

J. M. W. HEITMANN.
FENDER.
APPLICATION FILED JUNE 27, 1908.

1,018,316.

Patented Feb. 20, 1912.

Fig. B.

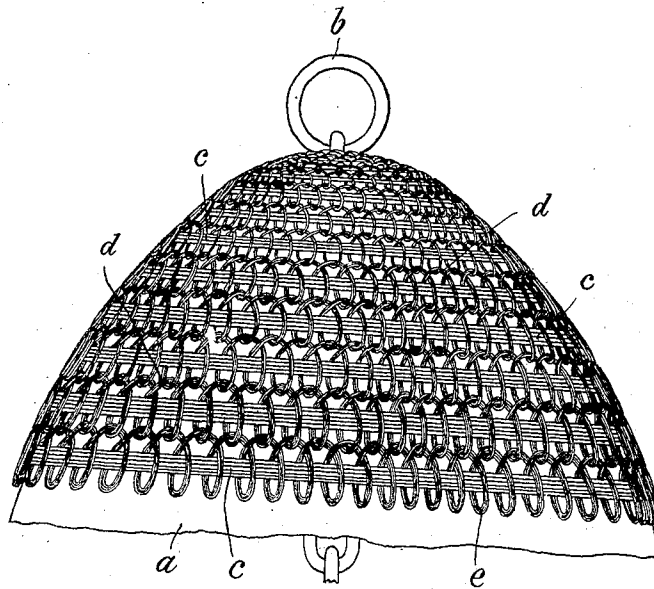
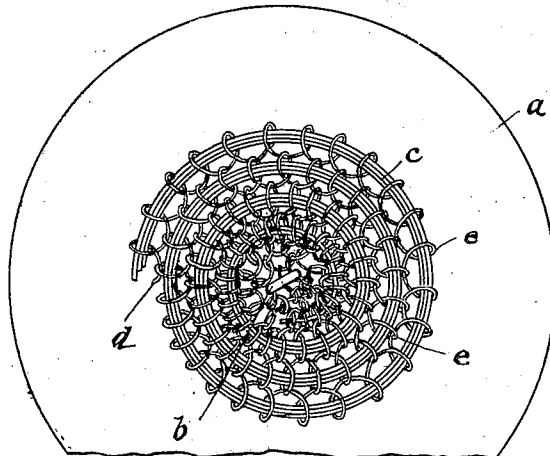


Fig. 1.



WITNESSES

C. E. Holste
J. P. Davis

INVENTOR

Johannes Martin Wilhelm Heitmann

BY

Munn & Co.
ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHANNES MARTIN WILHELM HEITMANN, OF HAMBURG, GERMANY.

FENDER.

1,018,316.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed June 27, 1908. Serial No. 440,765.

To all whom it may concern:

Be it known that I, JOHANNES MARTIN WILHELM HEITMANN, a subject of the German Emperor, residing at Antonistrasse 12, Hamburg, Germany, have invented certain new and useful Improvements in Fenders, of which the following is a specification.

The object of the invention is to provide a fender which, owing to the peculiar manner in which it is braided, has an exceptional amount of resilience and durability.

In making the fenders heretofore employed upon shipboard, it is customary to place upon a core a number of layers of network, each row of the network having meshes looped into the preceding row.

The construction just mentioned has the disadvantage that the meshes employed must necessarily be very small, and consequently break easily, which diminishes the durability of the fender. Moreover, the construction just mentioned gives to the fender very little elasticity, for the reason that portions of the meshes are liable to shift lengthwise of the fender when they are pressed together.

In my invention I employ a flexible winding member of spiral form which may consist of rods, reeds, canes or strips, and around this I twine a flexible member formed into meshes and connecting together the different loops of the spiral winding member.

My construction increases the resilience of the fender, for the reason that the flexible member used for binding together the various loops of the winding member has exceptional resilience toward the circumference only of the fender, and is not liable to be shifted lengthwise as in the old construction.

Again, my fender is much more durable, for the reason that the flexible member used for binding together the various loops of the winding member is progressively larger from the center outward, the flexible winding member being of smaller diameter at the center, from which the work of making the fender begins. Hence, in my construction the flexible binding member is not bent so abruptly as in other constructions, and therefore cannot break as readily.

Reference is to be had to the accompanying drawing forming a part of this specification in which like characters of reference

indicate corresponding parts in both views, and in which—

Figure 1 is a plan view of a partially completed fender made in accordance with my invention; and Fig. 2 is a side elevation of the same partly broken away.

At *a* is the core which is made of a suitable porous material and which may, according to the purpose for which it is used, be spherical, oval or sausage shaped. Secured to the core *a* is a chain, cable or the like, provided with a portion *b* to enable the fender to be secured to a chain, rope or cable in the usual manner.

A flexible winding member *c* is bent into spiral form and constitutes a considerable portion of the fender covering. This flexible winding member is composite in structure, being made of a number of reeds, canes, ropes or the like and so formed that its end portions are of lesser diameter than its middle portion. This is conveniently done by properly distributing the canes, ropes, cords or the like, of which it is composed. In the particular instance shown, the flexible winding member *c* is made of separate canes, the end of the flexible winding member being simply a continuation of one of these canes.

At a point a little removed from the end the flexible winding member comprises two canes; still farther out it comprises three canes, and so on. At *d* is a flexible binding member. In the particular instance shown this is a long piece of cane braiding which is passed around the flexible winding member *c* and formed into loops *e*, and after being passed through each loop is passed through the adjacent loop of the preceding winding of the flexible binding member. After the core *a* has received a complete covering of network, made in the manner just described, the operation is repeated, beginning at the opposite end of the core, and this is continued until the fender has reached the desired thickness.

I find it convenient to begin the spiral winding of the flexible winding member with only one or two canes, switches, or other equivalent, and afterward to add as many as desired, so that as the fender increases in size, the flexible winding member *c* contains three or more switches, canes or rods, as the case may be, according to the material of which it is composed. The

flexible binding member *d* may in like manner consist of a single switch or a number of switches twisted together. Hard hemp, rope, wire or soft wire cable may be employed for this purpose.

The spirally formed windings of the flexible winding member *c*, of course, encircle the core *a* and lie side by side, being braced relatively to each other by the network made up of the flexible binding member *d*. The spirally formed windings of the flexible winding member cannot shift lengthwise of the fender, and consequently the fender has the greatest amount of elasticity in a cross-wise diameter. This insures great durability in the fender, because the meshes must be larger than it is expedient to make them with the old style of network.

As raw material for making the fender, there may be used either cane or switches of ratan, willow, or other flexible growths. It is also practicable to make the flexible winding member *c* of several corded hemp ropes, or the like.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a fender, the combination of a core, a flexible winding member disposed spirally about the same, and a flexible binding member wound spirally around said winding member and formed into loops, the loops around one convolution of said winding member extending through the loops around another convolution of said winding member.

2. In a fender, the combination of a core, a flexible winding member disposed spirally about the same, and a binding member wound spirally around said winding member and formed into loops, each loop extending around a portion of said winding member and through an adjacent loop of another portion of said binding member.

3. A fender comprising a core, a winding member disposed thereupon, a portion of said winding member being thicker than another portion thereof, said winding member being formed into successive convolutions, and a flexible binding member wound into loops around one of said convolutions and also into loops around another convolution, the loops around said first-mentioned convolutions extending through the loops around said second-mentioned convolution.

4. A fender comprising a core having successive portions of gradually increasing diameter, a winding member disposed spirally around said core and having convolutions of small diameter engaging a portion of small diameter of said core, portions of larger diameter of said winding member thus being disposed upon portions of greater diameter of said core, and means for securing together the several adjacent convolutions of said winding member.

5. A fender comprising a core having generally an oval form, a winding member mounted spirally upon said core, the general diameter of said winding member, measured diametrically through said core, being progressively greater at the middle of said core than at the ends thereof, the diameter of the winding member, measured diametrically through said winding member, being also greater upon that portion of the winding member encircling the middle of said core, and means for securing different portions of said winding member substantially in predetermined positions relatively to each other.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOHANNES MARTIN WILHELM HEITMANN.

Witnesses:

HUGO BERTRAM,

LUDWIG SÜDERMAN.