Dec. 29, 1931. W. O. HECK 1,838,397

OIL BURNER

Filed Sept. 19, 1929

Fig. 1.

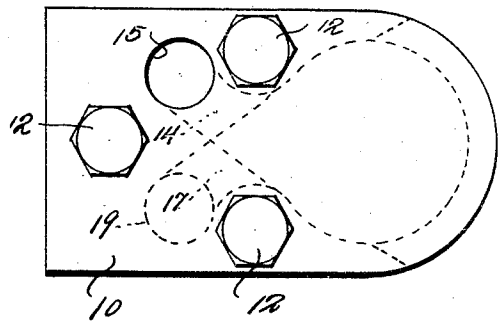


Fig. 6.

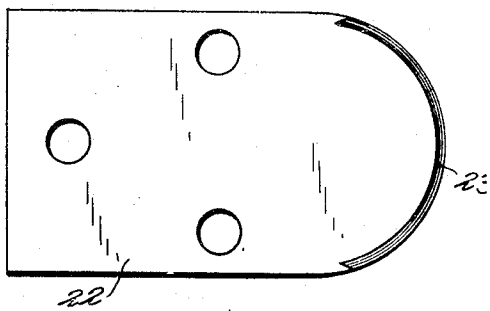


Fig. 2.

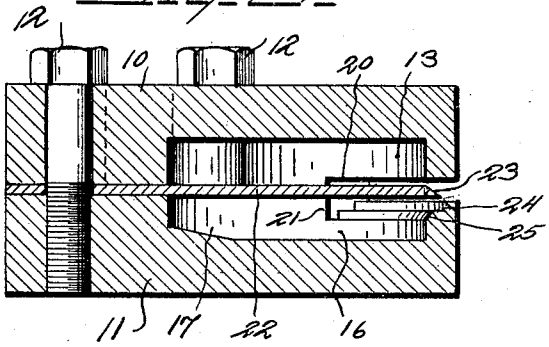


Fig. 3.

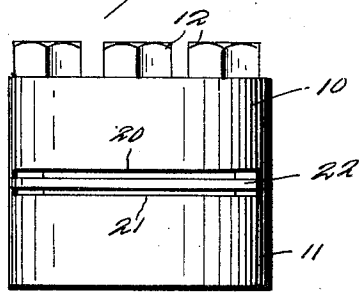


Fig. 4.

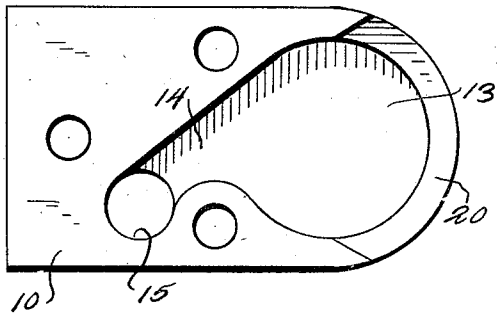
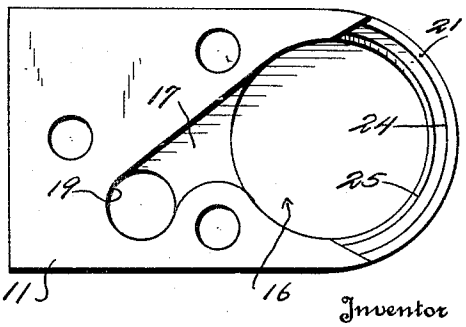


Fig. 5.



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UNITED STATES PATENT OFFICE

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OIL BURNER

Application filed September 19, 1929. Serial No. 393,723.

This invention relates to oil burners such as are used in furnaces and other situations and the general object of the invention is to provide a burner which is so designed that it will thoroughly atomize and partly gasify the fuel as it is discharged from the nozzle of the burner to thus secure a maximum of combustion and resulting in fuel economy.

Another object is to provide a burner of this character which is extremely simple, has but few parts and these parts are readily replaceable when worn.

Another object is to provide a burner of this character having an oil chamber and a steam chamber, the steam chamber being so constructed as to cause the discharge of steam in the form of a fan-shaped jet of whirling vapor and cause the discharge of the oil downward into said jet in a finely divided condition.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a top plan view of an oil burner constructed in accordance with my invention;

Figure 2 is a longitudinal section therethrough;

Figure 3 is an end elevation;

Figure 4 is an under side plan view of the upper section 10;

Figure 5 is a top plan view of the lower section 11;

Figure 6 is a plan view of the spray plate.

Referring to these drawings, it will be seen that the burner consists of an upper section 10 and a lower section 11. These sections are apertured for the passage of three bolts or screws 12 which hold the sections together. The upper section is formed to provide an oil chamber 13 which, as seen in Figure 4, is circular as regards its forward portion and then extends rearward and laterally as at 14 and communicates with an inlet opening 15 connected to any suitable source of oil, this inlet opening being screw-threaded to receive the nipple of a pipe connection. The lower section 11 is formed to provide a steam chamber 16 which is circular in form at the forward portion of the section 11 and which extends laterally and rearwardly as at 17 and communicates with a steam inlet opening 19 screw-threaded for the reception of a nipple or other pipe connection connecting the chamber to a source of steam. It will be seen that the rearwardly extending portions 14 and 17 of the two chambers extend laterally in opposite directions so that these chambers cross each other as it were.

The forward end of the upper section 10 is rounded on an arc having the same center as the circular chamber 13 and the rounded wall of the chamber 13 is reduced in depth at 20. The forward end of the section 11 is also rounded concentrically to the chamber 16 and the forward portion of the wall defining this chamber is reduced in depth as at 21. Thus these cut away portions 20 and 21 together form a semi-circular slot when the sections are disposed in operative relation to each other.

Disposed between the sections 10 and 11 is a spray plate 22 having the same form in plan as the sections and held in place by the screws or bolts 12. This spray plate separates the chambers 13 and 16 and extends partially through the front wall of the burner and into the slot formed by the cut away portions 20 and 21. The forward rounded edge of this spray plate 22 is beveled downward at an angle of approximately 60° with a normal to the spray plate as at 23. The forward wall of the chamber 16 to the extent of the slot 21 is formed at its upper end with the lip or shoulder 24 and at the inner corner of this wall with the lip or shoulder 25 which also extends coextensive with the semi-circle.

With the construction as described, the oil is taken into the chamber or cavity 13 from the oil supply and is discharged through the fan-shaped nozzle formed at the front end of the burner. Here it comes in contact with the steam from the steam chamber 16 which is being discharged from the slot 21. The beveled end of the spray plate 22, which beveled end is set back inward of the outside face of the end wall of the burner and has its edges in vertical alignment with the shoulder 24, causes the oil to be discharged downward

at an angle into the whirling jet of steam issuing from the slot 21. The jet of steam is given a whirling motion by the lip or shoulder 24 and the inclined shoulder 25. This whirling motion of the steam is brought about by the shoulders or lips 24 and 25 as a result of the steam in its passage forwardly through the chamber 16 being driven into the corners at the bottoms of the shoulders against the walls thereof, and as a result the steam pockets in these corners and striking the walls of the shoulders it is turned back and thus rises to the outlet opening between the edge of the plate 22 and the top shoulder, in a whirl and leaves the outlet in the whirling motion described. As a result of the inclined or beveled top edge of the plate 22 the oil discharges from the chamber 13 at a downward inclination and meeting the whirling steam it is thoroughly comingled therewith as a result of the whirling motion of the same.

It will be seen that with this construction a thorough atomizing of the oil is secured and a thorough mixture of the atomized particles of oil with steam and that thus the liquid fuel will be discharged in an atomized condition into the fire box or furnace of a steam boiler.

Another important feature of my invention lies in the fact that I provide for a reservoir of oil under pressure, that is, I provide a relatively large chamber for the oil and a relatively large chamber for the steam. Under these circumstances, the oil will remain liquid and flow freely under all conditions of firing. Where there is only a small chamber or recess for the passage of oil, there is always a tendency of carbonization at the mouth of the burner which will cause a stoppage of the flow. This causes the fire to go out under conditions of light firing. This is entirely avoided in my construction. The bevel 23 of the plate 22 is of importance for the reason that this bevel is downward and outward from the oil chamber to the steam chamber. If the bevel were the reverse, that is the edge of the plate was beveled upward from the steam chamber to the oil chamber, there would be a tendency to retard the oil as it merges from the nozzles, that is, the steam being discharged upward and outward would tend to prevent the free discharge of oil. In my construction, however, the steam is discharged straight outward and the oil is discharged downward into the steam. Again where the intermediate plate 22 is beveled from the steam chamber toward the oil chamber, there are times, particularly when heavier fuel is being used when the atomization is not very good and the fire has to be extinguished. This is not necessary with my construction. In my burner, the direction of the steam flow is such that it strikes the thin film of oil at an angle of about 80°. This gives a perfect atomization of the oil and partly gasifies it at the mouth of the burner. The corrugations 24 and 25 or series of steps at the mouth of the steam chamber gives the same a whirling exit and when it heats the thin film of oil, it secures a perfect atomization and still further gasifies the oil. These features I have found in practice are maintained during all conditions of firing.

It will be further seen that this construction is extremely simple, that at any time it may be readily taken apart for cleaning or repair, that the spray plate acts to separate the oil and steam until the two are discharged at a high velocity, and that the separator may be replaced at any time in case it should become worn.

While I have illustrated a certain definite construction for my burner which I believe to be particularly effective, I do not wish to be limited thereto, as it is obvious that the details might be changed without departing from the spirit of the invention as defined in the appended claims.

I claim:—

1. An oil burner of the character described formed to provide an upper section and a lower section and a spray plate disposed between said section and dividing the interior of the burner into an oil chamber and a steam chamber, the burner being formed with an arcuate front wall and with an arcuate discharge slot in said wall, said spray plate intersecting said slot but being less in length than the outside length of the burner and being downwardly and outwardly beveled at its forward end from the oil chamber toward the steam chamber, the said beveled surface extending from the top to the bottom faces of the plate, that face of the plate confronting the steam chamber being flat to the forward extremity of the plate to cause the discharge of the oil downward and forward into the jet of steam issuing from the steam chamber.

2. An oil burner comprising an upper section and a lower section, said sections having confronting cavities, a spray plate disposed between the sections separating the cavities from each other to provide an oil chamber and a steam chamber respectively connected to a source of oil and steam, the forward end of the burner having a discharge slot between the two sections, the spray plate extending into said slot but terminating short of the outer end face of the front end of the burner, said spray plate being beveled downward and forward from the oil chamber toward the steam chamber and the front wall of the steam chamber on its inner face being cut away to provide two stepped shoulders extending the length of said slot.

3. An oil burner comprising an upper section and a lower section, said sections having relatively large confronting cavities, a spray plate disposed between the sections separat-

ing the cavities from each other to provide an oil chamber and a steam chamber respectively connected to a source of oil and steam, the forward end of the burner being rounded to provide a semi-circular discharge slot between the sections, said spray plate being rounded at its forward end and extending into said slot but being spaced from the walls thereof and terminating short of the outer face of the forward wall of the burner and the rounded end of the spray plate being downwardly and outwardly beveled from the oil chamber to the steam chamber, the inner face of the forward semi-circular wall of the steam chamber being formed with two stepped shoulders extending the full length of said discharge slot and having the same centers of curvature.

In testimony whereof I hereunto affix my signature.

WILLIAM O. HECK.