

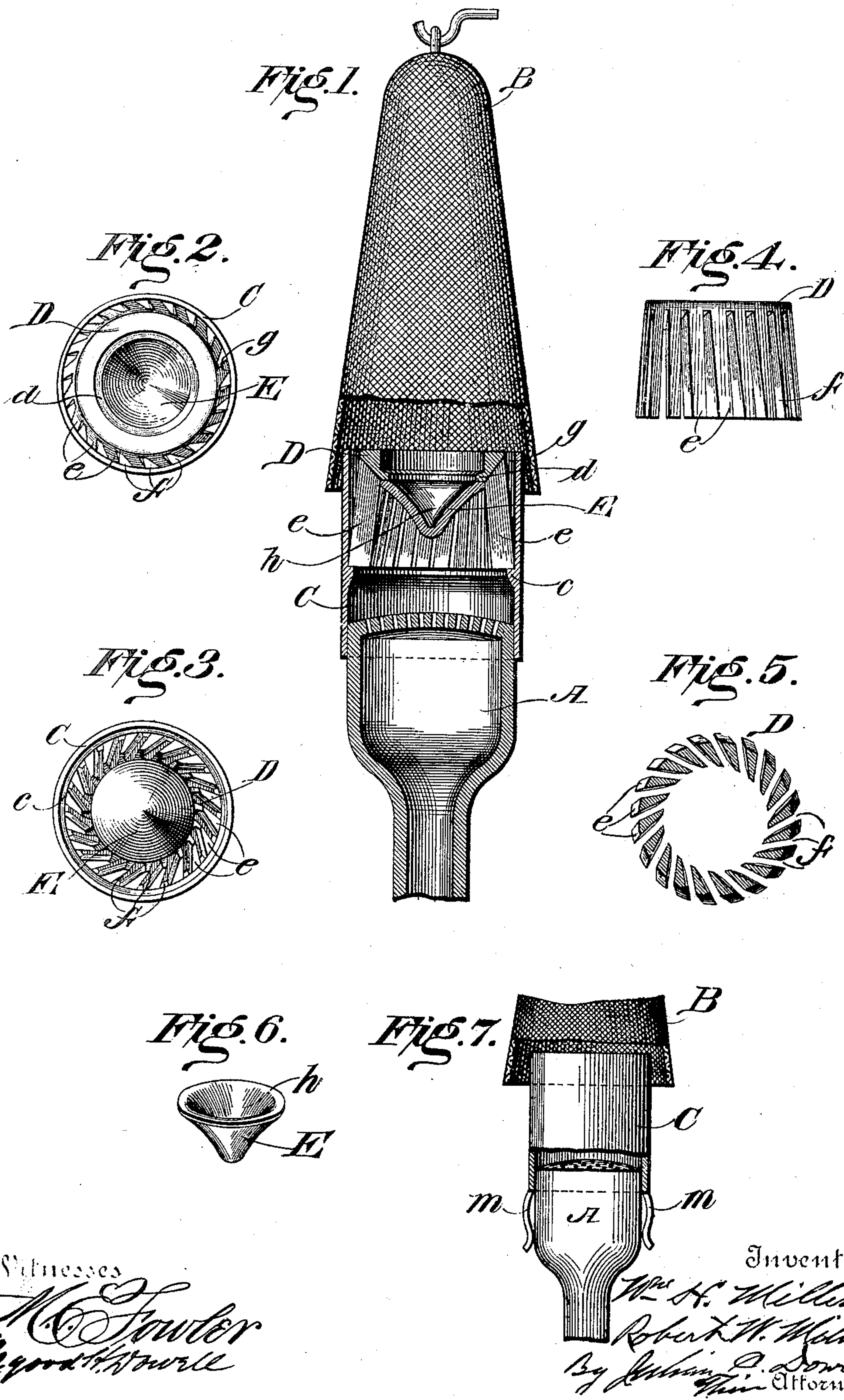
No. 704,653.

Patented July 15, 1902.

W. H. & R. W. MILLER.
BURNER CAP.

(Application filed May 7, 1901.)

(No Model.)



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UNITED STATES PATENT OFFICE.

WILLIAM H. MILLER AND ROBERT W. MILLER, OF HENRY CLAY,
DELAWARE.

BURNER-CAP.

SPECIFICATION forming part of Letters Patent No. 704,653, dated July 15, 1902.

Application filed May 7, 1901. Serial No. 59,170. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. MILLER and ROBERT W. MILLER, citizens of the United States, residing at Henry Clay, in the county of Newcastle and State of Delaware, have invented certain new and useful Improvements in Burner-Caps; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to gas or vapor burners; and it consists, substantially, in the improvements hereinafter more particularly described, and pointed out in the claims.

The invention has reference more particularly to burners of the ordinary Bunsen type, although it is equally applicable to burners of other forms in which an incandescent mantle is employed. In the class or type of burner referred to it is advantageous to a more successful use or operation of the burner that the gas or vapor shall enter the mantle from the burner with considerable force or pressure, to assist in making a better combustion, and to accomplish which various forms of devices have hitherto been employed, but which in large part have proven inadequate for many reasons, principally on account of the unstable character or nature of the mixture, as well as the feeble escape at the point of exit.

The object of the present invention is to overcome former disadvantages and objections in this class of devices and to provide means whereby the gas or vapor is delivered to the mantle from the burner in an uninterrupted flow and with much greater force or pressure than hitherto.

A further object is to provide means for obtaining more complete combustion, and consequently a purer and better light, and also to render the burner of increased efficiency generally.

The above and additional objects we attain by the means illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a gas or vapor burner embodying our improvements, the incandescent mantle being shown in elevation. Fig. 2 is a top plan view of our improved burner-cap, and Fig. 3 is a bottom

plan view thereof. Fig. 4 is a side view of the ring constituting a part of our improved burner-cap, said ring being of peculiar construction. Fig. 5 is a horizontal sectional view of said ring to more clearly indicate the construction thereof. Fig. 6 is a view in detail of the pendent conical deflector located centrally of the ring or cap. Fig. 7 is a view representing a modification of the means for securing the cap to a burner.

Before proceeding with a more detailed description it may be stated that our improvements comprise a suitable burner cap or tip, provided with means for imparting to the gas or vapor a whirling or circulatory motion at the point of escape or exit thereof, thereby greatly augmenting or increasing the force or pressure under which the fluid enters the incandescent mantle. The construction is such that the vapor or fluid is caused to move in a solid ring-like mass, the action being continuous and the mass being caused to ascend, due to the pressure of the constant supply of gas or vapor passing to the cap from beneath.

Our improved burner cap or tip comprises, essentially, a tube or nipple for attachment to the burner, a stationary ring of peculiar construction located within the tube, and a deflector arranged centrally of said tube and ring, all as will hereinafter be more particularly described.

Specific reference now being had to the accompanying drawings, A represents an ordinary gas or vapor burner, preferably of the Bunsen or similar type, and B represents an ordinary Welsbach incandescent mantle mounted upon or above said burner in any of the usual or well-known ways. Fitted to the upper end of said burner is my improved cap or tip, comprising a short tube or nipple C, preferably extending downwardly over the burner a sufficient distance to prevent escape of the gas or vapor, the said tube or nipple being preferably formed or provided interiorly with a flange or shoulder c, as shown. Fitting in the upper part of said tube or nipple C is a ring or device D, having an inner flange or shoulder d, and said ring or device is formed or provided all around with a series of pendent ribs or fingers e, which are divided or separated from each other by in-

intermediate oblique spaces *f*. Said ribs or fingers *e* are slightly divergent or inclined outwardly toward the bottom, thus giving to the said device D somewhat the general shape of a frustum of a cone, and the lower ends of the fingers *e* may rest upon the flange or shoulder *c* on the interior of the tube or nipple C. Due to the elasticity of the ribs or fingers *e*, the lower end of said ring or device D fits the said tube or nipple C very snugly and adjustably; but the device is removable therefrom when desired, and in virtue of the taper or gradual lessening of diameter of the ring upwardly a space *g* of upwardly-increasing width is formed between the outer surface of the ribs or fingers and the inner surface of the tube or nipple, as shown in Figs. 1 and 2. Said space *g* results from the general conical shape of the ring or device D and is essential to enable the escaping gas or vapor to assume its intended peculiar motion previous to entering the lower end of the mantle. Also due to the conical form of said ring or device the force of impingement of the gas or vapor against the inner surface of the nipple C gradually increases toward the upper end of the cap or tip, since the volume of gas constantly passing upwardly into the ring is necessarily compressed somewhat on account of the gradually-decreasing space within said ring, and consequently the pressure of the escaping gas is greater toward the upper extremities of the spaces *f*, all of which is desirable in the operation of our improved device. By simply adjusting the said ring to different heights in the nipple the effects may be varied, as is obvious. In order to impart to the gas or vapor the desired whirling action or circulatory motion, the sides of the ribs or fingers are preferably beveled or tapered inward, as shown, and said ribs or fingers are tangentially disposed or arranged at a suitable angle relative to the axis of the ring and the wall of the tube or nipple. Said ribs or fingers are separated at their lower ends, as shown, and they are also slightly tapered downwardly, so as to give increased width to the spaces *f* at the bottom of the ring or device D, this being preferable in use, though not absolutely essential. The ribs or fingers, moreover, are spirally disposed or inclined to one side circumferentially of the said ring or device, which construction materially aids in the escape of the gas or vapor through the spaces between the said ribs or fingers, as well as in the desired circulatory motion to be imparted to the vapor.

Within the ring or device D is formed or provided a pendent deflector E, which is preferably tapering or conical in form and which closes said ring or device at the upper end thereof, so as to insure the passage of the gas or vapor through the said spaces *f*. Said deflector could be solid throughout; but preferably it is formed with a conical depression or recess *h* at the upper part thereof, and in the use of our improved burner-cap said re-

cess or depression becomes filled with the escaping gas or vapor, which spins around, as it were, in the recess, thus aiding the continuous mass or volume of outpouring gas or vapor to combine in a solid whirling ascending ring resembling a waterspout, which enters or passes into the mantle with the desired degree of force or pressure to bring the latter to the most perfect state or degree of incandescence and producing a light of much greater candle-power than hitherto. The said deflector E can be constructed to fit the ring or device D in any suitable way; but as herein shown the same is held in place by the clamping action of the ribs or fingers, and the upper edge thereof abuts or lies closely against the under side of the flange or shoulder *d* on the interior of the said device D. By means of this construction the upward pressure exerted by the ascending gas or vapor assists in holding the deflector in place, and the flange *d* prevents the same from upward displacement by said pressure. The details of our invention can of course be altered or changed to suit particular requirements of use. Hence it will be understood that we do not limit ourselves in any manner whatever to the particular construction and arrangement of parts herein shown or described. In other words, our invention comprehends, broadly and without limitation, an attachment for gas or vapor burners comprising stationary means for imparting to the gas or vapor a whirling or rapid circulatory motion as it escapes into the superposed incandescent mantle. It will be understood that in most instances we dispense altogether with a pendent or deflector within the ring or device D, the said ring being then closed at the top in any suitable way, as by a plate or disk.

As shown in Fig. 7, the tube or nipple C is only of sufficient length below the inner flange *c* thereof to overlap the upper edge of the burner A, while said tube is formed or provided at suitable points of its diameter with suitable fingers or members *m*, of sufficient elasticity to clasp the sides of the burner, and thus hold the entire burner-cap in position by friction. Other suitable changes can also be adopted both in regard to the ring or device D and the deflector E and still be within the scope of our invention.

When thus constructed and mounted in position upon the burner, the action of our improved burner-cap or attachment is substantially as follows: The gas or vapor from the burner enters the said cap in an obvious manner, and in virtue of the construction and arrangement of the ribs or fingers of the ring or device D the volume of gas or vapor nearest the walls of the cap is caused to divide and pass upwardly and outwardly through the spaces *f* in the form of thin tangential sheets or streams, while the volume of gas or vapor rising centrally of the cap or ring is both divided and deflected in such manner as to spread laterally in all direc-

tions and also passes outwardly and upwardly through the said spaces *f*. This action is conducive of a more thorough admixture or commingling of the gas or vapor, and, due to the somewhat spiral or circumferential inclination of the ribs or fingers *e*, it is evident that the said gas or vapor has imparted thereto a whirling circulatory motion, which is rendered exceedingly rapid, due to the upward pressure produced by the constantly-rising column from beneath. The effect is to cause the gas or vapor to enter mantle under a force of pressure considerably greater than hitherto. The streams of gas or vapor, passing outwardly through the spaces *f*, impinge against the surrounding walls of tube or nipple *C* at angles other than right angles, and thus are said streams also deflected and further assisted to follow the general direction given thereto by the tangential arrangement and general construction of the said ribs or fingers. In this way the whirling action of the gas or vapor is greatly increased and the solidity of the volume or mass is maintained with an uninterrupted flow, more equal combustion, and a more perfect incandescence, and consequently a steadier and better light.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. An attachment for gas or vapor burners, comprising a tube or nipple, and an inner conical ring having elongated lateral openings or spaces for the escape of gas or vapor against the inner surface of said nipple, the wider portion of the ring fitting the nipple snugly and the walls of said openings being beveled, substantially as described.

2. An attachment for gas or vapor burners, comprising a tube or nipple, and an inner conical ring closed at the top and having elongated lateral openings or spaces for the escape of gas or vapor against the inner surface of said nipple, the wider portion of the ring fitting the nipple snugly and the walls of said openings being beveled, substantially as described.

3. An attachment for gas or vapor burners, comprising a straight open-ended tube or nipple, an inner conical ring having vertically-elongated openings for the escape of gas or vapor against the inner surface of said nipple, and a deflector closing the upper end of the ring, the wider portion of the ring fitting the nipple snugly and the walls of said openings being beveled, substantially as described.

4. An attachment for gas or vapor burners, comprising a tube or nipple, and an inner conical ring closed at the top and provided with a depression or recess in the closure therefor, said ring also having elongated lateral openings the sides or walls of which are beveled, and the wider portion of the ring fitting the nipple snugly, substantially as described.

5. An attachment for gas or vapor burners,

comprising a straight open-ended tube or nipple, and an inner conical ring, with the wider portion thereof snugly fitting said tube and formed with pendent ribs and intervening spaces, the vertical adjacent sides of said ribs being beveled inwardly, substantially as described.

6. An attachment for gas or vapor burners, comprising a straight open-ended tube or nipple, and an inner conical ring closed at the top and formed with pendent inclined ribs and intervening spaces, the vertical adjacent sides of said ribs being beveled inwardly and the closure for the ring being provided with a conical recess or depression in its upper surface, substantially as described.

7. An attachment for gas or vapor burners, comprising a tube or nipple, an inner conical ring with its under portion slidably fitting said tube, said ring having openings or spaces at the sides for the escape of gas or vapor against the inner surface of the tube, and a deflector closing the upper end of the ring and pendent within the latter, said deflector having in its upper part a recess or cavity.

8. An attachment for gas or vapor burners, comprising a tube or nipple, an inner ring having openings or spaces at the sides for the escape of gas or vapor against the inner surface of said tube, and a conical or tapering deflector closing the ring and pendent therein.

9. An attachment for gas or vapor burners, comprising a tube or nipple, an inner ring having openings or spaces at the sides for the escape of gas or vapor against the inner surface of said tube, and a conical or tapering deflector closing the ring and pendent therein, said deflector having a conical recess or cavity.

10. An attachment for gas or vapor burners, comprising a tube or nipple, a removable inner ring fitting therein and having oblique openings or spaces at the sides for the escape of gas or vapor against the inner surface of said nipple, and a deflector fitting within said ring.

11. An attachment for gas or vapor burners, comprising a tube or nipple, an inner ring having openings or spaces at the sides thereof for the escape of gas against the inner surface of said nipple, and provided interiorly with a flange, and a deflector within the ring against said flange.

12. An attachment for gas or vapor burners, comprising a tube or nipple, an inner ring having oblique openings or spaces at the sides thereof, and provided interiorly with a flange, and a conical deflector fitting within the ring against the flange, said deflector closing the upper end of said ring.

13. An attachment for gas or vapor burners, comprising a tube or nipple, a conical ring fitted therein having side openings or spaces for the escape of gas or vapor against the inner surface of said nipple, and means for closing the upper end of the ring.

14. An attachment for gas or vapor burn-
ers comprising a tube or nipple, an inner con-
ical ring having oblique side openings or
spaces for escape of the gas or vapor against
5 the inner surface of said tube, and means for
closing the upper end of said ring, substan-
tially as described.
15. An attachment for gas or vapor burn-
ers comprising a tube or nipple, an inner con-
10 ical ring having elongated inclined and ob-
lique openings therein for escape of the gas or
vapor against the inner surface of said tube,
and means for closing the upper end of said
ring, substantially as described.
- 15 16. An attachment for gas or vapor burn-
ers, comprising a tube or nipple, a conical ring
therein having oblique openings or spaces in
its sides for the escape of gas against the
inner surface of said nipple, and a deflector
20 within the ring.
17. An attachment for gas or vapor burn-
ers, comprising a tube or nipple, and a conical
ring therein having a series of pendent fin-
gers or ribs forming side openings or spaces,
25 the sides of the said fingers or ribs being tan-
gential to the ring and the ribs themselves
being spirally disposed or circumferentially
inclined with respect thereto.
18. An attachment for gas or vapor burn-
30 ers, comprising a tube or nipple, a conical ring
therein having ribs or fingers forming open-
ings or spaces, the sides of which are tangen-
tial to the ring, said ribs being spirally ar-
ranged or inclined circumferentially, and a
deflector closing the upper end of the ring. 35
19. An attachment for gas or vapor burn-
ers, comprising a tube or nipple, a conical ring
therein having fingers forming side openings
or spaces of gradually-increasing width to-
ward the bottom, the sides of said openings 40
or spaces being tangential to the ring and
said fingers being spirally disposed or inclined
circumferentially, and means for closing the
upper end of the ring, said means having a
conical cavity or recess therein. 45
20. An attachment for gas or vapor burn-
ers, comprising a tube or nipple, a conical
ring closely fitting therein and constructed
circumferentially with pendent ribs or fingers
having intervening spaces, and tapering to- 50
ward their lower ends and beveled or tapered
inwardly at the sides, and a deflector closing
the upper end of the ring.
- In testimony whereof we affix our signa-
tures in presence of two witnesses.
- WILLIAM H. MILLER.
ROBERT W. MILLER.
- Witnesses:
LEWIS SASSE,
LEMUEL MARR.