

(No Model.)

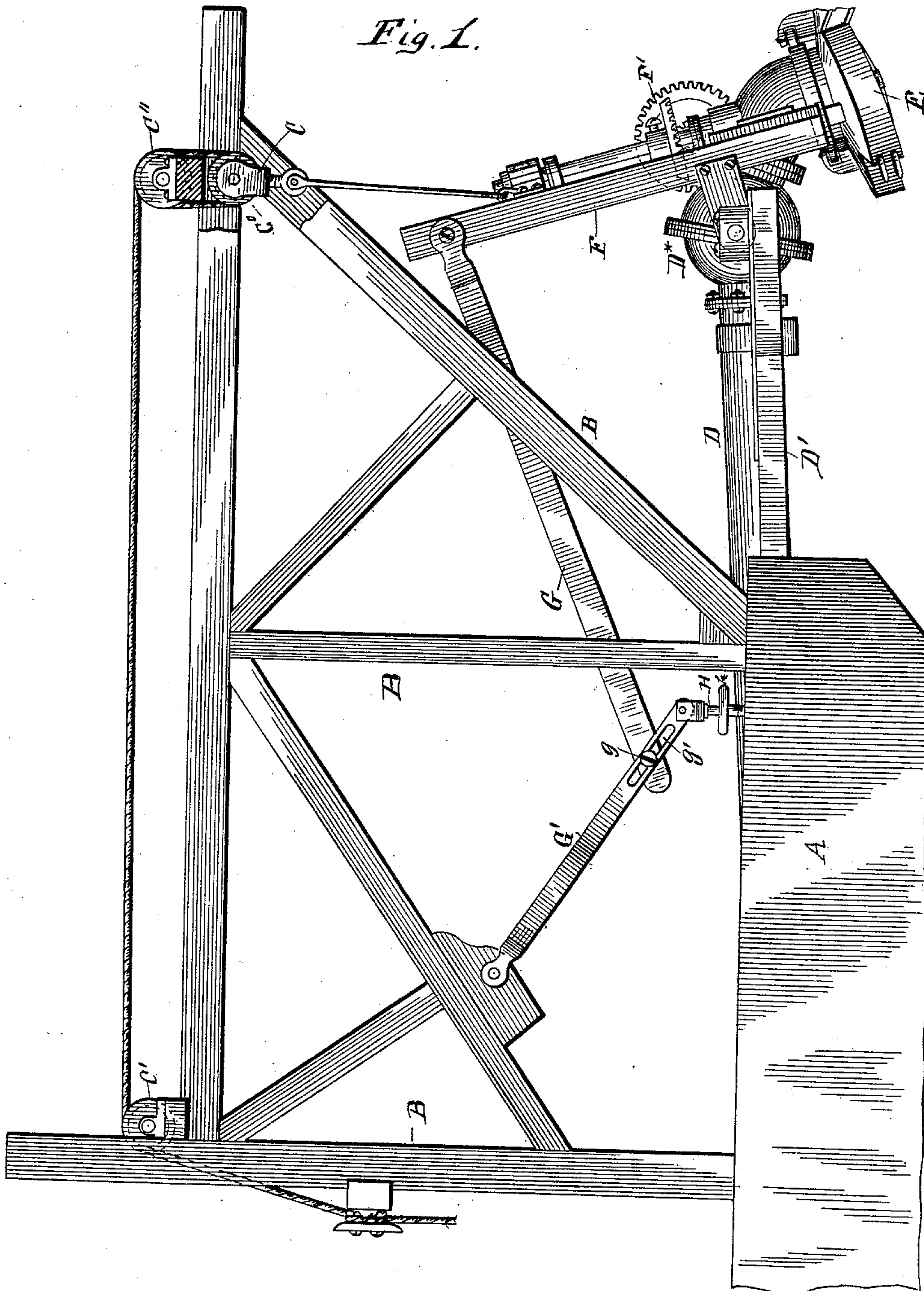
W. P. HUMPHREYS.
DREDGING MACHINE.

2 Sheets—Sheet 1.

No. 410,759.

Patented Sept. 10, 1889.

Fig. 1.



WITNESSES
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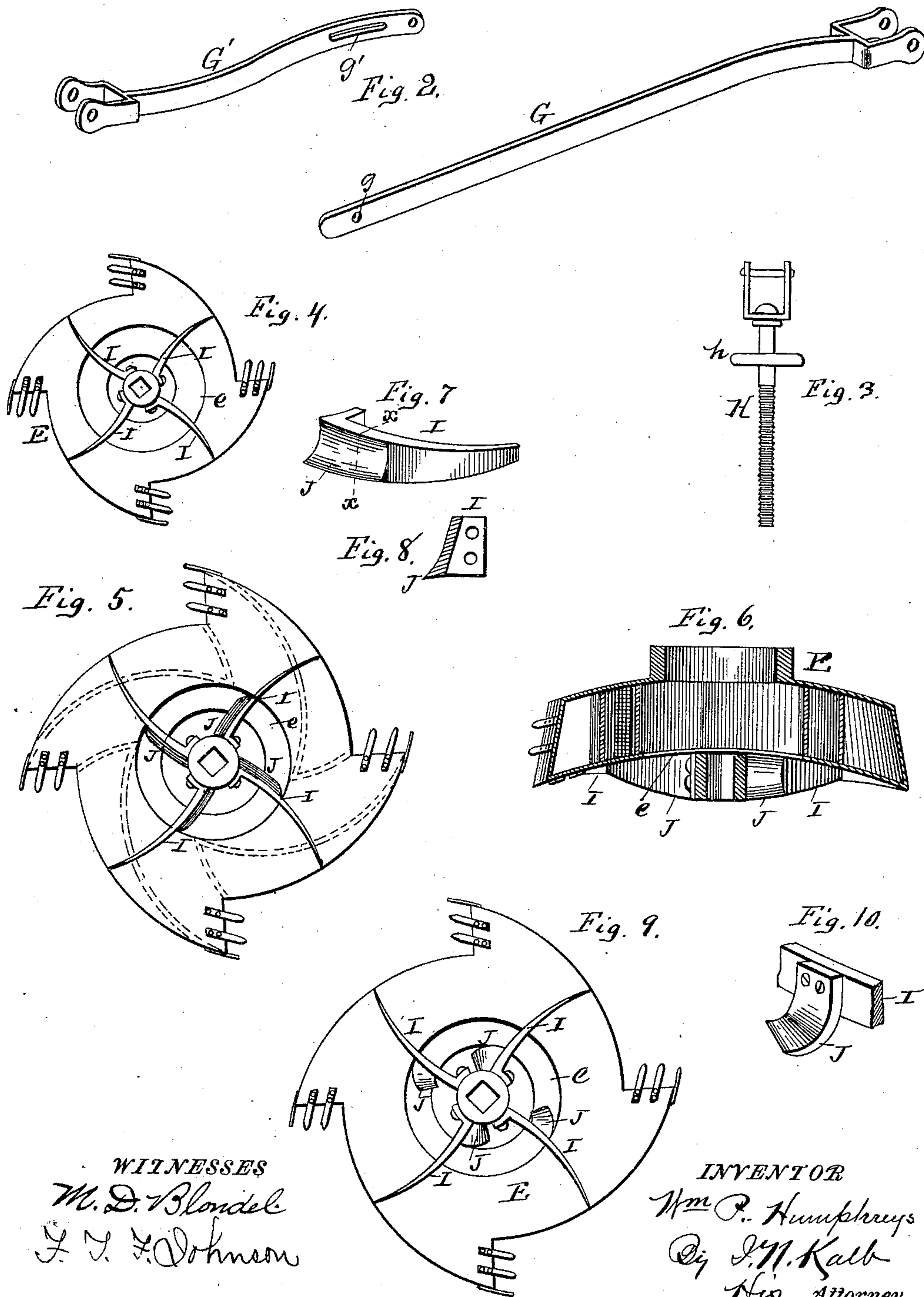
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UNITED STATES PATENT OFFICE.

WILLIAM P. HUMPHREYS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
CHARLES DODGE, OF WEST WASHINGTON, DISTRICT OF COLUMBIA.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 410,759, dated September 10, 1889.

Application filed March 26, 1889. Serial No. 304,780. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. HUMPHREYS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Dredging-Machines; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to dredges, and has particular reference to, first, a means for manipulating an excavator or cutter to cause it to assume any desired angle of inclination; second, the construction of the cutter itself whereby its efficiency and capacity are increased.

The following detailed description will fully explain the nature and purpose of my said invention and the manner in which it is carried into use.

The accompanying drawings illustrate what I consider a good means for carrying my invention into practice.

Figure 1 is a side elevation of an end portion of a dredger-scow with my improvements attached. Fig. 2 represents the jointed operating-arms detached. Fig. 3 is a view of the adjusting-screw detached. Fig. 4 is an inverted view of the cutter or excavator having an open bottom with cutting or scraping arms extending from the hub outward. Fig. 5 is a similar view, on an enlarged scale, showing scrapers on the arms each extending the full radius of the bottom opening, the helical passages being indicated by dotted lines. Fig. 6 is a transverse central section of Fig. 5. Fig. 7 represents one of the arms with the detached scraper upon it. Fig. 8 is a section of Fig. 7 on line X X. Fig. 9 is an inverted plan of an excavator having scrapers on the arms each covering only a portion of the radius from hub to edge of opening. Fig. 10 is a perspective view of one of the scrapers on a portion of an arm.

Similar letters of reference indicate corre-

sponding parts in all the figures where they occur.

A is an end portion of a dredge-boat, and B a suitable standard or frame, from which the swinging end of a suction-pipe and the excavator are manipulated.

C is a block and tackle, the cable of which runs over suitable pulleys C⁰ C'' to elevate and lower the swinging end of the suction-pipe and the excavator.

D is the swinging end of a suction-pipe, and D' a ladder on which it is supported.

E is the excavator, which is of the revolvable type, and is connected to the end of the suction-pipe by a joint D*, and is held by a standard F, which is hinged to the outer end of the ladder. To the standard, or a part fixed thereto, the cable of the tackle is also attached. The excavator is revolved by suitable gearing F', operated by a driving-shaft in the usual manner, which need not be particularly described. Extending from the top of the standard F into a suitable portion of frame B is a jointed arm, the members G G' of which are pivoted to the standard and the frame, respectively, at their ends, and are united by a swiveling and sliding joint at their meeting ends, one member having a slot g', and the other a pin g, which works in the slot. By means of this joint the central portion of the arm can be raised and lowered, thus having a shortening effect and drawing the top of the standard F inward and changing the inclination of the excavator.

To accomplish the adjustment of the jointed arm, I prefer to attach the end of one of its members, preferably the slotted one, to a screw H, which has a hand-wheel h, by which the screw is raised or lowered. By this means the angle of the jointed arms is changed at will, and the angle of inclination of the excavator consequently changed as may be desired.

The excavator is of the revolving type, and its general construction and operation are the same as that shown in the application of J. H. Von Schmidt, filed January 22, 1889, Serial No. 297,183; but I have made certain improvements in the excavator, which I will now describe.

I provide in the center of the bottom of

the excavator an opening *e*, of as great or greater area than the suction-opening above, and the helical passages leading from the periphery of the excavator to the excavator
 5 preferably terminate at the periphery of the opening. Extending from the hub to the periphery of the excavator are cutting-arms I, which span the semi-opening and deliver the spoil which they dislodge
 10 under said opening into the excavator directly in line with the suction-opening above, while their curved ends sweep the spoil outside to the periphery of the center to be taken in through the helical passages. The arms I
 15 may be provided with scrapers J, which, as shown in Figs. 5, 6, 7, and 8, may extend across opening *e*, and may be coincident in width with the cutting-arms, or may extend below their lower edge. These scrapers may
 20 be integral with or formed separate from the cutting-arms and have a curved face to catch the spoil and deliver it into the excavator, and act more efficiently than the arms alone.

Instead of having the scrapers extend from
 25 the hub to the circumference of the opening *e*, they may be made of less length, as shown in Figs. 9 and 10, and set in echelon order on the different arms to cover the entire diameter of the opening *e* at each revolution of the
 30 excavator. These are preferably made to project below the arms, as shown in Fig. 10, and the curve is such as to present their cutting-edge squarely against a radial line of the cutter, as will be seen in Fig. 9, to in-
 35 crease the taking power of the blades. There may be a standard F on each side of the excavator, and also two jointed arms to be operated in regulating the inclination of the excava-
 40 tor, one attached to each standard. It is also evident that other regulating means besides the screw can be used to raise and lower the arm-sections. It is also evident that the scrapers, which are integral with the cutting-
 45 arms, may be shorter than the radius of the opening in the bottom, and also that those formed of a separate piece may extend the full length.

Having thus described my invention, what I claim, and desire to secure by Letters Pat-
 50 ent, is—

1. The combination, with a suction-pipe, an excavator jointed to the suction-pipe, and a pivoted standard by which the excavator is
 55 jointed together attached to the top of the

standard at one end and to a fixed portion of the dredge-boat at the other for regulating the inclination of the standard, as set forth.

2. The combination, with a suction-pipe, an excavator jointed to the outer end thereof, 60 and a standard by which the excavator is carried, of an arm composed of two parts pivoted together and to the standard and dredge-boat at their outer ends, and a screw for reg-
 65 ulating the elevation of the meeting pivoted ends of the two parts of the arm, as set forth.

3. The combination, with a suction-pipe, an excavator swung thereupon, and a pivoted standard, of a jointed arm composed of two members, one having a slot and the other a 70 pin working therein, and an adjusting-screw attached to the end of one of the members of the arm, as set forth.

4. A rotary excavator having cutting-edges on its sides and spoil-passages leading there- 75 from to the suction-opening, and a central circular opening in the bottom of equal or greater area than the suction-opening above, the center of said bottom opening being be-
 80 neath the center of the suction-opening.

5. A rotary excavator having cutting-edges on its sides and helical passages leading in- ward therefrom and provided with a central opening in the bottom thereof, and cutting-
 85 arms extending over said opening, substantially as set forth.

6. A rotary excavator having cutting-edges on its sides and passages leading inward from said edges and provided with a central open-
 90 ing in the bottom, and cutting-arms with scrapers upon them beneath said opening, as set forth.

7. A rotary excavator having cutting-edges on its sides and passages leading inward, and having a central opening in the bottom, and 95 cutting-arms, each having a scraper integral with itself beneath the opening, as set forth.

8. A rotary excavator having cutting-edges on its sides and passages leading inward therefrom, and having a central opening in 100 the bottom, and radial arms having their portions which span the opening hollowed on one side and provided with a lower protruding cutting-edge, as set forth.

In testimony whereof I affix my signature 105 in presence of two witnesses.

WILLIAM P. HUMPHREYS.

Witnesses:

I. N. KALB,

F. T. F. JOHNSON.