

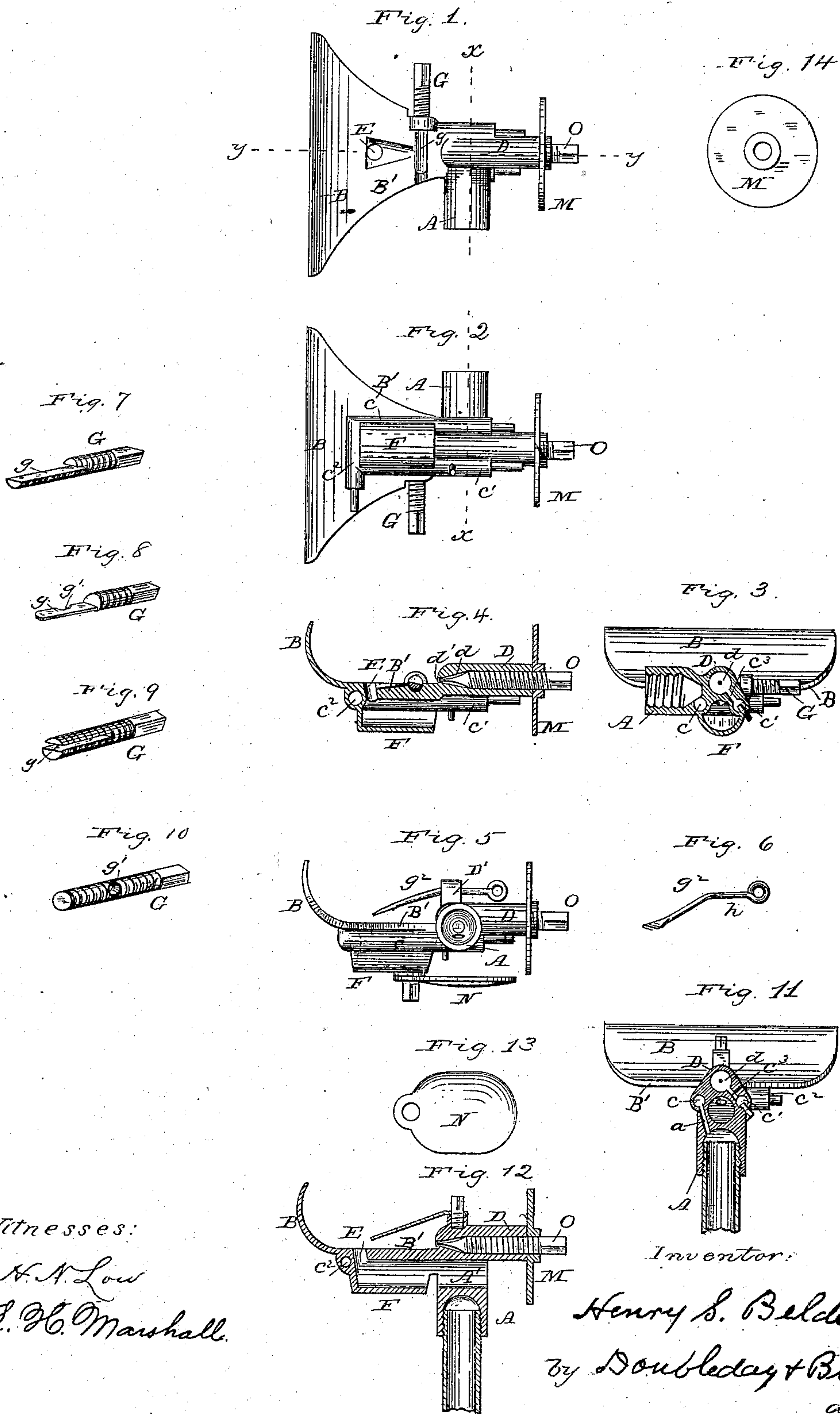
(No Model.)

H. S. BELDEN.

VAPOR BURNER.

No. 271,772.

Patented Feb. 6, 1883.



Witnesses:

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UNITED STATES PATENT OFFICE.

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VAPOR-BURNER.

SPECIFICATION forming part of Letters Patent No. 271,772, dated February 6, 1883.

Application filed April 10, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY S. BELDEN, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Vapor-Burners, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a top plan view of a vapor-burner embodying my improvements. Fig. 2 is a bottom plan view. Fig. 3 is a cross-section on the line *x x* of Figs. 1 and 2. Fig. 4 is a longitudinal section on line *y y*, Fig. 1. Fig. 5 is a side elevation of a similar burner, except that it has a modified form of jet-directing device, and shows also a supplemental or continuing sub-jet plate. Fig. 6 is a view of the directing device in Fig. 5, detached. Fig. 7 is a perspective of the jet-directing device detached, shown in Figs. 1, 2, 3, and 4. Figs. 8, 9, and 10 are other forms of the jet-directing device adapted to be mounted as is that in the last said figures. Fig. 11 is a cross-section, and Fig. 12 a longitudinal section, of a slightly-modified form of a burner. Fig. 13 is a plan view of the sub-jet continuing-plate. Fig. 14 is a face view of the stop-plate for the sub-heater, detached.

This invention pertains to improvements in vapor-burners for the past known as "plate-burners"—that is, burners having a plate which receives the impact of the jet of vapor and spreads and suitably shapes it to form a proper illuminating-flame.

The invention relates to devices whereby I can utilize to a greater extent than has heretofore been possible the heat which is generated by the main orifice. I accomplish this by constructing a plate in such a manner that it shall have one or more conduits or passages in the metal of which it is formed, and arranged to cause the vapor to travel in a broken path before it reaches the duct which leads to the valve-chamber. While the material is passing through the said passage or passages it has applied thereto the heat resulting from the combustion of the vapor to a greater degree than is possible with plate-burners as they have been heretofore constructed.

The invention relates, also, to a peculiar con-

struction of parts which permits a portion of the vapor to be carried downward, so that it can be ignited under the plate for the purpose of generating a more intense vaporizing-heat than can be obtained from the illuminating-jet alone. This heating-jet is arranged to play upon the passage or passages of supply, including not only the ducts in the plate, but also, if desired, that part of the burner from which the illuminating-jet issues, and that part through which the gas or liquid is introduced into the burner, so that there results a perfect vaporization of the illuminating material.

The invention relates, further, to a peculiar means whereby the jet which issues from the orifice can be regulated so as to throw it up or down relatively to the spreading-plate, or thrown or moved laterally relatively thereto and relatively to the passage through which the heating-jet passes.

The invention relates, also, to a device for continuing or extending the sub-jet or heating-jet. This device is arranged to protect and extend the length and useful heat of the sub-jet or supplemental heater, and serves to carry it forward to any desired point under the burner. It is made detachable and adjustable.

The invention relates, also, to various other matters, which will be fully set forth in detail in the following specific description.

In the drawings I have shown some of the forms of burner and parts thereof in which my improvements may be embodied. However, upon the examination of these, and of the following description, it will readily be seen that the essential features of the invention may be employed in burners having forms in some respects different from those specifically shown.

Referring to Figs. 1, 2, and 3, A represents a feed-pipe or portion of a pipe or socket adapted to receive the end of the supply-pipe, extending from any suitable reservoir. As shown in these figures, it is arranged to extend laterally from the other parts; but, if preferred, it may be arranged perpendicularly thereto, as shown in Figs. 12 and 13.

B B' represent the deflecting-plate, in which are formed (either by drilling, coring, or oth-

erwise) longitudinal passages, such as shown at c and c' , and lateral or transverse passages, as at c^2 , with suitable ducts, as at c^3 , to permit communication with the jet orifice or orifices. As shown, the lateral or transverse passage c^2 connects the longitudinal passages c and c' at their ends. The passage c communicates at one end with the supply pipe or socket A. The material which is to be ignited passes inward through the pipe or socket A into one end of the passage c , along said passage to the other end, thence to the passage c^2 , thence to the passage c' , and thence through the duct c^3 into the chamber d , and from there it issues at the jet-orifice d' . There are thus provided for the illuminating material indirect passages through the metal of which the plate is composed, which passages cause the material to follow a broken or interrupted path, whereby a very high volatilization can be produced. When the jet from orifice d' reaches the upwardly-turned portion B of the deflecting-plate B B' it is thrown upward, and if ignited there will be produced a vertical or upwardly-inclined flame, which will continue as long as the vapor is supplied. The heat from this flame is to a great extent transmitted to the passages through which the oil or vapor passes, the amount thus saved by conduction being much greater than can be utilized by the other plate-burners with which I am acquainted. To assist still further in effecting a perfect combustion, I conduct a portion of the jet of vapor downward to a point below the plate and ignite it, so that a flame is produced in immediate contact with the indirect passages or vaporizing-chambers. E is the duct through which this heating-vapor passes. It is received upon the under side within a chamber, shield, or conductor, F, which carries it back to the point where it is desired to produce a flame against or below the vaporizing-chamber and the main jet-orifice.

Instead of the partially-inclosed shield shown, use may be made of a plate whereby some of the advantages can be secured.

M represents a stop-plate situated in such position as to have the sub-heating-flame strike against it and guide said flame, and also conduct the heat from it upward to the metallic parts above, especially to the metal in which the needle-valve is mounted when such valve is used. A valve of this character is shown and indicated by O. Upon it the stop-plate M is supported, the stop being brought back to such point on the valve as to serve to prevent the valve from being driven in too far.

N is a plate secured to the under side of the burner below the heating-jet chamber or shield F. Preferably it is somewhat hollowed or dish-shaped, so that it can catch any oil that may overflow. It serves to extend or continue the jet-chamber or shield, and by it the flame can be carried to any desired point.

With the parts of the burner above described the peculiarly constructed jet-directing device

which I have shown may be combined. It consists of an adjustable piece lying partially in the path of the jet, or near it, as it escapes from the orifice. The one shown in Figs. 1 and 7 has a deflecting-surface, g , situated so that the jet can be caused to impinge upon it and be thrown upward or downward more or less, as occasion may require. A lateral adjustment can be effected by having a metallic guide on the side or sides of the jet and moving it transversely to the path of the jet. Thus in Figs. 8 and 10 a jet-director is shown having a lateral as well as a vertical guide, the lateral movement in the one shown in Fig. 8 being caused by an indentation, g' , and in Fig. 10 by an aperture through the rotating or rocking piece G. In Fig. 9 one is shown having a slot or elongated aperture, by which the same results can be accomplished. The one in Figs. 5 and 6 consists of a bent or curved piece of wire or metal strip, g^2 , mounted somewhat loosely in an ear, D', on the top of part D. The part h can slide longitudinally to vary vertically the point of impact of the jet, and can be rocked or oscillated to throw it in any desired direction laterally.

The jet-orifice d' is preferably controlled by a needle-valve, O, of any of the well-known constructions, though other valves can be employed, if desired; or a valve may be dispensed with at this point, and a suitable cut-off or regulating mechanism can be combined with the supply-pipe at any preferred point.

I do not in this application claim any of the matters set forth in the claims forming part of Patent No. 263,840, dated September 5, 1882; nor do I claim anything but what is specifically set forth in the following claims, reserving to myself the right to claim other patentable matters which I have herein shown in another application which I am about to file.

I do not limit myself to the exact arrangement of the indirect passages which I have shown, as they may be made more numerous or be put in different situations without departing from the spirit of my invention, if a broken or circuitous path be provided between the point where the oil enters the burner and the point where it enters the orifice-chamber, or the duct which leads into said chamber. When the feed-pipe is arranged perpendicularly to the plane of the plate and other parts, as shown in Figs. 12 and 13, I prefer to provide an aperture, A', therein, which serves as an elongation of the heating-jet chamber F, to carry the heating-jet outward against the stop-piece M. In this case a comparatively short duct, a , is formed, extending from the supply-pipe A to the duct c .

The stop-plate M is preferably circular, as shown in Fig. 14, so that in whatever position the valve-screw may be there will be a portion of the plate in proximity to the heating-jet.

The jet director or spreader shown in Fig. 12 is of a form now well known, it consisting of a piece of wire or metal secured above the

jet-orifice and extending downward toward the spreading-plate and into the path of the jet.

What I claim is—

1. In a vapor-burner, a needle-orifice for the escape of vapor under pressure, a plate having the part B across the path of the jet, and the part B' for conducting heat back from the part B, said part B' having a passage transverse to the jet-path for the admission of vapor, and passages therein transverse to the last aforesaid passage for causing the vapor to take an indirect path, and a duct which receives a portion of the vapor that escapes from the needle-orifice and directs it against the said indirect passages for producing a heat against them supplemental to the heat conducted backward from the illuminating-flame by the part B', substantially as set forth.

2. In a vapor-burner, a needle-orifice, a deflecting and heating plate having the curved part B across the path of the jet that escapes from said orifice, and the part B', integral with the part B, to conduct heat back from the illuminating-flame, and having a passage transverse to the jet-path for admitting the vapor and passages transverse to the last aforesaid passage and communicating therewith, devices which arrest a portion of the vapor after it escapes into the open air, a duct for carrying the arrested portion below the part B' of the plate to form a flame to provide a heat supplemental to that conducted back from the illuminating-flame, and the stop M, arranged to be impinged upon by said supplemental heating-flame, substantially as set forth.

3. The combination, in a vapor-burner having a needle-orifice, of a deflecting and heating plate having the curved part B across the path of the jet that escapes from said orifice, and the part B', integral with the part B, to conduct heat back from the illuminating-flame, and having a passage transverse to the jet-path for admitting the vapor, and passages transverse to the last aforesaid passage and communicating therewith, the part D on the concave side of the plate having a longitudinal valve-chamber communicating with the indirect passages in said curved deflecting and heating plate, substantially as set forth.

4. The combination, in a vapor-burner having a needle-orifice, of a deflecting and heating plate having the curved part B across the path of the jet that escapes from said orifice, and the part B', integral with the part B, to conduct heat back from the illuminating-flame and having a passage transverse to the jet-path for admitting the vapor, and also passages in the body of the part B' transverse to the last aforesaid passage and communicating therewith to form an indirect heating-conduit in the plate, a passage through the curved deflecting and heating plate for conducting a heating-jet from the concave to the convex side, devices which arrest a portion of the vapor after it escapes into the open air and conduct it through the last said passage in the plate, and a return conducting tube or passage, F, which receives the arrested portion of the vapor and guides it backward to form a supplemental heating-flame, substantially as set forth.

5. In a plate-burner, the adjustable stop or shield N, in combination with the valve-screw which regulates the main jet-orifice and the sub-heater, substantially as set forth.

6. In a plate vapor-burner, a plate having a portion adapted to form an illuminating-jet, and an adjustable device supported in front of the jet-orifice and adapted to throw the jet up or down upon the deflecting-plate, substantially as set forth.

7. In a plate vapor-burner, a plate arranged to deflect the illuminating-jet, and an adjusting device supported in front of the jet-orifice and adapted to vary laterally the path toward the plate, substantially as set forth.

8. In a plate vapor-burner, a plate arranged to deflect the illuminating-jet, and a jet-deflector arranged to be moved laterally and also vertically, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY S. BELDEN.

Witnesses:

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J. S. BARKER.