

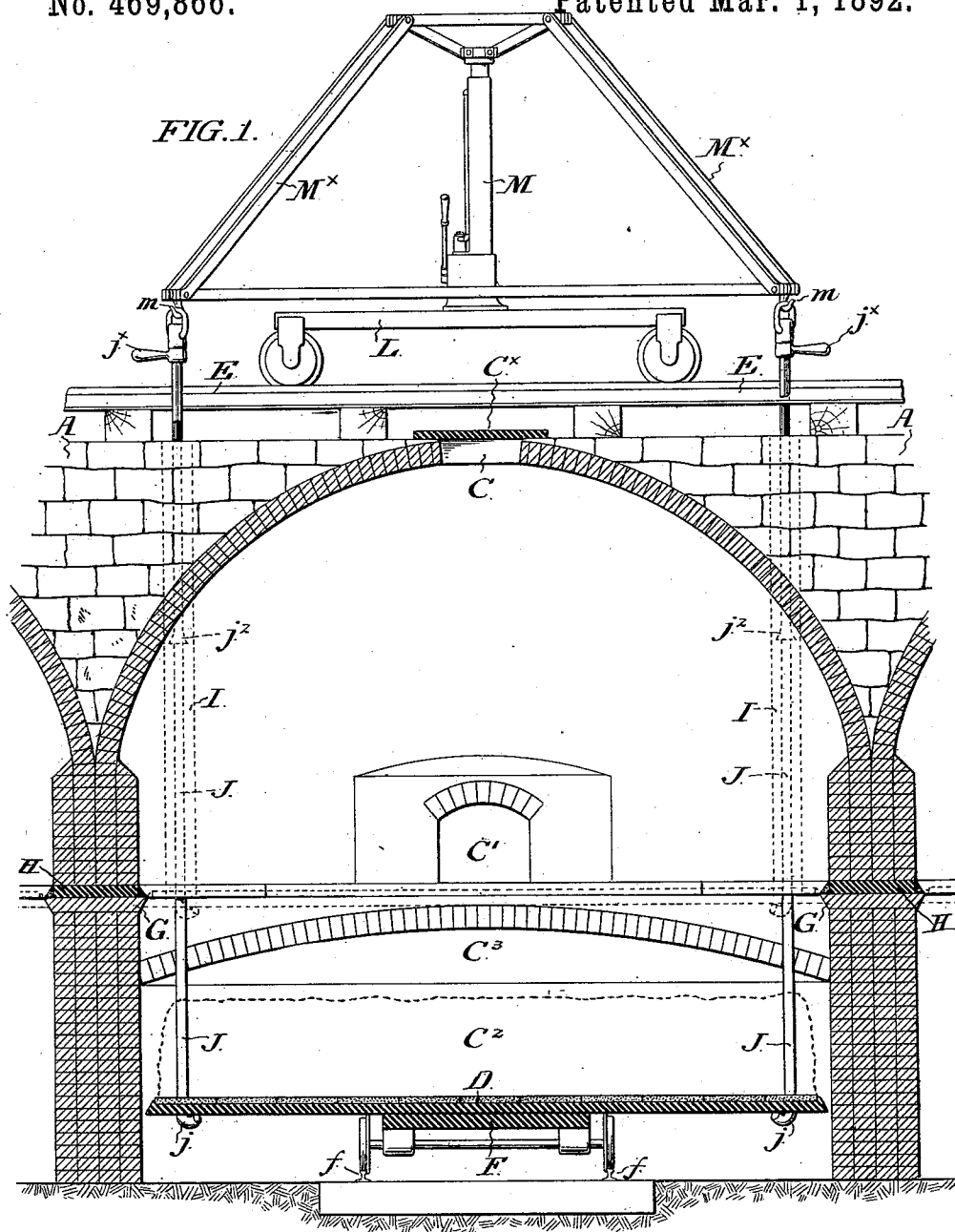
(No Model.)

4 Sheets—Sheet 1.

T. R. OSBOURN.
COKE OVEN.

No. 469,866.

Patented Mar. 1, 1892.



WITNESSES:

A. E. Paige
Frank Quinn

INVENTOR

Thomas R. Osbourn
By his attorney
Shawbridge & Taylor

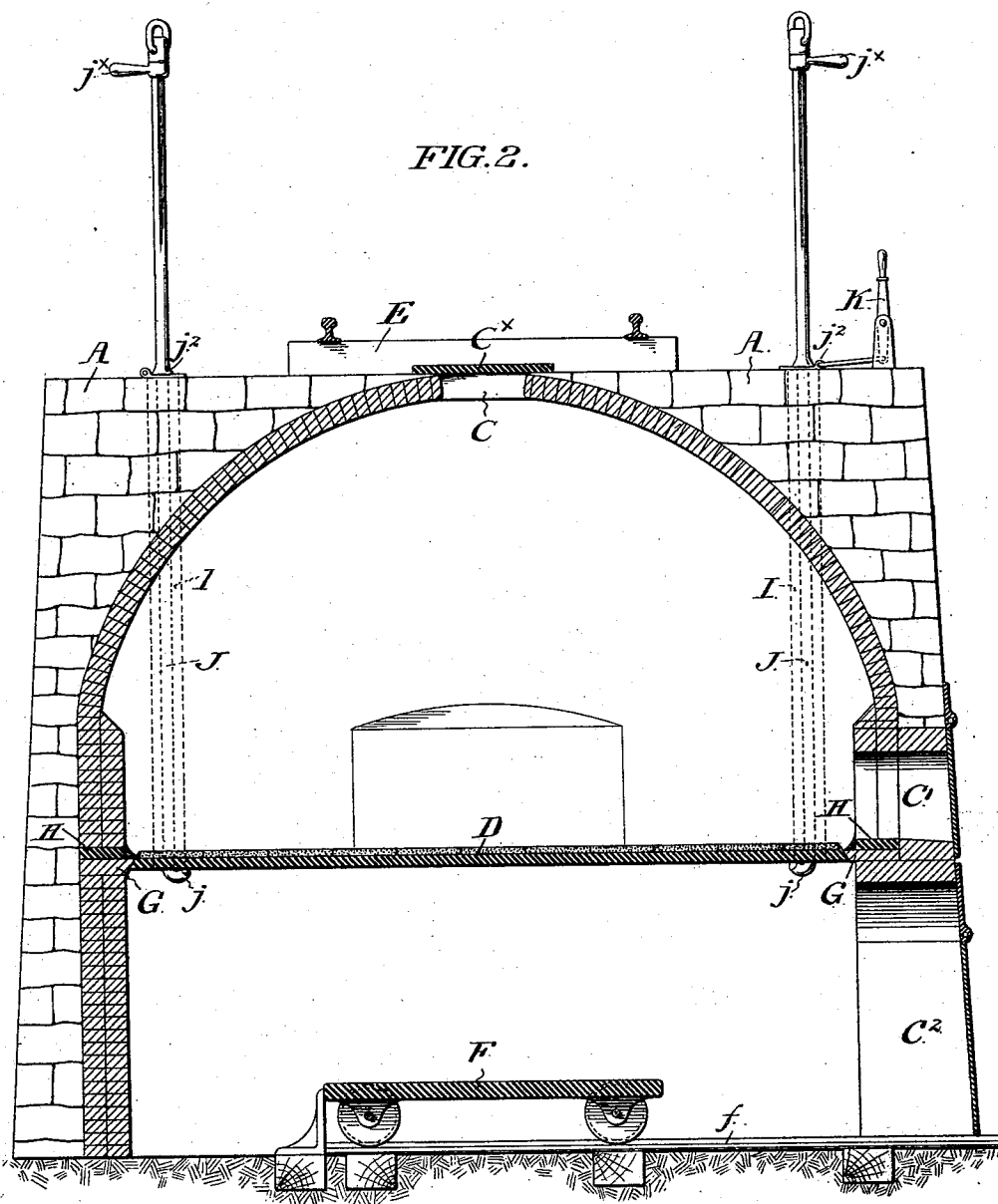
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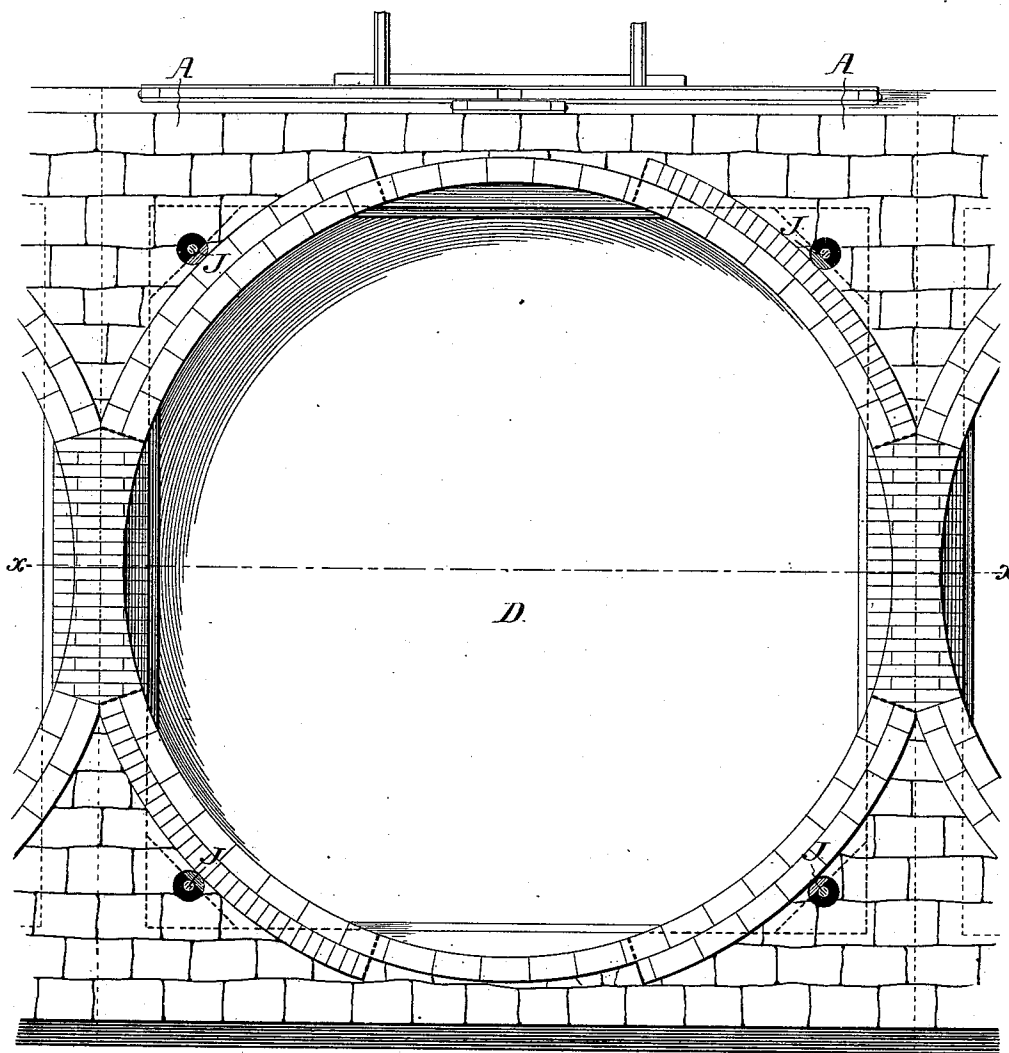
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FIG. 3.



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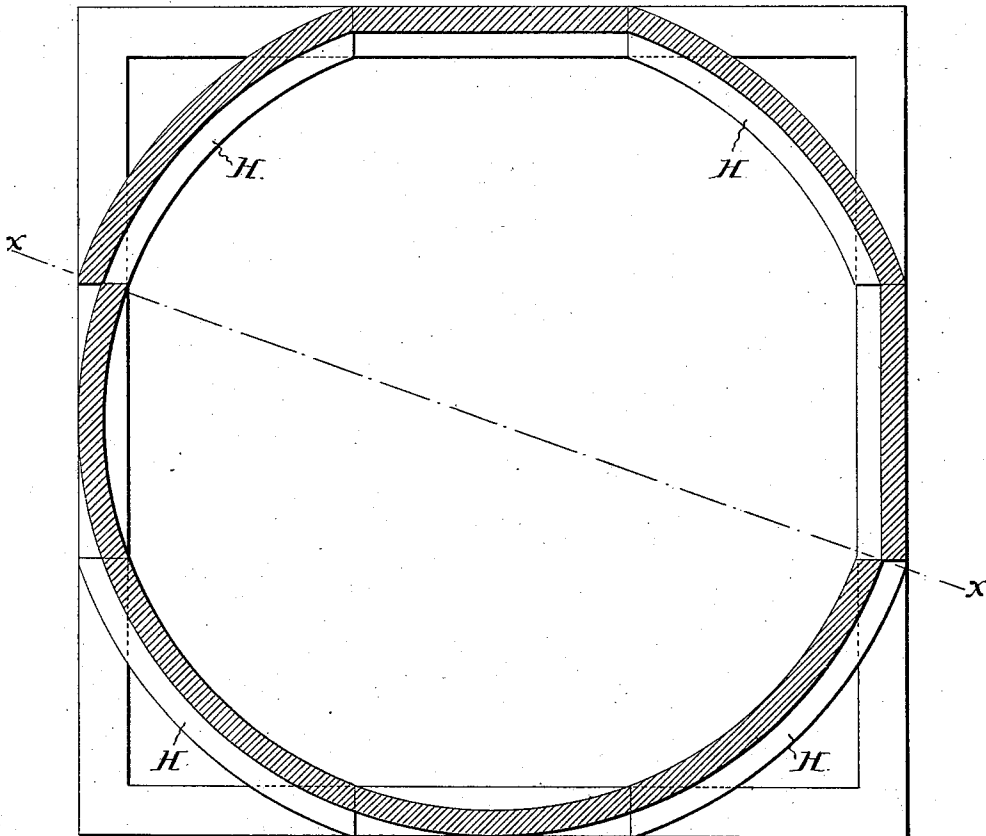
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FIG. 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS R. OSBOURN, OF PHILADELPHIA, PENNSYLVANIA.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 469,866, dated March 1, 1892.

Application filed December 12, 1890. Serial No. 374,441. (No model.)

To all whom it may concern:

Be it known that I, THOMAS R. OSBOURN, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Coke Ovens, of which the following is a specification.

The object of my invention is the improvement of coke ovens, in the following particulars, namely, first to provide in connection with an oven of the type equipped with a removable floor, improved means for supporting and manipulating said floor; and, second, to provide an improved plan or construction of oven of the type known as the bee-hive,—by which not only the building of such ovens is facilitated and rendered less expensive, while the completed oven is compact and simple in arrangement,—but also the internal arrangement of the oven is adapted to be readily altered to accommodate it to the requirements of different varieties of coal. A preferred and convenient form of oven, in which these objects are attained, is shown in the accompanying drawings, and is hereinafter described, the particular subject matter claimed as novel being hereinafter specified.

In the drawings, Figure 1 is a central vertical sectional elevation, of an oven embodying my invention, taken on the line *x x* of Fig. 3, sight being taken toward the front wall of said oven, the portable floor being shown as down upon the truck, but connected with the lifts and jack spider and in readiness to be elevated into position. Fig. 2 is a central vertical sectional elevational of the oven, in a plane at right angles to its front, showing, however, the portable floor in position to receive a charge of fresh coal to be coked. Fig. 3 is a sectional plan of the oven. Fig. 4 is a plan designed to illustrate both of the two types of oven hereinafter described.

Similar letters of reference indicate corresponding parts.

In the drawings, A indicates the masonry forming the exterior shell of a series of ovens, the linings thereof being preferably formed of brick work. Each oven is composed of an upper portion and a lower portion which I designate respectively as the oven and the pit, the line of division between the two being the floor when in its usual position. The oven

shown is of the general hemispherical form to which the term bee-hive has been applied, and its ceiling or inclosing wall embodies a charging opening C, ordinarily covered by a plate C^x. The front wall of the furnace embodies at or above the floor level a door C', and below said floor level a door C², of width at least equal to that of the floor D.

E is a track or tramway extending along the top of the battery, or series of ovens.

Generally stated the operation of the oven is as follows: A car of coal is drawn into position over the opening C and a quantity of coal charged through said opening and down upon the floor D. The oven having previously been heated to a sufficiently high temperature the charge is fired. The process of coking proceeds in a manner well known to those familiar with the art. After a sufficient time has elapsed the mass is sprayed with water to complete the operation, and this treatment with water may take place either before or after the heated mass is removed from the furnace, but preferably after. To remove the charge, the portable floor is lowered into the pit and upon a truck F mounted upon rails *f* leading out through the door C²,—is detached from its supports, and carried away by the truck to a receptacle into which the charge is placed, whereupon the floor is carried back, connected again to its supports or lifts, and elevated into the position shown in Fig. 2, when another mass of coal is charged upon it. I have stated that it is preferable that the water should be applied to the mass after its removal from the oven, and this is for the reason that if water is applied while it is in the oven, the oven becomes cold, and not only is the heat which it contains thus wasted, but the coking of a subsequent charge is delayed until the oven is reheated.

The construction and operation so far described are not novel with me.

In my improved construction and arrangement the oven is of the usual bee-hive form, but the pit, while it is in breadth of conveniently about the same measurement as the greatest diameter of the oven, is of general quadrangular plan, its corners extending beneath the arched masonry of the oven wall, and, the floor D, being of the same size as

the pit, the charge of coke placed upon it is less liable to be shaken off while being carried away from the oven on the truck. This increased area of the floor is secured without enlargement either of the body of the structure or the breadth of the door C², because said structure and door being necessarily large enough to suit a round floor of size equal to the diameter of the oven, equally accommodate a square floor of similar breadth. Three of the walls of the pit are shown as straight and continuous, while the fourth or front wall embodies near its top an arch C³ above the door C². At or about the position which it is desired that the floor should occupy when the oven is in operation, a stop G is conveniently provided, being in the drawings shown as consisting of a continuous bar or plate the body of which is built into the masonry of the wall, and the edge of which projects into the interior of the oven. The interior plan of the structure changes at this point from a general quadrangle to a circle, and to accomplish this I resort to the use of what I term hive sills, II, being plates of metal, each resting upon the tops of the two straight walls contiguous to a corner of the pit, and constituting a bridge across said corner, which plates are as to their front edges preferably of curved form to correspond to the radius of the lower portion of the hive. These plates may if desired be supplemented by others extending from one to the other, or a continuous annular casting may be employed. Upon the sills and upon the top of the straight walls of the pit may be built the arched or converged wall of the hive, the same being, apart from its foundation upon the hive sills, constructed in a manner familiar to masons and oven builders. The plates or hive sills and also the tops of the pit walls are quite broad, and, so far as the foundation of the arched wall upon the base composed of the straight walls of the pit and said plates is concerned, it is to be remarked, two methods are open to the constructor, which are secured by my invention; that is to say, the inner tier of brick may be laid along and flush with the front edges of the plates, and may when laid upon the masonry wall of the pit continue in a curve of the same radius as that of the plate until the next plate is reached, as shown in the lower half of Fig. 4, and by this arrangement said tier and the superimposed tiers will be circular. Incidental to this arrangement, however, it is to be noted that within the circle of said tier will exist a flat and uncovered portion of the center of each of the four walls of the pit, to prevent the lodgment of portions of coal upon which I prefer to cover each with a beveled top covering of brick or other material as shown in Figs. 1 and 2. When, however, a larger oven is desired, I enlarge it by setting the bricks of the first or inner tiers of brick at such increased radial distance from the center of the oven as will give the additional space re-

quired; as for instance by setting the bricks of the first inner tiers of the portion of the hive wall not resting on the curved corner hive sills, that is to say, the tiers which exist above the respective central portions of the four pit walls, in straight lines, and some distance back from the inner edges of their supports, and set such bricks as are placed directly upon the curved corner plates or hive sills back from the edges of said plates a sufficient distance to be flush or in registry with the adjacent ends of such straight tiers, as shown in the upper half of Fig. 4. In said second construction, the front edges of the pit wall and hive sills are preferably covered with brick to prevent their retaining portions of the charge. Where a series of ovens exist side by side, two side hive sills, one appertaining to one, and the other to another, of two adjacent ovens, may, as shown in Fig. 1, consist of a single integral plate of sufficient breadth.

In the coking of coal in bee-hive ovens it is a matter of common experience that a given volume of coal of one variety will coke to advantage in an oven of one area, while a similar quantity of coal of another variety will coke to advantage in an oven of another area, there being a certain relation to be observed between the richness in volatile matter of a mass of coal, and the size of the oven in which it is coked.

In my improved furnace as hereinbefore described it is obvious that the capacity of the oven may be altered by simply taking down its inner lining as far as the hive sills and rebuilding said lining in the manner required, the oven being to such extent adjustable.

The means to which I resort to manipulate the floor are as follows:

IIII are a series of bores or tunnels, passing vertically through the structure and opening as to their lower ends through the lower face of that portion of the oven which overhangs the corners of the pit, and preferably behind or through the hive sills hereinbefore referred to.

JJJJ are a series of metal rods or lifts one of which is mounted in each of the bores or channels referred to, and each of which is provided with means by which it may be detachably connected with the floor. Any desired arrangement of detachably connecting the rods with the floor may be resorted to, but I prefer to simply bend the lower end of each rod to form a hook *j* which by rotation of the rod may be carried beneath the floor or out from beneath the same as desired, and to enable such rotation to be made I equip each rod at its upper portion with an operating handle *j*^x.

Each lift is preferably provided with a shoulder *j*² situated intermediately of its length, at such point as to be about level with the upper face of the masonry when the floor is drawn to its upper position, so that a block

or stay pin may be inserted beneath each of such shoulders to maintain said floor.

K is a lever to which one or a set of such shoulder blocks are to be connected in any preferred manner, so that by its throw the blocks are set in and out of position.

L is a truck adapted to be run upon rails, upon which is mounted a jack, hydraulic ram, or kindred device, M, upon or in connection with which is mounted a spider M^x provided with hooks *m* adapted to engage with rings mounted in the upper extremities of the lifts. The truck, jack, and spider, are adapted to be propelled along the track and to successively operate the floors of the ovens of the series.

In the construction described the lifts are always in their places, and ready to be, as to their extremities, attached to or disconnected from the spider and the floor respectively, and are, moreover by the provision of the bores or channels exterior to the oven, protected from the great heat of its interior.

In the operation of the oven, when the charge, after being fired is in readiness for removal, the truck L is brought into position and attached to the lifts, the blocks are withdrawn from beneath the shoulders *j*², the floor lowered upon the truck F, and the lifts rotated by their handles to clear the hooks from the floor D and elevated to permit the lateral movement of the floor. After the floor has been removed and its contents discharged, it is returned to the pit, the lifts are again engaged with it, and the jack operated to elevate the floor until it comes into position, against the ledge G, hereinbefore described, in which position the shoulders of the lifts are in position to receive beneath them their supporting blocks, whereupon the truck and spider may be disengaged from the upper ends of the lifts and be passed along to the next or any selected oven.

Having thus described my invention, I claim: 45

1. In a coke oven, a structure forming a pit and a bee-hive oven situated above the same, and embodying in its masonry vertical lift channels, bores or tunnels exterior to the oven and extending from the top of the structure to the pit and terminating at their lower ends immediately over a movable floor, and lifts situated within said channels, substantially as set forth. 50

2. In a coke oven, a structure forming a bee-hive oven and a pit situated beneath the same, and embodying in its masonry vertical channels, bores or tunnels exterior to the oven and extending from the top of the structure to the pit, a portable floor, lifts composed of bars of metal situated within said lift channels, the lower ends of which lifts are detachably connected with the floor, and the upper ends of which lifts are provided with means whereby they may be connected with lifting mechanism, substantially as set forth. 65

3. In combination with a coke oven comprising a pit and a bee-hive oven and the wall of which embodies vertical lift channels, a portable floor, lifts composed of bars of metal which extend through the lift channels and the lower ends of which are detachably connected with the floor, lifting mechanism, and shoulders connected with the lift bars at points intermediate of their length by means of which said bars and the connected floor may be supported in an elevated position, substantially as set forth. 75

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 11th day of November, A. D. 1890. 80

THOMAS R. OSBOURN.

In presence of—

F. NORMAN DIXON,
FRANK QUINN.