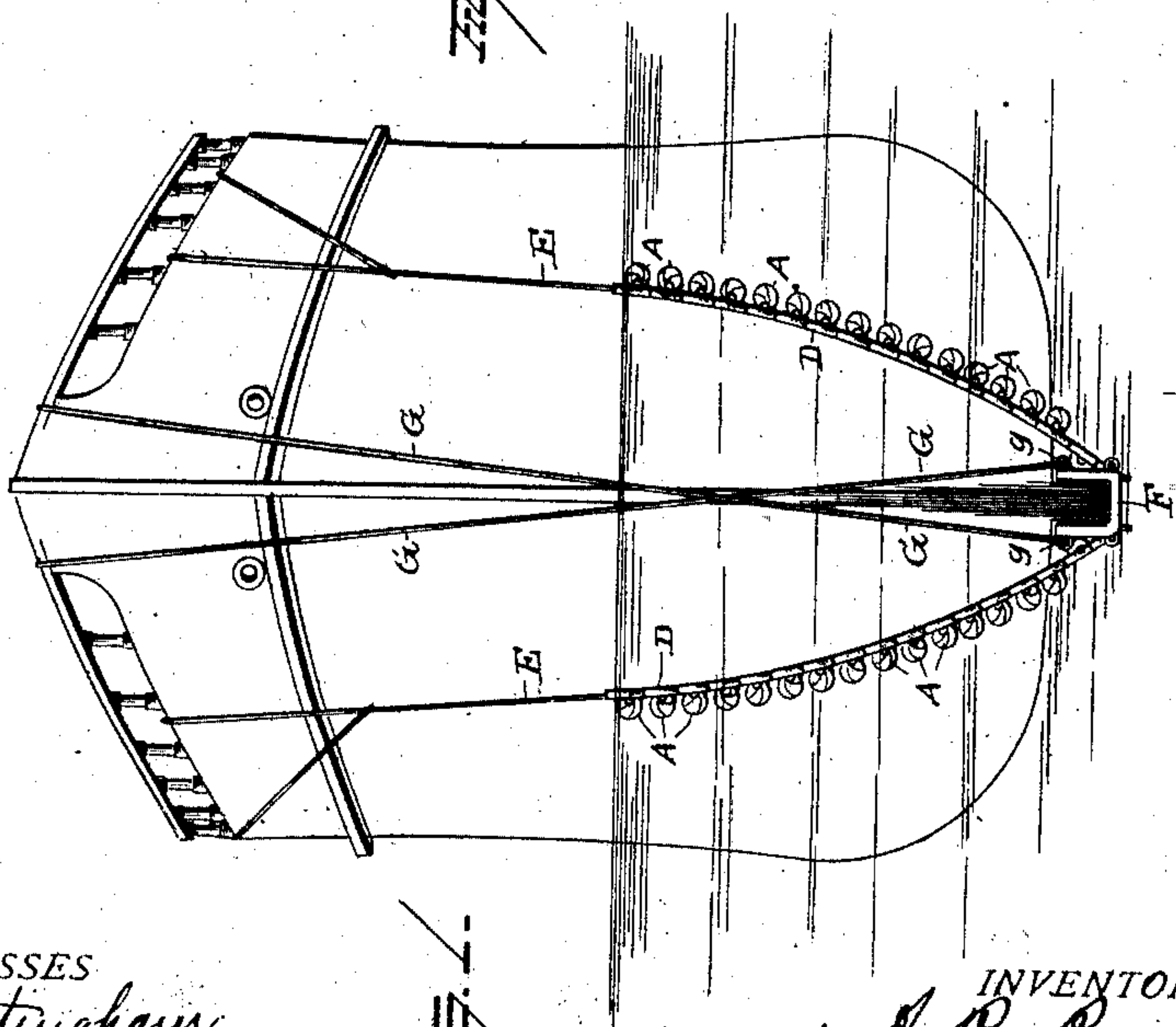
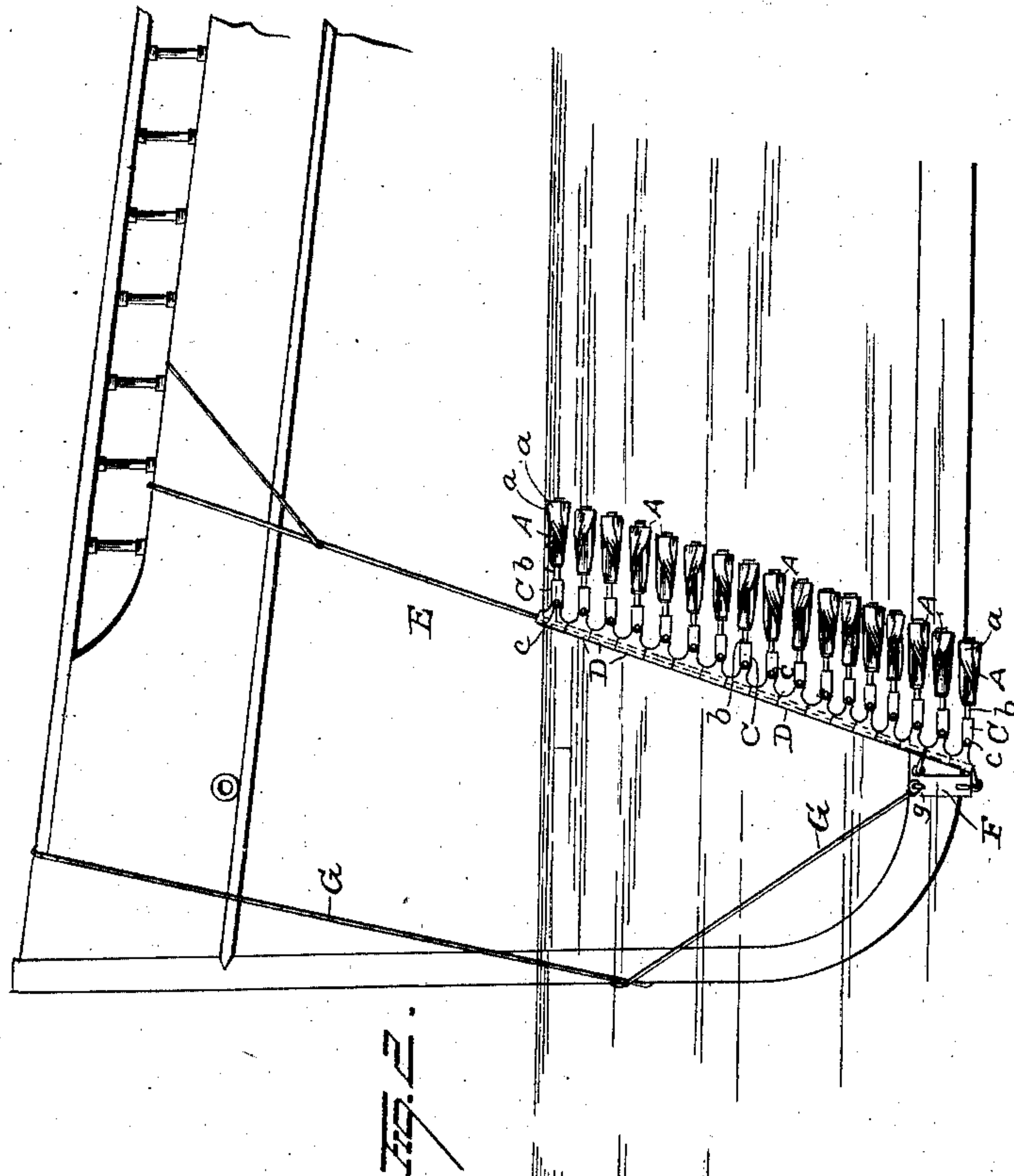


No. 883,423.

PATENTED MAR. 31, 1908.

A. R. ROGERS.
SHIP CLEANING APPARATUS.
APPLICATION FILED MAR. 18, 1907.

2 SHEETS—SHEET 1.



WITNESSES
E. J. Nottingham
G. A. Downing

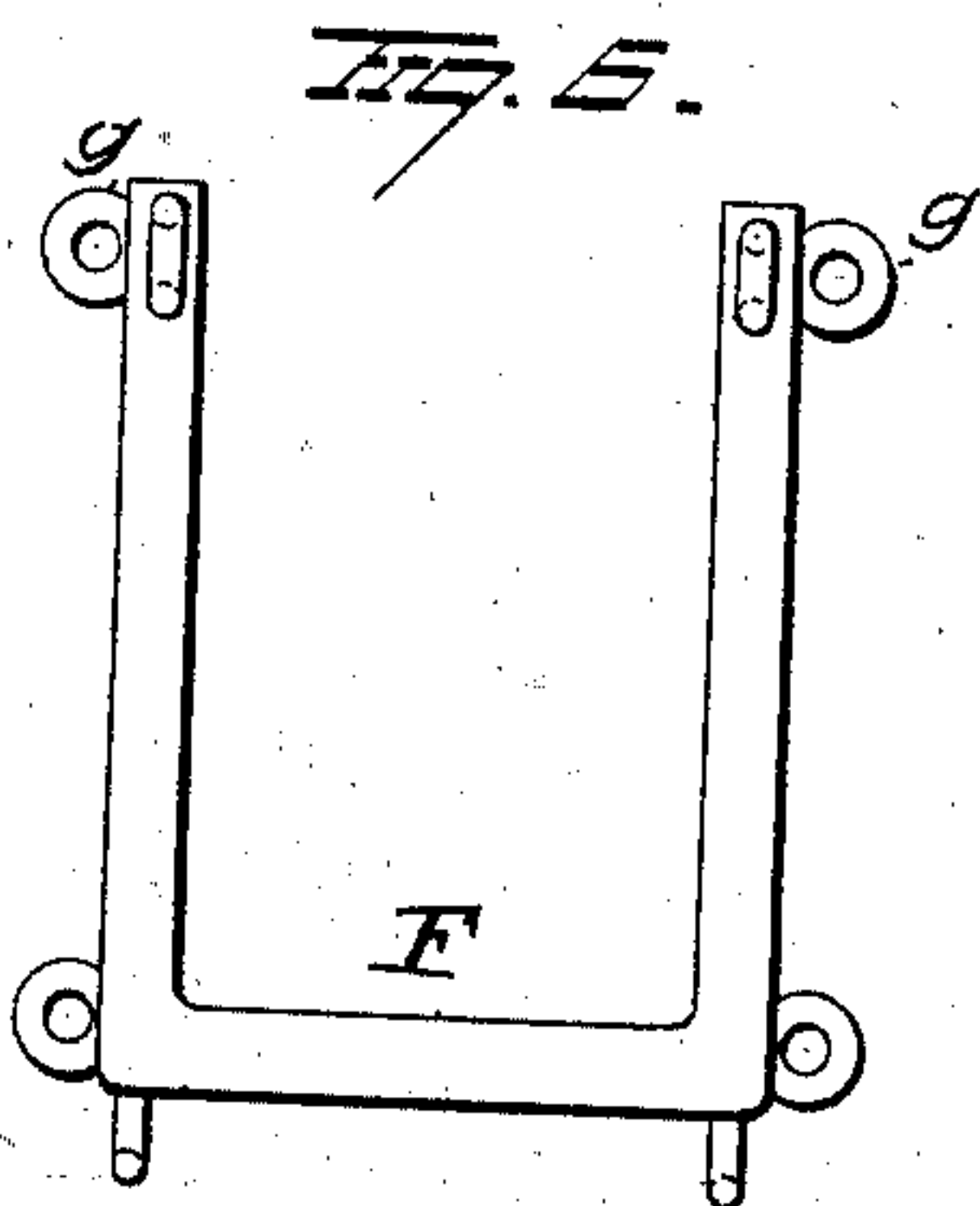
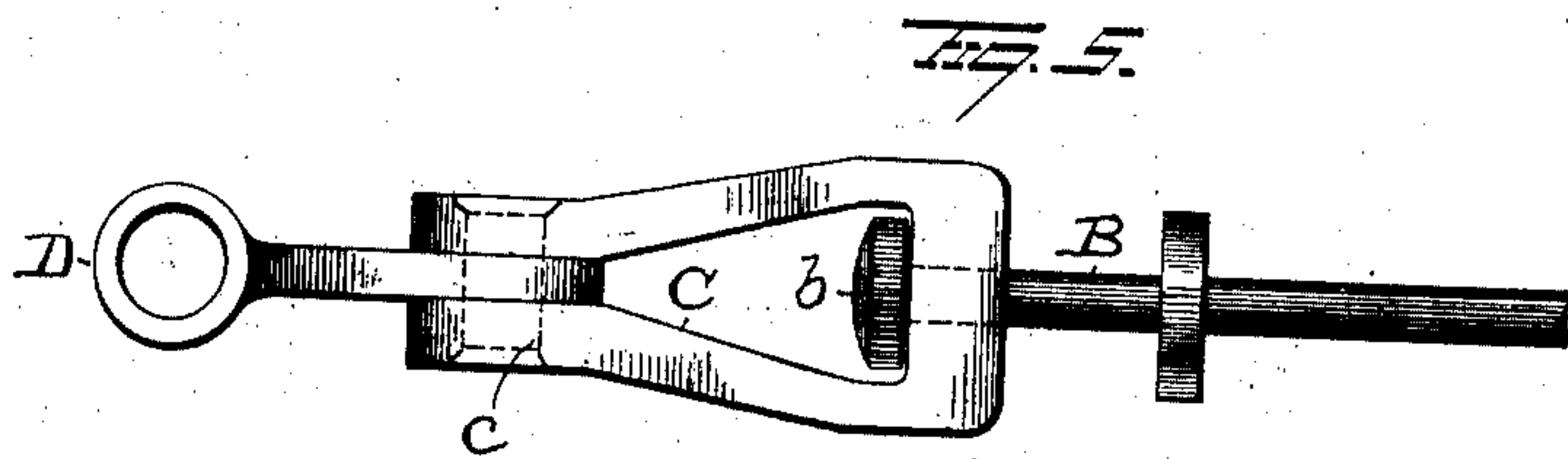
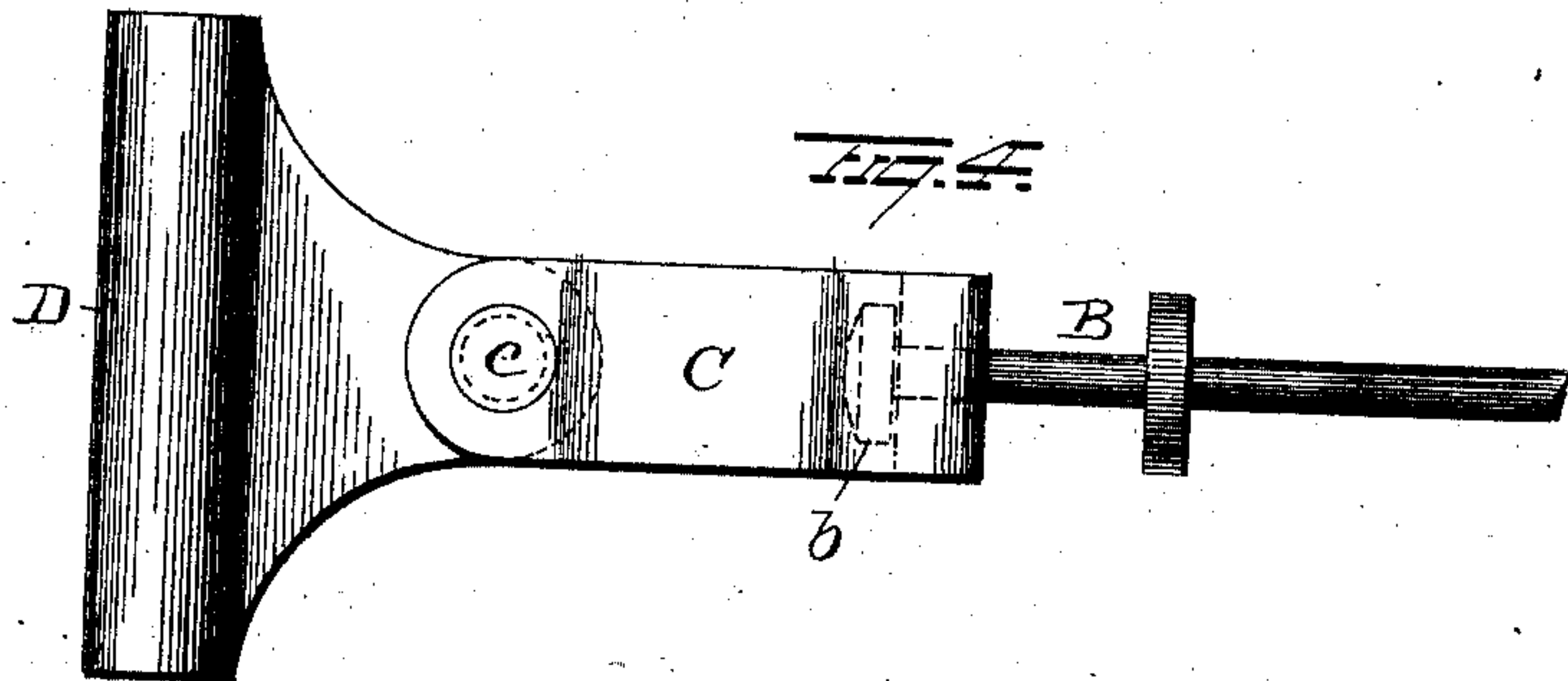
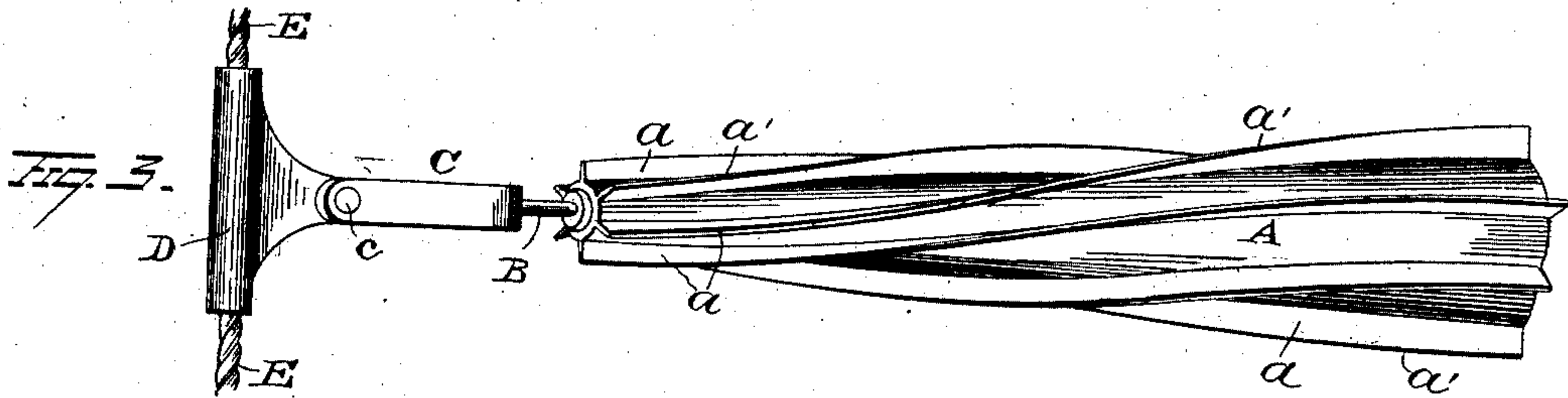
INVENTOR
A. R. Rogers
By H. A. Seymour
Attorney

No. 883,423.

PATENTED MAR. 31, 1908.

A. R. ROGERS.
SHIP CLEANING APPARATUS.
APPLICATION FILED MAR. 18, 1907.

2 SHEETS—SHEET 2.



WITNESSES
E. Nottingham
G. J. Downing.

INVENTOR
A. R. Rogers
By H. A. Seymour
Attorney

UNITED STATES PATENT OFFICE.

ARTHUR R. ROGERS, OF JONESPORT, MAINE.

SHIP-CLEANING APPARATUS.

No. 883,423.

Specification of Letters Patent.

Patented March 31, 1908.

Application filed March 18, 1907. Serial No. 362,954.

To all whom it may concern:

Be it known that I, ARTHUR R. ROGERS, of Jonesport, in the county of Washington and State of Maine, have invented certain new and useful Improvements in Ship-Cleaning Apparatus; 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 an improvement in ship cleaning apparatus, the object of the invention being to provide an apparatus which may be readily applied to all vessels however propelled, while under headway, and will be actuated by the movement of the vessel through the water, and will operate effectually to remove barnacles, marine growths and all other foreign materials from the submerged portion of the hull.

With this object in view my invention consists in certain features of construction and combinations of parts in a ship cleaning apparatus as will be hereinafter described and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in end elevation of a vessel having my improved ship cleaning apparatus applied thereto. Fig. 2 is a side view of the same. Fig. 3 is a detached view of one of the revolving scrapers. Fig. 4 is a detached view of the universal joint of one of the scrapers. Fig. 5 is an edge view of the latter and Fig. 6 is a view of the guiding frame which fits over the keel of the vessel.

A represents the revolving scrapers, each of which is conical in form, and is provided with flanges *a* the edges *a'* of which constitute scrapers which by their rotary movement in contact with the hull of the vessel, serve to remove barnacles and other foreign matter or material adhering thereto. When the ship is under headway the conical scrapers are drawn through the water and are rotated by means of their spiral flanges, the speed of their rotation depending on the speed of the vessel. A series of these revolving conical scrapers are flexibly connected together in the following manner. Each scraper *A* has secured to its forward end a rod *B* having a head or collar *b* which seats on the rear end of a link *C*, the latter being pivoted at *c* to a sleeve *D* mounted on a wire guide rope *E*. By means of this construction the scraper is free to rotate and is permitted a universal movement to enable it to operate

in contact with a section of the hull wider than the diameter of the scraper as the action of the water combined with the flexible joints of the support will cause the scrapers to revolve in different planes.

Two series of revolving scrapers are used, one for each side of the vessel, connected by the keel iron or guiding frame, guide ropes being secured at their lower ends to the upper end of the guiding frame *F* which is preferably made as a light steel structure and of proper form to fit around the keel of the vessel, while the upper ends of the guide ropes are attached to rings or appliances from which two short tail ropes lead to and are securely attached to the rail or deck, one tail rope being attached at a point one space further aft than the other. As the cleaning progresses and it is desired to move the scrapers further aft, the forward tail rope is slackened and made fast further aft, the other tail rope holding the strain and moving the scrapers aft during the shift.

At the eyes *g g* provided on the upper end of the guiding frame are attached two bow lines *G G* which lead forward one on each side of the ship and are adjustably secured to cleats on deck. The resistance of the scrapers when drawn through the water by the ship under headway will tend to draw aft the two series of scrapers and guiding frame and by slackening out the bow lines of the guiding frame and shifting aft the guide ropes supporting the scrapers, the whole apparatus can be easily applied to successive vertical sections of the under body of the vessel until her whole length has been covered and cleaned.

To put the apparatus in position for operation pass one series of scrapers with the guide ropes around the bow so that one series may be on the port and one on the starboard side of the vessel. Then fit the guiding frame over the stem of the ship and lower it keeping it in position until it engages the keel, then haul all the lines taut taking care to keep the two series of scrapers in a perpendicular line as far as possible. The ship is then started with the result that all of the scrapers will trail aft and rotate and clean the first berth or first vertical section of the under body of the ship. After the scrapers have remained in that position a sufficient length of time to remove all the barnacles or foreign matter, the port and starboard guide ropes are moved aft one space as

above described and the bow lines holding the guide frame are slackened accordingly so that the port and starboard guiding ropes will stand in a perpendicular line, and in this manner the scrapers are adjusted from time to time until they have operated upon and cleaned the entire under body of the hull.

If the apparatus is to be applied to a wooden vessel painted or coppered, the flanges of the scrapers are to be made of a material composed of rubber and cotton in combination so as to produce a soft and yielding material which will not tear or injure the paint or copper, but will be sufficiently hard to remove foreign material.

When the scrapers are applied to a ship propelled by a screw care must be taken not to allow the scrapers to become entangled with the screw, and it may be advisable when the cleaning process has reached the run of the ship to stop the vessel, shift the guiding frame and scrapers aft to a point immediately forward of the screw, tautening the several lines so as to hold the apparatus in place against a backward motion of the ship, and then reverse the screw and start the ship backwards. In this manner the scrapers are thrown in contact with all parts of the run up to the point already cleaned, shifting forward from time to time as formerly the scrapers have been shifted aft.

To adjust the apparatus to a paddle wheel a suitable guide rope can be run from forward to aft inside the wheel, and when the scrapers have reached the wheel they can be shifted around the wheel by the tail ropes attached to this lateral guide. After the ship has been cleaned her entire length she is stopped and the apparatus taken aboard.

In the arrangement of the series of scrapers it may be preferred to have half the scrapers built with right flanges and half with left flanges, and to have the scrapers alternate in each series so that each scraper will revolve in an opposite direction from the one above and below it. The object of this is to enable the flanges if the scrapers happen to come together to fit into each other like teeth on cog wheels, so that each would assist the other in its rotation.

My improvement in this cleaning apparatus will result in a great saving to ship owners because it will be possible for ships to be kept thoroughly cleaned without docking, and especially upon long voyages and between ports where there are no dry docks. In this way the speed of vessels can be materially increased and the expense and delay incident upon frequent docking for purposes of cleaning will be obviated, while no damage will be done to the paint, copper, or bottom of the ship.

Having fully described my invention what

I claim as new and desire to secure by Letters Patent, is:—

1. In a ship cleaning apparatus, the combination with an adjustable support, of a series of superimposed cone shaped scrapers, each connected at one end with said support, and free at the other end, and each scraper having a spiral flange.

2. The combination with an adjustable support, a series of superimposed scrapers having spiral flanges, and universal joints connecting one end of each scraper with the support, the other ends of said scrapers being free.

3. The combination with a flexible support, of a series of revolving bodies provided with rigid spiral flanges and constituting scrapers free at one end, and universal joints for securing the other ends of said scrapers to the flexible support.

4. The combination with a wire rope, of a conical scraper provided with spiral flanges, a sleeve adjustably mounted on the wire rope, a link pivoted to the sleeve, and a rotary connection between the link and scraper substantially as set forth.

5. The combination with a guiding frame constructed to engage the keel of a vessel, and ropes attached to said frame, of a series of revolving scrapers free at one end and connected at their other ends with the guiding frame, substantially as set forth.

6. The combination with a guiding frame, and supporting ropes attached thereto, of revolving scrapers connected at their forward ends to the said frame by swiveled joints and free at their other ends, substantially as set forth.

7. The combination with a rope, of a series of revolving scrapers connected at their forward ends to said rope and free at their other ends, and means for adjusting the scrapers vertically and longitudinally of the hull of the vessel.

8. The combination with a series of revolving scrapers, of ropes for supporting one end of each scraper, the other end being free and ropes for insuring the longitudinal movement of the scrapers along the hull of the vessel, substantially as set forth.

9. The combination with a guiding frame constructed to engage the keel of a vessel and a rope attached to said frame, of a conical scraper provided with spiral flanges, a sleeve on said rope, a link pivoted to the sleeve and a rotary connection between the link and scraper, substantially as set forth.

In testimony whereof, I have signed this specification in the presence of two subscribing witnesses.

ARTHUR R. ROGERS.

Witnesses:

H. L. HARDING,
WINTHROP WETHERBEE.