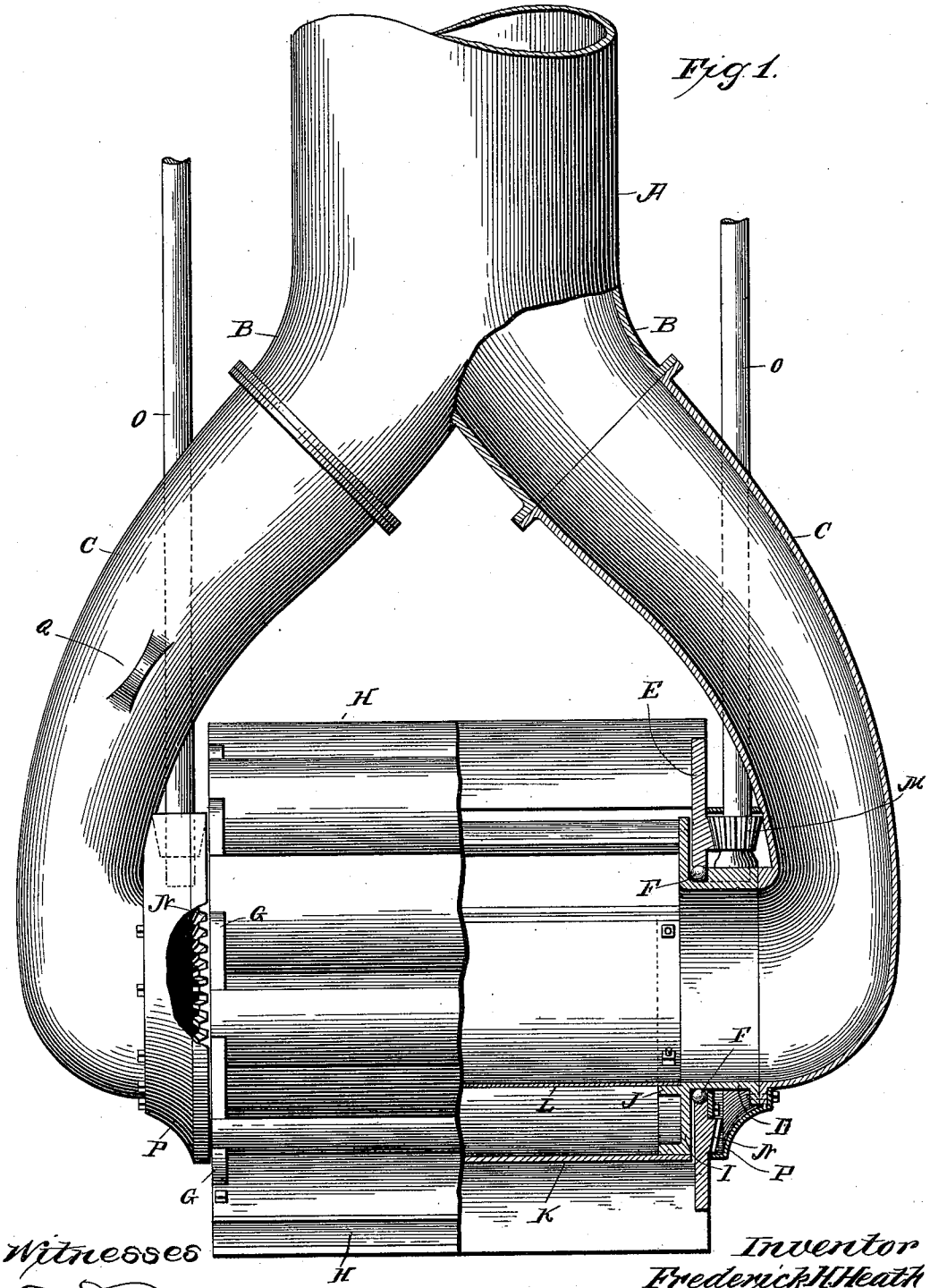
(No Model.) 2 Sheets—Sheet 1.

F. H. HEATH.

DREDGING EXCAVATOR.

No. 598,988. Patented Feb. 15, 1898.

Fig. 1.



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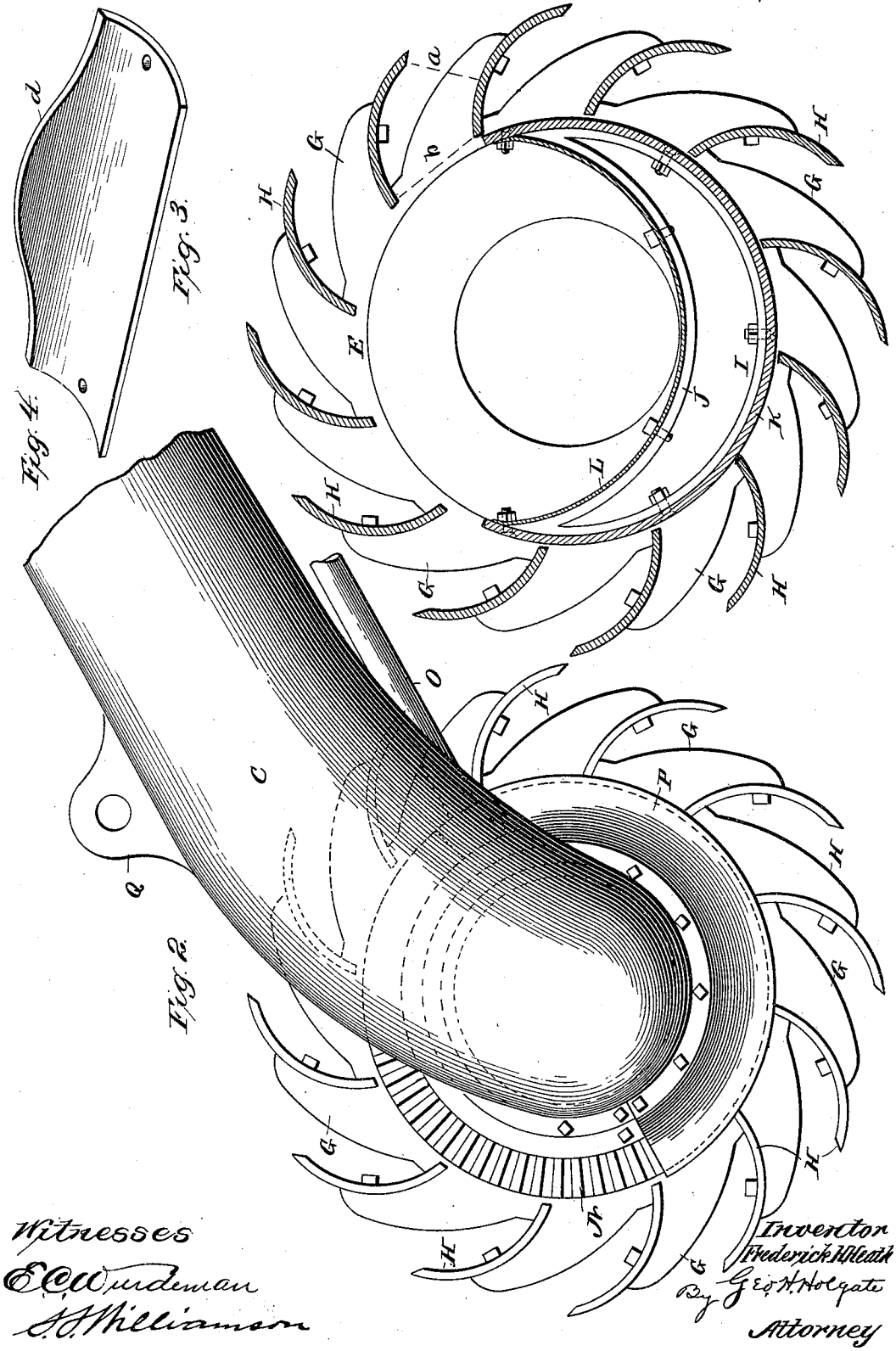


Fig. 3.

Fig. 4.

Fig. 2.

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UNITED STATES PATENT OFFICE.

FREDERICK H. HEATH, OF TACOMA, WASHINGTON.

DREDGING-EXCAVATOR.

SPECIFICATION forming part of Letters Patent No. 598,988, dated February 15, 1898.

Application filed April 20, 1897. Serial No. 632,919. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. HEATH, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a certain new and useful Improvement in Dredging-Excavators, of which the following is a specification.

My invention relates to a new and useful improvement in excavators for hydraulic dredgers; and the principal object aimed at in this device is to produce an inward delivery with direct lower and front cutting edges which will cut away and deliver the soil to a receptacle from whence it may be drawn by suction in uniform and regular quantities and not interfere with the inflow of water to said suction-pipe.

A further object of my invention is to provide a top feed to the suction-pipe, and also to prevent the delivery of stones or other material that is too large to be drawn through the suction-pipe.

The excavator is intended to be rotated by forty revolutions per minute, but may be decreased or increased at will by the operator, and this excavator is intended for use in connection with a dredging-boat having a suction-pipe connected with a pump upon said boat, and where water is the carrying medium the material elevated thereby may be discharged on floats or conveyed through piping to any suitable location, as is usual with hydraulic dredgers.

With these ends in view this invention consists in the details of construction and combination of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, the construction and operation will now be described in detail, referring to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a plan view of an excavator made in accordance with my improvement, a portion thereof being broken and sectioned away in order to illustrate the internal construction of the device; Fig. 2, a side view thereof; Fig. 3, a central section of the dredging-wheel, and Fig. 4 a detail perspective of one form of blade for this wheel.

In carrying out my invention as here embodied I provide a suction-pipe A, which terminates in the two branches B at the lower end thereof, and to these branches are secured in any suitable manner the curved pipes C. The last-named pipes extend downward and are turned inward, and have secured thereto the cylindrical sections D, around which the blade-disks E are journaled, preferably having series of balls F interposed therebetween in order to reduce the friction in the revolving of these disks. Each of the disks has formed therewith the arms G, to which are bolted the blades H, as clearly shown, and it is to be noted that these blades are so curved that the space between the outer edge of each blade and the curved back immediately in front thereof is less than the space between the inner edges of the blades, as indicated in dotted lines at *a* and *b*. The object of this is to prevent the passage between the blades of stones or other objects which are too large to pass through the blades and be received by the suction-pipes. This will prevent the wedging in of such objects between the blades, and will also serve as a guard against the taking in by the excavator of any object which cannot be freely elevated by suction.

Semicircular flanges I and J are formed upon the inner ends of the cylindrical sections D, and to the former of these flanges is secured the casing K, which coincides in contour with the line of movement of the inner edges of the blades, and, as clearly shown in Fig. 3, this casing will serve as a backing for these blades, so as to produce the effect of buckets in the revolving of the blades, whereby the material excavated will be elevated by these buckets until their inner edges pass the casing upon reaching the upper portion of their movement, when their contents will be precipitated therefrom. For the purpose of receiving the material thus excavated a receptacle is formed by the casing L, which is secured to the flanges J, when the material dumped within this receptacle will be upon a line with the inner open ends of the pipes C, which are continued by the cylindrical sections D. Now it is obvious that when a sufficient degree of suction is produced within the pipes C the material dumped within the receptacle will be drawn therefrom in con-

nection with a quantity of water, which will be fed thereto through the blades, and thus both the water and material will be elevated to the dredging-boat, and from thence may be conveyed to scows or a suitable location of deposit by means of piping, as is well understood.

The revolving of the dredging-blades is accomplished by means of beveled pinions M, which mesh with gear-teeth N, formed upon the outer surfaces of the disks E, and these pinions are secured upon the shafts O, which, passing upward, are driven by any suitable mechanism carried by the boat.

The excavating-blades may have their cutting edges formed upon a straight line, or they may be serrated, after the manner of teeth, in order to facilitate the cutting of hard soil, such as clay and the like; but the form of blade shown in Fig. 4 is desirable for most classes of work, and the cutting edge of this blade is formed upon a compound curve, as indicated at *d*, the central portion of which is elevated, thereby producing a lead in the cutting operation.

The gear-teeth N are inclosed within the casings P, which protect these parts from contact with the material being excavated and prevent them from becoming clogged. Suitable eyes Q are formed upon the pipes C, by means of which the depth of the excavator may be regulated.

While I have here shown the cutter-blades as being revolved by beveled pinions meshing with gear-teeth, it is obvious that this form of mechanism may be dispensed with and any other gearing used therefor—as, for instance, sprocket wheels and chains.

Having thus fully described my invention, what I claim as new and useful is—

1. In a dredging-excavator, a suction-pipe having branches leading therefrom, said branches being turned toward each other at their lower ends, disks carrying blades journaled between the ends of the branches, a semicylindrical casing secured to the branches and acting as backing for the blades, a casing secured just above the first-named casing, the upper edges of both casings being secured together, substantially as described.

2. In combination with a suction-pipe having branches arranged as described, blade-disks journaled on the ends of the branches, blades secured to the disks, said blades being curved so that the space between the outer edge of each blade and the curved back in front is less than the space between the inner edges of the blades, substantially as described.

3. In combination, a suction-pipe, two branches leading therefrom, cylindrical sections secured to the lower ends of the branches, disks mounted upon the cylindrical sections, a series of balls interposed between said disks and cylindrical sections for reducing the friction, curved cutter-blades secured to the disks and so placed relative to each other as to provide less space therebetween at the outer portion thereof than at the inner portion thereof, means for revolving said disks and blades, a semicircular casing adapted to act as a backing for the blades whereby the latter will be caused to act as buckets through certain portions of their revolution and a receptacle into which the material dredged is precipitated and from which it may be drawn by the suction-pipes, substantially as shown and described.

4. The herein-described combination of a suction-pipe, branches C leading therefrom, cylindrical sections secured to the lower ends of the branches, disks mounted upon said sections, a series of balls for reducing the friction between the disks and sections, curved cutter-blades secured to the disks in such manner as to prevent the passage of objects too large to be elevated by the suction-pipes, a casing for forming the blades into buckets through certain portions of their revolutions, a receptacle arranged within the center of the blades into which the material excavated will be deposited and from which it may be drawn by the branch pipes, a series of gear-teeth carried by the disks, beveled pinions meshing with said teeth, and shafts upon which said pinions are secured for transmitting motion to the blades, substantially as shown and described.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

FREDERICK H. HEATH.

Witnesses:
S. S. WILLIAMSON,
H. K. MOORE.