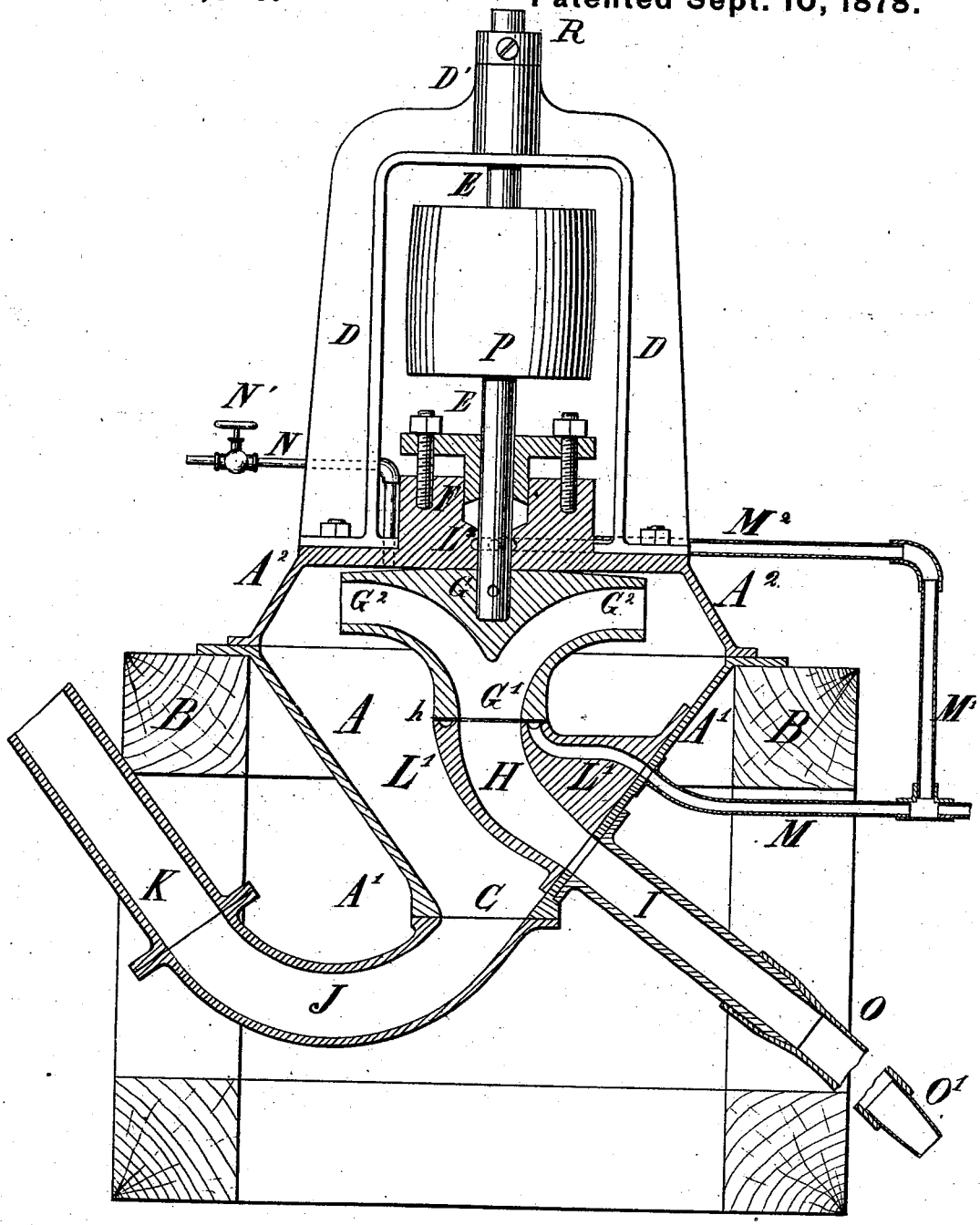
E. MOREAU.

Detritus-Pump.

No. 207,887. Patented Sept. 10, 1878.



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UNITED STATES PATENT OFFICE.

EUGÈNE MOREAU, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO AMERICAN MINING AND DREDGING COMPANY.

IMPROVEMENT IN DETRITUS-PUMPS.

Specification forming part of Letters Patent No. **207,887**, dated September 10, 1878; application filed March 7, 1878.

To all whom it may concern:

Be it known that I, EUGÈNE MOREAU, of the city and county of San Francisco, and State of California, have invented an Improved Detritus-Pump; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention has reference to certain improvements in centrifugal pumps, whereby they are adapted to raise earthy matter, stones, gravel and other substances mixed with water from the bottoms or beds of rivers, lakes, bays, or excavations, and also to force the said substances in any direction to the desired point of discharge.

My invention relates, first, to certain improvements in the shape of the receiving case or chamber, whereby a greater facility and evenness of discharge is obtained; and, secondly, to a water-pressure joint, for preventing particles of the raised material from getting between the moving faces of the joint which connects the suction-pipe and rotating disk, all as hereinafter more fully described.

G represents the centrifugal wheel or disk. This wheel or disk I make with a hub-like extension on one side. An opening or passage, G^1, extends through this hub-extension into the body of the disk, and one or more radial passages, G^2, lead from this central opening to the circumference of the disk, as shown. This wheel or disk I attach to the lower end of a vertical driving shaft or spindle, E, so that it will be suspended and rotated below the frame in which the shaft or spindle is supported at the top by means of the collar R.

The suction-pipe H I O, as will be readily understood, extends from the bottom of the lake, river, bay, or excavation up to the wheel or disk G, and its upper end abuts squarely against or close to the end of the hub-extension.

The surrounding case I make in two parts, the lower part, A, being shaped like a hopper, while the upper part is the frustrum of a cone, and made to fit down closely upon the lower part. The upper edge of the lower part has an outward-projecting flange surrounding it, which rests upon the timber B of a wooden frame, and the lower edge of the upper part has a similar flange, so that when the flanges are in place they can be secured together by bolts or otherwise, as shown. The wheel or disk is supported in the upper part of the case, so that its radiating passages will discharge the material against the inclined or diverging sides A^2 of the upper part of the cases.

A sufficient space is left between the walls of the case and the disk, so that the material can be discharged freely from the rim of the wheel into the case or chamber A.

It is important that the inclined or diverging sides be placed opposite the rim of the disk, in order to avoid too great wear from the impact of the stones and other solid substances thrown against them by the wheel. These substances will glance from the inclined sides without doing much injury, whereas if the sides were parallel with the rim of the wheel the continued abrasion would soon wear the case through.

The suction-pipe H I O passes through the side of the case, and extends up inside of it to the hub of the disk, and between the face of the runner and the face of the suction-pipe. A current of water under pressure is allowed to flow between the two by means of the pipe M and channel *h*.

The spindle passes through a stuffing-box, F, on the frame, and a groove, L^2, is made around it, and is connected, by the pipe M^2, with the pump, so that a water-joint is also formed around the spindle, which serves to keep out dirt, sand, and gravel.

A driving-pulley, P, is fastened to the spindle, to which the power for driving the disk is applied by means of a belt.

The operation of the machine is as follows: The case A is first filled with water, and, the power being applied, the disk G revolves rapidly. The water in the channels G^2 G^2 is discharged by the centrifugal force, thus leaving a vacuum at G^1. The water of the river rushes up through the suction-nozzle O into the pipe O, I, H, and G^1 into the channels G^2 G^2, and thus a continuous current is established between O′ and the case A, where the pressure of the

accumulated water forces it down toward G into the elbow J and up the discharge-pipe K. The solid substances, stones, or gravel, mixed with the water, will come up with it, to be ejected out of the channels G^2, and, glancing against the sides A^2 of the case, will come down with the current into the pipe J K, from which it is discharged.

The tendency of the machine is to draw the water and sand or pebbles through the joint *h*, the pressure of the water in the case A adding itself to the vacuum at G^1 to produce that result, the consequence of which would be the rapid destruction of the joint *h*. This is entirely obviated by the introduction of a current of water between the faces of the joint at a pressure greater than the pressure of the water in the case A. This current allows the joint to be made very close, and effectually shuts off the material in A from any communication with the suction-pipe I H. The pressure of the water in A would also push the sand or other gritty substance into the stuffing-box F if not prevented by the application of the current of water at L^2, said water acting on this joint, as described above.

Having shown the construction of my machine and its operation, I will now endeavor to show wherein my invention differs from the machines already known.

My pump, like many made before, is essentially composed of a runner inclosed in a box, said runner having an opening in the center, opposite the suction-pipe, and discharging the material at its periphery into a case, the latter being provided with a discharge-pipe. So far, these characteristics are common to a great number of pumps, and therefore I would not claim this combination as new; but I would claim as new and patentable such improvements in the shape and relative position of parts never made before, and the result of which would be to greatly increase the capabilities of the machine.

In ordinary centrifugal pumps the periphery of the disk is too close to the walls of the case, either all around or at some point of it, to allow gravel, and especially large stones, to be ejected safely from the disk without danger of being caught between the revolving runner and the inclosing-case, and, at least, of interfering with the discharge.

Now, it is obvious that the first thing to do to remedy that defect is to enlarge the case all round opposite the line of discharge of the revolving disk, so as to leave sufficient room for a free exit of the solid material from the channels G^2. This is an important improvement over the old method of making centrifugal-pump cases.

The next improvement that suggests itself is the one relating to the even distribution of the material in the case in a manner that will allow its continuous flow toward the point of discharge without danger of undue accumulation. This is done by making the box A, opposite the periphery of the disk, in the shape of an inverted funnel, and the lower part, A^1, of the box converging to the discharge-point C, so that the material coming out of the channels G^2 glances against the diverging sides A^2, and is thrown down toward C. Everything in this combination tends to send the material continuously in the direction of the discharge-pipe, even the action of gravity, which is made to help attaining the result.

I could have made the runner vertical, as in a great number of pumps, and inclosed it in my enlarged case; but the evenness of distribution of the material in the box would not be so perfect as that which is thrown up at the top would have to come down again to reach the discharge. For this reason, although I have made plans for a machine running vertically, I rejected this method on account of the more perfect action of the horizontal one.

The inclosing-box could be made in a curved shape, instead of being two parts of pyramids, A^1 and A^2; but the result would not be materially affected, and the plan adopted is much the cheapest for first construction.

I have also made the runner with only one channel, G^2, in the shape of an elbow, and, although this shape is very good for the flow of the material, the adoption of two or more channels has the advantage of keeping the rotating disk perfectly balanced.

I believe the construction of the joint of the runner with the suction-pipe and the application to it of the current of water under pressure have been sufficiently described above to require no more mention.

The suction-pipe O I can be made flexible, or telescopic, or jointed, so as to suit circumstances.

I do not broadly claim the method of lubricating bearings by forcing water under pressure between the bearing-faces, as this is the "*palier glissant*" method of lubricating and relieving bearings.

Having thus shown the construction and operation of my machine, and pointed out wherein it differs essentially from machines of the same class, what I claim as new in my invention, and desire to secure by Letters Patent, is—

1. A dredging-pump consisting of the rotating disk G, with its radiating passages G^2, and the suction-pipe H I O, said disk and suction-pipe being connected by a joint, in combination with a device for forcing clear water between the two faces of the joint, with the groove *h*, substantially as and for the purpose herein described.

2. The method of protecting moving joints which are exposed to wear from sand and foreign matter, consisting in forcing clear water

between the faces of said joints at a higher pressure than that of the surrounding material, substantially as herein described.

3. The combination of a centrifugal pump, G, with a suction-pipe, H I O, water-packed joint *h*, and hopper-shaped vessel A, the upper part of which has diverging sides A^2, said chamber having a discharge-pipe, J K, the whole combined and arranged to operate substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand and seal.

EUGÈNE MOREAU. [L. S.]

Witnesses:
GEO. H. STRONG,
FRANK A. BROOKS.