

No. 766,636.

PATENTED AUG. 2, 1904.

G. MACHLET, JR.
GAS BURNER.

APPLICATION FILED DEC. 1, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig: 1.

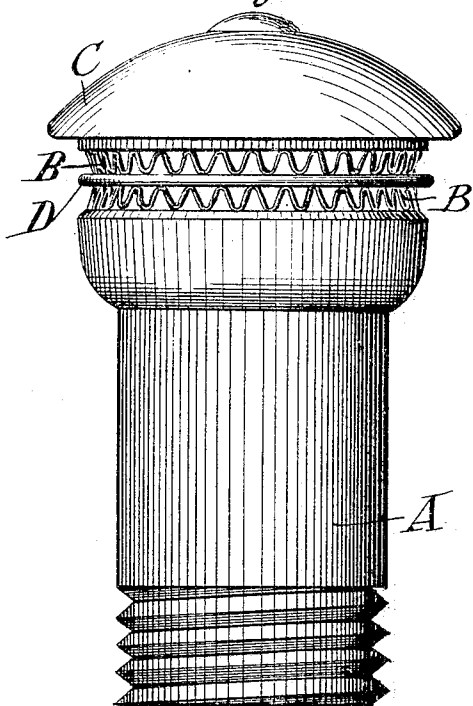


Fig: 2.

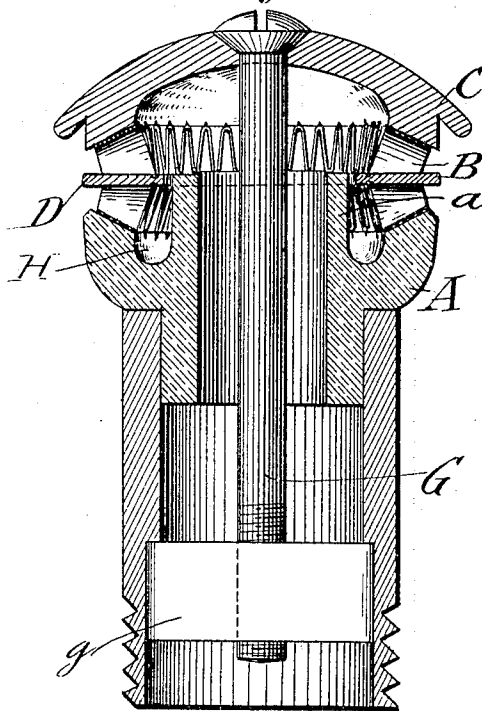


Fig: 3.

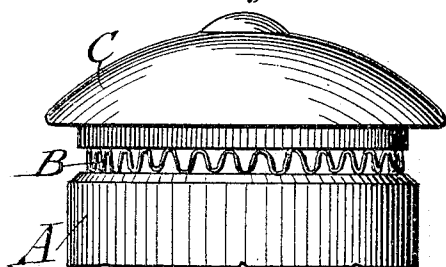


Fig: 4.

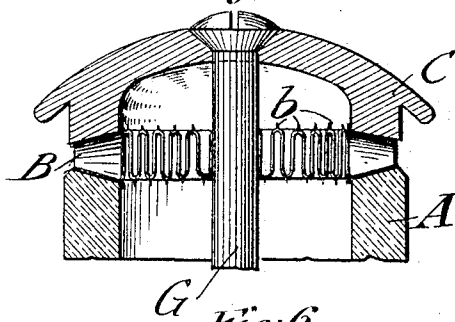


Fig: 5.

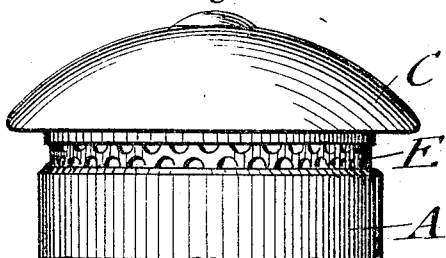
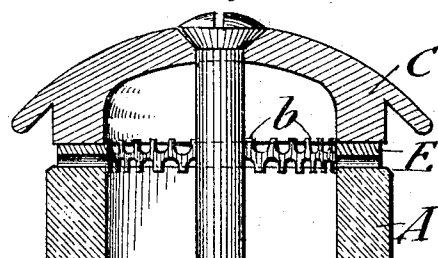


Fig: 6.



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2 SHEETS—SHEET 2.

Fig: 7.

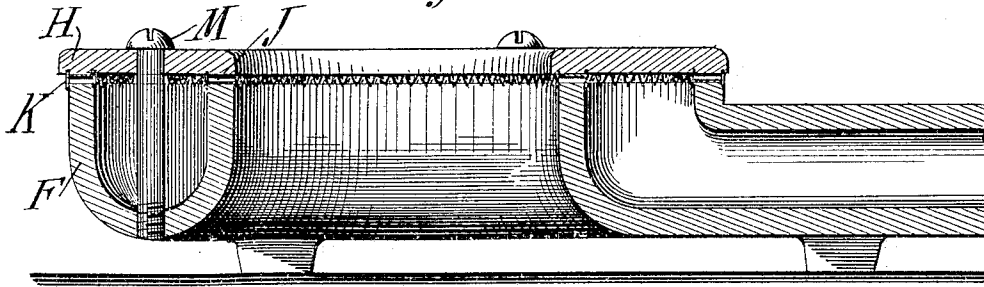


Fig: 8.

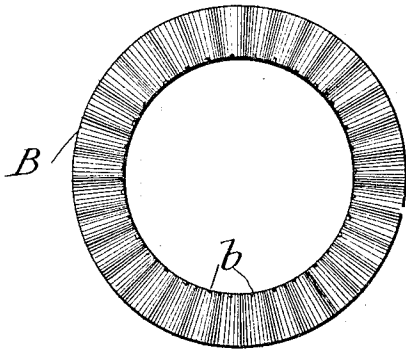


Fig: 9.

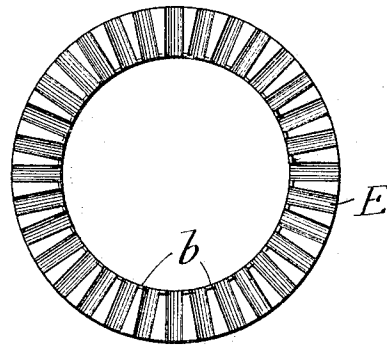
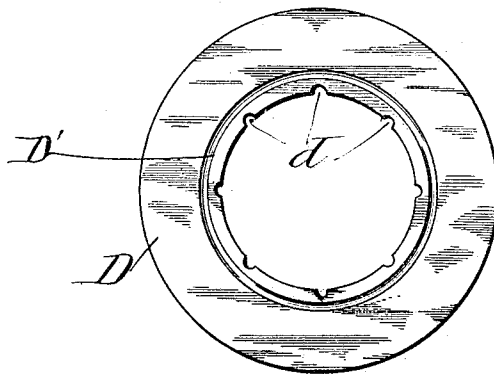


Fig: 10.



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UNITED STATES PATENT OFFICE.

GEORGE MACHLET, JR., OF ELIZABETH, NEW JERSEY.

GAS-BURNER.

SPECIFICATION forming part of Letters Patent No. 766,636, dated August 2, 1904.

Application filed December 1, 1903. Serial No. 183,333. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MACHLET, JR., a citizen of the United States, residing in Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Gas-Burners, of which the following is a specification.

This invention relates to certain improvements in gas-burners which are intended to produce a blue heating-flame, either at the ordinary pressure of gas supplied from a gas plant and mixed with air or for producing the blue flame from a mixture of gas and air under pressure, the burner being specially designed with a view of producing a high degree of heat from a comparatively small-sized burner, while protecting the escape-orifices against the settlement of dirt, dust, and other exterior matter, so as to keep all the outlet-orifices intact and in working order; and for this purpose the invention consists of a gas-burner, which will be fully described hereinafter and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improved gas-burner, showing the same arranged with two gas-distributing diaphragms and a separating-ring between the same. Fig. 2 is a vertical transverse section on line 2 2, Fig. 1. Figs. 3 and 4 represent a side view and a vertical central section of my improved gas-burner, showing the same arranged with one gas-supply diaphragm. Figs. 5 and 6 are a side elevation and a vertical central section of a modified form of diaphragm, the diaphragm in Figs. 3 and 4 being made of corrugated sheet metal, while that in Figs. 5 and 6 is made of metal in which the radial supply-channels are pressed or stamped into the metal. Fig. 7 is a vertical central section of a larger size of burner constructed on the same principle as the burner shown in Figs. 3 and 4. Figs. 8 and 9 are top views of the channel-diaphragms employed with my improved burner; and Fig. 10 is a plan view of the ring-shaped separating-plates used in connection with the burner having two diaphragms, as shown in Figs. 1 and 2.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the gas-supply tube through which the mixture of gas and air is supplied to my improved burner, either under the ordinary pressure of the gas-works or under higher pressure produced by supplying the air under pressure. On the upper end of the supply-tube A is located a ring-shaped diaphragm B, which may be either of corrugated sheet metal or a stamped metal ring, said diaphragm being shown in Figs. 8 and 9 and made in such a manner that the cross-sectional area of the inner ends of the radial depressions, corrugations, or channels are equal in size with the cross-sectional area of the outer ends of the same. When the diaphragm is made of corrugated sheet metal, the contour of the uppermost part of the depressions or corrugations is conical and also of the lowermost parts, as shown in Figs. 2 and 4. Hence the height of the channels at the inner ends is greater than that of the depressions or corrugations at the outer ends, so as to make up by the height the greater width at the outer ends and still produce the same equal cross-sectional width of the channels. When the channels are stamped into a sheet-metal ring, the radial channels are made of uniform width and area, as shown in Fig. 9. At the inner ends of the depressions, corrugations, or channels on the diaphragms are arranged upwardly-bent small projections or teeth *b*, which extend up from the metal and which serve to hold the diaphragm in position by engaging the bore of the tube or cap concentrically with the axis of the supply-tube, as shown in Figs. 4 and 6. When the corrugated sheet-metal diaphragm is used, the upper end of the supply-tube is made slightly inclined or conical, corresponding to the inclination of the top of the diaphragm, also the lower edges of the covering-cap C, which is placed over the diaphragm B and which is retained in position by a central screw-rod G, that passes through a central hole of the cap and engages with a diametrical support *g*, provided in the central opening for the screw-rod G, as shown in Fig. 2. The covering-cap is provided with an exterior rim, that serves as a deflector for the flame. The cap serves not only as a deflector for the

flame, imparting a regular round shape to the same, but also as a protector for the diaphragm for preventing dust or other sediment from settling in the corrugations or channels and partly or entirely choking the same.

My improved gas-burner may be made of any suitable size, or a number of gas-burners of small size may be arranged in a cluster, as required by the object to be heated. The burner shown in Figs. 3 to 7 may be used with ordinary pressure of illuminating-gas supplied from a central plant and mixed with air, so as to produce a blue flame, or with gas and air mixture supplied under a low pressure from a blower; but when the gas and air mixture is supplied under a comparatively high pressure the construction shown in Figs. 1 and 2 is preferably used, in which the tube A is provided with a sleeve *a*. This double-diaphragm construction is also preferable where such gases as oil-gas, natural gas, &c., are used. In this case two diaphragms with radial depressions, corrugations, or channels are employed which are held in position between the converging ends of the supply-tube and cap. The diaphragms are separated by a ring-shaped plate the outer diameter of which is greater than the outer diameter of the diaphragms, so as to form a separating-rim between the same. The inner diameter of the ring-shaped plate D being smaller than the inner diameter of the diaphragms, an annular chamber H is formed below the lower corrugated diaphragm, as shown in Fig. 2. This annular chamber is connected with the chamber above the upper diaphragm by small notches *d* at the interior circumference of the ring-shaped separating-plate, as shown most clearly in Fig. 10, which also serve for conducting the gas and air mixture under pressure into the annular chamber below the lower diaphragm, so that the gas is admitted at less pressure to the lower than to the upper diaphragm and serves for the purpose of permitting the ignition of gas escaping through the upper diaphragm and preventing the extinction of the same by the pressure at which the gas escapes through the corrugations of the upper diaphragm, the lower channel and the outlet-notches of the lower diaphragm serving for keeping up the regular heating-flame escaping through the radial corrugations or channels of the upper diaphragm. Without the escape of the gas and air mixture under pressure at the lower diaphragm it would be impossible to light the gas and air mixture escaping from the higher pressure from the upper diaphragm, the lower flame safeguarding the continuity of the heating-flame of the upper diaphragm and preventing the extinction of the same.

The ring-shaped separating-plate D is provided, besides the small notches at the inner circumference, with concentric grooves D' at

the upper and lower surface, in which the bent-up projections or teeth *b* at the inner ends of the corrugations project, so as to retain the diaphragms in proper concentric position on the burner tube and pipe, while the bent-up projections or teeth at the lower inner ends of the corrugations of the lower diaphragm and at the upper inner ends of the corrugations of the upper diaphragm retain the diaphragms in position on the rim of the supply-tube and the inner edge of the cap, respectively, as shown in Fig. 2.

My improved gas-burner can be used for many purposes for which a high degree of heat is required and can be made in any desired form—round, square, hexagonal, &c. They also may be made up in different sizes or grouped together in clusters, as required by the shape of the object to be heated. The burner can be used at the ordinary pressure of the gas or under higher pressure, according as a lower or higher degree is required. The burner can be readily assembled and burned-out diaphragms replaced at small expense and with great facility by simply disconnecting the fastening-screw rod and removing the worn-out diaphragm and replacing it by a new one and then replacing the parts again. The diaphragms by means of their projections can be always set again in the same position.

In the modification shown in Fig. 7 a ring-shaped burner-tube F of U-shaped section is separated from the flat ring-cap H by two diaphragms K L, the whole being held together by screws M.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A gas-burner consisting of a supply-tube, a cap, and an interposed diaphragm having depressions of the same cross-sectional area at their ends, each of said depressions varying in depth and width from end to end.

2. In a gas-burner, the combination with a supply-tube and a cap, said supply-tube and cap having outwardly-converging adjacent edges, of an interposed diaphragm provided with depressions varying in depth and width from end to end.

3. A gas-burner, consisting of a supply-tube, a cap, and a detachable diaphragm provided with depressions on both sides interposed between the cap and the tube, the cross-sectional area of the depressions at one end being equal to that of the other end, said diaphragm being provided with retaining projections or teeth.

4. A gas-burner, consisting of a supply-tube, a cap provided with an exterior deflecting-rim, two diaphragms located between the ends of the supply-tube and the cap, said diaphragms being provided with depressions, the internal cross-sectional area of which is equal to the cross-sectional area of the outer ends, and a ring-shaped separating-plate between the dia-

phragms provided with notches on the inner edges for supplying gas at a less pressure to the lower diaphragm than to the upper diaphragm.

- 5 5. A gas-burner, consisting of a supply-tube, a cap, two diaphragms located between the ends of the supply-tube and the cap, said diaphragms being provided with depressions interposed between the cap and the tube, a ring-shaped separating-plate between said diaphragms provided with notches at the inner edges for supplying gas at a less pressure to the lower diaphragm than to the upper diaphragm, annular grooves in said plate, said diaphragms being provided with centering projections or teeth extending at their inner ends into engagement with the inner edges of the supply-tube and cap and with the grooves in the separating-plate.
- 10 20 6. A gas-burner consisting of a supply-tube, a cap, two diaphragms interposed between said supply-tube and the cap, said diaphragms being provided with depressions, a sleeve carried by said supply-tube and forming a chamber in proximity to the inner end of the lower diaphragm, and a separating-plate between said diaphragms having means for supplying gas from the cap to said chamber and to the lower diaphragm.
- 25 30 7. A gas-burner, consisting of a supply-tube, a cap, two diaphragms located between the sup-

ply-tube and the cap, said diaphragms being provided with depressions, the cross-sectional area of the inner ends being equal to the cross-sectional area of the outer ends, a supply-tube 35 having an inner sleeve, and a ring-shaped separating-plate between the diaphragms surrounding said sleeve and provided with notches at its inner edge for supplying gas there-through from the cap to the lower diaphragm 40 at a reduced pressure.

8. A gas-burner, consisting of a supply-tube, a cap provided with an exterior deflecting-rim, two diaphragms interposed between the end of the supply-tube and the cap, said diaphragms being provided with depressions, the cross-sectional area of the inner ends of which is equal to the cross-sectional area of the outer ends of the same, and a ring-shaped separating-plate arranged between said diaphragms, 50 said diaphragms being provided with centering projections or teeth extending at their inner ends into engagement with the inner ends of the supply-tube and the cap and with the grooves of the separating-plate. 55

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

GEORGE MACHLET, JR

Witnesses:

PAUL GOEPEL,
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