(No Model.) 2 Sheets—Sheet 1.

J. JOHNSON & E. H. PACKER.

GAS HEATER.

No. 411,447. Patented Sept. 24, 1889.

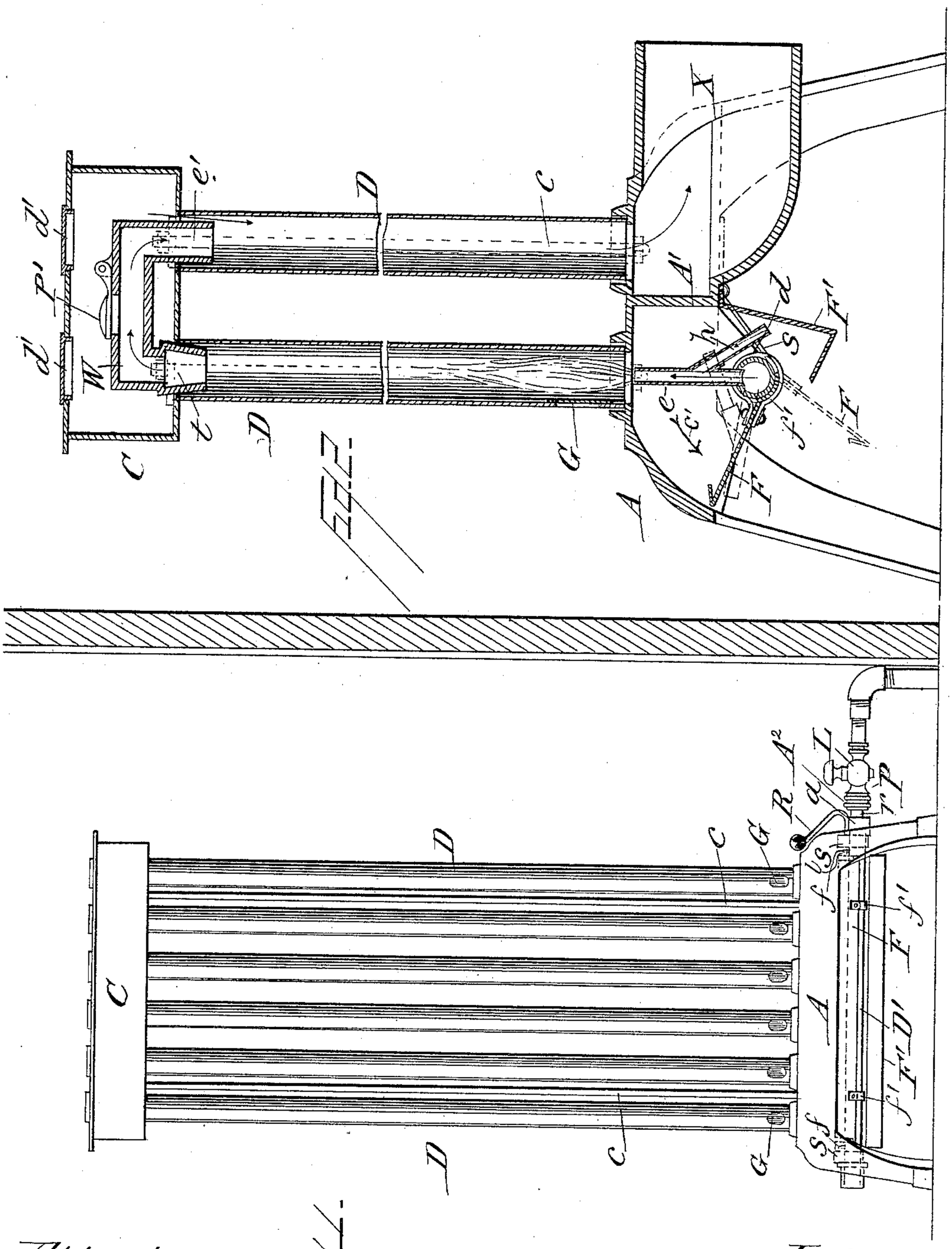

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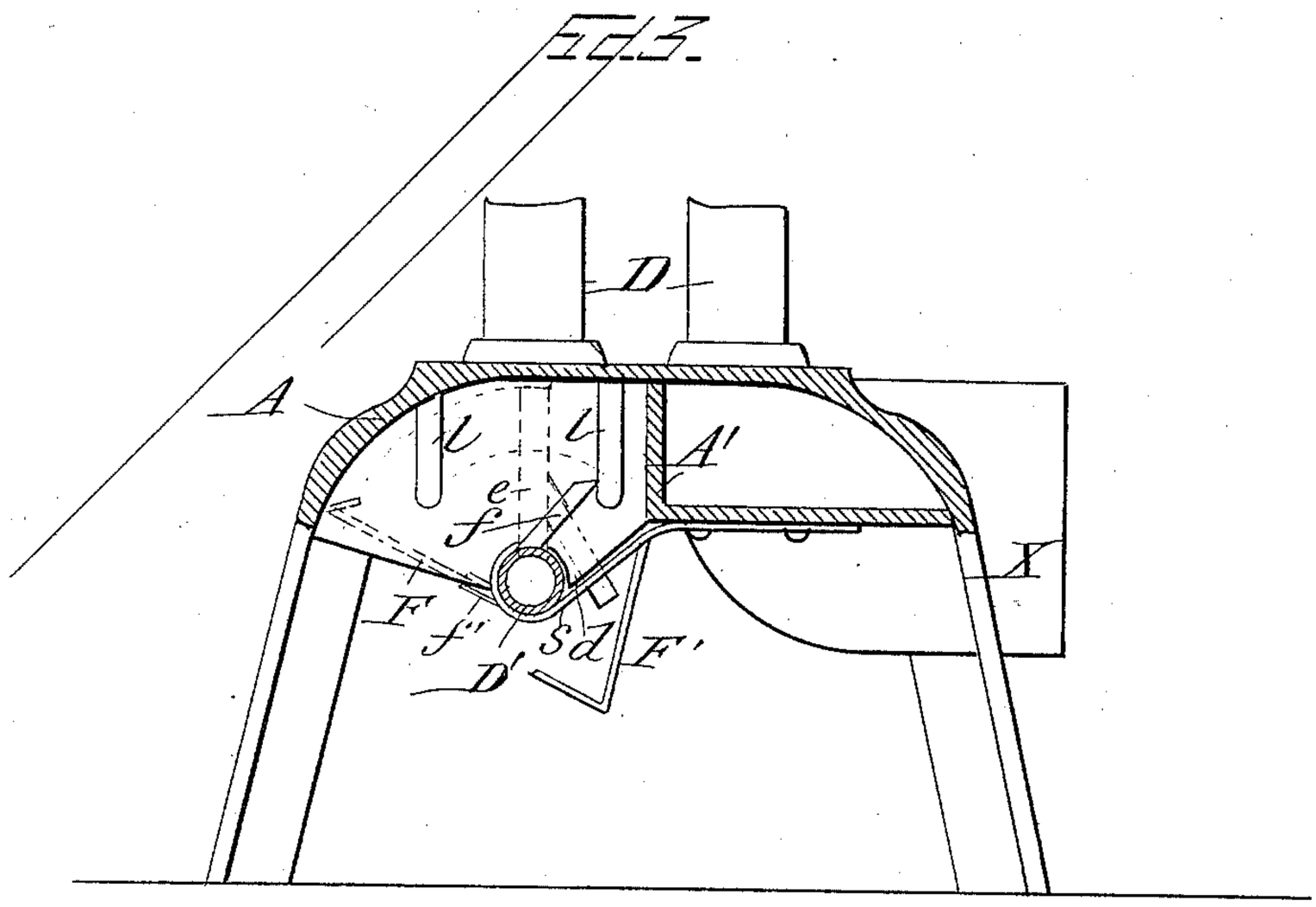
FIG. 3.



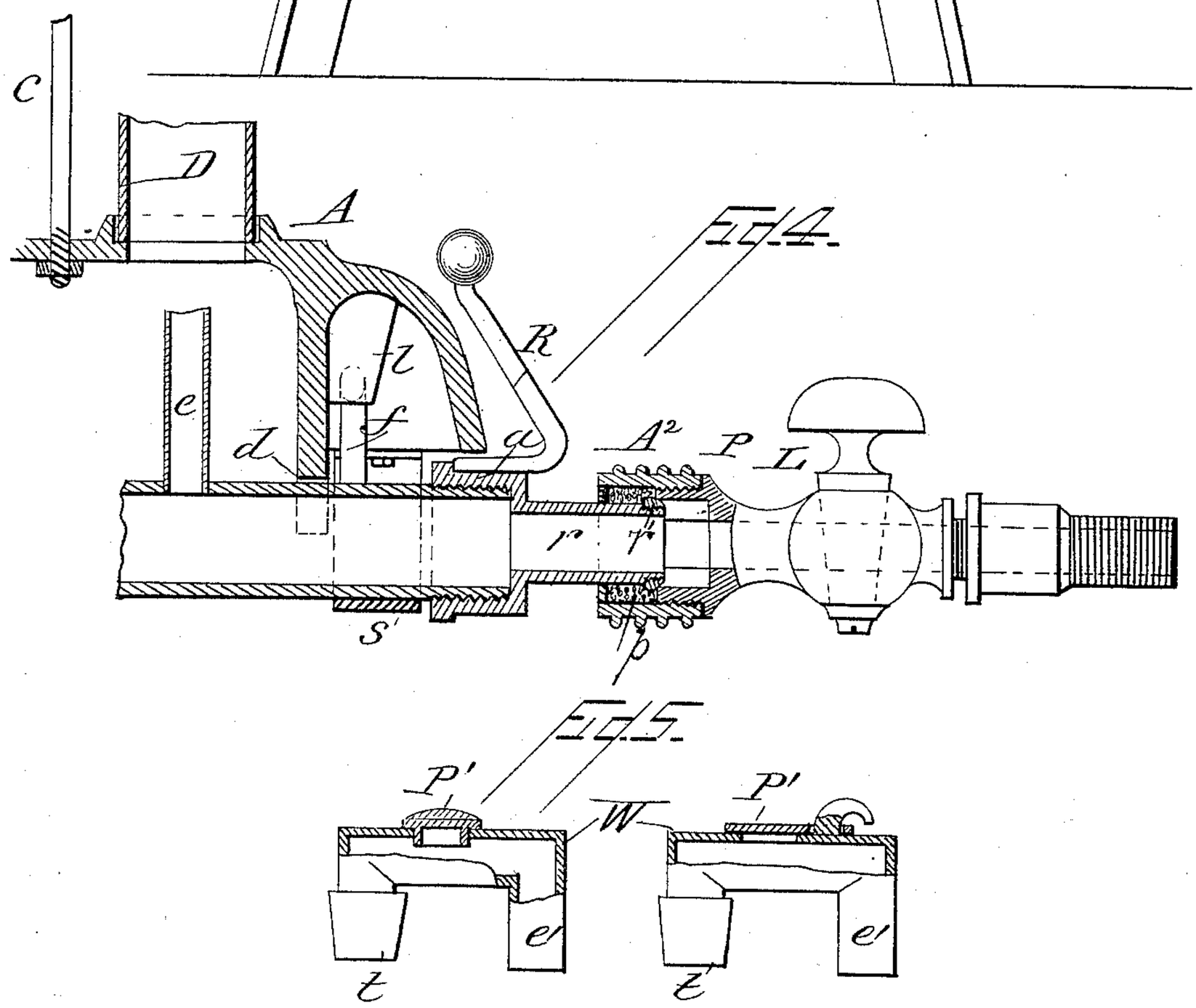


FIG. 4.

FIG. 5.

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UNITED STATES PATENT OFFICE.

JONATHAN JOHNSON AND EDMUND H. PACKER, OF LOWELL, MASSACHUSETTS.

GAS-HEATER.

SPECIFICATION forming part of Letters Patent No. 411,447, dated September 24, 1889.

Application filed May 10, 1889. Serial No. 310,292. (No model.)

To all whom it may concern:

Be it known that we, JONATHAN JOHNSON and EDMUND H. PACKER, citizens of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Gas-Heaters; and we do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to improvements in that class of radiators or heaters in which gas is used as a fuel.

The object of the invention is to construct the radiator in as simple a manner as is consistent with good results, to provide a means to prevent injury to the apparatus by explosions of gas and air in the pipes, to so construct the pipes as to have a positive draft through them, to provide fenders to protect the flame, and to prevent leakage by providing suitable connections for this purpose between the burner and the gas-supply pipe.

Figure 1 is a side elevation of the apparatus. Fig. 2 is a vertical transverse section. Fig. 3 is a cross-section of the base. Fig. 4 is a detailed view illustrating the method of connecting the rotatable burners with the supply-pipe. Fig. 5 is a longitudinal section of one of the return-elbows, showing the construction of the relief-valve.

In the several figures, A represents the base, preferably of cast-iron, provided with suitable legs to support it at a proper distance from the floor. It is subdivided by the partition A′ into smaller longitudinal chambers, the rear of which forms the connection between the ends of the rear row of radiating-pipes and the flue leading to the chimney. The other of these chambers incloses the rotatable burner. Seated on the top of the base are the radiator-pipes D, which connect with the chambers in the base by suitable openings. The tops of the radiator-pipes are seated in the under side of the head C. The head, base, and radiating-pipes are bound together by the rods *c*, which run parallel to the radiating-pipes and through the top and bottom pieces, holding them firmly in their relative positions.

Through the front chamber in the base and beneath the mouths of the row of pipes entering this chamber a rotatable burner passes, which consists of the pipe D′, seated at its end in the semicircular openings *d* in the ends of the chamber, and is kept in position by the spring S. These springs are fastened by screws or by any other suitable means to the bottom of the rear chamber and project far enough over the front chamber to have their free ends, which are hooked, engage with and hold the burners in position.

The pipe D′ has a series of burners—one for each front radiator-pipe—placed in a line along its periphery. These burners are screwed into holes tapped into the pipe and consist of the main part *e*, which carries the gas to the point where it is to be ignited. To the lower end of this main part a pipe *h*, to supply air to be mixed with the gas, is attached. One end of the pipe D′ is closed by a cap. The other end has an arm R for turning the burner and the arrangement for attaching a supply-pipe. This arm is attached to the pipe by a cap *a*, which has the projection *r* to connect with the pipe P, carrying the stop-cock L by packed joint A^2. At the end of the projection *r* is a nut *r*′, having its outer periphery larger than that of the projection, for the purpose of keeping the packing *p* in the packing-box. The arm R is used to rotate the burner to bring it in position either to be lighted or to heat. The packed joint A^2 allows the burner to move freely and at the same prevent leakage of gas.

To the end of the pipe which projects beyond the ends of the chamber are fixed the stops *f*, which engage with the lugs *l*. These stops and lugs are to confine the revolution of the burner to such a space as will be found necessary to move the burners far enough out to be lighted.

To the burner is attached the fender F in any suitable manner. Here it is shown attached by the straps *f*′. When the burner is

turned outward for lighting, it is in the position shown by dotted lines in Fig. 2; when turned back ready for heating, in position shown by full lines in the same figure.

From the rear side of the front chamber another fender F′ extends downward in a diagonal direction, inclosing the rest of the chamber to within a small distance of the fender F, allowing a small opening for the free ingress of the necessary supply of air. The purpose of these fenders is to protect the flame from any currents of air which may be stirring in the room and inflammable articles which may be brought accidentally in contact with the flame.

The head of the radiator contains a chamber which incloses the connections between the front and rear radiating-pipes. The rear radiating-pipes connect the chamber in the head directly with the rear one in the base, which leads to the flue connecting with the chimney. The elbow W connects the front radiating-pipe to the rear one. One end *t* of the elbow is swelled, so that when it is driven into the upper end of the front pipe it completely fills and plugs it. The other end *e′*, which enters the top of the rear pipe, is smaller than the opening which it enters, leaving a small space between its outside periphery and the inside periphery of the mouth of the rear pipe. The object of having this opening arranged in this manner will be explained further on. On top of this elbow is the pop-valve P′. This valve may be simply a disk seated in the opening, or one, detachable, hinged over it, or one hinged and undetachable. We find that the hinged valve is the preferable one; but either of these devices may be used without departing from the spirit of the invention.

The top of the head chamber is perforated, having an opening over each radiating-pipe, These apertures have detachable disks *d′* covering them, the object of which will be explained.

Gas may be conducted to the burner by a rubber pipe, or it may connect directly with a fixed pipe in the wall by using in both cases a packed joint A^2.

When it is desired to light the gas, the burner is turned by means of the arm in the direction indicated by the arrow *c′*, which brings the ignition-tubes in a position to be lighted, the stop-cock opened, and the light applied. Then the burner is turned back as far as the stops *s* and the lugs *l* will allow, and the ends of the ignition-tubes will be directly under the mouths of the front radiator-pipes and the flame will extend some distance up them. By means of the mica-covered openings G in the lower ends of the front radiating-pipes it can be seen whether or not all the ignition-tubes are lighted. The heated air and products of combustion will rise in the pipes, pass over to the rear pipes through the elbow, and down to the rear chamber in the base, from which they pass through the flue into the chimney or other outlet.

It has been found that when the radiating-pipes connect directly with the upper chamber the cold air and products of combustion in the upper chamber, instead of passing to the rear pipes, work backward and down through the front pipes, sometimes with force enough to extinguish the flames and fill the room with obnoxious fumes. To obviate this difficulty, we do not allow the front pipes to connect directly with the upper chamber, but have them connect with the rear pipes by means of elbows, which lead through the chamber and enter the rear pipes, leaving a small space between the outside periphery of its ends and the inside periphery of the pipe. The cold air in the chamber, as part of it becomes heated, will take the shortest route to escape, which will be down through the rear pipe, and by this means working back on the flame will be avoided.

It may happen sometimes that all the jets are not lighted, and the gas escapes, forming with the air an explosive mixture in the pipes. To relieve the force of the explosion, we provide a means by which it can readily escape without doing any serious injury to the apparatus. When the pipes and top chamber are filled with gas and exploded, the force of the explosion finds vent in the relief-valves in the elbows and the openings in the top of the chamber by throwing the disks off. The pop-valves are allowed to rise only a certain distance by the top of the chamber, and they will fall back into position as soon as the force of the explosion is expended, and the apparatus will continue working. The disks *d*, which have been blown off, can then be picked up and replaced in their proper position over the apertures in the top.

We do not in this application broadly claim the rotatable burner, as the same forms part of an application for improvements in gas-heaters patented by Jonathan Johnson May 14, 1889, No. 403,474.

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

1. As an improvement in gas-heaters, the combination of the radiating-pipes, the two-chambered base to which they are connected, the rotating burners provided with an arm to rotate the same, the stops attached to the base to limit the movement of the arm, the stationary fender secured to the base, and the fender secured to the rotating pipe turning with the same, substantially as and for the purpose set forth.

2. The combination of the burner-chamber in the base, the chamber in the top, the front radiating-pipes connecting said chambers, the bottom chamber leading to the flue, the rear radiating-pipes connecting said chamber leading to the flue and the top chamber, the elbows connecting the tops of the front and rear radiating-pipes, one end of said elbows completely filling the upper end of the front

pipe, to which it is attached, and having an annular space surrounding the end that enters a rear pipe, substantially as and for the purpose set forth.

3. As an improvement in heaters, the elbows provided with a relief-valve upon their upper sides, in combination with the radiating-pipes connected by said elbows, substantially as and for the purpose specified.

4. As an improvement in gas-heaters, the combination of the radiating-pipes, the chamber which receives their upper ends, said chamber provided with perforations opposite the ends of the pipes, and the covers for said perforations adapted to be thrown off and relieve the chamber in case of explosion therein, substantially as set forth.

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

JONATHAN JOHNSON.
EDMUND H. PACKER.

Witnesses:
AUSTIN K. CHADWICK,
GEO. J. CARNEY.