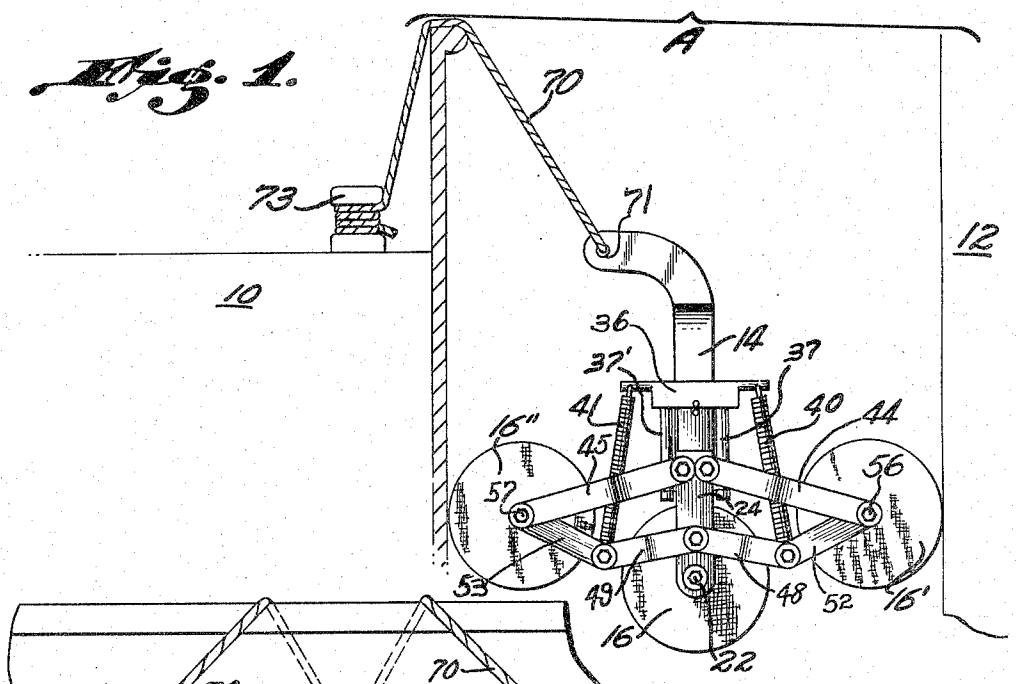
Aug. 25, 1959 D. H. WALKER 2,900,946

BOAT FENDER

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Fig. 1.



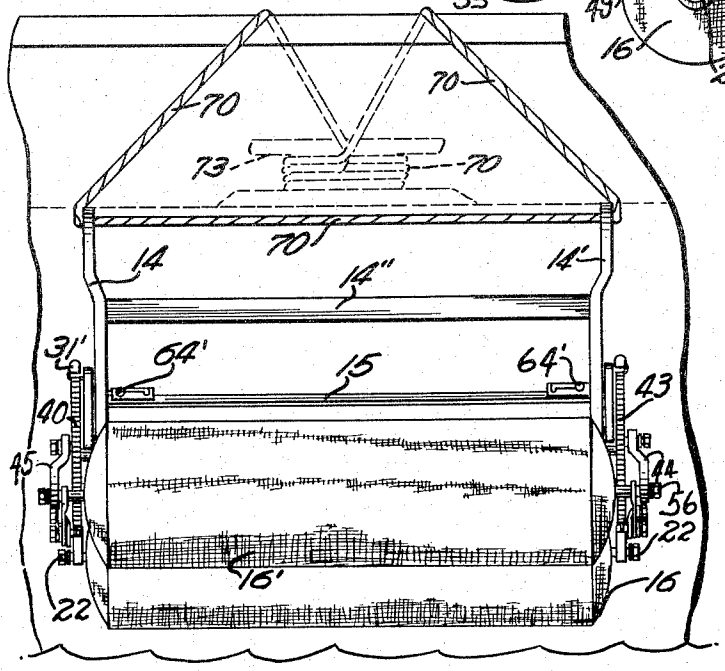


Fig. 7.

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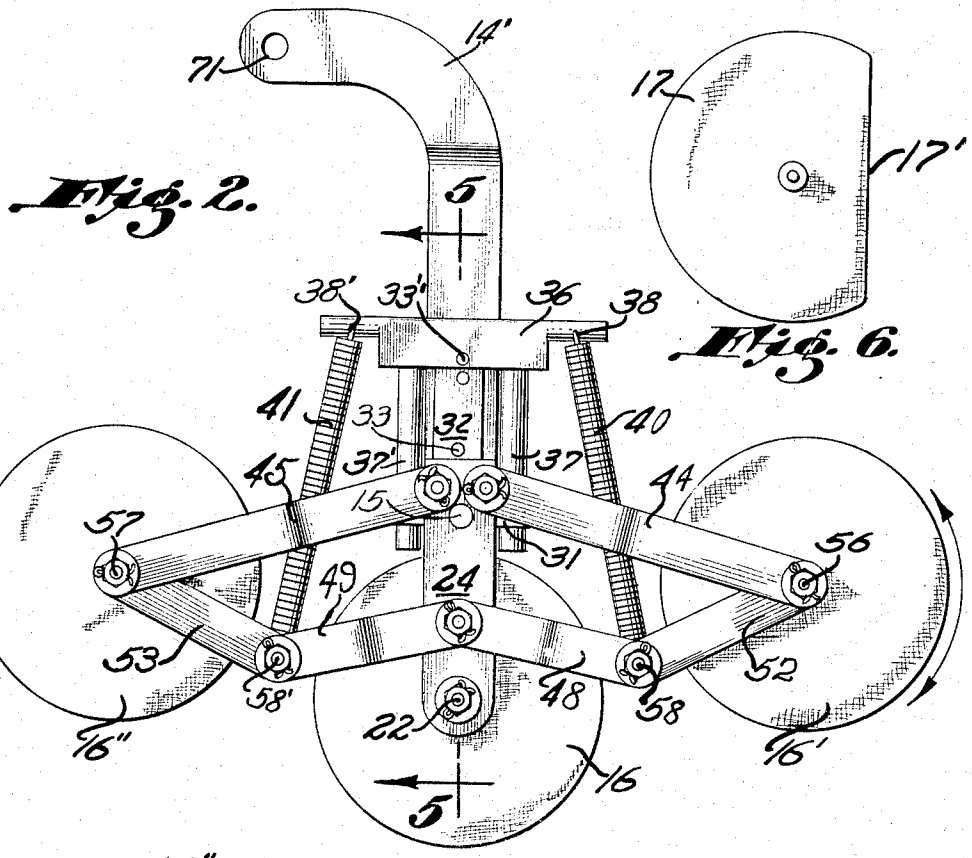


Fig. 2.

Fig. 6.

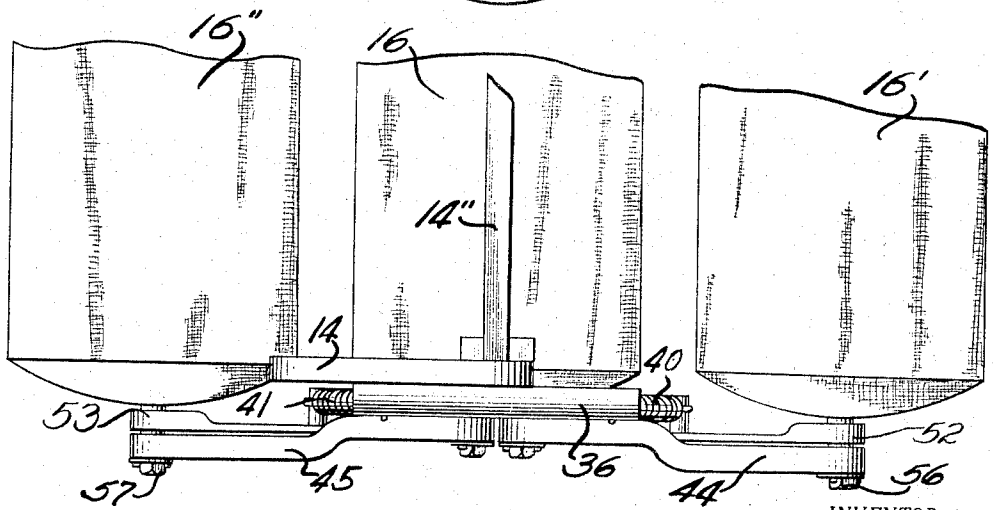


Fig. 4.

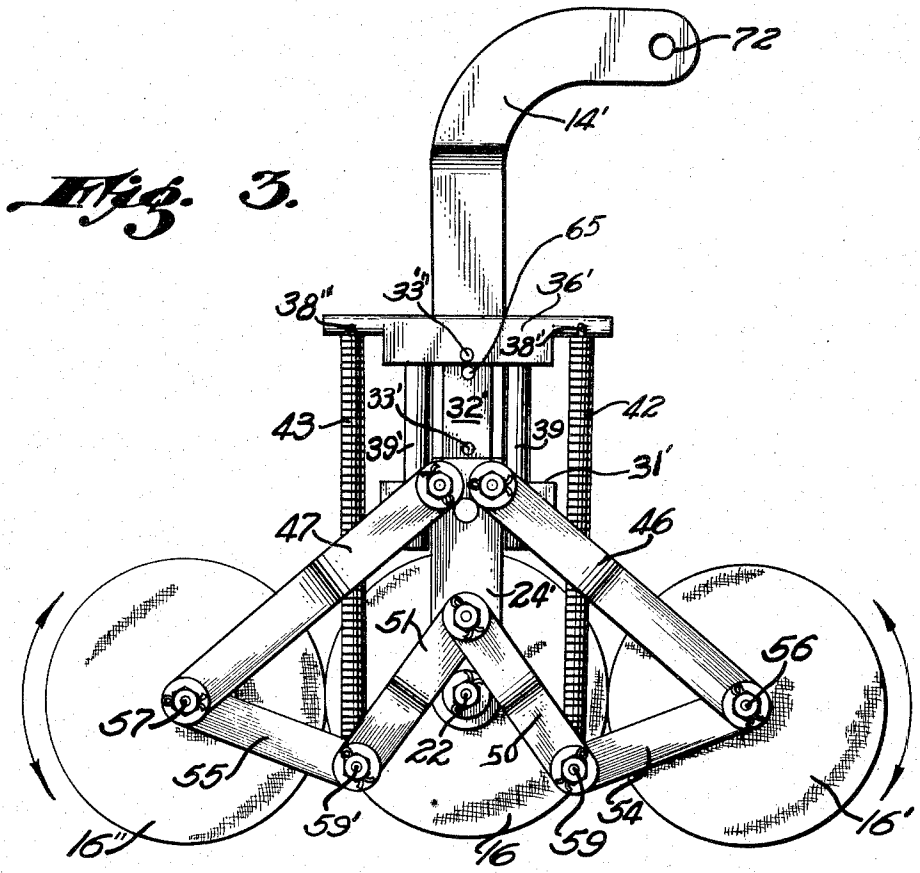
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BOAT FENDER

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Fig. 3.



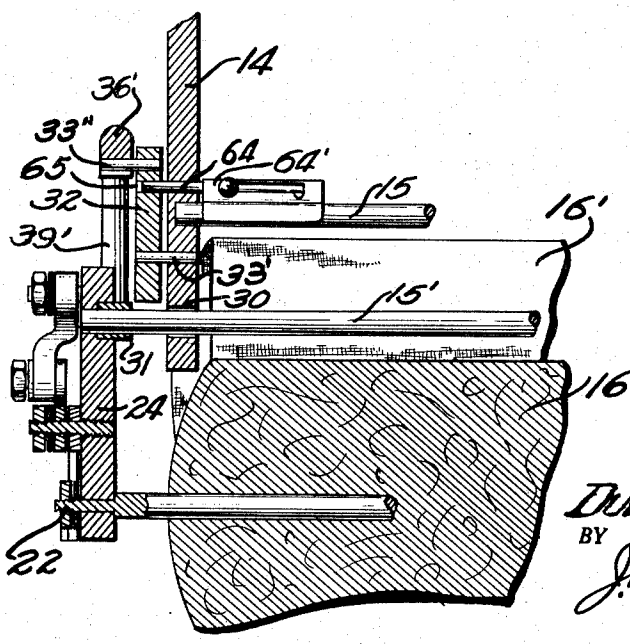


Fig. 5.

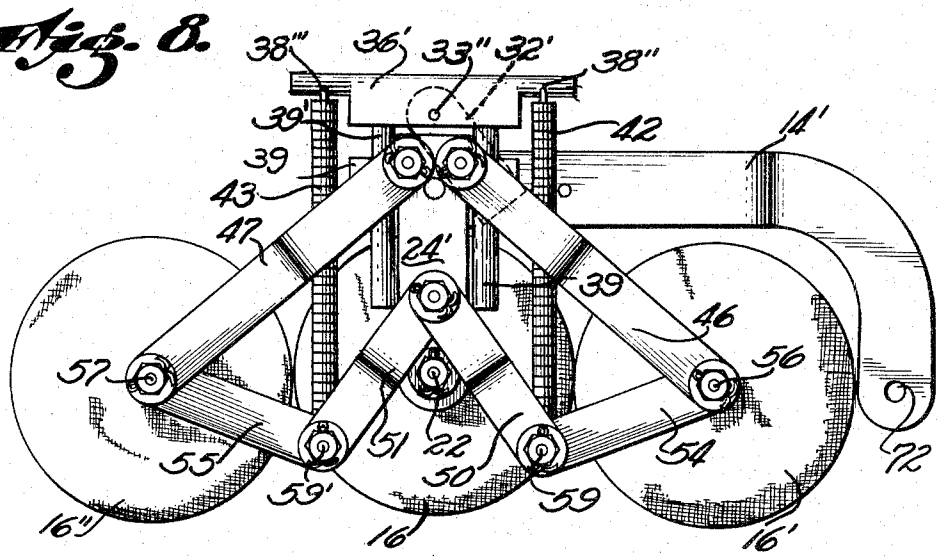
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BOAT FENDER

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Fig. 8.



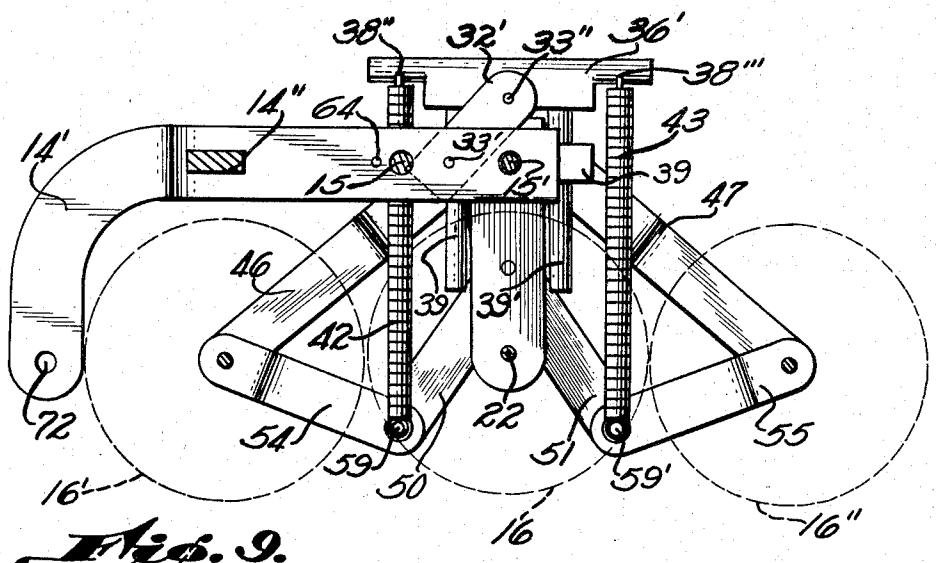


Fig. 9.

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United States Patent Office 2,900,946 Patented Aug. 25, 1959

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BOAT FENDER

Dunaway H. Walker, Baltimore, Md.

Application February 21, 1957, Serial No. 641,652

4 Claims. (Cl. 114—220)

The present invention relates to an improved boat fender or bumper for use in receiving the thrust of a water craft during berthing or like operations, or for tying up the boat to a dock, or tying the boat to another craft to provide a minimum of shock and disturbance to the boat or boats as the case may be when they are moved about by the wind, or the movement of the water.

The primary object of the invention is to provide a fender that has a predetermined amount of mechanical resilience and at the same time, of such structure as to prevent any contact between the boat and its berth or, between one boat and another boat even after the mechanical resilient features of the fender have been spent.

Another object of the invention is to construct such a fender of minimum parts and having practical working features.

A further object of the invention is to provide such a device that is conveniently carried on the boat and easily handled and put into operation.

Still a further object of the invention is to provide such a fender that will be economical in construction and durable in its use.

While several objects of the invention have been pointed out, other objects including its uses and advantages will become apparent as the nature of the invention is more fully disclosed consisting, in its novel construction, combination, and arrangement of its several parts as illustrated in the accompanying drawing and described in the detail description thereof.

In the drawings:

Figure 1 is an end elevation of the fender shown in position between a water craft or boat and a berth or dock.

Figure 2 is an enlarged end elevational view similar to that shown in Figure 1 showing the construction in more detail.

Figure 3 is an end elevational view of the opposite end of the fender similar to that shown in Figure 2 showing the fender in collapsed position.

Figure 4 is a fragmentary plan view of the end of the device as shown in Figure 2.

Figure 5 is a fragmentary sectional view taken along the line 5—5 of Figure 2 showing in detail several of the primary elements.

Figure 6 is an end elevational view of a modified form of one of the fender elements.

Figure 7 is a side view in elevation similar to the end view in Figure 1.

Figure 8 is an end elevational view showing the fender in folded position for carrying or storage.

Figure 9 is an elevational sectional view of the opposite end of the fender similar to that shown in Figure 8.

In referring to the drawings like numerals are used to indicate like and similar parts throughout the several views.

As both ends of the fender are substantially the same,

there appears to be no need to illustrate each end in all positions.

In Figure 1 the fender is shown extending between a water craft **10** and a pier or dock **12**. The fender is represented generally by the letter A to indicate the complete unit.

The fender A is provided with a supporting frame including end members **14** and **14'**. For supporting the members **14** and **14'** in their relative position to each other, there are cross members **15** and **15'**. The bumper elements per se comprise elongated cylindrical members **16**, **16'** and **16''** which are filled with ground cork, rubber or similar material with a pliable cover such as canvas. The bumper elements **16**, **16'** and **16''** are all of substantially the same type and structure. The bumper element **16** is rotatably supported upon a rod member **22** extending centrally therethrough. The ends of the rod are fixedly secured to members **24** and **24'**, one at each end of the fender, by any suitable means. The members **24** and **24'** are pivotally supported adjacent the lower ends of the members **14** and **14'** by the rod **15'**. Pivotally secured adjacent and to the outside lower ends of the members **14** and **14'** are links **32** and **32'** which are held to the members **14** and **14'** by the pins **33** and **33'** the pins extending through the members **14** and **14'**. The links **32** and **32'** are pivotally connected with movable cross-head members **36** and **36'** by the pins **33''**. Attached to the members **24** and **24'** are fixed cross-head members **31** and **31'**. Through the outer ends of these fixed cross-head members there are apertures for slidably receiving guide and supporting members **37**, **37'**, **39** and **39'**. These guide and supporting members **37** to **39'** have one end fixedly secured to the movable cross-heads **36** and **36'** for guiding and supporting these movable cross-head members. The guide members are usually of cylindrical form but may have any substantial cross-section shape. The link members **32** and **32'** operate to extend the movable cross-heads when the members **14** and **14'** are in upward and operating position.

Hingedly connected to the members **24** and **24'** and at the upper ends thereof are link members **44**, **45**, **46** and **47**, and connected to the lower portions of the members **24** and **24'** are link members **48**, **49**, **50** and **51**.

Referring first to Figures 1 and 2, there is shown members **44** and **45**, one end of each of these link members being hingedly connected with the upper end of the member **24** and their opposite ends being hingedly connected with one end of a pair of link members **52** and **53**. On the opposite end of the fender, as shown in Figure 3, the outer ends of the links **46** and **47** are hingedly connected to the outer ends of the links **54** and **55**.

Extending through the outer ends of the link members **44** to **47** and the link members **52** to **55** are rods **56** and **57**. These rods extend through the outer ends of these link members and centrally through the bumper members **16'** and **16''** and act to support these members horizontally in respect to the unit as a whole.

The outer ends of the link members **48** and **49** at one end of the fender, and the arm members **50** and **51** on the opposite end thereof have their outer ends pivotally connected with the opposite ends of the arm members **52** to **55** respectively. These links are connected by pins **58**, **58'**, **59** and **59'**.

The rod **22** is supported on the lower ends of the members **24** and **24'** which also support the bumper element **16**.

The movable cross-heads **36** and **36'** are provided with small apertures **38**, **38'**, **38''** and **38'''**. Connected between these apertures in the movable cross-heads and the pins **58** to **59'** are tension springs **40**, **41**, **42** and **43**.

The function of these tension springs is to move the linked members 48 and 52, 49 and 53 on the one end of the fender, and 50 and 54, 51 and 55 on the opposite end of the fender, toward a straight line which moves the bumper element 16' and 16'' outwardly from the center bumper element 16. This arrangement and mechanism is designed to resiliently position the links 44 to 47 and links 48 to 53 in a normal extended position, as illustrated in Figures 1 and 2, when the arm members are in raised position as shown in Figures 1, 2 and 3. When sufficient pressure is applied to the outer bumper elements 16' and 16'' in a horizontal plane, the tension springs will be extended allowing the lower link members 48 to 53 to collapse which allows the bumper elements 16' and 16'' to move inwardly and downwardly toward the central bumper element 16 until in contact therewith. The springs will always keep a force on the members 16' and 16'' to keep them extended under normal circumstances.

The members 14 and 14' are held in a vertical and operating position by the pin 64 carried in a housing 64'. This pin engages an aperture 65 in the member 32. The springs supporting the movable cross-heads 36 and 36' are held upwardly by the members 32 and 32' which are moved upwardly by the operation of the arms 14 and 14' when moved to a vertical position by virtue of the connecting pins 33 to 33'''. When the fender is being carried upon the boat, or not in use, the arms 14 and 14' may be folded down as shown in Figures 8 and 9. The pin 64 is withdrawn from the aperture 65 and the arms are folded to one side, the links 32 and 32', being connected to the arms 14 and 14' by the pins 33 and 33', move the spring supporting cross-heads 36 and 36' downwardly on the guiding and supporting members 39 through the proper apertures in the members 31 and 31'. This releases the tension on the springs 41 to 44 which allows the link members supporting the members 16' and 16'' to collapse and bring the outside members into contact with the central member 16.

As stated, the bumper elements are normally of cylindrical form. However, the outer elements 16' and 16'' may have a flat surface as shown by the bumper illustrated in Figure 6 and indicated by the numeral 17 having a flat side 17'. This type bumper will have the tendency to retain the bumpers in a horizontal position between the craft and the dock or pier during periods of severe rocking or movement of the boat.

Advantages of the present improved fender is that it keeps the craft a safe distance from the pier when tied up to the dock, or a safe distance between crafts when they are mooring side by side. The ordinary fender is so small in diameter that it is not sufficient to keep the sides of the crafts out of danger of rubbing against the pier or against each other.

Secondly, the additional mechanical resilience built into the fender provides that the crafts may be normally held apart at a distance slightly greater than is normally provided, but in case of additional pressure on the outer bumper elements 16' and 16'', the outer element will be

moved to collapsed position until all three of the bumpers are in contact with each other, as illustrated in Figure 3. At this point the mechanical resilience has been spent and as the bumpers are now all in contact further resilience will depend upon the compression of the bumpers themselves, and at this point the craft for all practical purposes is fixedly held at the distance of the three diameters of the three bumpers away from whatever object it is being supported from regardless of the pressure within limits. However, as soon as the pressure is released, the tension springs tend to move the bumper elements to their extended position, as shown in Figures 1 and 2, thus moving the craft outwardly from whatever object the fender is being used as a spacer.

In use, the fender is supported by a rope 70 which is carried through openings 71 and 72 on the upper ends of the fender supports 14 and 14'. The upper ends of the members 14 and 14' are curved toward the boat 10 to such an extent as to allow the fender to lie generally in a horizontal plane, or the contact line of the outer bumpers to contact the boat and dock in a horizontal line. The rope 70 may extend over the side of the boat and about a cleat 73. In this position and with the arms 14 and 14' in an upward position the fender is free to operate in the manner above described.

While the invention has been illustrated and described in its preferred form, it is not intended as a limitation as obvious changes and modifications of the device may be made without departing from the principles illustrated and described herein. Therefore, the scope of the invention is best defined in the appended claims.

I claim:

1. A fender for watercraft comprising, in combination, a single center bumper element and a pair of side bumper elements normally positioned outwardly from the center bumper in spaced relationship, a supporting frame for the center bumper element, foldable arms carried on the frame at each side of the center bumper for supporting on their outer ends the two side bumpers, tensioning means carried by the frame for normally holding the foldable arms in extended position to position the side bumper elements outwardly from the center bumper whereby, the arms will fold to allow the outer bumpers to move inwardly and contact the center roll when a predetermined pressure has been exerted against the two outer bumper elements.

2. A device as claimed in claim 1 in which the outer bumpers have at least one flat side.

3. A device as claimed in claim 1 in which each of the bumpers are rotatable on their supporting elements.

4. A device as claimed in claim 1 in which each of the bumpers are rotatable on their supporting elements and the outer bumpers have at least one flat side.

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