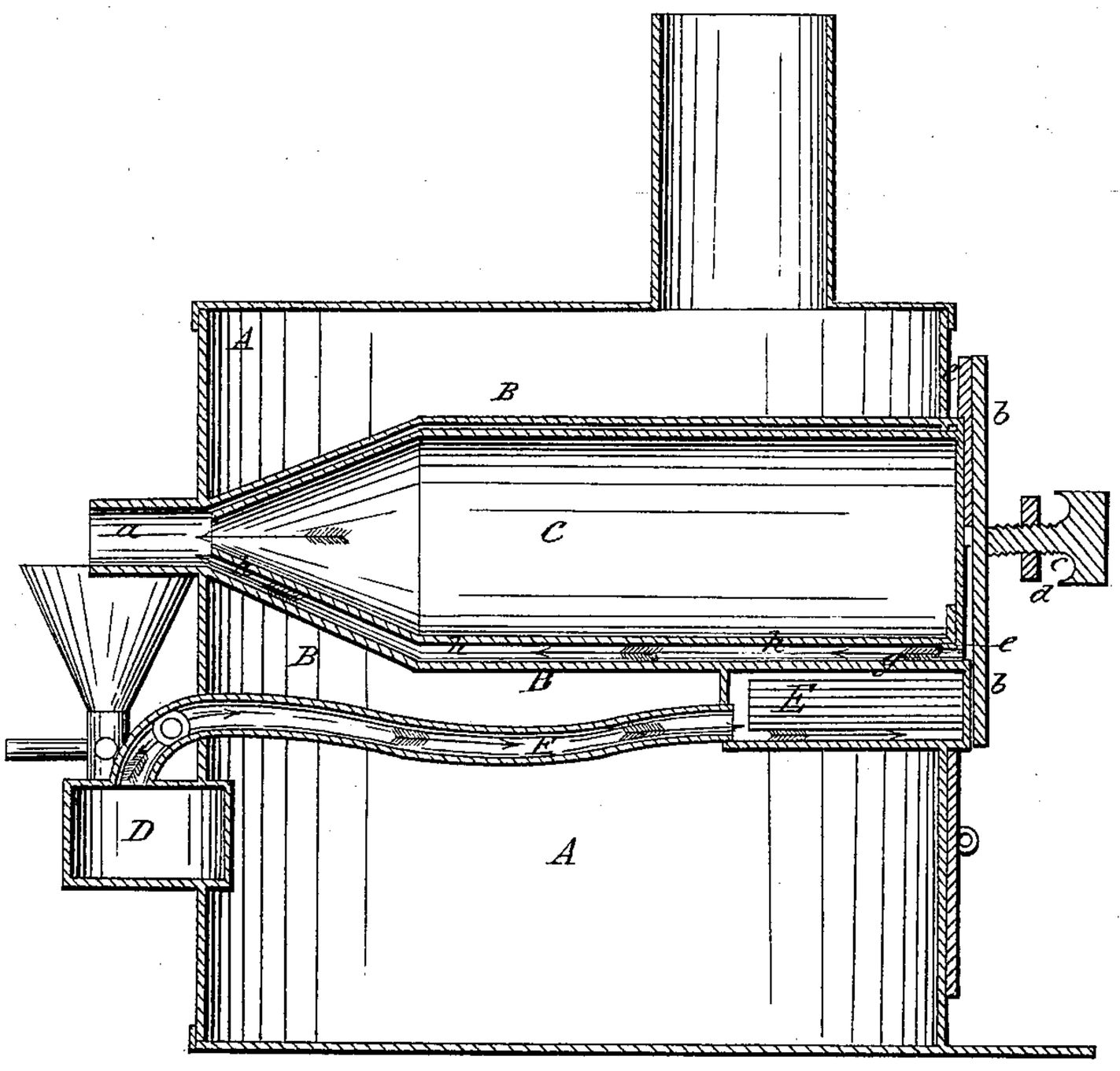
CHOATE & TYLER.

Making Wood Gas.

No. 16,682. Patented Feb. 24, 1857.



UNITED STATES PATENT OFFICE.

WARREN C. CHOATE AND CHARLES N. TYLER, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN COMBINING HYDROGEN AND WOOD GAS.

Specification forming part of Letters Patent No. **16,682**, dated February 24, 1857.

To all whom it may concern:

Be it known that we, WARREN C. CHOATE and CHARLES N. TYLER, of the city and county of Washington, in the District of Columbia, have invented a certain new and useful Improvement in the Manufacture of Gas for the Purposes of Illumination from Wood, of which the following is a full, clear, and exact description.

In the manufacture of gas by the dry distillation of wood it has heretofore been found necessary, previous to its being passed to the gasometer, to subject it to a protracted and high degree of heat in order to thin it or cause it to deposit a portion of its excess of carbon to render it suitable for the purposes of illumination, the carbon when in excess causing the pipe and burner to choke up and the flame to smoke. This, it will readily be perceived, must necessarily involve or entail upon the manufacturer a great loss, with whom it is always an object of great importance to economize and utilize the carbon as much as possible, since it is the carbon that is the principal source of light in the carbureted hydrogen forming the gas, the hydrogen gas being used more for the purpose of holding the carbon in suspension in an attenuated state than as a source of light of itself.

To utilize as much as possible the whole free carbon as driven off from the wood by the heat is the object of our invention; and it consists in combining or commingling with the gaseous products of the wood as it distills over from the retort a stream of hydrogen gas in a volume sufficient to dilute or thin the gas to such a degree as to render it fit for illuminating purposes. In mixing the hydrogen gas directly with the gaseous products of the wood as they issue from the retort not only is the excess of carbon contained in the carbureted-hydrogen gas before being heated in order to deposit it, as in the old plan, taken up, but a large proportion of that which would otherwise go toward the formation of tar and other such products resulting from this process is also taken up. By our process, therefore, we are enabled not only to consume the carbon entirely by mixing with it a sufficiency of hydrogen gas, so as to dilute it for that purpose, but by it we are enabled to manufacture a much larger quantity and of a better quality of gas from the same quantity of wood than has ever been done before. The same object may be effected by passing a sufficient quantity of hydrogen gas into the gasometer; but by this plan we would not be able to manufacture as great a quantity as when mixed with it as it distills over from the retort.

The accompanying drawing represents a vertical longitudinal section of an apparatus suitable for carrying our invention into execution, the same being taken centrally through it, in which A represents a stove or furnace of rectangular shape, into which is secured the retort B in any suitable manner, having its outlet *a* projecting through the rear end of the furnace, to which is attached the condensing-pipe. Into this retort is fitted or placed the canister C, that contains the wood to be distilled, after which the retort is closed up by means of a door *b* or plate of metal, which is tightly compressed against the door by the screw *c* in the cross-bar *d*, the latter being suitably secured to the flange *e* of the retort as to permit its (on the loosening of the screw *c*) being raised and turned to one side, by which arrangement the removing of one canister from the retort and replacing it by another is facilitated. Both the retort and canister in this instance have their rear ends of a funnel shape, the under side of the latter being slightly flattened, so as to form a channel or chamber *h* between it and the retort for the passage of the hydrogen gas as it is generated, along which it is conducted until it is brought into contact with the gaseous product of the wood as it distills over from the canister C, with which it mingles and thins it, as before mentioned. The hydrogen gas in this instance is manufactured by the decomposition of water by passing steam over red-hot iron borings, turnings, chips, or rods; but we do not mean to confine ourselves to such, although we prefer it as the simplest manner of producing it. The apparatus in this instance as used by us for this purpose consists in a boiler D, arranged at the rear of and extending into the inner side of the furnace, from which as the steam is generated it is conducted to another chamber E through a pipe *f*, which may be made either of porcelain or iron, having its inside coated with some substance that cannot be easily oxidized.

Into the chamber E are placed the iron chips, or, as in this case, rods, which on being heated to redness by the furnace readily deoxidize the steam and set free the hydrogen, which escapes through the orifice *g* in the retort into the passage *h* for the purpose before mentioned.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

Combining hydrogen gas with the gaseous products evolved from the dry distillation of wood in the manner substantially as and for the purposes described.

In testimony whereof we hereunto affix our names in presence of two subscribing witnesses.

W. C. CHOATE.
C. N. TYLER.

Witnesses:
E. D. CLAPP,
A. JOUAN.