

P. W. MACKENZIE & H. W. RAPPLEYE.

APPARATUS FOR BURNING ILLUMINATING GAS.

No. 259,881.

Patented June 20, 1882.

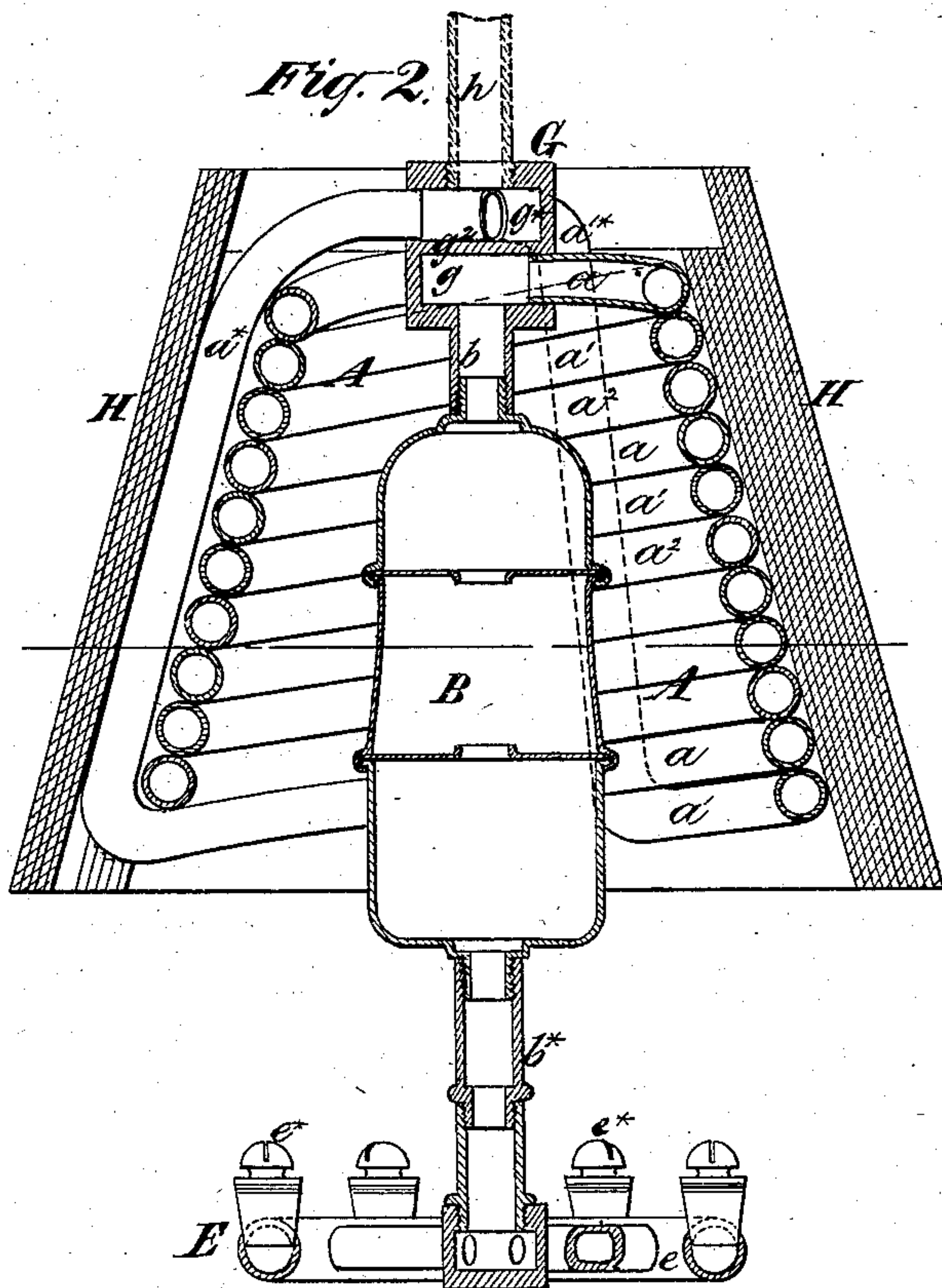
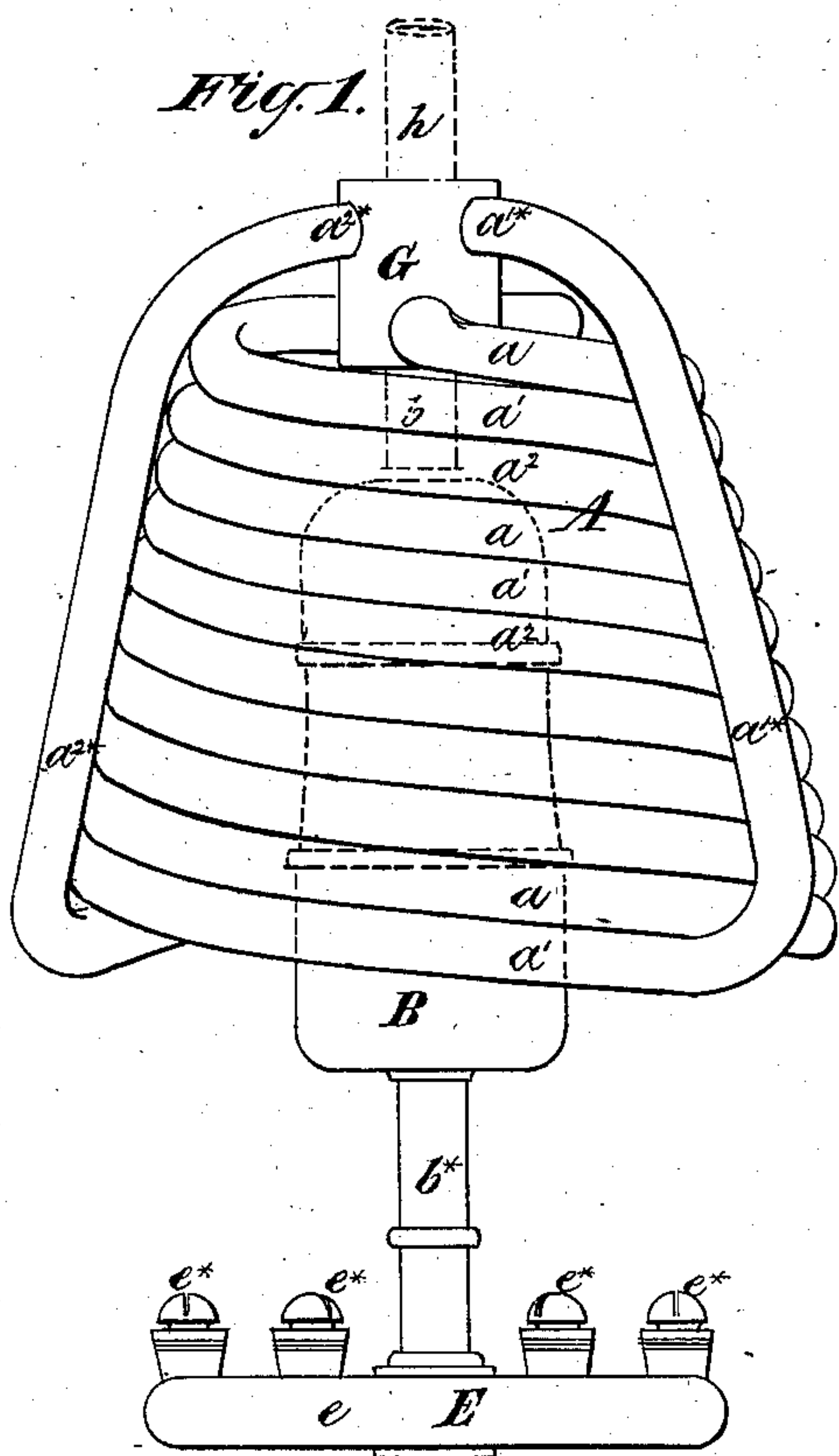
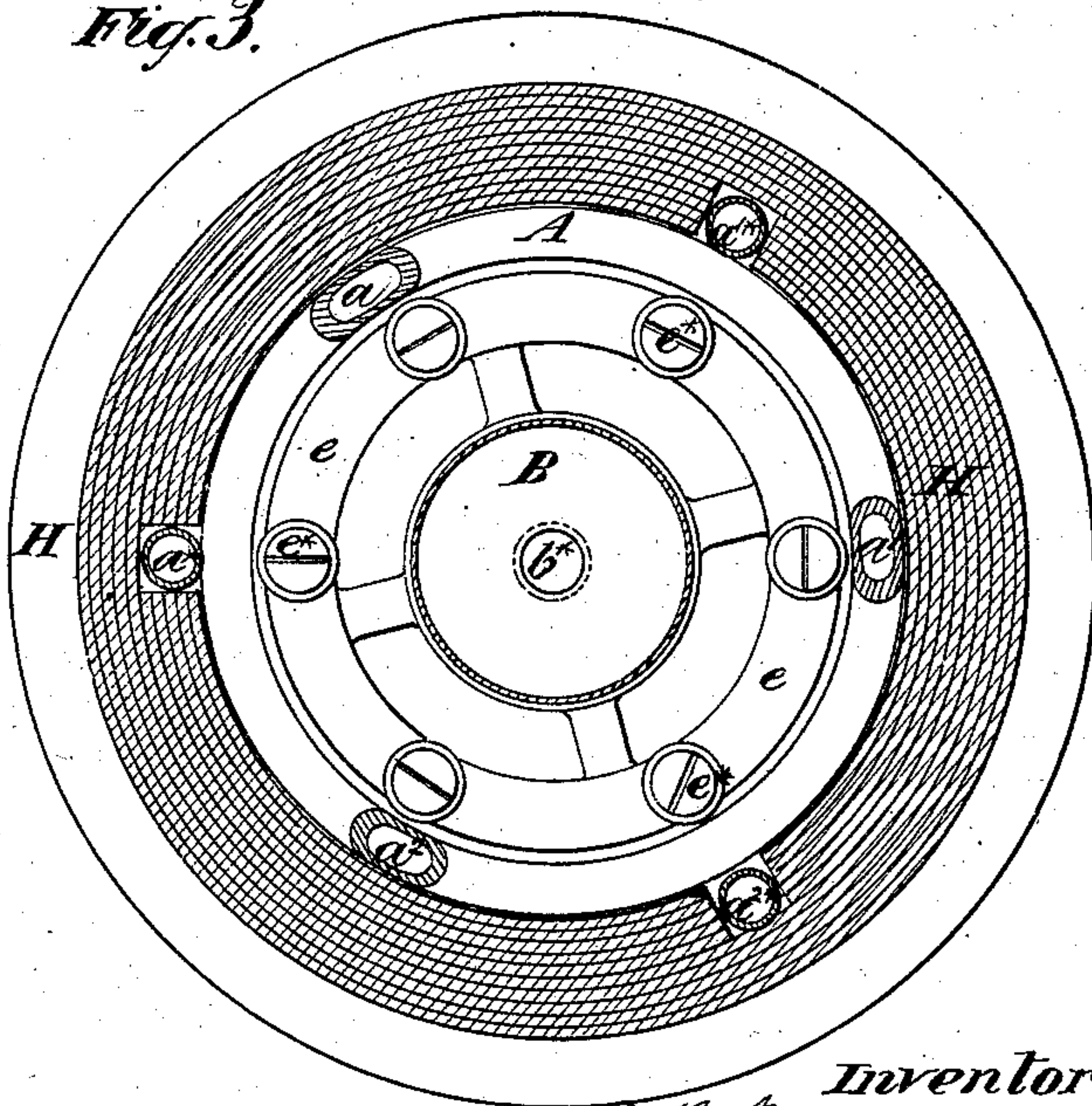


Fig. 3.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR BURNING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 259,881, dated June 20, 1882.

Application filed February 11, 1880.

To all whom it may concern:

Be it known that we, PHILIP W. MACKENZIE, of Blauveltville, in the county of Rockland and State of New York, and HANNIBAL W. RAPPEYE, of the city and county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Burning Illuminating-Gas, of which the following is a specification, reference being had to the accompanying drawings.

Our invention relates to the method of heating illuminating-gas prior to its introduction to a burner or group of burners by the waste heat from the flame of the same burner or group, whereby the illuminating power of the gas is increased and an economy in consumption effected.

The invention consists in the combination, with a burner or group of burners, of a heater arranged above and to be heated by said burner or group, and composed of a chamber divided at different heights by transverse perforated diaphragms, whereby a reverberatory action of the gas is produced in its passage through the heater to the burner or group.

We also preferably combine with the above-described heater a primary heater consisting of a coil of pipe arranged over the burner or group of burners, and through which the gas passes in its passage to the chamber-heater.

In the drawings, Figure 1 is an elevation of a group of burners with heaters and their connections, illustrating the invention. Fig. 2 is a vertical section of the same, showing also a jacket of non-conducting material which is not shown in Fig. 1; and Fig. 3 is a horizontal section corresponding with Fig. 2.

The heaters are indicated by letters A B and the burners or groups of burners by letters E. In Figs. 1, 2, and 3 two heaters, A and B, are shown. The heater A is composed of several conical coils of metal pipe, a a' a^2 , the laps of whose coils are so interposed and superposed close or nearly close together as to form substantially the equivalent of a hollow frustum of a cone with double walls and with spiral passages within the wall. Three coils are shown; but the number may be varied, or a single one might be used. The several coils

are connected at both ends with a head, G, which is arranged concentrically above them and divided horizontally into two chambers, g g^* , by a diaphragm, g^2 , the upper end of each coil being connected with the lower chamber, g , of the said head, and the pipes of the several coils being continued upward from the lowest lap or turn of each coil, as shown at a^* , a'^* , and a^{2*} , and connected with the upper chamber, g^* , of the said head, with which the gas-supply pipe h is connected. The said chamber g is connected by a pipe, b , with a central heater, B, from the bottom of which a pipe, b^* , leads to the hollow ring e , in which are secured the tips e^* e'^* , constituting the burner or group E. The central heater, B, is represented of cylindrical form, with perforated diaphragms to check the too rapid passage of the gas through it, and cause the gas to circulate with a reverberatory action between each pair or each two diaphragms. The gas entering the upper chamber, g^* , of the head G passes therefrom down the several extensions a^* a'^* a^{2*} of the coils a a' a^2 , thence upward through the said coils into the lower chamber, g , of the head, thence through the pipe b , the heater B, and pipe b^* to the burner or group of burners E, which should preferably be so far below the heaters that the flames from the burners cannot impinge upon the surfaces of the heaters, and thereby have their illuminating power diminished. The heaters are intensely heated by the radiation from the flame or flames from the burner or burners and by the passage in contact with their surfaces of the ascending column of the heated gaseous products of combustion from the said flame or flames.

It has been found in practice that such heaters as are hereinabove described may be heated to redness. The fixed or permanent gas passing through a heater or heaters so highly heated before entering the burner is very highly expanded, and has its illuminating power very greatly increased, so that from a given volume of gas at a given ordinary pressure we are thus enabled to obtain several times the quantity of light that could be obtained by burning it in the ordinary way, and as this effect is obtained by the waste heat from the

same burners which produce the light very great economy is effected.

It may be here remarked that in arranging in a ring or circular series burner-tips which
5 produce flat flames we propose to so set them that the planes of such flames will be radial, or approximately so, to the center of the circle. Such arrangement, however, forms no part of the present invention; but we may make it the
10 subject of an application for a separate patent.

Figs. 2 and 3 show the heater incased by an outer jacket, H, of non-conducting material, which may be composed of asbestos-paper, a number of sheets of which may be superposed
15 to obtain suitable thickness.

We claim—

1. The combination, with a gas-burner or group of burners, of a heater arranged above and to be heated by said burner or group, and
20 composed of a chamber, B, divided at different heights by transverse perforated diaphragms, whereby a reverberatory action of

the gas is produced in its passage through the heater to said burner or group, substantially as specified.

2. The combination, with a gas-burner or group of burners, of the annular coil-heater A and the cylindric heater B, comprising perforated transverse diaphragms or partitions, and into and through which the gas passes after
25 it has been partly heated in said coil-heater and before it is supplied to the burner, substantially as specified.

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