No. 692,685. Patented Feb. 4, 1902.

F. LOGAN.

AIR PUMP FOR GAS APPARATUS.

(Application filed Apr. 17,.1899.)

(No Model.) 3 Sheets—Sheet 1.

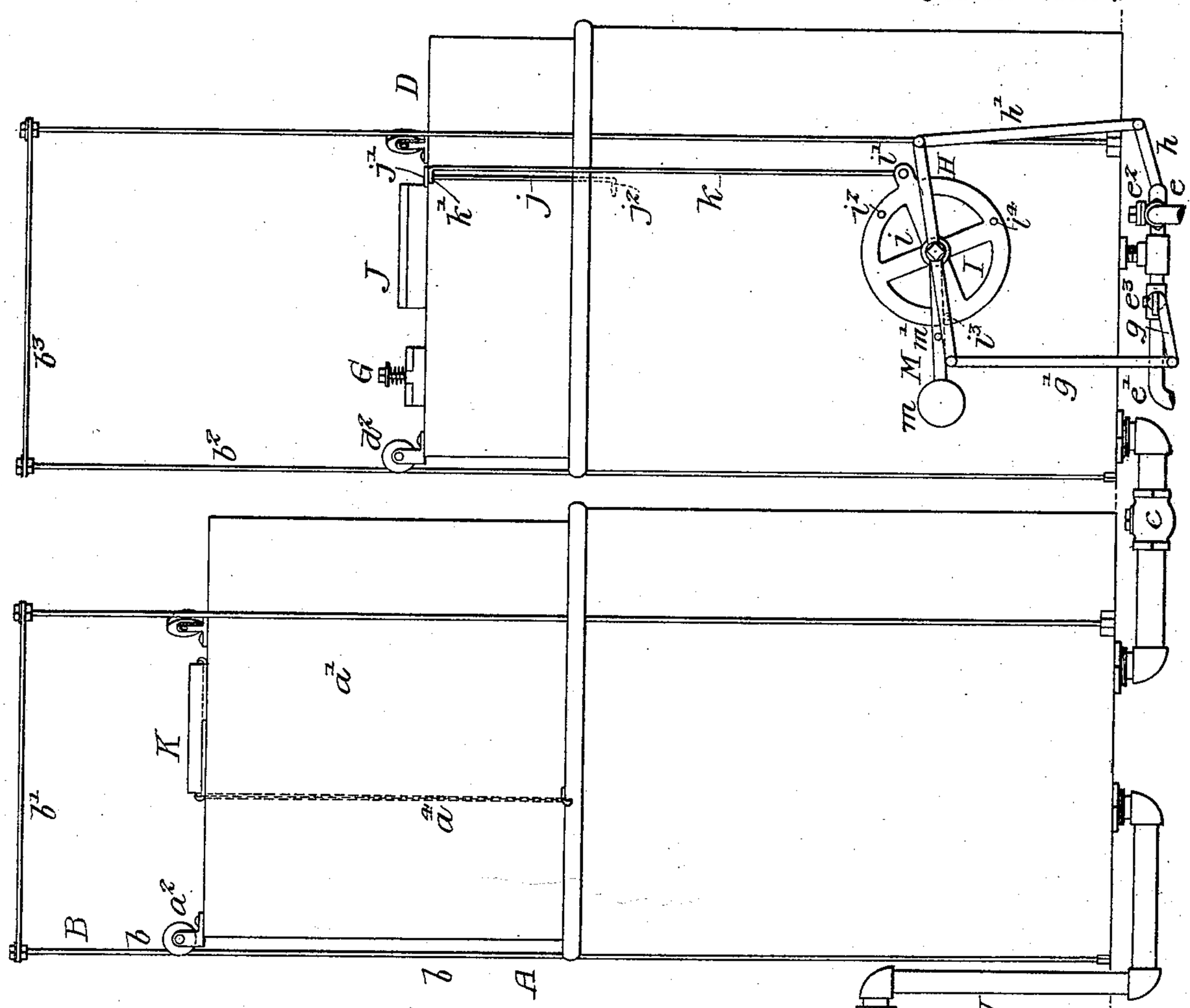

Fig. 1.

Witnesses:-
Frank L. A. Graham.
Louis M. F. Whitehead.

Inventor:
Ferdinand Logan.
by his Attorneys:- Howson & Howson

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(No Model.) 3 Sheets—Sheet 2.

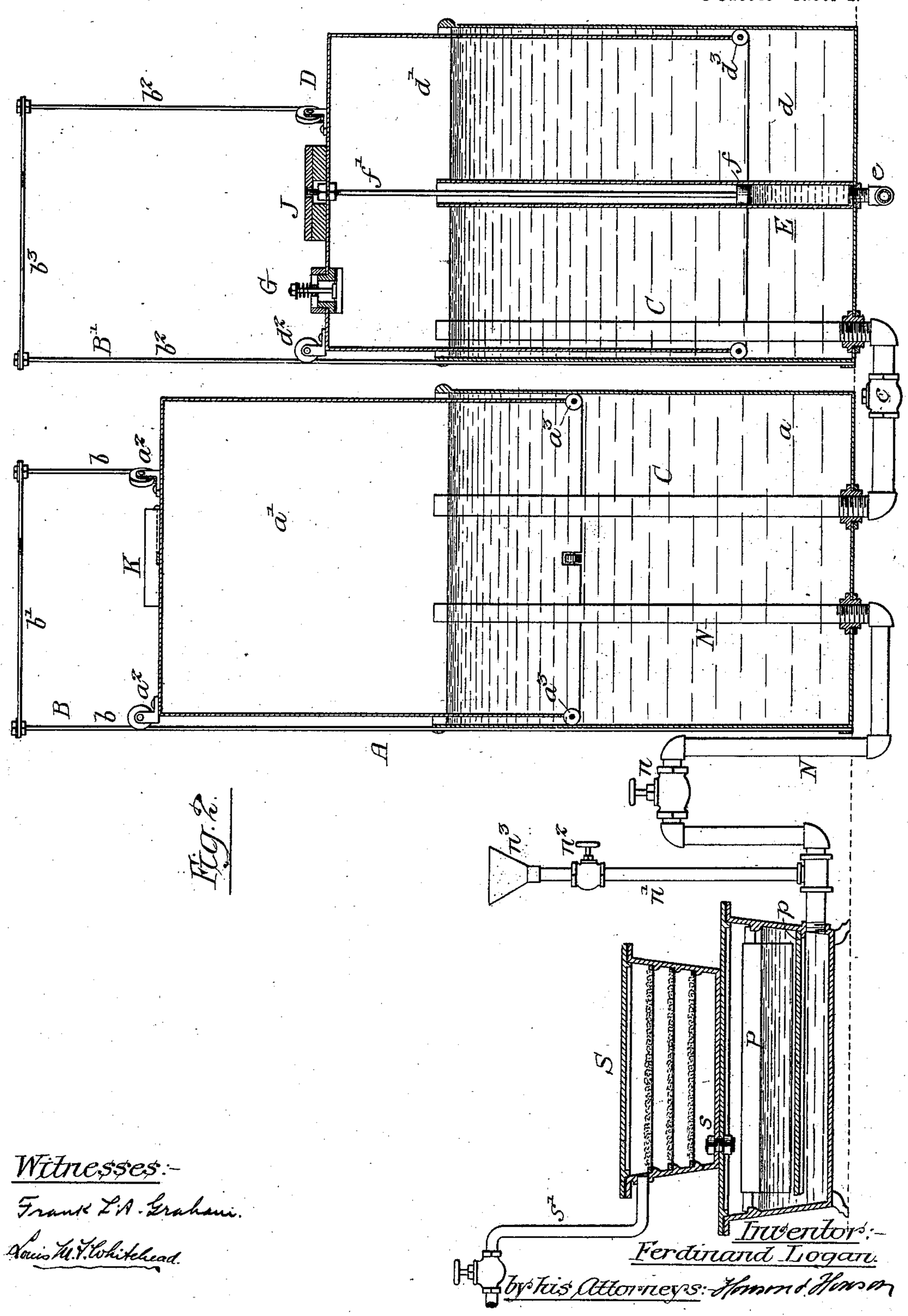

Fig. 2.

Witnesses:-
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Inventor:-
Ferdinand Logan.
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(No Model.) 3 Sheets—Sheet 3.

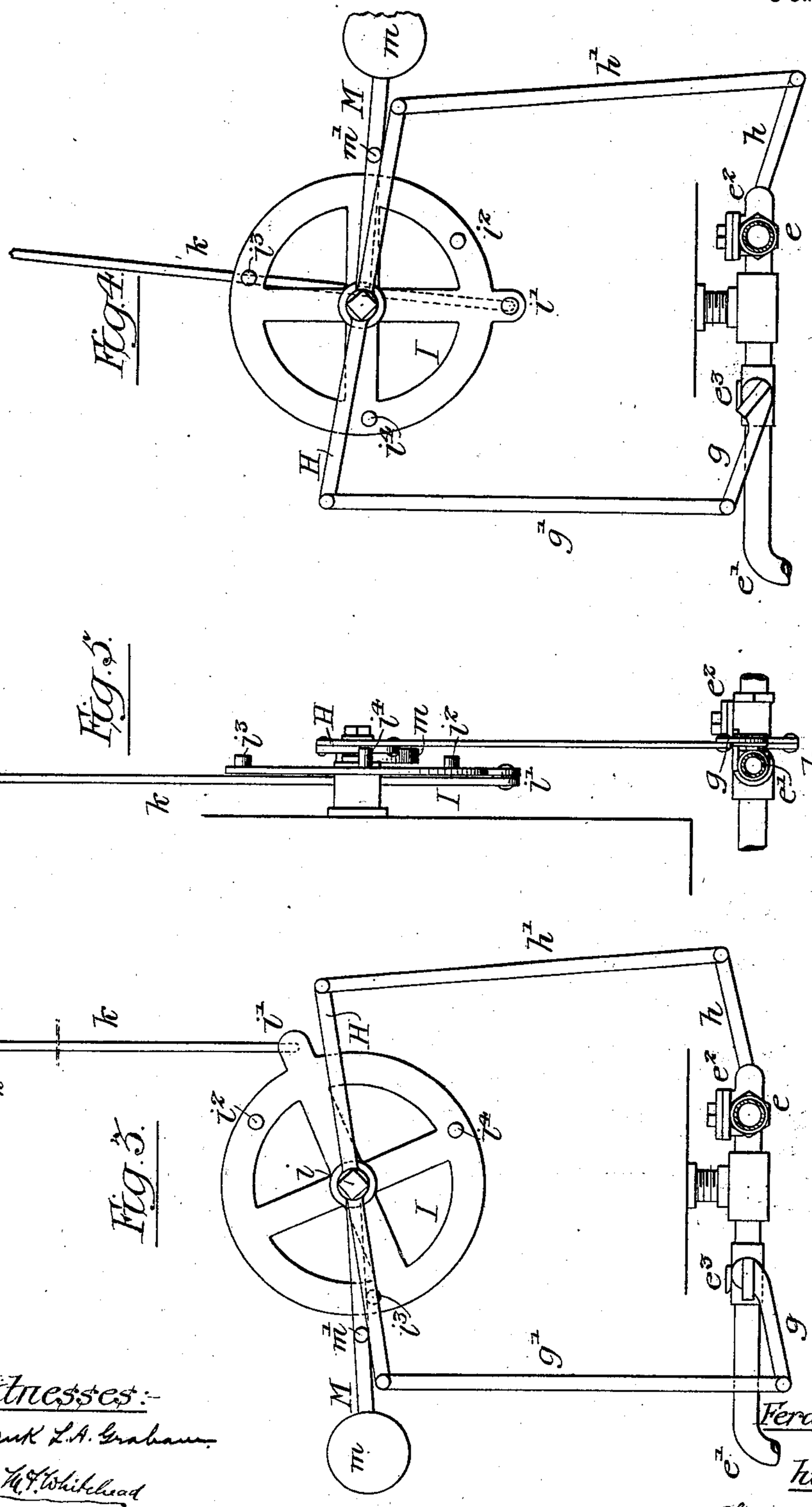

Fig. 4.

Fig. 5.

Witnesses:-
Frank L.A. Graham.
Louis M.F. Whitehead

Inventor:
Ferdinand Logan
-by-
his Attorneys:
Howson & Howson

UNITED STATES PATENT OFFICE.

FERDINAND LOGAN, OF PHŒNIXVILLE, PENNSYLVANIA, ASSIGNOR TO THOMAS LEIPER HODGE, TRUSTEE, OF PHILADELPHIA, PENNSYLVANIA.

AIR-PUMP FOR GAS APPARATUS.

SPECIFICATION forming part of Letters Patent No. 692,685, dated February 4, 1902.

Application filed April 17, 1899. Serial No. 713,349. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND LOGAN, a citizen of the United States, and a resident of Phœnixville, Pennsylvania, have invented certain Improvements in Air-Pumps for Gas Apparatus, of which the following is a specification.

My invention relates to certain improvements in air-pumps for supplying air to the carbureters of air-gas machines, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a side view showing my improved air-pump in connection with the carbureter. Fig. 2 is a sectional view of the pump. Figs. 3 and 4 are diagram views showing the valve-tripping mechanism in the two positions, and Fig. 5 is a side view of Fig. 4.

A is an air-holder having a fixed bottom section a and a movable top section a', similar in many respects to the ordinary gas-holder.

B is a frame consisting of uprights b and a cross-head b'. The upper section a' is provided at the top with wheels a^2, resting against the uprights b, and with guide-wheels a^3, which travel on the bottom section a.

C is an inlet-pipe extending upward in the air-holder A to a point (shown in Fig. 2) which is above the level of the water forming the seal of the holder. This inlet-pipe C also extends upward in the air-pump D to a point above the water-level therein, and in this pipe is a check-valve c, so that air will pass from the air-pump D through the pipe C, past the check-valve, and into the holder A. The pump D is made similar to the holder A, having a base portion d and a movable portion d'.

B′ is the frame, having uprights b^2 and a head b^3.

The movable portion d' of the pump has wheels d^2, which travel on the uprights b^2, and wheels d^3, which travel on the fixed portion d of the pump.

E is a cylinder connected to a water-supply pipe e and to a water-waste pipe e', and in this cylinder is a piston f on a rod f', secured to the top of the movable section d' of the pump. The cylinder E extends to a point above the line of the sealing water in the pump D.

G is an air-inlet valve which will open as the movable portion d' of the pump is raised. This valve consists of a frame having a circular valve proper adapted to close against the under side of the frame and provided with a spring which can be regulated by a nut on the valve-stem, so as to regulate the pressure as required. Other forms of air-inlet valves may be used without departing from the main feature of my invention.

In the inlet-pipe e is a valve e^2, and in the exhaust-pipe e' is a valve e^3. The valve e^2 has an arm h, connected to one arm of a lever H by a connecting-rod h'. This lever H is pivoted at i. The exhaust-valve e^3 has an arm g, connected to the other arm of the lever H by a rod g'.

I is a wheel also pivoted at i, and connected to this wheel at i' is a rod k. This rod has an eye k' at its upper end adapted to slide on a rod j, carried by the upper section d' of the pump. At the upper end of the rod is a stop j' and at the lower end a stop j^2.

M is an arm pivoted also at i. This arm has a weight m and a pin m', which projects far enough to engage the lever H when shifted either to the right or left, so as to close or open the valves e^2 e^3.

On the wheel I are pins i^2 i^3, which engage the arm M. The pin i^2 raises the lever and shifts it from the right-hand side to the left, while the pin i^3 raises the lever and shifts it from the left-hand side to the right. A stop i^4 is simply for the purpose of limiting the motion of the wheel. It will be understood that while I have shown a wheel a two-armed lever may be used as an equivalent.

It will be seen by referring to Figs. 1, 2, and 3 that if the parts are in the position shown in Fig. 3 the inlet-valve e^2 is open and water under pressure will enter the cylinder E and force its piston f up and with it the moving section d' of the pump. Consequently the air-inlet valve G will open to allow air to pass into the upper portion of the pump. When the stop j^2 reaches the eye k' of the rod k, it lifts the said rod, and consequently turns the wheel I, and the pin i^2 on this wheel will come into contact with the weighted arm M, carrying it up until it is past the center, when it will

fall by gravity, and its pins will strike an arm of the lever H, shifting the valves e^2 and e^3 to such an extent as to close the inlet-valve e^2 and open the exhaust-valve e^3, allowing the water in the cylinder E to escape.

On the movable section d' of the pump D is a weight J, and on the movable section a' of the holder A is a weight K, which is not as heavy as the weight J, so that the weighted section d' of the pump will force the air which is drawn into it through the air-passage C past the check-valve therein and into the holder A, the movable section a' of the holder rising as the air is introduced. The air cannot return to the pump, owing to the check-valve c.

Any suitable stop may be used to limit the upward movement of the section a' of the holder, and I have shown chains a^4, which can be lengthened or shortened according to the extent of travel desired.

The holder communicates with the carbureter P through the pipe N, which extends upward in the holder to a point above the level of the water therein and is bent so as to be above the level of the liquid in the carbureter P and communicates with the carbureter at a point under a partition-plate p. A valve n is provided to cut off the carbureter from the holder.

n' is a feed-pipe provided with a valve n^2 and a funnel n^3, by which the carbureter is charged with liquid.

Mounted above the carbureter is a purifier S, communicating with the carbureter by a passage s, and s' is a pipe leading to a gas main or holder.

The construction and arrangement of the carbureter and purifier are fully described in the application filed by me on the 15th day of February, 1898, Serial No. 670,389.

It will be seen that the pump has a fixed and a movable section forming a container, and it will be understood that the cylinder and the piston may be connected either to the fixed or to the movable section, and while I have shown two valves for controlling the flow of water to and from the cylinder it will be understood that a single valve having suitable ports may be used, and the tripping mechanism may be slightly modified without departing from the main feature of my invention.

I claim as my invention—

1. The combination of an air-pump, having a fixed and a movable section, an air-inlet valve constructed to admit air when the movable section is raised, a cylinder, a piston in said cylinder connected to the movable section of the pump, water inlet and outlet pipes communicating with the cylinder, valves in said pipes, a pivoted lever connected to the movable section of the pump, a weighted lever also pivoted and constructed to be periodically engaged by the first-mentioned lever, a pivoted arm operatively connected to the valve in the inlet and outlet pipes, said weighted lever being constructed to move the pivoted arm and thereby operate the valves, substantially as described.

2. The combination of an air-holder, an air-pump consisting of a fixed and a movable section, an air-inlet valve, a cylinder, a piston in said cylinder connected to the movable section of the pump, water inlet and outlet passages communicating with the cylinder, valves in said passages, a pivoted lever connected to the movable section of the pump, a weighted lever also pivoted and constructed to be periodically engaged by the first-mentioned lever, a pivoted arm operatively connected to the valves in the inlet and outlet pipes, said weighted lever being constructed to move the pivoted arm and thereby operate the valves, a passage communicating with the upper portion of the pump and the upper portion of the holder, the movable portion of the pump being heavier than the movable portion of the holder, so that when air is admitted to the pump and the water allowed to escape from the cylinder, the weighted movable section will cause the air to pass into the holder, substantially as described.

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

FERDINAND LOGAN.

Witnesses:
WILL. A. BARR,
JOS. H. KLEIN.