(No Model.)

H. PETERSEN.

FURNACE.

No. 444,671. Patented Jan. 13, 1891.

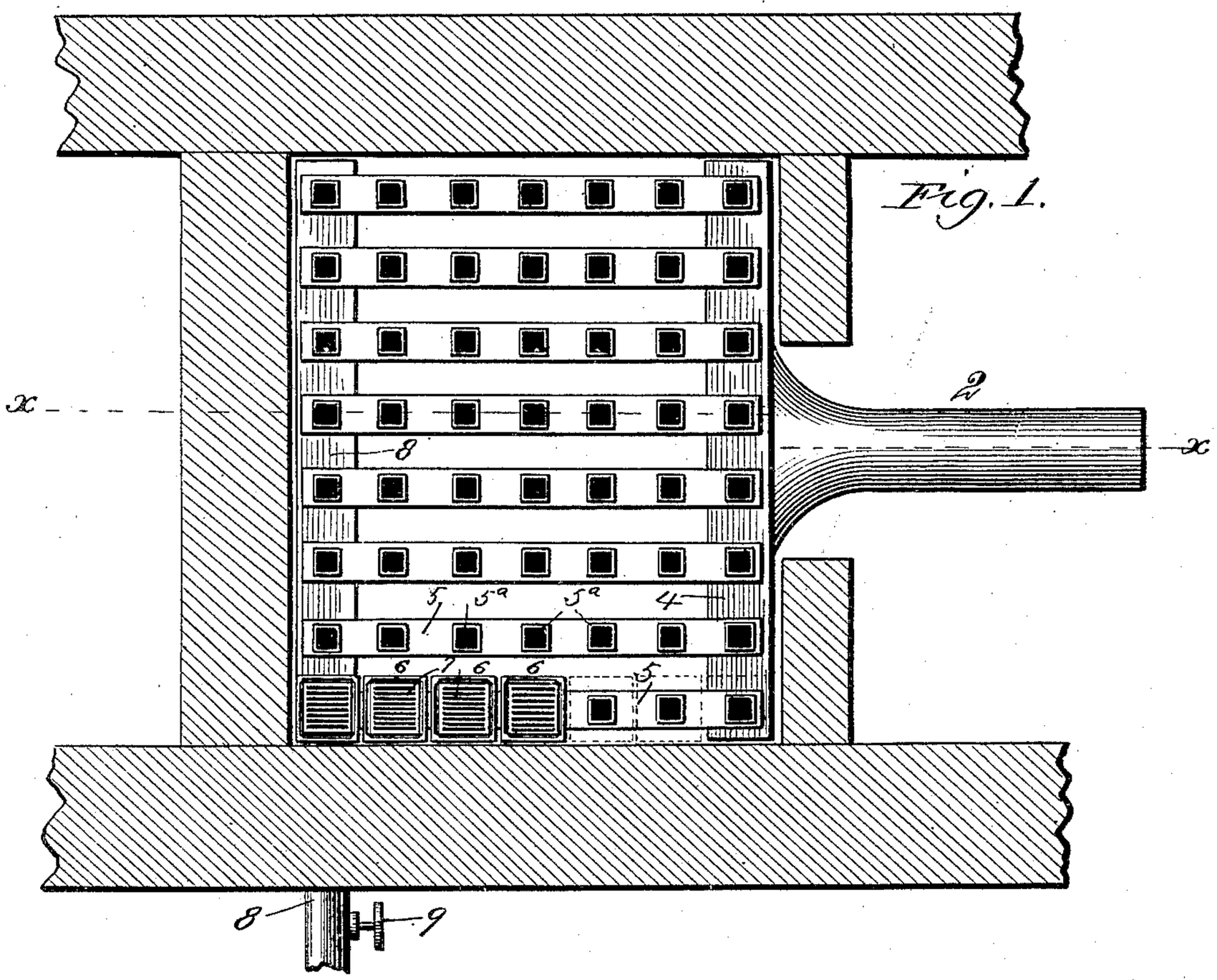


Fig. 1.

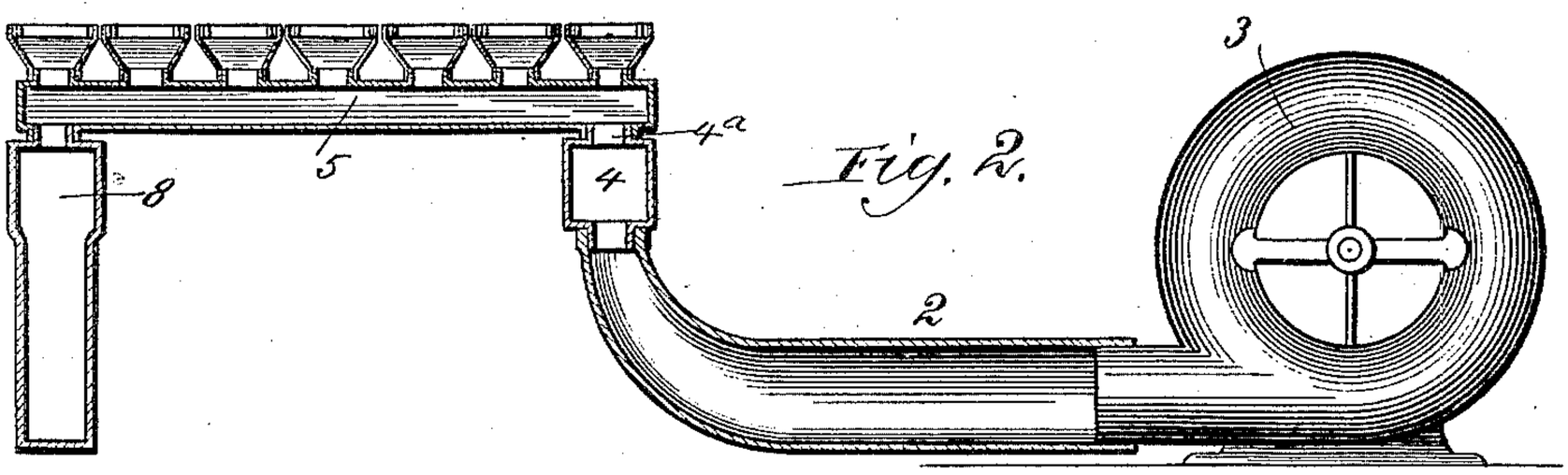
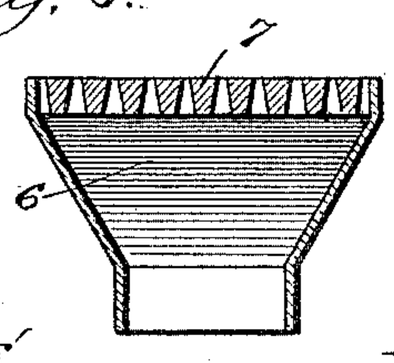


Fig. 2.

Fig. 3.



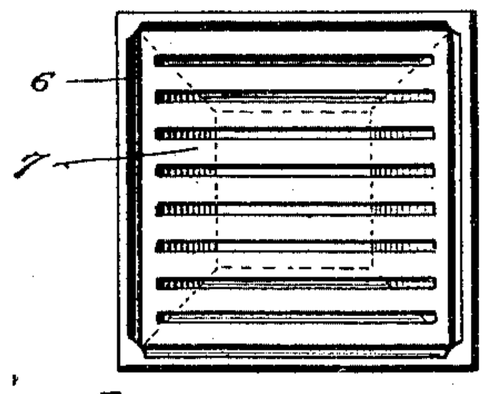
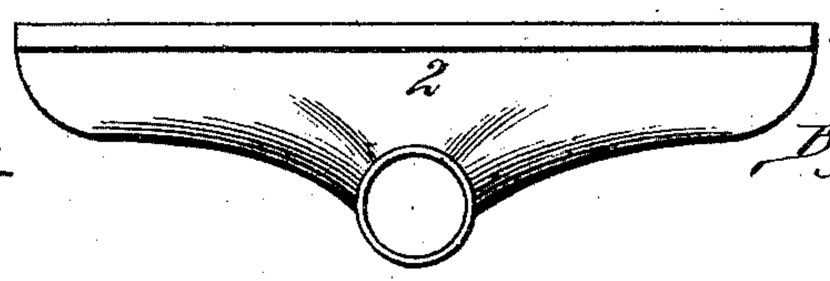


Fig. 4.

Fig 5.



Witnesses:
C. Prosser
Wm. W. Wallis

Inventor
Henry Petersen
By Raymond & Weeder
Attys

UNITED STATES PATENT OFFICE.

HENRY PETERSEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO JAMES O. PARKER, TRUSTEE, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 444,671, dated January 13, 1891.

Application filed October 22, 1889. Serial No. 327,784. (No model.)

To all whom it may concern:

Be it known that I, HENRY PETERSEN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Furnaces, of which the following is a specification.

My invention is applicable to a variety of heating-furnaces, but is intended especially for use under steam-boilers, and I have therefore shown a furnace adapted to such use in the accompanying drawings.

The object of my invention is to effect a thorough combustion of the fuel and to utilize low-grade materials, such as hard and soft coal screenings, tan-bark, and other substances. To attain this object I construct the furnace with a view to a minute division of the air-currents (which I supply under pressure by a fan or equivalent device) and avoid the cutting of the fire into sections by dead-air spaces on the grate-surface, the structure of the grates and their supports being such as to allow the air to flow uniformly through the grate.

To burn finely-powdered fuel it is desirable to have the grate-openings very small, not merely to prevent the fuel from sifting through, but to divide the air-currents sufficiently to get at the best results in combustion.

My invention is intended to provide an ample aggregate area of minute openings for the inlet of air in such a structure as shall by its freedom from a tendency to warp under the heat of the furnace not be liable to closure or choking or undue enlargement of the air-openings.

In the accompanying drawings, Figure 1 is a plan view of the grate, showing the furnace-walls in section. Fig. 2 is a longitudinal section on the broken line *x x*, Fig. 1. Fig. 3 is a cross-section, and Fig. 4 a plan view on an enlarged scale, of one of the furnace-gratings. Fig. 5 is a front view of the air-blast pipe.

2, Figs. 1 and 2, is the air-pipe leading from the fan 3 or other means of supplying the air under pressure to the furnace. Across the front of the furnace is an air-pipe 4, which for convenience of attachment of the parts I prefer to make of square section, as shown. The air-pipe 2 is broadened at its junction with the air-pipe 4, so that its mouth extends nearly the whole length of said pipe 4. This is done in order to secure a better distribution of the air-blast. The upper side of the pipe 4 is provided with a number of flanged openings 4^a, to each of which is attached an air-tube 5, extending longitudinally through the furnace. The tubes 5 are likewise provided with a number of flange-openings 5^a, to each of which is attached a short vertical tube 6, preferably flared at its top, so that the enlarged upper ends of the tubes are in contact with each other, or very nearly so. In the flared tops of said tube 6 foraminous or perforated plates or gratings 7 are set. The said gratings or plates 7 are made slightly smaller than the opening in the top of the flared tube 6, so that a narrow opening is left between their edges and the side of the tube, as may be seen by reference to Fig. 4, the proportional size of the opening, however, being exaggerated on account of the reduced scale of the drawings. The openings through the plate 7 are preferably in the form of narrow slots not exceeding an eighth of an inch in width, as this form of opening is more easily made sufficiently narrow by casting than a circular opening, and being made wider at the bottom prevents the grate from being choked up.

While I do not wish to be confined to any precise width of opening in the grate, I find by experience that a slot as narrow as an eighth of an inch, and in some cases a sixteenth of an inch, gives the best results.

To provide for clearing the air-tubes and passages from the ashes which sift through the grate from time to time, I provide an air-eduction pipe 8 at the back end of the furnace, to which the air-tubes 5 are connected in a manner similar to their connection with the air-induction pipe 4. This pipe is extended to some point outside of the furnace, as shown in Fig. 1, and a valve 9, of any construction which when opened will afford an unobstructed passage through the pipe 8, is attached to its outer end. This valve is usually closed, but is opened occasionally in order

to allow the air-blast to blow through and carry out any ashes which may have accumulated in the air-pipes.

What I claim, and desire to secure by Letters Patent, is—

1. In a furnace-grate, a series of vertical tubes of polygonal cross-section set closely together and with their tubular connections forming air-passages, the upper ends of said vertical tubes being provided with foraminous plates which, together with the upper edges of said tubes, form the entire grate-surface, substantially as described.

2. In a furnace-grate, a series of flared tubes and tubular supports together forming air-passages, said flared tubes having their enlarged ends uppermost, in combination with foraminous plates set in the flared ends of said tubes and forming the grate-surface, substantially as described.

3. In a furnace-grate, a series of flared tubes of polygonal section forming air-passages and having their larger ends uppermost and in close contiguity, in combination with foraminous plates set in the flared ends of said tubes and having air-passages between the edges of said plates and the tube ends, substantially as described.

4. In a furnace-grate, the combination of a series of air-tubes traversing the furnace, having openings on their top surfaces, in which are affixed flared vertical tubes having their larger ends uppermost, and foraminous plates set in the upper ends of said tubes and forming the grate-surface, substantially as described.

5. In a furnace-grate, a series of hollow chambers having foraminous covers, combined with an air-distributing conduit or conduits and air-pipes leading from said conduit or conduits to said hollow chambers, substantially as specified.

HENRY PETERSEN.

Witnesses:
IRWIN VEEDER,
P. H. T. MASON.