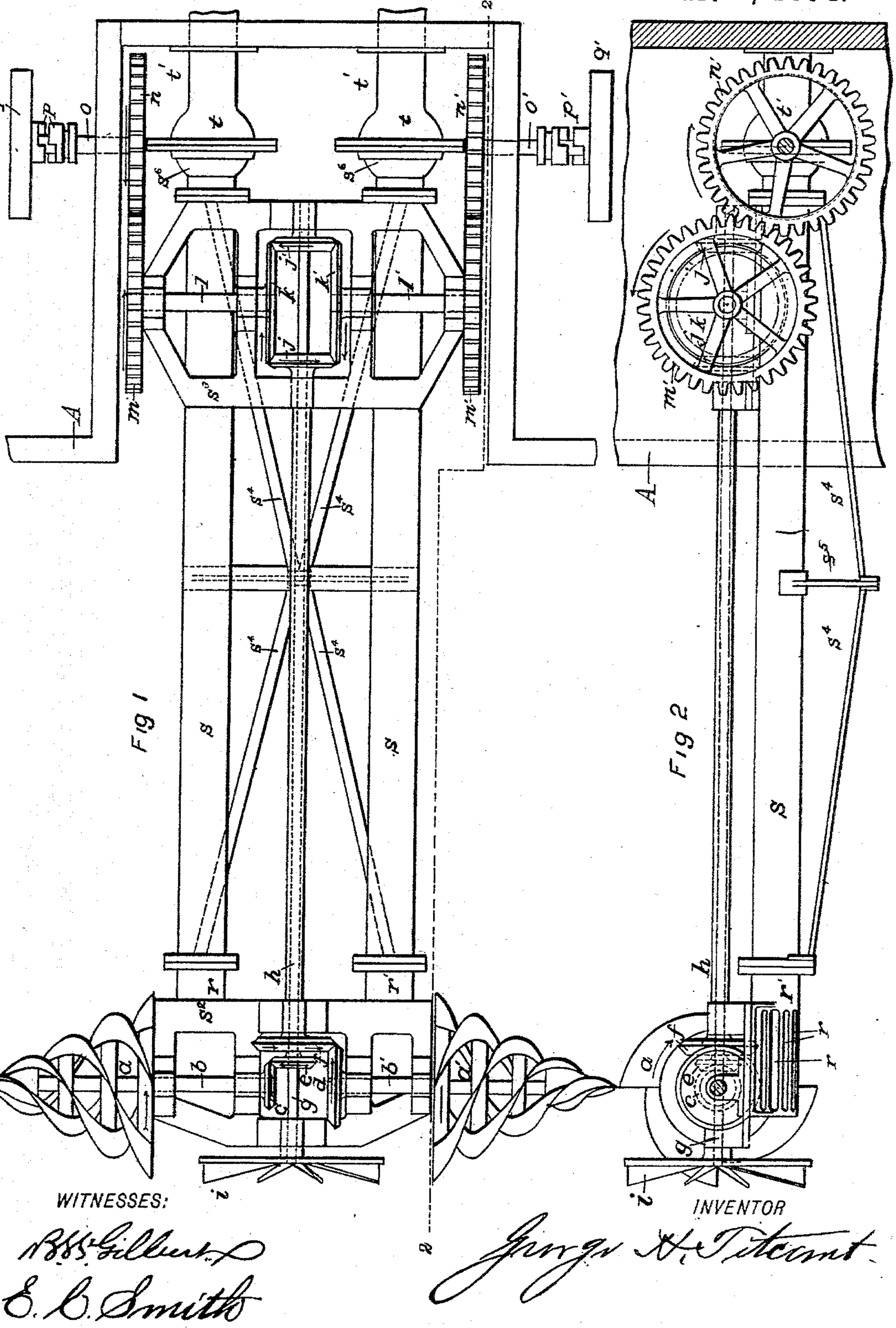
(No Model.)

2 Sheets—Sheet 1.

G. H. TITCOMB.

DREDGING MACHINE.

No. 516,066. Patented Mar. 6, 1894.



THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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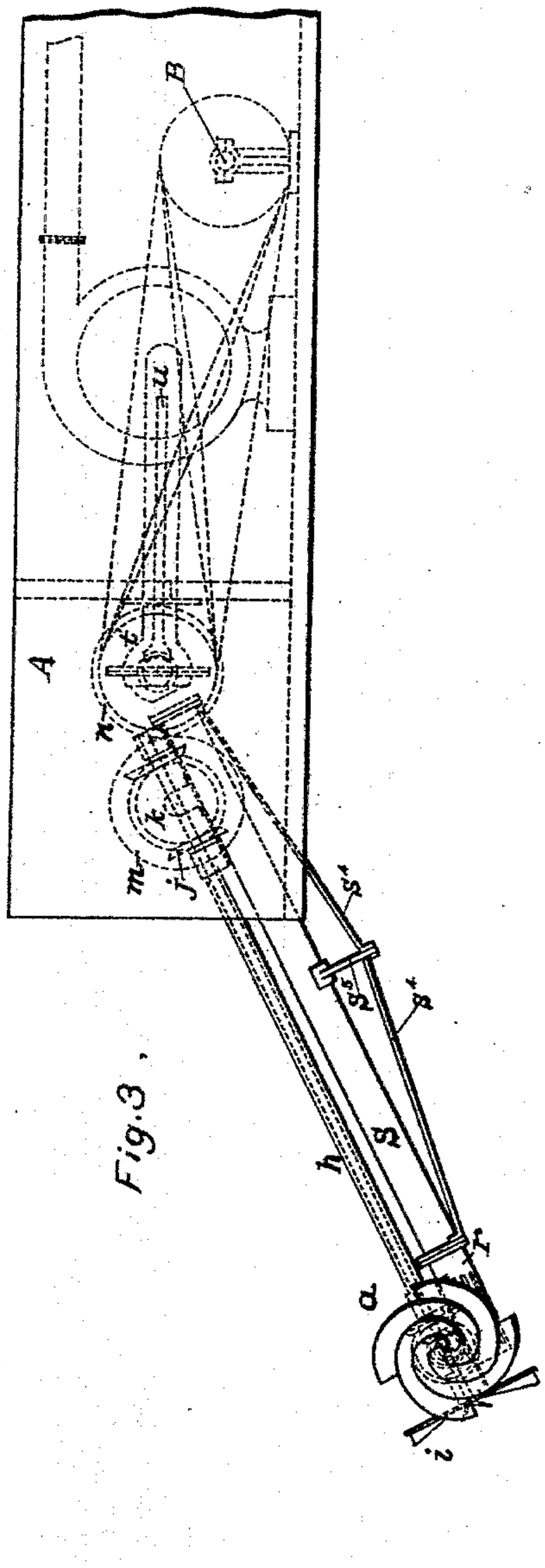

Fig. 3.

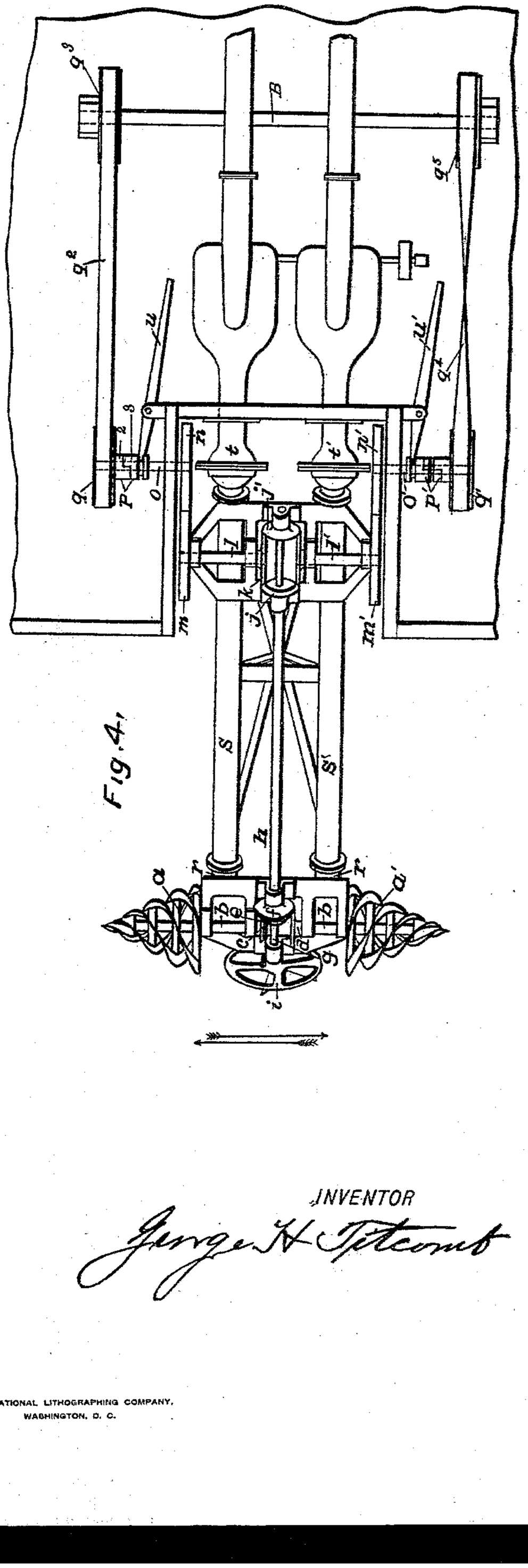

Fig. 4.

WITNESSES:

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GEORGE H. TITCOMB, OF BOSTON, MASSACHUSETTS.

DREDGING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 516,066, dated March 6, 1894.

Application filed January 9, 1893. Serial No. 457,850. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. TITCOMB, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Dredging-Machines, of which the following is a specification.

This invention relates to that calss of dredging machines in which a frame is pivotally connected to a floating support or vessel, so that the outer end of the frame can rise and fall, the frame being provided with rotary cutters at its outer end, and with mechanism for impelling said cutters by power imparted from the vessel, the arrangement being such that the cutters detach and loosen material from the submerged surface to be excavated, so that a pipe or conduit on the frame, communicating with a pump on the vessel, is enabled to elevate the loosened matter with a current of water supporting the same.

The invention has for its object to provide certain improvements in the construction of apparatus of this class, particularly with reference to the construction and arrangement of the cutters, the construction of the pivoted frame, and the means for imparting motion to the cutters; and to these ends, the invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming part of this specification: Figure 1 represents a top plan view of a pivoted frame provided with cutters and driving mechanism therefor, in accordance with my invention. Fig. 2 represents a section on line 2—2, Fig. 1, and a side elevation of the parts in Fig. 1 above said line. Fig. 3 represents a side elevation, showing a portion of the floating support and my improved apparatus connected therewith. Fig. 4 represents a top view of the construction shown in Fig. 3.

The same letters and figures of reference indicate the same parts in all the figures.

In the drawings: A represents a floating support, which may be an ordinary scow or vessel such as is used to support dredging apparatus.

s s represent parallel tubes or conduits, which are preferably lengths of strong, heavy, metallic pipe, connected at their ends with frames or heads s^2 s^3, the whole constituting an elongated frame, which is preferably strengthened by rods s^4 s^4 s^5, constituting a truss. The upper ends of the pipes s s are provided with spherical enlargements s^6 s^6, which are fitted to turn in spherical sockets t t formed on pipes t' t' affixed to the vessel A, the arrangement being such that the frame, of which the pipes s s constitute parts, can swing in a vertical plane, the pipes s s and t' t' at the same time constituting conduits through which water may be pumped from the lower ends of the pipes s s by a pump or pumps connected with the pipes t' t' and located on the vessel A.

a a' represent conical cutters, which are affixed to shafts b b', journaled in bearings on the frame or head s^2. Each cutter is composed of spiral blades, arranged in approximately conical form, the point or apex of each cutter being at its outer end, as shown in Figs. 1 and 4. The shafts b b' are in line with each other, and extend horizontally substantially at right angles with the direction of length of the pipes s s.

The vessel A is provided with a shaft B (Figs. 3 and 4), to which rotary motion may be imparted by an engine or motor on the vessel. Power is transmitted from the shaft B to the cutters a a' through the following mechanism:

h represents a tubular shaft, journaled in bearings on the frames s^2 s^3, and provided at one end with a bevel-gear f, meshing with a bevel-gear d on the shaft b', and at its other end with a bevel-gear j meshing with bevel-gears k k', which are affixed to shafts l l' journaled in bearings on the frame s^3.

g represents a shaft, which passes through the tubular shaft h, and is provided near one end with a bevel-gear e, meshing with a bevel-gear c on the shaft b, and at its other end with a bevel-gear j', meshing with the bevel-gears k k' at a point opposite the engagement of the gear j therewith.

o o' are shafts, journaled in bearings on the vessel A, the shaft o being connected by gears n m with the shaft l, while the shaft o' is connected by gears n' m' with the shaft l'.

q q' represent loose pulleys on the shafts o o', the pulley q being connected by a belt q^2 with a pulley q^3 on the shaft b, while the pulley q' is connected by a belt q^4 with a pulley q^5 on said shaft.

p represents a clutch, composed of a member 2 affixed to the pulley q, and a sliding member 3 keyed to the shaft o and adapted to be operated by a lever u to connect the pulley q with and disconnect it from the shaft o. p' represents a similar clutch, operated by a lever u' to connect the pulley q' with and disconnect it from the shaft o'. The belt q^2 is open and the belt q^4 is crossed, so that the motion imparted to the pulley q is in the opposite direction from that imparted to the pulley q'. The object of this arrangement is to enable the cutters to be rotated in the same direction by either of the shafts o o' alone, or by both shafts simultaneously.

In Fig. 4, I show the pulley q connected by its clutch p with the shaft o, the pulley q' being disconnected from its shaft. Under this arrangement, motion will be communicated from the pulley q, through the shaft o, gears n m, shaft l, bevel-gear k, bevel-gears j j', shafts g and h, gears e c and f d, and shafts b b' to the cutters a a', both cutters being rotated in the same direction. At the same time, the shaft l', gears m' n' and shaft o' rotate loosely.

When the pulley q is disconnected from its shaft o, and the pulley q' connected with the shaft o', rotary motion will be imparted from the pulley q' to the cutters, through the described intermediate mechanism, in the same direction as before. The object of the duplicate sets of driving mechanism is to provide against loss of time in case of the breakage of any part of one of said sets. It will be seen that the described arrangement of the cutters enables one cutter to operate whether the vessel A is swinging in the direction indicated by the arrow x in Fig. 4 or in the opposite direction, so that, when the vessel, which is pivotally connected with the bottom by means of a spud or vertical post affixed to the vessel and inserted in the bottom, is swinging in one direction, one cutter will act to loosen the material through the path in which it moves; and, when the vessel has reached the end of its movement in that direction, the other cutter can operate in a parallel path when the vessel is swinging in the opposite direction, the vessel being moved forward, if desired, between its swinging movements, so that, during the return movement, the acting cutter will reach material not reached by the other cutter during the preceding movement. The matter loosened and detached by the cutters is drawn with the surrounding water through the pipes s s and t' t' by the pumps connected with the pipes t', and is or may be conducted away from the vessel through a suitable pipe-line provided for that purpose. I prefer to provide each of the pipes s with a sieve or grating, to prevent the entrance of unduly large stones and solid masses into the pipes. In Figs. 1 and 2, I show these sieves or gratings made as sections r r of pipe, bolted to the lower ends of the pipes s s and provided with parallel longitudinal slots r', of such size as to exclude the undesirably large pieces that may be detached by the action of the cutters.

i represents a face-cutter, affixed to the lower end of the shaft g, and rotated in a plane at right angles with the plane of rotation of the cutters a a', the cutter i acting between the cutters a a', as shown in Figs. 1 and 4. The object of the cutter i is to detach and loosen material which may not be reached by the cutter a or the cutter a', during the forward motion of the vessel between the lateral swinging movements thereof.

I do not limit myself to the details of construction here shown, and may variously modify the same, without departing from the spirit of my invention.

Having thus described the nature of my invention and explained a way of constructing and using the same, although without attempting to set forth all of the forms in which it may be made or all of the modes of its employment, I declare that what I claim is—

1. In a dredging machine, the combination with a hull or floating support, of a frame pivotally connected with said support and provided with one or more longitudinal tubes or conduits, cutters rotatively connected with the frame at the swinging end thereof, said cutters projecting laterally in opposite directions, duplex driving-gear connected with said cutters, and clutches whereby either or both parts of said duplex gear may be rendered operative.

2. In a dredging machine, the combination with a hull or floating support, of a frame pivotally connected with said support and provided with one or more longitudinal tubes or conduits, cutters projecting laterally from the swinging end of the frame in opposite directions, a central cutter between said conical cutters, and whose axis is substantially at right angles to that of the latter and means for rotating said cutters, as set forth.

3. In a dredging machine, the combination with a hull or floating support, of fixed pipes on said support, a frame comprising pipes jointed to said fixed pipes whereby the said frame is adapted to swing vertically, rotary cutters projecting laterally in opposite directions from the swinging end of the frame, and means for rotating said cutters, as set forth.

4. In a dredging machine, the combination with a hull or floating support, of fixed pipes on said support, a frame comprising pipes jointed to said fixed pipes to give the frame a vertical swinging motion, rotary cutters projecting laterally in opposite directions from the swinging end of the frame and affixed to independent shafts, a tubular shaft h extending lengthwise of the frame and geared to one of the cutter-shafts, a shaft g within and extending through said tubular shaft and geared to the other cutter-shaft, and mechanism substantially as described for rotating said shafts, as set forth.

5. In a dredging machine, the combination with a hull or floating support, of fixed pipes on said support, a frame comprising pipes jointed to said fixed pipes to give the frame a vertical swinging motion, rotary cutters projecting laterally in opposite directions from the swinging end of the frame and affixed to independent shafts, a tubular shaft *h* extending lengthwise of the frame and geared to one of the cutter-shafts, a shaft *g* within and extending through said tubular shaft and geared to the other cutter-shaft, the shafts *l l'* having bevel-gears *k k'* engaged with gears on the shafts *h g*, the shafts *o o'* geared to the shafts *l l'*, the oppositely-driven loose pulleys on the shafts *o o'*, and clutches whereby said pulleys may be engaged with and disengaged from the shafts *o o'*, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 2d day of January, A. D. 1893.

GEORGE H. TITCOMB.

Witnesses:
C. F. BROWN,
A. D. HARRISON.