Jan. 13, 1931. H. BOND ET AL 1,788,480

ART AND APPARATUS OF BUOYANT GARMENTS

Filed Aug. 19, 1929

FIG. 1.

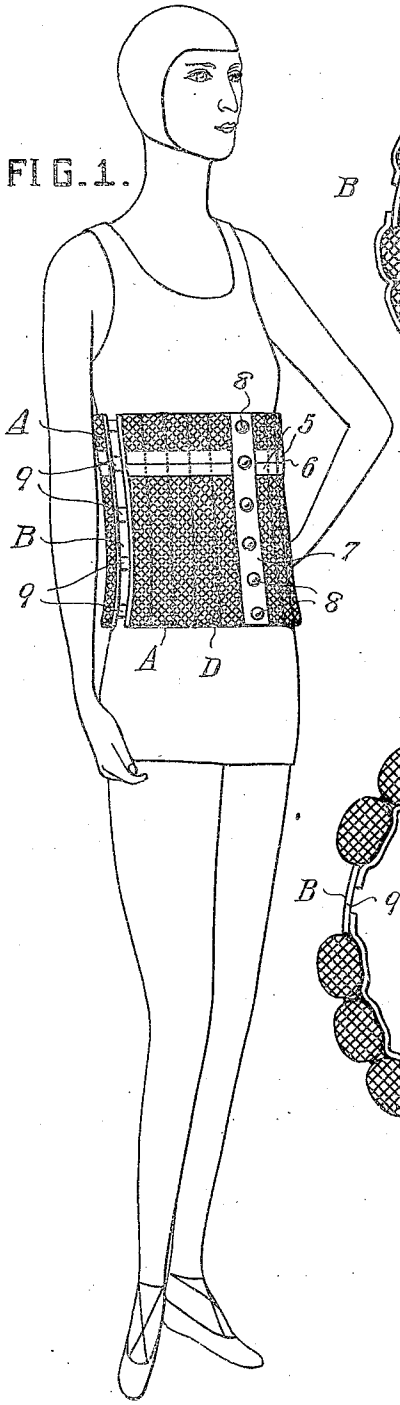


FIG. 3.

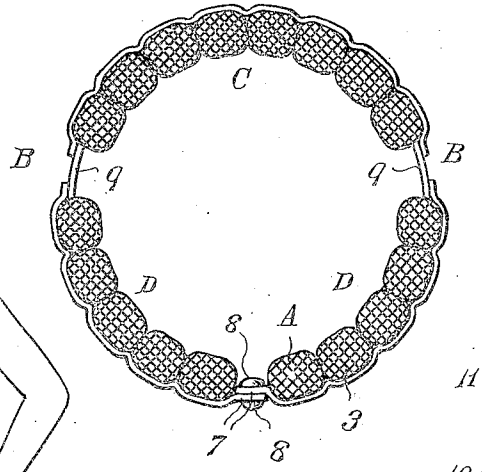


FIG. 2.

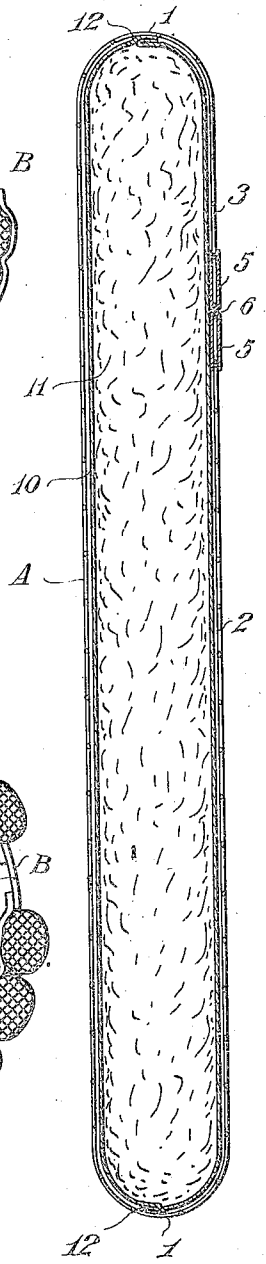
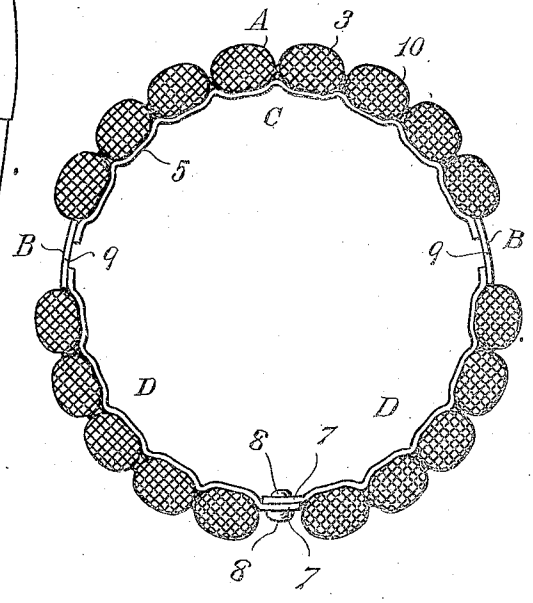


FIG. 4.



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UNITED STATES PATENT OFFICE

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ART AND APPARATUS OF BUOYANT GARMENTS

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This invention relates to improvements in devices designed for facilitating swimming, and to the art of producing such devices, and more particularly to buoyant garments susceptible of variable buoyancy.

The essential object in view is the combining of maximum efficiency with greatest simplicity.

Among other and more detailed objects are the reduction of the garment to the form of a belt; the formation of such belt in a manner to adapt it to fit persons of different girth without variation in the actual overall length of the garment; the rendition of the buoyancy of the belt variable by the demountable application and removal of buoyant elements thereto and therefrom; and the provision of means for facilitating ease and readiness of application and removal of such elements while effectively providing against dislodgment or displacement of the buoyant elements during use.

With these and other objects in view as will in part be hereinafter stated and in part become apparent, the invention comprises both the art of forming a buoyant garment and the product of such art, whereby a simple and efficient apparatus is produced which may be easily and quickly donned and removed, and may likewise have its buoyancy varied according to the effective displacement required whether relative to the proportional displacement of the user or to the degree of the efficiency of the user in swimming.

The invention also comprises certain novel steps and combinations of steps of the art of garment construction, and certain novel constructions, combinations, and arrangements of parts of garments as will be hereinafter made apparent and be subsequently pointed out in the appended claims.

In the accompanying drawings,—

Figure 1 is a perspective view of an embodiment of the features of the invention produced by the improved art and shown as applied and ready for use.

Figure 2 is an enlarged section taken transversely through the belt and longitudinally through one of the buoyant elements, the section being taken approximately on the median line of the buoyant element.

Figures 3 and 4 are end views of the belt detached and seen on a reduced scale with respect to Figure 2 and on an enlarged scale with respect to Figure 1, one figure showing the buoyant elements surrounded by and the other figure showing the buoyant elements surrounding the limiting strap or selvage by which variation in the available encircled space is clearly shown.

As will hereinafter become obvious, the present improved garment may well be produced in any of a great variety of ways, and may be constructed of any acceptable fabric suitable for the purpose. However, one very effective and preferred mode or process of construction consists of employing a strip of knitted or netted fabric, or like elastic material, the netted material being preferred for its lightness of weight and its physical strength. The strip is preferably provided with selvage or like finish along its longitudinal edges, and where such selvage is not initially present, an appropriate finish in substitution thereof should be made along the edges of the strip. The end edges of the strip will ordinarily be "raw" and require finishing to the equivalent of a selvage. The strip of netted or other material must be of approximately the length required for the finished belt, and should be a little more than twice the width thereof.

The strip is first provided along its longitudinal edges with a marginal binding of preferable limply flexible material, which may consist merely of a heavy, strong selvage or of the addition of a binding strip of tape. When tape is used, that commonly employed for binding garments may be utilized, or, when it is desired to increase the elasticity longitudinally of the belt, a special tape may be employed of the character of fabric commonly used as surgical bandages possessing a degree of elasticity inherent incident to the concatenation of the threads of the fabric without employment of rubber or like elastic. The tape or like binding material is preferably sewed to the belt-forming fabric, but may be otherwise secured thereto as

found preferable under any given conditions. After the attachment of the tape, if a tape be used, the belt-forming strip is folded longitudinally somewhat off the median line of the strip, so that the free edge of the folded part which carries one strip of the tape or like binding or depends upon a heavy selvage will fall somewhat short of the opposite tape or longitudinal edge of the belt-forming fabric. The said strip is then again folded along the unfolded portion to bring the last-named tape into or substantially into edge contact or approximate contact with the edge of the first folded part, so that the thus folded belt-forming strip will be approximately one-half of its original unfolded width. Then, the thus folded strip is secured by a series of transversely located lines of stitching or other appropriate securing means spaced apart longitudinally of the belting to provide a series of transversely located pockets, each closed at both ends and open only at the place of the selvaged edges or binding tapes. Said binding tapes being of less elasticity than the netted fabric of the belt produce a limiting strap causing the expression of greater elasticity at the opposite side or face of the pockets along the line of said strap. The result in the finished article is that the free area enclosed by the belt, when the strap produced by the tape is exterior of the belt, will be considerably less, as seen in Figure 3, than when the said strap is encircled by the pockets, as seen in Figure 4.

It is clear that the method of folding of the belt-forming fabric and the cross stitching thereof will result in the formation of a series of pockets, as above stated, each of which has a relatively long section preferably amounting to almost the whole length of the pocket, and a preferably comparatively short opposing section, the selvage or binding tape demarking the limits of said sections. Of course, other proportions in the lengths of the pocket sections may be provided when and as found desirable. Accessibility to the pocket sections is afforded by the nonattachment of the adjacent edges of the marginal tapes.

When the belt fabric is thus completed, it remains only to provide detachable attaching means for the ends of the belt to complete the same. Such attaching means may be any appropriate type of buttons, buckles, hooks and eyes, or other detachable fasteners, as, for example, snap fasteners of the glove-button or automobile-curtain type. Appropriate tape or other binding is preferably secured to the ends of the belt for stabilizing purposes, but the use of such tape is largely a matter of choice.

When thus completed, the pockets of the belt are designed and adapted to demountably receive buoyant elements or units which may be inserted longitudinally between the adjacent edges of the marginal tapes and passed first into the longer section of each pocket and then sprung or otherwise worked into the shorter section. The result, after all pockets have been supplied with buoyant elements, is a belt well adapted for use by those who do not know how to swim, and particularly by learners. As proficiency in swimming begins and progresses, less and less buoyancy will be required, and decreasing buoyancy may be produced by removal of successive buoyant elements, care being preferably exercised to alternately remove from approximately opposite portions to maintain substantial equilibrium.

Of course, the belt may, and in most instances will be, preferably constructed in sections, three sections being preferred, one for the back and one for each side at the front with the separable ends occurring between the two front side sections. Other desirable details may be employed as found preferable, some of which will be specifically pointed out with reference to the accompanying drawings in which A indicates the belt fabric folded at 1, 1, to provide the double thickness and produce the pocket sections 2, 2 and 3, 3, resulting from the transverse lines of stitching 4, 4. The longitudinal margins of the fabric A are finished by the selvage or tapes 5, 5, providing the access opening 6 to the pocket sections 2 and 3. The terminal edges of the fabric A are preferably bound by appropriate tapes 7, 7, which tapes carry the detachable securing means indicated in the drawings as snap fasteners 8, 8. The belt formed of such fabric is preferably divided at B, B into a back section C, and front side sections D, D, the back section being connected to the side sections by appropriate straps 9, 9, preferably of elastic material, such as garter elastic or the like, so as to provide desirable give and conformity to body contour and movements. Within each pair of pocket sections 2—3 is inserted a demountable buoyant element 10, each consisting preferably of an impervious tube filled with kapok, or other appropriate buoyant substance 11. The tube of each buoyant element may be of thin rubber and is sealed at both ends, as at 12, 12, to prevent access of moisture to the contained buoyant substance. Other substance may be substituted for kapok, but kapok has been found superior for most purposes because of its capacity to remain distended and occupy large areas with comparatively small bulk of material. Its capacity also to resist saturation in case of rupture of one of the impervious tubes is a further reason for its use. It is not desirable to employ a pneumatic tube because of danger of puncture, but, nevertheless, the present invention is not directed to the form and construction of the buoyant elements 10 which are, so far as the present invention is

concerned, known structures. It is desirable, however, that the size and shape of each buoyant element 10 be proportioned to adapt the element to the respective pocket sections 2 and 3 and to application and removal thereto and therefrom through the access openings 6.

In operation, the several pockets being filled with the demountable buoyant elements, the belt is applied to the person of the user after the manner indicated in Figure 1, and the fastening devices 8 are secured to connect the ends of the belt together. The structure is then ready for use. It is preferable to apply the belt after the manner shown in Figure 1 with the strap comprised of the tapes 5 outermost, so that the access openings 6 will be exposed. Thus, when one learning to swim and using one of the belts, finds that he has acquired a certain degree of efficiency and desires to test his progress, he may insert a finger or fingers through an opening 6 and sufficiently compress the upper part of the buoyant element 10 to withdraw the upper end thereof through the respective opening 6, and then withdraw the whole buoyant element. The belt displacement being proportionately decreased, the user will find necessity to exercise his swimming skill to a proportionately greater extent. He may thus progress, withdrawing a buoyant unit 10 occasionally from time to time, until all of the buoyant elements have been removed. Naturally, before he has actually reached the last buoyant unit, he will probably discard the entire belt, but there will be many stages between total inability to swim and such proficiency as enables discarding the belt, all of which stages will find appropriate adaptation by such varied displacement of the belt as required to keep the student or swimmer up to his swimming ability.

It should be understood that while the arrangement of the belt, as shown in Figure 1, has been expressed as preferred, it is naturally preferred for some purposes only. It is to be observed that when the parts are thus arranged, the free space encircled by the belt will correspond in any given size of belt to the space seen in Figure 3; whereas if the girth of the user be greater and no larger belt be available, by reversing the sides or faces of the belt and causing the strap made up of the tapes to appear at the inside, a greater girth will be accommodated, as clearly seen in Figure 4. This mode of application, however, possesses the drawback that one must reach inside the belt to find access to an opening 6 for withdrawing a buoyant element 10. This can be done or in either manner of use, the buoyant element or buoyant elements may be removed when the belt is not actually in use.

While the term "garment" has been largely used herein it is intended to be employed as possessing substantial equivalency with apparel to include a belt or belting.

What is claimed is:—

1. In the art of constructing variably buoyant articles of apparel, folding a strip of fabric to cause its edges to approach each other with one fold of greater width than the other and with the approaching edges arranged to provide an access opening therebetween, and securing the folded portions to the base portion of the fabric transversely of the strip to divide the fabric into pockets each having a relatively long section and a relatively short section.

2. In the art of constructing variably buoyant articles of apparel, folding a strip of fabric to cause its edges to aproach each other with one fold of greater width than the other and with the approaching edges arranged to provide an access opening therebetween, and securing the folded portions to the base portion of the fabric transversely of the strip to divide the fabric into a series of substantially uniform-width pockets, each having a relatively long section and a relatively short section.

3. In the art of constructing variably buoyant articles of apparel, folding a strip of fabric to cause its edges to approach each other with one fold of greater width than the other and with the approaching edges arranged to provide an access opening therebetween, and stitching the folded portions to the base portion of the fabric in a series of transverse lines dividing the fabric into a series of substantially uniform-width pockets, each having a relatively long section and a relatively short section.

4. An article of apparel comprising a series of fabric pockets each having a relatively long section and a relatively short section and formed with an access opening at the place of meeting of the sections.

5. An article of apparel comprising a series of fabric pockets each having a relatively long section and a relatively short section and formed with an access opening at the place of meeting of the sections, there being a sufficient number of said pockets and the pockets being united edgewise to produce a strip having its longitudinal dimension perpendicular to the longitudinal dimension of the pockets.

6. A variably buoyant article of apparel comprising a series of pockets each closed at both ends, and each of said pockets having a lateral opening intermediate the ends for the introduction and removal of a buoyant element.

7. A variably buoyant article of apparel comprising a series of pockets of somewhat elastic fabric, and a binding strap intermediate the ends of the pockets of less elasticity than the fabric of the pockets and connecting the pockets together.

8. A variably buoyant article of apparel

comprising a series of pockets of somewhat elastic fabric, and a binding strap intermediate the pockets of less elasticity than the fabric of the pockets connecting the pockets together, said strap comprising a plurality of strips of material spaced to provide openings into the pockets.

9. A variably buoyant belt comprising a strip of somewhat elastic fabric having its margins folded upon itself to a substantially meeting condition, and lines of stitching attaching the folded portions to the base fabric to produce a series of transversely arranged pockets open only at the place of approach of the margins of the original fabric toward each other.

In testimony whereof we affix our signatures.

HILL BOND.
ELIZABETH S. BOND.