No. 725,818. PATENTED APR. 21, 1903.

L. W. BATES.

CUTTER FOR SUCTION DREDGES.

APPLICATION FILED OCT. 19, 1900

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

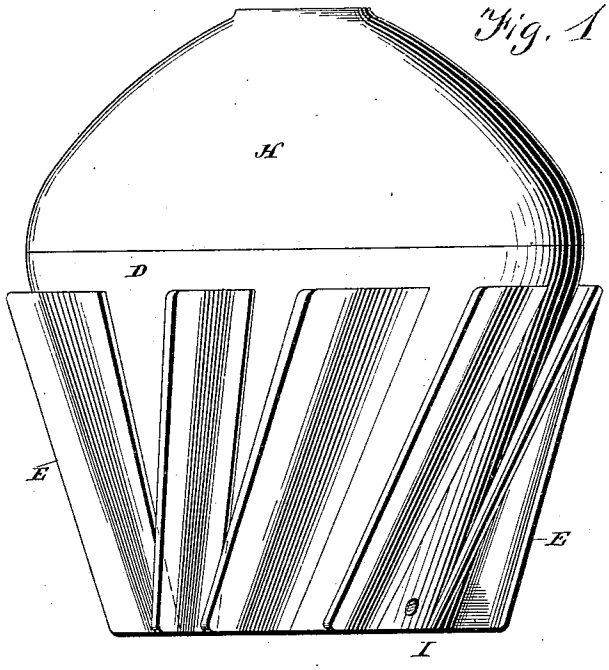
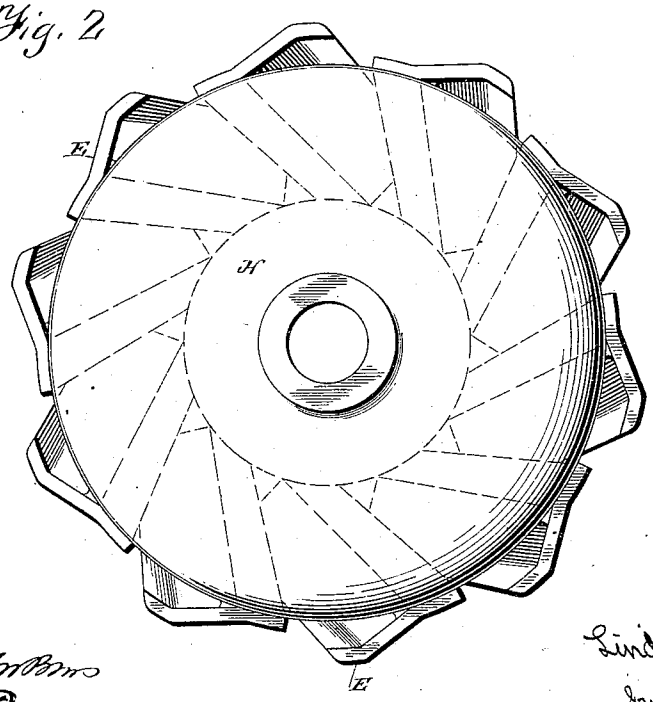


Fig. 2



Witnesses;
D. L. Johnson
J. M. Pond.

Inventor:
Linden W. Bates,
by Dodge & Son,
Attorneys.

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

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NO MODEL. 2 SHEETS—SHEET 2.

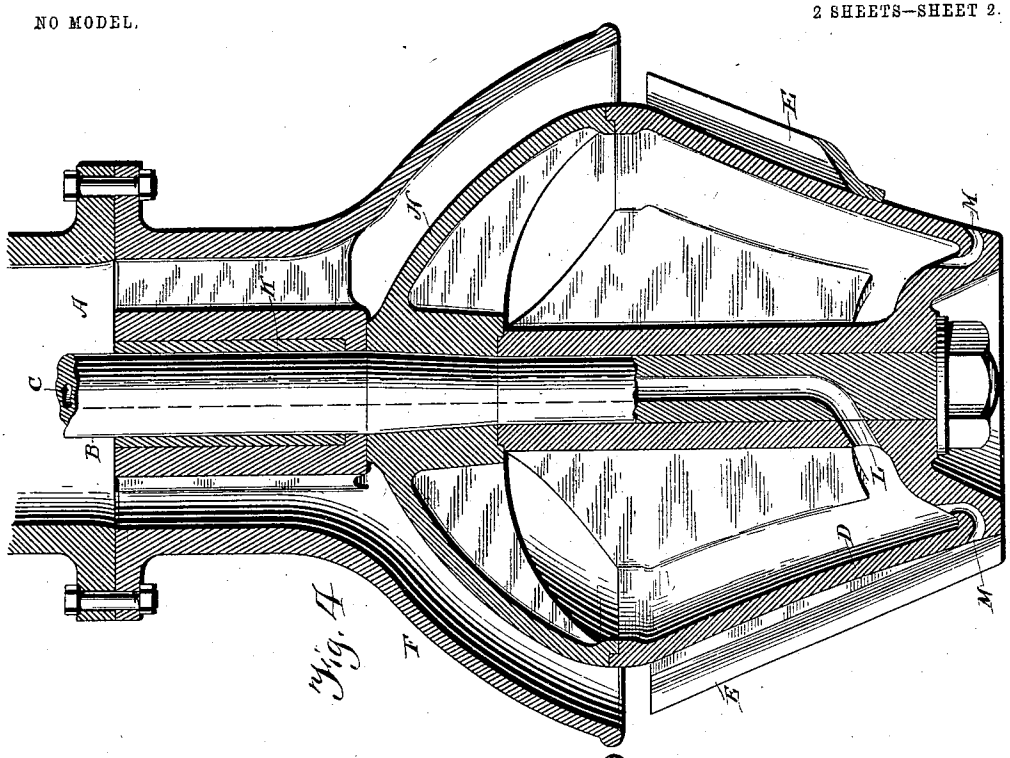


Fig. 4

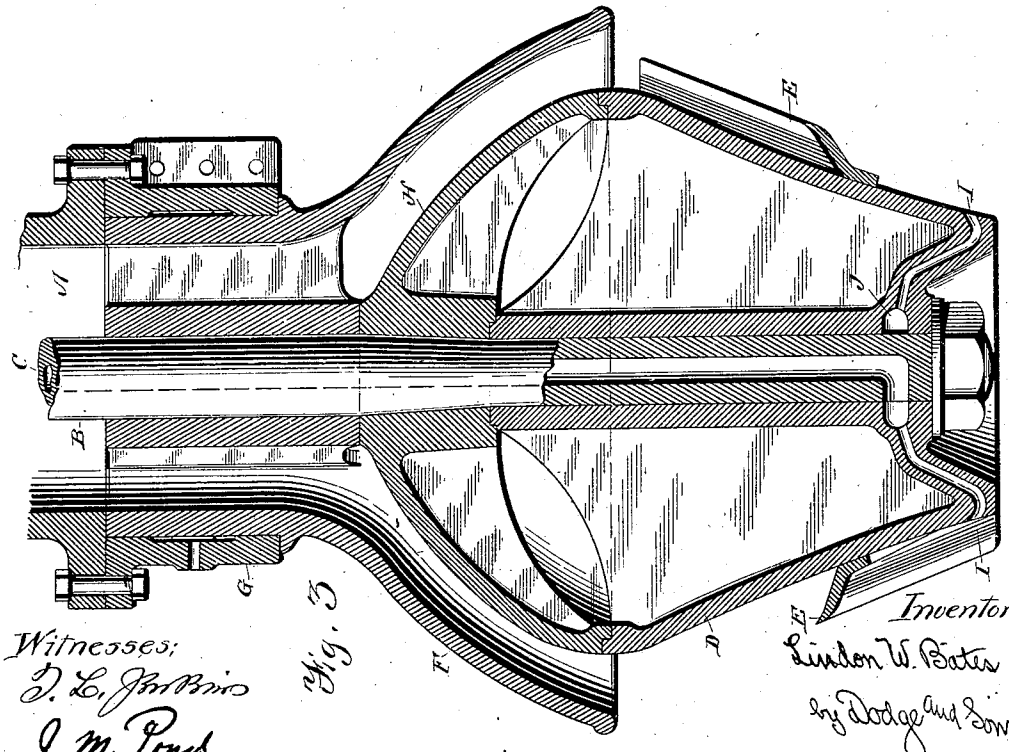


Fig. 5

Witnesses;
D. L. Jenkins
J. M. Pond.

Inventor:
Linton 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.

CUTTER FOR SUCTION-DREDGES.

SPECIFICATION forming part of Letters Patent No. 725,818, dated April 21, 1903.

Application filed October 19, 1900. Serial No. 33,550. (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 Cutters for Suction-Dredges, of which the following is a specification.

My present invention pertains to improvements in rotary cutters for hydraulic suction-dredges, the construction and advantages of which will be hereinafter set forth, reference being had to the accompanying drawings, wherein—

Figure 1 is a side elevation of the cutter-head proper; Fig. 2, a top plan view of the same; Fig. 3, a vertical longitudinal section of the cutter, its hood or mouthpiece, and a portion of the suction-pipe; and Fig. 4, a similar view showing a modified form of construction.

One object of my invention is to provide an improved rotary cutter of the milling type; and a further object is to provide a cutter of said type with means for keeping the cutting blades or edges free of material, especially where the cutter is working in a substance which is tenacious in its nature and has a tendency to adhere to the cutter and the blades.

Other advantages will appear in the following description.

Referring more particularly to Figs. 1 to 3, inclusive, A denotes the usual suction pipe or connection, through which extends a rotating shaft or spindle B, having a channel or passage C formed therein, preferably in its center, as shown, the lower end of the passage being deflected laterally, as indicated in Fig. 3. Secured to the lower end of the shaft is a cylindrical, conical, or hyperboloid casting D. This central casting carries a number of cutting-blades E, said blades or knives having their edges inclined to the generatrices of the casting under an angle of eighty to sixty degrees, according to the material being excavated and the depth of working, and the blades are tapered in the same sense as the conical carrier or casting. Mounted upon the shaft at the lower end of the suction-pipe A is a bell or mouthpiece F, which turns in a suitable box G, the parts being lubricated by water under pressure, as is well understood in this class of machinery. Surmounting the conical member or casting B is a boss or cover H, the outer rounding face of which conforms in contour to the inner curved face of the bell or mouthpiece F, so that the space formed intermediate the two is equal throughout, and the velocity of the flow therethrough remains constant.

From the construction thus far described it will be noted that the cutter head or casting D, the mouthpiece, and the boss or cover H all rotate as one with the shaft, and the material which is cut away and loosened is drawn up by the suction-pump into the bell or mouthpiece and thence delivered into the suction-pipe proper.

In working upon material which is tenacious or adhesive in its nature a cutter of the form shown may become clogged, and to prevent this there are formed in the lower wall of the cylindrical or conical member passages I I, which communicate with the lower end of the passage C in the spindle or shaft through an annular channel or way J, which extends around the hub of the casting and connects with all of said passages I. As will be noted upon reference to Figs. 1 and 3, the outer ends of the passages I are given a slight upward inclination and open intermediate the lower ends of the cutter-blades or knives. Water being supplied to the passage C under pressure, it will be projected from the mouths of the passages I with considerable force and detach any material which may collect in the space between the adjacent knives. Inasmuch as the jets are directed upwardly, any material thus loosened from the cutter-head will have imparted to it an upward movement, bringing it into line with the path of suction and at the same time disintegrating it to a greater or less extent.

In Fig. 4 there is shown a modified construction, wherein the bell or mouthpiece instead of rotating with the cutter-head is fixed to the lower end of the suction, and the shaft or spindle passes through a bearing K, preferably formed of lignum-vitæ. In said figure is also shown a modified construction of the water-jets. Instead of employing the annular passage connecting the series of jets or outlets the channel or passage C, formed in

the spindle or stem, is in direct communication with the interior of the cutter-head through an opening L, and a series of passages M extend through the walls of the cutter-head, forming the jet-orifices. The cutter-head and its cap-piece or boss form an air-tight chamber.

It is manifest that various forms of cutter-blades or knives may be employed and that other means for supplying the jets may be used without departing from the spirit of my invention.

Having thus described my invention, what I claim is—

1. A cutter for suction-dredges provided with a rotating head having cutter-blades mounted thereon; a suction member located above said cutter-blades in line therewith; means for positively rotating said cutter; and means independent of the action of the cutter for freeing the cutter from adhering material.

2. In combination with a closed rotary member, cylindrical or conical in form, a series of blades carried by said member; and a suction device extending around the rotary member in a plane above the blades.

3. In combination with a rotating cylindrical or conical member, a series of cutter-blades mounted thereon, said blades being inclined with relation to the longitudinal axis of said rotary member; a suction device extending around the rotary member above said blades or knives; and means for removing adhering material from said blades.

4. In combination with a closed rotary cutter of the milling type; a bell or mouthpiece located above said cutter and extending around the upper portion of the same at a distance therefrom; and a suction-pipe working in conjunction with said mouthpiece.

5. In combination with a cylindrical or conical shaped cutter-head; a series of blades or knives carried thereby; a cover or boss for the upper end of said cutter-head; and a mouthpiece or bell located adjacent to said boss, the inner face of said mouthpiece corresponding in contour to the adjacent outer face of the boss, whereby the space formed intermediate the two is constant throughout.

6. In combination with a rotative cutter-head; a cover or boss therefor provided with a rounding surface; and a mouthpiece or bell located in a plane above said boss or cover, the line of curvature of said mouthpiece corresponding to that of the boss.

7. In combination with a closed rotary cutter carrying a series of knives or blades; a bell or mouthpiece located above the blades and surrounding the upper end of the cutter; and a series of water-jets acting in the space intermediate the blades, whereby material tending to adhere to said blades and cutter will be loosened.

8. A rotary cutter provided with a cylindrical or conical head; a series of cutter-blades carried by said head arranged to act directly on the material being excavated; and a series of water-jets acting in the spaces intermediate said blades.

9. A rotary cutter provided with a cylindrical or conical head; a series of cutter-blades or knives carried thereby arranged to act directly on the material being excavated; and a series of water-jets opening from the lower end of the head upwardly into the spaces intermediate the blades.

10. In combination with a rotating shaft or spindle, a cylindrical or conical head or casting secured to the lower end thereof; a series of cutter-blades or knives carried by said head; a series of water-jets opening into the spaces between the said knives at the lower end of the head; a boss or cover H mounted upon the upper end of the conical head; and a bell or mouthpiece mounted above the boss or cover.

11. In combination with rotary shaft B provided with a longitudinal opening; a conical head or casting D having an annular chamber J formed therein connecting with a series of channels I; a series of cutter-blades carried by said head; a boss H mounted upon the upper end of said casting; a bell or mouthpiece F likewise mounted upon the shaft in a plane above said boss; a suction-pipe; and suitable connections intermediate said pipe and the mouthpiece.

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

LINDON WALLACE BATES.

Witnesses:
WM. O. BROWN,
H. MAYKELS.