

(No Model.)

E. B. BADLAM.

DEVICE FOR SUPPLYING AND MEASURING AIR FOR CARBURETORS.

No. 414,276.

Patented Nov. 5, 1889.

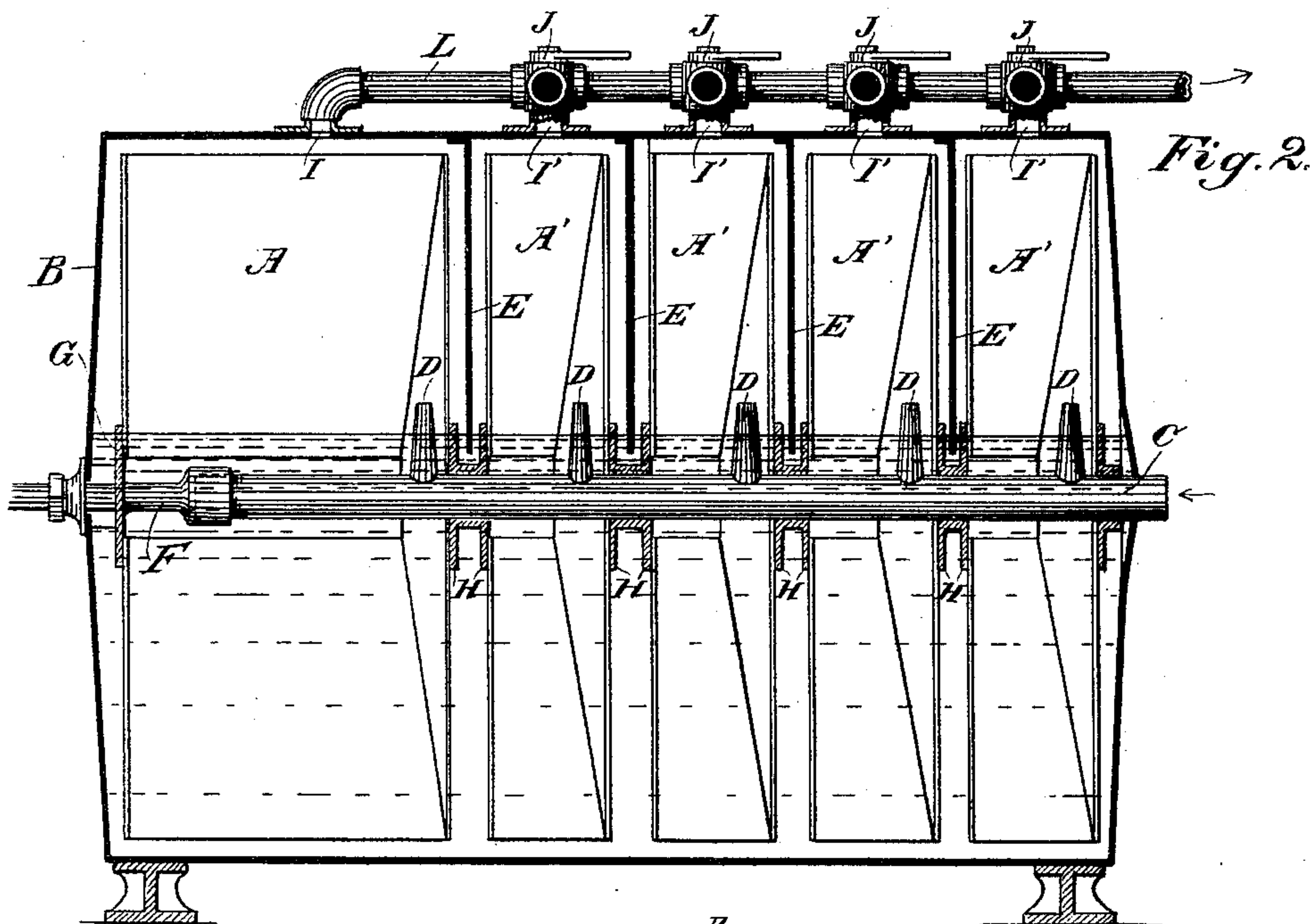
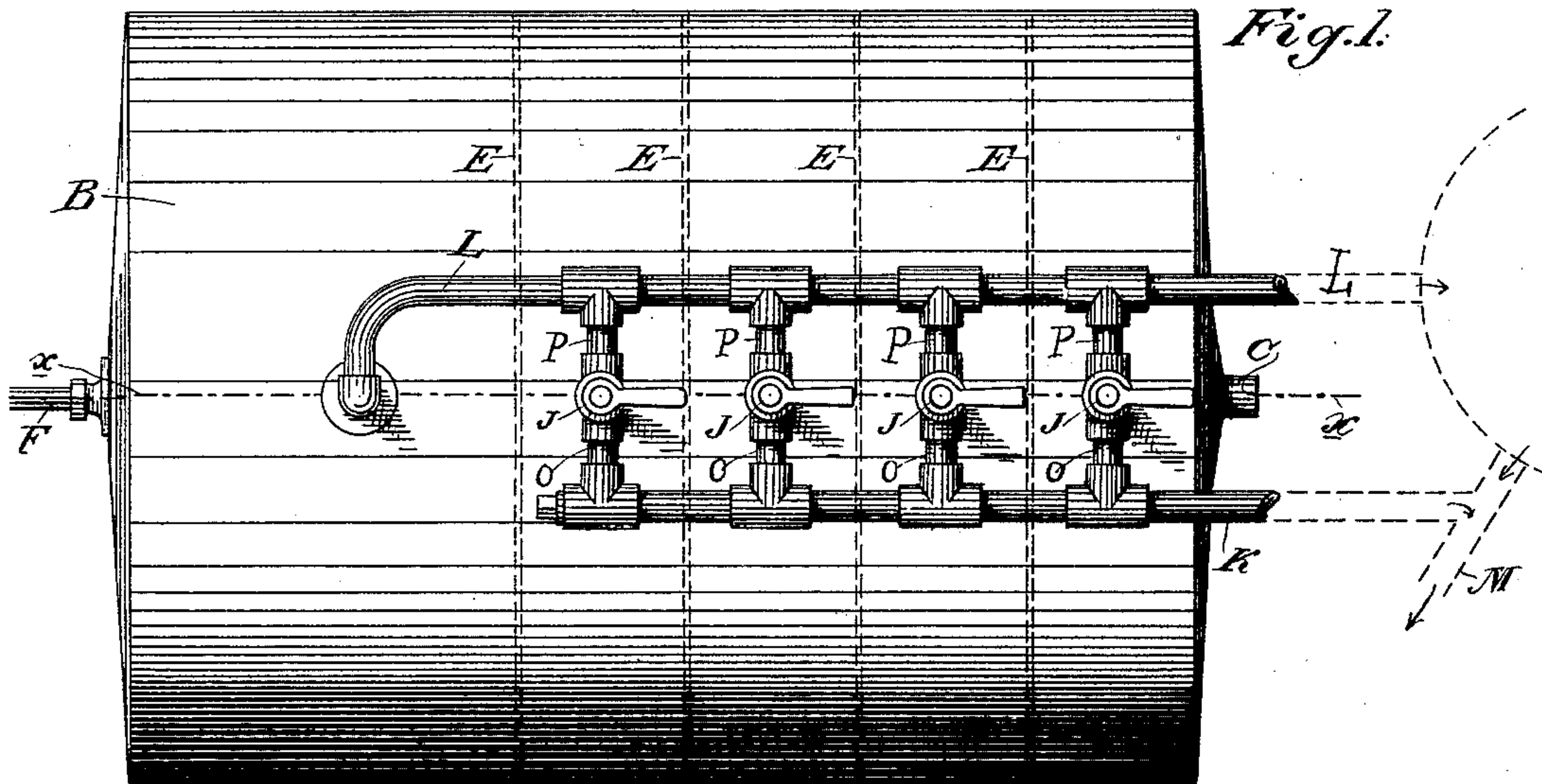
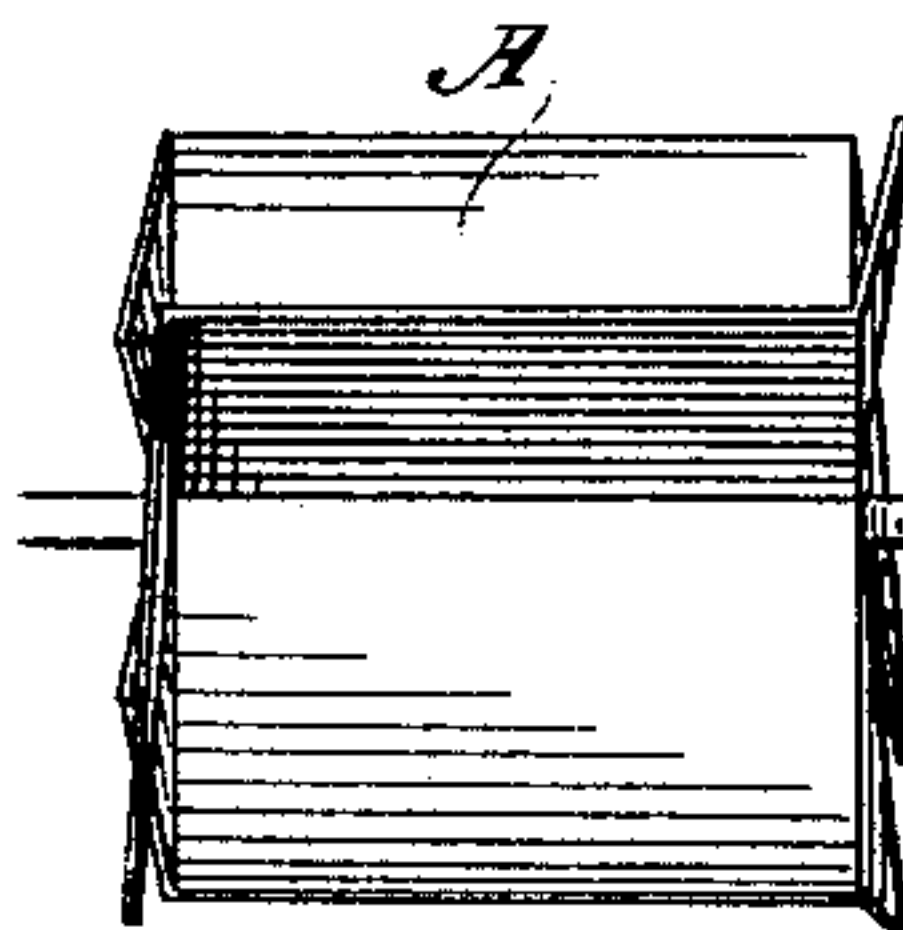


Fig. 3.



Witnesses,
Geo. H. Strong
R. H. House

Inventor,
Edgar B. Badlam
By Dewey & Co.
attys

UNITED STATES PATENT OFFICE.

EDGAR B. BADLAM, OF SAN FRANCISCO, CALIFORNIA.

DEVICE FOR SUPPLYING AND MEASURING AIR FOR CARBURETORS.

SPECIFICATION forming part of Letters Patent No. 414,276, dated November 5, 1889.

Application filed June 14, 1889. Serial No. 314,292. (No model.)

To all whom it may concern:

Be it known that I, EDGAR B. BADLAM, of the city and county of San Francisco, State of California, have invented an Improvement in Devices for Supplying and Measuring Air for Carburetors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a machine for proportioning the mixture of air and hydrocarbon gases. It is employed in connection with carburetors in which an inflammable vapor or gas is produced by passing air through the light gasoline or naphtha, this vapor, when properly mixed with atmospheric air, being suitable for illuminating purposes. It is a well-known fact that vapor produced from the liquid, when air is first passed through it, is very much richer and stronger than it is after a considerable amount of vapor has been taken away, and that in order to properly burn this vapor and make an equable and steady light it is necessary to mix a suitable proportion of air with the vapor, this proportion of air being greater as the vapor is richer and being reduced as the vapor becomes more impoverished.

The object of my invention is to provide an apparatus by which a variable amount of air may be accurately supplied to the carburetor and another volume simultaneously mixed with the vapor after this has been produced from the carburetor, the amount being increased in one instance in proportion as it is decreased in the other.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a plan view showing its connection with the carburetor and house-pipes. Fig. 2 is a vertical section taken through the air-pumping mechanism in the line $x x$, Fig. 1. Fig. 3 is a side view of one of the pumping-wheels.

My air-pumping mechanism consists of a number of wheels known as "meter-wheels" A A', which are arranged to revolve together in a hermetically-sealed case B, turning upon a stationary central pipe C, which extends longitudinally into the case, as shown, and which also serves as a common inlet or supply pipe for the air by means of the vertical

pipes D, which extend upwardly from this central supply-pipe, their upper ends being above the surface of the water in which the wheels revolve. These wheels are separated by partitions or diaphragms E, which are fixed in the upper part of the exterior case and extend downward between each of the wheels to a point below the surface of the water, so as to hermetically seal the air spaces or compartments surrounding each wheel. The wheels are driven by means of the shaft F, passing through the head of the case opposite the ends through which the supply-pipe enters, this shaft being connected with the flange G upon the end of the first wheel A, so as to cause it to revolve. The following wheel A' is driven from the wheel A by means of a double flange H, one head of which is fastened to the adjacent end of each of the wheels A A'. The succeeding wheels A' are in a similar manner driven by flanges fastened to them, as shown, so that the whole of the wheels are caused to rotate simultaneously, and when rotating will draw the air in through the supply-pipe above described, and will discharge it at the opposite face from which it enters, each wheel drawing in its own supply of air and discharging it within its own inclosing compartment, and thence through pipes, to be hereinafter described. These wheels are made of sheet metal, and may be of any suitable design, but preferably with an interior arrangement of wings which form a spiral or helix, so that when properly immersed in the liquid and revolved in the proper direction they will create a partial vacuum in the interior space, drawing air in through the supply-pipes. By the spiral arrangement of the wings within the wheels the air is confined above the surface of the water and is forced along and discharged into the compartments of the case, whence it escapes through pipes at I I'. Connected with these pipes are the three-way cocks J, of the usual or any suitable construction, whereby the air may be passed through the same and discharged into either the pipe K or into the pipe L, as may be desired, through the pipes O P.

The pipe L receives the air from the larger air-forcing wheel A and leads it directly to

the carburetor, which may be at any suitable or convenient distance from the house, and is usually buried in the ground. The carburetor being no part of my present invention, I have only indicated its existence. The air discharged from the main wheel A passes through this pipe L and is charged with vapor within the carburetor, being thence brought back by another pipe or main M to the house or place where the vapor is to be used. The pipe K opens into this supply-main, which leads to the burners, and it will be manifest that the cocks controlling any number of the air-forcing wheels A may be set so as to discharge air from this pipe K and into the supply-pipe M from the carburetor, or the vapor and air may be mixed in the larger chamber and afterward passed through the supply-pipe to the burners.

By means of the three-way cocks or equivalent controlling device the air from each of the wheels A' can be turned into the pipe L, joining air from the wheel A, and all being conveyed to the carburetor, or the air from each or all of the wheels A' may be discharged into the pipe K to be mixed with the vapor which arrives from the carburetor in any desired proportion.

The operation of the machine will then be as follows: When the liquid is new and strong, the air which is forced through the carburetor will carry a large proportion of the vapor for some time. Suppose that two feet of air will carry one foot of the vapor from the carburetor. This foot of vapor may be burned so as to produce a good and clear light through any burner—such as a six, eight, or ten foot burner; but in order to do this it must be mixed with such a proportion of air in each case as to fill the burner—that is to say, for an eight-foot burner six feet of air must be added, for a ten-foot burner eight feet of air, and so on. If it were burned in a burner without this proportion of air, it would make a smoky flame, which would not be desirable. It is therefore necessary to add a proportion, as, say, for an eight-foot burner of six feet of air to the vapor which has been taken up by the two feet of air forced through the carburetor by the wheel A. This proportion is supplied by turning the cocks of as many of the wheels A' as will be necessary to give the proportion desired, and this air is then introduced into the pipe or chamber which is receiving the carbureted air from the carburetor. As the vapor-bearing liquid becomes less volatile it will require more air to take up one foot of vapor in the carburetor, and at the same time a correspondingly less amount of air must be supplied to mix with the vapor after it has been carried off through the carburetor in order to maintain a proper proportion at the burner. It will be seen that this proportion is readily maintained by adding the air of one or more of the wheels A'

to that which is being forced into the carburetor from the wheels A by turning the three-way cocks connecting with the chambers of these wheels, so as to discharge therefrom into the pipe L, which conveys it to the carburetor, and a corresponding amount of air is thus shut off from the pipe K, which leads to the burner-supply main. In this manner the proportion of vapor and air is always maintained exactly for any number of burners, and the proper candle-power and illuminating qualities are satisfactorily maintained until the volatile liquid has been exhausted.

It will be manifest that various forms of air forcing and pumping mechanism may be employed in place of the wheels herein described; but these are simple, easily operated, and not liable to get out of order.

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

1. In a gas-machine, the combination, with the carburetor, pipes leading into said carburetor to bring air thereto, and a pipe leading from the carburetor, of a series of air-forcing devices operating in separate chambers, pipes leading from said chambers to the carburetor and to the burner-main, and three-way cocks or valves connected with said discharge-pipes and opening into the carburetor and into the main through which the carbureted air or gas is conveyed to the burners, substantially as described.

2. In a gas-machine, a series of air-forcing devices with their separate and independent reservoirs and pipes leading therefrom, three-way cocks connected with said pipes and also with the pipes K and L, a carburetor with which the pipe L connects, and a main through which the carbureted air is conveyed to its point of consumption, the pipe K being connected with said main, substantially as and for the purpose herein described.

3. In a gas-machine, the carburetor, the supply-pipe through which air is delivered into said carburetor, and a main through which the enriched or carbureted air is conveyed for consumption, in combination with a series of air-forcing mechanisms connected so as to operate simultaneously and located in independent air-receiving chambers, and three-way cocks connected with each of said independent chambers and also with the supply-pipe leading to the carburetor and with a pipe which leads directly to the main from the carburetor, whereby the proportion of air supplied to the carburetor and the main may be regulated, substantially as described.

In witness whereof I have hereunto set my hand.

EDGAR B. BADLAM.

Witnesses:

S. H. NOURSE,
H. C. LEE.