

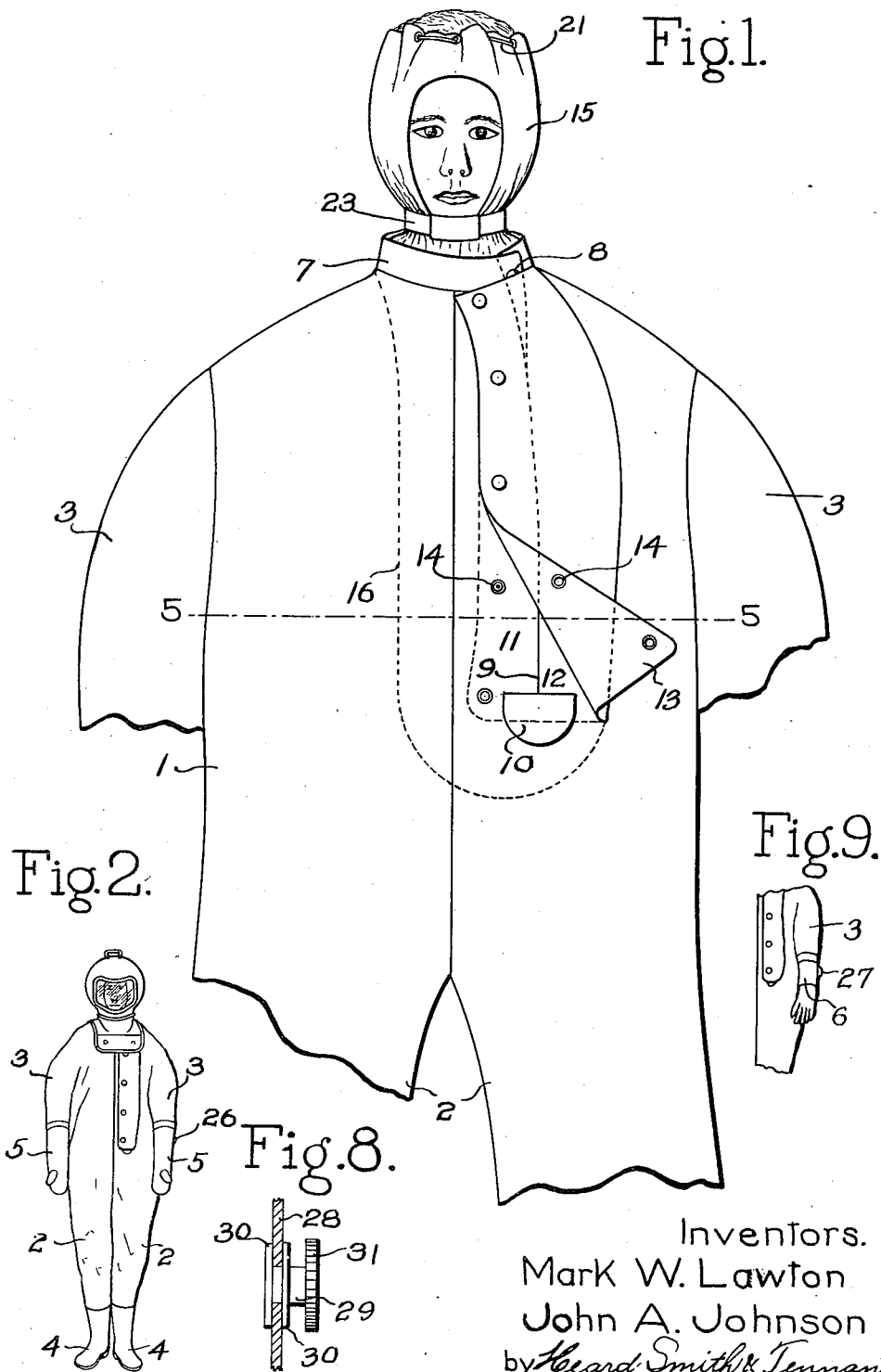
July 7, 1936.

M. W. LAWTON ET AL
SHALLOW WATER DIVING SUIT

2,046,565

Filed Oct. 11, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig.3.

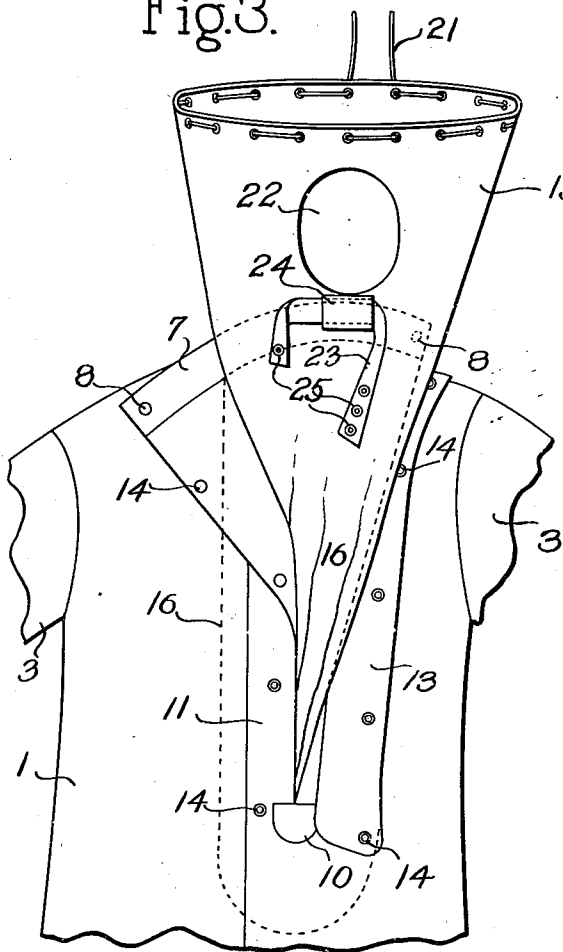


Fig.4.

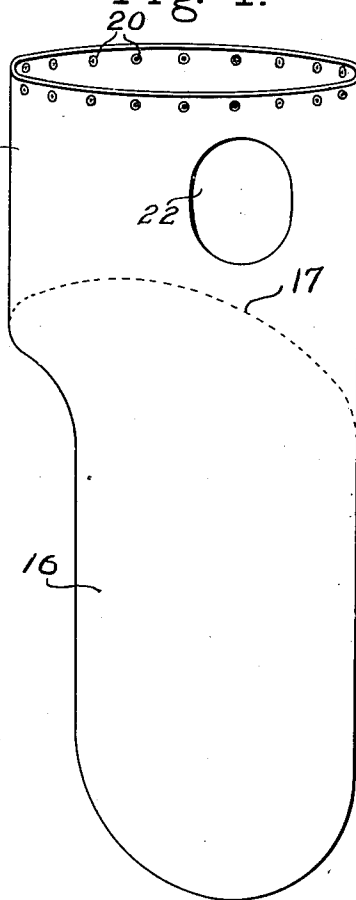


Fig.5.

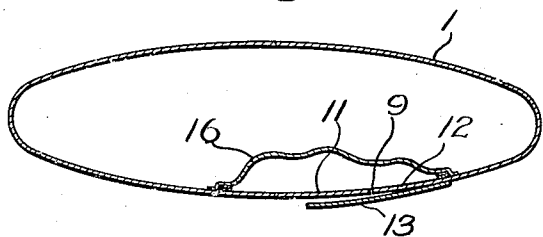


Fig.6.

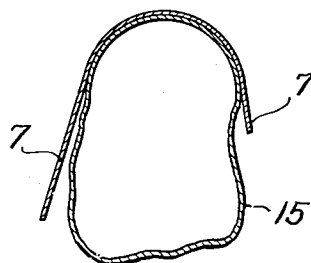
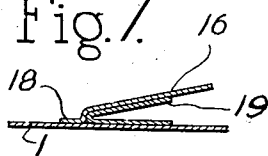


Fig.7.



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UNITED STATES PATENT OFFICE

2,046,565

SHALLOW WATER DIVING SUIT

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Application October 11, 1935, Serial No. 44,540

5 Claims. (Cl. 61—70)

This invention relates to a waterproof suit to protect the body of the wearer in wading or diving in comparatively shallow water. The suit is particularly designed for use in connection with a helmet which fits over the head and rests upon the shoulders of the wearer and into which helmet air is pumped through a hose extending to above the water.

While such a helmet has been extensively employed with the diver dressed in an ordinary swimming suit or work clothes, a suit embodying the present invention enables use of the outfit to be greatly extended. The diver's body is thoroughly protected by the suit and therewith he may work in much colder water and for longer periods of time with greater comfort.

The suit embodying the invention is also useful when employed as a wading suit without the helmet since the body of the wearer up to the head is thoroughly protected.

The invention also has for its further object to provide means readily operated by the wearer to release air compressed by the water and trapped in the suit.

The nature and objects of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

In the drawings:

Fig. 1 is a front view of the upper portion of a suit embodying the invention shown in position on the wearer.

Fig. 2 is a front view of a preferred form of the suit together with a diving helmet shown in position on the wearer.

Fig. 3 is a front view of the upper portion of the suit shown in Fig. 1 with the suit substantially in condition for being drawn over the body of the wearer.

Fig. 4 is a perspective view of the extension element of the suit.

Fig. 5 is a view in cross section taken on the line 5—5 of Fig. 1.

Fig. 6 is a view in cross section taken through the collar and extension element of the suit.

Fig. 7 is an enlarged detail in cross section showing the construction of waterproof joint employed between the extension element and the body of the suit.

Fig. 8 is a detail partially in cross section showing the air releasing valve.

Fig. 9 is a view similar to a portion of Fig. 2 illustrating the suit provided with a cuff instead of a mitten.

The suit is made of any suitable waterproof

material but preferably of light-weight canvas coated or impregnated with rubber so as to render it waterproof. It covers the entire body of the wearer and in the preferred form extends upward over the head of the wearer and is arranged to prevent entrance of water up to a line directly below the mouth of the wearer. The leg portions terminate in short rubber boots and the sleeves may terminate either in rubber mittens or in rubber cuffs compressed against the wrists to prevent admission of water.

The suit, as already pointed out, is particularly useful in connection with a diving helmet fitting over the head and resting upon the shoulders of the wearer. The combined preferred form of suit and helmet is shown generally in Fig. 2 and in this form the sleeves of the suit are shown terminating in the rubber mittens. In Fig. 9 the suit is of the same construction excepting that the sleeves terminate in rubber cuffs, leaving the hands free.

The main portion of the suit comprising the trunk 1, the leg portions or trousers 2 and the arm portions or sleeves 3 is constructed in any usual and suitable manner from the waterproof material such as waterproof canvas, the different sections being seamed and cemented together so as to prevent admission of water to the interior of the suit. The trousers 2, as shown in Fig. 2, terminate in suitable rubber boots 4 united thereto by waterproof joints. Likewise the sleeves 3 terminate in such a manner as to prevent admission of water. In Fig. 2 the sleeves are shown terminating in rubber mittens 5 united thereto by waterproof joints, while in Fig. 9 the sleeves 3 are shown terminating in rubber cuffs 6 united by a similar waterproof joint thereto and at their extremities compressed against the wrists of the wearer to prevent admission of water.

One of the main features of the invention resides in the construction of the upper portion of the suit by means of which it may readily be entered by the wearer and readily secured to the body and head of the wearer so as to protect the wearer against admission of water up to a line extending around the chin. Consequently when the helmet is placed over the head of the wearer and the water pressure applied thereto to keep the water out of the helmet, the wearer is completely protected from water and may work with ease and comfort in water even of considerable depth or under conditions where the heavy, expensive and standard diving suit is not necessary. A suit of the present invention when used with the helmet can be quickly fitted to the wearer

and employed for a wide variety of purposes such as inspecting yacht and other boat bottoms, rescuing persons, recovering bodies or observing under water objects.

5 The main or trunk portion 1 of the suit presents a neck opening bounded by a collar band 7 which forms the upper termination of the trunk portion 1. This collar band is provided at each end with a two-part separable fastener 8 by means of which the overlapped ends are secured together as shown in Fig. 1 providing the neck opening loosely surrounding the neck of the wearer.

From the neck opening a front opening 9 extends well down toward the waist and at the bottom of this opening the garment is strengthened by a suitable gusset 10 cemented thereto. When the garment is in position on the wearer, the edge portions 11 and 12 between which the front opening 9 extends substantially about, as shown in Fig. 5. The front opening is closed by a flap 13 of the material cemented at one edge to the exterior of the garment. In the construction illustrated the edge portion 11 of the garment and this flap 13 are provided with cooperating separable fasteners 14 by means of which, when the garment is in place on the wearer, the front opening 9 is covered and protected by the flap 13 being fastened to the edge portion 11.

30 The suit is rendered impervious to water at its upper portion notwithstanding the neck and front opening which are necessary to enable the wearer to get into the suit by means of an extension element. This extension element is shown separately in Fig. 4 and is likewise made of suitable waterproof material but preferably of a much lighter weight than that of the body portion of the suit. This extension element has an upper part 15 circumferentially continuous and of a size when distended, as shown in Figs. 3 and 4, sufficient to pass over the body of the wearer and a lower part in the form of a bib 16 continuous with and depending from the upper part. This extension element is secured to the interior of the garment with the entire lower edge secured to the garment along the rear of the neck opening and down on the inside of the garment at each side of and beneath the front opening by a continuous water-tight joint. That portion of the lower edge 17 in the rear of the upper part of the extension is secured to the rear portion of the garment at the collar, as shown in Fig. 6, while the edge of the bib portion 16, as shown in Figs. 1 and 3, extends from the collar at each side of and beneath the front opening 9. A suitable form of waterproof joint employed between the extension element and the body of the suit is illustrated in Fig. 5 and in detail in Fig. 7 wherein the bib portion 16 is shown as overlying and cemented to the body of the garment at 18 while a folded reinforcing strip 19 is fitted in between the body and the extension element and cemented to both.

The extension element in its preferred form is of sufficient length to extend over the entire head of the wearer and its upper edge is provided with lacing holes 20 through which a cord 21 is threaded to enable the extension element to be drawn together and held in place over the head of the wearer. At the front the extension element is provided with an opening 22 for the eyes, nose, and mouth of the wearer.

The extension element is also provided with means by which its upper part may be collapsed and compressed snugly against the head of the

wearer along a line extending around the chin and the back of the neck. For this purpose an elastic strap 23 is provided passing through a positioning loop 24 cemented to the extension and provided at its ends with cooperating separable fasteners 25.

When the suit is to be placed upon the diver the separable fasteners 8 and 14 are separated and the extension element expanded. The diver may then readily enter the suit through the open upper end of the extension. When the suit is adjusted to his person, the separable fasteners 8 and 14 are secured together, the extension element readily collapsing inside of the suit. The draw string or lacing cord 21 is then drawn tight over the head and the elastic strap 23 is drawn tightly around the chin and the back of the neck of the wearer and its separable fasteners 25 secured together. Thus it will be seen that there is no possibility of the admission of water to the suit up to the line of the strap 23. Furthermore, as this strap compresses the extension element of the suit snugly against a rigid portion of the head, there is little danger even of water passing the line of the strap. But when the suit, as it is particularly designed, is used with the diving helmet, water is prevented by means of the air pressure maintained in the helmet from approaching the line where the strap compresses the suit against the chin and neck of the wearer.

The suit is not only water-tight but is also airtight and consequently after the suit is in place and the wearer enters the water, the pressure of the water forces the trapped air toward the upper portion of the suit and it is therefore desirable to release the air. For this purpose the invention provides an air passage through the upper portion of the garment and a valve in this passage which may be operated by the wearer from the exterior of the garment to open and close the passage and thus permit the discharge or release of air from the interior of the garment. This valve is conveniently placed near the extremity of one of the sleeves so that the wearer, by raising the arm where the valve is located, may operate the valve with the other hand and release the air. Such a valve is shown in Fig. 2 at 26 in the mitten of the left sleeve and in Fig. 9 at 27 in the cuff of the left sleeve. In Fig. 8 the construction is shown more in detail. In this figure the material 28 of which either the mitten or the cuff is constructed is formed with a passage or hole in which is inserted the valve casing 29, the casing 29 being clamped in position by the clamping members 30. A knurled head 31 is illustrated and the rotation of this head in one direction or the other effects the opening and closing of the valve in the casing 29. No particular construction of valve is illustrated as the specific construction of the valve forms no part of the present invention. It will be seen, therefore, that the operator may readily grasp and turn the head 31 with the hand in the opposite sleeve and thus at any time release the entrapped air in the garment.

There is thus presented a highly efficient construction of diving or wading suit which completely protects the body of the wearer and which, when used with a diving helmet, embodies an outfit capable of a wide range of use in shallow water or under conditions where the standard heavy diving suit is not required.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A diving suit comprising a combination garment of waterproof fabric provided with means for preventing the admission of water to the sleeve and trousers' ends and having a neck opening and a front opening extending from the neck opening well down toward the waist, separable means for opening and closing the front opening, an extension of waterproof fabric having its upper part circumferentially continuous and of a size when distended sufficient to pass over the body of the wearer and its lower part a bib continuous with and depending from the front of the upper part with the entire lower edge of the extension secured to the garment along the rear of the neck opening and down on the inside of the garment at each side of and beneath the front opening by a continuous water-tight joint, and means for collapsing the upper part of the extension and compressing it snugly against the head of the wearer.

2. A diving suit comprising a combination garment of waterproof fabric provided with means for preventing the admission of water to the sleeve and trousers' ends and having a neck opening and a front opening extending from the neck opening well down toward the waist, separable means for opening and closing the front opening, an extension of waterproof fabric having its upper part circumferentially continuous and of a size when distended sufficient to pass over the body of the wearer and its lower part a bib continuous with and depending from the front of the upper part with the entire lower edge of the extension secured to the garment along the rear of the neck opening and down on the inside of the garment at each side of and beneath the front opening by a continuous water-tight joint, means for contracting the upper edge of the upper part of the extension over the head of the wearer, an opening in the front of the upper part of the extension for the face of the wearer, and means for collapsing the upper part of the extension beneath the opening and compressing it snugly against the head of the wearer along a continuous line around the chin and the back of the neck.

3. A diving suit comprising a combination garment of waterproof fabric provided with means for preventing the admission of water to the sleeve and trousers' ends and having a neck opening and a front opening extending from the

neck opening well down toward the waist, separable means for opening and closing the front opening, an extension of waterproof fabric having its upper part circumferentially continuous and of a size when distended sufficient to pass over the body of the wearer and its lower part a bib continuous with and depending from the front of the upper part with the entire lower edge of the extension secured to the garment along the rear of the neck opening and down on the inside of the garment at each side of and beneath the front opening by a continuous water-tight joint, means for contracting the upper edge of the upper part of the extension over the head of the wearer, an opening in the front of the upper part of the extension for the face of the wearer, and an elastic strap for surrounding the upper part of the extension beneath the face opening and acting when tightened up to collapse said part and compress it snugly against the head of the wearer along a continuous line around the chin and the back of the neck.

4. A diving suit comprising a combination garment of waterproof fabric impervious to the admission of water except at an opening for the neck of the wearer and a front opening extending from the neck opening well down toward the waist, separable means for opening and closing the front opening, an extension of waterproof fabric having its upper part circumferentially continuous and of a size when distended sufficient to pass over the body of the wearer and its lower part a bib continuous with and depending from the front of the upper part with the entire lower edge of the extension secured to the garment along the rear of the neck opening and down on the inside of the garment at each side of and beneath the front opening by a continuous water-tight joint, and means for collapsing the upper part of the extension and compressing it snugly against the head of the wearer.

5. A combination garment of waterproof material enclosing the entire body of the wearer up to the head having an air passage through the garment near the extremity of one of the arms and a valve in said passage operable from the exterior of the arm to open and close the passage to permit the discharge of air from the interior of the garment.

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