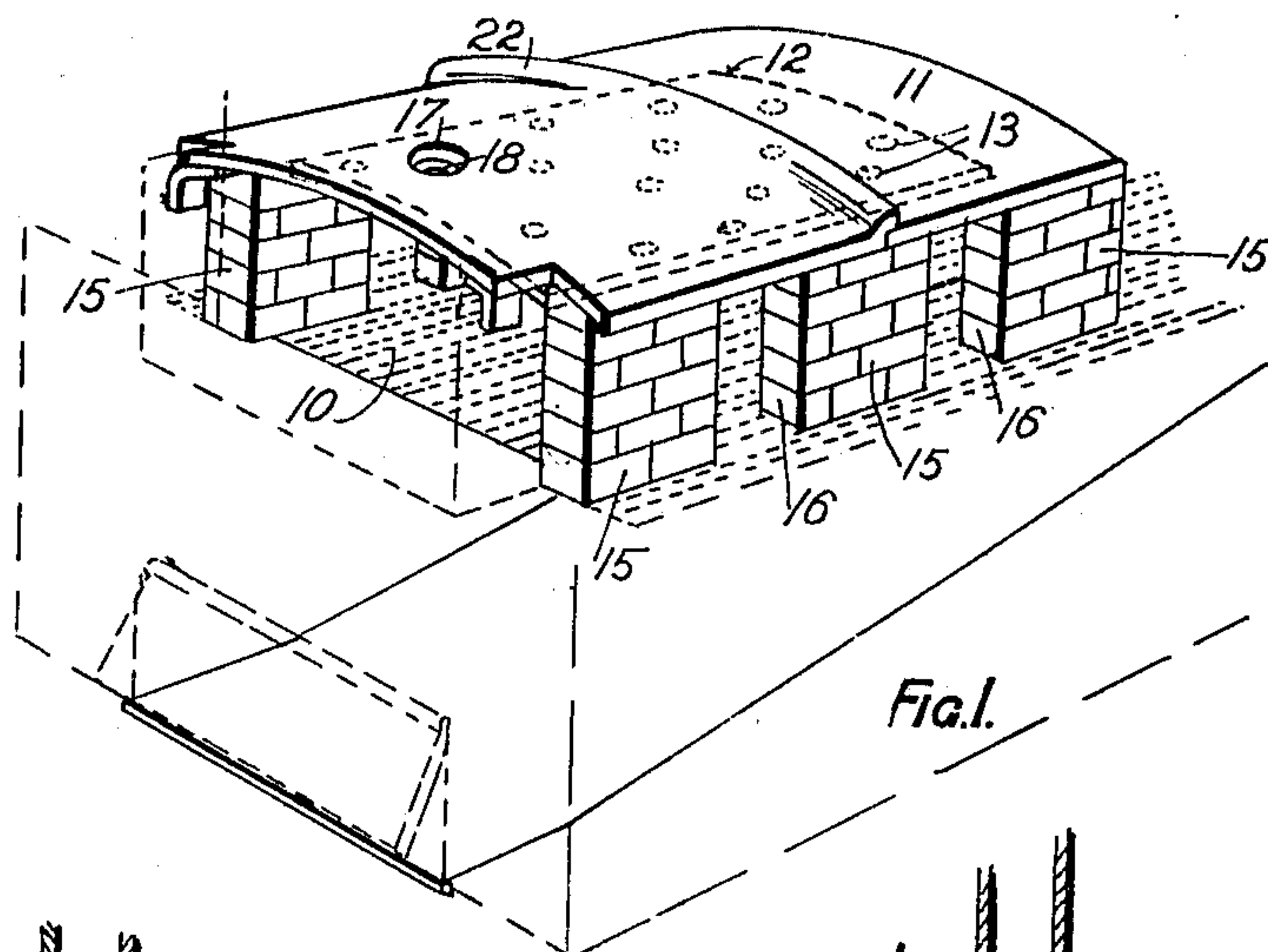
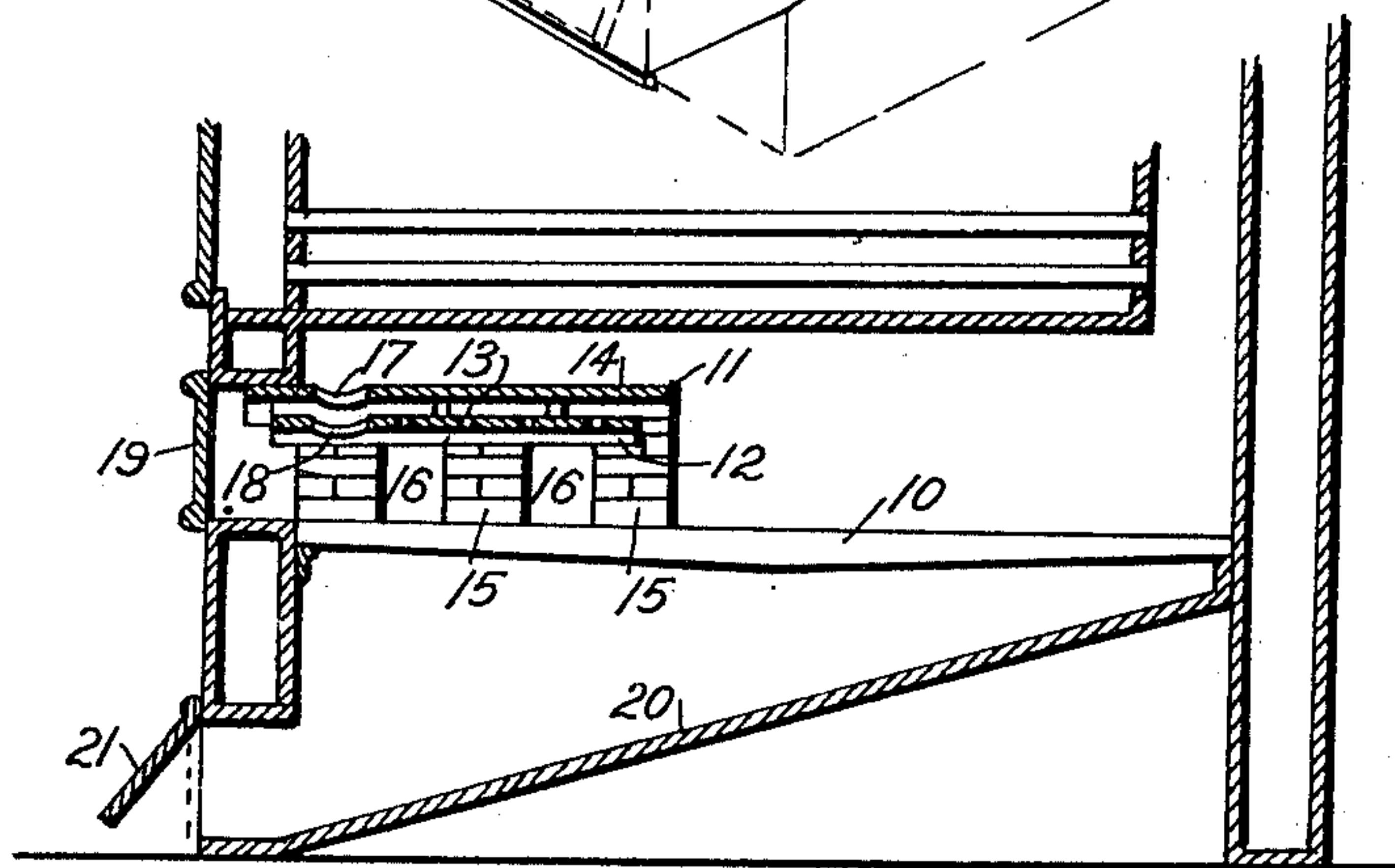


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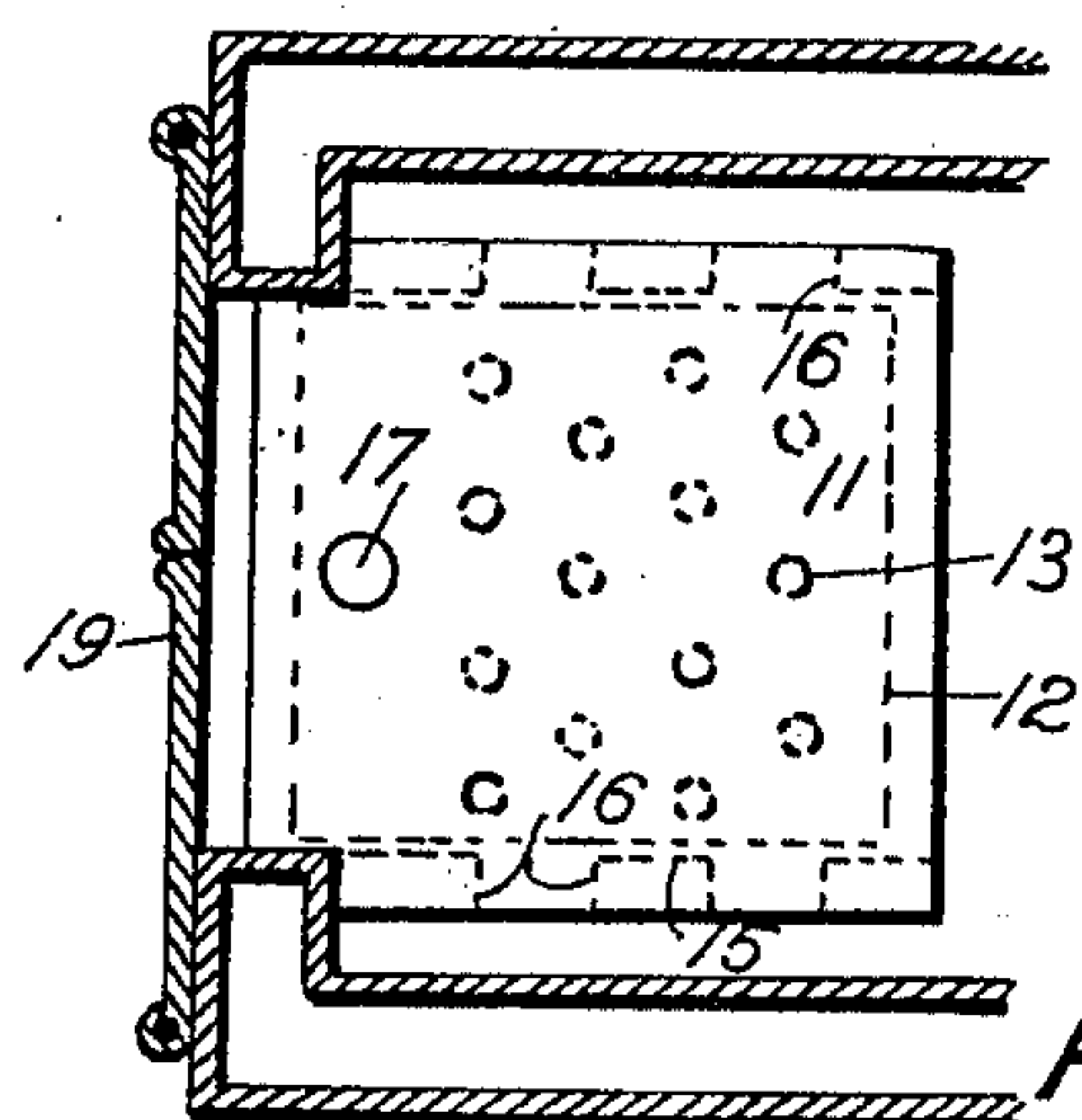
2 SHEETS—SHEET 1.



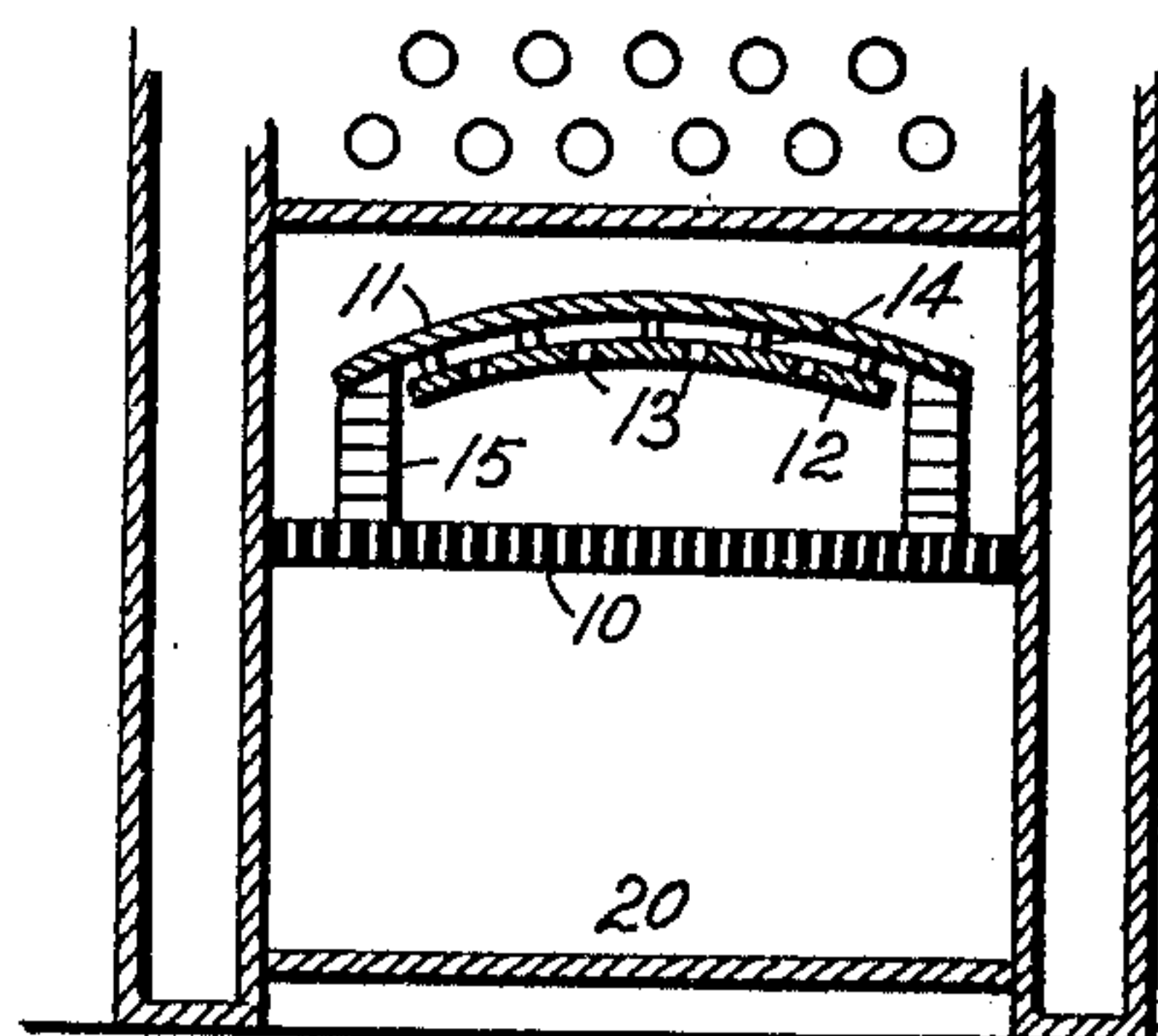
**FIG. 1.**



**Fig. 2.**



**FIG. 3.**



**FIG. 4.**

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SMOKE CONSUMING AND FUEL ECONOMIZING APPARATUS.  
APPLICATION FILED OCT. 1, 1909.

991,992.

Patented May 9, 1911.

2 SHEETS—SHEET 2.

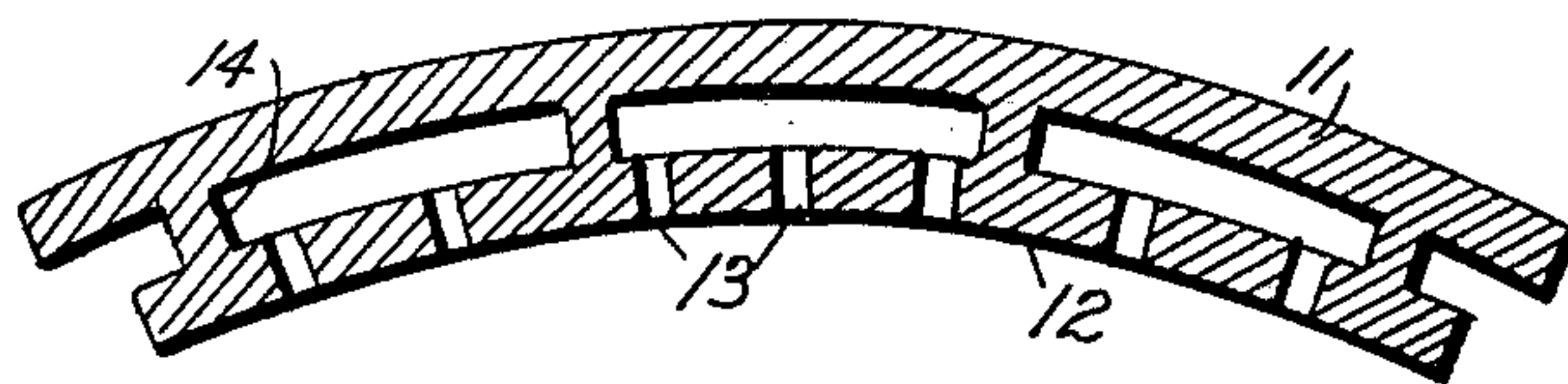


Fig. 5.

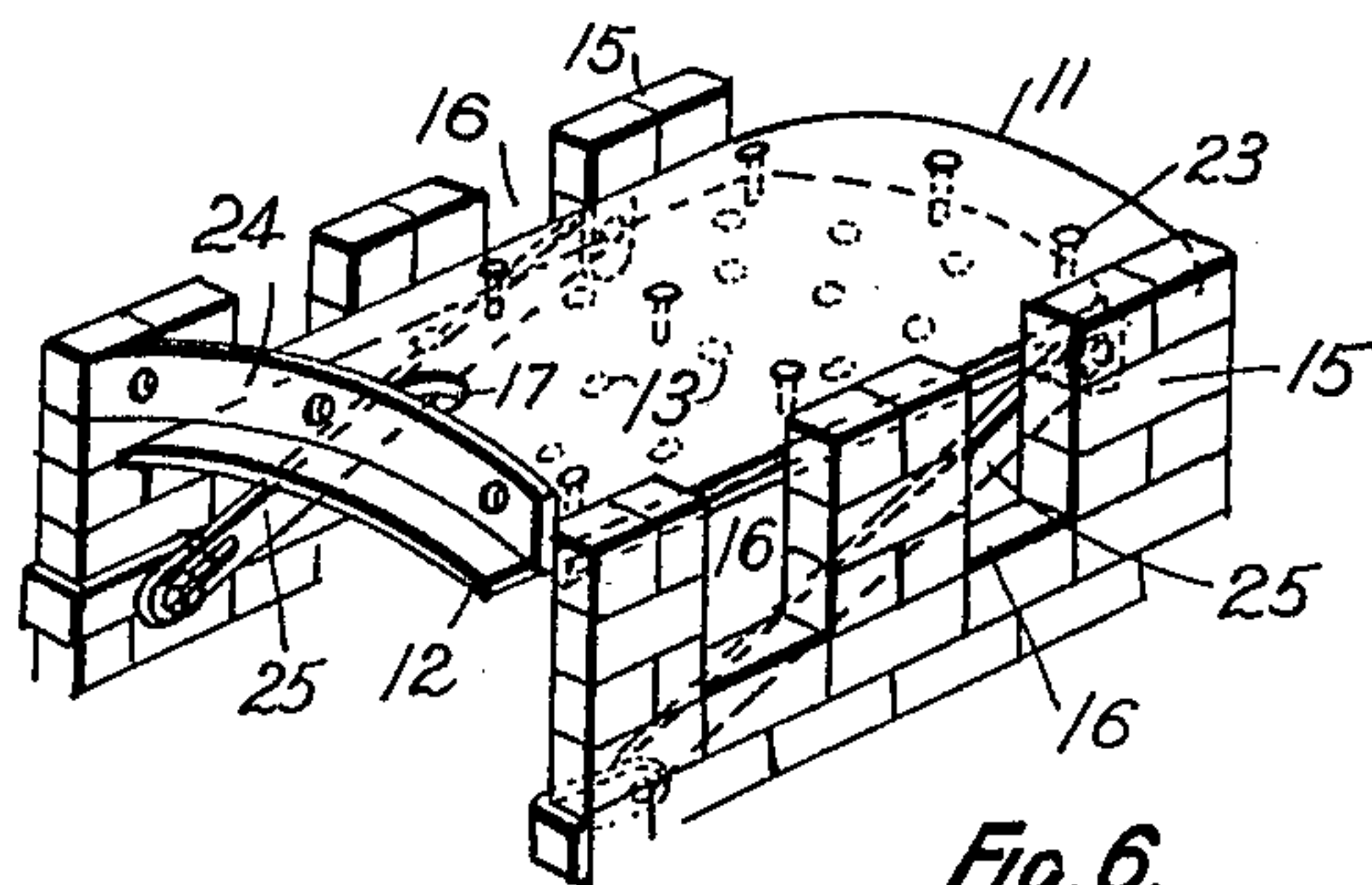


Fig. 6.

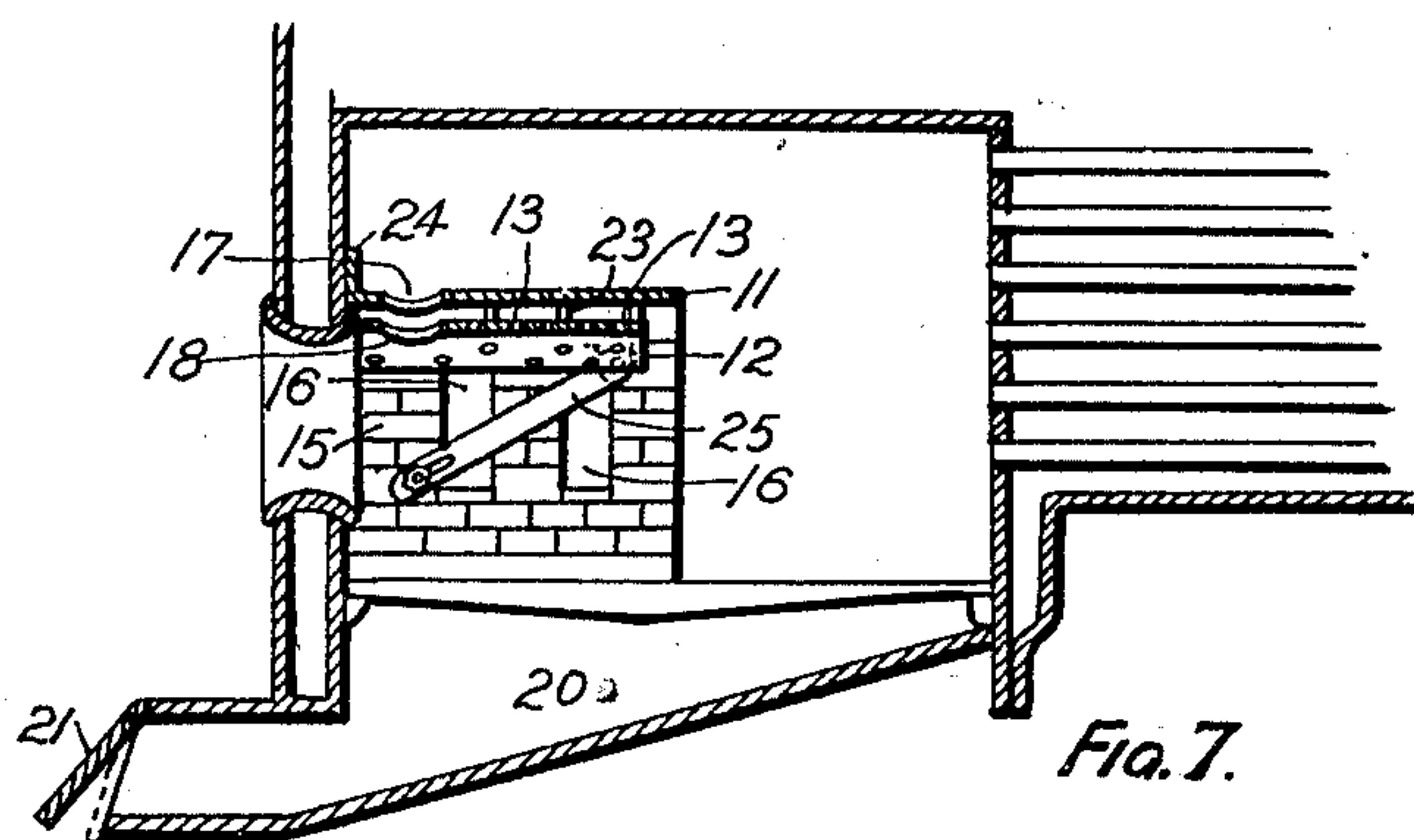


Fig. 7.

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# UNITED STATES PATENT OFFICE.

WILLIAM HOY, OF SURRY HILLS, SYDNEY, AND JOHN DOWNES, OF REDFERN, SYDNEY,  
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SMOKE-CONSUMING AND FUEL-ECONOMIZING APPARATUS.

991,992.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed October 1, 1909. Serial No. 520,572.

*To all whom it may concern:*

Be it known that we, WILLIAM HOY and JOHN DOWNES, subjects of the King of Great Britain, residing, respectively, at 53 Nickson street, Surry Hills, Sydney, New South Wales, Australia, and 73 Cleveland street, Redfern, Sydney, aforesaid, have invented new and useful Improvements in Smoke-Consuming and Fuel-Economizing Apparatus, of which the following is a specification.

This invention relates to improvements in smoke consuming and fuel economizing apparatus which can be readily and effectively applied to existing furnaces at comparatively little cost.

According to our invention we provide a baffle plate which is arched said plate extending from the door almost to the rear of the fire box in the case of furnaces for vertical boilers, but not so far in the case of furnaces for horizontal boilers. In addition to the said baffle we preferably secure below same a perforated plate of the same cross section maintaining a space between the two plates by means of distance pieces but said perforated plate does not extend to the length of the upper one. Below the fire bars we preferably provide a plate or inclined plane extending from the rear immediately below the bars toward the front of the ash pit the inclination being one of about 20°. But in order that our invention may be clearly understood, we will now refer to the drawings herewith, in which,

Figure 1 is a general perspective view illustrating our invention, while Fig. 2 is a sectional elevation. Fig. 3 is a sectional plan, and Fig. 4 a transverse section, while Fig. 5 is an enlarged cross section of the two plates. Fig. 6 is a perspective view illustrating a slight modification, while Fig. 7 is a longitudinal section.

The same numerals indicate the same or corresponding parts.

10 represents the fire bars of a furnace.

11 is the upper plate preferably constructed of fire clay and integral with the lower plate 12 which is perforated at 13, between the plates being the distance pieces 14. The plates are supported in any suitable manner, as, for instance, by the bricks 15.

16 represent air passages.

17 and 18 are holes in plates 11 and 12 for passage of air and 19 is the fire door.

20 is an inclined plate leading from the rear of the fire bars to the bottom of the ash pit door 21, said plane forming the bottom of the ash pit.

When the plates 11 and 12 are constructed of fire clay the upper plate is preferably made in two parts held together by a joint 22.

In the modification shown in Figs. 6 and 7 the plates 11 and 12 are constructed of metal and secured together by means of bolts 23 which also act as distance pieces the upper plate being loosely bolted to the door frame of the furnace through the flange 24 on said plate. The bolts and nuts are preferably covered with asbestos or other fire-proof composition to prevent burning out. 25 represent diagonal stays which support the rear end of plate 12 and allow the plates to be raised or lowered as desired.

The operation of our apparatus is as follows:—On combustion taking place in the fire box portion of the furnace the evolved smoke and gases strike the lower plate 12 (or the plate 11 when one plate is employed) and are diverted to the sides and rear where they mingle with air coming up through the fire bars and through the passages 16, 17, and 18 and are consumed, it being understood that part of the incoming air passes directly between the fire bars to the fuel to allow combustion, and part also passes through the fire bars at the sides and thence through the openings 16, while part travels up to the rear of the furnace, where it contacts with the products of combustion and forces said products back into the hottest area of the furnace, where they are consumed.

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

1. The combination, with the fire box and the fire bars of a furnace having a draft opening in the front wall of its ash pit; of an arch-shaped baffle supported above said bars and terminating short of the rear ends thereof for directing the products of combustion toward the rear of the fire box; and an inclined plate forming the bottom of the ash pit and leading from the bottom of said opening to the rear ends of said bars, for



directing part of the incoming air between the rear portions of the bars and into contact with said products, to force back the latter toward said baffle for consumption.

5 2. The combination, with the fire box and the fire bars of a furnace having a draft opening in the front wall of its ash pit; of a pair of superimposed arch-shaped baffle plates supported in spaced relation to each other above said bars and terminating short of the rear ends thereof, for directing the products of combustion toward the rear of the fire box, the lower of said plates being perforated; and an inclined plate forming the bottom of the ash pit and leading from the bottom of said opening to the rear ends of said bars, for directing part of the incoming air between the rear portions of the bars and into contact with said products, to force back the latter toward said baffle plates for consumption.

3. The combination, with the fire box and the fire bars of a furnace having a draft opening in the front wall of its ash pit; of a pair of superimposed connected arch-shaped baffle plates supported in spaced relation to each other above said bars and terminating short of the rear ends thereof, for directing the products of combustion toward the rear of the fire box, the upper of said plates being movably connected to the front wall of said fire box, and the lower plate being perforated; means for raising and lowering said plates; and an inclined plate forming the bottom of the ash pit and leading from the bottom of said opening to the rear ends of said bars, for directing part of the incoming air between the rear portions of the bars and into contact with said prod-

ucts, to force back the latter toward said baffle plates for consumption.

4. The combination, with the fire box and the fire bars of a furnace having a draft opening in the front wall of its ash pit; of a movably mounted arch-shaped baffle supported above said bars and terminating short of the rear ends thereof for directing the products of combustion toward the rear of the fire box; means for raising and lowering said baffle; and an inclined plate forming the bottom of the ash pit and leading from the bottom of said opening to the rear ends of said bars, for directing part of the incoming air between the rear portions of the bars and into contact with said products, to force back the latter toward said baffle for consumption.

5. The combination, with the fire box and the fire bars of a furnace; of an arch-shaped baffle movably connected to the front wall of the fire box and supported above said bars, for directing the products of combustion toward the rear of said fire box; means for raising and lowering said baffle; and means for directing a current of air upwardly between the rear portions of said bars and into contact with said products, for forcing the same back toward said baffle for consumption.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM HOY.  
JOHN DOWNES.

Witnesses:

CHARLES E. GRAHAM,  
HENRY W. CLARKE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."