

No. 622,232.

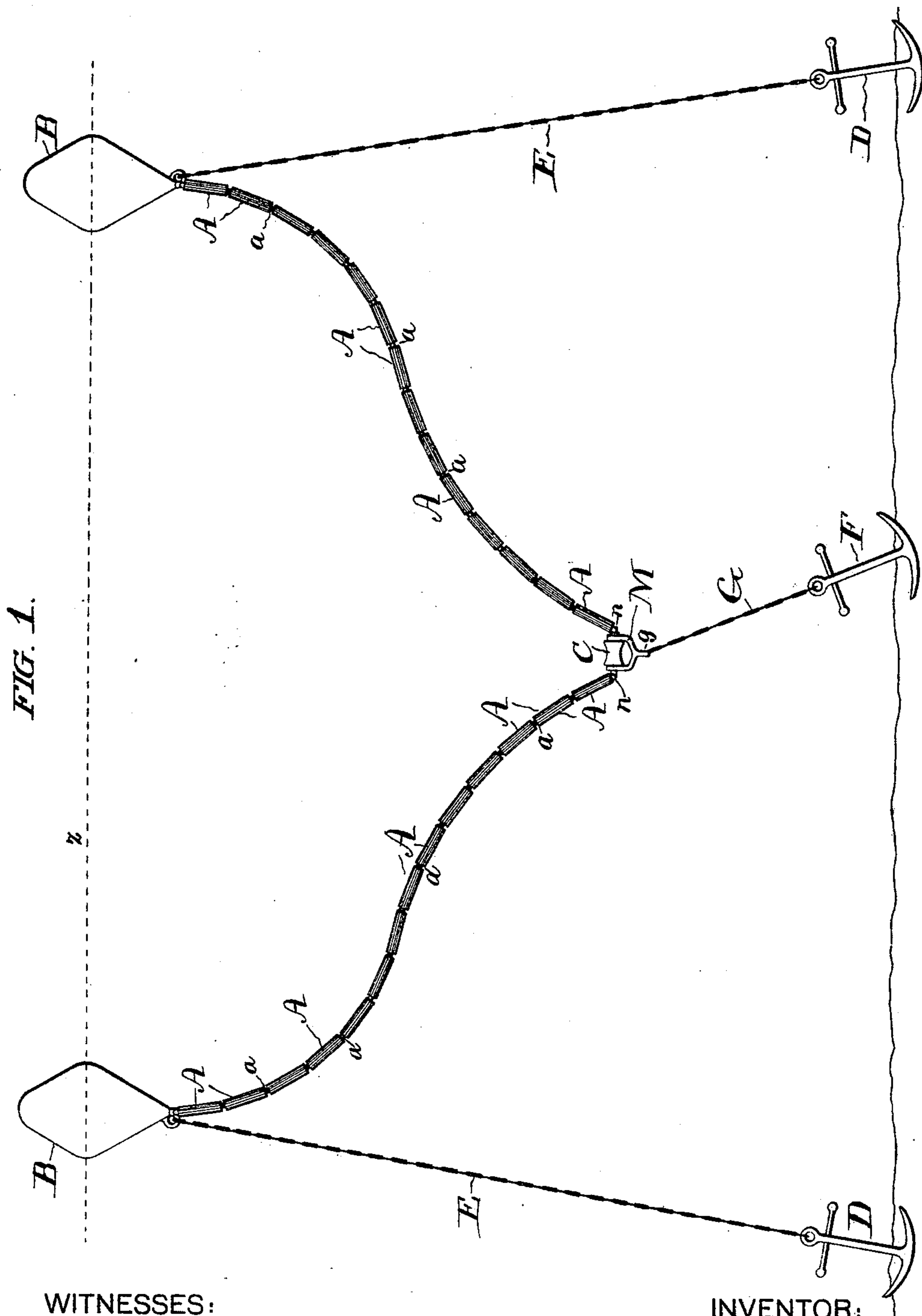
Patented Apr. 4, 1899.

O. E. INGLIS.
CLEANER FOR SHIPS' HULLS.

(Application filed June 8, 1898.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Arthur E. Paige
W. Stuart How.

INVENTOR:

by *Otto E. Ingles,*
Edw. F. Simpson, Jr.
his Attorney.

No. 622,232.

Patented Apr. 4, 1899.

O. E. INGLIS.
CLEANER FOR SHIPS' HULLS.

(Application filed June 8, 1898.)

(No Model.)

3 Sheets—Sheet 2.

FIG. 2.

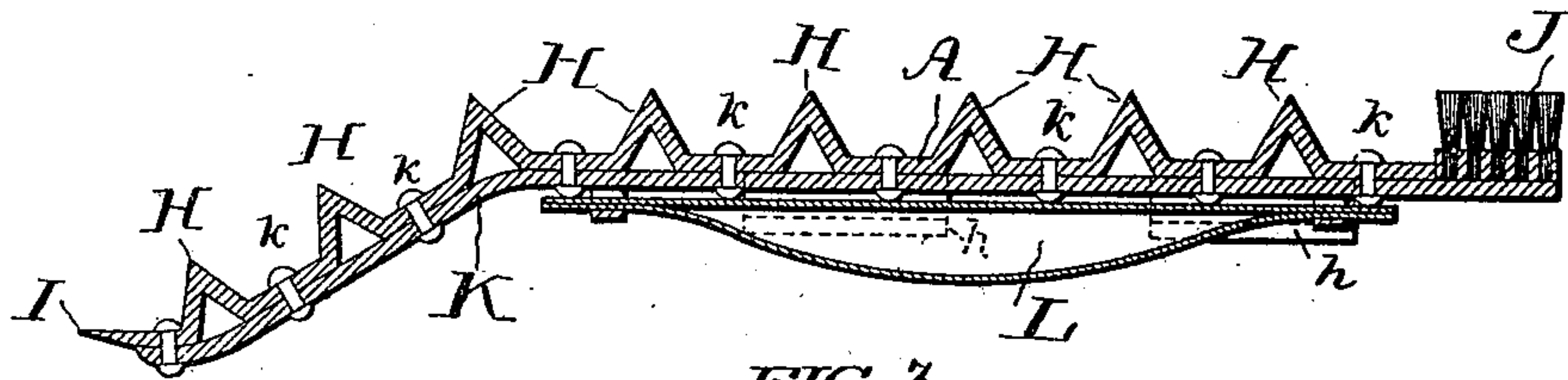
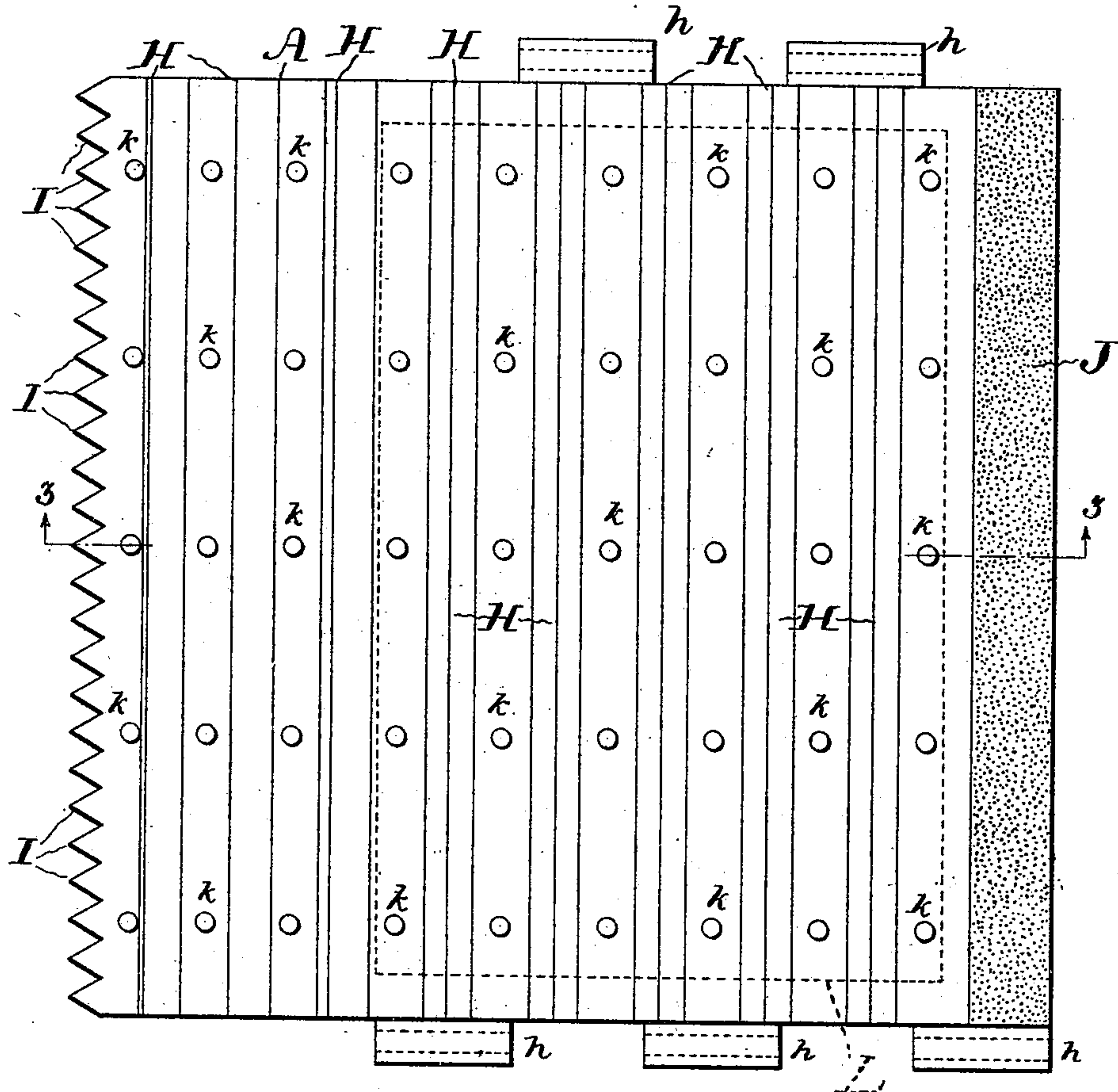


FIG. 3.

WITNESSES:

Arthur E. Paige
W. Storrs How.

INVENTOR:

Otto E. Inglis,
by Edw. F. Simpson, Jr.
his Attorney.

No. 622,232.

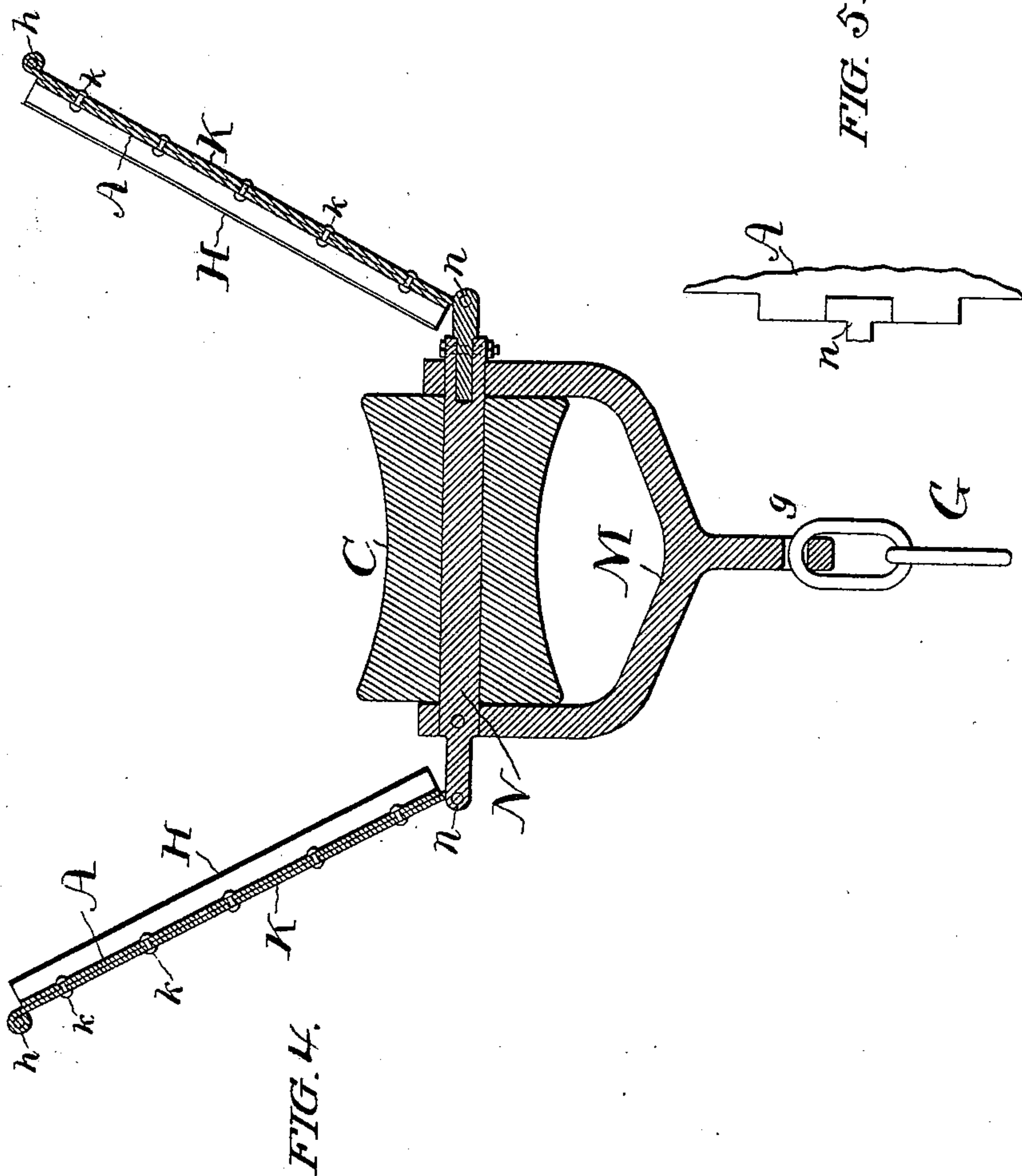
Patented Apr. 4, 1899.

O. E. INGLIS.
CLEANER FOR SHIPS' HULLS.

(Application filed June 8, 1898.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

Arthur E. Page
W. Storer How.

INVENTOR:

Otto E. Inglis,
by Edward J. Simpson, Jr.
his Attorney.

UNITED STATES PATENT OFFICE.

OTTO E. INGLIS, OF PHILADELPHIA, PENNSYLVANIA.

CLEANER FOR SHIPS' HULLS.

SPECIFICATION forming part of Letters Patent No. 622,232, dated April 4, 1899.

Application filed June 8, 1898. Serial No. 682,946. (No model.)

To all whom it may concern:

Be it known that I, OTTO E. INGLIS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Vessel-Cleaners; 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 apparatus for cleaning the foul bottom and sides of sea-going vessels; and it consists of certain improvements which will be hereinafter fully described and then specifically pointed out in the claims at the end of this specification.

The object of my invention is to provide a cleaning apparatus for vessels which is adapted to be held practically stationary in the water and to act in coöperation with a moving vessel for the purpose of scraping and cleansing the bottom and sides of the same by removing therefrom all barnacles, seaweed, &c., that may have accumulated thereon.

In the accompanying drawings, which illustrate a suitable and comparatively simple embodiment of my invention, and in which similar letters refer to corresponding parts throughout the several views, Figure 1 is a view in elevation of my improved cleaner in operative position. Fig. 2 is a top or plan view of one of the cleaner-plates forming one of the links or sections of my improved cleaner detached, on a larger scale than Fig. 1. Fig. 3 is a cross-section of the same on the line 3 3 of Fig. 2. Fig. 4 is a vertical central sectional view of the guide-roller of the cleaner and two of the cleaner-plates connected thereto. Fig. 5 is a detail view of the hinged connection between one of the cleaner-plates and the said guide-roller.

The improved cleaning apparatus generally consists of a flexible scraper composed of cleaner-plates, links, or sections A, hinged together at *a*. To the opposite ends of the flexible scraper are connected floats or buoys B B, which may be of any suitable well-known construction, shape, and size. They should be of such a size, however, as to float or suspend the cleaner in the water below the sur-

face thereof, as illustrated in Fig. 1. Midway the length of the flexible cleaner a guide-roller C is suitably secured for a purpose further on to be made plain. In order to maintain the cleaner practically stationary in the water, so that it will properly scrape barnacles, &c., from the bottom and sides of a vessel passing or sailing through or over the cleaner, the buoys B B should be anchored by means of suitable anchors D D and chains E E and the guide-roller C similarly anchored by an anchor F and chain G.

With the flexible cleaner held in a stationary position, as above described, and illustrated in Fig. 1, it will be apparent that the vessel to be scraped or cleaned is caused to move toward the cleaner and between the two buoys B B, which thus not only serve to float or suspend the cleaner, but also serve to guide the vessel in the proper direction. The vessel should be so guided as to cause its keel to strike and glide upon the guide-roller C, which is thereby depressed the full depth of the vessel below the water-line *z*, and the flexible scraper is thus caused to conform to the curved sides and bottom of the vessel. As the vessel moves forward with the flexible scraper in close contact with the outer surface thereof, the scraper being held stationary or prevented from moving with the vessel by reason of the anchors D D and F, all barnacles, grass, &c., on the said outer surface of the vessel are scraped off.

While the cleaner-plates forming the links or sections A of the flexible scraper or cleaner may be made in any suitable manner, I prefer to construct them as follows: Each plate may be made of sheet metal, as steel, ribbed or corrugated to form teeth or scrapers H, extending longitudinally of the flexible cleaner. The forward end of the cleaner-plate is bent or curved downwardly, as shown in Fig. 3, and the edge is provided with a series of saw-teeth I for the purpose of cutting or tearing off grass or seaweed from the bottom and sides of the vessel before the scrapers H commence to act upon the barnacles. The scrapers upon the downwardly-bent or curved portion of the cleaner-plate are each placed successively a little higher than the scraper in advance of it. The object of this arrange-

ment of the scrapers is to lessen the work to be performed by the scrapers on the body or flat portion of the plate by successively cutting or breaking off portions of the barnacles, the first scraper acting to break or cut off the largest of the barnacles or the ends thereof, the next scraper cutting off more of the barnacles until the scrapers on the body of the plate scrape the sides of the vessel clean. It will be observed that as there are a plurality of scrapers on the same level on the body of each plate and as these scrapers come in contact with the vessel the cleaner-plates are held in the proper position and cannot be twisted out of an effective scraping position. For the purpose of effecting a more thorough cleaning of the vessel than might be attained only by the use of the scrapers just described wire or other brushes J may be secured to the cleaner-plates at or near their rear edges. By locating the brushes in this position they do not come into action upon the moving vessel until the scrapers have performed the heavier work of removing the barnacles, &c.

The corrugated or ribbed sheet-metal cleaner-plates, if desired, may be strengthened or stiffened by the addition of a bottom or base plate K, also of sheet metal and connected to the corrugated or ribbed sheet by rivets k. If preferred, the cleaner-plates may be cast or wrought, instead of being formed of sheet metal, as described.

The cleaner-plates may be connected to each other by any preferred form of hinge-joint that will allow the cleaner to flex toward or away from the sides and bottom of the vessel, but which will not allow the cleaner to flex in the direction in which the vessel is moving to any great extent. In the present instance I have shown the joints as consisting of simple ears or perforated lugs h h, through which suitable pintles may be passed, as will readily be understood.

To secure the best results with my improved cleaner, each link or cleaner-plate of the flexible scraper may be provided with a float L, (see Fig. 3,) secured to the under side of the link. The tendency of the floats L is to give buoyancy to the flexible scraper and lift it upward, whereby the scraper may be caused to better conform to the curved sides and bottom of the vessel than can be attained by the keel of the vessel acting upon the guide-roller C. Another advantage of these floats is that when the anchor F is weighed the entire flexible cleaner is caused to float upon or near the surface of the water to enable it to be more readily gathered in for cleaning or storage when not in use.

I have shown the guide-roller C as mounted in a pulley frame or yoke M by way of the roller-axle N, the chain G of the anchor F being connected to said frame or yoke at g. The cleaner-plates A A immediately on opposite sides of the guide-roller are connected to said roller-axle by hinged joints n similar to the joints between the plates, or these plates

may be connected to said axle or to the roller frame or yoke in any other suitable manner.

Among the many advantages possessed by my improved vessel-cleaner may be mentioned the following: Any vessel of whatever size or shape may be equipped with one of the cleaners, which should be of a length approximately corresponding with the greatest width of the vessel—that is to say, the flexible cleaner should be of a length to adapt it to conform to the hull of the vessel with which it is to be used, so that as the vessel is forced forward through or over the cleaner practically the entire surface of the sides and bottom of the vessel may be scraped by the cleaner. The cleaner is comparatively simple in construction and may be stored away upon shipboard and occupy but little space. Any vessel provided with one of the cleaners may be readily cleaned at any time and in almost any place, whether in river, lake, harbor, or open sea, without the necessity of being docked; but little time and effort are required to adjust or place the cleaner in operative position, the cleaner practically being automatic in its cleaning or scraping action, it only being necessary to place the cleaner in proper position, as hereinbefore described, and steam or sail the vessel through or over it. The manual labor, time, and expense usually required to clean the sides and bottom of a foul vessel are reduced to a minimum. After the vessel has been thoroughly cleaned the cleaning apparatus may be floated and itself cleaned and then stored on the vessel again.

Obviously many changes not already pointed out may be made in the construction herein shown and described without departing from the spirit and scope of my invention, as I believe myself to be the first to provide a cleaning apparatus for foul vessels which is adapted to be held practically stationary in the water and act upon the bottom and sides of moving vessels, whereby the movement of the vessel performs the cleaning or scraping action without the employment of other forces or agencies and without the necessity of docking the vessel to be cleaned. The cleaner-plates may be constructed in any suitable manner and may be provided with any desired form of cleaning or scraping means or projections.

If thought advisable, a suitable keel-scraper (not shown) may be employed for scraping the keel of the vessel before it comes in contact with the roller C. This keel-scraper may consist of a U-shaped piece rigidly secured to the roller-frame M in advance of the roller C, as will readily be understood.

I claim as my invention—

1. An apparatus for cleaning the sides and bottoms of foul sea-going vessels, having means for suspending the apparatus in the proper position in the water and also having means for holding it practically stationary, whereby a vessel may be cleaned by its own movement by passing over or through the

said cleaning apparatus, substantially as described.

2. An apparatus for cleaning the sides and bottoms of foul sea-going vessels consisting
5 of a flexible cleaner composed of cleaner-plates hinged together, in combination with means for floating the flexible cleaner and with means for holding the same practically stationary, substantially as and for the purpose described.

3. In an apparatus for cleaning the sides and bottoms of foul sea-going vessels, the combination of a flexible cleaner composed of hinged cleaner-plates, a guide-roller located
15 midway the length of said flexible cleaner, an anchor connected to said guide-roller for holding the same in position, buoys connected to the opposite ends of the flexible cleaner for suspending said cleaner in the water and
20 anchors connected to said buoys for holding

the same in position, substantially as and for the purpose described.

4. A cleaner-plate for cleaning the sides and bottoms of foul vessels said plate being
25 curved downwardly at its front edge and provided on its upper surface with a series of scraping ribs or projections, the ribs or projections on the straight portion of the plate being on a level and those on the downwardly-curved front edge of the plate being below
30 the ribs or projections on said straight portion of the plate, substantially as and for the purpose described.

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

OTTO E. INGLIS.

Witnesses:

WILLIAM R. SIMPSON,
MARY C. BROWN.