E. E. RUSHTON.

HYDROCARBON AND GAS BURNER.

APPLICATION FILED SEPT. 30, 1920.

1,391,277. Patented Sept. 20, 1921.

FIG. 1.

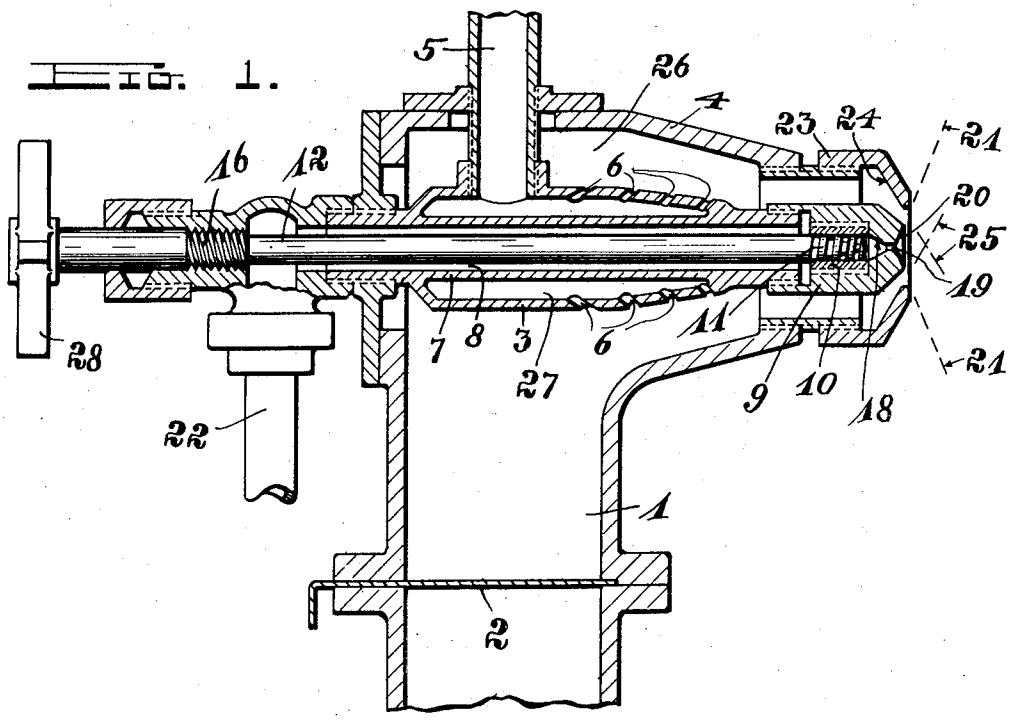
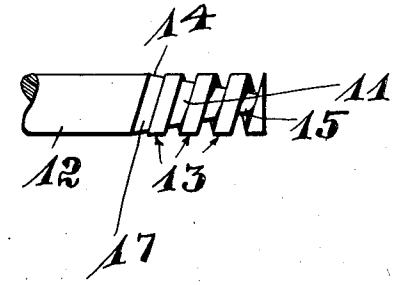


FIG. 2.



INVENTOR:

EDWIN E. RUSHTON,

BY: Otto H. Krueger

his Atty.

UNITED STATES PATENT OFFICE.

EDWIN E. RUSHTON, OF LOS ANGELES, CALIFORNIA.

HYDROCARBON AND GAS BURNER.

1,391,277. Specification of Letters Patent. Patented Sept. 20, 1921.

Application filed September 30, 1920. Serial No. 413,811.

To all whom it may concern:

Be it known that I, EDWIN E. RUSHTON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Hydrocarbon and Gas Burner, of which the following is a specification.

This invention relates to devices for burning hydrocarbon and gas intermixed with air.

One of the objects of this invention is to thoroughly agitate the fuel, whether gas or hydrocarbon is being used, so as to bring it into a suitably atomized state to easily mix with air at the proper predetermined point.

Another object is to provide a device with an air-supply connection preferably controlled by a gate-valve, a gas connection terminating within the air supply having a suitable number of orifices forming communicating means between the gas and air supply so as to properly distribute and mix the gas with the air, and a hydrocarbon supply tube passing through the whole for mixing with the gas and air mixture.

Another object is to provide a controlling valve for the hydrocarbon by which the hydrocarbon-supply can be properly adjusted as to amount and direction to be taken to properly mix with the air.

Another object is to provide such controlling means which can easily be cleaned and adjusted without requiring a dismantling of the whole device.

Other objects will appear from the following description and appended claims as well as from the accompanying drawing, in which—

Figure 1 is a longitudinal midsectional view of the device.

Fig. 2 is a fragmentary detail side elevation of the stem of the controlling valve.

The main body or outer shell 1 forms the air-supply connection of the device, having preferably a gate valve 2 for controlling the air passage. The gas nozzle 3 is preferably disposed concentrically within the front end 4 of the air-supply connection. Such gas nozzle 3 is naturally the termination of a gas supply connection 5. A number of orifices 6 are provided in the gas nozzle, so distributed in the surface of the nozzle-body, as to discharge the gas into the air supply in practically atomized form. The orifices or holes or perforations 6 are shown of rather large size, but it will easily be understood that such orifices are so proportioned as to give favorable results, and only for the sake of illustration to clearly appear in the drawing are such perforations so enlarged and indicated at such spaces. From the illustration it is also clear that the perforations are preferably disposed somewhat in the direction of the passing air. All perforations are furthermore so distributed over the gas nozzle as to assure a thorough mixing of the gas with the passing air. The gas nozzle is provided with an inner tube-like partition 7 forming a passage 8 for the hydrocarbon through the gas nozzle. The hydrocarbon passage normally has no communication with the gas nozzle.

The hydrocarbon nozzle 9 is provided with a sleeve 10 to make it possible that the controlling valve 11 can be properly fitted. The controlling valve 11 is illustrated in detail in Fig. 2, the stem 12 simply being threaded, (pointed or flat threads) the flat threads being preferred in the illustration since a better fitting can be accomplished, as will easily be understood, the tops 13 of the threads being of polished cylindrical form. The sleeve 10 is then preferably ground-fit disposed over the threaded portion of the stem. Such threading, fitting, and, eventually grinding of the threaded portion of the stem and of the bore of the sleeve assures a perfect closing of the controlling valve. In cases where not such exact fitting is required, it is naturally easier accomplished and assembled. From the point 14 to the front end 15 the threads are gradually cut deeper, as illustrated, so that the amount of passing hydrocarbon can be adjusted by moving the stem back or forward, as it may be required. For adjusting the controlling valve the stem 12 is provided with threads at a suitable point, in the drawing it being further to the rear as indicated at 16. A turning of the stem then naturally causes a moving of the threaded portion of the stem in relation to the sleeve 10.

In closed position, as illustrated in Fig. 1, the unthreaded portion of the stem reaches far enough into the sleeve 10 so as to shut off the passage through the sleeve, as will easily be understood.

For opening the controlling valve, the stem has then only to be turned to move

rearwardly so as to withdraw from the sleeve. At first, the shallow beginning of the threads allows only a small amount of hydrocarbon to pass around the stem into the sleeve, but, on further moving of the stem rearwardly, more and more hydrocarbon can pass into the sleeve as the stem is moved more in that direction.

Since the threads are preferably well fitted within the sleeve, no hydrocarbon can pass any otherwise but along the way of the threads. If only slightly opened, such slight amount of hydrocarbon as may pass is compelled to pass through the whole threads, thereby receiving a whirling motion. In this whirling condition, the hydrocarbon is thrown against the taper face 18 and through the orifice 19, naturally having the tendency to fly and spread out radially as soon as it emerges from the nozzle 9. The front face 20 of the nozzle 9 being slightly tapered, the atomized hydrocarbon naturally spreads out in the direction of the lines 21.

The hydrocarbon connection 22 is in communication with the passage 8 through the device and controlled by the controlling valve 11 during the normal working or operating time.

If the controlling valve 11 is not well fitted within the sleeve 10, a shut-off valve is naturally provided in the hydrocarbon connection line, not shown in the drawing, but will easily be understood without further illustration.

The front end 4 of the outer shell 1 is preferably closed by an adjustable cap 23. This cap 23 is adjustably mounted on the front end of the outer shell on threads or other similar means for shifting or moving the cap in longitudinal direction in relation to the hydrocarbon nozzle 9 so as to regulate the space between the mouth of the cap and the nozzle 9. The cap is provided with inner faces to direct the out-passing gas mixture centrally so as to penetrate the outspreading discharge of the atomized hydrocarbon, thereby naturally thoroughly intermixing with the discharging atomized hydrocarbon. The inner face 24 of the cap 23 slants inwardly from the practically cylindrical sleeve portion of the cap so as to cause the gas mixture to discharge in about the direction indicated by the lines 25, which is in a direction necessarily causing the air (or air and gas mixture, if gas is used in combination) to penetrate the discharged atomized hydrocarbon, as will be understood from the above.

Of course, air alone may be used in combination with the hydrocarbon and the air will then unite at the point of penetrating between the cap 23 and the nozzle 9. The gas connection 5 is in such a case, and preferably always, provided with a shut-off valve for controlling the gas supply, such a valve being not shown in the drawing but it will easily be understood without further illustration.

The space within the front end 4 of the outer shell 1, surrounding the gas nozzle 3, is properly the mixing chamber for the air and gas, indicated at 26.

The space within the gas nozzle 3 surrounding the inner tube 7 forms the pressure equalizing and gas distributing chamber, as indicated at 27.

The knob or handwheel 28 is for handling and operating the controlling valve 11 on the stem 12.

With this device as illustrated in the drawing and described above, a clogging up of the controlling valve, or a shutting down of the service of the burner on account of such clogging up can be avoided, since the stem 12 can easily be unscrewed by the handwheel or knob 28 through its threaded portion 16 to be entirely removed from the device so that the threaded portion of the controlling valve 11 can be cleaned while the rest of the device remains intact. The sleeve 10 naturally cannot get clogged up since the threaded portion of the valve 11 automatically cleans it.

Having thus described my invention, I claim:

1. In a burner of the class described, a controlling valve having gradually deepening threads forming the passage-adjusting and controlling means of the valve and having setting means to move the valve in longitudinal direction independent of the adjusting and controlling means.

2. In a burner of the class described, a valve stem having threads to move the stem in longitudinal direction and having feeding channels of gradually increasing cross sectional area near the end of the stem.

3. In a burner of the class described, a sleeve having a cylindrical bore forming a valve seat, and a stem having feeding channels of gradually increasing cross sectional area at a point to extend into the cylindrical bore of the sleeve for adjustably controlling the passage through the sleeve.

4. In a burner of the class described, an outer shell forming an air supply and mixing chamber, an adjustable cap provided on the front end of the outer shell forming the nozzle for the air-discharge, a hydrocarbon connection terminating within the outer shell, a nozzle provided on said hydrocarbon supply connection, and a valve stem having feeding channels of gradually increasing cross sectional area at a point to engage within the second-named nozzle for adjustably controlling the passage through the second-named nozzle and having threads for setting the stem within the shell irrelative to the feeding channels.

5. In a burner of the class described, an

outer shell forming an air supply and mixing chamber, an adjustable cap provided on the front end of the outer shell forming the nozzle for the air-discharge, a gas-supply connection terminating within the mixing chamber having orifices distributed and arranged over its length as well as circumference, so as to discharge into the largest possible volume inside of the outer shell, the gas supply connection having an inner tube-like partition forming a hydrocarbon passage through the gas supply means, a second nozzle, the said second-named nozzle being provided on the front end of the gas supply connection overlapped by the first-named nozzle so as to form an air discharging passage between the two nozzles, a sleeve within the second-named nozzle having a cylindrical bore, and a valve stem having feeding channels of gradually increasing cross sectional area at a point to engage with the sleeve for adjustably controlling the passage through the sleeve and thereby through the second-named nozzle.

6. In a burner of the class described, an outer shell forming an air supply and mixing chamber, an adjustable cap provided on the front end of the outer shell forming the nozzle for the air-discharge, a gas-supply connection terminating within the mixing chamber having orifices distributed and arranged over its length as well as circumference so as to discharge into the largest possible volume inside of the outer shell, the gas-supply connection having an inner tube-like partition forming a hydrocarbon passage through the as supply means, a second nozzle, the said second-named nozzle being provided on the front end of the gas supply connection overlapped by the first-named nozzle so as to form an air discharging passage between the two nozzles for deflecting the outpassing gas mixture in a conical central direction, a sleeve within the second-named nozzle, and a valve stem having gradually deepening threads at a point to engage with the sleeve for adjustably controlling the passage through the sleeve and thereby through the second-named nozzle, and having means adapted to clean the passage through the sleeve while operated.

In testimony that I claim the foregoing as my invention I have signed my name in the presence of two subscribing witnesses.

EDWIN E. RUSHTON.

Witnesses:

OTTO H. KRUEGER,

JESSIE A. MANOCK.