May 20, 1969 J. W. SMITH 3,444,570

WET-DRY SURVIVAL SUIT

Filed April 18, 1966

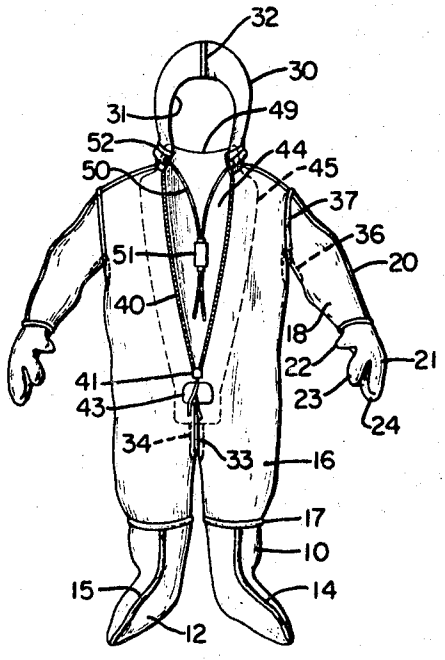


Fig. 2

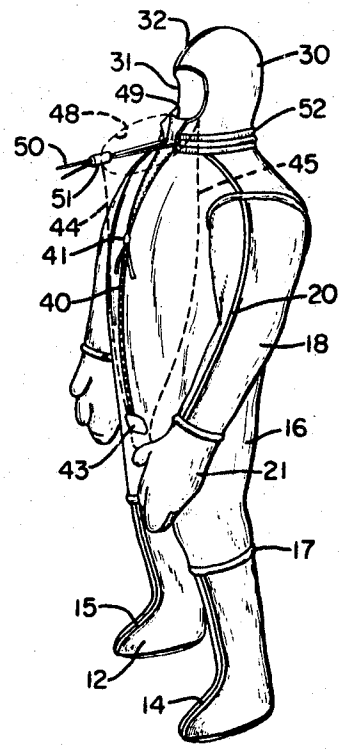


Fig. 1

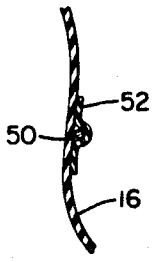


Fig. 3



Fig. 4

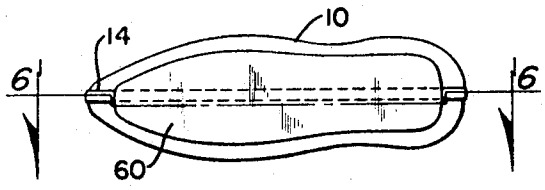


Fig. 5

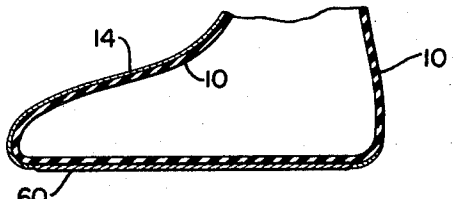


Fig. 6

INVENTOR.

JAMES W. SMITH

BY

Richard D. Law

ATTORNEY

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WET-DRY SURVIVAL SUIT

James W. Smith, 946 S. Joliet, Aurora, Colo. 80010

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ABSTRACT OF THE DISCLOSURE

A coverall-type survival suit having a connected hood and provided with integral hand and foot covers, is provided with a single front opening, partially closable by a slide fastener, to leave the face of an occupant exposed. A large triangular shaped flap is sealed around the slide fastener opening and forms with the face opening an entrance for a user. When the slide fastener is closed the flap covers the chin of the occupant and a draw string around the neck and over the flap keeps the occupant's body dry.

This invention relates to survival wear and more particularly to survival wear of a coverall-type in which a user may be immersed in water yet remain dry and relatively warm, and specifically the invention relates to frigid water survival wear.

Ice cold water, and particularly sea water is a real hazard for many occupations which require work near or above such water. Sailors in the Arctic and Antarctic Oceans and in other bodies of water during the winter, off shore drilling rigs on which workers work above the water, and like occupations may at times be subjected to immersing in the water due to mishaps and accidents. In 30 to 34 degree sea water, without protection, a human being can survive but a few minutes. Even in water with a temperature around 40° a survival time of a human being is quite limited, if such person is immersed in the water without adequate protection.

According to the present invention I have provided a survival suit of the coverall-type which provides insulation for the occupant of the suit permitting extended survival times in the coldest of water, and in addition, the suit provides means for maintaining the occupant dry. A further benefit from the suit is that it is made of a material which provides buoyancy to the occupant under all conditions, and even will provide buoyancy for the occupant where the suit has been torn, permitting the entry of water into the suit. The survival wear is made of a number of pieces secured together in such a manner as to produce, in final form, a one-piece suit having a single opening and a single slide fastener closing means. This permits the user to dress in the suit and to secure the same for water operation in a minimum of time. An additional advantage of the single opening is that essentially no instructions are necessary for dressing in the suit, and inexperienced persons can easily dress in the suit within a time of less than a minute. Once inside the suit the occupant may be immersed in water and still float even though the suit has not been secured for water tightness as where the slide fastener has not been closed either partially or wholly. This provides a means for survival under very limited time preparation.

Included among the objects and advantages of the present invention is to provide a survival suit with a single opening for minimum time of dressing in the suit and to provide a suit which will float indefinitely with an occupant even if completely full of water.

Another object of the invention is to provide a floating survival suit having sealed buoyancy capacity to maintain it afloat indefinitely.

Another object of the invention is to provide a wet-dry survival suit which has a single opening and is arranged to permit a fully clothed individual to efficiently and quickly enter the suit, fasten the suit securely about the person of the user, leaving only a small portion of the face exposed.

These and other objects and advantages of this invention may be readily ascertained by referring to the following description and pending illustrations in which:

FIG. 1 is a perspective view of a wet-dry survival suit according to the invention;

FIG. 2 is a front elevational view of a survival suit according to the invention showing a fastening means for the single opening thereof;

FIG. 3 is a detailed view of the closure means around the neck of the survival suit;

FIG. 4 is an enlarged detail view of a connection means for two panels of the material for the survival suit;

FIG. 5 is a detail view of the bottom of a foot of the suit; and

FIG. 6 is a cross-sectional detail of the foot part of FIG. 5, taken along section line 6—6.

The suit of the invention illustrated in the drawings is made of a series of panels which are cemented or otherwise welded together to form a suit for enclosing a human user. The suit is preferably made of foamed neoprene, or equal material. The neoprene has a smooth, continuous surface and includes a myriad of closed cells. In a preferred form, the material is approximately 3/16 of an inch thick and the neoprene is foamed with nitrogen gas so that the cells or pores are generally filled with nitrogen. For strength, the foamed neoprene is backed with an integral nylon mesh, and it is preferred that the suit be made with the nylon mesh on the inside.

The suit is made with panels which are cut from flap material and a single piece is folded on itself with the edges adhered together to form the major elements of the suit. As shown in the drawings, the feet, for example, may each be formed of a single piece of the material **10** and **12** and each welded together on the edge by means of a strip **14** and **15**, respecitvely. The foot is secured on the body by a strip **17**. The body of the suit is cut from a single piece of a material **16** folded so that the edges make an opening, and arms formed of a single piece **18** are welded along the seam **20**. The body is joined in the crotch. Likewise, the hands are cut from a single piece of a material folded and welded along the thumb **22**, the forefinger **23** and the third finger **24**. A hood **30** is made from a single piece of material which has a cut-out face area **31**, and is folded back on itself leaving the cut-out face opening. The top edges of the hood are placed together and sealed by a seal strip **32**. The hood is sealed around the neck to the body of the suit **16**, or it is preferably made as a part of the body of the suit which reduces the necessity of securing the hood to the suit. The

crotch 33 of the body has a reinforcing 34 welded to the inside for strength, and under the arms 36 other reinforcing may be provided to provide strength at that point. These two spots, the armpits and the crotch are essentially the only points where reinforcing is necessary to prevent the suit from tearing. As can be seen by making the panels of a single piece, a single seam provides strength and reduces the chances of leaking. The single panel 16 which forms the body of the suit is provided with a slit at the edges of the panel extending from the face piece and the neck down to about the crotch. A slide fastener 40 is attached to the material edge from the crotch to the neck for closing. A closing slide 41 may be run from the bottom to the top for closing the opening. A reinforcing 43 supports the material above the crotch. An inner flap 44 is cemented to the inside of the suit along the lines 45 which extend up both sides of the opening in the body portion past the neck and into the hood and along both cheeks of the hood. The various formed arms, hands and feet are secured to the body to form a suit.

As shown in FIG. 1 the flap 44 is enlarged and it may be pulled out through the unclosed slit in the body. The opening 48 at the top of the flap combined with the opening 31 of the hood provides means for entry into the suit, and it is the sole opening in the suit. The flap must be flexible and is normally made of thinner and non-foamed material than the suit, is folded back into the suit, and it leaves, when the slide fastener 40 is closed up to the neck, a flap 49 which covers the throat and extends up onto the chin of the user. The suit is secured around the neck of the user by means of drawstring 50 which is arranged with a slide 51 to pull the material tightly around the neck of the user effectively separating the inside of the hood from the inside of the body.

The drawstring 50 is held in place by means of a strip of rubber 52 which is cemented or otherwise secured to the throat and neck of the suit. As shown in FIG. 3 the material 16 at the neck has a rubber strip 52 welded or cemented to the material and the drawstring 50 is cemented in place between the strip and the material. It is not necessary that the string be free running under the strip since it is necessary that the suit be tight around the user's neck to prevent leaking in the event water splashes and comes into the hood at the face opening. Further, the string draws up tight against the flap 49 which is over the chin to securely seal the throat as well as the neck.

Each of the joints are made by cementing a thin strip of neoprene over the joining edges of the material. As shown in FIG. 4 a piece of foamed material 55 is abutted against another piece of foamed material 56 and a thin piece of unfoamed rubber or neoprene 57 is cemented over the joint forming a covered butt joint which is waterproof. The type of cement useful for the joints is commercially available, being generally of a permanent rubber or resin type cement.

Each foot has a wear sole for limited walking to prevent the wearing out of the foam neoprene. As shown in FIGS. 5 and 6, the foot material 10 is welded together at the joint 14 and a sole 60 is cemented over it. The sole 60 covers the joint on the bottom of the foot which is the result of material being wrapped around and butted together to form the foot itself.

The suit, when made of 3/16 inch material and of a size to fit the average height of man, weighs only eleven pounds. Its construction is such that it will not sink even though the suit is punctured and completely filled with water. The suit is very simply made and when properly secured around a person, even though it is quite ill fitting, it is watertproof and will maintain the occupant dry for an extended period of time. Pulling the drawstring tight around the neck separates the hood compartment from the body compartment and prevents water from going into the body compartment of the suit even though some water enters the hood around the face opening. The 3/16 inch material provides insulation for the occupant even in the coldest of water, and the suit will maintain an occupant warm in water with floating ice for extended periods of time. Additionally for the average man, the suit is made large enough so that he may enter the suit fully clothed and the clothing additionally helps to keep the occupant warm. Experience has shown that even a person having never used the suit before can enter the suit, pull the slide fastener up, move the drawstring tight about the neck and be in the water within less than a minute. With a little practice the time can be reduced to 30 seconds or less, showing the value of the device in escaping from a vessel or an oil rig. Experience has, also, shown that when properly fitted on a human, the human can jump into the water, be completely immersed and when brought back to the surface, under the buoyant power to the material, very little water has entered the suit. Under most conditions, no water at all will seep out of the hood beyond the neck.

The 3/16 inch size material is effective for most purposes; however, the material may be from 1/8 to 3/8 inches thick. The thinner material is useful in warmer climates for protection from sea water and exposure to the sun, while the thicker material is very effective in extreme cold. The material may, also, be reinforced on one side or both.

While the invention has been illustrated by reference to the particular device, there is no intent to limit the spirit or the scope of the invention to the precise details so set forth except as defined in the following claim.

I claim:

1. A bouyant survival suit comprising:

(a) a plurality of insulated, sheet stock pieces of foamed, closed-cell neoprene cut to a particular outline and sealed together to form a one-piece coverall type suit which can be worn over clothing, including pieces to form a body portion with appending pieces including:
  (1) a hood,
  (2) two arms,
  (3) two hands,
  (4) two feet,
  (5) and a single elongated opening along the front of said body portions extending from about the crotch and connected with a face opening in said hood,

(b) and being otherwise impervious,

(c) said pieces being sealed in a watertight manner by providing sealing strips of material overlapping abutting pieces of material and cemented thereto,

(d) said neoprene material being foamed with nitrogen to provide self-bouyancy even if said suit is punctured,

(e) reinforcing means at the seals of at least some of said body forming and appending pieces,

(f) an inner triangular shaped flap sealed along both sides to said body on the inside and closing said elongated opening with the base of said triangular shaped flap positioned across said face opening of said hood,

(g) said flap having its ends extending into said hood,

(h) the base of said inner flap being sufficiently wide to pull through said elongated opening so as to form with its top opening combined with said face opening of the hood a single entry into said suit,

(i) a slide fastener for opening and closing said elongated opening up to about the throat of said suit,

(j) a drawstring around the neck of said hood for pulling the suit material tightly around the neck of an occupant,

(k) said drawnstring being held in place by a thin strip of sheet material cemented to the neck of said suit over said drawstring so that said drawstring is not free running under said thin strip,

(l) means on said drawstring for holding it taut around the neck of said suit,

(m) said flap extending up onto the chin of the user

when said slide fastener is in a closed position to provide a smooth, watertight seal around the chin of the user.

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RICHARD J. SCANLAN, JR., *Primary Examiner.*

U.S. Cl. X.R.

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