

(No Model.)

J. S. SHRAWDER.
FIRE EXTINGUISHER.

No. 311,204.

Patented Jan. 27, 1885.

FIG. 2.

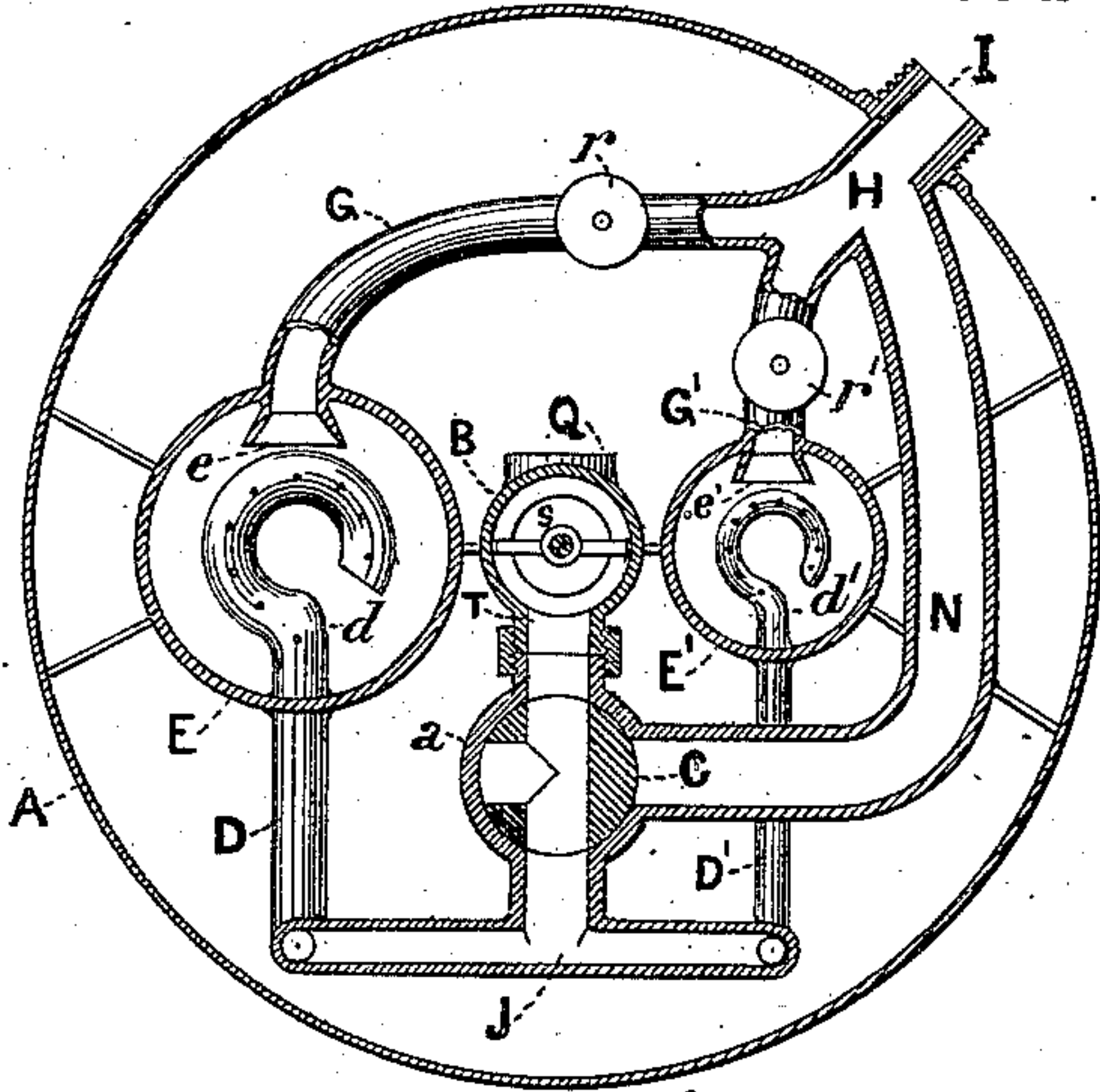


FIG. 1.

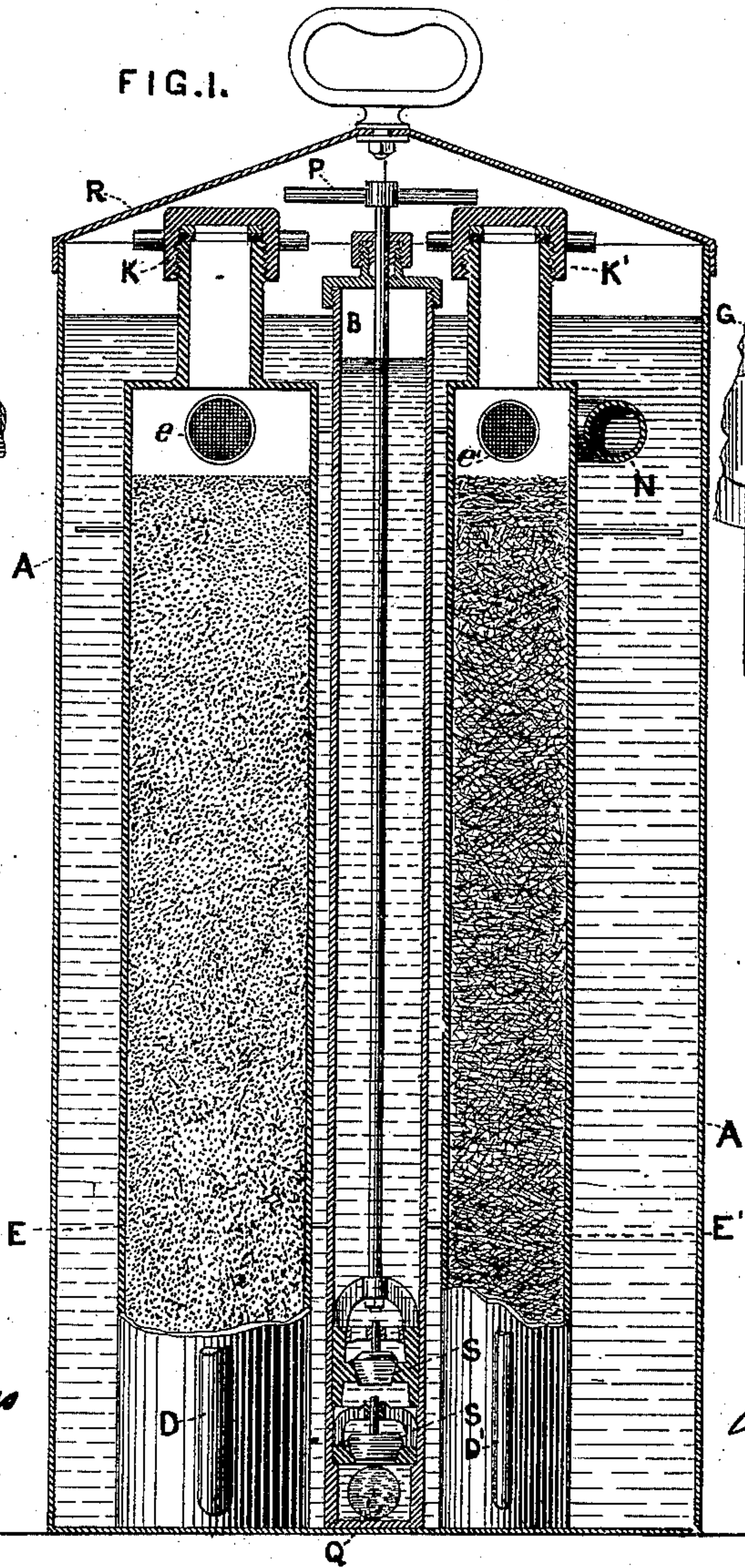


FIG. 3.

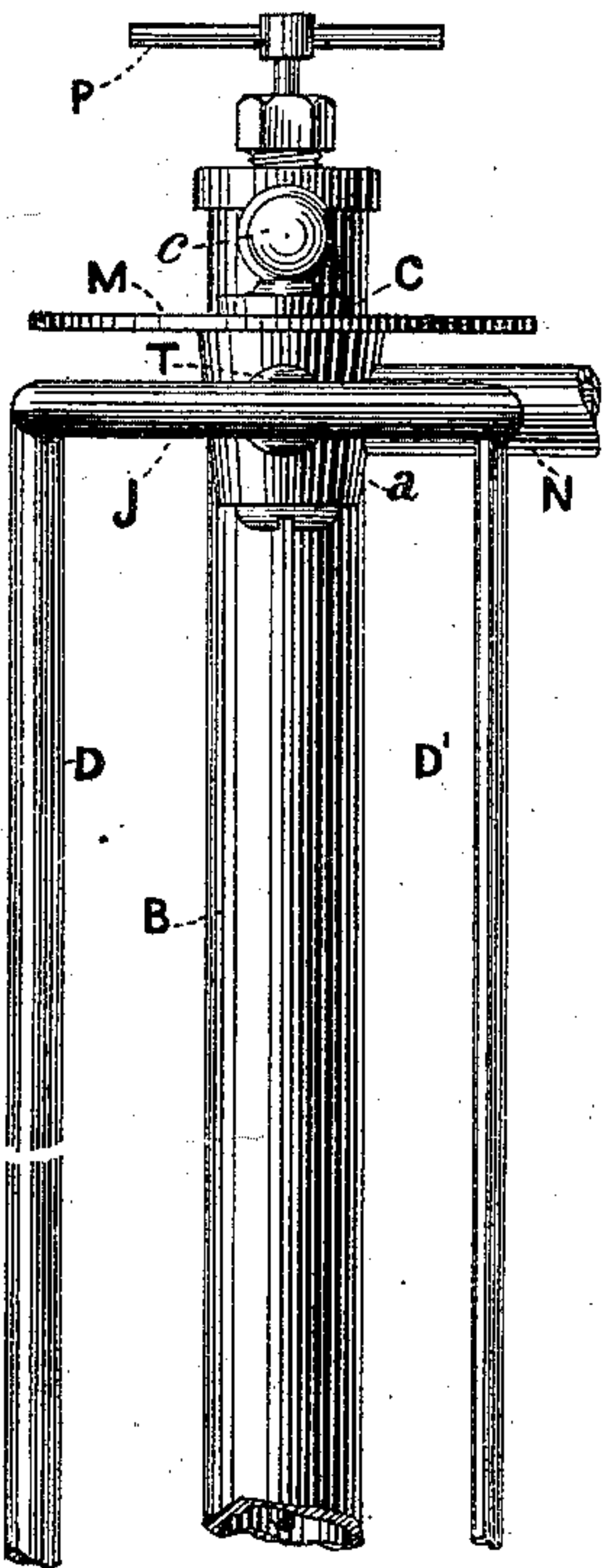
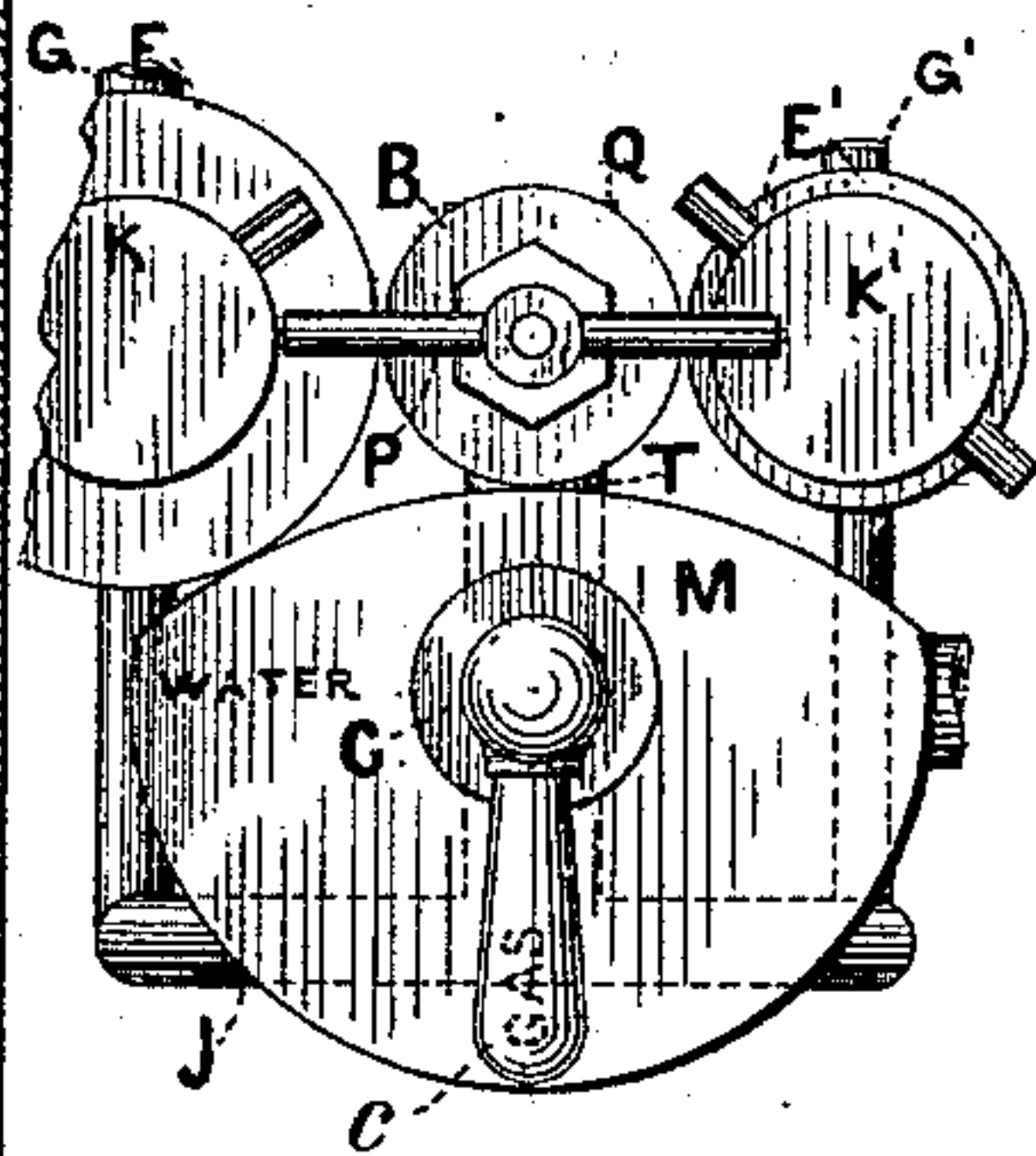


FIG. 4.



WITNESSES:

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FIRE-EXTINGUISHER.

SPECIFICATION forming part of Letters Patent No. 311,204, dated January 27, 1885.

Application filed October 31, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. SHRAWDER, of Upper Dublin, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Fire-Extinguishers.

The following is a specification of my improvements, reference being had to the accompanying drawings, wherein—

10 Figure 1 is a central vertical section through the apparatus. Fig. 2 is a horizontal section through the same on a line with the center of the discharge-nozzle. Fig. 3 is a front elevation of the pump and pipes leading there-
15 from detached from the rest of the apparatus; and Fig. 4 is a top or plan view of the parts indicated in Fig. 3, showing also the position of the cylinders which contain the chemicals.

My invention belongs to that class of fire-
20 extinguishers which make use of carbonated water, or water charged with carbonic-acid gas, to extinguish fire.

It consists in a device whereby a continuous stream of water thrown from a pump, or
25 supplied by other means, may be charged in its passage through the apparatus with the chemicals whose combination will evolve carbonic acid, the solution of the chemicals and their subsequent union being effected just previous to the discharge of the stream. I thus
30 not only free the apparatus from all pressure except that produced by the pump or other means of supply, but by charging the water with the chemicals after it has passed the
35 pump I avoid the corrosion of the valves, &c., which takes place when the solutions themselves are pumped; and I also completely isolate the chemicals from the water-reservoir when the machine is not in use, and thus protect
40 them from dampness and the vessels containing them from corrosion.

To these ends my invention comprises, primarily, the combination of the following elements: A pump or other device for producing
45 a supply of water, provided with two discharge-pipes, respectively connected with two isolated cylinders or vessels for containing in a dry state the chemicals, whose union in solution shall produce the carbonic-acid gas,
50 and separate discharge-pipes, which, after leading from said cylinders, unite in a common chamber adjacent to the nozzle or final dis-

charging-pipe of the apparatus, and means for regulating the supply of water to the respective cylinders. It further comprises the
55 combination, with this principal group of elements, of a means of direct communication between the water-supply pipe and the discharge-nozzle, whereby the stream may be diverted from passing through the chemical-re-
60 ceptacles, thus permitting the use of water alone when desired, and economizing the chemicals for a more urgent moment.

Other novel features of construction and minor details, which will be hereinafter mentioned, are also included in my invention.

The form of apparatus shown in the drawings I deem preferable, as it embodies, in addition to the elements referred to above, and in immediate connection therewith, a water
70 tank or reservoir and a pump; but, obviously, this tank may be dispensed with and the water obtained from any convenient source of supply. Furthermore, the pump shown in the
75 drawings need not be attached immediately to the apparatus, it being only essential that the discharge-pipe of the pump (or of the device whereby the flow of water is produced) be
80 suitably connected with the respective cylinders, so that the two chemical solutions are formed separately, and not until after the water has passed from the pump, &c., and are
85 not brought together for the evolution of gas until after they have emerged from the cylinders and are about to be ejected from the apparatus.

In the drawings, A is a water-tank, of sheet metal, preferably of cylindrical form, and containing within it the other portions of the
90 apparatus. Said tank is provided with a removable cover, R, and should also have a bail or other suitable means for carrying it.

B is a pump-cylinder, having an inlet-pipe, Q, at the bottom of the tank, a handle, P, and valves S, of the ordinary construction.

95 The discharge-pipe T of the pump leads to a chamber, a, in which is a three-way cock, C. When in the position shown in Fig. 2, the passage in this cock C leads to a cross-pipe, J, branching in each direction and communicating with the pipes D and D', which pipes D
10 D' differ in caliber for a reason and in a proportion to be hereinafter explained. The pipes D D' descend to the bottom of the ap-

paratus and enter the lower ends of the cylinders E E', respectively, where they terminate in perforated discharge-nozzles *d d'*. The cylinders E E' are preferably constructed of copper, or some metal not easily oxidized, and their respective capacities differ in the same proportion as the pipes D D'. Openings are provided at the top of the cylinders for charging them with chemicals, and these openings are tightly closed by means of screw-caps K K', respectively, having washers of rubber or other suitable material. Near the top of the cylinders E E' are discharge-pipes G G', respectively, whose orifices are protected by wire-gauze screens *e e'*. These discharge-pipes are provided with check-valves *r r'*, of the usual construction, to prevent backflow into the cylinders, and thence lead to a pipe, H, which forms what may be termed a "combining-chamber," the continuation I of this pipe H being the discharge-nozzle of the apparatus, to which a hose may be coupled, if desired. This discharge-nozzle I is also provided with a secondary supply-pipe, N, which leads there-to from the chamber *a*, the communication being thus direct between the pump and the discharge-nozzle I when the three-way cock C is turned at right angles to the position shown in Fig. 2, and the passage of the water through the cylinders being thus prevented.

As a convenient means of indicating the position of three-way cock, I provide a dial-plate, M, having the words "Gas" and "Water" inscribed at the respective points over which the handle *c* of the cock C stands when the water is passing through the cylinders, or direct to the nozzle I.

The difference in size of the cylinders E E' and their connections is determined by the respective and proper proportions of the chemicals used to evolve the carbonic-acid gas, the combined capacities of the two inlet-pipes D D' being not substantially greater than the capacity of the pump-discharge pipe T.

I prefer to employ bicarbonate of soda and oxalic acid, both in crystals, in which case the quantity of acid proper to decompose a given quantity of bicarbonate is in the ratio of about four to one of the latter, and the cubic capacity of the parts referred to is therefore in that proportion. In cases, however, where it is desired to use other chemicals, the relative proportions should be varied to correspond with the necessary bulk and solubility of each.

To prepare the apparatus for use, the larger cylinder E is charged with the carbonate of soda and the smaller cylinder E' with the oxalic acid. The caps K K' are then screwed tightly on and the tank A is filled with water.

To insure the dryness of the contents of the cylinders, the handles of the three-way cock C should be turned over the mark "Water" on the dial M, as this cuts off all communication between the pump-chamber and the cylinders.

When it is desired to use the apparatus, the three-way cock C is turned into the position shown in Figs. 2 and 4 (the handle *c* being then over the word "Gas" on the dial M) and the pump is actuated. The water thus pumped is forced in separate streams into the cylinders E E', and in their passage through the chemicals contained in each these streams take up, respectively, the proper amounts thereof, the loose mass of crystals affording but little resistance to the flow. On rising to the top of the cylinders the solutions of salt and acid pass out, respectively, through the pipes G and G', the screens *e e'* preventing the passage of any foreign matters which might clog the pipes. The two solutions then meet in the chamber H, where they combine and produce the carbonic-acid gas, with which the water prior to its exit from the nozzle I is charged. Should it be desired to throw a stream of water alone, the cock C is turned until the handle is over the mark "Water" on the dial, whereupon the stream passes direct from the pump to the nozzle I; but at any moment the stream may be instantly changed to a carbonated one. This capacity of the apparatus is highly useful, as it permits the operator to economize the chemicals when it is found that a water stream is sufficient, still keeping the gas-generator in readiness for immediate use, should the emergency arise.

I am aware that it is not new to construct fire-extinguishers with duplicate reservoirs for chemicals, each of which is intermediate between the water-supply and the nozzle, such an arrangement being shown in Letters Patent No. 97,894, dated December 14, 1869. The reservoirs in said patent were not, however, intended for simultaneous passage of the water stream, the object being merely to provide a second reservoir to use after the first should be exhausted; nor is the said device capable of use in the manner above set forth, as essential to my invention, since the inlet-pipe of each of said duplicate reservoirs was necessarily equal in size to the main supply-pipe, and consequently the water stream could not be divided so as to pass simultaneously through both, but would take the first course through one alone.

In my invention the relative sizes of the inlet-pipes and main supply-pipe are such that the water stream must be divided so as to pass simultaneously through both cylinders.

Having thus described my invention, I claim—

1. The combination, in a chemical fire-extinguisher, of the following elements: a pump for supplying water, a discharge-pipe leading therefrom to two separate inlet-pipes whose combined capacity is not substantially greater than the capacity of said discharge-pipe, two chemical-reservoirs into which said inlet-pipes, respectively, lead, and two separate exit-pipes leading from said reservoirs and uniting in a common discharge-nozzle, said elements

being arranged (with reference to the travel of the water stream) in the order mentioned, and for the purposes set forth.

2. The combination, in a chemical fire-ex-
5 tinguisher, of the following elements: a tank,
a pair of chemical-reservoirs within said tank,
but isolated therefrom and from each other, a
pump having an inlet communicating with
said tank, and separate supply-pipes which
10 lead into said reservoirs, separate exit-pipes

leading from said cylinders, a combining-
chamber into which said exit-pipes lead, and a
final exit-pipe adjacent to said combining-
chamber, said tank forming an inclosure for
the other elements of such combination, sub- 15
stantially in the manner specified.

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Witnesses:

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