No. 615,523. Patented Dec. 6, 1898.

J. M. BOIS.

APPARATUS FOR MANUFACTURING GAS.

(Application filed Apr. 22, 1897.)

(No Model.) 2 Sheets—Sheet 1.

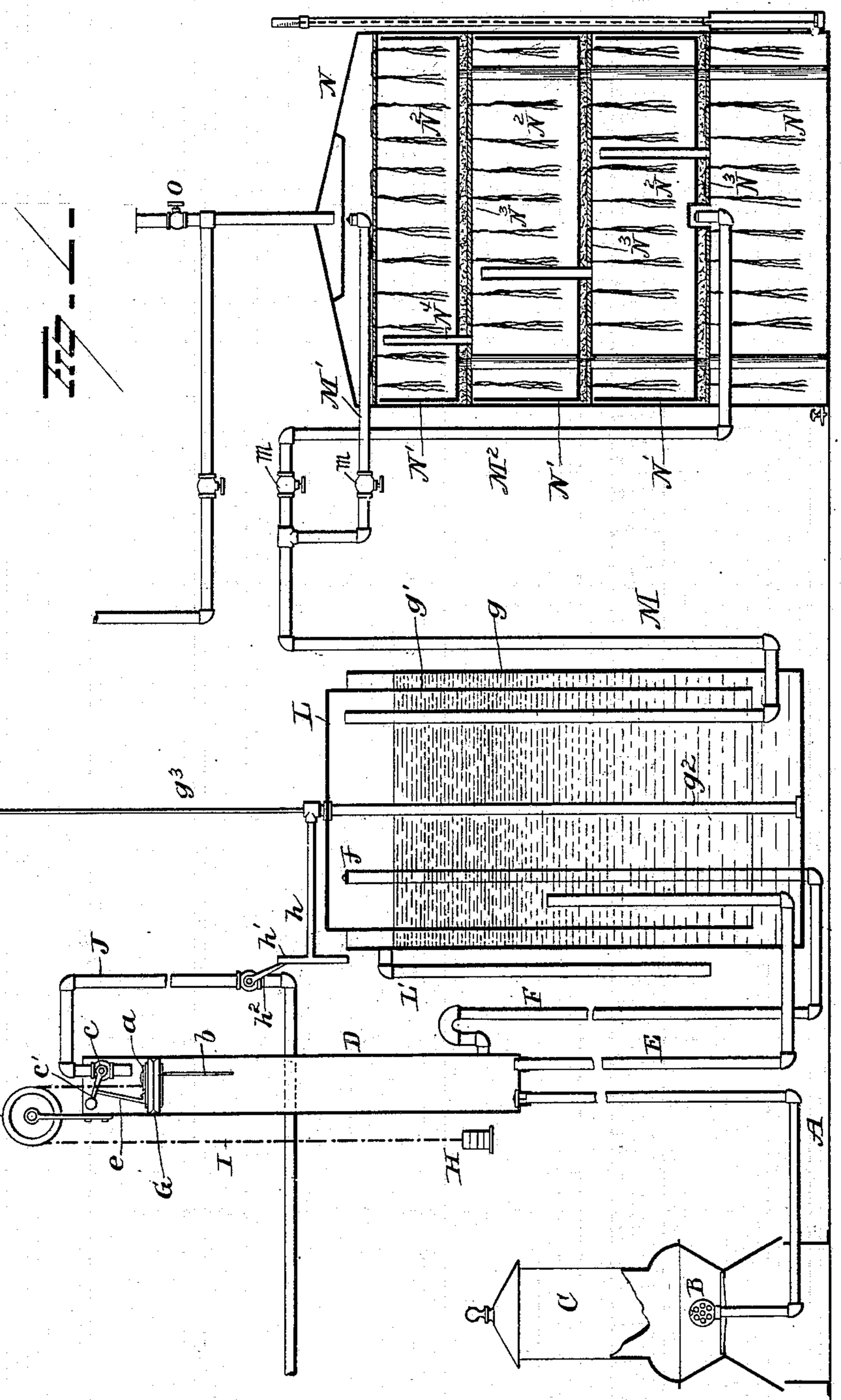

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Fig. 1.

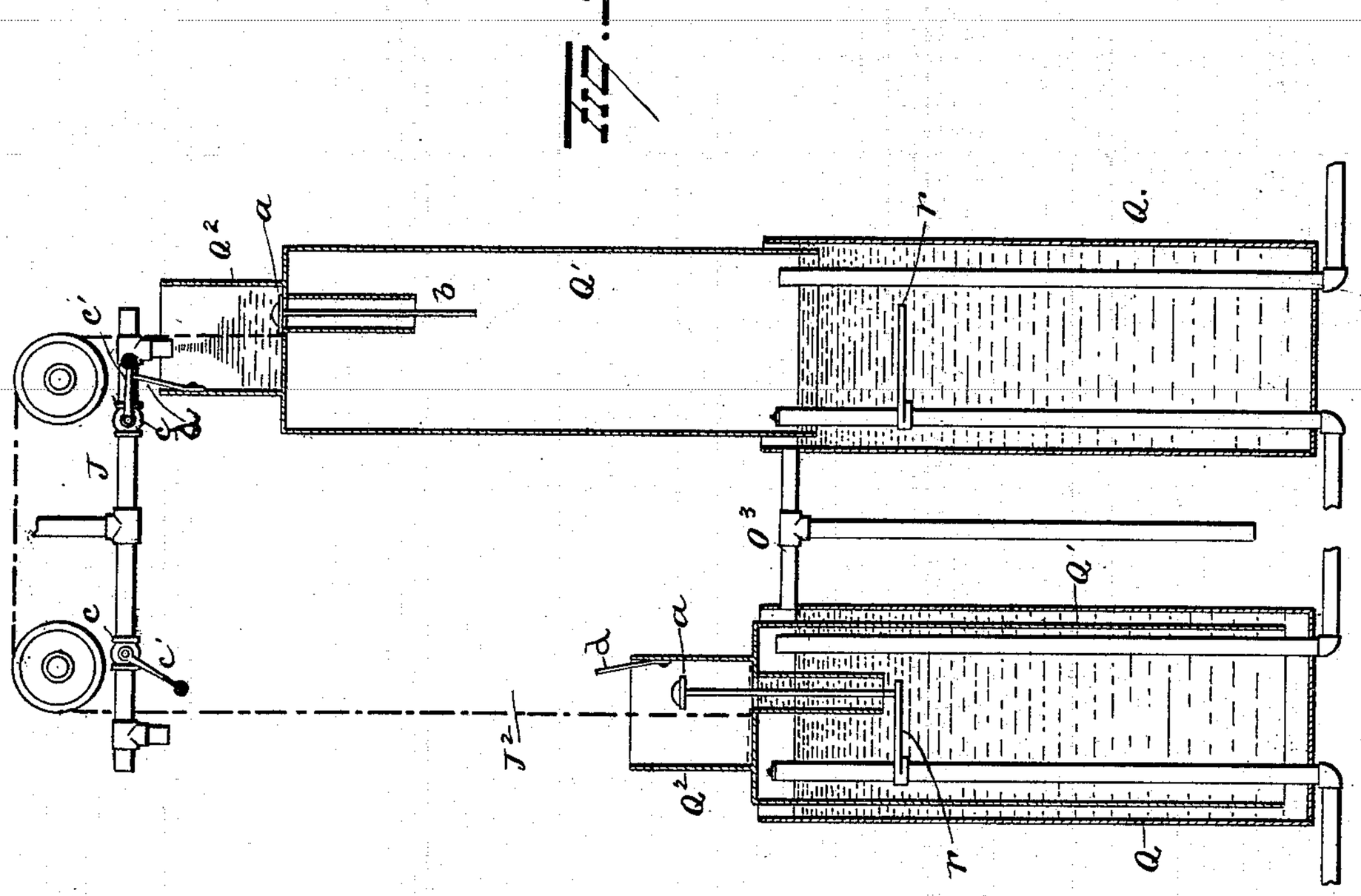
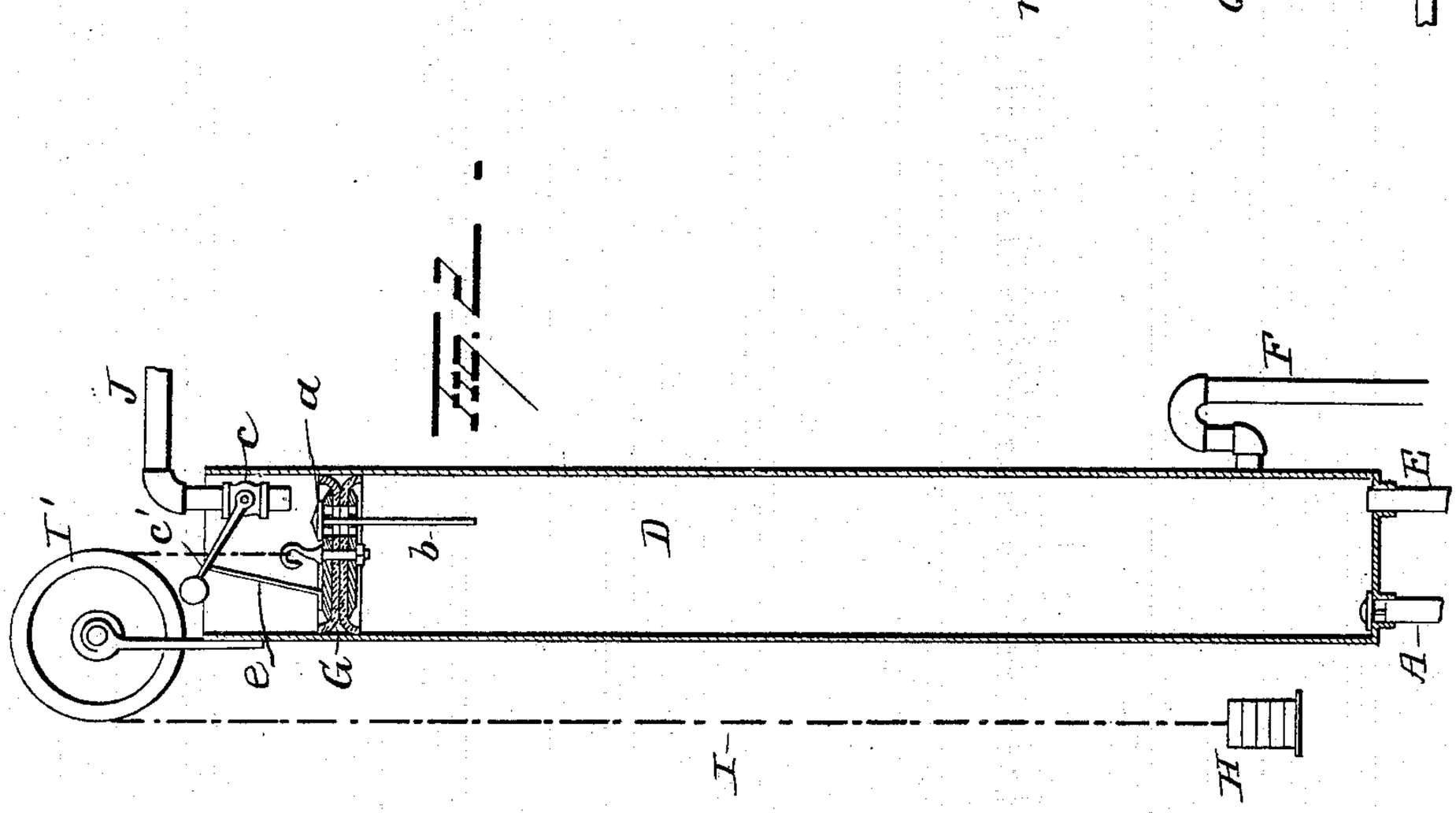


Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 615,523, dated December 6, 1898.

Application filed April 22, 1897. Serial No. 633,385. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. BOIS, of East Aurora, in the county of Erie and State of New York, have invented certain new and useful Improvements in Apparatus for Manufacturing Gas; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in apparatus for manufacturing gas, and is designed particularly for manufacturing gas on a small scale for domestic purposes; and it consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section of my apparatus. Fig. 2 is an enlarged view in section of the air-pump, and Fig. 3 is a similar view of a double-acting pump.

A represents a pipe surmounted at its free end by a hollow perforated ball B, which latter is designed to withstand the heat to which it is subjected and is located centrally within the combustion-chamber of a magazine-stove C. Instead, however, of providing the pipe A with a perforated ball located within the combustion-chamber of a stove or furnace, so as to receive the coal-gas generated from the burning coal, the pipe A may be open to the outer air; but in either event the pipe leads to the base of the pump D. This pump D comprises a cylinder open at its top and provided at its base with the inlet-pipe A and the water-outlet pipe E and at a point above the base with the air or gas outlet pipe F.

Located within the cylinder is the piston G, which latter is provided with an upwardly-opening valve *a*, provided with a depending stem *b*, which latter is designed to engage the base of the cylinder when the valve is in its depressed position and permit the water resting on the piston and valve and which has operated to depress the piston to escape through the piston and pass out of the cylinder through pipe E. This piston G is counterbalanced or slightly overbalanced by the weight H, which latter is secured to the chain I, passing over pulley I′, and secured at its other end to the top of the piston. With this it will be seen that the tendency of the weight always is to hold the piston elevated.

Located over and discharging into the piston is the water-supply pipe J. This pipe is provided with a cut-off valve or cock *c*, carrying the weighted lever *c′*. This lever *c′* tends to close the valve and shut off the supply of water; but as the piston rises the stud *e* thereon engages the weighted lever and turns same, which movement opens the valve and permits a full head of water to flow in on the top of the piston G. The weight of the water resting on this piston overbalances the weight H, thus causing the piston G to descend and forcing the air or coal-gas within the cylinder below the piston through pipe F into the gasometer or storage-tank, the said pipe F discharging above the water in said tank and provided with a valve *f*, which prevents a return of the air or gas into pipe F. As the piston G approaches the base of cylinder D the stem *b* engages said base or a stop located to engage said stem, thus opening valve *a* and permitting the water which operated as a weight to force piston G down to escape into the cylinder, and from thence through pipe E into the storage-tank L, the latter being provided with an overflow-pipe L′, through which the excess of water escapes. As soon as the piston G begins its descent the weighted lever *c′* closes the valve *c*, thus shutting off the water, and as soon as the water which operated as a weight to force the piston downwardly escapes through the piston G the weight H then operates to elevate the piston and open valve *c*. By this arrangement I have provided an automatically-operating single-acting pump which operates to withdraw the coal-gas generated in a stove or furnace or draw in air and force said air or gas into the holder L. This holder L is of the usual form and consists of a cylinder *g*, closed at the bottom and open at the top, and a smaller cylinder *g′*, closed at the top and open at the bottom, the cylinder *g′* being located within the cylinder *g*, the two cylinders being filled with water up to the level of the overflow-pipe L′. Secured to the closed top of the inner cylinder *g′* is the pipe g^2, which latter limits the downward movement of cylinder G′ and also receives the guide-rod g^3, which latter is secured at its ends and oper-

ates to maintain the inner cylinder g' in its proper position relative to the outer cylinder g.

The gas or air, as the case may be, is forced into the holder L and operates to elevate the inner cylinder g'. This cylinder g' carries the rod h, provided on its outer end with an elongated loop h', which latter straddles the cut-off lever h^2 in the water-supply pipe J. Thus when the cylinder g' is in its depressed position the upper end of the loop engages the lever h^2 and opens wide the valve, thus permitting the free passage of water up to valve c. When, however, the pump is supplying more air or gas than is demanded and is being used, the cylinder g' gradually rises, and as it reaches its upper limit of movement the lower end of the loop h' engages the lever h^2, turns same, and cuts off the supply of water, thus temporarily stopping the pump. The weight of the cylinder g' forces the air or gas therein out through pipe M into the carbureter. The pipe M is provided with two branches M′ and M², the former of which leads into the carbureter near the top thereof, while the latter discharges into the carbureter near the bottom. The pipes M′ and M² each have a valve m. Hence it will be seen that by closing one the air or gas may all be passed through the other. Hence if the air is rich in carbon, as it would be if drawn from a stove, pipe M² would be closed, and the air passed through the upper pipe M′ and coming into intimate contact with the vapors of the oil in the carbureter would be sufficiently enriched for all purposes. If, however, the pump is simply supplying air, the air should be discharged through pipe M² into the carbureter at the base thereof. This carbnreter N comprises simply a series of chambers N′, all of which except the lower one are provided with a vessel N² to hold oil. Between the bottoms of these vessels N² and the several horizontal partitions N³ is packed cotton-waste, wicking, or other absorbent, and from each partition N³ depend wads of wicking, terminating in the oil in the vessel or chamber below. Each chamber is provided with a pipe N⁴, discharging into the chamber or compartment below. Hence it will be seen that by introducing oil through the filling-pipe O it discharges first onto the top of the upper compartment and flows from thence through the openings through which the wicks pass into the vessel below. After this vessel becomes full the overflow passes through pipe N⁴ into the vessel next below, and so on until all the vessels and a portion of the lower compartment have been filled. The air passing in contact with the depending wicks and through the partition and waste ascends to the next partition, and so on. By the time it reaches the top it has become thoroughly saturated and is ready for use.

In the construction shown in Fig. 3 I have dispensed with the disk piston shown in Fig. 2 and employ in its stead a cylindrical piston closed at its top and open at its bottom moving within a cylinder closed at its bottom and open at its top, and I have connected the pumps in pairs, so that the descending piston operates to elevate the other. Each pump comprises an outer cylinder Q, open at the top, and an inner cylinder or piston Q′, open at the bottom, the closed top of each piston carrying a receptacle for holding water and provided with a valve a and stem b, as in the construction previously described. The pistons are connected by a chain I², and each receptacle Q² is provided with a stud d for actuating the weighted levers c', connected to the valves c in the water-pipe J. With this construction it will be seen that as one receptacle is filled with water it descends and elevates the other piston. As the descending piston nears the limit of its down movement the stem b of the valve a strikes the bracket or stop r, thus elevating the valve and permitting the water to escape into the vessel Q. While the lower receptacle Q² is discharging its water, the upper receptacle is receiving water, and as soon as it overbalances the lower receptacles it begins it descent, thus elevating the other vessel. The water discharged from the receptacles Q² passes from the tanks Q through the overflow-pipe Q³. With this construction it will be seen that air or coal-gas is drawn into the tanks Q by the suction caused by the pistons ascending and is forced out by the descent of the pistons, thus keeping up a continuous supply of air or coal-gas to the tank L.

It is evident that numerous slight changes might be made in the general form and arrangement of the several parts herein shown and described without departing from the spirit and scope of my invention, and hence I do not wish to limit myself to the precise details of construction shown and described; but,

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for manufacturing gas, the combination with a storage-tank, of a pump comprising a stationary cylinder, a piston therein, a counterbalancing device, a flexible connection between the piston and counterbalancing device, a water-supply pipe for discharging water onto the piston, a valve in the water-pipe and means carried directly by the piston for opening the water-supply valve.

2. In an apparatus for manufacturing gas, the combination with a storage-tank, of a pump comprising a cylinder, an air or gas pipe leading thereto, a pipe leading therefrom, a counterbalanced piston in said cylinder, a valve in said piston, a water-supply pipe having a valve, and means carried by the piston for opening said water-supply valve, substantially as set forth.

3. In an apparatus for manufacturing gas,

the combination with a water-supply pipe having a valve therein, a storage-tank comprising two cylinders, one inverted within the other and water-sealed therein, and a valve-actuating device carried by said inverted tank, of a pump comprising a cylinder, a piston therein, the latter located under the discharge end of the water-pipe, a second valve in said water-pipe, means carried by said piston for opening said second valve, and a valve in the piston for the escape of the water discharged onto said piston, substantially as set forth.

4. In an apparatus for manufacturing gas, the combination with a carbureter, a storage-tank, and pipes connecting the carbureter and storage-tank, of a pump comprising a cylinder, a counterbalanced piston, a water-pipe discharging onto said piston, means carried by the piston for regulating the discharge of water, a valve in the piston, and a pipe connecting the pump and storage-tank.

5. A pump comprising a cylinder, a counterbalanced piston therein, a water-pipe discharging onto the piston, a valve in said pipe, means carried by the piston for opening said valve, and a valve in the piston for the escape of the water above the piston.

6. A double-acting pump comprising two cylinders, pistons so connected that one counterbalances the other, a water-pipe discharging over both pistons, valves in said pipe, means carried by each piston for opening its respective valve, and a valve in each piston for the escape of the water above its piston, substantially as set forth.

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

JAMES M. BOIS.

Witnesses:
C. S. DRURY,
GEORGE F. DOWNING.