

(No Model.)

4 Sheets—Sheet 1.

J. HEMPHILL.
FURNACE.

No. 549,962.

Patented Nov. 19, 1895.

FIG. 1.

II

II

WITNESSES:

Chas F. Miller.
J. C. Gaither

FIG. 2.

INVENTOR,

James Hemphill
by Dennis B. Wolcott
Att'y.

(No Model.)

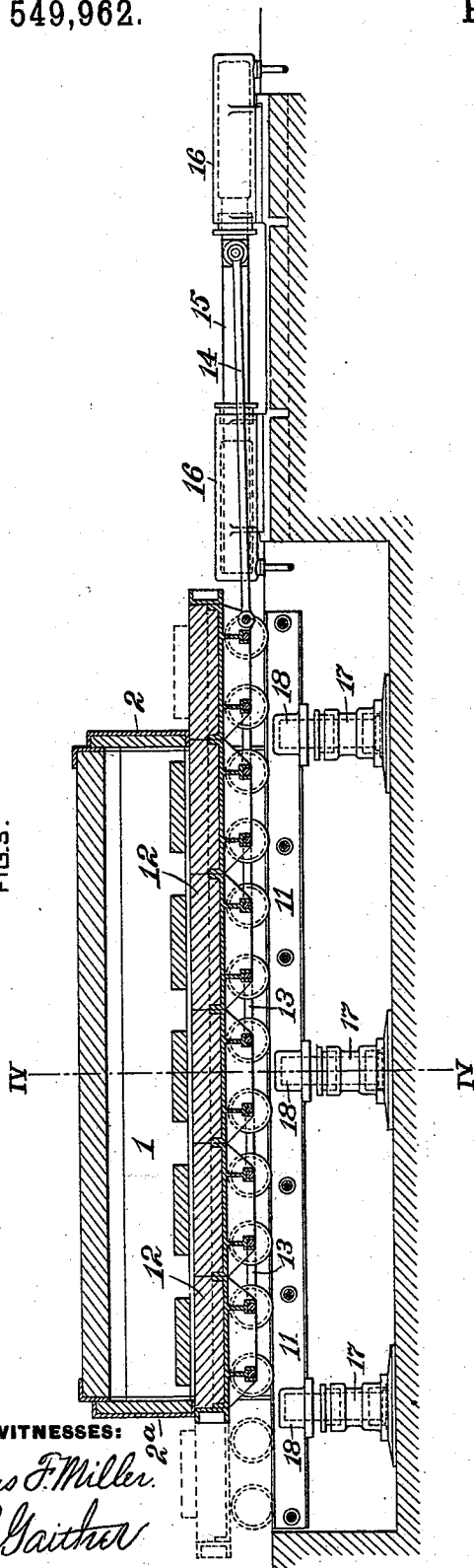
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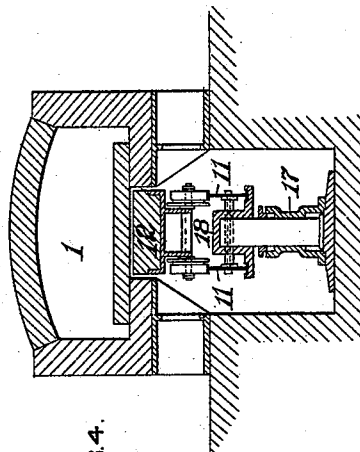
FIG. 3.



WITNESSES:

Chas F. Miller
J. E. Gaither

FIG. 4.



INVENTOR,

James Hemphill
by *Danini S. Wolcott* Att'y.

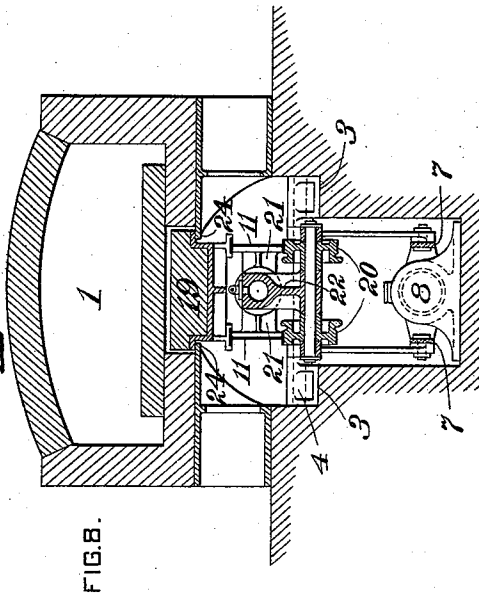
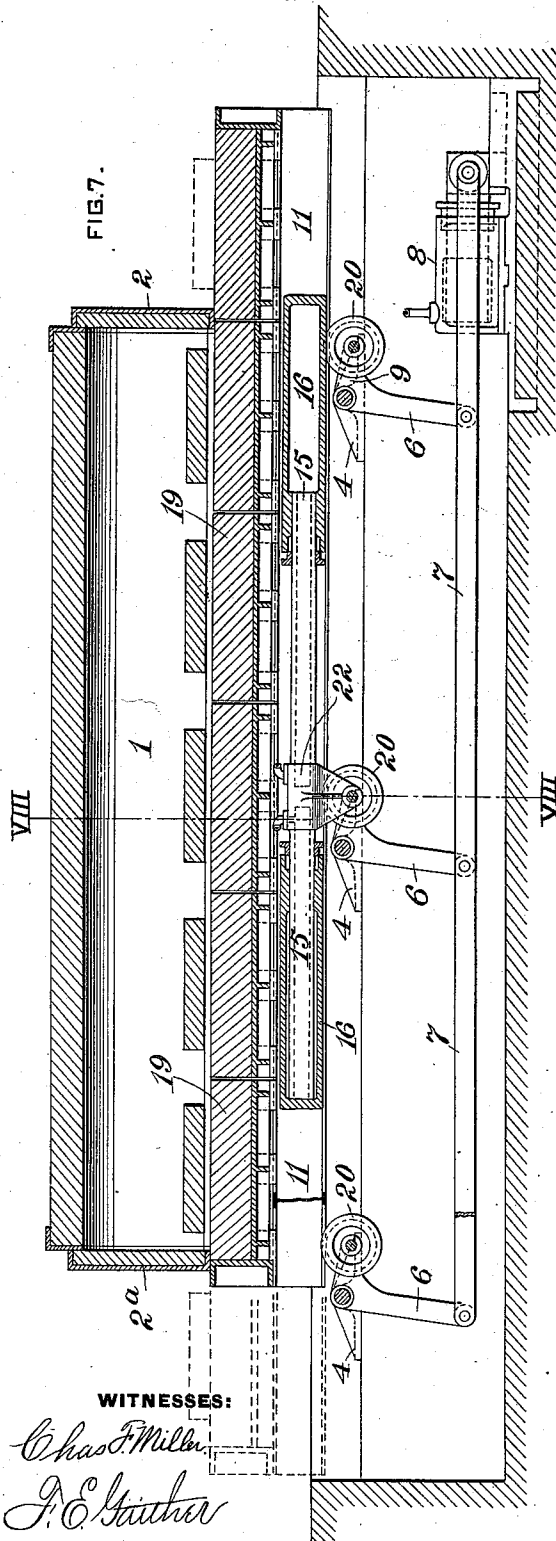
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4 Sheets—Sheet 4.

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Patented Nov. 19, 1895.



UNITED STATES PATENT OFFICE.

JAMES HEMPHILL, OF PITTSBURG, PENNSYLVANIA.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 549,962, dated November 19, 1895.

Application filed February 19, 1895. Serial No. 538,936. (No model.)

To all whom it may concern:

Be it known that I, JAMES HEMPHILL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Furnaces, of which improvements the following is a specification.

The invention described herein relates to certain improvements in heating-furnaces, and has for its object a construction of apparatus whereby the articles to be heated are moved progressively into, through, and out of the furnace by a step-by-step movement.

In general terms the invention consists in the construction and combination substantially as hereinafter more fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a longitudinal sectional elevation of my improved furnace. Fig. 2 is a transverse sectional elevation, the plane of section being indicated by the line II II, Fig. 1. Figs. 3, 5, and 7 are views similar to Fig. 1, illustrating certain modifications in the construction of the furnace. Figs. 4, 6, and 8 are transverse sectional views, the planes of section being indicated by the lines IV IV, VI VI, and VIII VIII, Figs. 3, 5, and 7, respectively.

In the practice of my invention the furnace, having any desired longitudinal and transverse dimensions, is provided with a bottom formed in two or more sections, one of which is movable. The ends of the furnace are closed, except when charging and removing articles, by doors 2 and 2', operated in any suitable manner. Upon ledges 3, projecting from the side walls of a pit over which the furnace is placed, or upon other suitable supports arranged in the pit, are placed pillow-blocks 4, supporting the transverse shafts 5. On the shafts are mounted bell-crank levers, having their longer arms 6 connected to rods 7, which in turn are connected to the piston of a fluid-pressure cylinder 8. The shorter arms 9 of the levers support blocks 10, which in turn support the beams 11. On these beams is mounted a truck 12, provided with a bed of refractory material, forming the movable section of the bottom. This truck, which, with

its superimposed bed of refractory material, is preferably formed in sections for convenience of repair, is made of a length greater than that of the furnace, so that a portion thereof will project beyond one or the other end of the furnace, and of such a width as to fit within a close longitudinal slot formed through the bottom of the furnace, but without binding against the edges of the slot. When the truck 12 is formed in sections, the latter are connected together so as to move in unison by side bars 13, fitting over the projecting ends of wheel-axes, as shown in Figs. 1, 2, 3, and 4. One end of the truck is connected by a rod 14 to the piston 15 of a fluid-pressure motor, which is preferably formed of two single-acting cylinders 16, arranged in line and having a piston common to both.

In using my improved furnace the article to be heated is placed transversely upon the end of the truck projecting beyond one end of the furnace, so that the ends of the article extend beyond the sides of the truck. The doors are then raised and fluid pressure is admitted to the cylinder 8, thereby so shifting the bell-cranks as to raise the truck, so that the article resting therein, and also the articles already in the furnace and resting on the bottom thereof, will be lifted a short distance from the bottom. Fluid pressure is then admitted to one of the cylinders 16, thereby shifting the truck 12, so that the article on the projecting end thereof will be carried into one end of the furnace. Those already in the furnace will be moved along one step, and the article at the rear end will be carried outside thereof. The doors are then closed and the truck lowered, thereby transferring the articles from the truck to the furnace-bottom, as the upper surface of the latter, when lowered, is a short distance below the surface of the furnace-bottom. After the truck has been lowered and the heated article removed from the portion of the truck projecting beyond the rear end of the furnace the truck is returned to normal position and the above operation repeated.

As shown in Figs. 3 and 4, a series of two or more fluid-pressure cylinders 17 can be substituted for the bell-crank arrangement shown in Figs. 1 and 2, the beams 11 being supported

on flanges projecting from caps 18, fitting over the ends of the pistons of said cylinders.

In lieu of a truck movable along the beam 11 the movable portion of the furnace-bottom may be formed of a series of blocks 19, of refractory material, resting upon the beam 11, which in such case is supported by a series of rollers 20, mounted on the short arms 9 of the bell-crank levers, as shown in Figs. 5 and 6, or on the pistons of the fluid-pressure cylinders 17, as shown in Figs. 7 and 8.

The fluid-pressure motor employed for shifting the movable portion of the furnace-bottom longitudinally may be arranged below such portion, as shown in Figs. 5, 6, 7, and 8. In such an arrangement the cylinder or cylinders forming the motor are attached by wings 21, formed integral therewith, to the beams 11, and the piston 15 is held from movement by the cross-head 22, connecting the piston with the shaft of one of the rollers 20 or with the cap 18 on the piston of one of the lifting-cylinders 17. When using the latter construction, the caps 18 are connected by rods 23 for distributing the strain incident to shifting the beams.

In using the construction shown in Figs. 5, 6, 7, and 8 it is preferred to provide the furnace-bottom with a flange 24, which will project under the movable portion and protect the operating mechanism from heat and molten cinder, &c.

I am aware that a series of bars have been arranged longitudinally in a furnace and that a portion of said bars are adapted to be raised and shifted longitudinally and then lowered to normal position by suitably-arranged mechanism for the purpose of moving articles progressively step by step through the furnace; but such bars do not form the bottom of the

furnace or any portion thereof, but are arranged above the furnace-bottom.

I am also aware that a truck provided with vertically-movable rails has been employed for moving an annealing-box into and out of the furnace; but neither the truck nor the supporting-rails are designed to form a part of the furnace-bottom, for the reason that the truck, after the box has been deposited upon suitable ledges in the furnace, is entirely withdrawn therefrom.

I claim herein as my invention—

1. A furnace having in combination a bottom formed in two or more solid sections whereby heat is confined to the heating chamber and means for moving one of said sections vertically and horizontally, substantially as set forth.

2. A furnace having in combination a bottom formed in two or more solid sections, whereby heat is confined to the heating chamber one of said sections being mounted on a truck, and means for moving the truck vertically and horizontally, substantially as set forth.

3. A furnace having in combination a bottom formed in two or more solid sections, whereby heat is confined to the heating chamber one of said sections consisting of a series of independent blocks, trucks for supporting said blocks, and means for moving the trucks vertically and horizontally, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JAMES HEMPHILL.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.