

No. 746,008.

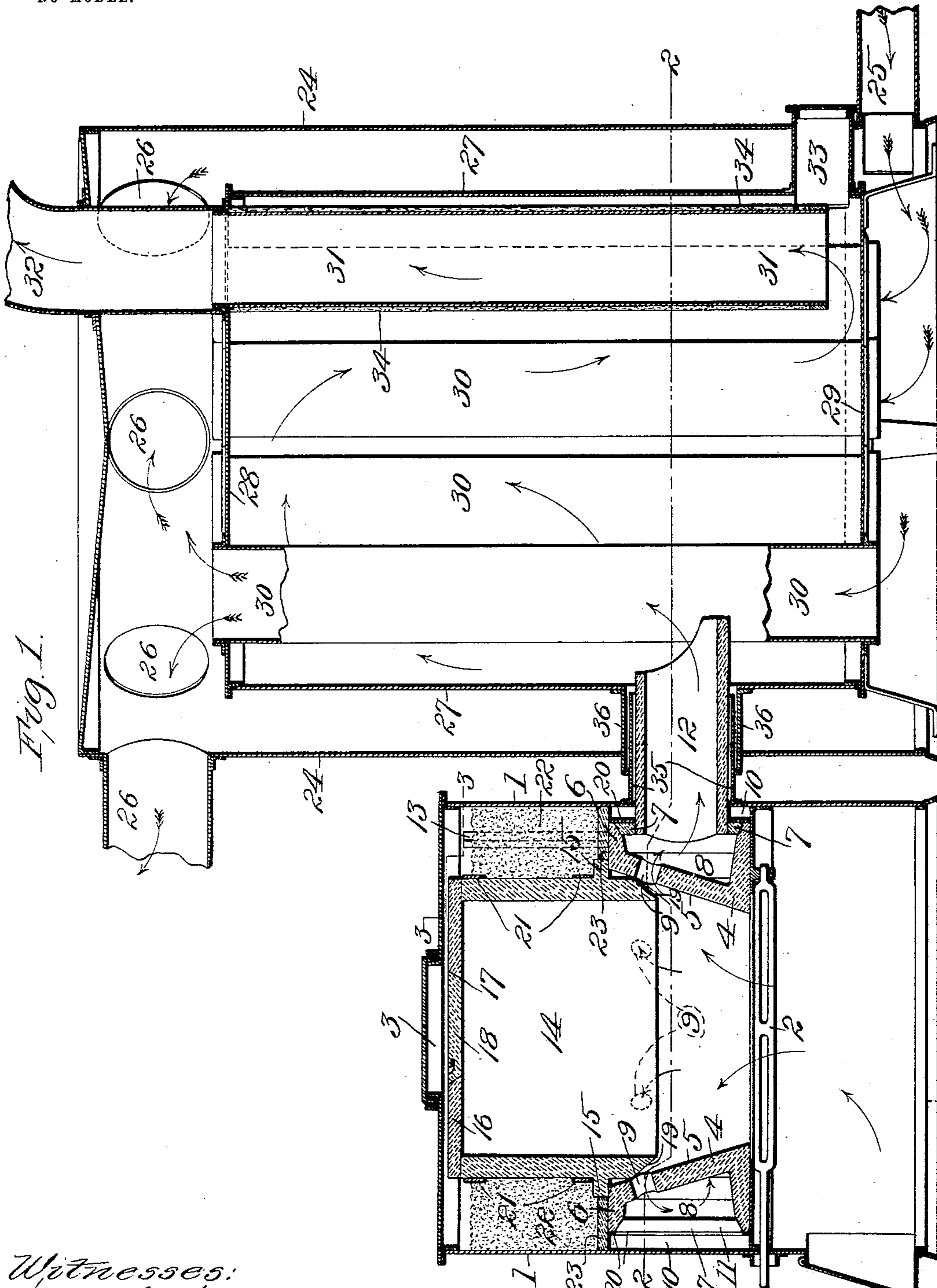
PATENTED DEC. 8, 1903.

P. M. BRUNER.
HOT AIR FURNACE.

APPLICATION FILED AUG. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



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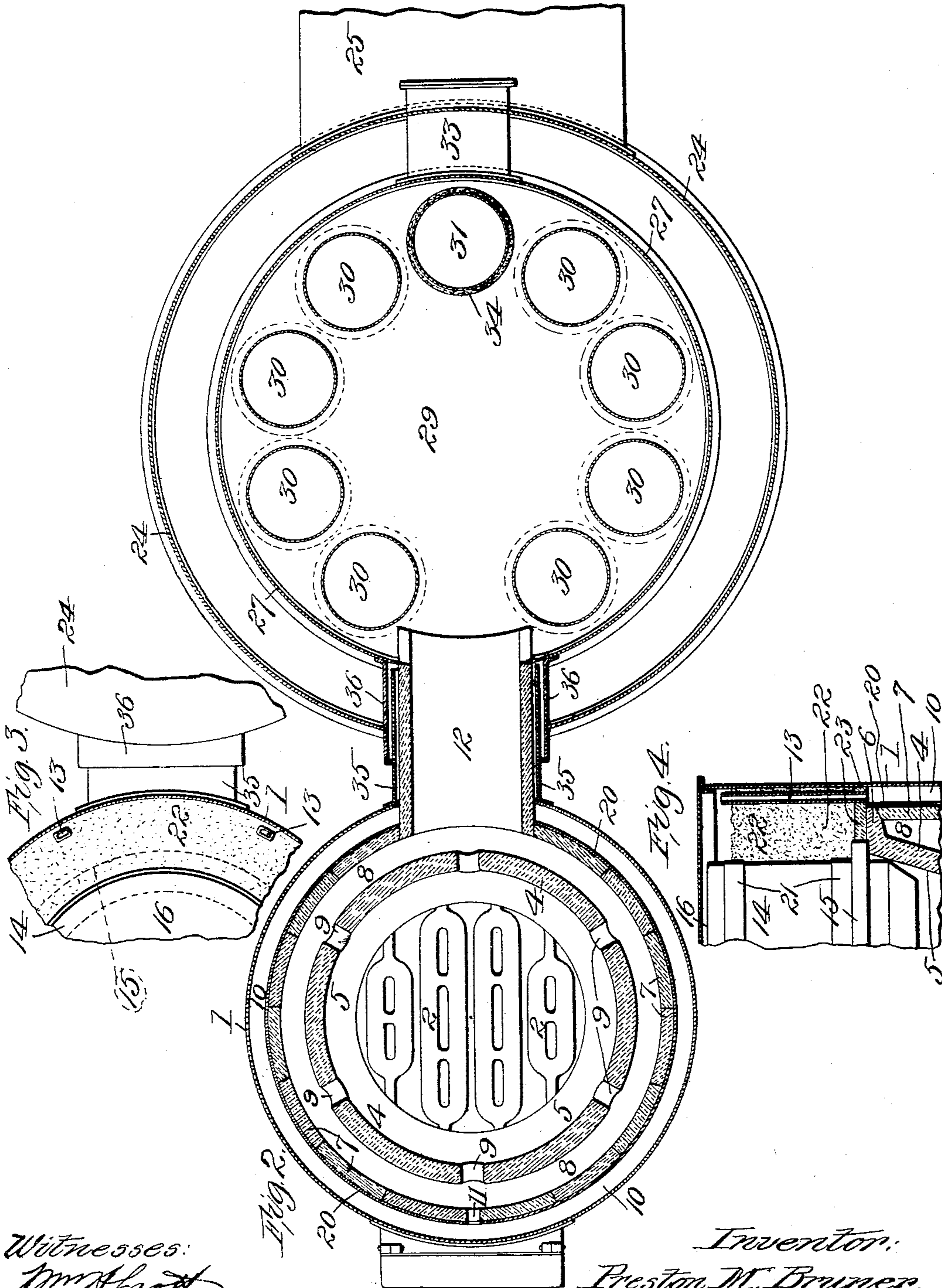
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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

PRESTON M. BRUNER, OF LEBANON, ILLINOIS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 746,008, dated December 8, 1903.

Application filed August 14, 1902. Serial No. 119,623. (No model.)

To all whom it may concern:

Be it known that I, PRESTON M. BRUNER, a citizen of the United States, residing at Lebanon, county of St. Clair, State of Illinois, have
 5 invented a certain new and useful Improvement in Hot-Air Furnaces, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same,
 10 reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical sectional elevation. Fig. 2 is a horizontal sectional view
 15 on the line 2 2, Fig. 1. Fig. 3 is a detail view on the line 3 3 of Fig. 1; and Fig. 4 is a detail view, in sectional elevation, through one of the pipes passing through the sand.

My invention relates to improvements in
 20 hot-air furnaces, my object being to provide a simple, inexpensive, and efficient construction.

To this end and also to improve generally upon devices of the character indicated, my
 25 invention consists in the various matters hereinafter described and claimed.

Referring now more particularly to the drawings, 1 indicates the shell of the furnace, said shell supporting the grate-bars 2
 30 in an appropriate manner and having in its top an opening 3, through which the furnace can be fed with fuel. Suitably supported above the grate-bars is the fire-pot lining 4, which is provided with an upwardly and out-
 35 wardly inclined wall 5, having outwardly-extending flanges 6 at its top and bottom. Tiles 7 are secured against the flanges 6, whereby an inner chamber 8 is produced in the lining, there being openings 9 communi-
 40 cating between the fire-pot and the said chamber. The said lining is spaced from the casing to produce an air-space 10 between the said parts, and at the front of the furnace a space 11 is left between appropriate
 45 tiles to provide communication between said air-space and the said inner chamber. A flue 12 extends from the said inner chamber at the back of the furnace. Suitable pas-
 50 sages are provided for introducing air into the space 10, and further reference will be hereinafter made to said passages.

Fuel being placed upon the grate-bars and

a fire being made, the heated gases and prod-
 ucts of combustion pass through the openings
 9 into the chamber 8 and traverse said cham-
 55 ber to the escape-flue 12. Air is admitted through the pipes 13 to the space 10, said
 pipes entering the said space 10 at the back of the furnace, and as this air enters the
 60 chamber 8 through the air-passage 11 it supplies any needed oxygen to the heated gases and products of combustion. Furthermore,
 as the air is admitted to the space 10 at the back of the furnace and must pass to the
 65 other side of the furnace before entering the chamber 8, this air becomes heated in its passage and also serves to prevent radiation
 of heat from the furnace-casing, any heat radiating from the fire-pot lining being taken
 70 up by the incoming air which is directed to the chamber in the fire-pot lining, and finally discharged from the furnace for heating pur-
 poses.

A magazine-casing 14 in the form of a bell has lateral projections (or a flange) 15, which
 75 rest upon the fire-pot lining, and the top plate 16 of said bell is provided with an opening 17 in line with the casing-opening 3, said opening having a closure 18. The vertical wall of the
 bell 14 extends below the openings 9, but
 80 does not close the same, said wall being conveniently beveled upwardly and inwardly, as shown at 19. Thus fuel in the magazine cannot enter and clog the openings 9, and a sufficient space is provided for the passage of the
 85 gases and products of combustion to the said openings. Preferably a binding-plate 20 extends about the fire-pot lining, and binding rings or hoops 21 extend about the magazine-shell, said plate or band 20 serving to close
 90 any cracks which may occur in the fire-pot shell. The vertical wall of said magazine is spaced from the casing, and the space above the fire-pot lining and outside of the said bell
 95 is preferably filled with some loose material 22, such as sand. This serves to hold the parts in proper position, and the material can be readily removed should it be desired to ob-
 100 tain access to the bell or the fire-pot lining. A layer 23 of clay or the like is placed above the fire-pot lining and below the sand, where-
 by the sand is prevented from entering the air-space 10. Vertical air-pipes 13 extend through the sand and have their open ends

above the same, said pipes entering the air-space 10 at the back of the furnace. The top plate 16 of the bell is spaced a sufficient distance from the top plate of the casing to permit passage of air from the said opening 3 to the pipes 13. Thus the opening 17 can be closed, whereby air is prevented from passing through the magazine to the fire-pot, and at the same time atmospheric air can be admitted to the chamber 8 through the opening 3 and the pipes 13.

The furnace is suitably connected to a heating-drum, and this drum has a mantle 24, which is provided with a cold-air inlet 25 and has the usual hot-air pipes 26 leading from its upper portion. Within this mantle is supported a casing having a vertical wall 27 and top and bottom walls 28 and 29, respectively, air-pipes 30 extending between the top and bottom walls. The smoke-pipe 31 depends from the said top wall and has its open end near and a short distance above the said bottom wall, a suitable pipe 32, connected to said smoke-pipe, leading from the mantle. The casing can be conveniently provided with a clean-out opening 33 near its bottom wall. The flue 12 leads into the space inclosed by the said casing, and the heated gases from the furnace pass into said casing and circulate around the pipes 30, the warmer air, of course, being in the top of said casing and the colder air falling to the bottom. This colder air finally finds its way into the open end of the smoke-pipe and escapes. Preferably the smoke-pipe is covered with some non-heat-conducting material 34, such as asbestos, in order that the warm air surrounding the smoke-pipe may not have its temperature lowered by the cooler air passing through the smoke-pipe. The colder air in the lower portion of the space inclosed by the mantle 24 passes upwardly through the pipes 30 and through the space between the casing and the mantle, said air being thus heated before it is delivered to the pipes 26.

Preferably the furnace and the heating-drum are provided with telescoping pipes 35 and 36, respectively, whereby the said furnace and drum are connected. The flue 12 extends loosely through the said pipes, whereby an air-space is presented between the said flue and the pipes, and preferably the said pipes are spaced some little distance from each other in order to provide a second air-space. These air-spaces serve to prevent loss of heat by radiation from the flue. Furthermore, the joint between the furnace and the heating-drum is outside of the latter, whereby if any gases escape from the furnace they are not fed into the heating-drum, and thus made to pollute the air to be heated.

I am aware that minor changes in the construction, arrangement, and combination of the several parts of my furnace may be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a furnace or the like, a lining comprising an integral wall, top and bottom flanges integral with said wall and projecting upon the same side of the same, a wall composed of slabs abutting against said flanges, and a band about said slabs and binding them against said flanges; substantially as described.

2. In a furnace or the like, a casing, a lining having an interior chamber, said lining being spaced from said casing, a flue leading from said chamber, there being openings leading to said chamber from the fire-pot and the space between said lining and said casing, and means for supplying air to said space; substantially as described.

3. In a furnace or the like, a casing, a lining having an interior chamber, there being an air-space between said lining and said casing, openings between said chamber and the fire-pot, a flue leading from said chamber, an opening between said air-space and said chamber upon the side of the lining opposite said flue, and means for admitting air to said space upon the side thereof opposite said last-mentioned opening; substantially as described.

4. In a furnace or the like, a fire-pot, a lining therefor and having formed therein an interior chamber which extends about the combustion zone of the fire-pot, means for admitting air to said chamber, and a flue leading from said chamber; substantially as described.

5. In a furnace or the like, a casing, a lining, a magazine-shell supported upon said lining and spaced from said casing, and loose packing material filling the space between the side of said casing and said shell; substantially as described.

6. In a furnace or the like, a casing, a combustion-chamber therein, a magazine leading to said chamber and having its wall spaced from said casing, there being an air-passage between said wall and said casing, said passage leading to said chamber and having an opening to atmosphere, and means for closing communication between said magazine and said air-passage; substantially as described.

7. In a furnace or the like, a casing having an opening to atmosphere, a combustion-chamber in said casing, a magazine in said casing and emptying into said combustion-chamber, said magazine being provided with an opening substantially in line with said casing-opening and being spaced from said casing, there being an air-passage between said magazine and said casing and leading to said combustion-chamber, the said casing-opening leading to said passage, and a closure for said magazine-opening; substantially as described.

8. In a furnace or the like, a casing, a lining having an interior chamber and spaced

from said casing to produce an air-space, there being an opening between said air-space and said chamber, a magazine-shell spaced from said casing and emptying into the space inclosed by said lining, loose material between
5 said shell and said casing but not entering said air-space, and means for admitting air to said air-space; substantially as described.

9. In a furnace or the like, a casing, a lining having an interior chamber and spaced
10 from said casing to produce an air-space, there being an opening between said air-space and said chamber, a magazine-shell spaced from said casing and emptying into the space inclosed by said lining, loose material between
15 said shell and said casing but not entering said air-space, and an air-pipe extending through said material and leading to said air-space; substantially as described.

20 10. In a furnace or the like, a casing, a lining having an interior chamber and openings communicating between the fire-pot and said chamber, a flue leading from said chamber, a magazine-shell in said casing and provided
25 with an opening and a closure therefor, said casing having an opening leading to said magazine-shell opening, there being an air-passage from said casing opening to said chamber; substantially as described.

30 11. In a furnace or the like, a fire-pot lining formed with openings in its fuel-inclosing wall, and a magazine-shell whose lower end extends over and is spaced from said openings to prevent fuel entering said openings
35 and to produce a passage leading from said fire-pot to said openings; substantially as described.

12. The combination with a furnace having an exit-flue, of a heating-drum isolated from said furnace except through said flue and including an air-casing which is confined to said
40 heating-drum and excludes said furnace, and pipes connecting said furnace and heating-drum, the joint between said pipes being a relatively loose one and located outside of
45 said heating-drum and said air-casing; substantially as described.

13. In a furnace or the like, a fire-pot whose fuel-inclosing wall is provided with an interior chamber for receiving and collecting the
50 heated gases and products of combustion, passages communicating between said chamber and the fuel-space inclosed by said wall, an escape-flue from said chamber, and a magazine-shell supported upon said fire-pot
55 wall; substantially as described.

14. In a furnace or the like, a casing, an insertible fire-pot in said casing and having its fuel-inclosing wall provided with an interior chamber for receiving and collecting the
60 heated gases and products of combustion, passages communicating between said chamber and the fuel-space inclosed by said wall, an escape-flue from said chamber, and an insertible magazine-shell in said casing and supported upon said fire-pot wall; substantially
65 as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 12th day of August, 1902.

PRESTON M. BRUNER.

Witnesses:

F. R. CORNWALL,
WM. H. SCOTT.