No. 634,328. Patented Oct. 3, 1899.

W. P. FREEMAN.

APPARATUS FOR CLEANING SHIPS' HULLS.

(Application filed June 11, 1898.)

(No Model.) 2 Sheets—Sheet 1.

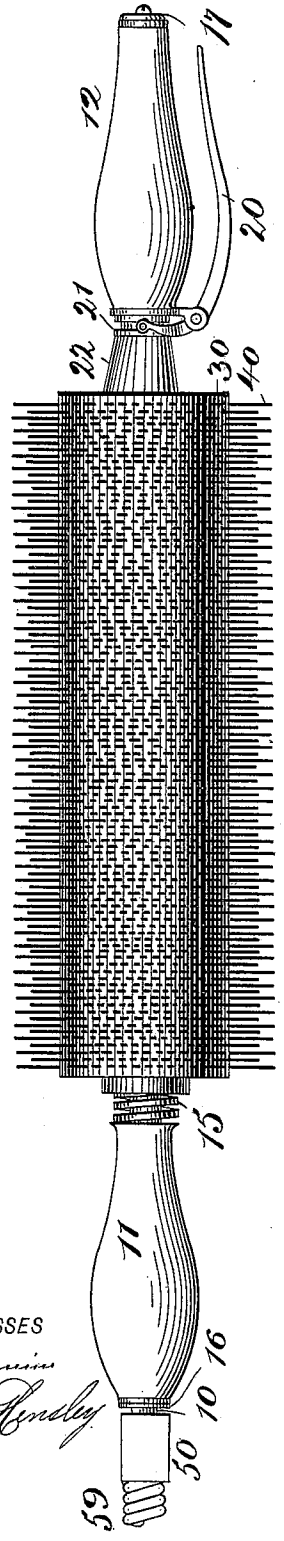


Fig. 1.

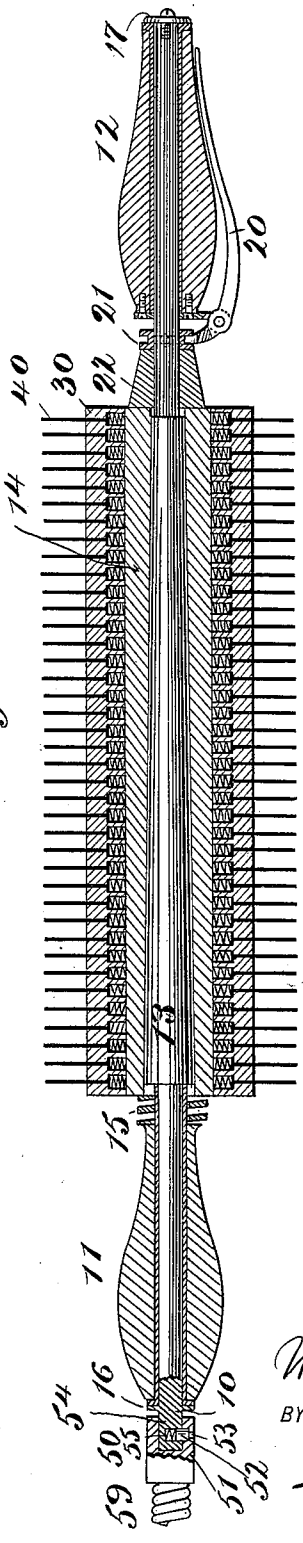


Fig. 2.

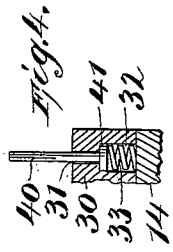


Fig. 4.

WITNESSES

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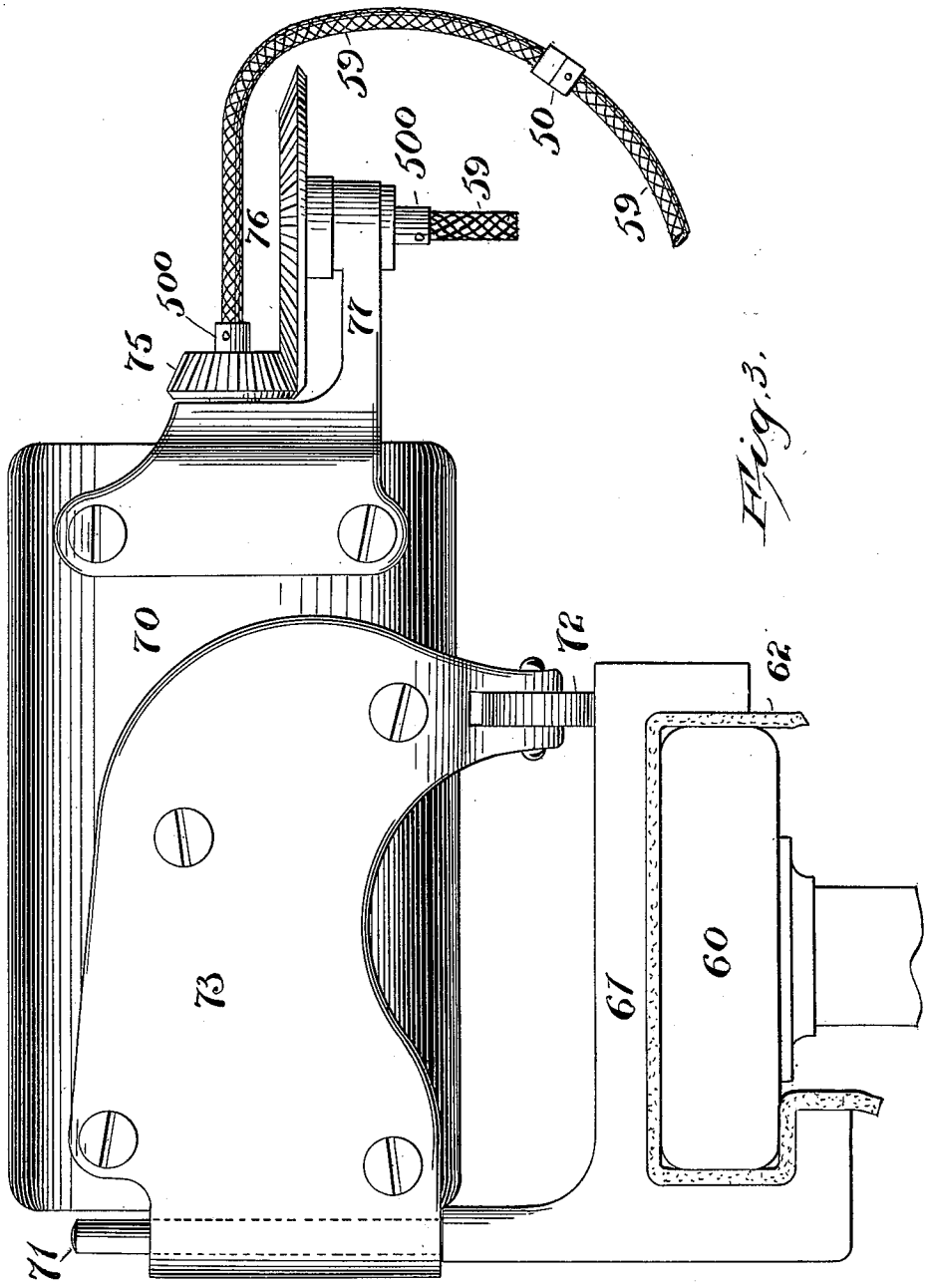


Fig. 3.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CLEANING SHIPS' HULLS.

SPECIFICATION forming part of Letters Patent No. 634,328, dated October 3, 1899.

Application filed June 11, 1898. Serial No. 683,173. (No model.)

To all whom it may concern:

Be it known that I, WARREN P. FREEMAN, mechanical and electrical engineer, of the city of New York, State of New York, have invented certain new and useful Improvements in Apparatus for Cleaning Ships' Hulls and for Similar Uses, of which the following is a description, referring to the accompanying drawings.

As embodied in apparatus for enabling divers to clean the hulls of ships under water the invention contemplates a motor placed on a suitable carriage on the deck or rail of the ship, a flexible rotary shaft by which power is transmitted from the motor to the cleaner, and details of the cleaner and its connection to the rotary shaft. These several features are fully shown in the accompanying drawings, wherein—

Figure 1 shows the cleaner and its connection to the shaft. Fig. 2 is a central section of the same. Fig. 3 is an end view of the support for the motor, showing the motor in side elevation; and Fig. 4 is a detail of the cleaner pins or wires.

Throughout the figures similar reference-numerals refer to similar parts.

Referring first to Figs. 1 and 2, the terminal section of the rotary shaft 10 forms the support for the cleaner and its handles 11 12, by which it is grasped and controlled. The shaft 10 carries a conical bushing 13, upon which fits the cylindrical core or center 14 of the cleaner. This core 14 is hollow and tapered internally to fit the cone 13. A spring 15, interposed between the handle 11 and the core or center 14, tends to force the core 14 from the base of the cone 13, so as to loosen it upon the cone. The reaction of the spring 15 upon the handle 11 is taken up by the collar 16, against which the handle 11 presses. The handles 11 and 12 are free to turn on the shaft 10, so that when grasped by the hands of the operator the cleaner may be manipulated while the shaft 10 is turning within the handles. The terminal end of the shaft 10 is provided with cap 17, which prevents the handle 12 from slipping off the shaft.

Pivoted to or near to the handle 12 is a finger lever or grip 20. The other end of this lever 20 is adapted to operate the double collars 21 longitudinally of the shaft 10, forcing them to the left of Fig. 2 when the lever handle or grip 20 is pressed by the hand against the handle 12. When pressure is so exerted, the collars 21 act through the interposed piece 22 to force the core or center 14 of the cleaner into close frictional contact with the cone 13, thereby causing the rotation of the shaft 10 to be transmitted to the core 14. When, on the other hand, the grip 20 is released, the spring 15 acts upon the core 14 and releases it from the cone 13, permitting it to stop, although the shaft 10 may continue its rotation.

With the exception of the handles 11 and 12 all the parts so far described are preferably of bronze or other metal which will not be injured by salt water. I prefer, however, to make the outer sleeve 30 of the cleaner, which I am now about to describe, of light metal, such as aluminium. This sleeve 30 is carried upon and turns with the core or center 14. It in turn carries the pins or wires 40 of the cleaner. These pins 40 are provided with heads 41, as shown in Figs. 2 and 4, and are set in perforations 31 at frequent intervals over the entire surface of the sleeve 30. The heads 41 lie in recesses 32 in the inner surface of the sleeve 30, and springs 33 are interposed between the heads 41 and the surface of the core or center 14. Consequently the pins 40 are thrust outward to their full extent, but are free to yield against the action of the springs 32 when pressed against the plate of a ship or other surface to be cleaned. By this means I provide a metallic brush-like cleaner in which each of the brush members or pins is yielding. When it is desired to substitute the rotary cleaner shown in Figs. 1 and 2 by a new instrument or some other instrument, it is only necessary to remove the cap 17 from the end of the shaft 10 and draw off the core 14 with its attachments.

I will now describe the detachable joint 50 by which the section 10 of the shaft is connected to the flexible sections and by which the flexible sections are connected together. The details of this joint are shown in Fig. 2. The outer member of the joint consists of a socket or sleeve 51, into which fits the nip-

ple or tongue 54 of the inner member of the joint. The two members are secured together so as to rotate and transmit power by means of a pin 52, carried by the nipple 54 and pressed outward by the spring 55, so as to enter a recess in the sleeve 51, as clearly seen in the figure, and thereby lock the two members of the joint together. A small hole 53 is provided, through which the end of a wire or pin may be thrust to force the pin 52 back from the sleeve 51, and thereby permit the withdrawal of the nipple 54 from the sleeve or socket 51 to disconnect the joint.

I prefer to form my flexible shaft 59 in several lengths connected by such joints as I have just described. The details of the flexible shaft are not material to the invention, as such devices have been made and used heretofore.

I prefer to actuate my rotary shaft, which drives the cleaner, by means of an electric motor placed on a suitable carriage on the rail of the ship. In Fig. 3 the rail is indicated at 60. A heavy slide 61, fitted to the rail 60 and provided with felt or soft material 62 to prevent its marring the rail, carries the motor 70. The motor turns upon a vertical pin 71, which forms part of the sliding base 61. The weight of the motor is supported on one or more wheels 72, journaled in the support or frame 73, to which the motor is rigidly secured. These details may of course be changed to some extent without departing from the principles of the invention. The object of the pivotal mounting is to enable the motor to swing when tension is exerted upon the flexible shaft 59. The motor is preferably provided with the beveled gears 75 76, one mounted on the end of the motor-shaft and the other mounted in the horizontal plane upon a bracket 77. Two sockets 500, similar in all respects to the socket 51 of the joint already described, are provided, one directly on the end of the motor-shaft and the other mounted and turning with the beveled gear 76. By this means flexible shafting 59 may be connected either horizontally to the end of the motor-shaft or vertically to the shaft of the gear 76. In the drawings I have shown flexible shafting connected at both these points, so that two sets of cleaners may be operated from the single motor 70. Of course either of these connections may be omitted and the motor designed for a single connection to the flexible shafting.

Having now set forth in sufficient detail the several features of my invention as I at present prefer to construct them, I claim, without attempting to enumerate the many modifications that may be made, the following points:

1. In combination in apparatus for cleaning hulls and similar uses, a cleaner, a source of power therefor remote from the cleaner, mechanical actuating connections extending from such source to the cleaner, and a friction-clutch for operatively connecting and disconnecting the cleaner from the said actuating connections without permitting of the detachment of said parts, substantially as set forth.

2. In combination in apparatus for cleaning hulls, and for similar uses, a slide fitted to the rail of the ship, a motor pivotally mounted upon said slide, and mechanical actuating connections extending from the motor to the apparatus to be operated, substantially as set forth.

3. In combination in apparatus for cleaning hulls, and for similar uses, a slide fitted to the rail of the ship, a motor pivotally mounted upon said slide, and a flexible rotary shaft actuated by the motor and connected to the cleaner, substantially as set forth.

4. In combination in a cleaner for cleaning hulls and for similar uses, a rotary shaft upon which the cleaner is mounted, handles loosely surrounding the said shaft, and a friction-clutch for operatively connecting and disconnecting the said cleaner and shaft without permitting of the detachment of said parts, substantially as set forth.

5. In combination in a cleaner for cleaning hulls and for similar uses, a rotary shaft upon which the cleaner is mounted, a tapered or conical bushing turning with the shaft, a hollow core or center for the cleaner internally tapered or conical to fit the bushing, and means for forcing the said core or center into and out of frictional engagement with the bushing, substantially as set forth.

6. In combination in a cleaner for cleaning hulls and for similar uses, a rotary shaft upon which the cleaner is mounted, a tapered or conical bushing turning with the shaft, a hollow core or center for the cleaner internally tapered or conical to fit the bushing, mechanism for forcing the said core or center into frictional engagement with the bushing, and a spring acting to disengage it, substantially as set forth.

7. In combination in a cleaner for cleaning hulls, and for similar uses, the core or center, a surrounding, recessed, and perforated, sleeve, and spring-pressed pins protruding from such recesses through the perforations, substantially as set forth.

8. In combination in a cleaner for cleaning hulls and for similar uses, a set of cleaning-pins projecting from and seated in a cylindrical support and each movable therein lengthwise of itself, substantially as set forth.

In testimony whereof I have hereunto set my hand this 2d day of June, A. D. 1898.

WARREN P. FREEMAN.

Witnesses:
HAROLD BINNEY,
WENDELL F. BECKER.