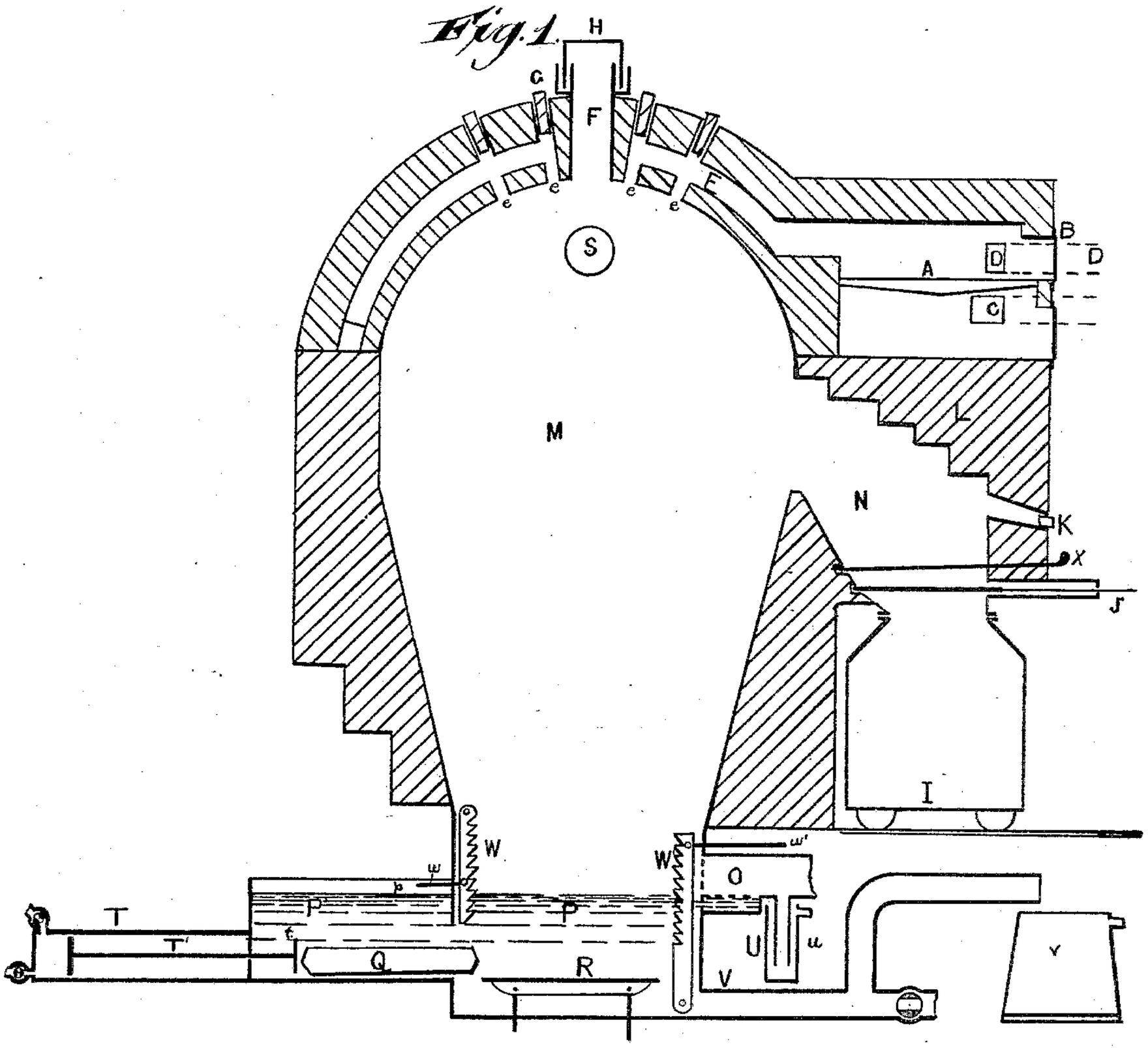
(No Model.) 2 Sheets—Sheet 1.

J. A. MATHIEU.

RETORT FOR CARBONIZING WOOD.

No. 300,385. Patented June 17, 1884.

Fig. 1.



WITNESSES.

Malcolm W. Edgar

Sumner Collins.

INVENTOR.

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(No Model.) 2 Sheets—Sheet 2.

J. A. MATHIEU.

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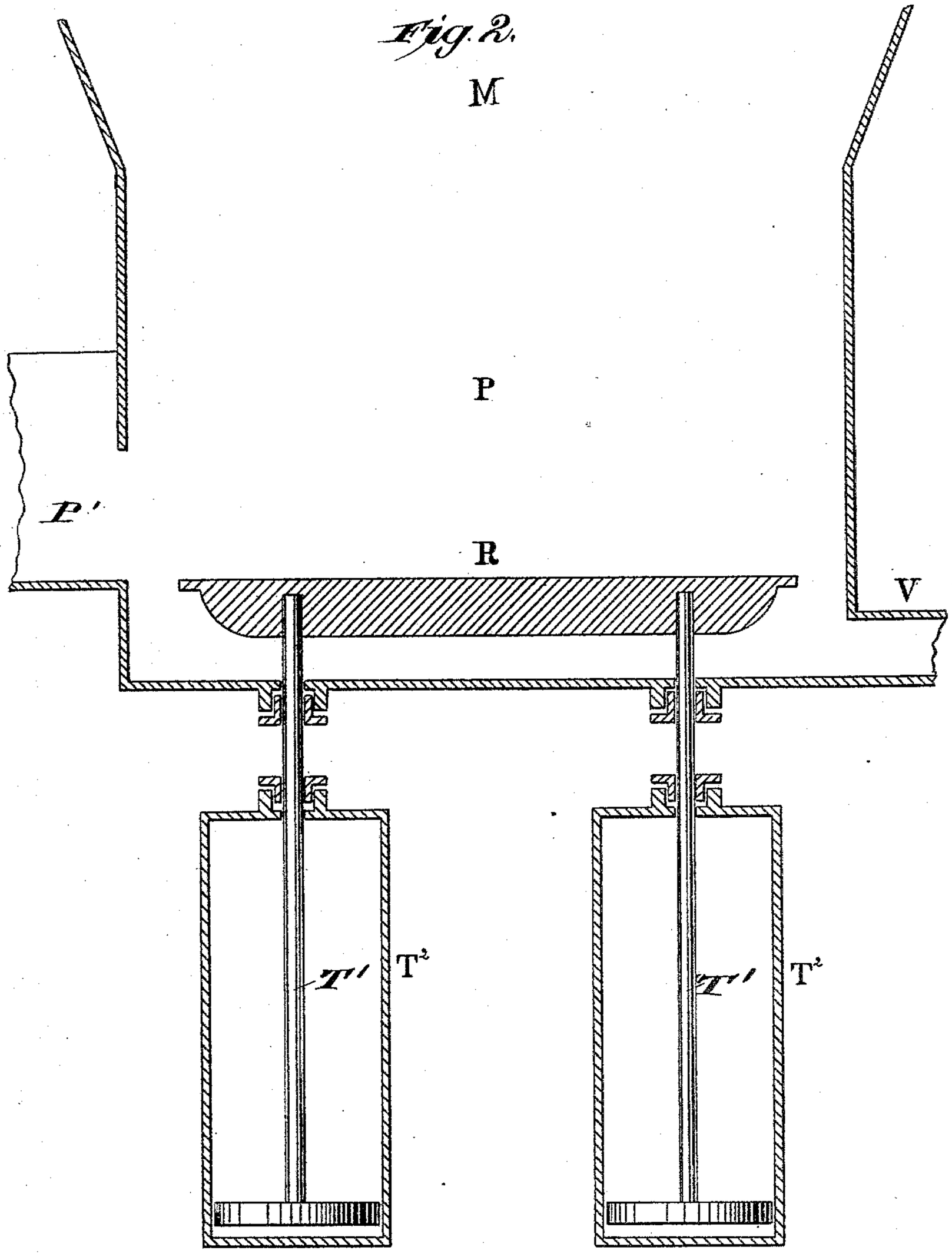
No. 300,385. Patented June 17, 1884.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JEAN A. MATHIEU, OF DETROIT, MICHIGAN.

RETORT FOR CARBONIZING WOOD.

SPECIFICATION forming part of Letters Patent No. 300,385, dated June 17, 1884.

Application filed April 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, JEAN A. MATHIEU, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Retorts for Carbonizing Wood, &c., of which the following is a specification.

This invention relates to improvements in retorts for carbonizing wood; and it consists, essentially, in a retort having in its top a flue communicating through apertures with the interior of the retort; a combustion-chamber communicating with said flue, an air-pipe and a gas-pipe leading into the combustion-chamber, and a gas-pipe leading into the retort, as will more fully hereinafter appear.

The invention embraces other features, which will be hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a vertical sectional view of a retort embodying my invention, and Fig. 2 a detail view showing means for raising the block R.

M represents a retort built of brick, except the bottom, which I prefer to build of iron, shaped substantially like the large retort M, shown and described in my Patent No. 208,835, October 8, 1878.

A represents a combustion-chamber built in the brick-work at the side of the upper part of retort M, closed by a door, B, and provided with ordinary grate-bars, to start a fire therein.

D represents a pipe leading into chamber A, through which I force the uncondensable gas arising from distillation of wood into chamber A.

C represents a pipe leading into chamber A, through which I force air into chamber A, and I make this pipe large enough to deliver much more air than is necessary to support thorough combustion of the gas which comes in through pipe D, for reasons which are hereinafter explained.

E represents a flue leading from the chamber A over and through the top of retort M, and communicating with said retort through the apertures *e e*.

S represents a pipe leading into retort M, by which I introduce gas into the retort.

F represents a pipe leading up through the center of the retort-top, carrying a pan, G, to hold water or other sealing-fluid, and having a cover, H, which dips into the fluid in pan G. This device is to afford vent for any small explosions of gas which may occur within the retort.

L represents a part of the brick wall of the retort, through which is made a passage, N, opening into the retort, closed at its lower end by a damper, J, and opening into the air at K, to permit the insertion of a poker or hook to draw finished charcoal out of retort M.

I represents an iron tank to catch and hold the finished charcoal as it falls out of passage N.

P P′ represent a metal box at the bottom of the retort, by which liquid, pyroligneous acid, &c., is held in the bottom of the retort up to the line *p*. The front wall of the retort is cut off above the bottom of box P P′, in the manner of the ordinary blast-furnace, forming a liquid seal at the bottom of the retort.

R represents an iron block at the bottom of the retort, provided with any suitable means for raising it vertically. The two short pieces attached thereto and rising through the bottom of the retort are piston-rods T′, operated by cylinders T², Fig. 1; or any proper device may be added in their stead.

Q represents a stick of wood.

T represents a hydraulic cylinder having a piston and rod, T′, provided at its outer end with a bearing-plate or follower, *t*.

O represents an outlet-pipe for gas, and runs to a condenser. It opens into the retort just above the liquid level *p*.

U is a trap to catch any liquid which may enter pipe O, the small pipe *u* opening into the bottom of pipe O.

V is a pipe leading from the bottom of the retort, rising to the level of line *p*, and discharging into a tub, Y. Its purpose is to draw off the tar which accumulates in the bottom of the retort.

W W′ are ratchet-toothed bars placed on the inside of retort M, to hold wood which has been forced up into the retort. They may be forced in or out by the rods *w w′*.

The apertures *e e* may be closed and the products of combustion from chamber A led through flue E directly into a chimney, when desired. This may be done when too much

heat would result from using the apertures *e e*, or when I wish to use hot gas alone.

The operation of the retort is as follows: The retort is filled with wood nearly to the level of pipe S, and the lower part filled with water or pyroligneous acid to line *p*. A fire is now started in chamber A, the chamber closed, and by fans or blowers hot gas is forced through pipes D S, and air through pipe C. The gas burns in chamber A, passes into flue E, and through apertures *e e* into the retort. As pipe C supplies more than enough air to support combustion of the gas which comes through pipe D, enough air is carried through flue E and apertures *e e* to support combustion of the gas which comes in through pipe S. The result is that the top of the retort becomes intensely hot, and the upper wood in the retort becomes carbonized by the heat radiated from the top of the retort and the radiant heat from the flame without coming in contact with any flame. When the upper surface of the wood is carbonized, a poker is inserted through passages K N, the charcoal drawn down onto pins X in passage N, passage K closed, damper J and pins X withdrawn, and the charcoal falls into the tank I. Fresh wood is placed in box P′, pushed into box P by piston-rod T′ until it rests on block R. This block is then elevated, raising the whole contents of the retort to the proper level, and the wood is caught and supported by the ratchet-bars W W′, thus leaving block R free to descend for another load. When too great heat results from combustion of the hot gas coming through pipe S, the apertures *e* are closed, and carbonization is effected by heat radiated from the top of retort M, plus the heat given off by the gas which comes through pipe S.

In distilling pine wood considerable turpentine is obtained, and this floats on the surface of the liquid in the bottom of the retort, passes into pipe O, and is caught in trap U, whence it is drawn into a tub.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A retort for carbonizing wood, having in its top a flue communicating through apertures with the interior of the retort, a combustion-chamber communicating with said flue, an air-pipe and a gas-pipe leading into said combustion-chamber, and a gas-pipe leading into said retort near its top, substantially as described.

2. In combination with retort M, the ratchet-toothed bars W W′, provided with push-rods *w w′*, substantially as shown and described.

3. The combination, with retort M, of the box P P′, cylinder T^2, having piston and rod T′, and block R, having attached thereto suitable mechanism for raising the same, substantially as described.

J. A. MATHIEU.

Witnesses:
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