

R. J. HUGHES.
VENTILATING GRATE.
APPLICATION FILED MAR. 27, 1903.

2 SHEETS—SHEET 1.

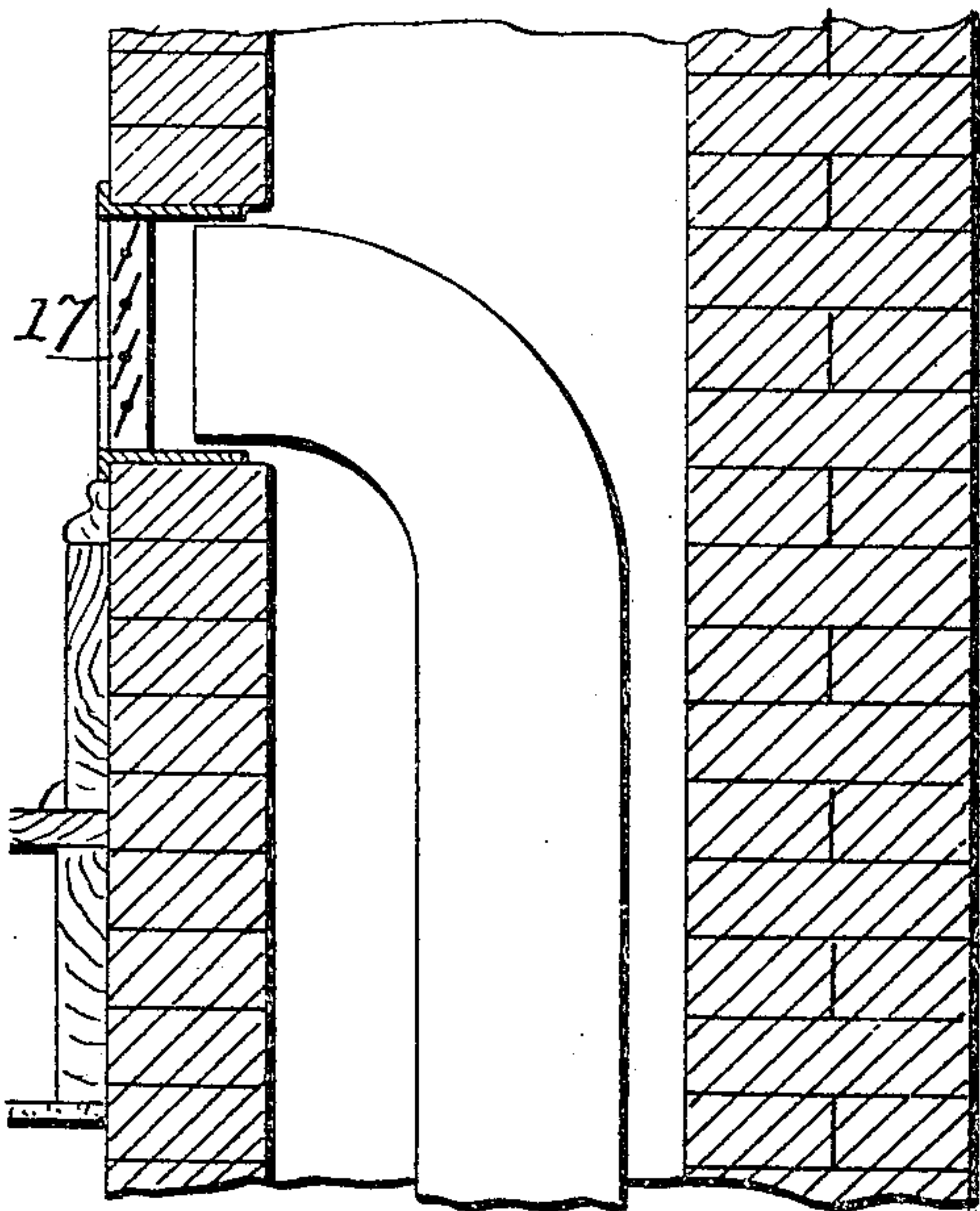
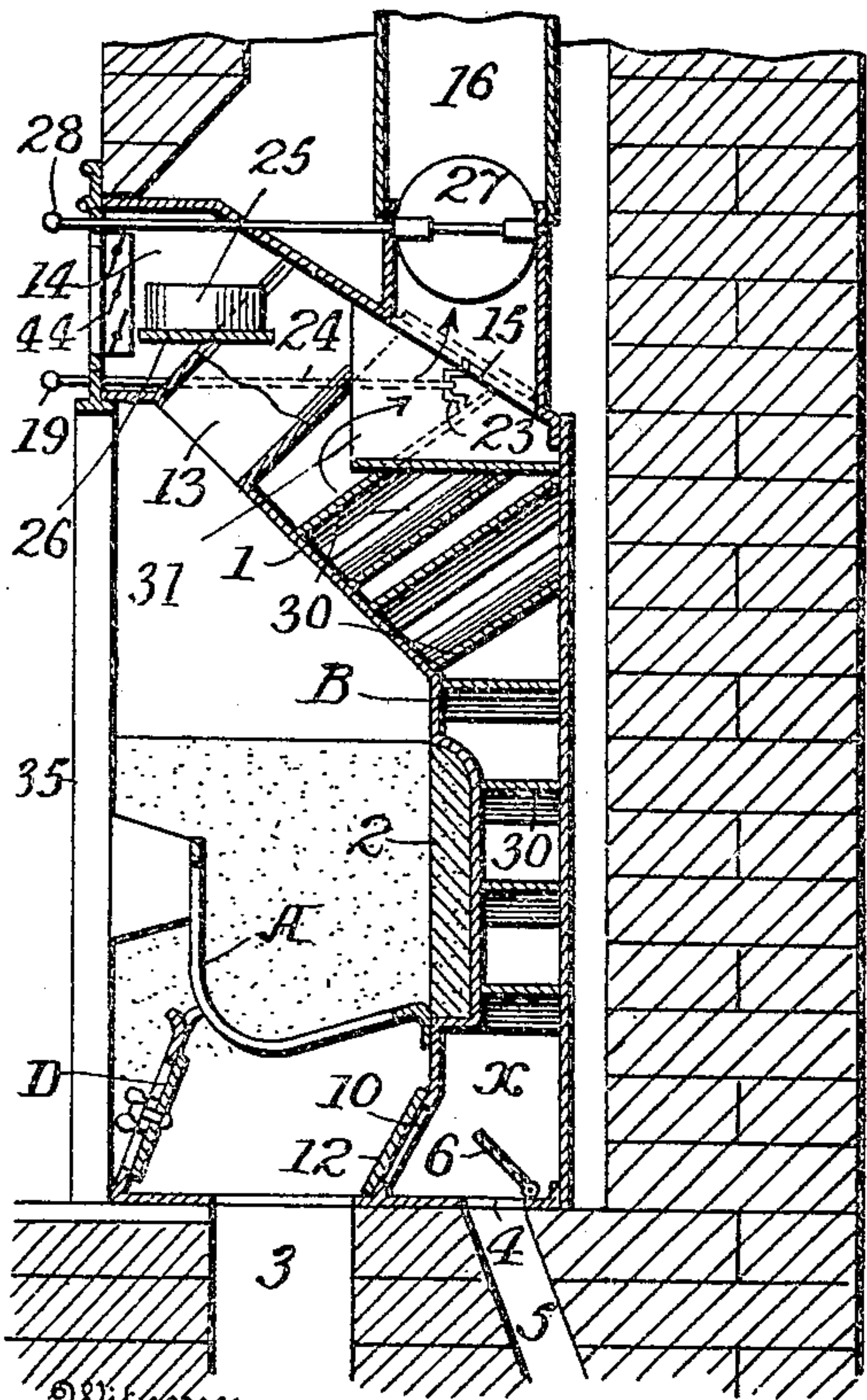
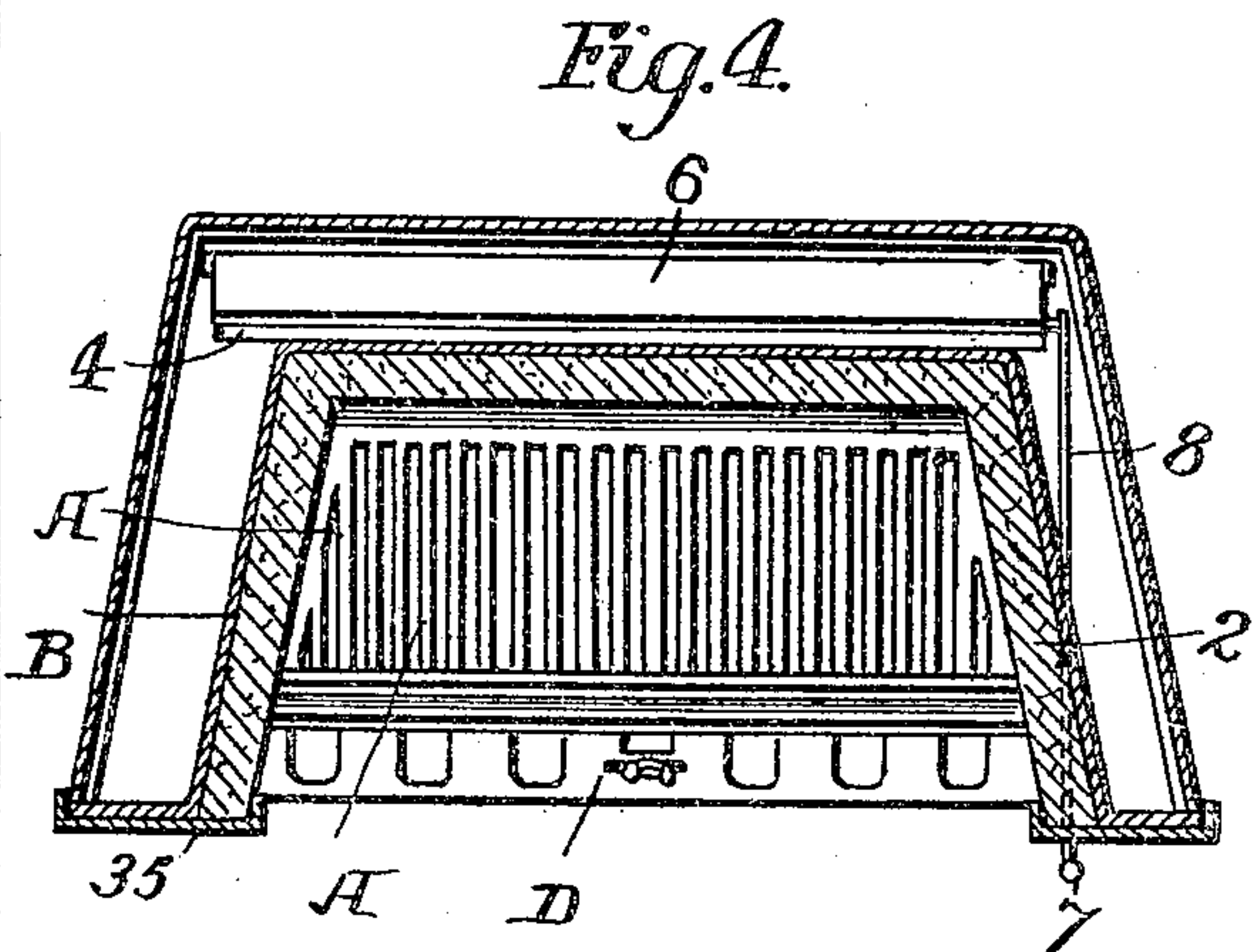


Fig. 1.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

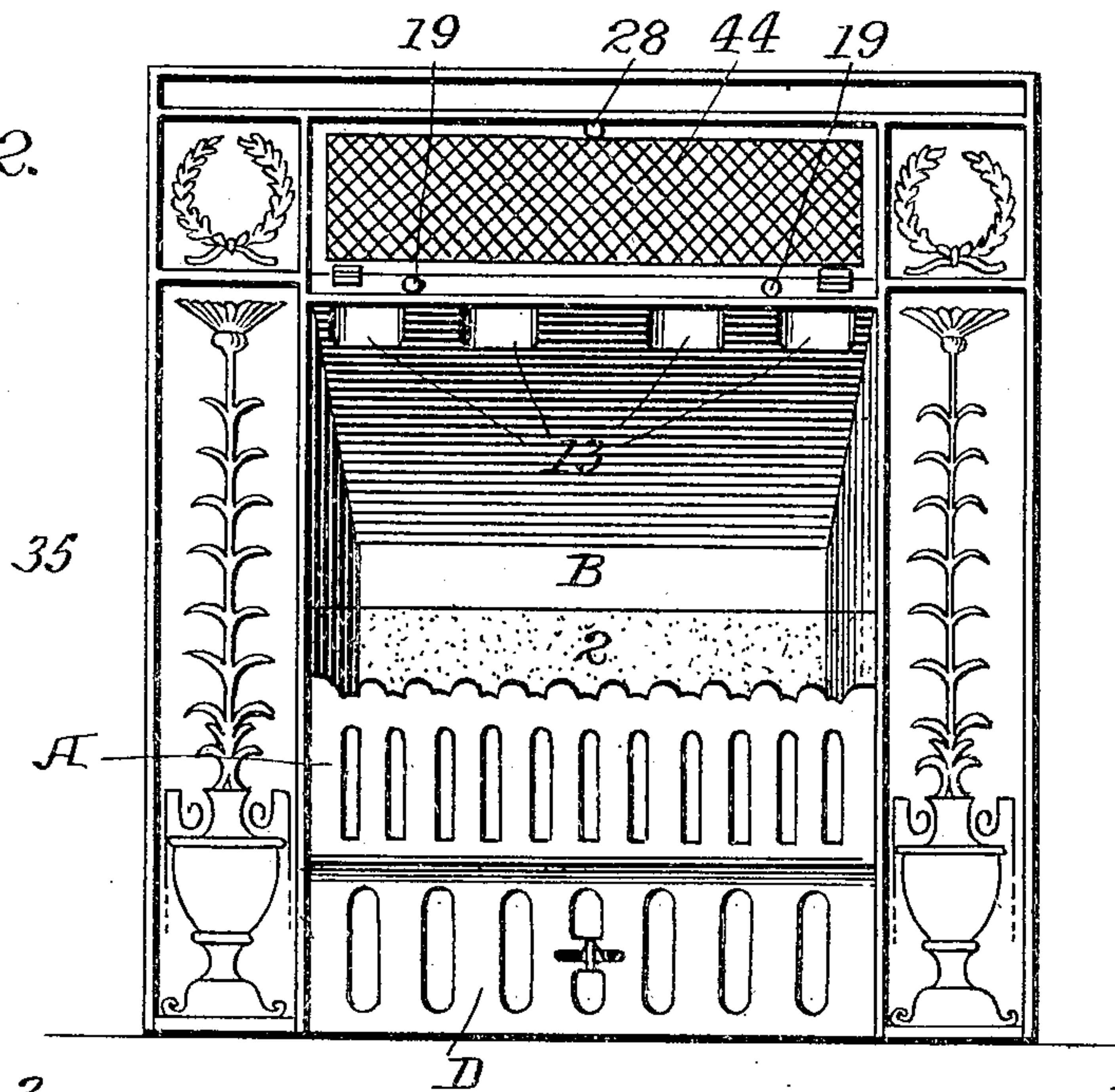


Fig. 3.

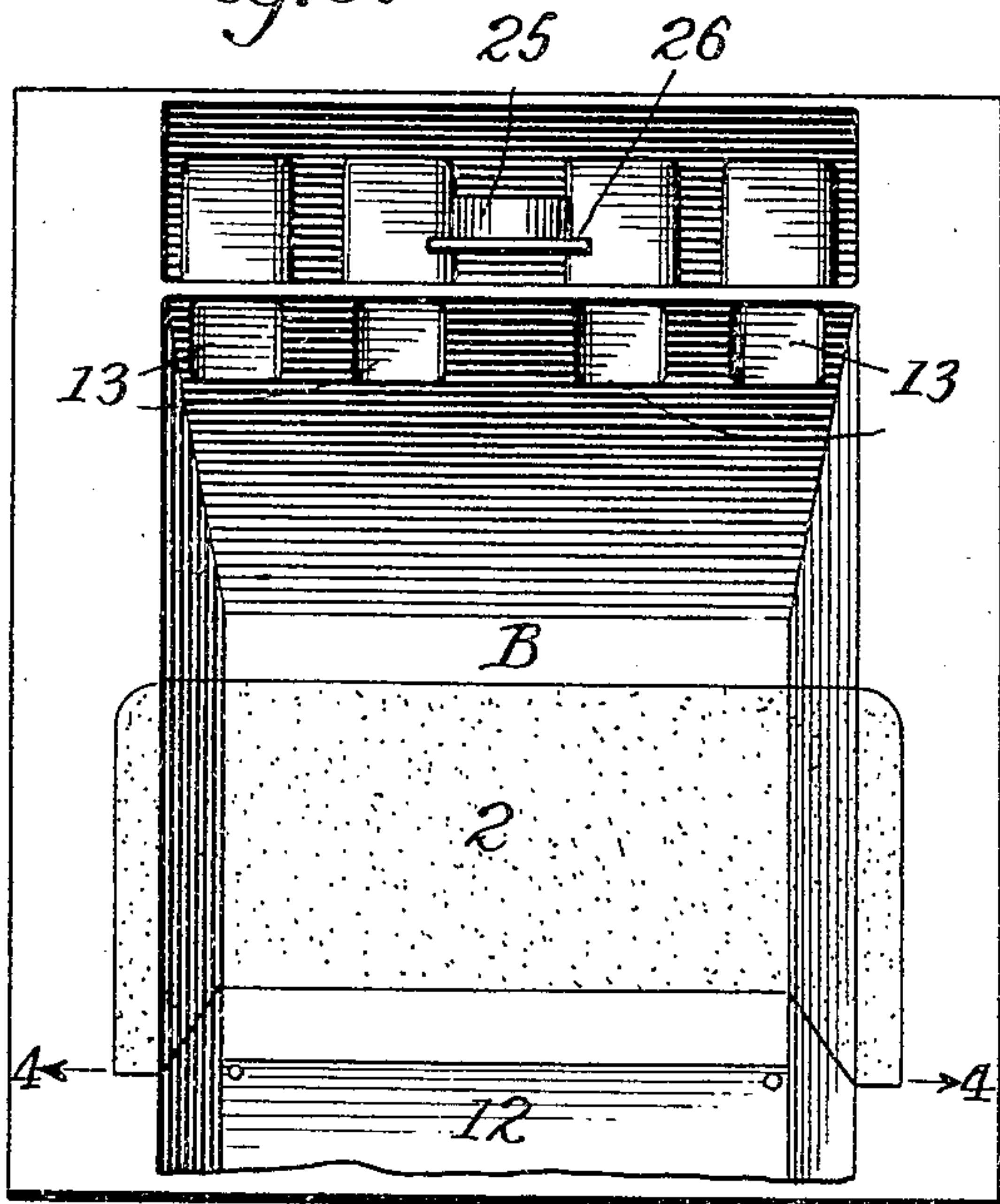
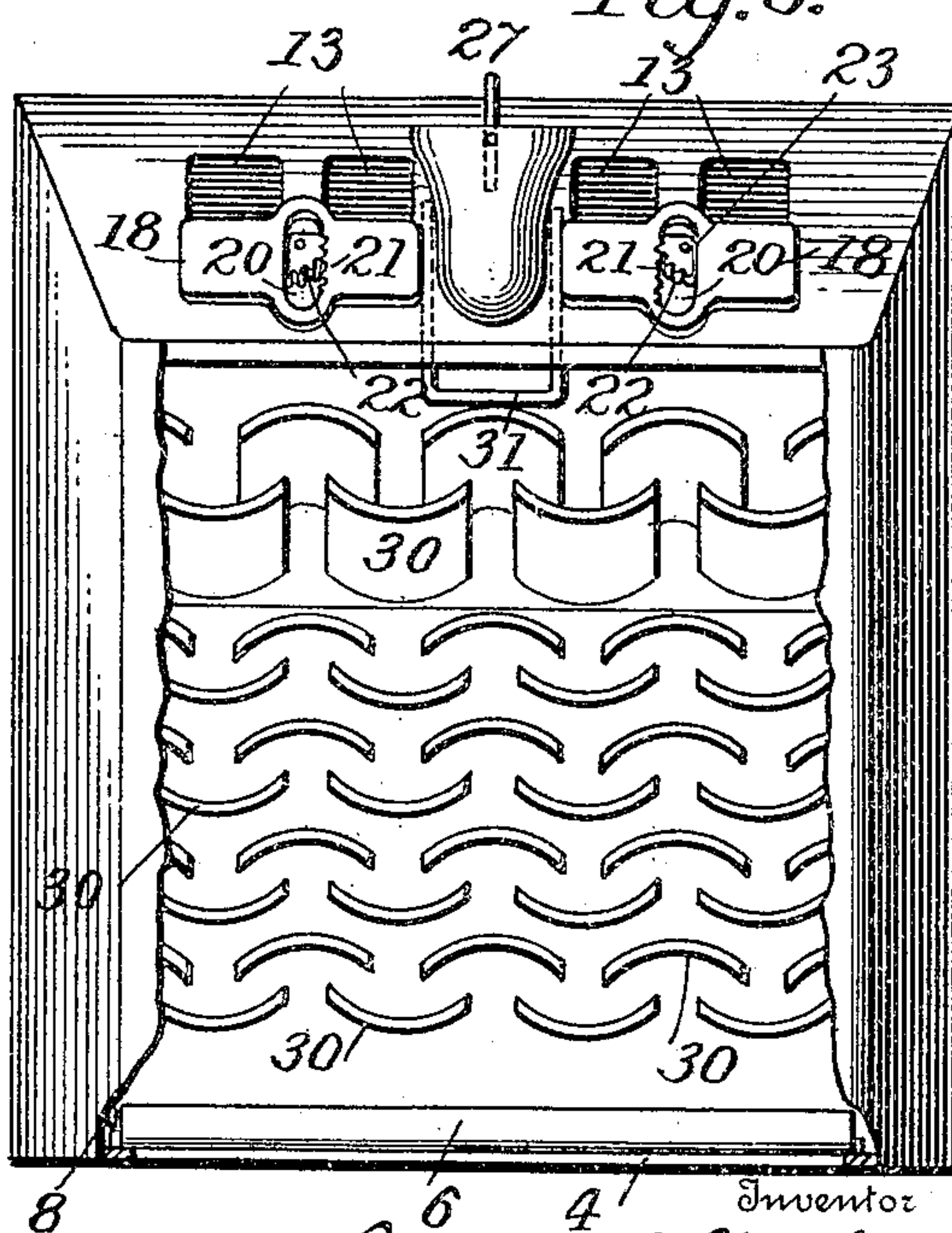


Fig. 5.



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UNITED STATES PATENT OFFICE.

RALEIGH J. HUGHES, OF RALEIGH, NORTH CAROLINA.

VENTILATING-GRATE.

No. 801,244.

Specification of Letters Patent.

Patented Oct. 10, 1905

Application filed March 27, 1903. Serial No. 149,907.

To all whom it may concern:

Be it known that I, RALEIGH J. HUGHES, a citizen of the United States, residing at Raleigh, in the county of Wake and State of North Carolina, have invented certain new and useful Improvements in Ventilating-Grates, of which the following is a specification.

My invention relates to heaters of that class comprising a grate arranged within a fireplace-casing to which cold air is admitted and from which the heated air is discharged; and my improvements consist in constructing the parts so as to secure the greatest possible amount of radiated heat, afford extended heating-surfaces for the cold air passing through the casing, prevent a too rapid passage of the air-currents, and generally improve the construction and efficiency of the heater, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is a transverse sectional elevation through a fireplace and chimney provided with my improved heater. Fig. 2 is an elevation showing the front of the heater. Fig. 3 is a front elevation, the ornamental cover-plates, register-plates, and grate removed. Fig. 4 is a sectional plan on the line 4 4, Fig. 3. Fig. 5 is a rear elevation of the heater, the rear plate of the casing removed.

The grate A is suitably and preferably detachably suspended in position within an outer casing B, which extends to the back and sides of the grate and is inclined forward over the top of the same, the inner portion 1 of the casing having a lower vertical portion and upper inclined portion and being preferably of cast metal, while the outer sides and back are of sheet metal. The inclined top is preferably of cast metal.

The fire-pot has preferably the usual fire-clay lining 2, and the ash-pit below the grate communicates through a suitable covered opening with the ash-flue 3 and is closed at the front by a register-plate D, having a sliding or other register for regulating the draft, and the upper edge of this plate is set away slightly from the grate. This prevents the ashes which fall from the vertical portion of the grate from being discharged onto the hearth.

At the lower end of the chamber x , within the casing B, is an air-inlet 4, communicating with an air-flue 5, which receives fresh air in any suitable manner, and this inlet is pro-

vided with a damper 6, which may be operated from a handle 7 at the front of the heater by means of a rod 8. (See Fig. 4.)

It is desirable to have access to the interior of the chamber x in erecting the heater, and I therefore provide an opening 10 in the front side of the casing B below the grate, which opening is closed by a plate or panel 12, bolted or otherwise secured in place, so that it may be removed when access to the interior of the casing is required, being at other times secured in place.

The casing B is arranged within the fireplace, as shown in Fig. 1, and smoke-flues 13 extend through the inclined portion of the casing, and the latter has a forward outlet 14 for the escape of hot air and also an opening or outlet 15 in the top, through which hot air can pass to a pipe 16, extending upward through the chimney to a register 17 in a room above.

The smoke-flues 13 are on opposite sides of the outlet 15, and the upper ends of these smoke-flues can be closed in whole or in part by sliding dampers 18, sliding upon the top of the casing. In order that these dampers may be shifted from handles 19 at the front of the heater, each damper 18 has an opening 20, at one edge of which is a rack 21, and with the latter engages a toothed sector 22 upon a rod 23, having a crank connected by a rod 24 with the handle 19, by pulling or pushing upon which the rod and sector may be turned so as to shift the damper.

The outlet 14 is provided with a register-plate 44, carrying any form of register, which may be opened and closed and preferably hinged so that it may be swung to uncover the opening 14 and permit a dish or other receptacle 25 to be placed upon or removed from a shelf or other suitable support 26, the said receptacle being supplied with water, the evaporation of which will moisten the air passing from the chamber x .

A damper 27 controls the flow of hot air to the pipe 16 and may be turned by a handle or knob 28 on the damper-rod, and by manipulating this knob 28 and the register of the register-plate 44 the hot air may be controlled in its flow to the lower or upper rooms.

In order to secure the full efficiency of the heater, it is necessary that the air passing upward from the inlet 4 to the outlets at the top of the casing should meet extended heating-surfaces and should be prevented from flow-

ing too rapidly—that is, it should be maintained in contact with these heating-surfaces until thoroughly heated. To secure these results, I form at the back of the front plate of the casing a series of deflector-plates 30, which, as shown, are separated from each other or arranged in separated rows one above the other and are curved in reverse directions, a downwardly - curved plate being arranged above the space between the edges of two adjacent upwardly - curved plates and an upwardly-curved plate arranged above and between the edges of two downwardly-curved plates, as best shown in Fig. 5. These series of plates not only afford extended heating-surfaces, but by curving some of the plates down and arranging them in positions above the passages through which the air-currents must flow upward I deflect these currents slightly downward, which tends to retain them for such a length of time in contact with the plates without interfering with the proper freedom of their upward flow that by the time the air reaches the upper portion of the casing it will be raised to a high temperature, which will be increased as it passes around the flues in flowing to the forward outlet 14, while that portion of the air which passes upward through the pipe 16 will be heated by the heat imparted to the said pipe from the heated gases flowing upward through the chimney.

To prevent the air from flowing too directly to the pipe 16 and retain it in contact with the heated surfaces for a greater length of time, I extend a plate 31, bent upward at the edges or sides, below the outlet 15 and from the back of the casing forward, so that the air will flow first forward and then back toward the opening 15.

With the parts above described I combine any suitably -ornamented cover - plates 35,

bolted or otherwise secured to the front of the casing.

Without limiting myself to the precise construction and arrangement of parts shown, I claim as my invention—

1. The combination of a grate, an air-heating casing at the rear and above the same, a hot-air flue extending centrally from the top of the casing, a pair of smoke-flues extending through the casing on both sides of the air-flue, and an independent sliding smoke-damper for each pair of smoke-flues, each damper having a central opening provided with a rack at one edge, a sector with teeth engaging each rack, a rod having a crank connected to each sector, and rods connected to the cranks and extending through the casing and beyond the front thereof, substantially as set forth.

2. The combination with a grate, of an air-heating casing at the rear and above the grate having a front wall partly vertical and partly inclined, and a plurality of horizontally-arranged series of separated deflector - plates extending rearward from said front wall, the plates in adjacent series being curved in reverse directions and the plates in each series alternating with the plates in the adjacent series, whereby the currents of air passing through the openings in certain series of the deflector-plates impinge centrally upon the concave under surfaces of the deflector-plates in the series next above, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RALEIGH J. HUGHES.

Witnesses:

W. C. DOUGLASS,
R. N. SIMONS.