June 1, 1954 L. E. E. GOSSNER 2,679,647

WATERPROOF SUIT

Filed Oct. 17, 1950

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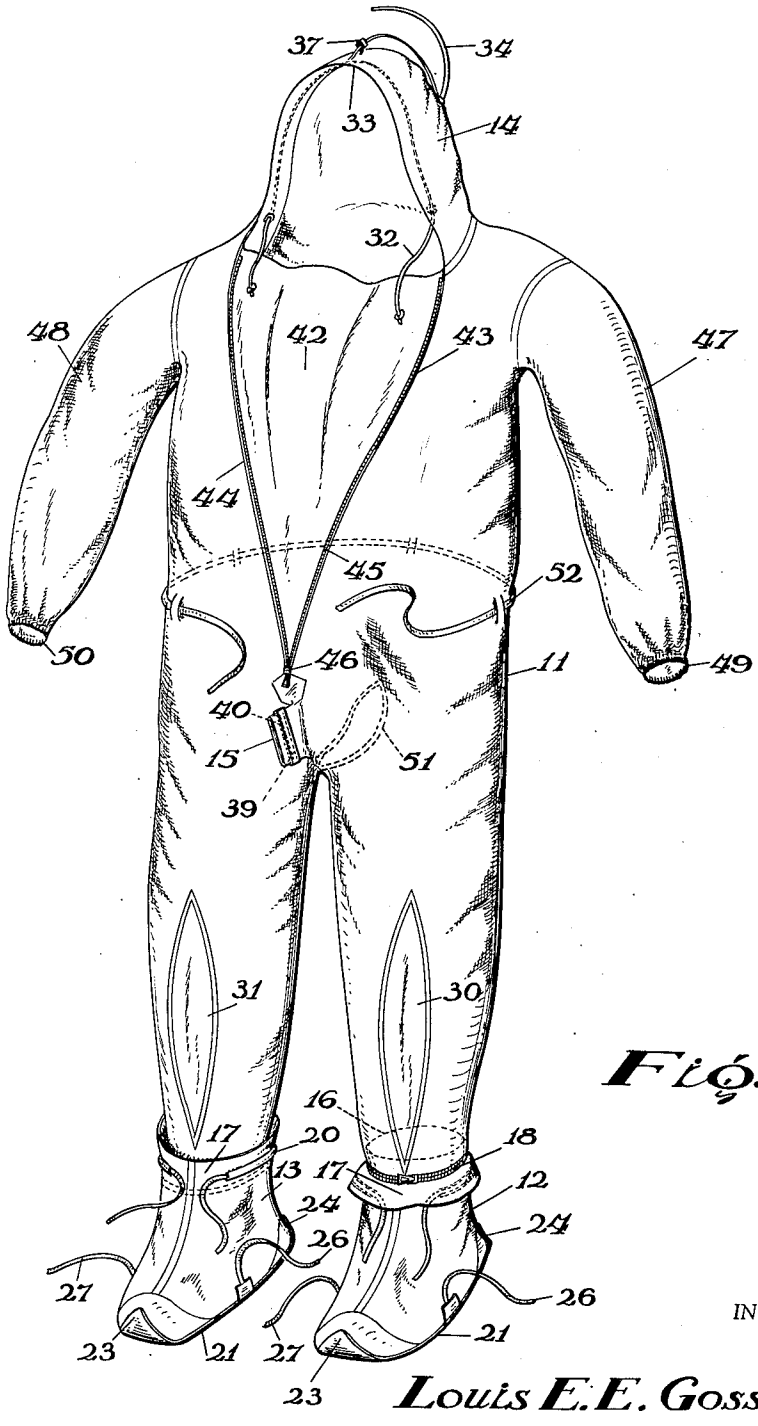


Fig. 1.

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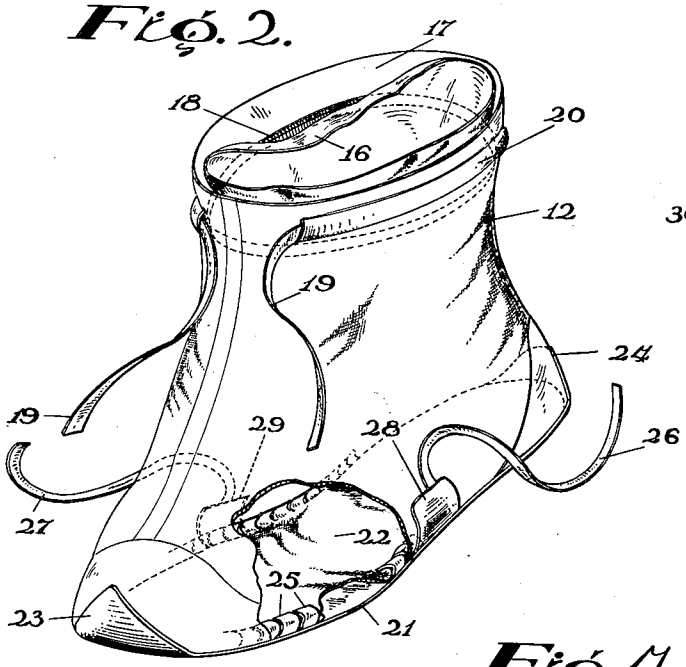
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Fig. 2.



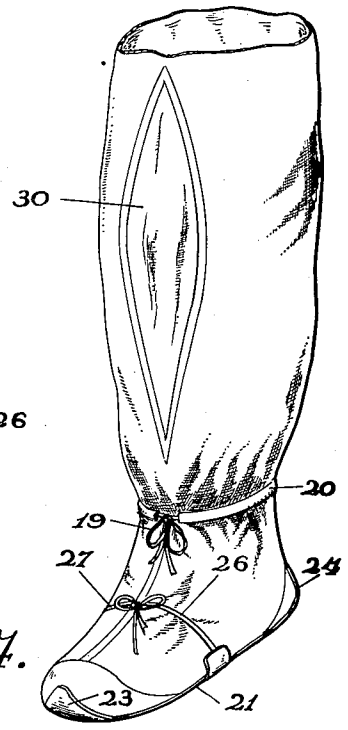


Fig. 4.

Fig. 3.

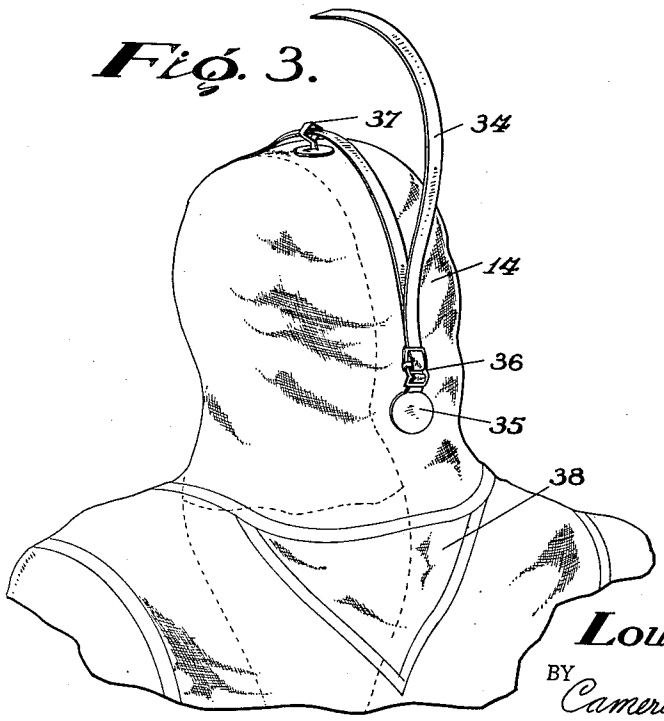
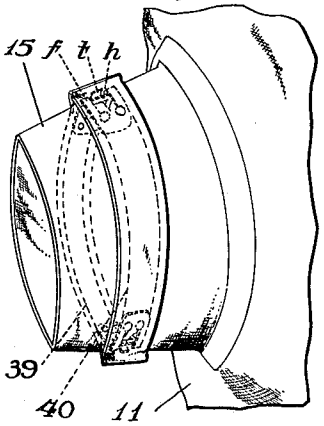


Fig. 5.



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WATERPROOF SUIT

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2 Claims. (Cl. 2—82)

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This invention pertains to a novel and improved waterproof suit or coverall particularly designed to be donned and removed rapidly and with a minimum of effort. The suit is particularly designed for use by troops during landing operations through water wherein the suit must be put on rapidly prior to the landing operation and may then be rapidly removed after the wearer has emerged from the water onto the land. It may also be used wherever a completely waterproof garment is required.

Prior suits of this type have been at best makeshift and have been extremely bulky and cumbersome and in many instances difficult to put on and more difficult to remove after they have been wetted.

The present invention contemplates an improved waterproof suit structure which will enable free movement, bending or crouching by the wearer and yet which will not be of excessive bulk. The invention further contemplates such a suit embodying a number of improved features which will be hereinafter discussed in detail.

It is therefore one object of this invention to provide an improved waterproof suit which will be of reduced bulk but which will allow free movement in any position by the wearer, without binding.

It is another object of this invention to provide such a suit which may be readily donned and easily removed.

It is a further object of the present invention to provide improved boots or foot extremities for such a suit which will obviate many of the disadvantages previously attendant in such footwear.

It is a further object of this invention to provide an improved fly structure for such suits.

It is a further object of this invention to provide an improved hood or head member for such a suit.

Other and further objects of the present invention will become apparent as this specification proceeds.

Referring to the drawings,

Fig. 1 is a plan view of the improved waterproof suit with the fastenings in open condition;

Fig. 2 is a perspective view, partially broken away, of the improved boot or foot member for the suit with the fastenings in open condition;

Fig. 3 is a rear view of the improved hood and shoulder structure of the suit;

Fig. 4 is a perspective view of a portion of the leg and foot structure for the improved suit with the fastenings closed;

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Fig. 5 is a detail of the improved fly structure for the suit.

In the drawings Fig. 1 indicates broadly a waterproof garment constructed of a suitable light waterproof material, for example, rubberized cotton fabric or other suitable light, flexible waterproof material, which comprises broadly a body portion 11, foot or boot members 12 and 13, hood member 14 and fly 15. It will be seen that the suit is designed to cover the entire body from head to foot and is completely waterproof up to the vicinity of the wearer's face.

In order to emphasize the various novel features of the suit the various elements thereof will first be considered separately.

Referring to Fig. 2 of the drawing, there is illustrated an improved boot or foot member designed to be used in conjunction with the suit or which may be formed as an integral part of the leg thereof. Boot or foot member 12 is preferably formed of the same light waterproof material as the balance of the suit and is preferably formed with a very slight taper from toe to heel to the substantially circular top thereof. In the embodiment shown in Fig. 2, which is separable from the lower portion of the trouser leg, the upper extremity of the boot is constructed with inner and outer walls 16 and 17 which are joined as shown at a point appreciably below the top of the boot to form a double-walled top extremity therefor. As shown, a peripheral line of zipper teeth 18 is preferably provided adjacent the line of junction of inner wall 16 and outer wall 17 and is appropriately sewn or stitched therebetween along their line of juncture. Zipper teeth 18 are designed to be meshed with a corresponding peripheral line of zipper teeth applied about the bottom extremity of the trouser leg, as will hereinafter be discussed in more detail.

A top binding strap 19 is shown disposed about the upper outer periphery of the foot top slightly above the line of zipper teeth and is maintained in position thereabout by strap loop 20 which is appropriately cemented or otherwise affixed about the outer periphery of the top of the boot.

The sole portion of the boot preferably comprises an outer sole 21 and an inner sole 22 which are preferably respectively cemented or otherwise applied over the reinforcd material forming the bottom of the foot. As shown, outer sole 21 is preferably turned up over the toe portion of the boot to provide a toe member 23 and is turned up over the heel portion thereof to provide a heel member 24. Outer sole 21 is pref-

erably formed of a reasonably heavy cork and rubber mixture, to provide a strong, nonslipping sole for the boot.

Inner sole **23** is preferably formed of a reasonably heavy soft material such as flannel or heavy cotton drill and is appropriately cemented over the material of the boot to provide an inner sole therefor. As shown, the lateral edges of inner sole **22** are preferably extended above the sole line of the boot and its edges are preferably segmented in substantially vertical segments **25** which lie against the lower inner wall of the upper of the boot. Binding straps **26** and **27** are shown suitably affixed laterally of the sides of the boot at about its median point by means of tabs **28** and **29** which are preferably cemented under the sole portion of the boot between the material and the outer sole **21** to provide a firm mounting for binding straps **26** and **27**. The boot is preferably reinforced about its entire periphery for about 1½'' above the edge of the sole.

The top opening of boot **12** is preferably on the order of 10 to 12 inches in diameter to permit the ready insertion of a foot and shoe therein.

Referring to the leg portions of the suit, bellows or insert members **30** and **31** are preferably provided in the forward center edges thereof, extending from the ankle portion thereof to an appreciable distance above the knee portion. Insert members **30** and **31** are preferably formed by slitting the material of the forward edge of the leg of the garment substantially from the ankle region to the center of the thigh region thereof and then inserting, as by cementing, an excess of material between these slits to provide a greater freedom for expansion at the forward knee portion of the leg. As shown, inserts **30** and **31** are preferably gradually enlarged to a point over the knee cap of the wearer and are then tapered onwardly above to a point at substantially the middle of the upper thigh. Inserts **30** and **31** are preferably formed of the same material as the balance of the suit.

Referring to the head or hood portion **14** of the suit, the hood is preferably of considerable width and extends outwardly to approximately the middle of the shoulders of the suit. Hood **14** is preferably provided with a facial drawstring **32** which is preferably inserted about the front lateral edges thereof in a peripheral recess provided by a doubling back and cementing of the material of the forward portion of the hood. As shown, drawstring **32** emerges from the lower front extremities of the hood through holes provided therefor in such fashion that it may be tied about the chin or lower portion of the face of the wearer.

The top or upper portion of the hood is preferably of such length as to extend downwardly to a point just above the wearer's eyes. In order that the hood portion of the garment may be adjustable to any size head and the position of the upper edge thereof may be adjustable to the individual wearer a strap **34** is provided, extending from the lower rear portion of the hood forwardly to its front forward edge **33**. Strap **34** is preferably adjustably affixed at the lower rear portion of the hood by means of the tab **35** carrying adjustable buckle **36**. As shown, strap **34** is preferably affixed to the hood adjacent its forward center edge and extends rearwardly thereover through strap eye **37** which maintains it in proper position across the medial line of the hood, whence it passes downwardly through buckle **36**. By pulling upwardly on the extremity of strap **34** the forward edge of the hood is pulled to the rear to adjust its position with respect to the face of the wearer.

Referring to the back shoulder portion of the garment, a V-shaped or triangular insert **38** is preferably provided centrally thereof, lying directly below the rear portion of the hood between the shoulders of the garment, to provide a bellows or expansible insert at that point to allow freedom of movement to the arms of the wearer and to facilitate donning and removal of the garment. As shown, insert **38** is preferably of triangular shape and is preferably tapered downwardly to a point approximately between the shoulder blades of the wearer.

Fly structure **15** is preferably composed of a substantially cylindrical extension of the lower center portion of the suit adjacent the crotch and is preferably made integral therewith and extends outwardly therefrom an appreciable distance, preferably on the order of two inches. Flat springs **39** and **40** are preferably disposed laterally within the outer edges of the opening of fly **15** in such fashion that when outward pressure is applied to the extremities thereof the outer periphery of the fly will open and will be maintained in open position until springs **39** and **40** are forced inwardly together. Details of the terminal connections of springs **39** and **40** are shown in Fig. 5. These terminal connections are identical at both end junctures of springs **39** and **40** and comprise, as shown, a spring steel tongue *t* and parallel fingers *f* affixed at the extremity of spring **39**, tongue *t* being curved and fitting through a slotted head *h* affixed to the extremity of spring **40**, fingers *f* bearing against the lateral extremities of head *h* above tongue *t*. Thus, when springs **39** and **40** are forced together slotted head *h* will pivot on tongue *t* in contact with fingers *f* which will then force it into a horizontal position against the pressure of tongue *t* to hold springs **39** and **40** in close, bearing relationship. Conversely, when springs **39** and **40** are forced outwardly slotted head *h* will pivot on tongue *t* against the pressure of fingers *f* until springs **39** and **40** are sufficiently distorted, at which time they will spring outwardly and remain in open, opposed relationship, maintained in that position by the spring tension of tongue *t* and fingers *f* against head *h*.

When in closed position fly **15** is designed to be folded back upon itself and clamped in that position to prevent ingress of water through the fly.

In the body of the suit it will be seen that a large triangular insert or apron **42** is provided between the edges **43** and **44** of the forward portion of the suit. Insert **42** is preferably cemented or otherwise affixed between the edges **43** and **44**, which as shown are provided with an appropriate zipper fastener **45** and slide **46**. Insert **42** is preferably triangular in shape and at its top portion is appreciably wider than the lower portion of the hood member and tapers downwardly to come to a point just above the fly member **15** of the suit.

Suitable arm members **47** and **48** are provided extending downwardly from the shoulders of the suit and are preferably provided with elastic wrist bands **49** and **50** at their extremities to provide a water-tight closure at the extremities of the sleeves of the suit about the wrists of the wearer. It will be noted that considerable fullness is preferably provided in the shoulders and

arms of the suit to accommodate the garments of the wearer.

An additional bellows insert 51 is also preferably provided in the crotch seam and seat of the garment, extending from the front edge of the crotch seam to approximately the center of the seat. This insert eliminates binding in the crotch of the garment when the wearer is in a stooping or bending position. It is preferably of substantially the same tapered shape as inserts 30 and 31 and is cemented or otherwise affixed to the edges of the opened crotch seam, which is split to receive it.

In the embodiment of the invention shown in Fig. 4 of the drawing the boot member is made integral with the trouser leg, the double-walled top and zipper extremity of the boot shown in Fig. 2 being eliminated in this embodiment of the invention. Binding straps 19 and 26—27 are provided to tighten the ankle and upper foot portion of the boot about the ankle and foot of the wearer.

In the embodiment of the invention in which the boot member is made separable from the trouser leg the lower extremity of the trouser leg and the boot top are of substantially the same diameter. In this embodiment of the invention after the balance of the suit has been put on the boot member is slipped over the foot of the wearer and the lower extremity of the trouser leg is inserted between inner wall 16 and outer wall 17 of the boot top. The zipper slide is then actuated to join the zipper teeth 18 with the zipper teeth about the lower periphery of the trouser leg. Strap 19 is then pulled tight and tied, providing a waterproof union between the lower extremity of the trouser leg and the double-walled boot top.

The embodiment of the suit in which the boot foot is made integral with the trouser leg, as shown in Fig. 4 of the drawing, provides a completely unitary garment which may be donned or removed in a minimum of time yet which preserves the various advantages of the removable boot embodiment of the suit.

The suit is preferably provided with a suitable belt 52 about its waist section to enable the wearer to belt the suit in at the waist after he has put it on, to eliminate puffing or bulging of the suit in the water.

In using the suit the prospective wearer first frees main zipper 43, then inserts his legs through the opening above insert 42, pulling the suit on until his feet register with the soles of boots 12 and 13. The arms are then inserted into the sleeves of the garment and the hood is pulled over the head. The wearer then ties straps 26 and 27 over the insteps of his feet to take up excess material in the feet and ties straps 19 about his ankles taking up excess slack in the legs of the suit. Zipper 43 is then pulled upwardly closing the front portion of the garment over the chest of the wearer. Head strap 34 is then pulled upwardly to raise the front edge of the hood to the desired height above the wearer's eyes. As a final step, cord 32 is knotted under the wearer's chin to enclose the edges of his face snugly within hood 14. The reverse of this operation is followed in the removal of the suit.

The present suit has numerous advantages over coverall suits which have been used in the past. Due to the bellows inserts 30 and 31 over the knees of the garment, the bellows insert 38 between the shoulders thereof and the crotch insert 51, even when the suit is completely fastened

over the person there is great freedom of movement of both the arms and legs and the wearer may assume a kneeling, crouching or crawling position in the suit without binding thereof. Furthermore, due to the novel disposition of the bellows inserts, excess fabric and bulkiness previously found in such coverall garments and which made them extremely cumbersome to wear, are eliminated.

Due to the various adjustments possible in the hood and boot portions of the garment it can be made in two sizes, i. e., medium and large, to fit practically any size wearer.

The garment is extremely light and relatively inexpensive to manufacture and due to its various watertight closure features it will maintain the wearer in a dry and comfortable condition during long periods of exposure to water.

The invention is susceptible of numerous embodiments without departing from the spirit thereof. Attention is directed to the appended claims for a limitation of its scope.

What is claimed is:

1. In a waterproof suit provided with body, leg, and arm covering portions, vertically disposed bellows inserts in the forward edges of the leg portions, a vertical bellows insert in the rear upper section of the body portion of the suit, narrow shoulder portions of approximately one fourth of the width of said body portion at the upper lateral extremities of said body portion, a downwardly widened hood made integral with the upper portion of the suit and extending to the inner edges of said narrow shoulder portions thereof, a draw string slidably inserted about the edges of the forward extremity of said hood, a central opening extending down the front of the suit to the crotch thereof, a V-shaped bellows insert affixed within the front portion of the suit behind said opening extending at its upper lateral extremities outwardly to the lower edges of said hood and wedge-shaped boots made integral with the lower legs of the suit.

2. In a waterproof suit including body, leg, and arm covering portions, narrow shoulder portions of approximately one fourth of the width of said body portion disposed at the upper extremity of said body portion, a downwardly widened hood made integral with the upper extremity of said body portion and extending outwardly to the inner edges of said narrow shoulder portions, bellows inserts vertically disposed in the knee sections of the leg portions thereof, a vertically disposed triangular bellows insert in the upper rear section of the body portion, an elliptical bellows insert horizontally disposed in the crotch area thereof, and wedge-shaped boots made integral with the lower extremities of the leg portions of the suit.

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