(No Model.)

2 Sheets—Sheet 1.

G. J. ROBERTS.

STEAM PUMP.

No. 484,241. Patented Oct. 11, 1892.

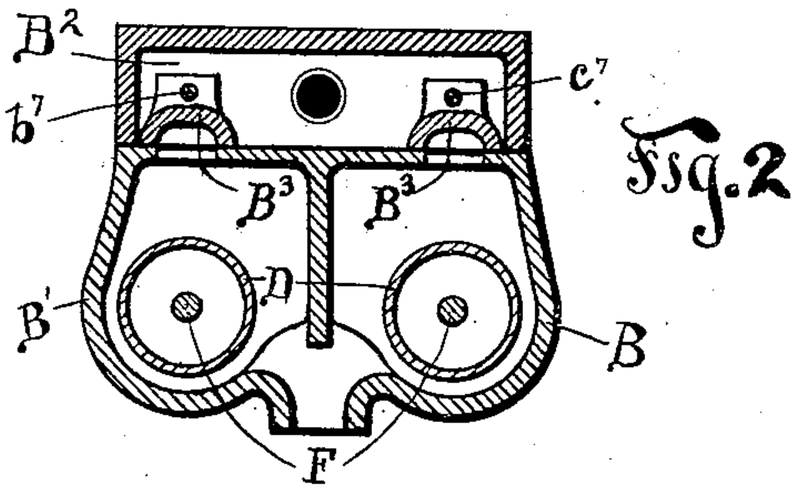

Fig. 2

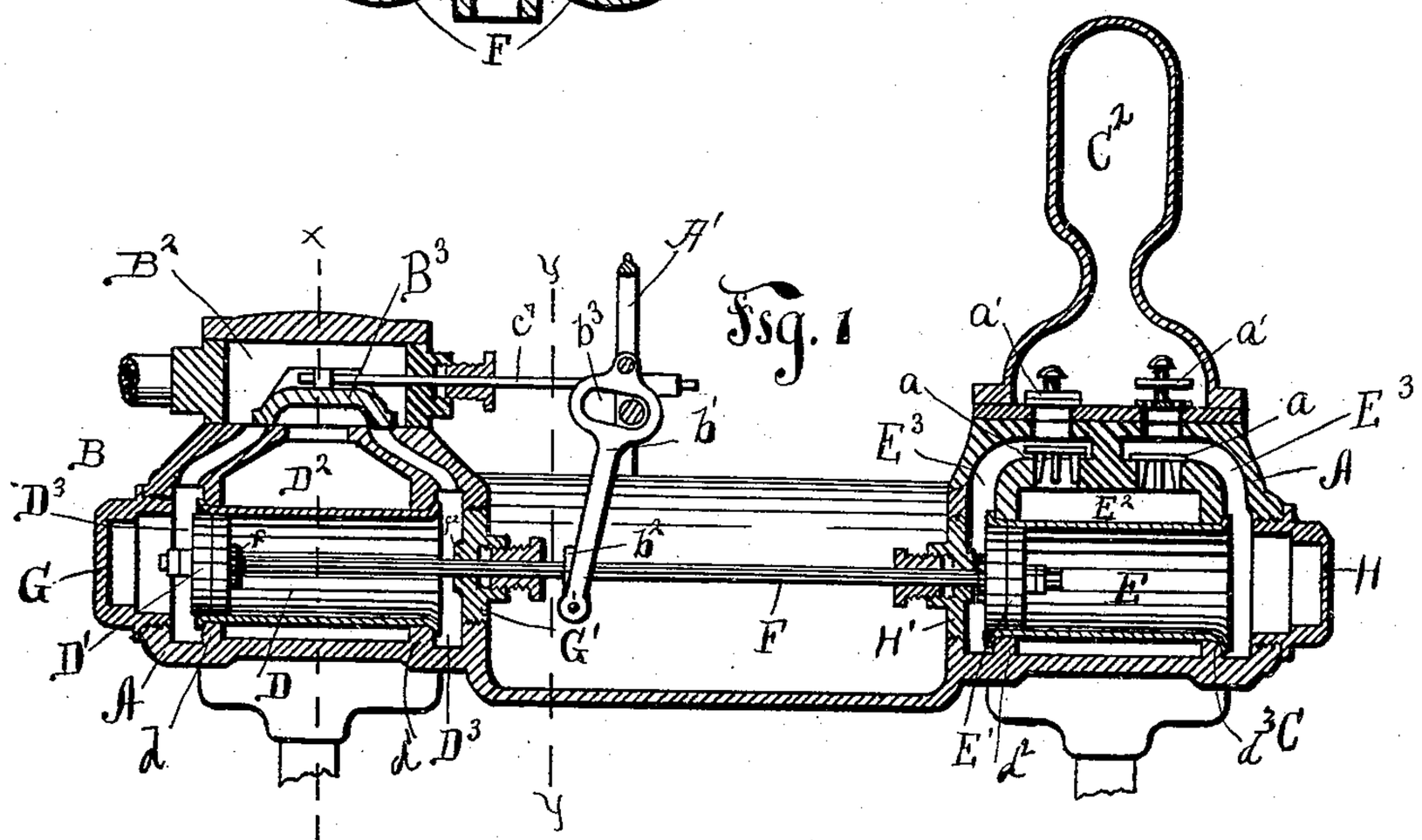

Fig. 1

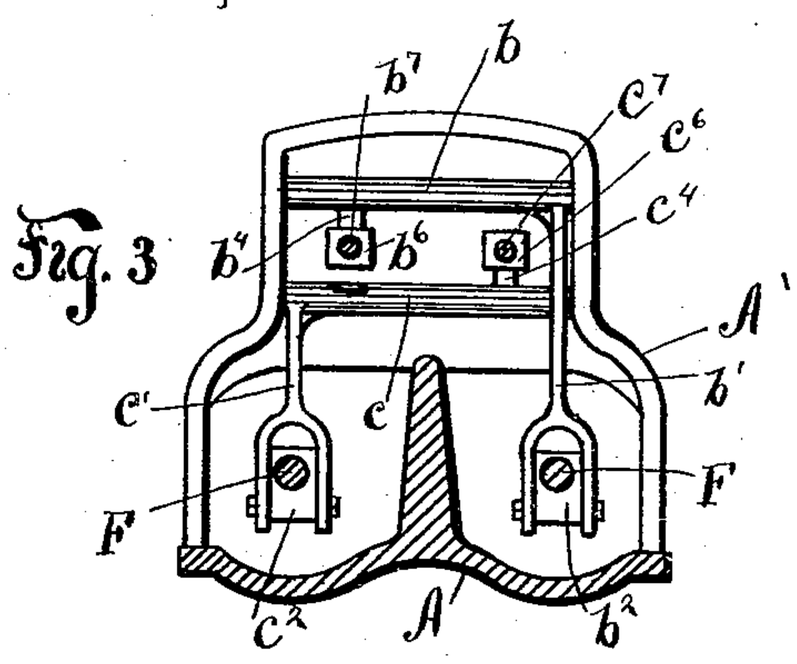

Fig. 3

WITNESSES:

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Ira C. Kochne

INVENTOR

Geo. J. Roberts

BY Stetson & Shepherd

ATTORNEYS

(No Model.) 2 Sheets—Sheet 2.

G. J. ROBERTS.

STEAM PUMP.

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Fig. 6

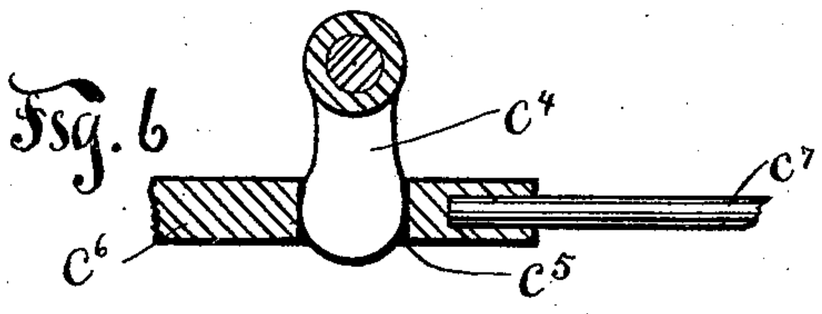


Fig. 4

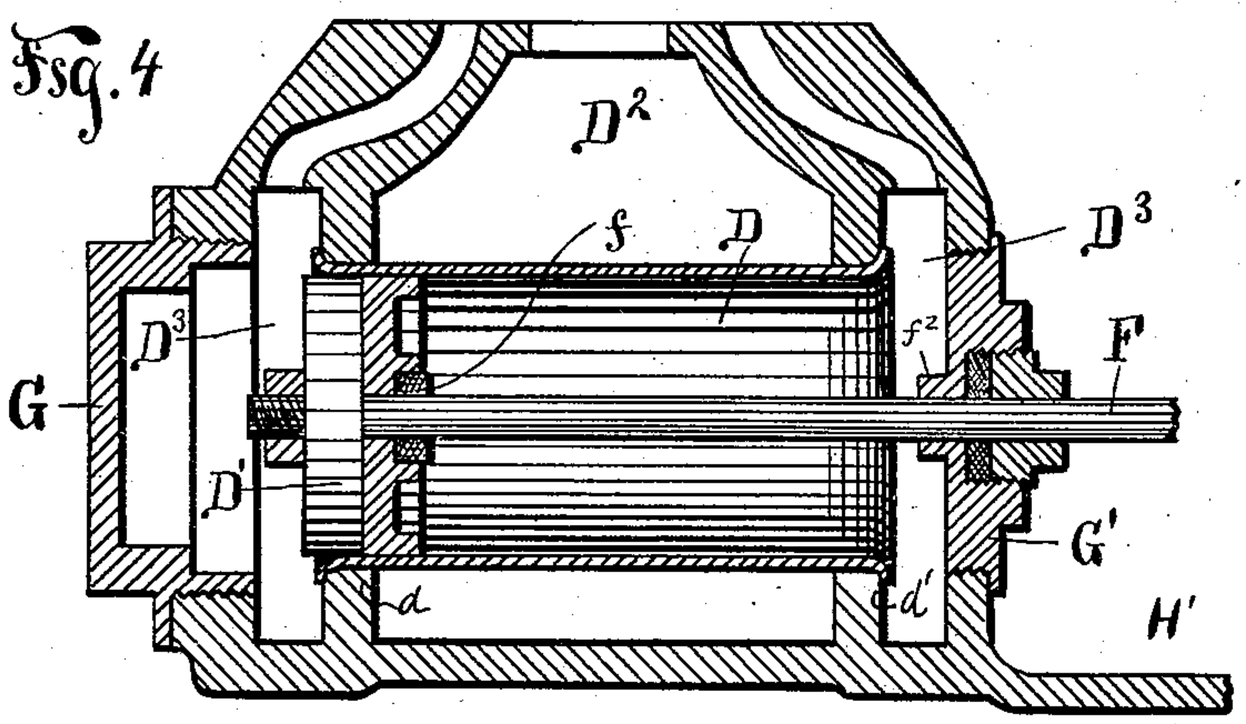
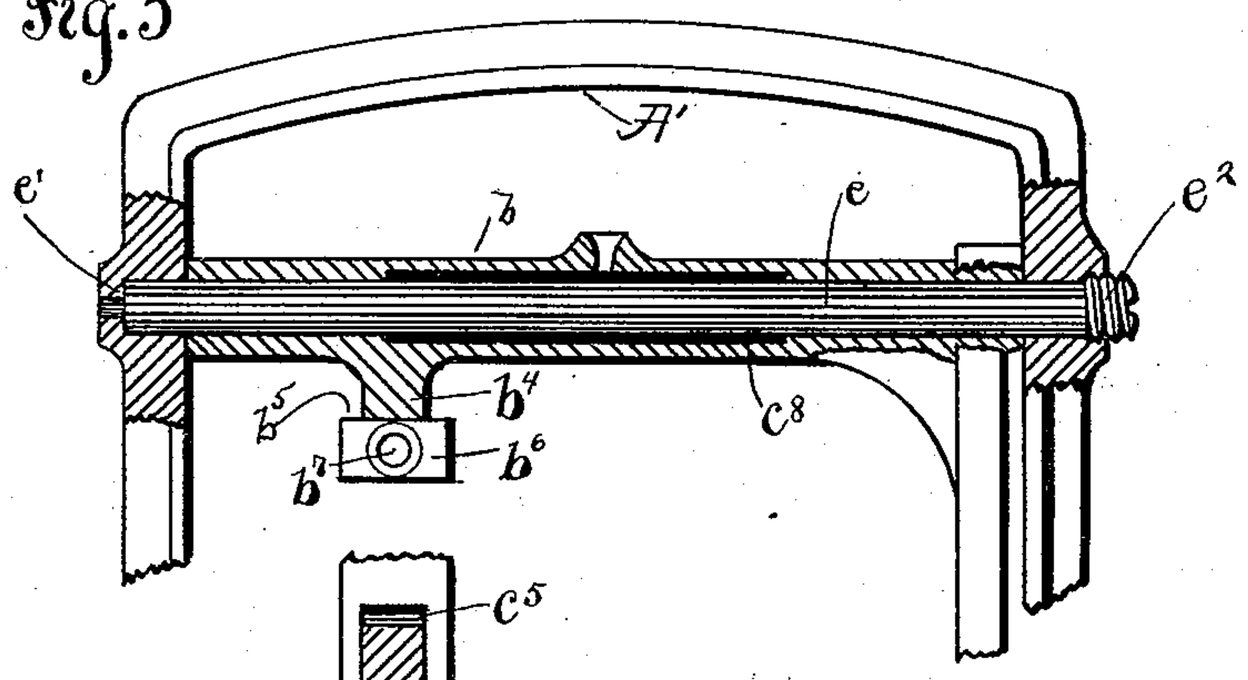


Fig. 5



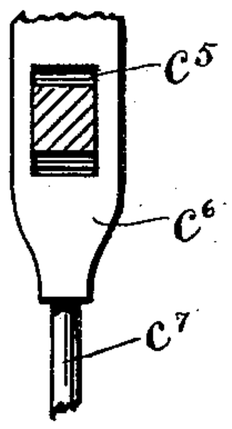


Fig. 7

WITNESSES:

Chas. I. Welch.

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UNITED STATES PATENT OFFICE.

GEORGE J. ROBERTS, OF DAYTON, OHIO.

STEAM-PUMP.

SPECIFICATION forming part of Letters Patent No. 484,241, dated October 11, 1892.

Application filed August 3, 1891. Serial No. 401,468. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. ROBERTS, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Steam-Pumps, of which the following is a specification.

My invention relates to improvements in pumps, and it especially relates to that kind of pumps known as "duplex pumps," adapted to be operated by water as a motive power, the construction, however, being equally adapted to steam or other motive power.

The object of my invention is to simplify and thus cheapen the construction of pumps of this character.

My invention consists in the various constructions and combinations of parts hereinafter described, and set forth in the claims.

In the accompanying drawings, Figure 1 is a longitudinally-sectional view taken through one of the actuating and pumping cylinders of one of the pumps. Fig. 2 is a transverse sectional view on the line x x in Fig. 1. Fig. 3 is a transverse sectional view on the line y y in Fig. 1. Fig. 4 is an enlarged sectional view of one of the actuating-cylinders. Fig. 5 is a longitudinal sectional view of a portion of the valve-operating gear in detail. Figs. 6 and 7 are detailed views of the same.

Like parts are represented by similar letters of reference in the several views.

In the said drawings, A A represent the main frame or bed of the pump, which is preferably cast integral with the outer casings B B′ and C C′ of the actuating and pumping cylinders.

B^2 is the valve chest or chamber of the actuating-cylinder, and B^3 the valves therein.

a a and a' a' are the inlet and outlet valves, respectively, of the pump, and C^2 is the air-chamber of the same.

D and E are the actuating and pumping cylinders proper fitted with the usual pistons or plungers D′ E′, connected to each end of the piston-rod F, the two pumps being located side by side and being in this respect duplicates one of the other.

Extending upwardly from the bed-plate A A is a supporting-arch A′, in which are supported rock-shafts b and c. Each of the rock-shafts is provided with an extended arm or lever b' c', preferably bifurcated at its lower end and pivotally connected through a suitable head b^2 c^2 to one of the respective piston-rods F. The said rock-shafts b c are preferably located in the supporting-arch A′, one above the other, and the arm b' of the rock-shaft b is provided with a slotted opening b^3, which embraces the lower rock-shaft c. Each of said rock-shafts is provided with an engaging projection b^4 c^4, which extends downwardly and upwardly from the respective rock-shafts, so that the outer ends stand in substantially the same horizontal plane midway between the respective rock-shafts. These engaging projections b^4 c^4 are adapted to engage in the slotted openings b^5 c^5, formed in the heads b^6 c^6 on the ends of the valve-stems b^7 c^7, connected to the respective valves B^3 of the engine or actuating end of the pump. The rock-shafts b and c are so arranged that the engaging projections b^4 c^4 of the respective shafts transmit the movement of the piston of one pump to the valve of the other, so that a positive movement of the actuating or engine valves is secured independent of the movement of the piston of said pump.

In forming the respective cylinders, both the actuating and pumping cylinders, I cast the outer casings in a single piece, the respective chambers of which are formed with a single core, so that the exhaust and supply chambers D^2 D^3 of the engine and E^2 E^3 of the pump are normally connected together, so as to form one large chamber, or, more properly speaking, a series of communicating-chambers D^3 D^2 D^3 and E^3 E^2 E^3, the cores for which are large and may be easily formed, the connecting-chambers being partially separated by perforated division-walls d d' d^2 d^3. The cylinders proper D and E are formed of metal tubing, preferably brass, and fitted into the outer casing, so as to form the division-walls between the respective supply and exhaust chambers, as shown, thus completely separating said chambers as effectually as though cast with separate cores and division-walls, in the usual way. At the same time I am enabled to employ brass or other suitable metallic cylinders, while the outer casings are made of common cast or gray iron. At the same time the mechanical work is considerably lessened and simplified.

In forming the rock-shafts *b* and *c* I construct them in the nature of sleeves, preferably chambered in the center, as shown at c^8, the sleeves being of a sufficient length to fit snugly within the arch A. Extending through the said sleeve is a plain shaft or pin *e*, which forms a bearing for said rock-shafts, said pin being held in place by projecting shoulders *e'* at one end and by a small plug-screw e^2 at the other. By this construction means are provided by which the parts may be readily assembled or removed, as desired, and the constructions much simplified.

I preferably place at the inner ends of the respective actuating and pumping pistons D' E' a cushion *f*, of rubber or other suitable material, adapted to contact with a projection f^2 on the outer casing in the event that the piston is not promptly reversed by the action of its controlling-valve, and thus prevent the contact between the piston and the casing and the consequent pounding or knocking resulting therefrom. The respective ends of the respective cylinders are each preferably closed by screw-threaded caps or plugs G G' and H H', which fit into corresponding openings in the outer casings B and C, so that access may be had to any of the cylinders at any time for assembling, repairs, or otherwise.

It will be seen by the construction as described that a very simple pump is secured. The constructions are such that it may be cheaply and easily built or repaired.

Having thus described my invention, I claim—

1. In a pump, the combination, with a hollow casing, the interior of which is provided with two perforated division-walls joined to the casing at the bottom and at the sides and extending to the top thereof, of a cylinder secured at its ends in the perforations of said division-walls, whereby three independent and disconnected compartments are formed, a piston in the cylinder, and means for opening and closing the said compartments at the top, substantially as set forth.

2. In a pump, the combination, with a hollow casing, the walls of which are open at each end and at the top and the interior is provided with two perforated walls, the perforations in the end of the casing and in the walls upon the interior being in alignment and the walls upon the interior being joined to the bottom and the sides of the casing and extending to the top thereof, whereby three open-top compartments are formed, and a plug in each of the end openings of the casing, of a cylinder secured at its ends in the apertures of the interior walls, a piston in the cylinder, and means for opening and closing the top of the compartments, substantially as set forth.

3. In a pump, the combination, with a frame having a casing at each end, one of which is provided with a cylinder and a piston and valve and the other casing is provided with means for operating said piston and valve, of an arch on the frame intermediate the casings, the sides of the arch being perforated, one of the perforations being provided with a shoulder and the other one being provided with a screw-thread, a rod in the perforations in the arch of a less length than the exterior width of the arch, one end of the rod bearing against the shoulder of one of the perforations, a screw-plug in the screw-threaded portion of the other perforation, and a sleeve upon the rod, provided with an arm and a projection, the arm being connected with the piston and the projection being connected with the valve, substantially as set forth.

In testimony whereof I have hereunto set my hand this 25th day of July, A. D. 1891.

GEORGE J. ROBERTS.

Witnesses:

MICHAEL J. SWADENER,

HARRY S. ONEILL.