

No. 711,010.

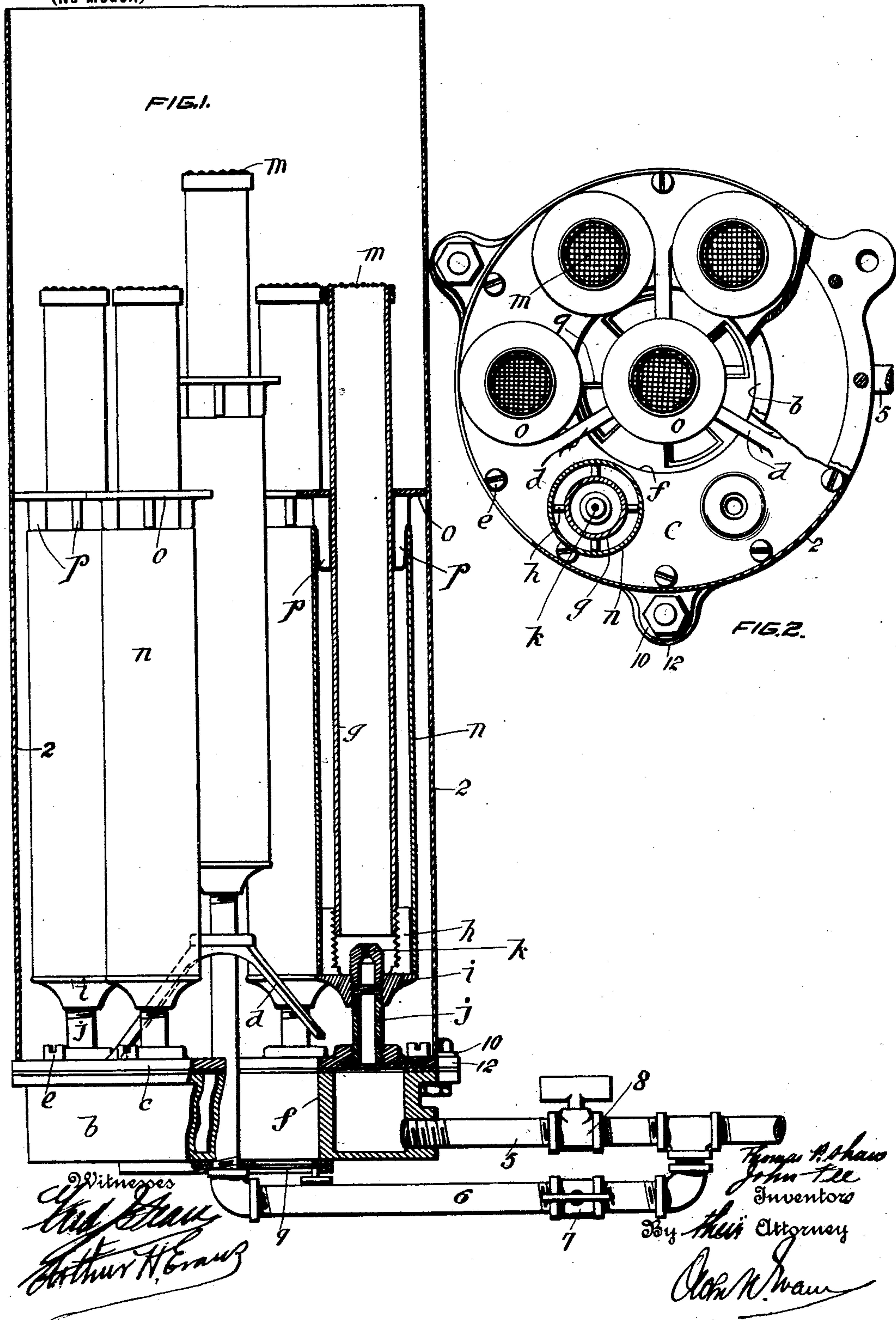
Patented Oct. 14, 1902.

T. P. SHAW & J. FEE.

GAS FURNACE.

(Application filed Nov. 26, 1900.)

(No Model.)





# UNITED STATES PATENT OFFICE.

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## GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 711,010, dated October 14, 1902.

Application filed November 26, 1900. Serial No. 37,843. (No model.)

*To all whom it may concern:*

Be it known that we, THOMAS PATTON SHAW and JOHN FEE, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Gas-Furnaces; and we do hereby declare that the following is a full, clear, and exact description of the same.

Our invention relates particularly to furnaces for use in water-heaters; and it has for its object to provide a burner that will secure perfect combustion and be proof against back-flash.

Our improved furnace may be said briefly to comprise one or more independent burners, each consisting of a tube constituting a mixing-chamber and having its lower open end set preferably adjustably over a gas-tip, a baffle for deflecting a current of air into said lower end of the tube, and preferably a wire-gauze cap for the upper end of said tube, said baffle being preferably in the form of an annular plate, which we prefer to locate a short distance from the top of and closely encircling said tube, while a second tube, of greater diameter than said mixing-chamber tube and of preferably less diameter than the annular baffle, extends from a short distance below said baffle to a short distance below the gas-tip, and the lower end of the latter tube is closed. The series of these burners are preferably arranged in a cluster, although obviously a single one can be used to advantage under certain conditions, and a single burner or the series are located in a cylindrical section having its upper end open and its lower end preferably closed and formed with a valve-controlled opening to constitute a furnace.

For full comprehension, however, of our invention reference must be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate the same parts, and wherein—

Figure 1 is a side elevation of our improved furnace, partly in section. Fig. 2 is a plan view thereof, also partly in section.

The base of our improved furnace consists, preferably, of an annular dish *b*, having an annular capping-plate *c*, from which a tripod-bracket *d* projects, the capping-plate being

secured to the dish by a series of screws *e*, while a gas-supply pipe 5 leads to the interior of the base, a branch 6 thereof extending upwardly through the central opening *f* therein (which is controlled by a damper 9) to the center of the tripod, and a series of tapped borings are formed in the capping-plate.

Each independent burner consists of a central tube *g*, having its lower end externally screw-threaded to take between the screw-threaded inside faces of a series of vertical arms *h*, integral with a disk *i*, rigid upon the upper end of a short length of gas-pipe *j*, having its lower end exteriorly screw-threaded. The disk has a central tapped perforation communicating with the upper end of said short length of pipe, which receives the gas-tip *k*, and the upper end of the tube which constitutes a mixing-chamber has a wire-gauze cap *m* thereon. The function of the screw-thread connection between the tube and its carrying part is to enable the draft of air admitted at the intake-port between the lower end of said tube and the disk *i* to be regulated. When our improved furnace is used for generating heat in a water-heater, to which use it is particularly adapted, the tendency of the upward draft in said heater is to pass the intake-port. To obviate this, we provide a baffle, and to enable the air to be heated before it reaches said port a tube *n*, of greater diameter than said tube *g*, is stretched or jammed over the arms *h* at its lower end and into tight engagement with the disk *i*, which closes it. The baffle is constituted by an annular plate *o*, closely fitting the outside of the tube *g* and being of an outside diameter greater than the tube *n*, while a series of arms *p*, integral with said baffle, project downwardly therefrom and have their lower portions diminished to fit tightly into the upper end of said tube *n*, thereby supporting the baffle a short distance above said tube and serving to deflect a portion of the upward draft of air into the upper intake-port therebetween and the top of the tube *n*. The air thus admitted will be drawn downwardly between the mixing-chamber and the air-tube *n* to the lower intake-port and the mixing-chamber, where it mixes with the gas



escaping from the tip and is burned therewith in a blue flame at the gauze-covered upper end of the burner. After the burner has been acting for a short time the mixing-chamber and air-tube will become heated, and consequently the air passing downwardly therebetween will also become heated and be supplied in that state to the burner. A series of preferably seven of these burners are used in the construction illustrated, six having the screw-threaded lower ends of the short lengths of gas-pipe *j* screwed into the tapped borings in the capping-plate of the base, while the seventh is similarly mounted upon the tripod-bracket and extends above the others. A cylindrical section 2 closely encircles the cluster of burners and has its lower end secured by lugs 10 to lugs 12 upon the sides of the top of the base, which closes said lower end, while its upper end is open. The branch pipe 6 is provided with a valve 7, and the main-pipe length 5 has a valve 8 between the point of connection of the branch and the burner-base. This arrangement is to facilitate lighting, as the gas-supply to the middle burner can be first turned on and said burner lighted and, if desired, used alone, or, as will generally be the case, the supply of gas turned on to the encircling burners, which will be lighted from the central burner, said central burner serving as a pilot to burn continually, if desired. We have discovered that the best results are attained by inclosing this cluster of burners in the said cylinder 2, as a furnace is thus constituted that will secure perfect combustion, a greater concentration of the heat generated, be proof against back-flash, and the central air-supply through the base insures perfect distribution to the burners, and the regulation thereof by means of the damper 9 enables the air-supply to be accommodated to the gas being consumed.

It is obvious that, if desired, where less heat is required a single burner, as above described, can be used in a cylindrical section, and in such a case the baffle, like the cluster of baffles shown and described, would have to be of less superficial area than the space between the inner tube and said inclosing cylindrical section to allow of a sufficient draft to supply the flame.

What we claim is as follows:

1. The combination with a gas-burner comprising a tube having one end closed, a second tube of less diameter than and located within said first-mentioned tube and extending from within a short distance of said closed end beyond the open end thereof, a gas-supply to the inner end of said inner tube, of a combustion-chamber consisting of a cylindrical section open at both ends and of greater length than and inclosing the outer tube; and a baffle within said inclosing cylindrical section a short distance beyond the open end of the outer tube and extending between said inner tube and inclosing cylindrical section but of less superficial area than the space

therebetween, substantially as described and for the purpose set forth.

2. The combination of a gas-burner comprising a tube having one end closed, a second tube of less diameter than and located within said first-mentioned tube and extending from within a short distance of said closed end beyond the open end thereof; of a combustion-chamber consisting of a cylindrical section inclosing said outer tube and having both ends open; a baffle located within said combustion-chamber a short distance from the outer end of said outer tube, and consisting of a flat annular plate carried by and fitting closely said inner tube, said annular plate being of greater diameter than said outer tube and of less diameter than said inclosing cylindrical section, and a gas-supply to the inner end of said inner tube, substantially as described and for the purpose set forth.

3. The combination of a gas-burner comprising a tube having one end closed, a second tube of less diameter than and located within said first-mentioned tube and extending from within a short distance of said closed end beyond the open end thereof; of a combustion-chamber consisting of a cylindrical section inclosing said outer tube and having both ends open; a damper controlling the lower open end of said combustion-chamber; a baffle located within said combustion-chamber a short distance from the outer end of said outer tube, and consisting of a flat annular plate carried by and fitting closely said inner tube, said annular plate being of greater diameter than said outer tube and of less diameter than said inclosing cylindrical section, and a gas-supply to the inner end of said inner tube, substantially as described and for the purpose set forth.

4. The combination of a series of gas-burners each comprising a tube having one end closed, a second tube of less diameter than and located within said first-mentioned tube and extending from within a short distance of said closed end beyond the open end thereof; of a combustion-chamber consisting of a cylindrical section inclosing said series of burners and having both ends open; a baffle located within said combustion-chamber a short distance from the outer end of said outer tube, and consisting of a flat annular plate carried by and fitting closely said inner tube, said annular plate being of greater diameter than said outer tube and of less diameter than said inclosing cylindrical section, and a gas-supply to the inner end of said inner tube, substantially as described and for the purpose set forth.

In testimony whereof we have affixed our signatures in presence of two witnesses.

THOMAS PATTON SHAW.  
JOHN FEE.

Witnesses:

WILLIAM P. McFEAT,  
FRED. J. SEARS.