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2,864,361

BACK PLATE AND HARNESS FOR AQUA-LUNG

Filed May 18, 1956

2 Sheets-Sheet 1

FIG. 1.

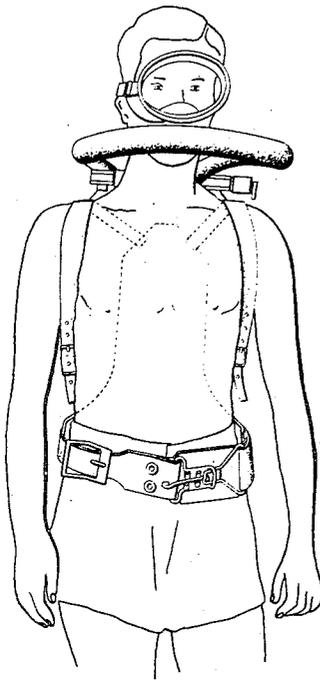


FIG. 2.

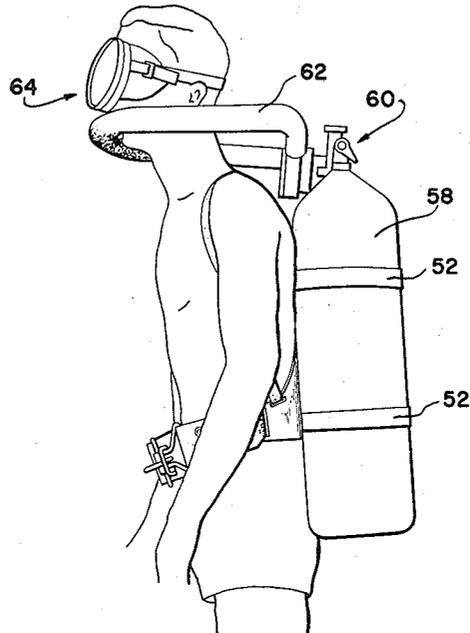


FIG. 3.

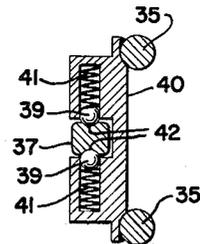
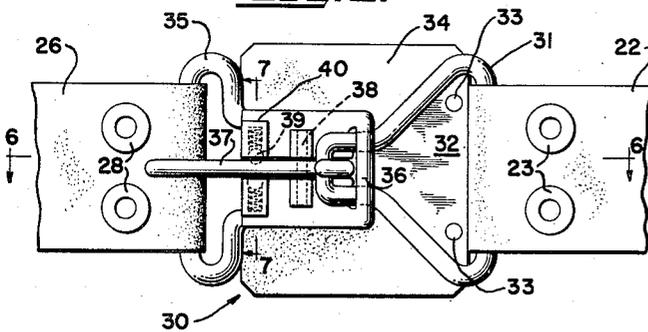


FIG. 5.

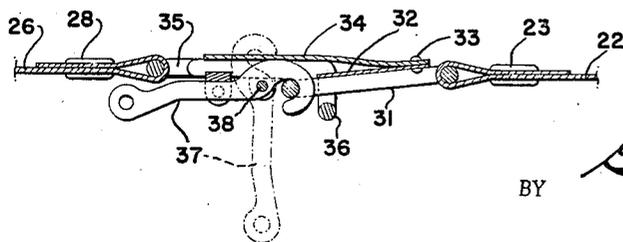


FIG. 6.

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FIG. 3.

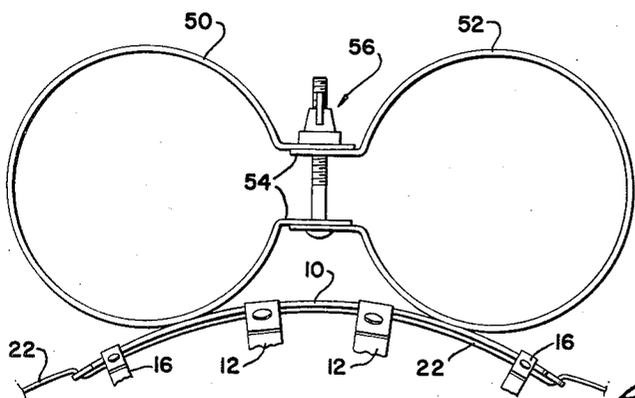
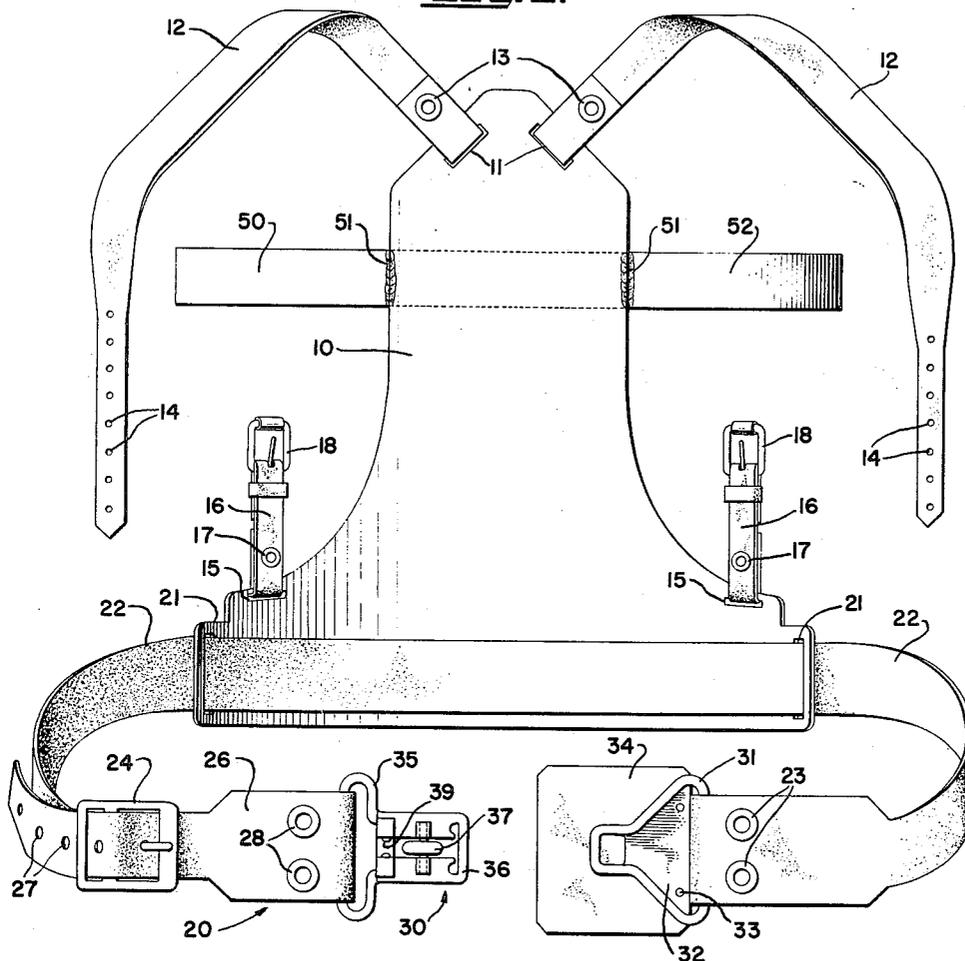


FIG. 4.

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BACK PLATE AND HARNESS FOR AQUA-LUNG

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Application May 18, 1956, Serial No. 585,912

4 Claims. (Cl. 128-142)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to breathing apparatus for use under water. More particularly this invention relates to improvements in back plate and harness structures worn by underwater swimmers or the like for carrying oxygen flasks.

The harness structures hitherto known which have been worn by underwater swimmers have inherent disadvantages in that they, for example, are bulky to handle; tend to plane the swimmer; are difficult to put on and take off; and they are not readily adjusted to the body of different size swimmers.

It is therefore a general object of this invention to provide a back plate and harness for underwater swimmers incorporating features that overcome the above disadvantages of known harness.

More specific objects of the present invention are to provide a back plate and harness for underwater swimmers that is: light in weight, low in bulk and contoured to the human body; easily adjusted to any size swimmer; easy to put on, thereby decreasing the time necessary to put a swimmer in the water; stationary on the swimmer's back; free of chafing of the body of the swimmer; free of planing; and, in case of emergency, rapid and sure of quick release while in the water.

Briefly, the above objects of the invention are accomplished by providing a back plate and harness wherein the back plate is made of aluminum, plastic or other light-weight material, and it is contoured to the back of the swimmer. That is, the back plate extends upwardly between the shoulder blades and at the bottom it is curved part way around the waist just above the hips of the swimmer. At the rear, the back plate has attached thereto, as by welding or the like, two pairs of circular metal straps for holding two cylinders or flasks of oxygen, which flasks are clamped in the circular straps by a pair of wing bolts. A pair of adjustable shoulder straps, made of leather belting or webbing, and each consisting of two parts, a strap part and a buckle part, extend over the shoulders of the swimmer and are attached, respectively to the top and bottom of the back plate. An adjustable waist band or girth, made of two parts, with one part attached to a front portion of the back plate at one side thereof and the other part attached to the front portion of the back plate at the opposite side thereof, is releasably fastened around the waist of the swimmer. One part of the waist band is provided with an adjusting buckle, and at the front of the swimmer, the two parts of the waist band are provided with cooperating loops of a quick-release fastener, which fastener is held in locked position by a pair of spring-loaded ball bearings, and which fastener is readily and quickly released by moving a small lever or clamp out of contact with the ball bearings. With the clamp released, the swimmer merely slips one shoulder strap off one shoulder and the

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other shoulder strap falls off the opposite shoulder. Thus there is no complicated mechanism to release and no chance of panic should the harness or oxygen flasks become fouled under water. A conventional face mask and aqua-lung, not per se a part of this invention, is attached through a hose and pressure regulator to the oxygen flasks.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the several views thereof and wherein:

Fig. 1 is a front elevation of the apparatus as worn in accordance with this invention;

Fig. 2 is a side elevation of the apparatus as worn;

Fig. 3 is a front perspective of the apparatus detached and with the oxygen flasks omitted for clarity of illustration;

Fig. 4 is a partial top plan of the apparatus shown in Fig. 3;

Fig. 5 is an enlarged detailed elevation of the quick-release fastener shown in Fig. 1;

Fig. 6 is a longitudinal section taken on line 6-6 of Fig. 5; and

Fig. 7 is an enlarged transverse section taken on line 7-7 of Fig. 5.

Referring now to the drawings, particularly to Fig. 3, wherein in accordance with this invention the back plate and harness includes a back plate 10 to the top portion of which is secured a pair of shoulder straps 12 and to the bottom portion of which is secured a pair of cooperating straps 16. A waist band 20 including two strap sections 22 and 26 and a waist buckle and quick-release fastener 30 is attached to the lower portion of the back plate.

Referring still to Fig. 3, the back plate, which is made of aluminum, plastic or other suitable light-weight material, is contoured to the human body, and because of its contour is relatively rigid to vertically-spaced bending moments and somewhat pliable to horizontally-spaced bending moments. As shown in Figs. 1 and 3, the upper part of the back plate is reduced in horizontal section so as to fit between the shoulder blades of the swimmer; whereas, the lower portion, which is pliable in horizontal section, is curved so as to wrap part way around the waist of the swimmer. Two pairs of circular metal straps 50 and 52, preferably of aluminum, are attached as by welds 51 (Fig. 3) to upper and lower portions of the back plate. As shown in Fig. 4 these circular straps are open at adjacent sides and are formed with overlapping straight portions 54 through which is inserted a pair of wing bolts 56, only one of which is shown. The circular straps are shaped to fit standard oxygen flasks or cylinders and by inserting the oxygen flasks within the straps and tightening the wing nuts, the flasks are secured to the back plate; only one such flask, 58, is shown and this in Fig. 2. A standard pressure regulator and valve 60 is attached to the oxygen flasks 58 and has a hose 62 leading from each side thereof, which hose is attached to a face mask and breathing apparatus indicated generally by reference numeral 64. The breathing apparatus is not, per se, a part of this invention and, therefore, need not be described in detail.

Referring again to Fig. 3, the shoulder straps 12 are attached to the back plate by insertion in a pair of slots 11 provided in the upper part of such plate and are secured in place by grommets 13. The cooperating straps 16 are likewise attached to the back plate by insertion through slots 15 in the lower portion of the plate and are secured by grommets 17. Each of the cooperating straps is pro-

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vided with a buckle 18 for adjustably receiving the reduced end of its respective shoulder strap, for which purpose the shoulder straps are each provided with a plurality of openings 14. The wider portion of each of the shoulder straps is utilized to carry the weight of the back plate and attached oxygen flasks and due to their width, do not cut or chafe the shoulders of the swimmer; whereas, the narrow portions of the shoulder straps are used to adjustably connect the shoulder straps to the cooperating straps.

The waist band 20 is attached to the back plate by insertion of the longer portion 22 thereof through a pair of vertical slots 21 formed in lower forward portions of such plate at each side thereof. The longer portion 22 of the waist band is provided at one end with a wide section for insertion through a bow or loop portion 31 of the quick-release fastener 30. After insertion through the loop of the fastener, the wide section of strap 22 is folded back on itself (Fig. 6) and secured by a pair of grommets 23. The opposite end of strap 22 is provided with a buckle 24 for adjustably receiving the narrow end of the other strap section 26, which narrow portion of strap 26 is provided with a plurality of openings 27 for attachment to the buckle 24. The opposite or wide end of strap 26 is inserted through a second loop of the quick-release fastener 30, folded back upon itself (Fig. 6) and attached to this second loop by a pair of grommets 28.

Referring to Figs. 5, 6 and 7, the quick-release fastener 30, which is made of aluminum or other light-weight metal, includes the two loops 31 and 35, with the loop 31 attached to the long strap 22 and the loop 35 attached to the short strap 26 of the waist strap 20. The loop 31 has attached thereto, as by welding, brazing or the like, a thin triangular plate 32, which plate has attached thereto, as by a pair of rivets 33, a pliable leather shield or body protector 34. The other loop 35 is formed with a right-angle bend 36 through which is inserted the small end of loop 31, and which end of loop 31 is releasably secured to loop 35 by the hooked end of a quick-release lever 37. The lever 37 is pivotally mounted on the loop 35 by a pivot pin 38 attached to such loop, and the lever is releasably held in locked position by a pair of balls 39. The balls 39 are mounted within a pair of wells bored into a boss 40 attached, as by welding, brazing or the like, to the loop 35. The balls are urged toward the lever by a pair of compression springs 41 and are held within the wells by suitable means, as by peening the entrance to the wells after the springs and balls have been inserted thereinto. As shown in Fig. 7, the balls 39 enter semi-spherical cavities 42 formed in opposite sides of the lever 37 and releasably hold the lever in the full line position, Fig. 6.

The advantages of the instant invention will be apparent from the foregoing description thereof. In normal practice where the harness is worn regularly by the same swimmer, or same size swimmer, the shoulder straps 12 will have been connected through the buckles 18 to the respective cooperating straps 16, the waist straps 22 and 26 will have been connected through the buckle 24 and the oxygen flasks will have been clamped to the back plate, so that, to don the harness all that is necessary is for the swimmer to slip first one arm and then the other arm through the respective shoulder straps, then the quick-release fastener 30 is secured by inserting the small end of loop 31 through the angle portion 36 of loop 35, and the lever 37 is moved from the broken- to the full-line position (Fig. 6), whereupon the hooked portion of the lever engages the small end of loop 31 and the balls 39 engage the depressions 42 in the lever, releasably holding the waist band in place. Thus, in a matter of seconds, the swimmer is ready for the water. In removing the harness, the foregoing steps are reversed. If for any reason it is necessary to quickly remove the harness, all that is required is for the swimmer to move the lever 37 from the full- to broken-line position (Fig. 6) and then slip the

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shoulder straps off his shoulders, without the need of unbuckling such straps. When worn by different size swimmers, the shoulder straps and waist band are adjusted to size by the respective buckles 18 and 24. Once adjusted to size the harness is donned and doffed by merely clamping and releasing the quick-release fastener, as described above.

Thus in accordance with this invention there is provided a back plate and harness for use under water or the like that is light in weight, low in bulk and adjustably contoured to the body; quick and easy to put on and take off; stationary on the wearer's back, thus free of chafing and planing; and quick and sure of release while under water.

While a principal use of the apparatus is in connection with underwater work, it is obvious that it may with equal facility be used for respiration any place where there is toxic or poisonous gases or deficiency of oxygen, and while the foregoing disclosure relates to only a preferred embodiment of the invention, it obviously may take other forms and be variously applied within the scope of the appended claims.

What is claimed is:

1. A support for portable breathing apparatus comprising a back plate generally contoured to the back of a wearer, said back plate comprising a one-piece integral construction having an upper vertical portion shaped to extend from the waist to and between the shoulder blades of the wearer and a lower horizontal portion shaped to wrap at least part way around the waist of the wearer, the construction and arrangement of the back plate being such as to fit snugly substantially in its entirety against the back and waist of the wearer, means on said back plate for attaching an oxygen flask thereto, a pair of shoulder straps adjustably attached to said back plate, and a waist band adjustably attached to said back plate and including a quick-release fastening mechanism at a front portion thereof.

2. A support as set forth in claim 1 wherein said quick-release fastener includes a first loop attached to one end of said waist band, a second loop connected to the opposite end of said waist band and a lever mounted on one of said loops and engaging the other of said loops for releasably locking said loops together.

3. A support for portable breathing apparatus comprising a back plate contoured to the body of a wearer, means on said back plate for attaching an oxygen flask thereto, said back plate being formed as a one-piece integral construction having an upper portion thereof shaped to fit between the shoulder blades of the wearer and a lower portion shaped to wrap at least part way around the waist of the wearer, a pair of shoulder straps each having a first portion thereof attached to an upper portion of said back plate, a second portion thereof attached to a lower portion of the back plate and a buckle connected to one of said portions for adjustably connecting the two portions, a waist band including two straps with one of such straps having connected to one end thereof one portion of a quick-release fastener and the other end having a buckle attached thereto, the other strap having one end thereof adjustably connected to said last-named buckle and having the other end thereof connected to a second portion of said quick-release fastener, and the first and second portions of said quick-release fastener having means thereon for releasably locking said two portions and thus the waist band together.

4. A support for portable breathing apparatus comprising a back plate contoured to the body of a wearer and having means thereon for supporting an oxygen flask, said back plate being formed as a one-piece integral construction having a vertical portion thereof substantially rigid to vertical-spaced bending moments and a horizontal portion relatively yieldable to horizontally-spaced bending moments, a pair of shoulder straps each having portions thereof attached respectively to upper

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and lower parts of the vertical portion of said back plate and having adjusting means included therein accessible at the front of the wearer, and a waist band, said waist band including a first strap connected to opposite ends of the horizontal portion of said back plate, said first strap having a buckle connected to one end thereof and a first portion of a quick-release fastener connected to the opposite end thereof, and a second strap having one end thereof adjustably connected to said last-named buckle and the opposite end thereof connected to a second portion of said quick-release fastener, the first and second portions of said quick-release fastener having cooperating means incorporated therein for releasably

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locking said portions together, and said last-named buckle and said quick-release fastener being accessible for ready manipulation thereof from the front of the wearer.

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