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BURNER

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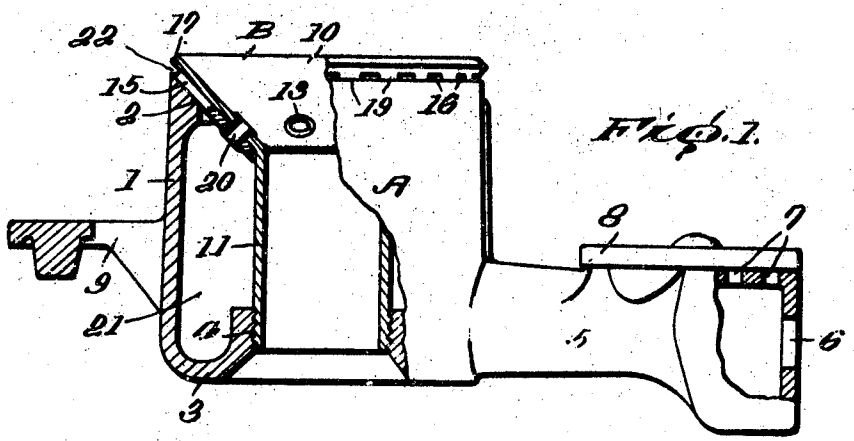


FIG. 1.

FIG. 2.

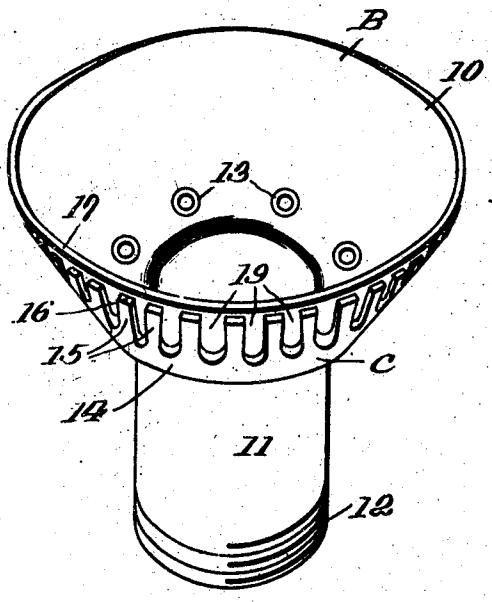
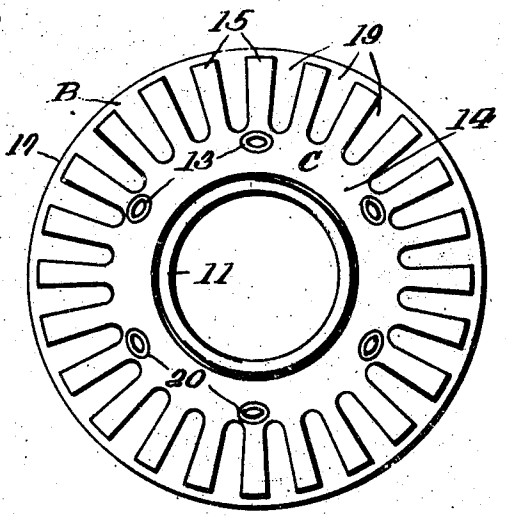


FIG. 3.



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BURNER

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Application July 14, 1941, Serial No. 402,376

4 Claims. (Cl. 158—116)

This invention pertains to a burner and more particularly to a gaseous fuel burner having a heavy main body portion and a comparatively thin burner cap.

The primary object of the invention is the provision of a burner of the type mentioned which is simple and cheap of manufacture yet highly efficient in operation.

A further object is that of providing a laminated burner cap to provide for convenience in the production of burners capable of efficiently operating on different types of gas.

A still further object of the invention is the provision of novel and improved means for securing the parts of the burner cap together to provide burner ports having a depth greater than the combined thickness of the parts comprising the cap.

A still further object of the invention is the provision of a burner having a stamped or die-formed steel burner head.

A still further object is that of providing a two-part burner cap made in a manner to permit treatment of the complete portions making up the cap to protect said portions against rust and corrosion.

Other objects, novel features of construction and improved results will appear from the following description when read in the light of the accompanying drawing.

In the drawing:

Figure 1 is a side view of the burner with a portion of the view broken away and shown in vertical section.

Fig. 2 is a top perspective view of the burner cap.

Fig. 3 is a bottom plan view of the burner cap.

The present burner is designed to burn a gaseous fuel and constitutes an improvement upon and has advantages over, as will be hereinafter specifically pointed out, burners of the same general type such as that disclosed in the A. Stockstrom et al. Patent No. 1,714,409 of May 21, 1929, and the H. Moecker, Jr., Patent No. 2,009,271 of July 25, 1935.

The burner, described broadly, comprises a main burner portion A, a burner cap B and a sub or secondary burner cap C.

In detail the main burner portion A has a circular or tubular portion defined by a wall 1. This tubular or circular portion constitutes an open ended housing. At the upper open end the wall 1 has its upper surface beveled as at 2 while the lower end of the wall 1 extends inwardly and upwardly as at 3 to form the opening at the bottom end of the housing which opening is internally threaded as at 4. At one side and adjacent its bottom the housing is provided with a manifold 5 which serves as a conduit for the admission of an air-gas mixture into the housing. This manifold is made of the proper size, length and configuration to meet the specific requirements to which the burner is to be adapted and in its outer end is provided with an opening 6 for the reception of the nozzle or jet of a fuel supply pipe and at its top adjacent its outer end is provided with a plurality of secondary air inlet openings 7 the size of which is under the control of a movable shutter 8.

At one of its other sides the burner housing is provided with an arm or bracket 9 which may be of any desired construction and serves as a means of accurately positioning and assisting to support the burner in proper position for operation in the stove or range of which the burner is a part.

Preferably, though not necessarily, the main burner housing is composed of cast iron but in any event whatever metal is used the walls of the housing, and particularly the upper end of the wall 1, should be of considerable thickness as it is desirable that the inclined or oblique face 2 be of considerable width. A cast iron construction is the most conventional and can be provided cheaply.

The burner cap B is of a funnel-like shape and as a consequence has an upper conical shaped end 10 from the lower extremity of which extends the pipe or conduit-like portion 11 which corresponds to the similar portion found in a funnel. The lower end of the conduit 11 is exteriorly threaded as at 12 and the diameter of the conduit is such as to coincide with the opening in the lower end of the main burner housing so that the threads 12 will threadedly engage the threads 4 of said housing opening. The angle of inclination of the flare of the upper conical end of the cap is identical to the angle of inclination of the beveled upper end 2 of the wall 1 of the main burner housing. This main burner cap is composed of a comparatively thin gauge of sheet metal, steel preferably, which is die stamped or in some other suitable like cheap manner formed into the desired aforesaid configuration. At a point well below its upper end and in aligned spaced relationship throughout its circumference the conical portion 10 of the cap is drilled or punched to provide a series of openings 13 which are to form burner ports, as will hereinafter appear, and these openings are disposed at an inclination to the surface of the conical portion of

the cap through which they extend and preferably the openings extend at substantially a right angle to the inclination of the surface through which they extend and therefore at approximately a right angle to the face of the beveled upper end 2 of the main burner housing.

The sub or secondary burner cap C is also made of sheet metal, preferably steel, and similarly die-stamped or in like cheap and easy manner formed into the desired and necessary configuration. This secondary cap is generally of a conical form and of the proper dimensions to fit snugly against the under side of the conical portion 10 of the main burner cap B. It comprises what might be termed a ring portion 14 which is at its bottom end and from the upper end of which in separated parallel relation throughout its circumference extend a plurality of finger-like portions 15 the upper ends 16 of which preferably terminate short of the upper peripheral edge 17 of the main burner cap B.

The sub cap C is drilled or punched to provide openings which will register with the openings 13 of the main cap and the sub cap is secured in position on the under side of the main cap and in tight abutting relationship therewith by hollow rivets 20 one of which extends through each of said aligned openings.

When assembled it will be readily apparent by reference to Fig. 1 of the drawing that the cap forms within the main burner portion a large fuel reception chamber 21 and that when the cap is rotated into final and proper position upon the main burner the fingers 15 of the sub cap are in abutment with the beveled upper end 2 of the main burner housing and that fuel within the chamber 21 can and will escape upwardly and outwardly from said chamber through the spaces 19 between the fingers so that the fuel can be ignited and burn as a peripheral ring flame at the point 22 throughout the circumference of the upper end of the cap. Fuel will also pass through the hollow rivets 20 and burn in a series of convergently directed flames from the ports or openings 13.

Prior to assembly and attachment of the main and sub burner caps to one another these elements are suitably treated or coated to prevent them from rusting or corroding. The particular treatment of these parts to render them resistant to rust and corrosion can be of varying natures. They might for instance both be electro-plated with a suitable resistant material, such as for instance chrome or one or both of them could be enameled. Whatever the particular treatment given separately to these parts prior to their attachment to one another is of no particular moment other than to assure that they are rendered resistant to rust and corrosive action. Making the cap in laminated form and securing the parts thereof together with hollow rivets has several advantages both from the manufacturing standpoint, which it simplifies and cheapens, and from the standpoint of operation of the burner and the life thereof.

In order that a burner orifice function properly it is necessary that the burner ports have considerable depth and this the ports 13 might very well not have when thin gauges of metal are used if means other than the hollow rivets within the ports were substitutes as a means of securing the cap portions together. As an example, if the cap portions were welded together the additional depth given to the ports by the hollow rivets would be lost and the ports with a thin cap could very well be of insufficient depth to function properly. Additionally it is highly desirable to treat the abutting surfaces of the main and sub cap to make them resistant to rust and corrision and this advantage would be lost were the two cap portions welded together because it is absolutely necessary that the surfaces be clean metal in order that a satisfactory weld between them be obtained. Still further this particular manner of securing the two-part cap together is extremely simple and cheap and simplifies the fabrication of the cap and thus keeps the cost of manufacture to a minimum.

Provision of a two-part sheet metal cap has definite advantages from the manufacturing standpoint by reason of the fact that the provision of a burner which will satisfactorily burn all types of gas is necessary and this requires burners having ports of different sizes, or as is commonly referred to, ports of different areas. Burners of this type must be provided to operate satisfactorily with natural gas; manufactured gas and the so-called bottled or synthetic gases such as those widely sold under the various trade names such as "Pyrofax" and "Philgas." This requires that burners having different port areas be provided and a burner to accommodate and properly operate with these different types of gases can cheaply and conveniently be produced in the present instance by merely substituting sub burner caps of different thicknesses or gauges of material. It is believed that sub caps in gauges of material between #13 and #18 would be sufficient to provide burners having the necessary variables of proper area to take care of different types of gas, it being obvious that as the thickness of metal of the sub cap is increased the port area or space between the fingers or tongues 15 of the sub cap will be increased and the depth of the interior burner ports or orifices 13 will be increased.

Furthermore by die forming the sub cap C accuracy in proper sizes and areas will be assured.

The advantages enumerated are not present in the aforementioned Stockstrom et al. and Moecker patents nor to our knowledge in any patent or burner either patented or unpatented. As respects the Stockstrom et al. patent specifically this patent has a burner cap composed of a material having a melting point below that of the gas flame burned by the burner and as a result these caps will on occasion melt due either to the burner flashing back at the burner port or orifice and continuing to burn inside of the burner housing and at the under side of the cap, or by reason of lack of adequate heat transference contact between the cap and the main burner housing which is occasioned when a user of the burner has removed the cap for cleaning or some other purpose and has replaced it improperly with the result that said heat contact is not made and with the further possibility of said improper replacement causing the gas to burn inside of the burner housing and beneath the cap. The foregoing disadvantages of a burner having a cap composed of a material having a melting point below that of the flame burned by the burner is overcome with the present steel cap burner.

The present laminated cap has a further advantage in that a cap of sufficient thickness is provided yet in the production of said cap the thickness of material is kept sufficiently low as

to not render the stamping or die forming of said cap either difficult, expensive or impractical.

From the foregoing it will therefore be seen that we have provided a gaseous fuel burner which is extremely simple and cheap of production and fabrication yet highly efficient in use. A burner having a cap which can be conveniently treated in a variety of finishes to make it resistant to corrosion and rust and a burner which can conveniently and cheaply be provided with a minimum of alteration to accommodate and correctly and properly burn various types of gases.

The pipe or conduit 11 acts as a feeder of secondary air to the inner burner port 13 and the passage of air through this conduit and over the conical cap assists in keeping down the temperature of the cap during the operation of the burner.

The lower or inner ends of the passageways between the fingers or tongues 15 are in unobstructed communication with the fuel chamber 21 by reason of the fingers being of a length to extend inwardly and downwardly beyond the inner face of the burner housing wall 1.

Inasmuch as changes and alterations in the specific construction of a burner embodying the present inventive concept can be made without departing from the spirit of the invention the invention is to be limited only within the scope of the hereinafter appended claims.

We claim:

1. An improved gas burner comprising, a housing having a circular open upper end, the top edge of said housing being inclined upwardly and outwardly, a main truncated cone-shaped cap having an upwardly and outwardly extending surface inclined at the same degree throughout its entirety as the degree of inclination of the upper edge of said housing, a cone-shaped sub-cap having open upper and lower ends, said sub-cap fitting over and being secured to the under side of said main cap, said sub-cap being provided with a plurality of closely arranged narrow fingers extending radially upwardly and outwardly, the degree of inclination of said sub-cap and fingers being the same as that of the main cap and the upper inclined end of said housing, means to secure said cap and sub-cap in place upon the upper end of said housing, the upper ends of said fingers being in engagement with the tapered upper edge of said housing but terminating short of the outer side of said housing upper edge, the lower ends of said fingers extending inwardly beyond the inner side of the upper edge of said housing and within said housing, and means securing said sub-cap to said main cap extending through both of said caps adjacent the lower edges thereof and providing a plurality of fuel passageways in spaced relation circumferentially of said caps.

2. An improved gas burner comprising, a housing having a circular open upper end, the top edge of said housing being inclined upwardly and outwardly, a main truncated cone-shaped cap having an upwardly and outwardly extending surface inclined at the same degree throughout its entirety as the degree of inclination of the upper edge of said housing, a cone-shaped sub-cap having open upper and lower ends, said sub-cap fitting over and being secured to the under side of said main cap, said sub-cap being provided with a plurality of closely arranged narrow fingers extending radially upwardly and outwardly, the degree of inclination of said sub-cap and fingers being the same as that of the main cap and the upper inclined end of said housing, means to secure said main cap and sub-cap in place upon the upper edge of said housing, the upper ends of said fingers being in abutment with the upper face of the inclined upper edge of said housing, the lower ends of said fingers being disposed within said housing, and a plurality of hollow rivets extending through and arranged in spaced relationship circumferential of the lower ends of said caps for securing said caps together and providing fuel passageways from said housing for supporting flames at the outer ends of said rivets.

3. An improved gas burner comprising, a housing having an open upper end, the top edge of said housing being inclined upwardly and outwardly, a main truncated cone-shaped cap having at its upper end an upwardly and outwardly extending surface inclined at the same degree as the degree of inclination of the upper edge of said housing, a cone-shaped sub-cap having open upper and lower ends, said sub-cap fitting over and being secured to the under side of said main cap, said sub-cap being provided with a plurality of spaced fingers extending radially upwardly and outwardly, the degree of inclination of said sub-cap and fingers being the same as that of the upper end of the main cap and the upper inclined end of said housing, means to secure said cap and sub-cap in place upon the upper end of said housing, the upper ends of said fingers being in engagement with the inclined upper edge of said housing, the lower ends of said fingers extending inwardly beyond the inner side of the upper edge of said housing and within said housing, and means securing said sub-cap to said main cap extending through both of said caps and providing a plurality of fuel passageways from said housing in spaced relation circumferentially of said caps.

4. An improved gas burner comprising, a housing having an open upper end, the top edge of said housing being inclined upwardly and outwardly, a main truncated cone-shaped cap having at its upper end an upwardly and outwardly extending surface inclined at the same degree as the degree of inclination of the upper edge of said housing, a cone-shaped sub-cap having open upper and lower ends, said sub-cap fitting over and being secured to the under side of said main cap, said sub-cap being provided with a plurality of spaced fingers extending radially upwardly and outwardly, the degree of inclination of said fingers being the same as that of the upper end of the main cap and the upper inclined end of said housing, means to secure said main cap in place upon the upper edge of said housing, the upper ends of said fingers being in abutment with the upper face of the inclined upper edge of said housing, the lower ends of said fingers being disposed within said housing, and a plurality of hollow rivets extending through and arranged in spaced relationship circumferential of said caps for securing said caps together and providing fuel passageways from said housing for supporting flames at the outer ends of said rivets.

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