

(No Model.)

W. CRAIG.
DOUBLE ACTING PUMP.

No. 505,441.

Patented Sept. 26, 1893.

Fig. 2.

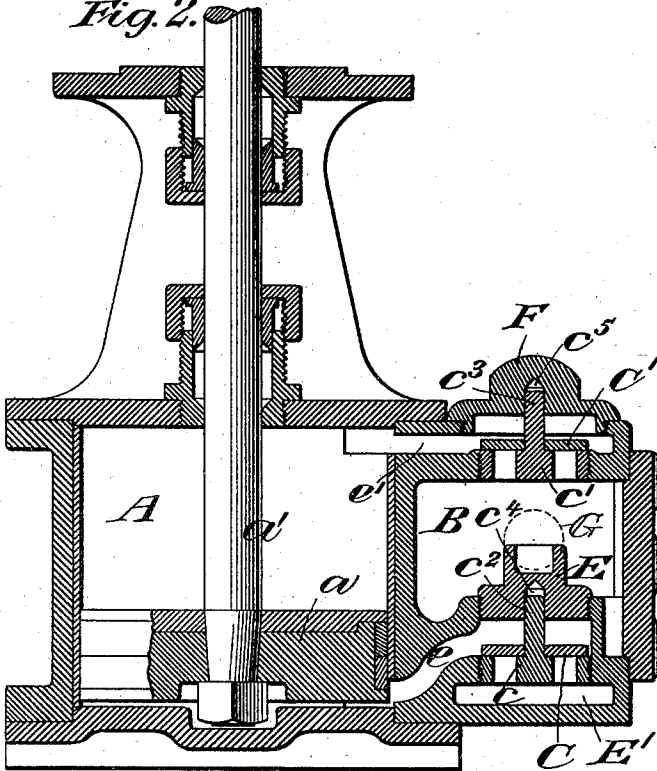


Fig. 3.

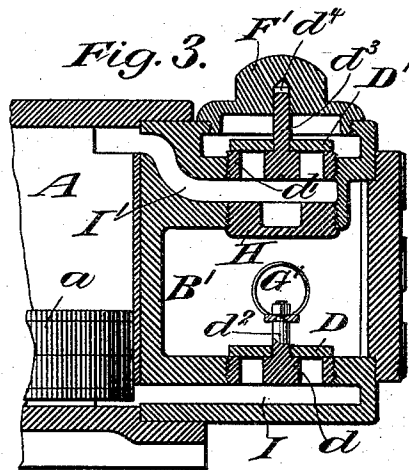
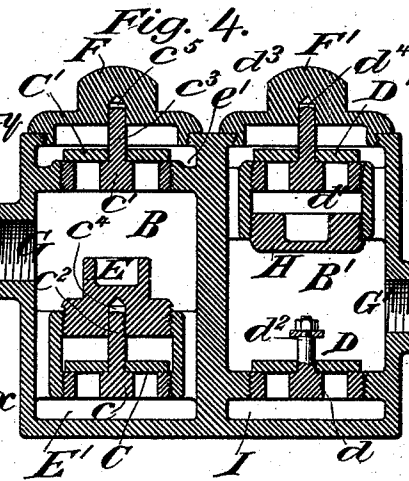
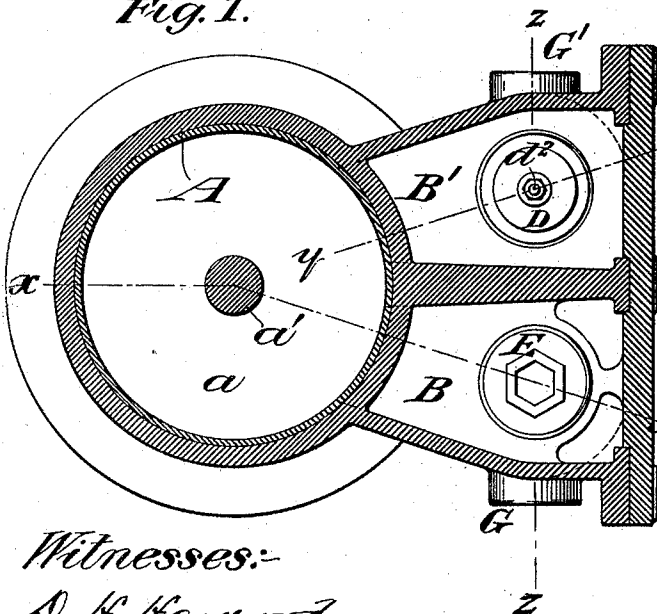


Fig. 1.



Witnesses:-

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UNITED STATES PATENT OFFICE.

WILLIAM CRAIG, OF BROOKLYN, NEW YORK.

DOUBLE-ACTING PUMP.

SPECIFICATION forming part of Letters Patent No. 505,441, dated September 26, 1893.

Application filed June 11, 1892. Serial No. 436,289. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CRAIG, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful
5 Improvement in Double-Acting Pumps, of which the following is a specification.

My invention relates to an improvement in double acting pumps in which the valves are arranged to open upwardly and are located in
10 close proximity to the ends of the cylinder.

A practical embodiment of my invention is represented in the accompanying drawings in which—

Figure 1 is a horizontal section through the
15 cylinder, inlet and discharge chambers. Fig. 2 is a vertical section through line *x, x* of Fig. 1. Fig. 3 is a vertical section through line *y, y* of Fig. 1. Fig. 4 is a vertical section through line *z, z* of Fig. 1.

20 In the form of pump which I have chosen to illustrate my invention, I have shown the inlet and discharge valves on the same side of the cylinder but they might be arranged upon opposite sides if so desired. I have also
25 shown the pump arranged to act as a force or compressor pump, and in the form which I have shown it may be used for moving either aeriform fluids or liquids.

The pump cylinder is denoted by A, the
30 piston by *a* and the piston rod by *a'*. The structure of the cylinder, its piston and rod may be of any well known or approved form. The cylinder is located in a vertical position and the inlet and discharge chambers B and
35 B' are located side by side in proximity to one side of the cylinder. The lower inlet valve is denoted by C, the upper inlet valve by C', the lower discharge valve by D and the upper discharge valve by D'. Their corresponding valve seats are denoted respectively
40 by *c, c', d* and *d'*. The several seats are made removable and screwed into position, the openings for the reception of the two inlet valves and of the two discharge valves being located
45 in alignment, one above the other, so that each pair of openings may be bored and fitted by a single advance movement of the tool. The valve chambers, in which the inlet valves C and C' operate, are separated from one another by a screw cap E, the opening for which
50 may also be provided in a diaphragm at the

bottom of the inlet chamber B by the same advance movement of the tool which forms the openings for the reception of the valve seats. The lower valve chamber communi- 55
cates with the lower end of the cylinder A through a port *e* and the upper valve chamber communicates with the upper end of the cylinder through a port *e'*. The valves C and C' both move upwardly away from their seats 60
and are guided by means of central studs *c*² and *c*³, preferably formed integral with the valve seats *c* and *c'*, the upper ends of the studs being adapted to fit within sockets *c*⁴ and *c*⁵, the former formed in the under face 65
of the cap E and the latter formed in the under face of the top cap F which forms the ceiling of the valve chamber for the upper valve C'. The fluid to be moved, entering through the inlet pipe G into the inlet chamber B passes thence either up through the
70 passage way opened or closed by the upper valve C' or down into the chamber E' underneath the lower valve C and thence up through the passage way opened and closed by the
75 said lower valve C to the cylinder. The discharge valves D and D' are also both arranged to lift from their seats and the chambers in which they move are separated from each other by a cap H, the opening for which may 80
be formed in a diaphragm extending across the discharge chamber, by the same advance movement of the tool which forms the openings for the valve seats *d* and *d'*. The discharge valves D and D' are guided in their
85 movements away from and toward their seats by central studs *d*² and *d*³, preferably formed integral with the valve seats, the upper end of the stud *d*³ being received in a socket *d*⁴ formed in the under face of the top cap F' 90
which forms the ceiling of the chamber in which the valve D' operates. The fluid escaping from the cylinder A, passes into a chamber I underneath the lower valve D, thence through the passage way opened and 95
closed by the valve D into the discharge chamber B' or into a chamber I' underneath the valve D' and thence through the passage way opened and closed by the valve D' and thence into the discharge chamber B' from 100
which it may pass through an outlet G'.

The operation may be briefly stated as fol-

lows: Supposing the piston to be in the position shown in Fig. 2, as it moves upwardly, it will discharge the fluid above it through an upper discharge valve D' into a discharge chamber B' and will at the same time fill the cylinder below it through the lower inlet valve C from the inlet chamber B. On its downward stroke, the piston will discharge the fluid below it through the lower discharge valve D into the discharge chamber B' and will at the same time fill the cylinder above it through the upper inlet valve C' from the inlet chamber B. It will be observed that the ports connecting the interior of the cylinder A with the valves are short, requiring but slight travel of the fluid being moved, that the entire set of valves open upwardly and hence seat under the influence of gravity so that there is no derangement of the action of the pump caused by the breaking or weakening of the springs, and that the valve seats and the separating caps or plugs are so arranged that access thereto may be conveniently had

at any time and the necessary fitting for their reception may be made with great facility. 25

What I claim is—

In combination, a cylinder and its piston, two inletting valves in alignment and separated by a removable partition in alignment with the valves, two outletting valves in alignment and separated by a removable partition in alignment with the valves, an inletting chamber in open communication with the two inletting valves upon opposite sides of the partition, an inletting chamber in open communication with the outletting valves upon opposite sides of their partition, inletting conduits leading from above the inletting valves to the opposite ends of the cylinder and outletting conduits leading from the opposite ends of the cylinder to the under sides of the outletting valves, substantially as set forth. 30 35 40

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Witnesses:

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