

Chapter 25

HELMETS FLYING PROTECTIVE (ONE PIECE) MK.2 AND MK.2A

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Introduction

1. The Helmets Flying Protective (one piece) Mk.2 and Mk.2A take the place of the Helmet Flying Type G and the Helmet Protective Mk.1A and provide the same facilities as these separate items in a single headpiece. In addition they have retractable anti-glare visors and blast screens which shut automatically in the event of ejection in an emergency.

2. There are three sizes of helmets available,

corresponding, approximately, to standard hat sizes. They are:—

	<i>Size</i>	<i>Ref. No.</i>
(1)	Small 6½ in. to 6¾ in.	Mk.2 22C/2323 Mk.2A 22C/2467
(2)	Medium 6¾ in. to 7¼ in.	Mk.2 22C/2324 Mk.2A 22C/2468
(3)	Large 7½ in. to 7¾ in.	Mk.2 22C/2325 Mk.2A 22C/2469

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Adjustments are provided to suit individuals on initial fitting, which must be conducted under the supervision of the D.P.M.O.(F) or his authorised

representative. The oxygen mask must also be fitted under the supervision of D.P.M.O.(F) or his authorised representative.

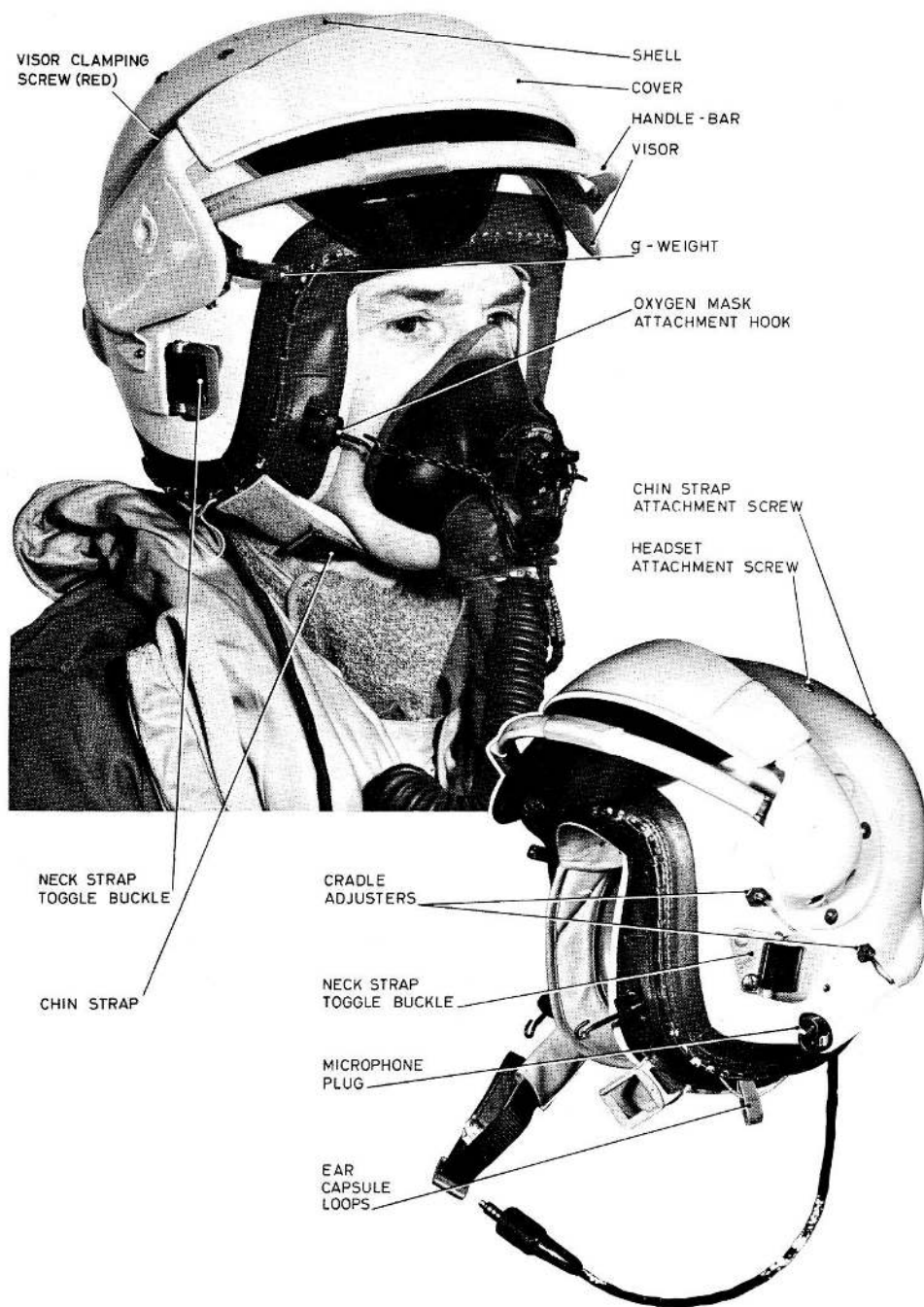


Fig. 1. Helmet Flying Protective (one piece) Mk. 2

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3. The Mk. 2 and Mk. 2A helmets are basically similar; the Mk. 2A, however, incorporates some minor modifications which do not materially affect the normal use and functioning of the helmet. The Mk. 2A is provided with a friction clutch adjustment on the visor mechanism and has an operating handle-bar of modified shape. Eventually all the Mk. 2 helmets will be modified to Mk. 2A standard but in the interim there are a number of helmets incorporating the friction clutch feature of the Mk. 2A while still retaining the operating handle-bar of the Mk. 2 version.

Note . . .

The similarities of the two helmets are exemplified by the use of both types in the series of illustrations given in this chapter.

DESCRIPTION

Shell (fig. 1)

4. The helmet is constructed with a rigid outer shell of glass fibre resin with locally formed lobes to accommodate the telephone receiver and microphone connector plug respectively. Shallow bosses, moulded on each side of the helmet in the region of the ears, provide flat platforms for mounting the visor pivots and mechanism.

Cradle (fig. 2)

5. Inside, immediately under the crown, the helmet is padded with a layer of cork which is covered by a sateen head lining. Below this, a harness of nylon webbing forms a suspension

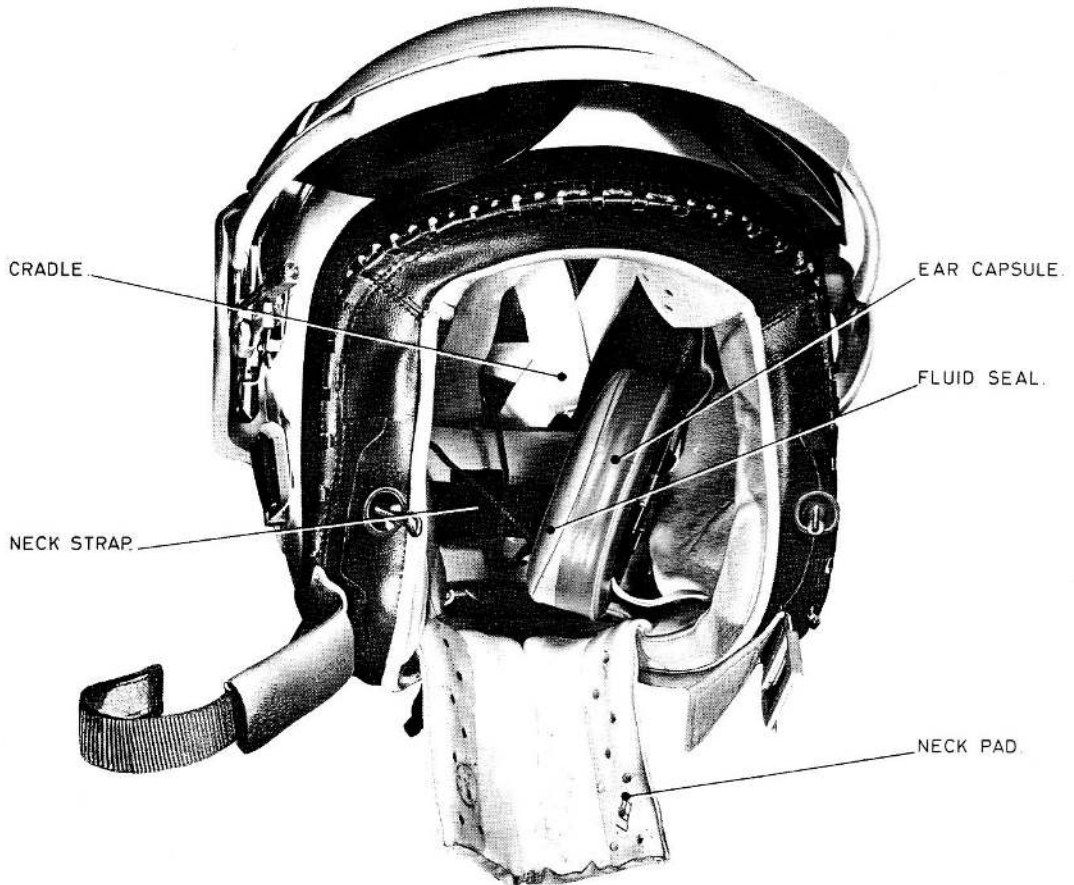


Fig. 2. Helmet Flying Protective (one piece) Mk. 2 Interior

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cradle to keep the shell clear of the head and minimise any shock transmitted. The initial tension of this cradle is adjusted to suit the wearer by the adjustment of two nylon cords, one controlling the front and the other the rear cross webbings. When satisfactorily adjusted the tensioning cords are locked in small exterior screw clamps on the left hand side of the helmet.

Neck strap

6. Another adjustable strap is provided inside the helmet and passes behind a pad at the back of the head to embrace the nape of the neck. This strap provides for longitudinal adjustment to suit the wearer. It is tensioned by external toggle buckles on each side of the helmet. When the toggle buckles are turned towards the rear the neck strap is relaxed, enabling the helmet to be drawn comfortably over the head. After donning the helmet the toggle buckles are turned forward, tightening the strap around the back of the neck and pulling the helmet back so that the telephone ear pads are brought in alignment with the ears.

Lining

7. The lining of the helmet is removable and comprises sponge rubber padding covered with soft leather, shaped to form a seal around the face aperture. Leather-covered flaps are provided at the forehead and nape of the neck and behind the ear capsule recesses. The lining is fitted with a leather attachment strip around the edge. This strip has a castellated edge formed by a series of loops or tunnels which mate with corresponding castellations formed in a leather strip cemented to the rim of the shell. The lace passes alternately through loops of the helmet and the lining and is tied at the back.

Chin strap

8. The chin strap is in two sections attached by screws to the rigid part of the helmet and passing through slots in the lining. It has a special quick-locking buckle and is adjustable in length. The loose end of the chin strap, after locking, is stowed by adhesion to a strip of 'Velcro' self-locking material on a leather tunnel attached to the lining.

Oxygen mask connection

9. The oxygen mask attachment hooks are designed to suit any oxygen mask with a chain type harness such as the Types P2A and Q2A and variants. The hooks pass through slots in the material of the lining and are adjustable in a

horizontal (fore and aft) direction on threaded shanks running in knurled captive nuts. Vertical adjustment is by means of a slotted anchorage plate attached to the inside of the shell behind the padding. A clamping screw, accessible from the outside, engages the slot in the plate and holds it in the selected position.

10. After initial fitting, the oxygen mask is left permanently attached to the hook on the left-hand side of the helmet. This hook is provided with a small plastic washer which closes the mouth of the hook, so that the chain cannot slip out after it has been connected.

Mic-tel assembly

11. The ear capsules are connected by acoustic tubes to a single miniature telephone Type 13775 installed in the lobe at the rear right-hand side of the helmet and attached by stitching to the shell. The ear capsules are surrounded by fluid-filled seals which are kept in close contact with the head by means of a wire spring suspension attached to the shell by screws. The capsules can slide on the wire frames to provide for vertical adjustment.

12. The capsules are located at their lower ends by looped tapes engaged by a second nylon lace threaded through alternate tunnels of the castellated strip to which the lining is also laced. These loops also serve to pull open the wire spring headset when donning the helmet.

13. The microphone connector plug is housed in a shaped aperture on the left-hand side of the helmet and is connected by internal cable to the telephone assembly. There are alternative types of cable connector which are interchangeable according to whether the standard R.T. system or the oxy-mic-tel system is to be used. The connector for the standard R.T. system has a 'pigtail' terminating in a Plug Jack (*Ref. No. 10H/18575*) which hangs from the back of the helmet. With the connector for the oxy-mic-tel system the pigtail is absent, all intercom circuits being completed through the microphone plug on the helmet.

14. With the oxy-mic-tel system, after the oxygen mask has been fitted to the helmet, the oxygen mask connector socket and the microphone plug are lashed together to prevent possible accidental disconnection. There are alternative ways of doing this (para. 33).

15. An additional sponge rubber pad is provided

behind the lining neck pad to cover the telephone assembly. It is held in place by threading the ends of the cord holding the intercom pigtail through the holes provided in the pad and tying them. Another pad of the same material is cemented behind the top edge of the face aperture to keep the helmet off the forehead. This pad can be removed or modified to suit the wearer on initial fitting.

Visor and mechanism (fig. 3)

16. The visor is an acrylic screen available at the discretion of the user, in either a light or a dark tint. It is designed for blast protection as well as a glare shield. It is raised or lowered by means of a handle-bar and in the raised (stowed) position is protected by a cover (fig. 1) made of light plastic material designed to blow off

and reduce drag when subjected to sudden frontal blast, to prevent undue strain on the neck.

17. The visor screen is connected to pivoting arms on each side of the helmet and is adjustable in a forward and backward direction, by loosening the attachment screws, to ensure a correct fit over the face mask exo-skeleton.

18. Operation of the handle-bar enables the visor to be lowered completely or held in an intermediate position. The handle-bar is spring loaded back to a central position and its maximum extent of travel, either upward or downward, is limited to a small arc so that it never comes within the range of vision below the top edge of the face aperture.

19. The visor operating mechanism is on the

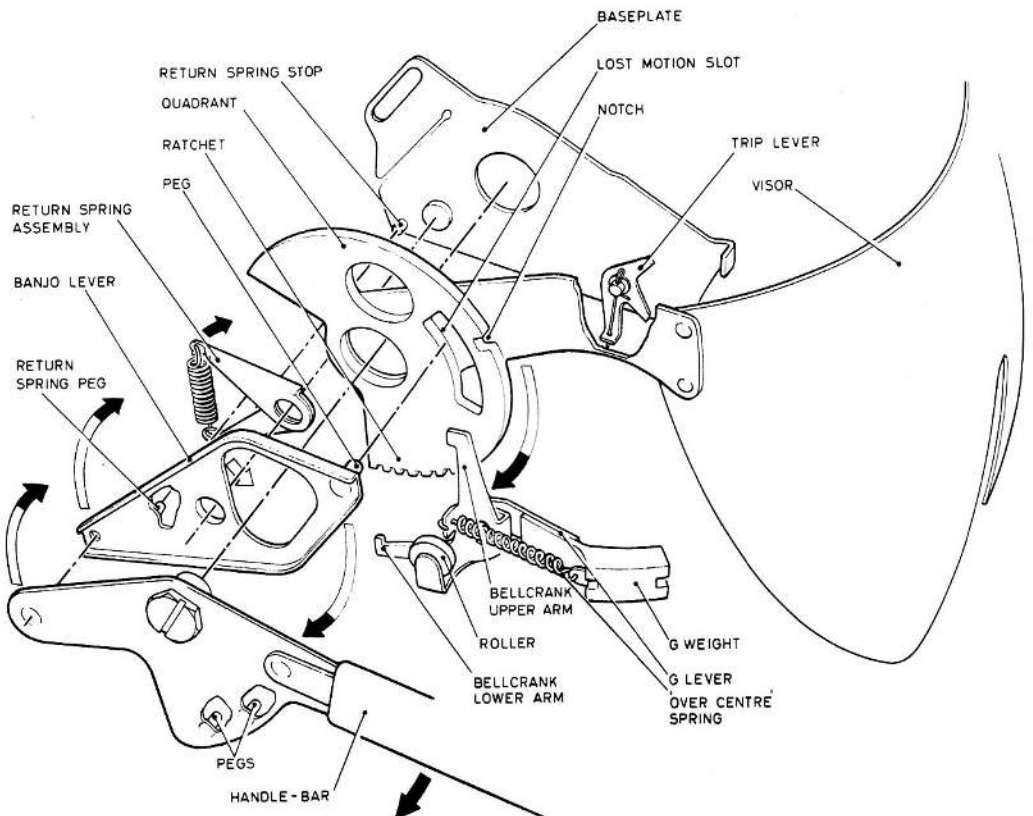


Fig. 3. Visor operating and g-mechanism

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right-hand side of the helmet and operates on a simple leverage system to ensure that a relatively small movement of the bar produces a much larger movement of the visor. Both the visor and the handle-bar pivot are on a common axis but move independently of each other although linked by the leverage system. An intermediate ('banjo') lever rocks on another pivot displaced a small distance from the visor/bar axis, and its lower, shorter, arm is linked to an extension of the handle-bar. The upper, longer, arm of the banjo has a projecting peg which engages a slot in the nylon quadrant on the visor. This arrangement constitutes a lever system giving a multiplication of radial movement of about three to one, so that a small movement of the bar in either direction results in the visor moving to the completely down or completely raised position.

20. The return of the handle-bar to its original position, on release, is ensured by a pair of levers which share the pivot of the banjo lever and are spaced apart by a fixed stop pin on the baseplate of the mechanism. The ends of the levers are joined by a tension spring to form a triangular assembly between which another peg, on the banjo lever, is interposed. When the banjo is rocked by the handle-bar this peg presses against one lever or the other, depending on the direction of movement, deflects the spring and causes the handle-bar to spring back on release. The purpose of the slot in the quadrant is to leave sufficient clearance for the banjo peg to permit the return movement of the handle-bar lever system in either direction, the end of the slot serving as a stop to arrest the handle-bar in its mid-position.

21. The visor will lock in any intermediate position between fully up and fully down by 'inching' the handle-bar a fraction of its full travel. This is ensured by ratchet teeth, cut in the rim of the quadrant, engaged by a pawl formed on the lower arm of a bell-crank on the g-release mechanism. The pawl is disengaged from the ratchet teeth by contact of a peg on the handle-bar with a roller on the spring bell-crank. There are two of these pegs: the upper peg presses against the roller to disengage the pawl while the handle-bar is moving downwards; the lower presses against the roller to move the pawl out of engagement with the ratchet when the handle-bar is moving upwards.

22. The locking mechanism is released automatically when the g-sensitive device comes into

operation. This unlatches the ratchet and pawl and allows the visor to fall into the down position, under the influence of the g-forces acting on it, and hold it there to form a blast shield. Once the g-mechanism has operated, the visor cannot be raised again by the handle-bar but has to be unlocked deliberately by lifting the g-weight into the re-set position. The g-mechanism is set to trip when subjected to between 10g and 12g and is thus insensitive to g-forces experienced in normal flight.

23. The g-latch is a weighted trip-lever, on the same pivot as the bell-crank and linked with it by a tension spring in such a manner that its line of action normally passes above the axis of the bell-crank, biasing the lower, locking pawl, arm towards the ratchet teeth on the quadrant. The balance of the lever is precisely adjusted so that the weight swings downwards when the specified g-force is exceeded and the line of action of the spring changes to below the bell-crank pivot, biasing it in the opposite direction. The second, upper, arm of the bell-crank now engages a notch in the rim of the quadrant and holds the visor in the down position.

24. To raise the visor again the g-lever is lifted back to its original position and the handle-bar operated. A small spring-loaded lever is provided to prevent the bell-crank hook jamming in the quadrant notch and assist it to resume the normal position.

25. A friction brake device is incorporated in the visor pivot on the left-hand side of the helmet. The purpose of this is to ensure that the visor does not fall during the momentary disengagement of the ratchet and pawl when operating the handle-bar but to ensure that it does fall when subjected to between $3\frac{1}{2}$ to 6 g in the emergency case. Adjustment is controlled by a friction washer, the pressure of which can be varied by a clamp nut on the visor pivot. On the Mk. 2A versions of the helmet this nut is accessible from outside the cover for adjustment with a special tool. All the g-adjustments on the helmet, however, are critical and are pre-set during manufacture to satisfy centrifuge tests.

26. The handle-bar is designed to project slightly on each side so that should the ejection seat be used the pulling down of the face screen firing handle knocks the handle-bar into the down position to close the visor. The design, in the case of the Mk. 2 helmets, includes a handle-bar with two locally formed wedge-shaped 'nodes';

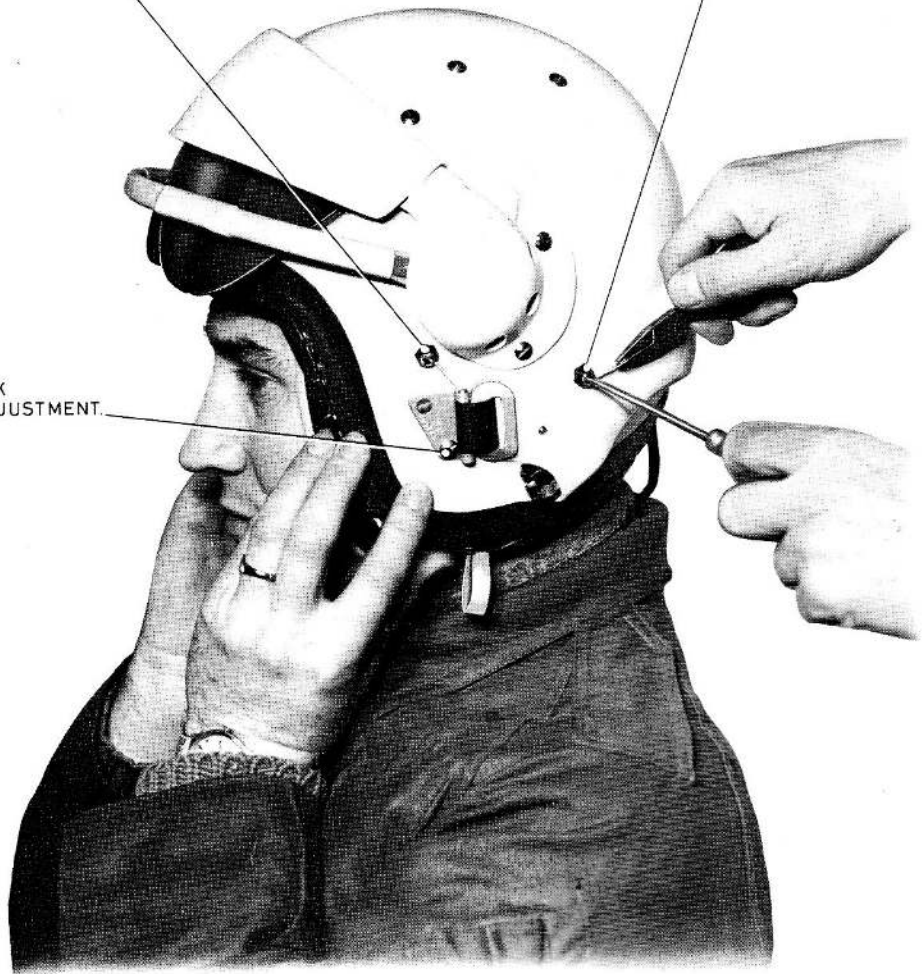
REAR CROSS
WEBBING ADJUSTMENT.FRONT CROSS
WEBBING ADJUSTMENT.OXYGEN MASK
VERTICAL ADJUSTMENT.

Fig. 4. Fitting the helmet to the wearer

in the case of the Mk. 2A version the nodes are deleted and the handle-bar is bowed outwards to serve the same purpose. There are a number of Mk. 2A helmets, however, which still retain the node type handle-bar.

Fitting the helmet

27. The helmet should be fitted to the wearer initially by D.P.M.O.(F) or his authorised representative. The basic size of helmet should be chosen according to head measurement; adjustments are then made to suit the individual

wearer. It is important that the fit is correct and comfortable and a careful selection should be made of the initial basic size.

28. There is a degree of overlap between the medium and the two other sizes. A person whose head size is on the top measurement of a basic size – say $6\frac{7}{8}$ in. – should also try the next size up (medium in this case). Similarly, a head size on the bottom limit of the larger size, – e.g. $7\frac{1}{4}$ in. – may be better off with the next size down (again medium). Generally speaking a

medium or short oval head shape is best suited with a smaller helmet and a long oval head with the larger.

29. To cover head sizes where the smaller helmet is tight longitudinally but the next size is too large the forehead strip of sponge rubber padding can be removed. This should not be done, however, until the helmet has been properly adjusted and has been worn for a while.

Adjusting the cradle

30. To adjust the cradle proceed as follows:-

- (1) Place the helmet on the head. The wearer should hold it in the desired position (*fig. 4*) while adjustments are made to the cradle harness. The top rim of the face aperture should be clear of the eyebrows and in such a position that it is just within the upward range of vision.
- (2) With the wearer maintaining this position slacken off the cable clamping screws on the left-hand side of the helmet.
- (3) Adjust the front cross webbing by pulling on the rear adjustment cord with pliers, tightening the cradle to maintain the vertical position being held by the wearer. Tighten the clamping screw to grip the cord.
- (4) Lift the helmet slightly and straighten it on the head. Fasten and moderately tighten the chin strap (see para. 38 (7)).
- (5) Slacken the front clamping screw, pulling on the cord until the cradle is felt to be bearing comfortably on the top of the head.
- (6) If not satisfactory on first adjustment, release the chin strap and re-adjust until the position is correct and the weight of the helmet is evenly supported by the cradle cross webbing. Tighten the screws.
- (7) If necessary raise or lower the ear capsules on their wire guides to align vertically with the ears.

Adjusting the neck strap

31. Adjustment of the neck strap is to be made so that when the toggle buckles are tensioned the helmet is drawn back with the ear capsules

in horizontal alignment with the ears. When correctly adjusted the toggle buckles should present a noticeable resistance to being turned into the locked (forward) attitude and the wearer should be conscious of a slight positive pressure at the back of the head. To adjust the neck strap:-

- (1) Remove the helmet.
- (2) Pull down the leather lined neck pad (perforated) exposing the neck strap adjuster.
- (3) Tighten or slacken the adjuster as required.
- (4) Don the helmet again and test. Repeat these operations until a satisfactory fit is achieved.

Fitting the oxygen mask (*fig. 5 and 6*)

32. The oxygen mask must be fitted under the supervision of D.P.M.O.(F) or his authorised representative. The procedure is as follows:-

- (1) Screw both the oxygen attachment hooks forward to their full extent by turning the knurled nuts.
- (2) Turn the small plastic locking ring on the left-hand attachment hook to the 8 o' clock position.

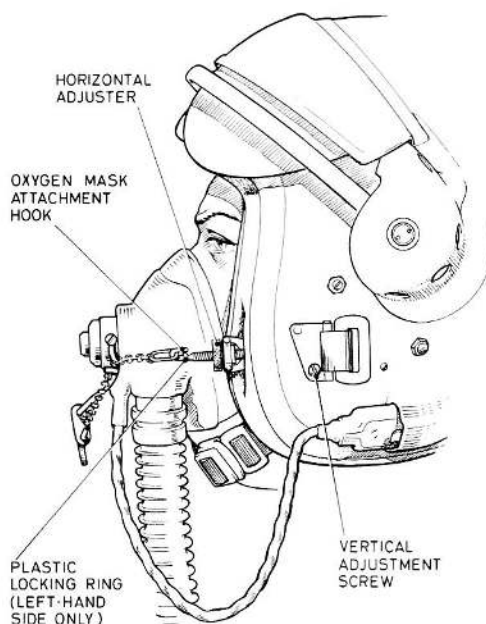


Fig. 5. Oxygen mask fitted

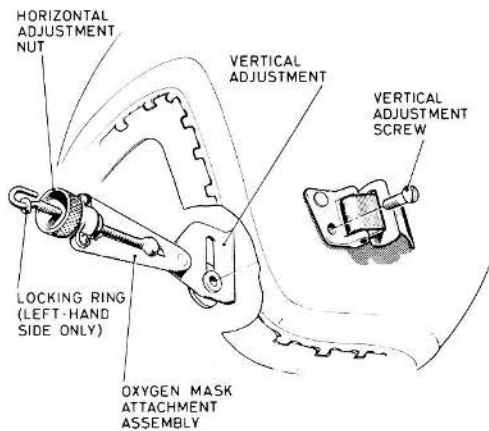


Fig. 6. Oxygen mask attachments

- (3) Hook the chain ring on the left-hand side of the oxygen mask to the hook.
- (4) Push the plastic ring back until it abuts against the screwed stem.
- (5) Hook the other chain to the right-hand oxygen mask attachment hook.
- (6) Press the mask close to the face and adjust the chains so that the mask is held lightly in position.
- (7) With the wearer supporting the mask, loosen the mushroom-headed screws $1\frac{1}{2}$ to 2 turns.
- (8) Using the vertical adjustment provided on the helmet move the attachment hooks up or down as required to obtain the best face mask seal. When satisfactory tighten the screws on each side of the helmet.

Connecting the microphone plug (fig. 7)

33. After fitting the oxygen mask connect the microphone socket on the mask to the plug at the side of the helmet. When the oxy-mic-tel system is used the plug and socket must be lashed together with thread. There are alternative methods according to the type of microphone assembly supplied.

34. Method 1. The plug on the helmet is provided with a short length of cord so that the

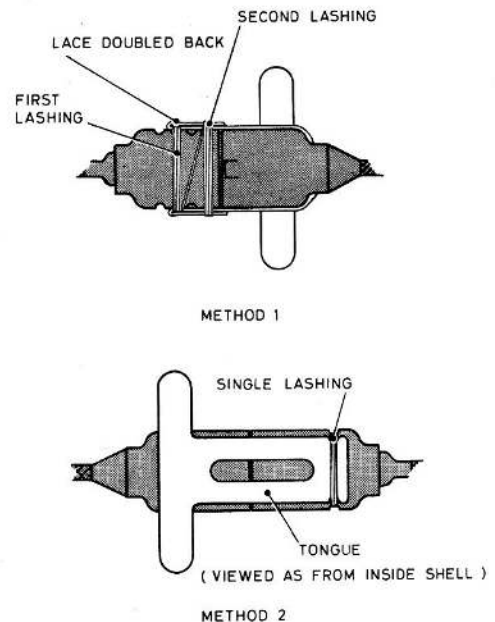


Fig. 7. Method of lashing the mic-tel plug (oxy-mic-tel only)

two loose ends project on either side of the plug.

- (1) After connection lay the cord ends over the socket and lash to the socket with thread.
- (2) Double the cord back on the lashing so that they now lie on either side of the plug and lash again.

35. Method 2. The plug mounting bracket is provided with a projecting tongue which lies behind the plug and socket when assembled. Simply lash the socket to this tongue as shown in fig. 7 which is a view of the microphone socket seen from inside the helmet.

Adjusting the visor

36. When the helmet has been satisfactorily fitted the visor screen will require adjustment as follows:—

- (1) If the visor screen is still covered with its protective coating, peel it off carefully. Solvents are not to be used.

- (2) Don the helmet. Tension the neck strap with the toggle buckles. Fasten the chin strap and the oxygen mask which should be tensioned for normal oxygen breathing.
- (3) Press down the g-trip lever and operate the handle-bar to bring the visor down in front of the face.
- (4) Slacken the visor clamping screw. This screw is coloured red and is accessible through the cover on the right-hand side of the helmet (*fig. 1*).
- (5) Pull down the handle-bar until the visor is resting on the oxygen mask exo-skeleton.
- (6) Re-tighten the red visor clamping screw.
- (7) The visor is provided with a degree of adjustment in a fore and aft direction to bring the lower edge nearer or further from the face. Slacken off the screws holding the visor to the mechanism side arms and move the visor as required. The peak of the visor cut-out must overlap the exo-skeleton by sufficient distance to prevent any possibility of the visor closing on the rubber facepiece. The top edge of the visor should be just clear of the helmet binding.
- (8) When a satisfactory fit is obtained, re-tighten the visor screws.

37. After a minimum of two flying hours the fit of the helmet should be re-checked and any adjustments made where necessary. When completely satisfactory lock the cradle adjustment screws with thread sealant. Trim off any surplus adjustment cord and heat seal the ends.

Donning the helmet (*fig. 8*)

38. After satisfactory initial fitting of the helmet it is donned as follows:-

- (1) Ensure that the neck strap toggle buckles are turned to the rear and the chin strap is unfastened.
- (2) Insert the forefinger of each hand through the white loops which project downwards below the rim of the helmet.
- (3) Place the thumbs inside the helmet in contact with the rim of the ear capsule and press back firmly against the rigid sides of the helmet.
- (4) Pull the helmet down over the top of the head with a downward and slightly rearward movement.
- (5) Adjust the capsules to lie comfortably on the ears by pulling on the loops or by inserting the fingers between the face and helmet lining. Take care not to damage the fluid seals surrounding the capsules.
- (6) Turn the toggle buckles forward to tighten the neck strap. If correctly fitted beforehand this will draw the helmet back in correct alignment with the ears and tighten the helmet on the head.
- (7) Connect the chin strap. To do this pass the adjuster buckle (on the strap) through the eye buckle (on the helmet) from the inner side outwards, the wider, stepped, side of the adjuster first. The adjuster will seat and lock in the recess of the eye buckle. Pull on the free end of the strap to tighten and secure with the Velcro fastener.
- (8) Connect the oxygen mask chain as required.

Doffing the helmet

39. To remove the helmet:-

- (1) Disconnect the chin strap quick-release buckle.
- (2) Turn the toggle buckles to the rear, releasing the neck strap.
- (3) Using the loops and pressing back the rear capsules as for donning pull the helmet off the head.

40. After use the helmet with oxygen mask should be wiped and hung up to dry. When thoroughly dried and aired, stow the helmet in the case provided (*fig. 9*). The oxygen mask is to be folded loosely in the helmet and the chin strap connected. The helmet is then placed crown downwards in the case and secured by passing the bungee straps round the outside, rigid part of the helmet (not over the top).

SERVICING

41. Servicing the helmets consists of periodical cleaning and examination for wear or damage. Broken stitching may be made good and small tears in the lining may be repaired. The paint

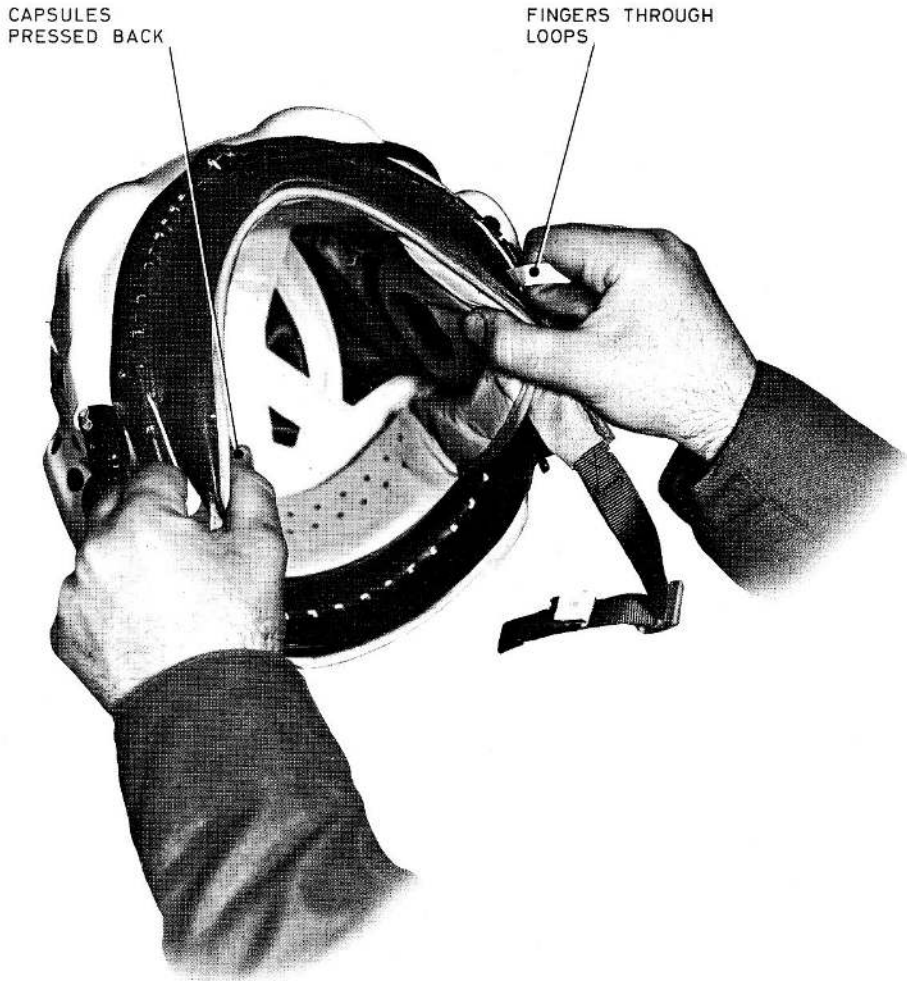


Fig. 8. Donning the helmet

of the shell may be touched up but only white polyurethane paint may be used. The visor may be cleaned with perspex polish (grade 3). Otherwise, repair is by replacement of the damaged or worn item. No attempt is to be made to lubricate, adjust, or dismantle any part of the g-mechanism. This requires special apparatus for re-balancing, not yet available to the Service. If the mechanism becomes faulty a complete

replacement should be demanded and the faulty helmet returned for rectification. On the Mk. 2A helmets only it is permissible to adjust the visor brake (para. 54).

42. If the cradle harness straps become dirty they should be washed with soap and water in situ without removal from the helmet. Detergents are not to be used for this purpose.

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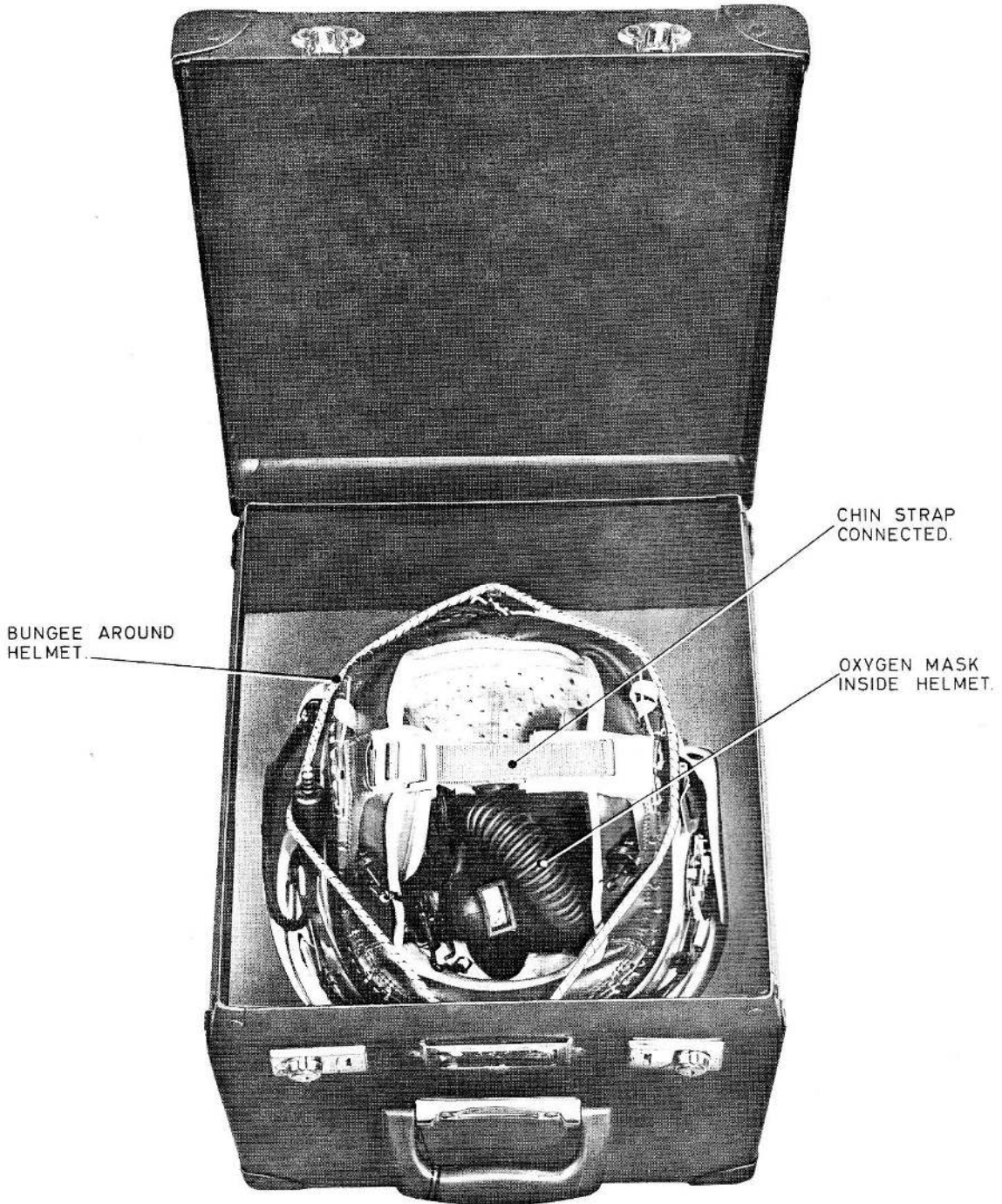


Fig. 9. Helmet stowage

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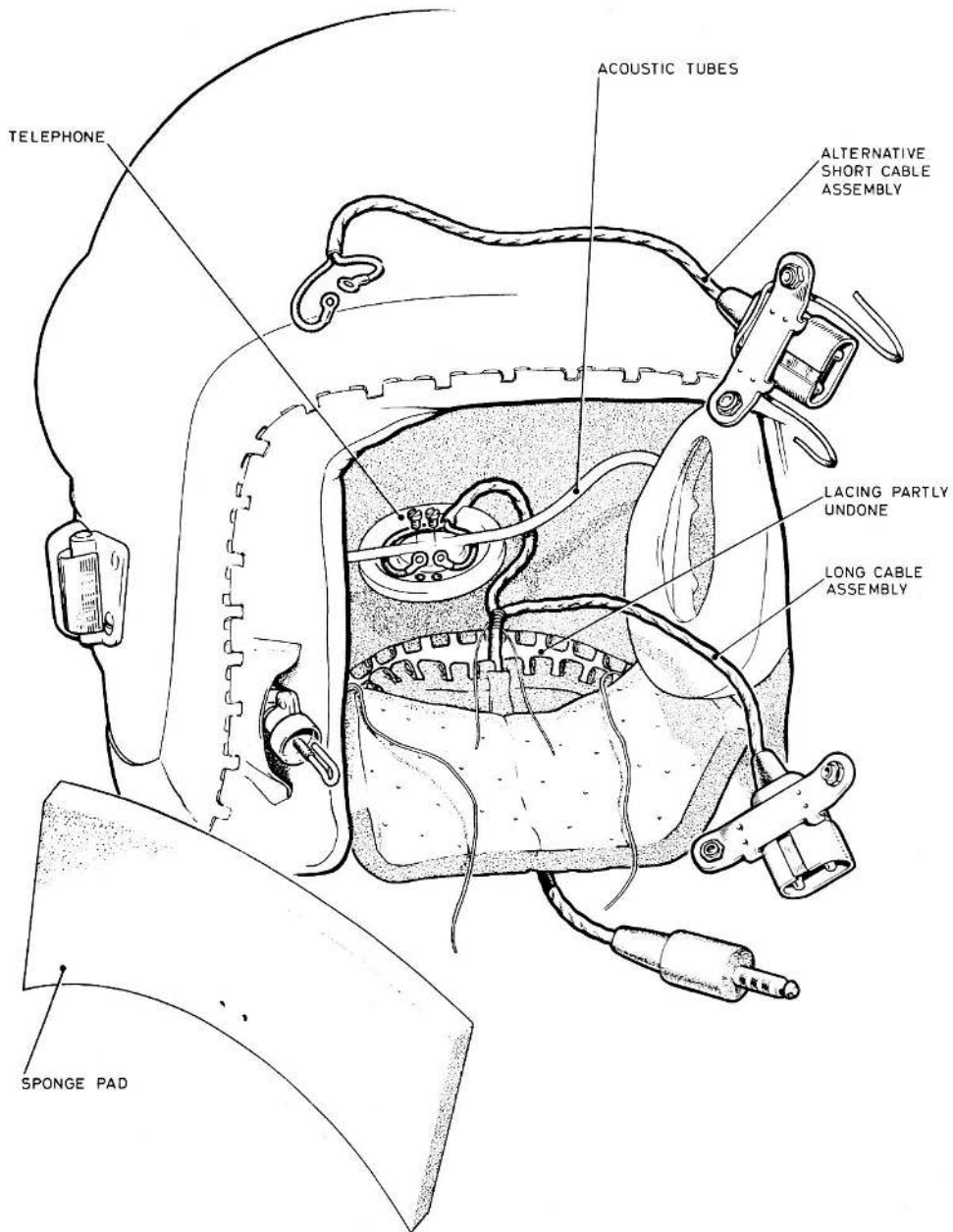


Fig. 10. Cable connection to telephone

Changing the connector assembly (fig. 10)

43. There are alternative cable connector assemblies used in conjunction with the Mk. 2 and 2A helmets. The Cable Assembly, Special Purpose, Branched (Standard R.T. System) has a 'pigtail' terminating in a Plug Type 626 for connection into an intercom. socket; in the Cable Assembly Special Purpose, Branched (Oxy-mic-tel System) this pigtail is absent since in the oxy-mic-tel system all connections are made through the microphone socket on the left-hand side of the helmet.

Note . . .

Initial issues of helmets were fitted with cable assemblies suitable for standard R.T. systems and oxy-mic-tel cable assemblies were included as spares. Later production helmets will include the type of cable assembly specified in the particular contract, to avoid units holding unwanted spare assemblies.

44. If it is necessary to change from one type of connector assembly to the other, the procedure is as follows:—

- (1) Rest the back of the helmet on a work table using a soft pad to prevent damage to the surface finish and assist in holding the helmet steady (the sponge pad can be removed from the storage case for this purpose).
- (2) Pull forward the neck pad to expose the interior of the helmet, untie the nylon lace securing the lining to the shell and unlace for about six inches each side of the centre line.
- (3) Unfasten the grey sponge pad and cable assembly.
- (4) Remove the pad and lay to one side.
- (5) Sever the lashings on the outside of the helmet one of which secures the rubber telephone holder; the other holds the cable to the rubber housing. Do not sever the lashings securing the sound tubes to the housing.
- (6) Unscrew the terminals from the receiver and release the two 6 B.A. screws retaining the microphone plug.
- (7) Take out the complete cable assembly.
- (8) Remove the old lashing thread.

- (9) Lash the rubber housing to the shell with a minimum of three turns of double thread (Ref. No. 32B/644) on either side and securely tie off the ends.
- (10) Re-fasten the microphone plug. Treat the screws with locking varnish (Ref. No. 33B/9433454) before re-assembly. The ends of the metal clip on the end of a new plug cable assembly may require setting slightly to align the rivet nuts with the 6 B.A. screws.

Note . . .

The method of assembly varies slightly according to the type of cable assembly.

- (11) *Long Cable Assembly.* Secure the cable to the helmet at the point of entry with the black lace, tying off with a reef knot on the inside.
- (12) Secure the grey sponge pad by passing the free ends of this lace through the holes in the pad and again secure with a reef knot on the inside.
- (13) *Short Cable Assembly.* Ensure that the linings are laced up and properly secured and then fasten the pad in a similar manner, but, using the free ends of the nylon lace securing the lining assembly to the shell.
- (14) Using a bodkin re-thread the nylon lace through the loops in the lining (fig. 11) and the alternate loops corresponding on the shell, first on one side and then the other, finishing by crossing the lace through the adjacent loops on either side of the join in the centre back of the helmet. Pass the free ends inside the helmet and tie off securely, ensuring the lace is taut and the lining is not puckered or distorted.
- (15) Test the telephone assembly for continuity.

Dismantling and re-assembly (fig. 12)

45. The following gives the sequence of operations for complete dismantling and re-assembly of the replaceable items so that the method of replacement of any particular single component is evident. Generally re-assembly is the reverse of dismantling and is only noted where the operations differ. On re-assembly all screw threads must be treated with locking varnish

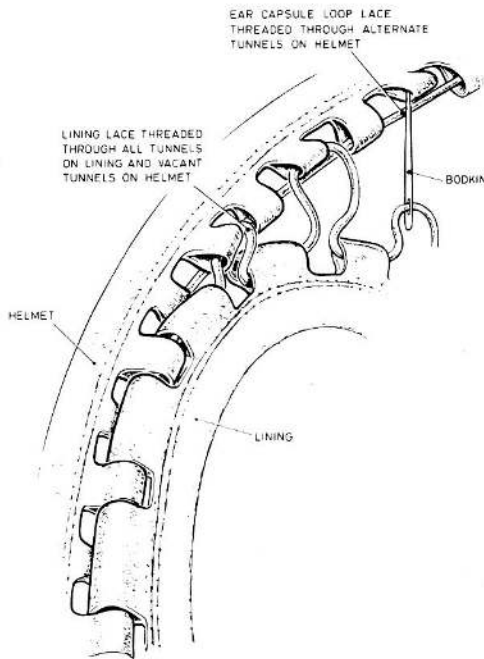


Fig. 11. Method of lacing the helmet lining

(Ref. No. 33B/9433454) except where self-locking nuts are used.

46. Proceed as follows:—

Chin strap

- (1) Remove the two rearmost mushroom-headed screws which pass through the top of the helmet.
- (2) Draw the straps, buckle ends first, through the slots on each side of the lining and out of the leather tunnel, (with the Velcro fastener) on the right-hand side (Note, sub-para. 16).

Neck strap

- (3) Turn down the neck pad. Disconnect the ends of the neck strap from the adjuster buckle.
- (4) Remove the screws, on which the toggle buckles hinge, on each side of the helmet.
- (5) Draw out the two halves of the strap through the slots in the shell.
- (6) On re-assembly the free end of the

left-hand strap (as worn) must pass through the buckle from front to back and be threaded back over the buckle bar and through the becket so that the loose end is behind, facing the shell. Some helmets are fitted with a grey neck strap. In this case the strap passes through the buckle in the reverse direction so that the loose end finishes in front (see fig. 15).

Oxygen mask attachment hook assemblies

- (7) Remove two mushroom-head screws which pass through the toggle buckle hinge plates. These screws have been lightly riveted over and it is necessary to clean up the ends before withdrawal.
- (8) Draw the oxygen hook attachment assemblies through slits in the lining.
- (9) New mushroom-head screws and shake-proof washers must be provided on re-assembly. Tighten the screw fully home, unscrew $1\frac{1}{2}$ to 2 turns so that the hook assembly slides freely, then lightly rivet over the ends.

Removing the complete headset

- (10) Remove the cable assembly as described in para. 43 operations (1) to (8) inclusive.
- (11) Remove the lashings attaching the telephone to the shell.
- (12) Remove the two mushroom-head screws in the foremost position through the top of the helmet.
- (13) Unlace the lower nylon cord far enough to release the tape loops attached to the ear capsules.
- (14) Remove the headset assembly complete. When re-assembling the headset thread the lace through the alternate loops and secure as described in para. 43(14).

Removing the lining

- (15) To remove the lining complete unfasten the upper lacing. This is tied at the back. Draw the lace completely out of the alternate lacing tunnels, freeing the lining and separating it from the rim of the shell.

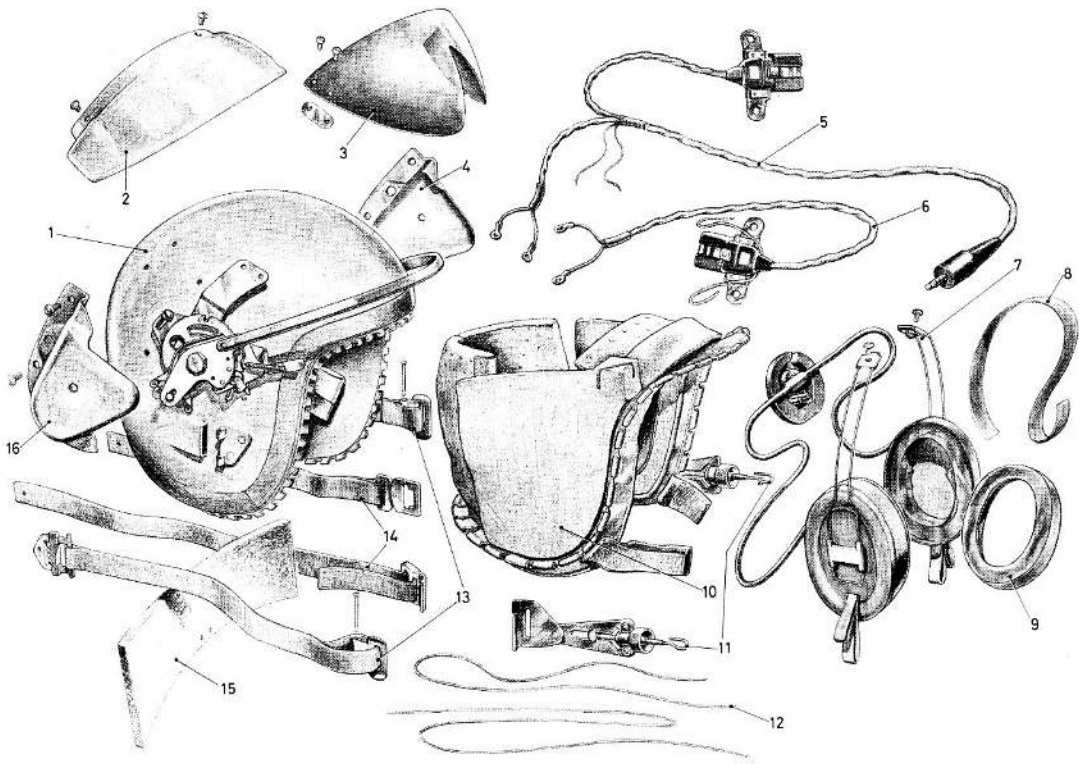


Fig. 12. Helmet dismantled

- | | | | |
|---|----------------------------------------------------|----|---------------------------------|
| 1 | SHELL AND VISOR MECHANISM | 9 | FLUID SEAL |
| 2 | VISOR COVER | 10 | LINING |
| 3 | VISOR | 11 | OXYGEN MASK ATTACHMENT ASSEMBLY |
| 4 | LEFT-HAND COVER | 12 | LACES |
| 5 | CABLE ASSEMBLY (LONG) | 13 | NECK STRAP (L.H. AND R.H.) |
| 6 | ALTERNATIVE CABLE ASSEMBLY
(SHORT, OXY-MIC-TEL) | 14 | CHIN STRAP (L.H. AND R.H.) |
| 7 | TELEPHONE AND HEADSET ASSEMBLY | 15 | SPONGE PAD |
| 8 | FLUID SEAL ATTACHMENT STRIP | 16 | MECHANISM COVER |

Re-attaching the lining (fig. 11)

- (16) If a new lining is to be fitted it is advisable also to fit a new chin strap as the Velcro fasteners on the old and new lining may not match. Thread this through the leather loop and the slots before the lining is laced to the helmet.
- (17) Using a new nylon lace and a bodkin, start at the centre point of the helmet at the top of the face aperture rim. Lace the cord through the alternate tunnels left vacant by the loop attach-

ment cord on the helmet castellated strip and the wider loops on the lining (fig. 11). Work from the centre of the face aperture to the centre of the back of the helmet (where the pigtail emerges) first one half and then the other, taking care to leave sufficient length of lace on each side for the purpose. Tie off as described in para. 43. Check the lacing carefully before tying off to make certain the lining is not puckered or a tunnel has been missed.

Removing the covers

- (18) The shroud and the mechanism covers can be removed by withdrawal of the appropriate mushroom-head screws. All these screws engage captive nuts on the inside of the helmet. Note also that all the screws are treated with locking varnish (*Ref. No. 33B/9433454*) before assembly to ensure adequate locking.

Removing and renewing the visor screen

- (19) With the visor in the lowered position remove the four 6 B.A. screws securing it to the side arms.
- (20) Fit a replacement screen using the same screws, nutplate and paper washer. The paper washer must be fitted between the perspex and the side arms, leaving the screws sufficiently slack to enable the screen to be adjusted relative to the side arms.
- (21) With the screen still down, adjust the top edge to clear the binding around the rim of the helmet and tighten the screw to hold this position.
- (22) Operate the bar to check for clearance. Adjust to ensure a minimum of 0.1 in. clearance from the shroud.
- (23) Tighten all screws. Do not overtighten as this may cause cracks or fractures in the perspex. Lock the screws with thread sealant.
- (24) After renewal or adjustment of the screen check in conjunction with the oxygen mask as described in para. 36.

Renewing the ear capsule seal

47. Damage to the ear capsule seals will cause the glycerine/water mixture to leak and may necessitate the stripping and cleaning of the helmet before renewal. The lining should be completely removed (see para. 46) and sponged with clean water to remove all traces of glycerine and allowed to dry before re-fitting.

48. To renew a damage capsule proceed as follows:-

- (1) Remove the screw at the top of the

helmet and detach the wire frame which holds the damaged capsule. Avoid straining or kinking the acoustic tube.

- (2) Examine for fluid in the capsule or the tube. If present remove the complete telephone headset assembly and fit a replacement. (If fluid has entered the tube the sound properties will be seriously impaired).
- (3) If fluid is not present in the interior, remove the strip of self-adhesive tape and remove the damaged seal.
- (4) Fit a new seal with a length of black self-adhesive P.V.C. tape (*Ref. No. 22C/2554*). The seals are handed and the flange of the replacement seal is now external as distinct from earlier seals with the flange inside the skirt. The protrubance on the flange must be turned rearwards.
- (5) After fitting a new seal check the headset with Test Set 376 (*Ref. No. 10S/16328*) checking that the signal is received with equal strength in both capsules.

Testing the visor mechanism

49. A set of test weights is available for checking the g trip lever mechanism and the visor screen friction brake. These weights are designed on the 'Go'-'No Go' principle. In the case of the g trip lever the weights are sleeves adapted to fit over the 'g' trip lever and form an extension to it; for testing the visor friction brake, a plastic attachment hook is provided, whereby each of the test weights may be hung directly on the visor in turn.

Testing the g trip lever

50. The test weights required are as follows:-

Trip lever	No Go weight	Ref. No. 4C/3370
Trip lever	Go weight	Ref. No. 4C/3371

51. Proceed as follows:-

- (1) Ensure the visor is in the raised position and the 'g' trip lever is UP (cocked).
- (2) Place the helmet on a level surface and adjust the position until the 'g' trip

lever is lying horizontal (fig. 13). Alternatively, place the helmet on a dummy head and adjust similarly until the lever lies horizontal.

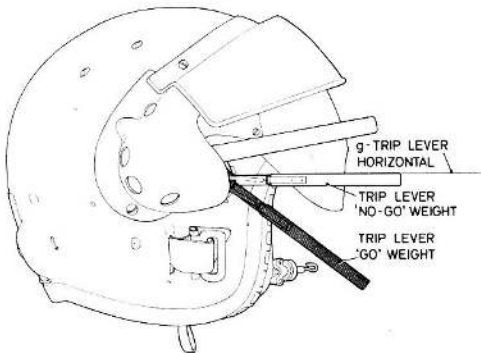


Fig. 13. Testing the 'g' trip lever

- (3) Pass the sleeved end of the No Go weight over the projecting part of the 'g' trip lever. With this weight in position and unsupported, the 'g' trip lever must not move, i.e. it must remain UP (cocked).
- (4) Remove the No Go weight and pass the sleeved end of the Go weight over the lever.
- (5) Support the weight until ready for the test. On removal of the support the 'g' trip lever should fall, unlatching visor.

If these tests are not met (i.e. the No Go weight causes the lever to fall, or the lever fails to fall under the Go weight) the mechanism is not operating correctly and the helmet should be returned for re-adjustment.

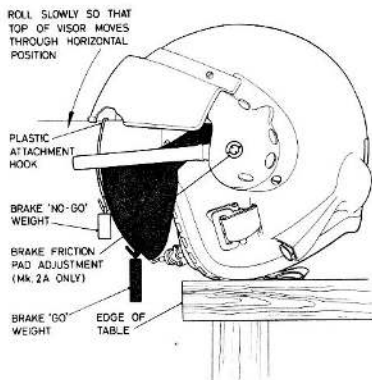


Fig. 14. Testing the visor brake

Testing the visor brake (fig. 14)

52. The test weights required are as follows:—

Brake Go weight	Ref. No. 4C/3373
Brake No Go weight	Ref. No. 4C/3372
Plastic attachment hook	Ref. No. 4C/3374
Container checking kit	Ref. No. 4C/3369

53. Proceed as follows:—

- (1) Bring the visor screen down to its lowermost position using the handle-bar.
- (2) Pass the plastic attachment hook upwards under the cover and hang it on the top of the visor screen in the centre.

Note . . .

When attaching or removing the hook or weights great care must be taken not to scratch or mark the perspex surface.

- (3) Raise the screen again by means of the handle-bar.
- (4) Press down the 'g' trip lever so that the screen is unlatched.
- (5) Stand the helmet on the edge of a table so that the visor will overhang the edge when lowered. If this is not done the test weights will foul and prevent complete movement of the visor.
- (6) Attach the Brake Go weight to the hook.
- (7) Using the corners of the helmet (chin strap attachment points) as a fulcrum, slowly rock the helmet forward over the edge of the table so that the visor swings over in the direction of the ground.
- (8) In the course of this movement the top of the visor will pass through a position where it is horizontal with the table. At this point the visor should move downwards under the influence of the Go weight.
- (9) Remove the Go weight and raise the helmet back to an upright position on the edge of the table.
- (10) Raise the visor screen with the handle-bar. Hang the No Go weight on the hook.
- (11) Roll the helmet over the edge of the

table again as described in operation (7).

- (12) The visor screen should not move when it passes through the horizontal position as in operation (8).

If the tests are not satisfactory on the Mk. 2 helmet no attempt at rectification is to be made. The helmet must be returned for re-adjustment. If the tests are not satisfactory on Mk.2A helmets it is permissible to adjust the brake by means of the adjustment nut accessible through a hole in the left-hand side cover.

Adjusting the visor brake on the Mk.2A helmet

54. Adjustment of the brake on the Mk.2A helmet requires the use of a special pin spanner. To use this spanner engage the inner pegs in the two holes in the adjustment then engage the dogs on the knurled sleeve with the key holes in the adjustment nut. Hold the centre shaft of the tool and turn the knurled sleeve. The adjustments are made as follows:—

- (1) If the visor falls when tested with the No Go weight the brake friction pad pressure requires increasing. Turn the adjustment clockwise until the visor will remain up.

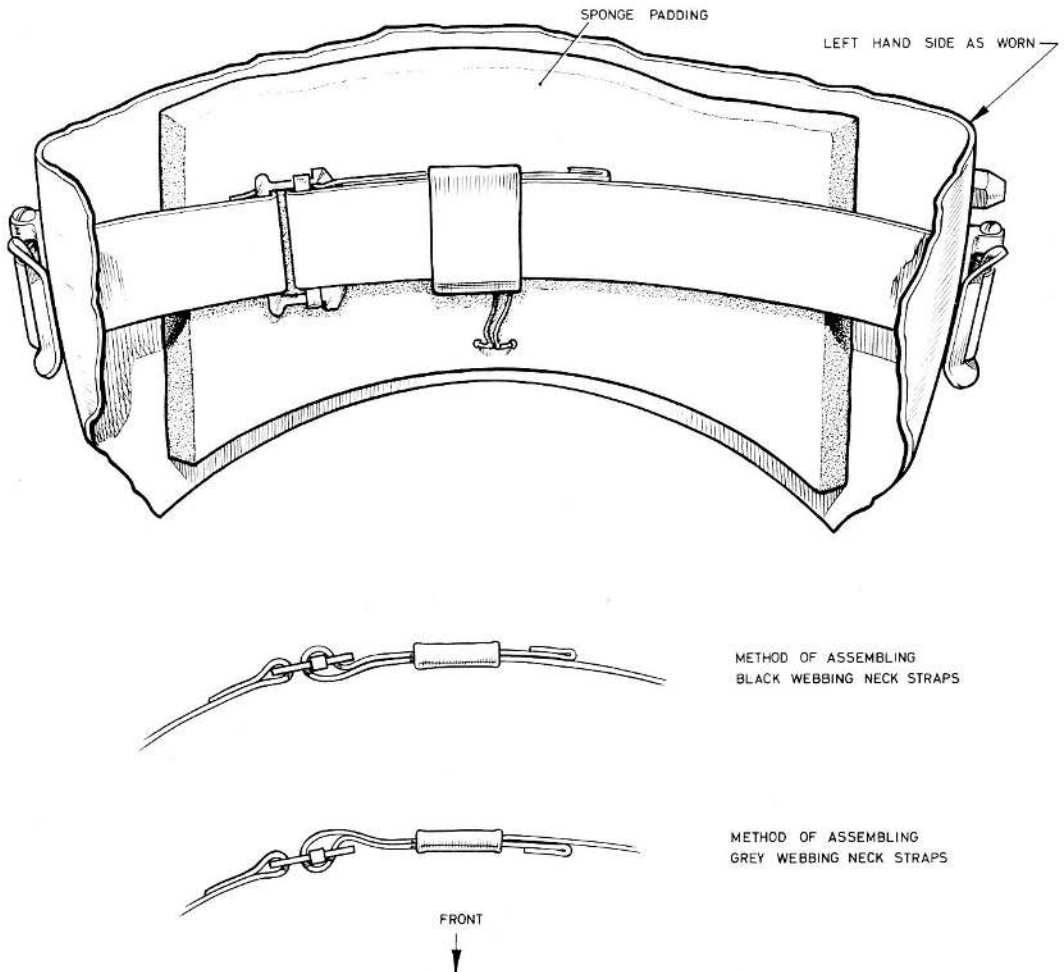


Fig. 15. Assembly of neck strap

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- (2) After adjustment check to see that the visor still falls when tested with the Go weight. If not, turn the adjustment slightly back anti-clockwise until the test is satisfied. Re-check to ensure it still stays up with the No Go weight.
- (3) If the visor does not fall under the Go

weight, adjust in an anti-clockwise direction until it does so. Re-check that the No Go adjustment is not disturbed.

When all tests are satisfactory, raise the 'g' trip lever into the UP (cocked) position.

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