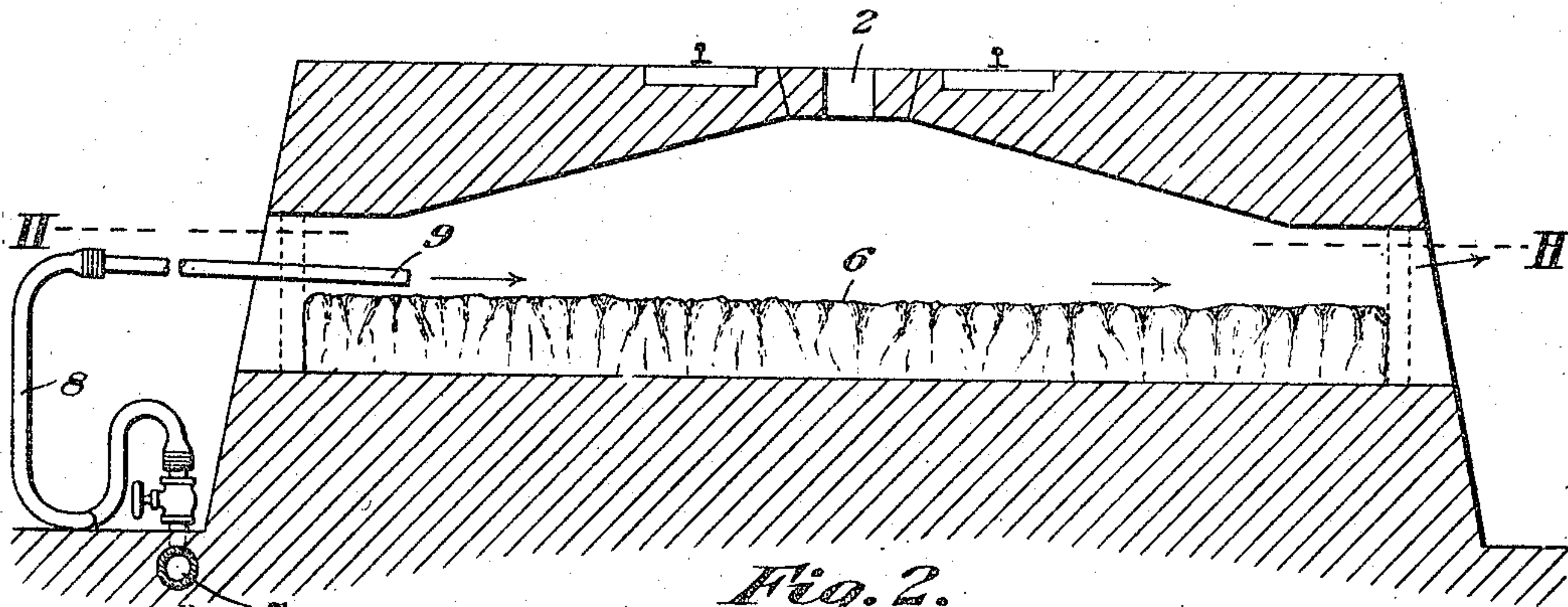


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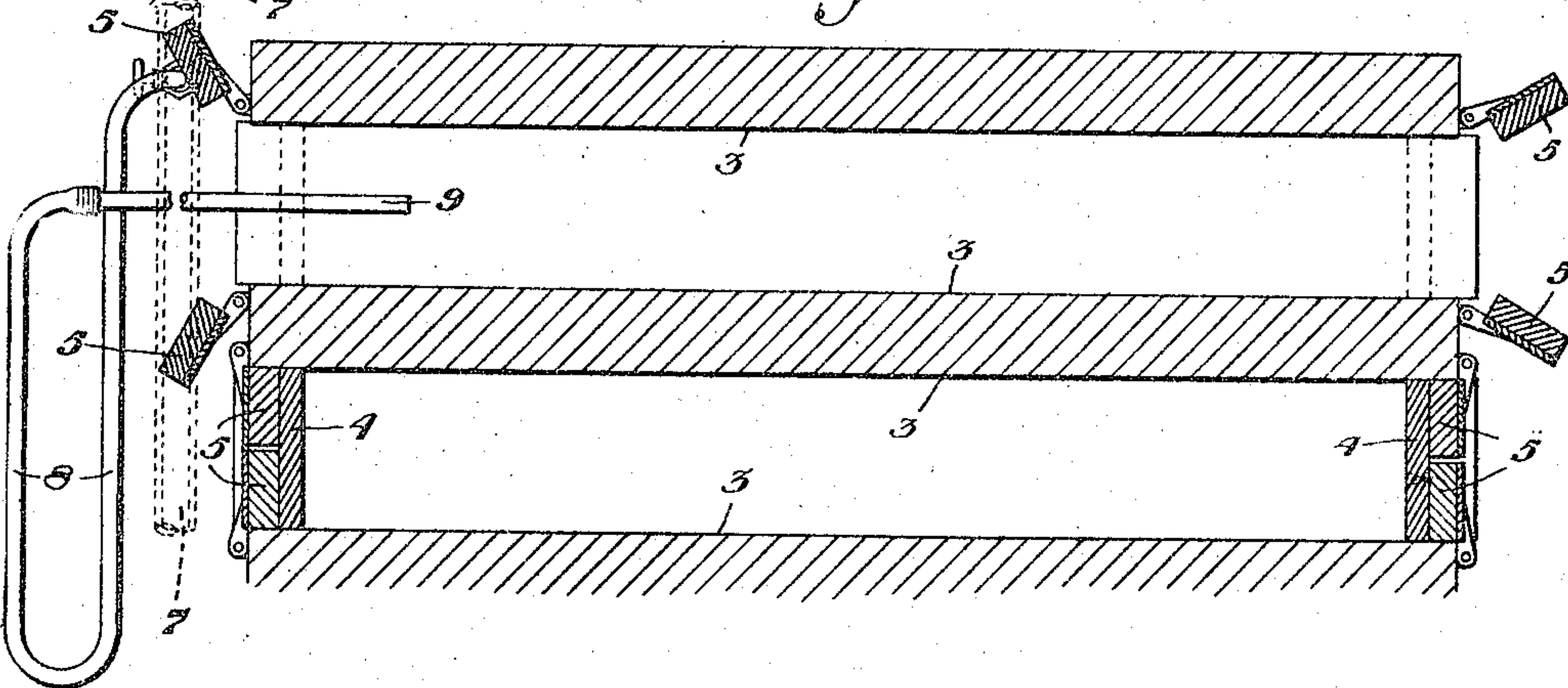
PATENTED MAR. 10, 1908.

J. H. HILLMAN.  
MANUFACTURE OF COKE.  
APPLICATION FILED NOV. 30, 1907.

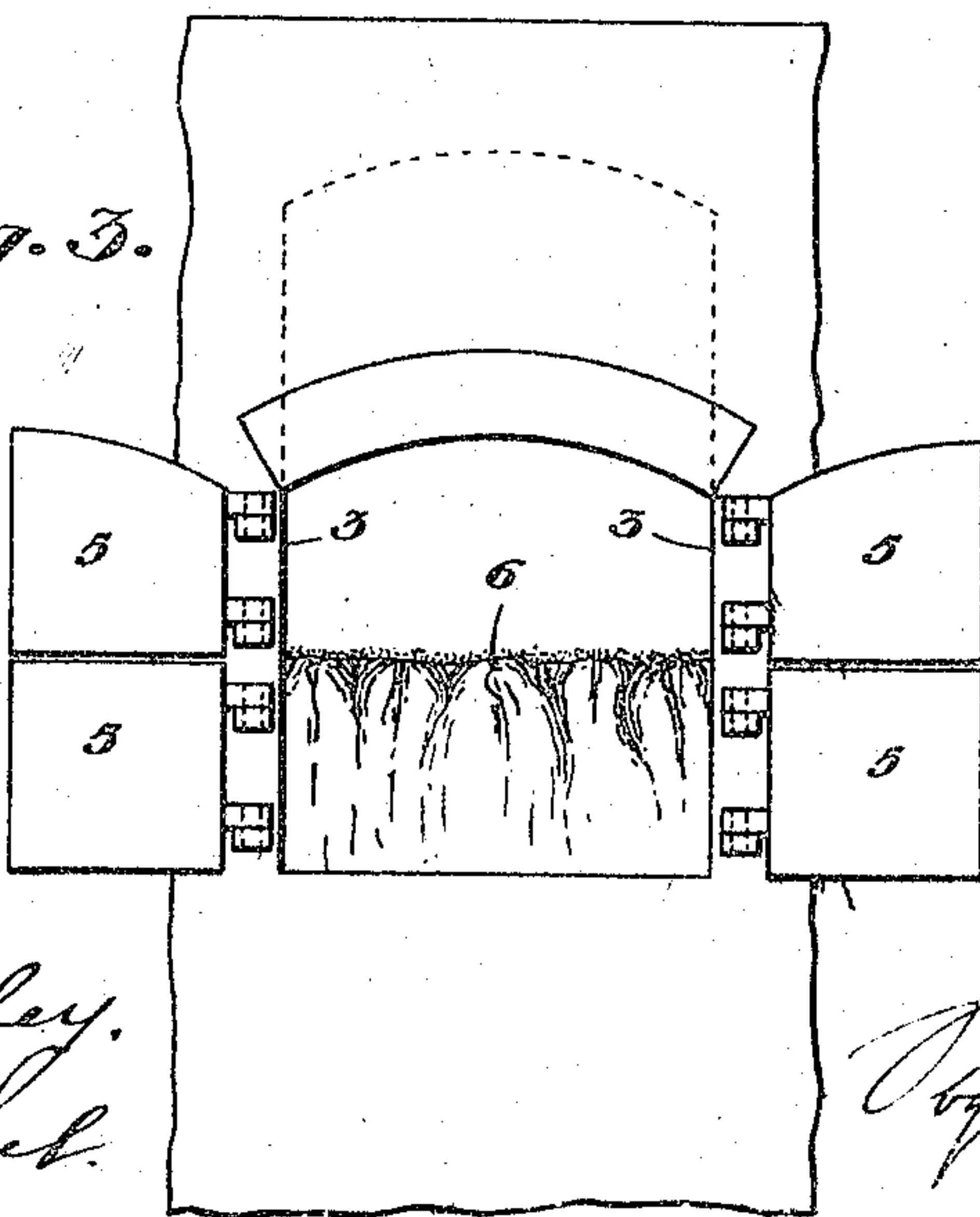
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:  
Chas. S. Siple.  
Fred Staub.

Inventor:  
John H. Hillman  
by O. M. Clarke  
his attorney



# UNITED STATES PATENT OFFICE.

JOHN H. HILLMAN, OF PITTSBURG, PENNSYLVANIA.

## MANUFACTURE OF COKE.

No. 881,685.

Specification of Letters Patent.

Patented March 10, 1908.

Application filed November 30, 1907. Serial No. 404,609.

*To all whom it may concern:*

Be it known that I, JOHN H. HILLMAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the Manufacture of Coke, of which the following is a specification, reference being had therein to the accompanying drawing:

My invention consists of an improvement in the art of manufacturing coke and refers particularly to the method or process of removing ashes, dirt or waste material from the surface of the coke within the oven immediately after the burning operation while the coke is still practically incandescent, and before quenching.

In carrying out my improvement I employ a blast of air directed across the surface of the incandescent coke within the oven, which is preferably of longitudinal tunnel form, of the type known as the Belgian oven, or any similar construction whereby an inlet is provided for the introduction of the blowing apparatus and an oppositely located outlet opening for the escape of the ashes, etc.

In the drawing accompanying this application:—Figure 1 represents a longitudinal vertical sectional view through a coke oven of the Belgian type, showing the end walls and doors removed or opened and the blow-pipe inserted at one end. Fig. 2 is a horizontal sectional view on the line II, II, showing a plurality of ovens assembled. Fig. 3 is a face-view showing the end of one of the ovens.

Ovens of the type to which my improvement is best adapted are in the form of longitudinal tunnels having arched roofs extending upwardly toward the center from each end to the charging opening 2, as indicated in Fig. 1, the inner faces 3 of the walls below the arch being vertical, and preferably somewhat tapering, i. e., wider apart at one end than at the other for ease of removal of the coke. By this construction the oven comprises a continuous coking retort of approximately thirty feet in length and of a width of, say five feet, into which the coal is charged through the opening 2 and leveled to a height of about two to three feet between the walls and within the ends, which are closed by the usual brick closures 4 to prevent entrance of excess air, during coking. The ovens are preferably provided with double doors 5, 5, at each end, said doors

being in pairs below and above the middle portion of the opening, and lined with brick, although any suitable closing means may be used for securing good results.

After the coking operation and the burning-off of all of the gases and bituminous matter, and while the coke is still in an incandescent condition prior to quenching, there remains upon its top surface 6 a certain proportion of ashes, partially burned coal, brick-dust, splinters, etc., which foreign matter is ordinarily removed from the oven with the coke and commingled therewith. Its presence in the coke is objectionable and injurious in the process of smelting iron ore in the blast furnace, resulting in such impurities being fused with the iron, and resulting in a more or less impure product wherever such coke is used in the arts. At the termination of the coking operation, these impurities, and particularly the light ash, remain lightly resting on the top surface of the coke and is readily removed by a blast of air or other gaseous fluid, the construction of the oven itself, of the type shown, being particularly adapted for the successful operation. After the doors have been opened and the brickwork removed, a clear opening is provided through each opposite end, and upon introducing the blast at one end a circulation is set up throughout the tunnel of the oven which confines its effect to the longitudinal top surface of the coke, and to the interstices of the coke and between the coke and the side walls of the oven.

It will be understood that in the operation of coking, crevices are formed during the transformation from a bituminous to a carbonaceous mass, and that the main body of the charge shrinks away from contact with the side walls, leaving openings into which the ashes and other impurities will fall, and from which they are removed by my improved process. The terminal nozzle of the blast-pipe may be of sufficient length to be introduced gradually along the area of the oven, the blast removing all the particles and waste matter from the surfaces and all spaces and interstices, carrying it out through the other end.

In carrying out my invention I employ a main supply-pipe 7, laid along in front of or adjacent to the front wall of the bank of ovens, with which by flexible hose 8, connection may be made at intervals as desired, the hose being of sufficient length for free manip-



ulation and provided at its other end with a blast-pipe having a terminal nozzle 9. The hose 8 is also of sufficient length to permit the blast-pipe to be used in several ovens of a series, which are located side by side for any number desired, and the blast-pipe is also of sufficient length to permit its insertion throughout the length of the oven if desired.

The advantages of my improved method consist in producing a clean and pure body of coke by removing the loose impurities from the surface of the coke charge in the oven, thereby preventing the commingling of the ashes and other impurities with the main charge in the process of drawing or discharging from the oven, and obviating the necessity of cleaning the coke by screening or other separating means.

In applying the blast while the coke is still hot and before quenching, the hot, dry quality of the impurities, together with the radiating heat, and the heated air of the blast, greatly assist in their separation and removal by the blast. After quenching the impurities are wet and are thoroughly impregnated with and adhere to the coke so that their separation by any other subsequent screening or cleaning operation is necessarily imperfect, laborious and expensive.

When carried out in the manner described immediately after the charge is thoroughly coked and while it is still in a highly heated or incandescent condition, the removal of the impurities is not only facilitated by the buoyant effect of the radiated heat, but is rendered easy, cheap and thorough, occupying but three or four minutes for cleaning the entire charge, and a further advantage is that the temperature of the charge is appreciably lowered by the blast of air.

While the best results may be secured in an oven of the type described, I do not desire to

be understood as limiting it to an oven of any particular dimensions or proportions, but generally to an oven of the Belgian type.

Having described my invention, what I claim and desire to secure by Letters Patent, is:

1. In the manufacture of coke, the process of removing the ashes, etc., from the top surface of the coke by introducing a blast of air at one portion of the charge, and directing it across the surface and towards an outlet opening remote from the point of introduction and leading to the atmosphere, prior to quenching the charge in the oven, substantially as set forth.

2. In the manufacture of coke, the process of burning the charge in a Belgian oven, opening the ends thereof after the coking operation, and introducing a blast of air at one end, whereby the loose impurities are removed from the charge and carried through the oven and outwardly through its other end, substantially as set forth.

3. In the manufacture of coke, the process of burning the charge in a longitudinal oven having a closed opening at each end, opening the end thereof after the coking operation, and introducing a blast of air from one end over the surfaces of the charge while it is highly heated and before quenching whereby the expanding blast and radiated heat remove and carry the loose impurities from the coke through the oven and outwardly through the other end substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. HILLMAN.

Witnesses:

MARGARET C. KUBLE,  
C. M. CLARKE.