

(No Model.)

F. MOORE.
GAS HOLDER.

No. 442,324.

Patented Dec. 9, 1890.

FIG. 1.

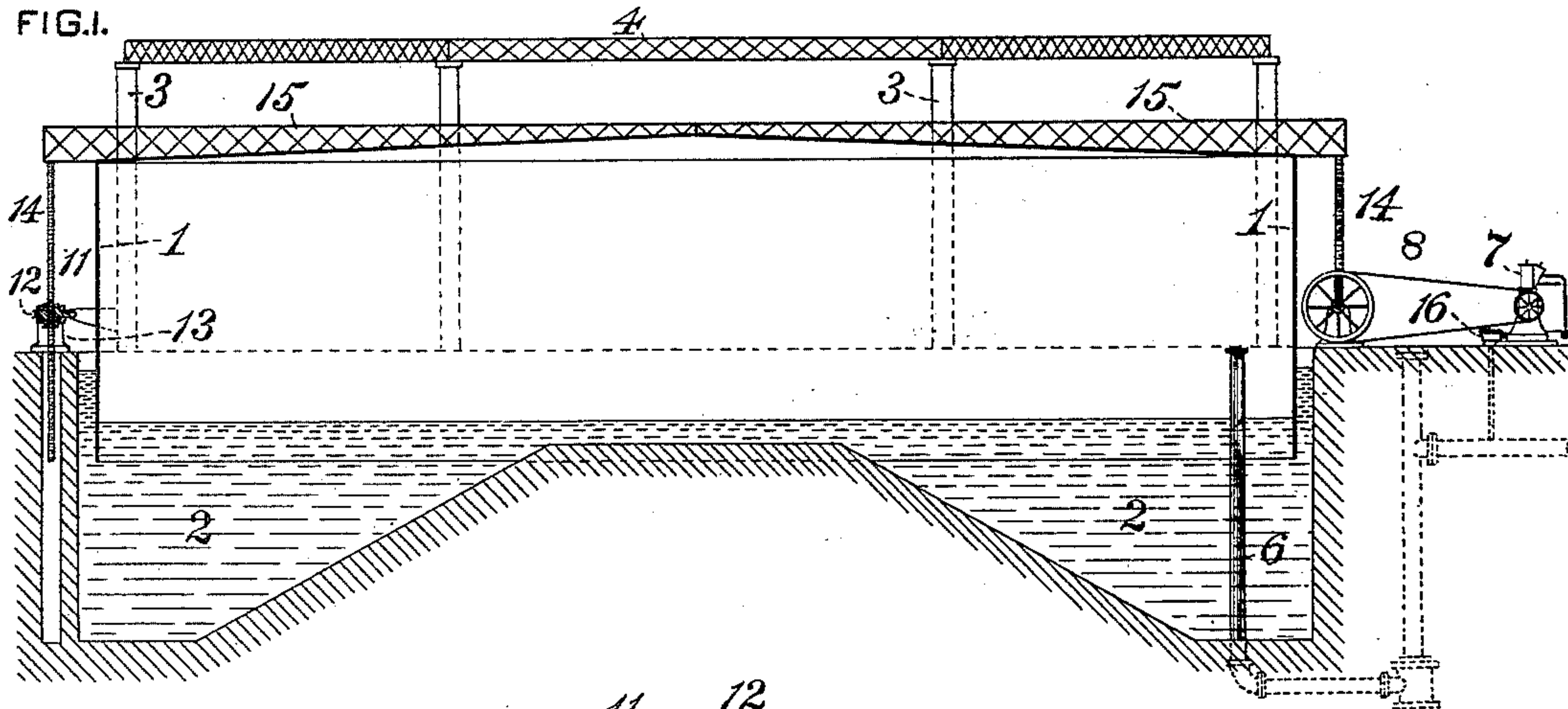
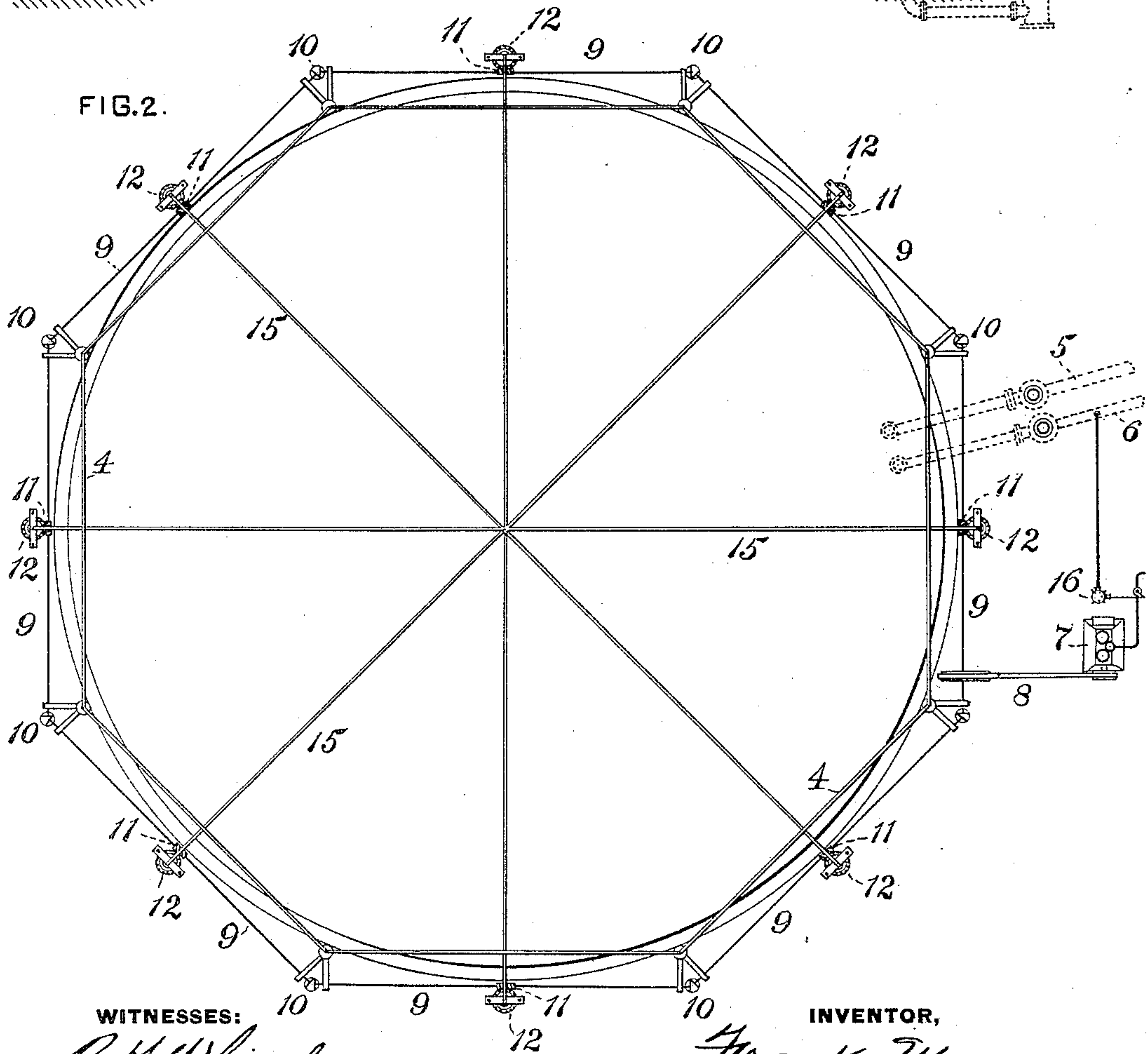


FIG. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK MOORE, OF PITTSBURG, PENNSYLVANIA.

GAS-HOLDER.

SPECIFICATION forming part of Letters Patent No. 442,324, dated December 9, 1890.

Application filed January 2, 1890. Serial No. 335,621. (No model.)

To all whom it may concern:

Be it known that I, FRANK MOORE, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Gas-Holders, of which improvement the following is a specification.

The object of my invention is to increase the available capacity of a gas-holder of determined dimensions, in which heating or illuminating gas is received from a source of manufacture or supply and stored for consumption by the provision of means for the compression of the gas therein to any desired degree.

To this end my invention, generally stated, consists in the combination, with a gas-holder and a tank or hydraulic seal, of mechanism for depressing the holder within the tank by the application of power, in order to effect the compression of volume of gas supplied to the tank.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical central section through a gas-holder, illustrating an application of my invention; and Fig. 2, a plan or top view of the same.

In the practice of my invention the gas-holder 1, which is of the ordinary cylindrical type, is, as heretofore, located in a tank of water 2, and suitably guided, and also counter-balanced, if desired, so as to be adapted to be moved freely up and down within a circular series of posts 3, connected at their tops by bracing 4. An inlet-pipe 5, leading from the source of generation or supply, and an outlet-pipe 6, leading to a delivery or discharge main, extend upwardly through the tank within the holder, their open upper ends being located a short distance above the highest level of the water which is maintained in the tank.

Gas-holders of the above type, as ordinarily constructed, are raised and lowered by the inflow and egress of the gas, in accordance with the varying conditions of supply and delivery, the holder being raised in and by the admission of gas thereto and correspondingly depressed as the gas is discharged, the pressure of the gas being uniformly in accordance with the difference of level of the water in the tank within and without the

holder and with that at which it is delivered to the holder, and no means being provided for increasing the pressure when the holder has been fitted to its maximum capacity.

My invention is designed to render a gas-holder of determined volume available for the supply of a greater volume of gas at any desired pressure than is within the capacity of the holder at such pressure by effecting the compression of the gas within the holder to a correspondingly higher degree. I attain this object by mechanically depressing the holder in the tank, and thereby imparting to the holder the double function of a gas-compressor and a gas-storage receptacle, the holder being similarly elevated after the discharge of a supply of gas preparatory to the reception and compression of a succeeding supply. Any suitable mechanism for effecting the depression and elevation of the gas-holder by the application of power thereto may be employed, and one of several constructions adaptable for this purpose, which is shown in the drawings, will now be described.

The main or driving shaft of a steam-engine 7 or other prime mover, located in convenient proximity to the gas-holder 1, is connected by a belt 8 or by suitable gearing with one of a series of horizontal counter-shafts 9, which are mounted in bearings and arranged in polygonal form around the gas-holder 1, said counter-shafts being connected one with the other, so as to rotate simultaneously, by bevel-gearing 10 or by universal-joint couplings. Each of the counter-shafts 9 carries a worm 11, which meshes with a worm-wheel 12, journaled in a bearing 13, in which it is held as against longitudinal movement and provided with an elongated hub, in which, and in the worm-wheel, there is cut centrally a substantial internal thread. A series of vertical screws 14 is secured to and projects downwardly from a trussed frame 15, fixed upon the top of the gas-holder 1, each of said screws engaging the internal thread of one of the worm-wheels. The rotation of the counter-shafts 9 by the engine in one or the other direction and the resultant rotation of the worm-wheels 12 will impart downward or upward movement, as the case may be, to the screws 14 and the gas-holder, to which they are connected. In order to automatically

regulate the degree of traverse thus imparted to the holder, a pressure-regulator 16, actuated by the pressure of gas in the outlet-pipe 6 of the gas-holder, may be connected to the 5 throttle-valve of the engine, so as to stop the same when the compression of the gas by the downward movement of the holder has been effected to the desired degree.

In operation the gas-holder is raised either 10 by the inflow of gas or by the engine coincidently with the inflow of gas to its highest level, and when filled with gas to its maximum capacity the engine is reversed and the gas-holder is depressed, the supply of gas being 15 continued until the gas is, in and by the downward movement of the holder, compressed to the required degree, when the engine is stopped either by the engineer or automatically by means of the pressure-regulator, and the charge of gas is retained in the 20 holder until delivered for consumption, as required. After the delivery of the charge the gas-holder is again elevated to its highest level, and thereafter similarly depressed for 25 the compression of the next charge. It will thus be seen that the gas-holder and its motor constitute a gas-compressor, by the employment of which the capacity of the gas-holder for delivery at a determined pressure 30 is increased above that due to the volume of the gas-holder proportionately to the degree of compression of the gas effected by the depression of the gas-holder in the tank.

I claim as my invention and desire to secure by Letters Patent—

1. The combination of a gas-holder, a tank or hydraulic seal, and a motor adapted to effect the compression of the contained gas and the depression of the gas-holder in the tank by the application of power to the gas-holder, 40 substantially as set forth.

2. The combination of a gas-holder, a tank or hydraulic seal, a motor adapted to effect the compression of the contained gas and the depression of the gas-holder in the tank by 45 the application of power to the gas-holder, and a regulator actuated by the pressure in the outlet-pipe of the gas-holder and controlling the supply of motive fluid to the motor, substantially as set forth.

3. The combination of a gas-holder, a tank or hydraulic seal, a power-applying motor, a series of counter-shafts rotated by said motor, and gearing through which rectilineal movement is imparted to the gas-holder from the 55 motor through the several counter-shafts, substantially as set forth.

In testimony whereof I have hereunto set my hand.

FRANK MOORE.

Witnesses:

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