

(No Model.)

2 Sheets—Sheet 1.

J. J. DUFFY.
FLUID PUMP OR COMPRESSOR.

No. 480,811.

Patented Aug. 16, 1892.

Fig. 1.

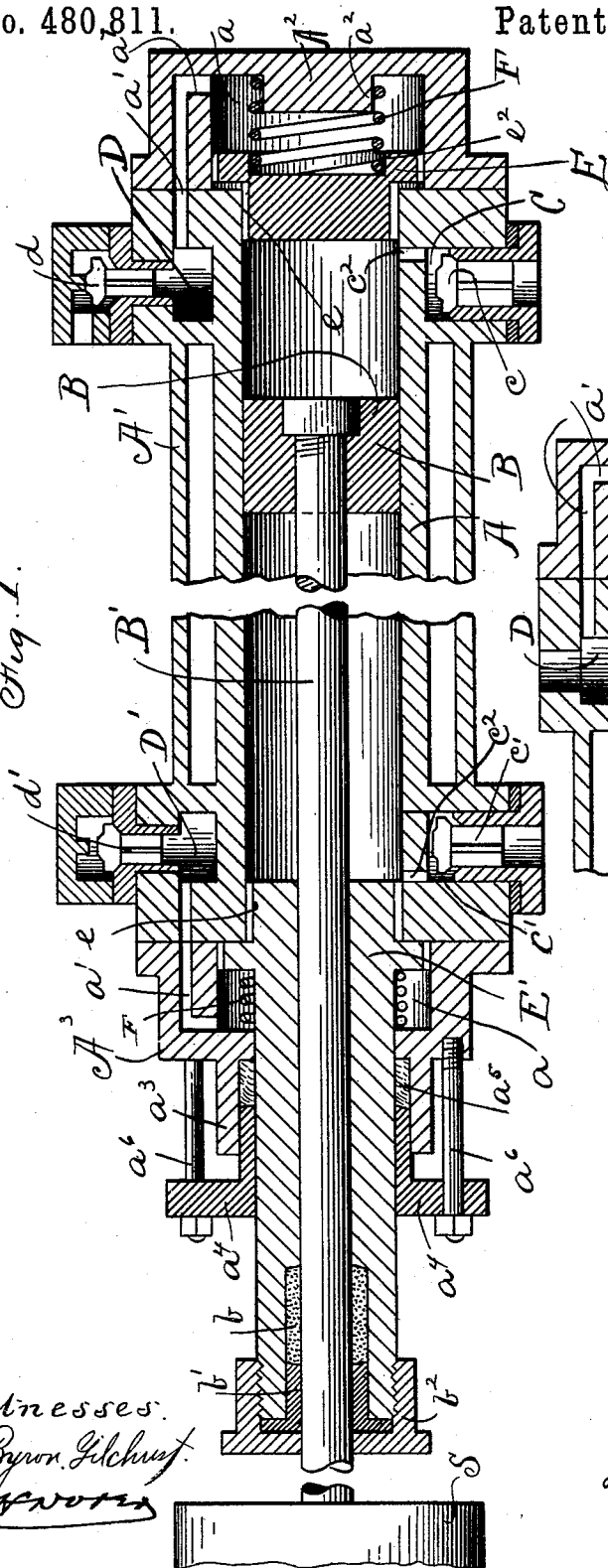
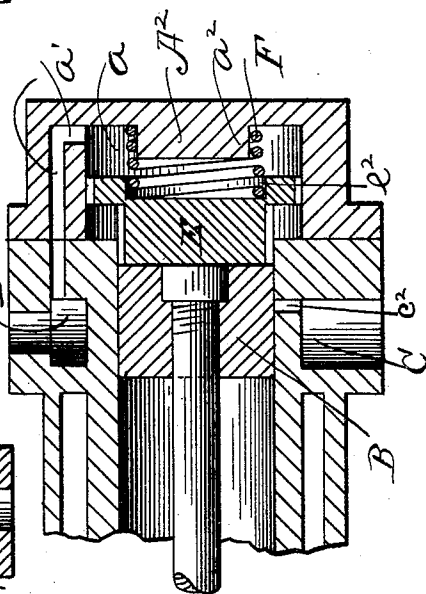


Fig. 2.



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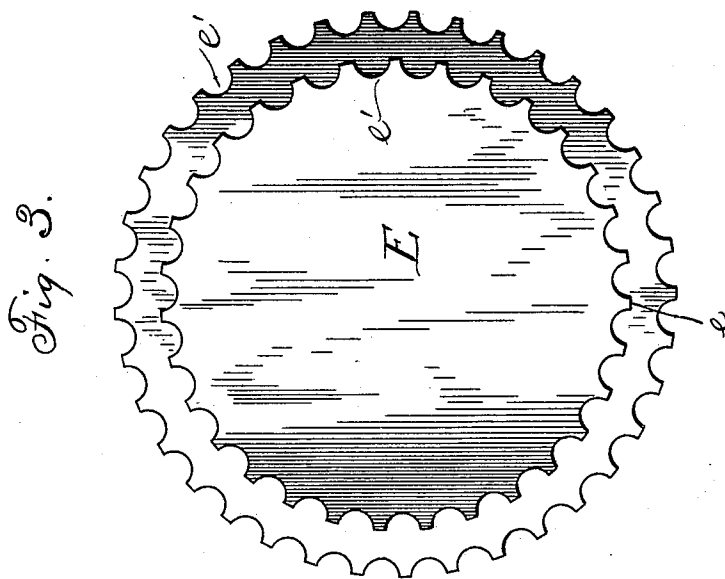
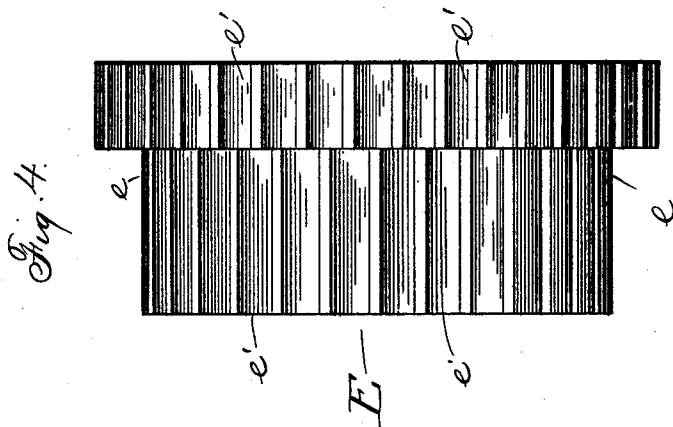
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

JOHN J. DUFFY, OF CLEVELAND, OHIO, ASSIGNOR TO EDWARD P. BATES, OF
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FLUID PUMP OR COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 480,811, dated August 16, 1892.

Application filed October 5, 1891. Serial No. 407,736. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. DUFFY, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful
5 Improvements in Fluid Pumps or Compressors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make
10 and use the same.

My invention relates to an improved fluid pump or compressor especially well adapted for compressing aeriform bodies.

My invention consists more especially in
15 the provision of a delivery-valve whereby the fluid that has been received and accumulated in the cylinder or barrel of the pump or compressor between the piston and said valve will all be discharged during the next succeeding
20 stroke of the piston without the possibility of any of the fluid thus discharged to return.

My invention consists, also, in the combination, with such delivery-valve, of the stuffing-box of the piston-rod; and it consists, also,
25 in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section of a
30 double-acting fluid pump or compressor embodying my invention, showing the piston in its movement toward the right-hand end of the cylinder. Fig. 2 is a vertical longitudinal section of the right-hand end of the pump
35 or compressor, showing the delivery-valve E moved by the piston somewhat farther from its seat. Figs. 3 and 4 are respectively the former a plan view and the latter a side elevation of said delivery-valve, showing more
40 clearly the construction of said valve.

A represents the fluid cylinder or barrel of a double-acting fluid pump or compressor, the same being preferably enveloped by a water-jacket A'.

45 A² A³ represent the respective heads of the fluid or compressor cylinder.

B represents the pump or compressor piston, and B' its piston-rod, the latter connecting with a piston working in the steam-cylinder S of the pump or compressor.

C C' represent, respectively, the chambers

of the suction-valves c c', and D D' represent the chambers of the delivery-valves d d', heretofore employed. The construction and arrangement of these valves and chambers are
55 too well known to require description in this specification. Suction-valve chambers C C are of course in open relation with cylinder or barrel A, as at c², and heads A² A³ are chambered, as at a, to make open communi-
60 cation with cylinder A and accommodate the movement of delivery-valves E E', hereinafter described, and passage-ways a' are provided for conducting the fluid from chambers a to the valve-chambers D D' or directly to a re-
65 ceiver. (Not shown.) Valves d d', in connection with my improved fluid pump or compressor, constitute check-valves and may be dispensed with, if desired.

E E' represent my improved delivery-valves
70 located, respectively, at opposite ends of cylinder A. These valves comprise, respectively, a disk or cylinder reduced in diameter, as at e, the reduced section fitting nicely within cylinder A, the ends of the latter constituting
75 the seats for these valves. Valves E E' are fluted or milled or provided in any suitable manner with alternating depressions and elevations on their peripheries, as at e', whereby numerous channels are formed for the escape
80 of the fluid from cylinder A when the valves are lifted off their respective seats.

Between delivery-valve E and head A² is located a spring F, preferably a coil-spring, as shown, head A² and valve E having, re-
85 spectively, the latter a depression, as at e², and the former an inwardly-projecting flange or member, as at a², whereby spring F is maintained in a central position relative to valve E and perpendicular with said valve.
90 The construction and arrangement of head A³ and delivery-valve E', employed at the other or opposite end of cylinder A, as shown, are substantially the same as the construction and arrangement of the corresponding parts
95 of the right-hand end of said cylinder already described, excepting that valve E' is elongated and extends through head A³, the latter being correspondingly perforated and terminating in a sleeve a³, that, in conjunction with
100 gland a⁴ and packing a⁵, interposed between the sleeve and valve E' and held in place by

the gland, constitutes a stuffing-box for said valve, gland a^4 being tightened by bolts a^5 , connecting the gland with head A^3 of cylinder A. As shown, delivery-valve E' also terminates in a stuffing-box—viz., for the piston-rod, being chambered for receiving packing b and a follower b' , and being screw-threaded externally for receiving the corresponding internally-threaded cap b^2 for tightening the follower of the stuffing-box.

As piston B moves from left to right, as shown in Fig. 1, of course delivery-valve E will be opened and suction-valve c will be closed, and when the piston has made contact with valve E the entire fluid contents of the cylinder A at the right of said piston previous to said stroke of the piston will have been discharged. The piston may or may not move farther—that is, lift valve E farther from its seat against the action of spring F, as shown in Fig. 2. In either case, as the piston recedes or commences its return stroke delivery-valve E, under action of spring F, will return with the piston, maintaining close contact with the piston until the valve will again have resumed its seat on the end of barrel or cylinder A, and it will therefore be seen that there is no possible opportunity for any of the fluid just discharged from cylinder A to return. Delivery-valve E having reoccupied its seat, as just described, and piston B continuing in its return stroke, suction-valve c will be opened, admitting a new supply of fluid into cylinder A at the right-hand side of the piston, while the fluid that during the preceding stroke of the piston has accumulated on the opposite or left-hand side of the piston is being discharged, suction-valve c' having closed and delivery-valve E' and check-valve d' (if the latter is employed) having been opened. Piston B will contact with valve E' and likely move it farther from its seat, the operation and result being substantially the same as described in connection with valve E, except that valve E' may or may not have a spring F connected therewith, as the pressure of the fluid contents remaining in the chamber of head A^3 , together with the ordinary atmospheric pressure, will be sufficient in most instances to maintain valve E' in contact with the piston until the valve has reoccupied its seat on the end of cylinder A. In case, however, a spring is employed the same is confined on the valve within chamber a of head A^3 immediately at the rear of the enlarged section of valve E' , as shown in Fig. 1.

With my improved pump or compressor it will be observed that all the fluid at the respective side of the piston in the fluid-cylinder of the pump or compressor is entirely dis-

charged without the possibility of the same returning to said cylinder, and hence the functions of the pump are not interfered with, as is the case with the pumps heretofore devised.

Of course if my invention were embodied in a single-acting pump or compressor but one delivery-valve—viz., the valve having the piston-rod stuffing-box combined therewith—would be employed and the advantages as compared with single-acting pumps or compressors heretofore devised would be equally marked.

What I claim is—

1. In a fluid pump or compressor, the combination, with a fluid-cylinder having outlets at its extreme ends, a piston, and valves constructed to move in the ends of the cylinder and having air-passages formed between them and the wall of the cylinder, of air-chambers formed outside of the valves and in communication with the air-passages, valves in the passage-ways constructed to permit the fluid to flow outward, and suction-valves in the cylinder, substantially as set forth.

2. The combination, with a cylinder open at one or both ends and piston, of a delivery-valve seated at the open end or ends of the cylinder and having a reduced section extending into the said cylinder and having alternating depressions and elevations on its periphery, substantially as set forth.

3. In a double-acting fluid pump or compressor, a delivery-valve seated at each end of the fluid-cylinder of the pump or compressor, said valves being adapted to be engaged when having been removed from their respective seats by the piston of the fluid-cylinder, one of said valves having a spring connected therewith and the other delivery-valve being perforated for the passage of the piston-rod and extending outside the adjacent head of the fluid-cylinder and terminating in a stuffing-box for the piston-rod, said adjacent head of the fluid-cylinder also terminating in a stuffing-box for said last-mentioned valve, substantially as set forth.

4. In a fluid pump or compressor, a delivery-valve seated at the end of the fluid-cylinder and having a reduced section extending into said cylinder and having alternating depressions and elevations on its periphery, substantially as and for the purpose set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 18th day of September, 1891.

JOHN J. DUFFY.

Witnesses:

C. H. DORER,
WARD HOOVER.