Aug. 27, 1929. W. A. BROWN 1,726,175

OIL BURNER

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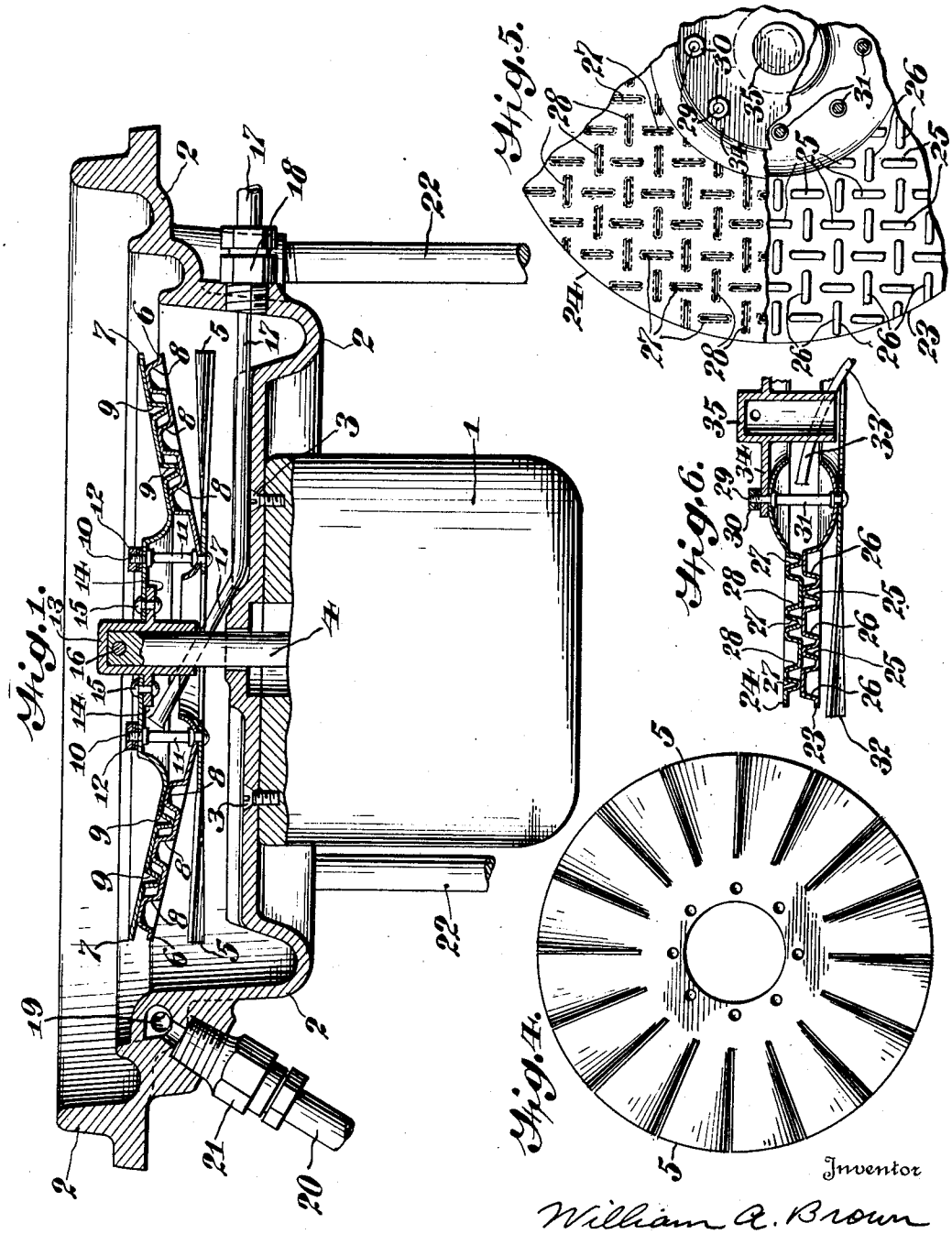


Fig. 1.

Fig. 5.

Fig. 6.

Fig. 4.

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Fig. 2.

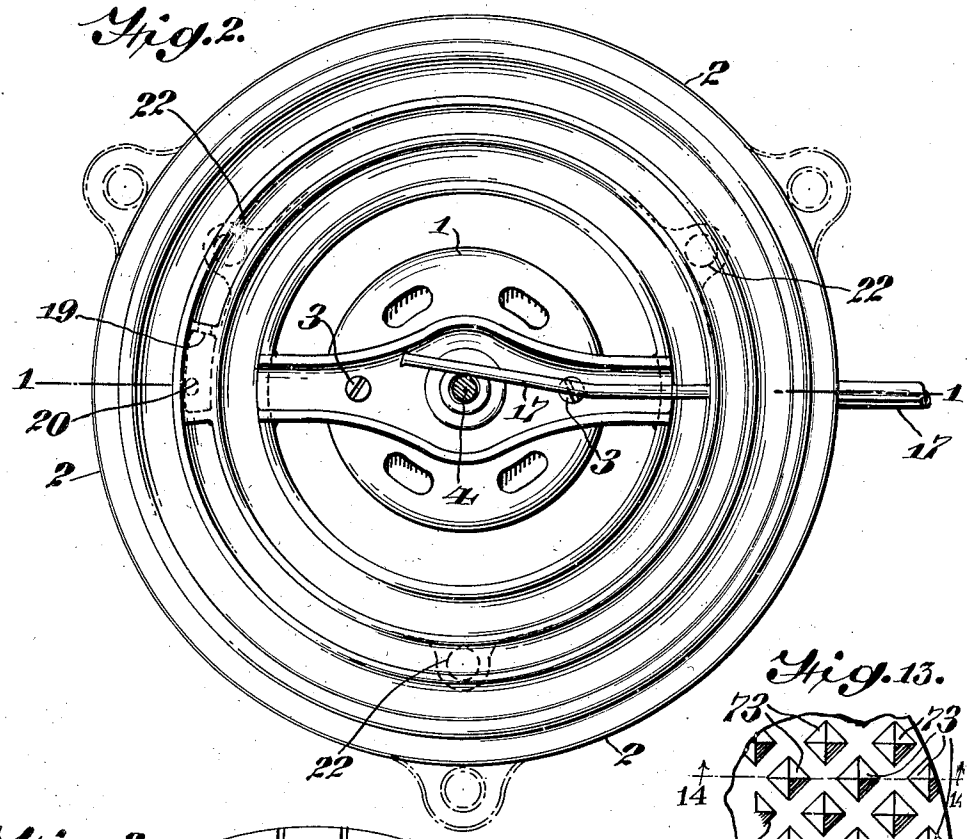


Fig. 13.

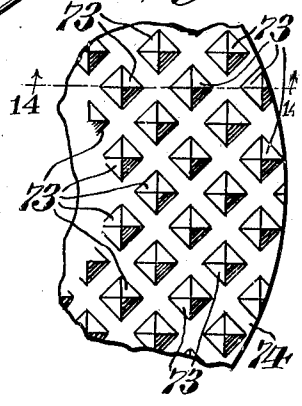


Fig. 3.

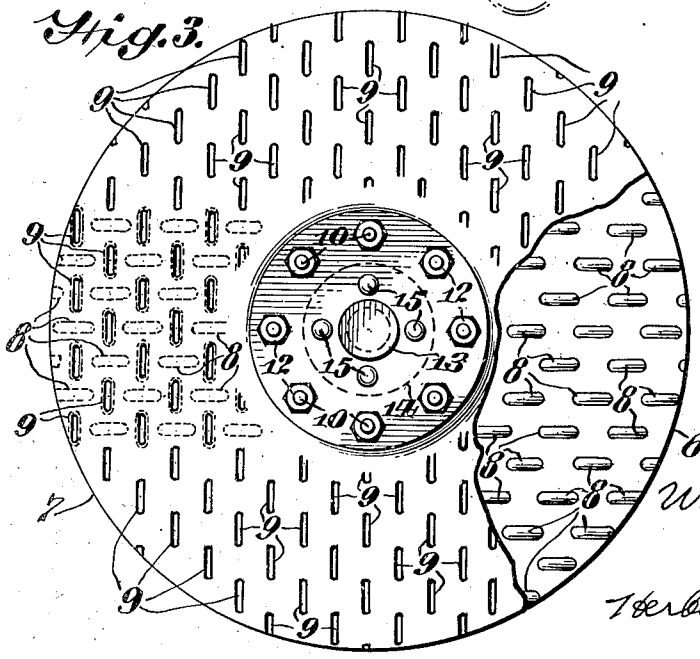


Fig. 14.



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Fig. 7.

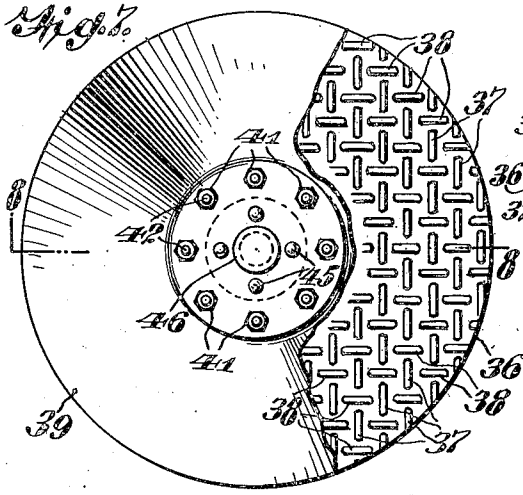


Fig. 8.

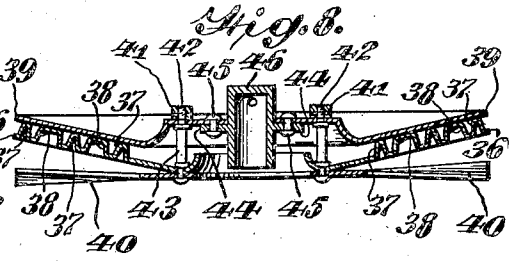


Fig. 9.

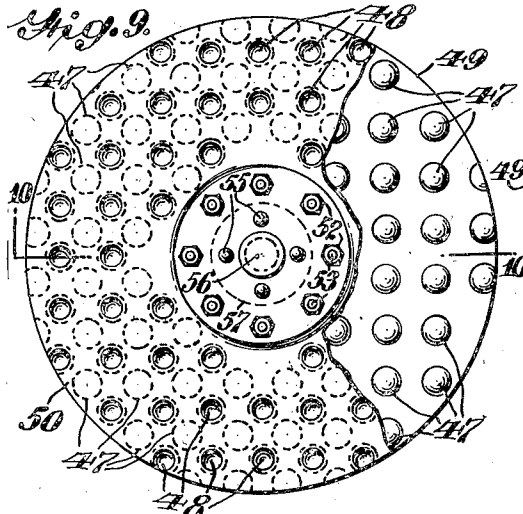


Fig. 10.

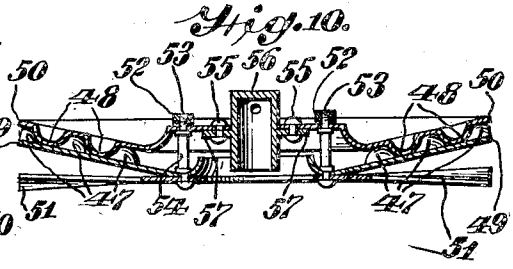


Fig. 11.

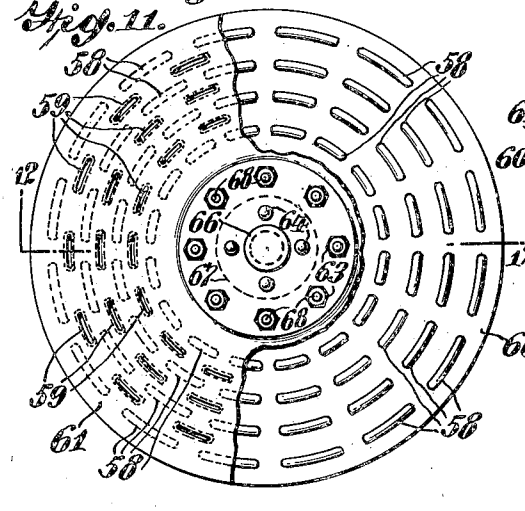
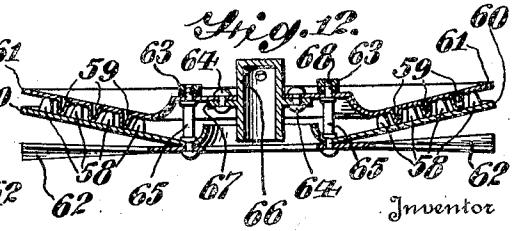


Fig. 12.



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UNITED STATES PATENT OFFICE.

WILLIAM A. BROWN, OF PHILADELPHIA, PENNSYLVANIA.

OIL BURNER.

Application filed May 14, 1928. Serial No. 277,431.

This invention relates to a fuel oil burner and more particularly to an inexpensive, positive means for agitating, diffusing and atomizing the molecules of the oil used in oil burners, to enable the use of heavy oils in those burners which do not employ a complicated preheating or pressure system for breaking up or atomizing heavy oils to induce vaporization prior to ignition and combustion.

The present methods of breaking up heavy oils by preheating and pressure are too expensive for use on the average low cost burner, with the result that the usual burner of this type which has been built heretofore to supply the needs of persons of limited resources has been a discouraging source of annoyance and distress. The slightest variation in the specific gravity of the oils used or the slightest inequality of any portion of a tank of oil causes constant or intermittent incomplete combustion with smoking and kindred troubles which in many cases prohibits the use of these burners unless the more expensive oils are bought, thus imposing a hardship on a class of people least able to stand it. And very often the more expensive oils, because of the lack of some means for producing positive, unfailing agitation, diffusion and atomization, have proved troublesome when used with the inexpensive burner.

It is therefore the prime object of this invention to provide a new and novel means for producing positive and unfailing agitation, diffusion and atomization of heavy oils by a method so simple and inexpensive as to enable its use on the average low cost fuel oil burner manufactured to meet the needs of the person of moderate circumstances.

With the above in view, my invention generically comprehends a novel fuel oil burner.

My invention further generically comprehends an oil atomization disc having a series of spaced baffles.

My invention further generically comprehends an oil atomization disc with baffles, in combination with means for revolving said disc at the desired speeds to produce violent centrifugal movement and impact of said oil on said disc and its baffles.

My invention further generically comprehends an oil atomization disc, with baffles in combination with a cover, to prevent the escape of oil during the process of atomization.

My invention further generically comprehends dual atomization discs with baffles, and so arranged one on top of the other as to prevent the escape of oil during the process of atomization.

My invention further comprehends the use of means for producing a current of air, adjacent to the periphery of my atomization disc to insure the necessary air required to induce perfect ignition and combustion of the vaporized oil as it leaves the disc.

My invention further comprehends the use of suitable means for igniting the mixture of vaporized oil and air.

My invention further comprehends the use of a proper housing for my atomization disc and its adjuncts to prevent the escape of any overflow of oil.

My invention further comprehends the use of means for feeding the required amount of oil to the atomization disc or discs.

My invention further comprehends the use of suitable means for revolving my atomization disc and its adjuncts at the required speeds to insure positive and unfailing atomization of the oil and the mixing of the vaporized oil with a current of air produced concurrently with the oil vapor prior to ignition and combustion of the mixture of air and oil vapor.

Other novel features of construction and advantage will hereinafter more clearly appear in the detailed description and the appended claims.

For the purpose of illustrating my invention, I have shown in the accompanying drawings typical embodiments of it, which, in practice, will give reliable and satisfactory results. It is, however, to be understood that these embodiments are typical only and that the various instrumentalities of which my invention consists can be variously arranged and organized, and that the invention is not, therefore, limited to the precise arrangement and organization of these instrumentalities as herein set forth.

Figure 1 is a sectional view of an oil burner, embodying my invention, the section being taken substantially on line 1—1 of Figure 2.

Figure 2 is a top plan view of the rotor housing and the motor with the motor shaft in section, and with the rotor removed.

Figure 3 is a top plan view, partly broken away of the rotor.

Figure 4 is a top plan view of the fan, in detached position.

Figure 5 is a top plan view, partly broken away of another embodiment of my invention showing another arrangement of baffles.

Figure 6 is a fragmentary section of Figure 5.

Figure 7 is a top plan view, partly broken away, of another embodiment of rotor with a different arrangement of baffles.

Figure 8 is a section on line 8—8 of Figure 7.

Figure 9 is a top plan view, partly broken away, of a rotor embodying my invention, with a different arrangement of baffles.

Figure 10 is a section on line 10—10 of Figure 9.

Figure 11 is a top plan view, partly broken away, of a rotor embodying my invention with another arrangement of baffles.

Figure 12 is a section on line 12—12 of Figure 11.

Figure 13 is a top plan view showing the atomizing disc with another form of baffles, embodying my invention.

Figure 14 is a section on line 14—14 of Figure 13.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

1 designates a motor of any desired or conventional construction which is preferably held in a position of positive alignment with the rotor housing 2 by means of the screws 3. The shaft 4 of the motor 1 supports the fan blades 5 and the atomization discs 6 and 7 which are provided with the spaced baffles 8 and 9. The atomization discs 6 and 7 are held in position by means of the bolts 10 and the distance pieces 11 or their equivalents. The fan 5 is also rigidly held in position on the disc 6 by the bolts 10. By removing the nuts 12 the lower disc 6 and the fan 5 may be dismantled to permit inspection and cleaning of the atomization discs 6 and 7. The entire structure comprising the discs 6 and 7 and the fan 5 form a rotor and are held in a stable centralized position on the shaft 4 of the motor 1 by means of the cap 13 which has the extension 14 to which the disc 7 is rigidly attached by the rivets 15 or their equivalent. The plug 16 prevents any movement of the cap 13 on the shaft 4. It is to be understood that the cap 13 is accurately machined and fitted to the shaft 4 to insure perfect alignment of the entire rotating assembly of discs and fan and their adjuncts.

The fuel oil pipe 17 which is held in position on the housing 2 by means of the fitting 18 feeds the oil to the discs 6 and 7 as will be seen. The gas pilot 19 is fed through the pipe 20 which is held in position on the housing 2 by means of the fitting 21. It is to be understood that while a gas pilot is illustrated other suitable ignition means may be employed if desired. The housing 2 and its adjuncts are mounted on the legs 22 or by any other suitable means.

In Figure 2 the relation of the motor 1 to the housing 2 and the position of the fuel oil pipe 17 with regard to the housing 2 and the shaft 4 will be clearly understood.

In Figure 3 I show the spaced baffles 8 and 9 on the discs 6 and 7 and the definite impedance at every point that these baffles form to a free flow of oil from the center to the periphery. From this figure it will be understood that oil delivered at or near the center of the discs 6 and 7, with these discs revolving at a speed of from 1000 to 5000 revolutions per minute, will be violently shot outwardly by centrifugal action and in passing from one baffle to another of the baffles 8 and 9 will strike these baffles with terrific force, and, at each impact, the oil globules are broken up. This action is continued so that when the heaviest oil that may be used has finally reached the periphery of the atomizing discs it has been reduced to a vapor and is in an ideal condition for mixing with the air generated around it to form a thoroughly combustible mixture of extraordinary efficiency.

Figure 4 shows a type of fan 5 which may be used with my disc or discs.

Figure 5 is a modification of my atomization method wherein I employ two identical atomization discs 23 and 24 having the baffles 25, 26, and 27, 28, respectively both discs having their baffles arranged in substantially the same relation to each other. In this construction more and heavier oils can be passed through the discs and reduced from a heavy consistency to that of vapor. The discs 23 and 24 are held in their assembled position by the bolts 29 and the nuts 30 in conjunction with the distance pieces 31.

Figure 6 more clearly shows the positions of the discs 23 and 24 in relation to each other, and, as will be seen, they are identical in form, with either the top or bottom disc having been turned around so that the atomizing baffles 27 and 28 of the top disc 24 are positioned substantially at right angles to the atomizing baffles 25 and 26 of the bottom disc 23. This construction allows a much greater space between the extreme top and bottom of my two coacting discs without sacrificing anything in the way of effectiveness of my method of reducing very heavy oils to vapor. This construction also removes the manufacturing problem of having the baffles too deep as is the case where only one

disc with baffles is used in conjunction with a cover for reducing very heavy oils, and introducing too much elongation of the metal when stampings are used, which is the preferred way of making my various discs. The fan 32, the fuel oil pipe 33, the shoulder 34, the cap 35 and the distance piece 31 are substantially the same as described for Figure 1. The atomization of the oil through violent agitation, diffusion and terrific impact on the various baffles in its passage because of centrifugal action from the center of the discs to the periphery of the discs where it emerges as a vapor, is the same as described for Figure 1.

Figures 7 and 8 are another modification of my inexpensive method of atomizing heavy oils and reducing them to a state of vaporization. In this construction I use only one atomization disc 36 having a series of baffles 37 and 38 substantially at right angles to each other and similar in character to the baffles 25 and 26 of the disc 23 and to the baffles 27 and 28 of the disc 24 seen in Figure 5. In this figure, however, I employ a smooth disc 39 as a cover to prevent the escape of oil before atomization has taken place. This construction may be used with many oils in place of that shown in Figure 1, with the same results, and at a substantial saving in costs. The fan 40, the nuts 41, the bolts 42, the distance piece 43, the extension 44, the rivets 45 and the cap 46 are the same as described for Figure 1.

Figures 9 and 10 are another modification of Figures 1 and 3. In these figures, I employ a series of circular knobs 47 and 48 so arranged on the discs 49 and 50 as to impede the flow of oil from the center of the discs to the periphery of the discs, in substantially the same manner as already described. The centrifugal action of the revolving discs 49 and 50 on the oil and the resultant agitation, diffusion and atomization caused by the knobs 47 and 48 as a result of the violent outward movement of the oil and the many impacts it receives during its outward passage is the same as already described. The fan 51 or its equivalent, the nuts 52, the bolts 53, the distance piece 54, the rivets 55, the cap 56 and the shoulder 57 are the same as described for Figure 1.

Figures 11 and 12 are another modification of my construction wherein I employ a series of circularly disposed baffles 58 and 59 on the discs 60 and 61 and so arranged as to produce the same effect of agitation, diffusion and atomization of heavy oils as already described. The fan 62, the nuts 63, the rivets 64, the distance piece 65, the cap 66, the shoulder 67, the bolts 68 are the same as described for Figure 1.

Figures 13 and 14 are another modification of my construction wherein I employ a series of baffles 73 on a disc 74 without a cover. This method may be employed with light oils where only agitation and diffusion are necessary.

It will be apparent from the foregoing that many different arrangements of baffles can be employed, only a few of which have been illustrated, the disc being preferably imperforate and the baffles being circumferentially and radially arranged and the oil under centrifugal action impacts against the baffles with a radial component and has a circuitous flow from the inner periphery of a disc to the outer periphery of such disc.

In so far as I am aware, I am the first in the art to accomplish this result in the manner herein set forth and it is to be understood that I desire my claims to such feature to receive a broad and generic interpretation.

It will now be apparent that I have devised a novel and useful construction of an oil burner which embodies features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have in the present instance shown and described preferred embodiments thereof which have been found in practice to give satisfactory and reliable results, it is to be understood that the same are susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

Having thus described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. In a device of the character stated, a centrally apertured disc, imperforate between its inner and outer peripheries and having baffles on its imperforate portion which are circumferentially spaced and radially staggered to form a circuitous path for the oil to atomize it by centrifugal action, means to feed oil to said disc, and means to revolve said disc.

2. In a device of the character stated, a centrally apertured disc, imperforate between its inner and outer peripheries and having baffles on its imperforate portion which are circumferentially spaced and radially staggered to form a circuitous path for the oil to atomize it by centrifugal action, a cover for said disc, means to feed oil to said disc, and means to revolve said disc.

3. In a device of the character stated, a centrally apertured disc, imperforate between its inner and outer peripheries and having baffles on its imperforate portion which are circumferentially spaced and radially staggered to form a circuitous path for the oil to atomize it by centrifugal action, an air generator in proximity to said disc, means to feed oil to said disc, and means to revolve said disc.

4. In a device of the character stated, a centrally apertured disc, imperforate between its inner and outer peripheries and having baffles on its imperforate portion which are circumferentially spaced and radially staggered to form a circuitous path for the oil to atomize it by centrifugal action, an air generator in proximity to said disc, means to feed oil to said disc, means to revolve said disc, and means to ignite the vaporized mixture of air and oil at the periphery of the disc.

5. In a device of the character stated, a centrally apertured disc, imperforate between its inner and outer peripheries and having baffles on its imperforate portion which are circumferentially spaced and radially staggered to form a circuitous path for the oil to atomize it by centrifugal action, means to feed oil to said disc, means to revolve said disc, and a housing for said disc.

6. Super-imposed discs, the lower of which has a central opening and an imperforate surface extending from the opening to its periphery, each of said discs having baffles circumferentially spaced and radially staggered to form circuitous paths for atomizing oil by centrifugal action, means to feed oil to said discs, an air generator in proximity to said discs, means to revolve said discs, and means to ignite the vaporized mixture of air and oil at the periphery of said discs.

7. An atomizing rotor, having members axially spaced, said members having means therebetween providing baffles circumferentially spaced and radially staggered to form a circuitous path for the fuel and impede its flow under centrifugal action, means to feed fuel to said members and means to revolve said members.

WILLIAM A. BROWN.