWN ON THIS ILLUSTRATION SHOULD IT BE FOUND THAT THE GAP BETWEEN THE FUSELAGE AND WING SKINS IS LESS THAN 0·03 IN

THE WING SHOULD BE TRIMMED FIRST, AND THEN, IF A FOUL STILL EXISTS, THE FUSELAGE

BEFORE TRIMMING A FUSELAGE, INSPECTION SHOULD BE MADE TO ENSURE THAT THIS WORK HAS NOT ALREADY BEEN CARRIED OUT.

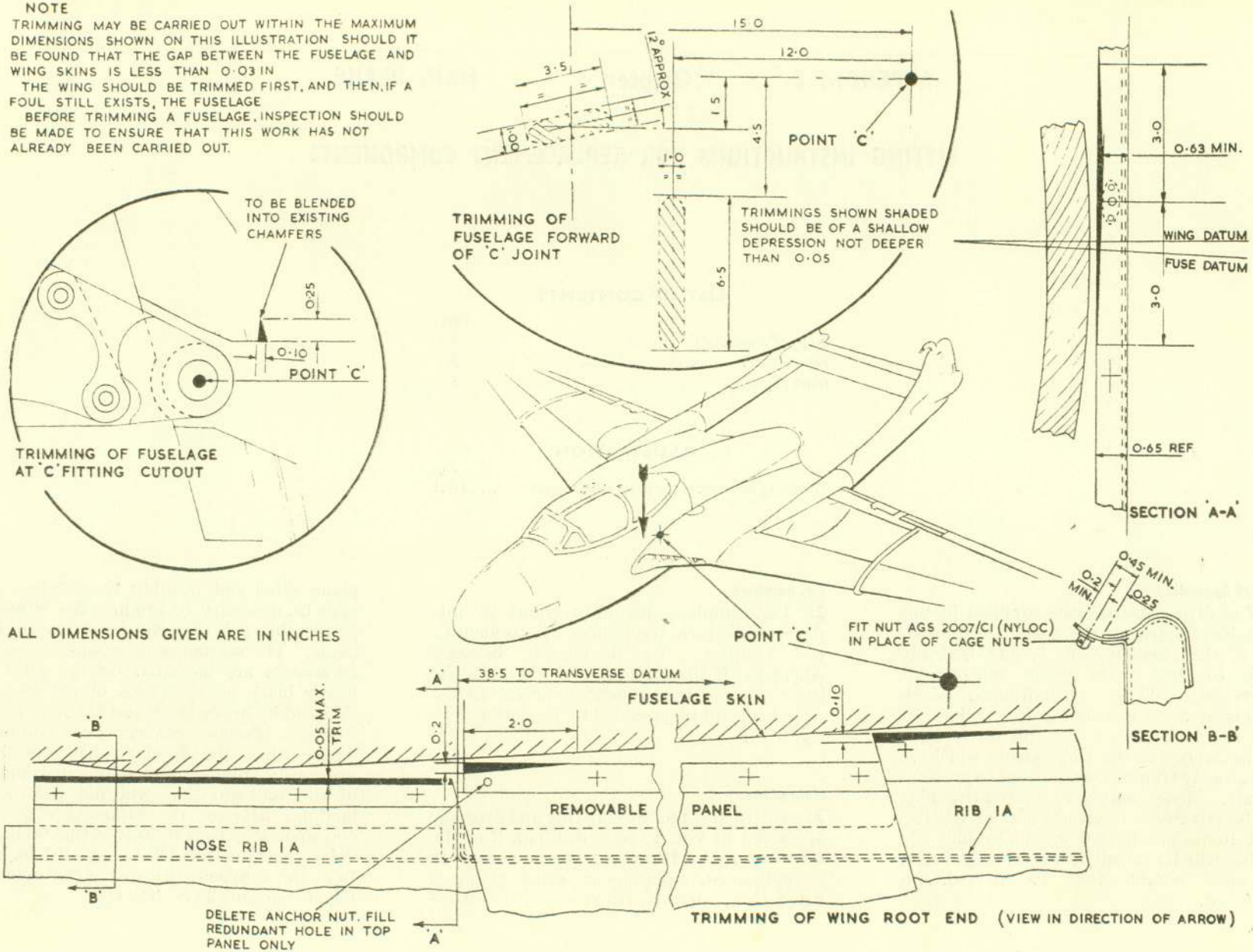



**Fig. 3/F.1. Trimming allowances for wing replacement**



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