

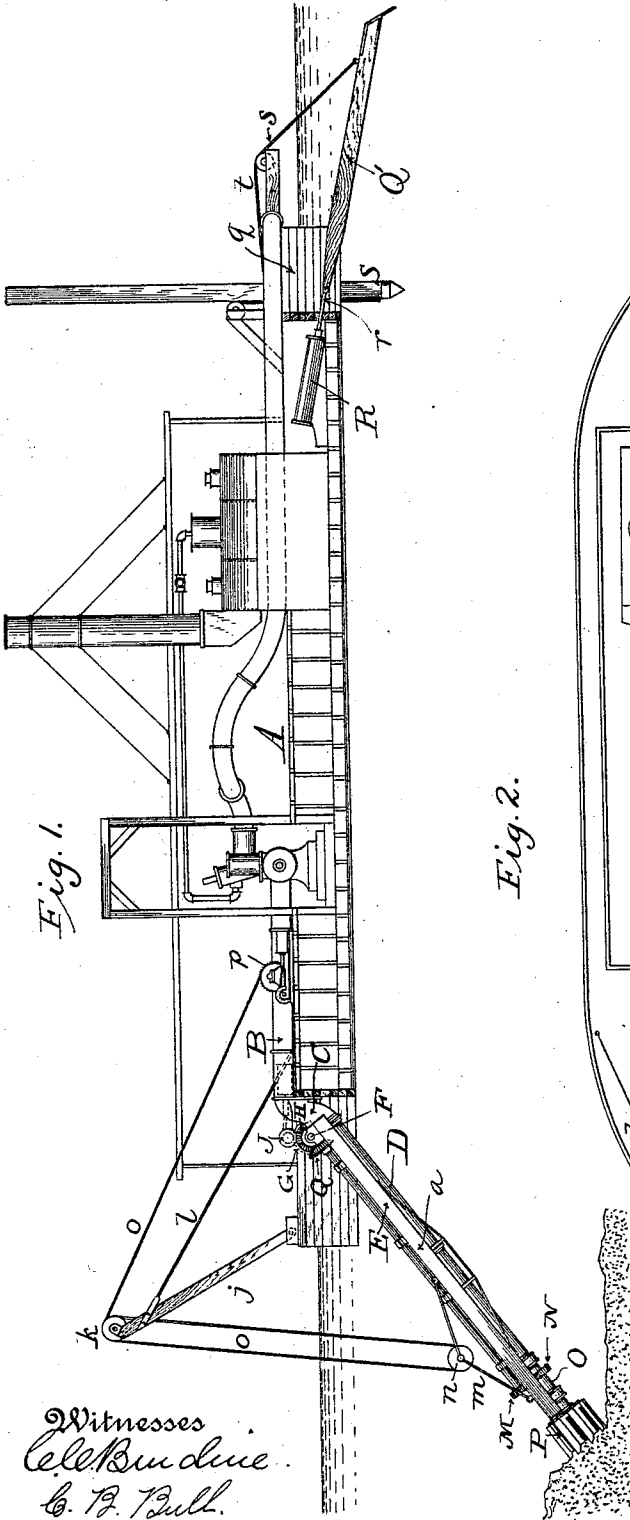
(No Model.)

3 Sheets—Sheet 1.

L. W. BATES.
DREDGER.

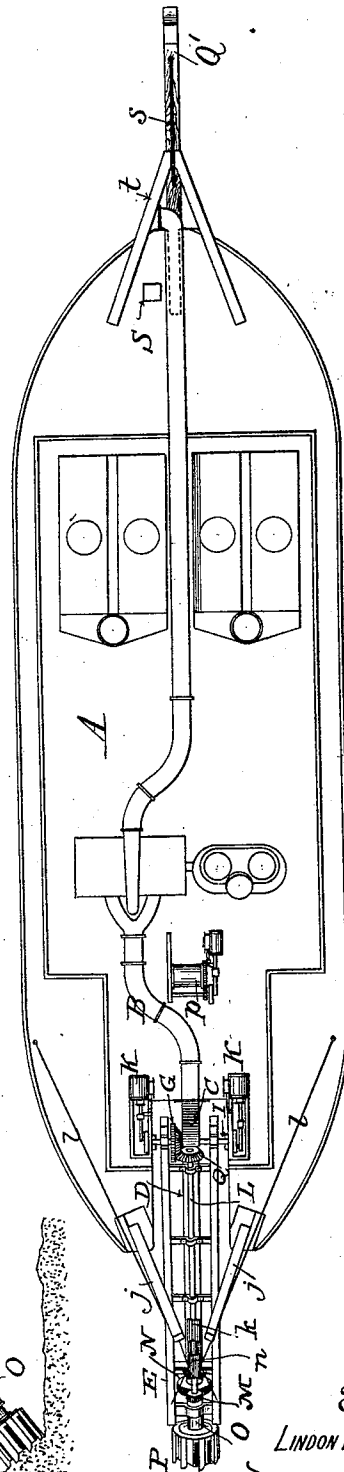
No. 521,580.

Patented June 19, 1894.



Witnesses
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C. B. Bull.

Fig. 2.



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(No Model.)

3 Sheets—Sheet 2.

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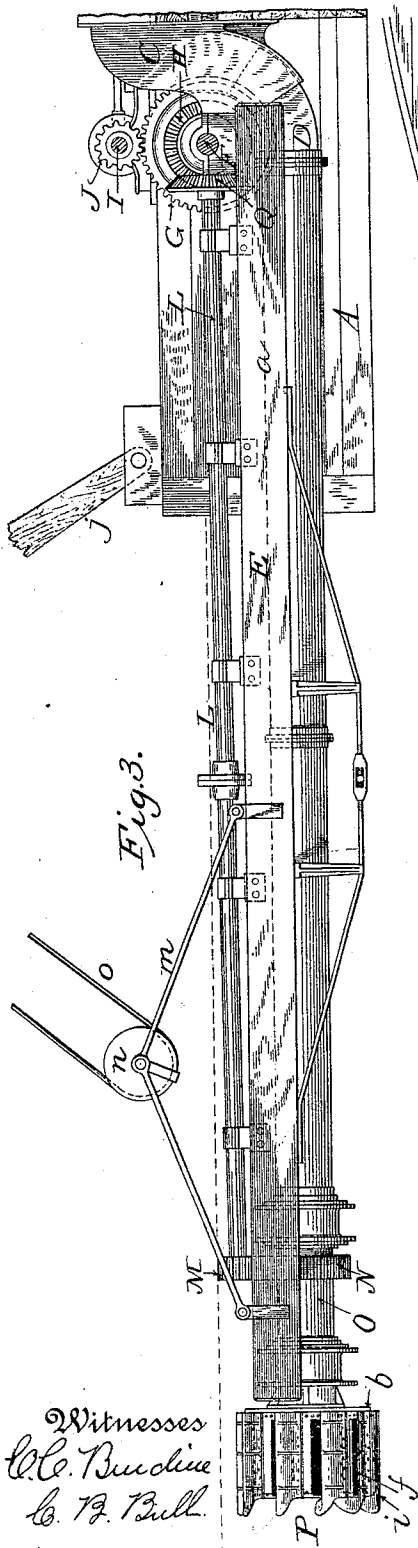


Fig. 3.

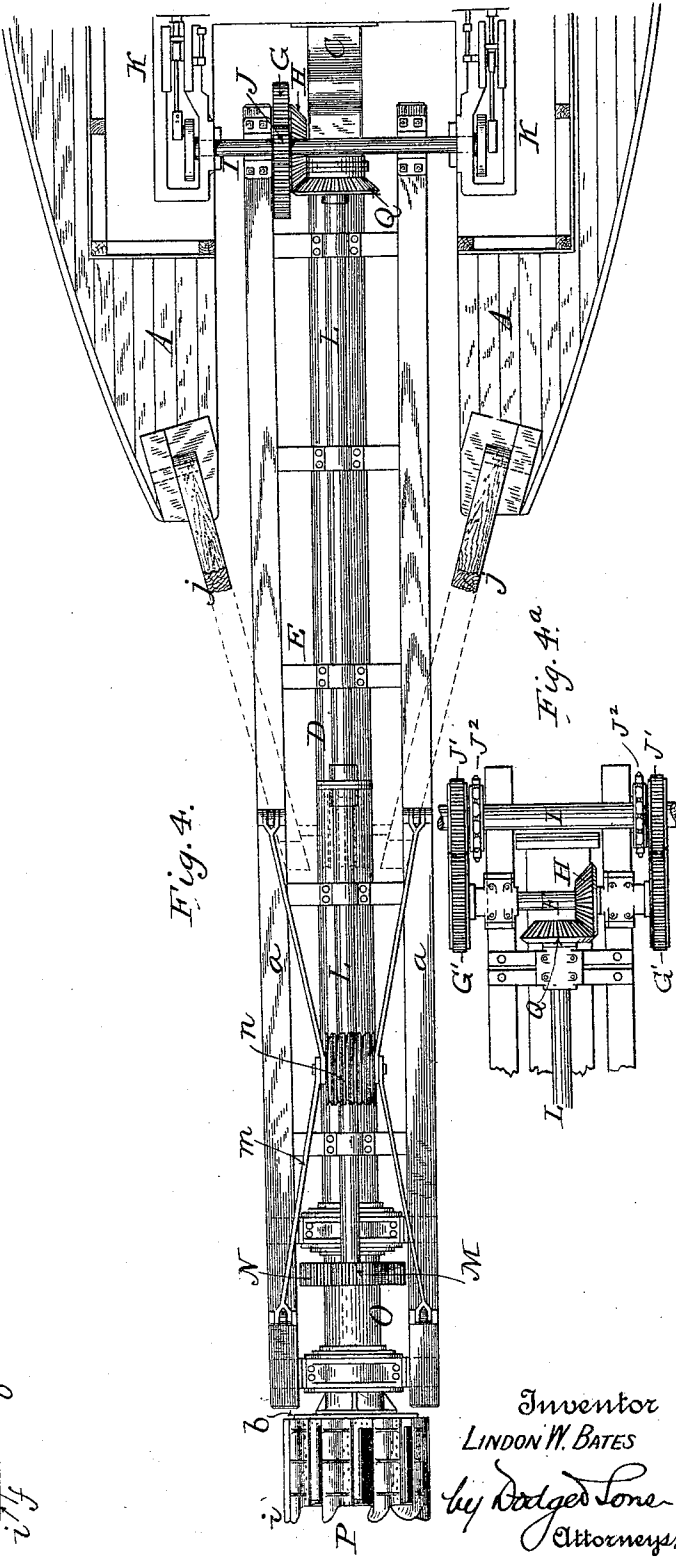


Fig. 4.

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Fig. 5.

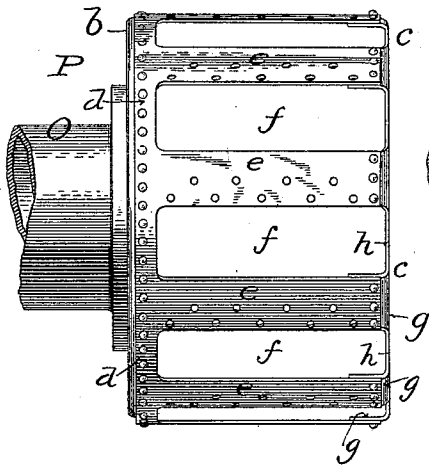


Fig. 6.

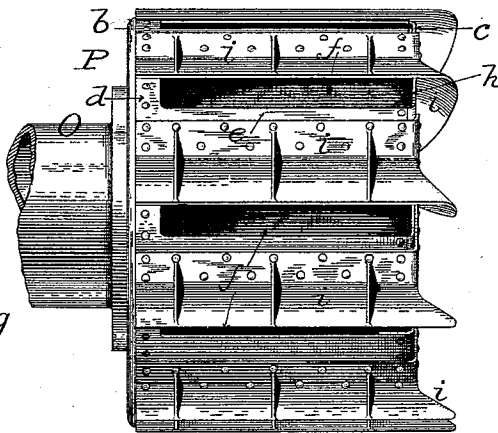


Fig. 7.

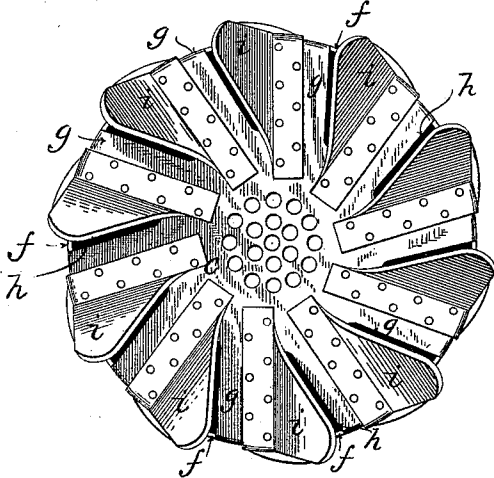


Fig. 8.

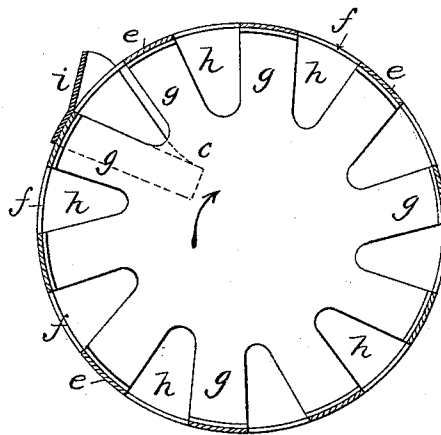
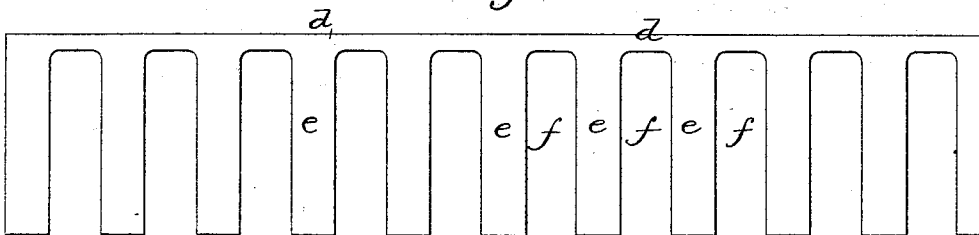


Fig. 9.



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UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF CHICAGO, ILLINOIS.

DREDGER.

SPECIFICATION forming part of Letters Patent No. 521,580, dated June 19, 1894.

Application filed February 19, 1894. Serial No. 500,750. (No model.)

To all whom it may concern:

Be it known that I, LINDON W. BATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Dredgers, of which the following is a specification.

My invention relates to dredging machines, and has reference more particularly to that class in which the dredged material is elevated through a suction pipe.

The present invention consists, first, in a novel means for supporting the pivoted suction pipe; second, in a novel arrangement of gearing for rotating the cutter carried by said pipe; and third, in a novel construction of the cutter itself.

In the drawings,—Figure 1 is a longitudinal sectional view, and Fig. 2, a plan of a dredge having my improvements applied thereto; Fig. 3, a side elevation of the ladder, suction-pipe, and cutter; Fig. 4, a plan view of the same; Fig. 4^a, a modification in the gearing employed; and Figs. 5, 6, 7, 8 and 9, views illustrating the cutter in detail.

A indicates a boat or dredge proper, which will, of course, be provided with the usual boilers, engines, pump, and other accessories. The sides, at the bow, are carried forward to form an open space to permit the ladder and suction pipe to rise and fall therein.

The induction pipe B on the boat determines in an ogee elbow C, into which fits the upper curved end of the suction pipe D carried by the ladder E. This ladder may be of any approved construction, but comprises, in the present instance, two longitudinal timbers *a a* suitably braced and stayed so as to form a rigid and stable support for the suction pipe. Ladder E is hung or supported upon a shaft F which is carried by the fixed elbow C and trunnion plates fastened to the hull, the curved lower mouth of the latter being concentric with said shaft, so that as the ladder rises and falls or swings upon the shaft F, the curved end of the suction pipe will move freely into and out of the elbow.

Secured rigidly upon the shaft F are the spur gear G and miter gear H,—Figs. 1 to 4,—while upon a shaft I directly above the shaft F is secured a small pinion J, which latter en-

gages the larger spur gear G. Shaft I is turned or rotated by means of an engine K, preferably two, one at each end, and the motion is transmitted through the pinions J and G to the bevel gear H upon the shaft F.

Extending lengthwise of the ladder, above the suction pipe, is a shaft L which carries at its upper or inner end a miter gear Q to mesh with the miter gear H, and at its lower or outer end with a small gear M, which, as shown in Figs. 1 to 4, engages a gear ring N secured to the rotating section or end O of the pivoted suction pipe; the gearing thus described transmitting motion from the engine or engines K to the cutter carried by the rotatable section of the suction pipe. This cutter P comprises two flanged heads or disks *b* and *c*, the former being fitted to the pipe-section O, and a body portion, which latter comprises a narrow strip *d* from which projects a number of parallel separated arms *e*, the said body portion being riveted to the flanged heads so as to form a cylindrical body with a number of longitudinal openings *f* in or through the periphery. The arms *e* may be used without the connecting strip *d*, and fastened directly to the flanged spokes *g*. It will be noticed upon reference to Fig. 8 that the disk *c* is not only perforated at the center, but is provided with a number of arms or spokes *g* which are separated from each other to form openings *h*, which form, in effect, continuations of the peripheral openings *f*. Applied to the periphery of the frame or skeleton thus built up, are the knives *i* whose cutting edges project forwardly and slightly overhang the openings *f*. The outer ends of the knives extend toward the center of the head *c*,—over the outer face of the latter,—and project forwardly over the openings *h* in said head, in the same manner as the main body of the knives overhang the openings *f*. When the cutter is turned or rotated in the direction of the arrow, the knives will cut both along their straight edges and at their curved ends, and the material dislodged will be forced by the inclination of the knives into and through the openings *f* *h*, into the interior of the cutter, and through the central opening in head *b* into the suction pipe.

In order to properly sustain the suction pipe and ladder in their different positions, I mount upon the bow of the boat an A-frame, the separate legs *j* of which are pivoted at their lower ends to the forwardly-projecting portions of the bow, and connected at their upper ends where they are provided with a grooved sheave or sheaves *k*,—see Figs. 1 and 2,—the frame as a whole being steadied and supported by stays or rods *l*.

Secured to the upper face of the ladder is a frame *m* carrying a sheave or sheaves *n* about which and the sheave *k* above, passes the rope or chain *o*, which latter is controlled from the winch *p*. Under this arrangement the ladder and its suction pipe may be raised and lowered as desired, but cannot swing laterally.

Instead of placing the shafts *F* and *I* one above the other, as in Figs. 3 and 4, they may be placed one behind the other, as in Fig. 4^a, the shaft *F* in such case being provided with two gears *G' G'* which mesh with smaller gears *J' J'* upon the shaft *I*. Where this form of gearing is employed, the shaft *I* will be provided with sprocket wheels *J² J²* to receive chains which will be driven from any suitable motor.

At the rear end of the boat is a narrow vertical wellway *q*, or a suitably constructed outwardly projecting frame, in which works the push bar *Q'*, said bar being weighted and provided with a shoe at its outer end, as shown in Figs. 1 and 2. This bar *Q'*, which projects downward at an angle from the boat, is connected directly or indirectly with the piston rod *r* projecting from cylinder *R*, so that by means of a valve or valves controlling the admission of steam or water to the cylinder, the push bar may be reciprocated, or the bars may be reciprocated by ropes and sheaves or other means. Bar *Q'* is suspended by means of a rope or chain *s*, carried by an overhanging frame *t*, and may be raised or lowered as circumstances may require, the rope being released or relaxed during the pushing operation. At the rear of the boat there is also a vertically-moving spud *S*, which is controlled

in its movements by a steam or hydraulic cylinder, or winding drums.

In operation, the hoisting-rope *s* is relaxed, the push-bar moved outward, and the vertical spud then dropped. The push-bar is then raised preparatory to the next move.

Having thus described my invention, what I claim is—

1. In combination with a boat having a fixed elbow; a ladder pivoted to the elbow; a suction pipe carried by the ladder and having a curved end to fit the elbow; a rotatable pipe-section 10 provided with a cutter and a gear-ring *N*; a shaft extending lengthwise of the ladder and provided with a pinion *M* to engage the gear-ring; and means for rotating the shaft.

2. In combination with the boat having the curved elbow; the ladder provided with a suction-pipe having a curved end; a rotatable cutter carried by a rotatable section of the pipe; a gear-ring *N*; the shaft *F* provided with gears *G H*; the shaft *I* provided with gear *J*; and a shaft *L* provided with gears *M* and *Q*.

3. A cutter-body having the openings *f* and *h* in its periphery and end,—said openings *h* forming a continuation of the openings *f*,—in combination with knives extending lengthwise and over the end of the body, substantially as shown and described.

4. The herein-described cutter, comprising the flanged heads *b* and *c*; longitudinal arms *e*; and knives applied to the arms.

5. The herein-described cutter, comprising the flanged heads *b* and *c*; the body portion composed of strip *d* and arms *e*; and knives applied to the periphery.

6. In combination with a boat having a wellway, the supporting frame at the rear end; a push bar mounted therein; means for reciprocating said push bar, and a vertically-moving spud.

In witness whereof I hereunto set my hand in the presence of two witnesses.

LINDON W. BATES.

Witnesses:

R. N. FOWLER,

G. H. GLENDENING.