

HOWARD TILDEN.

Sheet 1, 2 Sheets.

HYDRO-CARBON-GAS GENERATOR.

NO. 97247.

PATENTED NOVEMBER 23, 1869.

Fig. 1.

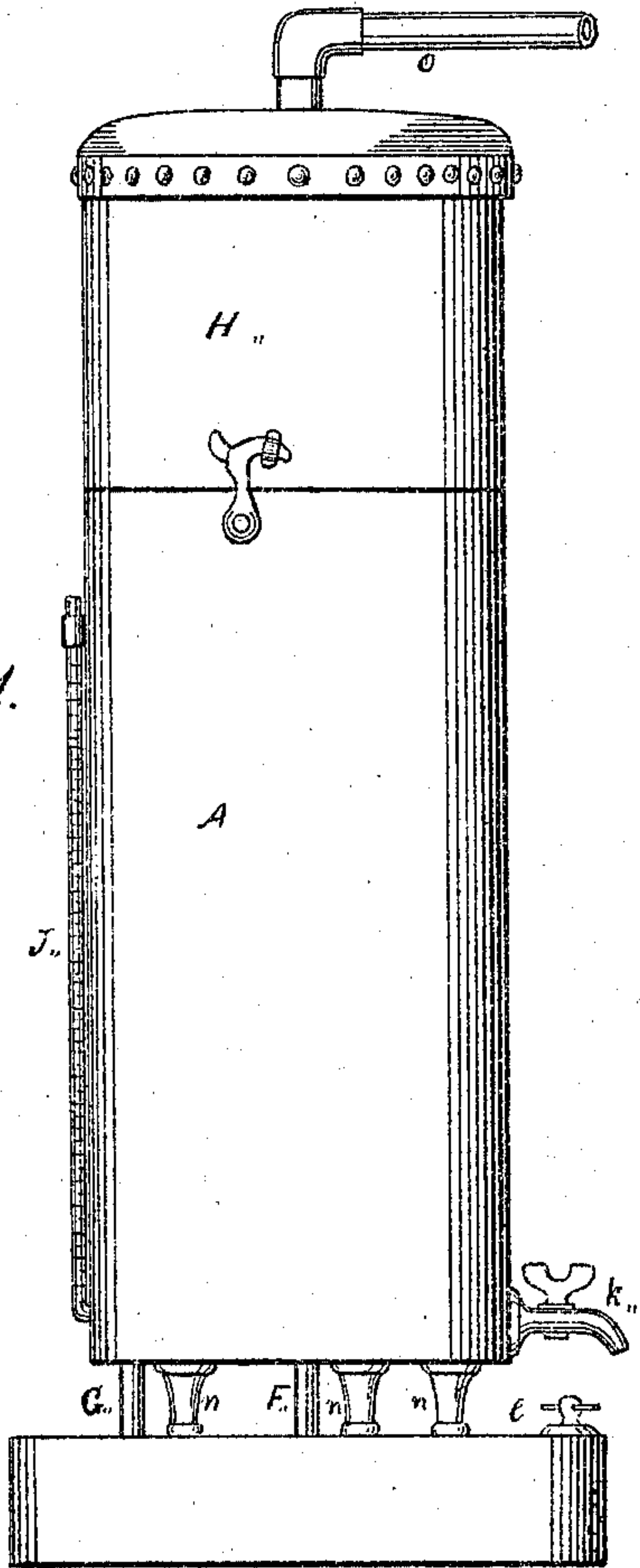


Fig. 2.

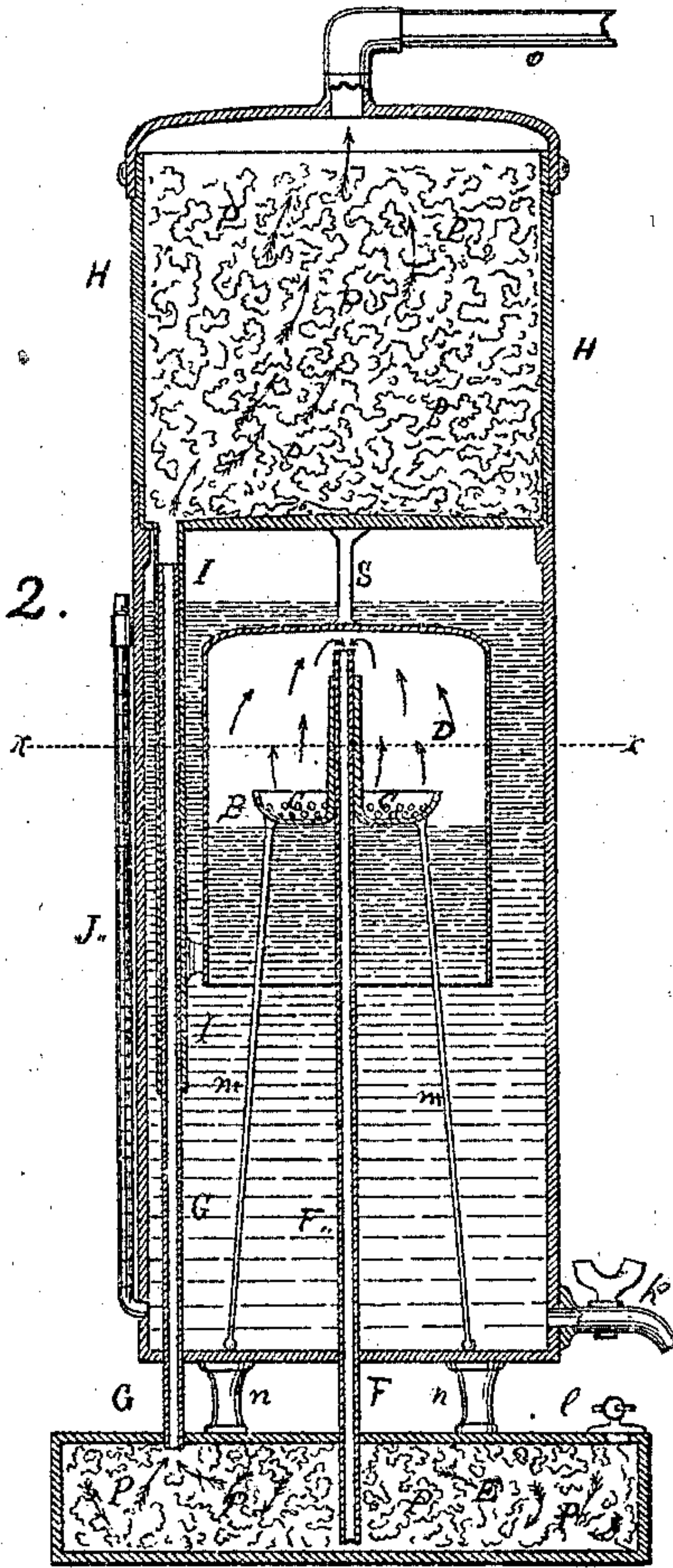
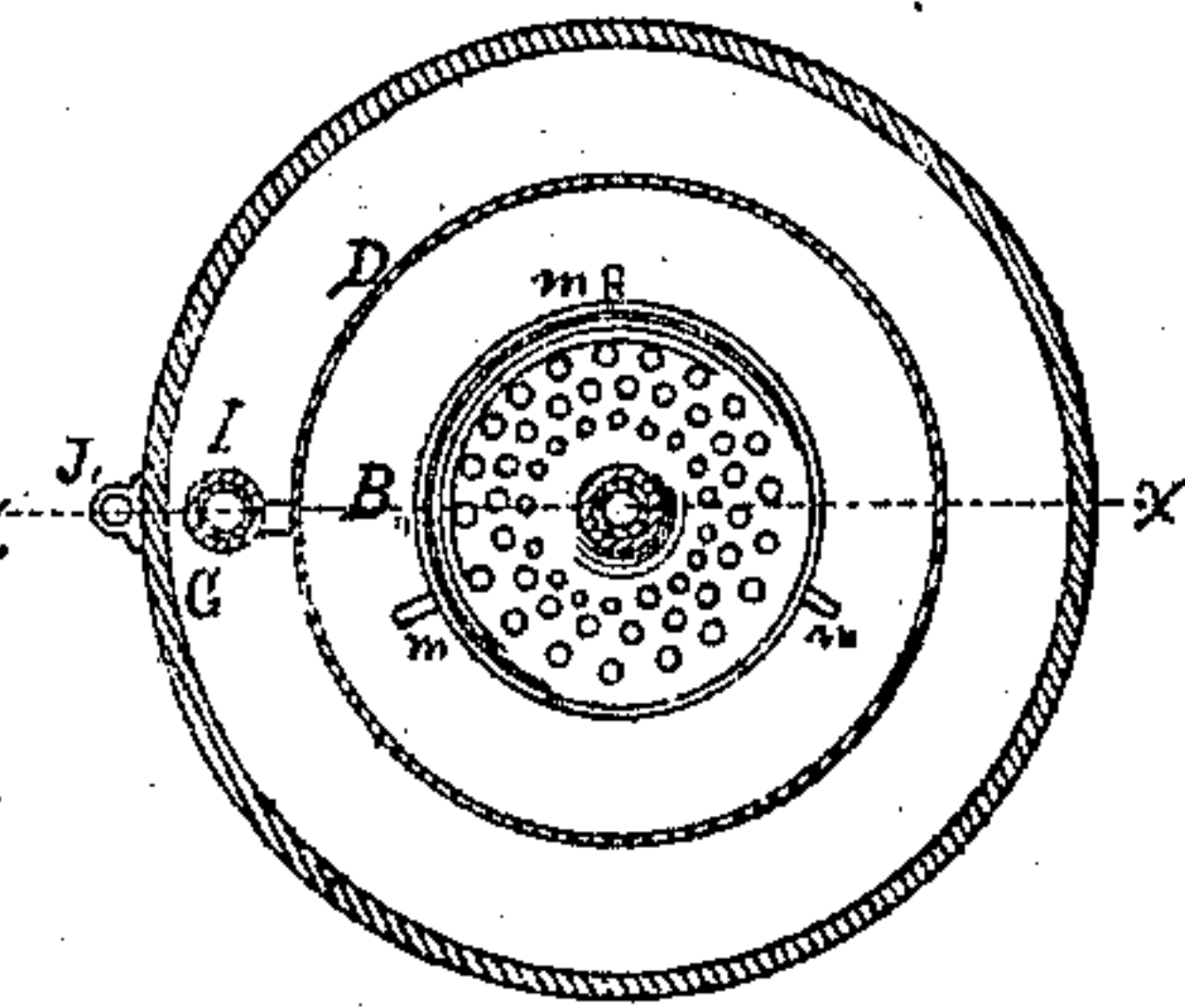


Fig. 3.



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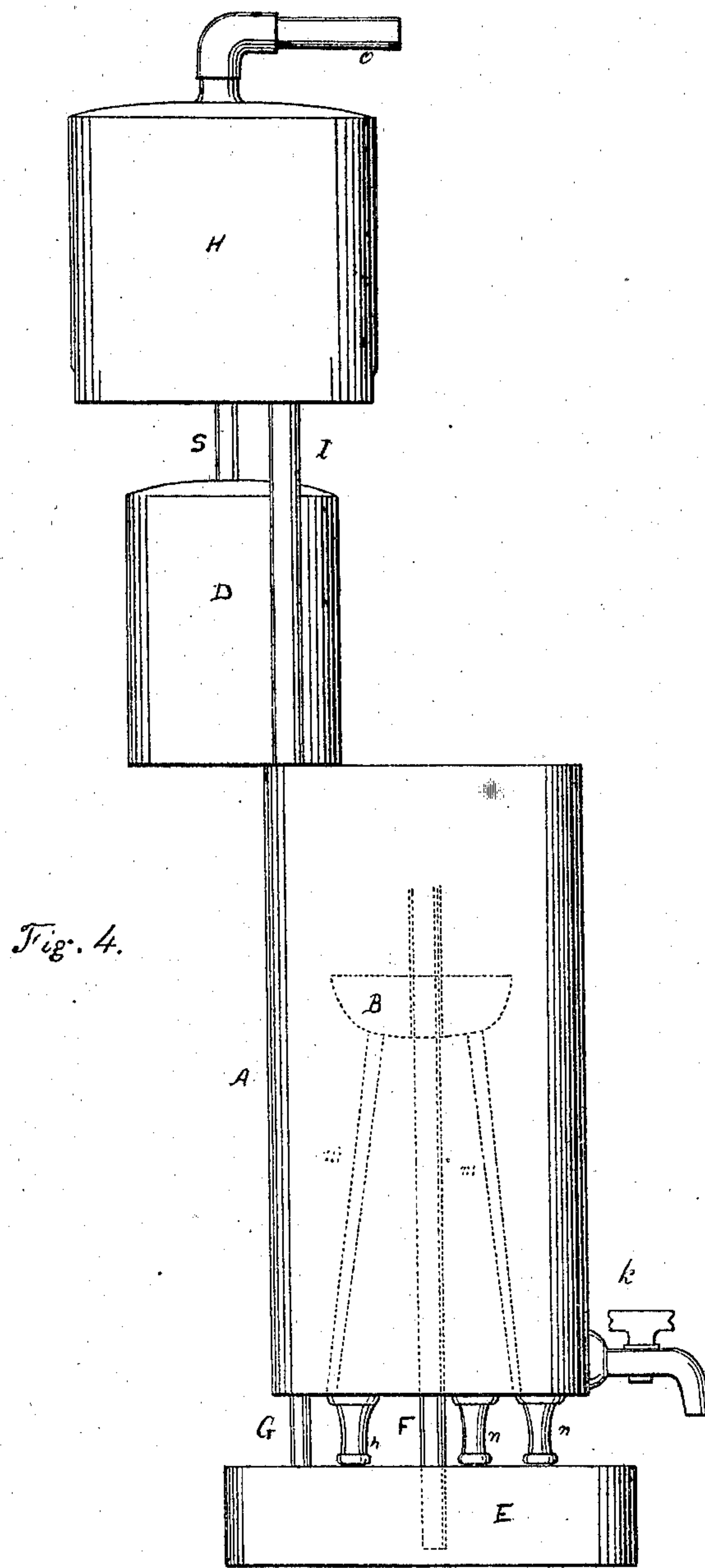
HOWARD TILDEN.

Sheet 2, 2 Sheets.

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UNITED STATES PATENT OFFICE.

HOWARD TILDEN, OF BOSTON, MASSACHUSETTS.

IMPROVED GAS-MACHINE.

Specification forming part of Letters Patent No. 97,247, dated November 23, 1869.

To all whom it may concern:

Be it known that I, HOWARD TILDEN, of Boston, in the county of Suffolk and State of Massachusetts, have, as I believe, invented new and useful Improvements in Hydrocarbon-Gas Machines; and do hereby declare the following to be a full and exact description of the same, reference being had to the drawings that accompany and form a part of these specifications.

Figure 1, front elevation of my apparatus; Fig. 2, bisection of the same, exhibiting manner of arranging the interior parts; Fig. 3, horizontal section on line *x x*; Fig. 4, on second Sheet, exhibits the position of parts while supplying the chemicals to the interior.

My invention relates to certain important improvements in that class of gas-machines by which simple hydrogen gas is first produced, which is afterward changed to a pure, brilliant, and cheap illuminating-gas, by being carbureted from contact with some of the volatile liquid hydrocarbons.

Letter A represents a cylindrical vessel, the base of which is supplied with acidulated water; letter B, a perforated basin, supported upon the legs *m*, or otherwise suitably retained in position; letter C, zinc or iron turnings or filings, filling the basin B; letter D, an inverted cylindrical chamber, suspended from the chamber H by rod S; letter E, container of the hydrocarbon liquid, and located as in Fig. 2; letter F, a small tube, joined firmly to the bottom of cylinder A and passing through the top of the vessel E terminates within and near the bottom thereof, while its upper end may be found within and near the top of the chamber D; letter G, a tube, rising from the top of the vessel E through the cylinder A near its inner wall nearly to the top thereof; letter H, a cylindrical chamber, for the reception of the carbureted gas, and fits suitably the top of A, and has leading from it the pipe O, which supplies the burners; letter I, a tube, whose interior diameter is a very trifle greater than the full diameter of the pipe G, over which it slides, and extends nearly to the bottom of the vessel A; letter J, a glass tube, by which the height of the acidulated water in vessel A is exhibited; letter *k*, cock, through which the liquid in the vessel A may be drawn off; letter *l*, screw-

cap, through which the hydrocarbon is supplied to the container E; letters *m m m*, supports to the perforated basin B, and may be of wood; letters *n n n*, the feet or supports to the cylinder A; letter O, pipe, leading away to the burners; P, stripped and curled wood, such as is called "Excelsior," fitting both the carbon-vessel E and gas-holder H. The peculiar objects of this will be more fully explained hereinafter.

The objects of my invention are several and various: First, compactness in structure and adaptedness for locomotion, as upon railroad cars or steam-boats, by such an arrangement of parts as to secure freedom from stopping and flickering at the burners. These are secured by making the gas-holder H stationary and allowing it to cover and fill closely the open top of vessel A, and allowing an air-chamber in the upper portion of said vessel A, while the hydrocarbon-container is placed in a close vessel, and outside of the other chambers, connecting the various parts by means of pipes F, G, and I, as hereinabove described, and illustrated in the drawings herewith furnished and forming a part of this specification. Second, a desirable feature in my device is the ready method of removing the receptacle of the metal filings so that any waste may be put aside and the said receptacle replenished, and doing this in such manner as to prevent the mixing of the atmosphere with the gas at the time, in the holder H. To do this I have simply to elevate the holder H so far as to bring the bottom of the chamber D to the top of vessel A, (as D, being supported from H, will rise therewith,) when these parts may be turned horizontally to one side, on the tube I as a center, said tube still covering a portion of pipe G, (see Fig. 4,) so no gas can escape either from the hydrocarbon-holder E or from the gas-holder H, and no air enter from without; then, to remove the basin B by raising it out at top of cylinder A, when the cleansing, replenishing, and return thereof are easily accomplished, and the elevated portions moved back to position. Third, a further object of my device is to secure a more uniform carbureting of the hydrogen gas before it passes to the service-pipe O, as with the machines of this nature heretofore in use there has

been much complaint that the gas at the burner is sometimes scarcely more than simple hydrogen so little carbon has it taken up, consequently possessing very little illuminating power, while, at other times, so much carbon has been absorbed that much will escape at the burner in the form of smoke, and not only this, but a condensation of portions thereof in the service-pipes very soon chokes them up. These things I remedy by placing the hydrocarbon-holder where the temperature thereof can be controlled, without influence from the ever-varying temperature of the contents of cylinder A, and filling the said holder H with the fine curled-wood shavings P. The peculiar effect of this filling is as follows: The hydrogen gas, coming down through the pipe F, is very volatile, and the curled shavings tend to obstruct it in its passage through the chamber E and cause it to take many turnings and windings in its way to the exit-pipe G, absorbing, all the while, carbon to give it illuminating power, and especially, when a very considerable portion of the liquid hydrocarbon in E has been exhausted, will the shavings be covered with innumerable minute globules of the carboniferous liquid, which the passing hydrogen, warm from the generator A, will rapidly take up, while if, by a general high temperature, or a high degree of volatility of the hydrocarbon liquid, one or both, the gas, on reaching the reservoir H, should contain too much carbon, the curled-wood shavings in this chamber H will absorb more or less of this superabundance, so that often, in condensed or liquid form, it will settle in minute globules upon all the surface of the shavings, to be at some future time taken up, when, as might and will sometimes happen, from too low a temperature or too great specific gravity of the liquid hydrocarbon, the gas entering the holder H is deficient in illuminating properties.

The working of my machine will be so readily comprehended, from the drawings and foregoing description, that there remains only to say that it is automatic in its operation, as by placing a sufficient quantity of acidulated water (sulphuric acid one part by measure to ten or twelve of water) in the vessel A, to rise to the line *x*, filling the basin B with the filings or small chips of zinc and iron, one or both, and supplying the vessel E with naphtha or other volatile hydrocarbon, the machine is ready to perform the work intended. The action of the acid upon the contents of the basin B immediately sets free a comparatively pure hydrogen gas, which, rising to the upper portion of chamber D, will accumulate until the pressure produced is sufficient to force it down through the pipe F into the carboniferous

liquid in vessel E, whence, finding its way slowly through the packing or filling of curled-wood shavings, it rises, through the tube or pipe G, into holder H, having taken up a sufficiency of the illuminating principle of the liquid in E to make it a very superior gas for lighting purposes, and ready for use whenever required; but when no consumption of gas is going on the accumulation thereof in holder H will soon become such that, by pressure, it will react through the tubes I and G, the vessel E, and pipe F upon the non-carbureted hydrogen in the chamber D, and thereby occasion, by the continued supply from the chemical action in basin B, such a pressure on the surface of the liquid in D as to cause it to fall, a rise at the same time taking place in the space in A surrounding chamber D, this continuing until the acidulated water in D has fallen quite free of the filings in basin B, when the further production of hydrogen will cease and the whole apparatus be at rest. So soon as burners are lighted, and gas is thus drawn from the reservoir H, the pressure within the chamber D will be at once reduced, so that the column of liquid in A will descend, causing that in D to rise until the filings in B are again covered, when the production of hydrogen will be at once resumed and the apparatus will promptly perform its functions.

These machines may be of almost any size desired, one of six feet in height and one foot to two feet in diameter being sufficient for ten burners.

The material in the structure of the parts coming in contact with the acidulated water should be such as would not be consumed by the acid.

The apparatus may be placed in any convenient locality, out-building, or basement.

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

1. The combination of the cylinder A, the chamber D, and the gas-holder H, substantially as and for the purposes specified and set forth.

2. The combination and arrangement of the chamber D, the basin B, the tube F, and the hydrocarbon-vessel E, as and to operate as described and illustrated.

3. The telescopic gas-conduit, leading from hydrocarbon-vessel E to gas-holder H, formed by the manner of arranging and combining the pipes G and I.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HOWARD TILDEN.

Witnesses:

JOHN P. WOODBURY,
JOHN JOHNSON.