United States Patent [19]

Oeland, Jr.

[11] **3,735,598**

[45] **May 29, 1973**

[54] **DIVER'S BELT AND METHOD OF MANUFACTURE**

[75] Inventor: **Ernest N. Oeland, Jr.**, San Diego, Calif.

[73] Assignee: **The United States of America as represented by the Secretary of the Navy**, Washington, D.C.

[22] Filed: **Dec. 9, 1971**

[21] Appl. No.: **206,249**

[52] **U.S. Cl.** **61/70**

[51] **Int. Cl.** **B63c 11/02**

[58] **Field of Search** ..... 61/70; 2/309–312, 2.1 R

[56] **References Cited**

UNITED STATES PATENTS

3,090,205	5/1963	Hurwitz et al.	61/70
3,105,359	10/1963	Ellis	61/70
3,263,432	8/1966	Maskell	61/70
3,364,616	1/1968	Speers	61/70

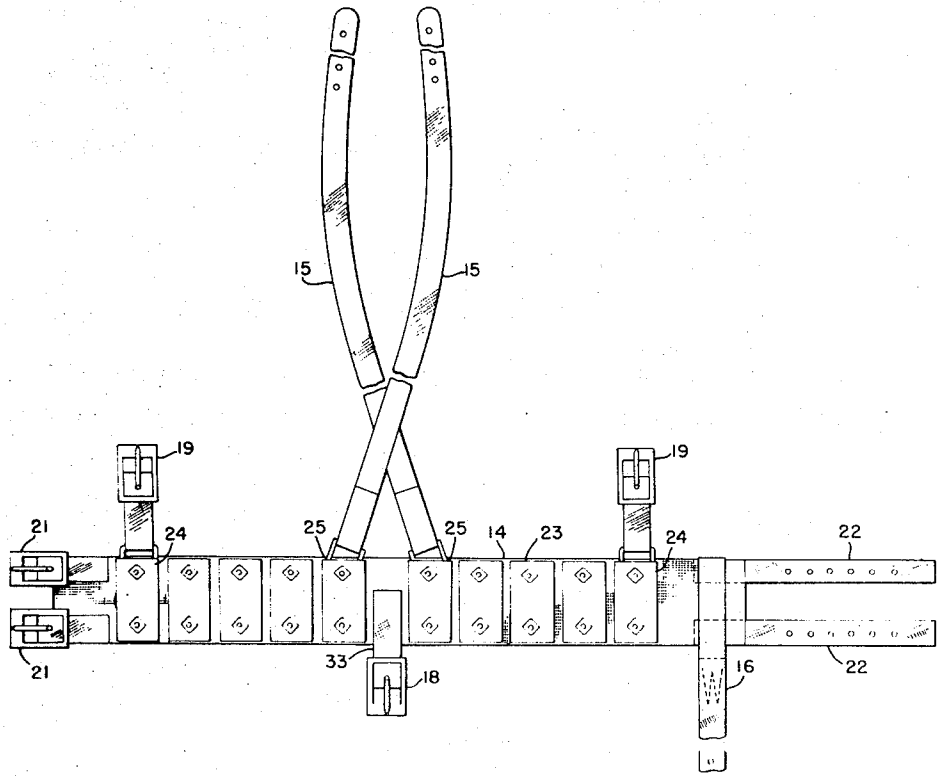
Primary Examiner—J. Karl Bell

Attorney—Richard S. Sciascia, Ervin F. Johnston and William T. Skeer

[57] **ABSTRACT**

A method of manufacturing articles from webbing includes the steps of impregnation of selected areas with urethane under hydrostatic pressure and forming fastening apertures in the impregnated areas. The method is particularly useful in the fabrication of a diving weight belt for use with helmet, or hard hat, diving equipment. The belt made according to the method is a new and useful article having improved salt water deterioration resistant properties and added strength especially around the fastening apertures.

3 Claims, 8 Drawing Figures



PATENTED MAY 29 1973

3,735,598

SHEET 1 OF 3

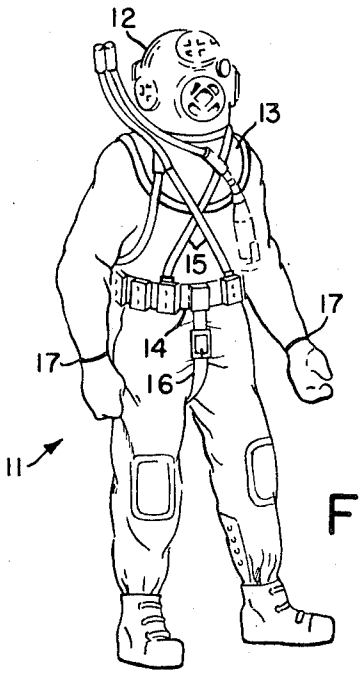


FIG. 1

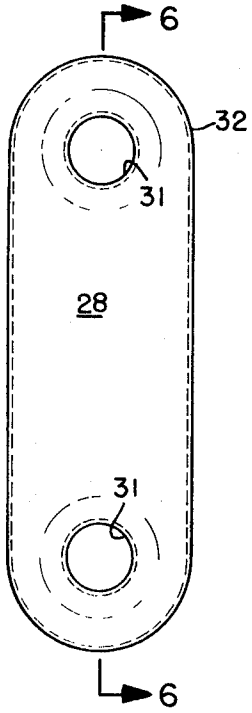


FIG. 5

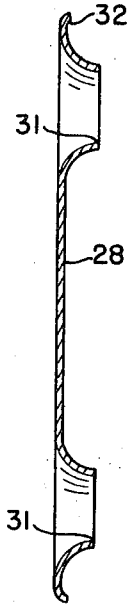


FIG. 6

FIG. 4

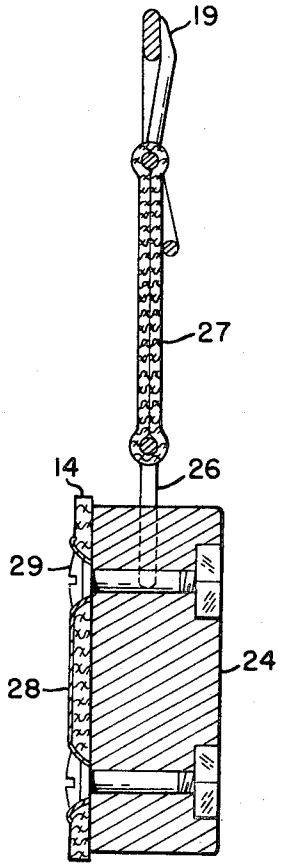
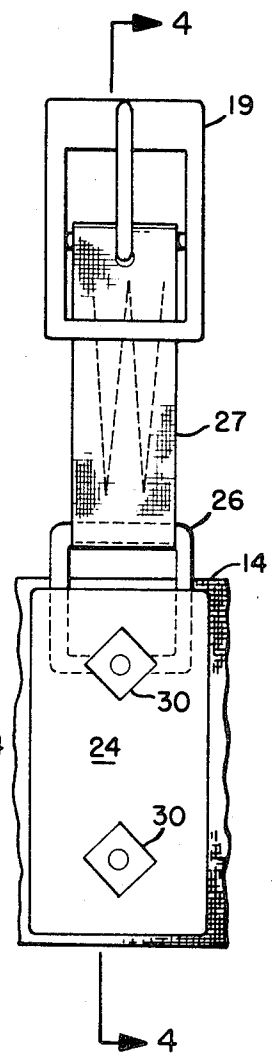


FIG. 3



ERNEST N. OELAND, JR.
INVENTOR

BY WILLIAM T. SKEER
AGENT
ERVIN F. JOHNSTON
ATTORNEY

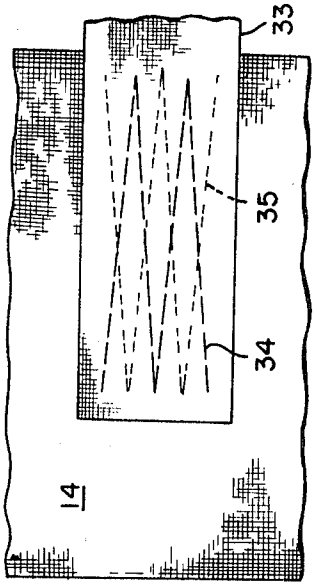


FIG.7

FIG.2

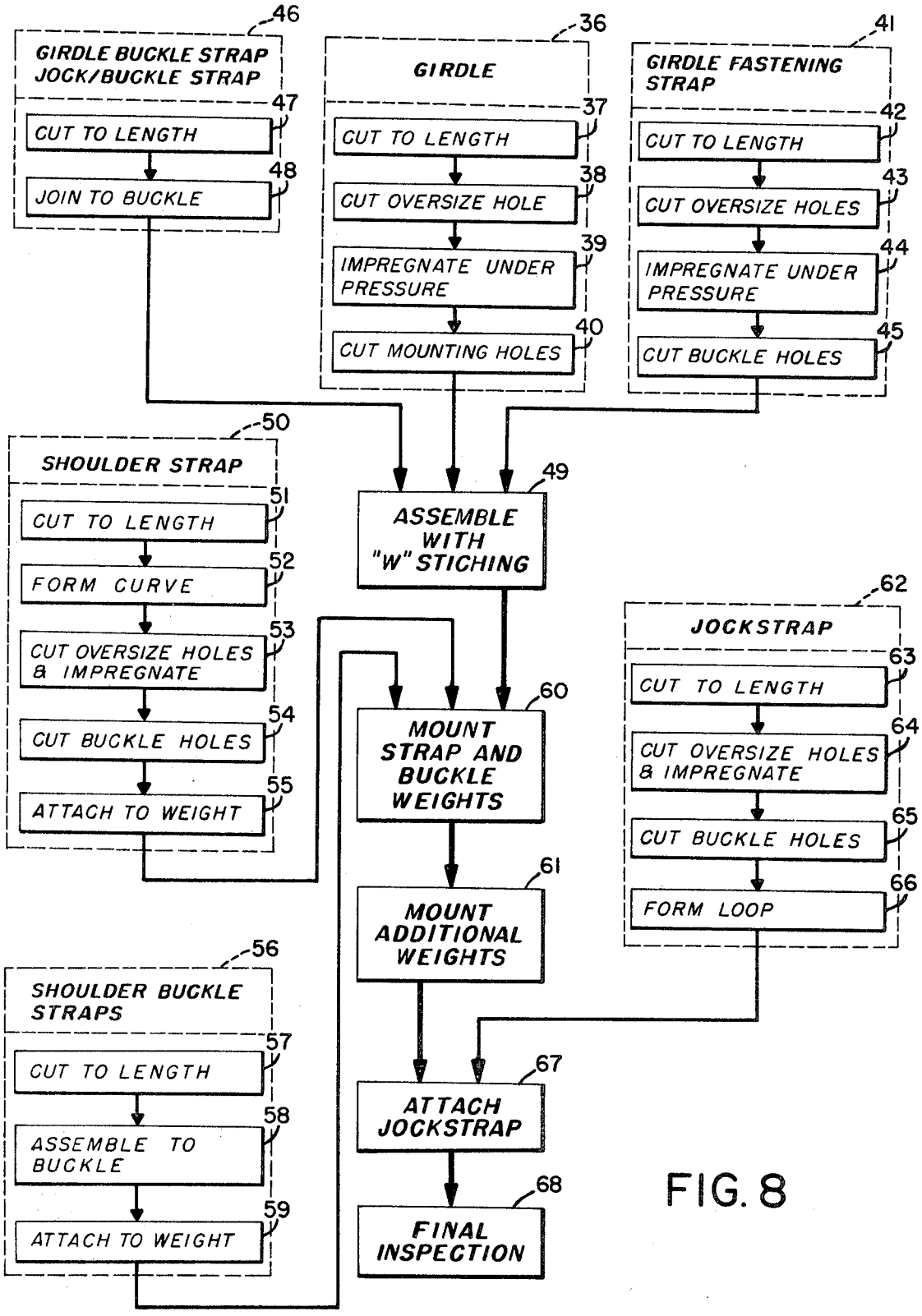

46
GIRDLE BUCKLE STRAP JOCK/BUCKLE STRAP
47
CUT TO LENGTH
48
JOIN TO BUCKLE
36
GIRDLE
37
CUT TO LENGTH
38
CUT OVERSIZE HOLE
39
IMPREGNATE UNDER PRESSURE
40
CUT MOUNTING HOLES
41
GIRDLE FASTENING STRAP
42
CUT TO LENGTH
43
CUT OVERSIZE HOLES
44
IMPREGNATE UNDER PRESSURE
45
CUT BUCKLE HOLES
50
SHOULDER STRAP
51
CUT TO LENGTH
52
FORM CURVE
53
CUT OVERSIZE HOLES & IMPREGNATE
54
CUT BUCKLE HOLES
55
ATTACH TO WEIGHT
49
ASSEMBLE WITH "W" STICHING
62
JOCKSTRAP
63
CUT TO LENGTH
64
CUT OVERSIZE HOLES & IMPREGNATE
65
CUT BUCKLE HOLES
66
FORM LOOP
60
MOUNT STRAP AND BUCKLE WEIGHTS
61
MOUNT ADDITIONAL WEIGHTS
56
SHOULDER BUCKLE STRAPS
57
CUT TO LENGTH
58
ASSEMBLE TO BUCKLE
59
ATTACH TO WEIGHT
67
ATTACH JOCKSTRAP
68
FINAL INSPECTION

FIG. 8

DIVER'S BELT AND METHOD OF MANUFACTURE

STATEMENT OF GOVERNMENT INTEREST

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.

FIELD OF THE INVENTION

This invention pertains to the field of fabrication of webbing articles. More particularly, this invention pertains to the manufacture of articles to be used in underwater environments. More particularly, but not by way of limitation, the invention pertains to the manufacture of articles to be used by divers. In still greater particularity, the invention will be described as it pertains to the manufacture of an improved diver's weight belt.

DESCRIPTION OF THE PRIOR ART

Weight belts for Navy divers and other underwater apparel using belting and strapping material are presently made of leather. For a large part, the reason that leather is employed in these applications is due to historical considerations. That is, the art of deep sea diving is a relatively old art and at the time of its conception leather was the most durable material available. Despite the long standing use of leather, there are a great many disadvantages associated with this material when used in underwater environments. When wet, these belts stretch and become loose. Upon returning to the surface, they dry and crack and have a relatively short life. By way of illustration of the shortcomings of leather material, reference is made to the most authoritative work in the diving arts, the United States Navy Diving Manual, NAVSHIPS 0994-001-9010, March 1970, available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402, wherein, the state of the art relative to diving belts is set forth. On page 241 thereof the maintenance procedure for a diving belt is described in paragraph 38:

> "To protect the belt leather, it should be given a coat of Neat's-Foot Oil well rubbed in so that it will not be disagreeable to handle. Because leather used in the water will soon become dry and hard, the frequency of applying oil will depend upon how frequently the belt is used. Deterioration of leather is not always discernable from visual examination; consequently, the belt strap, including the shoulder and jockstraps, should be tested for tensile strength. This may be accomplished by securing a regular diving belt buckle to the overhead, run the strap to be tested through the buckle; then have a man who weighs about 160 pounds gradually put his entire weight on the strap which will withstand the load if in satisfactory condition."

The foregoing provides an indication of the troubles encountered in the maintenance of leather for underwater applications. It should be noted, that leather is used for other pieces of diving apparatus, for example, wrist straps, ankle straps, shoe fasteners, and other securing fasteners. The instant invention is applicable to all of these applications. However, for purposes of brevity, only diving belts will be considered in the detailed portion of the invention disclosure, in as much as they are representative of the problems encountered in this area of technology.

There have been many attempts to overcome the disadvantages of leather by using modern synthetic fabrics. Although these synthetic fabric materials showed great promise in the replacement of leather, initial attempts to fabricate such equipment ran into developmental problems which precluded the use of such materials until the present time. The first such belts manufactured were made of a standard synthetic material, nylon webbing, which was impregnated and coated with a heat cured polyvinyl material. The fabrication of these early prototypes used usual leather fabricating techniques and merely copied the design of the present leather belt configuration. Although this belt was strong and relatively free from deterioration caused by salt water, the belt-hole grommets in the jockstrap pulled away from the material and dropped out.

The problem of having adequate belt-hole grommets proved to be the most serious technical challenge to the replacement of the leather belts. Similarly, other apertures in the belt used for mounting weights and interconnecting straps also failed and required techniques different from those used in the leather working arts in manufacturing the prior art belts.

Another method tried in hopes of solving the belt hole problem was to melt the fibers by inserting a hot penetrating tool through the belts, the tool having the same diameter as the desired hole. Since the holes formed in this manner consist of an area of melted fibers, the edges proved to be too brittle. In use, the brittle material separated and the hole become enlarged thereby weakening the fastening arrangement and permitting excessive slippage.

Another prior art attempt to overcome this weakness melted a hole in the webbing in a fashion similar to that described above, and installed a metal grommet therein. Belts made with this technique tended to fail in service because the metal grommet was not flexible and when used in a buckle or fastening arrangement the grommet became torn loose from the flexible webbing.

Another prior art diving belt made of webbing attempted to overcome this mounting problem by impregnating the webbing with a plastic binder material before cutting the hole through the webbing. The sides of the hole formed in this fashion are lined with the ends of fibers of the webbing. The plastic binding material around the sides of the material was intended to hold the fibers in a unitary configuration. However, when subjected to the high stresses normally accompanying the use of such fiber belts, the individual fibers slipped apart from the bindings and the holes became enlarged.

These problems of providing mounting holes and buckle engaging holes in webbed belts seemed to be insurmountable and as a result it was assumed that the webbing material, although satisfactory in every other respect, would not be suitable for use in this type apparatus.

Other prior art attempts to manufacture synthetic strapping and belting material have, of course, been tried. One prior art arrangement which, for a time, held great promise made the diving belts and other strapping from material developed for the harness of race horses. Despite the apparent dissimilarity in the two arts, the problems of lightweight high tensile strength webbing to be subjected to flexible use and alternate saturation and drying were, in fact, quite similar. This material

comprises a strip of woven stainless steel webbing and covered with a layer of polyvinyl. Although initially guite strong, belts made of this material proved unsatisfactory after short periods of use. Failures occurred because of corrosion at the places where apertures were cut therethrough and the inability of the stainless steel webbing to prevent elongation of the hole when used with a buckle.

Another type of prior art synthetic belt was made of three-ply ballistic nylon cloth impregnated with the urethane compound. These belts were too stiff and not pliable enough for comforatable use by the divers. Further, during initial tests of belts of this type the belt hole problems again appeared.

SUMMARY OF THE INVENTION

The invention provides a new type diver belt made of continuous filament nylon webbing. The nylon webbing is contoured such as to provide a better fit in the shoulder straps and breast plate area than prior leather belts and has improved belt holes for mounting lead weights and for cooperation with fastening buckles. The improved holes are characterized by having an area surrounding them impregnated with suitable elastomeric material such as urethane, for example.

The invention also provides an improved method for fabrication of strapping and other belt accessories used in underwater diving applications. The method comprises impregnation of areas with urethane under high hydrostatic pressures. Further, the method of the invention provides a process whereby the belt and webbing may be contoured along their length to provide better fit. Also, an improved stitching technique is disclosed which greatly improves the strength of the belt to belt joints.

STATEMENT OF THE OBJECTS OF THE INVENTION

Accordingly, it is an object of the invention to provide improved belting for underwater applications and a method of manufacture thereof.

A further object of this invention is to provide an improved diver's weight belt and a method of manufacture thereof.

A still further object of this invention is to provide an improved diver's weight belt having improved strength and longevity over those known in the prior art.

A further object of this invention is to provide a method for the reinforcement of fastening holes through continuous filament nylon webbing for underwater applications.

A further object of this invention is to provide an improved diving belt and method of manufacturing thereof having urethane reinforced fastening holes therein.

These and other objects of the invention will become more readily apparent from the ensuing specification when taken with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a diver wearing the device of the invention;

FIG. 2 shows a diving belt according to the invention;

FIG. 3 shows the mounting details of the shoulder straps of the invention;

FIG. 4 is a sectional view taken along lines 4—4 of FIG. 3;

FIG. 5 shows a reinforcing member used to mount weights on the diving belt of the invention;

FIG. 6 is a section taken along lines 6—6 of FIG. 5;

FIG. 7 illustrates a detail of the webbing construction showing the stitching pattern used; and

FIG. 8 is a flow diagram of the method of manufacture of the improved diving belt according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, diver 11 is shown wearing a helmet 12 which fits over and encloses his head and rests upon his shoulders on a breast plate 13. Diver 11 is wearing a diving belt according to the invention which comprises a girdle 14 which encircles diver 11 waist and two shoulder straps 15 which pass over breast plate 13. A jockstrap 16 passes from the back of girdle 14 between the diver's legs to be attached to girdle 14 by means of a buckle. The weighted belt provides the necessary negative buoyancy to overcome the positive buoyancy of helmet 12 and the diving suit when it is moderately inflated. The weight of the complete belt is approximately 84 pounds; however, the weight may be varied if desired by adding or removing plurality of individual weights which are attached by means to be further described to girdle 14. Shoulder straps 15 are mounted in suitable metal fittings which are cast into four of the weights, as will be described in greater detail herein, and pass over helmet breast plate 13. The straps cross in the front and the back so as to counteract any tendancy the belt may have to shift. Jockstrap 16 is provided for the dual purposes of preventing the helment from rising over the diver's head as it would do if the dress were permitted to elongate due to overinflation and to hold the girdle portion 14 in its proper location about the waist of the diver 11.

Referring to FIG. 2, the belt according to the invention may be seen in greater detail. Girdle 14, which as previously noted, is made of a nylon webbing material and has jockstrap buckle 18 secured to the center thereof so as to depend downwardly therefrom. Jockstrap 16 is attached to the belt girdle 14 by means of a loop formed in one end thereof and slipped over the end of girdle 14 so as to be slidably positioned therealong. Shoulder strap buckles 19 are mounted on buckle attaching weights 24 and cooperate with the ends of shoulder strap 15 to secure the strap over the shoulder of the wearer. In turn, shoulder straps 15 are mounted on strap attaching weights 25. In a similar fashion to jockstrap buckle 18, girdle buckles 21 are attached to girdle strap 14 and cooperate with firdle fastening straps 22 to secure girdle 14 about the waist of the diver 11. When girdle 14 is placed about the waist of diver 11, buckles 21 are attached to straps 22 and shoulder straps 15 are passed over the back of diver 11 and made fast to buckles 19. Jockstrap 16 is drawn between the diver's legs and attached to buckle 18 as shown in FIG. 1. This may be done with the diver in the normal standing attitude whereas, formerly, it was necessary to draw the diver over in a stooped crouch so as to make allowance for the stretching of the prior art leather belts.

The weight of the complete belt may be varied by adding additional weights, such as shown at 23, between the strap mounting weights 24 and 25. The num-

ber of such weights employed depend upon the size of the diver and the depth at which he will be working.

Referring now to FIG. 3, the details of attachment of buckle 19 to buckle attaching weight 24 are illustrated. A suitably shaped mounting loop 26 is integrally cast with weight 24 so as to protrude thereabove and provide mounting attachment means for a webbing strap 27. Weight 24 is made of lead, as are the prior art weights, and, like them, weighs approximately 7½ pounds.

Mounting strap 27 extends a short distance upwardly from weight 24 and is attached to buckle 19. This permits buckle 19 to be moved freely for short distances so as to facilitate securing shoulder straps 15 therein.

Referring now to FIG. 4, which is a sectional view taken along lines 4—4 of FIG. 3, further details of mounting weight 24 may be more clearly seen. As shown weight 24 is on the front side of girdle 14 and a stiffener plate is placed on the rear side of girdle 14 and two threaded fasteners, such as screws 29, are received in threaded nuts 30 which, in turn, fit in depressions on the forward side of weight 24.

Stiffener plate 28, screws 29, and nuts 30 are made of any suitable corrosion resistance material capable of withstanding the adverse effects of immersion in salt water. It should be noted, however, that brass has proven satisfactory for this application in developmental models of the invention. Although, if desirable, other materials may be used.

Referring to FIGS. 5 and 6, stiffener 28 has oval shaped end portions each pierced with an aperture 31. Stiffener 28 is depressed in the region of aperture 31 such that the walls of the aperture form approximately two depressions having standard countersink dimensions used with screws 29. It will also be observed the marginal portions of stiffener plate 28 have suitably rolled edges 32. Rolled edges 32 do not extend downwardly as far as the walls of apertures 31.

In affixing weights to girdle 14, screws 29 pass through apertures 31 and pull apertures 31 into suitably placed apertures in belt girdle 14 thereby securing affixing weights 24 to girdle 14. Although shown on weight 24, it should be understood that weights 23 and 25 are mounted in a similar fashion. The holes in girdle 14 through which bolts 29 pass as well as the holes in shoulder straps 15, jockstrap 16 and girdle fastening strap 22 have the marginal portions thereof impregnated with suitable elastomeric material, such as urethane. This material has the property of bonding with the individual strands comprising the webbing which girdle 14 and the aforementioned straps are made.

Referring now to FIG. 7, the method of attaching the straps one to the other will now be described. FIG. 7 and the attaching method will be described as it pertains to fitting the jockstrap buckle retaining strap to girdle 14. However, it should be understood that the same technique is used in forming all of the fabric strap to strap joints. Basically, the straps to be joined are overlapped and held in position and, if desired, they may have a cementitious bond applied therebetween. When the straps are in the desired position a W shaped stitch is sewn through both pieces of fabric on one side. Such a stitching is shown in FIG. 7 at 34 as passing through strap 33 and girdle 14. The entire assembly is then inverted and a second W shaped stitch pattern, shown at 35, is applied from the other side, that is from girdle 14 through jockstrap buckle retaining strap 33 which is now positioned on the lower side. The two W shaped stitch patterns 34 and 35 intersect so as to form three lozenge shaped enclosed areas and side extensions. Any suitable synthetic thread designed to work with materials of the webbing chosen may be used, however, for purposes of completeness, that a nylon thread having a 40 pound minimum breaking strength made by a Robinson Thread Company of Worcester, Mass. and marketed under the designator "Robinson's No. B/277" has proven satifactory in the belt of the invention.

METHOD OF MANUFACTURE

The manufacture of the improved diving belt according to the invention may be best understood with reference to FIG. 8, a flow diagram of the steps of fabrication. The first step in the manufacture of the diving belt according to the invention is the preparation of girdle 14. This preparation is indicated by the broken line in box 36. The first step in preparation of girdle 14 is the cutting of the webbing to the desired length. This cutting is performed with a heated instrument so as to give a heat seal cut. Such cutting techaniques are well understood in the fabric working arts and, therefore, will not be explained in detail herein.

As indicated by box 38, the next step in girdle preparation 36 is to cut oversized holes at selected locations therein. Of course, the oversized holes are cut in locations where it is desired to attach weights to girdle belt 14, that is, the areas through which screws 29 will pass.

The next step in the preparation of girdle 14, as indicated by box 39, is to impregnate the selected areas previously cut with oversized holes with a suitable material which will bond to the webbing of the belt and form a solid plug therein. In the instant example, where nylon filament webbing is employed, urethane under hydrostatic pressure has proven very satisfactory. In this application, the belt is placed on a suitable work surface and urethane is applied thereto under considerable hydrostatic pressure so as to completely impregnate the webbing for a distance extending radially outward from the oversized holes.

After the urethane has cured, the next step in the processing of diving belt is to cut the weight mounting holes through the urethane plugs. This step indicated by box 40 may be performed with any suitable cutting device. The wimbles used in leather working arts will prove satisfactory in most instances, however, other hole cutting and boring tools such as those used in plastic working arts, will perform satisfactorily as.

As indicated by broken line box 41, the preparation of girdle fastening straps 22 is accomplished in the same fashion as the preparation of girdle 14. That is, the straps are cut to length, as indicated by box 42, and oversized holes are cut therein, as indicated by box 43. As in the preparation of girdle 14, the cutting is performed so as to provide a heat seal cut and the oversized holes are left untreated. As indicated by box 44, the holes and areas immediately adjacent thereto are impregnated with urethane under pressure in the same fashion as was girdle 14. After the urethane has cured the buckle engaging holes are cut therein as indicated by box 45. It should be noted that the preparation of girdle fastening straps may proceed at the same time as the preparation of girdle 14 or may be done before or after, that is, the time sequence in the performance of

steps within broken line box **41** is not critical with respect to those within broken line box **36.**

Similarly, as indicated by broken line box **46,** the preparation of the girdle and jockstrap buckle straps may proceed independently or simultaneously with the preparation of girdle **14.** The first step, indicated by box **47,** is the cutting of the individual straps to the proper length. As previously noted, this length is the exact length required unlike the leather straps of the prior art which must be cut shorter to allow for elongations when wet. Like the other web cutting steps, these are performed to provide a heat seal edge. The next step as indicated by box **48** is the attachment of the strap to the individual buckle. The joining to the buckle may comprise other fabric working steps in dependence on the particular type of buckle to be employed. That is, if the buckle has a tongue hasp a hole may have to be provided in the appropriate strap. Should such a hole be necessary, the technique used in placing holes in girdle **14** or girdle fastening strap **22** will, of course, be employed.

As indicated by block **49,** the next step in the preparation of the diving belt according to the invention is the assembly of girdle portion **14** to the girdle fastening straps **22,** jockstrap buckle retaining strap **33,** and the girdle buckle straps. This assembly is performed with fabric stitching techniques as previously described in connection with FIG. **7.** That is, a W shaped stitch is placed in the appropriate area for each strap, the belt is inverted in a similar W shape stitch, but facing the other direction, is sewn through the other side thereof.

The steps required to prepare shoulder strap **15** are shown by broken line box **50.** The first step, indicated by box **51** is to cut the strap the proper length. This cutting, as in previously cuttings, is effected so as to obtain a heat sealed edge.

The next step in the preparation of shoulder straps **15** is to form the straps into the desired curve. This step, indicated by box **52,** is accomplished by heating one edge of the strap Because that the strands thereof become somewhat elastic and flexible. Becasue of the nature of the webbing and the material from which it is made this heating causes the webbing to shrink along the heated edge. This heating may advantageously be combined with a pressure application. One satisfactory method is to pass a heated roller over one edge until the desired curvature is obtained. The resulting strap has a curvature therein which permits the strap **15** to pass over the breast plate **13** in a less cumbersome and binding fashion than the leather straps of the prior art.

The next step, as indicated by box **53,** is the cutting of oversized holes and impregnation thereof with urethane. This step, indicated by box **53,** is essentially the same operation as indicated in the preparation of girdle fastening straps and girdle portion itself. The time sequence of this step and the curving step may be reversed. That is, the holes may be made prior to curving, if desired.

The next step, shown by box **54,** is to cut buckle engaging holes in the treated areas. This cutting operation, like the previous hole cutting operations, may proceed with any standard fabric working tool.

The next step, indicated by box **55,** is the attachment of shoulder straps **15** to shoulder strap attaching weights **25.** As indicated by the box **55,** this attachment is accomplished by performing the aforedescribed W stitching operations in a loop formed by extending one end of the strap in the engaging hardware on the weight **25** and stitching the end of the strap to the side thereof.

As will be seen in FIG. **2,** the attaching hardware embedded in weight **25** is set at an angle with respect to the weight. This angle helps strap **15** conform to the desired cross pattern and prevents undue twisting. However, since such fastening straps were known in the prior art weight belts, no further description thereof is deemed necessary.

Referring again to FIG. **8,** the steps to prepare shoulder buckle straps **27** will be described. These steps, shown contained within broken line box **56** comprise cutting the belt to length, indicated by box **57,** assembling the strap to the buckle, indicated by box **58,** and attaching to the weight by W stitching techniques, as indicated by box **59.** As will be obvious, these steps essentially duplicate those used in preparing shoulder straps **15** and contained within broken line box **50** and, accordingly, will not be described in fuller detail.

The next step in the assembly of the diving belt is to mount the shoulder straps and buckle weights on belt girdle **14.** This step, indicated, by box **60,** employs, conventional mechanical assembly techniques. That is, stiffener plate **28** is placed on one side of belt **14,** the appropriate weights **24** or **25** are placed on the other side thereof, and screws **29** pass therethrough so as to engage nuts **30.** After screws **29** are tightened in nut **30,** nuts **30** may be secured to prevent accidental loosening by peening either lead weight **28** or screw **29.**

As indicated by box **61,** the next step in the manufacture of the diving belt according to the invention is the mounting of additional weights thereon as required for the particular application.

Referring now to broken line box **62,** the preparation of the jockstrap **16** will be described. As indicated by box **63,** the first step in preparation of jockstrap **16** is the cutting of the selected webbing to length. As in previous cuttings to length, the cutting is effected to produce a heat seal edge thereon. Next, as indicated by box **64,** oversized holes are cut therein and impregnated with urethane. The cutting and impregnating represented by box **64** is essentially the same as described in greater detail in connection with boxes **38** and **39** and, accordingly, will not be further described at this point. Next, the desired size buckle engaging holes are cut in the impregnated treated areas as shown by box **65.** The next step, indicated by box **66,** is the forming of a loop in the end of jockstrap **16.** This loop should be of sufficient size to permit jockstrap **16** to pass over the end of gridle girdle The loop is formed by bending one end over and back against the length of the jockstrap **16.** Then, the W stitching technique, previously described, is employed on both sides so as to make a firm bond. As indicated by box **67,** the next step in the manufacture of a diving belt according to the invention is the sliding of the jockstrap **16** over the end of girdle **14.** This completes the assembly of the device and, as indicated by box **68,** only the final inspection and necessary testing need be performed.

MODE OF OPERATION

The operation of improved belt according to the invention is exactly the same as the prior art belts which it replaces with the exception of the tightening of jockstrap **16,** previously described. Therefore, no particular description need be given to the belt's operation. Like the leather belts, some care is to be exercised to pre-

vent the belt from being engaged by sharp objects when it is stored and to permit it to air dry prior to storing. However, the improved characteristics of the material when combined with the fabrication techniques, above described, result in a new, useful article which is a profound improvement over that heretofore available.

The foregoing description taken together with the appended claims constitute a disclosure such as to enable a person skilled in the diving equipment arts and having the benefit of the teachings contained herein to make and use the invention. Further, the structure herein described meets the aforestated objects of the invention, and generally constitutes a meritorous advance in the art unobvious to such skilled workers not having the benefits of the teachings contained herein.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings, and, it is therefore understood that within the scope of the disclosed inventive concept, the invention may be practiced otherwise than specifically described.

What is claimed is:

1. An improved diving belt for use by a diver wearing a diving helmet comprising:

a girdle portion made of continuous filament synthetic fiber webbing;

a jockstrap portion made of a continuous filament synthetic fiber webbing and having a loop formed in one end thereof to slidably receive said girdle portion therein;

first fastener means attached to one end of said girdle portion for the securing thereof about the waist of the diver;

second fastener means attached to said girdle portion near the mid-section thereof and depending downwardly therefrom for securing the nonlooped end of said jockstrap portion to said girdle when it is passed between the legs of said diver;

elastomeric impregnated areas at predetermined locations along said girdle portion and said jockstrap portion surrounding an elastomeric material plug extending therethrough for providing stretch resistant reinforcement thereat;

aperture means extending through said girdle portion and said jockstrap portion in said elastomeric plug for cooperating with said first and second fastener means to provide high strength attachment points therefor;

weight means attached to said girdle means at other of said aperture means for providing negative buoyancy for said diver;

shoulder strap fastener means attached to selected ones of said weight means for attachment of shoulder straps thereto; and

shoulder straps means extending between the selected ones of said weight means and attached to said shoulder strap fastener means associated therewith for cooperatively engaging the breast plate of the diving helmet worn by said diver.

2. An improved diving belt according to claim **1** wherein said first and second fastener means comprise strap supported buckles secured to said girdle means by stitching extending therethrough.

3. An improved diving belt according to claim **2** in which the stitching comprises an open geometric pattern repeated on each side the open patterns being oriented with respect to each other in such a fashion that the two patterns cooperate to form closed geometric forms which distribute tensioning forces across the area of the figures.

* * * * *