No. 721,347. PATENTED FEB. 24, 1903.

E. S. WILLEY.

DEVICE FOR CLEANING THE BOTTOMS OF VESSELS.

APPLICATION FILED MAY 3, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1

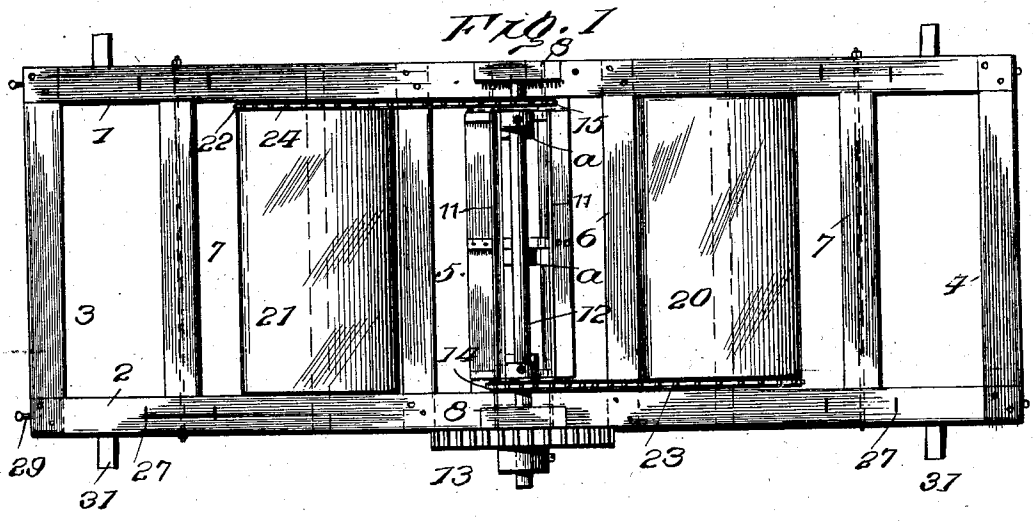



FIG. 2.

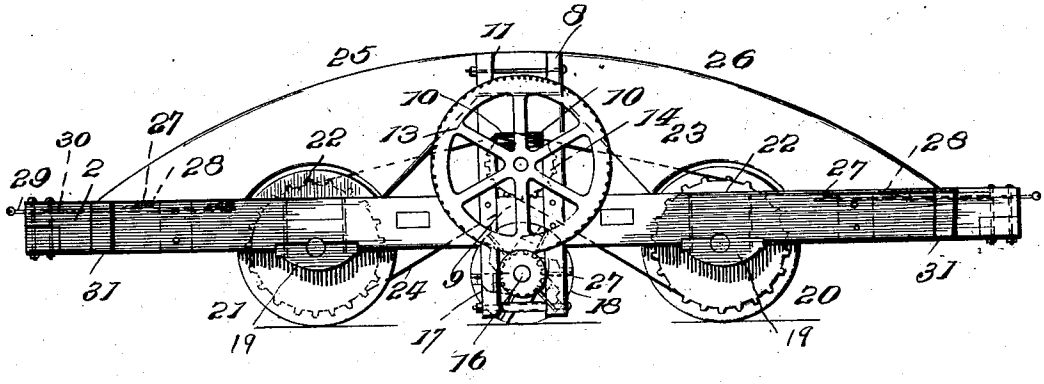
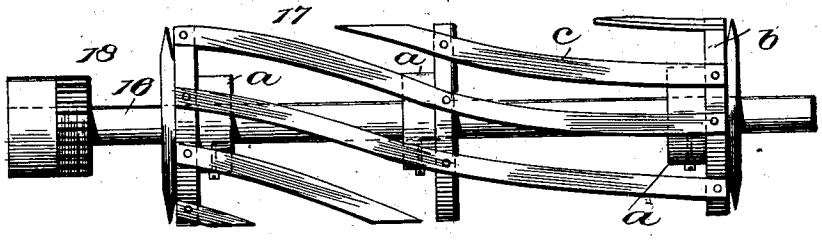



FIG. 6.




Inventor

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Witnesses

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NO MODEL. 2 SHEETS—SHEET 2.

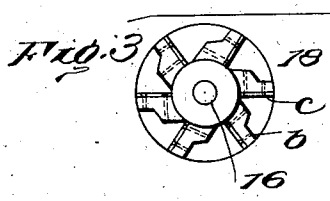



Fig. 3.

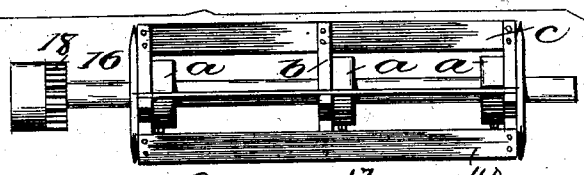
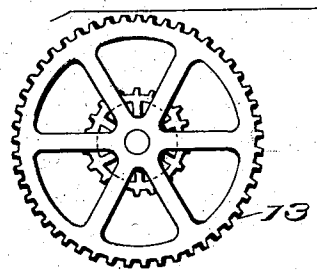



Fig. 4.



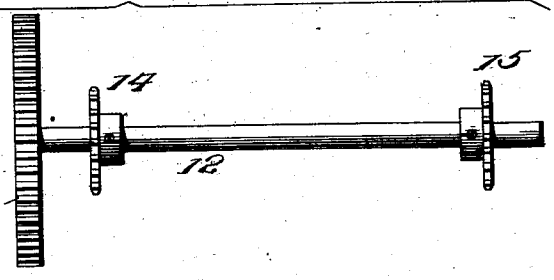




Fig. 7.

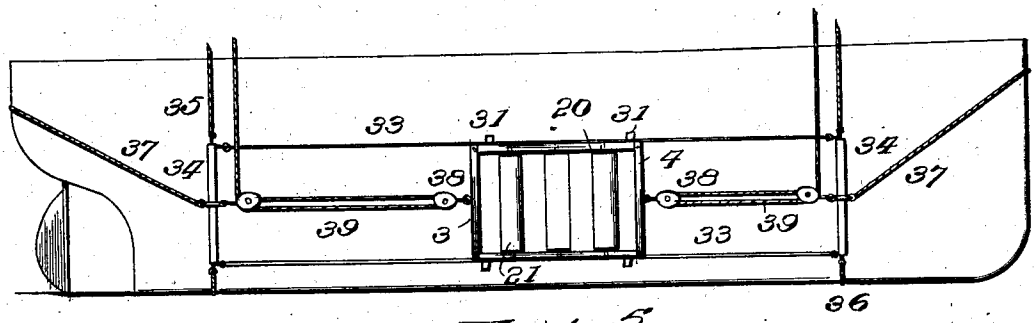



Fig. 5.

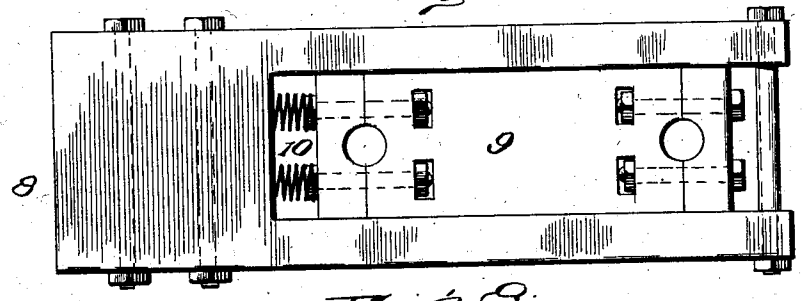
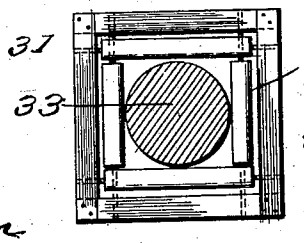



Fig. 8.




Witnesses

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# UNITED STATES PATENT OFFICE.

EDWARD S. WILLEY, OF ELIZABETH CITY, NORTH CAROLINA, ASSIGNOR OF ONE-FOURTH TO RICHARD O. CRISP, OF ELIZABETH CITY, NORTH CAROLINA.

## DEVICE FOR CLEANING THE BOTTOMS OF VESSELS.

SPECIFICATION forming part of Letters Patent No. 721,347, dated February 24, 1903.

Application filed May 3, 1902. Serial No. 105,834. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD S. WILLEY, a citizen of the United States, residing at Elizabeth City, in the county of Pasquotank and State of North Carolina, have invented certain new and useful Improvements in Devices for Cleaning the Bottoms of Vessels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to devices for cleaning the bottoms of ships; and it consists, essentially, of the peculiar construction and novel arrangement of the several parts, as will be hereinafter described, and particularly stated in the claims.

The principal object of the invention is to provide a simple and effective device for removing the marine growth and other adhesions from the bottoms of vessels, and thereby dispense with the necessity of dry-docking the same, which can only be accomplished at great expense, even when such operation is available.

With my improved device the sides and bottoms of vessels may be effectively cleaned of all marine growth—such as barnacles, seaweed, &c.—with but little trouble.

In the drawings, Figure 1 is a top plan view of my improved device with the air-tanks removed; Fig. 2, a side elevation of the same, showing the air-tanks in position. Fig. 3 is a plan and end elevation of the cutters; Fig. 4, similar views of the main gear-wheel; Fig. 5, a plan view of one of the journal-box frames, in which the gear and cutter shafts are journaled; Fig. 6, a modified form of cutter-blade; Fig. 7, a diagrammatic view showing the device applied to the side of a vessel, and Fig. 8 a plan view of one of the fair-leaders or guides.

In the several views the numerals 1 and 2 indicate the side bars of a rectangular frame, 3 and 4 the respective end bars, and 5 and 6 intermediate bars. To further strengthen and render the frame more rigid, a transverse brace 7 is placed between each end bar and intermediate bar. The end and intermediate bars and braces may be connected to the side bars in any suitable manner, preferably that shown in Figs. 1 and 2.

Secured to each side bar of the frame at the center thereof is a journal-box frame 8, in which is slidably secured a double journal-box 9, the sliding movement of each being controlled by two springs 10 10. The outer ends of the journal-box frames 8 are connected together by a transverse bar 11, which gives to them additional rigidity and tends to further strengthen the frame as a whole. Journaled in the upper journal-box is a main shaft 12, carrying a main gear-wheel 13 and two sprocket-wheels 14 and 15, respectively, the purpose of which will be hereinafter explained. Journaled in the lower journal-box is a shaft 16, on which is mounted a cutter 17 and a gear-wheel 18, the latter meshing with the main gear-wheel 13. The cutter consists of three hubs *a*, from which project radial arms *b*, carrying cutter-blades *c*, adjustably secured thereto by means of slots and pins, as shown by dotted lines in Fig. 3.

Journaled in suitable bearings 19, secured to the side bars of the frame, are fluted gripping-rollers 20 and 21, one on each side of the journal-box frames. Each roller is provided with a sprocket-wheel 22, the one on roller 20 being connected with the sprocket-wheel 14 by a sprocket-chain 23 and the one on roller 21 being connected with sprocket-wheel 15 by a sprocket-chain 24.

Detachably secured to the upper side of the frame are two air-tanks 25 and 26, the under sides of which are so formed as to permit the free operation of the working parts. The under side of the air-tanks near each end thereof are provided with eyes 27, which are engaged by hooks 28 on rods 29, slidable in suitable bores or guideways 30, made in the side bars of the frame, as shown by dotted lines in Fig. 2.

Attached in any suitable manner to each corner of the frame of the device is a "fair-leader" or guideway 31, consisting of a small rectangular frame in which is journaled four rollers 32, as shown in Fig. 8. Running through the fair-leaders are ropes or wires 33,

which serve as a track to guide the device in its forward and backward movements. The respective ends of the ropes 33 are attached to drags 34, which are provided with drag-ropes 35 and 36, by means of which the device is moved to different positions on the sides and bottom of the vessel. Attached to the center of each drag is stay-rope 37, which serves to hold the drag at a fixed position, and thereby allow for the free and easy movement of the device over the space between the drags. Attached to each end of the frame and to the center of each drag are pulley-blocks 38, and running through the pulley-blocks are ropes 39, by means of which the device is hauled back and forth over the track formed by the ropes 33.

The operation of the device will be readily understood without further description or explanation other than to state that the air-tanks press the device against the hull, and the springs in the journal-box frames are caused to open the blades of the cutters against the foul side or bottom of the vessel, and as the device is hauled back and forth the rollers bite into or grip the side or bottom and impart motion to the cutter.

After the first cutting the device may, if desired, be made to cut diagonally or vertically by a proper manipulation of the guide and drag ropes, as will be evident.

Other forms of cutters may be substituted for the one described—such, for instance, as that shown in Fig. 6, wherein the blades 40 are curved and are so fastened to the cutter-heads that each blade will cut a fraction of a second later than the preceding blade, similar in manner to the cutting-blades of a lawn-mower.

If found desirable, an additional roller provided with brushes of steel or other suitable material may be carried by the frame and connected with one of the fluted rollers by sprocket wheel and chain, so as to brush the hull clean in the rear of the travel of the device.

Other modifications and variations in the construction of the device may be made without departing from the spirit of my invention or sacrificing the principle thereof.

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

1. In a device for cleaning the hull of a vessel, the combination with a suitable frame carrying gripping-rollers, of vertical journal-box frames provided with spring-pressed slidable journal-boxes, a cutter mounted in the lower journal-boxes, provided with a gear-wheel, a main shaft mounted in the upper journal-boxes, provided with a gear-wheel meshing with the cutter gear-wheel, and means connecting the gripping-rollers with the main shaft, whereby when said device is moved back and forth rotary motion is imparted to said main shaft and thereby to the cutter.

2. In a device for cleaning the hull of a vessel, the combination with a suitable frame carrying gripping-rollers, a rotary cutter journaled in spring-pressed bearings, and mechanism driving said cutter, of air-tanks detachably secured to the frame, as and for the purpose specified.

3. A device for cleaning the hull of a vessel, consisting of a suitable frame carrying gripping-rollers, a rotary cutter journaled in spring-pressed bearings, and mechanism driving said cutter, in combination with guideways attached to the frame, ropes or wires running through said guideways and having their ends secured to suitable drags, said guideways forming a track for the cleaning device, and means moving said device back and forth.

4. A device for cleaning the hull of a vessel, consisting of a suitable frame carrying gripping-rollers, a rotary cutter journaled in spring-pressed bearings, mechanism driving the cutter, and air-tanks detachably secured to the frame, in combination with guideways attached to the frame, ropes or wires running through said guideways and having their ends secured to suitable drags, and means moving the device back and forth over said ropes or wires.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWARD S. WILLEY.

Witnesses:
M. R. GRIFFIN,
CHAS. GUIRKIN.