

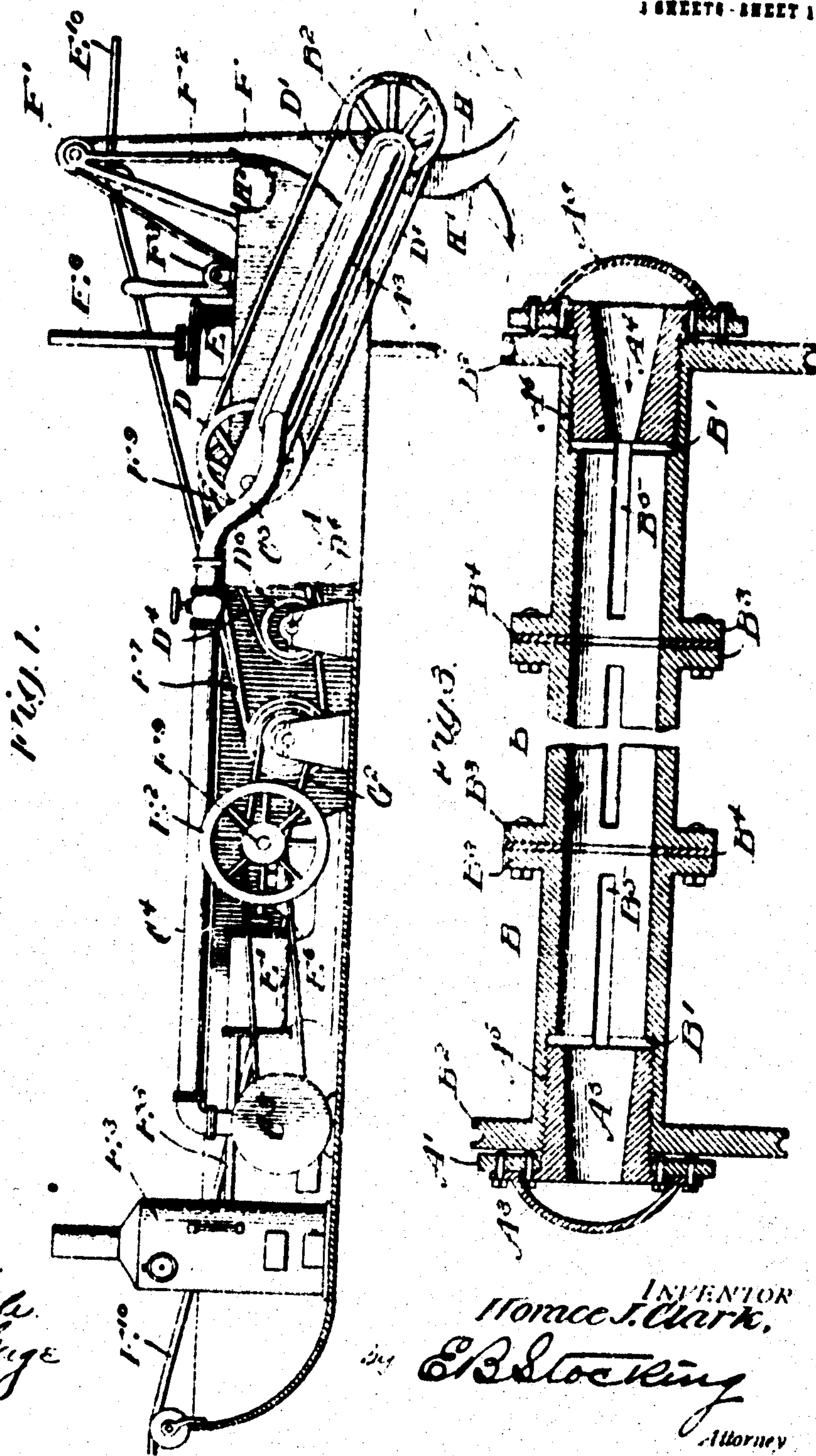
**No. 814,019.**

**PATENTED MAR. 6, 1906.**

**M. J. CLARK.**  
**GOLD DREDGE.**

APPLICATION FILED MAR. 20, 1905.

1 SHEETS - SHEET 1.



**No. 814,019.**

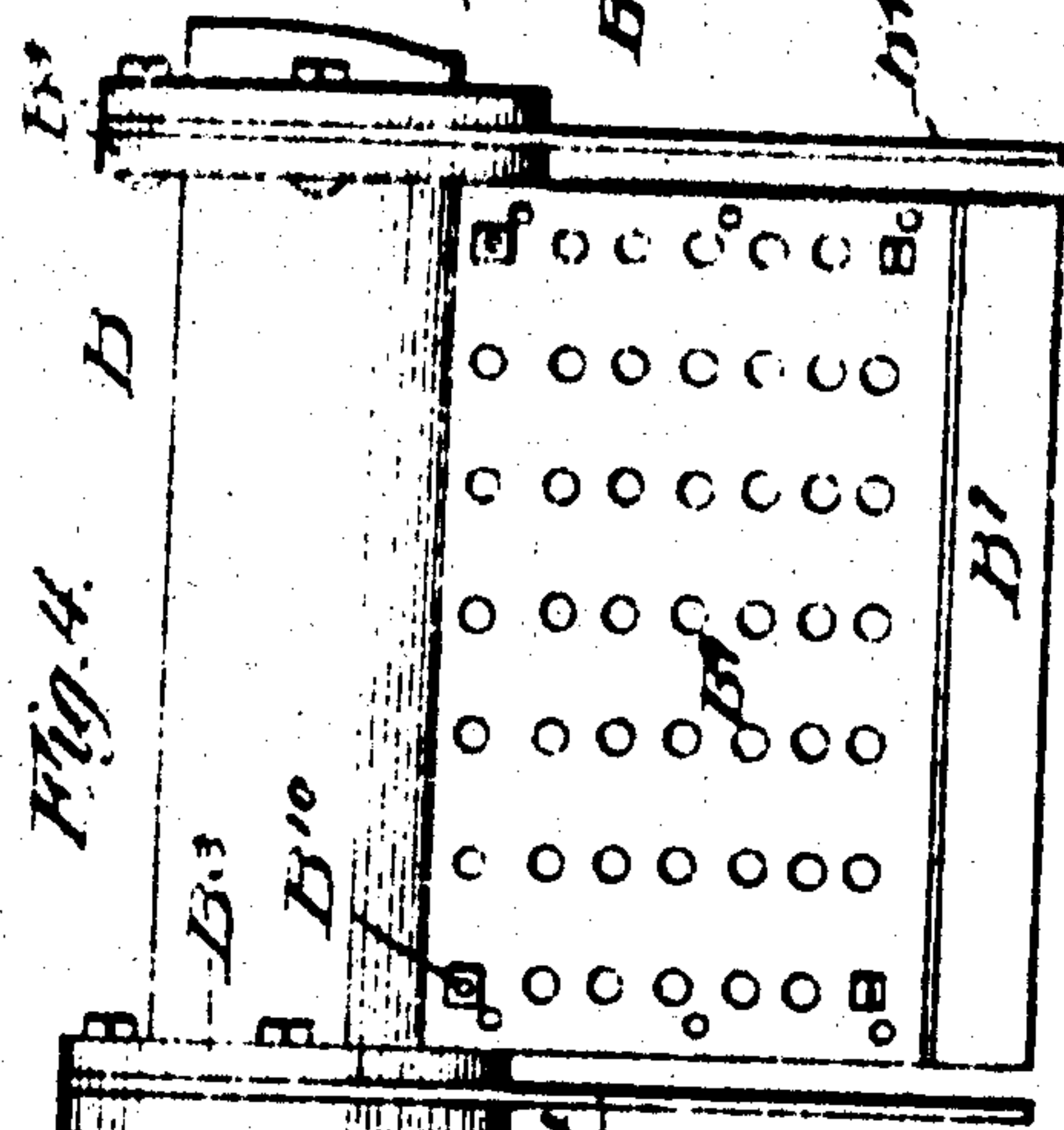
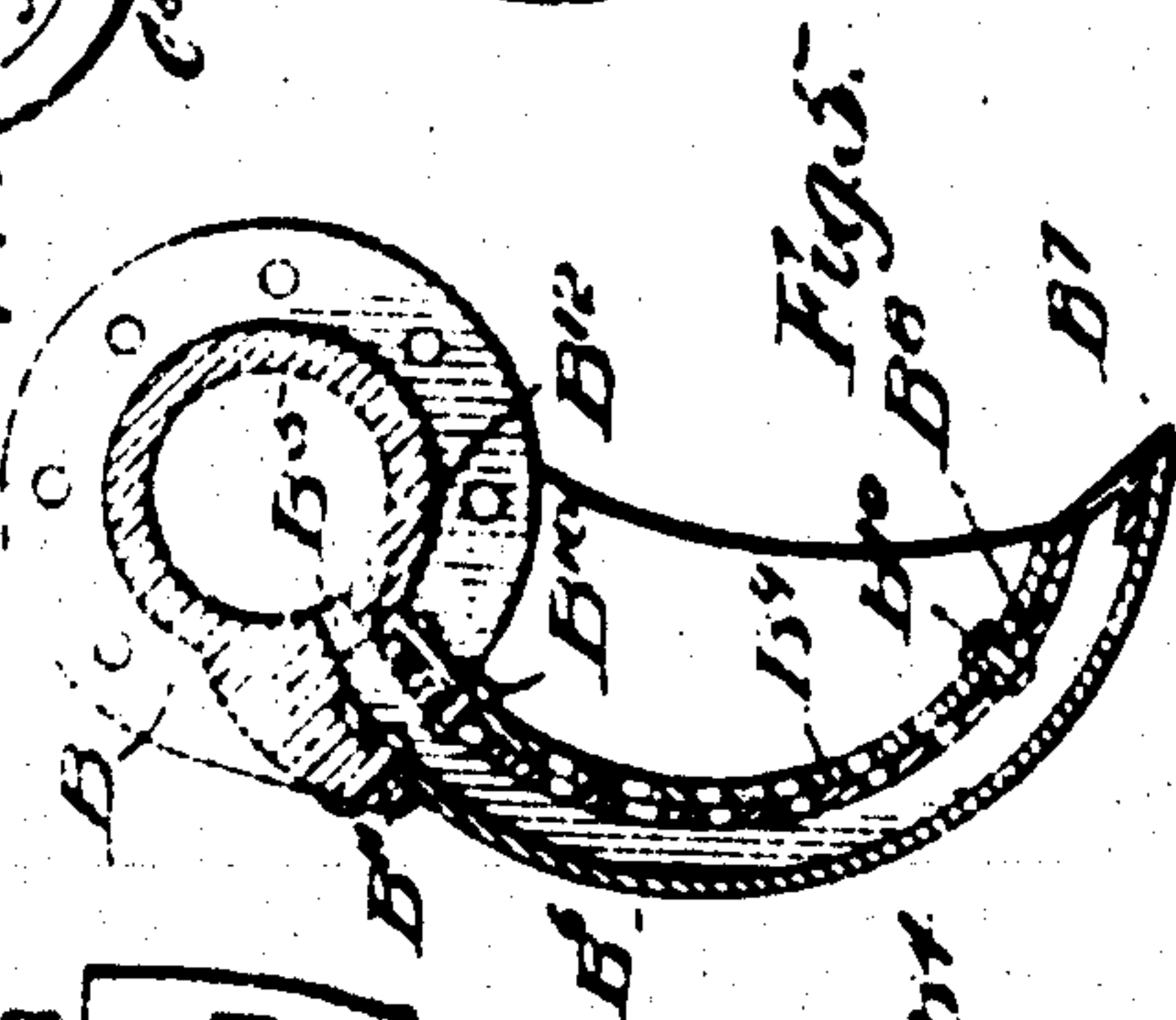
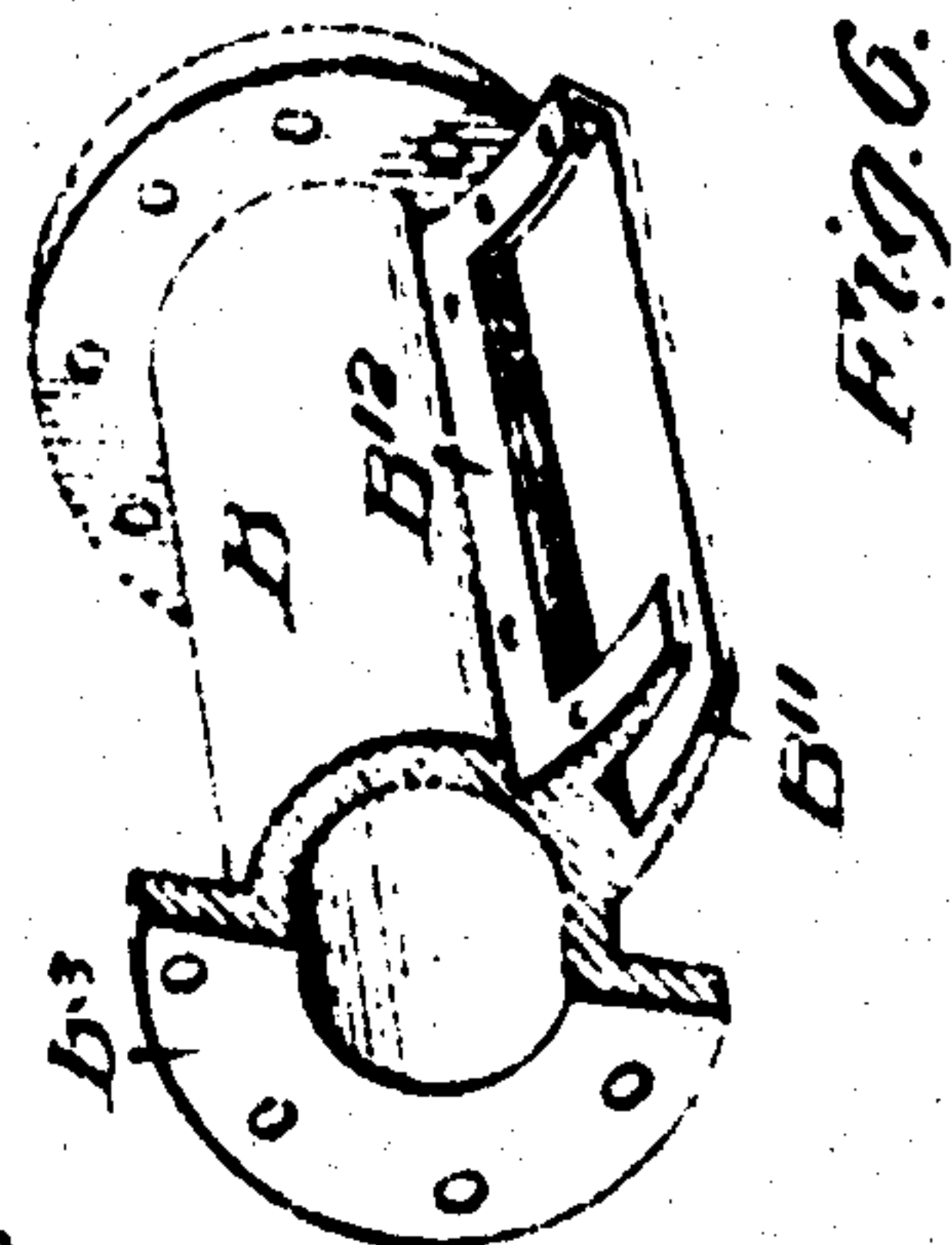
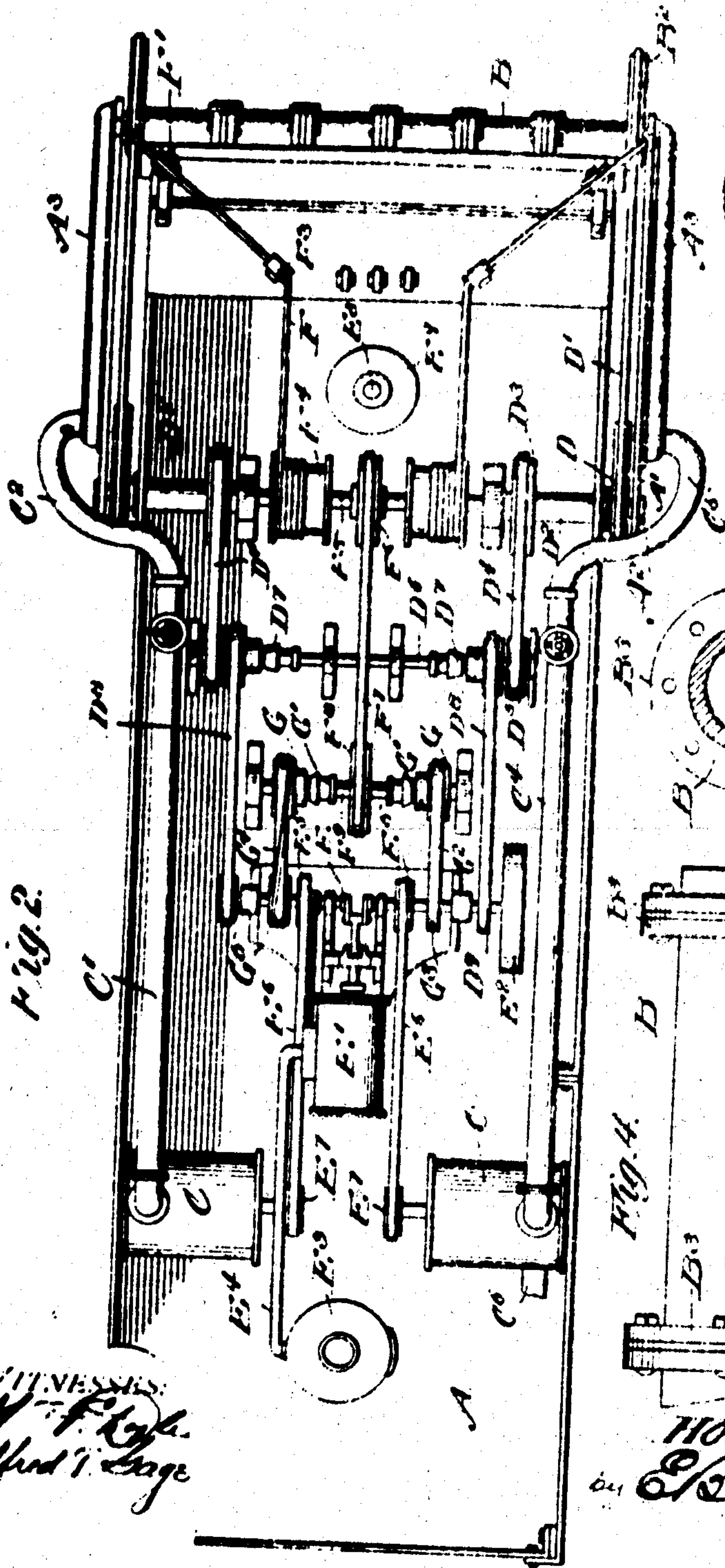
**PATENTED MAR. 6, 1906.**

H. J. CLARK.

## GOLD DREDGE.

APPLICATION FILED MAR. 20, 1905

3 SHEETS-SHEET 2.



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3 SHEETS-SHEET 2

Fig. 8.

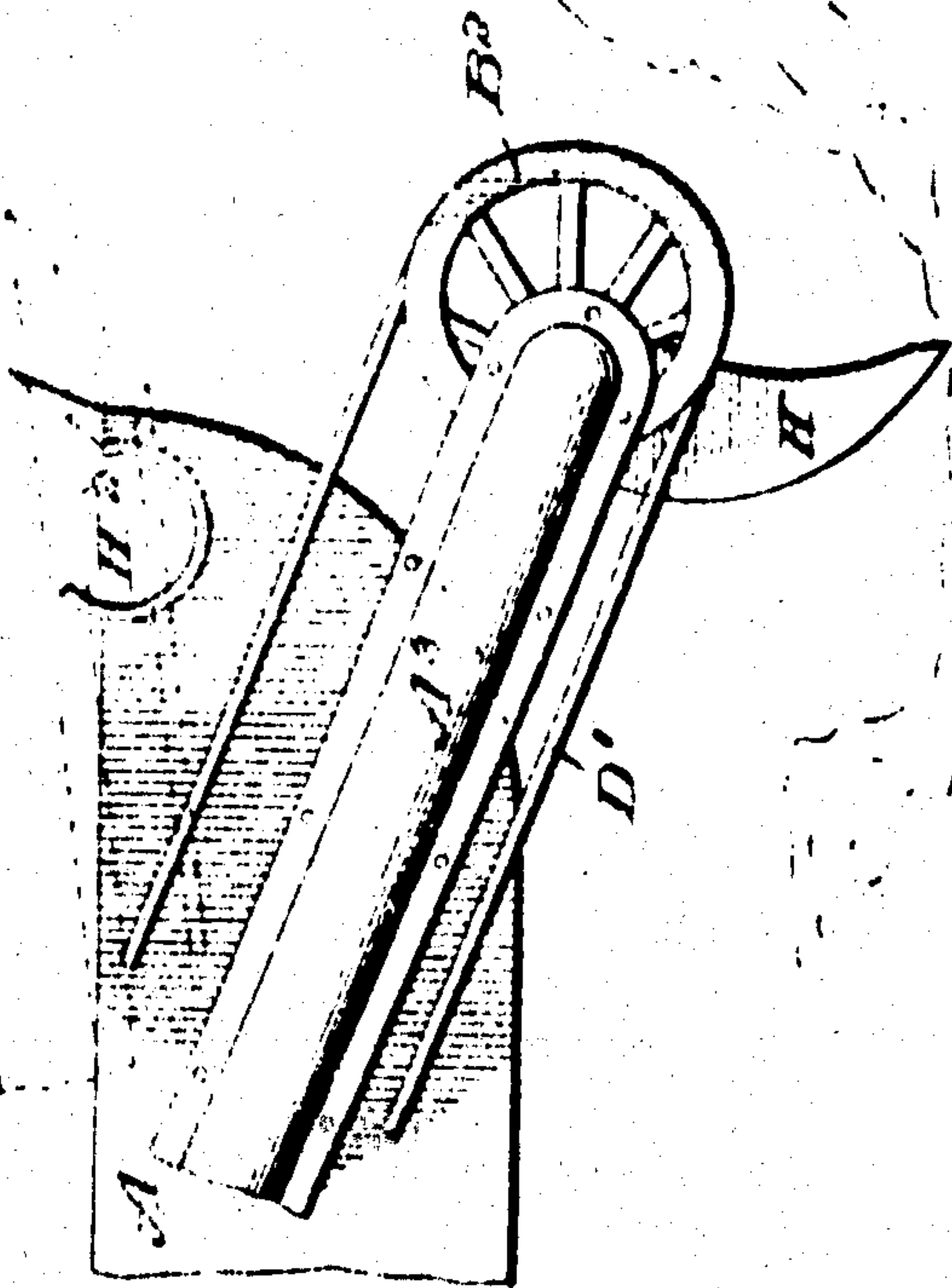


Fig. 9.

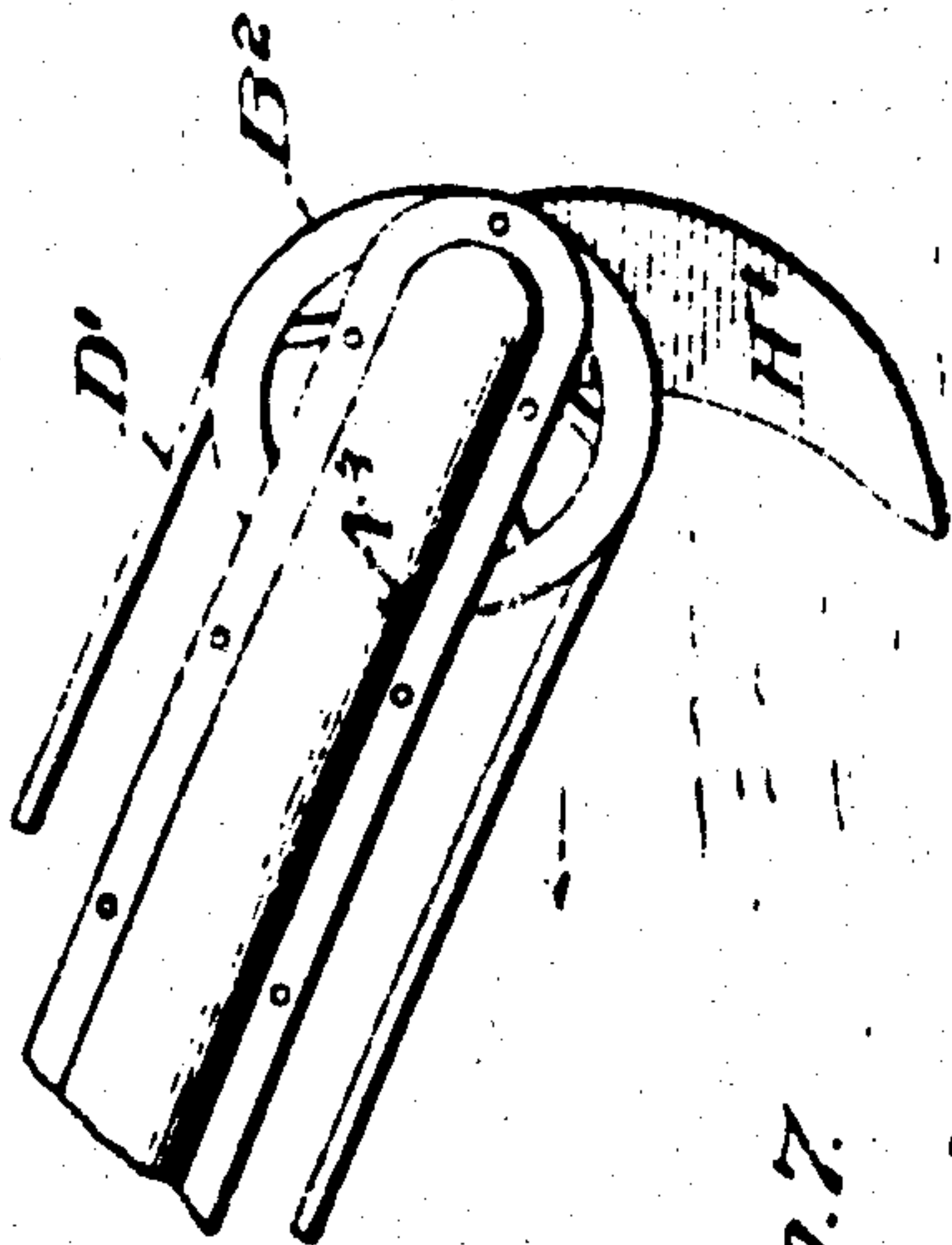
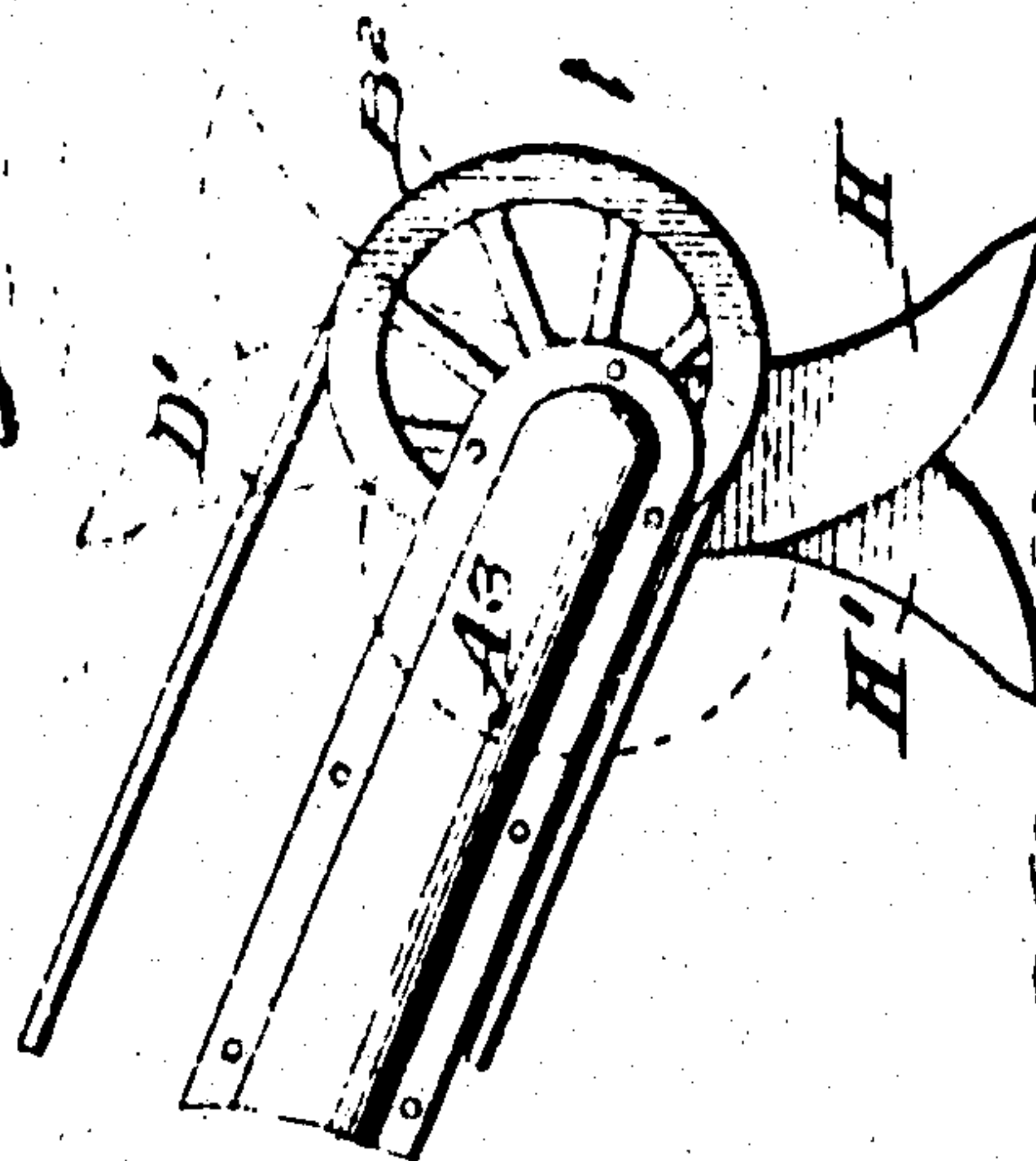


Fig. 7.



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# UNITED STATES PATENT OFFICE.

HORACE J. CLARK, OF BOISE, IDAHO, ASSIGNOR TO THE CLARK DREDGING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEVADA.

## GOLD-DREDGE.

No. 814,019.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed March 20, 1905. Serial No. 251,170.

*To all whom it may concern:*

Be it known that I, HORACE J. CLARK, a citizen of the United States, residing at Boise, in the county of Ada, State of Idaho, have invented certain new and useful Improvements in Gold-Dredges, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a gold-dredge, and particularly to an apparatus adapted for the removal of the finer material carrying the gold values during the dredging operation.

The invention has for an object to provide an improved construction and arrangement of scoop or shovel provided with reticulations therein and connected with a suitable suction device, so that the water and fine sand or material pass through the face of the scoop and are delivered separately from the larger material which may be dumped from the scoop.

A further object of the invention is to provide a novel construction and arrangement of the driving mechanism for maintaining the suction-pressure upon the scoop and for oscillating the latter in its working movement.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawings, Figure 1 is an elevation of the invention applied to a dredge with part of the latter in section; Fig. 2, a plan thereof; Fig. 3, a longitudinal section of the assembled hubs of the scoops forming the suction-shaft; Fig. 4, an elevation of one of these scoops; Fig. 5, a central vertical section through Fig. 4; Fig. 6, a detail perspective of the scoop-hub with parts in section; Fig. 7, an enlarged elevation of a scoop and adjacent parts; Fig. 8, a similar view showing a modified application of the invention in which the scoop is adapted to discharge either at its rear or to be elevated for discharge into the dredge, and Fig. 9 an elevation of a scoop adapted for operation as a plow.

Like letters of reference refer to like parts in the several figures of the drawings.

The letter A designates a boat of any suitable character—for instance, a dredge or flat-boat, as here shown—adapted to contain the necessary driving machinery for actuating the several parts. The scoops B, which are

assembled to form the suction-shaft, as shown in Fig. 3, are pivotally mounted at the free end of arms A', which extend parallel with the sides of the dredge, as shown in Fig. 2. These arms are pivoted at their inner ends upon shafts or studs A<sup>2</sup> and are provided upon their outer faces with a segmental casing A<sup>3</sup>, forming a conducting-tube extending longitudinally of the arm. Each of these arms is provided with an inwardly-projecting nozzle, one of which comprises a jet-nozzle, as shown at A<sup>4</sup>, and the opposite one a suction-nozzle, as at A<sup>5</sup>, and each of these nozzles is exteriorly threaded, as shown at A<sup>6</sup>, into a threaded recess B' at one end of the terminal hubs of the scoops. These scoops are adapted to travel in their partial rotation upon the threaded faces of nozzles A<sup>4</sup> and A<sup>5</sup>, and the hubs thereof are provided with an eccentrically-disposed driving wheel or pulley B<sup>2</sup> to secure the maximum leverage in the lifting travel of the scoop. The suction-shaft is composed of any desired number of sections similar in construction, and each of which is provided with a bolting-flange B<sup>3</sup>, between which flanges a partition-plate B<sup>4</sup> is disposed to form the side walls of the scoop disposed between the same. The hubs are also provided with a slot B<sup>5</sup>, communicating with the space between the solid rear wall B<sup>6</sup> of the scoop and the face-plate B<sup>7</sup>. This wall is preferably segmental in shape and provided with a proper cutting edge B<sup>7</sup>, while spaced therefrom is a perforated or reticulated face-plate B<sup>8</sup>.

In adapting the machine for different classes of work it is often necessary to regulate the size or mesh of these perforations, and this may be accomplished by an adjustable perforated face-plate B<sup>9</sup>, corresponding in curvature to the plate B<sup>8</sup> and held in its adjusted position thereon by any desired means—for instance, bolts B<sup>10</sup>. It will be apparent that when the apertures in the plates B<sup>8</sup> and B<sup>9</sup> are in alinement the largest opening is secured, and a shifting of these plates relative to each other controls the subsequent area of opening. For the purpose of mounting the plates the hub is provided with flange B<sup>11</sup> and B<sup>12</sup> thereon at opposite sides of the opening B<sup>5</sup> therein, which provide a rigid and firm support and connection for the plates to the hub of the scoop.



While the material may be drawn into the hub of the scoops by any desired suction, still it is desirable to provide also a pressure device to retain the suction-pipe in primed condition when the scoop is elevated from the water and the suction-pipe exposed to the atmosphere. This is accomplished by means of a pressure-pump C of centrifugal or any desired character, which is adapted to force a column of liquid through the pipe C' and flexible connection C'' and passage A'' into the jet A', carried at one end of the suction-pipe. This jet maintains a column of moving liquid through the suction-pipe and into the nozzle A' at the opposite side therefrom, upon which nozzle the suction-pump C' operates, through the pipe C' and flexible connection C'', with the passage A'' communicating with the nozzle. The material which contains the gold or other values is discharged from this suction-pump at C' and conveyed to any desired place. The eccentrically-disposed driving pulleys or wheels B' for the scoops are connected with similar wheels D by means of belts or cables D', as shown in Figs. 1 and 2, and the wheels D at each side of the dredge are carried upon a suitable shaft D'', which may be driven in any desired manner—for instance, by means of a driving-pulley D'' thereon, which is geared by a belt D'' with a similar pulley D'' upon a counter-shaft D'', which shaft is provided with any suitable construction of clutch mechanism, as shown at D'', for starting and stopping the movement of the parts. Power is transmitted to this counter-shaft by means of a belt D'', extending from a suitable pulley D'' upon the crank-shaft E of the engine. (Shown at E'.) This shaft is also provided with a balance-wheel E'', while the engine is supplied from any suitable source of power—for instance, a boiler E'', connected by a steam-pipe E'' therewith. The pumps C and C' are also adapted to be driven from the crank-shaft E by means of pulleys E'' thereon and a belt E'', extending to a driving-pulley E'' upon the shaft of each of the pumps. These parts are duplicated upon each side of the machine. It is also found desirable under some conditions to retain the dredge in fixed position by means of a holding-pile E'' of any desired construction—for instance, operated by a steam-cylinder E''—or a cable, as shown at E'', may be extended to a fixed point for the purpose of moving or maintaining the dredge in any preferred or desired position.

Under some conditions of operation during the transportation of a dredge it is desirable to raise the arms carrying the scoops to or above the water-level, and for this purpose the same are connected by means of cables F, extending over suitable bearing W' upon standards F'', and thence beneath bearing-rollers F'' to drums F'', mounted upon a shaft F'', which is independent in its rotation from

the shafts D'' for operating the scoops. This shaft is provided with a hand-wheel F'' thereon, connected by a belt F'' with a similar wheel F'' upon the counter-shaft F''. This shaft is also provided with pulleys G, loosely mounted thereon and adapted to be operatively connected by the clutches G'. One of these pulleys is connected by a straight belt G'' with a driving-pulley G'' upon the crank-shaft of the engine, while the opposite pulley is connected by a crossed belt G'' with a pulley G'' upon this crank-shaft. It will thus be seen that a movement of the clutches in the proper direction will cause a driving of the drums in either direction to raise or lower the scoops through the connections just described.

While one form of mechanism has been described for the purpose of operating and driving the several parts, still it is not intended or desired to confine the invention thereto, as it is capable of operation by different constructions and arrangements of operating mechanism, that shown being merely one form thereof.

In the form of the invention shown in Figs. 1 and 7 the hubs are provided with two scoops H and H', disposed in opposite positions, so that during an oscillation thereof toward the right the scoop H will receive material and remove the finer substances therefrom, while during the return movement the same action is secured by means of the scoop H'. Under some conditions of use it is desirable to raise the larger material carried by the scoop which does not pass into the hub thereof and deposit the same upon the dredge, and this can be accomplished by raising the scoops upon their swinging arms into the position shown by dotted lines in Fig. 8, where the scoop is oscillated, so as to discharge its contents into the trough H''. At other times the scoop may be dumped by rotating it into the position shown by dotted lines in Fig. 7, where the waste material will be deposited at the rear of the scoop.

In Fig. 9 a further modified application of the invention is shown in which the scoop is not oscillated, but acts as a plow, the scoop H being omitted therefrom and only the scoop H' used under such conditions.

In the operation of the invention it will be seen that the finer material passes through the apertures in the scoop and is conducted by the suction device to a suitable point of discharge, while the coarser material may be immediately discharged from the scoop by a proper oscillation thereof or raised, a found desirable. The construction embodying the pressure and suction pumps provides against the entrance of air in the suction-pipe when the scoop is raised above the water-level and retains this pipe in proper primed condition for the most efficient operation. The eccentrically-mounted driving-wheels for the scoop



provide the necessary lifting leverage and permit the scoop to closely approach the work in its oscillatory travel without interference from the wheel therewith, particularly when the scoop rests upon the bottom. The construction of the scoop-hub permits the same to be assembled in any desired number to form the hollow suction-shaft, while the arrangement of the oppositely-disposed scoops thereon effects an operation at each movement of the scoop during its oscillation.

It will be obvious that changes may be made in the details of construction and configuration without departing from the spirit of the invention as defined by the appended claims.

Having described my invention and set forth its merits, what I claim, and desire to secure by Letters Patent, is

1. In a dredge, a segmental scoop provided with a conducting-space therein, and a reticulated receiving-face thereto, and a hollow hub communicating with said space.
2. In a dredge, a segmental scoop provided with a conducting-space therein and a reticulated receiving-face thereto, a hollow hub communicating with said space, means for creating a suction within said hub, and means for oscillating said scoop.
3. In a dredge, a scoop provided with a conducting-space therein, and a reticulated receiving-face thereto, a hollow hub communicating with said space, means for creating a suction within said hub, means for adjusting the openings in the reticulated face of said scoop, swinging arms upon which said hub is mounted, and means for raising and lowering said arms.
4. In a dredge, a scoop provided with a conducting-space therein and a reticulated face thereto, a hollow hub communicating with said space, means for creating a suction within said hub, means for oscillating said scoop, swinging arms upon which said hub is mounted, means for raising and lowering said arms, and curved plates secured to the outer faces of the arms to form conducting-passages upon said arms communicating with said hub.
5. In a dredge, a scoop provided with a conducting-space therein and a reticulated receiving-face thereto, a hollow hub communicating with said space, means for adjusting the openings in the reticulated face of said scoop, swinging arms upon which said hub is mounted, means for raising and lowering said arms, conducting-passages upon said arms communicating with said hub, and means for exerting a pressure within one of said arms and a suction within the opposite arm.
6. In a dredge, a scoop provided with a conducting-space therein and a reticulated face thereto, a hollow hub communicating with said space, a nozzle for creating a suc-

tion within said hub, means for oscillating said scoop, swinging arms upon which said hub is rotatably mounted, means for raising and lowering said arms, conducting-passages upon said arms communicating with said hub, means for exerting a pressure within one of said arms and a suction within the opposite arm, a pressure-nozzle within said hub at one end, and bolting-flanges provided upon said hub for connecting a plurality thereof together.

7. In a dredge, a scoop provided with a hollow hub, a solid segmental rear wall, an apertured front wall spaced therefrom to form a passage communicating with said hub, and an apertured adjusting-plate mounted upon the front wall of said scoop.

8. In a dredge, a scoop provided with a hollow hub, a solid segmental rear wall, an apertured front wall spaced therefrom to form a passage communicating with said hub, an apertured adjusting-plate mounted upon the front wall of said scoop, a flange disposed at one end of said hub, and a side wall disposed in contact with said flange.

9. In a dredge, a suction-pipe comprising a plurality of hollow hubs secured together and each provided with a radially-disposed scoop having a passage therein communicating with the hub and an apertured wall.

10. In a dredge, a suction-pipe comprising a plurality of hollow hubs secured together and each provided with a radially-disposed scoop having a passage therein communicating with the hub, and an apertured wall, supporting-arms for said hubs provided with nozzle portions threaded into the opposite ends of the hubs, conducting means carried by said arms to communicate with said nozzles, and means for rotating said hubs.

11. In a dredge, a suction-pipe comprising a plurality of hollow hubs secured together and each provided with a radially-disposed scoop having a passage therein communicating with the hub, and an apertured wall, supporting-arms for said hubs provided with nozzle portions threaded into the opposite ends of the hubs, conducting means carried by said arms to communicate with said nozzles, and wheels for rotating said hubs and disposed eccentrically to the axis of the hubs.

12. In a dredge, a suction-pipe comprising a plurality of hollow hubs secured together and each provided with a radially-disposed scoop having a passage therein communicating with the hub, and an apertured wall, supporting-arms for said hubs provided with nozzle portions threaded into the opposite ends of the hubs, conducting means carried by said arms to communicate with said nozzles, wheels for rotating said hubs and disposed eccentrically to the axis of the hubs, driving-shafts for said hubs provided with eccentrically-disposed wheels thereon, and a gearing extended between said wheels.



13. In a dredge, a suction-pipe comprising a plurality of hollow hubs secured together and each provided with a radially-disposed scoop having a passage therein communicating with the hub, and an apertured wall, supporting-arms for said hubs provided with nozzle portions threaded into the opposite ends of the hubs, conducting means carried by said arms to communicate with said nozzles, wheels for rotating said hubs and disposed eccentrically to the axis of the hubs, driving-shafts for said hubs provided with eccentrically-disposed wheels thereon, a gearing extended between said wheels, a pressure device communicating with the conducting means upon one of said arms, and a suction device communicating with the conducting means upon the opposite arm.

14. In a dredge, a boat structure, pivotally-mounted arms supported at one end thereof, a suction-hub supported in said arms and communicating with said boat, a scoop carried by said hub, and eccentrically-disposed means upon said hub for oscillating said scoop.

15. In a dredge, a boat structure, pivotally-mounted arms supported at one end thereof, a suction-hub supported in said arms and communicating with said boat, a scoop carried by said hub, means for oscillating said scoop, supporting-standards upon one end of the boat, and means carried by said boat and passing over said standards for elevating said arms and the scoop carried thereby.

16. In a dredge, a suction-scoop, pivotally-mounted arms for supporting the same, a casing carried by one face of said arms and communicating with the hub of said scoop, a pressure device communicating with said casing and with a nozzle at one end of said hub, and a suction device communicating with the opposite casing and the opposite end of said hub.

17. In a dredge, a suction-scoop, pivotally-mounted arms for supporting the same, passages carried by said arms and communicating with the hub of said scoop, a pressure de-

vice provided with a nozzle at one end of said hub, a suction device communicating with the opposite end of said hub, means mounted upon said hub for oscillating the same upon said arms, and driving connections for operating said oscillating means.

18. In a dredge, a suction-scoop, pivotally-mounted arms for supporting the same, passages carried by said arms and communicating with the hub of said scoop, a pressure device provided with a nozzle at one end of said hub, a suction device communicating with the opposite end of said hub, means mounted upon said hub for oscillating the same upon said arms, driving connections for operating said oscillating means, an elevating-cable connected to the free end of said arms, a bearing-standard for said cable, and a winding-drum for said elevating-cable.

19. In a dredge, a scoop comprising a hollow hub, a segmental portion extending from said hub and provided with a perforated face and a chamber communicating with said hub, an adjustable perforated plate mounted upon said perforated face to vary the capacity of the apertures thereof, flanges at the opposite ends of said hub, and side walls for said scoop disposed between the flanges of adjacent hubs.

20. In a dredge, a scoop comprising a hollow hub, a segmental portion extending from said hub and provided with a perforated face and a chamber communicating with said hub, an adjustable perforated plate mounted upon said perforated face to vary the capacity of the apertures thereof, flanges at the opposite ends of said hub, side walls for said scoop disposed between the flanges of adjacent hubs, a supporting-arm for said hub, and a casing upon the outer face of said arm to provide a channel communicating with said hub.

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

HORACE J. CLARK.

Witnesses:

GERTRUDE MILLS,  
SHERMAN GLENN.