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O. F. MARSTON

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FLEXIBLE BUOYANT ARTICLE

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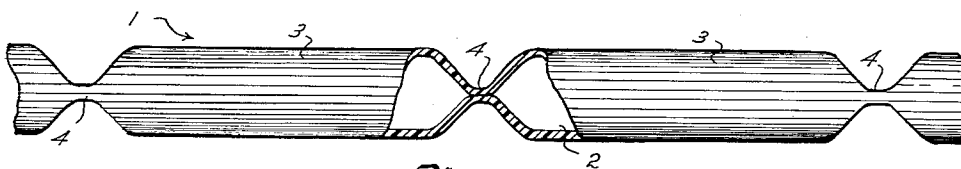


Fig. 1.

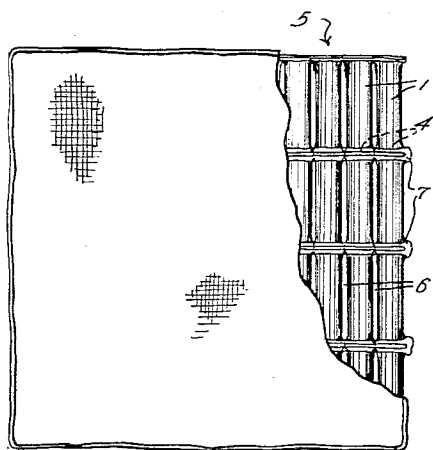


Fig. 2.

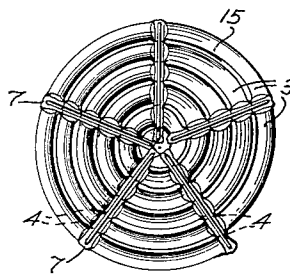


Fig. 5.

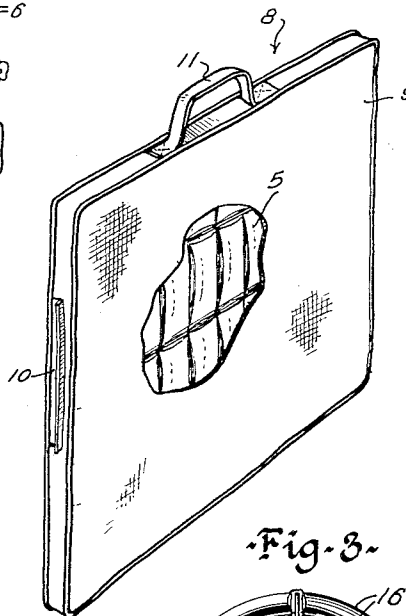


Fig. 3.

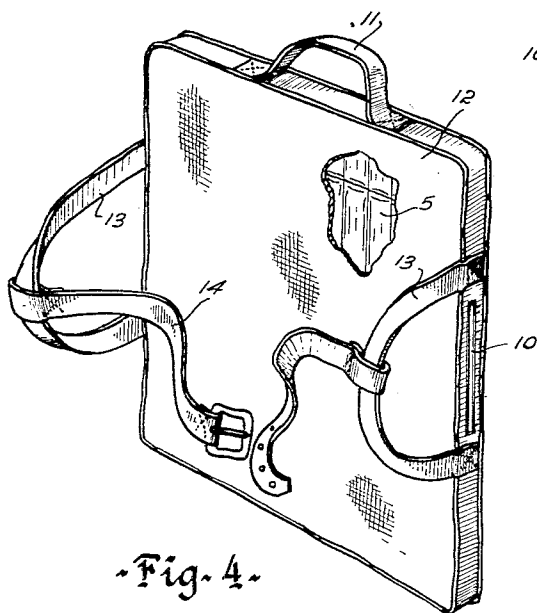


Fig. 4.

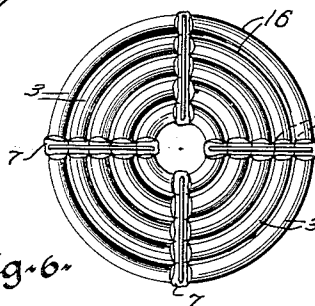


Fig. 6.

INVENTOR.
Oliver F. Marston
BY Alex. C. Mackay
Attorney.

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FLEXIBLE BUOYANT ARTICLE

Oliver F. Marston, Richmond, Va.

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4 Claims. (Cl. 9—17)

This invention relates to flexible, waterproof, buoyant structures, and articles made therefrom, such as cushions, mattresses, life preservers, pillows, floats, bumpers, insulation units and the like.

An object of the invention is to provide a waterproof, buoyant filler pad structure, which may be readily employed in the formation of articles, such as cushions and life preservers and which comprises a strip composed of closed, hollow, flexible link sections, each section being connected to but separated from one or more adjacent sections by intermediate sealing portions, the strip being thereby readily severable to permit provision of unit strips of any desired length, whereby formation of articles therefrom of varying sizes is facilitated.

Another object is to produce such a strip from air or gas filled tubing composed of a suitable flexible thermoplastic composition, heating means being applied to the tubing transversely thereof to unite the walls of the tubing at spaced intervals to form said sealing portions with link sections therebetween.

Another object is to form a buoyant, waterproof filler pad composed of one or more of said strips having portions thereof arranged in side by side relation, and including means connecting together the adjoining sealing portions, the link sections of each strip being spaced from the link sections of adjacent strips to permit free spaces therebetween for passage of air, water or other liquids.

Another object is to provide an article composed of a pad formed from one or more of such strips, and having thereon a covering freely permeable by air and liquids and/or of a fireproof nature.

Other objects, details and advantages of the invention will appear from the following description, with particular reference to the accompanying drawing, in which

Figure 1 is an elevation partly in section, of a strip in accordance with the invention,

Figure 2 is a plan view of a filler pad unit in accordance with the invention,

Figure 3 is a perspective view of a cushion embodying the invention,

Figure 4 is a perspective view of a life preserver embodying the invention, and

Figures 5 and 6 are plan views of modified forms of filler pad units.

Referring to the drawing, a strip 1 in accordance with the invention comprises a tubing 2, preferably of extruded flexible thermoplastic resin composition, such as polyethylene, or like flexible non-porous plastic compositions. The tubing may vary widely in cross-sectional shape and may, for instance, be of round, square, oval or other cross section. The overall width of the tubing may also vary widely as desired. For instance, a round tubing of one inch external diameter is satisfactory, but such diameter may vary, say, from $\frac{3}{4}$ to 3 inches. The tubing wall is preferably relatively thin. Thus, a 1 inch diameter tubing having a wall thickness of .03 inch is satisfactory. However, such thickness may vary, say, from .003 to .25 inch. It will be apparent that the wall thickness, length

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of links, overall width, diameter, and thickness chosen will depend to large extent upon the end products for which the strips are to be employed. The strip is composed of a plurality of successive cells or link sections 3 separated by alternate sealing portions 4, formed by thermally uniting opposed portions of the tube wall at spaced intervals. Such thermal union may be effected by applying to the tubing a heating bar unit, such as electronic heating means, transversely thereof to compress the tubing at the line of application and to generate sufficient heat to fuse the wall portions together and completely seal the interior of each link section. It will be apparent that one or more of such heating units may be applied simultaneously to one or more tubes to effect the rapid formation of the strips. Each link section contains air or other gas, such as nitrogen, under low pressure, preferably slightly above atmospheric pressure, for instance, approximately three to five pounds per sq. inch. The tubing may be inflated with air or gas prior to or at the time of sealing of the portions 4.

Each link section may vary in length, which may be, for instance, from one to six inches depending upon the desired dimensions of the articles for the manufacture of which the strips are to be employed. A link section of approximately four inches in length has been found satisfactory in a tubing of one inch diameter.

The sealing portions 4 may be of sufficient extent in the longitudinal direction of the strip, say one-eighth or more, to permit ease of severance of one section 3 from an adjacent section by cutting the portion 4 transversely of the strip while leaving fully sealed areas thereof on either side of the line of severance.

In forming a filler pad unit 5 as shown in Figure 2, a plurality of separate strips 1 are arranged in parallel laterally aligned rows. The sealing portions 4, which are of greater width than the link sections 3, are preferably in juxtaposed and laterally aligned relation, in which relation a plurality of openings 6 are provided between the adjacent link sections 3. The strips 1 are joined together in such relation by transverse bands 7 of thermoplastic resin composition or the like and which are adhesively secured to each strip along the aligned sealing portions 4. The resultant filler pad is of fully ventilated character by reason of the openings 6. Moreover, these openings permit rapid shedding of water or other liquids, thus preventing the entrainment or accumulation of bodies of such liquids on the pad.

Referring to Figure 3, the cushion 8 shown comprises a filler pad 5 and a covering 9, preferably of woven yarns of water-proof rayon, nylon, artificial leather, and the like, which are non-moisture absorbent. It is also preferred that such covering be of a loosely woven or porous nature whereby air or liquids will circulate freely therethrough. The covering may be provided with one or more openings 10 to facilitate circulation of fluids therethrough. The covering may be provided with a carrying strap or handle 11.

The covering 9 may also be formed of a woven fiber glass material or the like, which renders the cushion substantially fireproof.

Referring to Figure 4, the life preserver shown may comprise a filler pad 5 provided with a suitable porous covering 12, to which are attached arm-encircling loops 13 and a securing strap 14.

It will be obvious that the cushion 8 may be readily available for use as a life preserver by mounting thereon suitable securing straps. It will also be apparent that the cushion 8 may be provided with any desired number of tabs or the like for securing it to a chair or other article.

Referring to Figure 5, the filler pad unit shown comprises a single continuous strip 15 arranged in coil forma-

tion. In this form of pad unit, the sealing portions 4 are preferably arranged in radially disposed rows, as shown, with the link sections 3 of progressively greater length outwardly from the center of the coil. The securing bands 7 are thus readily applied along each radial row of sealing portions. Moreover, manufacture of such a concentrically arranged strip is conveniently accomplished simply by arranging a closed length of tubing in a coil and then applying electronic sealing means or the like radially across the concentric turns of the coil to form simultaneously each radial row of sealing portions 4.

Referring to Figure 6, the filler pad unit shown is similar to that illustrated in Figure 5 but is composed of a plurality of concentric rings 16 of tubing. In this form also, the sealing portions are arranged in radially disposed rows to which are applied the securing bands 7.

It will thus be observed that there has been provided a filler pad unit which is waterproof, self-ventilating, sanitary and easy and inexpensive to manufacture. Since the unit is formed from standard, extruded, thermoplastic tubing, a simple heat treatment only is necessary to form the link sections and expensive vulcanizing or like operations, are avoided.

Each individual link section, with its contained gas under slight pressure, is permanently sealed. Thus, puncturing of one cell or link section has no effect on adjacent cells. If desired, a liquid sealing composition or the like may be placed in the interior of each link to provide a self-sealing means should puncturing occur.

Covering of the filler pad with a fireproof material renders the resultant article substantially fire resistant.

Articles made as described are extremely buoyant while occupying relatively small storage space.

Moreover, in addition to the natural flexibility of the tubing employed, increased flexibility is imparted to the filler pad by reason of the sealing portions 4 which render the pad readily bendable about such portions.

The use of a porous or ventilated covering does not destroy the inherent self-ventilating and self-liquid-shedding nature of the filler pad.

It will be apparent that the filler pad unit may be employed in the construction of insulating bodies.

It will also be apparent that any desired number of layers of filler pad units may be employed in the construction of required end products.

It will be understood that the articles hereinbefore illustrated and described are given by way of example only and may be varied widely within the scope of the appended claims.

I claim:

1. A buoyant, flexible filler pad comprising a plurality of strip portions arranged in laterally disposed relation, each said strip portion comprising a tube of flexible thermoplastic resinous material having opposed parts of the tube wall completely united together in fluid sealing relation at spaced intervals to form an individually sealed link section between each adjacent pair of sealed parts, each said sealed part of one strip portion being arranged in laterally aligned relation to a sealed part of an adjacent strip portion to form a plurality of laterally disposed rows of aligned sealed parts in said pad, and a connecting strip overlying each said row of sealed parts and united to each sealed part in said row, each said link section being in spaced relation to adjacent link sections of laterally

disposed strip portions to provide fluid circulating openings therebetween extending perpendicularly through said pad.

2. A buoyant, flexible filler pad comprising a plurality of strips arranged in parallel laterally aligned relation, each said strip comprising a hollow, elongated body of flexible thermoplastic resinous material, the wall of said body being continuous in cross-section, opposed portions of said wall being completely heat-sealed together at spaced intervals along the length of said body to form an individually fluid sealed cell between each adjacent pair of sealed portions, each said sealed portion of one strip being arranged in laterally aligned relation to a sealed portion of an adjacent strip to form a plurality of laterally disposed rows of aligned sealed portions in said pad, and a connecting strip overlying each said row of sealed portions and heat sealed to each sealed portion in said row, each said cell being in spaced relation to adjacent cells of other strips to provide fluid circulating openings therebetween extending perpendicularly through the pad.

3. A buoyant, flexible filler pad comprising a tube of flexible thermoplastic resinous material having opposed portions of the tube wall completely united together in fluid sealing relation at spaced intervals to form an individually sealed link section between each pair of sealed portions, said tube being arranged in a spiral, the convolutions of which lie substantially in the same plane, said sealed portions being arranged in a plurality of radially disposed rows, and a connecting strip overlying each said row of sealed portions and united to each sealed portion in said row, each said link section being in spaced relation to adjacent link sections to provide fluid circulating openings therebetween extending perpendicularly through said pad.

4. A buoyant flexible filler pad comprising a plurality of rings arranged in concentric, laterally aligned relation, each said ring comprising an endless tube of flexible thermoplastic resinous material having opposed portions of the tube wall completely united together to form an individually sealed link section between each adjacent pair of sealed portions, said sealed portions being arranged in a plurality of radially disposed rows, and a connecting strip overlying each said row of sealed portions and united to each sealed portion in said row, each said link section being in spaced relation to adjacent link sections to provide fluid circulating openings therebetween extending perpendicularly through said pad.

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