Chapter 21

FLYING SUIT, MK. 5, COMBINED WITH HARNESS TYPE D, MK. 3

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LIST OF ILLUSTRATIONS

Introduction

1. The Mk. 5 flying suit combined with the Parachute Harness, Type D, Mk. 3, is provided for the use of aircrew whose duties during flight are such that they cannot wear a parachute assembly at all times. The suit combines the features of a flying suit and a life jacket: it provides a housing for the parachute harness and a means of stowing gloves, maps and the following aids to escape and survival:—

(1) Emergency oxygen.
(2) Flotation stole.
(3) S.A.R.A.H. equipment.
(4) Heliograph.
(5) Fluorescine pack.
(6) Sea activated battery and lamp.
(7) Whistle.
(8) Life line.
(9) Aircrew knife.

The suit complete with its lining, and the harness and remaining items, are issued separately and assembled in the Flying Clothing Section. The suit and its lining and the harness are made in a range of sizes, therefore, it follows that the same size in each should be specified when demands are prepared. Although the suit and lining are issued as a single item, replacement linings are provisioned under the references given in para. 8.

DESCRIPTION

Suit (fig. 1 to 5 inc.)

2. The suit is an overall type garment made from a mixture of flax and terylene, open at the front where a sliding fastener is fitted. Pockets and stowages are provided for the items given in para. 1 and lobe covers for the accommodation of the stole. The locations of the pockets and stowages can be seen in fig. 2. Those for the accommodation of the S.A.R.A.H. battery and speech unit are fastened with nylon draw rods which are passed through beckets on the stowages and the cover flaps. Details of the oxygen stowage not shown in fig. 2 can be seen in fig. 5.

3. ◀Later production suits have a redesigned battery beacon pocket to facilitate the insertion and withdrawal of the equipment stowed in them. This has an integral webbing harness and the stowage for the heliograph and ground/air emergency code is fitted inside the lower flap.▶

4. Each breast of the suit bears an anchorage for one of the combined snap hooks and canopy releases fitted to the parachute harness. The stiffened mounting is fitted with a plate on which are brackets in which the hook is secured. Above and below the mountings are slots provided to afford passages for the lift webs of the harness and the dinghy attachment straps. These features are shown in fig. 3 and 4.

Fig. 1. Mk. 5 suit combined with Type D, Mk. 3, harness

5. Outlined in stitching on each thigh is the

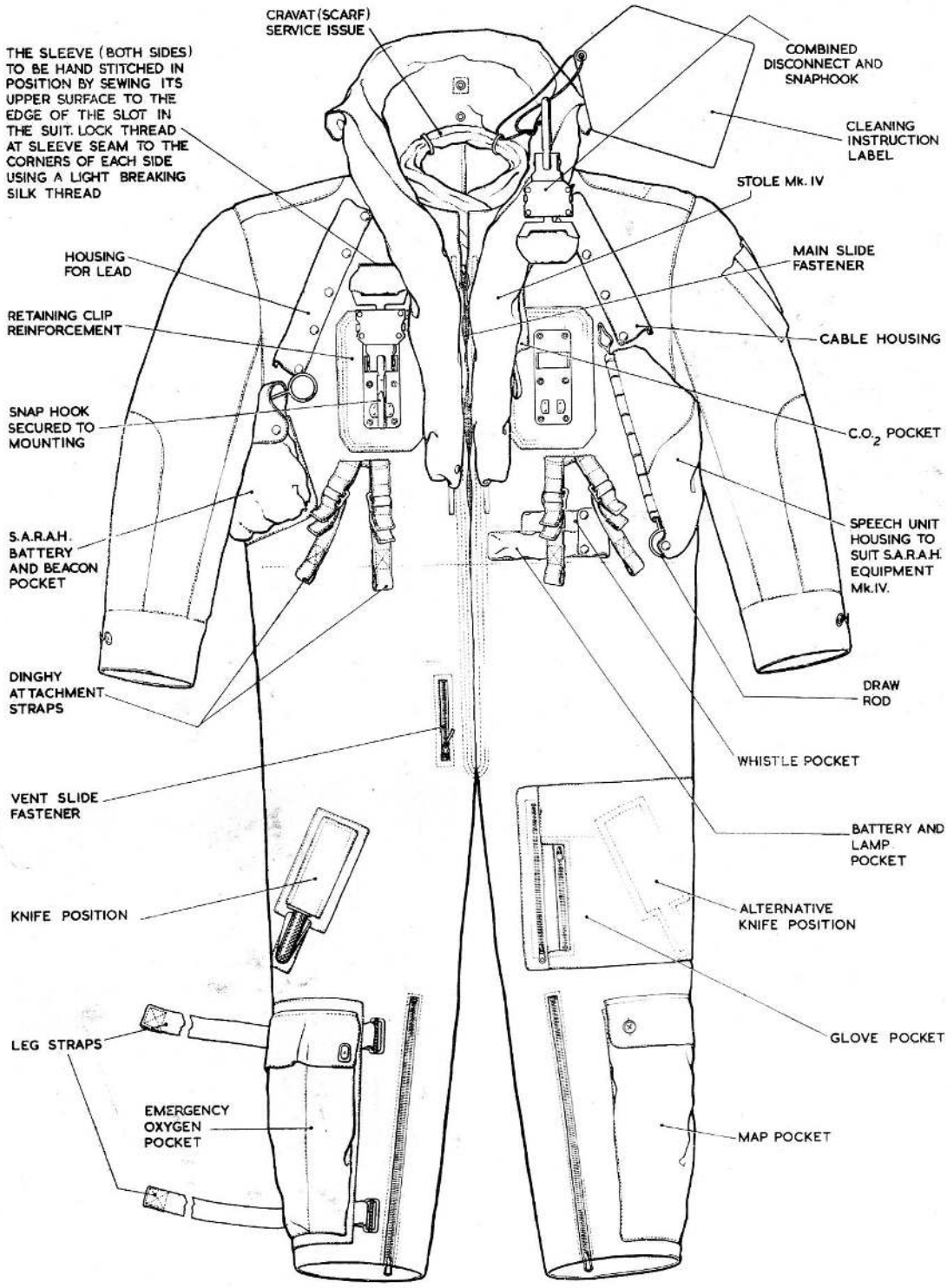

Fig. 2. Suit details

Fig. 3. Mounting for snap hook

position for the attachment of the aircrew knife. The positions are alternatives and the choice of which should be used is that of the wearer who should be consulted before the knife is fitted. These positions are specially reinforced, therefore no other position should be used. Details of the method to be used in fitting the knife are given in para. 19 to 21.

6. Other features of the suit are the provision of loops to retain a scarf, a vent, gussets to enable the legs to pass over footwear, flaps to cover the lead from the S.A.R.A.H. battery to the speech unit, one part of a sliding fastener inside the front opening to match a similar part on the lining, and buttons inside the legs and sleeves to which the lining is secured.

Lining

7. The lining is a trunk fitting garment, made from nylon, used to retain the harness in position. It is fitted with a series of double-ended beckets to which the harness is tied with light silk thread. In the legs and sleeves are buttonholes located to match the buttons referred to in para. 5, and on each side of the front opening at waist level are the male portions of press studs which match female portions on the waist belt of the harness. The front opening is fitted with the matching part of the sliding fastener also referred to in para. 5. The outline of the lining is shown in fig. 6.

Harness

8. The harness (fig. 7) consists of nylon webbing waist belt, cross strap, back strap, and leg straps, joined by a series of eight lengths of 700 lb. nylon cord in parallel. Two nylon straps, 1 in. wide, connect the seat strap and the waist belt and prevent the latter from riding up during a descent. Special shoulder adapters in which there are four slots, each affording passage for two of the cords, permit a small measure of self adjustment as the loads of the canopy opening are transmitted to the cords. The harness is fitted with combined canopy releases and snap hooks (fig. 8 and 9). Four dinghy attachment straps, less attachment fittings, are sewn to the waist belt, two on each side at the front. The waist belt itself is fitted with the four female parts of the press studs referred to in para. 6. A sliding bar buckle enables the ends of the waist belt to be

Fig. 4. Snap hook mounted

Fig. 5. Right leg showing knife position and oxygen stowage

fastened round the wearer before the front of the suit is fastened and, at appropriate locations on the waist belt and leg straps, beckets are provided to enable the harness to be tied to the matching beckets on the lining, also referred to in para. 6.

Sizes

9. Components are issued in the following sizes under the references shown:—

Size	*Suit complete with lining*	*Lining only*	*Harness*
1 ...	22C/2001	22C/2073	15A/875
2 ...	22C/2002	22C/2074	15A/876
3 ...	22C/2003	22C/2075	15A/877
4 ...	22C/2004	22C/2076	15A/878
5 ...	22C/2005	22C/2077	15A/879
6 ...	22C/2006	22C/2078	15A/880

When determining the size required, all appropriate other clothing should be worn.

ASSEMBLING THE COMPONENTS

Harness to lining

10. (1) Place the harness flat on a table and stretch it to its fullest extent by gripping the adapter at Item 1 of fig. 7 and the seat strap at Item 3, and pulling them apart until the adapter reaches the base of the zig-zag stitching at the connection of the lines to the disconnect attachment lug.

(2) Repeat this on the other side of the harness.

(3) Ensure that the marks on the two cords lying nearer the centre of the harness on each side coincide with the upper edge of the leg strap (Item 2) and tie the cords, in pairs, to the beckets on the leg straps using thread (Ref. No. 15A/510) tied with double reef knots.

(4) Place the harness over the lining, passing the legs of the lining through the leg straps and the arms through the cross brace. Feed the end of the strap (Item 12 of fig. 6) and the buckle (Item 15 of fig. 6) through the apertures in the lining so that they are inside the lining.

(5) Fasten the mating parts of the press studs (Item 14) to secure these in position.

(6) Tie the matching beckets at Items 8, 9, 10 and 11 together with thread (Ref. No. 15A/510) using double reef knots.

(7) Turn the lining front downwards and tie the beckets at Items 6, 7 and 13 in a similar manner.

Harness and lining to suit

11. (1) Place the lining and harness inside the suit so that the inside of the back of the suit and the outside of the back of the lining are next to each other.

(2) Operate the canopy releases and remove the snap hooks and releases.

(3) Pass the dinghy attachment straps through the slots below the snap hook mountings and the attachment rings of the canopy releases through the slots above them.

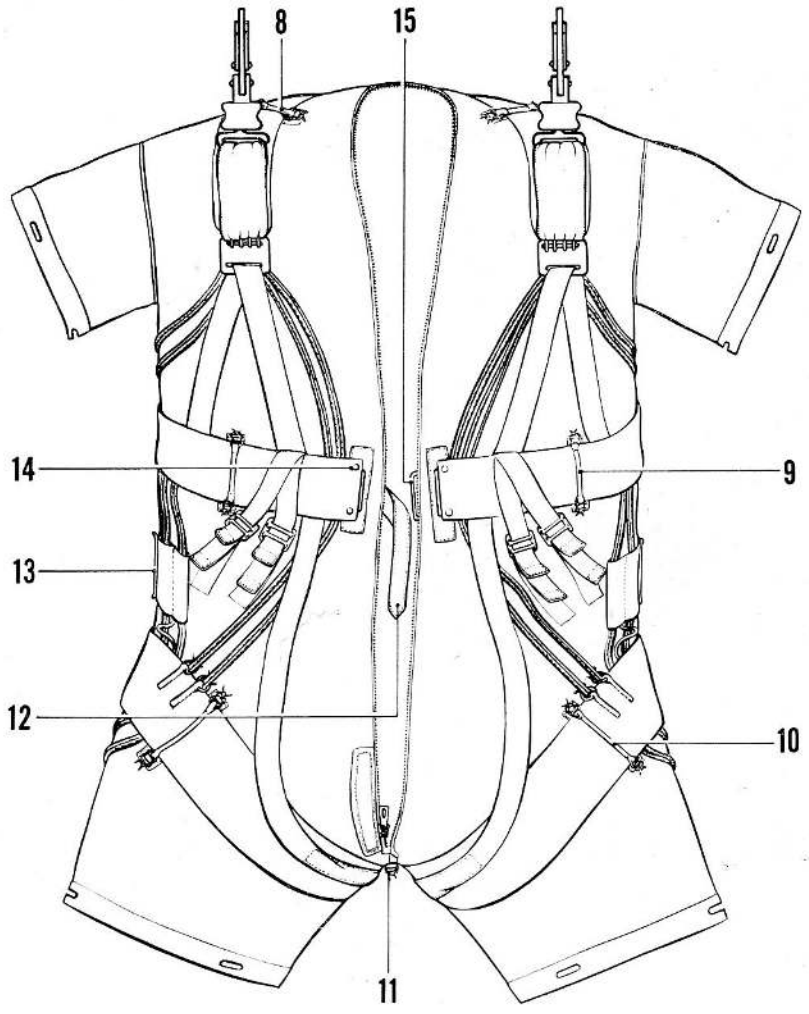

Fig. 6. Lining and harness assembled

(4) Connect the snap hooks and releases and secure the hooks to the mountings with the shear bolts.

(5) Ensure that the buttons and button holes are correctly matched and secure them together. A useful check is to arrange the seams to match.

(6) Check to ensure that there are no twists in the lining and harness and link the two parts of the sliding fastener on the inside of the suit and the lining together.

(7) Hand sew the tops of the gabardine sleeves covering the releases to the top edges of the slots, using thread (Ref. No. 15A/510).

Fitting the stole

12. Securely stitch the free end of the life line to the lifting becket on the left-hand stole cover. Hank the line in $2\frac{1}{2}$ in. turns and stitch the hank to the becket with three stitches of scarlet locking thread, locking off the end. Secure the toggle with a single stitch. The stole, which is of the same capacity as those used in aircrew life jackets and inflated from a similar cylinder, should be slightly inflated and inserted in the cover through the opening provided, ensuring that it lies flat and is not twisted. Fasten the snap fasteners at the bottom of each lobe, feed the oral inflation tube through the aperture in the front of the cover and pass it under the keeper loop. Deflate the stole, ensure that

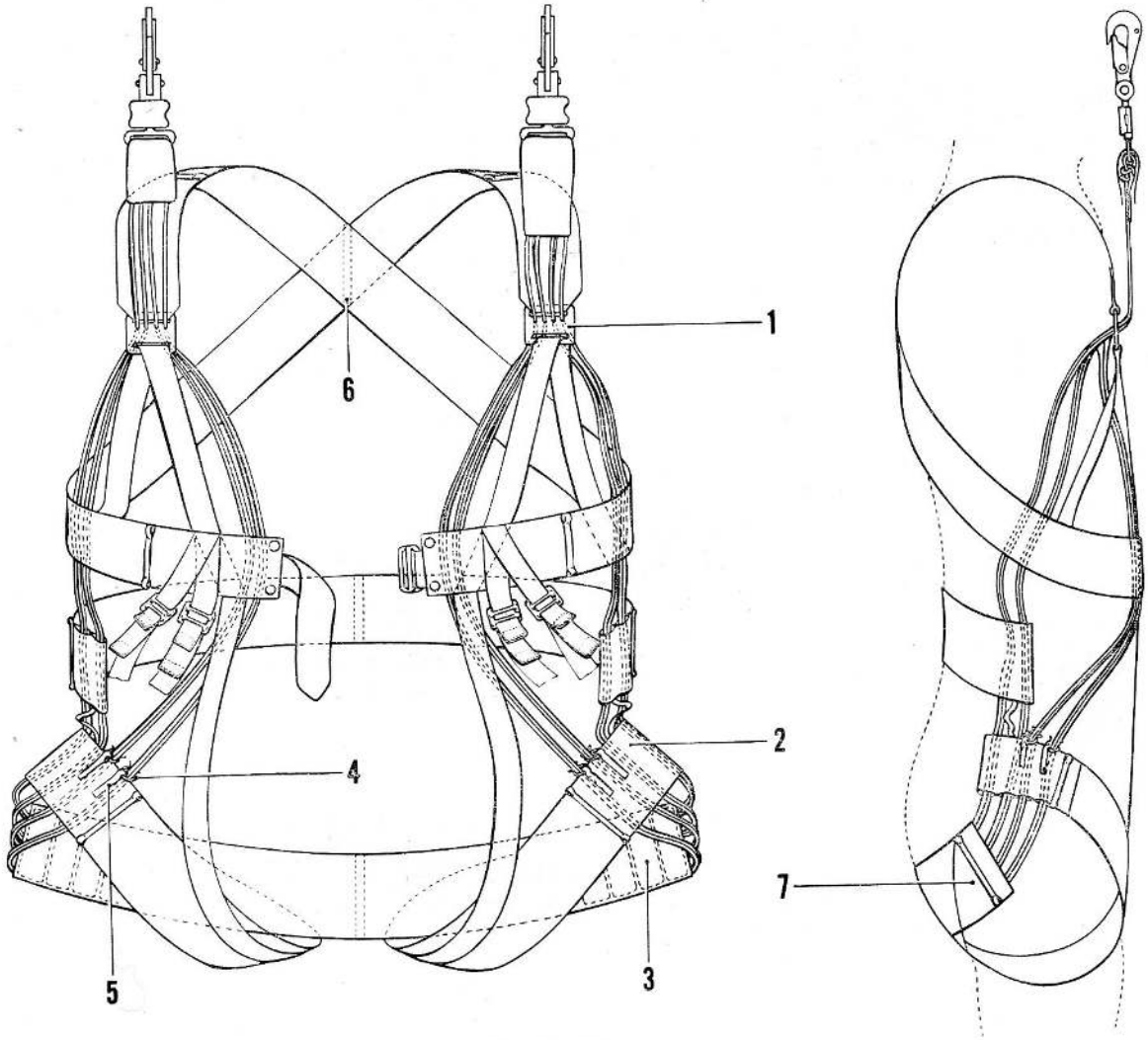

Fig. 7. Harness

the mouth-piece of the oral inflation tube is screwed down firmly and feed the schrader valve connection through the hole in the back left-hand side of the cover. Flatten out the stole, fold the lobes inwards and secure them with the press studs.

Fitting the operating head

13. Fit the operating head to the cylinder as described in Chap. 9 and then to the schrader valve as follows:—

(1) Release the securing tape attached to the retaining clip in the coupling nut of the operating head and remove the clip.

(2) Remove the coupling nut.

(3) Check to ensure that the tip and threads of the schrader block stem and the threads and internal seating of the coupling nut are clean and undamaged.

(4) Screw the coupling nut finger tight on to the schrader block stem until the end of the stem meets the seating inside the nut and then, using two spanners,

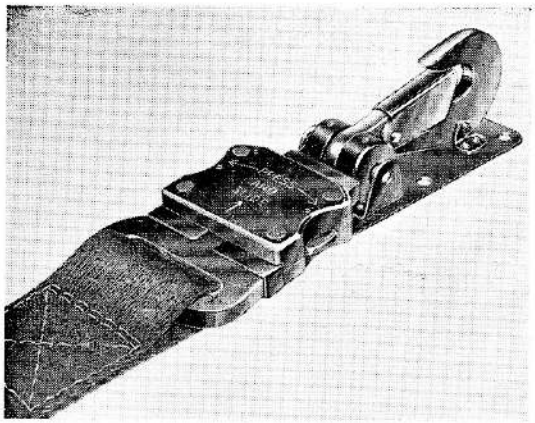

Fig. 8. Combined snap hook and canopy release on mounting plate

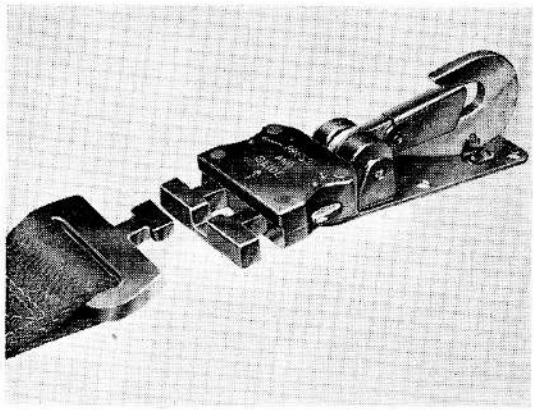

Fig. 9. Snap hook and canopy release separated from harness. (**Note**—*In operation the rivet shears and the hook leaves the mounting plate which is secured to the suit.*)

tighten the nut a further quarter turn.

(5) Push the gas outlet boss on the operating head into the coupling nut with a slight twisting movement.

(6) Check that the alignment of the assembly is correct. This is best done by feeling to ensure that the flat surface of the schrader valve block is in the same plane as the long axis of the gas cylinder and that the stole is not twisted.

(7) Insert the coupling nut retaining clip.

(8) Tie the retaining clip tape round the nut with a thumb knot and bow.

(9) Check the operating head to ensure that the sealing thread on the cap is unbroken.

(10) Tie the webs at the bottom of the cylinder pocket securely round the connecting nut so that they take the strain if the head is operated.

Fitting the emergency oxygen

14. Place the cylinder in the pocket with the tube projecting to the rear and the release cable lying horizontal. Ensure that the bottom of the cylinder is in contact with the bottom of the pocket so that it takes the weight. If it is necessary to adjust the height of the cylinder in the pocket, a packing of the required number of thicknesses of expanded rubber (Ref. No. 32C/385 or 386) cut to shape and stuck together with a suitable adhesive should be made and placed under the cylinder. Thread the feed tube

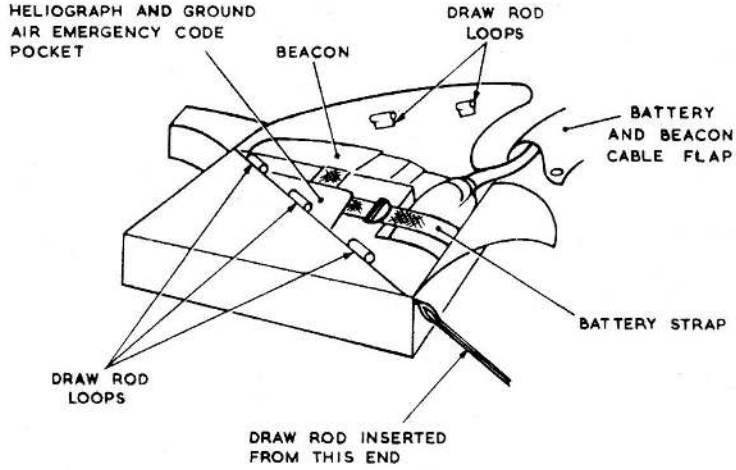

Fig. 10. Layout and equipment in later production suits

through the channel inside the stowage and up through the small channel above. Tie it in position with the two tapes. Lay the release cable inside the stowage and secure the housing with the nylon cords. This is essential to obviate the risk of accidental operation of the oxygen. Pass the nylon cords three times round the housing immediately below the ferrule and knot it three times on the side facing the tube. Cover the knots with several turns of adhesive tape and close the sliding fastener.

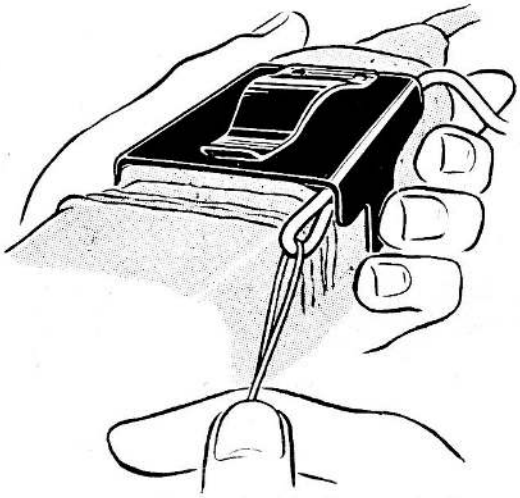

Fig. 11. Connecting the beacon to the battery switch pin—first stage

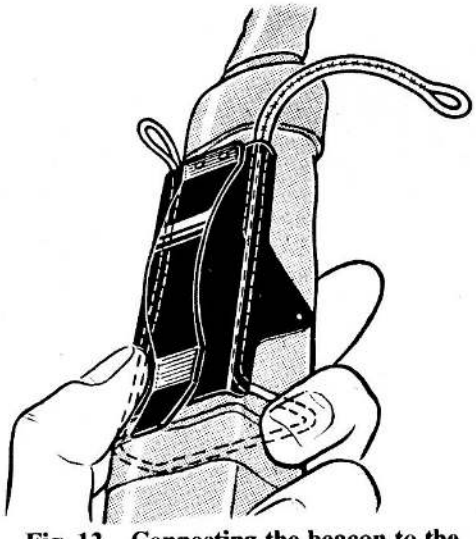

Fig. 12. Connecting the beacon to the battery switch pin—second stage

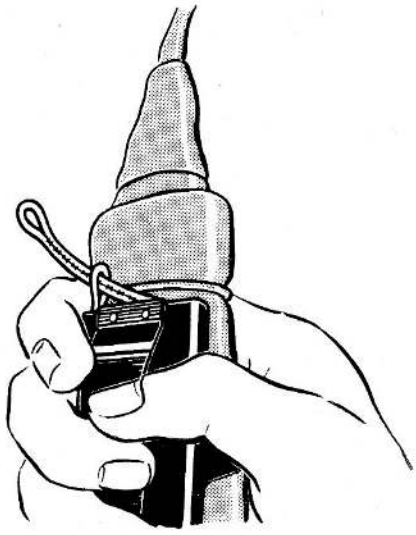

Fig. 13. Connecting the beacon to the battery switch pin—third stage

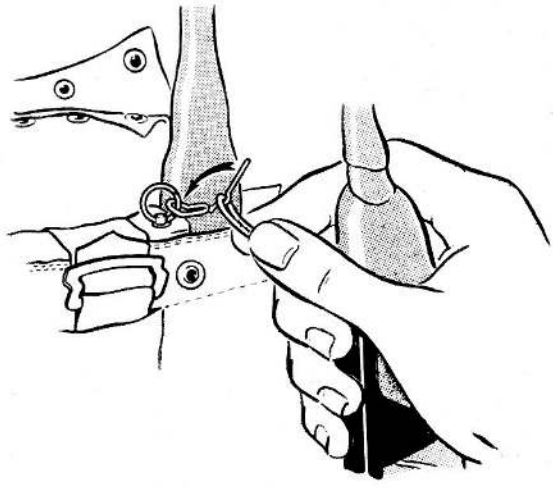

Fig. 14. Connecting the beacon to the battery switch pin—fourth stage

Installing S.A.R.A.H.

15. (1) Place the battery in its pocket with the coding unit facing the front of the suit and secure it in position with the straps and buckles.

(2) Holding the beacon as shown in fig. 11, loop a length of suitable wire or cord through the length of cord on the

beacon, thread it between the clip and the beacon and pull it through.

(3) Pass the cord round the beacon and again thread it under the clip. Position it as shown in fig. 12.

(4) Pass the longer end through the loop at the other end (fig. 13).

(5) Place the loop at the end of the cord over the beacon switch release pin as shown in fig. 14 and position the pin as shown by the arrow so that it retains the loop of cord.

(6) Raise the switch plunger (fig. 15) by lifting the ring with a loop of cord and insert the switch pin into the hole which becomes exposed when the plunger is lifted. Fig. 16 shows how the switch pin is extracted when the beacon is withdrawn.

(7) Place the beacon in its stowage over the battery pocket, draw the edges

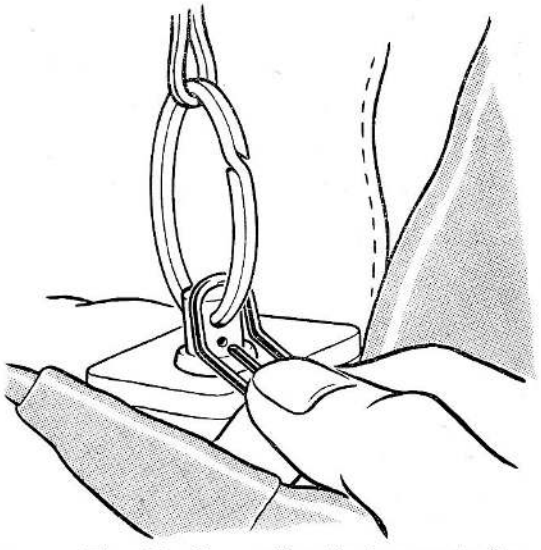

Fig. 15. Connecting the beacon to the battery switch pin—fifth stage

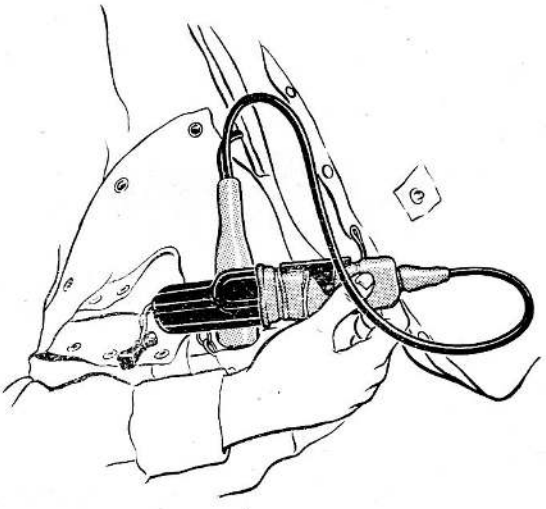

Fig. 16. Automatic extraction of battery switch pin as beacon is withdrawn

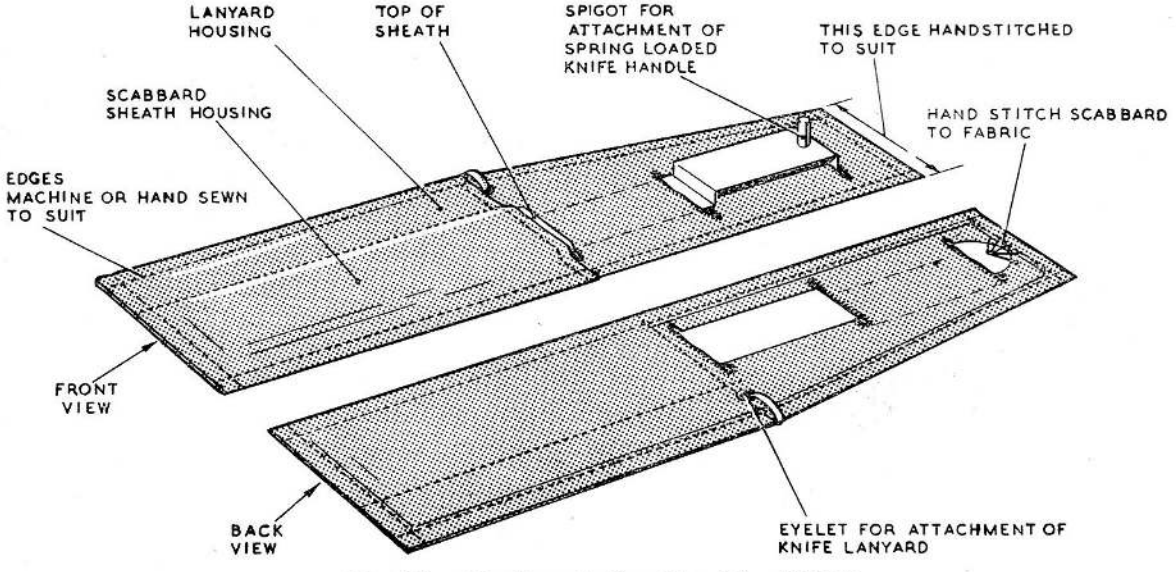

Fig. 17. Attachment of scabbard to retainer

of the flaps together and secure them by passing the draw rod through the beckets from front to rear, using those on the pocket and the flap alternately.

(8) Pull over the outer flap and secure it with the studs.

(9) Stow the loop of cable running between the battery and the beacon under the retaining flap beside the armhole in the suit.

(10) Pass the battery cable through the retaining flaps beside the armhole and behind the neck.

(11) Stow the speech unit and any surplus cable in the speech unit pocket on the left front of the suit and close the pocket by passing the draw rod upwards through the beckets.

(12) Secure the finger ring on the draw rod with the snap fastener at the bottom of the pocket.

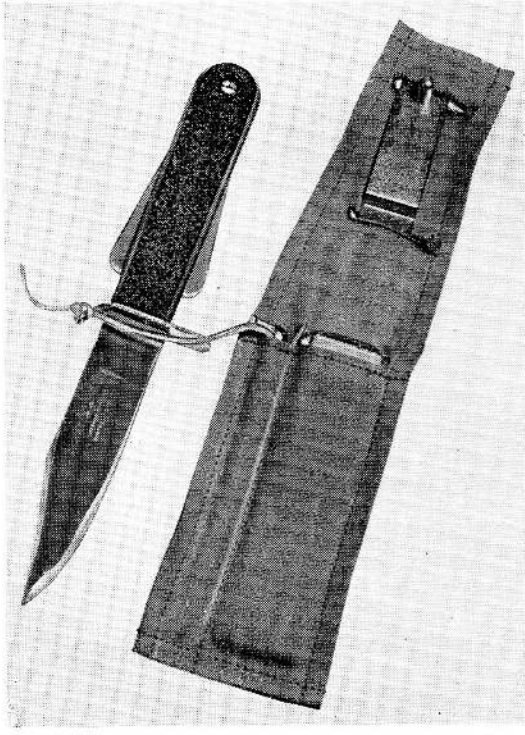

Fig. 18. Knife and scabbard fitted to retainer

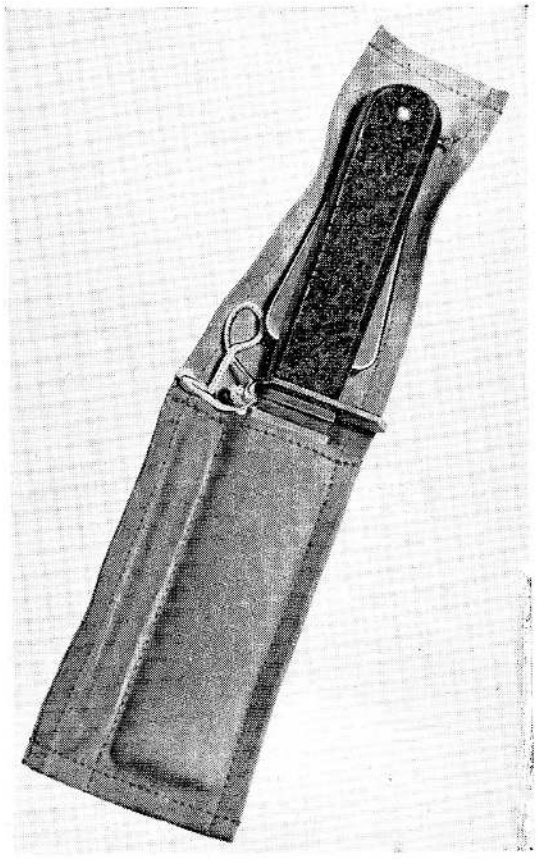

Fig. 19. Knife in scabbard

16. ◀Stowage of the battery, beacon, heliograph and ground/air emergency code in the later production suits is to be in accordance with the following procedure:—

(1) Remove the draw rod from the retaining loops.

(2) Insert the beacon into the upper section of the pocket with the clip inserted in the webbing retainer, and push the unit well into the pouch with the toggle lying adjacent to the beacon.

(3) Stow the heliograph and ground/air emergency code in the small pocket.

(4) Insert the battery in the vertical harness strap below the beacon with the cable leading off to the front. Secure the battery in position by fastening the strap and buckle of the horizontal webbing.

(5) Fold the three flaps over the equipment with the nylon webbing loops on all flaps staggered but in alignment. Insert the draw rod through the loops from front to rear and secure the finger ring with the press stud.

(6) Stow the beacon battery cable and the battery speech unit cable under the flap positioned at the front of the armhole.

The layout of the equipment can be seen in fig. 10.

Stowing the sea-activated battery and lamp

17. Before putting the battery in its pocket ensure that there is a length of cord between the studs on the case and the eyelet in the corner of the pocket. This cord should be $3\frac{1}{2}$ in. long, which is sufficient to allow the battery to be removed from the pocket before the studs are pulled out so that water can enter. A second length of cord should be tied to the same eyelet and the hole in the battery case to act as a retaining lanyard. This should be 33 in. long.

18. Stow the battery in the pocket, studded side forward, with the longer cord looped across the bottom of the case so that it will not snag up when it is withdrawn. The method of packing new lamps and batteries originally adopted resulted in the cable taking up a permanent set at the point at which it emerges from the plug. As a result, when the equipment had a long shelf life before being brought into use or the cable disturbed for examination, there has been a tendency for the insulation to split and open out at the point of set. This tendency has been aggravated by repeated tight wrappings during servicing. At the intervals given in Vol. 4, special attention is to be given to the examination of the cable to ascertain whether splitting has occurred. Lamps with exposed conductors are to be rejected but those with marked or kinked cables may be put back into service provided there is no splitting of the insulation. When re-stowing lamps and batteries the cable is to be led away from the plug in a bend of approximately 1 in. across, wrapped round four fingers and the coil secured to the plug side of the battery with a rubber band. The lamp is to be located in a suitable position for stowage, flat side up, on top of the flex. When stowing the equipment ensure that the loop leading away from the plug is not flattened.

Stowing the whistle and lanyard

19. The end of the lanyard should be secured to the corner of the pocket and the remainder hanked and stowed with the whistle in the pocket beside that in which the sea-activated battery and lamp are stowed.

Stowing the heliograph and ground/air emergency code card

20. These two items are placed in the small pocket on the front of the S.A.R.A.H. battery stowage.

Fitting the knife and scabbard

21. The knife is issued with a metal scabbard and retaining patch, the latter to serve the dual purpose of housing the scabbard and providing a means of attachment to the suit. The scabbard must be secured to the retainer and the retainer to the suit. The positions outlined on the thighs are specially reinforced and the knife must be attached at one of these locations, the choice of which lies with the wearer, who should be consulted before the fitment is commenced. To fit the scabbard to the retainer proceed as follows:—

(1) Refer to fig. 17. Pass the scabbard through the slots in the retainer so that the sheath lies on the under side, i.e. the side on to which the edges of the retainer are sewn.

(2) Secure the top of the scabbard to the retainer with hand stitches passing through the fabric and the hole in the scabbard. Not less than six stitches of double thread (Ref No. 22A/577) are to be used. Ensure that the top of the sheath is not fouled by the fabric.

22. To fit the retainer to the suit place the retainer over the prepared position with the top of the scabbard at the bottom of the location so that the point of the knife will face the wearer's groin and then:—

(1) Commencing with a small triangular stitch at one end of the shortest edge of the retainer, stitch the edges to the suit with a single row of stitching approximately $\frac{1}{8}$ in. from the edge of the material. Use thread (Ref. No. 22A/577), eight stitches to the inch. Terminate the stitching at the other side of the shortest edge with a locking tack.

(2) Sew the short edge of the retainer by hand stitching with similar thread used double and locked off.

23. Attach the knife to the retainer with the lanyard. Pass one end of the lanyard through the hole in the hilt, tie it with three knots and secure the knots with three stitches of the thread. Secure the free end of the lanyard to the corner of the slot through which the mouth of the scabbard is exposed with a series of hand stitches locked off. Insert the knife into the sheath and fit the handle over the spigot, ensuring that it is locked by the spring-loaded device.

Note . . .

Instances of difficulty in removing and re-sheathiing the knife have been shown to be due to the shape of the back of the blade. Knives are to be chamferred on both edges of the backs of the blades by removing approximately 0·030 *in. of metal from the edge to make a* 45 *deg. chamfer, by filing or grinding until they can be removed and re-sheathed easily.*

SERVICING

24. Servicing is to be in accordance with Vol. 4 at the intervals stated therein.

Cleaning

25. The lining should be washed in warm, not hot, water using emulsion detergent (Ref. No. 33C/1129) as the cleaning agent. Washing should be by hand, the material being gently kneaded without rubbing so that the dirt is floated out. After washing, the lining is to be rinsed in clean water until all traces of the detergent are removed, and then hung to dry naturally away from artificial heat and strong light. The suit and scarf should be similarly treated.

Wearing the assembly

26. The suit should be put on carefully, slide fasteners being unfastened to prevent strain. It is essential that the waist belt of the harness is fastened before the main sliding fastener is closed.

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