

A. W. SCHRAMM.
PUMP.

APPLICATION FILED SEPT. 5, 1907.

941,958.

Fig. 1.

Patented Nov. 30, 1909.

2 SHEETS—SHEET 1.

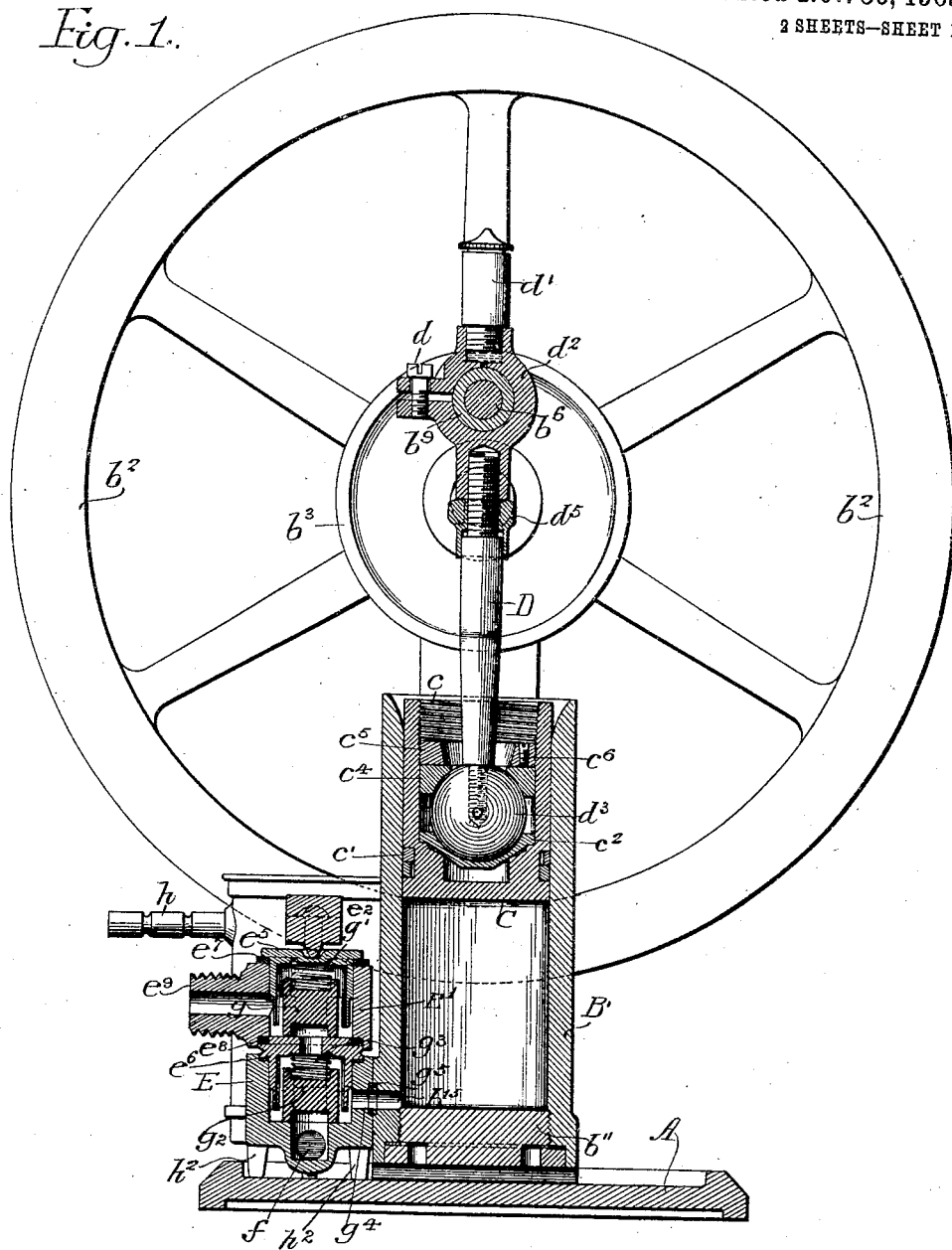
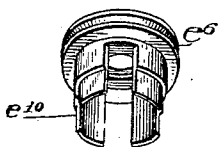
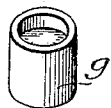


Fig. 5.

Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 2.

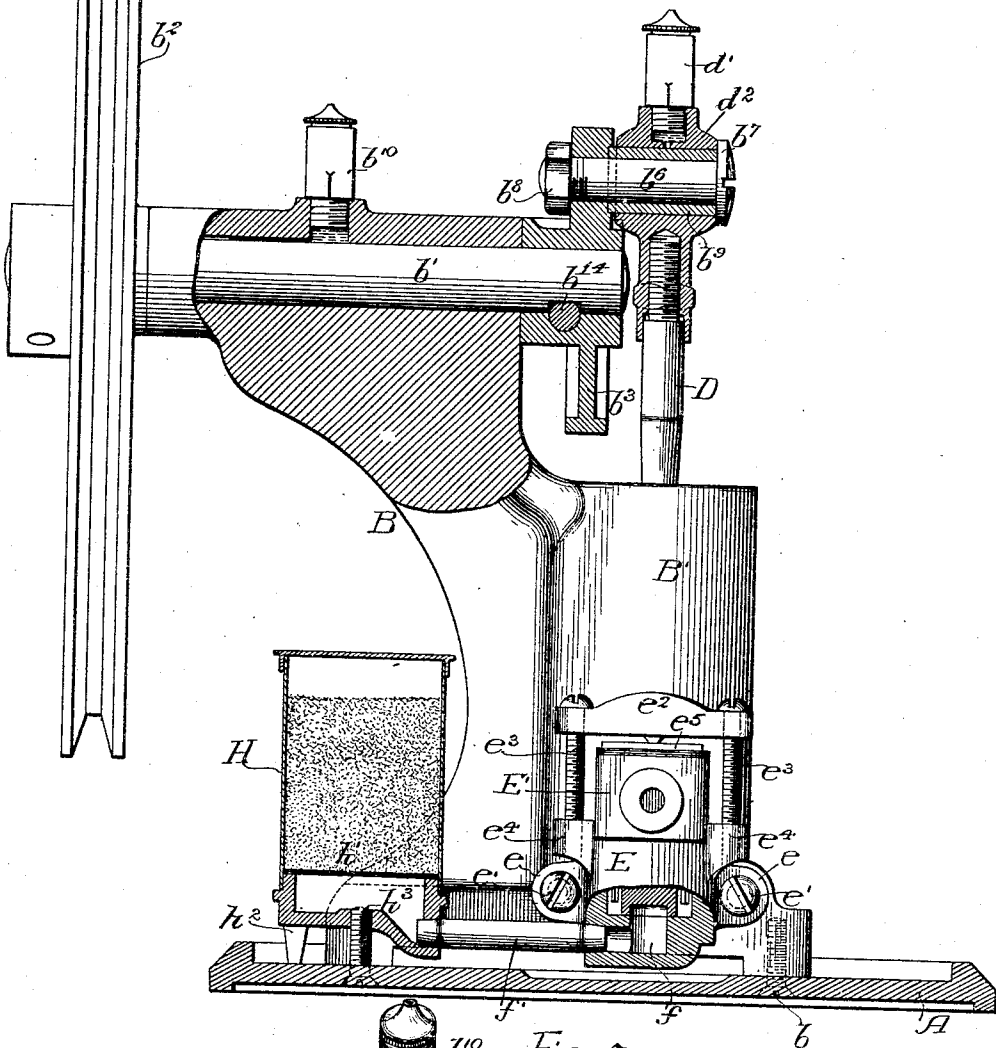
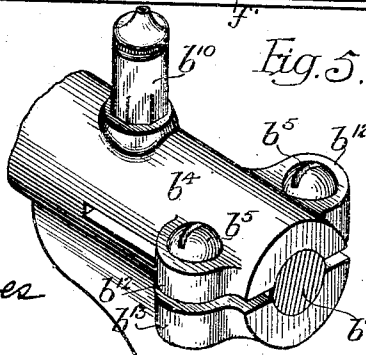


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PUMP.

941,958.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ADOLPH W. SCHRAMM, a citizen of the United States, residing in Riverton, New Jersey, have invented certain
5 Improvements in Pumps, of which the following is a specification.

One object of my invention is to provide a relatively simple and efficient pump particularly designed for compressing air, it
10 being particularly desired that the device, while being comparatively inexpensive to manufacture shall be reliable in its operation and unlikely to get out of order.

It is further desired to provide a pump
15 having the above noted general characteristics, with valve mechanism involving but few parts and so constructed as to be conveniently accessible for inspection.

These objects and other advantageous
20 ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1, is a vertical section taken through the cylinder of my improved pump
25 and illustrating the detail construction of the valves and connecting rod with their associated parts; Fig. 2, is a side elevation partly in vertical section further illustrating the detail construction of the pump; Figs.
30 3 and 4, are perspective views of one of the valves and one of the valve cages respectively, and Fig. 5, is a perspective view of a part of the main structure of the pump.

In the above drawings, A represents the
35 base or supporting structure of the pump and to this is held the main pump casting B by means of screws b , as indicated in dotted lines in Fig. 2. This main pump casting is provided with a vertically placed cylinder
40 B' and has an upwardly extending portion formed into an elongated bearing for a horizontal shaft b' . This shaft has on one end a pulley b^2 , and on its opposite end is a crank b^3 . For holding the crank in place the
45 shaft is provided with a transverse recess or groove, as shown in Fig. 2, and a pin b^{14} passing through the hub of the crank enters this groove so as to rigidly retain said crank in position. Immediately adjacent to the
50 crank, the main pump casting B is provided with a horizontal slot opening into the shaft bearing as shown in Fig. 5, so that the upper portion of the casting is overhung and may be drawn toward the lower portion to a limited
55 extent by means of screws b^5 made to

take up the wear due to the alternate up and down stresses on the end of the shaft. Each of these screws passes through a lug
 b^{12} projecting from the overhung portion b^4 , into a similar lug b^{13} projecting from the
60 lower portion of the casting.

The crank b^3 is provided with a crank pin
 b^6 consisting of a bolt having a slotted head b^7 and a nut b^8 on its opposite end. Upon
65 the overhung part of this pin I place a hardened steel bushing b^9 and counterbore the face of the crank so that it is immovably held in place by said crank pin with its cylindrical surface parallel to the shaft b' .
70 The connecting rod has one head in engagement with the bushing b^9 and in the present instance is of the slotted type, being extended at one side, as shown in Fig. 1, and horizontally slotted so that its two parts may be drawn toward each other by means of an
75 adjusting screw d .

A cup d' for lubricant is mounted on the upper end of the head d^2 of the connecting rod and there is also an oil cup b^{10} mounted
80 at substantially the center of the top of the main casting B in order to supply lubricant to the shaft b' .

The threaded lower portion of the connecting rod D is screwed into and pinned to a hardened steel ball d^3 which takes bearing
85 in the piston C of the pump. This piston consists of a cylinder open at one end having internal threads as indicated at c and external packing rings c' . Within one end of the piston is a shoulder upon which is loosely
90 placed a concave socket piece or seat c^2 for the reception of the ball d^3 , while in addition there is a second seat or socket member c^4 annular in form and maintained in any adjusted position by means of a threaded
95 ring c^5 , which engages with the thread c . Said ring is preferably split and is immovably held in position by means of a tapered screw c^6 which expands it so that it is in effect jammed in position.
100

The head d^2 of the connecting rod is recessed and the body of said rod is screwed into said recess, being permanently held in a given position by means of a jam nut d^5 .
105 The cylinder B' is interiorly threaded at its lower end and a flanged head b^{11} is screwed into it as indicated in Fig. 1; there being provided any suitable form of packing between these two members.

The valve mechanism for the pump con- 110

sists of two substantially cylindrical casings or fittings E and E' mounted one above the other, the first of these being provided with lugs e through which extend screws e' whereby it is rigidly held to the main casting B. The casing E' is held to the first casing by means of a clamp formed of a cross piece e^2 and two screws e^3 which connect the ends of said cross piece with suitably formed lugs e^4 on the casing E. This cross piece is provided with a centrally placed and pointed projection which enters a recess in the top of a cage e^5 belonging to the top casing so as to center and properly hold the various parts in the desired relative positions. The cage e^5 has the form of a cylinder closed and flanged at one end and provided with longitudinally extending slots in its sides, as shown in Fig. 1, and in the assembled valve structure is forced into the upper casing E' which has the general form of a ring. Washers e^7 and e^8 of lead or other relatively soft packing material are confined between the flange of the cage e^5 and the top edge of the casing E' and also between the lower edge of said casing and the top of a second cage e^6 , which in turn is fitted within the casing E. The casing E' is provided with an outlet e^9 which in the present instance is threaded for the reception of any desired form of coupling, while a passage f is formed in the lower portion of the casing E for the reception of an inlet conduit f' .

Within the cage e^5 and resting upon the top of the valve g is a spring g' whereby said valve is held to the top surface of the cage e^6 as a seat and similarly within said cage e^6 is a second valve g^2 preferably of the same general construction as the valve g . This second valve is held to the seat formed by the bottom of the cavity within the casing E by means of a spring g^3 , it being noted that the passage f opens into said casing immediately under the valve. Both valves are preferably formed as reversible cylinders having annular flanges at their ends.

It will be noted from Fig. 4 that the two cages e^5 and e^6 have portions e^{10} of their sides slightly reduced in exterior diameter, so that even though the length of said cages is such as to bring them opposite the passage in the outlet e^9 in the one case and a passage g^4 in the other case, there is still the possibility of air flowing through the casings E and E' around said cages.

As shown in Fig. 1, the passage from the side of the casing E communicates with the passage b^{15} opening into the bottom of the cylinder B', there being a soft metal washer g^5 placed between the two adjacent surfaces of the cylinder and of said casing E in order to properly pack this joint.

Also mounted on the base casting A of the pump is a muffler and straining casing H

which is provided with an air inlet h in its upper portion and is preferably filled with cotton or other suitable material. The lower portion of this muffler cylinder is provided with a strainer h' and has feet h^2 whereby it is supported somewhat above the level of the base casting A upon which it is held however by means of a vertically extending screw h^3 . The lowermost part of the interior of the cylinder H is connected with the inlet of the pump through the conduit f' .

Under operating conditions the pump is driven in any desired manner by power applied to its pulley b^2 and on the upward stroke of the piston air is drawn into the cylinder B', being sucked into the inlet pipe h , casing H, through the screen h' into the pipe f' , through the passage f and after raising the valve g^2 , through the passages g^4 and b^{15} into the pump cylinder. On the down stroke of the piston C this air is forced out through the passages b^{15} and g^4 , through the opening in the top of the cage e^6 and after raising the valve g , flows through the outlet e^9 .

If for any reason it is desired to inspect the valves, access may be had to either or both of the casings E or E' by loosening the screws e^3 and removing the cross piece e^2 , by which operation said casings are free for removal and examination.

In the event of an objectionable amount of play between the shaft b' and its bearing, the screws b^5 may be tightened so as to cause the overhung portion b^4 of the casting B to be drawn toward the lower or main part thereof. Similarly the wear between the steel bushing b^9 and the head of the connecting rod may be taken up by adjusting the screws d .

I claim:

1. The combination in a pump of a main casting having a cylinder, a piston operative in the cylinder, a main shaft extending through said casting and operatively connected to the piston, said casting being provided with a slot or slots extending into the shaft bearing, and having means for drawing together those portions defined by the opposite faces of the slot or slots, substantially as described.

2. The combination in a pump, of a cylinder, a piston, means for driving said piston, two valve casings communicating with each other, one casing communicating with the cylinder, and the other having means for connection to a reservoir, a cage interposed between the two casings, a second cage in the second casing, a valve in each casing, and a spring confined between each cage and its valve, substantially as described.

3. The combination in a pump, of a cylinder, a piston, means for driving said piston, two valve casings connected to each other, one of said casings also connecting with the

cylinder, and the other having means for connection to a reservoir, a structure interposed between said casings, and a valve in each casing, said structure having an opening and serving as a seat for one of the valves, with means for holding the valves to their seats, substantially as described.

4. The combination in a pump of a cylinder, a piston, means for driving said piston, two valve casings communicating with each other, one casing communicating with the cylinder, and the other having means for connection to a reservoir, a cage interposed between the two casings, a second cage in the second casing, and a valve in each casing.

5. The combination of a cylinder, a piston therefor, means for driving the piston, two valve casings, one casing being detachably connected to the cylinder and communicating therewith, a cage mounted between the two casings, a second cage mounted in the second casing, a yoke piece holding said cages and casings together, with valves in the cages, there being an inlet to the first casing, an outlet to the second casing and a passage connecting said casings, substantially as described.

6. The combination in a pump of a cylinder, a piston therefor, means for driving said piston, valve mechanism for controlling the flow of air to and from the cylinder, said valve mechanism including an inclosing

structure and a reversible, longitudinally symmetrical valve having similar recesses in its opposite ends, with a spring entering one recess so as to maintain the end having the other recess on its seat.

7. The combination of a cylinder, a piston therefor, means for driving the piston, two valve casings of which one is detachably connected with the cylinder and communicates therewith, a cage mounted between the two casings, a second cage mounted in the second casing, means for holding said cages and casings together, with valves in the cages, there being an inlet to the first casing, an outlet to the second casing, and a passage connecting the casings.

8. The combination in a pump of a cylinder, a piston, means for driving said piston, a hollow casing communicating with the cylinder, a cage fitted to said casing, a second casing mounted on the cage and communicating with the first casing, a second cage for said second casing, a valve in each casing, and an outlet for the second casing.

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

ADOLPH W. SCHRAMM.

Witnesses:

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CHARLES H. HOWSON.