June 26, 1928. 1,674,631

J. BENNIGER

OIL BURNER

Filed Oct. 28, 1926 2 Sheets - Sheet 1

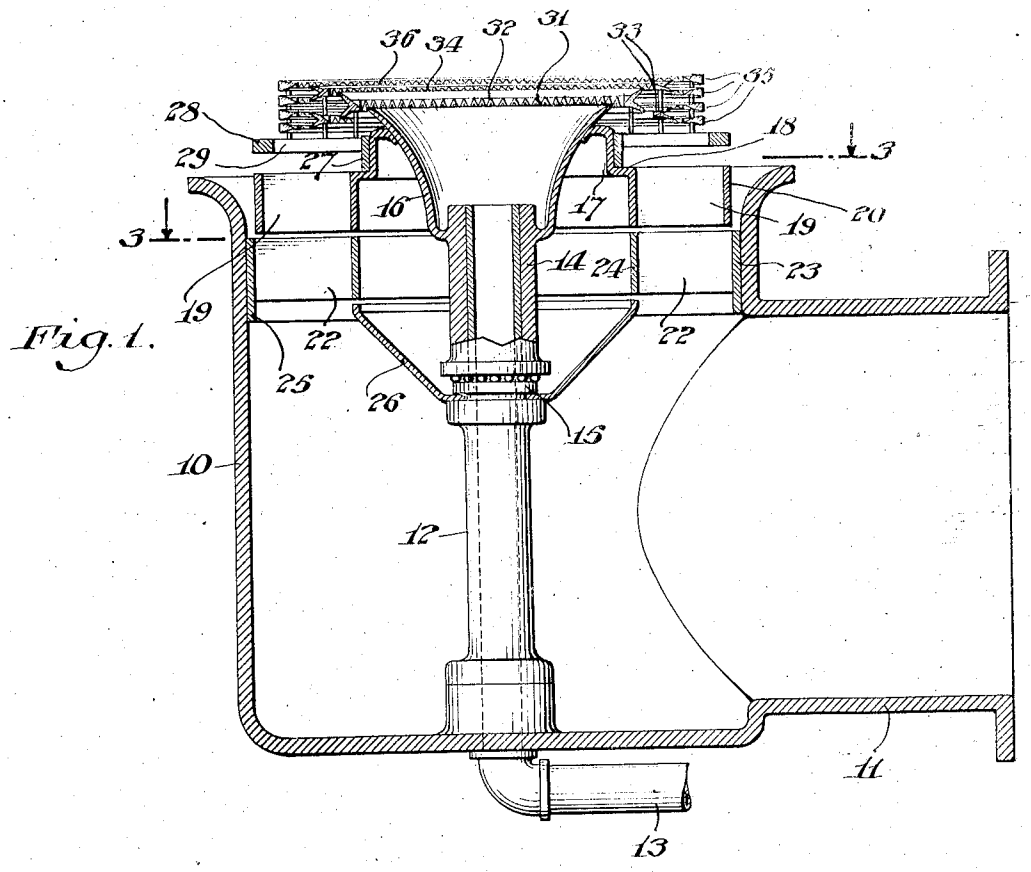


Fig. 1.

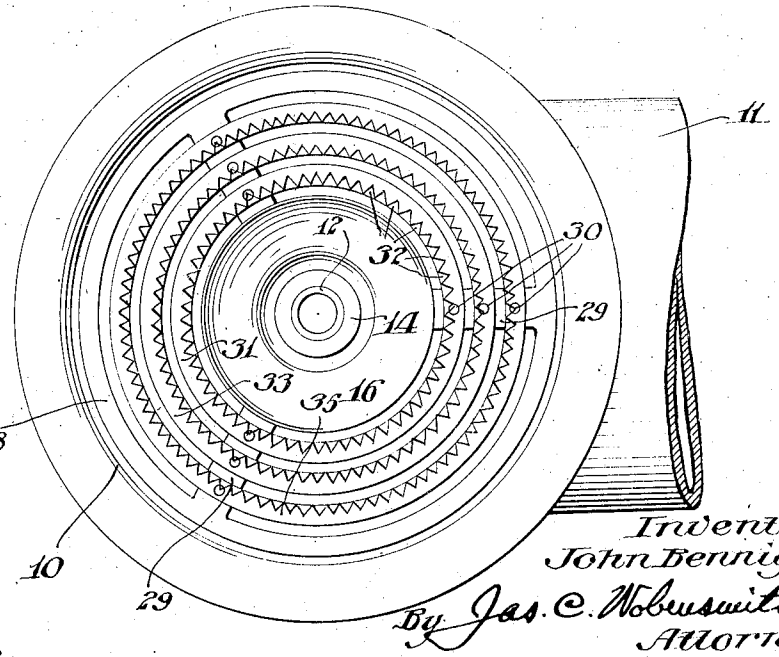


Fig. 2.

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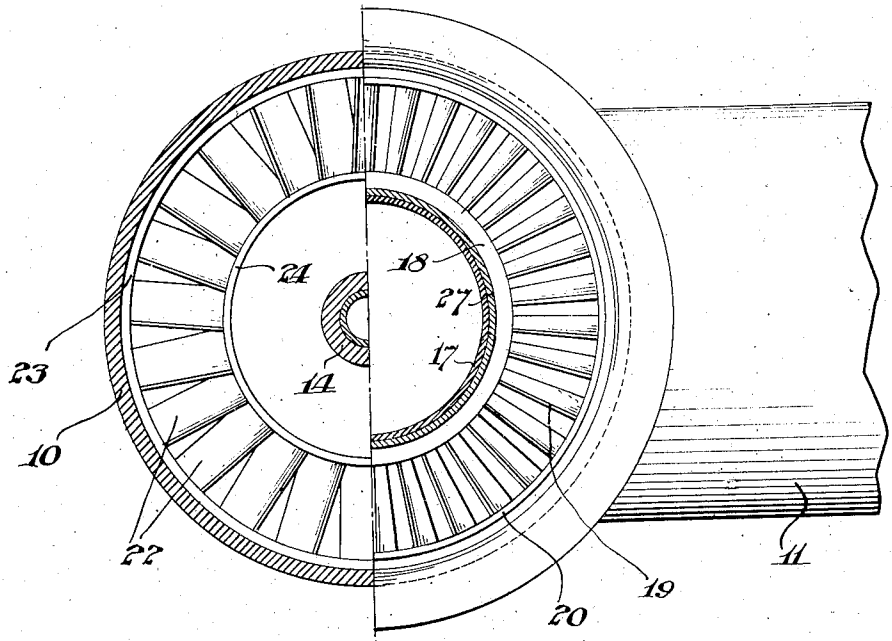
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Fig. 3.



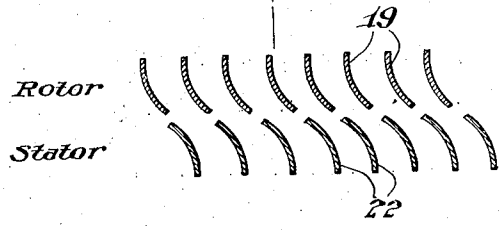


Fig. 4.

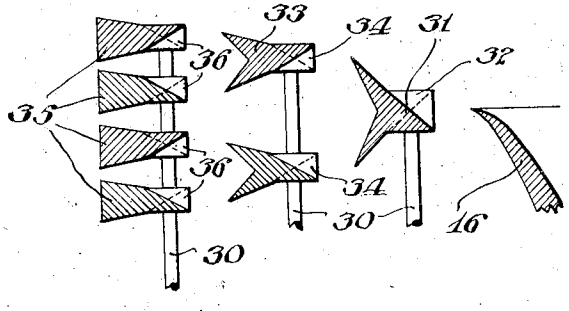


Fig. 5.

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Patented June 26, 1928. 1,674,631

UNITED STATES PATENT OFFICE.

JOHN BENNIGER, OF PHILADELPHIA, PENNSYLVANIA.

OIL BURNER.

Application filed October 28, 1926. Serial No. 144,874.

My invention relates to oil burners, that is to say, to a device adapted for the burning of fuel oil to utilize the heat of combustion thereof in boilers and heaters of various types.

As is well known, fuel oil is of such nature that it is difficult to burn the same so that the combustion will be complete. In the use of various types of oil burners, a great deal of smoke frequently results, as well as the deposition of quantities of soot due to the incomplete combustion of the fuel oil.

The object of my present invention is to provide an oil burner in which the fuel oil will be so broken up that all parts thereof will be exposed to the air, whereby the combustion will be complete and greater efficiency will result.

A further object of my invention is to provide a device of the character aforesaid which is so constructed and arranged as to utilize the passing current of air for the actuation thereof.

The nature and characteristic features of my invention will be more readily understood from the following description, taken in connection with the accompanying drawings forming part hereof, in which:

Figure 1 is a vertical central sectional view of an oil burner embodying the main features of my present invention;

Fig. 2 is a top or plan view thereof;

Fig. 3 is a horizontal section taken approximately on the line 3—3 of Fig. 1;

Fig. 4 is a section, to a certain extent diagrammatic, illustrating the arrangement with respect to each other of the blades of a stator and rotor, constituting portions of the device; and

Fig. 5 is an enlarged fragmentary section illustrating the construction and arrangement of rings for successively breaking up the oil into a progressively increasing number of parts.

Referring to the drawings, in the particular embodiment of my invention therein shown, 10 is a housing, having an extension 11 which constitutes a portion of the conduit for the supply of air to the burner.

Centrally mounted in the interior of the housing 10 is a hollow standard 12, through which fuel oil is adapted to be supplied to the burner. Suitable piping 13 is connected to the bottom of the standard for such oil supply. A sleeve 14 is rotatably mounted on the upper end of the standard 12, a thrust ball bearing 15 being provided at the bottom of the sleeve 14 whereby said sleeve 14 and the parts carried thereby may freely rotate. The upper end of the sleeve 14 is provided with a flaring cup shaped extension 16.

Secured to the outer surface of the cup shaped extension 16 of the sleeve 14 is an annulus 17, having a shoulder portion 18 for a purpose to be presently explained. The annulus 17 carries a plurality of rotor blades 19, the outer ends of which are secured in a ring 20. A plurality of radially disposed stator blades 22 are arranged immediately below the rotor blades 19, said stator blades being supported by an outer ring 23 and an inner ring 24. The outer ring 23 is fixedly positioned to the interior of the housing 10, preferably by means of an annular shoulder 25 provided on the inner surface of the wall of the housing. A frusto-conical deflector 26 is carried by the standard 12, and serves to deflect the air through the stator blades 22 for a purpose to be presently explained.

Upon the shoulder portion 18 of the annulus 17 there is mounted the inner ring portion 27 of a spider frame 28, the arms 29 of which carry a plurality of vertically arranged supporting pins 30. The pins 30 serve as a means for supporting a plurality of oil dividing rings which are concentrically arranged with respect to each other in a progressively increasing number in each series, as will be hereinafter more fully explained.

The innermost oil dividing ring 31 has its inner portion notched or serrated as at 32, thereby to provide a plurality of channels extending alternately to the top and bottom surfaces of the ring 31. It should be noted that the medial line of the serrated inner portion of the ring 31 lies in the plane of the rim of the cup shaped extension 16 of the sleeve 14.

Concentrically arranged on the outside of the ring 31 are two rings 33, each of which is provided, in a manner similar to that of the ring 31, with a plurality of notches or serrations 34 extending alternately to the top and bottom surfaces of each ring 33. The medial line of the serrated inner portion of each ring 33 lies in the plane of one of the peripheral edges of the inner ring 31.

Concentrically arranged on the outside of the rings 33 are four rings 35, each of which is provided in a manner similar to that of

the rings 33, with a plurality of notches or serrations 36, extending alternately to the top and bottom surfaces of each ring 35. Here again the arrangement is such that the medial line of the serrated inner portion of each ring 35 is arranged in one of the horizontal planes of the peripheral edge of one of the rings 33.

It will, of course, be understood that still other series of rings may be concentrically arranged on the outside of the series of rings 35, if it be found that further subdivision of the fuel oil will be required. This may be necessary in burners of large capacity.

The operation of the device may now be explained. Air under pressure is supplied by means of a blower or other suitable apparatus to the interior of the housing 10 through the conduit of which the extension 11 of the housing 10 forms a part. The passing current of air will be guided by means of the frusto-conical member 26, so that the same will pass through the stator blades 22 and thereby be deflected against the rotor blades 19 which are carried by the annulus 17. In this manner, a rotary movement of high speed will be imparted to the sleeve 14 and the parts carried thereby.

The fuel oil being supplied by means of the piping 13 to the vertical standard 12, will pass up through the same into the cup-like extension 16 of the rotatable sleeve 14. As the cup-like extension 16 is rotated at a high rate of speed, in the manner hereinbefore set forth, the fuel oil, due to the centrifugal action, will be carried upward over the flaring inner surface of the cup-like extension 16, until it reaches the rim thereof, whence it will be thrown off in a relatively thin sheet, and will impinge against the serrated inner portion of the ring 31.

As the oil impinges against the serrated inner portion of the ring 31, the same will be broken up into a plurality of subdivisions, one-half of which will pass to the top surface of the ring 31, and the other half of which will pass to the bottom surface of the ring 31, by reason of the peculiar arrangement of the notches or serrations provided in the inner portion of the ring 31, as hereinbefore described. The oil which passes over the top and bottom surfaces of the ring 31 will in turn be thrown off from the periphery thereof, whence the same will impinge against the serrated inner portions of the rings 33.

In like manner, the oil will be thrown off from the upper and lower surfaces of each of said rings 33 by centrifugal action, and will impinge against the serrated portions of the rings 35, where the same will be still further subdivided. If but three series of rings are provided, as shown in the drawings, the oil will be thrown off from the periphery of the upper and lower surfaces of each of the rings 35, and will be in such condition that all parts thereof will be accessible to the air, thus insuring the efficient and complete combustion of the oil.

It will be seen that there is thus provided a simple and efficient form of oil burner which will break up the oil so that all parts thereof may be readily consumed, and which is adapted to be actuated by the passing current of air, thus eliminating the necessity of positive driving mechanism for actuating the oil distributing devices. It should be understood, however, that other means for rotating the oil dividing rings and associated parts may be employed if desired.

Having thus described the nature and characteristic features of my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an oil burner, means for subdividing the fuel oil comprising a rotatable ring having its inner edge serrated, the serrations comprising a plurality of channels extending alternately to the upper and lower surfaces of said ring.

2. In an oil burner, means for subdividing the fuel oil comprising a rotatable ring having its inner edge serrated, the serrations comprising a plurality of channels extending alternately to the upper and lower surfaces of said ring, and means for delivering the fuel oil to the serrated edge portion of said ring.

3. In an oil burner, means for subdividing the fuel oil comprising a plurality of rotatable rings, each having its inner edge serrated, the serrations comprising a plurality of channels extending alternately to the upper and lower surfaces of said ring.

4. In an oil burner, means for subdividing the fuel oil comprising a plurality of rotatable rings, each having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of said ring, said rings being concentrically arranged in successive progressively increasing series.

5. An oil burner comprising a housing, a rotatable member mounted therein, said rotatable member having a flaring cup-like extension, means for supplying fuel oil to said cup-like extension, and a rotatable ring for subdividing the oil, said ring being concentrically arranged with respect to the rim of said cup-like extension and having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of the ring, and the serrated portion of said ring being arranged in the plane of the rim of the cup-like extension.

6. An oil burner comprising a housing, a rotatable member mounted therein, said rotatable member having a flaring cup-like extension, means for supplying fuel oil to said

cup-like extension, and a ring carried by said rotatable member for subdividing the oil, said ring being concentrically arranged with respect to the rim of the cup-like extension and having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of the ring, and the serrated portion of said ring being arranged in the plane of the rim of the cup-like extension.

7. An oil burner comprising a housing, and a plurality of rotatable rings for subdividing the oil mounted in said housing, said rings being concentrically arranged with respect to each other in progressively increasing series, each of said rings having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of the ring, the serrated portions of the rings of one series being arranged in the planes of the upper and lower surfaces of the adjacent enclosed series of rings, and means for delivering fuel oil to the serrated portion of the innermost ring.

8. An oil burner comprising a housing, a rotatable member mounted therein, a plurality of rings carried by said rotatable member for subdividing the oil, said rings being concentrically arranged with respect to each other in progressively increasing series, each of said rings having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of the ring, the serrated portions of the rings of one series being arranged in the planes of the upper and lower surfaces of the adjacent enclosed series of rings, and means for centrifugally delivering fuel oil to the serrated portion of the innermost ring.

9. An oil burner comprising a housing, a rotatable member mounted therein, said rotatable member having a flaring cup-like extension, means for supplying fuel oil to said cup-like extension, and a plurality of rings carried by said rotatable member for subdividing the oil, said rings being concentrically arranged with respect to the rim of said cup-like extension and with respect to each other in progressively increasing series, each of said rings having its inner portion serrated to provide a plurality of channels extending alternately to the upper and lower surfaces of the ring, the serrated portions of the rings of one series being arranged in the planes of the upper and lower surfaces of the adjacent enclosed series of rings, and the serrated portion of the innermost ring being arranged in the plane of the rim of the cup-like extension.

In testimony whereof, I have hereunto signed my name.

JOHN BENNIGER.