

(No Model.)

H. M. PIERCE.  
PROCESS OF MANUFACTURING CHARCOAL.

No. 272,976.

Patented Feb. 27, 1883.

Fig. 1.

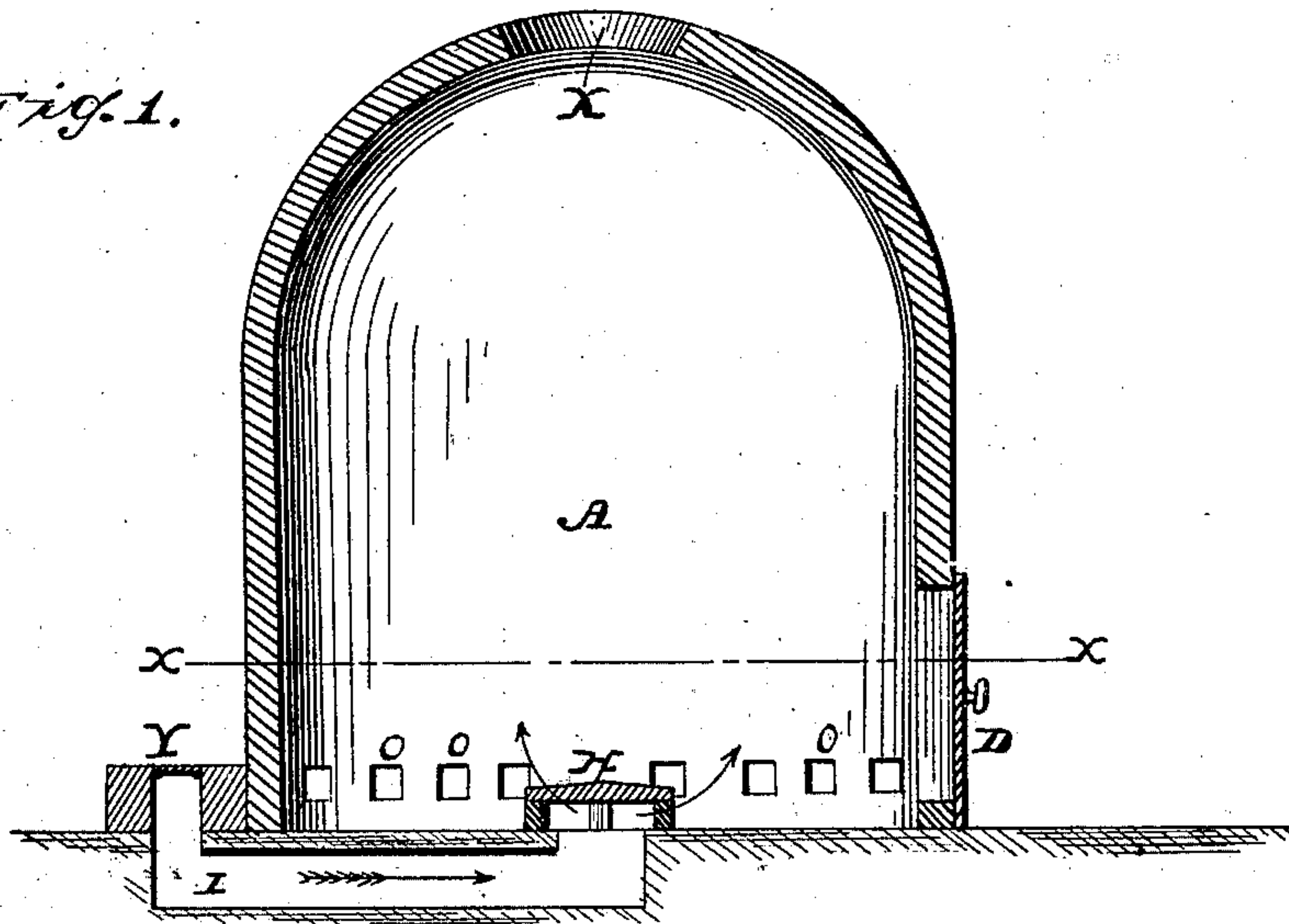
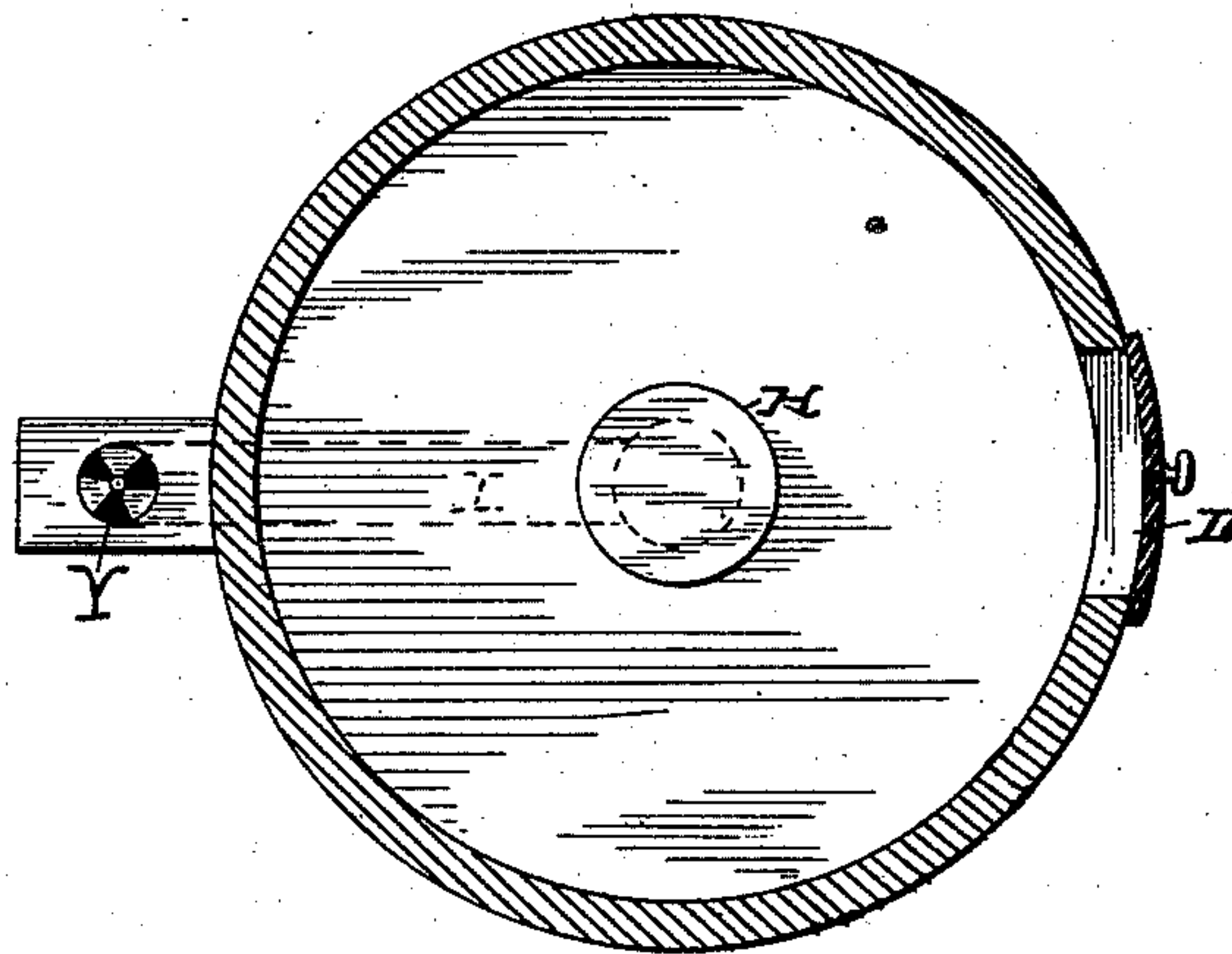


Fig. 2.



Witnesses

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# UNITED STATES PATENT OFFICE.

HENRY M. PIERCE, OF CHICAGO, ILLINOIS.

## PROCESS OF MANUFACTURING CHARCOAL.

SPECIFICATION forming part of Letters Patent No. 272,976, dated February 27, 1883.

Application filed November 25, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY M. PIERCE, 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 Processes of Manufacturing Charcoal; and I hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, wherein—

Figure 1 is a vertical section of a kiln embodying my invention. Fig. 2 is a horizontal section of the same on the line *xx*, Fig. 1.

Like letters refer to like parts wherever they occur.

The object of this invention is to facilitate and render more complete the carbonization of wood in a charcoal-kiln, to increase the yield of charcoal, and to preserve the kiln itself.

It is well known among charcoal-makers that wherever wood is fired in a charcoal-kiln at the top, as is the common practice, the carbonization begins at the top of the kiln and gradually works downward toward the air-inlets. It is also well known that as the process continues the charring is retarded by the difficulty of drawing and holding the heat to the lower and central part of the kiln. In other words, it always takes longer time to char the bottom third of the contents of a charcoal-kiln than the upper two-thirds. This fact, I believe, is not alone owing to the tendency of heat to hang in the top of the kiln, but also to the general effects of having the air-inlets and gas-outlets very near together, and both in the circumference near the bottom of the kiln. The operation of this defective construction by admitting air at the bottom and around the circumference of a kiln is to draw the carbonization gradually down toward these air-inlets and gas-outlets, while a large amount of wood and brands is left uncarbonized in the center and bottom of the kiln. To remedy this difficulty the collier is often compelled to carry on a live combustion of wood around the air-inlets to complete the charring of the lower portion of the kiln. This course involves two objectionable features: first, the destruction by actual burning of a considerable portion of the wood; and, secondly, great injury to the lower portion of the brick-work of the kiln

itself. A charcoal-kiln would be almost indestructible were it not for the burning away of the lower interior part of its walls.

To remedy these complicated and injurious effects I have devised a process wherein the carbonization is conducted by admitting the necessary air-supply at or near the center and base of the charge, firing the charge above or at the top, and withdrawing the vapors, gases, &c., evolved from the circumference and base of the charge, so that while the carbonization approaches gradually the air-inlet or central portion of the charge, the charge toward the circumference is undergoing carbonization from the effects of the highly-heated gases, &c., which escape in that direction, and the carbonization process is consequently rendered uniform, while the brick-work of the kiln is protected.

In the drawings is shown a kiln adapted to carry out my process, wherein a flue or flues, I, extend from the outside of the kiln underneath the wall and floor of the kiln, terminating and opening upward through the center and bottom of the kiln. The termination of this air-flue I in the bottom of the kiln is provided with a raised shield or deflector, H, with air-outlets between the supports of the shield. This shield H is provided for the double purpose of scattering the air and protecting the flue I from filling up with coal, &c. The outer air-inlet end of this air-flue is turned upward, and a register may be affixed thereto to regulate the quantity of air demanded for the carbonization of the kiln. In this way the charring can be controlled and made to proceed slower or faster as effectually as a stove or furnace can be regulated by its dampers.

The operation in brief of my system is as follows: The kiln A being charged and doors luted up, the wood is fired through the opening X in the top of the kiln. This opening is then closed and air admitted through the register Y of the air-flues, combustion of portions of the wood commences, heat is thereby evolved, and the charring begins. This process continues strictly in conformity with the well-known fact that the charring or carbonization progresses steadily toward the points of air-supply H. As by my process air is admitted through the bottom and along the center of



the kiln, the result is that the carbonization is drawn from the top toward the bottom, through or along the center of the kiln; but as it is also well-known that the hot volatile gases thrown off from the wood in the process of charring effect by far the greater part of the carbonization of the contents of the kiln, the too great concentration of heat toward the air-inlets is corrected by the passage of the hot gases through the wood along the sides of the kiln on their way to their outlets in the circumference of the kiln, so that the carbonizing progresses uniformly throughout the entire charge.

The two great agencies for carbonizing wood in a charcoal-kiln are, first, the heat evolved by the absolute combustion of portions of the wood and gases, and, second, the hot volatile gases in the passage through the wood to their outlets. In the old system both of these agencies tend to draw carbonization toward the circumference of the kiln, and on account of the close proximity of the air-inlets and gas-outlets the central portion of the kiln is deprived, first, of the heat generated by direct combustion; second, by the heat of the volatile gases, which, especially toward the close of the operation, escape almost as soon as generated. In my system, however, the central portions of the wood are charred by the direct heat, and the more outward portions by the hot volatile gases in their passage to their outlets in the circumference of the kiln.

I am aware that in the manufacture of charcoal it has been customary to fire the charge or heap at the top and to withdraw the vapors, &c., from the base and circumference of the charge, as well as to admit the air-supply there-

at, and do not herein claim the same, for the reason that in all such cases the tendency of combustion is toward the air-inlets, in which direction the carbonization is already progressing satisfactorily, because the heated gases, &c., pass in that direction as they escape, and as a result leave the central portions of the charge to carbonize more slowly and less satisfactorily. By my method, on the contrary, the combustion is held to the center of the kiln, (as the fire tends toward the air-supply,) while the outer layers of the charge are carbonized by the passage of the highly-heated gases, &c. Consequently carbonization goes on uniformly throughout the kiln, and terminates uniformly and without the loss which often occurs where the outer layers are carbonized before the center of the charge.

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

In the manufacture of charcoal, the method herein described of conducting the carbonizing process, which consists in admitting the air-supply at or near the center and base of the charge, firing the charge at or near the top thereof, and withdrawing the gases and vapors from the base and circumference of the charge, substantially as and for the purpose specified.

In testimony whereof I affix my signature, in presence of two witnesses, this 20th day of November, 1882.

HENRY M. PIERCE.

Witnesses:

F. W. RITTER, Jr.,  
H. B. MOULTON.