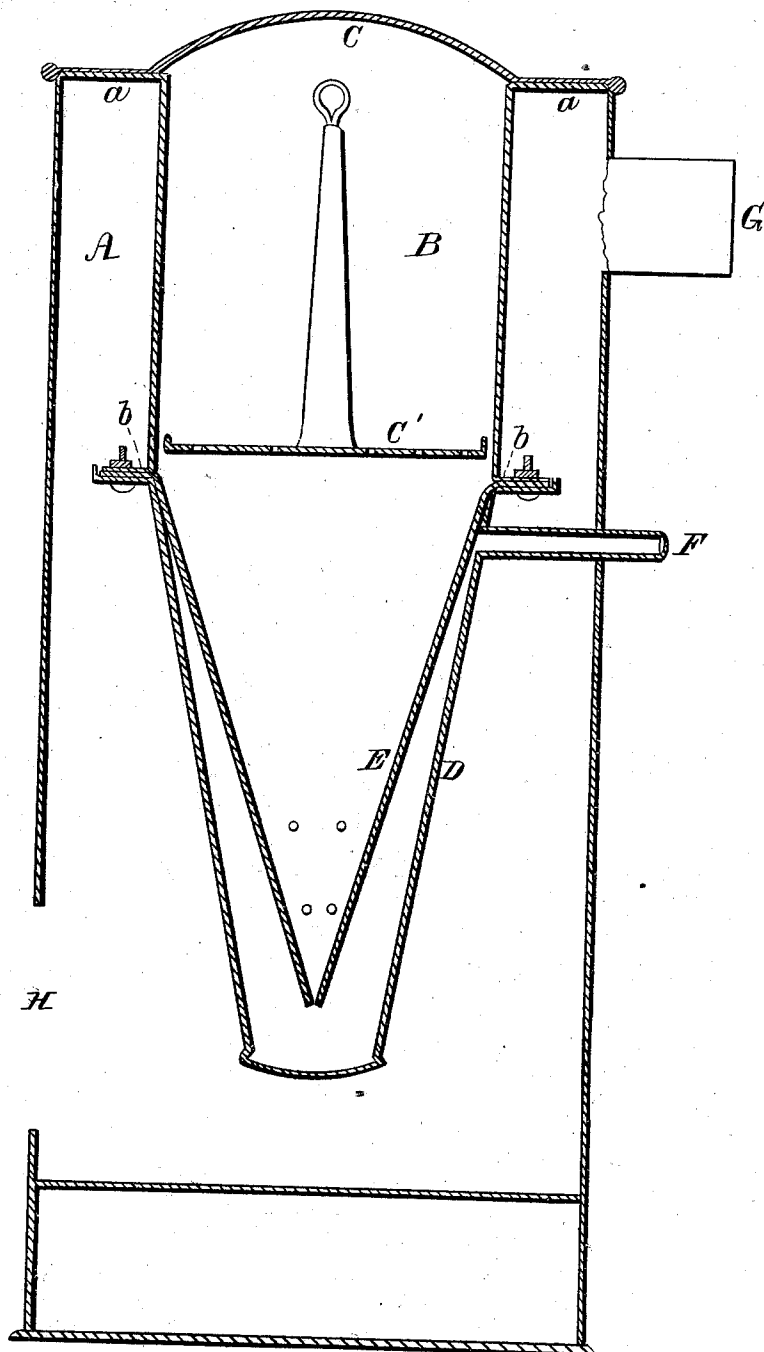


W. D. PORTER.  
Making Wood Gas.

No. 11,560.

Patented Aug. 22, 1854.



# UNITED STATES PATENT OFFICE.

WILLIAM D. PORTER, OF NEW YORK, N. Y.

## IMPROVEMENT IN WOOD-GAS GENERATORS.

Specification forming part of Letters Patent No. 11,560, dated August 22, 1854.

*To all whom it may concern:*

Be it known that I, WILLIAM D. PORTER, of New York, in the county and State of New York, have invented a new and useful Improvement in a Still for Converting Wood into Carbureted Hydrogen or Illuminating Gas; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification.

It has long been a desideratum to construct an apparatus for the production of gas from resinous wood wherein is combined economy of fuel, simplicity of construction, and efficiency of operation, and where from the sale of the residuum—viz., the charcoal—the expense may be materially reduced. These results have been obtained in my improvement in the construction of the apparatus wherein the wood is subjected to the action of heat, as in a still, by which the resinous products are eliminated and permitted gradually—that is, drop by drop—to fall upon a highly-heated portion of the lower vessel, attached to the one in which the wood is placed, and are thus converted into carbureted-hydrogen gas, as well as all the volatile constituents of the wood—such as water, pyroligneous acid, &c.—are commingled and subjected to the same violent heating. It has been found that the production of gas from wood with the same number of retorts, in a given time is six times more than from coal, and that it does not affect the health, and is in so pure a condition as to require little or no purification before it enters the burners. The arrangement is so simple that the still may be placed in an ordinary stove or fire-place used for heating dwellings, in the furnace of a steam-boat or galley of a vessel, and by suitable pipes be distributed to the burners.

To enable others skilled in the art to make and use my invention, I will describe it, as follows:

In the accompanying drawing, A represents an ordinary stove. In it is placed the still in a vertical position. It consists of an iron cylinder B, provided with flanges *a* at its upper and *b* at its lower edges. The upper end, after being charged with wood, is closed by a cap luted and bolted on the flanges *a*. The wood rests on a perforated diaphragm C', and by a

rod or handle the diaphragm is drawn out, and with it the charcoal. This diaphragm separates the cylinder from the gas-producing portion placed below the cylinder—viz., a conical-shaped tight vessel D, within which is a smaller-sized vessel E, also conical, perforated with holes near its bottom or pointed end. Both these cones are provided with flanges corresponding with *b* of the cylinder, and by bolts and lute are united thereto and made air-tight.

F is the escape-pipe of the gas from between E and D, and is situated directly under the flanges of the cones.

The stove is provided with dampers, fire-grate, &c., of the ordinary construction, and the heat of the fire-chamber, after acting directly on the bottom and sides of the still, rises and circulates around the cylinder B and escapes into the smoke-stack through G'. As there is no tar formed in this operation, no provision for its collection is considered necessary, the resinous portion of the wood being decomposed on dropping from the cylinder.

The resolution of the wood is effected as follows: By the more moderate heat impinging on the cylinder B, charged with pine wood, the crude turpentine or resinous portion of the wood is melted and permitted to fall upon the inner cone E, drop by drop, (as the production of it in large quantities without immediate decomposition would produce tar.) Through this cone it passes by the small holes or openings in the sides of the cone E, and falls upon the highly-heated inner surface of cone D and is instantly decomposed into resin-gas. The watery, spirituous, and other gases first eliminated in the cylinder B, instead of being permitted to escape from the upper part thereof, descend through the perforated diaphragm through the cone E, and are exposed to D, as the crude resinous portions, and are mixed and commingled and decomposed, and ascend with the resin-gas between the inner cone E and outer cone D. In this way the watery portions, as well as all the products of decomposition of the wood except the charcoal, are subjected to further decomposition in the gaseous state.

From some experiments recently instituted, notices of which will be found in the

journals of 1852 and 1853, the mere commingling of steam produced from water in a separate boiler with resin-gas has been supposed to be of advantage; also, the decomposition of hickory wood for economical illumination; but of how much greater import must it be to decompose the gases from pine or resinous wood, furnishing in itself all the constituents of a good gas, without the production of the condensable portions, (sometimes arising in other apparatus from resin itself,) as tar, pyroligneous, &c., and at the same time a valuable residuum in the charcoal sufficient to pay the expense of production of the illuminating-gas.

Having thus fully described the nature of

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

The construction of a gas apparatus or still consisting of a metallic or other cylinder B, the cones E and D, diaphragm-plate C', and exit-pipe F, substantially as described in the foregoing specification and shown in the accompanying drawing.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

W. D. PORTER.

Witnesses:

S. W. THOMPSON,  
A. A. PHILLIPS.