

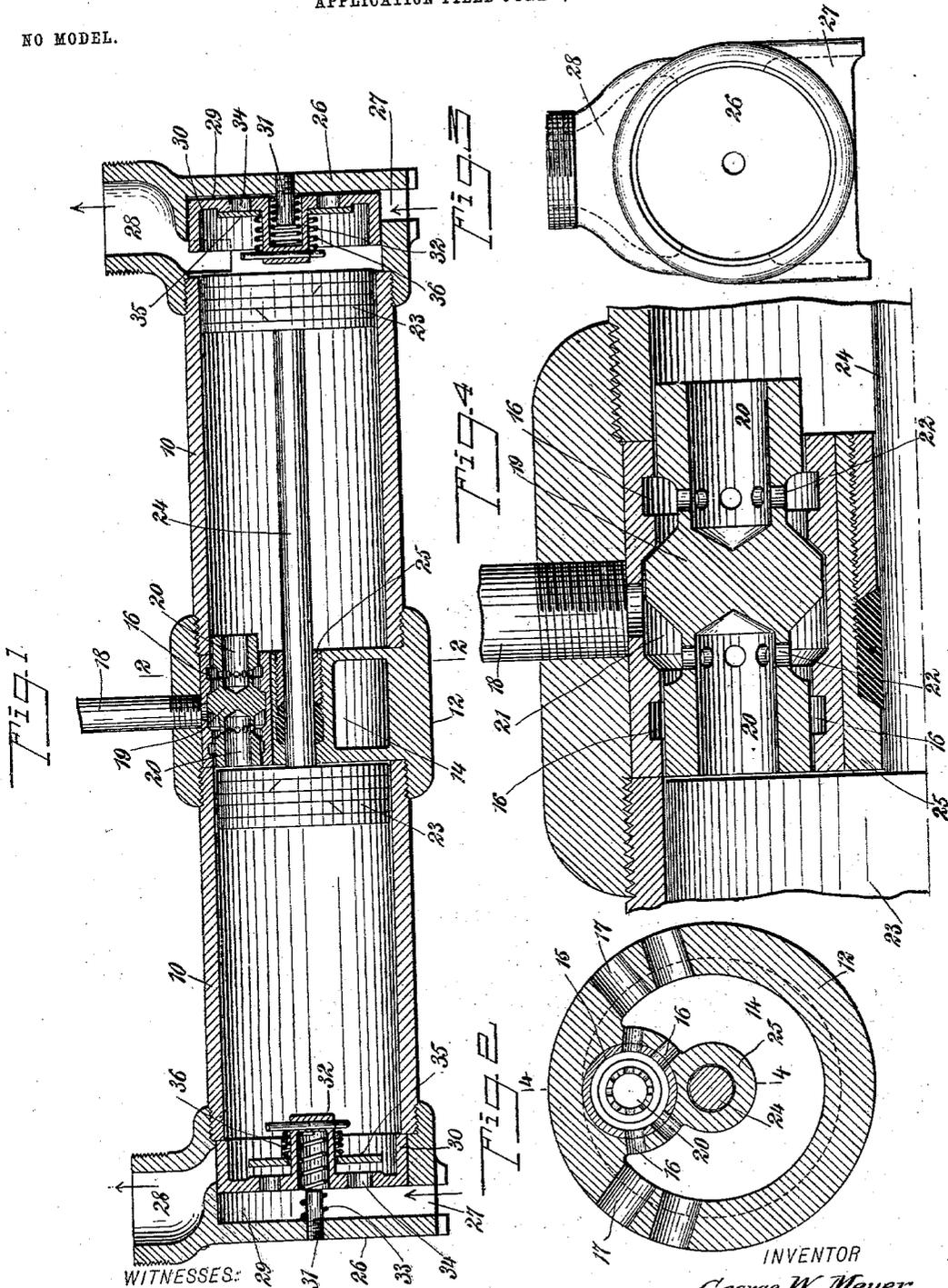
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G. W. MEYER.  
PUMP.

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NO MODEL.



WITNESSES: 29 31 26 33 34

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# UNITED STATES PATENT OFFICE.

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## PUMP.

SPECIFICATION forming part of Letters Patent No. 740,892, dated October 6, 1903.

Application filed June 2, 1902. Serial No. 109,887. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. MEYER, a citizen of the United States, and a resident of Sparrows Point, Baltimore, in the State of Maryland, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

This invention relates to a duplex pump adaptable to all ordinary purposes, but especially adapted for use in places which are confined and otherwise difficult of access. It may be operated by any fluid under pressure; but compressed air is thought to be most effective.

The invention involves certain features of construction and combinations of parts, which will fully appear hereinafter.

This specification is an exact description of one example of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section of the invention. Fig. 2 is a cross-section on the line 2 2 of Fig. 1. Fig. 3 is an inner side elevation of one of the cylinder-heads; and Fig. 4 is an enlarged fragmentary section on the line 4 4 of Fig. 2, especially illustrating the valve.

Two cylinders 10 are provided, these cylinders being in longitudinal alinement and being rigidly connected together by a box 12, which is fastened to them. The box 12 is formed in its interior with an exhaust-chamber 14 and a valve-chamber 15, the valve-chamber communicating with the exhaust-chamber by ports 16, and the exhaust-chamber communicating with the atmosphere by ports 17.

18 indicates a motive-fluid feed-pipe which passes into the valve-chamber. The valve is of duplex form and comprises a main part or diaphragm 19, from each side of which project the tubular valves proper, 20. The main part or diaphragm 19 has limited movement in an enlarged portion 21 in the valve-chamber, and said tubular extensions or valves proper, 20, are perforated, as indicated at 22, so as to permit the steam to pass from said enlarged portion 21 in the valve-chamber into the interior of each tubular extension, accord-

ing to the position of the valve, and also to permit the exhaust fluid from the cylinders to pass from the interior of said tubular extensions into the exhaust-ports 16, communicating with the exhaust-chamber 14. In each cylinder works a piston 23, these pistons being connected by a rod 24 to move in unison and said rod passing centrally through a stuffing-box 25, formed in the box 12. The motive fluid being continually under pressure in the pipe 18, as the left-hand piston strikes the valve it throws it into the position shown in Figs. 1 and 4. This places the left-hand ports 22 in communication with the left-hand ports 16, and the fluid in the right-hand cylinder may then be exhausted through the tubular extension 20, ports 16, exhaust-chamber 14, and exhaust-ports 17. Also the motive fluid in the pipe 18 may pass from the enlargement 21 of the valve-chamber through the left-hand extension 20 of the valve and into engagement with the left-hand piston, forcing it through the corresponding cylinder.

At each outer end of the cylinders 10 heads 26 are provided. These heads are securely fastened to the respective cylinders and have inlet-ports 27 and outlet-ports 28. They are also constructed with valve-chambers 29, whose internal diameters are slightly greater than the internal diameters of the cylinders 10. In each of these chambers 29 cup-valves 30 are arranged, and these valves have movement axially of the cylinders, such movement being confined at the outer limit by the walls of the heads 26 and at the inward limit by the outer extremities of the cylinders 10. Stud 31 are fastened in the cylinder-heads 26 and project into casings 32, formed in the valves 30, and expansive springs 33 are arranged in these casings and guided by said studs, such springs tending normally to throw the valves into the position shown at the left-hand extremity in Fig. 1. Each valve 30 is formed with ports 34, and these ports are commanded by auxiliary valves 35, which are in the form of disks or plates fitted to slide axially on the casings 32. Springs 36 are provided, said springs tending normally to seat the auxiliary valves 35 against the main valves 30 and close the ports 34.

When the main and auxiliary valves 30 and 35 are in the position shown at the left-hand

end of Fig. 1, the fluid being pumped is being drawn through said valves into the left-hand cylinder, and when said valves are in the position shown at the right-hand end of Fig. 1 the fluid being pumped is being forced from the right-hand cylinder out through the outlet 28 of the left-hand head 26. Assuming, therefore, that the parts are in the position shown in Fig. 1, the fluid-pressure will act on the left-hand piston 23, and the fluid-pressure previously introduced into the right-hand cylinder 10 will be exhausted. Both pistons will move to the left and the left-hand main and auxiliary valves will both seat—that is to say, they will each assume the limit of their outward movement—and the left-hand outer port 28 will then be opened, permitting the left-hand piston to force the fluid out from the left-hand cylinder. Simultaneously the right-hand main and auxiliary valves will shift from the position shown in the drawings and will close the outlet 28 at the right-hand end of the pump, opening the inlet 27 at said end and permitting the right-hand cylinder to fill with the fluid being pumped. When the right-hand piston strikes the motive-fluid valve, it causes it to move from the position shown in Figs. 1 and 4 to the extreme position in the other direction, and the above-described operation will be repeated.

Various changes in the form and details of my invention may be resorted to at will without departing from the spirit of my invention. Hence I consider myself entitled to all forms of the invention as may lie within the intent of my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of two axially-alined cylinders, a box connecting the contiguous ends thereof, said box having an exhaust-chamber communicating with the atmosphere and a valve-chamber communicating with the exhaust-chamber, said communication of the valve-chamber with the exhaust-chamber being formed by two ports located at different points along the longitudinal axis of the valve-chamber and said valve-chamber having an enlarged portion intermediate said ports thereof, a valve comprising a main or enlarged portion adapted to move in the said enlarged portion of the valve-chamber and the valve also comprising tubular extensions respectively opening into the cylinders, said extensions being perforated at points inward toward the main or enlarged portion of the valves, means for supplying a motive fluid to the said enlarged portion of the valve-chamber, and connected pistons working respectively in the cylinders and adapted to strike alternately the said tubular projections of the valve, whereby to shift the valves.

2. The combination of two cylinders axially alined, a box connecting the contiguous ends thereof, said box comprising a valve-chamber

the ends of which open respectively into the cylinders and said box also comprising two exhaust-ports passing from the valve-chamber at different points along the longitudinal axis thereof, a valve having a limited movement in the valve-chamber and comprising a solid central portion and oppositely-directed tubular extensions respectively opening into the cylinders, said tubular extensions being perforated at points inward toward the central portion of the valve, for the purpose specified, means for leading the motive fluid into the valve-chamber at a point intermediate the said exhaust-ports, and connected pistons working in the cylinders.

3. The combination of two cylinders axially alined, a box connecting the contiguous ends thereof, said box comprising a valve-chamber the ends of which open respectively into the cylinders and said box also comprising two exhaust-ports passing from the valve-chamber at different points along the longitudinal axis thereof, a valve having limited movement in the valve-chamber and comprising a solid central portion and oppositely-directed tubular extensions respectively opening into the cylinders, said tubular extensions being perforated at points inward toward the central portion of the valve, for the purpose specified, means for leading the motive fluid into the valve-chamber at a point intermediate the said exhaust-ports, and connected pistons working in the cylinders, said valve being arranged to project alternately into the cylinders so as to be struck by the piston, whereby to operate the valve.

4. The combination of two cylinders axially alined, a box connecting the contiguous ends thereof, said box comprising a valve-chamber, the ends of which open respectively into the cylinders, and said box also comprising two exhaust-ports passing from the valve-chamber at different points along the longitudinal axis thereof, a valve having limited movement in the valve-chamber and comprising a solid central portion and oppositely-directed tubular extensions respectively opening into the cylinders, said tubular extensions being perforated at points inward toward the central portion of the valve, for the purpose specified, means for leading the motive fluid into the valve-chamber at a point intermediate the said exhaust-ports, connected pistons working in the cylinders, a head at the outer end of each cylinder, said heads each having inlet and outlet orifices, and valve devices commanding said orifices.

5. A pump, comprising two cylinders, a box connecting the two and having an exhaust-chamber communicating with the atmosphere and also having a valve-chamber communicating with the source of motive fluid and communicating with the exhaust-chamber by two ports, a valve in the valve-chamber and comprising two portions respectively communicating with said ports to the exhaust-chamber and also respectively communicat-

ing with the cylinders, connected pistons working in the cylinders, and means for controlling the inlet and outlet of fluid to and from the cylinders.

5 6. A pump, comprising two cylinders, a box connecting the two and having an exhaust-chamber communicating with the atmosphere and also having a valve-chamber communi-  
10 cating with the source of motive fluid and communicating with the exhaust-chamber by  
15 two ports, a valve in the valve-chamber and comprising two portions respectively commu-  
nicating with said ports to the exhaust-chamber and also respectively communicating with  
the cylinders, connected pistons working in  
the cylinders, and means for controlling the  
inlet and outlet of fluid to and from the cyl-  
inders, the end portions of the valve being  
projected beyond the box so as to be alter-  
nately struck by the pistons to be moved  
thereby.

7. A pump, comprising two cylinders, a box  
connecting the two and having an exhaust-  
chamber communicating with the atmosphere  
25 and also having a valve-chamber communi-  
cating with the source of motive fluid and  
communicating with the exhaust-chamber by  
two ports, a valve in the valve-chamber and  
comprising two portions respectively com-  
30 municating with said ports and also respec-  
tively communicating with the cylinders, con-  
nected pistons working in the cylinders, and  
means for controlling the inlet and outlet of  
fluid to and from the cylinders, the said valve-  
35 chamber of the box having an intermediately-  
located interior enlargement with which said  
source of motive fluid communicates and the  
valve having an enlarged middle portion lo-  
cated in the enlargement of the valve-cham-  
40 ber to limit the movement of the valve.

8. A pump, comprising two cylinders, con-  
nected pistons working respectively in said  
cylinders, a box connecting said cylinders and  
having feed and exhaust passages therein, the  
45 box also having a valve-chamber with which  
said feed and exhaust passages communicate,  
and a valve placed in said chamber and con-  
trolling the feed and exhaust passages, the  
ends of the valve being projected beyond the  
50 box into the respective cylinders so as to be  
struck by the pistons, whereby to throw the  
valve from one position to the other.

9. A pump, comprising two cylinders, a box  
connecting the two and having a valve-cham-  
ber therein and also having a feed-port lead- 55  
ing to the valve-chamber and exhaust-ports  
leading from the valve-chamber on opposite  
sides of the feed-port, a valve mounted in the  
valve-chamber and comprising two portions  
respectively communicating with the cylind- 60  
ers and having orifices serving to place its  
two portions in communication with the re-  
spective feed and exhaust ports and also in  
alternate communication with the feed-port,  
according to the movement of the valve, con- 65  
necting-pistons working in the cylinders, and  
means for controlling the inlet and outlet of  
fluid being pumped to and from the cylinders.

10. A pump, comprising two cylinders, a box  
connecting the two and having a valve-cham- 70  
ber therein and also having a feed-port lead-  
ing to the valve-chamber and exhaust-ports  
leading from the valve-chamber on opposite  
sides of the feed-port, a valve mounted in the  
valve-chamber and comprising two portions 75  
respectively communicating with the cylind-  
ers and having orifices serving to place its  
two portions in communication with the re-  
spective feed and exhaust ports and also in  
alternate communication with the feed-ports 80  
according to the movement of the valve, con-  
necting-pistons working in the cylinders, and  
means for controlling the inlet and outlet of  
fluid being pumped to and from the cylind-  
ers, the end portions of said valve being pro- 85  
jected beyond the respective ends of the box  
in position to be struck by the respective pis-  
tons, whereby to operate the valve.

11. A pump, comprising a cylinder, a piston  
mounted therein, a box located at one end of 90  
the cylinder, said box having feed and ex-  
haust passages therein, a valve controlling  
said passages and movable into the cylinder  
to be struck by the piston, whereby automati-  
cally to operate the valve, and means at the 95  
other end of the cylinder to control the inlet  
and outlet of fluid.

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

GEORGE W. MEYER.

Witnesses:

JOSEPH T. MARTIN,  
CHARLES L. REED.