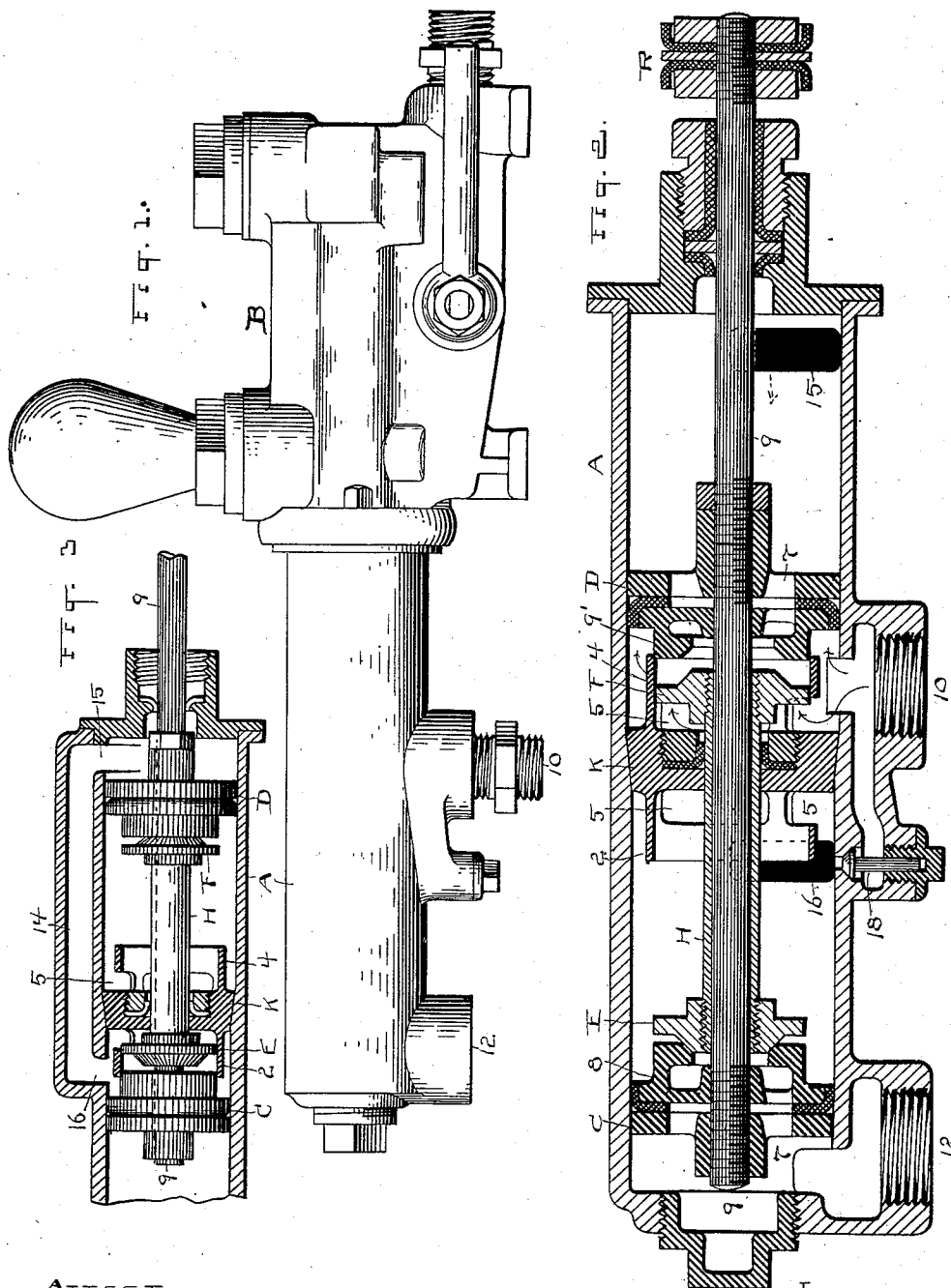


(No Model.)

M. A. YEAKLEY.
ENGINE.

No. 571,144.

Patented Nov. 10, 1896.



ATTEST.
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ENGINE.

SPECIFICATION forming part of Letters Patent No. 571,144, dated November 10, 1896.

Application filed October 3, 1895. Serial No. 564,499. (No model.)

To all whom it may concern:

Be it known that I, MELVIN A. YEAKLEY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Engines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in engines; and the object of the invention is to provide an engine in which the valves are instantly reversed at the end of each stroke and the motor fluid continues to flow through the engine in a continuous and unbroken stream, whether such motor fluid be steam, water, air, or other like agent, all substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved engine and a force-pump connected therewith. Fig. 2 is a longitudinal sectional elevation of the engine alone enlarged. Fig. 3 is a longitudinal sectional elevation of the engine with the pistons and valves in a reverse position to that shown in Fig. 2 and the view taken at right angles to Fig. 2.

The engine thus illustrated is constructed for connection with the service-pipes in a residence or like place which is furnished with water from the city main; but though I illustrate and describe the invention in connection with a certain use and source of power I do not understand that it is thereby limited to such use or that other motive power may not be employed if preferred.

A represents the casing of the engine, and B the casing of the pump. (Shown here as connected to the engine-casing.) The pump in itself does not constitute invention, but it serves to show one of many uses to which the engine can be applied. For example, while the engine is being driven by power derived from the main it can be employed to pump water from a cistern or other source to whatever place it may be desired.

Within casing A are two rigidly-connected pistons C and D and two rigidly-connected valves E and F. The shaft or rod 9 unites the pistons, and the tube H, sleeved on said

rod, unites the valves. Centrally in the engine-casing is the division-wall or partition K, dividing the casing into two chambers and holding packing about the sleeve H, and projecting from this partition in opposite directions are annular hoods or housings 2 and 4. These hoods are alike in construction and of less cross-section than the interior of the casing, so as to leave room about them for the passage of power fluid into the hoods behind the valves through any suitable openings 5 at their base, and the said hoods form retreats for the valves and cut-offs for the pistons, as will hereinafter appear.

Both pistons C and D are suitably packed about their periphery so as not to leak, and both have ample through-passages 7 from side to side and inside annular projections 8 and 9', adapted to enter the hoods 2 and 4, and provided with seats for the valves E and F, which are of the same cross-section as the said hubs or projections, 8 and 9'. These valves effectually close or open the passages 7, and the sleeve H is so shortened that when one valve is closed the other must be open, and the said valves therefore reciprocate back and forth with the strokes of the pistons.

The casing A is provided with inlet-port 10 and exhaust-port 12, and between the chambers for the pistons C and D is the fluid-passage 14, Fig. 3, extending along the outside of the casing A between the two openings 15 and 16. A valve 18 is shown at the bottom of the engine, Fig. 2, intended to be opened only when the power fluid has been cut off and for any reason it is desired to withdraw the fluid wholly from the engine, as in winter to prevent freezing or for repairs; otherwise the said valve will remain closed, and its construction and arrangement are such as to insure this result.

The operation is as follows: Referring to Fig. 2, the engine is seen at the instant of reversal from left to right. As here shown, the power-pressure is just cut off from piston and valve C E by the movement of the hub of piston D into the hood 4. The valve F enters this hood some time before the said hub and closes the waterway through said hood, so that now the passage into the engine is entirely closed, but for a brief instant only. The instant this occurs the pressure behind

valve F will move both valves to the right and open valve E and close valve F against its piston. Then the pressure behind piston C will exhaust through said piston, and the pressure against piston D and valve F will carry the parts to the right. Now since the piston-rod 9 extends into the pump B and carries a piston R therein the pump will be operated, and thus the purpose of the present construction will be served. The movement to the right continues until valve E at the left is drawn into the hood 2, as seen in Fig. 3, and the hub of piston C has passed within the edge of the hood 2, thus cutting off exhaust through its passage 7. Instantly as this occurs the pressure of the fluid through passage 14 and piston D is exerted behind valve E through the openings 5 in said hood and closes the valve against its seat on piston C. This of course opens valve F at the other end and allows the power fluid free flow through piston D and passage 14 until all the parts are carried again to the position seen in Fig. 2. Thus the action is repeated first to the right and then to the left and with certain reversal and with uniform stroke without interruption until the power is turned off or started. The reversal is so speedy as not really to involve time that can be measured or noted by the senses, and yet is practically noiseless. It will be noticed that when the valves E and F are closed the fluid-pressure is also against them and they become for the time being a part of the piston.

The valve 18 is so constructed that when the fluid-pressure is on it bears against the bottom of the valve and holds it up against its seat; but as soon as the pressure is withdrawn the valve drops of its own gravity a sufficient distance to afford an open outlet to the water in the engine back into the supply-pipe. Thus if the engine be in hydraulic connection in a house and the water is turned off and the waste-plug in the cellar be opened the engine will drain dry through the passage controlled by valve 18.

What I claim is—

1. In an engine as described, the pistons provided with fluid-passages, and reciprocating valves between said pistons arranged to open and close said passages during the stroke of each piston successively, substantially as described.

2. The engine described having a casing with two fluid-connected chambers, and a wall between said chambers, and single inlet and exhaust ports, connected pistons with openings through them, and connected valves arranged to reciprocate between said pistons and open and close the pistons alternately, substantially as described.

3. An engine having connected pistons with fluid-passages and connected valves to close said passages, and fixed hoods between the pistons for the valves constructed to reverse the valves by the fluid which drives the engine, substantially as described.

4. The casing having two chambers and an inlet-port to one chamber and an outlet-port to the other chamber and a fluid-passage between said chambers, connected pistons and connected valves in said chambers and hoods at the center of the casing for said valves, substantially as described.

5. The casing described having a partition between its chambers and a hood or housing on each side of said partition with a fluid-opening at its base, in combination with the pistons and the connected valves in said chambers, said valves constructed to enter and close said hoods from their front, substantially as described.

6. The casing having two chambers and single inlet and outlet ports and a fluid-passage from one chamber to the other, the central partition of said casing having hoods on its sides with fluid-openings at their base, in combination with a piston and a valve for each chamber, said valves constructed to enter said hoods, and the pistons having seats for said valves and water-passages through them, substantially as described.

7. The casing constructed with ports and passages substantially as described, and having hoods serving as housings for the valves and cut-offs for the pistons, in combination with the pistons in said casing having extensions to enter said hoods, and valves for said pistons entering said hoods, substantially as described.

8. The engine described having a piston-rod extending out through the same in position to make power connection, power-pistons rigid with said rod, and connected valves between said pistons and sliding on said rods, said pistons having openings controlled by said valves, substantially as described.

9. The casing having fluid-passages, a pair of rigidly-connected reciprocating pistons in the casing, and a pair of rigidly-connected reciprocating valves located between said pistons, said parts arranged and operating substantially as described.

10. The casing having a pair of chambers divided by a partition and a fluid-passage connecting the said chambers, in combination with a piston for each of said chambers and a valve for each of said pistons, and a fluid-inlet to one of said chambers and a fluid-outlet from the other chamber, substantially as described.

11. The casing divided into chambers by a fluid-tight partition-wall, a fluid-inlet to one chamber and a fluid-outlet from the other chamber, and a fluid-passage from one chamber to the other, in combination with pistons in said chambers having water-passages through them and valves to open and close said passages, substantially as described.

12. The combination substantially as described, of the casing, the pistons with water-passages through them and the valves for said pistons, the said casing having a water-tight wall separating the same into two cham-

bers, two fluid-passages opening into each of
said chambers and the said pistons rigidly
connected and arranged to operate between
the fluid-passages in their chambers, respec-
tively, whereby the said fluid-passages are
5 kept constantly open, substantially as de-
scribed.

Witness my hand to the foregoing specifi-
cation this 27th day of September, 1895.

MELVIN A. YEAKLEY.

Witnesses:

H. T. FISHER,
R. B. MOSER.