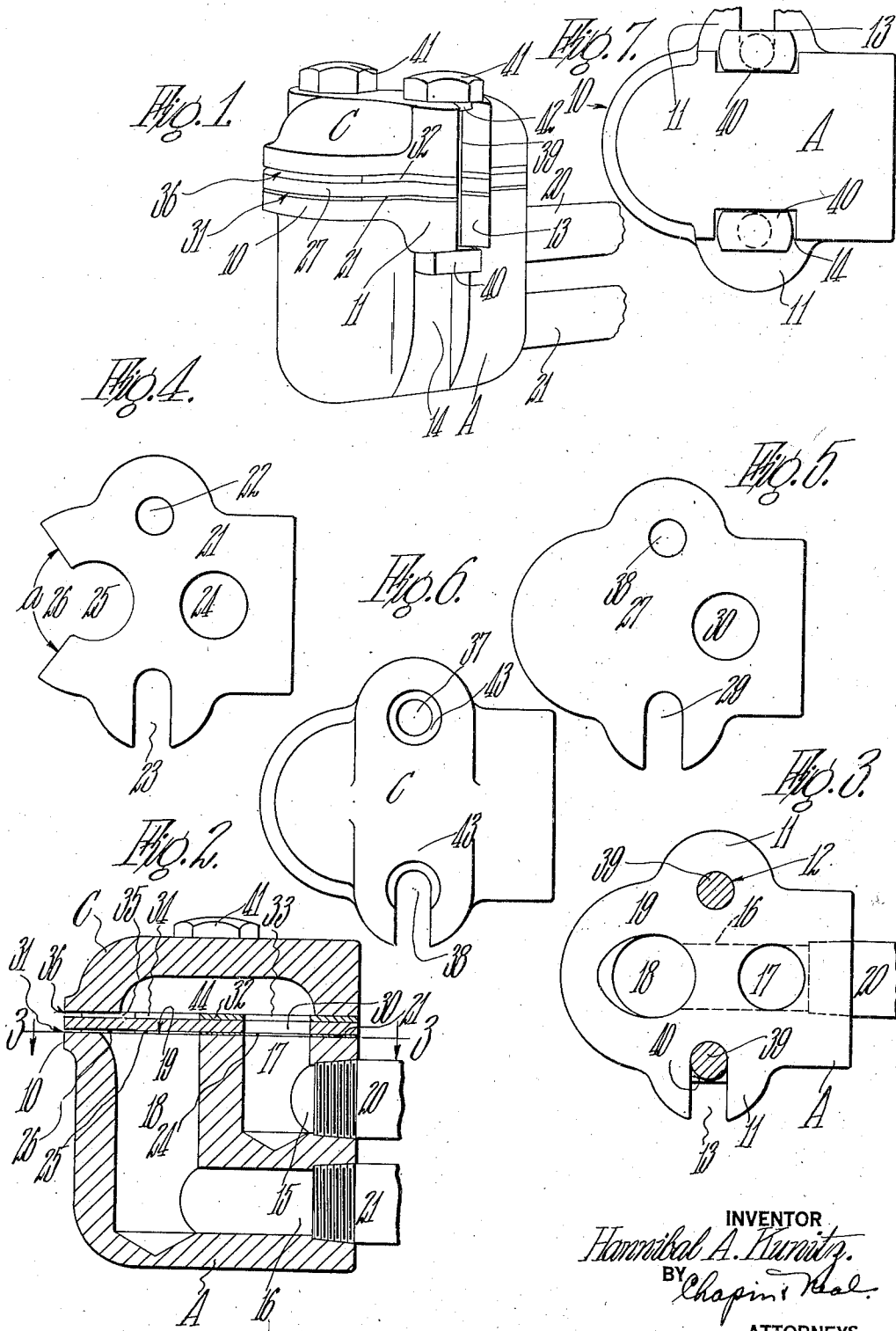


H. A. KUNITZ.
 ATOMIZING BURNER.
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ATOMIZING-BURNER.

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To all whom it may concern:

Be it known that I, HANNIBAL A. KUNITZ, born in Tunis of a German father and French mother and not positively knowing of what citizenship I am, but having formally declared my intention of becoming a citizen of the United States in accordance with the United States naturalization laws and having diligently prosecuted my application for United States citizenship to date, and now residing at Springfield, in the county of Hampden and State of Massachusetts, United States of America, have invented certain new and useful Improvements in Atomizing-Burners, of which the following is a specification.

This invention relates to improvements in burners and, more particularly, to that class of burners wherein the atomization of fuel occurs outside the burner itself. While the invention is capable of general application, it finds one advantageous use as a burner for liquid fuel, such as oil, which is atomized by mingling with a suitable fluid, such as steam or air for example.

The object of the invention is to provide a burner built up of two members, such as a body and cap, with removable plates therebetween which cooperate with the cap and body to form the nozzles of the burner.

According to this object, the removable plates control the thickness and width of the nozzles as well as the angle of the mouth of the nozzle, while the body and cap have no effect on the characteristics of the nozzles. Thus, the body and cap may be standardized and used under all conditions while the removable plates may be changed or other plates substituted to provide just the desired characteristics to meet the varying conditions of each burner installation, as encountered.

Another object of the invention is to provide in a burner of the type described, improved means for removably securing the plates, caps and body together, to the end that the plates may be rendered conveniently accessible for inspection or cleaning and removed with convenience when desired.

Another object of the invention is to provide a burner of specifically improved construction.

Other objects and advantages will appear in the following description and in the illus-

trative embodiment of the invention in the accompanying drawings, in which:

Figure 1 is a perspective view of a burner embodying the invention;

Fig. 2 is a sectional elevational view thereof.

Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 2;

Figs. 4 and 5 are plan views of the removable plates of the burner;

Fig. 6 is a plan view of the cap of the burner; and

Fig. 7 is a bottom plan view of the burner.

Referring to these drawings, the burner includes a base or body portion, a series of recessed nozzle forming plates and a cap member, all such elements being clamped together, preferably in a manner to permit them to be readily and conveniently separated.

The body portion, indicated at A, may be advantageously formed by casting. As shown, its forward end is substantially semi-circular in plan and is capped by a semi-circular rim or flange 10. On opposite sides of the body A, and located near the top thereof, ears 11 are formed, one of these being provided with a vertical hole 12 there-through and the other with a slot 13. Beneath the ears 11, the body A is so formed as to afford two oppositely disposed channels the purpose of which will later appear. The body is provided with upper and lower horizontal passages 15 and 16 respectively, which extend from the rear face of the body A part way into the interior. The passages 15 and 16 connect at their inner ends with the lower ends of vertical passages 17 and 18 respectively, which extend to the top face 19 of body A. The passages 15 and 16 are adapted for connection to supply pipes 20 and 21, which are generally used for oil and steam or oil and air, respectively.

Upon the top face 19 of body A are superimposed several plates. One of these plates 21, as shown in Fig. 4, is formed to conform generally to the contour of the top face 19 and has a hole 22 and slot 23 for registration with the hole 12 and slot 13 in body A. In addition, plate 21 has a hole 24 for registration with passage 17 and an opening 25 for registration with passage 13. The plate 21 however, has its forward edge cut away to form a recess 26 which is gen-

erally although not necessarily fan shaped and communicates with opening 25 and diverges outwardly therefrom.

The plate 21 rests directly upon the top face 19 of body A and upon plate 21 is a second plate 27 which is provided, as is plate 21, with a hole 28 and slot 29, to register with holes 22 and slot 23, and with a hole 30 to register with the hole 24. No hole is provided to register with opening 25 and the contour of plate 27 conforms exactly with that of flange 10 so that the plate overlies and blanks off the opening 25 and recess 26 leaving a nozzle 31 for the emission of steam.

A third plate 32 is applied upon the plate 27 and is constructed exactly as is the plate 21. Plate 32 has a hole 33 to register with hole 30 and an opening 34, which communicates with a recess 35, preferably an outwardly diverging one as shown, and likewise has a hole and slot for registration with hole 28 and slot 29, respectively. The recess 35, is closed at its top by the cap member C of the burner, thus leaving a nozzle 36 for the emission of oil.

The cap C, as shown in Fig. 6, is formed to conform to the contour of the upper face 19 of the body A. The cap has ears, similar to the ears 11 of the body, and one of such ears has a hole 37 and the other a slot 38 to overlie and register with the holes 12, 22, and 28 and the slots 12, 23 and 29 respectively. A bolt 39, having a substantially rectangular head 40 to fit in one of the channels 14 as shown in Figs. 1 and 7, is passed through all the registering holes 12, 22, 28, the corresponding hole in plate 32, and hole 37 and a nut 41 on bolt 31 engages cap C to clamp the members A, 21, 27, 32 and C together. A similarly constructed bolt 39 likewise is slipped into the registering slots 13, 23, 29, the slot in plate 32 and 23, and a nut 41 acts to clamp the body, cap and plates together. Both nuts are formed with a short cylindrical portion 42 (Fig. 1) and the cap C is counterbored, as at 43, to receive the portions 42. The engagement of the latter in the counterbores 43 serves to center the bolts 39 and particularly that bolt 39 which lies in the several registering slots. Moreover, as to the last named bolt, the engagement of the portion 42 in counterbore 43 prevents the bolt from being dislodged from the slots even if its nut 41 should loosen slightly. The cap C, which may advantageously be formed by casting, is provided with a recess 44 in its lower face by means of which communication is established between the hole 33 and opening 25 in plate 21.

In operation, the oil, entering through pipe 20, travels through passages 15 and 17 to, and through, the several registering holes in plates 21, 27 and 32 and into the

recess 44, from which it enters the opening 34 and is discharged in a fan shaped generally outwardly diverging sheet through the nozzle 36. Steam or air, entering through pipe 21, travels through passages 16 and 18 into the opening 25 and thence discharges in a generally fan shaped outwardly diverging sheet from the nozzle 31. The sheets of oil and steam are discharged horizontally outward in close proximity and the oil falls into the steam and is atomized thereby.

An important feature of the invention resides in the manner of building up the burner by the use of plates, such as the plates 21, 27 and 32. These plates, which are comparatively inexpensive to produce and may even be stamped out in a punch press, if desired, may be varied within relatively wide limits to meet varying conditions. For one thing, the thickness of the plates may be varied. Thus, the effective cross sectional area of the nozzles 31 and 36 may be varied by varying the thickness of plates 21 and 32, respectively. As shown, the oil plate 32 is thicker than the steam plate 21 but if more steam is needed for atomization of the oil the plate 21 can readily be replaced by a similar one of increased thickness. Moreover, the spacing of the two nozzles may be varied by providing spacing plates 27 of varying thicknesses. For another thing, the angle α (Fig. 4) of the nozzle may readily be changed by providing substitute plates. With the described construction, the manufacturer can standardize his burner equipment. That is, only one type of body A and cap C need be kept in stock and the plates, the relatively inexpensive elements, may be provided in various thicknesses and with varying angles α .

With this equipment practically every condition ordinarily encountered may readily be met. Again, it frequently requires some little experimentation to best meet the conditions of each various installation. With a burner of the present type, changes can readily be made as necessary. For example, one in installing the burner may be supplied with a variety of plates of different thicknesses and having different angles α . Then the vital characteristics of the burner, as the angle and cross sectional area of the nozzles may be varied until the desired results are obtained.

The substitution of the various plates is made with convenience and rapidity, due to the manner of fastening the parts together. Only two bolts are employed and one is quickly removable after its nut 41 has been loosened by reason of the slotted ears in the body, cap and plates. Again, an important factor is that both supply pipes are connected to the body A, rather than one to the

body and the other to cap C. Thus, cap C is readily removable at all times without disturbing the piping. The construction described is also important since it permits quick and convenient access to the burner parts for inspection and cleaning. For such purposes, only one bolt 39 need be withdrawn, and this one is quickly removable by reason of the slotted ears. Then all the elements of the burner pivot about the remaining bolt, which need be but slightly loosened to permit each element of the burner to be moved about it. Thus, access to each of the several elements of the burner may be conveniently obtained.

The invention has been disclosed herein, in an embodiment at present preferred, for illustrative purposes but the scope of the invention is defined by the appended claims rather than by the foregoing description.

What I claim is—

1. In a burner having a body portion provided with inlets for fuel and an atomizing fluid formed therein and lying in a single plane, a cap provided with a recess the longitudinal axis of which is located in the same plane as the plane of the inlet passages, a spacing plate between the body and cap, nozzle-plates of similar construction located upon opposite sides of said spacing plate and each provided with a recess formed in one edge thereof and extending inwardly into communication with one of said inlet passages and said recess in the cap, respectively, said nozzle-plates and spacing plate each being provided with openings formed therein in communication with the opposite end of said recess in the cap plate from that with which the recess in the edge of one of said nozzle-plates communicates whereby the recess in the cap plate may be in constant communication with one of said inlet passages, and means for securing the body and cap together with said plates clamped therebetween.

2. In a burner having a body portion provided with inlets formed therein and lying in a single plane for fuel and an atomizing fluid, a cap provided with a recess the longitudinal axis of which is located in the same plane as the plane of the inlet passages, a spacing plate between the body and cap, a pair of nozzle-plates of similar construction but of different thickness located upon opposite sides of said spacing plate and each provided with a recess formed in one edge

thereof and extending inwardly into communication with one of said inlet passages and said recess in the cap, respectively, said nozzle-plates and spacing plate being each provided with openings formed therein in communication with the opposite end of said recess in the cap plate from that with which the recess in the edge of one of said nozzle-plates communicates, whereby the recess in the cap plate may be in constant communication with the inlet passage opposite that which communicates directly with the recess in the other nozzle-plate, and bolts located upon opposite sides of the plane of said inlet passages for securing the body and cap together with the said plates clamped therebetween.

3. In a burner, having a body with inlets for fuel and an atomizing fluid, a cap and nozzle forming and spacing plates between the cap and body; means for removably securing the cap, body and plates together, said means comprising, a pivot bolt passing through registering holes in the cap, plates and body portion, and a second bolt passing through and withdrawable laterally from registering slots in said body, cap and plates.

4. In a burner, having a body with inlets for fuel and an atomizing fluid, a cap and nozzle forming and spacing plates between the cap and body; means for removably securing the cap, body and plates together, said means comprising a bolt on each of the two opposite sides of the burner and passing through registering openings in the body cap and plates, and a nut for each bolt, said body having channels therein and said bolts having rectangular heads to fit in said channels.

5. In a burner, having a body with inlets for fuel and an atomizing fluid, a cap and nozzle forming and spacing plates between the cap and body; means for removably securing the cap, body and plates together, said means comprising, a pivot bolt passing through registering holes in the cap, plates and body portion, and a second bolt passing through and withdrawable laterally from registering slots in said body, cap and plates, and nuts for said bolts to engage said cap, the nut for said second bolt having a cylindrical lower portion and said cap having a recess larger than the width of said slot to receive said portion.

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