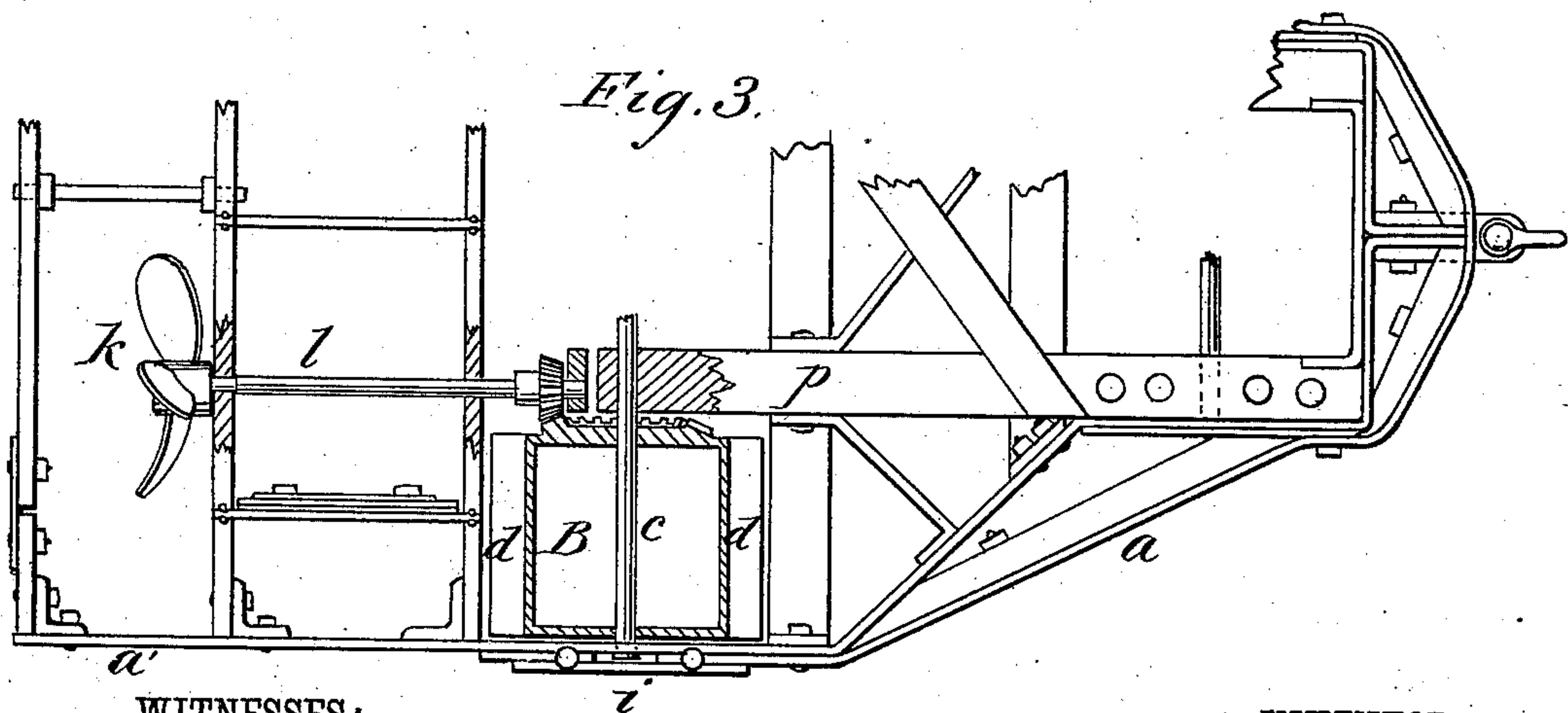
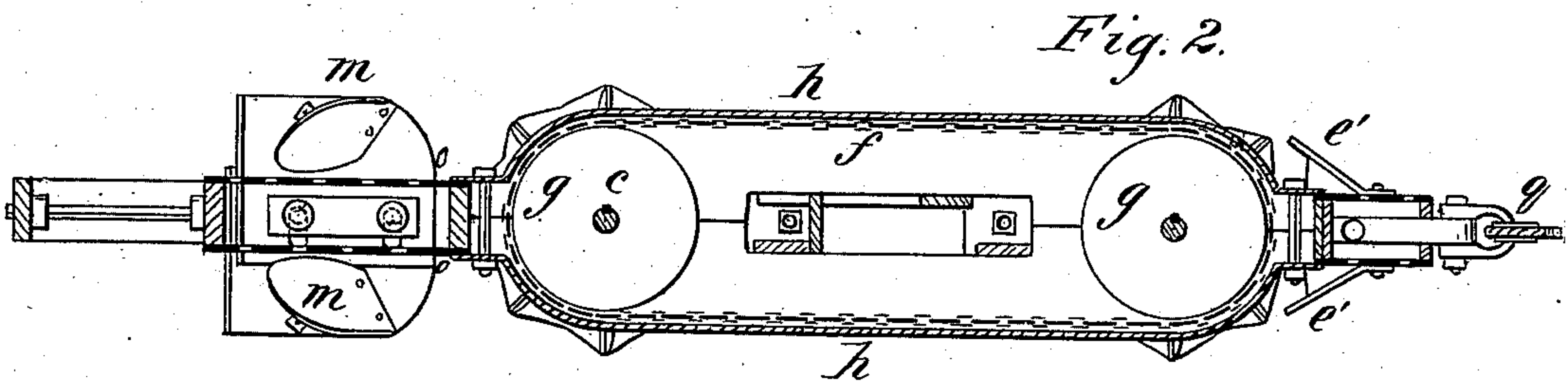
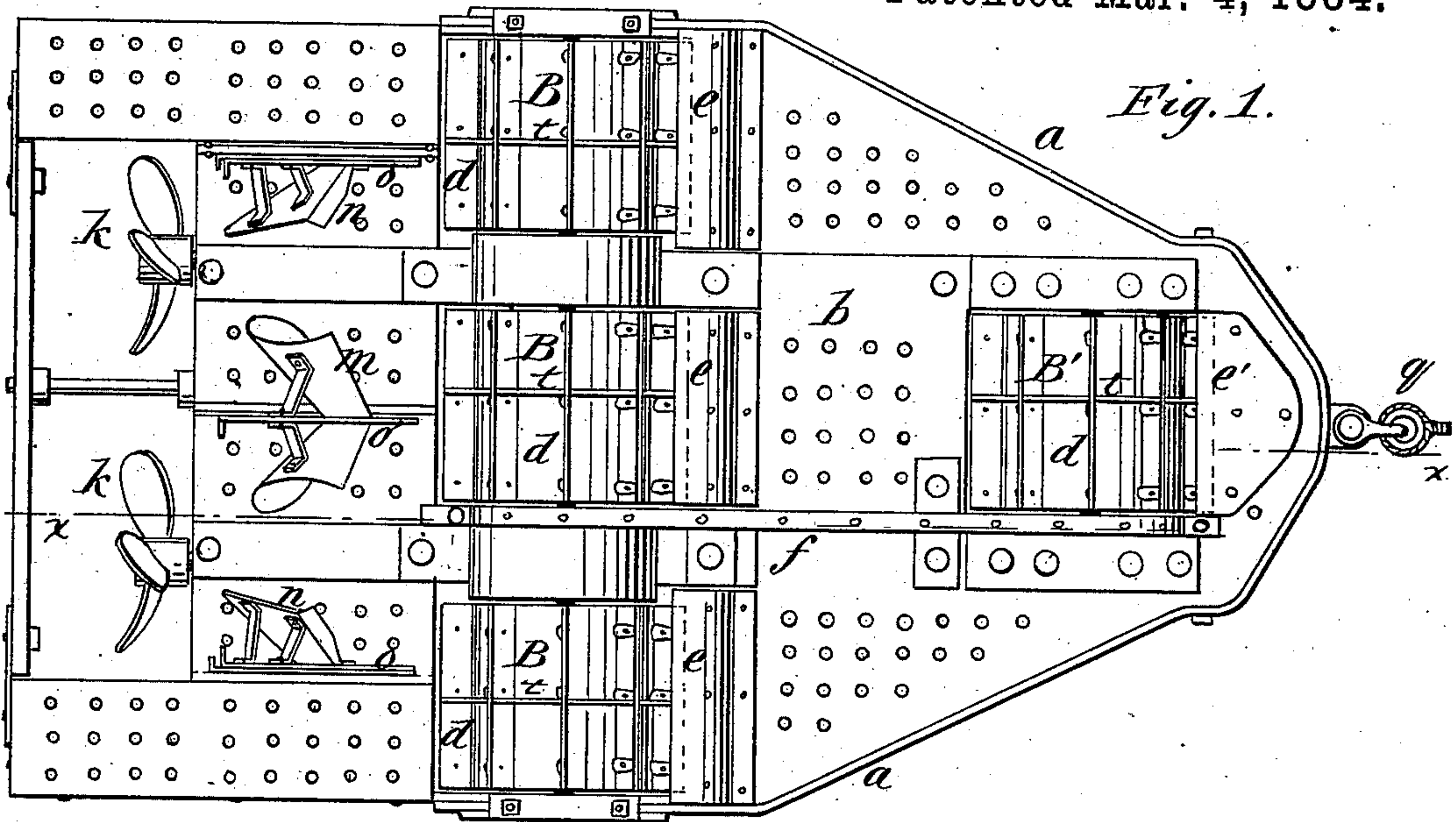


(No Model.)

L. A. JOHNSON & N. E. JOHNSEN.
APPARATUS FOR LOOSENING UP AND REMOVING SAND BARS, &c.,
IN RIVERS AND HARBORS.

No. 294,737.

Patented Mar. 4, 1884.



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UNITED STATES PATENT OFFICE.

LARENCE ALEXANDER JOHNSON AND NELS EMANUEL JOHNSEN, OF
PORTLAND, OREGON.

APPARATUS FOR LOOSENING UP AND REMOVING SAND-BARS, &c., IN RIVERS AND HARBORS.

SPECIFICATION forming part of Letters Patent No. 294,737, dated March 4, 1884.

Application filed July 21, 1883. (No model.)

To all whom it may concern:

Be it known that we, LARENCE ALEXANDER JOHNSON and NELS EMANUEL JOHNSEN, both of Portland, in the county of Multnomah and State of Oregon, have invented a new and Improved Apparatus for Loosening Up and Removing Sand-Bars and other Obstructions in Rivers and Harbors, of which the following is a full, clear, and exact description.

By study of the nature of sand-bars formed in rivers and harbors, we have found that they have usually a hard coating or crust, which it is difficult to loosen or remove by ordinary means. This crust is formed from the soil, clay, and refuse carried down by the rivers, and which settles upon the bar. Usually under this covering or crust there are several feet of sand; but in some cases we have found shallow layers of sand upon hard and sticky clay, which the dredging-machines will not take hold of.

The object of our invention is to provide for the loosening up of the hard covering or crust formed upon sand-bars, and of other obstructions of a hard nature, which cannot be removed by ordinary means.

To that end our invention consists in a machine constructed to be drawn over the river or harbor bottom, and arranged with rotary cutting wheels and plows, as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of our improved machine. Fig. 2 is a longitudinal section on the line *x x*, Fig. 1. Fig. 3 is a sectional plan view, the covering being removed to show the arrangement of the gearing.

The frame *a* is constructed of plate-iron, with a rounded or pointed forward end, so that the apparatus may readily clear obstructions, such as anchors and sunken boats, and it is covered top and bottom with metal plates *b*, which exclude large obstructions, but which are perforated to allow the circulation of water for the purpose of carrying off any sand that may accumulate in the machine. At

about the mid-length of the frame it is fitted with a cross-shaft, *c*, that carries cylinders or drums *B B*, and at the forward end of the frame is a short shaft carrying a single drum or wheel, *B'*. These drums *B B'* are fitted with radial blades *d*, which are strengthened by a central flange, *t*, and the drums and blades project an equal distance from the covering-plate at either side of the machine, so that it may be used either side downward. At the front the wheels are protected by guards *e*, which prevent injury to the blades from any obstructions that cannot be broken up, and the wheel at the front is similarly protected by a guard, *e'*, and this front drum or wheel is also connected with the shaft *c* by a chain or perforated band, *f*, passing over chain or sprocket wheels *g g* on the shafts, so that the drums or wheels will be operated continuously. The chain or band *f* is covered by boxing *h*, to prevent its being injured by obstructions. The ends of the shaft *c* pass through the side frames, *a' a'*, (see Fig. 3,) of the apparatus, and are formed with heads, so that the shafts serve as a means to prevent the frame from spreading laterally, and the heads of the shafts are covered by plates *i* for their protection.

At the rear of the machine are propeller-wheels *k k*, fitted upon shafts *l*, that are geared to the side drums, *B B*, so as to be operated thereby, for the purpose of stirring up the water and causing the dispersion of the loosened material.

Behind the central drum or wheel, *B*, is a double plow, *m*, attached rigidly to the covering-plate *b*, and at each side are single plows *n n*. These plows are each provided with longitudinal bars or blades *o*, which act as knives to assist in cutting or breaking up the hard crust and material. There may be any number of drums or wheels *B*.

In case the machine is used for loosening up soft material, the drums can be made air-tight, so as to serve as floats to lessen the weight of the apparatus; but when the full weight of the machine is required, as when the obstruction to be removed is of a hard nature, the drums are then to be left open, so that the water may enter.

As shown in Fig. 3, the side plates of the frames *a* are strengthened by braces and knees, and from the front of the frame longitudinal timbers *p* extend to the rear for support of the cross-shaft *c*, and also for strengthening the pointed part of the frame.

In using the machine it is to be dragged behind a steamboat or barge by means of a rope attached to the forward end, as shown at *g*, and being thus dragged over the bottom of the river or harbor, the blades *d* of the drums or wheels will act to break and loosen up the material. The plows will also act to loosen up the sand and obstructions still further, so that they will be readily carried into deep water by the current. In this manner obstructions of a hard nature or sand-bars covered with a hard crust can be entirely removed or loosened up in such a manner that they can be readily removed by ordinary means.

Having thus fully described our invention, we claim as new and desire to secure by Letters Patent--

1. The apparatus for loosening up and removing obstructions from rivers and harbors, consisting of a frame-work having a pointed or rounded forward end, and provided with drums having radial blades, and with plows, substantially as shown and described.

2. The combination, with the frame *a*, provided with covering-plates *b*, of the drums *B* *B'*, provided with the radial blades *d*, substantially as shown and described.

3. The combination, with the revolving drums *B*, of the plows *m n*, substantially as and for the purpose specified.

4. The combination, with the supporting-frame, of the revolving drums *B*, the plows *m n*, and the propeller-wheels *k*, substantially as and for the purpose specified.

5. The combination, with the plows *m n*, arranged substantially as described, of the blades or bars *o*, substantially as and for the purpose specified.

6. The cross-shaft *c*, provided with heads at its ends, and the covering-plates *i*, combined with the side plates or frames, *a'*, of the apparatus, substantially in the manner and for the purpose specified.

7. The combination, with a series of revolving and air-tight drums provided with radial blades, each extending continuously the length of its drum, and provided with a central supporting-flange, of a suitable supporting-frame and shaft provided with end heads, to prevent the frame from spreading laterally, substantially as shown and described, to form an apparatus adapted for being dragged on the bottoms of rivers or harbors, for the purpose of removing obstructions, as specified.

LARENCE ALEXANDER JOHNSON.
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Witnesses:

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