

(No Model.)

3 Sheets—Sheet 1.

W. M. DOUGLAS.
HYDRAULIC EXCAVATOR.

No. 475,936.

Patented May 31, 1892.

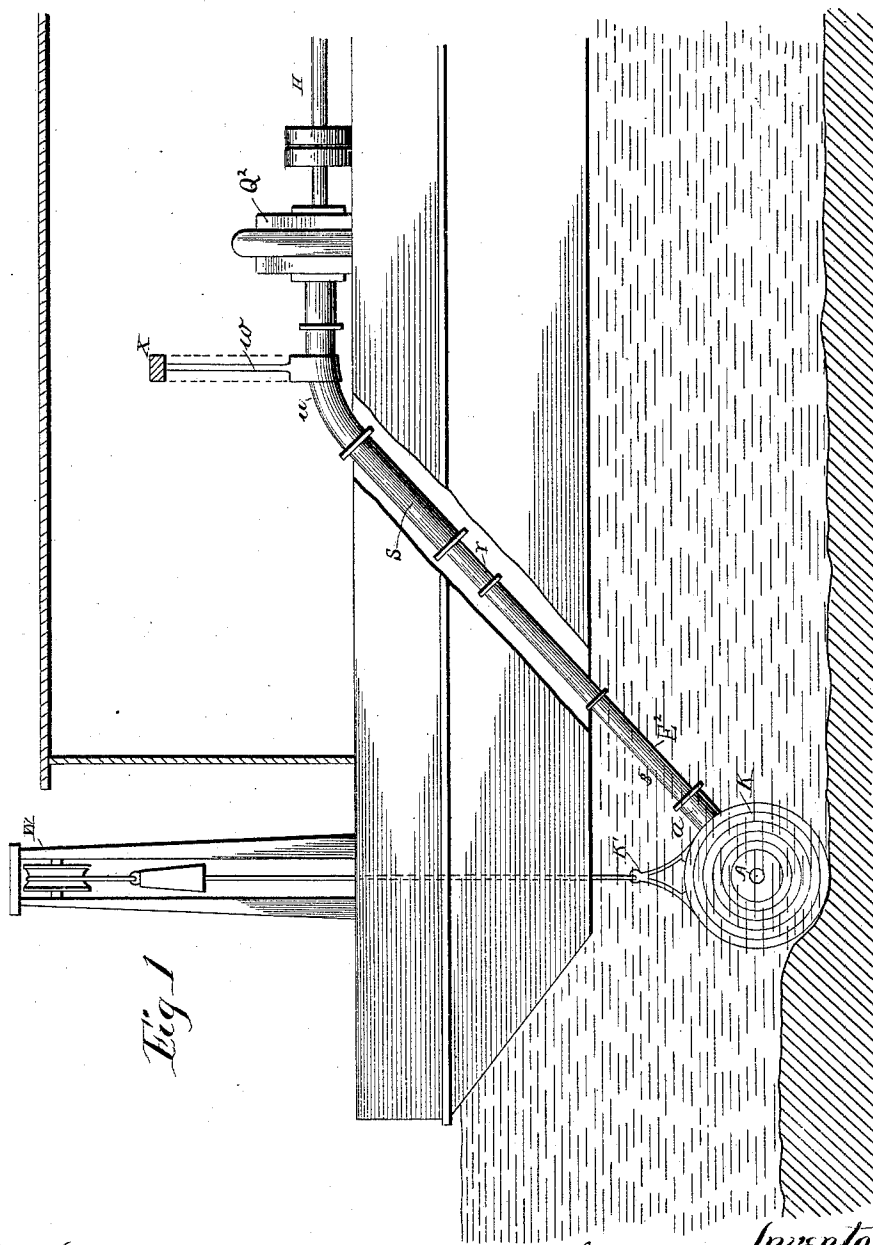


Fig 1

Witnesses
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Geo. L. Wheelock

Inventor
William M. Douglas
per *W. M. Douglas*
his atty.

(No Model.)

3 Sheets—Sheet 2.

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Fig 2

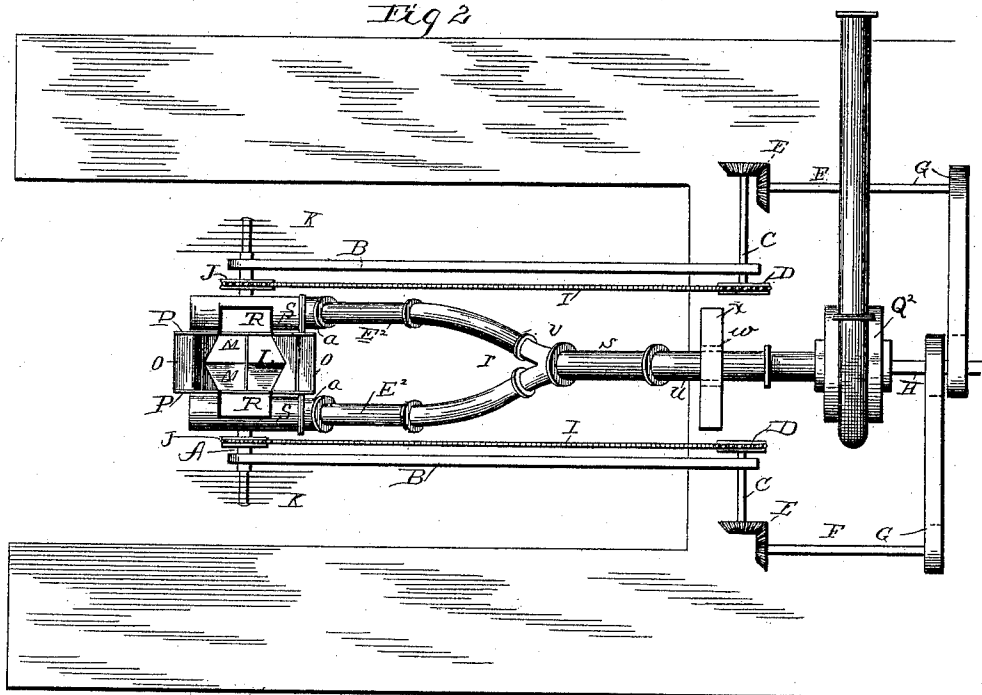
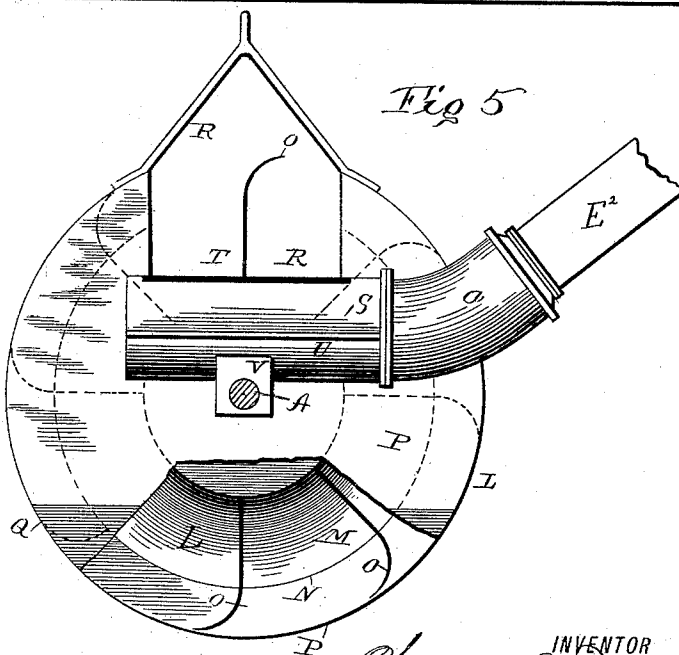


Fig 5



WITNESSES:

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INVENTOR

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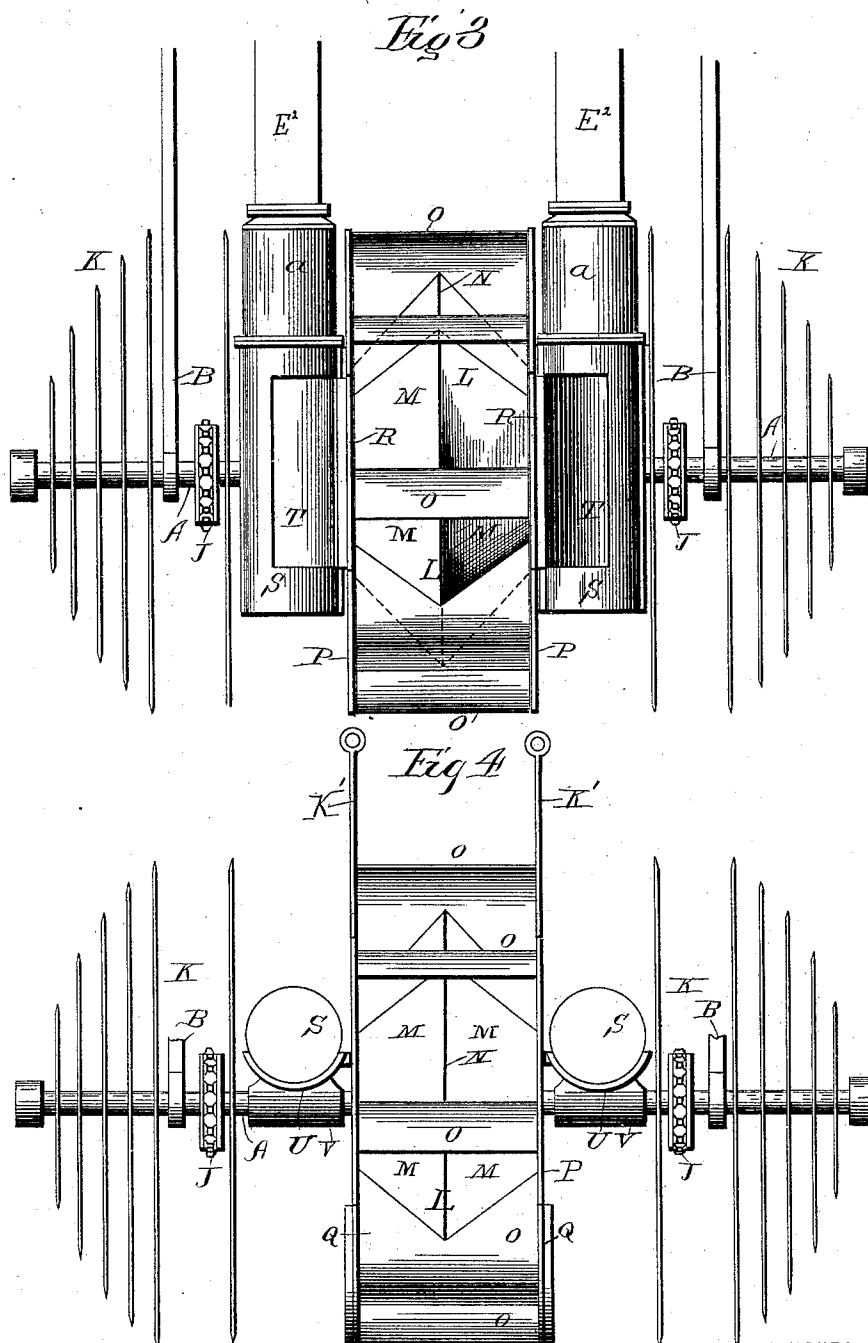
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3 Sheets—Sheet 3.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM M. DOUGLAS, OF GALVESTON, TEXAS, ASSIGNOR OF ONE-HALF TO
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HYDRAULIC EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 475,936, dated May 31, 1892.

Application filed June 1, 1891. Serial No. 394,627. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM M. DOUGLAS, a citizen of the United States, residing at Galveston, in the county of Galveston and State of Texas, have invented certain new and useful Improvements in Hydraulic Excavators; 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 that class of hydraulic dredging-machines in which a revolving bucket-wheel is employed for excavating the silt, sand, &c., and carrying such matter to the depositing chambers or reservoirs, from which it is drawn by suction in the usual manner and discharged to the final place of deposit. In most of the machines of this character previously in use the bucket-wheel after digging up the material carries it directly to the mouth of the suction-pipe and depends almost entirely upon the suction from the pump for relief in freeing its buckets of their contents, and thus the two operations—excavating the spoil and carrying it off by suction—are largely dependent upon each other, and without the co-operation of the one the other is useless; hence arises the difficulty in successfully operating these machines. My invention contemplates overcoming these objections by producing an arrangement in which the two actions previously mentioned take place independent of each other, and the excavator depends upon the peculiar formation of its buckets to free it from the material carried by the latter, said buckets having a downward and outward discharge away from the perimeter of the bottom of the buckets, which is accomplished by gravity alone unassisted by the suction from the pump, whereas in former constructions the delivery has been in most cases directly outward or inward in a direction substantially parallel with the axis of the buckets. In short, the object sought to be accomplished is to produce a more practical and serviceable construction than has heretofore been known; and with this end in view my invention consists in certain peculiarities of construction and combinations of

parts more fully described hereinafter, and set forth in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of a portion of the hull of a dredger carrying my improved excavating mechanism; Fig. 2, a plan view of the same; Fig. 3, an enlarged top view in detail of the excavator proper; Fig. 4, a similar front view of the same; and Fig. 5, a side elevation partly in section, parts being omitted.

Referring to the drawings by letter, A indicates the shaft, on which the cutting-knives and bucket-wheel or scoop are mounted, and said shaft is supported by parallel arms B, being journaled in the lower ends of the same, while the upper ends of said arms are mounted loosely on the shafts C, which also carry sprocket-wheels D, and are actuated by the pump-engine through the medium of the bevel-gears E, counter-shafts F, and belting G, connecting the latter with the drive-shaft H. The sprocket-wheels D are rigid on the shaft C and drive the bucket-wheel shaft A through the medium of chains I and sprocket-wheels J, rigid on said shaft, and upon the latter, outside of the arms B, are keyed a number of circular cutting knives or disks K, which are arranged in series with increasing diameters, the smallest ones being fastened on the outside extremities of the shaft and the others increasing in size toward the bucket-wheel and constituting wing-knives for cutting up and loosening the spoil. The bucket-wheel is mounted rigidly on the shaft A at its middle and consists of a central shell L, having the form of a pair of truncated cones placed base to base, and thus presenting oppositely-sloping surfaces M, meeting in a sharp circular edge N, and of the blades or scoops O, which project from said sloping surfaces and out beyond the edge N, being formed with curved outer extremities, which better adapt them for scraping up the spoil. On opposite sides of this bucket-wheel stationary disks or ballast-wheels P are disposed upon the shaft, their lower arcs being weighted, as at Q, to hold them in position and anchor the excavator. These disks are situated close to the bucket-wheel, so that their inner faces form the side walls of the buckets, while the

sloping surfaces M constitute the bottoms of the same. Openings R are made in the upper portions of the disks, and opposite these openings are located the cylindrical depositing chambers or reservoirs S, which are also provided with suitable ports T, and which are mounted in saddles U, having bosses V, loose on the shaft A. Suction-pipes E², having a diameter two-thirds as great as that of the cylindrical reservoirs S, lead from the latter, being connected thereto by flexible joints *a*, and said pipes are conjoined by a two-way or Y-coupling *r* and empty into a large pipe *s*, which is connected to the pump Q² by a flexible joint *u*, and the latter is hung in a swinging bail *w*, suspended from a frame *x*. Suitable hoisting pulleys, weights, and chains are supported in frame-work W, erected on the dredger-hull, and the chains are attached to brackets K' on the ballast-wheels P and operate to raise and lower the excavator, and the supporting-arms B are so mounted on the shaft C as to allow nearly direct vertical movement of said excavator.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that as the bucket-wheel is revolved its blades will scoop up the spoil into the buckets formed conjointly by said blades, the disks P, and the sloping sides of the shell O, and hence as the material is carried around it will press against the side walls of the buckets, or, in other words, the inside faces of the disks P, by reason of the slope of the sides of said shell O, which form the bottoms of the buckets, and as the latter pass the openings R in the disks P said spoil will empty through the same by gravity into the depositing-chambers S, from which it will be drawn off through the suction-pipes *e* to the pump and be discharged. By this arrangement it will be apparent that the buckets do not depend for relief from their load upon the suction from the pump, but discharge by gravity owing to their sloping bottoms, and thus the two operations are distinct and independent of each other.

It is evident that many slight changes which

might suggest themselves to a skilled mechanic could be resorted to without departing from the spirit and scope of my invention, and therefore I do not wish to limit myself to the precise construction herein shown; but,

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a hydraulic dredging-machine, a rotary excavating bucket-wheel having a series of disks on the opposite ends of and rotating with the bucket-shaft, substantially as set forth.

2. In a hydraulic excavator, the combination of a bucket-wheel provided with buckets having outward-sloping bottoms, whereby the spoil discharges laterally from the wheel, and a pair of suction-pipes located on opposite sides of said wheel, as and for the purpose set forth.

3. In a hydraulic excavator, a bucket-wheel arranged to discharge laterally, in combination with suction-pipes located on opposite sides of the wheel, substantially as set forth.

4. In a hydraulic excavator, a bucket-wheel provided with buckets arranged to discharge laterally, in combination with a Y-shaped suction-pipe, the lower ends of which pass astride the wheel, as set forth.

5. In a hydraulic dredging-machine, the combination, with a bucket-wheel consisting of a central shell having the form of a pair of truncated cones placed base to base, their sloping sides forming the bottoms of the buckets, and scooping-blades projecting from said shell, of a pair of disks on opposite sides of the latter and provided with openings and depositing-chambers on opposite sides of said bucket-wheel, into which the buckets discharge through said openings, substantially as described.

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

WILLIAM M. DOUGLAS.

Witnesses:

JOHN N. STOWE, Jr.,
JOSEPH BEVAN.