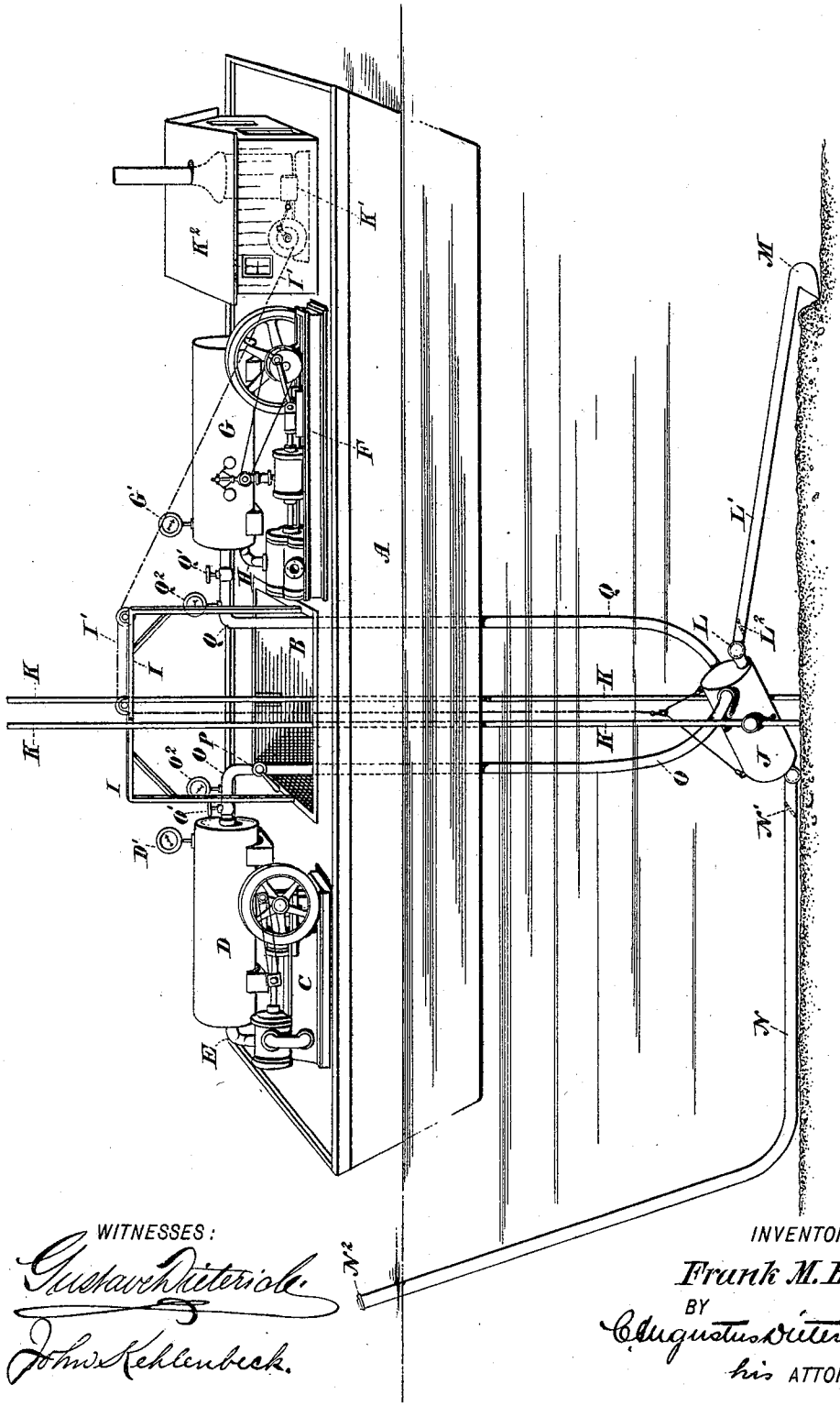
No. 645,660. Patented Mar. 20, 1900.

F. M. BELL.

DREDGING.

(Application filed Oct. 13, 1899.)

(No Model.)



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK M. BELL, OF NEW YORK, N. Y.

DREDGING.

SPECIFICATION forming part of Letters Patent No. 645,660, dated March 20, 1900.

Application filed October 13, 1899. Serial No. 733,458. (No model.)

To all whom it may concern:

Be it known that I, FRANK M. BELL, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Dredging, of which the following is a full, clear, and exact specification.

My invention relates to improvements in apparatus for the excavation and removal of earth, sand, and analogous matter either under water or upon land; and said invention has for its object more particularly to provide a simple, efficient, and economical means for the excavation of said matter and the removal thereof to a place of deposit. These objects above set forth I am enabled to attain by means of my invention, which consists in the novel details of construction and in the combination, connection, and arrangement of parts, as hereinafter more fully described and then pointed out in the claims.

In the accompanying drawing, forming part of this specification, I have shown by a perspective view an apparatus constructed according to and embodying my invention.

In said drawing, A designates a float or other vessel having a centrally-arranged opening B therein. Upon said float A, near its forward end, is arranged a single-cylinder air-compressor C, and beside said air-compressor C is supported a cylinder D, provided with a gage D′, and a pipe E, connecting said cylinder D with the compressor C.

Arranged upon the float A, to the rear of the opening B, is a single-cylinder vacuum-pump F, and arranged beside the same is a cylinder G, provided with a gage G′, and a pipe H, connecting said cylinder G and the vacuum-pump F.

I denotes a suitable support arranged over the opening B in the float A, from which support is suspended, by means of a cable I′, a cylinder J, provided with vertical guide-rods K K, the said cylinder J and guides K K being adapted to be raised or lowered to any desired position by means of the cable I′ and the hoisting-engine K′, arranged within the structure K^2 on the float A.

The cylinder J, I have shown submerged and maintained at an angle, with its forward or discharging end lower than its rear or receiving end. To the raised rear end of said cylinder J is secured, by a universal joint L, an intake-pipe L′, provided with a check-valve L^2 and a scoop-shaped end M.

N denotes the discharge-pipe, having one end secured to the forward end of the cylinder J by a universal joint and provided with a check-valve N′ and the other end of said discharge-pipe N carried upward to the place of deposit and provided with a valve N^2.

From the air-cylinder D extends a pipe O, which is connected to the submerged cylinder J and provided adjacent to the cylinder D with a valve O′ and intermediate said valve O′ and the cylinder J with a gage O^2 and a quick-acting valve P.

From the vacuum-cylinder G extends a pipe Q, which is also connected to the submerged cylinder J and provided near its upper end with a valve Q′, and a gage Q^2, arranged intermediate said valve Q′ and the cylinder J.

The operation of the apparatus is as follows: If we assume the cylinder D to contain air under suitable pressure, as indicated by its gage D′, and the cylinder G to be exhausted to the requisite degree, as indicated by its gage G′, the engine C and F, working to maintain the air-pressure and vacuum in their respective cylinders and the cylinder J in proper position, it then simply becomes necessary to open the valve Q′ in the pipe Q, leading from the cylinder G to the cylinder J, whereupon the air will be exhausted from said cylinder J and the water and matter loosened by the scoop M of the intake-pipe L′ caused to be drawn into said cylinder J. As soon as the cylinder J is filled the valve Q′ is again closed and the valve O′ in the pipe O, leading from the compressed-air cylinder D to the cylinder J, opened and the air under pressure permitted to enter the cylinder J and cause the matter therein to be forced out of said cylinder through the discharge-pipe N to the place of deposit. As soon as the contents of the cylinder J has been discharged the valve O′ is again closed. Should an excess of air under pressure remain in the cylinder J after its contents have been discharged, the relief-valve P should be opened and the excess of air permitted to escape until the gage O^2 indicates a pressure about atmospheric in said

cylinder J, and thus prevent the inflow of water only by way of the intake-pipe L'. Hereupon the valve Q' is again opened and the operation above described repeated, and so on.

It will be observed that by means of the apparatus herein shown and described I am enabled to accumulate air under pressure in sufficient quantity to quickly lift the excavated matter from the cylinder J while the cylinder G is drawing the matter into the cylinder J and that I obtain the required vacuum in the cylinder G while the air from the cylinder D is forcing the matter from the cylinder J. It will thus be apparent that the operation of my apparatus is an alternating one and that by employing a plurality of receiving-cylinders J and properly connecting the same with the intake-pipe and discharge-pipe I can maintain a constant discharge of matter through the pipe N'. It is to be further observed that while I have shown the cylinder J submerged I do not wish to limit or confine myself to this feature, as the said cylinder may be placed either under or over water. Neither do I wish to limit or confine myself to the details of construction, which may be varied within the scope of the invention.

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

1. In an apparatus of the character specified, a receptacle adapted to receive excavated matter, a vacuum-receptacle and a receptacle containing air under pressure; said receptacles being connected to the receptacle first mentioned, and valve mechanism for alternately placing said first-mentioned receptacle in communication with the vacuum-receptacle and the receptacle containing air under pressure whereby to cause the excavated matter to be drawn into said first-mentioned receptacle, and thence discharged therefrom, substantially as specified.

2. In an apparatus of the character specified, a submergeable receptacle adapted to receive excavated matter, intake and discharge pipes connected to said receptacle, check-valves arranged in said pipes, an air-compressing apparatus, a receptacle adapted to receive the compressed air connected to said compressing apparatus and the submergeable receptacle, an exhausting apparatus, a receptacle adapted to be exhausted connected to said exhausting apparatus and said submergeable receptacle, and valve mechanism for controlling the ingress and egress of fluids and matter to and from the submergeable receptacle, substantially as specified.

3. In an apparatus of the character specified, the combination with a suitable support, of a submergeable receptacle, means for raising and lowering the same, intake and discharge pipes connected to said submergeable receptacle, check-valves arranged in said pipes, an air-compressor and a receptacle adapted to receive the compressed air connected thereto disposed upon the support, a pipe connecting the compressed-air receptacle, and the submergeable receptacle, a valve and a gage arranged in said pipe, a vacuum-pump and a receptacle adapted to be exhausted connected thereto disposed upon the support, a pipe connecting said vacuum-receptacle and submergeable receptacle, a valve and a gage arranged in said pipe, and a relief-valve provided in the pipe leading from the compressed-air receptacle to the submergeable receptacle, and disposed intermediate said submergeable receptacle and the valve controlling the admission of air under pressure thereto, substantially as specified.

Signed at the city of New York, in the county and State of New York, this 11th day of October, 1899.

FRANK M. BELL.

Witnesses:
GUSTAVE DIETERICH,
JOHN KEHLENBECK.