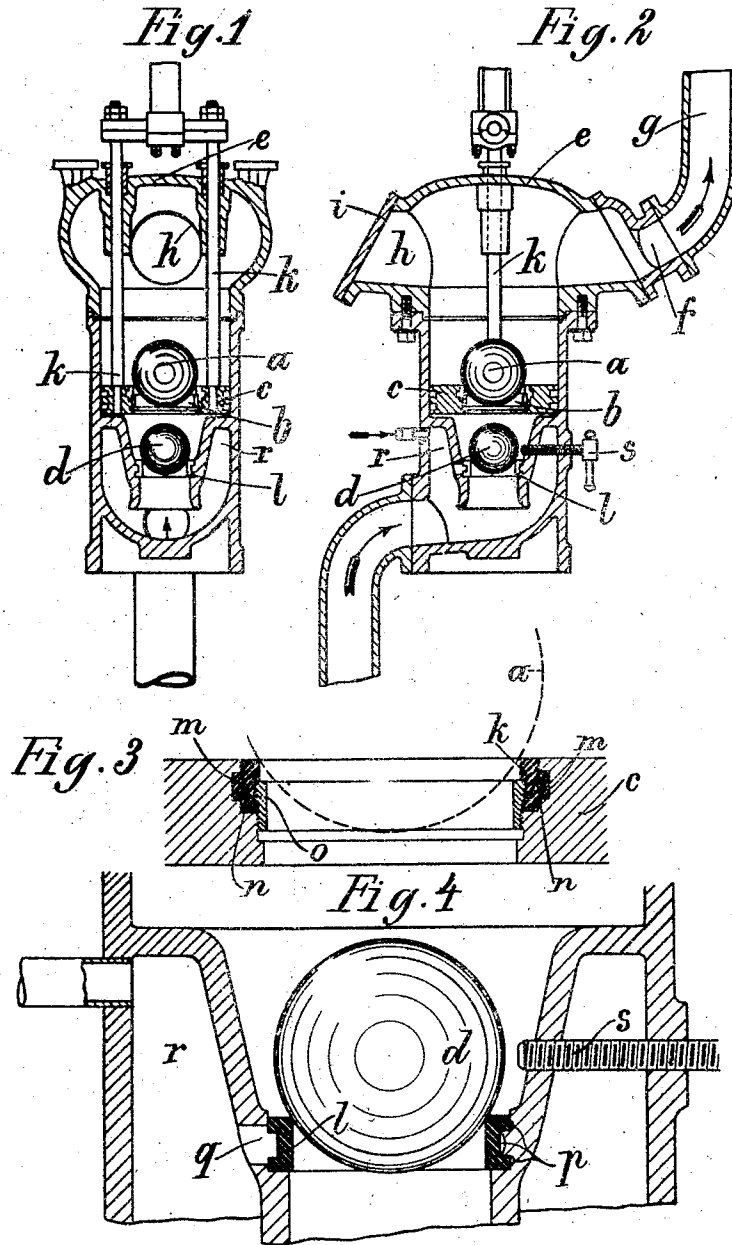


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PUMP.
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1,036,398.

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To all whom it may concern:

Be it known that I, WILHELM WINTERHOFF, a subject of the Emperor of Germany, residing at 51 Kronprinzenstrasse, Dusseldorf, Germany, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The invention herein presented relates to a pump provided with suction and delivery balls positioned one above the other, the upper or larger delivery ball co-acting with a correspondingly dimensioned central aperture of a reciprocating piston in such a manner that the lower or smaller suction ball may be conveniently removed by hand through such opening.

One of the objects of the invention is to line the valve-seats of both of the valve-balls with elastic rings made out of rubber or the like in such a manner that the rings are secured to the seats of the valves on the one hand, and on the other hand that the rings may be easily and quickly exchanged, if necessary. The elastic rings are securely held fast in the seat without any additional securing means but permit an easy and quick exchange. The annular projection is positioned at the center of the elastic ring in such a manner that the ring, subsequent to having become worn on one side, may be simply turned over; i. e., can be used on both sides. The elastic ring moreover may, if desired, be secured by means of a metal ring positioned at the outer circumference of said elastic ring and having a thread, whereby the metal ring may be partially screwed into the elastic ring and partially into the valve-seat. This threaded ring however is not absolutely essential.

The piston pump according to this invention is illustrated, by way of example, in Figures 1 to 4 of the accompanying drawing, in which:

Figs. 1 and 2 represent two vertical sectional views of the pump, the sections being taken at right angles to one another, and Figs. 3 and 4 illustrate two methods of securing the elastic valve-seating rings, on an enlarged scale as compared with Figs. 1 and 2.

The upper or larger ball *a* engages a correspondingly dimensioned central aperture of a reciprocating piston *c*. This central opening is of such size that on removal of the upper ball *a*, the lower ball *d*, which acts as a suction valve, can easily be withdrawn

through the opening *b*. The tapering form of the lower part of the pump enables the suction valve or valves *d* to always correctly seat itself. Moreover the diameter of the upper ball *a* may be so chosen in relation to the diameter of the pump cylinder, as to prevent the upper ball from becoming seated on the solid surface of the piston, but to cause it to always assume its correct position in the aperture thereof.

The upper part of the pump is constructed in the form of a double hood *e* which also serves as an air chamber. This double hood, as shown in Fig. 2, is provided with openings at opposite sides, one opening *f* serving for the connection of the outlet pipe or conduit *g*, while the other opening *h* is closed by an appropriate cover *i*. Upon removal of this cover, it is easy to withdraw by hand the upper larger ball *a* as well as the lower smaller valve *d* through the opening *b*. The hood or cover of the pump, which if desired, may be bolted on to the pump cylinder also acts as a guide and abutment for the upper ball when the piston reaches its highest position.

As the valve seats for the suction and delivery balls are each lined with a removable elastic ring or bushing *k* and *l* respectively, the valve bodies or balls which coöperate with these elastic seats, may be made of metal, glass or the like, and are not subject to wear, and thus need not, as hitherto be provided with a rubber covering or be made entirely of rubber. These elastic rings or linings may of course be secured to the valve seat in any suitable manner so as to be removable. As shown in Fig. 3 an annular groove *m* is turned or worked in the valve opening so as to receive an annular projection or enlargement *n* provided on the outer face of the elastic ring *k*. This arrangement offers the advantage of enabling the seating ring to be turned over if the annular projection or enlargement *n* is arranged centrally thereof, in the event of one side of the seat wearing out, thereby enabling both sides or surfaces of the seating ring to be used.

In order to prevent the elastic rings from easily detaching themselves under the influence of the suction pressure an angular metal ring *o* provided with external screw threads may be screwed from above partly into the valve opening and partly into the elastic ring *k*. The elastic ring is thereby held in position and at the same time the

upper edge of the metal ring *o* forms an abutment for ball *a* thereby preventing the ball from being pressed too firmly into the yielding ring *k*. The elastic seating ring for the suction valve or ball *d* may of course be constructed in the same or a similar manner.

As shown in Fig. 4 the elastic ring *l* which acts as a seat for the suction ball may be attached to the valve seat in the following manner. Arranged in the valve seat and around the elastic ring are one or several annular air passages *p* communicating through a passage *q* provided in the wall of the suction end of the pump with the suction chamber *r*. During the working of the pump a vacuum is produced in the space *r* and consequently also in the passage or passages *p* whereby the elastic ring is firmly held to its seat.

The piston pump according to this invention is particularly adapted for thick fluids such as paper pulp and the like, as the balls or valves being of metal will always seat tightly on the yielding or elastic seating rings, even in the event of long fibers or the like entering between the ball and the seating ring. A further advantage of this pump, which renders it particularly adapted for the conveyance of paper pulp and the like consists in the fact that the material operated upon is caused to move in a practically straight course from the suction end to the outer end, whereby sudden deviations in directions of the flowing substances are avoided. Owing to the ball-shaped form of the valves, the fluid substance flows simply in a tangential direction past the balls and consequently is not abruptly deviated at points around the valves, whereby whirling and similar actions are avoided.

The possibility of easily exchanging the valves and the elastic seating rings is more over of importance, particularly where the pump is to be used for substances of different consistency and color. This pump moreover is conveniently applicable for the evacuation of the suction rollers in paper making machines. In order to enable any liquid that may be present in the pump prior to the removal of the valves and seating rings to be drained off, a screw *s* is introduced from the outside into the suction end of the pump, so as to enable the suction valve *d* to be displaced and lifted off its seat in order to free the passage for the liquid to the suction conduit.

What I claim and desire to secure by Letters Patent is:—

1. A pump comprising a casing, a reciprocating piston therein provided with a central opening, having a grooved wall, an elastic ring positioned in said opening and having a rib engaging said groove and a rigid threaded ring within said opening for assisting in holding said elastic ring in place.

2. In a pump of the kind described a reciprocating piston provided with a central opening, having a grooved wall, an elastic seating ring adapted to fit in said opening and provided with a rib engaging said groove, and means for allowing the suction action of the pump to assist in maintaining said ring in correct position in the opening, substantially as set forth.

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

WILHELM WINTERHOFF.

Witnesses:

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LOUIS VANDORY.