

(No Model.)

L. W. BATES.
DREDGER.

3 Sheets—Sheet 1.

No. 503,732.

Patented Aug. 22, 1893.

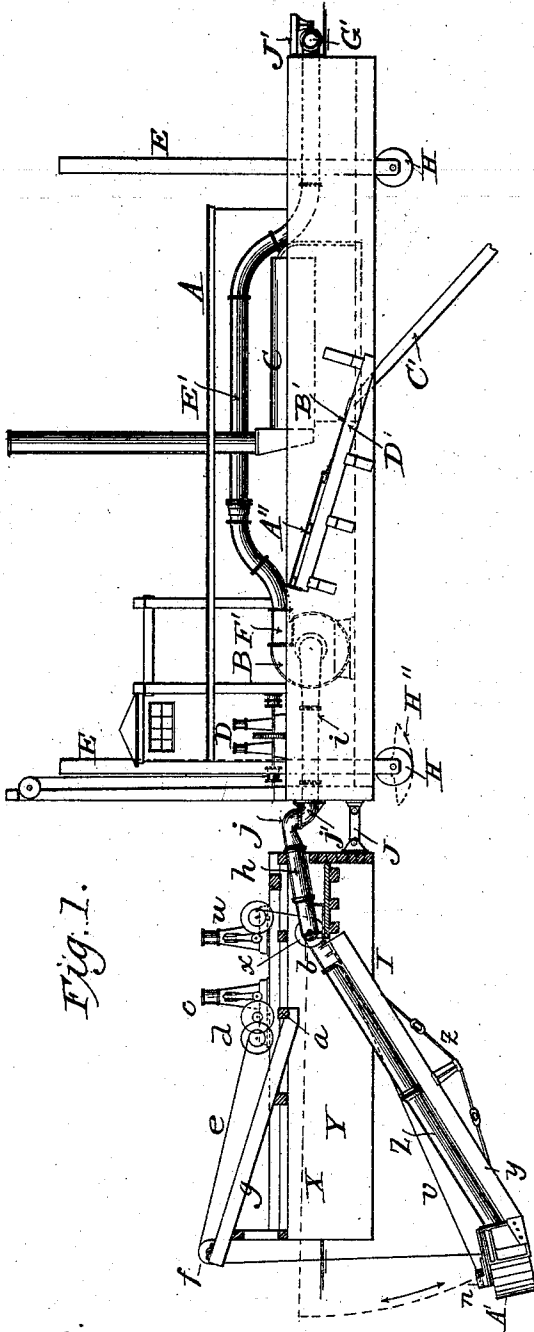


Fig. 1.

Witnesses:
Sidney P. Hollingsworth
Horace A. Dodge.

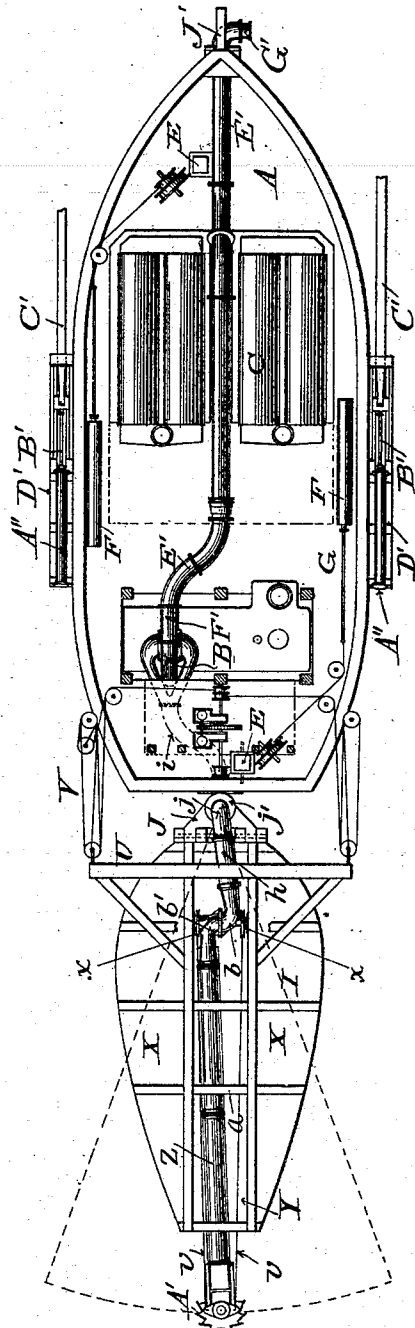


Fig. 2.

Lindon W. Bates,
Inventor,
by his attorneys,
Dodges Sons.

(No Model.)

3 Sheets—Sheet 2.

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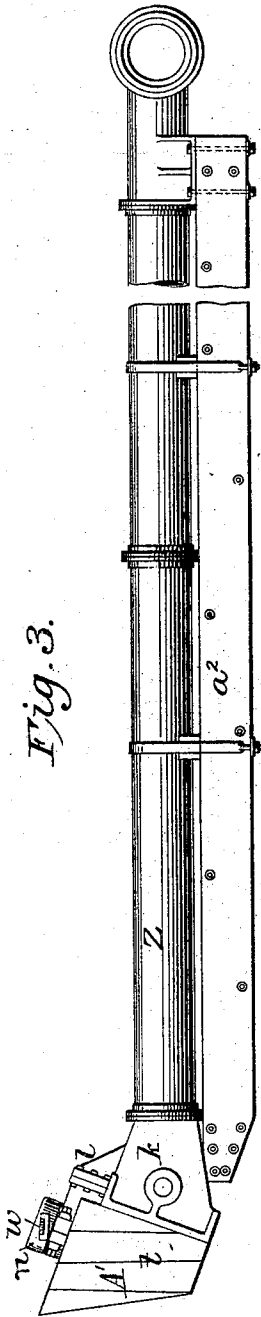


Fig. 6.

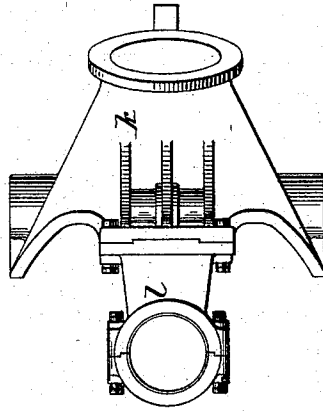


Fig. 8.



Fig. 7.

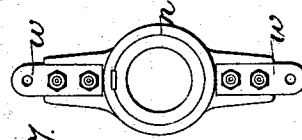


Fig. 4.

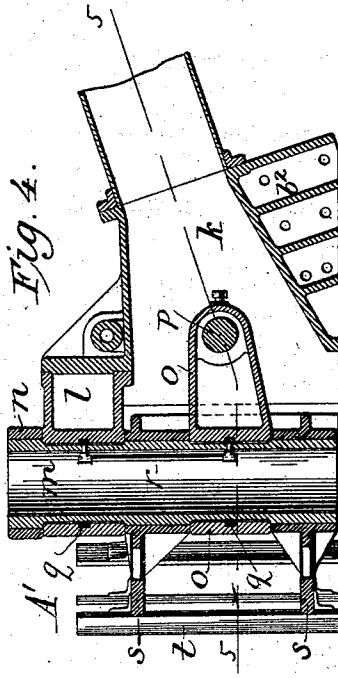
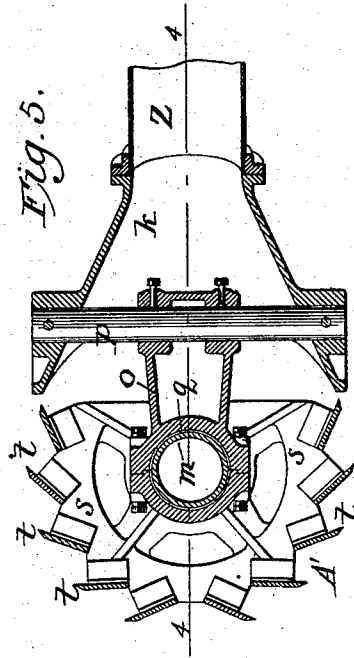


Fig. 5.



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3 Sheets—Sheet 3.

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Fig. 13

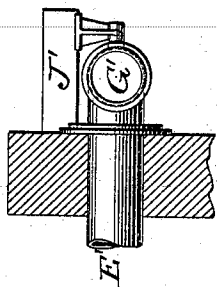


Fig. 14

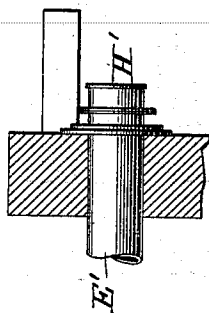


Fig. 15

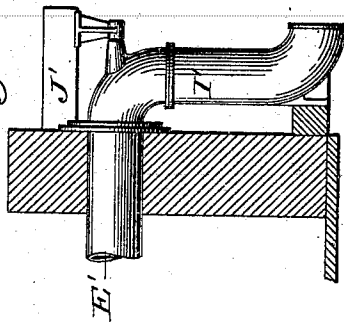


Fig. 10

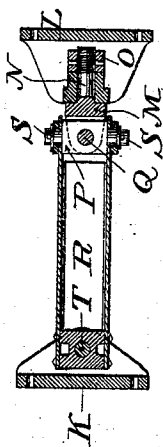


Fig. 11

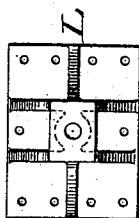


Fig. 12

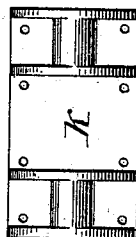
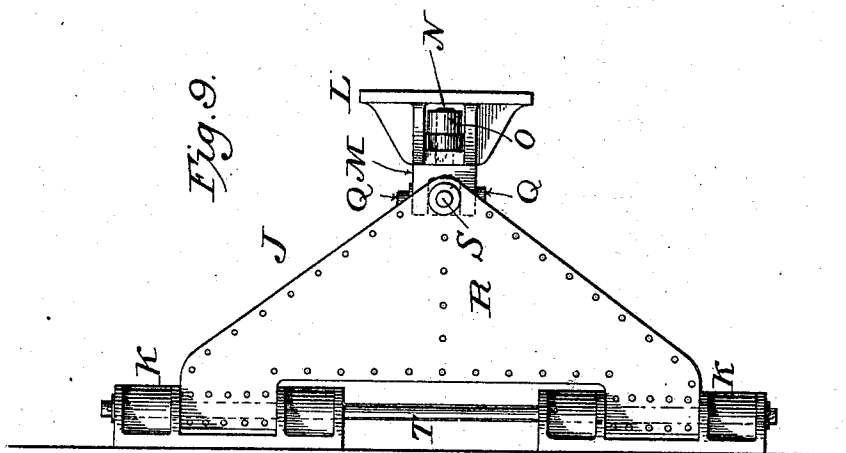


Fig. 9



Witnesses:
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UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF CHICAGO, ILLINOIS.

DREDGER.

SPECIFICATION forming part of Letters Patent No. 503,732, dated August 22, 1893.

Application filed May 5, 1892. Serial No. 431,936. (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 dredgers, and has reference more particularly to that class of machines in which the material to be excavated or removed is carried off or raised by hydraulic means.

In the drawings,—Figure 1 is a side elevation, partly in section of my improved dredger; Fig. 2, a top plan view; Fig. 3, a side elevation of the pivoted suction pipe and cutter; Fig. 4, a vertical sectional view through the cutter and the mouth-piece of the suction pipe; Fig. 5, a horizontal sectional view of the same; Fig. 6, a top plan view of the mouth-piece of the suction pipe; Figs. 7 and 8 respectively, plan and side views of the yoke secured to the cutter for oscillating the same; Figs. 9, 10, 11 and 12, views illustrating the construction of the connection between the dredger proper and the ponton; and Figs. 13, 14 and 15, views illustrating the connection at the rear end of the dredger proper for the discharging pipe.

A indicates the barge or dredger proper, which may be of any desired construction except as hereinafter particularly specified. This barge will be provided with such implements and apparatus as are usually employed upon such machines, among which might be mentioned the pump B by means of which the earth, &c., are raised and deposited where desired, the boilers C, the engines D, the spuds E, and the cylinder F having the pistons G, which latter are connected with the spuds so as to raise and lower them. These spuds E are each provided at the lower end with a wheel or roller H, which permits the dredge or barge to be advanced or receded, when necessary, without necessitating the raising of the spuds and the subsequent resetting of the same, the rollers or wheels easily riding along the bottom of the stream. In lieu of a wheel or roller a shoe H' shown by dotted lines in Fig. 1 may be employed.

I indicates a ponton which is connected by means of the universal joint or connection J,

to the front end of the dredge or barge A, as shown in Figs. 1 and 2, so that the said ponton may rise and fall, rock or oscillate, and may also be swung laterally with reference to the barge. This connection or joint J,—see Figs. 9, 10, 11 and 12—comprises a pair of plates K K secured to the rear face of the ponton; a plate L secured to the front face of the barge; a yoke M having a stem N swiveled horizontally in the plate L and secured thereto by nuts O; a block P mounted vertically between the arms of the yoke and adapted to swing or rock in a vertical plane upon the horizontal studs Q; a link or plate R secured at its rear end upon the vertical studs or pivots S of the block P, and secured at its forward end to the brackets K K by means of the pivot rod or bolt T. From this construction it will be seen that the ponton may rise and fall, not only upon the bolt or pivot T, but also upon the pivots Q; and it will also be seen that the said ponton may swing horizontally upon the pivots S and have a rocking or tipping movement upon the stem or axis N. The link or plate R is made narrow at its rear end so as not to interfere with the swinging of the ponton.

Projecting from the sides of the ponton near its rear end is a boom U, through or by means of which and the tackle V, the ponton may be swung laterally and held in its adjusted positions, this swinging mechanism being designed to be actuated by one of the engines D on the barge.

The ponton I to which I have already referred, and which is shown in Figs. 1 and 2, comprises two independent water-tight bodies X X, separated one from the other a distance to form the channel Y, but nevertheless connected by suitable cross-bars *a* so as to be in effect one structure with independent water-tight compartments.

Pivoted to the ponton and working vertically within its channel is the suction pipe or tube Z, the forward end of the tube or pipe being designed to be raised and lowered as desired. In order to effect this raising and lowering, I mount upon the ponton an engine *c* operating a winding or hoisting drum or mechanism *d* to which is secured one end of a chain or rope *e*. This chain or rope is connected at its opposite end to the forward

end of the tube or pipe Z, and passes over an intermediate sheave *f* carried at the upper end of the beam *g*, which beam, as shown in Fig. 1, projects upward and forwardly from the deck of the ponton. To the upper end of the pivoted suction pipe Z there is a short "hose" or section *h* which connects the said pipe Z with the pump supply pipe *i*, as shown in Figs. 1 and 2. The pipe or section *h* has at one end a downwardly turned portion *j* which connects with the up-turned end *j'* of pipe *i*, in such manner that while it effects a tight joint, it permits the ponton (and the parts carried thereby) to swing horizontally upon the joint as a center. At its opposite end the pipe or section *h* is provided with a lateral neck *b* which is connected to a corresponding neck *b'* on the upper end of suction pipe Z, the construction and arrangement being such that the suction pipe may be raised and lowered as desired. From this it will be seen that the weight of the pivoted suction pipe is borne entirely by the ponton; that the strain due to the raising and lowering of the said pipe is thrown entirely upon the ponton, and that instead of having to swing a large, heavy and unwieldy barge around to place the suction pipe at the desired point, it is only necessary to swing the light ponton. Instead of swinging the ponton from a boom at its rear end, it may be swung from such a boom at the forward end.

At the lower end of the pipe Z there is a mouth-piece *k* shown in Figs. 1, 3, 4, 5 and 6, which has bolted or otherwise secured to its upper face an arm or bracket *l* designed to serve the purposes of a bearing for the oscillating cutter A' whose tubular and circumferentially recessed hub *m* projects upward through the above bracket or arm *l* where it is provided with the yoke *n* shown in detail in Figs. 7 and 8. At the point between its ends, the hub is also encircled by a bearing bracket or arm *o* secured at its inner end to a rod or bar *p* carried by the mouth-piece *k*, as shown in Figs. 4 and 5. Each of these bearings *l* and *o* is provided with a circumferential groove *q*, which grooves are connected by a pipe *r* located within the tubular hub *m* and passing through the walls of the latter, as shown in Fig. 4, so as to supply a lubricant to the bearings. Secured to the hub or hollow shaft *m* are two plates, disks, or spiders *s* supporting the upright knives or blades *t*, which latter are bolted or otherwise secured to the spiders.

Upon reference to Fig. 5 it will be noticed that the blades do not extend entirely around the periphery of the spiders, and that one-half of the blades have their cutting edges facing one way while the other half have their cutting edges facing in the opposite direction. When the cutter is oscillated first in one direction and then in the other, the two sets of blades will operate alternately, and it is so disposed with reference to the mouth-piece *k* that when it is oscillated alternately in oppo-

site directions, some of the blades will enter the open front end of the mouth-piece from one side, while others enter from the other, thus bringing the loosened earth within the mouth-piece and in reach of the suction. The cutters may, however, be arranged at an angle to the axis as shown in Fig. 3; and knives may also be placed on the bottom edge so as to swing horizontally.

In order to effect the oscillation of the cutter, I employ an engine *u* (mounted upon the ponton) which is connected by the chains, ropes or rods *v v* with the arms *w w* of the yoke or collar *n*, as shown in Fig. 2; the said ropes or chains passing over sheaves or pulleys *x x* in line with the pivot or joint of the upper end of the pivoted pipe Z. Where rods are employed, the sheaves will be supplanted by elbow levers.

In Fig. 1, I have shown the pivoted pipe Z mounted in an open frame *y*, braced by truss-rods *z*; but in Fig. 3 there is shown bolted to the under side of the pipe a beam *a'* of wood or iron, which serves the same purpose as the frame and truss-rods.

Where the beam is employed, the mouth-piece *k* will be provided on its under side with webs or flanges *b'* to which the beam is bolted and which serve as a rest or support for the lower end of the pipe or tube when at work.

It frequently happens that the dredge-boat cannot be stopped at the exact point desired, and hence it becomes necessary to provide supplemental impelling devices for throwing either end of the boat around or for advancing the boat a slight distance. This device comprises a cylinder A'' secured upon the boat at any convenient point, but preferably on the sides as shown in Figs. 1 and 2. Within this cylinder works a piston whose rod B' is secured to the upper end of a push-rod C'. Of course the admission of fluid under pressure to the cylinder effects a movement of the boat and rods relatively to each other. The piston-rod B' travels in suitable guides D', and the push-rod is hinged or pivoted to said rod B' so that it, the push-rod, may be raised and lowered by any suitable mechanism when desired.

The rear end of pipe E' is adapted to receive a lateral elbow or pipe G' as shown in Fig. 13; a straight pipe or section H' as shown in Fig. 14; or a downwardly and rearwardly projecting extension I' as shown in Fig. 15. Under the latter arrangement the water discharged through the pipe I' will effect the propulsion of the boat. Where a lateral or downward pipe is applied to pipe E', it will be found advisable to employ a bracket J' which shall aid in holding the pipe sections in place. These parts G', H' and I' are removable and interchangeable and may be applied to the pipe E' without in any manner disturbing the latter. When the pipe I' is used it will generally be employed in connection with the curved elbow G', which lat-

ter will then be turned down to the position shown in Fig. 15. The suction pipe may be borne in part by the main barge or boat,—making the horizontal and vertical ladder movement from the main boat; but the outer end of the ladder should be supported by the ponton.

Having thus described my invention, what I claim is—

10 1. In a dredging machine, the combination with a dredger or barge having a pump, of a ponton connected with the barge, and a suction pipe carried by the ponton and connected with the pump.

15 2. In combination with the barge, a ponton pivotally connected thereto so as to swing laterally, and a suction pipe mounted upon the ponton.

20 3. In combination with the barge, a ponton connected thereto, and a suction pipe pivoted in the ponton.

4. In combination with the barge, a ponton pivoted thereto so as to swing laterally, and a suction pipe pivoted in the ponton.

25 5. In combination with the barge, a ponton connected thereto, a suction pipe pivoted in the ponton, and means located upon the ponton for raising and lowering the suction pipe.

30 6. In combination with the barge, a ponton connected thereto and provided with the vertical space or channel Y, and a suction pipe mounted within the channel.

35 7. In combination with the barge and the ponton, the herein-described connection J comprising the following elements: brackets K and L secured respectively to the ponton and barge; a plate or link R pivotally connected to brackets K; a block P swiveled vertically in the link or plate R, and horizontally in a yoke M, and the said yoke M swiveled in the bracket L.

40 8. In combination with the barge and a ponton connected therewith, a suction pipe

mounted in the ponton, a cutter carried by the pipe, and means located upon the ponton 45 for actuating the cutter.

9. In combination with the suction pipe Z, the cutter A' provided with the knives or cutting blades *t*, a portion of which face in one direction and the others in the opposite direc- 50 tion.

10. In combination with the suction pipe Z, the mouth-piece *k* provided with bearings *l* and *o*, the cutter A' journaled therein; the yoke or collar *n* secured to the shaft of the 55 cutter and provided with arms *w w*, the rods or chains or wire rope *v* secured to the arms and means for actuating them.

11. In combination with the ponton, the pivoted pipe Z carrying the oscillating cutter 60 A', the yoke or collar *n* and the rods or chains *v* for actuating the cutter, and the sheaves or pulleys *x*, substantially as and for the purpose set forth.

12. In combination with a dredge-boat A, 65 and spuds carried thereby, the push-rods C' and the pistons and cylinders for actuating the same.

13. In combination with the ponton, the pivoted suction pipe Z provided at its upper 70 end with a lateral neck *b'*; a hose or pipe *h* affixed in position in the ponton and provided at one end with a lateral neck *b* to engage the neck *b'*, and at its opposite end with a downwardly-turned neck *j*; a boat, and a 75 pipe *i* fixed in position within the boat and provided with an upwardly turned neck *j'* to engage the neck *j* of pipe *h*, all substantially as shown and described.

In witness whereof I hereunto set my hand 80 in the presence of two witnesses.

LINDON W. BATES.

Witnesses:

A. J. DIGGINS,
J. A. FABER.