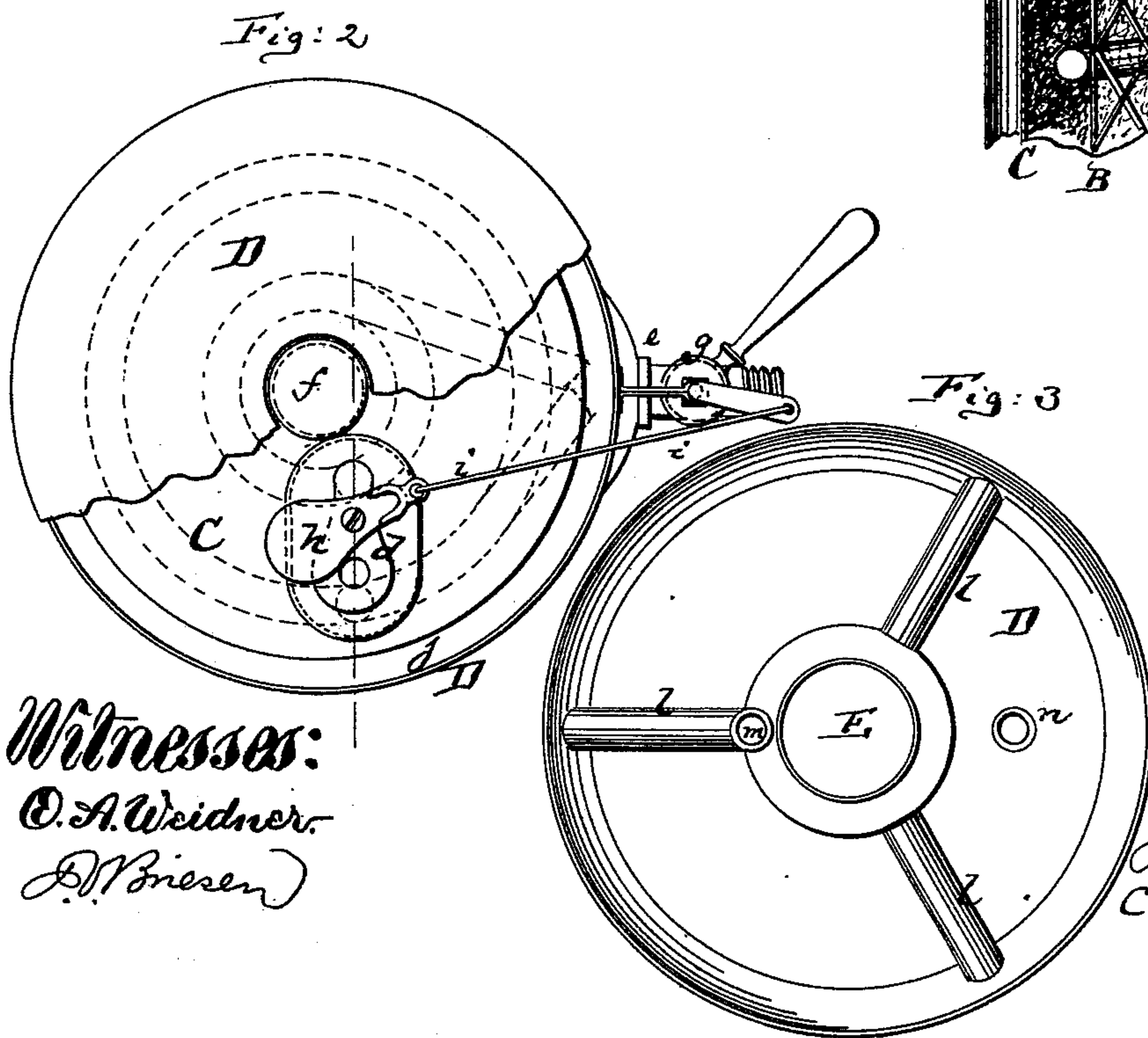
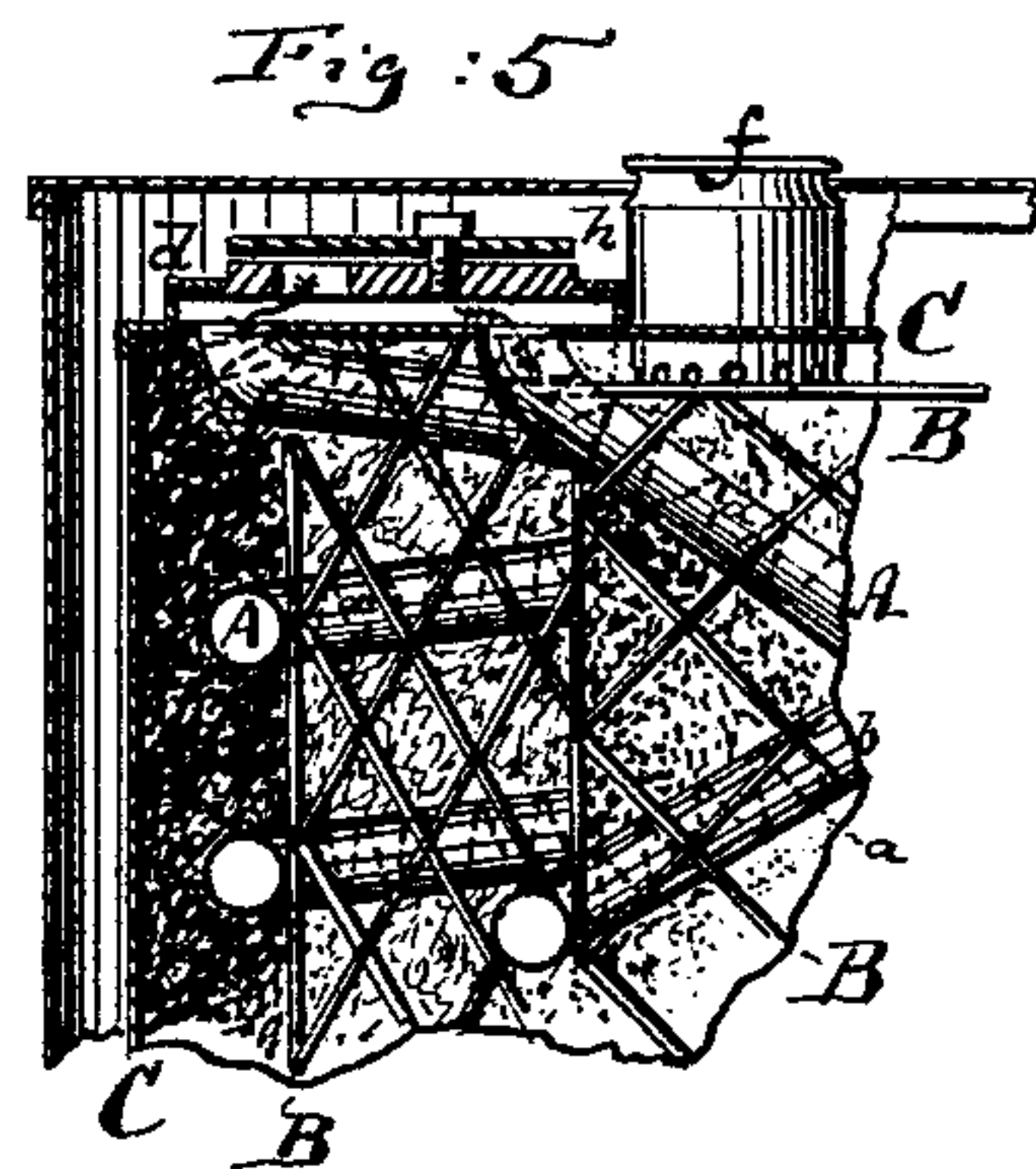
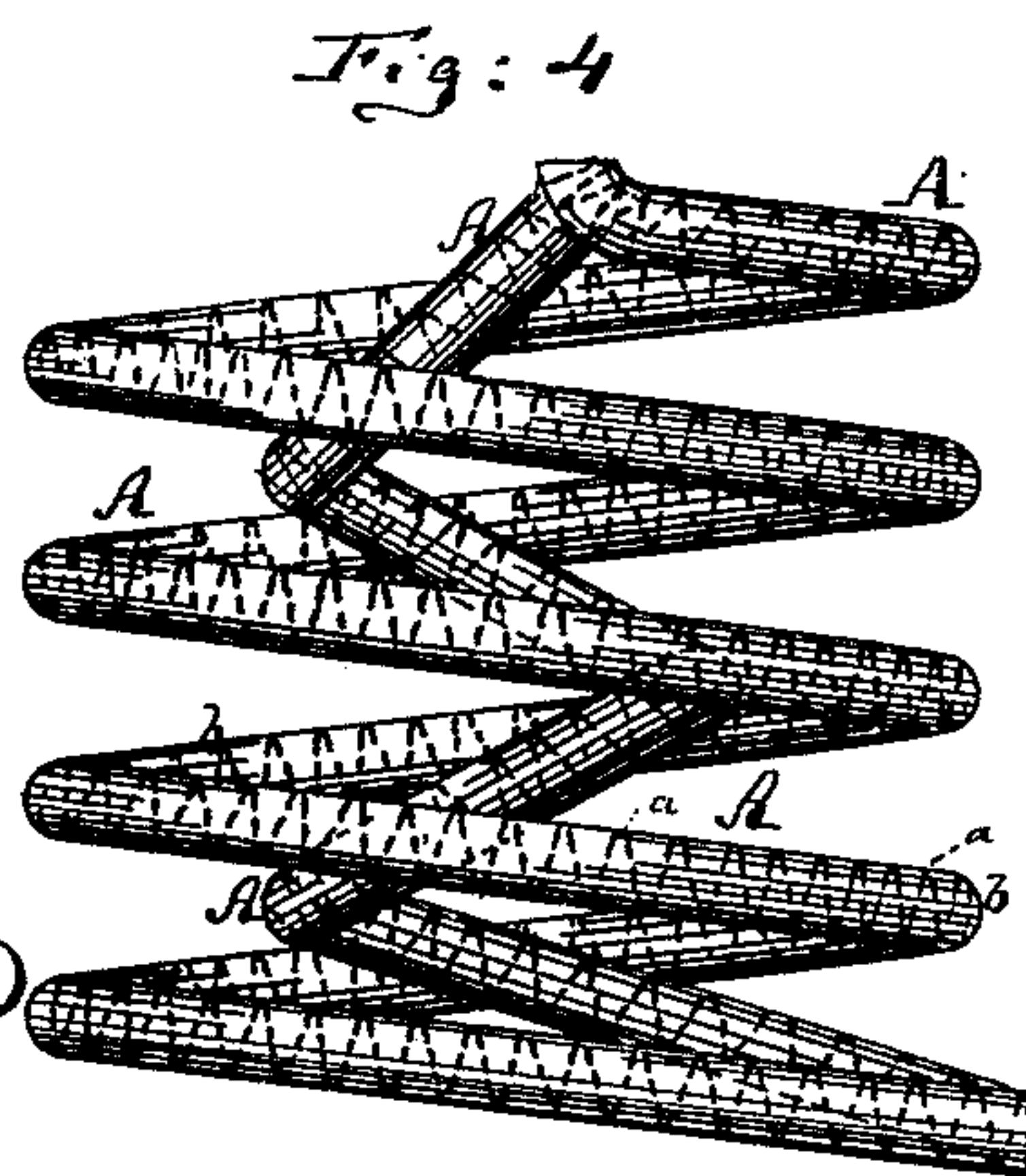
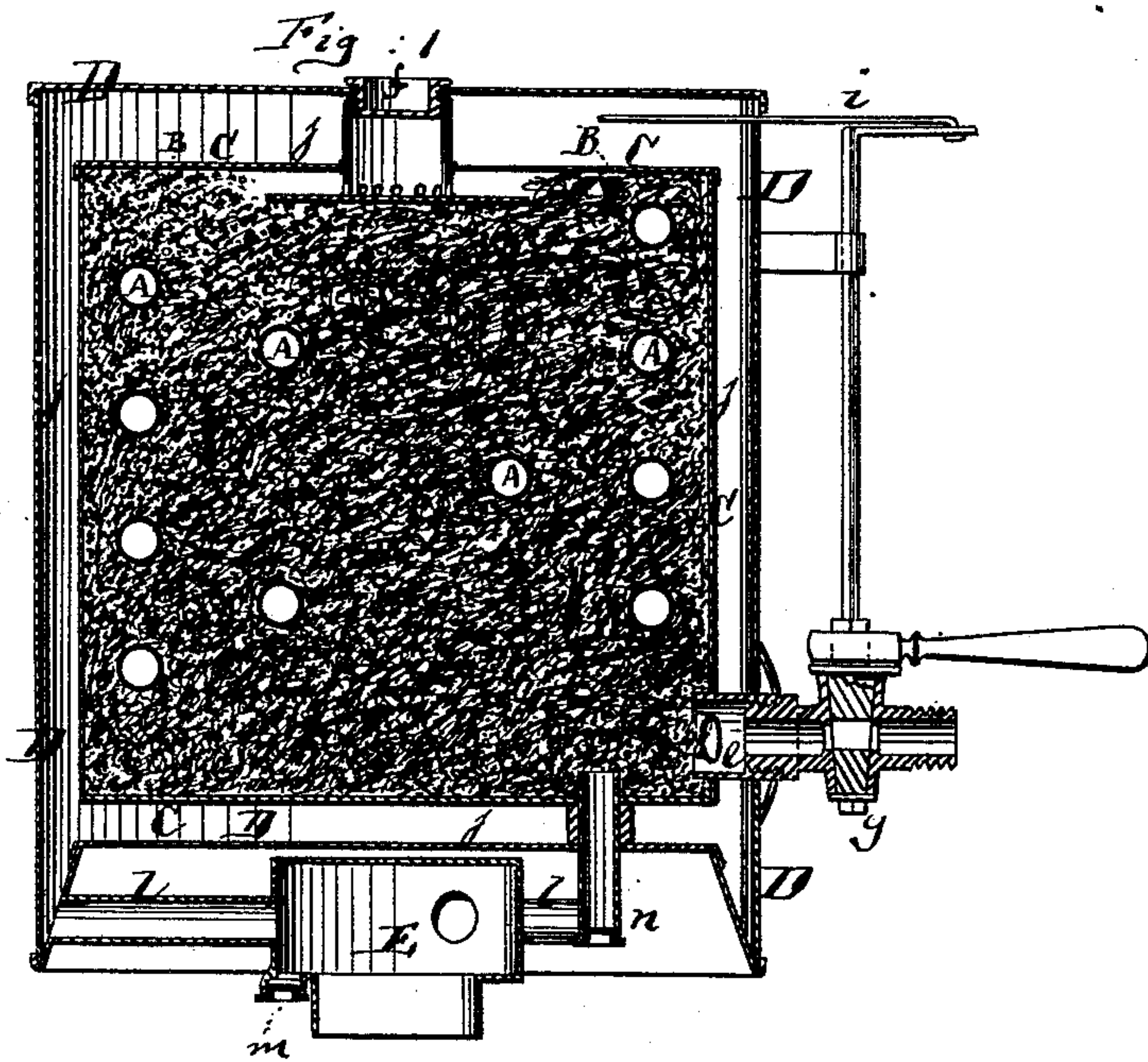


J. C. PEACOCK & C. W. BRADLEY
CARBURETER.

No. 185,957.

Patented Jan. 2, 1877.



Witnesses:
O. A. Weidner.
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UNITED STATES PATENT OFFICE

JOHN C. PEACOCK AND CHARLES W. BRADLEY, OF LONDON, ENGLAND.

IMPROVEMENT IN CARBURETERS.

Specification forming part of Letters Patent No. 185,957, dated January 2, 1877; application filed June 9, 1876.

To all whom it may concern:

Be it known that we, JOHN C. PEACOCK and CHARLES W. BRADLEY, of London, England, have invented a new and Improved Apparatus for Making Gas from Hydrocarbon Liquids, of which the following is a specification:

Figure 1 is a vertical central section of our improved gas apparatus. Fig. 2 is a top view, partly in section, of the same; Fig. 3, a bottom view of the same; Fig. 4, a detail side view of the generating-tube; and Fig. 5, a detail sectional view, showing the junction of the generating-tube with the surrounding air-chamber.

Similar letters of reference indicate corresponding parts in all the figures.

This invention has for its object improvements in the manufacture of illuminating and heating gas from hydrocarbon liquids, and in the distribution thereof for use by means of apparatus adapted for said purposes. For these purposes we form a flexible and porous tube by winding a wire into an open coil, and covering it with a woven fabric or gauze. This tube we call the "generating-tube." We arrange the generating-tube in a coil of convenient form and mold, or pack around it a porous block. The material we prefer for the said block is bamboo or light wood pulp. The block when thoroughly dry is inclosed in a case of sheet metal or other material.

When required for use, the block is saturated with hydrocarbon liquid. Air is allowed to enter at the upper end of the generating-tube, and the lower end is connected by a descending pipe with the gas-burners. The air, while in the generating-tube, takes up hydrocarbon vapors, and becomes thereby so much heavier than the external air that it will flow by gravity down a descending pipe to the burner.

Where a fall of several feet or more is attainable a full supply to the burners can be obtained by this simple method; but where it would be inconvenient to place the apparatus at a sufficient elevation above the burners air-forcing apparatus, driven by clock-work, may be applied. The evaporation of the hydrocarbon tends to cool the block, and, to prevent

this cooling action from going on to such an extent as to impoverish the gas and seriously to affect its lighting and heating powers, we cause the air entering the generating-tube, and passing through it to the burners, to be drawn from a flue, pipe, or chimney, into which the hot products of combustion of one or more of the burners are received.

Although, as already described, we prefer to form around the generating-tube a porous block, a more or less similar result may be obtained by packing cotton, or other such like material, around the generating-tube.

The letter A represents two coils of the generating-tube. We make each coil about one inch in diameter and twenty to thirty feet long. These dimensions will suffice for the production of about twenty or thirty cubic feet of gas per hour. If more be required we employ two or more generators. The coil is of light brass or tinned iron wire *a*, and a thin gauze, *b*, is sewed around it. This gauze is used in order that the wood pulp may not run into the wire tube and choke it, so as to prevent a free passage for the gas. The spiral wire tube thus formed we prefer to wind into two spirals—one within the other—in such a manner that there shall be about one and a half inch space between them and their own folds. These are kept fixed in their places by any suitable method.

The plan we adopt is to fix them to ordinary wire netting B, bent into tubes or any suitable form. The generating-tube we place within a tank or case, C. We then pour or place fibrous pulp carefully into the case C and allow it to drain, filling up the case from time to time as the material sinks. The case should not be shaken, as this would tend to render the block too firm and dense, and for the same reason the fibrous pulp should not be too fine.

The bamboo pulp is a very suitable material; it requires simply opening, so as to leave no pieces or lumps, and mixing thoroughly with water, so as to form a semi-fluid pulp, which will pour readily from a jug. As soon as the block is set it is placed in a stove and dried. A block thus made is very strong, so that a man may stand upon it without crushing it; but is yet so porous that it will absorb

and hold by capillary action three-quarters of its own bulk of hydrocarbon spirit. The case or tank C is provided with suitable sockets to receive the ends of the generating-tubes. The upper socket *d* is left open during operation to allow the requisite flow and admission of air, but can be more or less closed by a valve, *h*.

The lower socket *e* is connected with the service-pipe, descending to the burners. At the top of the case a screw-plug, *f*, is fitted. It is removed in order to pour into the case, around and through the block, the hydrocarbon liquid with which the apparatus is to be charged.

Under the opening *f* a perforated spreader is placed, in order that the liquid poured in may spread evenly through the mass of the solid block.

When the block is fully charged the hydrocarbon liquid becomes practically solid, and the danger hitherto existing in gas-making machines of a similar nature—namely, that when an accident happens, or, that which has happened in some machines, an explosion occurs, the liquid flows about, or is dangerously thrown around—cannot occur in this. All danger of the sort is absolutely avoided. But in all apparatus of this nature it has been found that by continuous use the heat becomes abstracted by the rapid evaporation of the spirit, and to such a degree that no gas can be formed; or it is of such a tenuity that it is practically useless. To restore this heat many plans have been devised, many of them dangerous, most of them very expensive, and none of them have surmounted the difficulty of oxidation.

In our machine the difficulties have been overcome, and at the same time additional security against firing or explosion is attained. This is effected simply by carbonic-acid gas, which can be used as a medium or vehicle for the carriage of the gas to the burners, and is even a better medium for that purpose than the ordinary atmosphere itself. In this machine the heated products of combustion of its own gas are carried into the convolutions of the spiral tube, and thus into the very center of the machine itself, and not only restore to it the heat taken away by the very rapid evaporation of the liquid, but add to the brilliancy of the light.

In order to supply warmed air to the generating-tube, and around the porous block, we inclose the first case C in a second or outer case, D, thus producing an intervening air-space, *j*, which, at the bottom, is attached to a metal chimney, E, placed over the nearest gas-burner. This arrangement is shown in section at Fig. 1. There is or may be a valve in the chimney to regulate the temperature of the air passing to the block. This tempera-

ture should not be too high. It is sufficient when the gas is delivered at a few degrees above the freezing-point.

There are, as will be seen, lateral branches *l l*, leading from the chimney E into the air-space *j*, between the cases C and D. The passage of the heated products into the space *j* between the two cases C D, in order to restore the heat to the gas-meter, is thus not allowed to strike directly against the bottom of the machine, but is diverted by the three or more smaller pipes *l l* to the sides, so as to leave a space of air between them and the bottom of the outer casing, and the heated products thus pass with nearly a uniform degree of heat over the whole. There is also a cock, *m*, inserted in the lowest part of the outer casing to take away the water condensed from the products of combustion, and an arrangement is necessary to prevent the block being overcharged with spirit. The latter is effected by having a tube, *n*, extending from the bottom of the inner case C downwardly, said tube having a cock, or by making the bottom of the case C hollowed out, so as to leave a space between it and the porous block, and inserting a cock to the lowest part of this, in order that any surplus spirit may be drawn off. The descent of gas to the burners is regulated by a stop-cock, *g*.

The valve *h* on the socket *d* may be coupled by a rod, *i*, with the stop-cock *g*, so that when the flow of gas is checked a corresponding reduction shall be made in the quantity of hot air entering the outer case. According to this invention no forcing power is required or used, as the natural law of gravity takes the place of any force, and the gas descends to the burners because the gas formed in this machine is much heavier than the air.

We claim as our invention—

1. The generating-tube A, made of wire *a*, and covered with thin gauze *b*, substantially as herein shown and described.
2. The combination of the generating-tube A, wire-netting B, and case C, substantially as specified.
3. In combination with the case C, which contains the hydrocarbon and the generating-tube A, and with the outer case D, forming the intervening air-space *j*, the branch pipes *l*, and chimney E, said chimney and pipes being arranged below the case D, substantially as specified.

The foregoing description and claims of our invention signed by us this 31st day of March, 1876.

JOHN C. PEACOCK.
CHAS. W. BRADLEY.

Witnesses:

CHAS. LAKES,
WM. EVANS.