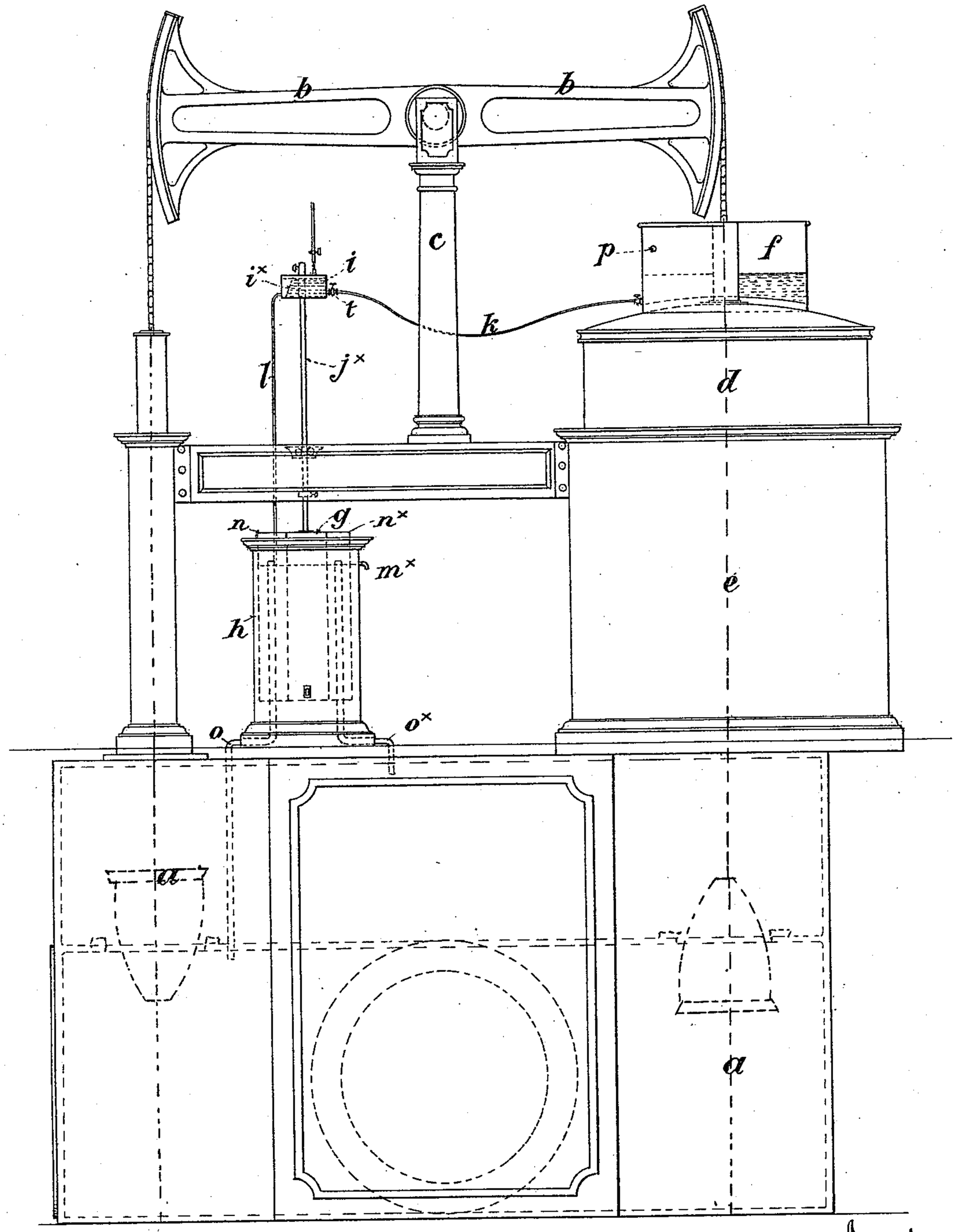
(No Model.) 3 Sheets—Sheet 1.

J. HAWKYARD.

STATION GAS GOVERNOR.

No. 518,143. Patented Apr. 10, 1894.

FIG: 1.



Witnesses.
George Baumann
James Gracie

Inventor.
John Hawkyard.
By his Attorneys
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THE NATIONAL LITHOGRAPHING COMPANY,
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(No Model.) 3 Sheets—Sheet 2.

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STATION GAS GOVERNOR.

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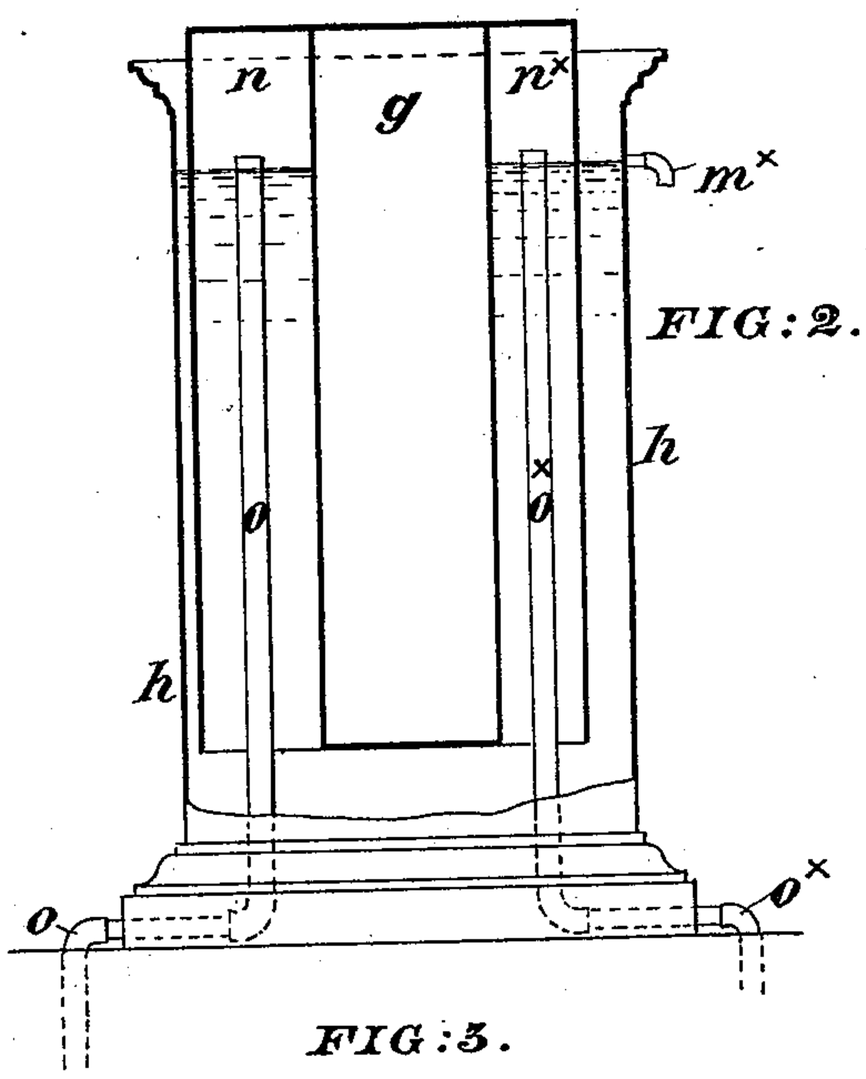


FIG: 2.

FIG: 3.

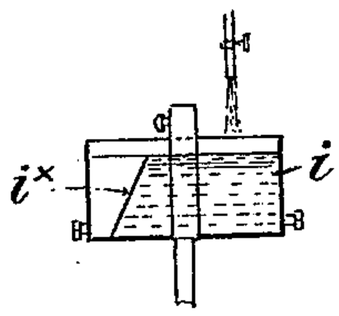


FIG: 4.

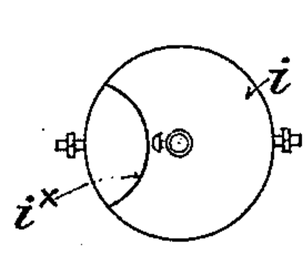


FIG: 5.

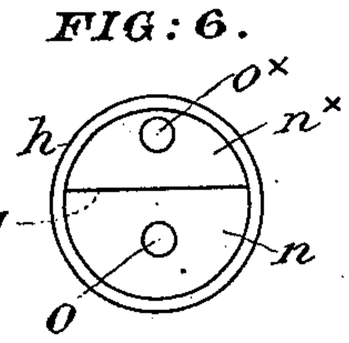


FIG: 6.

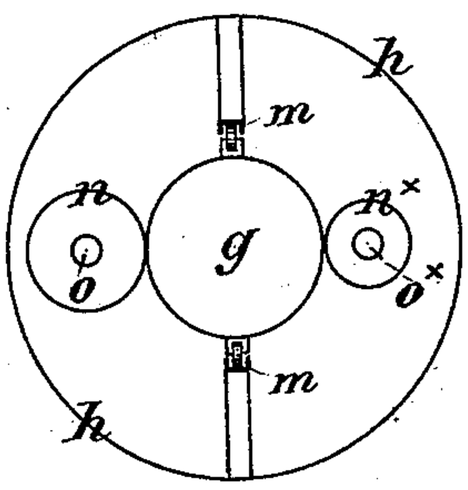
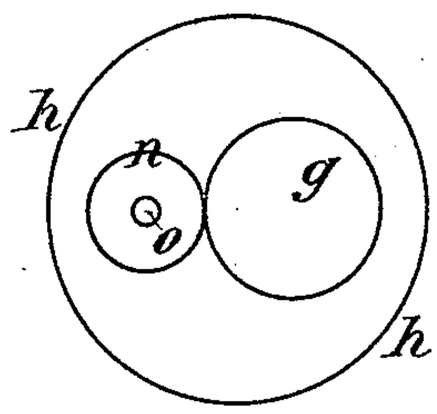


FIG: 3a.



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(No Model.) 3 Sheets—Sheet 3.

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STATION GAS GOVERNOR.

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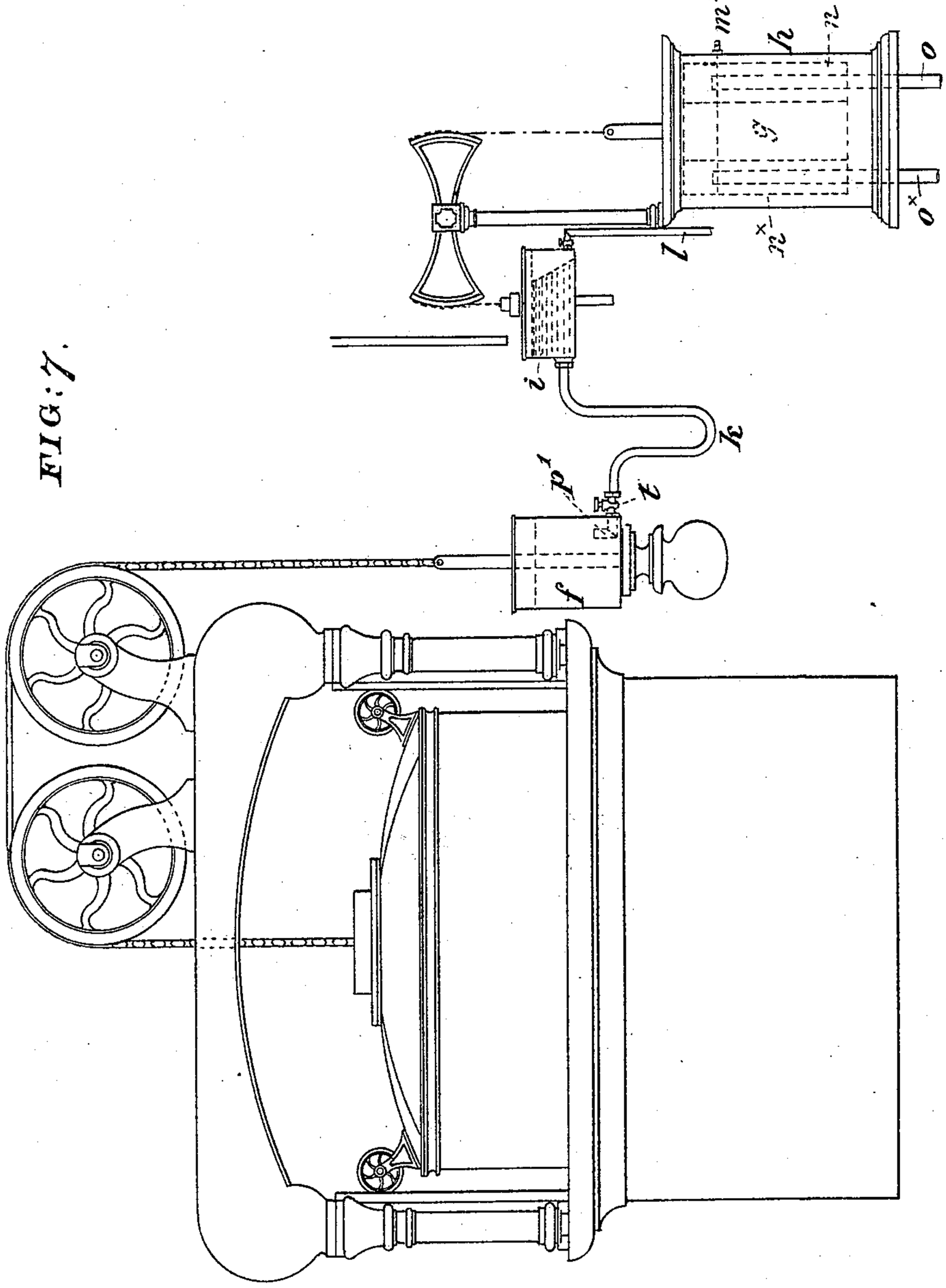
FIG: 7.



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UNITED STATES PATENT OFFICE.

JOHN HAWKYARD, OF SADDLEWORTH, ASSIGNOR TO JOSEPH BRADDOCK OF OLDHAM, ENGLAND.

STATION GAS-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 518,143, dated April 10, 1894.

Application filed March 18, 1893. Serial No. 466,664. (No model.)

To all whom it may concern:

Be it known that I, JOHN HAWKYARD, a subject of the Queen of Great Britain and Ireland, residing at Saddleworth, in the county of York, England, have invented Improvements in Station Gas-Governors, of which the following is a specification.

The objects of these improvements are to produce a station gas governor that will automatically give an increased outlet pressure whenever the demand for gas increases, and a diminished outlet pressure as the demand for gas falls, such increase or decrease being constant notwithstanding variations of inlet pressure.

The nature of my invention and the manner in which the same is to be performed or carried into practical effect will be readily understood on reference to the three sheets of drawings hereunto annexed and the following explanation thereof.

Figure 1 on the drawings is an elevation of a station gas governor with my invention shown as applied thereto. Figs. 2, 3, 3ª, 4, 5, 6, are detached sectional views on a larger scale hereinafter more particularly referred to showing the details of my invention and slight modification thereof.

The particular construction of station gas governor represented on the drawings is one made according to the drawings and specification of Letters Patent granted to myself and Joseph Braddock in Great Britain, No. 16,065, bearing date the 10th day of October, 1890, but my invention may also be applied to other forms of station gas governors, as shown at Fig. 7.

On Fig. 1 of the drawings *a* is the gas chamber divided by a midfeather into an inlet and an outlet chamber. In the midfeather are two valves connected by rods and chains passing through water seals to the ends of the balance beam *b* which oscillates on knife edges supported on the pillar *c* as described in the said specification above referred to.

d is the governor bell and *e* the water tank for the same.

According to my invention I employ a loading or pressure changing tank *f* fixed upon the crown of the governor bell *d*, and containing water or other liquid and I so arrange the supply and overflow of this tank *f* that the height of the water or other liquid therein shall increase automatically as the demand for gas increases, and shall decrease as the demand for gas falls, and in order to compensate for the effect of a varying inlet pressure which would alter the position of the valve for the same quantity of gas passing through the governor, I employ two bells and a float *g* working in a liquid in a tank *h*, which bells and float vary in height to any desired degree with the variation of the inlet pressure.

On the top of the float *g* I place an overflow vessel *i* connected to the loading tank *f* above named by a flexible pipe *k* (or other equivalent means) so that the level of the water or other liquid will be the same in both the overflow vessel *i* and the loading or pressure changing tank *f*. A constant supply of water may be given to the overflow vessel *i* which is provided with a suitable overflow pipe *l* or a nozzle to carry off superfluous liquid, or a contrivance may be introduced to prevent the waste of water when not required.

When the governor is loaded to give the maximum outlet pressure desired at any time and the valves are open to the full extent required therefor the level of the water or liquid in the loading tank *f* will be at the highest relative point, and as the inlet pressure increases from any cause the tendency of the governor bell *d* is to rise and partially close the balanced valves, and thus to throw off more of the liquid from the loading tank *f* into the overflow vessel *i* and reduce the outlet pressure, but the bells and float *g* being subjected to the inlet pressure and also to the outlet pressure rise to the same extent, carrying up the overflow vessel *i* thereby retaining the original level of the water or other liquid in the loading tank *f* and thus maintain the maximum outlet pressure.

Fig. 2 is a vertical section and Fig. 3 a horizontal section illustrating the bell and float arrangement. The float *g* rises and falls between two vertical guides *m* in the tank *h* which is provided with an overflow at $m^{\times}$ and the float has attached to it two bells *n* and $n^{\times}$. The pipes *o* and $o^{\times}$ are open above the water level and communicate one to the inlet division and the other to the outlet division of

the gas chamber *a* or they may communicate direct with the inlet and outlet mains, so that both the inlet and outlet pressure are brought to bear upon the two bells *n* and $n^{\times}$ (which are suitably proportioned according to the requirements of the governor) and through them and the float *g* upon the overflow vessel *i*. In some cases the float *g* may be connected to one bell *n* communicating with the inlet main alone see Fig. 3ª.

Figs. 4 and 5 show enlarged views of this vessel *i;* it is provided with an overflow lip $i^{\times}$ leading to the waste water pipe *l*. I may here remark that the water may be supplied either direct to the vessel *i*, as shown, or to the loading or pressure changing tank *f* and that the latter may be provided with an overflow at *p* which is at the ordinary maximum pressure so that the highest desirable maximum is attained when the water overflows at the said point *p*, and even this can be exceeded if required by plugging the overflow aperture *p* and allowing the loading or pressure changing tank *f* to be filled to the top, giving the highest possible maximum pressure.

I prefer to apply a small tap *t* to the flexible pipe *k* to regulate the flow of the water between the vessel *i* and the tank *f*.

Instead of arranging the float *g* and bells *n* and $n^{\times}$ as shown at Figs. 2 and 3 they may be arranged in a concentric form as shown at Fig. 6, in which case the float *g* is made of an annular section the internal space being divided by a midfeather *q* into two suitably proportioned chambers *n* and $n^{\times}$ with which the inlet and outlet pressure pipes *o* and $o^{\times}$ communicate.

In cases where it may be more convenient to have the tank *h* placed somewhere above the station governor the overflow vessel *i* instead of being supported by a rod $j^{\times}$ as shown may be suspended by a similar rod chain or equivalent attached to the float *g* and passing out through a water seal.

This invention is applicable with special advantage to governors made as above described according to the invention for which British Letters Patent No. 16,065, dated October 10, 1890, were granted to myself and Joseph Braddock. It is also applicable to governors where the bell is weighted, or gives the maximum pressure, and the loading or pressure changing tank *f* is fixed as a counterbalance in which case the supply vessel *i* must be provided with a chain which passes over a pulley or must be otherwise similarly balanced, as shown at Fig. 7, the bent elbow *p'* being the equivalent in this case of the overflow *p* on Fig. 1. It is applicable to governors with internal floats.

I claim—

1. In a gas governor, the combination of the main governor bell and a loading tank connected to and moving with the said bell, with an overflow vessel in communication with such tank so as to maintain an equal water level in both the overflow vessel and loading tank, a float carrying said overflow vessel and acting in a tank and provided with a bell in communication with the inlet pressure, substantially as set forth.

2. In a gas governor, the combination of the main governor bell and a loading tank connected to and moving with the said bell, with an overflow vessel in communication with such tank so as to maintain an equal water level in both the overflow vessel and loading tank, a float carrying said overflow vessel and acting in a tank and provided with two bells, one in communication with the inlet pressure and the other in communication with the outlet pressure, substantially as set forth.

3. In a gas governor, the combination of the main governor bell, and a loading tank mounted upon the top of said bell, with an overflow vessel in communication with such tank so as to maintain an equal water level in both the overflow vessel and loading tank, a float upon which said overflow vessel is mounted and acting in a tank and provided with a bell in communication with the inlet pressure, substantially as described.

4. In a gas governor, the combination of the main governor bell, and a loading tank mounted upon the top of said bell, with an overflow vessel in communication with such tank so as to maintain an equal water level in both the overflow vessel and loading tank, a float upon which said overflow vessel is mounted and acting in a tank and provided with two bells in communication one with the inlet pressure and the other with the outlet pressure, substantially as described.

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

JOHN HAWKYARD.

Witnesses:

GEORGE DAVIES,

CHARLES A. DAVIES.