(No Model.)

3 Sheets—Sheet 1.

L. W. BATES.

HYDRAULIC DREDGER.

No. 576,250. Patented Feb. 2, 1897.

Fig 1

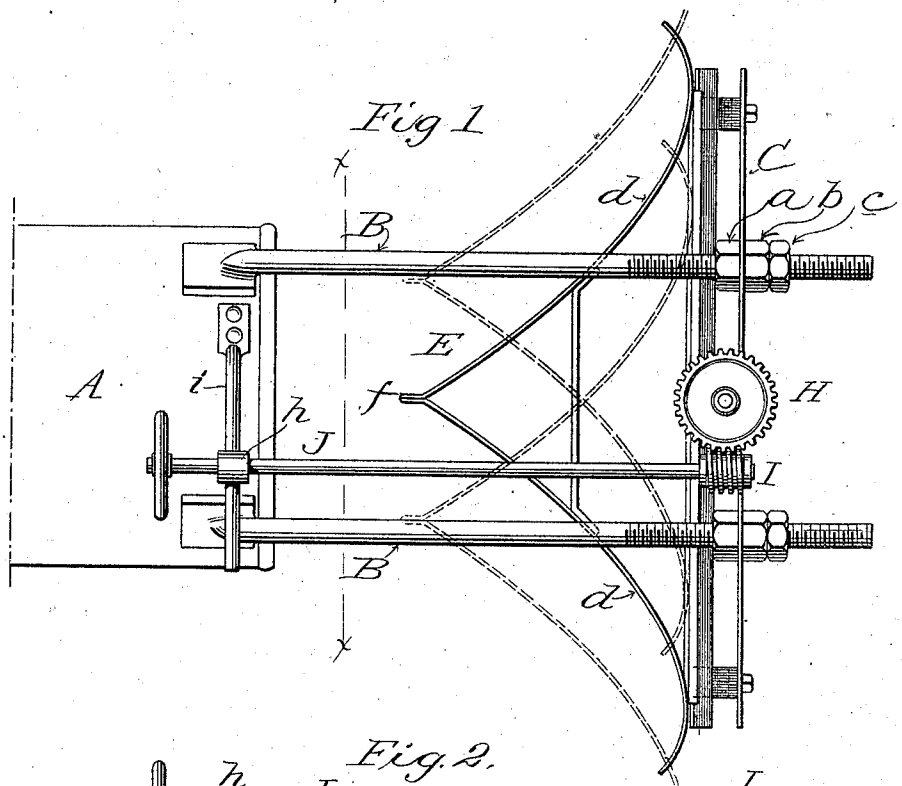
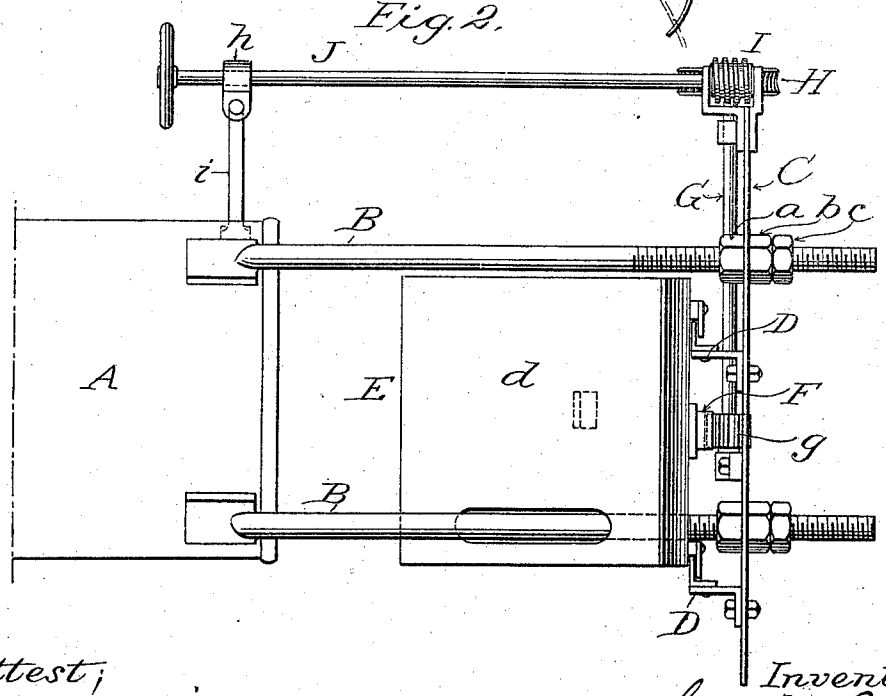


Fig. 2.



Attest;
W. C. Burdine
D. C. Burdine.

Inventor;
Linden W. Bates,
by Dodger Sons Atty's

(No Model.)

3 Sheets—Sheet 2.

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Fig 3.

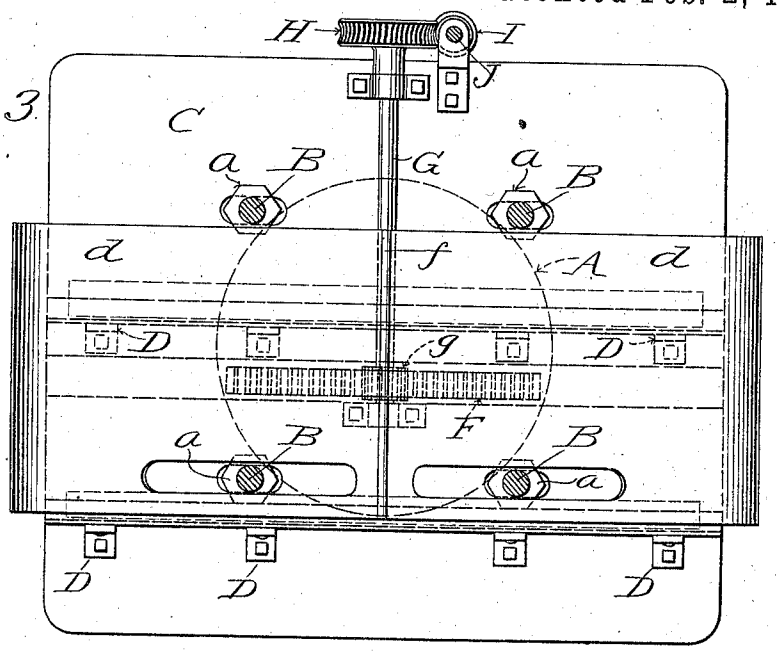
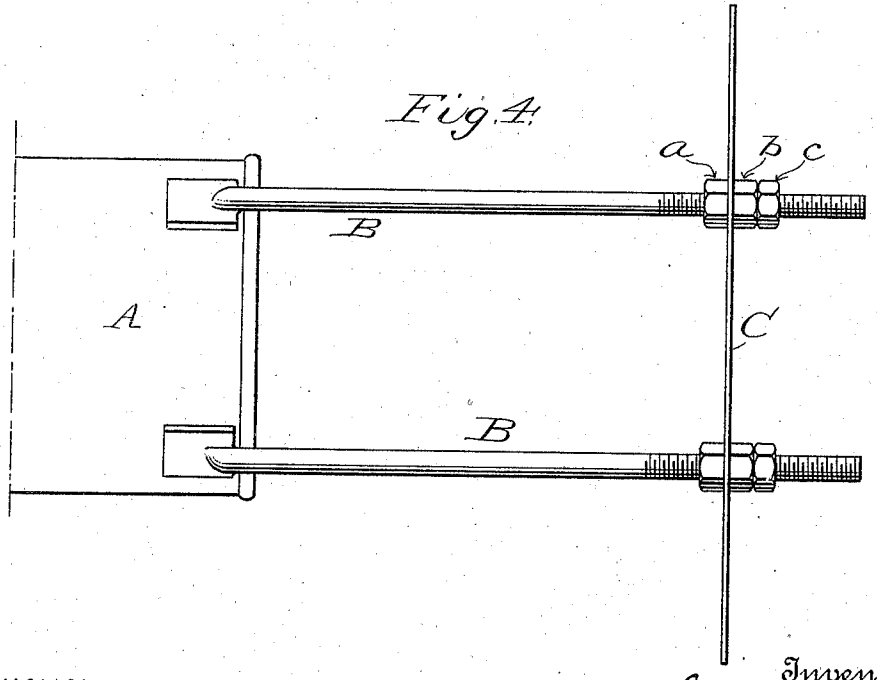


Fig 4.



Witnesses
W. C. Burdine.
D. E. Burdine

Inventor:
Linden W. Bates,
by Dodger Sons,
Attorneys.

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Fig. 5

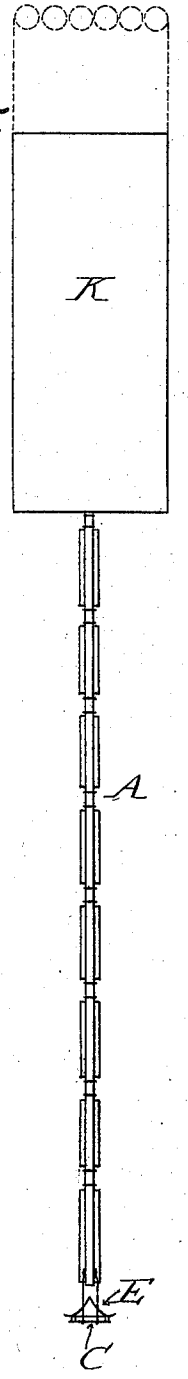
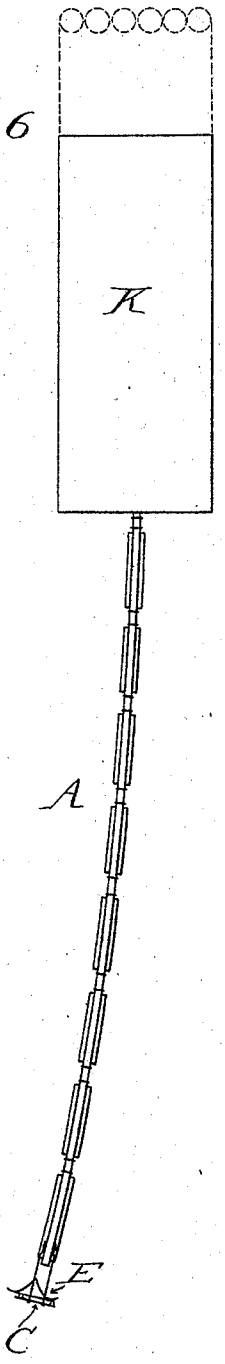


Fig 6



Witnesses
D. E. Burdine
W. C. Burdine

Inventor:
Linden W. Bates,
by Dodger Sons,
Attorneys.

UNITED STATES PATENT OFFICE.

LINDON W. BATES, OF CHICAGO, ILLINOIS.

HYDRAULIC DREDGER.

SPECIFICATION forming part of Letters Patent No. 576,250, dated February 2, 1897.

Application filed June 12, 1896. Serial No. 595,328. (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 Hydraulic Dredgers, of which the following is a specification.

My invention relates to hydraulic dredgers, and more particularly to a baffle-plate to be used in connection with the discharge or delivery end of the pipe through which material is discharged from the dredge.

The purpose of the invention is to provide means whereby the delivery-pipe, and especially its discharge end, may be maintained in proper position, notwithstanding the currents, tides, and wind or wave motion of the water over which the discharge-pipe extends and upon which it is sustained.

In the accompanying drawings, Figure 1 is a top plan view of the rear extremity of a discharge-pipe, showing the baffle-plate and its supporting and adjusting devices in position; Fig. 2, a side elevation of the same; Fig. 3, a vertical cross-section on the line *x x* of Fig. 1; Fig. 4, a top plan view showing the backing-plate without the adjustable deflector, and Figs. 5 and 6 diagrammatic views illustrating the operation of the device.

In employing hydraulic dredgers it is the present practice to conduct the dredged material either to a dumping-ground at one or the other side of the basin dredged, to another part of the stream or basin, or to scows conveniently located to receive the material, the discharge-pipe in such cases being supported by floats or pontoons lying upon the surface of the water.

Where there are strong currents or wave motion, it is found difficult to maintain the discharge-pipe in proper position, and ordinarily it is necessary to employ anchoring devices or an anchored scow or float to hold the discharge end of the pipe at the proper point. This is inconvenient, adds to the expense of operations, and involves considerable labor and the loss of time in changing the position and in reanchoring the delivery end of the pipe.

My invention aims to render the anchorage unnecessary and to place the discharge-pipe under the ready and certain control of the attendants by utilizing the force or pressure of the escaping stream or body of material acting against a suitably-constructed baffle-plate or deflector, and thereby tending, first, to straighten or elongate the jointed discharge-pipe, and, secondly, to deflect or carry to one side or the other the delivery end of the pipe. The form and the details of construction of this baffle-plate may vary. When intended only to keep the discharge-pipe straightened out, a mere flat plate may be found sufficient, but in practice I prefer to employ a substantially V-shaped deflector or one composed of two curved plates or surfaces uniting at an angle, the curves being such as to occasion but little friction and being modified or varied according to the degree of back pressure which it is desired to throw upon the plate or deflector.

In Fig. 1 I have represented the preferred form and construction of the device, the deflector being constructed of two plates having in horizontal section the form of the well-known Schiele frictionless curve, except that the outer edges or extremities are turned forward to cause the outflowing stream or current to act more effectively upon the deflector to move or press the same backward.

Describing the construction in detail, A indicates the rear end of a discharge-pipe, which in practice will be made up of a series of sections or lengths, as in Fig. 5, connected at their ends by flexible collars or sleeves and floated upon pontoons or specially-constructed floats, as is now the common practice. Firmly secured to and projecting rearwardly from the delivery end of pipe A are four heavy rods B, each of which is screw-threaded at its rear or outer end and for a suitable distance inward therefrom.

C indicates a plate, preferably of metal, provided with four perforations spaced to correspond with the spacing or arrangement of the rods B and designed to permit the plate to be passed over or upon said rods, as shown in Figs. 1 to 4. Before placing the plate C in position upon the rods heavy nuts *a* are screwed thereon in proper position to form stops or abutments to determine the point to which the plate C may be moved inward and

to sustain the plate against further movement in that direction. Outside or in rear of the plate C the rods are provided with clamping-nuts *b* and jam-nuts *c*, by which the plate may be bound and securely locked upon the rods in the desired position, as indicated in Fig. 4.

If it be desired only to utilize the backward pressure of the discharged stream from pipe A to straighten the pipe and insure a relatively free escape, the backing-plate C may be used without further attachment, being set nearer to or farther from the delivery end of the pipe, as found expedient. If, however, it be necessary or desirable to provide for determining and maintaining the position of the discharge end of the pipe, there will be secured to the plate C, on its inner face or upon that side nearest to the delivery end of pipe A, suitable guides or ways D, which may be conveniently made of angle-bars and brackets, the bars being riveted or otherwise secured to the brackets and the brackets bolted or made fast to plate C.

E indicates the baffle-plate or deflector proper, composed of two curved plates or surfaces *d*, meeting in a vertical rib or edge *f*, Fig. 1. The body of each of the plates *d* is curved, according to well-known rules or formula, to offer the minimum amount of friction to a stream or current of material gliding over or in contact with its surface. This curvature may be maintained throughout the entire surface of each of the plates, especially if the device is to be used in a stream where the current is always in one direction and where said current will be sufficient to keep the discharge-pipe properly stretched or straightened. When, however, it is necessary to provide additional means for keeping the pipe elongated or straightened, the outer edges of the plates *d* may be curved forwardly, as shown in Figs. 1 and 2, thus giving the escaping or outflowing stream or current a better hold upon the deflector and causing said current to press back upon the deflector sufficiently to insure the result mentioned.

In order that the force of the outflowing stream or current may be made to oppose and counteract the deflecting tendency of the natural currents of the stream, the tide, or the wind, and that the force of this opposing action may be varied and controlled, the deflector E is made adjustable across the path of the discharge-current from pipe A; or, in other words, it is adapted to be moved from side to side, so that the outflowing current or stream from pipe A shall act at one or the other side of the rib or edge *f* to a greater extent than at the other side. In some cases it may be found expedient to so adjust the deflector that all of the outflowing stream shall act upon one face or plate *d* of the deflector, thereby exerting its entire force or lateral pressure in throwing or in pressing the delivery end of the pipe A to one side. The dotted lines in Fig. 1 indicate the adjustments of the deflector to opposite extremes, while the full lines indicate the medial position. If the deflector be thrown to its extreme position to the right, the escaping stream or current, acting upon the left face of the deflector, will tend to press or urge the deflector, and consequently the pipe A, to the right. If adjusted to the left or lower position, (indicated in Fig. 1,) the deflector will receive the outflowing stream or current upon the right or upper face *d* of the deflector, and the deflector and pipe will consequently be pressed to the left. When the deflector is in its medial position, (indicated in full lines in Fig. 1,) the outflowing stream or current will be evenly divided, and, acting upon the two faces *d* alike, will have no tendency to move the pipe laterally, the two forces counteracting each other.

For the purpose of shifting the deflector and of holding it in its adjusted position I provide, preferably, the mechanism shown in Figs. 1, 2, and 3, though equivalent devices may obviously be used for the purpose. As shown in said figures, a toothed bar or rack F is secured to the back of the deflector E, and a vertical shaft G, carried in suitable bearings on the plate C, is provided with a pinion *g*, which meshes with and gives motion to the rack, and consequently to the deflector, when the shaft G is turned.

H indicates a worm-wheel keyed or otherwise made fast upon the shaft G, and I a screw or worm meshing with and serving to give motion to wheel H, and consequently to shaft G and pinion *g*. The worm or screw I is carried by a shaft J, one end of which is supported in suitable bearings at the upper edge of plate C and the other end of which passes through a supporting sleeve or collar *h*, pivotally supported upon a standard *i*, rising from the rear section of pipe A. The sleeve *h* is loosely fitted upon a horizontal arm of the supporting-standard *i* and is free to slide thereon and also to rock or tip, so that there shall be no cramping or binding of the shaft J in the sleeve *h*, through which sleeve the shaft is free to move longitudinally. This provision is made in order that there shall be no twisting, cramping, or binding of the shaft in the event of the plate C getting out of its normal adjustment relatively to pipe A.

It is obvious that any equivalent mechanism may be substituted for the adjusting devices herein described, though that shown is found in practice to answer very well.

In Figs. 5 and 6 I have indicated diagrammatically the action of the device, Fig. 5 showing the deflector set at its medial position, and consequently holding the pipe straight and directly astern from the dredge *k*, while in Fig. 6 the deflector is shown thrown to its extreme adjustment to the left, and the

pipe A is shown deflected in the same direction by reason of the outflowing current pressing upon the right face of the deflector.

The deflector is of course slotted, as indicated in Fig. 3, to permit it to move over or upon the lower rods B, which pass through it; but its upper edge being below the upper rods B does not require to be perforated. I do not, however, limit myself to this precise construction, as the deflector may clear all of the rods or they may all pass through the deflector, though the arrangement indicated will be found best for ordinary working conditions. The number of rods may obviously be varied.

The holes in plate C will be elongated to permit said plate to be set at different angles, if desired, in which case the deflector E may be omitted; but ordinarily it is deemed advisable to use said deflector.

The term "pipe" is used throughout the specification to indicate a flexible pipe-line or discharge-pipe, whether jointed or not and however supported upon the water. As above indicated, the deflector tends to give rigidity to the pipe or pipe-line and to maintain the form and position given it to cause delivery at a predetermined point.

Having thus described my invention, what I claim is—

1. In combination with the discharge-pipe of a dredge, a baffle-plate adapted to receive the impact or the pressure of the outflowing current from said pipe at variable angles, substantially as and for the purpose set forth.

2. In combination with the discharge-pipe of a dredge, an adjustable deflector or baffle-plate adapted to receive the pressure of the stream delivered by said pipe, and thereby to determine the position of the pipe.

3. In combination with the discharge or delivery pipe of a dredge, a baffle-plate or deflector having diverging faces, and adapted to divide the stream flowing from the delivery-pipe, and to direct the same to opposite sides thereof.

4. In combination with the discharge-pipe of a dredge, an adjustable deflector having diverging surfaces and adapted to be adjusted laterally across or relatively to the discharge end of the pipe, whereby the outflowing stream may be divided and caused to pass to opposite sides in any desired proportions.

5. In combination with the discharge-pipe of a dredge, a deflector having a central dividing rib or edge *f*, and diverging curved faces *d*.

6. In combination with the discharge-pipe of a dredge, an adjustable deflector having a central dividing rib or edge *f* and diverging curved faces *d*.

7. In combination with the discharge-pipe of a dredge, a deflector having a central dividing rib or edge and diverging curved faces with forwardly-turned edges, substantially as and for the purpose set forth.

8. In combination with the discharge-pipe of a dredge, a laterally-adjustable deflector having a central dividing rib or edge and diverging curved faces with forwardly-turned edges, substantially as and for the purpose set forth.

9. In combination with the discharge-pipe of a dredge, a series of rods projecting rearwardly therefrom, and a plate secured upon said rods and adjustable to varying angles relatively to the axis of the discharge-pipe.

10. In combination with the discharge-pipe of a dredge, a series of rods projecting rearwardly therefrom, and a plate secured upon said rods in a plane transverse to the axis of the discharge-pipe, and adjustable toward and from said pipe.

11. In combination with discharge-pipe A, rods B, plate C carried by said rods, and guides or ways upon said plate; deflector E mounted upon said guides or ways; and means substantially as shown for moving the deflector upon said ways.

12. In combination with discharge-pipe A, rods D, and plate C provided with guides or ways; deflector E provided with rack-bar *f*; shaft G provided with pinion *g* and worm-wheel H; and shaft J provided with worm or screw I, all substantially as shown.

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

LINDON W. BATES.

Witnesses:

WILLIAM W. DODGE,

HORACE A. DODGE.