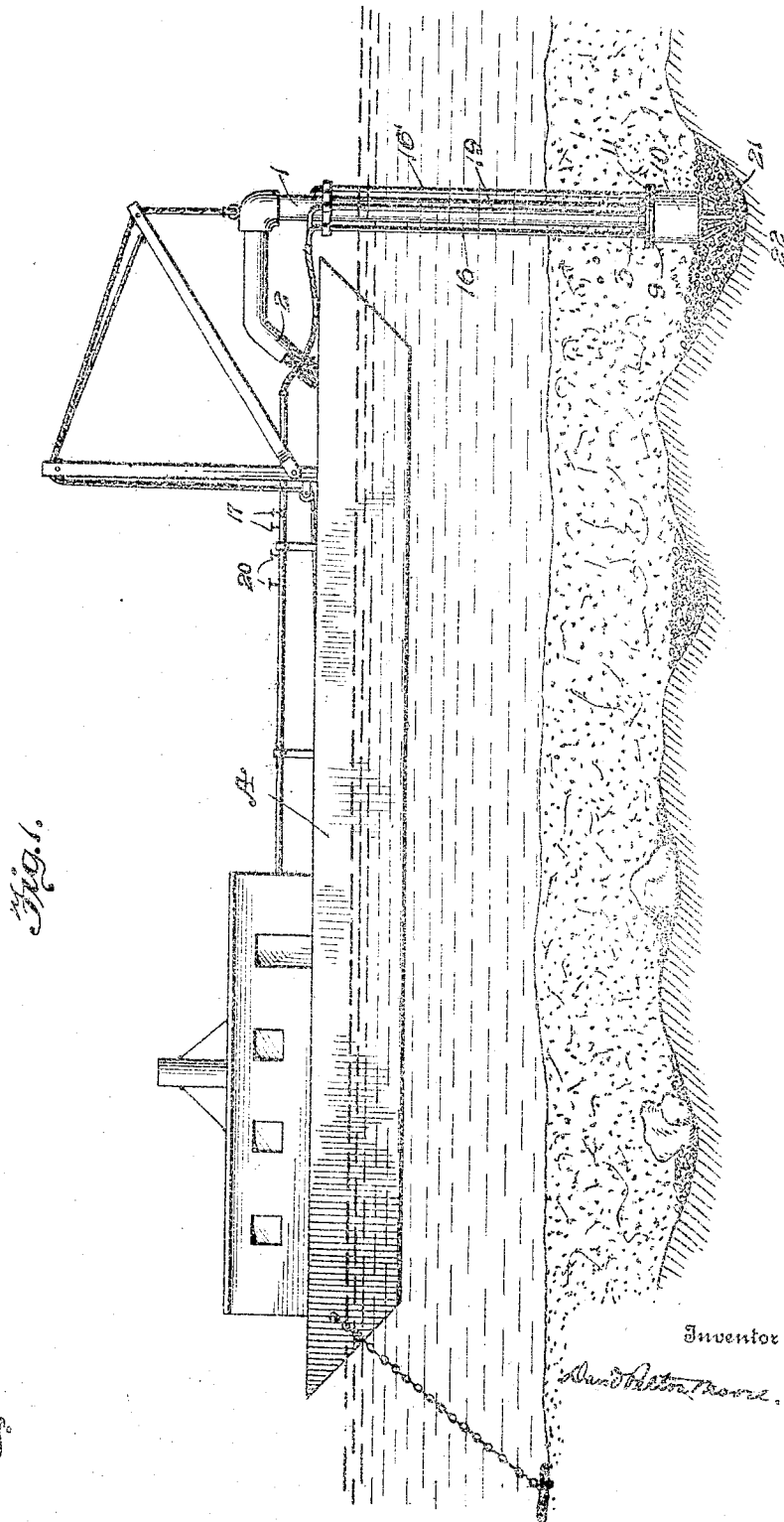


No. 890,245.

D. P. MOORE. PATENTED JUNE 9, 1908.
DREDGING APPARATUS.
APPLICATION FILED MAR. 6, 1908.

3 SHEETS-SHEET 1.



Witnesses
G. M. Spring
M. E. Moore

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3 SHEETS—SHEET 2.

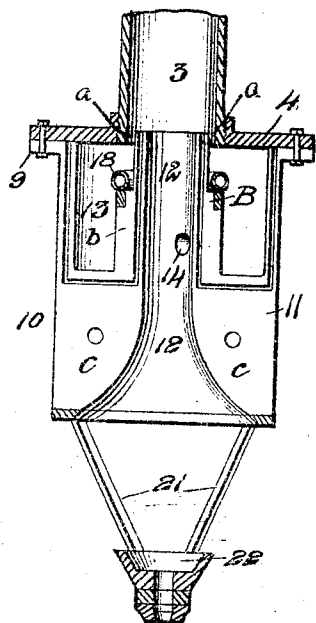


Fig. 2.

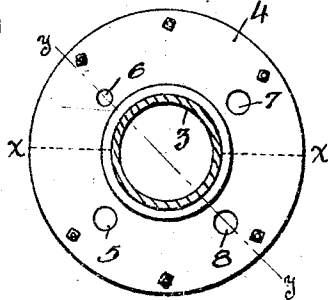


Fig. 4.

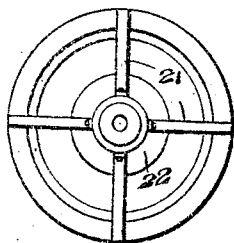


Fig. 5.

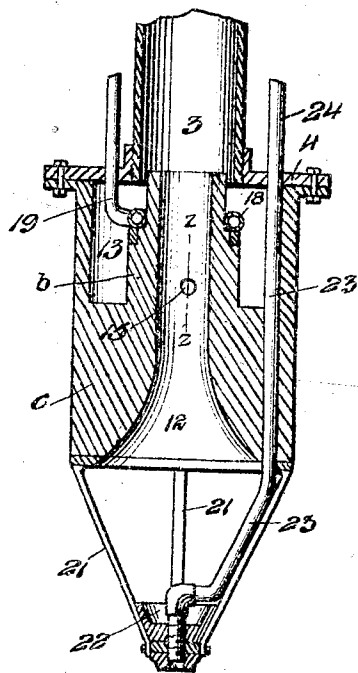


Fig. 3.

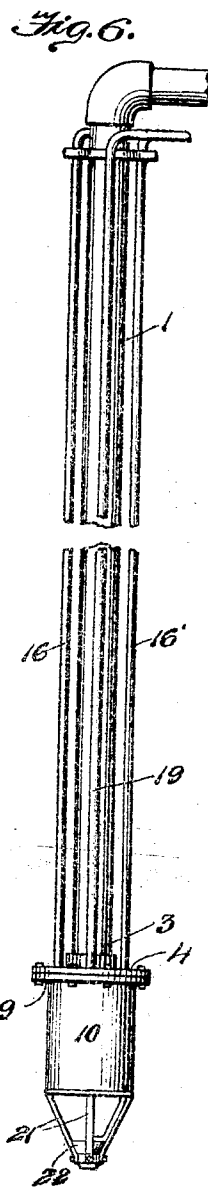


Fig. 6.

Witnesses
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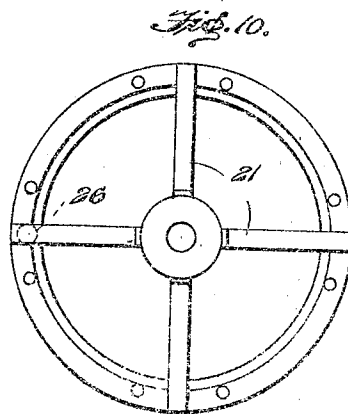
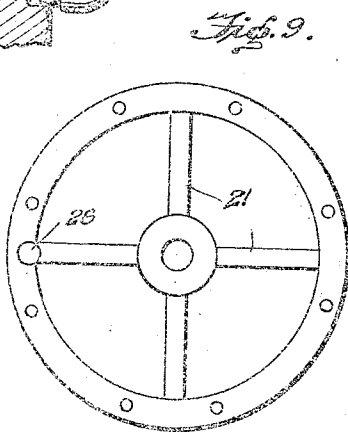
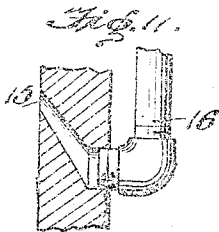
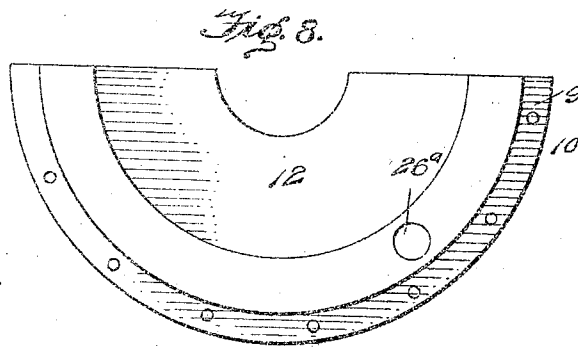
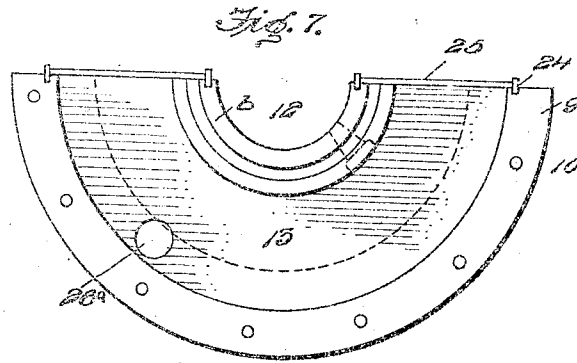
Inventor
David Pelton Moore.

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3 SHEETS—SHEET 3.



Inventor

David Patton Moore.

Witnesses

E. M. Sprung

M. E. Moore.

UNITED STATES PATENT OFFICE.

DAVID PELTON MOORE, OF WASHINGTON, DISTRICT OF COLUMBIA.

DREDGING APPARATUS

No. 390,345.

Specification of Letters Patent.

Patented June 9, 1902.

Application filed March 6, 1902. Serial No. 419,221.

To all whom it may concern:

Be it known that I, DAVID PELTON MOORE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Dredging Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My present invention relates to improvements in dredging apparatus, and relates more particularly to that class of dredging apparatus, employing blasts of water or air, or both, in submerging the dredging head, and also in elevating the submerged deposit, that is desired, either for mining or other purposes.

The main object of my invention is to provide an improved apparatus, in which the air under pressure is commingled with the gangue to supplement water under pressure for lifting the gangue. In order to accomplish this, I provide a dredging head, which is provided with an inverted main nozzle, which has jets of fluid under pressure acting upwardly therethrough so as to cause the gangue to be drawn upwardly through the nozzle into the main duct, where the gangue is conducted to the proper place, either to land or in a scow. Two jets are preferably employed in this nozzle, and they may both use water under pressure, or one may use water and the other air, as may prove more efficient. Surrounding the upper end of the nozzle, which projects slightly into the lower end of the gangue duct and provides an annular space between it and the duct, is a vacuum chamber, which is in communication with the duct through said annular space. Mounted in this vacuum chamber is what I term a perforated or "jet" rim, which receives either air or water, under pressure and projects it into the gangue duct through the annular space. Thus by this arrangement, I thoroughly mix air with the water, so that there is no alternate flow of air and water, but a steady flow of evenly-mixed flux of the air and water bearing the sand and other substances in suspension.

To more clearly illustrate my invention, attention is invited to the accompanying drawings, in which:—

Figure 1 is a side elevation of a scow with my apparatus in submerged and operable position. Fig. 2 is a vertical section of the lower end of the gangue duct, with the dredg-

ing head in position, one member of the head being shown in elevation, as the section is taken on line $x-x$ of Fig. 4. Fig. 3 is a vertical section through the dredging head and lower end of the duct (line $y-y$ Fig. 4). Fig. 4 is a top plan view of dredging head. Fig. 5 is a bottom plan thereof, Fig. 6 is a side elevation of duct and head. Fig. 7 is a top plan of one section of head. Fig. 8 is a bottom plan of same section of the head. Figs. 9 and 10 are top and bottom plans of cage, and Fig. 11 is a section on line $z-z$, Fig. 3.

Referring to the drawings:—A designates the scow, provided with the crane or derrick for properly suspending the sectional conduit or duct 1, whose discharge end 2, may lead to any desired place, and may be either rigid or flexible. If it should be desired the conduit may be swung from a cable extended across the channel, in which the dredge is to operate, and in this event, the discharge would be flexible and extend to the shore, where also would be located the machinery, which, when the scow is used, is located in the scow.

Secured exteriorly to the lower end 3, of the duct, is a circular plate or disk 4, in which is provided a series of small openings, 5, 6, 7, and 8, although I would have it understood that more or less of these may be employed when desired, without departing from the spirit of my invention. Supported by and secured to the lower face of this plate is the upper rim 9, of the dredging head 10, which consists primarily of the two members 11, which are adapted to be assembled and held in place by means of bolts passing through the openings 11', and the removable ring 12, the two members co-acting and having in their center the upwardly tapering main nozzle 12, the upper end of which is of lesser diameter than the duct, and projects slightly thereinto leaving an annular space a , thereabout, to allow communication with the vacuum chamber 13, formed in the casting around the upper portion b , of main nozzle 12.

Formed in the walls of the portion b , preferably upon opposite sides and tapering inclinedly upward are the two jets 14 and 15, which are connected respectively to the two pipes 16 and 16', which enter the vacuum chamber through the openings 5 and 7 of the disk 4, (Fig. 4.), these two pipes paralleling the duct upon opposite sides and being connected to the water or air supply mounted

in the scow, valves 17, being employed to control the supply to said pipes, so that both may be operated either singly or jointly.

Upon the exterior of the portion *b* of the main nozzle within the chamber 13, is an annular shoulder upon which is supported the jet ring 18, whose jets direct the air or water toward the annular space *a*, where the currents thus produced will assist the currents from the jets 14 and 15, in propelling the flow upwardly through the duct. When air is used in the jet ring, water is used in the jets 14 and 15, and vice versa, or if necessary, air may be used in one of the jets 14 or 15, and the jet ring, while water is used in the other jet, it being my desire to so employ these jets as to obtain the best possible results in establishing a steady and practically uninterrupted flow through the nozzle and duct. The ring jet is connected in the chamber 13 to the lower end of the pipe 19, which enters the chamber through the opening 6, the upper end of the pipe being controlled by a valve 20.

By forming the lower end of the two members 11 solid, as illustrated at *c*, Figs. 2 and 3, the submerging and retaining submerged of the head is more easily accomplished, and in order to facilitate the submerging, I mount the conical screen or open frame 21, upon the lower end of the two members 11, and provide in its apex the funnel mouth piece or nozzle, 22, in which is mounted the lower end of the water pipe 23, which is connected to the pipe 24, the pipe 23 passing through the opening 8, and the pipe 24 terminating in the scow. This pipe besides being used to assist in submerging the head, will also be employed in nosing the head between boulders, where the deposits of the pure metal may lie, thus dispensing with the employment of divers to assist in moving the boulders to facilitate the dredging operation, the boulders when using my apparatus, not being disturbed.

From the foregoing description taken in connection with the drawings, it is evident that I provide a novel and practical means, whereby the bed rocks of streams or rivers containing metal bearing sands, may be scoured; and an apparatus in whose current inducing or dredging head, the submerged deposit is drawn from directly below and radially, so that the most valuable deposits are projected through the conduit or duct, and which is further provided with a peculiar form of main nozzle, the upper end of which is surrounded by a vacuum chamber out of which is projected exteriorly of the upper end of the main nozzle and into the lower end of the conduit or duct, an assisting fluid under pressure, thus insuring a thorough commingling with the flow, to produce a powerful and constant delivery through and from the duct.

What I claim, as new, is:—

1. In a dredging apparatus, the combination of a duct, a head mounted upon the lower end, a main nozzle extending centrally through said head into the duct, and jets projecting into and around said nozzle, as and for the purpose set forth. 70

2. In a dredging apparatus, the combination of a duct, a head mounted upon the lower end, means for submerging said head and duct mounted in the extreme lower end of the head, a main nozzle extending centrally through said head and into the duct, and jets projecting into and around said nozzle, as and for the purpose set forth. 75 80

3. In a dredging apparatus, the combination with a support, of a duct having an entrance and a discharge end, a head mounted at the discharge end, a nozzle carried in the head and extending from its bottom into the lower end of the duct, said head being provided with a chamber around the upper end of the nozzle, jets projecting into said nozzle, and a jet mounted in the chamber and mounted to direct a discharge into the duct around the upper end of the nozzle. 85 90

4. In a dredging apparatus, the combination with a support, of a duct having an entrance and a discharge end, a head mounted at the entrance end, a nozzle carried in the head and extending from its bottom into the lower end of the duct, said head being provided with a chamber around the upper end of the nozzle, means for projecting a fluid under pressure into said nozzle, means surrounding the nozzle within the chamber for projecting a fluid under pressure into the duct around the nozzle, and means for submerging the head and duct. 95 100

5. In a dredge, the combination with a duct and exterior pressure fluid supply ducts, of a head having a tapered nozzle emptying into the first duct and having its flaring end toward the bottom, and means mounted in the nozzle and connected with the proper fluid pressure supply ducts for inducing a current in the nozzle toward the first duct. 105 110

6. In a dredge, the combination with a duct and exterior pressure fluid supply pipes, of a head having a tapered nozzle emptying into the duct and having its flaring end toward the bottom of the head, and means mounted in the nozzle and connected with the pipes for inducing a current in the nozzle toward the duct. 115 120

7. In a dredge, the combination with a duct and exterior pressure fluid supply pipes, of a head having a tapered nozzle emptying into the duct and having its flaring end toward the bottom of the head, means mounted in the nozzle and connected with the pipes for inducing a current in the nozzle toward the duct, and means within the head and exterior of the nozzle connected with the proper pipes for inducing a current around 125 130

the protruding end of the nozzle within the duct to assist the other inducing currents.

8. In a dredge, the combination with a duct and exterior pressure fluid supply pipes, of a head having a tapered nozzle emptying into the duct and having its flaring end toward the bottom, and means within the head and exterior of the nozzle connected with the proper pipe for inducing a current around the protruding end of the nozzle within the duct.

9. In a dredge, the combination with a duct and exterior pressure fluid supply pipes, of a head, a tapered nozzle in the head having its reduced end toward the duct, and two oppositely arranged jets in the nozzle intermediate of the nozzle's ends and in communication with two of the pipes, so as to project the fluid into the nozzle.

10. In a dredge, the combination with a duct and exterior pressure fluid supply pipes, of a head, a tapered nozzle in the head having its reduced end toward the duct, two oppositely disposed jets mounted in the nozzle intermediate of its ends, and in communication with two of the pipes so as to project the fluid into the nozzle, and an auxiliary inducing jet mounted to project its fluid into the duct around the reduced end of the nozzle.

11. In a dredge, the combination with a gangue duct and pipes for supplying pressure fluid so as to enter the lower end of the duct

to induce currents which lift therewith the heavier material desired to be removed, of a head secured to the duct and pipes and carried by the duct, a nozzle carried by the head and having its reduced end of lesser diameter than the duct and projecting slightly into the lower end of the duct so as to form an annular space therebetween, and means connected with the pipes for inducing a current within and around the nozzle as and for the purpose set forth.

12. In a dredge, the combination with a gangue duct and pipes for supplying pressure fluid, of a head secured to the duct and pipes and carried by the duct, a nozzle mounted in the head and having a tapered end of lesser diameter than the duct and projecting slightly into the lower end thereof to form an annular space between the duct and nozzle, jets connected with the pipes and mounted so as to empty into the nozzle, and another jet exterior of the nozzle and connected to one of the pipes to project pressure fluid through the annular space between the nozzle and duct.

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

DAVID PELTON MOORE.

Witnesses:

E. H. PARKINS,
G. M. SPRING.