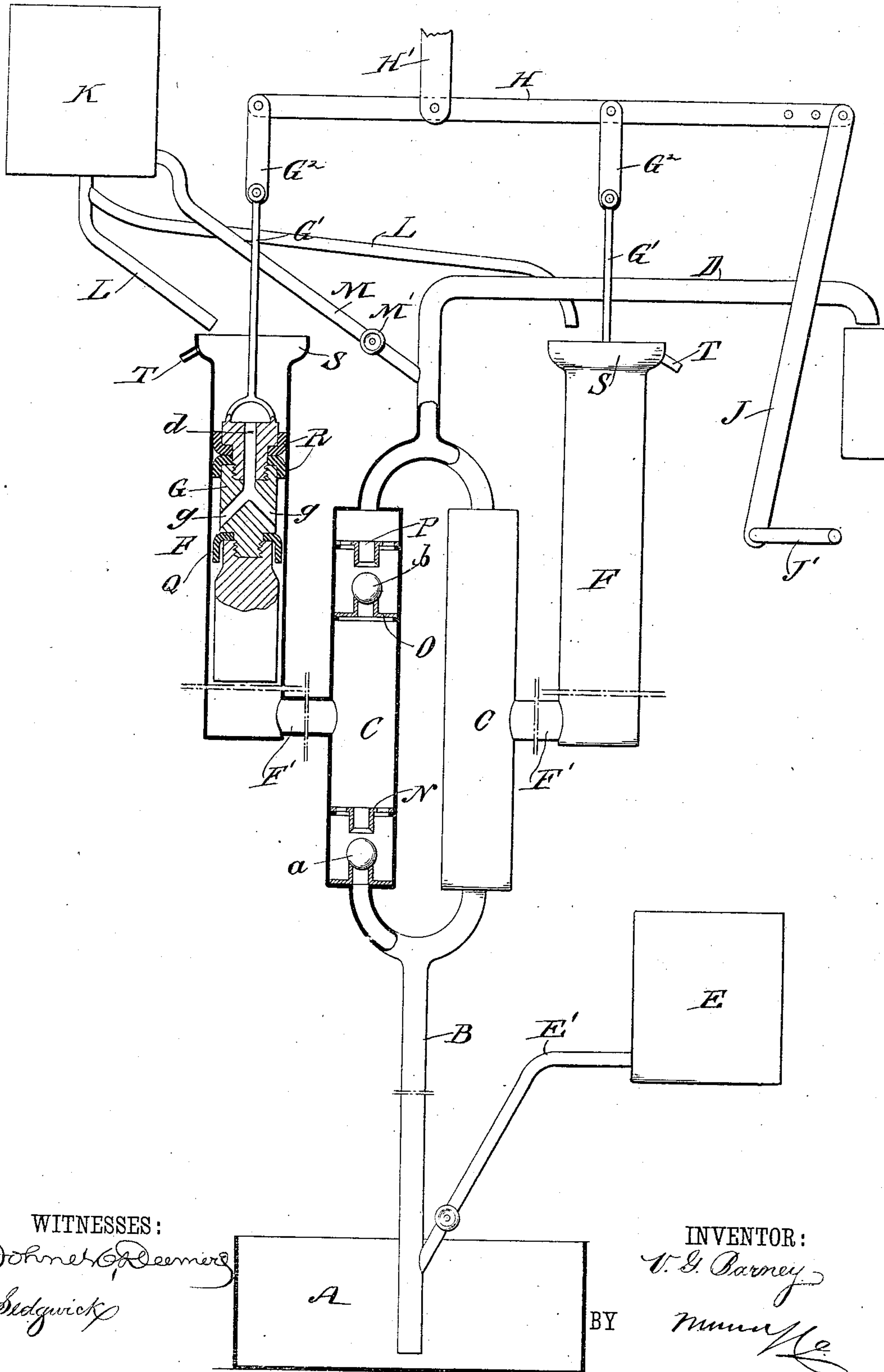


(No Model.)

V. G. BARNEY.  
SAND AND WATER PUMP.

No. 312,069.

Patented Feb. 10, 1885.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

VALENTINE G. BARNEY, OF CHARLES CITY, IOWA.

## SAND AND WATER PUMP.

SPECIFICATION forming part of Letters Patent No. 312,069, dated February 10, 1885.

Application filed August 7, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, VALENTINE G. BARNEY, of Charles City, in the county of Floyd and State of Iowa, have invented a new and Improved Sand and Water Pump, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved pump for pumping water mixed with sand or other gritty material, which pump is so constructed that the piston always plays in clear water while the pump is pumping the mixture of sand and water.

The invention consists in the combination, with a pump-cylinder, of a piston fitting closely in the cylinder at its upper end and loosely at its lower part, which piston is provided with a series of apertures extending from the top to that part fitting loosely in the cylinder, for the purpose of conducting water through the piston into the cylinder to form a sleeve of water around that part of the piston fitting loosely in the cylinder, to prevent the piston from being worn off.

Reference is to be had to the accompanying drawing, forming part of this specification, in which a face view of my improved pump is shown, parts being broken out and others shown in section.

The mixture of water and sand is pumped from a tank, A, through a stand-pipe, B, which is forked at its upper end, each prong of the said fork leading to an upright cylinder, C, which cylinders are united at the top by a forked pipe, D, leading to the receptacle into which the sand and water are to be pumped. The sand and water are conducted into the tank A from some suitable source. The pipe E' extends from a water-tank, E, to the lower part of the pipe B, to which it is held at an inclination. This pipe serves to wash out the sand that accumulates in the lower part of the pipe B, which sand must be washed out before starting the pump. With the middle of each cylinder C the lower end of a pump-cylinder, F, is connected by a pipe, F'. Each cylinder F contains a piston or plunger, G, connected by a rod, G', and a link, G<sup>2</sup>, with a walking-beam or other lever, H, pivoted to a hanger, H', between the links G<sup>2</sup>. A connecting-rod, J, connects one end of the lever H to a crank, J', on a suitable shaft, which

may be revolved by hand-power or machinery. From a tank, K, two pipes, L, lead to the upper end of the pump-cylinders F, and a pipe, M, provided with a valve or stop-cock, M', leads to the pipe D. In the lower part of each cylinder C a ball-valve, a, is held between the bottom of the said cylinder and a transverse apertured partition, N.

In the top of each cylinder C a ball-valve, b, is held between transverse partitions O and P, which transverse partitions O and P have necks projecting toward each other, on which necks the ball-valve b is adapted to fit, and the partition N and the bottom of the cylinder are also provided with necks projecting toward each other, against the ends of which necks the ball fits. I have provided the necks and arranged their ends so that the ball-valves can fit against them in order to prevent binding of the valves, as no sand can accumulate on the edges of the necks, and the balls and sand wear off the ends of the necks uniformly, so that the balls will always fit very closely, and thus prevent leakage. The plunger or piston G in each cylinder fits closely in the cylinder at its upper end, or is provided with packing-rings which fit closely at the upper end; but the lower part of the piston does not fit closely in the cylinder, so that a thin sleeve of water can pass downward in the cylinder between the walls of the cylinder and the said thinner part of the piston for the purpose of washing out the sand.

I may construct the upper part of the piston to fit closely in the cylinder; or two packing-rings, R, may be held in the upper part of the plunger, of which rings one projects upward and the other downward, the said packing-rings fitting closely against the sides of the cylinder, and a short distance from the lower end of the plunger a downwardly-projecting packing-ring, Q, of rubber, leather, or other material is held.

In the upper part of the piston a vertical channel, d, is formed, which at its lower end forms two branch channels, g, the lower ends of which are located directly above the packing-ring Q. The packing-ring Q is made of such size that it does not fit closely in the cylinder when the piston ascends. Each cylinder F is provided at its upper end with a cup-shaped enlargement, S, which is provided with



an overflow-pipe, T. The cylinder must be of such length that the lower end of the piston in its downward stroke does not come to the bottom of the cylinder. For this reason I have  
5 shown part of the cylinder broken out to indicate that there is some space between the lower end of the piston, when the same is lowered, and the bottom of the cylinder.

As stated above, I do not wish to limit myself to any special construction of the piston; but in all cases means must be provided for conducting water into the top of the cylinder.

The operation is as follows: When a piston rises, it creates a vacuum, thus permitting the sand and water rising in the pipe B to open the bottom ball-valve, *a*, and thus permitting the sand and water to pass through apertures in the partition N into the cylinder C. When the piston descends, it forces the mixture of  
15 sand and water from the cylinder C through the pipe D, whereby the valve *b* will be raised, the valve *a* being closed to prevent the mixture of sand and water from falling back, and so on alternately in the same manner as the usual double-acting pump. When the piston  
20 moves downward, the packing-ring Q is distended and pressed by the water between the said ring and the body of the piston against the side of the cylinder, so as to afford a close fit. When the piston rises, the pressure is removed from the packing-ring Q, which contracts. Water flowing from the water-tank K, through the pipes L, into the cylinders F,  
25 passes through the channels *d g* of the pistons, and washes the sand or other gritty material off the sides of the piston and cylinder, thus preventing the said gritty material from destroying the packing-ring Q. The ring Q prevents the mixture of sand and water from coming in contact with the packing-rings R, and  
30 streams of water passing through the channels *d g* keep the packing-ring Q free.

For starting the pump water must be admitted into the cylinders C. This is accomplished by opening the cock M' in the pipe M,  
35 connected with the tank K. When the pump stands idle for a greater or less time, the water all flows out of the cylinder, and for that reason a priming-pipe, M, must be provided.  
40 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a pump, the combination, with the cylinder, of a piston, the upper part of which

fits closely in the cylinder, and the lower  
55 part of which fits loosely in the cylinder, the piston being provided with apertures for conducting water from the top of the piston to a point below that part of the piston fitting  
60 closely in the cylinder, substantially as herein shown and described.

2. In a pump, the combination of the cylinder F, of considerable length, and provided with a plunger having channels, with means for conducting water into the cylinder at or  
65 near its top, substantially as herein shown and described.

3. A pump-piston provided with packing-rings a short distance from each other and with channels extending from the top of the  
70 piston to the space between the packing-rings, substantially as herein shown and described.

4. In a pump, the combination, with the cylinder, of a plunger or piston having packing-rings which fit closely in the cylinder, and  
75 having a packing-ring which fits loosely in the cylinder a short distance below the tight-fitting packing-rings, and a channel extending from the top of the piston to the space between the packing-rings, substantially as herein  
80 shown and described.

5. In a pump, the combination, with the cylinder F, of the piston or plunger G, having the close-fitting upwardly and downwardly projecting rings R at the top, the downwardly  
85 projecting ring Q, some distance below the packing-rings R, and the channels *d g*, extending from the top of the piston to the space between the packing-rings R Q, substantially  
90 as herein shown and described.

6. In a pump, the combination, with the cylinder, of a piston or plunger having a long loosely-fitting lower end, and provided with channels and means for conducting water into the cylinder at or near its top, substantially  
95 as herein shown and described.

7. In a pump, the combination, with the valve-cylinders C C, of the pump-cylinders F F, connected with the same, the suction-pipe B, the delivery-pipe D, and the priming-pipe  
100 M, extending from the water-tank K to the delivery-pipe of the pump, substantially as herein shown and described.

VALENTINE G. BARNEY.

Witnesses:

CAROLYN BARNEY,  
BERTHA BARNEY.