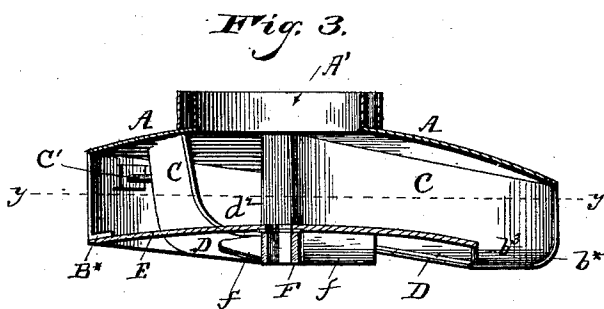
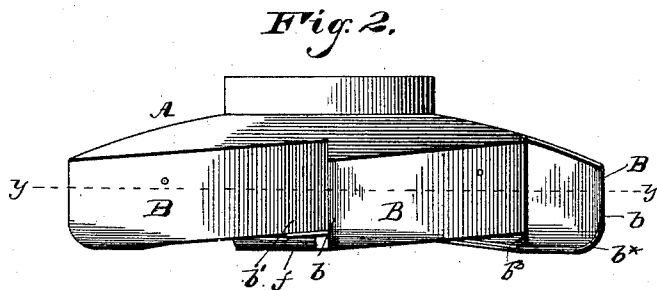
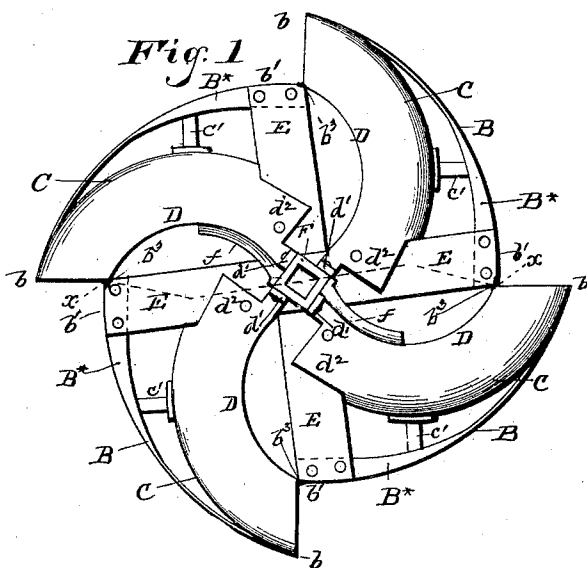


W. P. HUMPHREYS.

ROTARY EXCAVATOR FOR HYDRAULIC DREDGING MACHINES.

No. 467,607.

Patented Jan. 26, 1892.



WITNESSES

Samuel Ker.
J. J. F. Johnson

INVENTOR

William P. Humphreys
By J. M. Kaly
His Attorney

(No Model.)

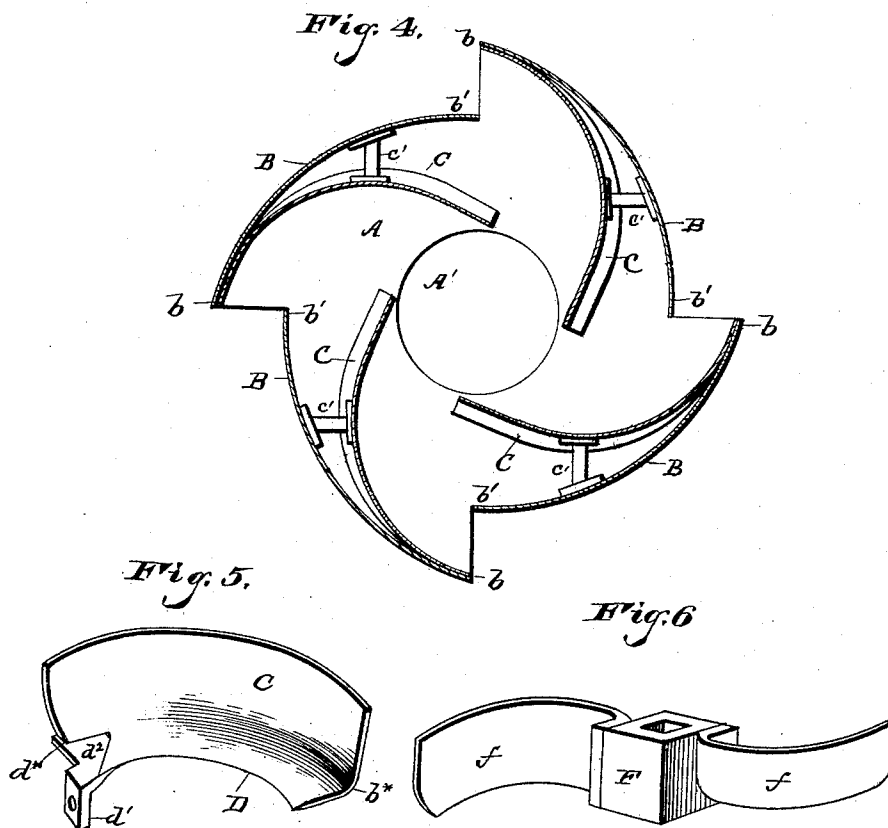
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UNITED STATES PATENT OFFICE.

WILLIAM P. HUMPHREYS, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO
A. M. STINCEN, OF SAME PLACE.

ROTARY EXCAVATOR FOR HYDRAULIC DREDGING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 467,607, dated January 26, 1892.

Application filed December 12, 1890. Serial No. 374,496. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. HUMPHREYS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Rotary Excavators for Hydraulic Dredging-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in rotary cutters or excavators for hydraulic dredging-machines, and has for its object the provision of a simply constructed and effective device of this sort, which shall cut and take in both upon the sides and in the bottom, and which shall be free from choking, have great capacity, and cut only such a depth of spoil as can be readily disposed of by the suction-pipe.

The invention comprises certain new and useful improvements in rotary excavators, which are hereinafter fully described, and pointed out in the claims.

The accompanying drawings illustrate my said invention.

Figure 1 is an inverted plan view of the excavator. Fig. 2 is a side elevation of the same. Fig. 3 is a transverse section taken on line *x x*, Fig. 1. Fig. 4 is an inverted horizontal section taken on line *y y*, Figs. 2 and 3. Fig. 5 is a detached perspective view of one of the spoil-walls and bottom cutters, and Fig. 6 is a perspective view of the hub and central supplemental cutters.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

A is the top or cover of the excavator, and A' is the central opening to which the outer end of the suction-pipe is attached.

B B is the sectional side walls of the excavator, the parts of which are sprung at a curve or angle differential to the curve of the imaginary circle bounding the circumference of the excavator.

C C are backs or rear walls to the spoil inlets or passages, which passages have no front wall. These walls C are set at a curve differential to the sections B B, and meet the said sections at their outer extremities, forming the cutting edges or lips *b b*, which, as seen, project beyond, peripherally, the rear ends *b' b'* of the sections B, forming mouths to cut the spoil.

The backs C C are bolted or otherwise securely fastened to the top A, and extend inward nearly or quite to the central opening, and, as will be seen in Fig. 4, the said walls C C are the only division between the delivery or discharge ends of the spoil-passages in the excavator, thus rendering almost the entire circumference of the central opening a receiving-channel for the spoil and making the movement of the spoil easy and sure. No separate front wall whatever is provided for the lateral spoil-passages, thus simplifying the construction and at the same time enlarging the capacity of the spoil-passages.

The walls C C are extended into the form of or provided on the bottom with knives or cutters D D, and these are curved downward on their edges to take the spoil from beneath the excavator, and the backs or walls C C are sloped on a gradually-enlarging curve from the mouth to the discharge end, as seen in Figs. 1 and 4, so that the spoil will easily slip over them into the central opening. The outer corner *b** is rounded, as seen, and may be made more or less so as found desirable or beneficial.

Transverse braces E E cross the bottom of the cutter at right angles and have the ends *b'* of the wall-sections B attached to their ends, and near the mid-length of the braces the walls C and cutters D are attached, as will presently be explained. Knife-edged braces *b³* connect the outer ends of the bottom cutters to said braces E. The cutting-braces *b³* serve also to cut into the spoil, and the bottom cutters D may extend slightly beyond them, as shown in Fig. 3, to start the cut into the spoil. At the point where the braces E cross each other a squared hub F, to receive the squared end of a driving-shaft, (not shown,) is set upon them, and to the sides of this hub the flanges *d' d'* of the bottom

cutters D are bolted. Recesses d^* in the cutters D receive the braces E, and the shoulders or ledges d^2 rest upon the outer surfaces of the braces and are bolted thereto. It will thus be seen that the cutters D, walls C, braces E, and hub F are firmly united, and great strength is insured to the excavator. It will also be seen that the bottom of the excavator is open, with the exception of such portions thereof as are covered by the braces E and the bottom cutters D. It will also be seen that the cutting-edges of the knives D are shaped substantially the same as the bend of the wall C, so that they will have an auger-like cut or contact with the spoil. In order to stiffen the rear walls C, braces $c' c'$ are set between them and the sections B of the outer wall at a suitable point in their curvature.

As will be perceived in Figs. 2 and 3, the bottom of the device is hollowed to bring the hub F on a level with the bottom of the periphery, and in order to give the depressed center operativeness in cutting, the bottom knives D D are either made wide enough at this point to make the bottom cut level, or I may, as seen in Figs. 3 and 6, provide central supplemental knives $f f$, secured to the hub and extending out upon or along the cutters D as far as may be desired.

In order to further strengthen the bottom of the excavator and stay the walls B and C, on which the strain of the circular cutting falls, I provide the walls B with strengthening-ribs B^* , to which the ends of the braces E are bolted.

It is evident that in many of the details of construction the specific structure of the parts may be widely varied without departing from the principle nor sacrificing the advantages of my invention.

The operation of the device will be readily understood by those skilled in the art. It is mounted upon the end of a suction-pipe and rotated in the usual way.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A rotary excavator consisting of a top having a central opening at which the suction-pipe terminates and radial cutters having bottom and side cutting-edges extending from beneath and near the axis of the opening of the suction-pipe outward, as and for the purpose set forth.

2. A dredging-excavator consisting of a top having a central opening at which the suction-pipe terminates, curved radial cutters secured to the top and extending from said

opening to the periphery, and sectional side walls connected to said cutters at the periphery, as set forth.

3. A dredging-excavator consisting of a top having a central opening, curved radial cutters, and a spoil-wall secured to said top, said cutters having substantially horizontal cutting-edges on the bottom and vertical cutting-edges at the periphery of the excavator, and sectional side walls, each section extending from and forming the inner boundary of the mouth of one cutter to the vertical cutting-edge of the next cutter, as set forth.

4. A dredging-excavator having peripheral cutting-edges, walls or spoil-guides, and bottom cutting devices mounted upon and curved to correspond with the wall or spoil-guide, and a cross brace or braces to which said bottom cutters are secured at the center, as set forth.

5. A dredging-excavator having spoil-walls, side and bottom cutters, and transverse braces secured to the walls and to the inner ends of the bottom cutters, as set forth.

6. A dredging-excavator having spoil walls or guides and side and bottom cutters, the latter being provided with flanges on their inner ends, in combination with cross-braces bearing a hub to which said flanges are secured, as set forth.

7. A dredging-excavator having spoil walls or guides, side cutting devices forming mouths, and bottom cutting-knives extending from the center of the excavator to the mouths of the side cutting devices and provided with shoulders, as d^2 , to rest upon and be secured to cross-braces, in combination with said cross-braces, as set forth.

8. A dredging-excavator having side cutting devices and bottom cutters, as described, whose cutting-edges are dipped or bent downward from their backs, in combination with cutting-braces b^3 , each connecting the outer end of a bottom cutter to the excavator, as set forth.

9. A dredging-excavator having side and bottom cutting devices and side and spoil-guiding walls, said side walls being provided with strengthening-ribs B^* , in combination with the cross-braces E, bolted to said ribs, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM P. HUMPHREYS.

Witnesses:

I. N. KALB,
F. T. F. JOHNSON.