

No. 726,173.

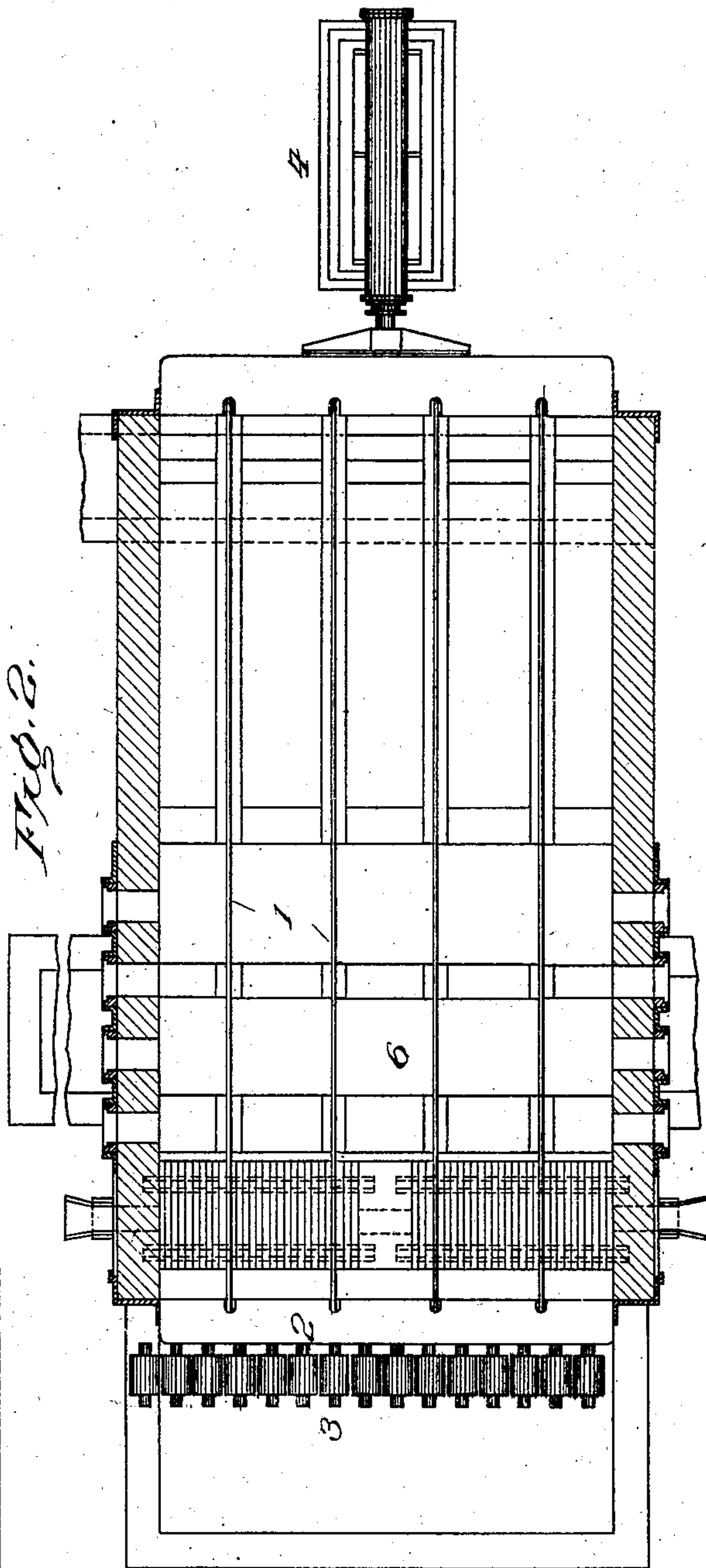
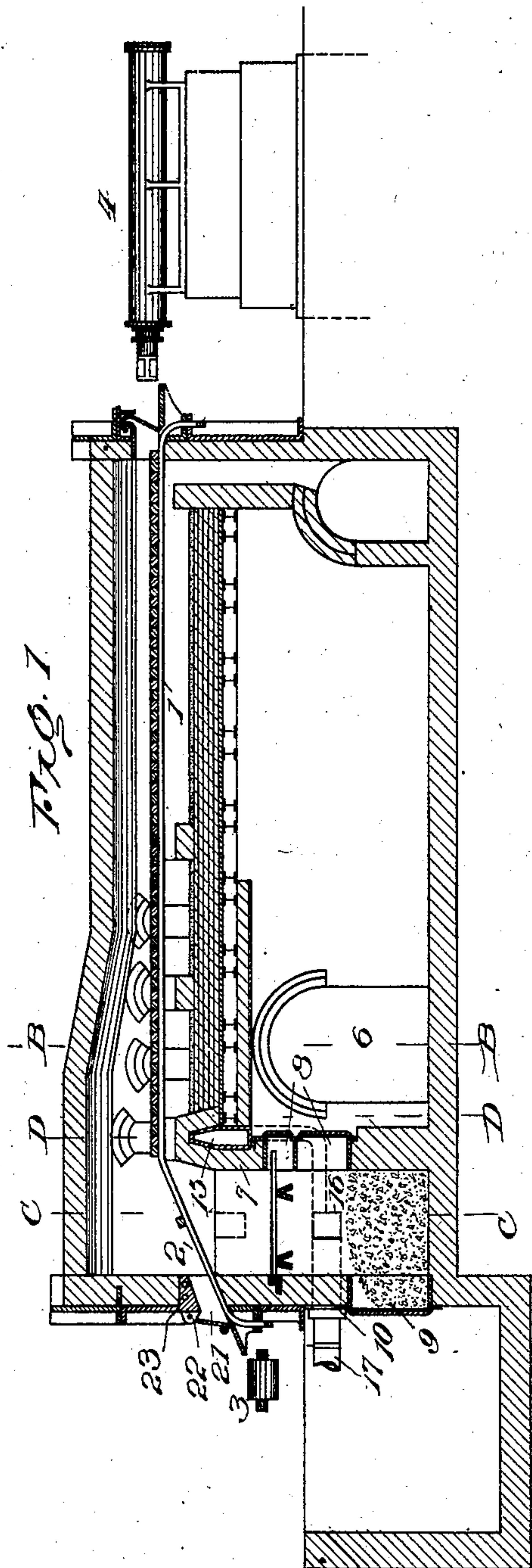
PATENTED APR. 21, 1903.

A. LAUGHLIN & J. REULEAUX.
CONTINUOUS HEATING FURNACE.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



WITNESSES

John D. Smith
Charles L. Smith

INVENTORS

Alexander Laughlin
Josef Reuleaux

John D. Smith

ATTY.

No. 726,173.

PATENTED APR. 21, 1903.

A. LAUGHLIN & J. REULEAUX.
CONTINUOUS HEATING FURNACE.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

4 SHEETS—SHEET 2.

Fig. 3

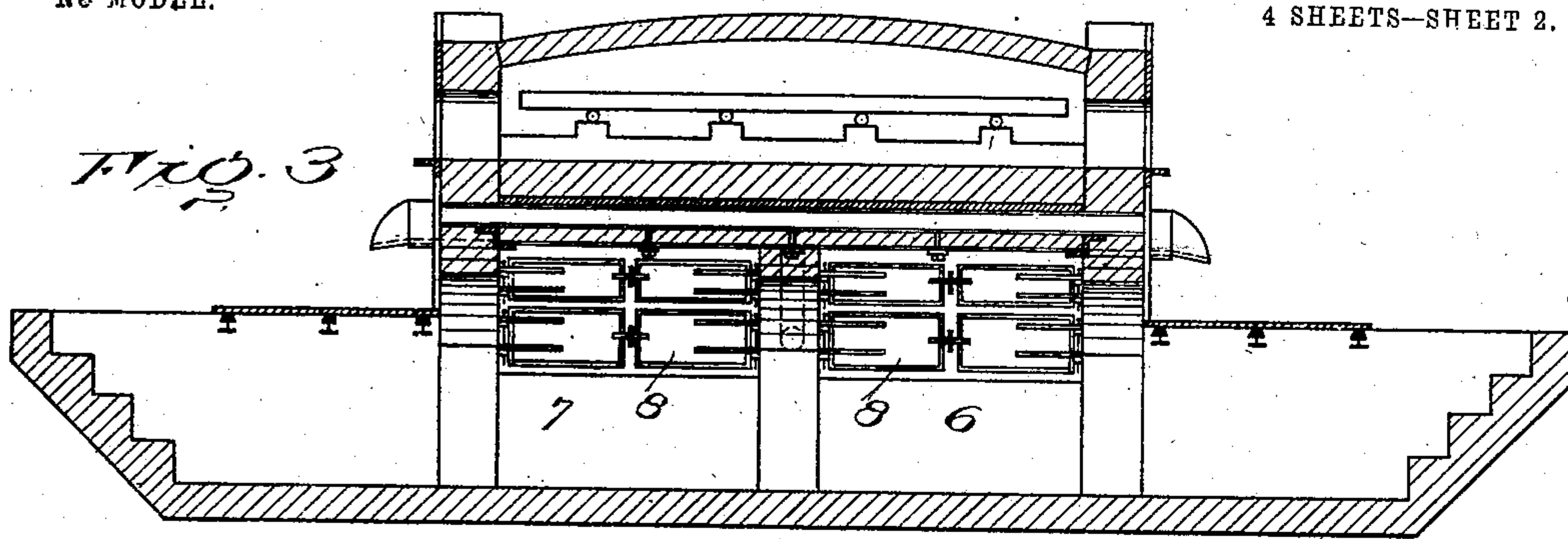


Fig. 4

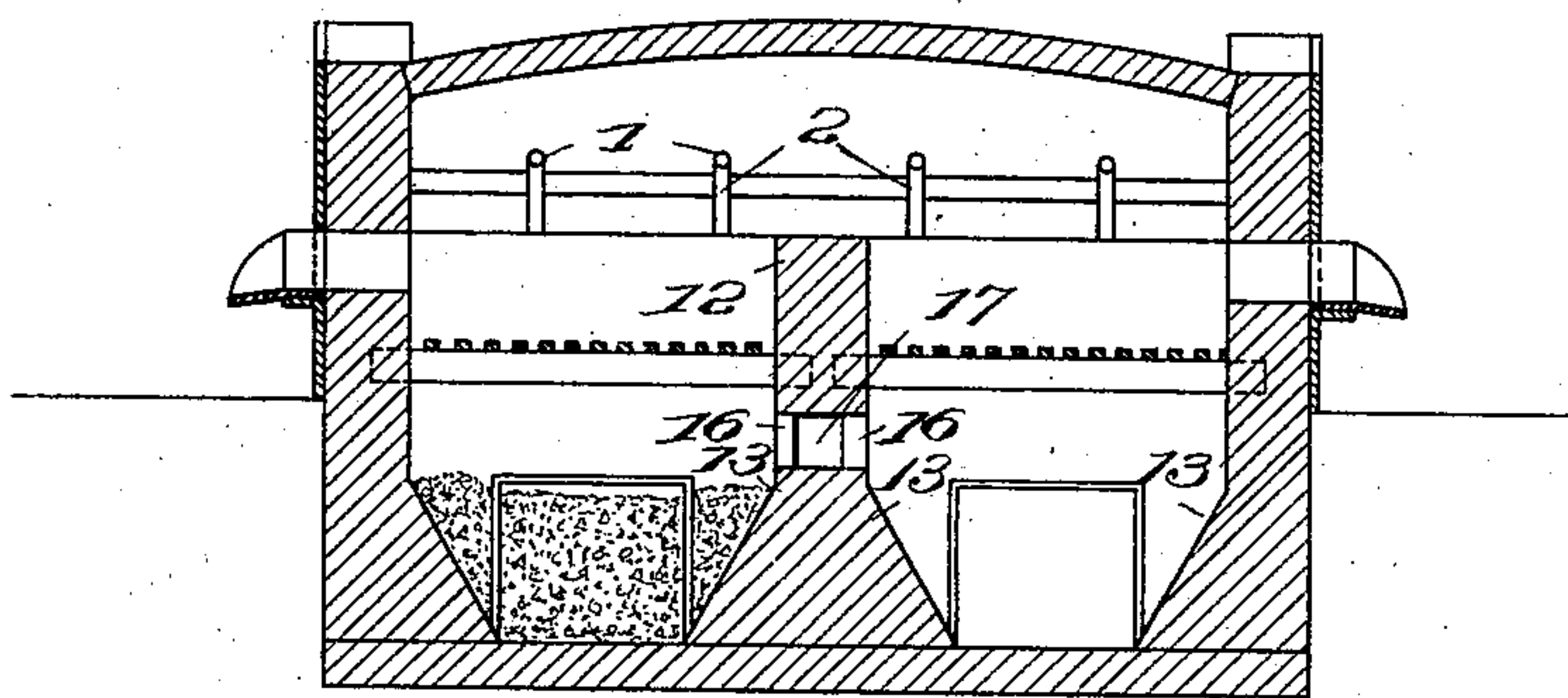
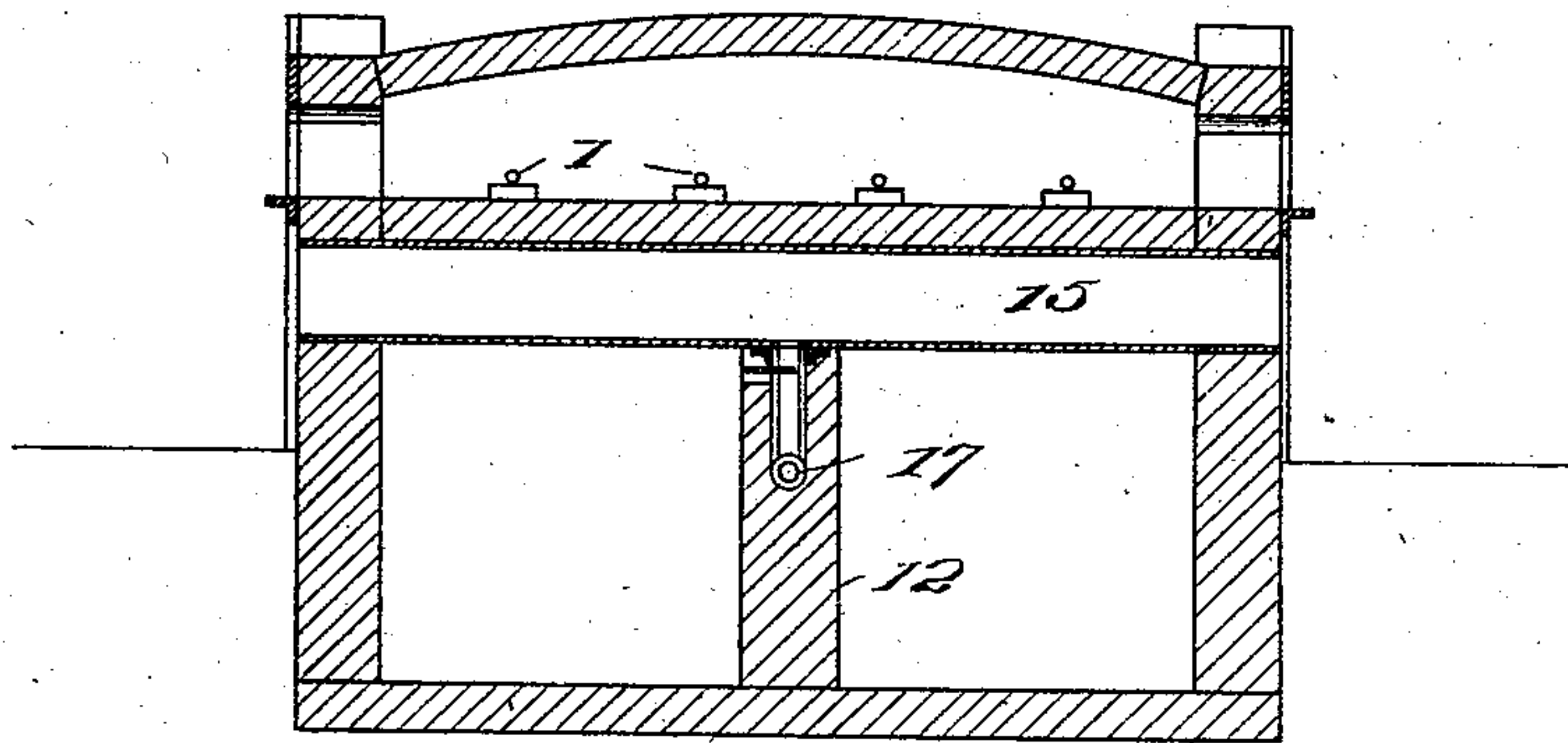


Fig. 5



WITNESSES:

John M. ...
Charles L. ...

INVENTORS

Alexander Laughlin
Josef Reuleaux

J. M. ...

Att'y.

No. 726,173.

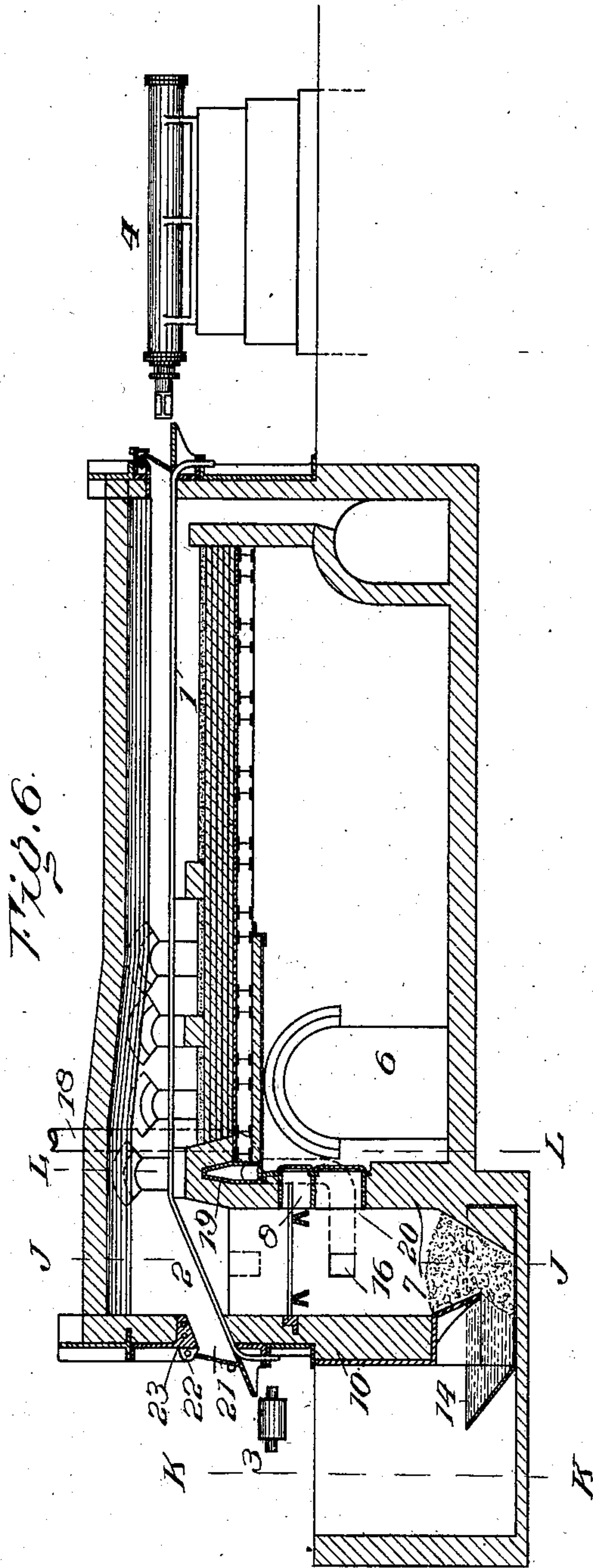
PATENTED APR. 21, 1903.

A. LAUGHLIN & J. REULEAUX.
CONTINUOUS HEATING FURNACE.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

4 SHEETS—SHEET 3.



WITNESSES

Pro Veritas
Charles L. McMillan

INVENTORS

Alexander Laughlin
Josef Reuleaux

by J. H. McMillan

ATTY.

No. 726,173.

PATENTED APR. 21, 1903.

A. LAUGHLIN & J. REULEAUX.
CONTINUOUS HEATING FURNACE.

APPLICATION FILED JAN. 12, 1903.

NO MODEL.

4 SHEETS—SHEET 4.

Fig. 7

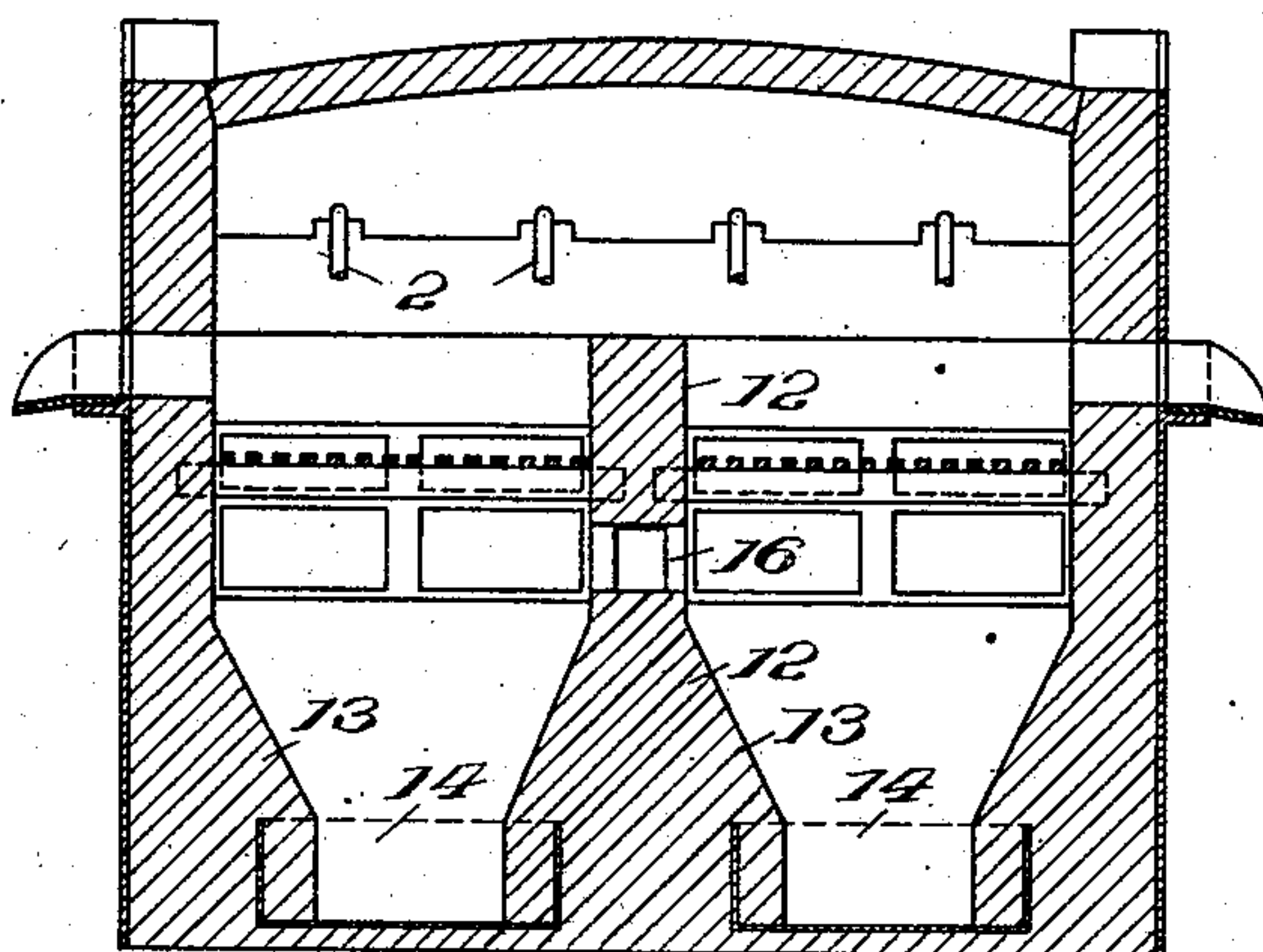


Fig. 8

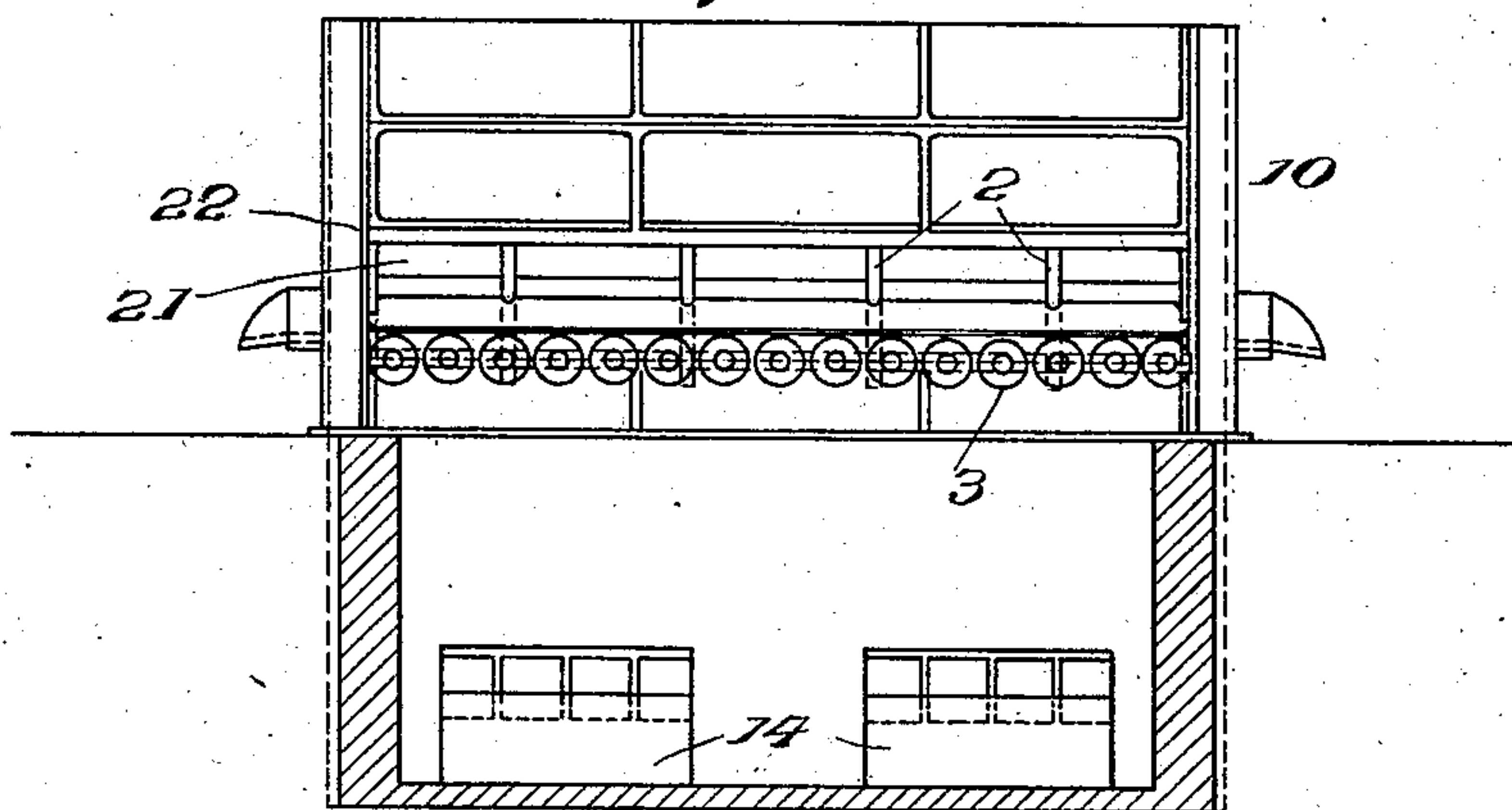
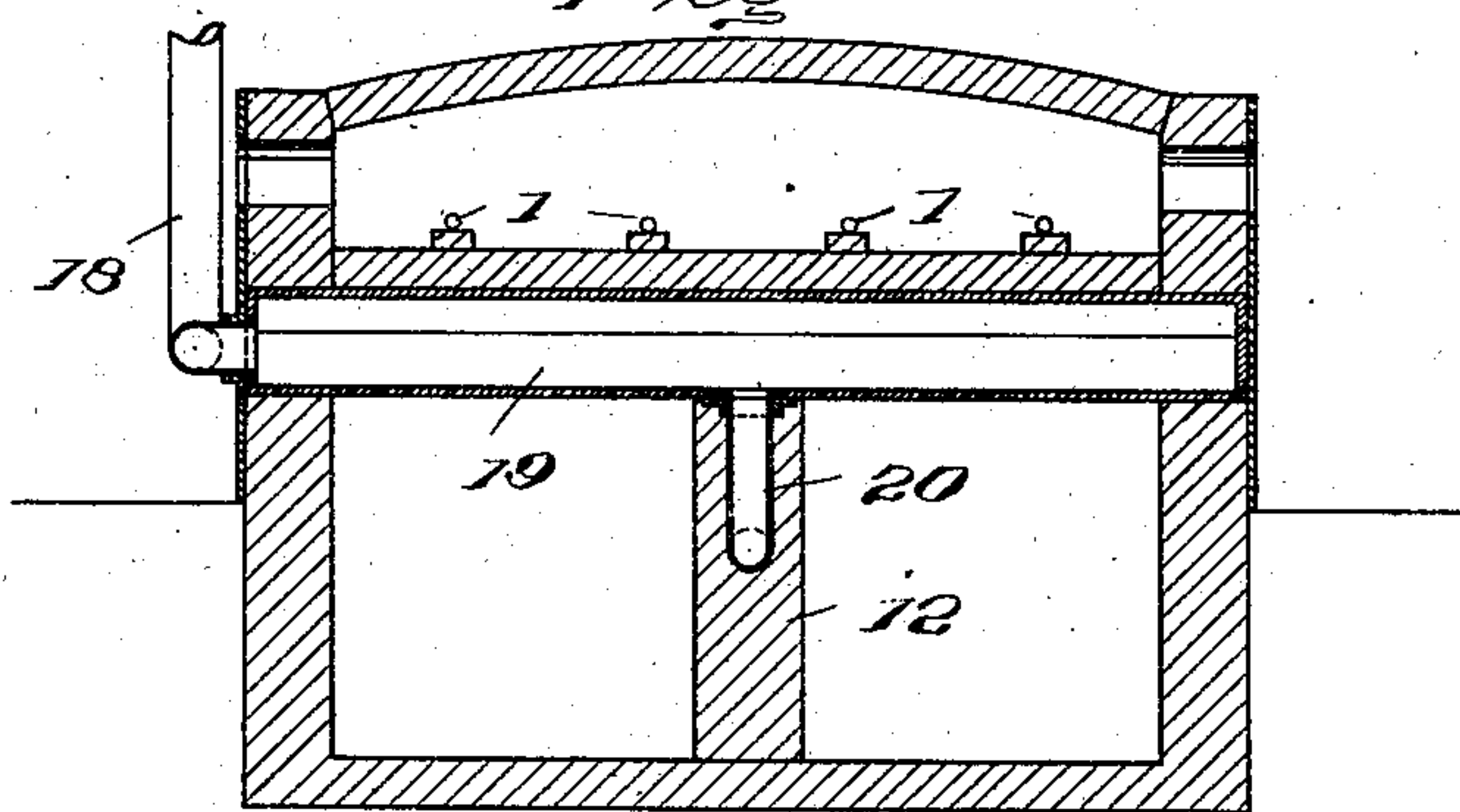


Fig. 9



WITNESSES:

John Miller
Charles L. Miller

INVENTORS

Alexander Laughlin
Josef Reuleaux

John Miller

Att'y.

UNITED STATES PATENT OFFICE.

ALEXANDER LAUGHLIN, OF SEWICKLEY, AND JOSEF REULEAUX, OF WILKINSBURG, PENNSYLVANIA; SAID REULEAUX ASSIGNOR TO SAID LAUGHLIN.

CONTINUOUS HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 726,173, dated April 21, 1903.

Application filed January 12, 1903. Serial No. 138,759. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER LAUGHLIN, of Sewickley, and JOSEF REULEAUX, of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Continuous Heating-Furnaces; and we do hereby 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.

This invention relates to continuous heating-furnaces of the class shown and described in reissued Letters Patent No. 11,666, issued to us May 31, 1898, and is more particularly identified with the form of furnace embraced by Letters Patent No. 680,997, issued to us August 20, 1901. In the furnaces disclosed by the said Letters Patent provision is made for effecting the automatic discharge of blooms, billets, or other material over or from the point of highest heat within the furnace, the materials being moved beyond such point independently of the means by which they were moved to it. Upon their discharge the materials fall upon a conveyer extended transversely of the furnace at the end thereof.

The objects of the present improvements are, first, to so adapt such automatic discharge feature to a coal or solid-fuel furnace that access may be readily had to the fire-bed and ash-pit of an extra-wide furnace without interfering with the conveyer onto which the material is discharged; secondly, to so connect the air-blast and the chill in the furnace-breast that air will be forced both into the fire-box and through the chill and may be heated before entering the former, and, finally, to improve the construction and promote the efficiency of coal-fired furnaces employing means for automatically discharging the material directly over the fire-bed.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view. Fig. 2 is a horizontal sectional view. Figs. 3, 4, and 5 are vertical cross-sectional views on lines B B, C C, and D D, respectively, Fig.

1. Fig. 6 is a vertical longitudinal sectional view showing a water-seal ash-pit and the air-blast connected first to the chill in the furnace-breast. Figs. 7, 8, and 9 are respectively vertical sectional views on lines J J, K K, and L L, Fig. 6.

As pointed out in the patents hereinbefore noted, the blooms, billets, or other material to be heated are introduced in the furnace at one end and mechanically pushed there through over supports extending longitudinally of the heating-chamber, and upon reaching the point of highest heat such material is automatically discharged by gravity over inclined supports and passing out the discharge-opening fall upon a conveyer.

In the several figures of the drawings, 1 designates the supports; 2, the inclined portions thereof; 3, the conveyer, and 4 the pusher whereby the material is pushed along the supports up to the point at which the discharge thereof is automatically effected.

In the several forms shown in the drawings we have provided coal or solid-fuel combustion-chambers over which the material is automatically discharged. We have found in actual practice that in a very wide furnace built to accommodate long material it is impossible to clean the fires from the end of the furnace because of the presence of the conveyer and that it cannot be done from the sides of the furnace, owing to the great distance to be reached in order to get to the middle of the fire-bed. To overcome these difficulties in wide furnaces, we construct a cleaning-pit 6 directly under the body of the furnace, and in the inner or breast wall 7 we form door-covered openings 8, so that the grate-bars may be operated to shake down the ashes or the fire bed or beds be otherwise worked. The space being necessarily contracted, provision is made for removing the ashes from the end of the furnace by the formation of door-covered openings 9 in the end wall 10, access being thus had to the ash-pit at points beneath the conveyer, the latter in no way interfering with access to the former. Thus the attendant is enabled to clean the fires through the upper set of doors in the inner or breast wall of the furnace and to re-

move the ashes through the lower set of doors in the outer wall beneath the conveyer.

In wide furnaces, such as we have described, it is preferable to divide the fire bed or chamber and ash-pit by a central partition 12, (see Fig. 4,) and we have found it advantageous to incline or taper the furnace side walls and partitions, as at 13, so that the ashes will be directed toward the center of each pit, from which they may be readily removed through comparatively narrow door-openings.

In Figs. 6, 7, and 8 we have shown the ash-pits with water-sealed openings, through which the ashes may be removed from the lower or supplemental pit 14, containing the water.

Extending transversely through the furnace breast-wall 7 is a chamber or passage-way forming a chill 15, the purpose of which is to preserve the wall by the presence or circulation of cold air. Air is also introduced into the fire-chambers beneath the grates through openings 16. In Figs. 1, 4, and 5 we have shown the air-blast 17 as extended through the partition 12 and opening first into the fire-chambers through the openings 16 and thence into the chill, so that air will be supplied both to the fire-chambers and the chill directly from the blast; but in some instances it is preferable to reverse this arrangement and supply the air first to the chill and thence to the fire-chambers, with the result that the chill is cooled and the air is warmed before entering the fire-chambers. This arrangement is shown in Figs. 6 and 9, the blast-pipe being 18 and the chill 19. A suitable connection 20 connects the chill to the openings 16, leading into the divided fire-chamber. (See Fig. 9.)

The opening 21 in the end wall 10, through which the material is automatically discharged, is of uniform height throughout its width (see Fig. 8) and is supported by a casting 22, which casting is water-cooled by the circulation of water through the pipes or tubular openings 23. When this discharge-opening is formed of brick, as heretofore, it has to be arched, and hence made very much higher at the middle of the furnace than at the sides; but by the employment of the water-cooled casting this opening may be of uniform height throughout its width, and the casting need be only sufficiently above the inclined supports to allow the material to pass freely out onto the conveyer.

As hereinbefore stated, the material to be heated is mechanically pushed forward over the longitudinally-extended supports up to the point at which it reaches the fire-chamber, whereupon as soon as it is directly above the fire-beds the blooms, billets, rails, or other materials will one at a time be automatically discharged over such bed and pass out onto the conveyer. Thus the materials are brought into close relation with the fire-beds while being discharged from the furnace.

By arranging the cleaning-pit beneath the body of the furnace an operator is enabled to work the fire-beds at every point regardless of the width of the furnace, and by locating the ash-pit openings in the end wall of the furnace—that is, in the wall opposite to that in which the other openings are formed—we are enabled to secure in a furnace of the character herein described all of the advantages of the automatic discharge and conveyer, as set forth in the before-noted patents.

We claim as our invention—

1. A continuous heating-furnace having, in combination, a discharge-opening at or near the rear end of the furnace, a fire-chamber within the furnace adjacent to such opening, said fire-chamber opening directly into the heating-chamber, supports for the materials being heated extending from the front end of the furnace over the fire-chamber to the said discharge-opening, and a cleaning-pit beneath the heating-chamber in rear of the inner wall of the fire-chamber, such fire-chamber having openings in said inner wall about on line with the fire-bed, and also having ash-removal openings in its end wall, as set forth.

2. A continuous heating-furnace having, in combination, a discharge-opening at or near the rear end of the furnace, a fire-chamber within the furnace adjacent to such opening, said fire-chamber opening directly into the heating-chamber, supports for the materials being heated extending from the front end of the furnace over the fire-chamber and to the said discharge-opening, a conveyer outside the furnace for receiving the materials as they leave the latter, and a cleaning-pit beneath the heating-chamber in rear of the inner wall of the fire-chamber, such fire-chamber having openings in said inner wall about on line with the fire-bed, and also having ash-removal openings in its end wall beneath said conveyer, as set forth.

3. A continuous heating-furnace having, in combination, a discharge-opening at or near the rear end of the furnace, a fire-chamber within the furnace adjacent to such opening, said fire-chamber opening directly into the heating-chamber, ash-pits beneath the fire-chambers, supports for the materials being heated extending from the front end of the furnace over the fire-chamber and to the said discharge-opening, a conveyer outside the furnace for receiving the materials as they leave the latter, a cleaning-pit beneath the heating-chamber in rear of the inner wall of the fire-chamber, such fire-chamber having openings in said inner wall about on line with the fire-bed, and also having ash-removal openings in its end wall beneath said conveyer, and a central partition within said fire-chamber, the opposite faces of such partition and the side walls of the fire-chamber being inclined toward the centers of the ash-pits, as set forth.

4. A continuous heating-furnace having, in combination, a discharge-opening at or near

the rear end of the furnace, a fire-chamber within the furnace having a breast-wall, an air-blast, a central partition within such fire-chamber, said partition having air-openings leading into each part of the divided fire-chamber, a chill within such breast-wall in communication with the air-blast, the latter supplying air to both the chill and the fire-chamber, supports for the material being heated extending from the front end of the furnace over said fire-chamber and to the said discharge-opening, the supports being inclined over said fire-chamber, and means for pushing the materials along the supports up to the fire-chamber, such materials being automatically discharged over such fire-chamber, as set forth.

5. A continuous heating-furnace having, in combination, a discharge-opening at or near the rear end of the furnace, a fire-chamber within the furnace having a breast-wall, a chill in such breast-wall, a partition centrally di-

viding the fire-chamber, having air-openings leading into each part of the divided fire-chamber, a connection between the chill and said air-openings, an air-blast opening into the chill, supports for the material being heated extending from the front end of the furnace over said fire-chamber and to the said discharge-opening, the supports being inclined over said fire-chamber, and means for pushing the materials along the supports up to the fire-chamber, such materials being automatically discharged over such fire-chamber, as set forth.

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

ALEXANDER LAUGHLIN.
JOSEF REULEAUX.

Witnesses:

THOMAS BUCKLEY,
NEWMAN GROVES.