

No. 620,763.

Patented Mar. 7, 1899.

H. A. FLEUSS.
AIR AND GAS PUMP.

(Application filed Nov. 7, 1898.)

(No Model.)

Fig. 1.

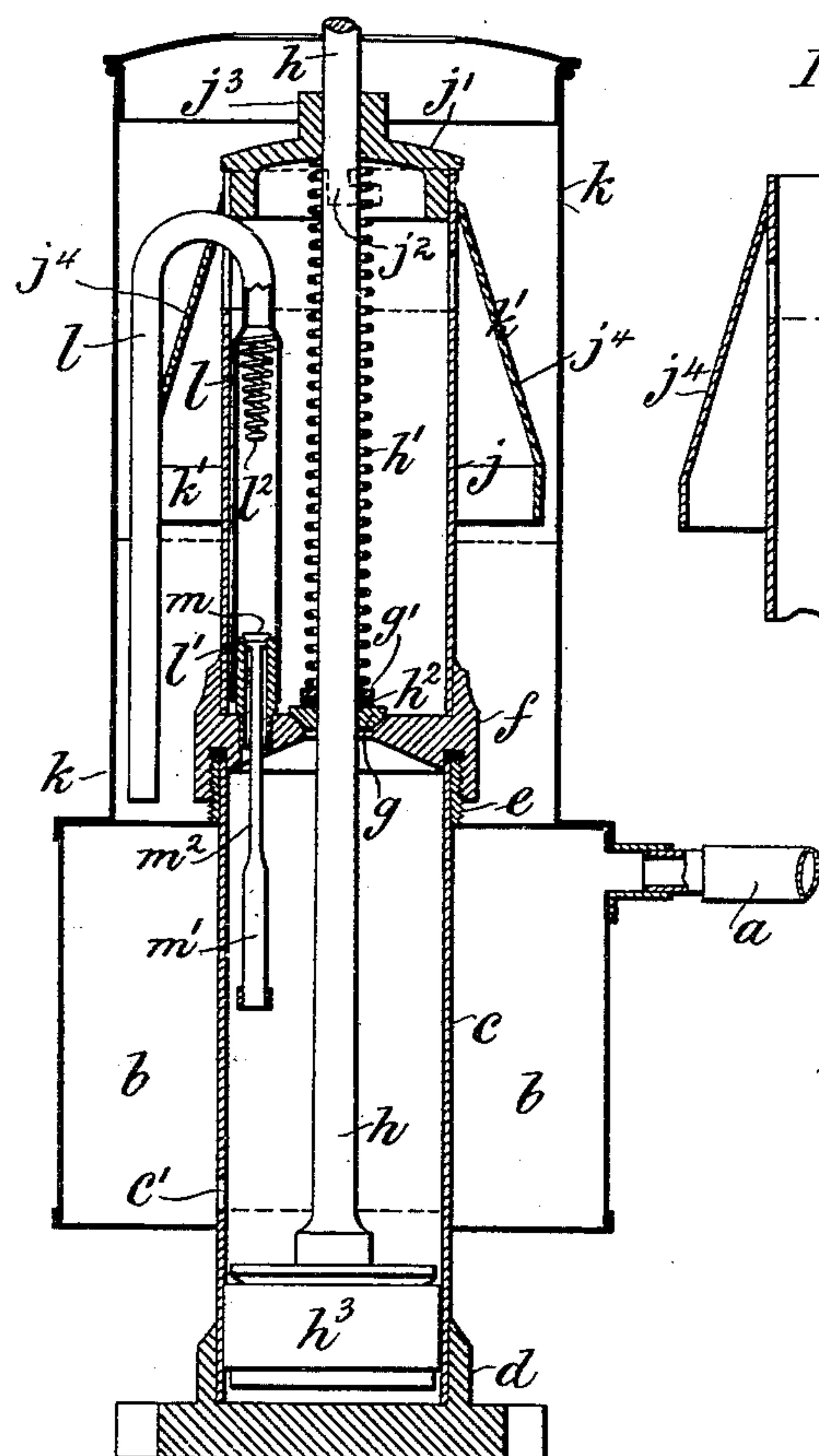
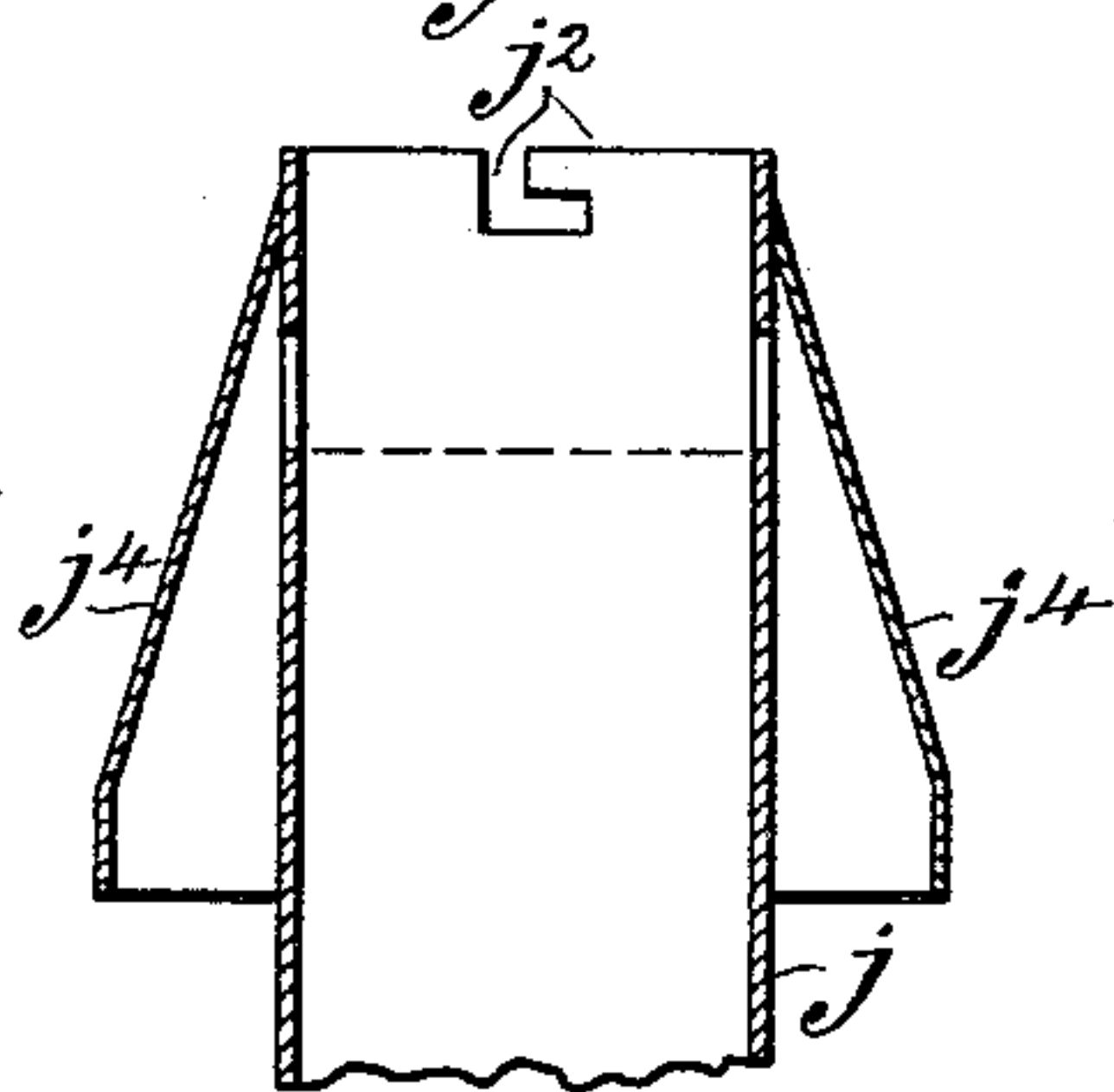


Fig. 2.



Witnesses.

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HENRY ALBERT FLEUSS, OF LONDON, ENGLAND.

AIR AND GAS PUMP.

SPECIFICATION forming part of Letters Patent No. 620,763, dated March 7, 1899.

Application filed November 7, 1898. Serial No. 695,745. (No model.)

To all whom it may concern:

Be it known that I, HENRY ALBERT FLEUSS, engineer, a subject of the Queen of Great Britain, residing at The Priory, Knowle Green, Staines, London, in the county of Middlesex, England, have invented a certain new and useful Air and Gas Pump, of which the following is a specification.

This invention relates to pumps which are especially suitable for my well-known machines in which water is frozen by absorbing its vapor in sulfuric acid under a vacuum.

Figure 1 is a vertical section; and Fig. 2 is a part vertical section at right angles to Fig. 1, showing a detail.

a is the suction-pipe, which opens into the top of an annular chamber *b*, surrounding the pump-barrel *c*, and at the bottom of the chamber is a hole *c'* into the barrel, the latter extending below the chamber.

The pump-barrel consists of a tube *c*, with its bottom fitting into a socket *d* in a stand and having fixed to its top a ring *e*, on which is a screw-thread to engage with a similar thread inside the cap *f*. The latter is conical inside and has at the top a conical seating to receive a cone-valve *g*, having a hole through it for the piston-rod *h*.

Fixed to the top of the cap *f* is a tube *j*, similar to the pump-barrel and surrounded by a casing *k*, fixed to the top of the annular chamber *b* and having an annular space *k'* between it and the tube. The tube *j* has a cover *j'* attached to it by a bayonet-joint *j²*, Fig. 2, and having a nut *j³* at the top. The piston-rod *h* passes out through a central hole in this cover. The tube contains a helical spring *h'*, surrounding the piston-rod and bearing on a washer *g'*, which in turn bears on a washer *h²*, of leather or like material, resting on the valve *g*. The spring, at its top, bears against the cover *j'*. By unlocking the cover the spring can be raised, and by turning the cover by means of the nut *j³* the tube is unscrewed from the top of the pump-barrel *c*. In this way the parts can be got at without removing the casing. A bent pipe *l* passes through the top of the tube *j*, one branch descending nearly to the bottom of the annular space *k'* and the other descending to a valve-seat *l'* at the top of a hole through the cap of the pump-barrel. A valve *m* fits on the seat and has a

stem projecting down through the hole into the pump-barrel. The lower part *m* of this stem exactly fits the hole, while the upper part *m²* does not. Oil is introduced into the pump-barrel above the piston *h³* and into the tube *j* and the bottom of the annular space *k'*. When the piston *h³* is at the bottom, the barrel is in communication with the annular chamber *b* and receives air from it. When the piston rises, first the oil and then the piston close the opening *c'* into the annular chamber *b* and the air is compressed in the top of the barrel *c*. When the piston gets near the top of its stroke, it comes against the valve-stem *m'* and lifts it and the valve *m*; but before the piston has got high enough in the barrel to sufficiently compress the air to make it escape through the open valve the bottom part *m'* of the stem enters the hole and makes a tight joint. As the piston further rises toward the top of the barrel the pressure of air lifts the conical valve *g* against its spring *h'* and the air rises through the oil in the tube *j* and escapes with some of the oil into the annular space *k'*, baffle-plates *j⁴*, Fig. 2, being provided to direct the oil downward onto the surface of the oil already in the bottom of the space *k'*. When the piston is at the top of its stroke, the oil above it fills the conical cap *f* and completely expels the whole of the air and some of the oil passes into the tube *j*, causing an overflow into the annular space *k'*. Immediately the piston begins to descend the conical valve *g* closes and a vacuum is formed in the pump-barrel. The valve *m*, whose stem is resting on the piston, descends with the latter, a spring *l²* being provided to prevent sticking, and when the lower part *m'* of the stem escapes from the hole oil is sucked by the vacuum through the bent pipe *l* from the annular space *k'*, replacing the oil which escapes with the air through the conical valve *g*.

What I claim is—

1. The combination of a pump-barrel, a chamber communicating with the barrel, a suction-pipe leading into the chamber, a cover to the barrel, a piston in the barrel, a piston-rod fixed to the piston, a tube above the barrel, an upper chamber communicating with the top of the tube, and two valves at the top of the barrel, one opening from the barrel into

the tube, the other from the upper chamber into the barrel.

2. The combination of a pump-barrel, a chamber communicating with the barrel, a suction-pipe leading into the chamber, a cover to the barrel, a piston in the barrel, a piston-rod fixed to the piston, a tube above the barrel, an upper chamber communicating with the top of the tube, a U-shaped pipe, one end open to the bottom of the upper chamber, the other forming a continuation of a hole through the cover of the barrel, a valve opening from the top of the barrel into the tube, and a second valve opening from the U-shaped pipe into the top of the barrel.

3. The combination of a pump-barrel, a chamber communicating with the barrel, a suction-pipe leading into the chamber, a cover to the barrel, a piston in the barrel, a piston-rod fixed to the piston, a tube above the barrel, an upper chamber communicating with the top of the tube, a U-shaped pipe, one end open to the bottom of the upper chamber, the other forming a continuation of a hole through the cover of the barrel, a valve opening from the top of the barrel into the tube, a second barrel opening from the U-shaped pipe into the top of the barrel, and a rod fixed to the latter valve, the lower part of the rod fitting the hole through the cover of the barrel, and the upper part being smaller than it.

4. The combination of a pump-barrel, an annular chamber surrounding the barrel and communicating with it, a suction-pipe leading into the chamber, a cover to the barrel cone-shaped inside, a piston in the barrel, a piston-rod fixed to the piston, a tube above the barrel and forming a continuation of it, an upper annular chamber surrounding the

tube and communicating with its upper part, a U-shaped pipe one end open to the bottom of the upper annular chamber, the other forming a continuation of a hole through the cover of the barrel, a valve around the piston-rod opening from the top of the barrel into the tube, a second valve opening from the U-shaped pipe into the top of the barrel, and a rod fixed to the latter valve, the lower part of the rod fitting the hole through the cover of the barrel, and the upper part being smaller than it.

5. The combination of a pump-barrel, an annular chamber surrounding the barrel and communicating with it, a suction-pipe leading into the chamber, a cover to the barrel cone-shaped inside and screwing onto the top of the barrel, a piston in the barrel, a piston-rod fixed to the piston, a tube above the barrel and forming a continuation of it, an upper annular chamber surrounding the tube and communicating with its upper part, a U-shaped pipe one end open to the bottom of the upper annular chamber, the other forming a continuation of a hole through the cover of the barrel, a valve around the piston-rod opening from the top of the barrel into the tube, a helical spring around the piston-rod and bearing on the valve, a cover to the tube attached to it by a bayonet-joint and bearing on the spring, a nut on the cover, a second valve opening from the U-shaped pipe into the top of the barrel, and a rod fixed to the latter valve, the lower part of the rod fitting the hole through the cover of the barrel, and the upper part being smaller than it.

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Witnesses:

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