2 Sheets—Sheet 1.

A. G. RONAN.

Steam Fire-Engine Pump.

No. 227,655. Patented May 18, 1880.

Fig. 1.

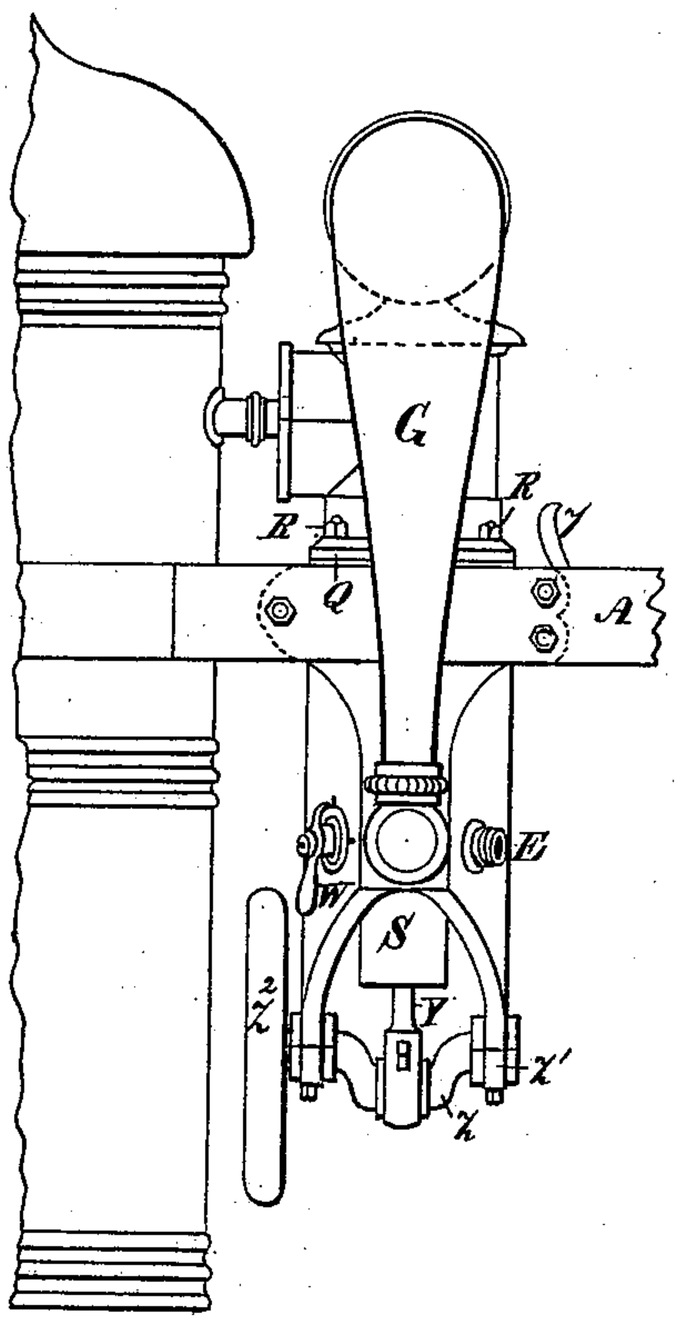
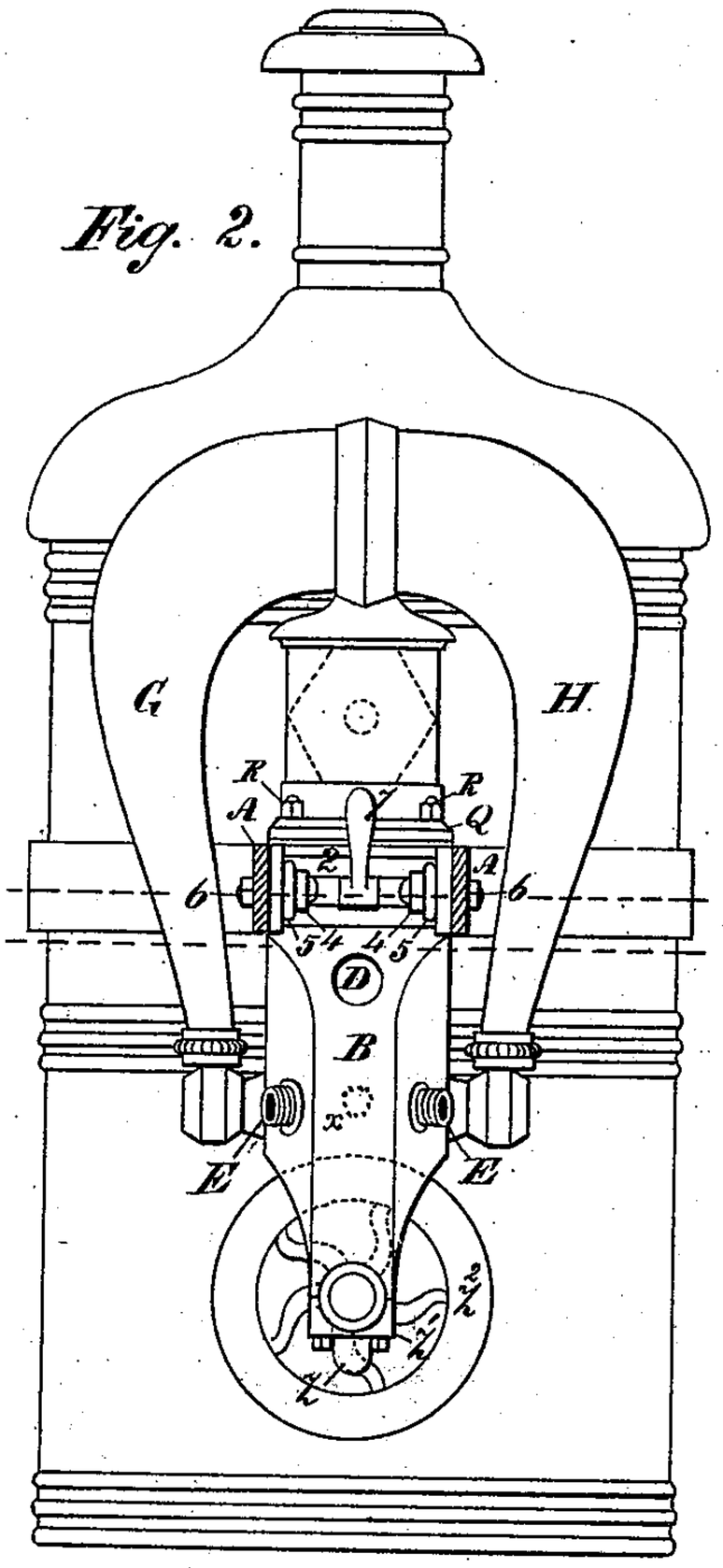


Fig. 2.



Witnesses
John Grist
Fred. J. Ross

Inventor
A. G. Ronan
By Henry Grist
Att'y.

2 Sheets—Sheet 2.

A. G. RONAN.

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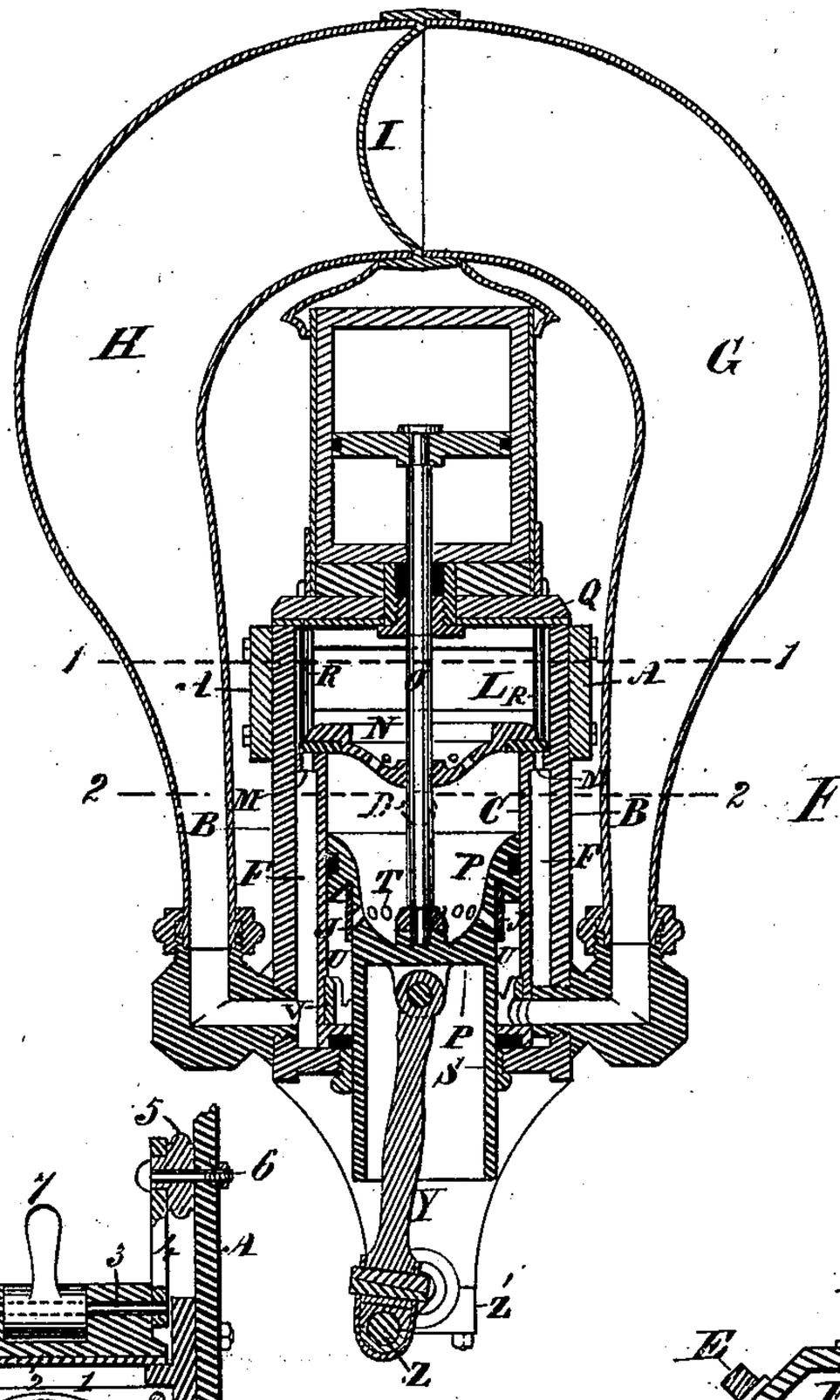

Fig. 3.

Fig. 4.

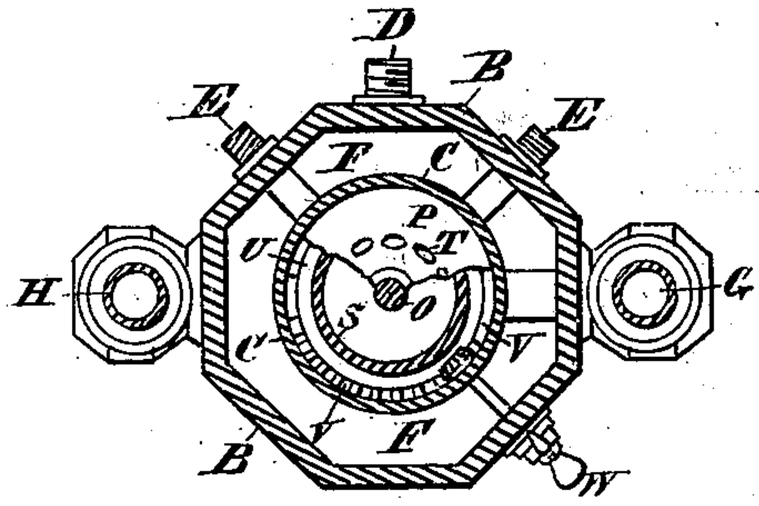

Fig. 5.

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UNITED STATES PATENT OFFICE.

ANSON G. RONAN, OF QUEBEC, PROVINCE OF QUEBEC, CANADA.

STEAM FIRE-ENGINE PUMP.

SPECIFICATION forming part of Letters Patent No. 227,655, dated May 18, 1880.

Application filed January 26, 1880.

To all whom it may concern:

Be it known that I, ANSON GROVES RONAN, of the city and Province of Quebec, Canada, have invented certain new and useful Improvements in Steam Fire-Engine Pumps, of which the following is a specification.

This invention relates to the construction of a single-acting plunger-pump; and it consists of a single cylinder within a jacket or casing, with induction and eduction orifices, to which hose is coupled, and orifices connecting with vacuum and air chambers.

Induction-valves connect the annular space between cylinder and casing with a chamber above the cylinder, which cylinder has a plunger having a barrel of less diameter working through one end of the cylinder, whereby a water-space is formed between the barrel and cylinder, which space is connected by valves in the barrel with the chamber above the cylinder, the plunger being cup-shaped to allow the valves to be inserted in the barrel below the plunger. The hose-outlets are closed by a ring-valve in the cylinder, and a relief-valve simultaneously opened thereby, so that the pump need not be stopped when the hose-connections are cut off.

Figure 1 is a side elevation of a portion of a fire-engine having my improved pump and gear. Fig. 2 is a transverse section, showing the pump in front elevation. Fig. 3 is a vertical section of the pump broken from the engine-carriage. Fig. 4 is a horizontal section on line 1 1, Fig. 3; and Fig. 5 is a horizontal section on line 2 2, Fig. 3.

A A are portions of the reaches of the carriage connecting the bolster of the front axle with the rear axle, and intermediately supporting the furnace and pump in the usual manner.

B is an external casing of the pump-cylinder C, which casing is of strong metal, preferably rectangular above the cylinder and octagonal around the sides. The rectangular portion is bolted to the reaches A A, and thereby supported.

D is an induction-orifice in the casing B, to which the suction-hose is coupled. E E are eduction-tubes from the cylinder C, to which the fire-hose is coupled.

G is a tubular air-chamber coupled to casing B, and passes through annular water-space F into annular water-space U, which is between barrel S and cylinder C. H is a tubular vacuum-chamber coupled to casing B opposite to air-chamber G, and opens into annular water-space F between casing B and cylinder C. The two tubes G and H are conjoined at top in arch form for mutual support, and internally divided at top by a concavo-convex partition, I, separating the two chambers G H.

The vacuum-chamber H is directly connected with the water-space F, which is supplied by suction-hose D, and is full of air until the engine begins to work, when the pump exhausts the air out of both hose D and the vacuum-chamber H, which will fill with water by atmospheric pressure. The vacuum-chamber then acts as a reservoir to supply the upstroke.

When the plunger P descends water is drawn through the suction-hose D up through the circle of valves M at the top of water-space F, and remains in chamber L, ready to supply the upstroke, when instantly on the upstroke the rubber valve-ring J will be forced open by the pressure of water from above and down through openings T, which are under the rubber ring, into the space U, there to be ready for the downstroke.

The cylinder C is confined within the casing B, so that the water-space F is closed at one end and valved at the other end, which connects with a chamber, L, above the cylinder, formed by the rectangular sides of the casing B, and is valved by a ring, N, sliding on rod O of the plunger P, working in the cylinder C, which opens into chamber L, which is covered by a top plate, Q, held by bolts R.

The plunger P is cup-shaped, and has a fixed barrel, S, which works air-tight through the lower end of the cylinder, and is provided with suitable packing-rings. The barrel S has apertures T opening into the cup of the plunger P, and thereby connect the space U between the barrel and cylinder C with the chamber L. The apertures T are valved by an elastic ring, J, or other means outside the barrel.

When the plunger P descends water is drawn into the annular space F through the suction-hose, and thence into chamber L through aper-

tures M. The apertures T then become closed, and the water in space U is ejected through the hose E E. When the plunger P rises the apertures M become close-valved and the apertures T open. The water in chamber L is then forced through the apertures T and ejected through the hose E E.

It will be observed that the downstroke is both force and lift and the upstroke force alone. The force exerted by the upstroke is caused by the plunger S, when ascending, displacing its own bulk of water, both strokes giving the same amount of water, the area of the barrel S being equal to the cubic contents of the water-space F.

The hose-connections are cut off by a valve-ring, V, in cylinder C, which ring has apertures corresponding to the outlets. The ring is provided with a rack-and-pinion gear, so that it may be turned circumferentially by a lever, W, from the outside of casing B, to open or close one or both hose-orifices and open a relief-valve, X, in cylinder C between the two orifices, whereby, when the hose-connections are stopped, the circulation in the pump is carried on without stopping the engine.

The pump-rod O is operated by a steam cylinder and piston over the chamber L, a non-conductor of wood or other material being interposed between the end of the cylinder and plate Q, on which it bears, to prevent condensation of steam by cold arising from the water in chamber L.

The plunger P is connected by a pitman, Y, within the barrel S to a crank-shaft, Z, which is journaled to the lower end of casing B by bearings Z′ bolted thereto.

Z^2 is a fly-wheel on the shaft Z.

To gain access to the valves of the apertures M for adjustment or repairs, one side of the casing B is formed with a large opening, 1, and closed by a rubber-lined plate, 2, hung on a shaft, 3, eccentrically journaled to arms 4, journaled in eccentrical-sleeved bearings 5, on bolts 6, passing through the arms 4, bearings 5, and reaches A A. The shaft 3 is provided with a lever, 7, for revolving it on its eccentric journals. By turning the eccentric sleeved bearings 5 the arms 4 cause the plate 2 to press over the opening 1, and by operating lever 7 shaft 3 will be rotated eccentrically in its bearings, whereby plate 2 will be forced air-tight against the face of opening 1 to prevent leakage from chamber L.

The steam-cylinder and pump-gear being bolted together, and the pump-rod being fixed to the steam-cylinder piston, and the fly-wheel being located below, the pump is near the ground; hence the machine will work with but little tremulous motion.

I claim as my invention—

1. A steam fire-engine having a pump consisting of casing B, provided with suction-hose orifice D, air and vacuum chambers G and H, cylinder C, having fire-hose tubes E E passing through casing B, and the chamber L, connecting with water-space F by valved apertures M, in combination with plunger P, having barrel S, working through end of cylinder C, forming water-space U, connecting with chamber L by valved openings T, as and for the purpose set forth.

2. A steam fire-engine pump having air and vacuum tubes G H, joined at top in arched form and divided by partition I into two compartments, as set forth.

3. The cover 2, hung by arms 4, journaled in eccentric sleeves 5 on bolts 6 to reaches A, and by shaft 3, having eccentric journals and lever 7, as and for the purpose set forth.

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Witnesses:

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