

[54] SURVIVAL SUIT

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[51] Int. Cl.<sup>2</sup> ..... B63C 9/10

[58] Field of Search ..... 9/313, 330-332; 2/2.1 R

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[57] ABSTRACT

A full covering suit, formed of a closed cell, foamed material, includes flotation material around the waist of the suit, breast flotation members, and back of the head members; floating a user high in the water on his back. Releasable weights adjacent the feet of the suit hold a user upright in the water with the user's head high out of the water.

[56] References Cited

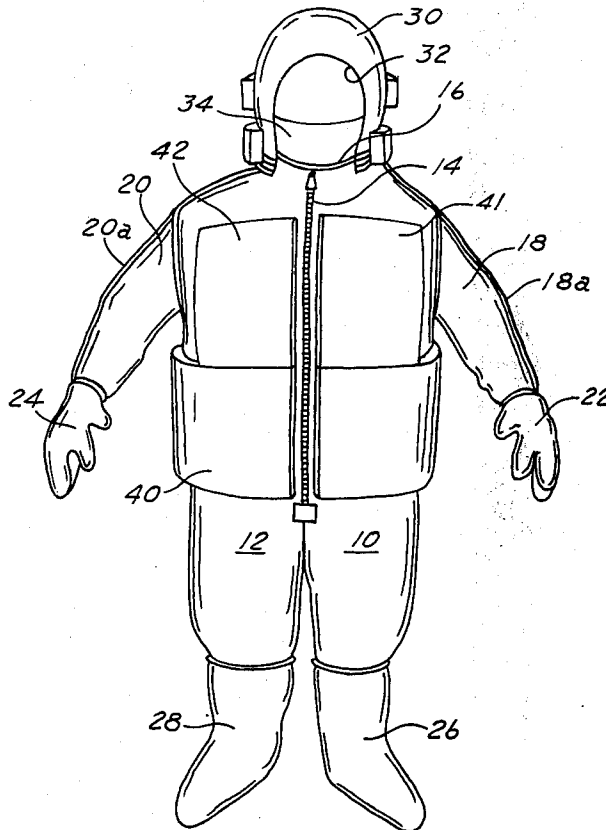
UNITED STATES PATENTS

3,076,206 2/1963 Shaw et al. .... 9/330

FOREIGN PATENTS OR APPLICATIONS

557,220 11/1942 United Kingdom ..... 9/331

5 Claims, 8 Drawing Figures



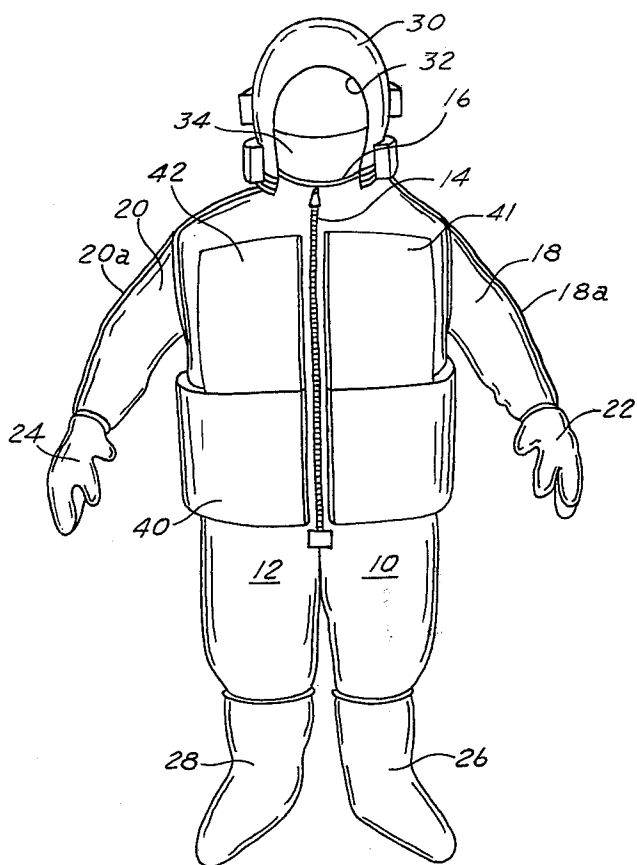


FIG. 1

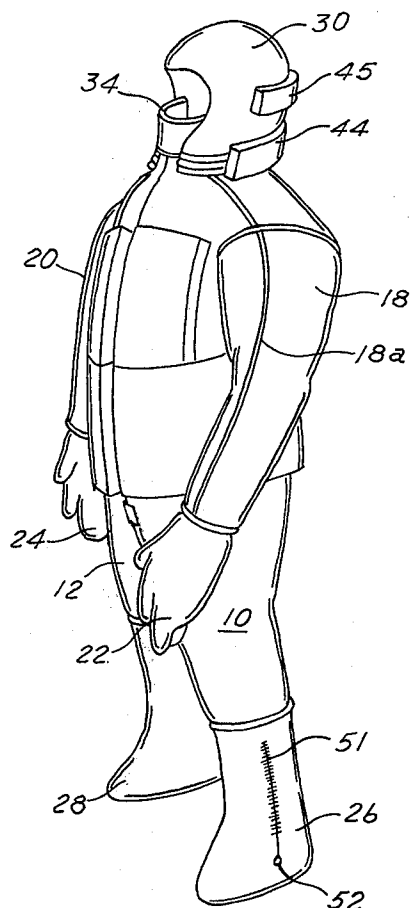


FIG. 2

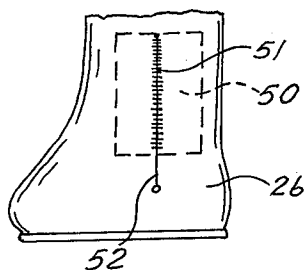


FIG. 4

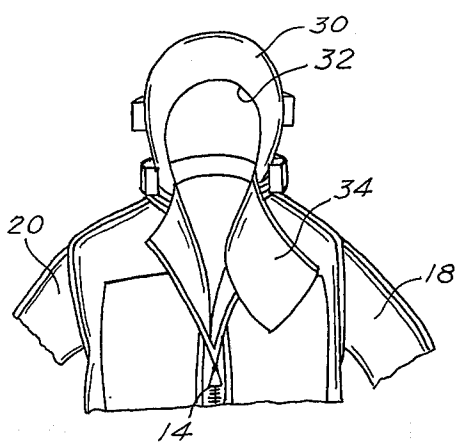


FIG. 3

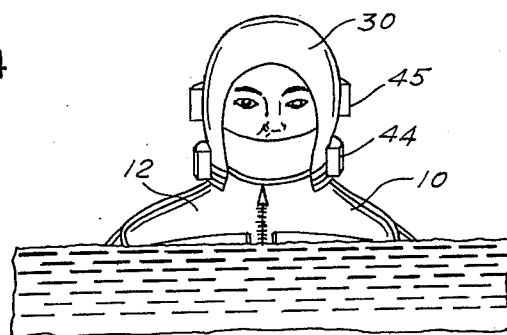


FIG. 5

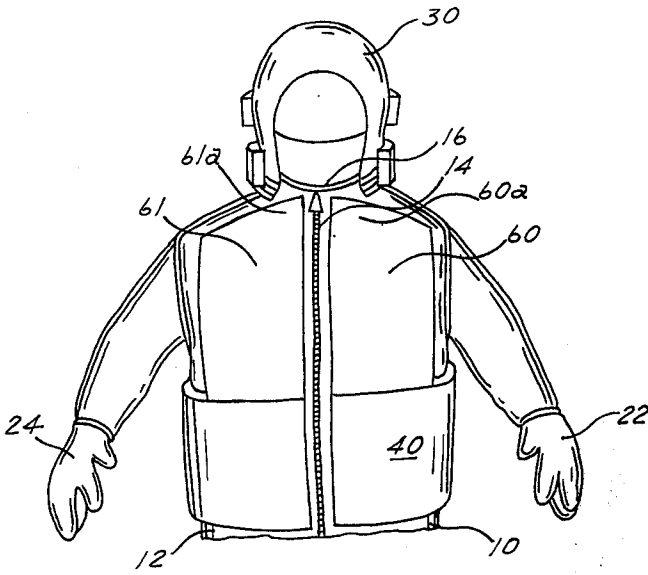


FIG. 6

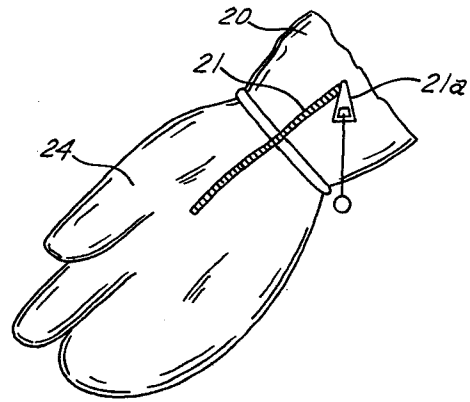


FIG. 7

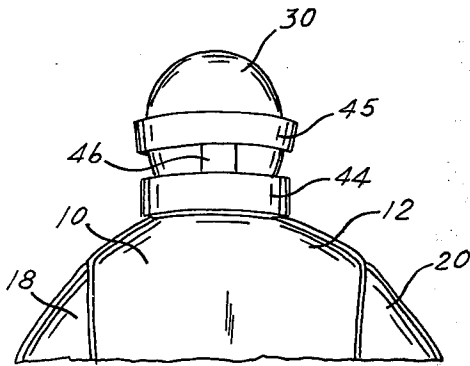


FIG. 8

## SURVIVAL SUIT

As the use of the world's oceans has increased, the need for survival equipment of the human beings in the oceans has become a high priority. The vessels for such operations as offshore drilling, fishing, naval combat, and the like, normally do not carry lifeboats. Thus, survival equipment is not available to the occupants of the platforms or vessels. One method of personnel survival is to provide flotation gear for individual persons. In warmer climates, the survival gear may be simply a life raft or life jacket, but in the colder regions of the world it is necessary to provide protection of the individual against cold as well as protection against drowning. In the Arctic and Antarctic regions, it is highly necessary to provide cold water protection since even a clothed person in these cold waters will survive only a few minutes.

Survival suits for cold waters and the like have heretofore been made as full suits of neoprene rubber or the like, including attached feet, attached gloves and an attached hood. These suits have relied solely on the flotation properties of the foam rubber, usually 3/16 inch or 1/4 inch thick foam rubber, for supporting the user. This type of suit generally provides protection for the user against the chilled water and the climate. With a large adult fully clothed against the climatic conditions, such suits have tended to float these adults quite low in the water whereby the suit ships water through the face opening, and further the face of the user is continually splashed by even small waves. These foam rubber suits do provide flotation for long periods and tend to provide a warm environment for the user. However, the longer the user of the suit is in the water, the more water is generally shipped into the suit and the lower the user floats, thereby tending to ship more water. Of course, once the suit is full of water, it will not sink any lower, but it may be quite uncomfortable for the user.

The present invention is an improvement of applicant's U.S. Pat. No. 3,444,570, which concerns a survival suit formed of neoprene rubber, but it relies only on the flotation capacity of the neoprene rubber. This suit does provide survival capacity, however, as pointed out above, it may be uncomfortable for the user, particularly for long flotation periods. According to the present invention a full suit of closed cell, foam rubber, foam plastic, or the like, covering the whole body of the user with only a small partial face opening, is provided with a flotation belt and flotation chest pads as well as flotation pads on the back of the head to float the user, particularly his head, high in the water when the user is on his back. The face opening, being well above the water level, ships relatively little water and the user stays essentially dry. Also, weight pockets are provided adjacent to the feet of the suit which, when containing a sufficient amount of weight, floats the user upright in the water. This mode is particularly advantageous for unconscious persons, since the head is held well out of the water, permitting an unconscious person to breathe. The weights are easily released so that the user floats on his back with his face high out of the water. Since the user in the suit floats high out of the water, he may move quite rapidly through the water by finning with the hands, and with relatively little energy. Additionally, waterproof zipper openings are provided adjacent to the suit's gloves to permit the user to extend his

hands through the openings providing use of a free hand without opening the suit's main zipper.

It is, therefore, among the objects and advantages of the present invention to provide a cold water survival suit covering the body of the user with only a minor portion of the user's face exposed.

Another object of the invention is to provide a cold water survival suit with attached flotation pads arranged to hold the user high in the water and prevent shipping of water in the suit.

Yet another object of the invention is to provide the cold water survival suit arranged with flotation pads on the rear of the suit's hood to thereby hold the user's head high out of the water and generally prevent shipping of water in the face opening of the suit.

Still another object of the invention is to provide a cold water survival suit arranged with flotation pads on the upper portion of the suit and releasable weights adjacent the feet of the suit for floating a user in upright position in the water with the head generally held upright out of the water.

An additional object of the invention is to provide a cold water survival suit having easily releasable weights generally holding the user upright in the water and on releasing permits the user to lie prone in the water on his back.

A still additional object of the invention is to provide a cold water survival suit having sufficient flotation pads secured to the upper portion of the suit and weight in the feet tending to turn the user into a back floating prone position after jumping into the water and after dropping the weight.

Yet another object of the invention is to provide a cold water survival suit provided with waterproof zipper openings permitting the user to extend a hand out of the suit without opening the main zipper of the suit.

These and other objects and advantages may be readily ascertained by referring to the following description and appended illustrations in which:

FIG. 1 is a front elevational view of a cold water survival suit according to the invention;

FIG. 2 is a front quarter perspective view of the suit of the invention;

FIG. 3 is a detailed view of the cold water survival suit according to the invention showing the suit partially opened displaying the partial face covering flap;

FIG. 4 is a detail view of a foot portion of the suit, showing a zippered weight pocket therein;

FIG. 5 is a generally schematic view of the position of the suit with a user therein floating in upright position when the weights are in the weight pockets;

FIG. 6 is a detailed view of slightly modified breast flotation pads;

FIG. 7 is an enlarged detail view of the inside of the attached gloves of the suit, showing a zippered hand opening; and

FIG. 8 is a detailed view of the back of an attached hood of the suit, showing the flotation pad arrangement thereon.

In the device illustrated in the drawings, a survival suit is formed of neoprene rubber, usually 3/16 of an inch or 1/4 inch thick, and preferably covered with a nylon fabric which is a bright color, for example, orange, for visibility in the water. This suit includes a body section or body covering formed of the neoprene rubber and includes a left side 10 and a right side 12 which are sealed together in the crotch and along the back to form the body section. A zipper 14 is secured

to the edges of the front of the body sections to provide a closable opening generally extending from the crotch to the neck portion 16 of the body section. This provides easy access for a user who would normally be fully clothed. The body sections should be large enough to form a suit which is sufficient to handle a full grown adult with heavy arctic clothing thereon. Arm portions 18 and 20 are secured to the body, and these may include a seam 18a and 20a along the top thereof forming a tubular sleeve generally out of a one-piece material. Glove portions 22 and 24 are joined to the end of the arms, and the gloves are made of the same material as the body and the arms to provide protection against the cold. In a similar manner, feet portions 26 and 28 are secured to the leg portions of the body portions 10 and 12, and these must be sufficiently large to permit a person with shoes or boots on to enter the suit. A hood 30 is secured to the neck 16 of the body and it is provided with a face opening 32. The seams joining the various parts of the suit are made watertight, which is accomplished by rubber cement, stripping and sewing the stripped seam. The zipper 14 is a watertight zipper which is, of course, currently available commercially. A flap 34 is secured to the left side of the hood and it is arranged to extend into the hood and partially cover the face of the user, permitting the user to see and to breathe and yet aiding the unit from shipping water.

To permit the user of the suit to bare a hand for manipulation where the neoprene rubber gloves are not usable, a zipper in the palm of the glove and into the sleeve permits the wearer to extend his hand through the opening for use. A zipper 21 in the palm of glove 24 into the sleeve 20 provides means for extending the enclosed hand out through the opening and in a similar manner a zipper in glove 24 (not shown) permits the free use of the right hand of the user. Thus, both hands may be used without opening the main zipper 14. This permits hand use when the user is floating in the water and desires fine manipulation which is impossible with the heavy gloves 22 and 24. The zippers 19 and 21 are of the waterproof type. All of the zipper slides of the suit should have an elongated knotted string attached thereto to permit the heavy gloves to grasp the string for opening the zippers. In this case, the zipper slide of the zipper 19 has a string 19a which is elongated and knotted, and the slide of zipper 21 has a string 21a attached thereto and it also is knotted for manipulation.

The flotation of the suit is provided, in addition to the neoprene rubber of the suit itself, by a waist band 40 which extends from adjacent one side of the zipper around the waist of the suit to the opposite side of the zipper leaving a space for operation of the zipper therebetween. The flotation material of the band 40, for the suit to fit a 6 foot adult of about 200 pounds, runs from about 14 to 16 inches wide and some 50 to 60 inches long around the suit. Flotation material may be foam neoprene rubber, foam plastic, or the like, and preferably is about an inch thick. The rubber material of the flotation pads is Rubatex No. R-1905-H by the Bayley Suit Company, 900 South Fortuna Boulevard, Fortuna, California, which surpasses the requirements of A.S.T.M.D. No. 1667-64 and A.S.T.M.D. 1056-68, SBE 41 and surpass the U.S. Coast Guard Requirements of Title 46, CFR 164.015. This rubber is covered with the nylon mesh material, the same as on the outside of the suit. The flotation belt is, of course, secured to the suit and it becomes part of the suit. The flotation

pads are secured on the breast and extend upwardly on each side of the zipper on the suit from about the belt and preferably they are about the same thickness as the belt 40. These pads are generally rectangular breast pads 41 on the left side of the suit and breast pad 42 on the opposite side of the suit. The flotation material of these pads should generally be the same as the belt material, and, likewise, these are about an inch thick and are covered with the nylon fabric the same as the suit. The flotation pads for the head include a lower pad 44 and upper pad 45 secured to the hood 30. These pads should be about the same material as the belt and breast pads so as to provide additional flotation for the head and hold it out of the water when the occupant of the suit is lying on his back in the water. These pads, of the same material as the other flotation pads, are covered with the nylon mesh fabric to prevent injury to the material and aid in securely holding the material to the suit. As is readily apparent from the drawing, the head flotation pads are contiguously joined with the outside surface of the hood. Likewise, the waist band and head flotation pads are contiguously joined with the outside surface of the body covering.

A modified form of breast pad is shown in FIG. 6, where pointed breast pads 60 and 61 are secured to the breasts of suit halves 10 and 12. The pads extend from the belt flotation 40 upwardly along zipper 14 to about the neck joint 16 between the hood 30 and the suit. The pointed ends 60a and 61a are terminated closely adjacent the chin of the user. These flotation pads are stiff enough to help support a person's head in upright position, even if unconscious. As pointed out below, with weights, a person will float in upright position. In this position, the pointed flotation pads will hold the user's head upright with the face held out of the water.

The head flotation pads may be made in the form of a "T," as shown in FIG. 8. In this case, a pad 46 is placed between the pads 44 and 45. This adds flotation to the hood, helping keep the user's head high in the water.

To provide for an upright flotation, the suit is provided with pockets on the outside of each leg adjacent the feet members, as shown in FIG. 4. In this instance, a pocket 50 is covered by the material of the foot, and a zipper 51 having a string 52 attached to the slide thereof, permits means of opening the pocket. The pocket should be of a size to hold about 10 to 12 pounds of lead shot on each of the legs, and therefore each leg includes a pocket similar to that shown in FIG. 4. With the flotation pads secured to the suit, a man in the suit and with about 10 pounds of weight in each of the pockets on the legs, the man in the suit will float upright with the head about 5 inches or more above the water, shown in FIG. 5. In this position, even an unconscious person will float in an upright position. The suit and flotation pads are sufficient to hold the person's head upright above the water. When the person is desirous of lying prone on his back, all that is necessary is to reach down, pull the zipper cord open on each weight pocket and the shot spills from the pockets. The suit will now automatically move to a prone position with the user on his back.

The suit is very simply used. With the zipper 14 in full open position, the flap 34 is pulled out of the hood. An adult, fully clothed and even with arctic gear, may step into the suit and after pulling the flap 34 around his face and into the hood, the zipper 14 is very easily closed. Thus covered, a person may jump into the

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water and with the weights in the feet pocket. As the user rises to the surface, he will find that he floats in an upright position. Once he drops the weight, the suit moves to an advantageous position with the user's head in a position to breathe air above the water. The flotation of the belt and the head pads are sufficient to float a fully dressed adult high enough, so that by finning with the hands, the person can move quite rapidly through the water with very little effort. Thus, a person is able to move quite freely on the surface of the water.

The survival suit of the invention is made so that with only a small portion of the face of the user exposed and with the face flap securely tucked in the hood very little water ships in the suit even though the person completely submerges on jumping into the water. Air billows out of the suit to insure that no water, or very little, will enter when the person is completely submerged. Once the user is stabilized in the water, generally lying prone on his back, his head is held high enough so that it will not normally ship water into the face opening. Also, the head is held high enough so that it easily rides the waves keeping the person's face out of the spray of the waves and generally preventing the breaking of the waves over the head. One very important feature of the suit is that enough Coast Guard-approved, closed-cell, flotation material is provided to hold a person lying prone on the surface without any addition of work finning or kicking to keep afloat or to keep in the prone position on the surface of the water. The excess flotation material exceeds the Coast Guard requirement of 25 pounds of positive buoyancy. Further, when the person is floating in an upright position with the weights in the pockets, the head is held high. This is a very valuable asset, for when a user tires or goes to sleep, the suit will maintain the user's head out of the water, either in upright or the back prone position without sculling with the hands or kicking with the feet, particularly with the pointed breast pads. Further, when the user dives head first into water, the flotation pads on the suit force the user back to the surface in an upright position with the weights in the feet pockets.

In one form of the invention, a suit for a medium sized man, dressed for arctic weather, was made of 1/4 inch neoprene rubber. The waist flotation material was formed of two superimposed strips of the 1/2 inch foamed rubber material and was about 50 inches long and 14 inches wide. This provided about one-eighth of the flotation effect as the material of the suit. The chest flotation material was two pieces 12 inches by 14 inches double 1/2 inch foamed rubber material and provided about one-twentieth of the flotation effect of the suit. The head flotation pieces were of similar material providing flotation for the head. The effective amount of flotation material added to the suit runs from about one-tenth to about one-half of the flotation effect of the suit material to provide the buoyancy necessary to float a person upright and to hold the head high out of water in the back prone position.

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A preferred material is foamed neoprene rubber, according to the A.S.T.M. and Coast Guard statistics given above, with a nylon mesh covering both sides to protect the rubber from cuts and abrasions. However, foamed plastics of the closed cell-type are also useful, particularly when covered by nylon mesh material for strength.

I claim:

1. A cold water survival suit comprising:

- a. a body covering of closed-cellular material having a thickness of approximately three-sixteenths inch to one-fourth inch, said body covering having inside and outside surfaces and having a waist portion, a chest portion, a hood portion, glove portions, and boot portions, said hood portion having a front and back and an opening in the front for the face of the user;
- b. head flotation means in band form and of essentially the same material as said body covering, said head flotation means being contiguously joined with said outside surface of said body covering at said hood portion thereof and extending around the back of said hood portion for holding a user's head high in the water;
- c. waist flotation means in the form of a wide band of essentially the same material as said body covering, said waist flotation means being contiguously joined with said outside surface of said body covering, said waist flotation means extending around said waist portion of said body covering;
- d. chest flotation means of essentially the same material as said body covering, said chest flotation means being contiguously joined with said outside surface of said body covering at said chest portion thereof;
- e. all regions of said suit having an essentially solid cross section substantially free of voids other than those within the cells of said closed-cellular material;
- f. whereby the buoyancy and protective properties of said suit are maintained even if said outside surface is damaged.

2. The survival suit of claim 1 wherein all of said flotation means provide additional buoyancy of from one-tenth to one-half of the buoyancy of the body covering.

3. The survival suit of claim 1 wherein zippered pockets are provided adjacent the feet of the boots and on the outside thereof for holding releasable weights, whereby the user floats upright in the water when weights are in said pockets.

4. The survival suit of claim 1 wherein zippered openings are provided from the palms of the suit's gloves to above the wrist thereof for releasing a hand without opening the main zipper.

5. The survival suit of claim 1 wherein all the waist, chest, and head flotation means provides a positive buoyancy of at least about 25 pounds.

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