

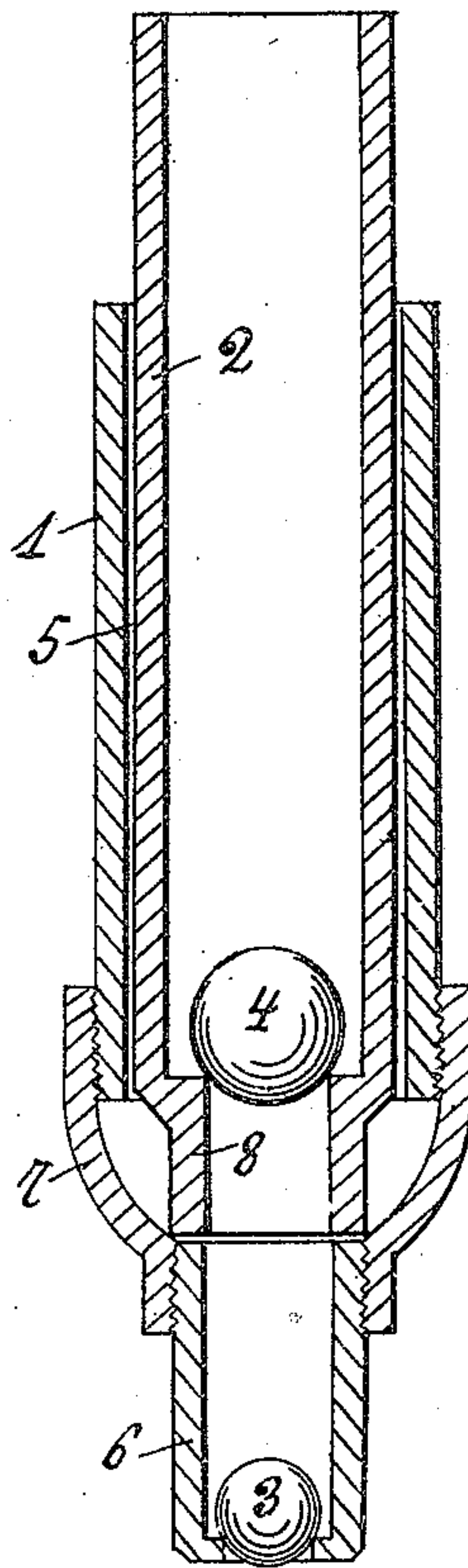
No. 880,039.

PATENTED FEB. 25, 1908.

M. POLLATSCHEK.

PUMP.

APPLICATION FILED DEC. 12, 1904.



Witnesses  
Am. Hillman Jr.  
Arthur Bryant

Inventor  
Mark Pollatschek  
by John Freeman Watson  
Attorneys

# UNITED STATES PATENT OFFICE.

MARK POLLATSCHEK, OF BUCHAREST, ROUMANIA.

## PUMP.

No. 880,039.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed December 12, 1904. Serial No. 236,577.

*To all whom it may concern:*

Be it known that I, MARK POLLATSCHEK, a subject of the Emperor of Austria-Hungary, and a resident of Bucharest, Roumania, have  
5 invented certain new and useful Improvements in Pumps, of which the following is a specification.

My invention relates to improvements in pumps, whereby all stuffing boxes, piston  
10 packings and the like are rendered superfluous and the repairs of the pumps are rendered very easy and simple without necessitating long pauses; and the objects of my improvement are, first, to make the internal  
15 surface of the pump cylinder cylindrical throughout from the bottom to the top; second, to employ a tube as piston and delivery pipe, a small clearance being left between the pump cylinder and the tube;  
20 third, to dispose at the bottom of the pump cylinder a suction valve and at the bottom of the tube a delivery valve, both valves being preferably ball valves; and, fourth, in  
25 some cases, to so arrange the two valves, that they can be easily withdrawn upwards through the tube and replaced without taking the pump to pieces. I attain these objects by the construction illustrated in the  
30 accompanying drawing, which is a vertical longitudinal section through a pump embodying my invention.

In opposition to ordinary pumps the new pump essentially consists of two tubes 1 and 2 placed one in the other and two valves 3 and 4.  
35 The external tube 1 serves as a cylinder and the internal tube 2 as a piston and a delivery tube. The two valves 3 and 4 are preferably ball valves, although they may be of any other known and approved construction. A  
40 convenient seat 6 is provided for the suction valve 3 and it may be connected with the external tube 1 by means of a sleeve 7 or otherwise. Or both the seat 6 and the cylinder 1 may be made in one piece, the essential point being, that the internal surface of the  
45 cylinder 1 be perfectly cylindrical from the top down to the seat proper, as shown, or to a certain point above the seat. A small clearance  
50 must be left between the two concentric tubes 1 and 2. The internal tube 2 is shown as made in one piece with the seat 8 for the delivery valve 4. The construction of the two valve seats 6 and 8 is immaterial. Where  
55 so preferred, the two valves 3 and 4 may be arranged in separate valve boxes of any

known construction, which are suitably attached to the lower ends of the two tubes 1 and 2.

Both tubes 1 and 2 may be made of approximately the same length, or the internal  
60 tube 2 may be made preferably longer than the external tube. The external tube 1 should be mounted in any suitable portable frame or on a stage down in the pit and so inserted into the liquid (water, petroleum or  
65 the like) to be raised, that its upper edge just projects above the level of the liquid. I have not shown any frame or stage, as the construction of the same is immaterial and it is well known how such frames or stages should  
70 be arranged. The top of the internal tube 2 should be connected with the driving means and by the latter the internal tube 2 should be moved up and down, much in the same  
75 manner as the piston of any ordinary pump. Some convenient arrangement of any known kind should be provided for conducting the raised liquid from the top of the internal tube  
80 2 to a reservoir. I have not shown any connection between the top of the internal tube 2 and the driving means nor any arrangement for the delivery, as both are immaterial and may be of any known construction.

The pump described is operated in the following manner: By means of some frame or  
85 stage the external tube is so disposed in the liquid to be raised, that its top edge remains at a small height above the level of the liquid. When assuming the internal tube 2 to occupy its lowermost position, the liquid will  
90 lift the suction valve 3, and fill up the space around the suction valve 3 and between the two tubes 1 and 2, while rising to the level of the ambient liquid. Afterwards the suction valve 3 again falls and closes its seat 6. On  
95 the internal tube 2 being raised by the driving means, it will leave behind it a space, which is at once filled up by liquid, the latter lifting the suction valve 3 and entering the cylinder 1. By reason of its adhesion the  
100 thin layer of liquid in the annular space between the two tubes also partakes in the upward motion of the internal tube 2, but this liquid never flows over the upper edges of the tubes, since the resistance of this adhering  
105 liquid is so great, that its level always remains at a considerable depth beneath the level within the internal tube 2 when in working order. The thin layer of liquid in the narrow annular space 5 between the two  
110



tubes 1 and 2 serves for tightening the piston 2 in a similar manner as the packing in any ordinary stuffing box. When the space in the cylinder is filled up, the suction valve 3 will sink down and close its seat 6. On the internal tube 2 descending, the liquid contained in the cylinder 1 will lift the delivery valve 4 and enter the internal tube 2. When the piston 2 repeats its ascent, a fresh quantity of liquid will be sucked in the manner described above, which liquid will then be forced upwards during the following descent of the piston 2. Evidently the liquid within the internal tube 2 will rise during the reciprocating motion of the latter, so that it can be conducted from the top of the piston 2 to a reservoir in any known manner.

It is obvious, that the new pump is not only very simple, but it is also practically subjected to no wear and tear, as there are no sliding parts, between which any friction might be produced. Hence the pump will hardly require any repairs, which are limited to the valves.

In order to be able to make repairs without taking the pump to pieces the valve 3 is made of such size that it can be introduced through the cavity of the internal tube 2 and the seat 8 of the delivery valve 4 and again withdrawn. Then in case of repairs it will be only necessary to introduce through the internal tube 2 a suitable device of any known construction, which is adapted for seizing and releasing the two valves 3 and 4 one after the other. The pump need not be taken to pieces at all.

The pump shown is single-acting, but it is obvious, that it may also be constructed as a double-acting pump. The pump may be arranged to be driven by hand or by power in any known manner.

It will be seen, that in the new pump all stuffing boxes, piston packings and the like are dispensed with, so that all the heavy defects in connection therewith are avoided. No frequent stoppages and pauses as with the ordinary pumps need be apprehended, which are usually caused by rapid wear and tear of the working surfaces, by the exchange of parts and by the repairs of the whole pump, as the latter requires to be taken to pieces. This is an important advantage of the new pump. Besides this there is a further essential advantage in that the new pump is capable of raising equally well clean, dirty or sandy liquids. This is of

special importance for raising raw petroleum or other oil from wells.

As is well known, it is to-day not possible to raise the oil from great depths in any other manner than by means of buckets. Ejectors have failed to answer the purpose. Also various constructions of special pumps for great depths have been tried, but in vain, since after a few hours' working they proved to be impracticable, as their piston packings were too quickly destroyed by the sand carried with the raw petroleum. Experiments have shown, that the new pump is actually capable of raising very sandy liquids. Further it is to be taken into consideration, that subterranean reservoirs of raw petroleum of say 4 meters depth cannot be emptied at all with the aid of the ordinary pumps and therefore they must be left alone, which means a loss of a quantity equal to the load of thousands of railway cars. By means of the new pump, on the contrary, such deep reservoirs of raw petroleum can be completely emptied and thus utilized.

In the ordinary methods of oil-raising hardly more than five railway cars of 10,000 kilograms each can be filled in ten hours, whereas the new pump of two inches diameter is capable of filling 2 cars in every hour. In the ordinary methods one is for economical reasons compelled to make the boreholes very large in diameter, which of course necessitates the use of wide pipes entailing heavy expenses and a good deal of time for the boring operation.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a pump, the combination with a cylinder, of a cylinder extension of reduced diameter, a sleeve uniting the same, a ball valve in said extension, a piston and delivery tube fitting the cylinder and having a valve seat and ball valve, the arrangement being such that the opening in the piston and delivery tubes corresponds in size with the opening in the extension cylinder whereby the valve for the latter may pass through the opening in the former, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARK POLLATSCHEK.

Witnesses:

JEAN HAUSER,  
F. NADLER.