May 10, 1938. W. R. URQUHART ET AL 2,117,121

SHIP FENDER

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Fig. 1

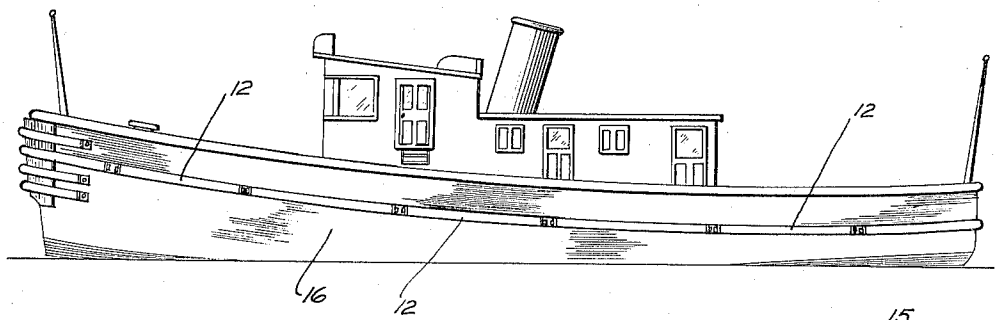


Fig. 2

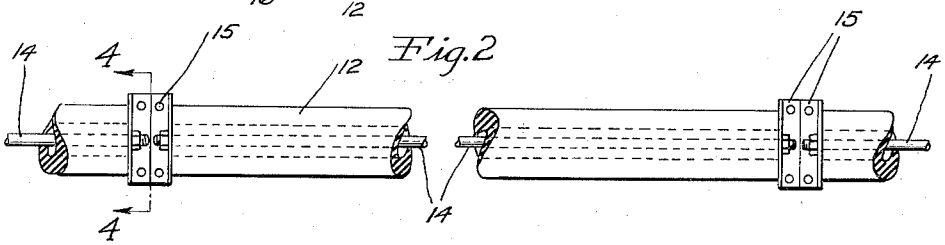


Fig. 3

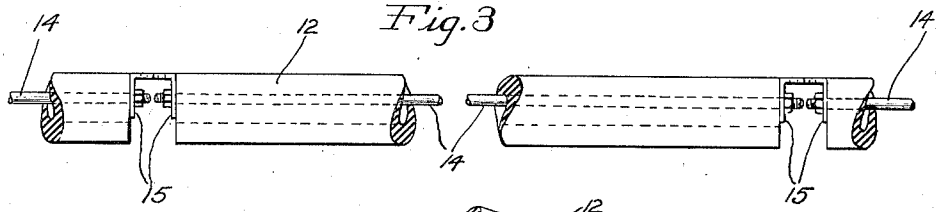


Fig. 4

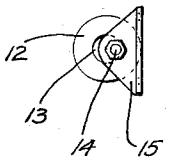
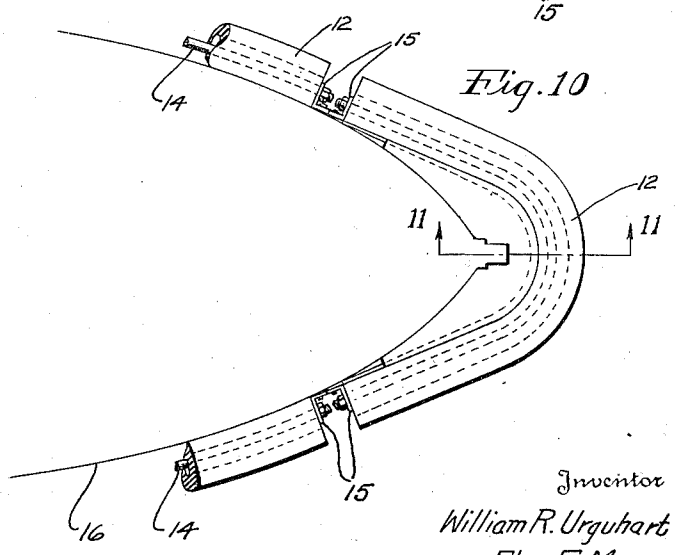


Fig. 10



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SHIP FENDER

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Fig. 11

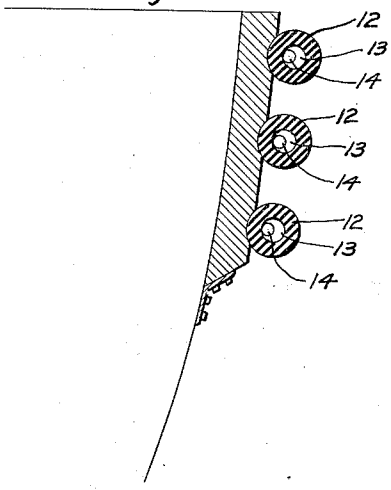


Fig. 7

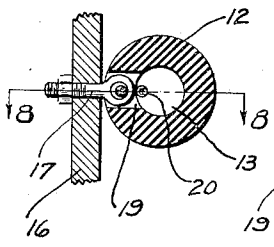


Fig. 8

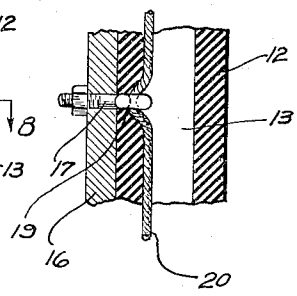


Fig. 6

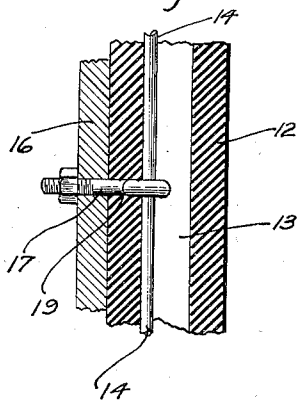


Fig. 5

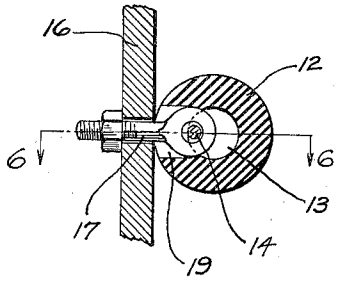
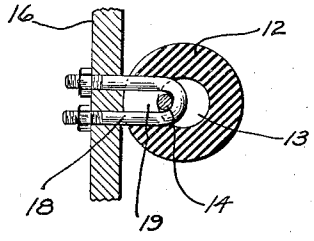


Fig. 9



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Patented May 10, 1938 2,117,121

UNITED STATES PATENT OFFICE

2,117,121

SHIP FENDER

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Application November 20, 1935, Serial No. 50,650

12 Claims. (Cl. 114—219)

The present invention relates to marine fenders and it has particular relation to fenders adapted to be positioned along the sides and bow of a ship to cushion or absorb shocks frequently encountered in docking or in passing through restricted channels.

The principal object of the present invention is the provision of a simple and efficient resilient fender which may quickly and easily be secured to the side or bow of a ship in such manner as to obtain maximum cushioning effect and which may readily be replaced when broken or worn.

Other objects will become apparent as the description of the invention proceeds.

In the accompanying drawings:

Fig. 1 is a view of a ship equipped with fenders constructed in accordance with the present invention;

Fig. 2 is an elevational view of the improved fender;

Fig. 3 is a plan view of the fender shown in Fig. 2;

Fig. 4 is a vertical sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a vertical section showing another manner of mounting the fender on the side of a ship;

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 5;

Fig. 7 is a vertical section of still another form of securing means;

Fig. 8 is a horizontal section taken on line 8—8 of Fig. 7;

Fig. 9 is a vertical section showing still another manner of mounting the fender;

Fig. 10 is a plan view of the fender mounted on the bow of a ship; and

Fig. 11 is a vertical sectional view taken on line 11—11 of Fig. 10.

Referring to the drawings and particularly to Figs. 1 to 4 thereof, a ship fender constructed in accordance with the invention, is shown as comprising a plurality of tubular bodies 12 of rubber or rubber reinforced with fabric and having an axial opening 13 and which is mounted upon the sides and bow of a ship. This mounting is obtained by means of a relatively stiff metal rod 14 extending through the opening 13 and secured at its ends in brackets in the form of angle irons 15 bolted to the side or plate 16 of the ship.

The diameter of the rod 14 is considerably less than the internal diameter of the member 12 so that when in position to clamp the member against the side of the ship, it is disposed eccentrically of the member thus providing a space of substantial size outwardly of the rod. This insures a maximum degree of yieldability under the forces of compression. Moreover, the several fenders are, in this manner, maintained against sagging and in alined position so as to provide maximum buffing effect. In addition, the individual members may quickly and easily be replaced when worn or frayed.

If desired, the brackets 15 may be supplemented by additional fastening means such as one or more eye bolts 17 (Figs. 5 to 8) or one or more V-bolts 18 (Fig. 9) which extend through openings 19 in the tubular members 12 and embrace the supporting member. In Figs. 7 and 8 the supporting member is shown as comprising a flexible cable 20 which is threaded through the eye of the bolt 17. The advantage of this particular construction is that when the bolt 17 is tightened the eye portion is drawn into the opening 19, thus permitting the member 12 to flex uniformly throughout its length without being hampered in this respect by the presence of the eye within the space 13.

In Figs. 10 and 11 the improved fender is shown as being mounted upon the bow of the ship. In this case a resilient backing block 21 of rubber or the like is preferably arranged between the fender or fenders and the bow and is formed with recesses 22 within which the members 12 are seated and thus prevented from sagging.

Other modifications and changes in proportions and arrangement of the several necessary elements constituting the invention may be made by those skilled in the art without departing from the nature and scope of the invention as defined in the appended claims.

What we claim is:

1. A marine fender for ships and the like comprising an elongated tubular element of resilient material, a supporting member extending axially through said element, the diameter of said member being substantially less than the internal diameter of said tubular element, and means for securing said supporting member to the side of a ship or the like with said supporting member eccentrically disposed with respect to said tubular element and means for clamping the opposite ends of said supporting member firmly against the side of the ship with a substantial air space disposed outwardly from said clamping means, thus insuring adequate yieldability when subjected to compressive forces.

2. A marine fender for ships and the like comprising an elongated tubular element of resilient

material, a substantially rigid supporting member extending axially through said element, the diameter of said member being substantially less than the internal diameter of said tubular element, and bracket means for securing said supporting member to the side of a ship or the like with said supporting member eccentrically disposed toward the ship with respect to said tubular element and clamping the supporting member firmly against the side of the ship with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces.

3. A marine fender for ships and the like comprising an elongated tubular element of resilient material, a supporting member extending axially through said element, the diameter of said member being substantially less than the internal diameter of said tubular element, means for securing said supporting member to the side of a ship or the like with said supporting member eccentrically disposed with respect to said tubular element and means for clamping the opposite ends of said supporting member firmly against the side of the ship with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces, and means extending laterally through said tubular element and engaging said supporting member for additionally clamping said tubular element to the side of the ship.

4. A marine fender for ships and the like comprising an elongated tubular element of resilient material, a rod extending axially through said element and being sufficiently stiff to withstand material bending under localized bending stresses, the diameter of said rod being substantially less than the internal diameter of said tubular element, bracket means for securing said rod to the side of a ship or the like with said rod eccentrically disposed with respect to said tubular element and clamping the same firmly against the side of the ship with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces, and screw eye means extending laterally through said tubular element and embracing said rod for additionally clamping said tubular element to the side of the ship.

5. A marine fender for ships and the like comprising an elongated tubular element of resilient material, a flexible cable extending axially through said element, the diameter of said cable being substantially less than the internal diameter of said tubular element, means for securing said cable to the side of a ship or the like with said cable eccentrically disposed with respect to said tubular element and clamping the same firmly against the side of the ship with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces, and screw eye means extending laterally through an opening in said tubular member and embracing said cable for additionally clamping said tubular member to the side of the ship, the eye portion of said screw eye means being located within the opening in said tubular member when in clamping position.

6. A marine fender for ships and the like comprising an elongated tubular element of resilient material and shaped to conform to that of the bow of a ship, a supporting member extending axially through said element, the diameter of said member being substantially less than the internal diameter of said tubular element, a resilient backing interposed between said tubular element and the bow of the ship, and means for securing said supporting member to the bow of a ship with said supporting member eccentrically disposed with respect to said tubular element and clamping the same firmly against said resilient backing with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces.

7. A marine fender for ships and the like comprising an elongated tubular element of resilient material and shaped to conform to that of the bow of a ship, a supporting member extending axially through said element, the diameter of said member being substantially less than the internal diameter of said tubular element, a resilient backing interposed between said tubular element and the bow of the ship, said backing having a recess provided therein, and means for securing said supporting member to the bow of a ship with said supporting member eccentrically disposed with respect to said tubular element and clamping the same firmly within the recess in said backing with a substantial air space disposed outwardly therefrom, thus insuring adequate yieldability when subjected to compressive forces.

8. A marine fender for ships and the like comprising an elongated tubular element of resilient material, a rod extending axially through said element and being relatively stiff to withstand material bending under localized bending stresses, the diameter of said rod being substantially less than the internal diameter of the tubular element, means for securing said rod to the side of a ship or the like with said rod eccentrically disposed toward the ship with respect to the opening in said tubular element when applied to a ship, said rod clamping the material of said tubular element against the side of the ship, leaving a substantial air space disposed outwardly from said rod toward the outer side of said tubular element.

9. A marine fender for ships and the like comprising an elongated member having a longitudinal opening therethrough, substantially inextensible holding means extending through said opening, means for tensioning said inextensible means and for holding said tubular member closely adjacent the side of a ship, said inextensible means having a cross-section which is substantially less than the cross-section of the opening through which it extends to provide an air space within the tubular element for securing greater yieldability of the tubular element.

10. A marine fender for ships and the like comprising an elongated member having a longitudinal opening therethrough, substantially inextensible holding means extending through said opening, means for tensioning said inextensible means and for holding said tubular member closely adjacent the side of a ship, said inextensible means having a cross-section which is substantially less than the cross-section of the opening through which it extends to provide an air space within the tubular element for securing greater yieldability of the tubular element, and being arranged eccentrically with respect to said opening when applied to a ship or the like.

11. A device as set forth in claim 10 in which

the cross-section of said opening is at least four times the cross-section of said holding means.

12. A marine fender for ships and the like comprising an elongated tubular element, a substantially inextensible holding means extending through said element, bracket means for securing said inextensible means to the side of a ship or the like and means associated with said brackets for tensioning said inextensible elements, and means embracing said inextensible elements intermediate the ends thereof and extending through the wall of said tubular element for holding intermediate portions of said inextensible element against the side of a ship or the like.

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