

(No Model.)

2 Sheets—Sheet 1.

J. H. GRELL, Sr.

FENDER FOR SHIPS.

No. 293,321.

Patented Feb. 12, 1884.

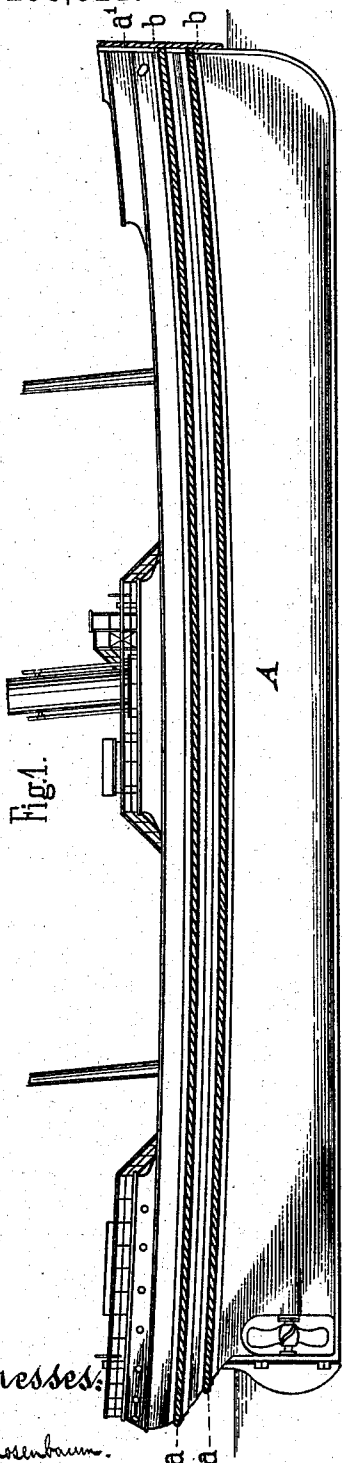


Fig. 1.

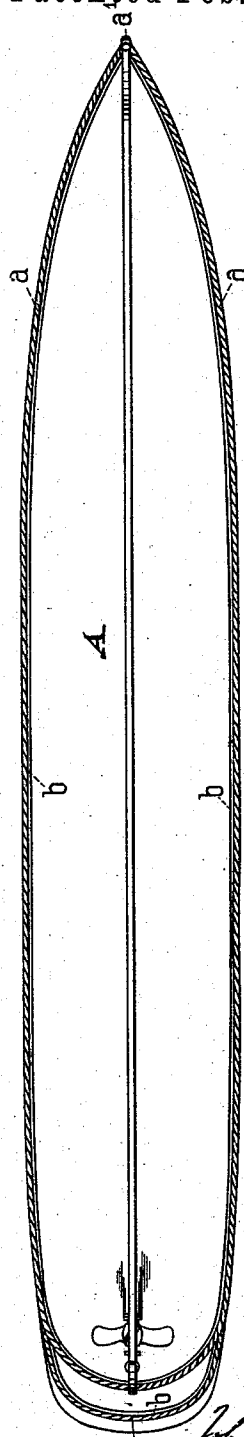


Fig. 2.

Witnesses:

W. N. Rosenbaum.

Otto Risch.

Inventor:

Johann H. Grell, Sr.  
by George Raegen  
Attorneys.

(No Model.)

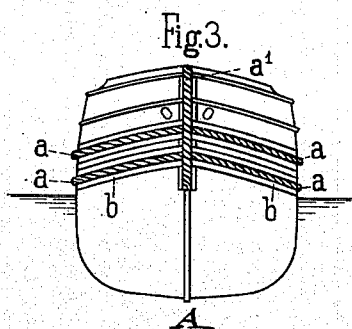
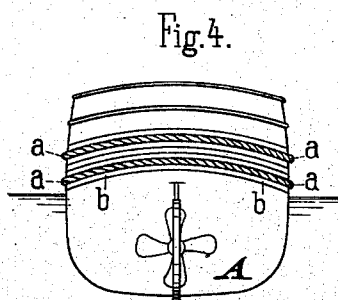
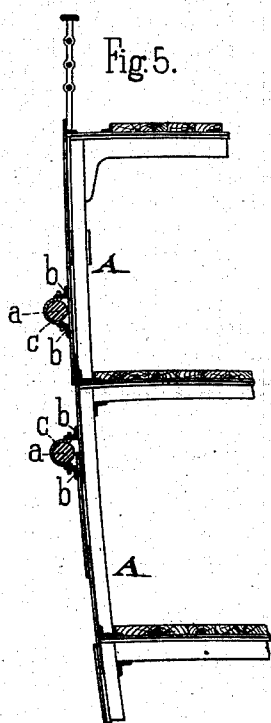
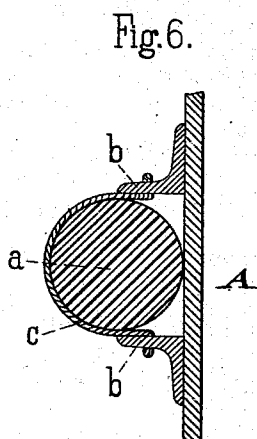
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2 Sheets—Sheet 2.

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Witnesses:

*W. H. Rosenbaum.*  
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Attorneys.

# UNITED STATES PATENT OFFICE.

JOHANN HEINRICH GRELL, SR., OF HAMBURG, GERMANY.

## FENDER FOR SHIPS.

SPECIFICATION forming part of Letters Patent No. 293,321, dated February 12, 1884.

Application filed September 26, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JOHANN HEINRICH GRELL, Sen., a subject of the Emperor of Germany, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in Means for Preventing or Lessening Damage to Ships from Collisions, of which the following is a specification.

The object of my invention is to prevent or lessen the damage arising to vessels from collisions by means of a simple and inexpensive attachment to the hulls of the same; and the invention consists of two or more ropes of wire, hemp, or other suitable material, that are stretched tightly in longitudinal direction around the hull and across the bow and stern, said ropes being retained by means of angle-irons, between which the rope is confined, and by straps passing transversely across the ropes. To the bow of the vessel is applied in a similar manner a vertical rope, that acts as a fender to lessen the force of the shock.

In the accompanying drawings, Figure 1 represents a side elevation of a steamship provided with my improvement. Fig. 2 is a bottom view of the same. Figs. 3 and 4 are end views, showing, respectively, the bow and stern. Fig. 5 is a vertical transverse section of a part of the hull drawn on a larger scale; and Fig. 6 is a detail vertical transverse section, showing the manner of fastening the rope to the hull.

Similar letters of reference indicate corresponding parts.

A represents the hull of a steamship or other vessel; and *a* is a rope of wire, hemp, or other suitable material, of which one or more are stretched tightly in longitudinal direction above the water-line around the hull of the vessel, the ends of the rope or ropes *a* being connected together. Each rope is securely retained in position on the hull by means of angle-irons *b b*, which are fastened to the hull parallel to each other, of a depth of about half the diameter of the rope *a*, and of a width from

each other equal to the diameter of the rope. The rope *a* is retained between the angle-irons *b b* by means of cords, straps, or wires *c*, that are drawn tightly transversely across the rope *a* from one angle-iron to the other and fastened thereto in order to retain the rope *a* in the required position, as shown clearly in Fig. 6.

According to the size of the vessel, one, two, or more horizontal ropes may be used to protect the hull and distribute the effect of the collision over the whole surface of the hull, thus increasing the power of resistance of the same.

The bow is provided with a vertical rope, *a'*, which is fastened in the same manner by angle-irons to the stem-post of the bow, so as to lessen the force of the collision and act in the nature of a fender.

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

1. The combination, with the hull of a vessel, of one or more ropes extending longitudinally around the sides and ends of the same, parallel angle-irons, which are attached to the hull at each side of the rope or ropes, and transverse straps that extend across the ropes and serve to retain them between the angle-irons, substantially as and for the purpose set forth.

2. The combination, with the hull of a vessel, having one or more pairs of parallel angle-irons extending longitudinally around the hull, of ropes retained by said angle-irons and transverse straps, and of a vertical fender-rope applied to angle-irons of the stem-post of the bow, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 31st day of August, 1883.

JOHANN HEINRICH GRELL, SEN.

Witnesses:

ALEXANDER SPECHT,  
EMIL HAASE.