No. 627,737. Patented June 27, 1899.

G. W. McLEOD.

RETORT FOR MAKING WOOD GAS.

(Application filed Jan. 6, 1898.)

(No Model.)

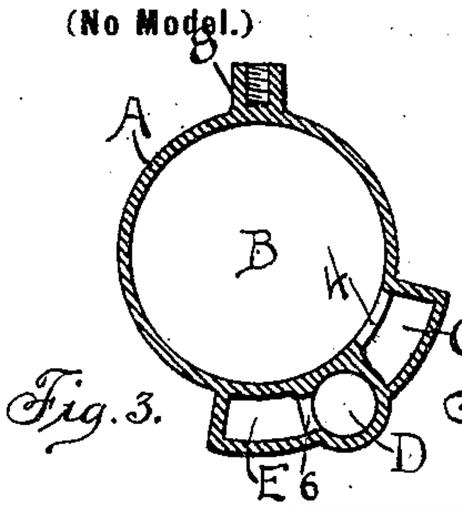

Fig. 3.

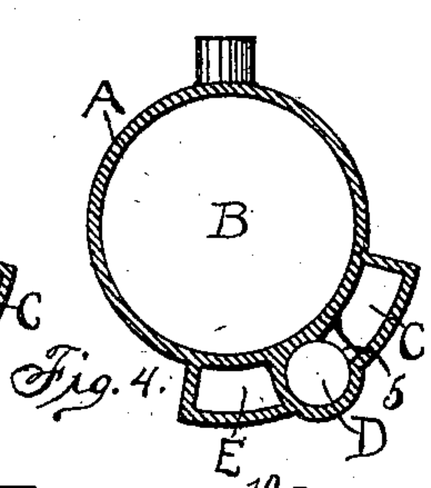

Fig. 4.

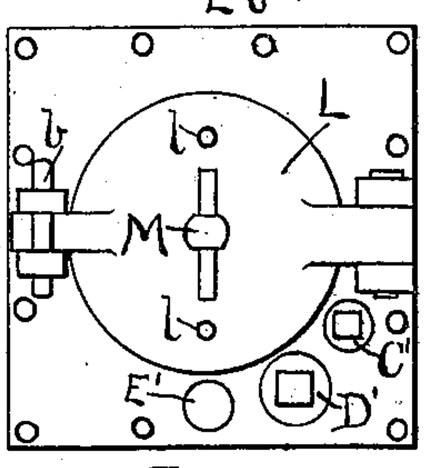

Fig. 5.

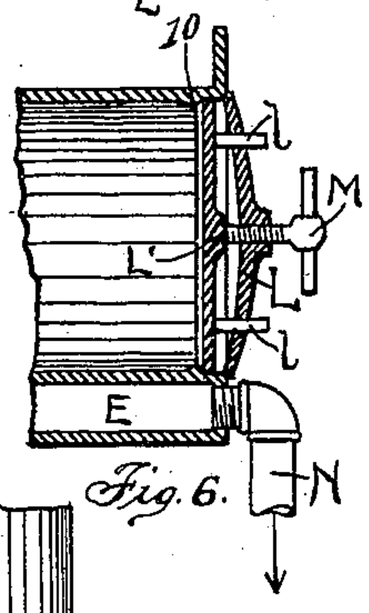

Fig. 6.

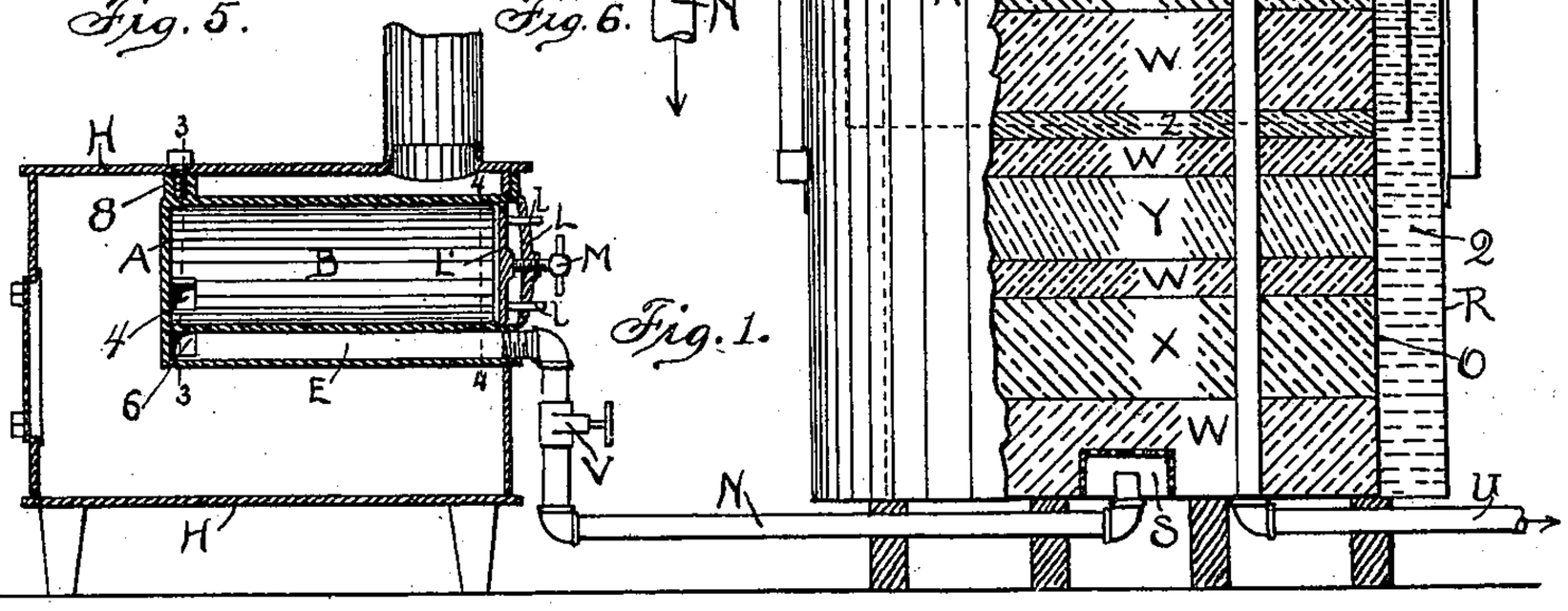

Fig. 1.

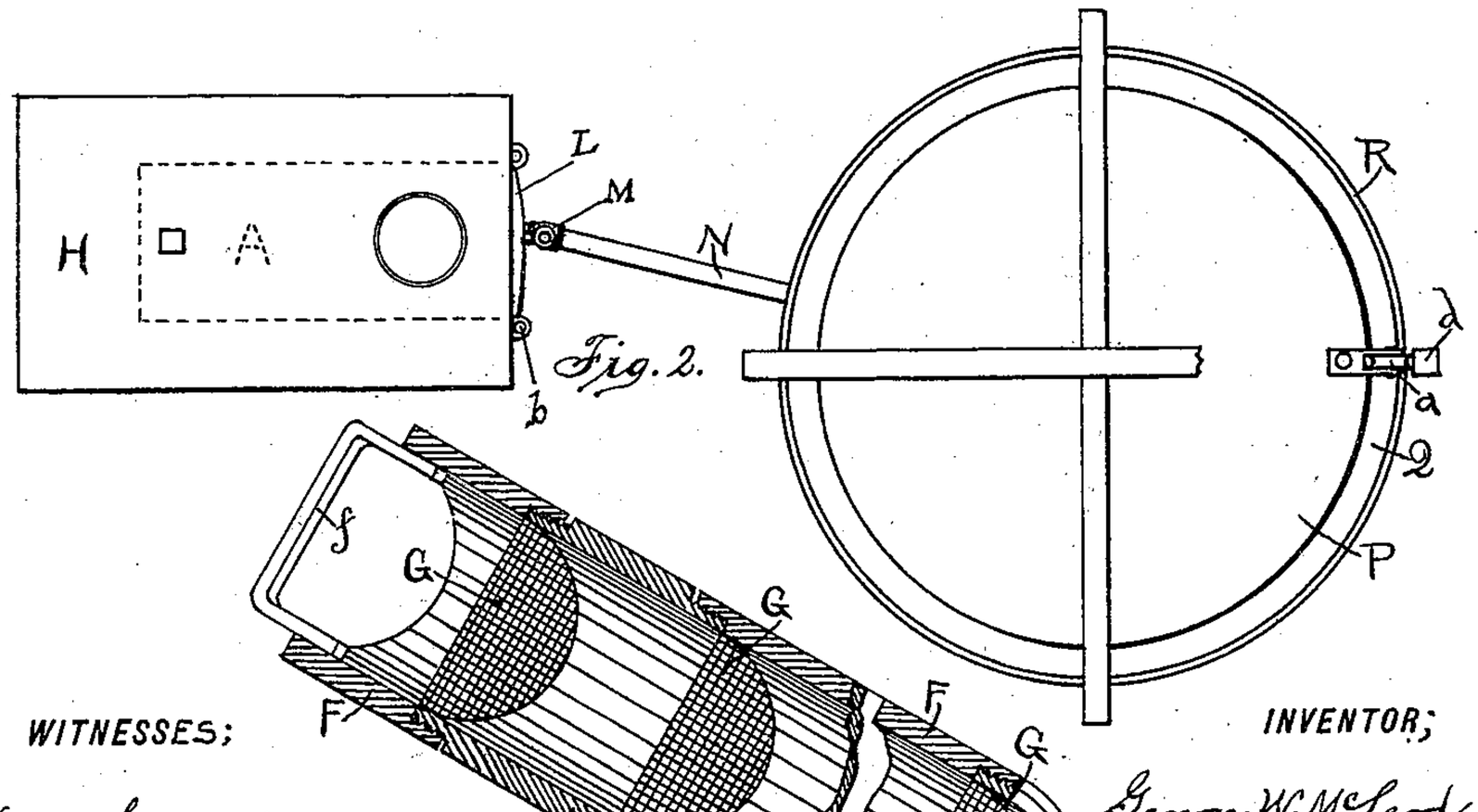

Fig. 2.

Fig. 7.

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RETORT FOR MAKING WOOD-GAS.

SPECIFICATION forming part of Letters Patent No. 627,737, dated June 27, 1899.

Application filed January 6, 1898. Serial No. 665,842. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. McLEOD, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented a certain new and useful Improvement in Devices for Making Illuminating and Fuel Gas from Wood, of which the following is a specification.

The object of my invention is to manufacture a highly-inflammable gas from wood, preferably for illuminating purposes, though for fuel and other uses, if desired. I attain this object by means of the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of my apparatus, the purifying and storage tank being shown partly in elevation. Fig. 2 is a top view of my apparatus. Fig. 3 is a cross-section of the retort at 3 3. Fig. 4 is a cross-section of the retort at 4 4. Fig. 5 is an elevation of the end of the retort, showing the openings to the same. Fig. 6 is a partial longitudinal section of the retort through the end in which the openings are located. Fig. 7 is an enlarged sectional view of the devaporizing-tube to be inserted in passage D of the retort.

The gas-generator consists of a retort A, having a large opening B, in which the wood is placed and sealed up and the gas roasted out of it. The retort is provided with a number of exterior passages C, D, and E, through which the vaporized tar and gas extracted from the wood must pass on its way to the purifying and storage tank. Of these passages the passage C communicates at its rear through an opening 4 with the interior of the port B of the retort and at its forward end communicates through the port 5 with the passage D, which passage at its rear communicates through the port 6 with E, so that the gas may pass through these several passages, as will be obvious from this description. These passages may be cast onto the side of the body of the retort, as shown, or they may be made of separate pieces of pipes suitably connected with the opening B and with each other. In one of these passages D a closely-fitting tube F, Fig. 7, is to be inserted. This tube is provided with a number of fine-wire screens G G G. These screens cause the vaporized tar and other substances extracted from the wood to become devaporized, and in their passage through C, D, and E they become so highly superheated as to be decomposed into a fixed gas ready to be purified and deposited in the storage-tank, from whence it is to be drawn off for use. This tube F may be made in sections, the ends of adjacent sections being screw-threaded, so as to unite the sections together, and the screens may be held in place by frictional contact with the tube or by clamping their edges between the screw-threaded portions, as indicated in Fig. 7.

My invention is designed, preferably, to be used in homes and individual buildings for the purpose of making gas for the building in which the apparatus is to be located. The retort A is fixed in a stove or furnace H, as indicated in Figs. 1 and 2, the end in which the openings are located being made a part of the side or outer surface of the stove or furnace. The retort is held in place by having its front end fitting flush with and resting upon a portion of the furnace, as clearly indicated in Fig. 1, and having a threaded socket or boss 8 on its outside near its rea end, into which socket will fit a screw-bolt 9, as indicated in Fig. 1, so as to secure the retort in place. By being thus fixed the retort may be opened for cleaning and for refilling while a fire is burning in the stove. By this means gas may be made for lighting the building by using the fire in a stove used to warm the building and at a minimum cost. The retort may be varied in size to be adaptable to the stove and to the amount of gas required to be made at stated intervals of time.

My invention is not limited to use in single buildings, but is adapted to the making of wood-gas for a number of buildings or for a whole city by building a plant on a large scale, as do gas corporations for the manufacture of gas for corporate use.

To make gas with my device, the door L of the retort is opened and the opening B is filled

with wood and closed up. The door L, it will be observed, has an inner air-tight door L′, supported on L by the guide-pins *l l*. When door L is shut and locked by means of the pin-bolt *b*, the inner door L′ is forced tightly in place against a flange or seat 10 by means of the hand-screw M, fitted in the center of door L for that purpose. The heat from the fire in the stove soon extracts all gaseous substances from the wood, reducing the wood to charcoal. The substances extracted pass back and forth through the passages C, D, and E, and by being highly superheated and passing through the screens G G G previously described they are decomposed into a fixed gas and pass through the pipe N into the purifying and storage tank O and P, respectively.

The purifying and storage tank is composed of three chambers O, P, and R. The inner chamber O is located inside of the outer chamber R, leaving a circular space Q between. The inner chamber is provided with a small perforated inclosure S on the center of its bottom. The pipe N discharges the gas inside this perforated inclosure, as seen in Fig. 1. The chamber O is filled with a number of layers or strata of sawdust W, manure X, lime Y, and sal-ammoniac Z, as shown in section in Fig. 1. The strata are so proportioned as to secure the best results in purifying the gas and each is packed closely in place. The gas under pressure percolates the several strata and finally passes through the topmost layer thoroughly purified and ready for use.

The inverted storage-chamber P is inserted in the circular space Q between O and R and the space filled with water. The upper part of P is held in position by the small rollers *a*, fitted to run on upright guide-rails *d*. The gas coming from the purifying-chamber is now confined in P, which rises to provide space for storage as fast as the gas is made. The chamber P may be made of heavy iron or be provided with weights to secure sufficient pressure to force the gas through the pipe U to the gas-burners.

While charging or cleaning the retort the pipe N is shut off by means of the valve V. The passages C, D, and E may be cleaned by means of the openings C′, D′, and E′. The opening D′ is made the full size of D, so that the devaporizing-tube F may be inserted and withdrawn. The tube is provided with a handle *f*, with which it may be withdrawn.

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

1. In a device for making gas, a retort provided with a series of external chambers communicating with each other at alternate ends and one of said chambers communicating with the retort, a tube or shell fitting in one of the external chambers and provided with screens for devaporizing substances extracted from the gas-producing material, an oven inclosing said retort and its external chambers, and means for leading off the gas to a purifier, substantially as and for the purposes described.

2. In a device for making gas, the combination with the outside oven, of the retort provided with a series of external chambers communicating with each other at alternate ends and one of said chambers communicating with the retort, the front plate having an opening for access to the retort and to each of the external chambers, and constituting a portion of one side of the oven, a cover hinged to the front plate and adapted to close an opening therein in front of the retort, a pipe connecting with one of the external chambers through said front plate, and closures for the other two chambers opening through the front plate, substantially as described.

3. In a device for making gas, the combination with the outside oven, of the inclosed retort provided with the external chambers communicating with each other and one of them with the retort, the front plate having openings into the retort and the external chambers and provided with closures for said openings, said plate supporting the forward end of the retort and external chambers upon a portion of one side of the oven, and means for suspending the rear portion of the retort and its chambers inside of the oven, said means consisting of a bolt entering a part of the retort and passing through the top of the oven, substantially as described.

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

GEORGE W. McLEOD.

Witnesses:
IRA A. TOWN,
G. W. BULLARD.