E. J. MOORE.

CONVERTIBLE CORE OVEN.

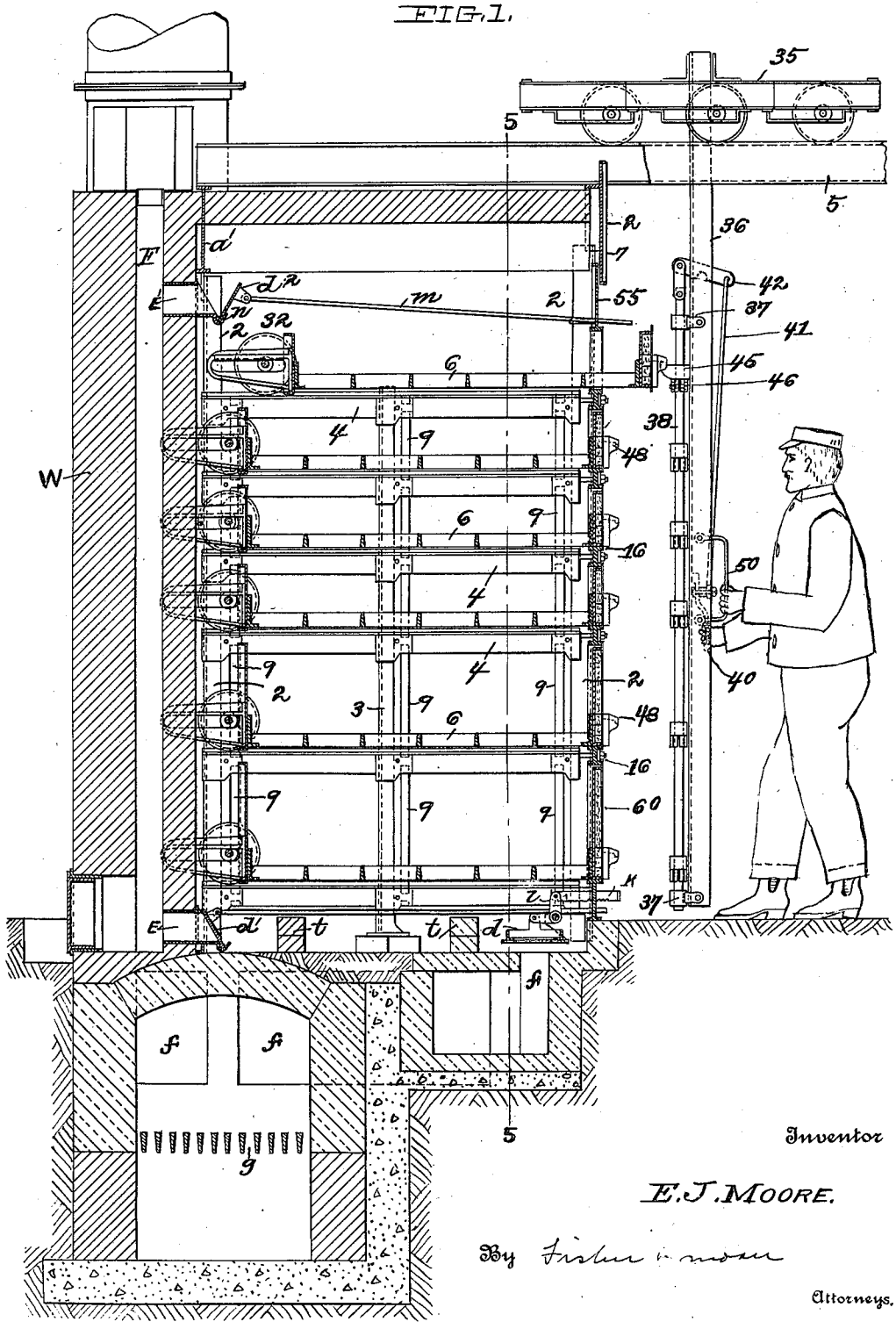
APPLICATION FILED AUG. 8, 1917.

1,301,075.

Patented Apr. 15, 1919.

7 SHEETS—SHEET 1.

FIG. 1.



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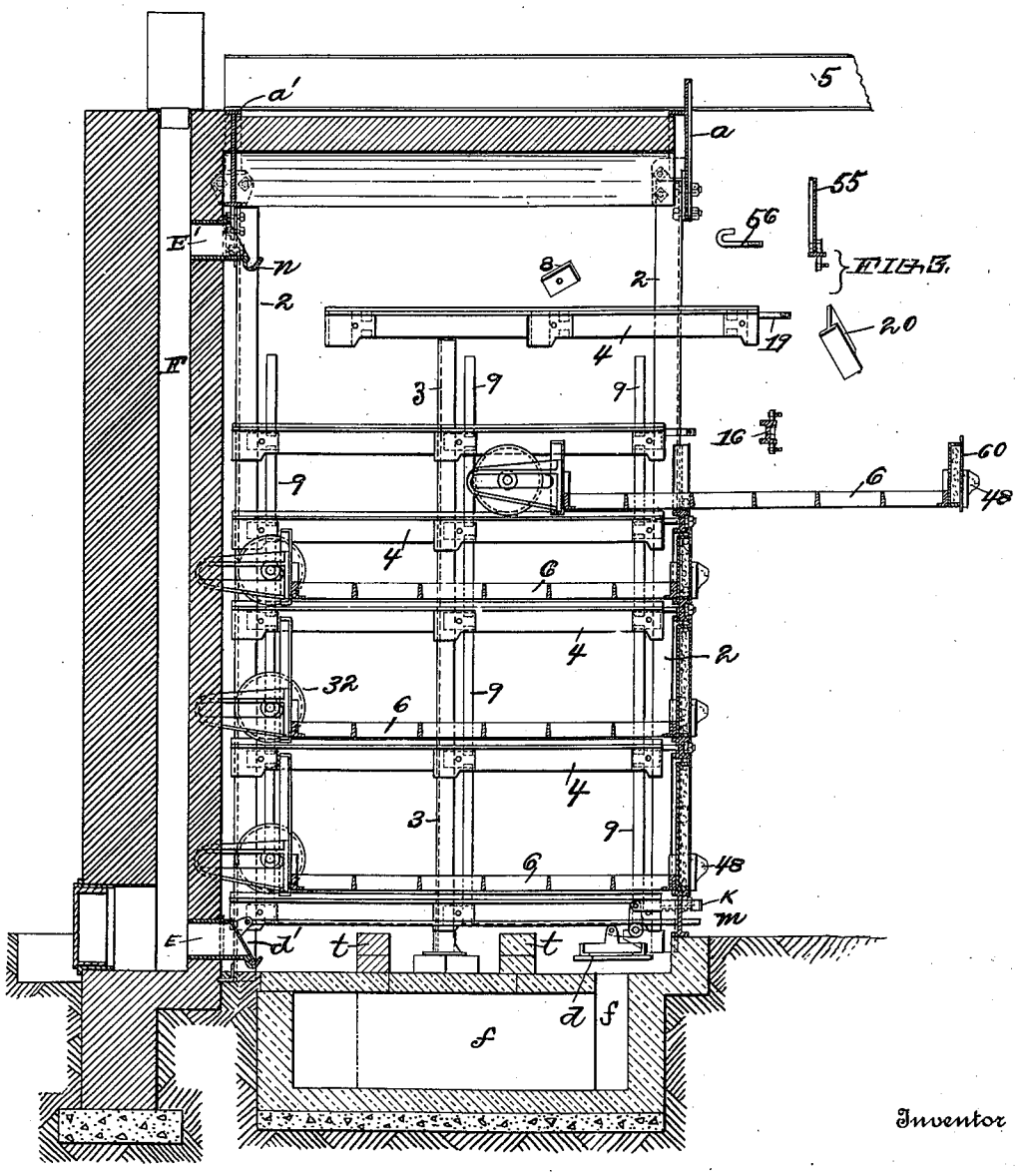
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7 SHEETS—SHEET 2.

FIG. 2.



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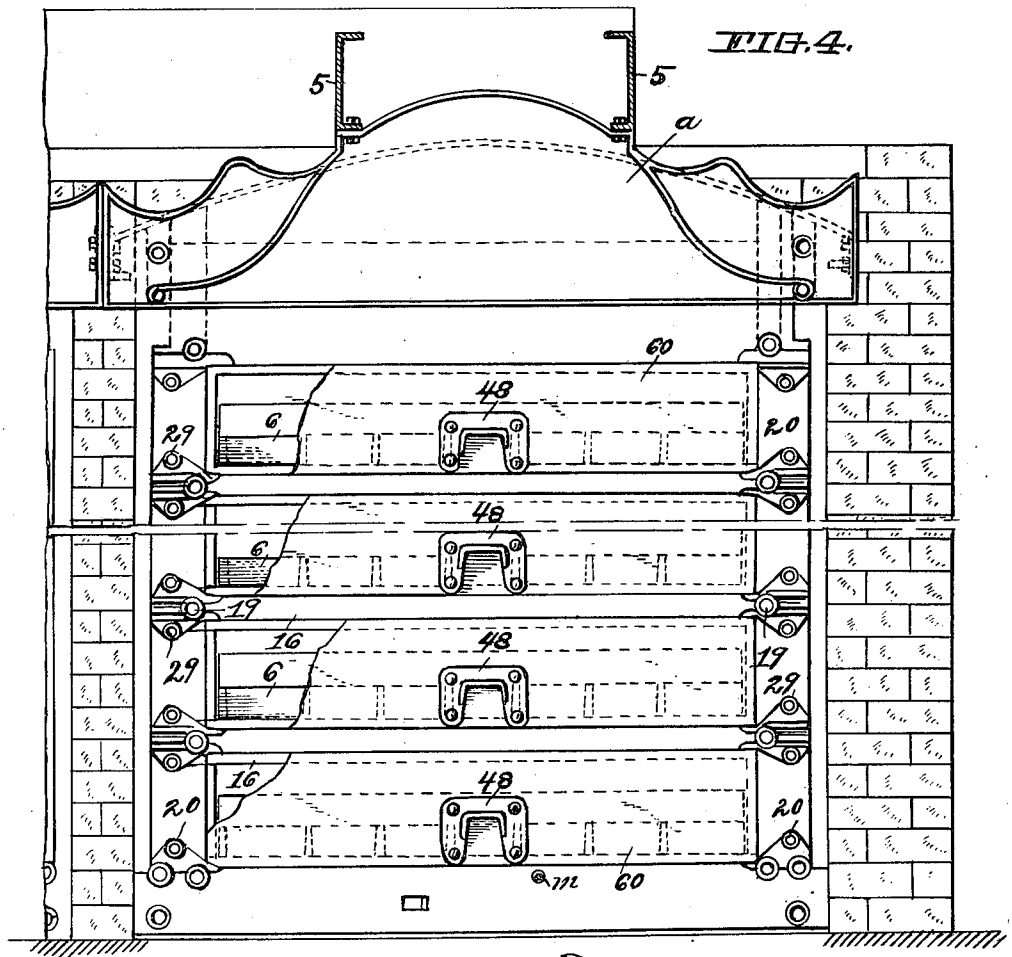
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7 SHEETS—SHEET 3.

FIG. 4.



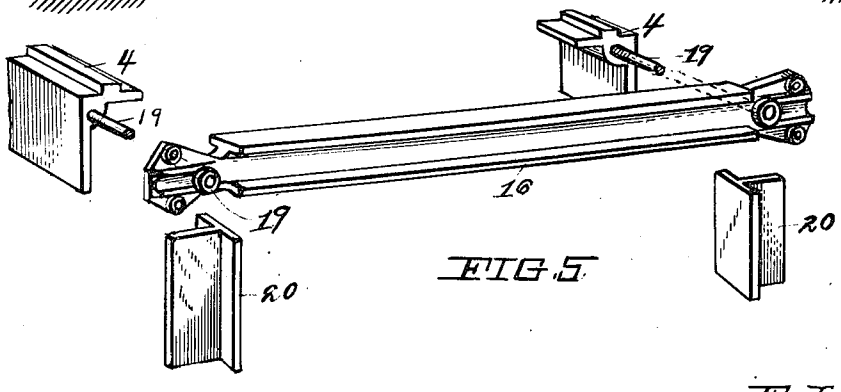


FIG. 5.

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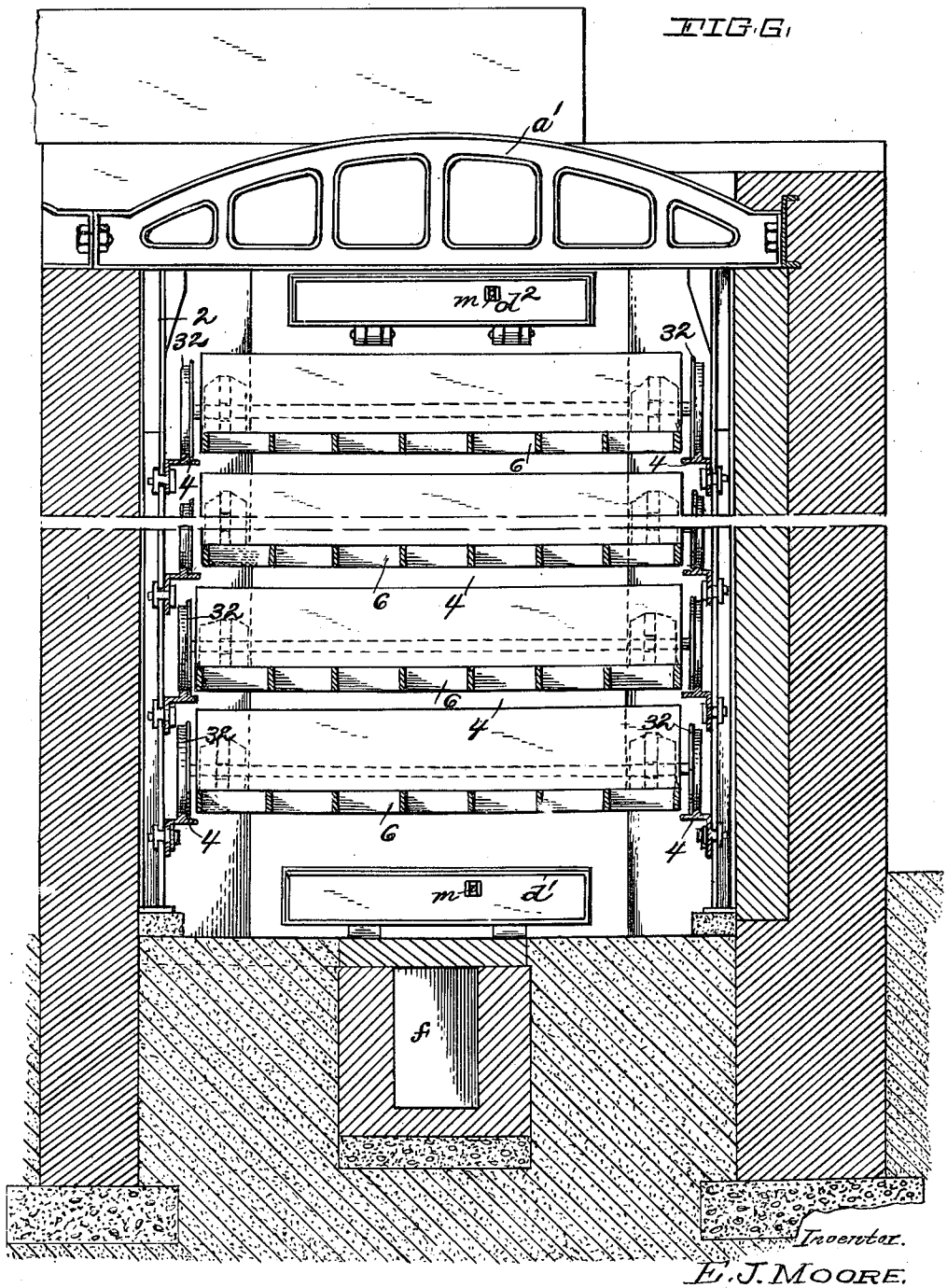
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7 SHEETS—SHEET 4.

FIG. 6.



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7 SHEETS—SHEET 5.

FIG 7.

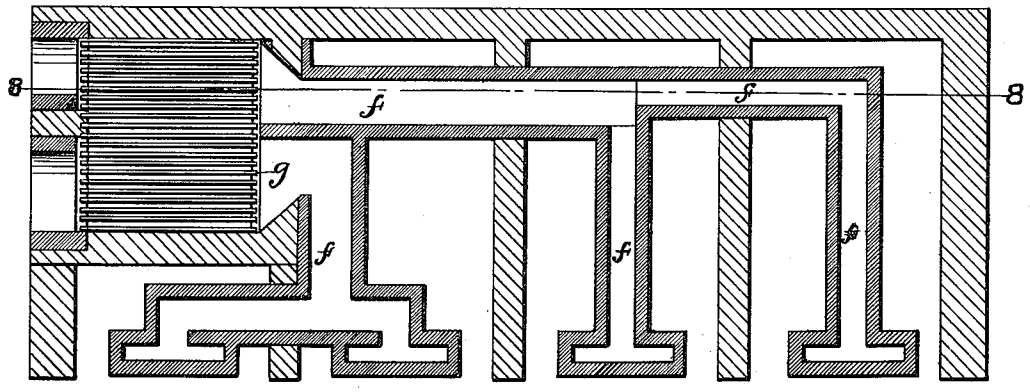
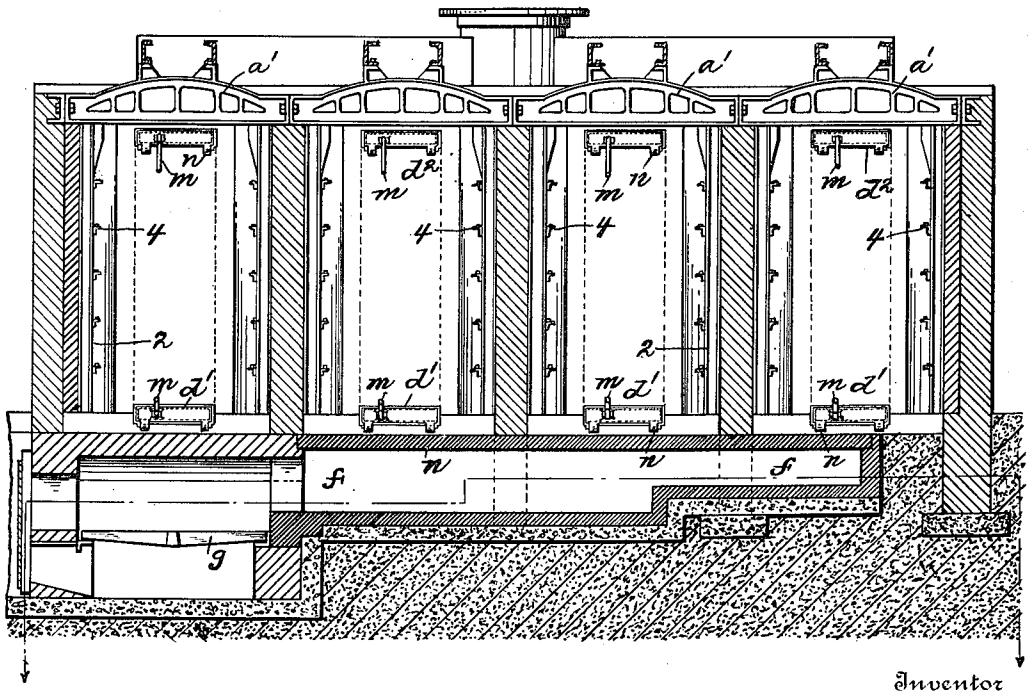


FIG. 8.



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7 SHEETS—SHEET 6.

FIG. 7.

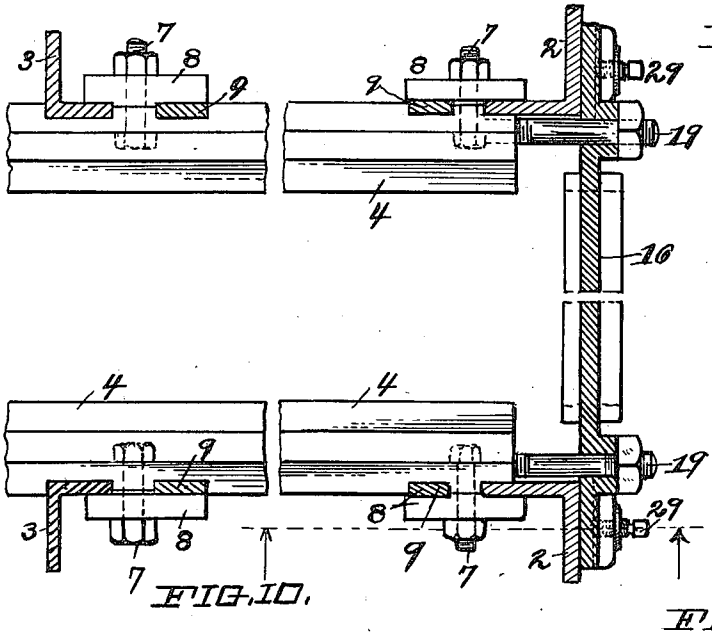
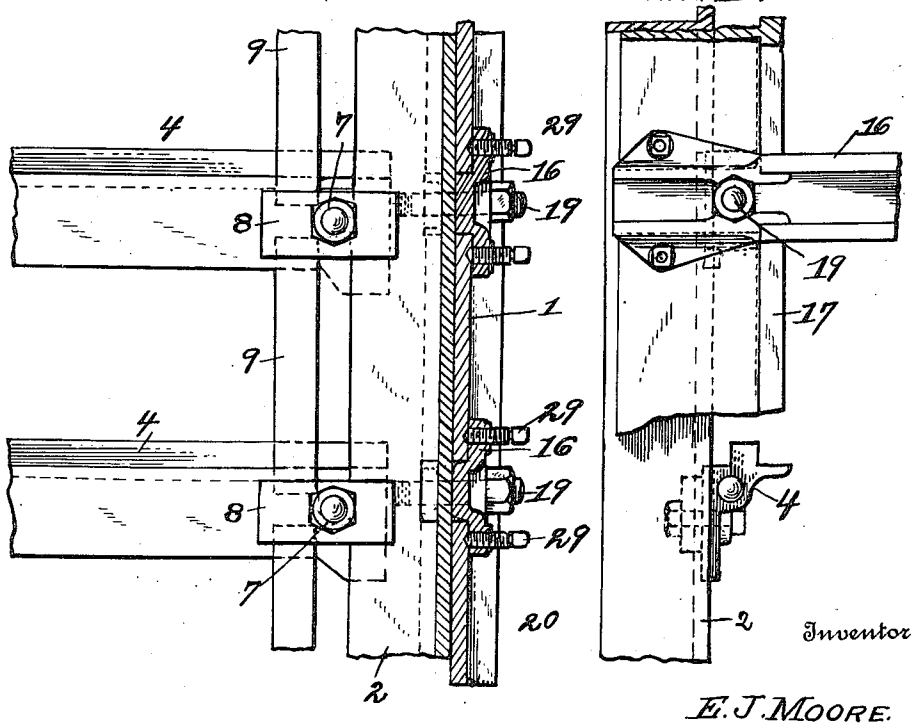


FIG. 10.

FIG. 11.



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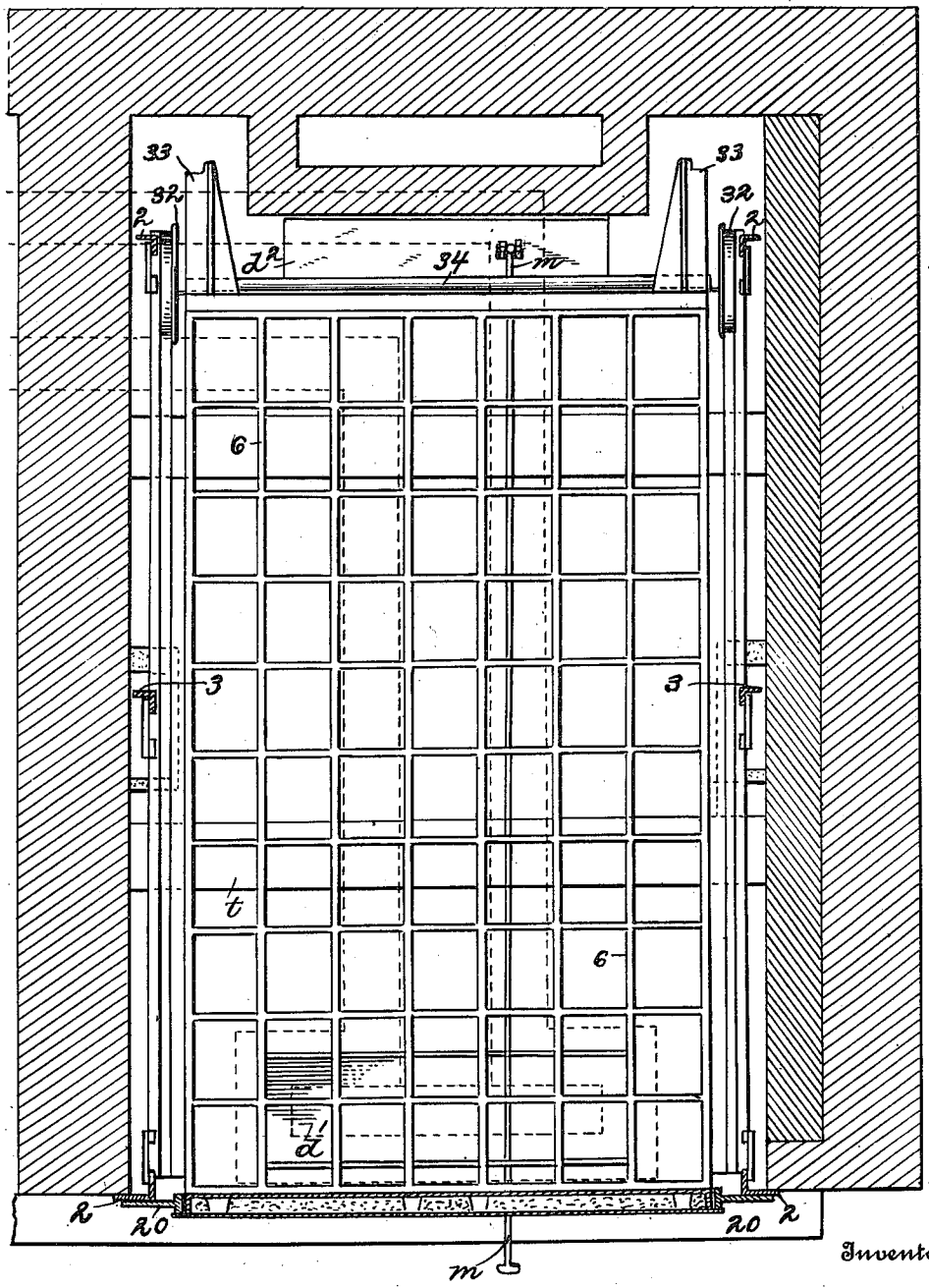
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7 SHEETS—SHEET 7.

FIG. 12.



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UNITED STATES PATENT OFFICE.

EDWARD J. MOORE, OF CLEVELAND, OHIO.

CONVERTIBLE CORE-OVEN.

1,301,075. Specification of Letters Patent. Patented Apr. 15, 1919.

Application filed August 8, 1917. Serial No. 185,037.

To all whom it may concern:

Be it known that I, EDWARD J. MOORE, citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Convertible Core-Ovens, of which the following is a specification.

This invention pertains to a convertible core oven, in which economy and simplicity of construction are combined with convenience and efficiency in operation, all substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a sectional elevation of the oven, or a single unit thereof, front and rear, and showing the upper grid as partially withdrawn.

Fig. 2 is a sectional elevation, corresponding in the main to Fig. 1 but through a different unit and showing the upper part or the internal structure partially dismantled, and Fig. 3 is a group of details showing a section of the front panel and the hook bolt therefor and a front spacing plate.

Fig. 4 is a front elevation of the oven, showing four instead of six grids, as in Fig. 1, and Fig. 5 is a perspective view of certain parts of the frame work, including a front cross-bar, end of track rails and front spacer plates.

Fig. 6 is a vertical cross section of the oven, looking to the rear.

Fig. 7 is a horizontal plan view on line 7. 7 Fig. 8 and showing the heat flues to the several oven units, and Fig. 8 is a vertical sectional elevation through a series of units corresponding to line 8. 8 Fig. 7.

Figs. 9, 10 and 11 are enlarged views of parts constituting the frame work of the oven and the means for connecting the same.

Fig. 12 is a horizontal plan view of a complete furnace unit on a line over one of the grids.

It is well known to men practical in the foundry art that there is constant call for changes here and there to meet the development of the work and the demands for improved facilities, and this has come to apply also to core ovens which, heretofore, have conformed to certain conventional and fixed standards and from which there have been no material deviation or changes, or at least not that have fallen under my observation and not of the character herein set forth. In fact, the present invention contemplates certain radical departures from the common style of ovens as they are more or less generally in use and especially in the original particular of having an oven with a convertible or knock-down frame, the convertible feature enabling me to employ grids or drawers of various sizes or depths and different numbers thereof as the work may require, and a frame work suspended from fixed top supports rather than being built upon foundations at the bottom. There also are a number of novel structural differences in connection with the foregoing improvements which are regarded as material and are hereinafter fully described and claimed. I may also add that while I show a plurality of oven units or ovens which embody portions of my invention in their associated relations, Figs. 7 and 8, the structural part or frame work in all the units is the same and I have illustrated the said frame work in connection with a single oven or parts thereof, and preferably in connection with the first of the series of units, as seen in Figs. 1 and 2.

Now, having reference to the complete oven as such I show a suitable inclosing wall W of brick work and comprising or inclosing all the several oven units and provided with a furnace or fire box having a grid *g* and flues *f* extending therefrom provided with subdivisions leading to the several units, Fig. 7, and so proportioned and averaged as to convey substantially the same measure or volume of heating agent to each, as nearly as possible. Each unit also has its own exhausts which open into a common outlet passage or exhaust flue F at the rear and discharging into the stack over the same. The immediate inlet flue *f* to each unit is seen in full lines in cross section in Figs. 1, 2, and 6, and is controlled by a damper *d* of a new and original type, as I believe. The usual damper is of a kind which reduces the size of the passage by a slide or equivalent movement, but it will be noticed that the present damper has a support of its own over and removed from the flue opening and is adapted to be bodily lowered in respect to the entire opening and uniformly over the same after the manner of a baffle, and which has the advantage of diffusing the heating agent as it pours through the opening instead of restricting or narrowing the passage and cutting off a portion of the flow,

as usual. By my construction and operation of damper I obtain diffusion and spreading of the heating agent as it enters the oven and promote its distribution evenly to the grids at successive elevations. The said damper is operatively controlled by a bell crank lever l and a notched or toothed controlling bar or arm k or its equivalent, extending outside the front wall of the oven in position to be reached to operate the said damper or baffle as the work may seem to require. Of course a given oven unit may be entirely shut off from the heating agent by the same means.

In this connection especial attention is called to the use of two exhaust dampers d^1 and d^2 at the rear of the oven and at the top and bottom thereof, respectively, covering corresponding openings. The exhaust openings are two in number for each oven, and are each provided with cast metal stub tubes E and E′ which line the passages and have depending curved lips n in which the respective dampers are seated to rock on their correspondingly rounded seating edges, and control is by a rod m to each damper from the front of the oven. These dampers are seen in front in Figs. 6 and 8. It will also be noticed that at the bottom of the oven I interpose one or more obstructing walls t between the inlet flue controlled by damper d' and the exhaust E, so as to prevent short circuiting of the heating agent to said exhaust and to promote its upward flow among the grids.

As to this latter movement of the heating agent currents the upper flue damper d^2 performs an important office and particularly in conjunction with the lower damper d^1, because thereby the volume of heating agent can be directed wherever it is wanted, and of course if the discharge be mainly by damper d^2 the heating agent must travel first through the oven. Complete control of the heating agent in the oven is therefore provided by this double damper arrangement, and this so far as I know and believe is new in core ovens.

Now, having the foregoing oven construction with its improved heating and heating agent controlling facilities, it is to be noted that each oven unit also has its own individual chamber or space within the walls thereof, and the grids for the cores and the means to support and operate the same are located in these chambers. These means comprise, first, the front and the rear arches a and a^1 respectively, consisting of suitably heavy metallic castings built into and supported by the side wall of the oven, and the entire frame work or internal structure which carries the grids is supported from these arches by the upright bars or posts 2 bolted to the said arches at their upper ends and suspended therefrom instead of resting on a bottom wall for their support. This however does not include the brace bars 3 at the middle, which rest on the wall of the oven at their bottom and are intended to resist any possible tendency in the frame to sag at the middle of the oven. In fact, however, the said bars or posts 2 and the horizontal angle iron rails 4 fixed thereon at intervals are intended to possess all the inherent strength required to afford a rigid support for the grids without the aid of the said intermediate brace bars 3. It will be noticed, also, that the trolley rails 5 on the top of the oven are supported directly upon the said arches. This ties the arches and the said rails 5 and the grid frame together as a unitary structure, and has the important advantage of always maintaining the same working relation between said parts and the parts supported thereon whatever may occur to the inclosing wall or to other parts.

For instance, it is of the first importance that the trolley and means for carrying the core grids on their withdrawal from the oven should always sustain exact and absolutely safe working relations, but if it were possible for the grid supports to sink or sag away from the trolley rails such engagement might become precarious if it were not entirely defeated. But with the arches having both said rails and the grid supports locked together, the grid carrier suspended from the rails and the grids necessarily maintain their working relations and thus one of the most serious troubles that is found in the old style of core ovens is overcome and perfect safety of operation is assured.

Important details in connection with the grid frame comprise the means shown by which the uprights or posts 2 of the frame and the grid supporting rails or bars 4 are secured together, having in mind particularly the element of convenience and dispatch in converting the structure by the movement of said bars 4 up or down to change the positions of the grids according to their numbers and sizes and with different sizes or spacers between them. Thus, referring to Figs. 9 and 10, it will be seen that both the said corner members or posts 2 and the said grid rails 4 are of angle-bar formation, and that said rails are recessed to receive the posts and also the space plates or pieces 9 and that the bolts 7 through the rails 4 enter a clamping plate 8 bearing on the posts and spacers and all said parts are thus rigidly locked together. Different lengths of spacers are used according to the space between grids and like spacers are used between the ends of rails 4 and at the middle thereof.

By these means it will be seen that to change the bars 4 for different sizes of grids no tool is required except an ordinary wrench, and no special skill since the space

between bars is determined by the length of the spacers, and when these are inserted and the clamping bolts 7 are tightened nothing more is required to be done in so far as the immediate supports for the grids are concerned. I may add, however, that the front cross-bars 16 are engaged at their ends with the ends of the rails or bars 4 by means of stud nuts 19, and which incorporate said front rails with the general frame-work of the oven. Vertically disposed front space plates 20 are interposed at each side of the oven between the ends of the front bars 16 and cover the otherwise exposed sides of the frame. The said plates are of T shape in cross section with the heads of the plates inside in working relations with the sides of the grids or drawers. Fig. 4. Set screws 29 in the ends of bar 16 bear against said plates and tighten them in position.

The said grids or drawers have wheels 32 at their rear supported on a shaft 34 adapted to roll back and forth in slots in the brackets 33 fixed on the rear corners of the grids and adapted to run on the rails 4. Means are also provided to lift the front of the grids from the rails 4 and move the same with a roller support, the same comprising a trolley 35 adapted to run on the outside rails or tracks 5 and from which there is suspended a rigid hanger 36 equipped with means to engage and lift the front ends of the grids. The said means comprise a bar 38 slidably mounted on said hanger in keepers or bearings 37 fixed on the hanger, and said bar is adapted to be raised and lowered within limits by the operator through a controlling lever 40 pivoted at its end on said hanger and adapted to operate the link 41 engaged therewith and with a rock arm 42 pivoted in said hanger and links connecting said arm with the bar 38. These or equivalent means may be used to actuate said bar, the design being to raise the bar when engagement is to be made with a grid. To this end suitable grid lifters 45 are rotatably and adjustably mounted on bar 38 and adapted to rest on clamp bearings 46 slidably adjustable on said bar. Normally said lifters are rotated to one side out of engaging position, but when one is to be used it is rotated to the front in position to engage from beneath by its raised and somewhat pointed nose in the corresponding grid lifting hook 48 on the front and middle of the grid. Such engagement having been made and the grid raised to hang from the trolley, the operator exerts the necessary pull through the hand grip 50 on the hanger 36 and draws the grid bodily outward, as seen in Fig. 1. Engagement of the grid lifts 45 on the hooks is so effective that there is no danger of disengagement during operation. This is important in the light of previous experiences with lift devices of this general character but which had no means of relative adjustment of the parts when settlement or sagging of the grid carrying frame might occur in respect to the trolley rails 5 and throw the parts out of engaging relations. This is overcome in the present oven by making arches a and a^1 the exclusive support for the suspended grid frame and for the trolley rails 5, and which is supplemented by the convenient adjustment of the grid lifters 45 on the operating bar 35 to engage the hooks 48.

A panel plate 55, Figs. 1 and 3, is adjustably mounted over the front of the oven above the upper grid therein to fill the intervening space and is shown as being secured by hook bolts 56, or equivalent means.

Each grid has a front 60 of a suitable size and character to close the opening in the front of the oven between the cross-bars 16 allowed for each grid.

What I claim is:

1. An oven as described, having a vertically disposed inlet in its bottom, a damper horizontally disposed over said inlet and means suspending said damper and adapted to raise and lower the same in respect to said inlet, said means comprising a bell crank lever and a rack bar controlling the same.

2. An oven as described, having an inlet flue in its bottom and front and an exhaust opening at its rear and bottom, a damper over the said flue adapted to be raised and lowered, a damper for said exhaust opening and a baffle between said inlet flue and said exhaust opening adapted to intercept the flow of the heating agent and to divert the same upward.

3. In a core oven, an oven having an exhaust passage and a stub tube lining said passage having a lip at its inner end and bottom curved upwardly and outwardly, and a damper rotatably seated in said lip and adapted to tilt thereon within limits and open and close said passage.

4. In core ovens, a wall having metallic arches in the top thereof relatively at the front and rear of the oven and a grid supporting frame suspended from side arches.

5. In core ovens, an oven having front and rear arches in the top thereof and a grid carrying frame having corner members hung from said arches.

6. In core ovens, an oven having metallic arches in its top and a grid frame having corner members bolted to said arches, and grid carrying rails fixed upon said corner members on the respective sides of the oven at successive elevations.

7. In core ovens, an oven wall and front and rear metallic arches in the top thereof, a grid carrying frame suspended from said arches and a trolley track supported on the top of said arches outside the said wall.

8. In core ovens, an oven wall and front and rear arches in the top thereof exposed

within and without said wall, a grid supporting frame having corner members bolted to said arches on the inside thereof and trolley carrying rails fixed to the said arches on the outside of said wall.

9. In core ovens, an oven having a grid carrying frame suspended at its respective corners from the top thereof and centrally disposed stays at the sides of said frame supported on the bottom of the oven and adapted to prevent possible sagging at the middle of said frame.

10. In core ovens, a grid carrying frame having corner members suspended from the top of the oven and a bar at each side and middle of said frame resting on the bottom of the oven to avoid possible sagging, and grid supporting rails separably engaged with said members and bars.

11. In core ovens, a supporting frame for grids having corner posts and grid carrying rails adjustably engaged with said posts.

12. In core ovens, a metallic frame having four corner posts, a series of grid supporting rails and clamping mechanism engaging said rails rigidly with said posts.

13. In core ovens, a frame comprising four corner posts, a series of grid carrying rails having recesses in which said posts are engaged, clamps adapted to bear on said posts in said seats and bolts through said rails and clamps adapted to lock said parts together.

14. In core ovens, a frame having corner posts and grid carrying rails at the sides thereof, spacers interposed between said rails and clamping mechanism binding said posts and rails and spacers rigidly together.

15. In core ovens, a frame for the grids having corner posts and a series of grid carrying rails adjustably secured to said posts, and front cross-bars opposite the ends of said rails and separably bolted to said ends through the front posts.

16. In core ovens, a frame comprising corner posts and grid rails at successive elevations locked upon said posts, a cross-bar at the front of said frame and bolts through the ends thereof into the ends of said rails, and spacers between the said rails next to said posts and between the ends of said cross-bars, the said spacers being interchangeable, according to the space between grids.

17. In core ovens, a frame and grids therein adapted to be run in and out, a trolley having a hanger in front of said grids, a bar slidably supported on said hanger and lift members adjustably supported on said bar and adapted to engage and carry the front ends of the grids.

18. In core ovens, a series of core carrying grids one above the other and each provided with a hook shaped device at its front adapted to be engaged by a grid lifter, a trolley and a hanger suspended therefrom in front of said grids, a bar slidably mounted on said hanger and means to raise and lower the said bar, and a lifter for each grid adjustably and rotatably supported on said bar and adapted to engage in said device to lift and operate the grid.

19. In core ovens, a supporting frame having rails at its sides, a grid and brackets fixed on the rear thereof having horizontal slots relatively above the sides of said grids, a shaft through said slots and wheels on said shaft at the rear and sides of the grid adapted to run on said rails.

Signed at Cleveland, in the county of Cuyahoga and State of Ohio, this sixth day of July, 1917.

EDWARD J. MOORE.