No. 727,691. PATENTED MAY 12, 1903.

A. W. ROBINSON.

CUTTER HEAD FOR DREDGES.

APPLICATION FILED DEC. 6, 1901.

NO MODEL.

Fig. 2.

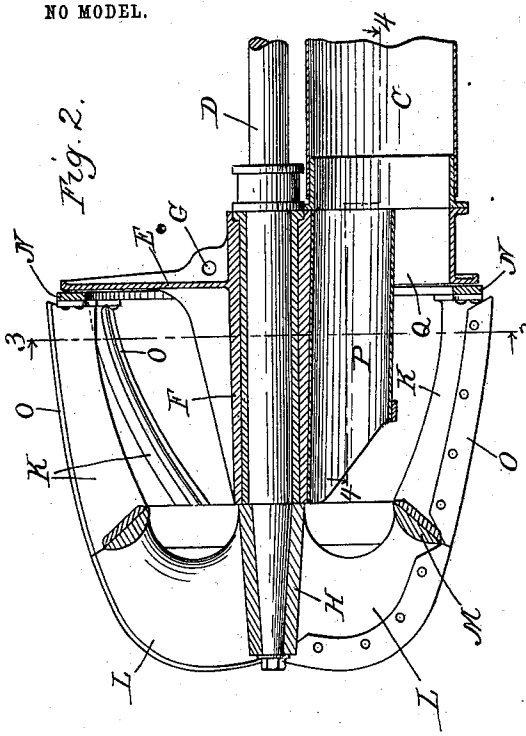


Fig. 1.

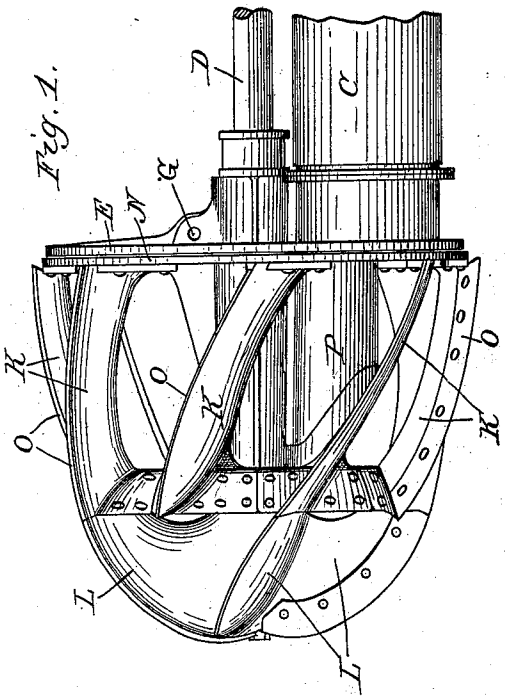


Fig. 3.

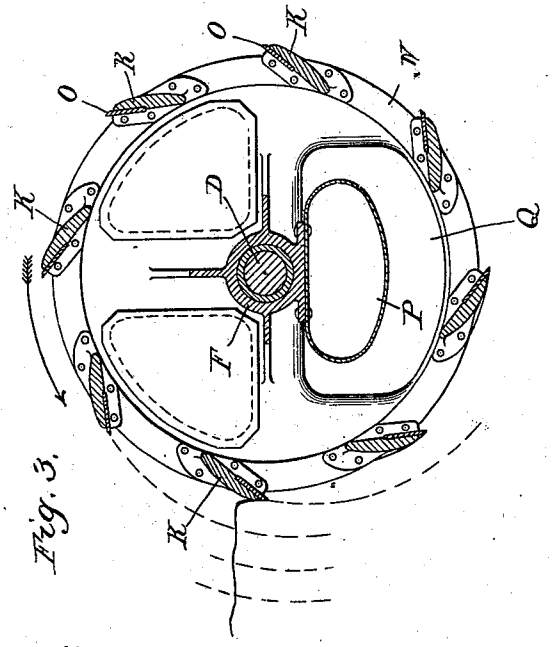
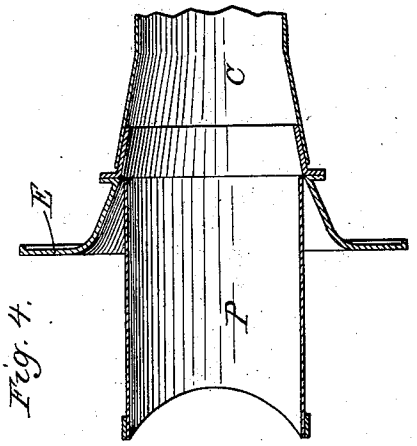


Fig. 4.



Witnesses.

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No. 727,691. Patented May 12, 1903.

UNITED STATES PATENT OFFICE.

ARTHUR W. ROBINSON, OF MONTREAL, CANADA.

CUTTER-HEAD FOR DREDGES.

SPECIFICATION forming part of Letters Patent No. 727,691, dated May 12, 1903.

Application filed December 6, 1901. Serial No. 84,884. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. ROBINSON, a citizen of the Dominion of Canada, residing at Montreal, in the county of Hochelaga, Province of Quebec, Canada, have invented certain new and useful Improvements in Cutter-Heads for Dredges, of which the following is a specification.

My invention relates to cutting or excavating devices for hydraulic dredges, and has for its object to provide a new and improved cutter-head for such dredges.

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevation of a cutter-head embodying my invention. Fig. 2 is a longitudinal section of the device shown in Fig. 1. Fig. 3 is a section on line 3 3, Fig. 2. Fig. 4 is a section through the suction-pipe.

Like letters refer to like parts throughout the several figures.

My invention has, among other objects, that of providing a cutter-head or excavating device which shall have a greater efficiency than the cutter-heads heretofore used, which can be operated better in clay or sticky material, with less liability to clog with such material, and which can be more easily and cheaply constructed.

I have illustrated the cutter-head in the drawings as mounted on the end of the shaft which is carried on top of the suction-pipe of the dredge. This suction-pipe is carried by the dredge and is connected therewith, so that it can be raised or lowered to bring it in contact with the material to be acted upon. Means are also provided for feeding the cutter-head into such material. Any desired mechanism for this purpose can be used, and I have not illustrated such mechanism, for any of the well-known appliances for this purpose may be used. The cutter-head is mounted upon the shaft D, which is rotated during the operation of the dredge by a suitable motor mounted upon the dredge. This shaft, as herein shown, is located above the suction-pipe C, through which the excavated material is drawn by a pump or other suction device located on the dredge. The cutter-head is provided with a series of cutting-blades carried by the hub H, keyed or otherwise fastened to the shaft D. As herein illustrated, there are two sets of cutting or excavating blades. The blades L are connected directly to the hub H, said blades terminating in the ring M, as shown. The blades K are connected at one end to the ring or support M and at the other end to the ring or support N. These blades may be integral with the rings or bolted or riveted thereto or attached to such rings or supports in any desired manner. When the blades are bolted or riveted to the rings or supports, they are provided with suitable flanges for this purpose. The ring or support N connects the ends of all the blades K and rotates in proximity to, but out of contact with, the stationary back plate E, which serves to close up the back part of the cutter-head. The blades K are greater in number than the blades L. As herein illustrated, there are four blades L and eight blades K. This construction permits greater freedom of opening between the blades L than would be the case if all of the blades K were converged and were attached to the hub H. This greater space or freedom of opening between the blades L allows the material acted upon to more freely pass therethrough and prevents clogging up when the cutter-head is operating upon clay or adhesive material of any kind. It will be noted that each alternate blade K in the construction herein shown is in line with one of the blades L, thus forming, as it were, a continuous separable blade, all of the blades K being connected together by the ring or support N. It will also be seen that the cutter-head is provided with what may be termed a series of long blades and another series of shorter blades. It will further be seen that the device comprises two sections, one section having a greater number of blades than the other. The blades are provided with the renewable cutting edges O of steel or the like, said edges being detachably attached to the blades in any suitable manner.

The suction-pipe may be provided with an enlarged flaring opening at the end, if desired, and I prefer such a construction, as it facilitates the entrance of the material therein. I arrange the suction-pipe so as to increase the area controlled by the mouth thereof, thus enabling me to use a much longer cutter-head. I have illustrated the suction-

pipe as provided with means for extending or increasing the effective suctional area. As illustrated, the end or mouth of the suction-pipe is divided into sections terminating at different points. This construction may be termed a "multiple-mouth suction-pipe," and it is of course evident that any desired number of mouths may thus be provided. The upper section P, as illustrated in Fig. 2, extends into the interior of the cutter-head a considerable distance, while the lower section Q preferably terminates near the end thereof. By this arrangement a portion of the suction-pipe may be extended forward in close proximity to the blades L L, and the suction-pipe is enabled to more readily remove the material from the front end of the cutter-head and to at the same time remove the material loosened by the blades K. This construction therefore enables me to employ a cutter-head of much greater length than has been heretofore possible, and hence a larger cut can be excavated and the efficiency of the dredge very materially increased.

I have illustrated the cutter-head as made up of a series of separate parts, and I prefer to make it in this way; but it is of course evident that the parts may all be made in one piece, if desired.

In the operation of the device the cutter-head is rotated, so as to cut or loosen the material acted upon, and such material passes in between the blades and is drawn up through the suction-pipe and discharged at the point desired, the cutter head being fed laterally as the material is cut away.

The ring or annular part M is preferably formed so as to offer the least resistance to the entering material, and it also serves the purpose of cutting or dividing the excavated material into two streams, which are therefore better adapted to be removed by the multiple mouth of the suction-pipe.

I claim—

1. A cutting or stirring device for dredges, comprising two sets of cutting-blades, one set of cutting-blades located at the end of the other set and provided with converging ends which are rigidly fastened together.

2. A cutting or stirring device for dredges, provided with a series of cutting-blades, said cutting or stirring device divided into two sections, one section provided with a greater number of blades than the other section the blades of both sections attached at both ends to supporting-pieces.

3. A cutting or stirring device for dredges, comprising a series of long blades and an intermediate series of shorter blades, all mounted upon a suitable supporting device so as to be rotated together the longer blades converging at their ends and connected with a common central piece.

4. A cutting or stirring device for dredges, comprising a series of blades mounted upon a support attached to a rotatable shaft and united at their outer ends, a second series of blades connected with the first series so as to rotate therewith, said second series being greater in number than the first series.

5. A cutting or stirring device for dredges, comprising a rotatable shaft, a series of blades connected with a part attached to said shaft, said blades terminating in a ring, a second series of blades connected with said ring and having curved converging ends, and a uniting device which unites the converging ends of said latter blades.

6. A cutting or stirring device for dredges, comprising a shaft, a hub attached thereto, a series of blades connected with said hub, an annular part extending around the shaft but free therefrom and joining the ends of said blades, a second series of blades connected to said annular part, and means for supporting the ends of said latter blades.

7. A cutting or stirring device comprising two sets of cutting-blades, one set located at the end of the other set, and a suction-pipe having two mouths, one associated with each set of cutting-blades.

8. The combination with a cutting or stirring device for dredges of a suction-pipe provided with a multiple mouth, opening in the direction of the length of the pipe, one portion being in advance of the other whereby the effective suctional area of the pipe is increased.

9. The combination with a cutting or stirring device for dredges of a suction-pipe, having its mouth divided into sections which open in the direction of the length of the pipe at different points along its length, whereby the length of the cutting or stirring device may be increased and its efficiency enlarged.

10. A dredging device, comprising a rotatable shaft, provided with a hub carrying a series of cutting-blades, a second series of cutting-blades located in proximity to the ends of the first-mentioned blades and greater in number than the first series, and a suction-pipe provided with a multiple mouth and associated with said blades.

11. A dredging device, comprising a rotatable shaft, provided with a hub carrying a series of cutting-blades, a second series of cutting-blades located in proximity to the ends of the first-mentioned blades and greater in number than the first series, and a suction-pipe having its mouth divided into sections opening at different points along the length of said blades, one section adapted to hold the material loosened by one series of blades and the other section to hold the material loosened by the other series of blades.

12. A dredging device, comprising a cutting or stirring device made up of two series of blades united by an annular part, a suction-pipe, having its mouth divided into at least two sections opening at different points, said annular part acting to divide the current of excavated material into two streams, so as to better adapt such material to be removed by the suction-pipe.

13. A dredging device, comprising a series of rotary cutting-blades, a suction-pipe associated therewith, having its mouth divided into at least two sections opening in the direction of its length and at different points, and means for dividing the current of entering material so as to facilitate the entrance of such material into the sections of the suction-pipe.

14. A dredging device, comprising a rotatable shaft, a series of blades mounted thereon, an annular part to which the ends of said blades are attached, a second series of blades attached to said annular part, a ring to which the ends of said latter blades are connected, a stationary back plate which serves to close up the back of the device, and a suction-pipe extending through said back plate.

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Witnesses:
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