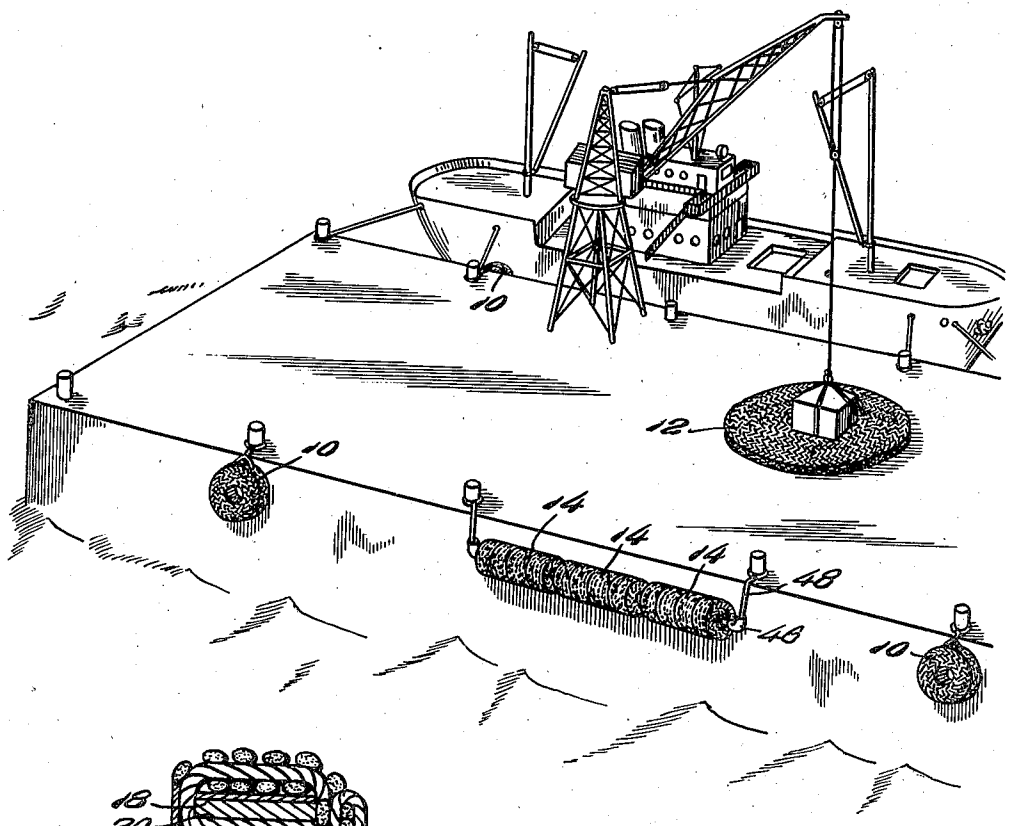
Dec. 30, 1947. N. L. MARCHAL, SR. 2,433,569

FENDER OR CUSHION

Filed May 15, 1946 2 Sheets-Sheet 1

Fig. 1.



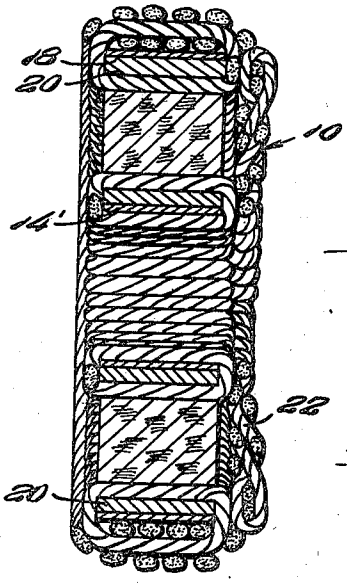


Fig. 3.

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Filed May 15, 1946 2 Sheets-Sheet 2

Fig. 2.

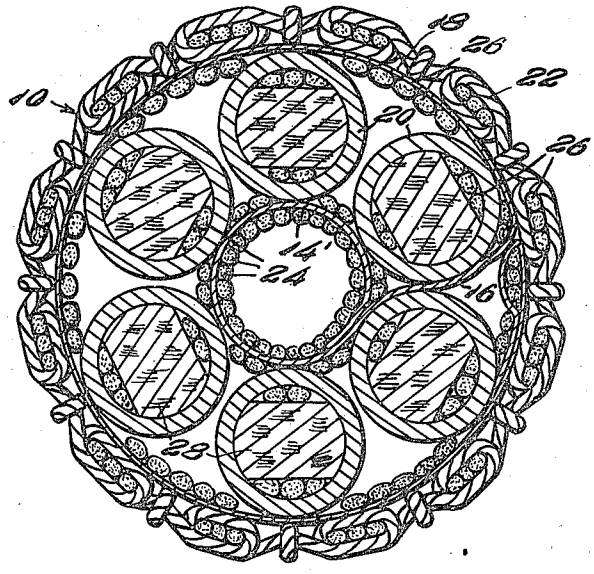
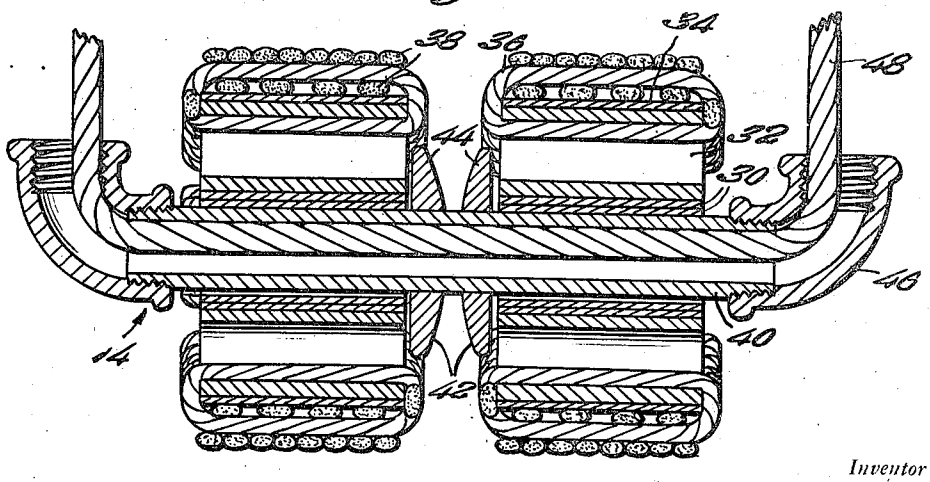


Fig. 4.



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2,433,569

UNITED STATES PATENT OFFICE

2,433,569

FENDER OR CUSHION

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Application May 15, 1946, Serial No. 669,922

8 Claims. (Cl. 114—219)

1

The present invention comprises a novel, useful and improved fender or cushion and more particularly pertains to a resilient, fabricated structure particularly adapted to serve as a fender, cushion, loading mat and the like for vessels and general nautical use.

The primary object of my invention resides in the construction of a cushioning device for marine use, which shall possess unusual durability and resiliency.

A second object of the invention is the provision of a device in accordance with the foregoing object, which shall be capable of fabrication from readily available scrap materials.

A third object of my invention is the formulation of a device in conformity with the aforesaid objects which shall be inherently capable of utilization in a variety of ways such as fenders, loading mats, cushions and the like.

A fourth object of the invention is the preparation of a device according to the preceding objects, which is held together by a network which serves also as additional cushioning means.

A fifth object of my invention is the designing of a device as set forth in the aforementioned objects, which is provided with novel means for assembling units for utilization as a combined assembly.

A sixth object of the invention is the preparation of a device corresponding to the objects set forth hereinbefore, which is compact, serviceable and inexpensive.

These, together with numerous other objects which will become apparent as the following description proceeds, are attained by my invention, three embodiments of which have been illustrated by way of example only in the annexed drawings, wherein:

Figure 1 is a perspective view illustrating various means of employing the invention;

Figure 2 is a vertical sectional view through one form of the invention;

Figure 3 is a transverse vertical sectional view, taken at right angles to Figure 2, of the invention disclosed in Figure 2; and

Figure 4 is a longitudinal vertical sectional view of another embodiment of my invention.

In Figure 1 of the drawings, I have illustrated the principles of this invention applied to a vessel cushion or fender 10, to a merchandise loading mat 12 and to a cylindrical roll 14 for cushioning the impact of vessels against a pier or each other. Turning now to the form of the invention indicated at 10, the construction of which is more fully disclosed in Figures 2 and 3, it will

2

be seen that numeral 14' designates a tubular arbor having one or more folds of a ribbon or web wound into cylindrical form with its free extremity disposed outward from the cylinder as at 16 and being disposed as at 18 to encompass and surround a plurality of tubular, cylindrical, cellular members 20 which are disposed parallel to and abutting the cylinder and each other as shown clearly in Figure 2. A loosely woven network 22 of rope, cord, fiber or the like is arranged to envelop and enclose the periphery, and entire side or face of the surface and with a depending flange upon the other face to retain the cover upon the device, portions of the network being wound as at 24 within the tubular arbor and the tubular cells for securing the same together in sturdy but flexible relation, and also being wound as at 26 to secure the outer peripheral portion 18 to the network covering and to the cells 20. As shown at 28, the individual tubular cells, may be partially filled as at 28 with a reinforcing core of resilient, deformable or compressible material such as rubber, cork or the like. It is intended to form the individual cells 20 of a readily obtainable or scrap material, such as sections of rubber hose, rubber bicycle tires, or the like. The network covering 22 may be readily fabricated from worn or discarded rope, rigging or other suitable material.

It will be noted that as constructed, the device 10 possesses elasticity and compressibility in both an axial and a radial direction due both to the materials employed, and to the loosely woven, loosely assembled construction. As will be apparent, this embodiment of my invention is adapted to function as a collision mat, or fender to prevent chafing and rubbing of vessels against each other or against the pier.

The embodiment of the invention shown at 12 in Figure 1, is constructed in the same manner described above, except that additional circular layers of cells are built outwards from the center resulting in a mat of any desired diameter. As illustrated, this mat serves to cushion the descent of cargo unloaded by wenches upon a dock or ship or for any other analogous purposes requiring an extensive surface area of cushion.

Alluding now to Figure 4, it will be seen that the form of my invention depicted at 14 in Figure 1, comprises a plurality of wheel-like cushion members, mounted in axial alignment upon a rigid tubular rod or support. This form of the invention is constructed similarly to that of Figures 2 and 3, except that the central cores 28 may conveniently be omitted. A plurality of

folds 30 are wound to constitute a cylindrical arbor of flexible web-like material, about which are disposed a plurality of tubular cylindrical cells 32. A portion of web forming the cylindrical arbor is extended radially outward and envelops and embraces the assembly of tubular cells as at 34. A network of rope or cord is disposed as at 36 to encompass and embrace the assembly of arbor and cellular members into a loosely bound wheel arrangement wherein the network and the cellular members are secured together as by interweaving portions of the network into the cellular members as at 38. Upon a tubular rod 40 threaded at both ends, are disposed a plurality of the wheel-like members 14 separated from each other by pairs of loosely disposed spacing members 42 whose adjacent surfaces 44 are convex-shaped as shown. Retaining means, such as elbows 46 or the like are threaded upon the ends of the tubular member 40 and serve to retain the wheels and spacers in assembled relation. A rope or cable 48 is passed through the elbows 46 and the tubular member 40 to constitute an attaching or fastening means for securing the cylindrical cushion in operative position.

As will be readily appreciated, the cylindrical member may be disposed with its axis in a horizontal plane as shown in Figure 1, or it may be positioned in vertical arrangement as the expediencies of the situation dictate.

It will be appreciated that the form of construction shown in Figure 4, possesses an inherently greater cushioning action, due to the larger mass of material positioned in the line of operation of the forces involved, than the arrangement of Figures 2 and 3. Moreover, the spacing members with their rounded adjacent surfaces and the loose arrangement of the wheel upon the rigid tubular rod serve to distribute the rubbing and compressive forces more evenly throughout the length of the device thereby increasing its efficiency and prolonging its useful life.

It is to be understood that I do not limit my invention to the exact construction shown, but that I may avail myself of various modifications falling within the scope of the appended claims.

I claim as my invention:

1. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells.

2. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, said arbor including a plurality of turns of web material, said web having one end extending from said arbor to envelope the outer periphery of the plurality of cells.

3. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, said cells consisting of cylinders of tubular flexible material.

4. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompasisng the assembly of cells, said cells consisting of cylinders of tubular flexible material, said cylinders containing cores of resiliently deformable material.

5. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, said network binding said cells to said arbor.

6. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, said cells being joined by said network into a flat disk having a plurality of circular rows of cells, secured to each other by said network.

7. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, and a support shaft extending axially through and uniting together a plurality of said arbors.

8. A cushioning device of the character described, comprising an arbor of flexible material, a plurality of resilient cells disposed in parallel relation peripherally of and abutting said arbor, and a loosely woven fiber network, woven through each cell and encompassing the assembly of cells, and a rigid support extending axially through and uniting together a plurality of said arbors, and spacing means between said arbors and attaching means secured upon said rigid support.

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