

J. ARMSTRONG.
 APPARATUS FOR THE MANUFACTURE OF COKE.
 APPLICATION FILED JAN. 22, 1912.

1,166,422.

Patented Jan. 4, 1916.
 2 SHEETS—SHEET 1.

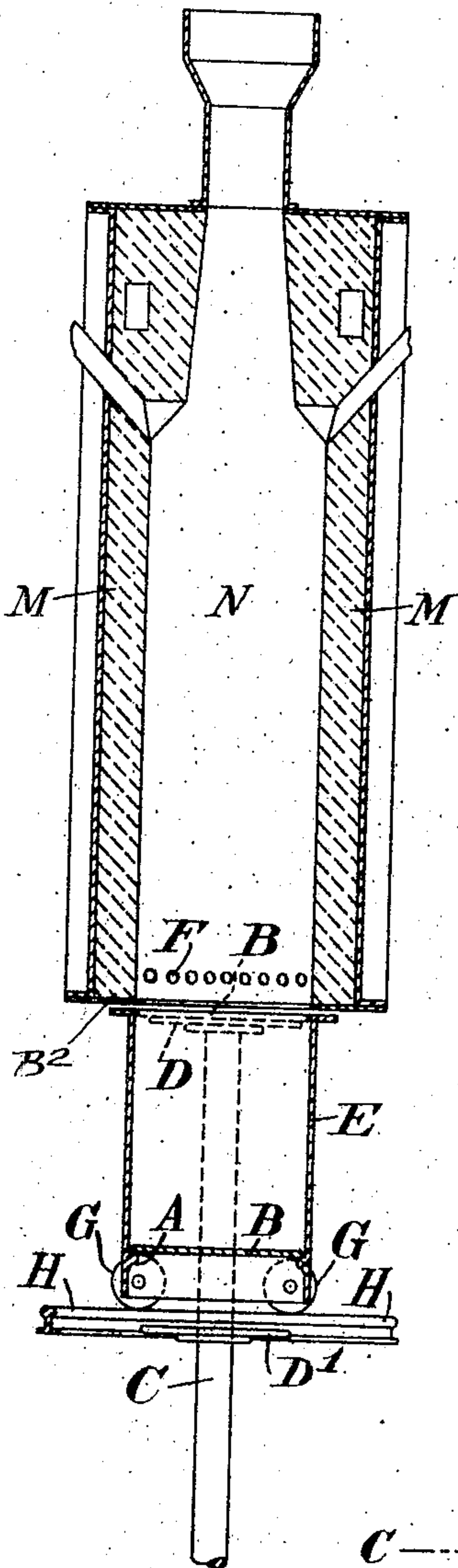


Fig. 2.

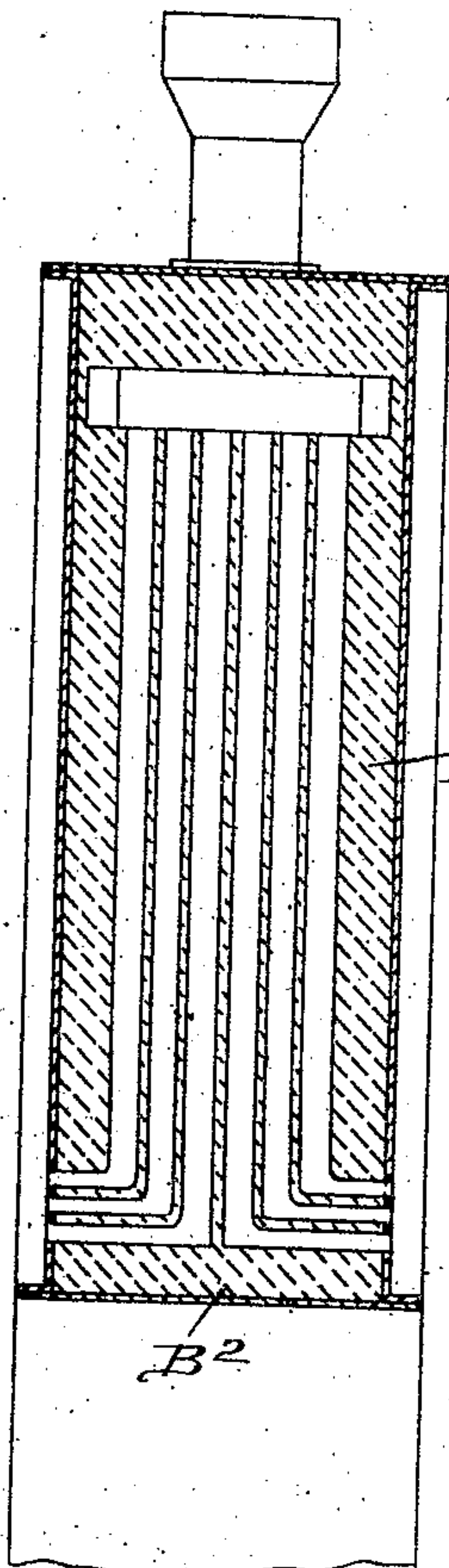


Fig. 1.

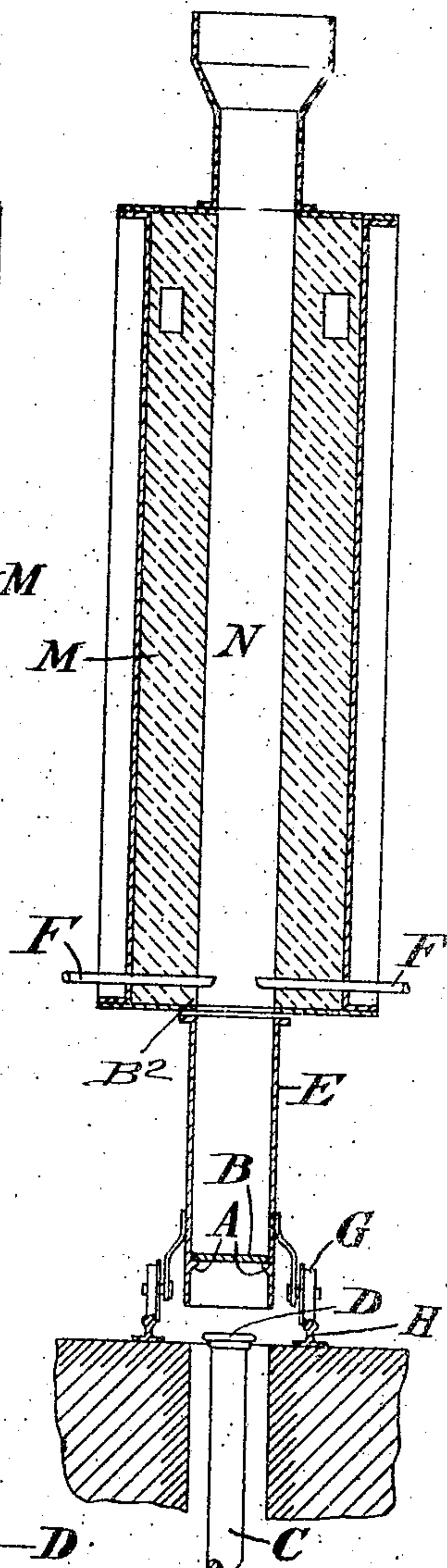


Fig. 3.

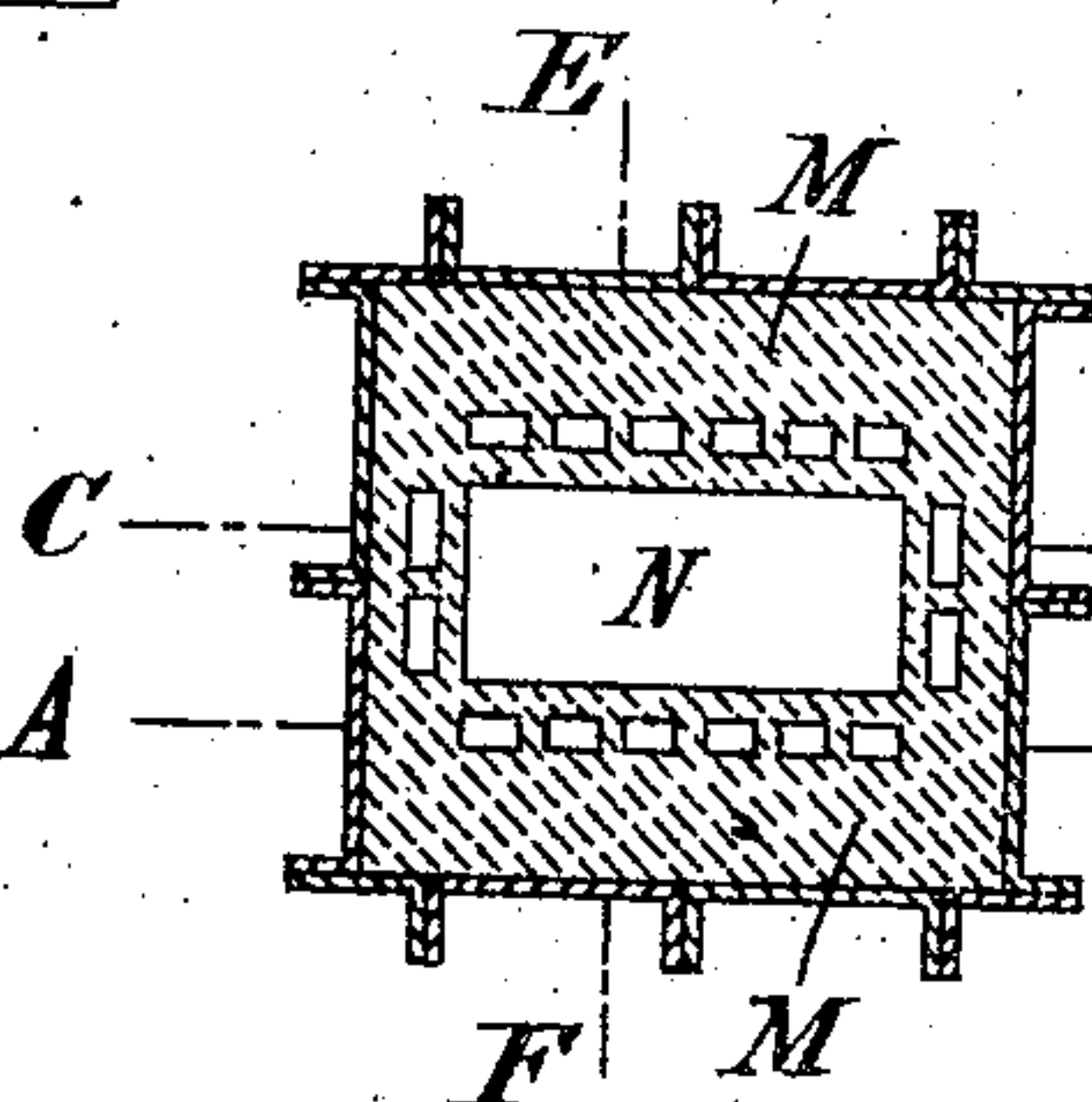


Fig. 4.

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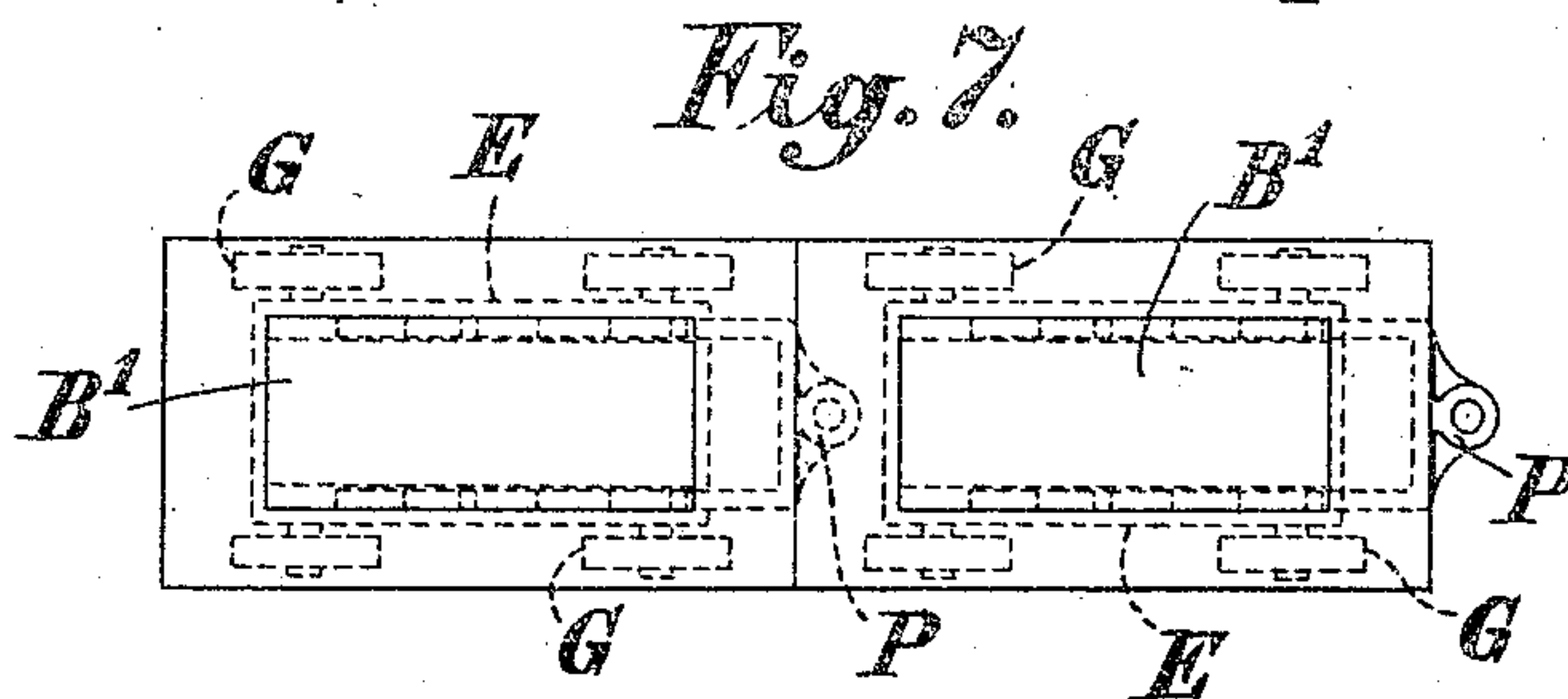
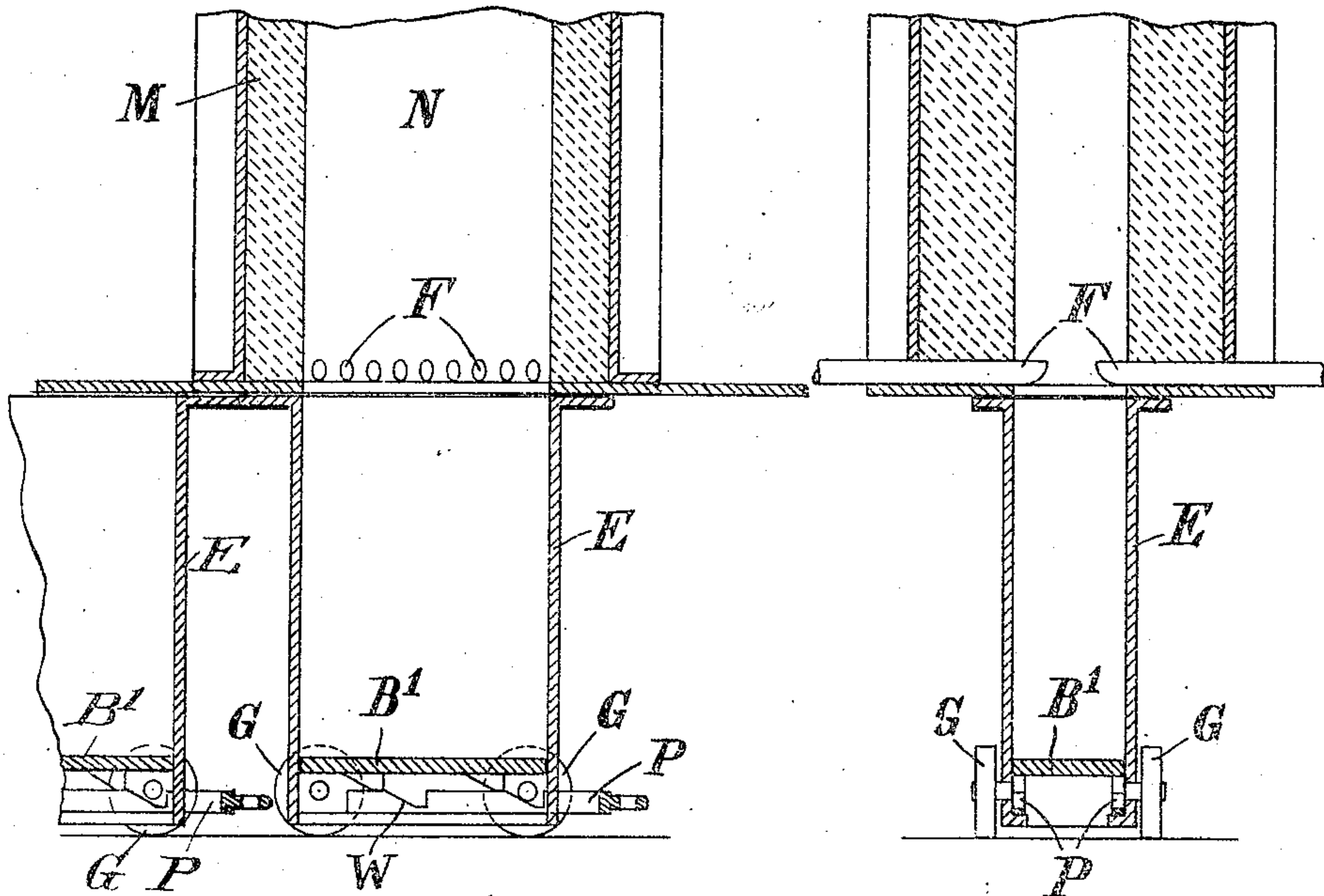
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Fig. 5.

Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR THE MANUFACTURE OF COKE.

1,166,422.

Specification of Letters Patent.

Patented Jan. 4, 1916.

Application filed January 22, 1912. Serial No. 672,694.

To all whom it may concern:

Be it known that I, JOHN ARMSTRONG, subject of the King of Great Britain, residing at London, in the Kingdom of England, have invented certain new and useful Improvements in Apparatus for the Manufacture of Coke, of which the following is a specification.

For some time it has been known, through my own patents and others, that coke can be produced of very good quality in a high furnace. The difficulty with such furnaces, however, was that the material had to fall down into a well below the oven, and be drawn out therefrom, or pulled out at the side of the oven and carried off on an inclined or horizontal railway or conveyer. The coke was thus considerably broken, and owing to surface oxidation had an uneven and poor color.

Now my present invention is designed to do away with these evils and is set forth in the accompanying drawings, in which I have not shown the heating devices, as these do not form a part of my invention.

In these, Figure 1 is a vertical section through line A B, Fig. 4; Fig. 2, a vertical section through line C D, Fig. 4; Fig. 3, a vertical section through line E F, Fig. 4; Fig. 4, a sectional plan Fig. 5 is a longitudinal section of a modified form of carriage, in which a ram is not used; Fig. 6 a transverse section of the same; and Fig. 7 a plan of two of said carriages.

In these it will be seen that the heating flues are brought from the outside one under the other, and the injecting devices are placed outside, instead of underneath the furnace. For high temperatures air heating flues are inserted in the outside walls so that hot air can be used for burning the gas in the heating flues. It will thus be seen that the bottom of the furnace is perfectly smooth. In these N is the chamber in which the coke is formed. M outside walls thereof.

F F are forks or a series of bars which go through the lower portion of the walls and penetrate the coke so as to hold it in any convenient position. These forks may be worked by screw levers or any other convenient mechanism not shown, so that they can be driven into the chamber until they

meet, or in place of having two sets meeting, a single set can be driven right across the chamber. The prongs are preferably considerably deeper than they are broad so as to form girders as it were.

C is a ram working vertically inside the cylinder E. This cylinder E can be moved forward or backward on the rails H by means of wheels G.

B is a movable bottom, which when brought up against the retort chamber forms an impervious bottom. D is a little platform on the top of the ram supporting this movable bottom, but otherwise free of it.

A A are supports or ledges on the side of the cylinder to support the bottom in its lowest position when the ram is lowered out of the cylinder.

The mode of action in using this apparatus for vertical or even for somewhat inclined ovens or retorts is as follows:—When the oven or retort is full of coke, and a large quantity at the bottom, or the whole of it is finished and ready to be drawn, the forks F F are pushed through their respective holes into the bottom of the oven. They penetrate the coke until there is a grate formed all over the bottom. When this is done, and the coke is firmly secured, the bottom B is taken away, and the caisson or cylinder is run immediately under the oven or retort, and fixed in position by bolts or otherwise. The ram is then raised from the lower position shown at D', lifting up the loose bottom from its position on the ledges or snugs A A to the position immediately under the bottom of the oven or retort shown in the drawings as B². When this has been done, the forks F F are withdrawn, and the charge is now on the head of the ram, which is lowered to the position shown at B, but before it is lowered quite so far, if the column of coke in the oven or retort capable of resting on the bottom is taller than the cylinder, the forks are again applied both to arrest the coke descending, and to cut it off at this point. The ram now descends farther till the bottom B rests on the ledges A A. The ram is then lowered to the position shown at D' when the cylinder with its contents of hot coke is removed

on the wheels -G G on the rails, to be quenched in the cylinder out of contact with air. In making hard coke it is not necessary that the forks should go right through the coke; if they penetrate an inch or two it is sufficient.

In the construction shown in Figs. 5, 6, and 7, B' is the bottom of the cylinder. P is a pusher, formed with wedge-shaped portions upon its upper surface, as shown at W. This pusher is normally placed as shown, but may be pulled out as required.

The mode of operation of this structure is as follows: The tops of the carriages are rectangular, as shown, and they pass successively under the furnace. When it is desired to fill the one immediately under the furnace, the prongs F, Fig. 3, are withdrawn, and the coke falls down into the carriage, filling the same. The prongs F are now rammed back into their position, the pusher is pulled out, allowing the bottom to drop about two inches. This enables the coke under the prongs to sink to the level of the carriage. The empty carriage behind this carriage is now pressed forward, pushing the first carriage out from under the furnace, and taking its place; a lid or cover of any kind is placed on the first carriage, and it is carried away to be cooled and emptied, and the cycle is repeated with the second carriage.

In the operation of the modified construction just described, the successive carriages maintain the furnace practically sealed against the admission of air at the bottom, even during the substitution of one carriage for the other. The omission of the ram is feasible, but is not recommended, except in plants of relatively small importance, because the falling of the coke charge causes some breaking up of the coke during the discharging of the furnace. This fracturing is not nearly so great, however, as when the charge is dumped into an open car larger in transverse section than the furnace, because in my construction there is frictional resistance to the descent and also an air-cushioning action, due to the retarded escape of air around the sides of the descending coke lump, which greatly reduce the shock. The charge, though somewhat cracked or broken, retains its original shape and dimensions, and fitting tightly in the carriage is protected against excessive oxidation. Consequently, while the modified construction is not the full equivalent of the preferred construction, it nevertheless attains in a more or less limited degree the characteristic advantages of my invention.

I declare that what I claim is:—

1. The combination with a coke oven open at the lower end, and having sides substantially parallel and vertical; means for temporarily holding the contents of the oven in

position; and a receptacle for receiving the coke from the lower end of the oven when said means are withdrawn from the supporting position, said receptacle fitting closely to said lower end, the receptacle and the oven being of substantially the same cross-section, whereby when the means for holding the coke are withdrawn or removed, the coke falls into the receptacle without being exposed to the air, and without fracture, all arching, such as is occasioned when the lower end of the oven is contracted, being prevented.

2. In combination with a coke oven, a series of receptacles for removing the coke discharged from the lower end of the oven, said receptacles being internally of similar horizontal cross-section to that of the lower end of the oven, and making a relatively close fit with said lower end; a movable bottom in each receptacle capable of closing the bottom of the oven; and means for raising and lowering said bottom.

3. In combination with a coke oven; a series of carriage-like receptacles adapted to be moved beneath the same and into which the coke is discharged, said receptacles each having an internal cross-section substantially conforming in shape to the lower discharge end of the oven; a movable bottom carried in each receptacle; and means for raising and lowering said bottoms.

4. In combination with a coke oven, a plurality of bars located at the lower end thereof and adapted to be projected inwardly into the coke therein, a plurality of carriage-like receptacles adapted to receive successive masses of coke discharged from the oven, said receptacles having an internal cross-section substantially the same as that of the discharge end of the oven; a movable bottom located in each receptacle; and means for raising and lowering said bottom.

5. In combination with a coke oven, a receptacle adapted to receive coke discharged therefrom; means for sustaining the undischarged coke in the oven; and means carried by the receptacle for sustaining the discharged coke and lowering the same away from the oven and thereby permitting the coke in the receptacle to clear the lower end of the oven.

6. In combination with an elevated coke oven, rails extending beneath the same; a plurality of carriage-like receptacles mounted upon the rails and adapted to successively make a close fit with the lower open end of the oven; a movable bottom plate arranged in each of the receptacles; and means for raising said plate from the lower portion of the receptacle into contact with the lower portion of the oven.

7. In combination with a coke oven, a movable receptacle mounted below the same, said receptacle in cross-section conforming sub-

stantially to the internal cross-section of the discharge end of the oven; a bottom plate mounted in said receptacle; means for raising and lowering said bottom plate; and
5 means, independent of the plate, for sustaining the coke in the lower portion of the oven.

In witness whereof, I have hereunto signed my name this 9th day of January 1912, in the presence of two subscribing witnesses.

JOHN ARMSTRONG.

Witnesses:

H. D. JAMESON,
O. J. WORTH.