

J. H. HILLMAN.
MEANS FOR SUPPLYING AIR TO COKE OVENS.
APPLICATION FILED OCT. 6, 1908.

924,462.

Patented June 8, 1909.

Fig. 1.

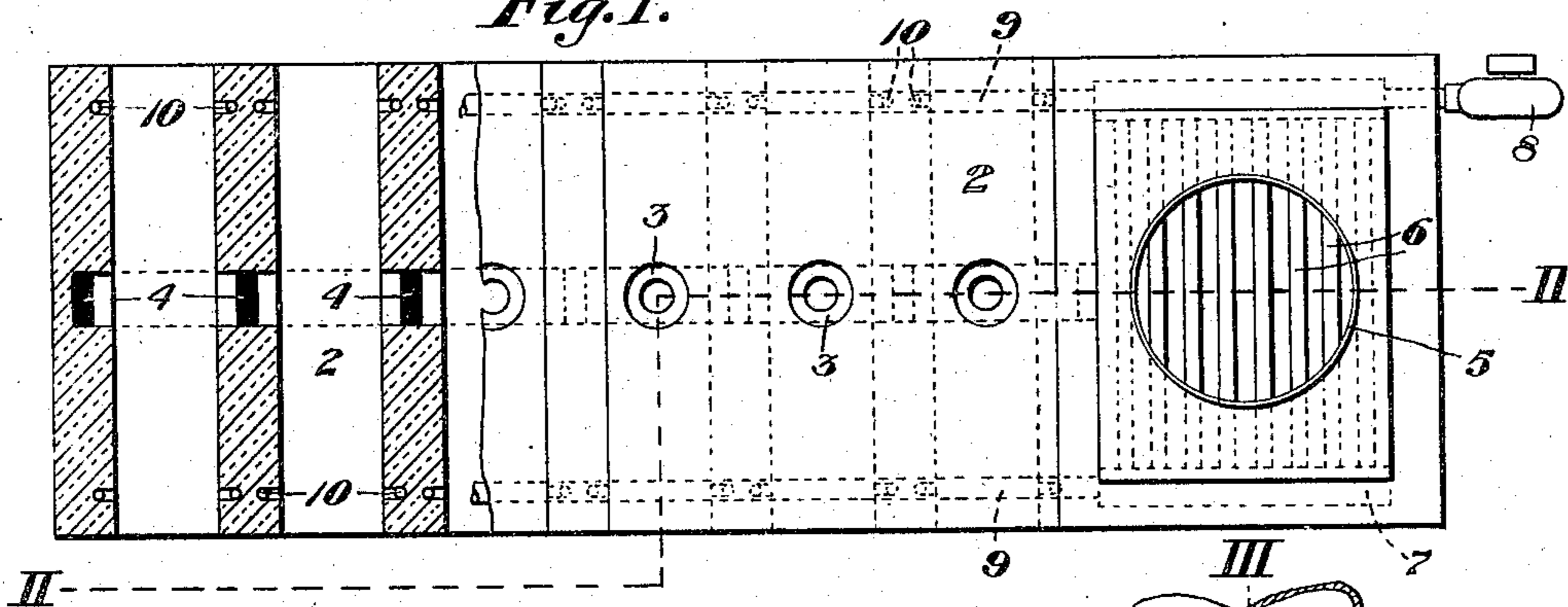


Fig. 2.

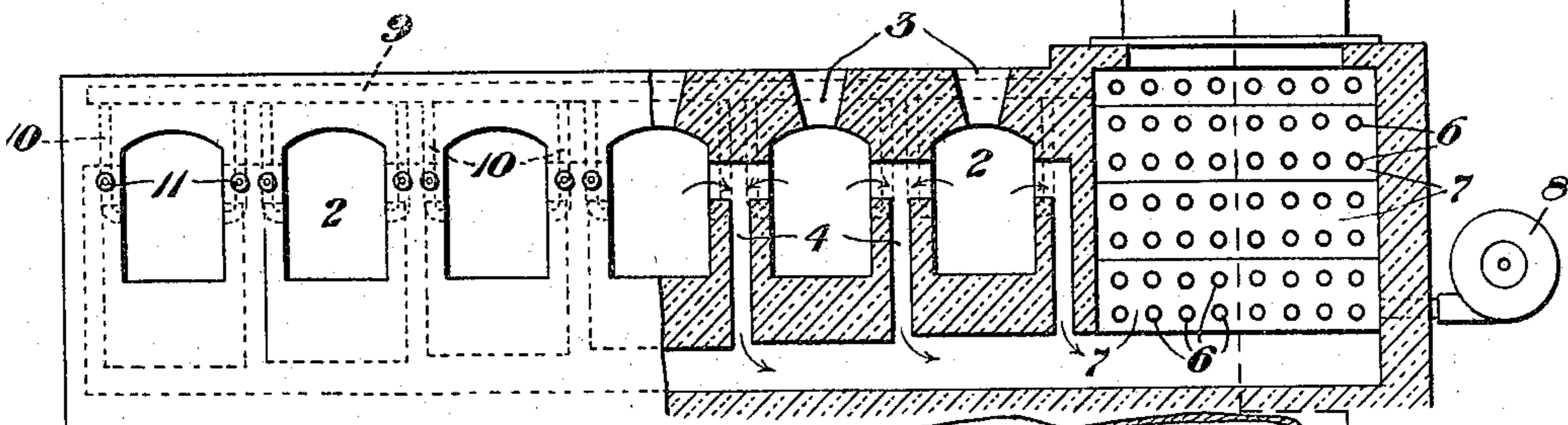


Fig. 3.

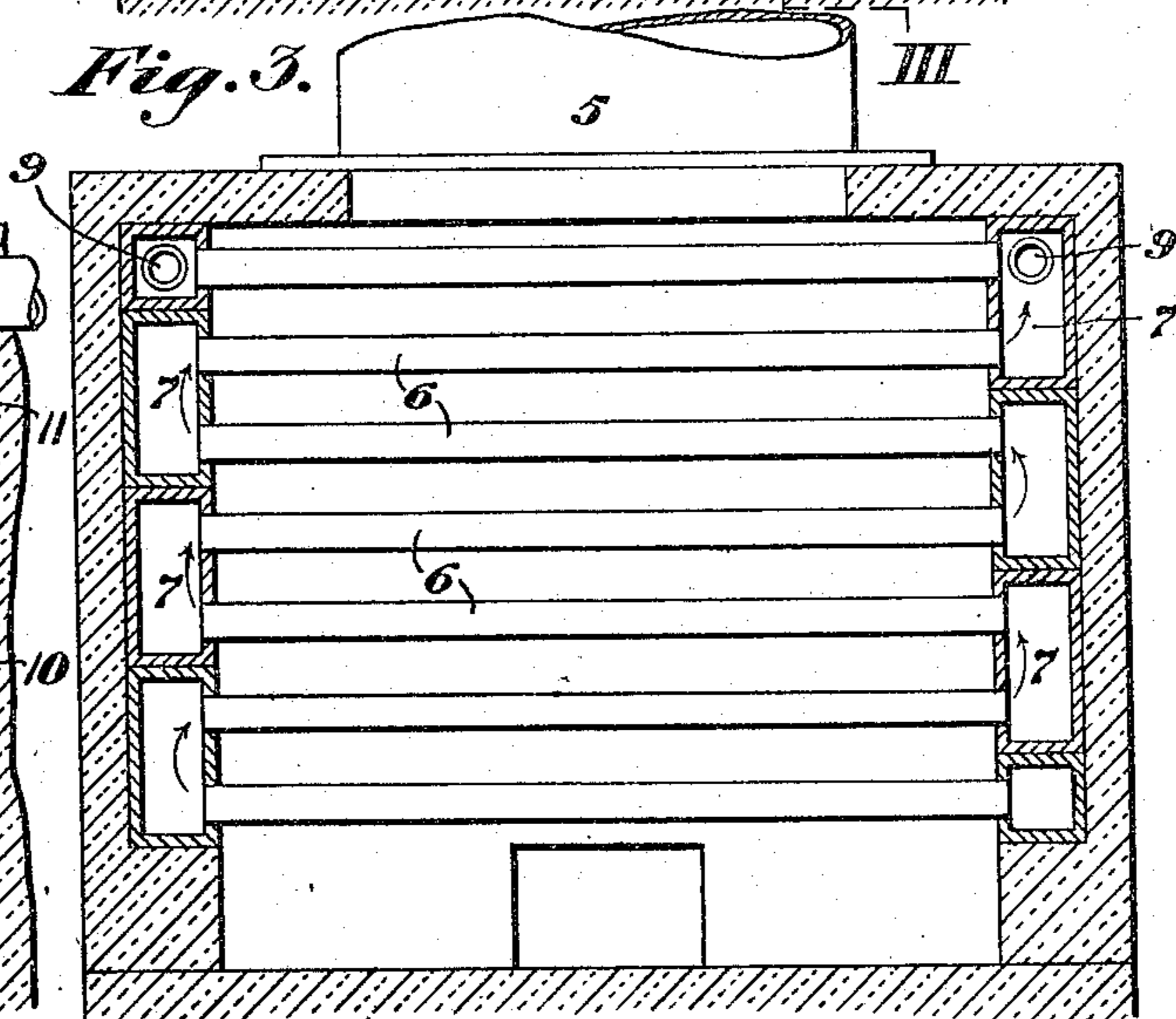
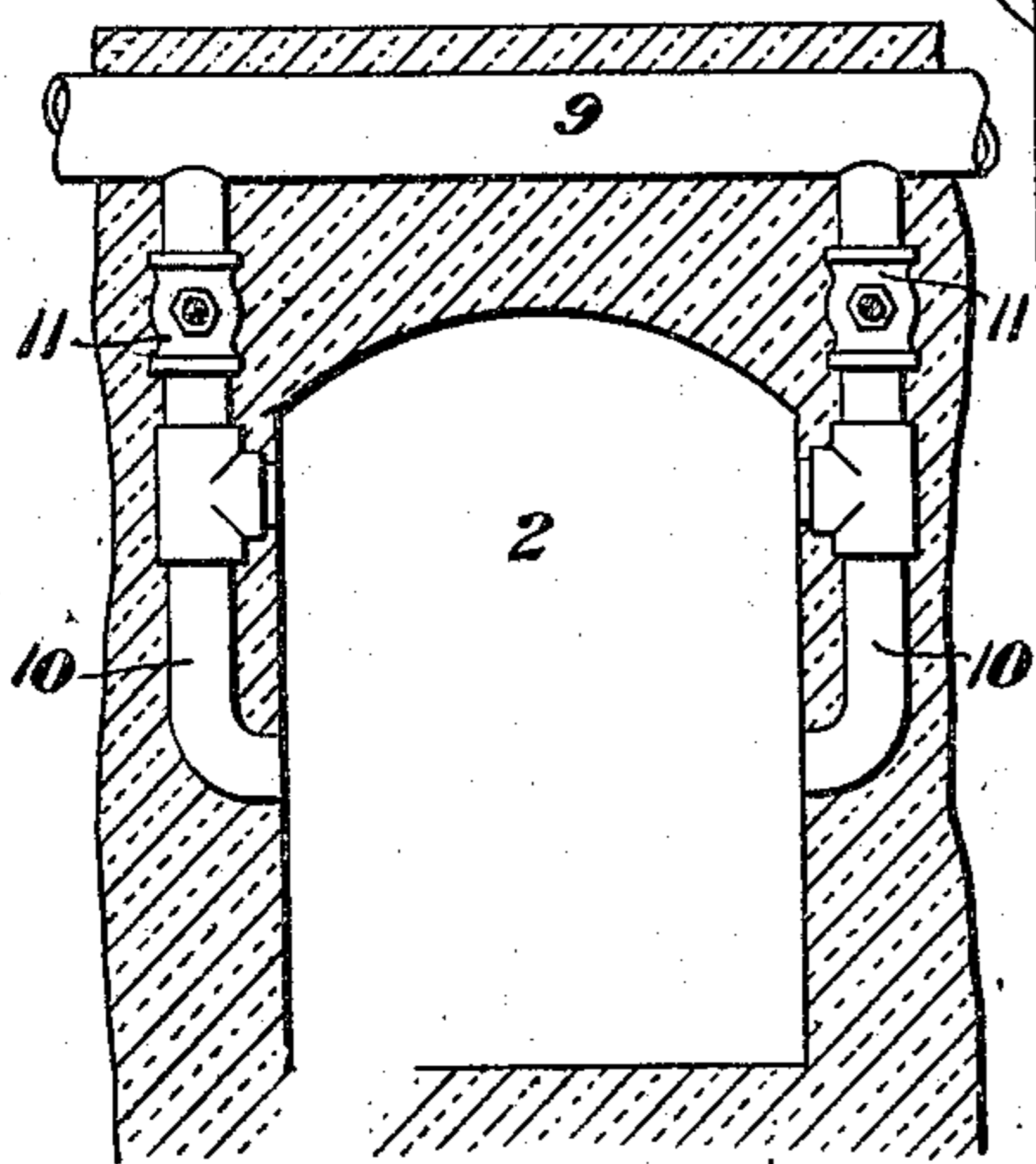


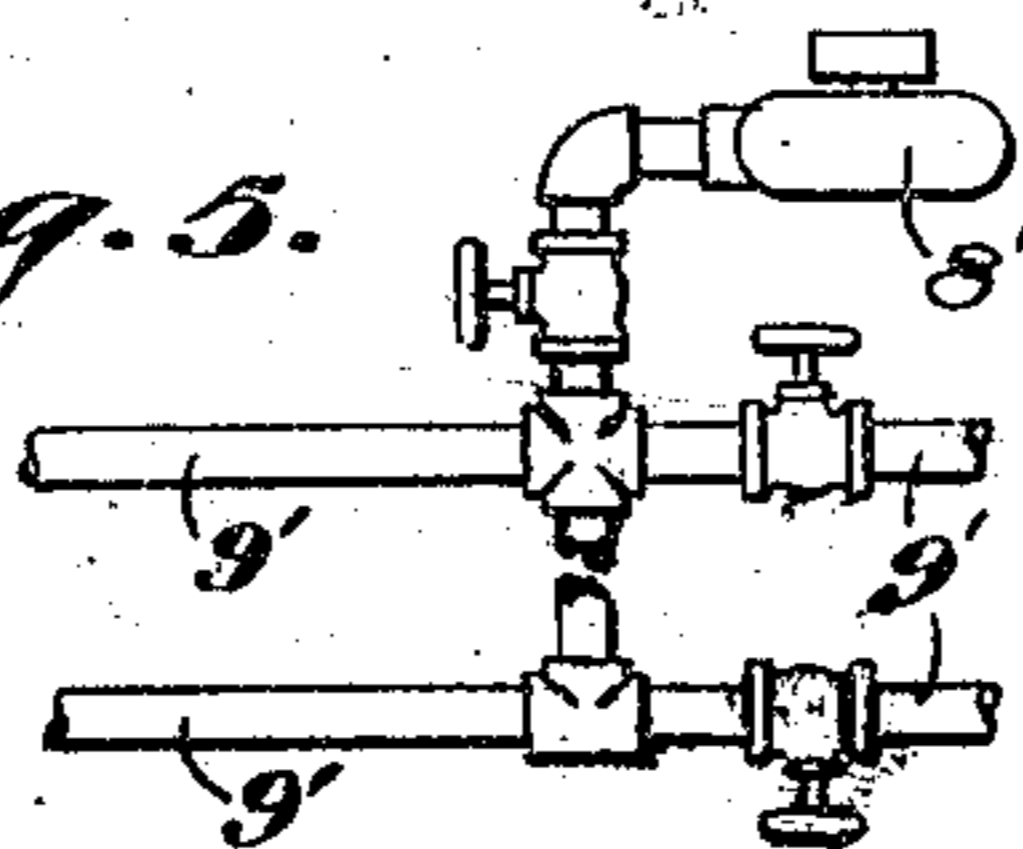
Fig. 4.



Witnesses:

Chas. S. Fepley
Henry L. Lusk

Fig. 5.



Inventor:

John H. Hillman
by C. M. Clarke
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UNITED STATES PATENT OFFICE.

JOHN H. HILLMAN, OF PITTSBURG, PENNSYLVANIA.

MEANS FOR SUPPLYING AIR TO COKE-OVENS.

No. 924,462.

Specification of Letters Patent.

Patented June 8, 1909.

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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 Means for Supplying Air to Coke-Ovens, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to the manufacture of coke, and consists of means for furnishing a supply of air, either at the normal atmospheric temperature, or previously heated, to the interior of the oven or ovens during burning of the charge for the purpose of driving off the volatile matter, as sulfur, ammonia, and other volatiles, by the use of an artificial air supply, in the manner hereinafter described.

In the ordinary process of manufacturing coke, the necessary air supply is furnished through fissures or openings in the doors of the ovens, the burning of the coke continuing until the volatile ingredients are burned off, after which the supply of air is cut off by daubing the door openings. I have found in practice that owing to variations in the temperature, the amount of moisture carried in suspension in the atmosphere, the varying wind currents or absence or presence of wind, with other atmospheric conditions, result in a great variation of the coked product, due to the varying supply of air and the constantly varying degree of its condition.

The object of my invention is to control these conditions by supplying a current of air, either at normal temperature or previously heated, preferably under pressure, in varying degrees of volume, to each one of a series of ovens, thereby controlling the conditions of combustion, suiting the supply and quality of air to the particular kind of coal being coked, and subjecting it absolutely to the control of the operator.

A further and valuable feature of the invention is, that by furnishing a fixed amount of air to the ovens, the duration of the coking process is greatly shortened, thereby lowering the cost of manufacture, and reducing the ash to a minimum.

In carrying out my invention, when using pre-heated air, I employ the heat of the waste gases of the ovens for pre-heating the air, the invention being adapted to any type

of oven wherein the products of combustion, instead of escaping freely to the atmosphere, are conducted to a common stack or other collecting and distributing element.

In the drawings accompanying the application:—Figure 1 is a plan view, partly in section, of a bank of ovens provided with the air heating and distributing apparatus for carrying out my invention. Fig. 2 is a view in side elevation, partly in vertical section, on the line II. II. of Fig. 1. Fig. 3 is an enlarged cross sectional view, on the line III. III. of Fig. 2. Fig. 4 is an enlarged detail sectional view through one of the ovens, showing the valve-controlled air-distributing pipes. Fig. 5 is a detail view showing a modified construction of air supply connections.

In the drawings, 2 represent the oven cavities, which in the form shown, extend transversely from one side to the other in tunnel form, being arranged in a bank and provided with the usual central charging opening 3 and outwardly and downwardly conveying ports 4 leading to the base of a common stack 5, of well known construction. In the ordinary practice of this type of ovens, the products of combustion pass outwardly from the ovens through the conveying ports to the stack, and for the purpose of pre-heating the air, I provide a series of transversely arranged circulating pipes 6 extending in series, as shown, across the area of the space traversed by the waste gases. Pipes 6 are connected at each end with a series of headers 7, 7, of any suitable form, and are so arranged as to constitute a series of layers of pipes whereby, when air is introduced into the lower layer of such series, it will traverse therethrough to the next adjacent header and from said header backwardly across the same area above the said layer, to the header on the other side, then reversing its course and so on until the final top layer delivers its air into the last header. By this construction and arrangement, it will be seen that when air is forced through the series of numerous pipes arranged across the path of the products of combustion, it will finally emerge into the upper headers in a highly heated condition. In the place of the headers shown ordinary elbow, U or tee connections may be used to join the ends of the pipes, as in ordinary pipe fitting.

For the purpose of supplying air to the pipes, any suitable means may be employed

as a blower, compressor, or pump 8, connected as shown with the first header, while for the purpose of distributing the air from the upper headers at each side, distributing trunk pipes 9 are connected with each upper header at opposite sides, carried along through the brick work of the structure at each side, preferably above the door openings, as shown, and provided with downwardly extending air supply pipes 10. Said pipes 10 may be of any number desired and may be connected through the walls of the oven at any desired point, as indicated in Figs. 2 and 4, so as to furnish the air as desired. They may also be arranged outside of the walls and covered with any suitable non-conducting material, as asbestos. For the purpose of accurately controlling the supply of air through said pipes, each branch pipe is preferably provided with a controlling valve or cock 11 having a handle or key extending outwardly beyond the front of the ovens, or adapted to be operated by a socket wrench, so that the supply of air to each oven may be accurately controlled and regulated by the operator in charge, from time to time as the coking process advances. Likewise, the initial pressure of the air, or its volume may be controlled by regulating the speed or supply opening of the blower. It will thus be seen that the air supply is capable of being raised to any desired temperature to suit the constantly varying weather and atmospheric conditions.

35 If desired, the pre-heating coils may be cut out and air of the normal atmospheric temperature supplied directly to the distributing pipes 9', corresponding to pipes 9 and leading to the oven chambers, by blower 8' as indicated in Fig. 5, suitable cut-out valves or cocks being provided so that either cold or hot air may be supplied as desired according to conditions.

The advantages of my invention will be readily appreciated by all those familiar with the manufacture of coke. It may be employed with good results with a bank of "beehive" ovens having a suitable bustle pipe leading from the charging holes to a stack, with similar pre-heating and circulating pipes or conductors, which latter may, if preferable, be in the form of checker work, as in the ordinary regenerative furnace, with a suitable reversing

valve, when desirable to furnish heated air, or with the blower and pipe connections for air at normal temperature.

The use of the process results in a better quality of coke, renders the burning operation much more regular and exact, reduces the ash to a minimum by reason of avoiding unnecessary combustion, and will be found to generally improve the quality of the coke, lessening the amount of labor and time required in its manufacture, while guaranteeing uniformity in the product which is not possible where the air supply is constantly subject to natural changes and ignorance and carelessness of the operator.

Having described my invention, what I claim is:—

1. The combination with a series of tunnel ovens each having outlet flues at its middle portion and a common flue leading therefrom to a common outlet stack, of a series of connected circulating conductors arranged across the outlet passage of the waste gases, means for supplying atmospheric air under pressure to said conductors, and conduits leading therefrom through the front walls of the ovens and having branch conduits opening through the side walls of the ovens at their front ends adapted to furnish heated air for circulation toward the middle of each oven, substantially as set forth.

2. The combination with a series of tunnel ovens each having outlet flues at its middle portion and a common flue leading therefrom to a common outlet stack, of a series of connected circulating conductors arranged across the outlet passage of the waste gases, means for supplying atmospheric air under pressure to said conductors, and conduits leading therefrom through the front walls of the ovens having branch conduits opening through the side walls of the ovens at their front ends adapted to furnish heated air for circulation toward the middle of each oven, and having means for controlling the volume of air therethrough, substantially as set forth.

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

JOHN H. HILLMAN.

Witnesses:

C. M. CLARKE,
CHAS. S. LEPLEY.