No. 716,173.

Patented Dec. 16, 1902.

L. W. BATES.

SUCTION DREDGE.

Application filed Aug. 28, 1900.)

(No Model.)

3 Sheets—Sheet 1.

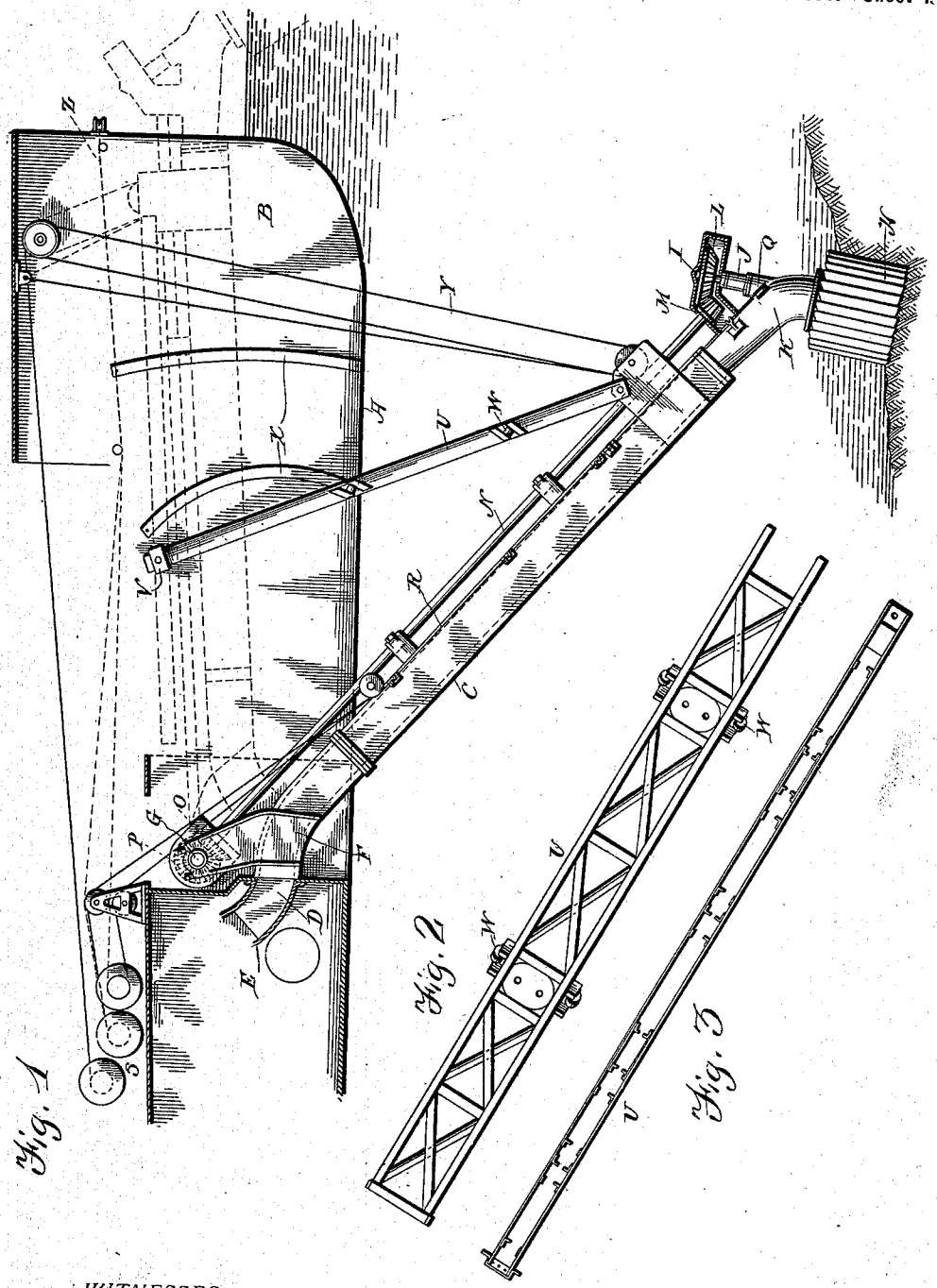


Fig. 1

Fig. 2

Fig. 3

WITNESSES

J. E. Hartmann

D. E. Burdine

INVENTOR:

Lindon W. Bates

by Dodge and Sons

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 716,173.

Patented Dec. 16, 1902.

L. W. BATES.

SUCTION DREDGE.

(Application filed Aug. 28, 1900.)

(No Model.)

3 Sheets—Sheet 2.

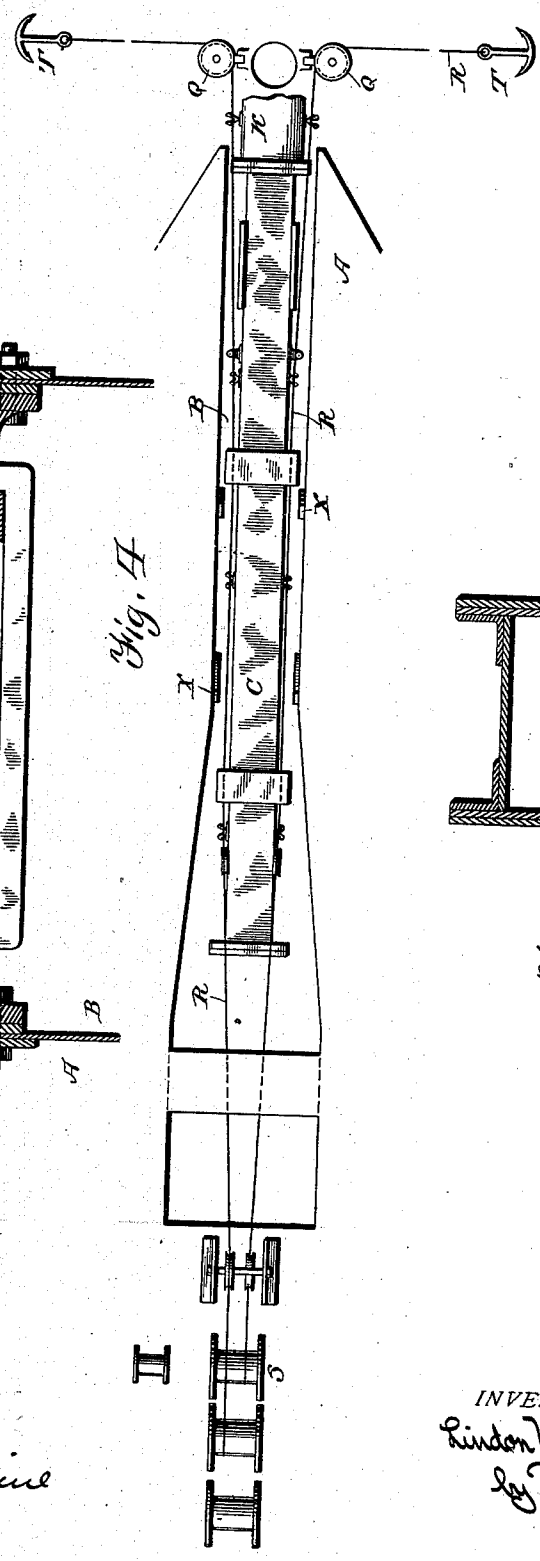


Fig. 4

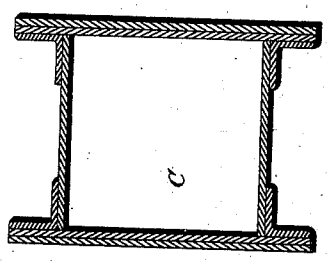


Fig. 5

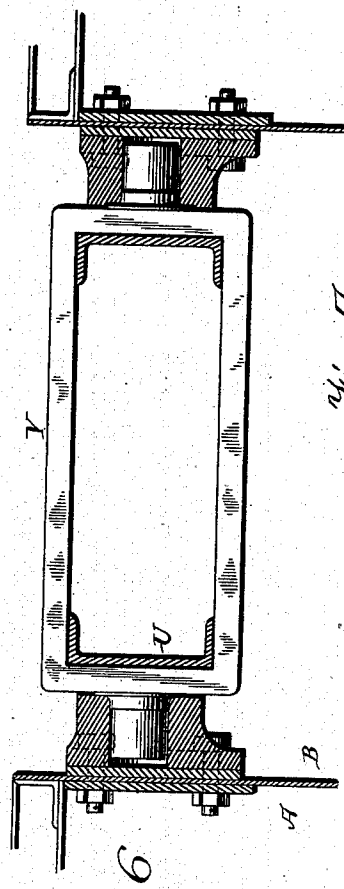


Fig. 6

WITNESSES

D. L. Gammon

D. E. Burdine

INVENTOR:

Linden W. Bates

by Dodge and Sons

Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 716,173. Patented Dec. 16, 1902.

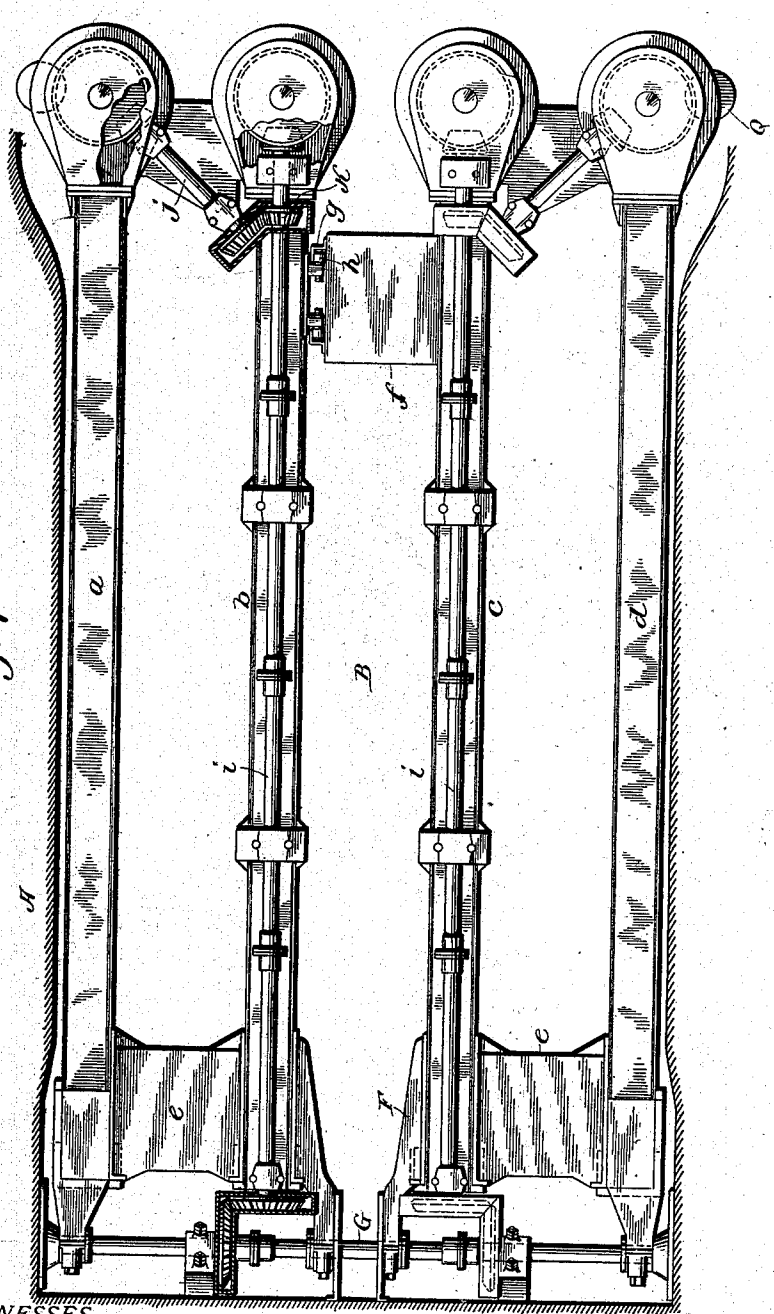
L. W. BATES.

SUCTION DREDGE.

(Application filed Aug. 28, 1900.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 7



WITNESSES

D. L. Jenkins,

D. E. Burdine.

INVENTOR:

Lindon W. Bates,

by Dodge and Sons,

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LINDON WALLACE BATES, OF CHICAGO, ILLINOIS.

SUCTION-DREDGE.

SPECIFICATION forming part of Letters Patent No. 716,173, dated December 16, 1902.

Application filed August 28, 1900. Serial No. 28,338. (No model.)

To all whom it may concern:

Be it known that I, LINDON WALLACE 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 Suction-Dredges, of which the following is a specification.

My present invention relates to suction-dredges, and has reference more particularly to the suction mechanism employed in connection therewith.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation, partly in section, of so much of a dredge and suction device as is necessary to a clear understanding of the structure; Figs. 2 and 3, detail views of the strut used in connection with the suction device; Fig. 4, a top plan view of a single suction device, showing its position in the wellway; Fig. 5, a cross-sectional view of the suction device or ladder; Fig. 6, a detail view of the guide for the strut, and Fig. 7 a top plan view showing a battery of suction devices.

The main object of my invention is to provide a suction pipe or ladder for hydraulic dredges of sufficient strength to withstand all strains to which it may be subjected, and this without any extraneous supporting device.

Suction-ladders as hithereto made have generally consisted of a suction-pipe carried on a suitable structure for taking the weight of the suction-pipe and the strains to which it is subjected when the dredge is performing different operations. With the present construction this independent support is done away with.

Referring first to Figs. 1 to 5, inclusive, A designates so much of the hull of a vessel as is necessary to a clear understanding of the invention, having a wellway B formed in one end thereof. The suction-pipe C carries a bend D at its upper end, which bend works telescopically in the fixed end E of the suction-pipe of the vessel. The suction-pipe C in the form illustrated comprises a hollow box-girder preferably constructed of steel plates, a cross-section of which is shown in Fig. 5. It is made of sufficient strength to withstand all of the strains to which it is subjected and takes the place of the ordinary suction pipe and ladder hitherto employed. To maintain the upper end of the suction-pipe C in position, brackets or hangers F are used, which have their bearings upon a cross-shaft G. The axis of this shaft coincides with the center of the telescopic joint, so that the suction pipe or ladder is free to perform radial movements about this axis.

The lower end of the ladder or suction-pipe is provided with a cutter H, which in the form illustrated stands at an angle to the axis of the suction-pipe, though it is manifest that any form of cutter may be employed. If the form shown is used, then rotary motion is imparted thereto by a shaft I, which extends through a thrust-block J, formed upon the lower member or fitting K. A bevel-gear L, mounted upon the outer end of the shaft I, meshes with a bevel-pinion M, carried by the lower end of a shaft N, the upper end of which is provided with a bevel-gear or spur O, which in turn meshes with a gear P, mounted upon the cross-shaft G. Any suitable means may be employed for imparting motion to shaft G. Where cutters of a different type are used, the gear will be modified accordingly, as will be understood by any one skilled in the art.

The lower member or casting K is provided upon each side with a sheave Q, about which passes a cable or cables R, leading to a suitable warping-engine S, mounted upon the vessel, and to anchors T or other suitable devices at the outer end of the cable, as best indicated in Fig. 4. By manipulation of the engine the suction-pipe or ladder, together with the boat, may be shifted laterally, the construction of the suction-pipe being sufficiently rigid to permit this strain to be placed upon it. Owing to the position of the sheaves, this strain is transmitted in the most direct manner to the cutter. The ladder or suction-pipe, brackets, or hangers, and the shaft and bearings of the brackets are of sufficient strength to transmit the strain from these sheaves to the ship; but an additional means of doing this is provided by a strut or guide U. Said strut U, preferably built up of angle-pieces, as indicated in Figs. 2 and 3, is pivotally connected at its lower end to the

suction-pipe C. The upper end of the strut passes through a swivel-block or tumbler V, mounted in the wellway. Guide-rollers W are also placed upon the sides of the strut and bear upon tracks or ways X, formed or placed upon the walls of the wellway. Mounting the strut in this manner permits it to adapt itself to the varying positions of the suction-pipe. Any lateral strain thrown on the ladder is transmitted to this strut and through the guide-rollers to the sides of the wellway, thus relieving the shaft and the hangers or brackets and their bearings from strain to a considerable degree.

Suitable mechanism for raising the ladder or suction-pipe will be employed—such, for instance, as a chain or cable passing about a sheave mounted upon the lower end of the ladder and any suitable hoisting-engine upon the boat. Instead of employing the cables R for shifting the cutters and boat laterally independent cables Z may be employed for bringing about this result or assisting in doing so.

While the cross-section of the suction-pipe is shown as rectangular, it is manifest that other forms of pipe may be employed, so long as they possess the required degree of stiffness and rigidity, and I do not, therefore, desire to limit myself to the rectangular shape.

In Fig. 7 is illustrated a battery of suction-pipes constructed in accordance with the present invention. In said figure the suction-pipes *a b* and *c d* are connected in pairs, respectively, by the distance-plates *e*. Each pair is in turn held in its proper position relatively to the other by a distance-plate *f*, connected to one member, as, for instance, *c*, said distance-plate being provided with guides *g*, which work in conjunction with rollers *h*, carried by the corresponding member *b*, of the opposite pair of suction-pipes. The guide-plates *g* will of course be formed upon a circle struck from the center of motion of the two ladder systems—viz., the common axis of the hangers for said ladders or suction-pipes. It will be seen from this that each pair of ladders may assume a position either above or below the other pair, a disposition which is desirable in many cases. These distance-plates, both rigid and movable, serve to strengthen and brace the suction-pipes.

It will be seen upon reference to Fig. 7 that but two main shafts *i* are mounted upon the suction-pipes, the cutter of the companion pipe being driven by suitable gearing mounted upon a short cross-shaft *j*, which derives its motion from a bevel-gear *k*, mounted upon the shaft *i*. While four of the suction-pipes are shown in Fig. 7, it is manifest from said figure that two of said pipes may be employed alone. If the two suction-pipes are to be worked rigidly together, then the intermediate distance-plate *f* will be dispensed with. If, however, it is desired to use two of the suction-pipes, so that they may have an independent movement, the outer members *a d* will be discarded, together with the short shafts and the distance-plates *e*, the intermediate distance-plate *f* being retained. With the construction shown in Fig. 7 the cutter-mountings on the outside ladders are provided with sheaves for swinging lines, and the strain produced by these is distributed over the whole system of ladders and bearings through the distance-pieces between the various ladders, whether they be rigid or sliding connections. Struts similar to those decribed for the single ladder may also be employed, with necessary modifications.

Having thus described my invention, what I claim is—

1. In combination with a dredge, a hollow box-like suction-pipe; a telescopic connection intermediate said pipe and the dredge; a strut pivotally connected to the suction-pipe; and a swivel-bearing for the upper end of said strut.

2. In combination with a dredge, a box-like suction-pipe; a telescopic connection intermediate said pipe and the dredge; a strut pivotally connected to the lower end of the suction-pipe; a swivel-bearing mounted in the wellway of the dredge for the upper end of said strut; and rollers mounted upon the strut adapted to bear against the walls of the wellway.

3. In combination with a dredge, a pair of rigid suction-pipes; cutters mounted upon the ends of said suction-pipes; an operating-shaft mounted upon one of said suction-pipes; and connections intermediate said shaft and the cutters for operating the latter.

4. In combination with a dredge, a pair of rigid suction-pipes flexibly connected thereto; means for maintaining the pipes at the same distance apart as they are raised or lowered one independent of the other.

5. In combination with a dredge, a series of rigid, independent suction-pipes flexibly connected thereto; and means for maintaining the suction-pipes their proper relative distance apart.

6. In combination with a dredge provided with a wellway, a shaft extending across said wellway; a series of rigid, independent suction-pipes journaled upon said shafts; and means acting in conjunction with said suction-pipes to shift said pipes and the dredge laterally.

7. In combination with a dredge provided with a wellway, a shaft extending across said wellway; a pair of rigid suction-pipes journaled upon said shaft; a second pair of rigid suction-pipes likewise journaled upon the shaft; and means carried by said pipes to maintain each pipe of each pair and each pair of pipes their proper relative distance apart, and to likewise distribute the strain placed upon said pipes throughout the entire system, substantially as described.

8. In combination with a dredge provided with a wellway, a shaft extending across the same; a pair of rigid suction-pipes journaled

upon said shaft; a second pair of rigid suction-pipes likewise journaled upon the shaft; a distance-plate carrying guides secured to one pair of said pipes; and rollers carried by the other pair of suction-pipes adapted to act in conjunction with said guides.

9. In combination with a dredge provided with a wellway; an operating-shaft extending across the same; a pair of rigid suction-pipes journaled upon said shaft and permanently secured to each other; a second pair of rigid suction-pipes journaled upon said shaft and likewise rigidly secured to each other; a distance-plate provided with guides secured to one pair of said suction-pipes; guide-rollers secured to the opposite pair; cutters carried by said suction-pipes; and connections intermediate the said cutters and the operating-shaft.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LINDON WALLACE BATES.

Witnesses:

EDMUND S. SNEWIN,

WM. O. BROWN.