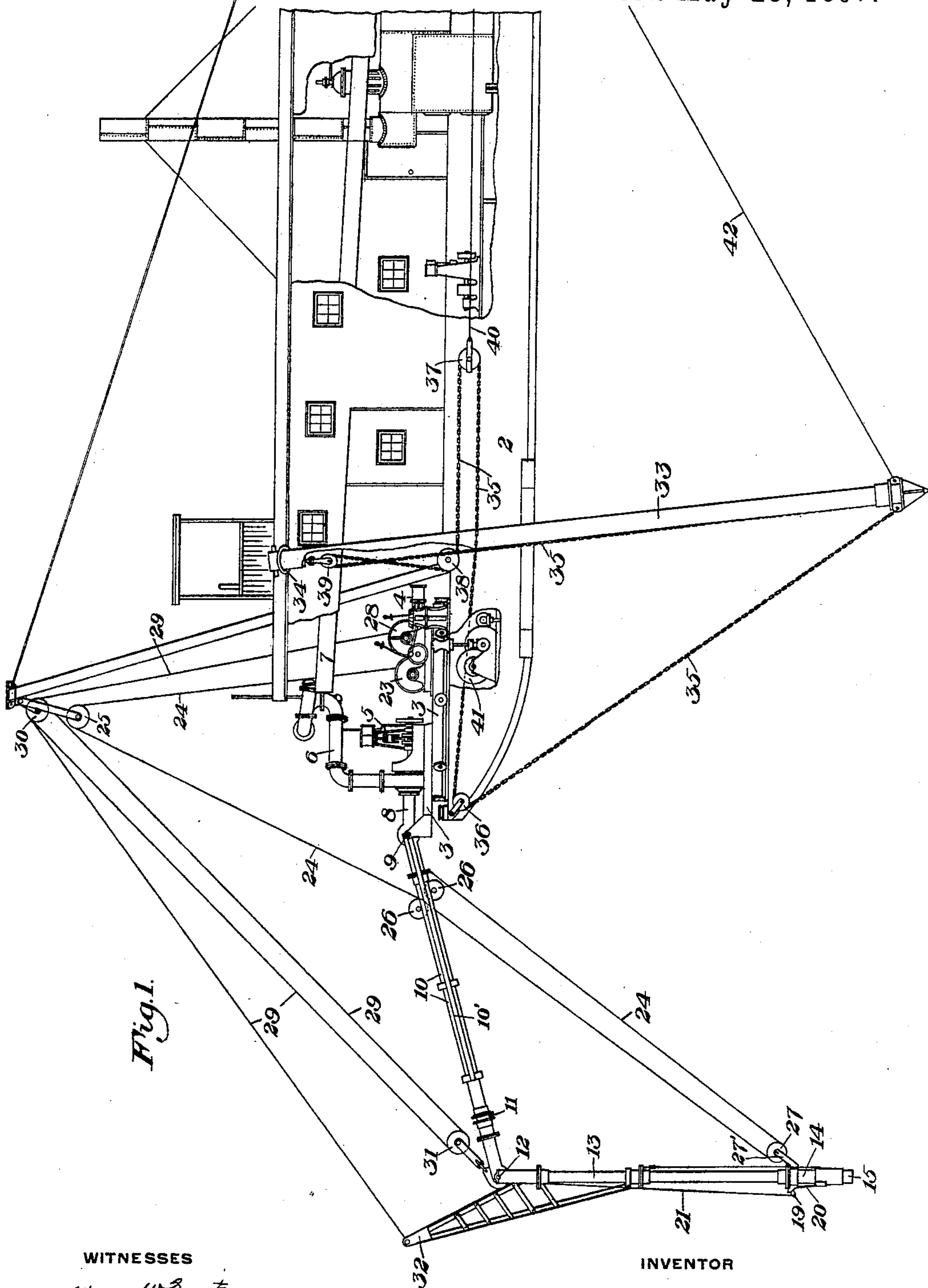


F. E. YOUNGS.
DREDGING APPARATUS.

No. 583,319.

Patented May 25, 1897.



WITNESSES

Warren W. Swartz
St. M. Corwin

INVENTOR

Fred E. Youngs
by Baxendell & Baxendell
his Attorneys.

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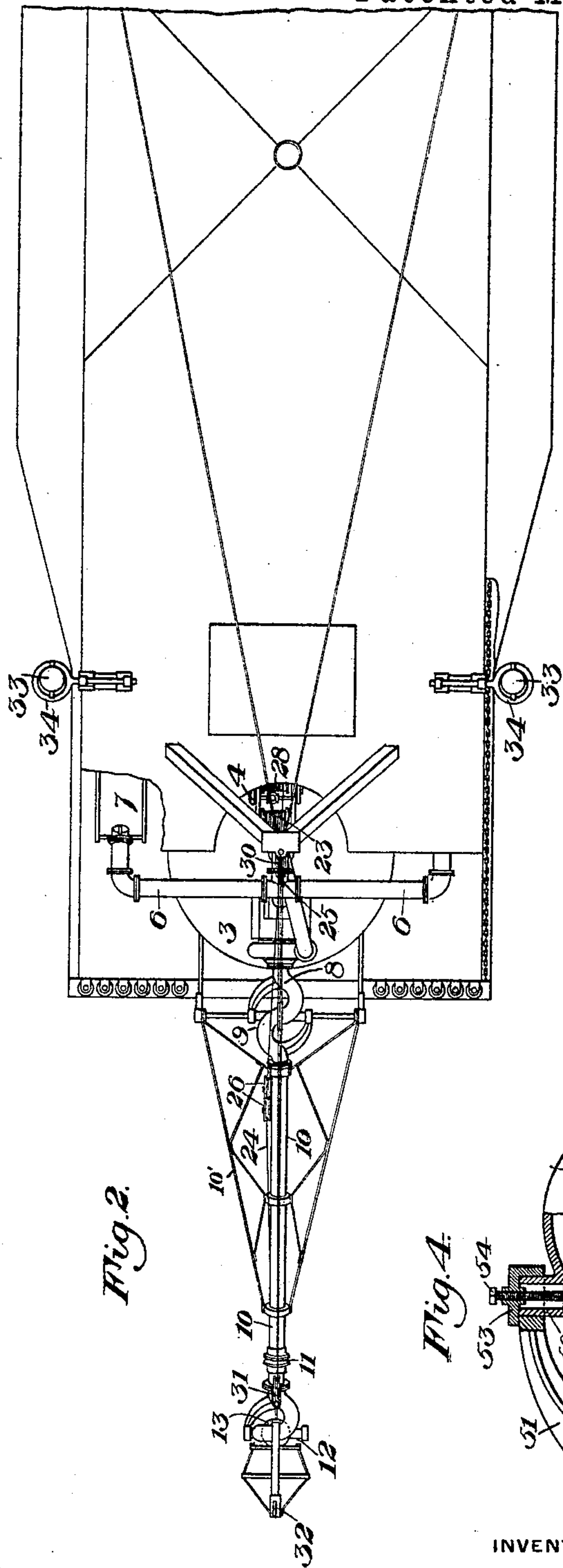


Fig. 2.

Fig. 4.

WITNESSES

Warren W. B. Swartz.
J. M. Corwin

INVENTOR

Fred E. Youngs
by Russell L. Russell
his Attorney.

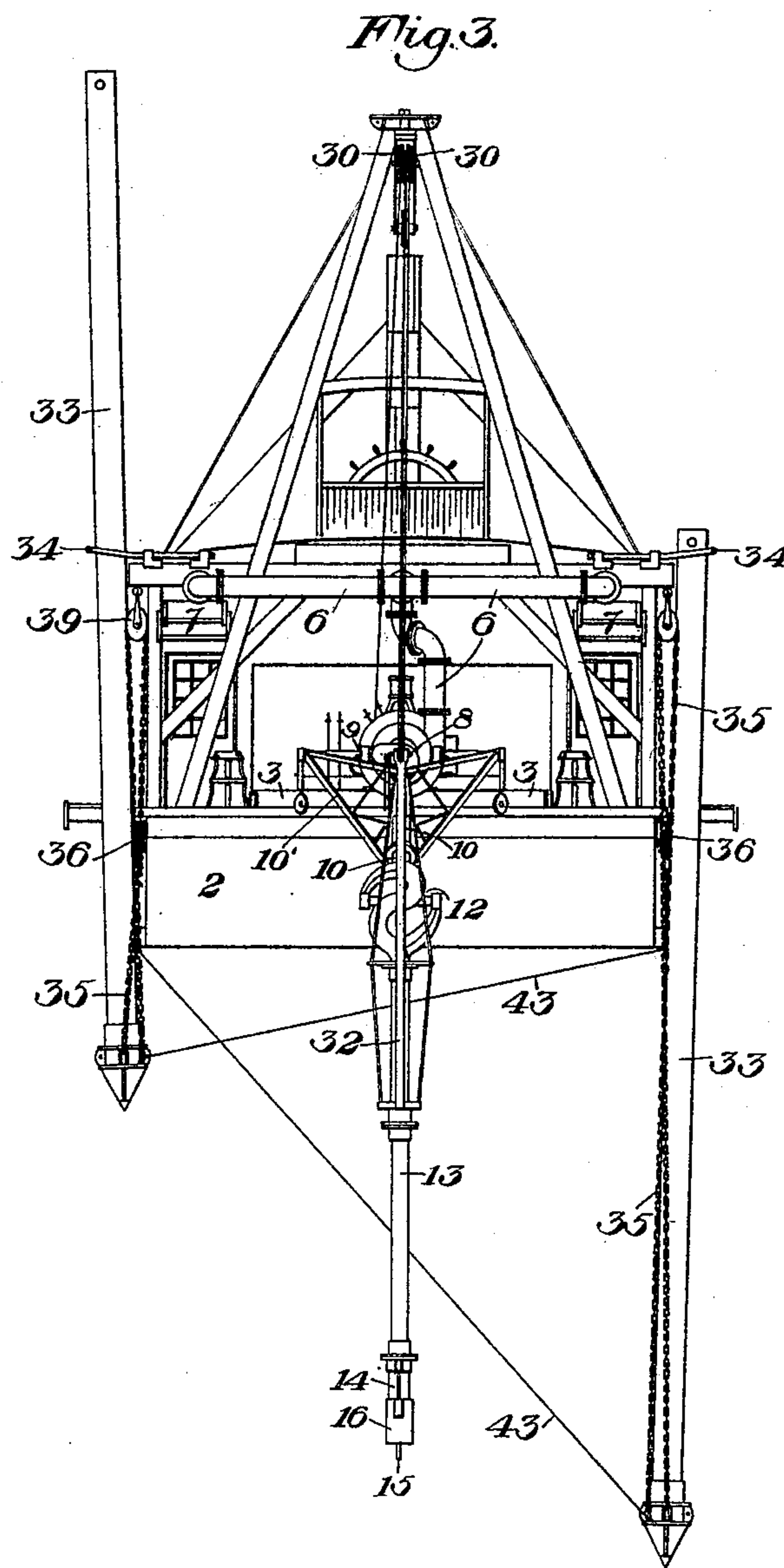
(No Model.)

4 Sheets—Sheet 3.

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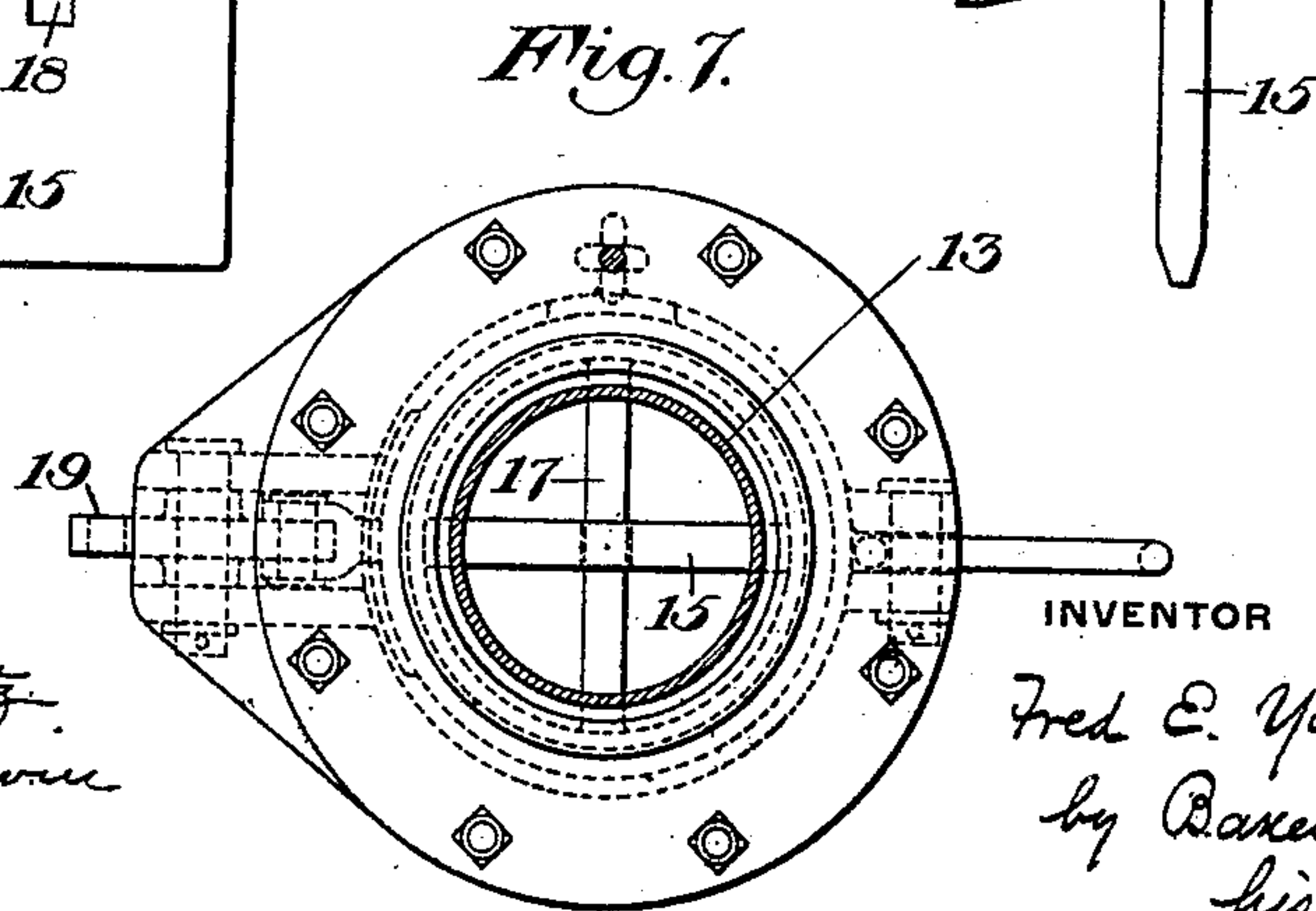
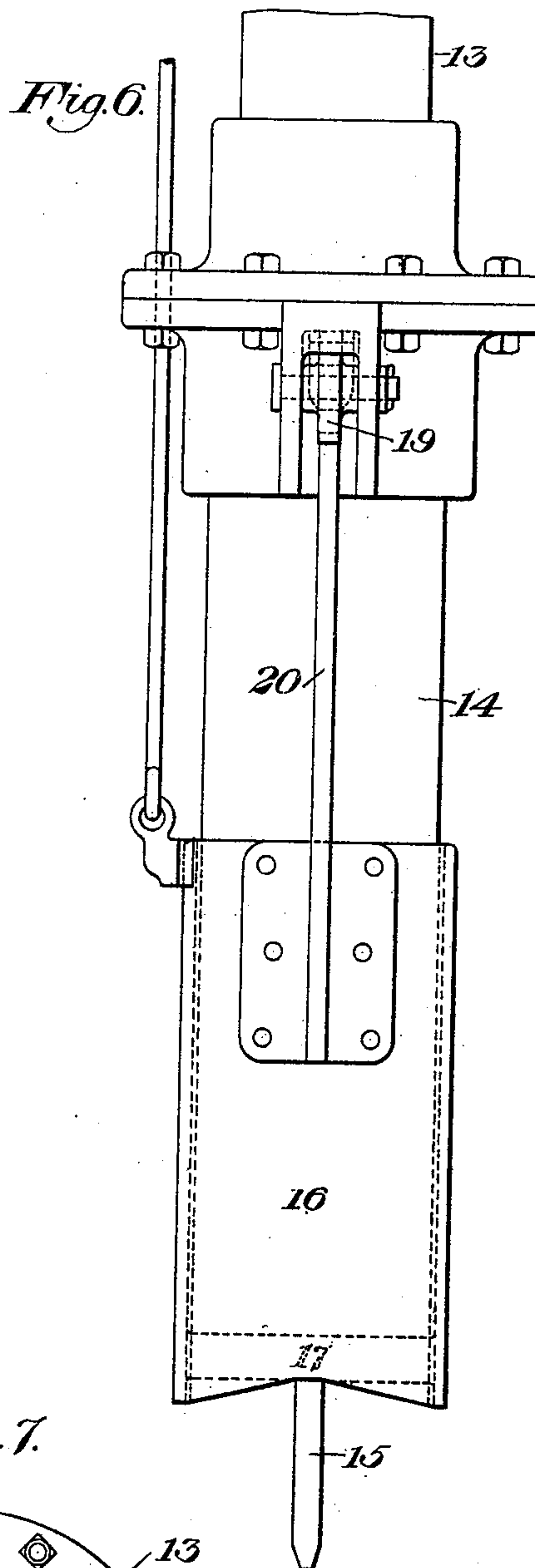
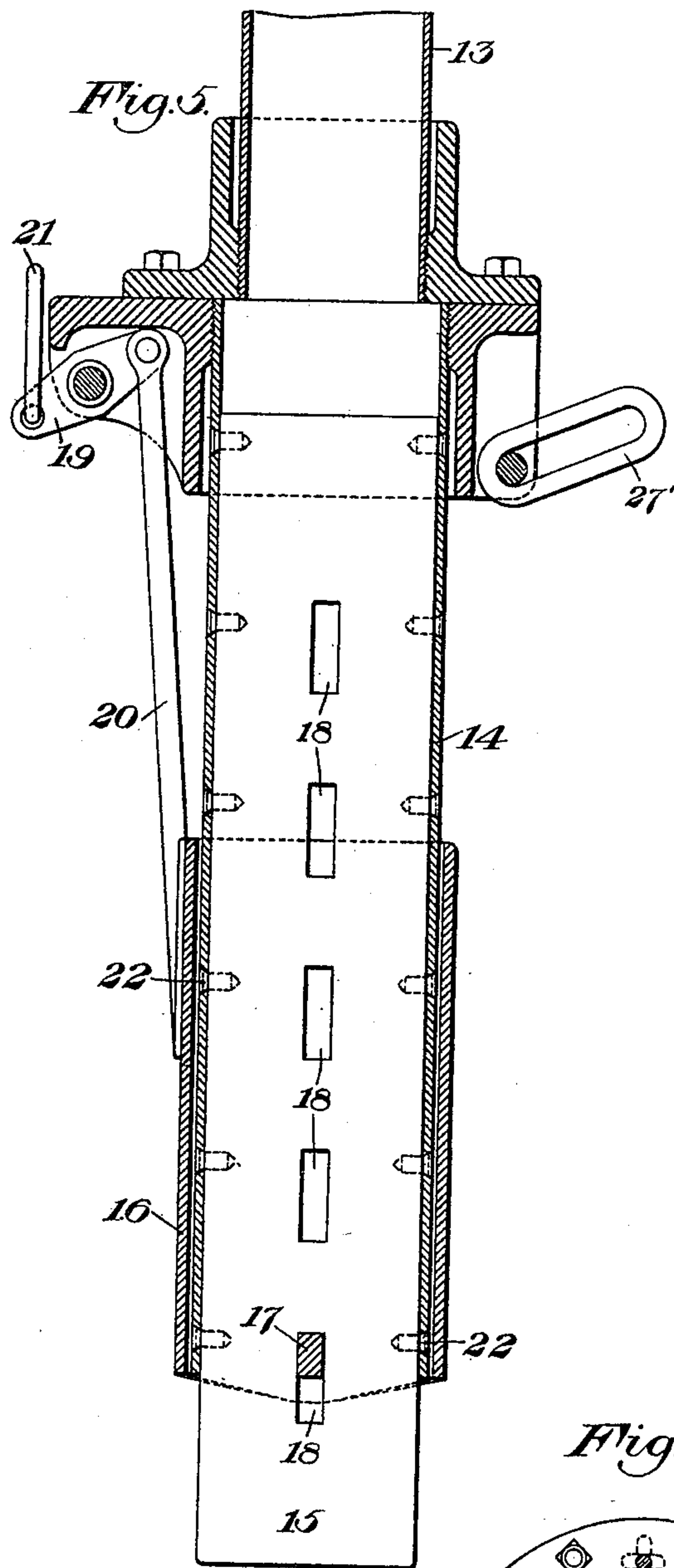
INVENTOR

Fred E. Youngs
by R. A. Baskin & Baskin
his Attorneys.

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WITNESSES

Warren W. Swartz
H. M. Corwin

INVENTOR

Fred E. Youngs
by Baxendell & Baxendell
his Attorney.

UNITED STATES PATENT OFFICE.

FRED E. YOUNGS, OF ALLEGHENY, PENNSYLVANIA.

DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 583,319, dated May 25, 1897.

Application filed November 22, 1895. Serial No. 569,774. (No model.) Patented in Canada November 15, 1895, No. 50,600.

To all whom it may concern:

Be it known that I, FRED E. YOUNGS, of Allegheny city, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dredging Apparatus, (patented to me in Canada, No. 50,600, dated November 15, 1895,) of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved apparatus. Fig. 2 is a top plan view thereof. Fig. 3 is a front elevation. Fig. 4 shows in detail one of the swivel-joints, partly in section. Fig. 5 is a sectional view of the ejector for dislodging stones, &c., from the suction-pipe. Fig. 6 is an elevation thereof, and Fig. 7 is a sectional plan view of Fig. 6.

The purpose for which I have especially designed my invention is to dredge and elevate from the bottom of rivers, &c., gold-bearing sand, which is often found in large deposits in such places. By my apparatus the gold is lifted into a boat by suction through a pipe which extends to the bottom of the stream and which by suitable mechanism is moved so as to stir up the sand and stones and to expose the gold.

The nature of my invention is summarized in the claims.

In the drawings, 2 represents a boat.

3 is a turn-table or platform mounted at the bow of the boat and adapted to be driven by a suitable engine 4, so that it may be rotated for the purpose of moving the suction-pipe to the bow or to either side of the boat, as desired.

5 is a pump mounted on the platform 3 and having a discharge-pipe 6, which leads to and discharges into a sluice or trough 7, in which suitable provision is made for catching and retaining the gold. The inlet-pipe 8 of the pump is swiveled at 9 to an outwardly-extending pipe 10, which at its outer end is swiveled at 12 to a downwardly-extending pipe 13, the extremity of which serves, as hereinafter described, to agitate the sand, &c., at the bottom of the river and to suck it up when the pump is in operation.

10' is a frame by which the pipe 10 is sup-

ported and braced. The construction of the extremity of the pipe is shown on Sheet 4 of the drawings. It is fitted with a removable pipe-section 14, having fixed diametrically and longitudinally within the same a blade 15, which projects beyond the end thereof. This blade is preferably beveled or sharpened at the end, so that it may act as a knife and should be made of steel or other suitably durable material. For the purpose of dislodging stones, if any such should become caught in the end of the section 14, I provide an externally-sliding sleeve 16, which may be fitted with a cross-bar 17, fixed to the section 16 and passing through one of a series of vertical slots 18 in the blade 15, so that it may have some longitudinal motion thereon. Such motion may be effected by means of a lever 19, connected with the sleeve by a link 20 and having a chain 21 extending upward to the boat. By pulling this chain the sleeve can be projected and obstructing stones dislodged. I prefer to provide the blade 15 with several slots 18. The purpose of these several slots is that if the end of the blade 15 should be worn and shortened by such wear the screws or rivets 22 by which it is held to the section 14 may be removed, the cross-bar 17 taken out, the blade 15 projected to a suitable extent to compensate for the wear, and the bar 17 refitted in the next slot above. The pipe 10 is provided also with a swivel-joint 11, the axis of which is coincident with the axis of the pipe, so that when the pipe is turned to the side of the boat, if the current should act with great pressure upon the downwardly-extending portion 13, the pipe may turn on said swivel and thus by yielding to its pressure prevent undue strain.

For the purpose of raising and lowering the suction-pipe and moving it back and forth I employ drums 23 28, mounted on the platform 3 and driven by the engine 4. From the drum 23 a rope or chain 24 passes over an elevated sheave 25, thence between idler-sheaves 26, around a sheave 27, which I show connected to link 27' at the lower end of the pipe-section 13, and thence to the pipe 10, to which it is attached. From the drum 28 a rope or chain 29 passes over an elevated sheave 30, thence around a sheave 31 at the

end of the pipe-section 10, thence over a second elevated sheave on the same axis with the sheave 30 to an arm 32, which projects from the pipe-section 13. The construction of these sheaves and rope is such that if the operator desires to raise the pipe-section 13 or to lower it he actuates the drum 28 without actuating the drum 23, and thereupon the chain or rope 29 is drawn or paid out, as the case may be, and the entire pipe is swung up or down on the axis of the swivel 9. It is in this manner that the pipe is lowered to the bottom of the river and is raised therefrom. When it is lowered and when it is desired to swing the pipe-section 13 on the axis of the swivel 12, so as to stir up the gravel, &c., at the bottom of the stream, the operator actuates the drum 23, thereby drawing on the rope 24 and pulling the pipe-section 13, causing it to swing toward the boat on the axis of the swivel 12. While the pipe-section 13 is thus swinging toward the boat, the knife at its end plows along the bottom of the stream, and during such operation a proper degree of down pressure of the pipe-section upon the bottom is maintained by paying out the rope 29. At the end of the inward motion of the pipe-section it is raised, as above explained, by actuating the drum 28 until the end of the pipe is well clear of the bottom, and then by permitting the rope 24 to pay out the pipe-section will swing outwardly to and beyond the vertical to the desired extent, the motion beyond the vertical position being effected by the attachment of the rope 29 to the end of the upwardly-extending arm 32. I am thus enabled to effect all these motions by the use of two drums and two ropes. This results in a material simplification of the apparatus.

It will be noticed that in the act of dredging the pipe-section is pulled toward the bow of the boat and in the direction of the current. This is new and is important, because in so moving it plows a furrow on the bottom of the stream, and the current acts to wash the particles of gold down along the furrow to the mouth of the pipe-section. The device is thus improved in efficiency.

For the purpose of holding the boat stationary during the dredging operation I employ downwardly-projecting spuds or arms 33, set at the sides of the boat and each passing through a ring 34 at the top frame of the boat, but otherwise independent of the boat construction. To raise and lower these spuds, I employ at each side of the boat a rope or chain 35, fastened at both ends at the bottom of the spud. One branch thereof passes upwardly over a pulley 36 at the bow, thence aft around a traveling sheave 37, thence over a guide-sheave 38 and sheave 39 to the bottom of the spud. The traveling sheave 37 is provided with a rope or chain 40, which passes aft around a pulley (not shown) and thence forward under the deck to a spud-hoist drum 41. All the parts last described, except the

spud-hoist drum and the rear pulley upon which the chain 40 passes, are at the outside of the boat, so in case the boat should become entangled in the ice the spuds and all their connections can easily be cleared. From the bottom of each of the spuds a stern anchor-rope 42 leads aft to the stern of the boat. This rope is fixed at each end, so that it shall maintain a constant length. To anchor the boat, the spuds are lowered by paying out the rope 40 and permitting the pulleys 37 to move forward until the ends of the spuds strike the bottom. By reason of the double attachment of the chain 35 to the spud the line 42 is kept taut in all positions. When the spuds are embedded in the bottom, the bow of the boat pointing upstream, the strain exerted on the boat by the current is taken up by the stern anchor-lines 42, and the boat is held firmly anchored. To brace the spuds against lateral strain, I employ side guy-lines 43, which extend, respectively, from the lower ends of the spuds under and around the boat to the same side of the boat with the spud to which it is attached, where it is connected detachably and adjustably to a suitable cleat.

In Fig. 4 I show in detail the construction of the swivel-joints 9 and 13. The joint comprises two curved pipe-sections 44 and 45, the inner end *b* of each being directed at right angles to the axis of its outer end *c*. These ends *b b* have flanges 46, adapted to abut against each other and having annular registering grooves 47, within one of which is set a ring 48 and adapted to work loosely in the other. A water-pipe 49 leads from a suitable water-supply on the boat to one of the grooves 47 and by maintaining therein a body of water under pressure serves to seal the joint. Each section 44 and 45 has on one side a trunnion 50 in line with the axis of the end *b* and at the other side an arm 51, having a forked end 52, adapted to fit around and turn upon the trunnion. In assembling the swivel the parts above described are fitted together, as shown in the drawings, and caps 53, having semiannular sockets, are fitted over the trunnions and bolted to the forked ends 52. Adjusting-bolts 54 pass through the ends of these caps and bearing upon the ends of the trunnions enable the parts of the swivel to be drawn firmly together. This construction is simple and affords a secure and water-tight swivel capable of turning readily on the axis of the trunnion.

I claim—

1. A suction-dredge, having at the outer end of the suction-pipe a movable ejector for ejecting lodged obstructions, substantially as described.
2. A suction-dredge, having at the outer end of the suction-pipe a sliding ejector for ejecting lodged obstructions substantially as described.
3. A suction-dredge, having at the outer end of the suction-pipe a sliding ejector for

ejecting lodged obstructions, said ejector having a cross-bar extending across the pipe; substantially as described.

4. A suction-dredge, having at the end of the suction-pipe a projecting blade, which extends diametrically across the pipe, and an ejector having a cross-bar extending through a slot in the blade, substantially as described.

5. A suction-dredge, having at the end of the suction-pipe a projecting blade, which extends diametrically across the pipe, and an ejector having a cross-bar extending through a slot in the blade, said blade having several slots to permit adjustment, substantially as described.

6. A suction-dredge, having at the end a suction-pipe, and a fixed knife-blade or plow fitted within the pipe and extending across and beyond the same; substantially as described.

7. A suction-dredge, having a jointed pipe projecting outwardly and downwardly from the boat, two drums and two ropes one connected with the downwardly-projecting portion of the pipe, for the purpose of swinging the same in one direction, and the other rope passing around pulleys and having two points of connection with the extended pipe and being adapted to raise, lower and swing the same, substantially as described.

8. In a dredging apparatus, the combination of a suction-pipe, a pump, a drum for raising, lowering and swinging the pipe, said pump, its engine, the drums, and the drum-engine being mounted upon a single rotatory platform, substantially as described.

9. The combination with the boat, of a spud for anchoring the same, said spud having a stern anchor-line and having a hoisting-line

attached at both ends to the spud and operated by a traveling connection at a middle point, substantially as described.

10. In a suction-dredge, a suction device, comprising a pipe extending outwardly from the boat and having swiveled connection thereto, and a rigid pipe extending downwardly therefrom and swiveled to the other pipe so as to swing to or from the boat, a mechanical connection extending from the downwardly - extending pipe to the boat, means for drawing thereon to pull the pipe positively toward the boat and to plow its end over the bottom of the stream, and suction apparatus adapted to suck up the matter dislodged by such plowing; substantially as described.

11. In a suction-dredge, a suction device, comprising a pipe extending outwardly from the boat and having swiveled connection thereto, and a rigid pipe extending downwardly therefrom and swiveled to the other pipe so as to swing to or from the boat, a mechanical connection extending from the downwardly-extending pipe to the boat, means for drawing thereon to pull the pipe positively toward the boat and to plow its end over the bottom of the stream, suction apparatus adapted to suck up the matter dislodged by such plowing, and a rotatory platform from which the suction-pipe extends; substantially as described.

In testimony whereof I have hereunto set my hand.

F. E. YOUNGS.

Witnesses:

G. I. HOLDSHIP,
H. M. CORWIN.