Feb. 1, 1944. W. J. JANOSKY 2,340,389

BURNER

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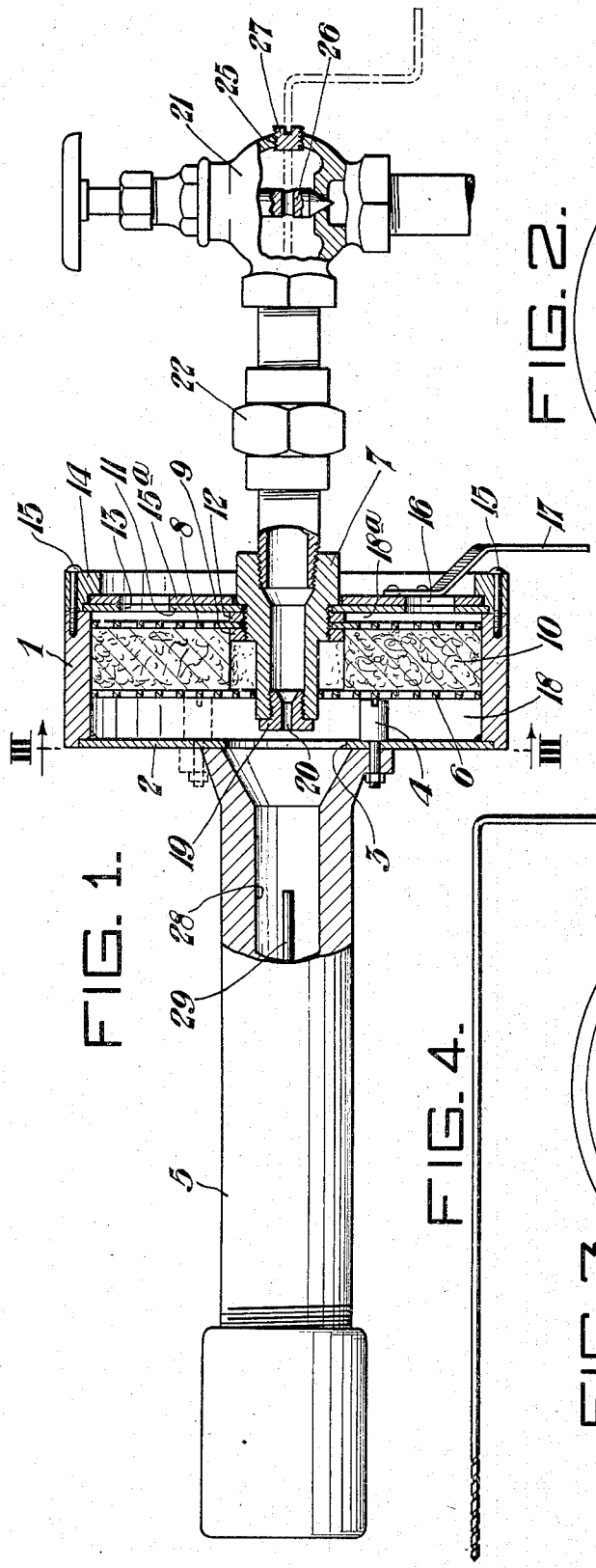


FIG. 1.

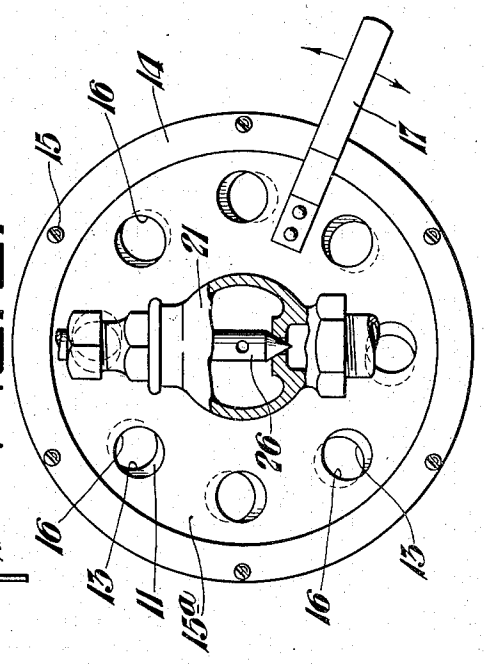


FIG. 2.

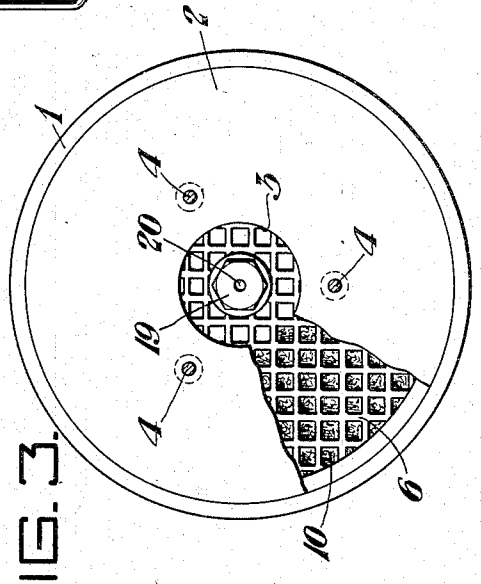


FIG. 3.

FIG. 4.

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BURNER

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2 Claims. (Cl. 158—118)

This invention relates to improvements in burners such as used in fuel burning systems wherein prepared fuels are fed through burners equipped with ignition means.

Among the objects of the invention are to provide a cleaning device for inspirated air entering the burner effective to prevent clogging of the fuel and air passages in the burner; to afford facilities for readily cleaning the various passages and openings through which both fuel and air flow prior to combustion; to prevent short circuiting of the ignition means and resultant backfiring and burning of the combustible mixture within the burner; to reduce the maintenance required in servicing the equipment with a corresponding increase in overall efficiency and functioning of the component parts of the burner.

The above and other objects are attainable by use of the burner apparatus hereinafter described in detail. For a complete understanding of the invention, reference is to be made to the accompanying drawing, in which:

Figure 1 is a side elevation having a part in longitudinal section, of a burner embodying the invention;

Figures 2 and 3 are elevations viewed from opposite ends of the burner, Figure 2 having a portion in section and Figure 3 having a portion broken away illustrating means for readily cleaning the burner tip; and

Figure 4 is a detail view of a nozzle cleaning drill.

Referring in detail to the drawing, the numeral 1 designates a substantially cylindrical container shell partially closed at one end by a plate 2 which is secured thereto by a seam weld, as shown. The plate 2 is provided at the center thereof with a hole 3 for the passage of fuel and air and it carries three circumferentially evenly spaced studs 4 which are utilized to secure the entire assembled unit to the burner 5. Said studs 4 project inwardly from the plate 2, as clearly shown in Figure 1, thus forming a series of abutments for a foraminous disk 6. The disk is pierced at its center by an adapter nozzle 7. A second foraminous disk 8 is secured to the adapter nozzle 7 by means of a lock nut 9. The annular space between the disks 6 and 8 is filled with a pad or filter medium 10 which is preferably, although not necessarily, formed of shredded steel particles treated with paraffin oil or the like.

A baffle plate 11 is secured to the nozzle 7 by a lock nut 12 and is provided with a plurality of symmetrically spaced holes 13 of approximately ¾ inch in diameter to permit the ingress of air, the outer periphery of the baffle plate 11 being fitted within an annular recess formed in a retainer ring 14. Screws 15 are provided for removably securing the retainer ring 14, thus firmly clamping the plate 11 in place and preventing any movement thereof. A shutter plate 15ª is mounted with freedom for rotary movement in a suitable annular groove formed in the retainer ring 14. The plate 15ª is provided with a series of holes 16 which normally register with similar holes 13 of the plate 11. A lever 17 is secured to the plate 15ª for manipulating the plate so as to adjust or meter the influx of air to the burner, it being understood that by swinging the lever 17 the shutter plate 15ª is caused to partially rotate, thus varying the overlapping relationship between the holes 13 with respect to the holes 16 with an increase or decrease in the area of air passage jointly provided by such holes, thus forming a positive means for controlling the volume of air which passes through the filter medium and into the chamber 18 and thence to the burner 5.

The prepared fuel passes through the nozzle 7 upon which is assembled the various parts above described. As shown in Figure 1, the space 18 between the plate 2 and disk 6 provides an unimpeded reservoir for filtered air which has been thoroughly cleansed in its passage through the foraminous disks 6 and 8 and the filter pad 10.

The space 18ª between the baffle plate 11 and the disk 8 provides a similar reservoir in which the entering air may be said to be distributed over the entire approximate area of the foraminous disk 8, thus utilizing the filter medium 10 to full advantage.

At the inner extremity of the nozzle 7 there is a removable tip 19, the center of which is provided with a minute orifice 20 through which the fuel passes with sufficient velocity to draw in cleaned air from the reservoir 18 which thus intermixes with a fuel stream and forms a combustible mixture.

In devices heretofore used the central opening of the fuel tip frequently becomes partially closed as a result of precipitation thereon of impurities from unfiltered air. Such condition is objectionable as it causes a short circuiting of the electrode, such as shown at 29, frequently used for igniting the mixture and therefore interferes with the proper operation of the ignition device and ultimately results in the burner becoming inoperable or in objectionable backfiring

in the opening 28. One advantage of the present invention is to overcome the objection just referred to which is inherent in burners heretofore used. The invention also provides means for readily cleaning out the burner without entirely dismantling the same.

The improved burner apparatus includes a valve 21 which controls the fuel stream, this valve being interposed between the fuel supply line and the nozzle 7 as shown, a union 22 being utilized to sever the connection and provide for dismantling the cleaner in order to remove the specially treated filter element 10.

Due to the presence of foreign substances in the fuel supply, the orifice 20 occasionally becomes clogged, thus impeding the proper flow of fuel with a naturally resulting decrease in the efficiency of the burner. Heretofore it has been necessary to remove the entire burner assembly completely from the furnace in order to clean the orifice 20. The present invention overcomes this disadvantage by providing means for opening up the clogged orifice 20 by use of a specially designed drill, such as shown in detail in Figure 4, which is of sufficient length to reach through the valve 21, nozzle 7 and tip 19. The nozzle tip 19 is formed with a flared opening so as to facilitate the entry of the extremity of the drill into the orifice 20. Thus with the drill properly engaged with the orifice, rotation of the crank portion thereof will easily and quickly drill out and remove any impurities in the orifice 20 and restore it to its proper operative condition.

To provide access to the tip 19 for the purpose of cleaning without permitting the escape of fuel, the valve is closed firmly on its seat thus shutting off the fuel supply to prevent danger of explosion. An opening is provided in the valve body 21 as shown at 25 and a similar opening is drilled through the valve stem 26 in alignment with the hole 25. The hole 25 is threaded to receive a suitable screw plug 27 whch serves to effectively close the valve body against the escape of fuel when the burner is placed in service after cleaning.

The component parts of the apparatus can be readily produced by interchangeable methods of manufacturing thus lessening the cost of production and yet providing a structure in which the parts individually and jointly cooperate to serve their respective and conjoint functions as herein set forth.

While I have described quite precisely the preferred embodiment of the invention herein illustrated, it is not to be construed that I am limited thereto since various modifications and substitutions of equivalents may be made by those skilled in the art without departure from the invention as defined in the appended claims.

I claim:

1. A burner apparatus of the character described comprising a shell-like casing, an inner end plate secured thereto provided with a central opening, a pair of spaced foraminous disks spaced from said end plate, a filtering medium confined in the chamber formed by the casing and said disks, a nozzle piercing said disks, an outer end plate secured to said casing and pierced by said nozzle, said outer end plate being spaced from the outer foraminous disk and having a plurality of air inlet openings therein.

2. The apparatus of claim 1, including a rotatable shutter plate in face-to-face contact with said outer air inlet plate and having a plurality of openings therein adapted when moved relatively to the openings in said outer air inlet plate to control the influx of air to the reservoir defined by said shell, said outer foraminous disk and said outer plate.

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