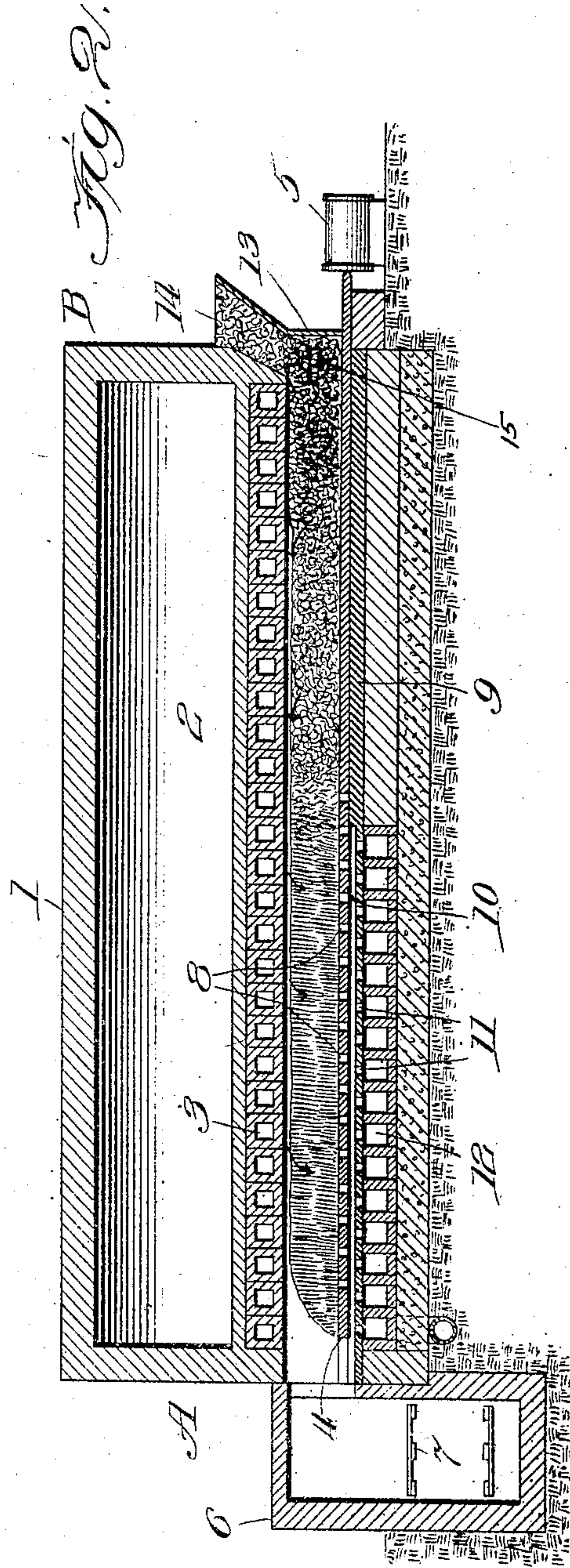
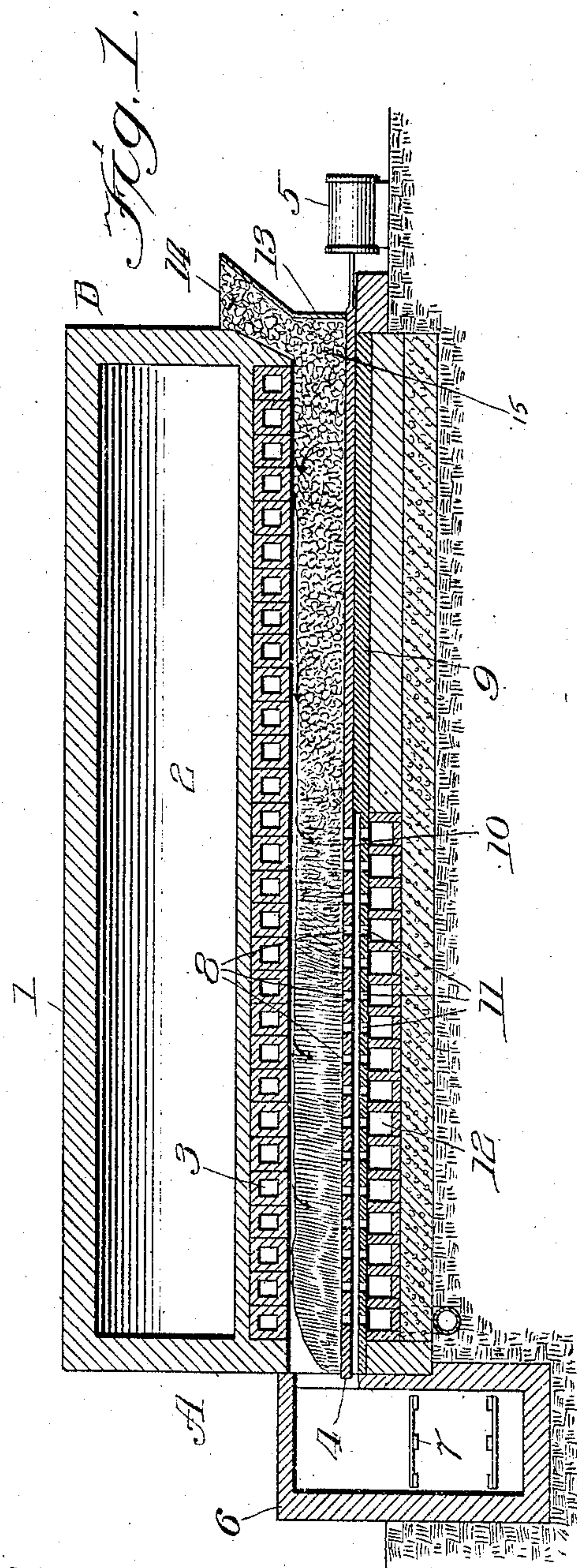


L. L. SUMMERS.  
COKING FURNACE.  
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943,610.

Patented Dec. 14, 1909.



Witnesses:

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# UNITED STATES PATENT OFFICE.

LELAND L. SUMMERS, OF CHICAGO, ILLINOIS.

COKING-FURNACE.

943,610.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Original application filed March 19, 1909, Serial No. 484,354. Divided and this application filed October 4, 1909. Serial No. 520,929.

*To all whom it may concern:*

Be it known that I, LELAND L. SUMMERS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Coking-Furnaces, of which the following is a specification.

The object of my invention is to construct a retort for coking, with means whereby the material treated therein may be efficiently conveyed therethrough from end to end, and at the same time may be conducted into the retort in such condition as to facilitate the production of a compact and coherent coke formed in large pieces.

A further object attained by my invention resides in the fact that the material is supplied to the retort in such manner as to produce an efficient seal against the entrance of atmospheric air or escape of gases at the discharge end of the furnace without the use of door or similar expedients.

The mechanism and mode of action described in this application are fully set forth in my copending application Serial No. 484,354, and this application is filed as a division of said copending application, for the purpose of presenting claims to one of the forms of apparatus described and illustrated in said copending application.

In the drawings—Figure 1 is a longitudinal vertical section through a coking furnace embodying my invention, and Fig. 2 is a similar view, showing the parts in a different position.

The coking furnace illustrated, which may be one of many units constituting a complete plant, comprises an outer covering or arch 1 separated by an air space 2 from the retort, the air space 2 serving as an insulating medium to prevent the radiation and waste of heat. Above the retort are a series of flues 3 by means of which the retort is heated. These retorts are designed to lead from a suitable furnace and to conduct the products of combustion therefrom back and forth over the top of the retort from the discharge end A toward the charging end B, where they are allowed to escape or are utilized for other purposes.

I have not illustrated and will not describe herein the specific construction of the heating furnace, for the reason that these elements are fully set forth in my copending application above referred to and form no

part of the invention to be specifically claimed herein.

Resting upon the floor of the retort is a reciprocable conveyer floor 4 extending throughout the length of the retort. Means are provided for reciprocating this floor endwise of the retort, such means, preferably, consisting of a hydraulic cylinder 5 to the plunger of which the movable conveyer floor is attached.

The outlet or discharge end A of the retort is provided with some form of seal, this being indicated generally in the accompanying drawings by the closure 6, in which I have shown a conveyer 7 for carrying away the coke. Means are provided adjacent the discharge end of the furnace for causing the gases distilled from the cooler freshly charged material to pass through the more highly heated carbonated material adjacent the discharge end. It will be understood that the material adjacent the discharge end will be much more highly heated than that at the charging end, by reason of its having been subjected to the heat of the retort for a longer period, and, further, by reason of the fact that the heated gases are discharged into the flues 3 at the discharge end A and gradually lose heat as they proceed in a zig-zag course across the top of the furnace toward the charging end.

The means illustrated for compelling the distilled gases to pass through the coke adjacent the discharge end of the furnace consists of a series of apertures 8 in the conveyer floor, through which the gases escape or are drawn outward. In the present instance I have shown a stationary floor 9 beneath and supporting the conveyer floor 4, said stationary floor being provided with grooves 10 registering with the apertures 8 and openings 11 leading from the base of said grooves into ducts 12 located beneath the stationary floor. It will be understood that there may be a plurality of rows of apertures 8 and 11, together with a plurality of registering grooves 10. The ducts 12 may communicate with the atmosphere or with treating and storing apparatus for the gases passing therethrough, and if desirable some degree of vacuum may be maintained in the ducts 12 for the purpose of promoting the discharge of gases through the heated material in the retort. Inasmuch as these matters are fully described in my copending



application and are not involved in the invention claimed herein, further description thereof is unnecessary. At the charging end of the furnace and spaced from the end wall thereof is a wall 13 forming in the present instance the lower part of a hopper 14 through which material is fed to the outer end of the conveyer floor 4. The wall 13 extends downward into close proximity with the upper surface of the conveyer floor 4 and serves to prevent the material upon the conveyer floor from being moved outwardly when the floor is drawn out through the action of the hydraulic cylinder 5. The hopper 14, preferably, extends upwardly a sufficient distance to hold a considerable body of coal.

In Fig. 1 the conveyer floor is illustrated as moved to its inward position. When, through the action of the hydraulic cylinder 5, or other mechanism employed, the conveyer floor is drawn outwardly to the position shown in Fig. 2, the material at the point 15 which dropped to the conveyer floor from the hopper upon the previous inward stroke of the conveyer floor is compressed to a considerable extent against the wall 13. This compression results from the fact that upon the outward movement of the conveyer floor it tends to draw the material resting thereon with it, and this material being arrested by the wall 13 and being confined by the side walls of the hopper is compacted or compressed against said walls. The compression and compacting of the material at the point 15 is further contributed to by the weight of the superimposed coal in the hopper 14, and upon the next inward movement of the conveyer floor this compacted freshly fed material is carried forward into the retort, thus permitting additional material to drop from the hopper upon the conveyer floor, whereupon the continued action of the floor brings about a repetition of the steps above explained. The compacting of the material as above explained facilitates the formation of a compact and coherent coke, and, furthermore, serves the function of contributing to the formation of an effectual seal at the charging end of the retort. The entrance of atmospheric air or the escape of gases at the charging end is prevented by the coal in the hopper and in the retort adjacent the charging end.

By the use of the conveying means above described, the material is moved through the retort with comparative ease and the walls of the retort are free from any outward pressure, such as is incident to the use of rams acting directly upon the material charged to the retort. In the case of a long retort, any attempt to force material there-  
through from end to end by means of force

applied directly to said material, as by means of a ram or plunger, results in producing an injurious outward pressure upon the walls of the retort, and if sufficient force is applied to move the material, the walls of the retort are destroyed.

I claim:

1. A coking furnace comprising a retort, a reciprocable floor in said retort, means for feeding material to one end of said floor and for restraining the material against movement except in a direction toward the retort.

2. A coking furnace comprising a retort, a reciprocable floor in said retort, means for feeding material to one end of said floor, means for retaining a body of material above the point at which it is fed to said floor and for restraining the material against movement except in a direction toward the retort.

3. A coking furnace comprising a retort, a reciprocable floor extending through the retort from end to end, means for feeding material to one end of said floor and for restraining the material against movement except in a direction through the retort from the point at which the material is fed thereto.

4. A coking furnace comprising a retort, a reciprocable floor extending through the retort from end to end, means for feeding material to one end of said floor, means for retaining a body of material above the point at which it is fed to said floor and for restraining the material against movement except in a direction toward the retort.

5. In a coking furnace, a retort, a reciprocable floor in said retort, said floor extending throughout the length of said retort and projecting beyond the end of the retort at the charging end, and a retaining and stripping wall above the projecting end of said floor.

6. In a coking furnace, a retort, a reciprocable floor in said retort, said floor extending throughout the length of said retort and projecting beyond the end of the retort at the charging end, and a hopper above the projecting end of said floor, said hopper extending downward into proximity with said reciprocable floor.

7. In a coking furnace, a retort, a reciprocable conveyer floor, means for sealing said retort at the discharge end, a hopper extending upwardly from the charging end of said retort and having its outer wall extending downwardly into proximity with the upper surface of said conveyer floor, and means for reciprocating said conveyer floor.

In testimony whereof, I have subscribed my name.

LELAND L. SUMMERS.

Witnesses:

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HENRY A. PARKS.