

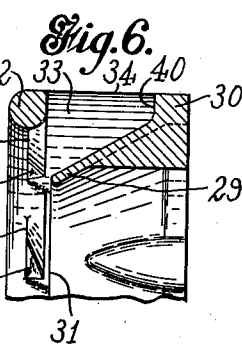
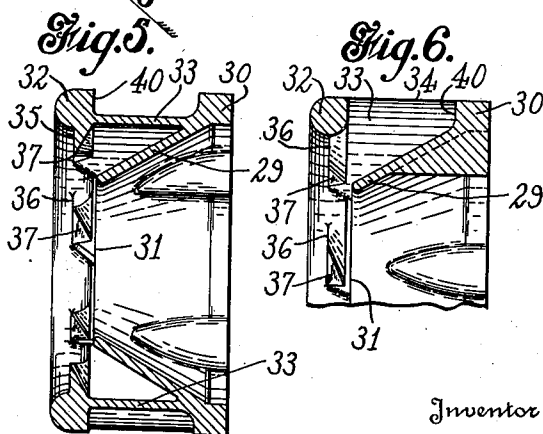
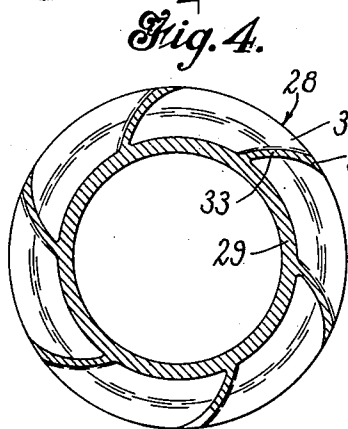
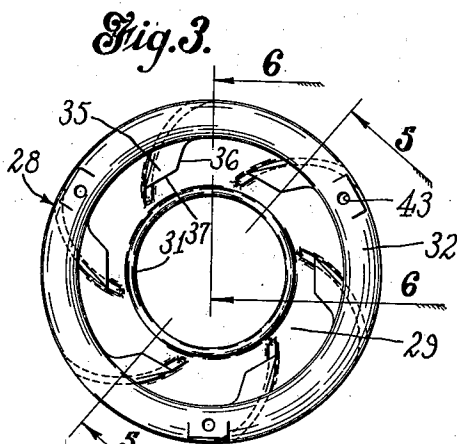
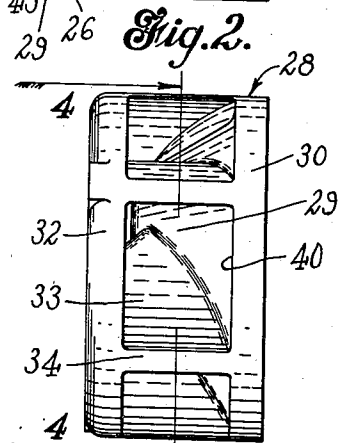
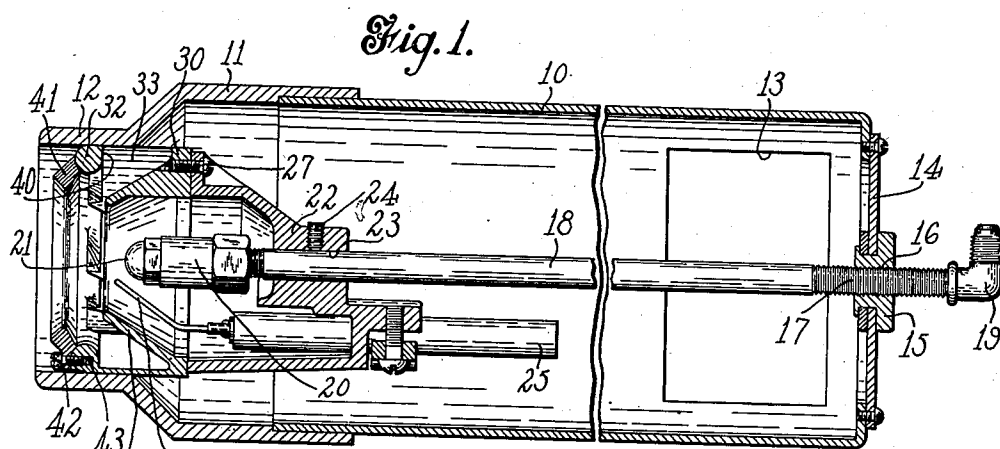
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F. L. HAMMER

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OIL BURNER

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UNITED STATES PATENT OFFICE

2,222,031

OIL BURNER

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6 Claims. (Cl. 158—76)

This invention relates to oil burners, and more particularly to an adjustable burner head or air control head for a device of this character.

5 In the case of oil burners for domestic and other purposes, the fuel is usually atomized by being forced through a relatively fine opening in a fuel nozzle, and air is delivered to the atomized fuel around the outside of the spray which issues from the nozzle opening. The amount of this air is, in many cases, controlled by an element 10 slidable in the outer casing and having openings which are partially closed by the outer casing, the amount of air being permitted to pass 15 depending upon the position of the member in the casing. This member also usually comprises a constricting ring which constricts the flame, and such ring should preferably be at a fixed distance from the burner nozzle. However, when the 20 burner nozzle is fixed within the outer casing and the ring is adjusted in order to control the supply of air furnished to the flame, the distance between this constricting ring and the nozzle is varied with deleterious results.

25 In the present invention it is contemplated that the burner head shall have connected thereto all of the parts of the burner, including the constricting ring, the air-volume-controlling means, and the atomizing nozzle, and that this head as a whole be made adjustable relatively to the outer casing, so that the head is adjusted to vary the volume of air furnished to the burner, while all of the parts of the head, including the flame-constricting ring and the nozzle, be main- 30 tained in the same positions relatively to each other. It will, of course, be understood that the burner nozzle may be adjusted relatively to the remaining parts of the head during the assembly or installation of the burner in order to obtain 40 its proper setting. However, after the proper setting of the fuel nozzle within the burner head is once obtained, the volume of air delivered may be adjusted as desired without altering the relative position of those parts.

45 It is also contemplated by the invention to so construct the burner head, and particularly that part of it that governs the flow of air to the atomized fuel, that this air will be directed sharply toward the center of the head at a point 50 spaced a short distance only in front of the burner nozzle whereby a thorough mixing of the oil and air will occur, and the combustible mixture will burn close to the nozzle of the burner, 55 as it is very undesirable to have the beginning of

the flame a considerable distance from the end of the nozzle.

One object of the present invention is to provide an oil burner having a burner head of novel construction, whereby the amount of air delivered to the burner may be controlled without 5 altering the relative positions of the fuel nozzle and the other parts of the head.

A still further object of the invention is to provide in the casing of an oil burner, a sliding 10 ring having vents or openings through which the air is delivered to the burner, and a flame-constricting member upon the ring, the ring being secured in fixed relation to the fuel nozzle of the burner so that the ring and fuel nozzle may be 15 moved together to vary the amount of air passing through the ring without changing the relative position of the flame-constricting member and the nozzle.

A still further object of the invention is to provide air-deflecting means of novel character such 20 that the air delivered to the fuel spray will be directed sharply toward the center of the burner head at a point spaced a short distance only from the burner nozzle.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the accompanying drawing:

Fig. 1 is a sectional view of an oil burner nozzle 30 and associated parts embodying my improvements;

Fig. 2 is a side elevational view of the air-deflecting member;

Fig. 3 is a front view of the same looking to- 35 ward the left in Fig. 2;

Fig. 4 is a sectional view on line 4—4 of Fig. 2;

Fig. 5 is a sectional view on line 5—5 of Fig. 3; and

Fig. 6 is a partial sectional view on line 6—6 40 of Fig. 3.

To illustrate a preferred embodiment of my invention, I have shown an oil burner comprising a casing 10 of substantially cylindrical shape, this casing having on the forward end thereof 45 a cap 11 reduced in size at its forward end, as shown at 12. It will, of course, be understood that the members 10 and 11 may be integrally formed if desired. Adjacent the rear end of casing 10 is an opening 13 through which the combustion-supporting air for the burner is 50 driven into the casing by a suitable fan (not shown).

On the rear end of the casing is mounted a plate 14, at the center of which is rotatably se- 55

cured a nut 15 having a threaded opening 16 to receive the threaded portion 17 of the oil supply pipe 18. This pipe may be provided with an elbow 19 which may be connected to the oil supply in any suitable manner. The oil pipe 18 extends to the forward end of the casing, and at its front end is provided with an atomizing nozzle 20 having a relatively fine opening 21 through which the fuel is forced.

Mounted on the pipe 18 adjacent the forward end thereof but rearwardly of the nozzle 20 is the burner head which comprises a rear base portion 22 having an opening 23 which receives the tube 18, and this member may be secured upon the tube in the proper position by means of the set screw 24. The rear base portion 22 of the head flares forwardly, as shown, and secured in the wall thereof below the pipe 18 are electrode holders 25 for the electrodes 26 which furnish the spark for the flame. Only one of these electrodes is shown in the drawing, but it will be understood that another is supported beside the first, as is usual in devices of this character.

Secured to the forward portion of the member 22 by any suitable means such as screws 27, is an air deflector which is designated generally by the numeral 28, and is shown in detail in Figs. 2 to 6 of the drawing. This member comprises a substantially cone-shaped portion 29 having a base portion or ring 30, this portion being larger at its rear end adjacent the member 22, and having a constricted opening 31 at its front end.

Spaced from the circular base member or ring 30 is a second ring 32, which is of considerable thickness so as to serve as a flame-constricting member and constrict to some extent the spread of the flame produced by the burner. The members 29 and 32 are connected by a number of spiral vanes 33, these vanes having relatively wide bases 34 at the outer periphery of the flame deflector and tapering in width toward the smaller end of the cone-shaped member 29, or where this member approaches the ring 32. At their forward ends or adjacent the junction of these vanes with the ring 32 there are provided abutments or projecting shoulders 35, as shown more particularly in Figs. 3, 5 and 6. These shoulders have their front faces disposed in a plane substantially parallel with the general plane of the ring 32, and from these broad faces taper rearwardly so as to merge into the vanes 33. The forward faces of these shoulders or projecting members are comprised substantially of four sides, one side of which abuts the inner periphery of the ring 32, another side lies against the vane 33, while the one free edge 36 is substantially parallel to the vane and the other edge 37 is substantially concentric with the restricted opening 31.

Between the bases 34 of the vanes 33 and the members 30 and 32 are openings 40 through which air delivered to the casing 10 through the opening 13 may pass spirally or helically between the vanes 33 and into the path of the spray issuing from the atomizing or spray nozzle 20. It will be obvious that the amount of air so delivered to the burner may be controlled by moving the deflector element 28 longitudinally within the casing 10. This is due to the fact that the member 28 makes a relatively tight fit within the reduced portion 12 of the burner casing, so that as the member 28 is moved forwardly the openings 40 will be closed or substantially closed by this portion of the casing. The adjustment of the burner head longitudinally of the casing 10 may be ef-

fectively accomplished by rotating the nut 15 with respect to the plate 14 in which it is mounted. Due to its threaded connection with the oil tube 18, this rotation moves the tube and thereby the entire burner head forwardly and rearwardly of the casing, thus regulating the effective size of the openings 40, and also, of course, regulating the amount of air that passes through these openings to the oil spray.

It may also be noted that this adjustment is effected without varying the distance between the burner nozzle 20 and the cooperating parts of the burner, so that the amount of air may be adjusted without changing the relationship of the air-deflecting means or the flame-constricting ring with respect to the burner nozzle. If the ring 32 does not constrict the flame to a sufficient extent, as may be true in the case of relatively small heating plants, an auxiliary flame-constricting ring 41 may be secured on the ring 32 by means of screws 42 passed through openings in the ring 41 and into threaded openings 43 in the ring 32.

It may also be noted that the air which passes through the openings 40 and between the vanes 33 strikes the shoulders or projecting members 35 at the tip of the vanes, and is deflected sharply inwardly toward the center of the burner, so that it will be introduced into the oil spray at a point close to the burner nozzle. This provides for a thorough and effective mixing of the air with the oil spray at a point close to the nozzle, so that the combustion flame will begin at this point, a feature which is very desirable in a burner of this character. The edge 36 of each of the members 35, as is seen in Fig. 3, makes a slight angle with a line drawn from the center of the opening 31 to the base of the associated vane 33, such, for example, as the section line 6-6 shown in Fig. 3. This angle should probably be between ten and twenty degrees for the best results, but in any event it is highly desirable to have these abutment members at the forward ends of the rings to direct the air sharply toward the longitudinal axis of the burner head at a point closely in front of the spray nozzle. These members 35, while they have, as shown in Fig. 3, relatively broad faces, taper rearwardly from both edges 36 and 37 until they merge with the inner faces of the vanes 33.

It will be obvious from the foregoing that I have provided a very simple and compact arrangement of parts which will insure a thorough mixing of the air and fuel at a point close to the burner, and at the same time provide a very simple control adjustment for varying the amount of air delivered to the burner merely by moving the burner head rearwardly and forwardly by means of the nut 15, which does not alter the adjustment between any of the parts of the burner head and the spray nozzle. If such adjustment is necessary, it may, of course, be made when desired by loosening the set screw 24 and sliding the member 22 forwardly or rearwardly upon the fuel tube 18.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. An oil burner comprising a casing, a burner head movably mounted in said casing, a fuel nozzle secured to said head, said head comprising an air deflector to deliver air from the casing

to a point forwardly of the nozzle, said casing and head being provided with cooperating means to vary the air so delivered upon movement of the head in the casing, and a flame-constricting member on the head forwardly of said nozzle whereby said constricting member, nozzle and deflector are movable together with said head.

2. An oil burner comprising a casing, a burner head movably supported in said casing and comprising an air deflector through which air passes from the casing to a point forwardly of said head, said deflector having air openings therein communicating with the interior of the casing, said casing having means to cooperate with said openings to vary the effective size thereof upon movement of the head in the casing and thereby vary the volume of air passing through the deflector, a fuel nozzle secured to the head and movable therewith in the adjusting movements of the head, and a flame-constricting member also carried by said head to be movable therewith.

3. An oil burner comprising a casing, a fuel tube extending longitudinally through said casing and mounted for longitudinal movement therein, a fuel nozzle on the forward end of said tube, a burner head mounted upon said tube rearwardly of said nozzle and extending forwardly to embrace the nozzle, said head comprising an air deflector having air openings communicating with the casing and positioned to deliver air to a point forwardly of the nozzle, said casing having a restricted portion cooperating with said openings to vary the effective size thereof upon longitudinal movement of the head relatively to the casing, and a flame-constricting member on said head normally maintained in a fixed position relatively to said nozzle during the adjusting movements of said head.

4. An oil burner comprising a casing, a fuel tube extending longitudinally through said casing and mounted for longitudinal movement therein, a fuel nozzle on the forward end of said tube, a burner head mounted upon said tube rearwardly of said nozzle and extending forwardly to embrace the nozzle, said head comprising an air

deflector having air openings communicating with the casing and positioned to deliver air to a point forwardly of the nozzle, said casing having a reduced portion at its forward end snugly fitting the periphery of said deflector whereby the effective size of said openings is varied when the deflector is moved into or out of said reduced portion, and said nozzle and deflector being normally maintained in fixed relative positions during adjusting movements of said head.

5. An oil burner comprising a casing, a burner head mounted within the casing for longitudinal movement relatively to the casing, a fuel nozzle disposed within the head and secured thereto, said head comprising a member of frusto-conical shape extending forwardly of said nozzle, a ring spaced forwardly of said member, spirally disposed vanes connecting said member to said ring and defining a series of openings between the vanes, said casing having means cooperating with said openings to vary the effective size thereof upon longitudinal movement of the head in the casing, said openings communicating with the casing at their outer ends to deliver air therefrom to a point forwardly of the nozzle.

6. An oil burner comprising a casing, a burner head mounted within the casing for longitudinal movement relatively to the casing, a fuel nozzle disposed within the head and secured thereto, said head comprising a member of frusto-conical shape extending forwardly of said nozzle, a ring spaced forwardly of said member, spirally disposed vanes connecting said member to said ring and defining a series of openings between the vanes, said casing having means cooperating with said openings to vary the effective size thereof upon longitudinal movement of the head in the casing, said openings communicating with the casing at their outer ends to deliver air therefrom to a point forwardly of the nozzle, said ring serving as a flame-constricting member and being normally maintained in a fixed position with respect to said nozzle during movements of the head.

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