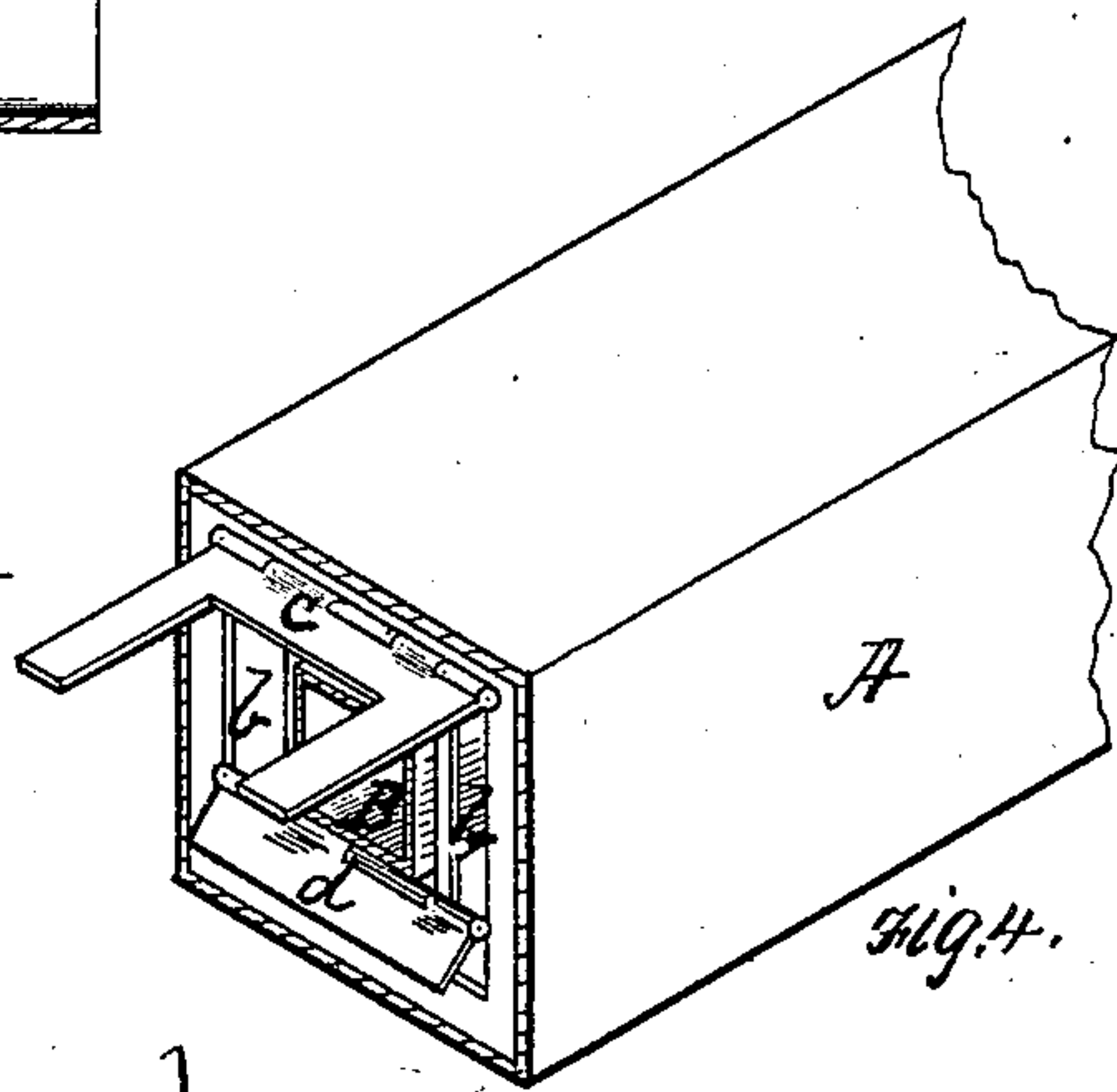
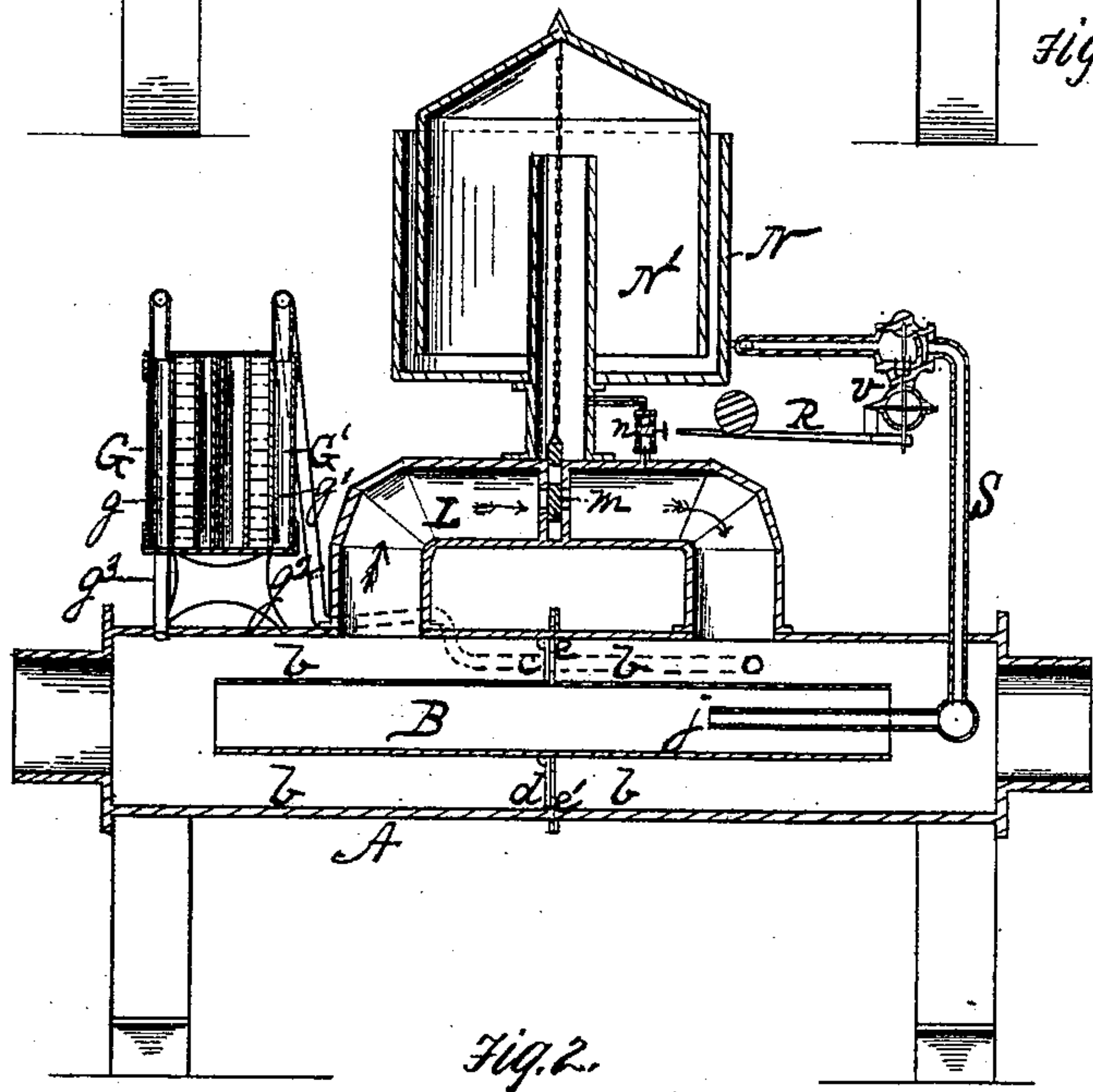
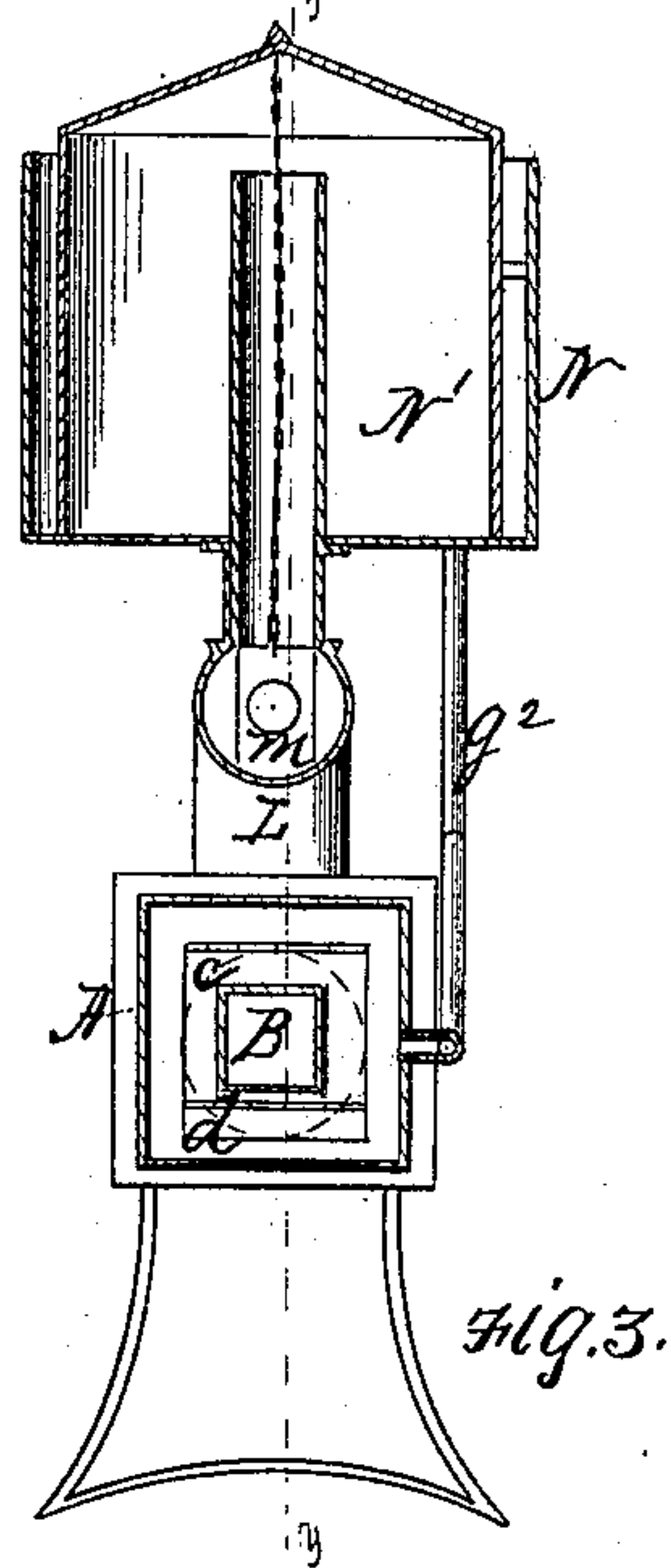
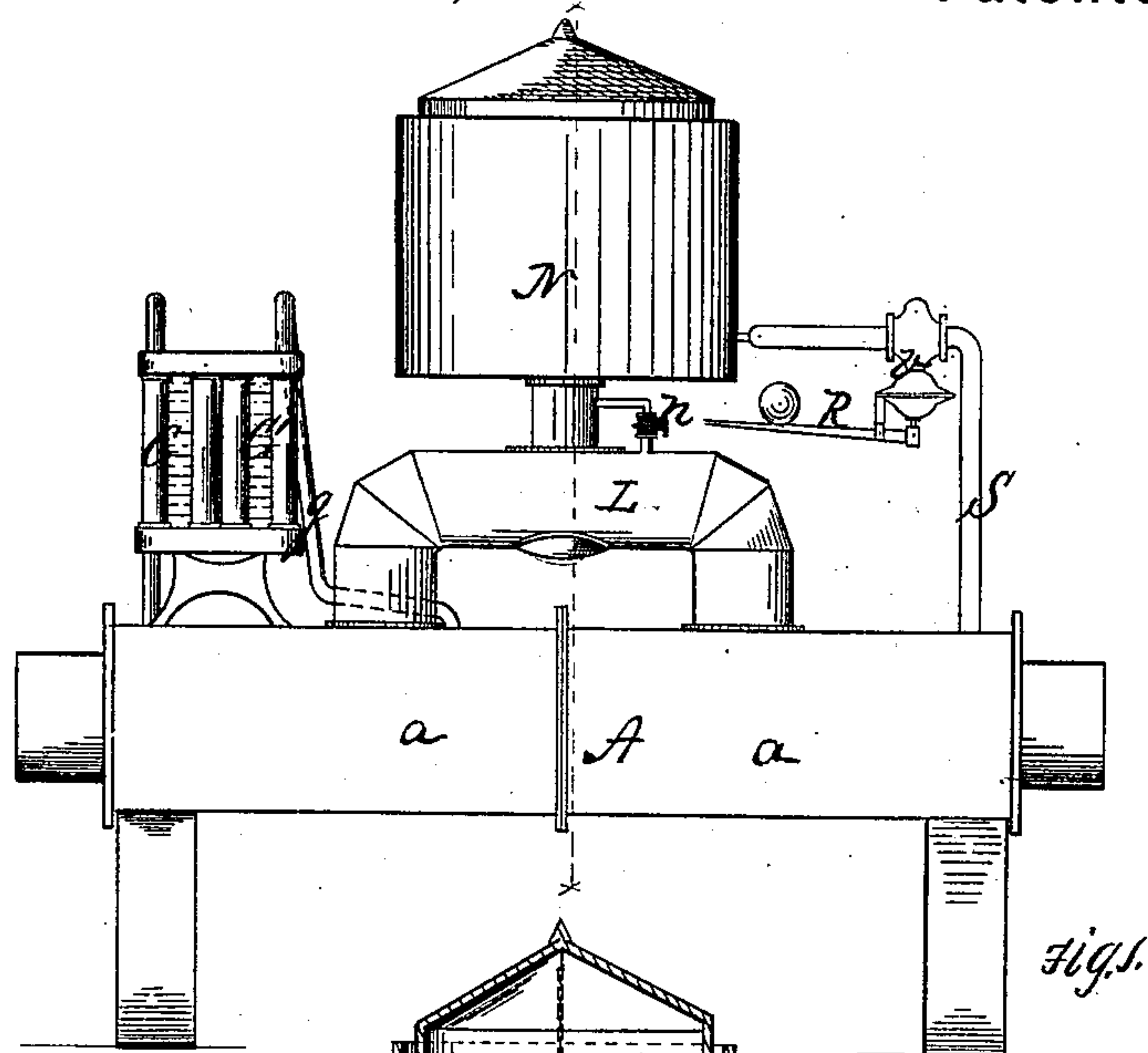


J. S. CONNELLY.
Jet-Exhauster for Gas-Works.

No. 215,723.

Patented May 27, 1879.



Witnesses
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UNITED STATES PATENT OFFICE.

JOHN S. CONNELLY, OF NEW CASTLE, PENNSYLVANIA.

IMPROVEMENT IN JET-EXHAUSTERS FOR GAS-WORKS.

Specification forming part of Letters Patent No. **215,723**, dated May 27, 1879; application filed April 10, 1879.

To all whom it may concern:

Be it known that I, JOHN STORER CONNELLY, of New Castle, in the county of Lawrence and State of Pennsylvania, have invented a new and useful Improvement in Jet-Exhausters for Gas-Works and other purposes; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of devices embodying my invention. Fig. 2 is a longitudinal central section. Fig. 3 is a transverse section on the line *x x*, Fig. 1. Fig. 4 is an enlarged sectional detail view.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of jet-exhaust apparatus for gas-works and for various other purposes where such devices are required; and it consists, first, in the combination of a by-pass exhaust-pipe and suitable valves, the exhaust-pipe and valves being arranged within the by-pass, so that a compact, cheap, and efficient jet-exhaust is obtained; and, secondly, in the combination, with a by-pass and its exhaust-pipe and steam-jet provided with a governing-valve, of a return-pass with its valve and governor, whereby the steam-jet may be set at its full working capacity, and the governor of the return-pass will serve to equalize the exhaust.

Exhaust apparatus for gas-works and for like purposes are of several characters—viz., fans, pumps, jet-exhausts, &c.,—all as at present constructed more or less complicated and expensive. Of these the steam-jet exhaust is perhaps the most desirable for all purposes, but especially for small gas-works, as its first cost is less, it demands no engine or equivalent machinery to operate it, is simple, efficient, and can be operated at little expense; but so far as I am aware the exhaust-tube and by-pass in each and all of the known and recited exhausters have been separate and independent each of the other, thus increasing the bulk of the devices the number of tight joints to be made, and materially adding to the size and to the cost of manufacture.

The object of the present invention is, therefore, to simplify, perfect, and cheapen the construction, and render the devices compact, and therefore more available for small works.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates a tube or pipe of any desired cross-sectional form, but preferably square, composed of any number of longitudinal flanged sections or lengths *a*, and of such diameter as the capacity of the works demands. B indicates a tube of much less cross-sectional area, suspended within the tube or pipe A, and constituting the exhaust-tube, while the space between the tube, as at *b*, constitutes the by-pass.

In order that the by-pass shall be closed when the exhaust is in operation, and at liberty to open when the exhaust ceases to operate, automatic valves are essential, and these I preferably form as flat or swinging valves *c d*, hung so as to open away from the retorts or equivalent point, and having sufficient seats formed by flanges *e e'*, one on the interior of tube A and the other on the exterior of tube B, so as to close and resist back-pressure.

S indicates the steam pipe, which passes through the outer tube, A, and terminates in a steam-jet, *j*, arranged within one end of exhaust-tube B. The steam-pipe at a point exterior to tube A is provided with a valve, *v*, controlled by a scale-beam or balanced lever, R, so that the valve can be set to give any desired pressure of steam to the jet without regard to the fluctuation of pressure in the boiler.

With such devices I employ a return pass or passage, L, with a valve, *m*, connected to a float or cup, N', set in a water-tank, N, the interior of the cup communicating with tube A or L, back of the exhaust, by a pipe, *n*, so that the float or cup N' will rise or fall according to the pressure back of the exhaust, as before specified.

The valve *m*, which may be a perforated gate, used in conjunction with a perforated diaphragm in pipe L, should be so set that the falling of the float N' will open the tube or re-

turn-pass L, and permit the return of the gas from beyond the exhaust, as indicated by the arrows.

The jet *j*, with such devices, will then be set to the full working capacity of the exhaust, or at any desired pressure; and if the gas-supply runs short, or, in other words, if the pressure back of the exhaust decreases, the float will fall, and open valve *m*, permitting the return by return-pass L of sufficient gas to cause the proper working of the apparatus.

G G' indicate pressure-gages of any desired construction, usually of the water-columns *g g*¹, one connected by a pipe, *g*², with the tube A between the exhaust and retort, or its equivalent, and the other connected with the tube A between the exhaust and the delivery by pipe *g*³, so that the pressure existing on both sides of the valves of the by-pass can be readily determined.

The above devices will operate as follows: The jet *j* having been set to give the maximum exhaust desired, and steam having been turned on, the gas will be drawn from the retort (or scrubber or equivalent point,) and forced through exhaust-tube B, entering pipe A at its forward end, the back-pressure serving to keep the valves of the by-pass closed.

The float N', having been properly weighted for the pressure at which the exhaust is to work, will fall when the pressure decreases, and open valve *m* of return-pass L, permitting the return of sufficient gas to cause the proper working of the devices, but as soon as the pressure rises it will actuate the float, which will close valve *m*.

When for any reason the jet is not used, the automatic valves *c c d* of the by-pass are free to swing open and permit the gas to pass, the same as when no exhaust is used.

In the drawings and description I have shown the pipes A B and the jet *j* as square, for I prefer such cross-sectional form; but I do not wish or intend to limit myself to any specific form of cross-section, for, as before indicated, any preferred form may be selected, and will work equally well, the choice of form being a matter of convenience in construction and matter of taste.

Having thus described the nature, advantages, and operation of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a by-pass exhaust-pipe and suitable valves, the exhaust-pipe and valves being arranged within the by-pass pipe, substantially as and for the purpose specified.

2. The combination, with the by-pass and exhaust-pipe, of the steam-jet and its governing-valve and the return-pass and its valve and governor, substantially as and for the purpose specified.

In testimony whereof I, the said JOHN STORER CONNELLY, have hereunto set my hand.

JOHN STORER CONNELLY.

Witnesses:

F. W. RITTER, Jr.,
R. H. WHITTLESEY.