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No. 776,217.

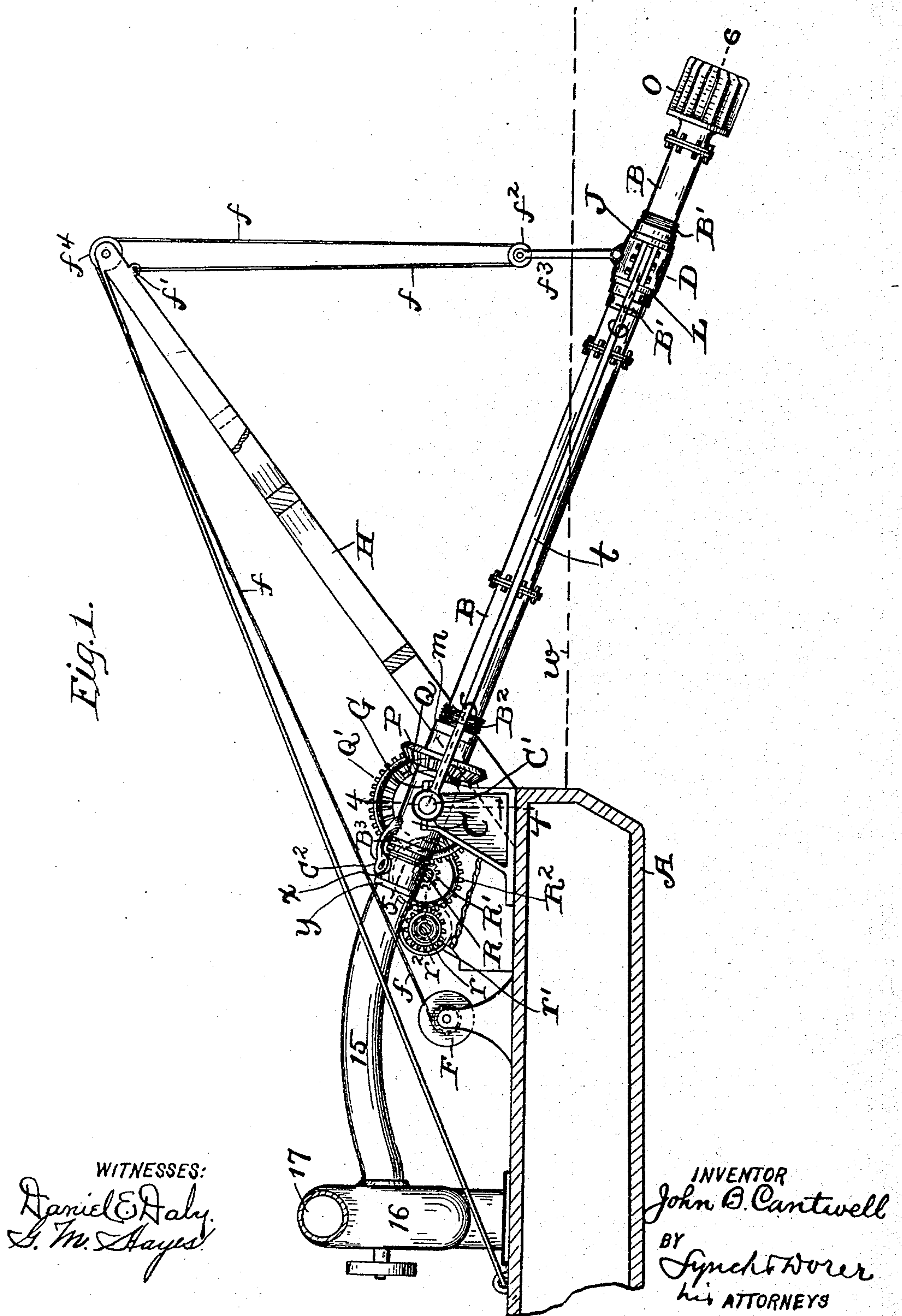
PATENTED NOV. 29, 1904.

J. B. CANTWELL.
DREDGE.

APPLICATION FILED MAR. 7, 1904.

NO MODEL..

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 2.

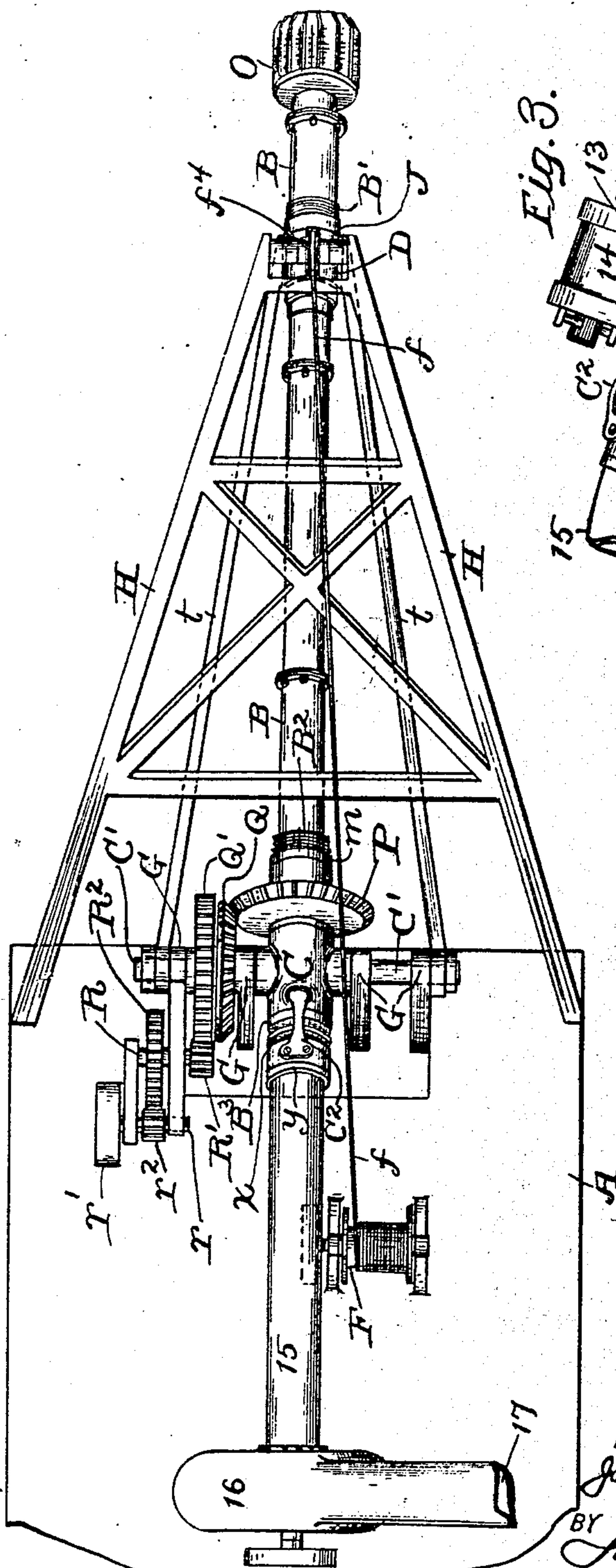
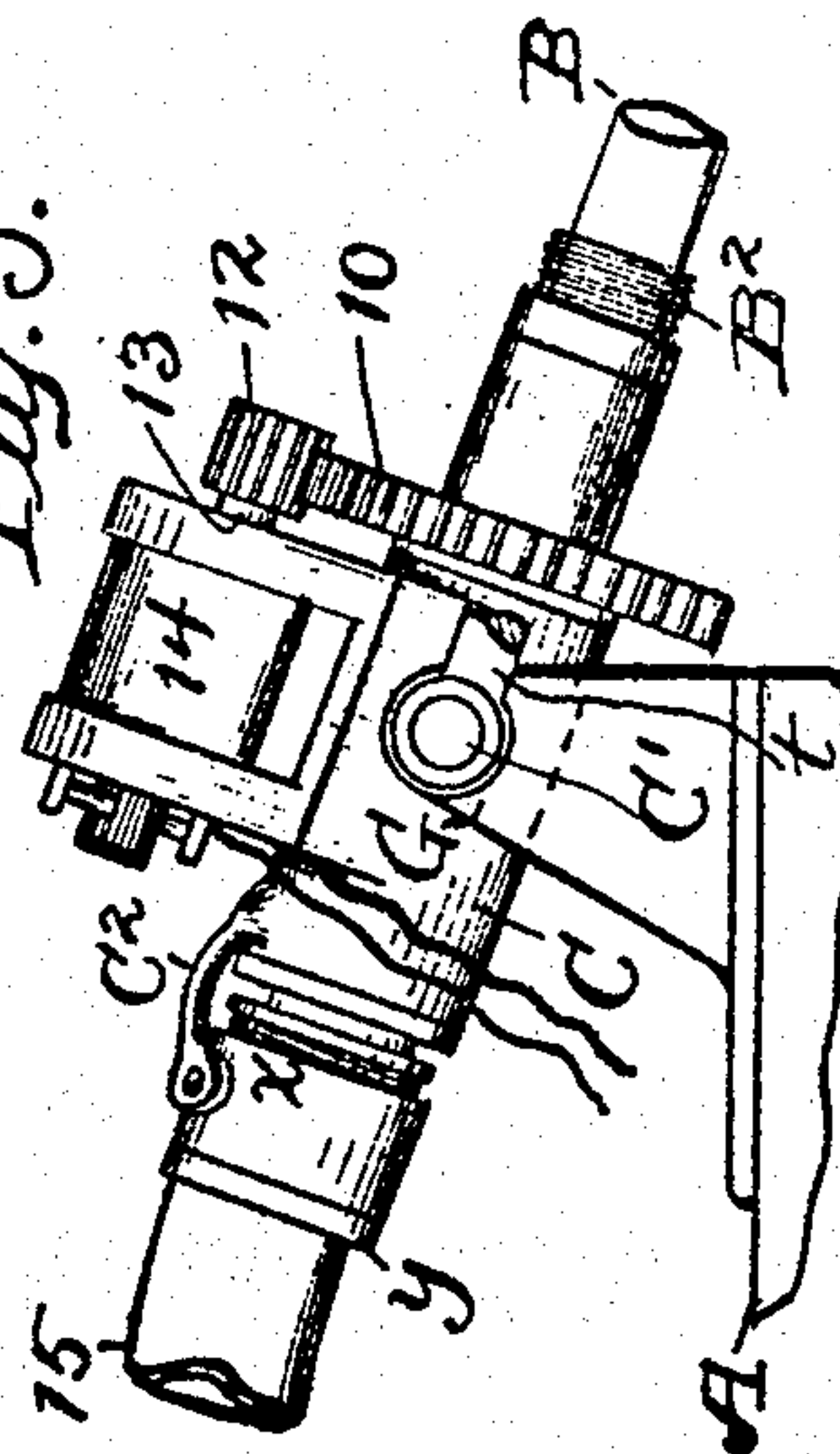


Fig. 3.



WITNESSES:
Daniel E. Daly.
G. W. Hayes.

INVENTOR
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BY
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3 SHEETS—SHEET 3.

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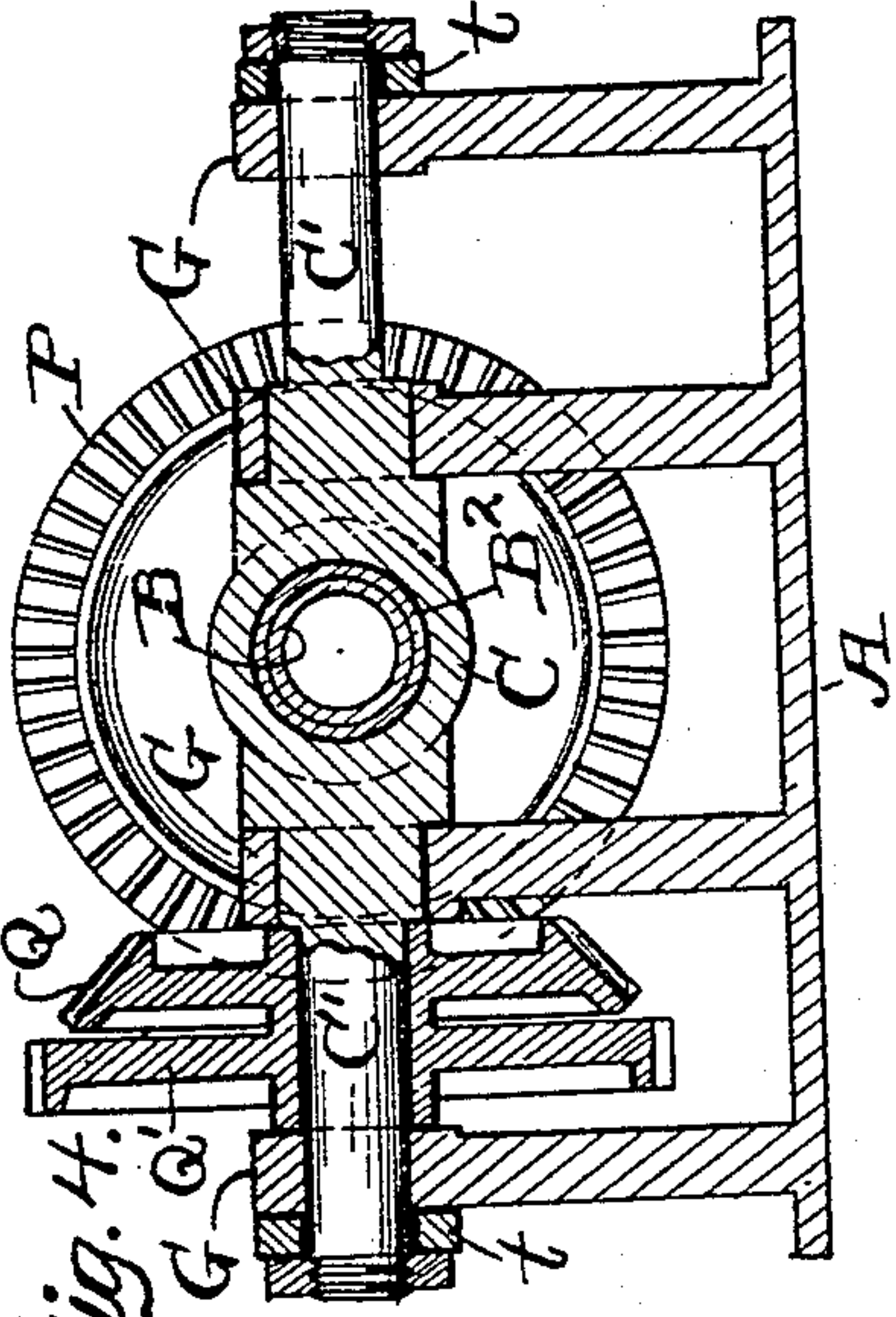
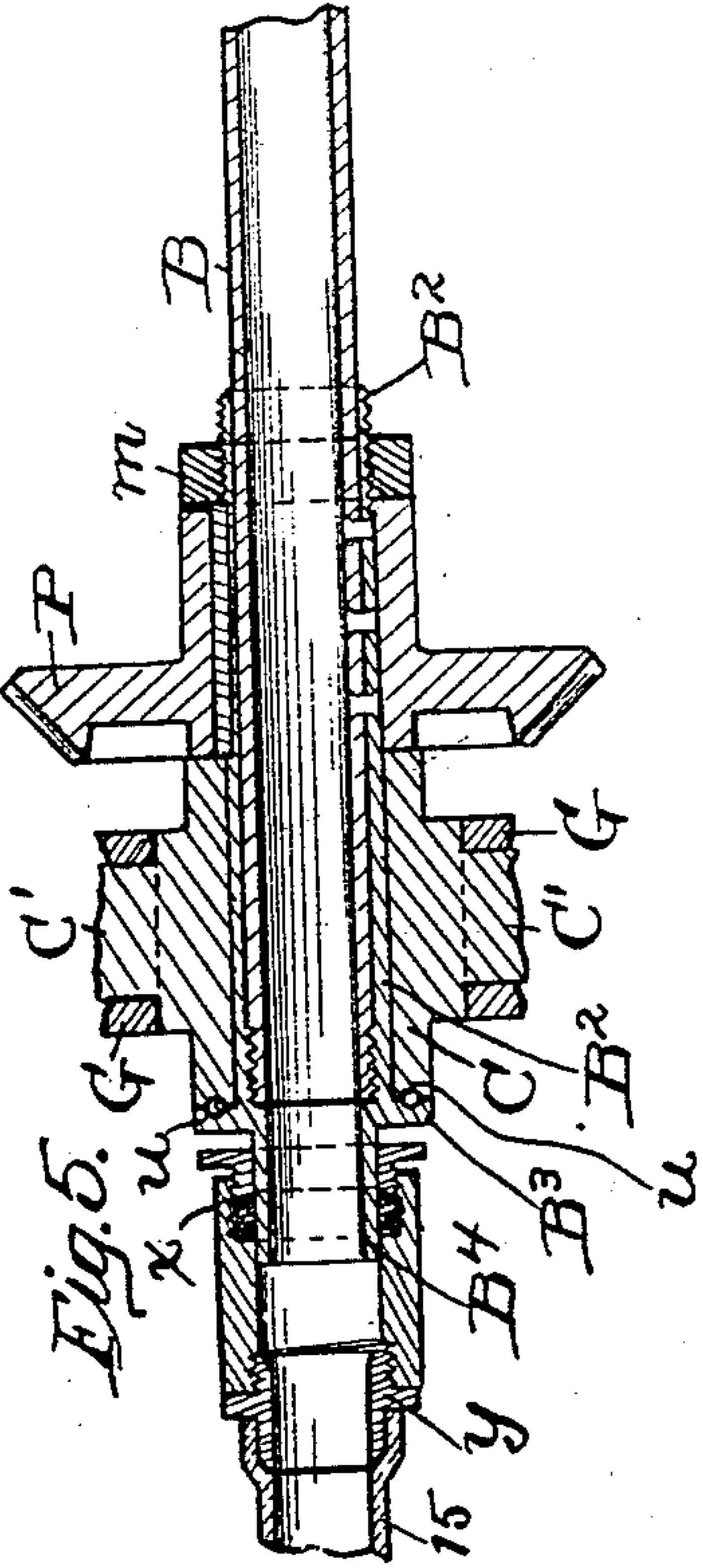


Fig. 4.

WITNESSES:

Daniel E. Daly.
G. M. Hayes.

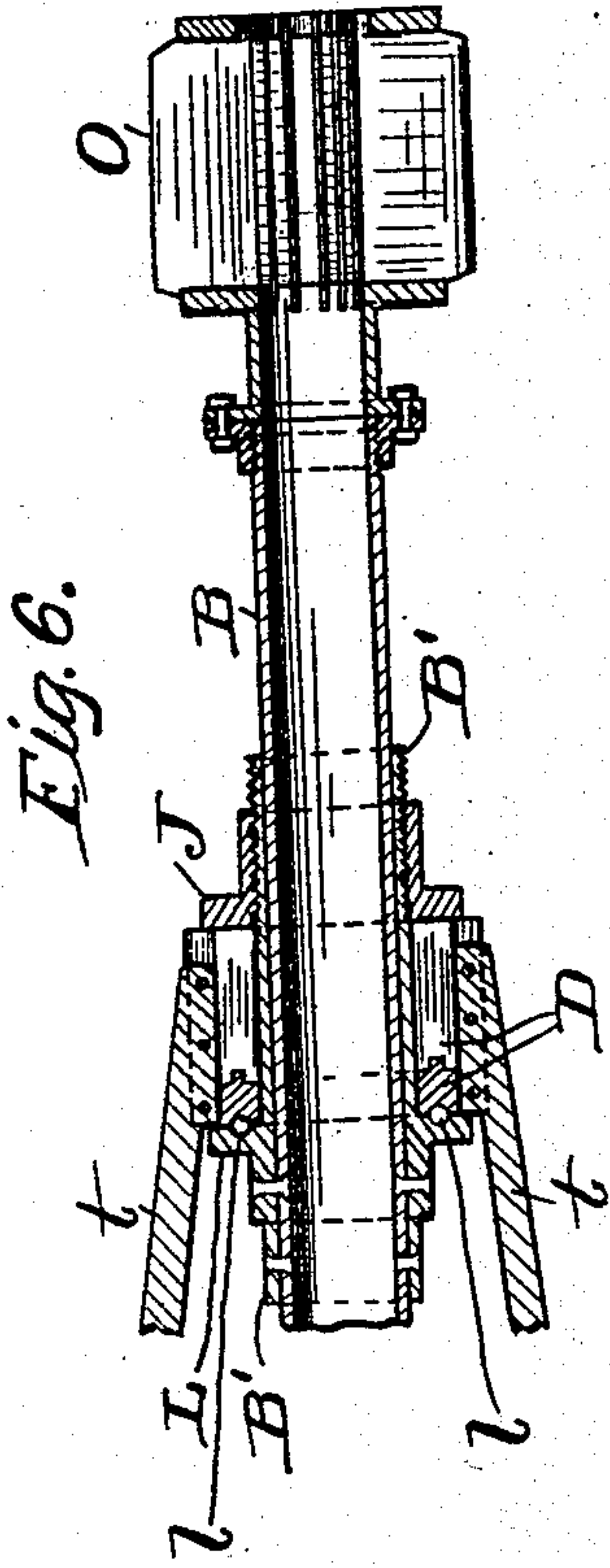


Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN B. CANTWELL, OF WATERTOWN, NEW YORK.

DREDGE.

SPECIFICATION forming part of Letters Patent No. 776,217, dated November 29, 1904.

Application filed March 7, 1904. Serial No. 196,970. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. CANTWELL, a citizen of the United States of America, residing at Watertown, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Dredges; and I 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

10 which it pertains to make and use the same.

This invention relates to improvements in hydraulic dredges, and more especially pertains to a dredge in which water and accompanying solid matter are sucked or drawn

15 through a suction-pipe from the bed of a basin or waterway.

The primary object of this invention is to simplify the means employed in transmitting power to the cutter or soil-loosener at the receiving end of the suction-pipe.

20

Another object is to dispense with the use of a cumbersome ladder in supporting the suction-pipe from the hull or body portion of the dredge.

Another object is not only to operatively mount the cutter or soil-loosener directly on the receiving end of the suction-pipe and to accommodate the reduction in size diametrically of the cutter or soil-loosener, but to reduce to a minimum the submerging of the means employed in rotating and supporting the said cutter or soil-loosener.

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My invention consists, primarily, in the combination, with the hull or body portion of the dredge, of a rotary suction-pipe extending outwardly from the body portion, a box affording bearing to the said pipe and pivotally supported from the body portion and arranged to swing in a vertical plane, a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the receiving end of the pipe, pipe-hoisting means, means for rotating the pipe, and means for effecting a flow of water and accompanying solid matter

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through the suction-pipe.

With the hereinbefore-mentioned objects in view and to the end of realizing other advantages hereinafter appearing this invention consists also in certain features of construction and combinations and arrangement of

parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, partly in section, of a dredge embodying my invention. Fig. 2 is a top plan relative to Fig. 1. Fig. 3 is a side elevation, illustrating a desirable construction and arrangement of means which may be employed in rotating the suction-pipe. Fig. 4 is an elevation, largely in vertical section on line 4 4, Fig. 1, looking in the direction indicated by the arrow. Fig. 5 is a top plan in section on line 5 5, Fig. 1, illustrating the discharging end portion of the suction-pipe, a portion of the means employed in rotating the said pipe, and the means employed in preventing leakage between the said pipe and the flexible connection between the said pipe and the pump employed in drawing water and accompanying solid matter through the said pipe. Fig. 6 is a top plan in section on line 6 6, Fig. 1, illustrating the manner of supporting the cutter-bearing end portion of the suction-pipe. Figs. 4, 5, and 6 are drawn on a larger scale than Figs. 1, 2, and 3.

Referring to the drawings, A designates the hull or body portion of a dredge. The body portion A is provided with a rotary suction-pipe B, which is supported and extends over and outwardly from an end portion of the body portion A in such a manner as to render the said pipe capable of being swung in a vertical plane without interfering with the rotatability of the pipe. The suction-pipe B has bearing in two boxes C and D, arranged a suitable distance apart longitudinally of the said pipe.

The box C is preferably arranged at the discharging end of the suction-pipe B over the body portion A and is provided with two trunnions C' and C'', arranged horizontally and in line endwise at opposite sides, respectively, of the said pipe, which trunnions have bearing in boxes G, which are supported in any approved manner from the body portion A. The box D is arranged near the receiving end of the pipe B and is constructed in any approved manner. The box D is operatively attached in any suitable manner to the hoisting-cable f. The hoisting-cable

operatively engages a suitably-operated wind-drum F, which is mounted upon the body portion A. The cable f is attached at one end, as f' , to a frame H, which overhangs the pipe and is rigid with and projects from the body portion A. The cable f leads from its point of attachment to the frame H downwardly to and in under the sheave f^2 of hoisting-tackle attached to the box D, and thence upwardly to and over a guide-sheave f^4 , supported from the outer end of the frame H, whence the said cable leads to the drum F. It is obvious, therefore, that the suction-pipe is hoisted or lowered by gravity, according as the drum F is rotated in the direction to wind up or pay out the engaging cable.

The pipe B is reinforced by a tubular shell B^2 , which forms a portion of the pipe and extends through the box D and increases the thickness of the said pipe where the pipe has bearing in the said box. The member B^2 is secured in place in any approved manner.

The pipe B is provided with two collars J and L, rigid with the said pipe and arranged (see Figs. 1 and 6) at the outer end and inner end, respectively, of the box D, which collars prevent displacement of the said box endwise of the said pipe. Antifriction balls or bearings l are preferably interposed between the collar L and the box D.

By the construction hereinbefore described it will be observed that the suction-pipe is capable of rotation and free to be hoisted or lowered without interfering with the rotatability of the said pipe.

Fig. 1 of the drawings illustrates the rotary suction-pipe B as supported from the body portion A above the water-line w , and a cutter or soil-loosener O, employed in cutting or loosening the soil or solid material to be removed from the bed of a water-basin or waterway, is operatively mounted directly upon and extends beyond the receiving end of the said pipe. The cutter or soil-loosener O is of course constructed to accommodate the passage of water and accompanying solid matter therethrough into the pipe B; but the cutter forms no part of my present invention and need therefore not be illustrated in detail in this application.

The means for rotating the suction-pipe B, as shown in Figs. 1, 2, and 4, comprises the following: A bevel-gear P is operatively mounted on the pipe B at the outer side of the trunnions C' and is in mesh with a pinion Q , which is loosely mounted on one of the said trunnions, which pinion is rigid and axially in line with a spur-gear Q' , which meshes with a pinion R' , operatively mounted on a shaft R, arranged horizontally at one side of and parallel with the said trunnion and supported from the body portion A. The shaft R is operatively provided with a spur-gear R^2 , which meshes with a pinion r^2 , operatively mounted on the driving-shaft r , which

is supported from the body portion A and operatively provided with a driving-wheel r' , to which power is applied in any approved manner. It will be observed, therefore, that Fig. 1 shows power transmitted to the suction-pipe B from a driving-shaft arranged over the body portion A of the dredge, that the bevel-pinion Q is arranged with its axis coincident with the axes of the trunnions C' of the box C, and therefore will remain in proper mesh with the gear P during the swinging of the said pipe in a vertical plane. However, the means for driving the suction-pipe B may be varied at pleasure, and modifications in the details of construction may be made without departing from the spirit and purpose of my invention. For instance, not undesirable means for rotating the pipe B is shown in Fig. 3, wherein a spur-gear 10 is operatively mounted on the said pipe and meshes with a spur-pinion 12, with which the shaft 13 of a motor 14, shown mounted on the said box, is operatively provided.

The pipe B, as shown very clearly in Fig. 5, is reinforced by a tubular member B^2 , which forms a portion of the said pipe and extends through the box C and increases the thickness of the said pipe where the pipe has bearing in the said box. The member B^2 is secured in place in any approved manner.

The transmission of the power required to rotate the suction-pipe B in the manner shown in Figs. 1, 2, and 4 will result in some thrust endwise upon the said pipe in the direction of the receiving end of the pipe, and a thrust-bearing is therefore provided at the inner end of the box C and comprises a collar formed by an annular flange B^3 , with which the member B^2 is provided at and opposite the said end of the said box. Antifriction balls or bearing u are preferably interposed between the opposing surfaces of the collar B^3 and the box C, as shown in Fig. 5.

The reinforcing member B^2 of the pipe B extends, as at B^4 , (see Fig. 5,) into a stuffing-box x , which surrounds the said member B^2 . A coupling member y , employed in connecting a hose or flexible connection 15 to the member B^2 , is attached to the stuffing-box x , which, as shown in Figs. 1 and 3, is supported from an arm C^2 , formed upon and projecting from the box C. It will be observed, therefore, that the flexible connection 15 is held in communication with the pipe B without interfering with the rotatability of the said pipe. The flexible connection 15 communicates at its discharging end, as shown in Figs. 1 and 2, with the inlet of a suitably-operated rotary pump 16, mounted upon the body portion A of the dredge. The pump 16 communicates at its outlet with a pipe or passage-way 17, which leads to the place to which water and accompanying solid matter, drawn through the suction-pipe B by the operation of the pump 16, is to be

A collar *m* is mounted upon and rigid with the reinforcing member B^2 of the pipe B at the outer end of the hub of the gear P and is arranged, therefore, to prevent displacement
5 of the said hub endwise of the said pipe away from the box C.

The pipe B is prevented from swaying laterally by two steadying bars or rods *t* and *t*, arranged at opposite sides, respectively, and
10 longitudinally of the said pipe, which rods or bars are secured at one end to the box D at opposite sides, respectively, of the said box and are journaled at their outer end upon the different trunnions C' and C' , respectively, of
15 the box C, so as to render them capable of swinging in a vertical plane with the pipe B when the said pipe is hoisted or lowered, as hereinbefore described.

It will be observed that my improved
20 dredge, as hereinbefore described, is exceedingly simple and durable in construction and reliable in its operation; that the rotary suction-pipe B is not only employed in transmitting power to the cutter or soil-loosener, but
25 also is adequately, advantageously, and inexpensively supported from the body portion; that the pipe-rotating means is applied in such a manner as to accommodate the swinging of the suction-pipe in a vertical plane without
30 interfering with the rotatability of the pipe; that the passage-way formed by the suction-pipe and the flexible connection between the said pipe and the pump is straight or approximately straight, so as to facilitate the passage
35 of water and accompanying solid matter through the said passage-way, and that the mounting of the cutter O directly upon the suction-pipe renders possible the reduction to a minimum of the size of the cutter diamet-
40 rically, which is desirable, because a smaller cutter not only requires less power, but also enables its construction so as to facilitate a more rapid flow of water and accompanying
45 solid matter through the cutter into the suction-pipe and would thereby be less liable to be choked or obstructed by soil or solid matter drawn into the pipe with the water.

What I claim is—

1. The combination, with the hull or body
50 portion of a dredge, of a rotary suction-pipe pivotally supported and extending outwardly from the body portion and arranged to swing in a vertical plane; a cutter or soil-loosener operatively connected with the suction-pipe
55 at the outer end of the pipe; means for rotating the said pipe; pipe-hoisting means, and pipe-steadying members suitably connected, at one end, to the suction-pipe and pivotally supported, at the opposite end, from the body
60 portion, and the pivotal connections between the said pipe-steadying members and the body portion being arranged with their axes coincident with the axial line of the aforesaid pivotal connection between the suction-pipe and
65 the body portion.

2. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion to
70 render the pipe capable of swinging in a vertical plane; a cutter or soil-loosener operatively connected with the suction-pipe at the outer end of the pipe; means for rotating the said pipe, and means for effecting a flow of
75 water and accompanying solid matter through the suction-pipe from the outer end of the said pipe.

3. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe
80 extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion to render the pipe capable of swinging in a vertical plane; a cutter or soil-loosener opera-
85 tively connected with the suction-pipe at the outer end of the pipe; another box affording bearing to the suction-pipe between the soil-loosener and the first-mentioned box; means for rotating the said pipe, and means for ef-
90 fecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

4. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe
95 extending outwardly from the body portion; a box affording bearing to the said pipe and having two trunnions arranged in line endwise at opposite sides respectively of the box; boxes affording bearing to the trunnions and
100 supported from the body portion; a cutter or soil-loosener operatively connected with the suction-pipe at the outer end of the pipe; means for rotating the said pipe, and means for effecting a flow of water and accompanying
105 solid matter through the suction-pipe from the outer end of the pipe.

5. The combination of a rotary suction-pipe; a box affording bearing to the said pipe and having two trunnions arranged in line
110 endwise at opposite sides respectively of the box; suitably-supported boxes affording bearing to the trunnions; a cutter or soil-loosener operatively connected with the said pipe; means for rotating the suction-pipe, and means
115 for effecting a flow of water and accompanying solid matter through the suction-pipe.

6. The combination of a rotary suction-pipe; a box affording bearing to the said pipe and pivotally supported and arranged as re-
120 quired to render it capable of swinging in a vertical plane; means for rotating the suction-pipe; a cutter or soil-loosener operatively connected with the suction-pipe, and means for effecting a flow of water and accompanying
125 solid matter through the suction-pipe.

7. The combination of a rotary suction-pipe; a box affording bearing to the said pipe and having two trunnions arranged in line
130 endwise at opposite sides respectively of the

box; boxes affording bearing to the trunnions; a cutter or soil-loosener operatively connected with the suction-pipe; a bevel-gear operatively mounted on the suction-pipe; a bevel-pinion meshing with the gear and loosely mounted on one of the aforesaid trunnions, and means for driving the pinion.

8. The combination of a rotary suction-pipe; a box affording bearing to the said pipe and having two trunnions arranged in line endwise at opposite sides respectively of the box; boxes affording bearing to the trunnions and supported from the body portion; a cutter or soil-loosener operatively connected with the suction-pipe; suction-pipe-rotating means; another box affording bearing to the suction-pipe and arranged between the soil-loosener and the pipe-rotating means, and means for effecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

9. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe pivotally supported and extending outwardly from the body portion and arranged to swing in a vertical plane; a cutter or soil-loosener operatively connected with the said pipe at the outer end of the pipe; a box affording bearing to the suction-pipe between the soil-loosener and the pivotal connection between the pipe and the body portion; a collar rigid with the suction-pipe at the inner end of the box; antifric-tion-bearings between the said end of the said box and the said collar; pipe-hoisting means; means for rotating the suction-pipe, and means for effecting a flow of water and accompanying solid matter through the suction-pipe.

10. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe pivotally supported and projecting outwardly from the said body portion and arranged to swing in a vertical plane; a cutter operatively connected with the suction-pipe at the outer end of the pipe; a box affording bearing to the suction-pipe between the cutter and the pivotal connection between the said pipe and the aforesaid body portion; pipe-hoisting means connected to the said box; and two pipe-steadying members attached, at one end, to the said box at opposite sides respectively of the box and pivotally supported, at their opposite end, from the aforesaid body portion, and the pivotal connections between the said pipe-steadying members and the body portion being arranged with their axes coincident with the axial line of the aforesaid pivotal connection between the suction-pipe and the body portion.

11. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion to render the pipe capable of swinging in a vertical plane; a cutter or soil-loosener borne by

and operatively connected with the suction-pipe at the outer end of the pipe; the thrust-bearing next adjacent the said box; pipe-hoisting means; means for rotating the suction-pipe, and means for effecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

12. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion to render the pipe capable of swinging in a vertical plane; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe; pipe-hoisting means; pipe-rotating means, and the pipe being reinforced where it extends through the aforesaid box.

13. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion to render the pipe capable of swinging in a vertical plane; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe; another box affording bearing to the suction-pipe near the soil-loosener; pipe-hoisting means attached to the last-mentioned box; means for rotating the suction-pipe, and means for effecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

14. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe, which box is pivotally supported from the body portion and arranged to swing in a vertical plane; a cutter or soil-loosener operatively mounted on the suction-pipe at the outer end of the pipe; another box affording bearing to the suction-pipe near the soil-loosener; pipe-rotating means arranged above the water-line, and means for effecting a flow of water and accompanying solid matter through the suction-pipe.

15. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and having two trunnions arranged horizontally and in line endwise at opposite sides respectively of the box; boxes affording bearing to the trunnions and supported from the body portion; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe; means for rotating the suction-pipe; means for supporting the suction-pipe in suitable proximity to the soil-loosener, and means for effecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

16. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and having two trunnions arranged horizontally and in line endwise at opposite sides respectively of the box; boxes affording bearing to the trunnions and supported from the body portion; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe; a bevel-gear operatively mounted on the suction-pipe at the outer end of the aforesaid box; a bevel-pinion meshing with the gear and loosely mounted on one of the aforesaid trunnions, and means for driving the pinion.

17. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and having two trunnions arranged horizontally and in line endwise at opposite sides respectively of the box; boxes affording bearing to the trunnions and supported from the body portion; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe; suction-pipe-rotating means arranged above the water-line; another box affording bearing to the suction-pipe and arranged between the soil-loosener

and the pipe-rotating means; pipe-steadying members extending longitudinally of the pipe and arranged at opposite sides respectively of the pipe, which pipe-steadying members are attached, at one end, to the last-mentioned and outer box and are journaled, at the opposite end, upon the different aforesaid trunnions respectively; pipe-hoisting means attached to the outer box, and means for effecting a flow of water and accompanying solid matter through the suction-pipe from the outer end of the pipe.

18. The combination, with the hull or body portion of a dredge, of a rotary suction-pipe extending outwardly from the body portion; a box affording bearing to the said pipe and pivotally supported from the body portion and arranged to swing in a vertical plane; pipe-hoisting means; means for rotating the said pipe; a cutter or soil-loosener borne by and operatively connected with the suction-pipe at the outer end of the pipe, and means for effecting a flow of water and accompanying solid matter through the suction-pipe.

In testimony whereof I sign the foregoing specification in the presence of two witnesses.

JOHN B. CANTWELL.

Witnesses:

C. H. DORER,
G. M. HAYES.