Aug. 30, 1932. F. C. FANTZ 1,874,002

OIL BURNER

Filed Jan. 31, 1929

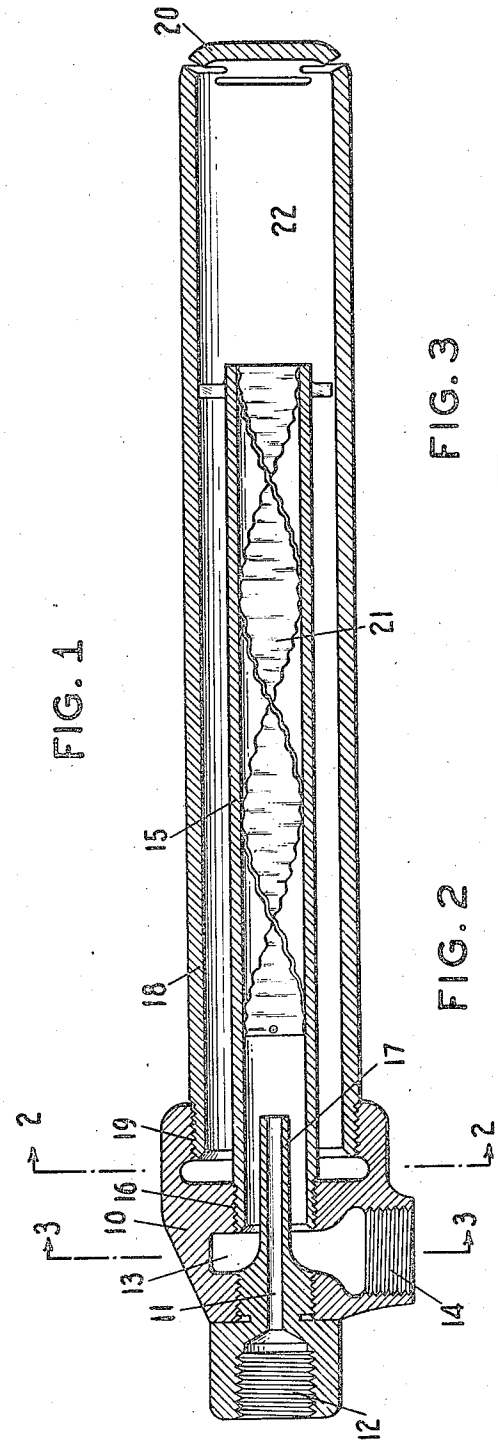

FIG. 1

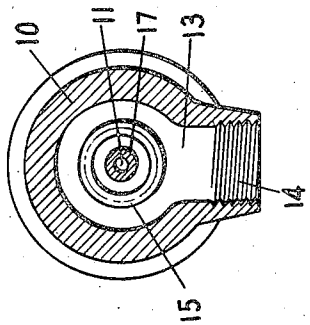

FIG. 3

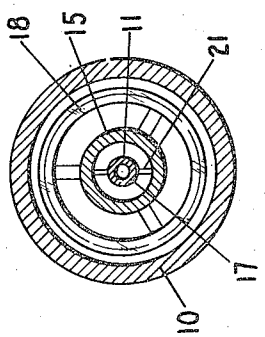

FIG. 2

INVENTOR
FRED C. FANTZ
BY Dodson & Roe
ATTORNEYS

Patented Aug. 30, 1932 1,874,002

UNITED STATES PATENT OFFICE

FRED C. FANTZ, OF WEBSTER GROVES, MISSOURI

OIL BURNER

Application filed January 31, 1929. Serial No. 336,389.

My invention relates to the art of combustion, and particularly to burners used in oil-consuming devices, such as boilers, furnaces, stills, and the like.

My principal object is, to construct a device adapted to thoroughly break up the oil and mix it, at the proper time and under proper mixing conditions, with air or steam for atomization.

A further object is, to provide means whereby the oil passageways will always be kept clean and free from deposits, so as to eliminate the customary depositing of large quantities of residue and sludge, which have a large free carbon content, in the passageway of the burner, or to permit the precipitation of such deposits on the floor of the combustion chamber.

One of the major problems to be met in constructing oil burners is, to eliminate the clogging up of the small oil passageways, due to the particles of carbon and foreign matter settling on the walls thereof, which, in time, build up to such an extent as to retard the free flow of oil, or to completely cut it off. A further object of my invention is, to so construct a device as to eliminate such deposits which form on the burner tips or in the oil passageways.

My invention consists of certain details of construction, hereinafter set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which—

Fig. 1 shows a longitudinal sectional view of my improved oil burner;

Fig. 2 shows a cross-section, taken on line 2—2 in Fig. 1; and

Fig. 3 shows a cross-section, taken on line 3—3 in Fig. 1.

Similar reference numerals refer to similar parts throughout the entire description.

Referring to the accompanying drawing, a mixing head 10 is provided with a longitudinal opening 11 extending centrally therethrough, connecting with a screw-threaded opening 12 to receive the connection carrying the oil for consumption. A steam or air chamber 13 is formed in the mixing head 10, preferably surrounding the wall defining the longitudinal opening 11. A screw-threaded opening 14 in the mixing head 10 receives the connection carrying the air or steam entering into the chamber 13.

A cylinder 15, open at both ends, is designed to receive the oil, said cylinder 15 being secured to the mixing head 10 by a screw-threaded connection 16, the open inner end of the cylinder 15 communicating with the air or steam chamber 13. This cylinder 15 receives centrally a nozzle 17 of the mixing head 10, through which the longitudinal passage 11 extends. Surrounding the cylinder 15, and concentrically placed with relation thereto, is a second cylinder 18, also open at both ends, said cylinder 18 extending beyond the outer end of the cylinder 15. The cylinder 18 is seated in a screw-threaded opening 19 in the mixing head 10, and to the outer end of said cylinder 18 is secured a burner tip 20. Within the cylinder 15 is secured a corrugated spiral element 21, the outer edges of which preferably contact the inner wall of said cylinder 15. I have found that these corrugations serve effectually to break up the oil particles. However, unlike the sharp projections which are sometimes employed for this purpose and against which the sludge and the like lodges and thus greatly decreasing the efficiency of the mixing device, the smooth surface presented in my structure affords no place for the accumulation of a sludge, etc., thereby a greatly increased efficiency is obtained by this construction.

In use, the complete burner as just described, including the mixing head 10 and the cylinders 15 and 18 thereto attached, projects into a combustion space (not shown).

In practical operation, the oil enters, under pressure, through the passage or port 11

in the nozzle 17, into the cylinder 15. At the same time, a proper amount of air or steam, under proper pressure, enters through the opening 14 into the chamber 13 and thence into the cylinder 15, where it mixes with the incoming oil. The incoming oil and steam, under pressure, are forced outwardly through the cylinder 15 and forcibly impinged upon the corrugations in the spiral element 21. By forcibly striking this spiral element and the corrugations therein, and also due partly to the steam cutting across the incoming oil, the particles of oil are torn apart. The spiral element 21, providing a spiral passageway through the cylinder 15, imparts a whirling motion to the oil and steam and, as a proper pressure on the oil and steam is exerted, a high velocity is reached, and the particles of oil, as well as any solids, such as sludge and the like, which might be contained therein, are thrown against the inner wall of the cylinder 15 and the corrugations on the wall of the spiral element 21, and this operates to completely break them up before they reach the outer end of the cylinder 15.

This cylinder 15 with its corrugated spiral passage, I designate as my mixing chamber, and the space in the cylinder 18 formed by its projection beyond the end of the cylinder 15, I designate as my expansion chamber 22. The steam and oil, thoroughly mixed at this time, pass out of the expansion chamber 22 through orifices in the burner tip 20, where they are met by a proper air draft (not shown) to provide the necessary oxygen for combustion.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is:

1. A burner for oil fuel comprising a mixing head having a steam chamber therein, an imperforate cylinder opened at both ends secured to said head, the open inner end being in communication with said chamber, a fuel nozzle in said head which projects into said cylinder, a transversely corrugated spiral element in said cylinder adjacent the nozzle discharge, an outer cylinder which surrounds said first named cylinder secured to said head, said outer cylinder being of larger diameter and length than the first named one, means to mount said cylinders in spaced relation to each other, a burner tip mounted in the end of the outer cylinder, there being a plurality of arcuate slots between the burner tip and the wall of the outer cylinder.

2. A burner for oil fuel comprising a mixing head having a steam chamber therein, a cylinder opened at both ends secured to said head, the open inner end being in communication with said chamber, a fuel nozzle in said head which projects into said cylinder, a corrugated spiral element in said cylinder adjacent the nozzle discharge, an outer cylinder which surrounds said first named cylinder secured to said head, said outer cylinder being of larger diameter and length than the first named one, means to mount said cylinders in spaced relation to each other, a burner tip mounted in the end of the outer cylinder, there being a plurality of arcuate slots between the burner tip and the wall of the outer cylinder.

FRED C. FANTZ.