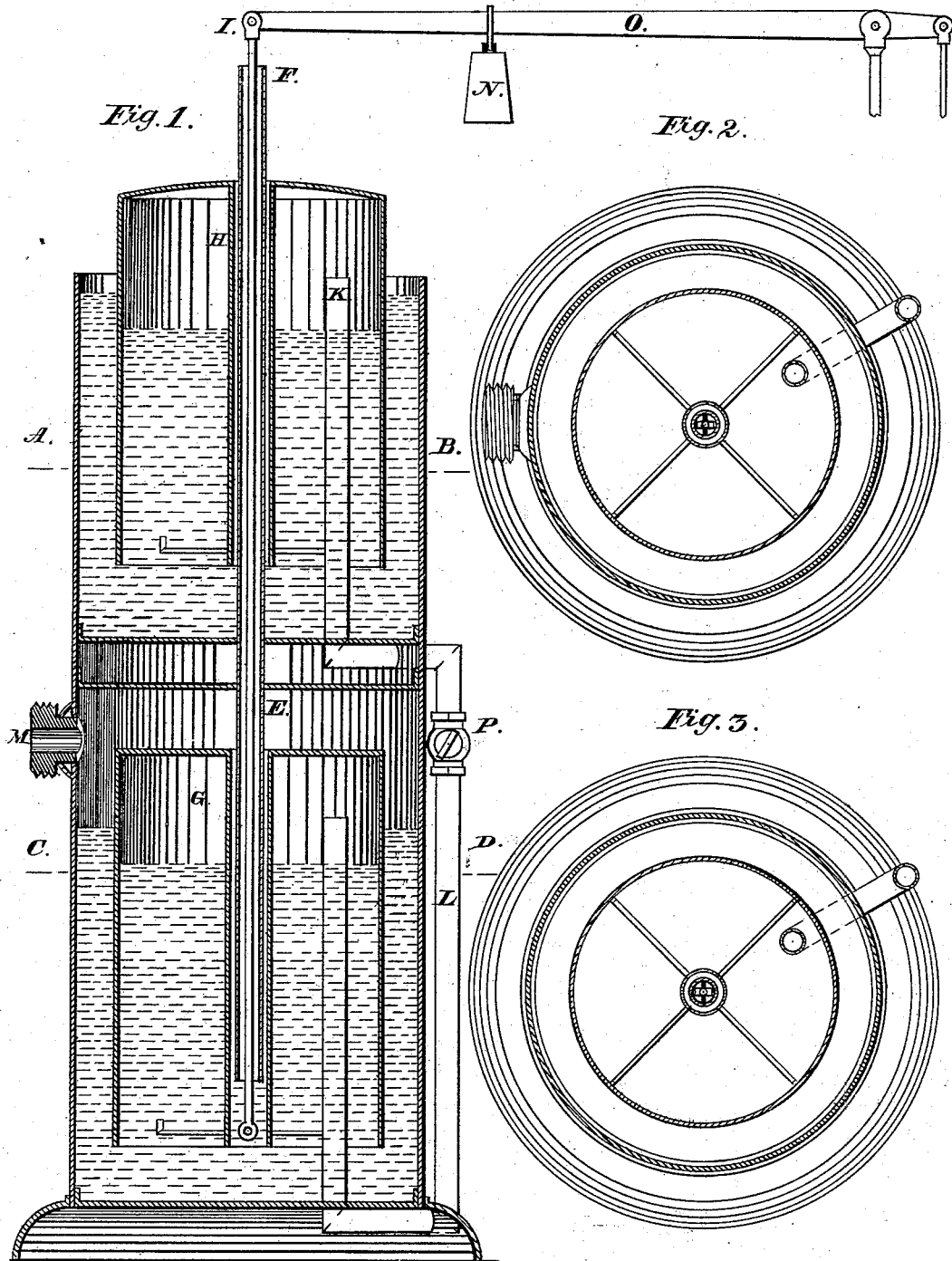


W. HELME.  
Gas-Exhauster Governor.

No. 218,965.

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Witnesses  
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## IMPROVEMENT IN GAS-EXHAUSTER GOVERNORS.

Specification forming part of Letters Patent No. **218,965**, dated August 26, 1879; application filed July 16, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM HELME, of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Gas-Exhauster Governors; and do hereby declare that following this is a full, clear, and exact description thereof, and consists in a new arrangement for governing gas-exhausters.

In the manufacturing of gas for illuminating purposes it has been found advantageous to relieve the retorts of the pressure incident to the generation of the gas. Various machines have been used for this purpose, known as "gas-exhausters," mostly propelled by steam-engines, but in some cases by gas-engines; but there are some in which a jet of steam is introduced requiring no propelling power, but require to be governed in the amount of steam admitted. As the amount of gas produced in the retorts during distillation is constantly varying, it is necessary to have a correspondingly-varying power to relieve them, in order to maintain a uniform pressure.

The object of my invention is to govern the action of the exhauster through the propelling power more effectively than has yet been done, and thereby secure greater uniformity of pressure in the retorts. Various instruments have been used for this purpose, some of which have hollow air-tight floats. These float on the surface of the water and rise and fall with it, which is limited to less than the actual variation in pressure. This limited motion or stroke requires a nicety of adjustment hard to obtain or maintain, owing to the surface of the water being exposed and the liability to evaporation, the effect of which would be to lower the float when not desired. Others have floats open at the bottom and closed at the top, which are counterpoised or balanced from the exterior of the crown in various ways with weights, some attached to chains or cords passed over pulleys, and others to levers, the friction of working which is found to affect their delicacy of action, and thereby impair their efficiency.

The object of my invention is to get rid of friction, so as to make available as far as possible the whole power of the instrument in controlling the action of the propelling power

working the exhauster. This I do by the greatly-increased motion or stroke of float without the working of any metal or other friction-producing joints, as in those referred to.

Referring to the accompanying drawings, which form a part of this specification, Figure 1 is a sectional elevation through the center. Fig. 2 is a sectional plan view on a line with A B; and Fig. 3 is a sectional plan view on a line with C D.

The tank E, Fig. 1, is divided about the center with two disks, making a tank of two stories. Both disks are made water-tight, with a space left between for the pipe K. One disk would answer; but as the pipe F, extending from the extreme top to near the bottom, is supported at this point, it is more securely done by being fastened to two than one.

In the lower apartment of the tank E is placed a float which has a closed top, as shown at G, and open bottom, with a pipe in the center extending its whole length, and sufficiently large to admit freely the pipe F. In the top of the tank is placed the float H, which is similar in all respects to G excepting the crown, which is rounded. Both of these floats move up and down on and are kept in place by the pipe F, which answers the double purpose of guide for them, and the means of making a connection from the top through the center to the float G below. This connection is shown in Fig. 1 at I, where it is attached to the valve-lever of the steam-engine or jet-exhauster, extending downward to bottom of the pipe in float G, where it is attached to that float. Both tanks being partly filled with water, these pipes are sealed at their lower ends against the escape of the air retained in the interior of the floats, and the floats partly submerged, with the air lying between the water and the under side of the floats supporting them in such a way that if the one is pressed down and the air expelled it passes through the pipes K and L to the same position in the other one, that being the only avenue of escape. Under these circumstances, if the floats are of equal weight and area they will balance each other midway in the space through which they move, as shown in the drawings, Fig. 1.

The opening M into the tank or chamber E

is for the purpose of connection with the inlet to the exhauster with a pipe, through which the pressure will be equalized and maintained at the extremes.

If a pressure greater than that of the atmosphere in the chamber E is produced by the action of the exhauster it will be exerted on the crown of the float G and force it downward and farther into the water, and thereby open the steam-valve of the engine, increasing the speed of it and the exhauster. This increase of speed would, on the other hand, reduce the pressure and again relieve the float, which would react and rise to its former position or beyond if the pressure had been brought below that which formerly existed, and in rising would close the steam-valve and check the speed of the engine. In this action the air expelled from the interior of float G, while descending, would pass to the interior of the float H, raising it to a point counterpoising or balancing each other, where it would become stationary through the deeper immersion of the one and the lessening of the other.

One great advantage, if not the greatest, found to arise from the use of two floats in combination, as described, is the means it gives of placing the float G, which is connected to the valve-lever, in an air-tight chamber, as shown at E, where the liability to evaporation is very slight.

Exhausters are generally worked at a speed which holds the pressure in front of the inlet at zero, or the same as the surrounding atmosphere.

There being no opening into the float-chamber above referred to, air cannot enter to be drawn off through and by the exhauster, carrying with it any vapor that may arise from the water; consequently the water-line is undisturbed from this cause.

In the apparatus described by Ernest Korting, which he uses in connection with the placing of a jet-exhauster, patented March 2, 1875, No. 160,443, the top of the tank is open to the atmosphere, in consequence of which evaporation is constantly going on. This lowers the water-line and carries the float with it, and in so doing opens the steam-valve more than desired. To remedy this, water must be supplied or the connecting-rod lengthened.

In my improvement the float H is in a tank, where the water is liable to the same thing;

but having no connection with the valve-lever it may fall some inches by the lowering of the water-line without interfering with its function or duty of balancing the float G. In fact, until sufficient water is drawn off to let it down on the bottom, it performs as well at one point as another, and, as provision is made for several inches of evaporation, months may pass without its requiring attention.

Any desired pressure at the inlet of the exhauster can be obtained by increasing or diminishing the weight of the float H, which can be done with separate weights or by shifting the weight N to the right or left on the lever O.

To prevent the too rapid action of the floats in either direction, the cock P is placed in the pipe L, which can be closed to an extent necessary to keep them under control and prevent the opening or closing too quickly of the steam-valve of the engine.

While in the drawings I have placed the floats in a line one over the other for convenience and compactness, it is not necessary they should be so arranged. In cases where height may be objectionable, the one can be placed on the same level and alongside of the other, or, if more desirable, can be put in some convenient but remote place, and the connection made with a suitable pipe.

Having thus described the nature of my invention for governing the action of a gas-exhauster, the following is what I claim as new and desire to secure by Letters Patent:

1. The combination of the two floats G and H, each with an opening in the bottom, and both partly submerged and working in water or other liquid, so arranged and adjusted that they balance or counterpoise each other in the manner described and set forth in the foregoing specification.

2. The combination of the cock P with the pipe L, by which the too rapid action of the floats G and H are checked and controlled, as set forth and described.

3. The placing of the float G in the chamber or tank E, which is connected with the inlet of the exhauster by a pipe through which the pressure is equalized, as set forth and described.

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