

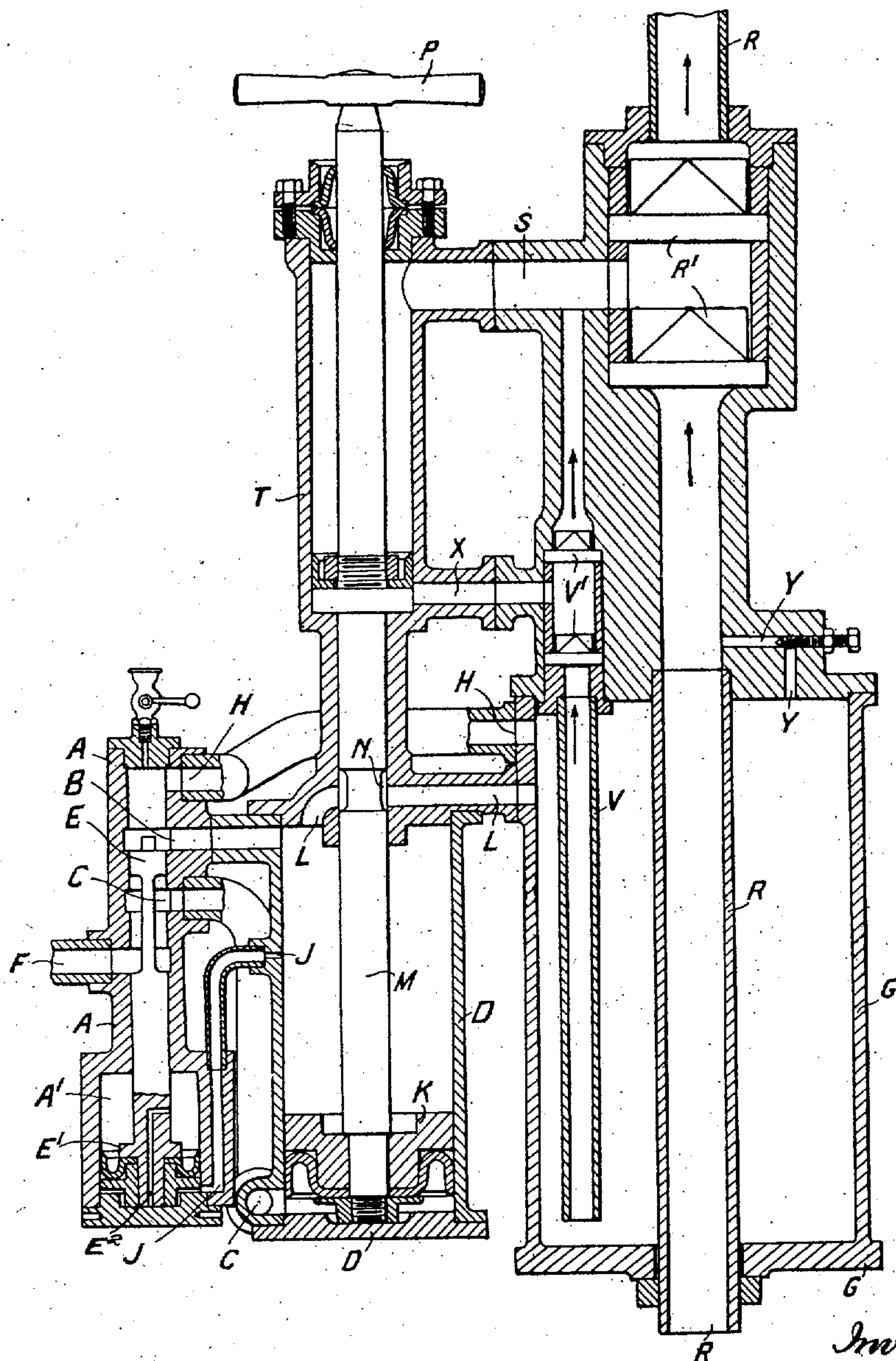
No. 850,108.

PATENTED APR. 9, 1907.

E. B. BADCOCK.
FLUID PRESSURE MOTOR.
APPLICATION FILED JULY 7, 1906.

2 SHEETS—SHEET 1.

FIG. 1



Witnesses
Charles Smith
A. B. Serrell

Inventor
Edward Baynes Badcock
per Harold Serrell
his atty.

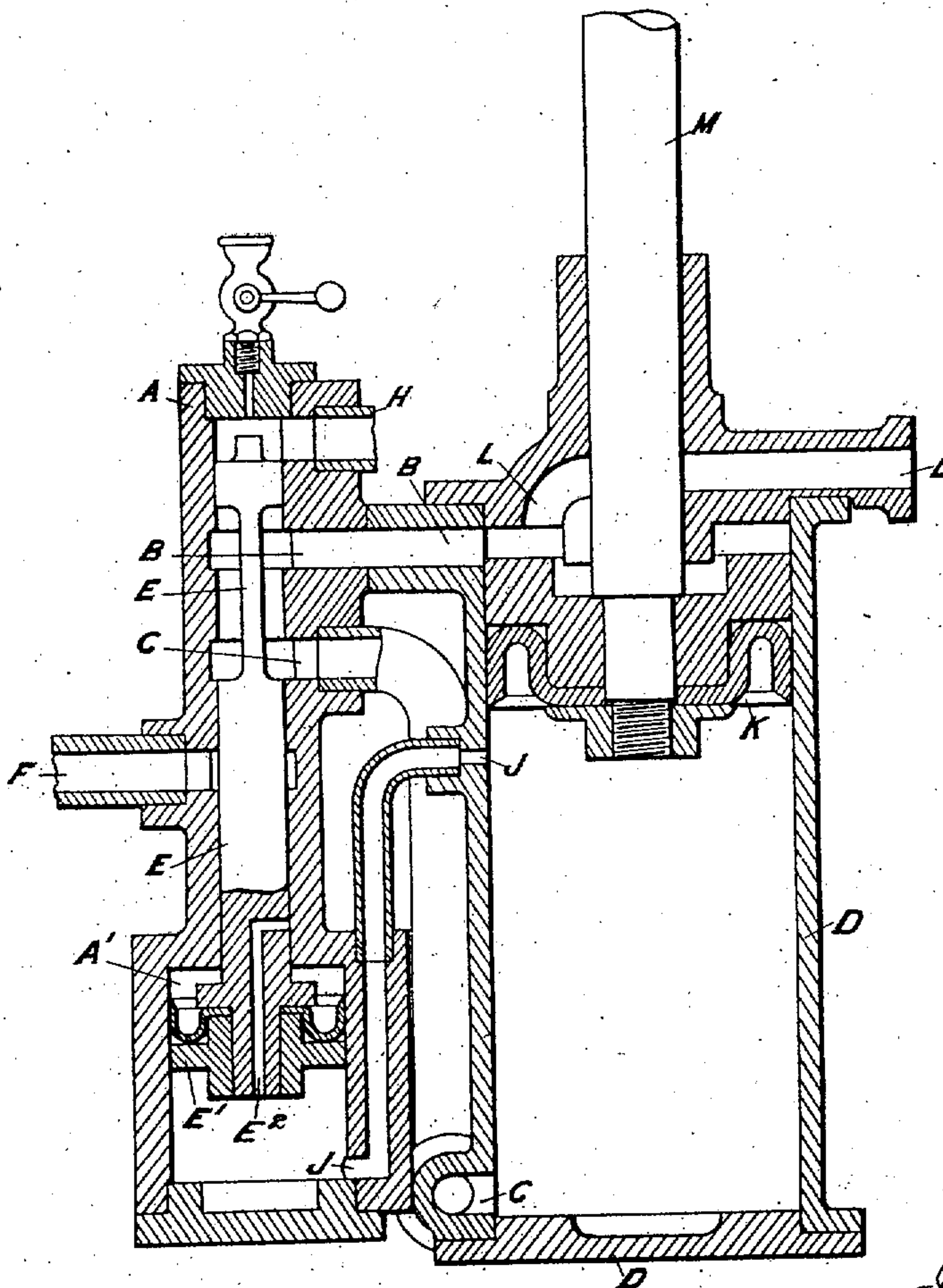
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2 SHEETS--SHEET 2.

FIG. 2.



Witnesses

Chas. Smith
A. B. Serrell

Inventor

Edward Baynes Badcock
for Harold Terrell *his atty*

UNITED STATES PATENT OFFICE.

EDWARD BAYNES BADCOCK, OF LONDON, ENGLAND, ASSIGNOR TO THE
LAMP PUMP SYNDICATE, LIMITED, OF LONDON, ENGLAND.

FLUID-PRESSURE MOTOR.

No. 850,108.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed July 7, 1906. Serial No. 325,078.

To all whom it may concern:

Be it known that I, EDWARD BAYNES BADCOCK, a subject of the King of Great Britain and Ireland, residing at 7 Pembridge Crescent, London, in the county of London, England, have invented new and useful Improvements in Fluid-Pressure Motors, (for which I have made application for a patent in Great Britain, No. 4,884, bearing date February 28, 1906,) of which the following is a specification.

This invention relates to improvements in or connected with single-acting fluid-pressure motors; and the object of the invention is to construct an improved and simple form of motor in which the power-piston is adapted to make its effective stroke under a difference of pressure—such, for example, as is produced by connecting one end of the cylinder of the motor with a generator and opening the other to exhaust, the return stroke being made after the connections with the generator and exhaust are cut off and while the two ends of the cylinder are thrown into communication with one another, this condition being maintained until the piston has nearly completed its return stroke, when the ends of the cylinder are opened to exhaust preparatory to again establishing the initial conditions for a continuation of the cycle of action, the actions of the motor being controlled by a valve operating under the influence of gravity and the pressure fluid acting in the cycle of operations occurring in the motor.

One form of motor as constructed in accordance with this invention will now be described with reference to the accompanying drawings, in which—

Figure 1 is a vertical section illustrating the motor with its parts at rest and showing its application in combination with a water-pump. Fig. 2 is also a vertical section drawn to a larger scale, but showing the motor element alone with its parts in the position they would occupy after completing its effective stroke.

In the construction illustrated a vertically-arranged controlling-valve casing A is connected by top and bottom distributing-ports B C with the head and base of a vertically-arranged cylinder D. The valve-casing is fitted with a reciprocating valve E, the form illustrated being of the piston type, and the

valve-casing A is formed with a steam-inlet F, so located that when the controlling-valve is down, as shown in Fig. 1, the bottom port C of the cylinder will be placed in communication with the steam-inlet F, and when the valve is raised it will close the steam-inlet F and place the bottom port C in circuit with the top port B, and so throw the head of the cylinder in direct communication with its base. The head of the controlling-valve casing A communicates with a condenser G by an outlet port or passage H, and the controlling-valve E is so formed that when down it places the head of the cylinder in communication with the condenser G by way of the ports B and H, as is shown at Fig. 1, and when the valve E is raised this connection is closed, as shown at Fig. 2. A valve-actuating way J extends from the base of the controlling-valve casing A to the cylinder B, the port J in the cylinder being located so as to be passed by the power-piston K as it approaches the top of its stroke. An exhaust-way L, connecting the condenser G with the head of the cylinder D, is opened and closed by forming the piston-rod M to act as a reciprocating cut-off valve, a port N being formed in the piston-rod at a position which will open the exhaust to the condenser when the piston K approaches the end of its down-stroke, as shown at Fig. 1. A starting-handle P may be provided on an extension of the piston-rod M, which in the form of construction illustrated is arranged to actuate the piston of an air-pump T of the condenser G, as will be hereinafter more fully explained. It may be noted that the base of the controlling-valve casing forms a cushioning-cylinder A' and that the valve E is made with a foot extension fitted with a piston E' and in which a port E² is formed in order to establish a connection between the opposite sides of the piston E', when the head of the port E² is clear of the bore of the valve-casing A.

To start the motor when under steam, working conditions may be established and an initial vacuum produced in the condenser by operating the piston-rod M by means of the starting-handle P, and so operating the piston of the air-pump of the condenser, or an initial vacuum in the condenser may be produced by other means. With working conditions established and the controlling-valve E and piston K in the positions illus-

trated at Fig. 1 steam will pass from the port F to the base of the cylinder by the port C, while the head of the cylinder communicates with the condenser G by the port B and outlet-port H, and under the joint influence of pressure below and vacuum above the piston will rise, its rod M immediately closing the exhaust L, and when approaching the top of its upstroke the piston K will pass the valve-actuating way J, and steam passing to the base of the controlling-valve casing A will cause the controlling-valve E to rise into the position shown at Fig. 2 and close the communication between the condenser and the head of the cylinder and also cut off the steam-supply, while placing the head of the cylinder in communication with its base by connecting the ports B and C, and so establish a balance of pressure above and below the piston K. The weight of the piston and connected parts then causes the return stroke to be made, and when nearly completed the port N in the piston-rod places the head of the cylinder in communication with the condenser by opening the exhaust L, and upon a vacuum being established in the head and base of the cylinder and also in the base of the controlling-valve casing through its connection by the actuating-way J the controlling-valve E will drop into the position shown at Fig. 1 and reestablish the conditions for a continuation of the cycle of action. In this movement the valve E will be assisted to drop by the action of the fluid compressed in the cushioning-cylinder A' when the valve made its upstroke.

It is to be understood that although gravity may preferably be taken advantage of in making the return stroke of the power-piston and the downstroke of the controlling-valve, yet these actions may be made or assisted under other conditions by arranging the moving parts to act against counter-pressure devices.

In the construction of pump illustrated in conjunction with the motor at Fig. 1, R designates a service-pipe which extends down to the source from which water is to be raised and up to the place of delivery. Check-valves R', permitting a flow in the direction of the arrows, are arranged in the

service-pipe below and above a juncture S, communicating with the head of the pump-barrel T. A similar arrangement is made between the base of the condenser G and the juncture S by means of a suction-pipe V, fitted with check-valves V', arranged below and above a passage X, communicating with the base of the pump-barrel. Y designates a water-supply way fitted with a screw control-valve for admitting a jet of water from the service-pipe R into the condenser G. In action it will be noted that the base of the pump-barrel serves the purpose of an air-pump and the head that of a main suction and delivery pump.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A single-acting fluid-pressure motor having a cylinder fitted with a power-piston and formed with distributing-ports and a valve-actuating way communicating with a valve-casing formed with steam inlet and outlet ports and fitted with a controlling-valve adapted to connect the base of the cylinder to supply while opening the head to exhaust and to connect the two ends of the cylinder while closing the connections to supply and exhaust, with means for exhausting the cylinder at the completion of the effective stroke of the power-piston.

2. A single-acting fluid-pressure motor having a cylinder fitted with a power-piston and formed with distributing-ports and a valve-actuating way communicating with a valve-casing formed with steam inlet and outlet ports and fitted with a controlling-valve adapted to connect the base of the cylinder to supply while opening the head to exhaust and to connect the two ends of the cylinder while closing the connections to supply and exhaust, in combination with an exhaust-way at the head of the cylinder controlled by a cut-off valve.

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

EDWARD BAYNES BADCOCK.

Witnesses:

JOHN GILMORE,
RONALD CAMPBELL.