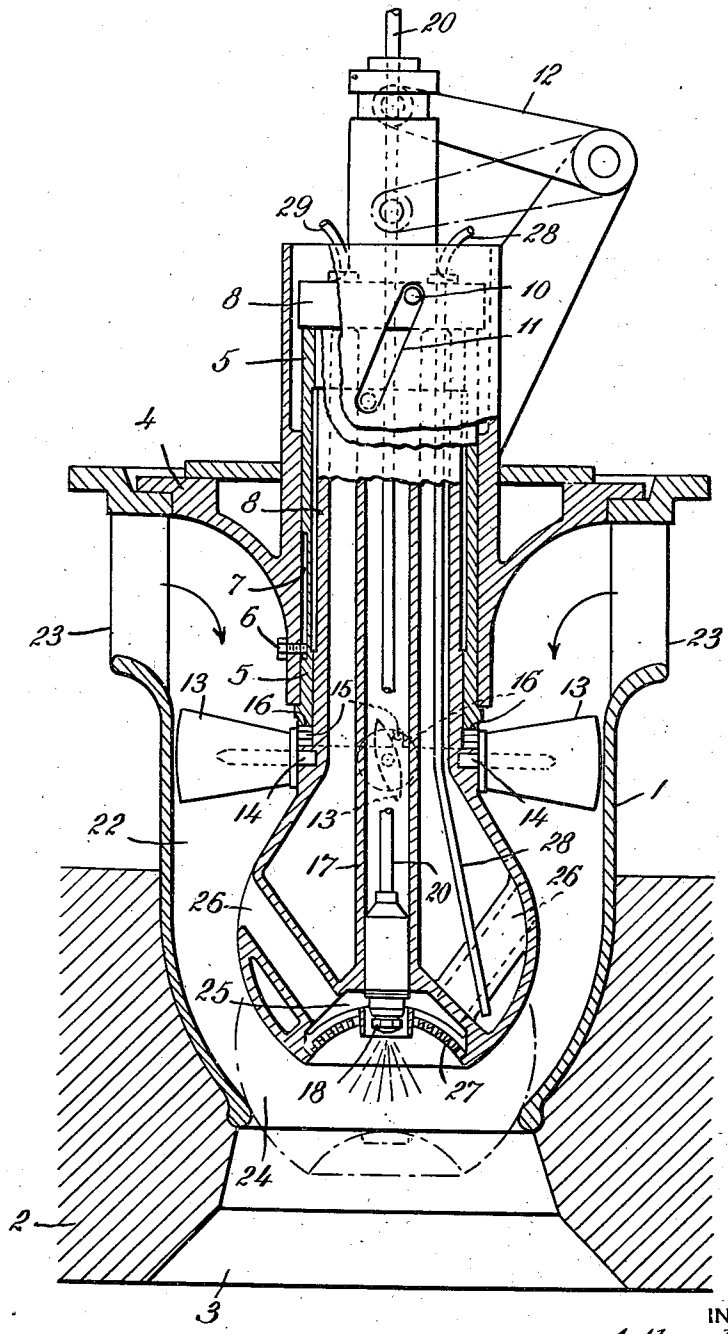
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FUEL BURNING DEVICE

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FUEL BURNING DEVICE

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This invention relates to fuel burners and has for its object the provision of an improved device of this kind. The device of the invention may be used for the burning of various liquid fuels but is particularly applicable to the burning of viscous fuels.

The burner of the invention is of the kind which comprises a main air inlet passage provided with guide blades for imparting a rotary movement to the air, and a main air outlet opening the area of which is adjusted by axial displacement of an inner part of the burner to vary the supply of air as the fuel is varied.

In a burner according to the present invention, the guide blades for imparting a rotary motion to the air issuing from the main outlet opening are mounted on the inner axially movable part of the burner and the arrangement is such that the adjustment of the guide blades and the axial displacement of the inner movable part of the burner can be made dependent upon each other so that the rotary movement of the issuing air can be adjusted in accordance with the area of the main air outlet opening and with fluctuations of load.

According to a further feature of the invention, a subsidiary air passage is provided which communicates with the main air inlet passage and immediately surrounds the fuel nozzle body, being axially displaceable with the inner part of the burner and fitted with a grid-like grating dividing the air issuing therefrom around the fuel nozzle into a number of streams for the purpose of preventing a deposit of fuel near the nozzle, and the formation of carbon.

The inner movable part of the burner may be so arranged that it makes a turning movement as it is axially displaced, and this turning movement may be utilized to effect an adjustment of the guide blades. The burner of the invention is so constructed and arranged that the fuel introduced can be varied so as to produce combustion free of smoke.

These and other novel aspects of the invention will be better understood from the following discussion taken in conjunction with the single figure of the accompanying drawing, in which is shown in side elevation, partly in section, a fuel burner embodying the invention.

The burner illustrated in the drawing, comprises a body portion or casing 1 adapted to be mounted in a support 2 having a suitable opening 3 through which the fuel and air may be discharged into a combustion chamber. The casing 1 has a housing 4 attached thereto having a central opening in which a bushing 5 is mounted to slide in an axial direction therein, but prevented from rotation by a pin 6 in the housing which projects into a longitudinal slot 7 in the bushing. The central portion of the bushing has an opening in which the inner axially movable member 8 of the burner is mounted. The member 8 is slidably mounted with respect to the casing, being slidable axially with the bushing and rotatable in the bushing. The upper portion of the movable member 8 carries a pin 10 which projects into an inclined slot 11 in the upper end of the housing 4, the member 8 also engages with a pivotal adjustment member 12.

The central portion of the member 8 carries a plurality of guide blades 13 pivotally mounted on axles 14, and each blade has a pin 15 engaging a slot 16 in the bushing 5. The lower portion of the member 8 is preferably enlarged and has means adjacent the lower end for engaging a central tube 17 in which a burner nozzle 18 is mounted, preferably adjustable in the axial direction. Any suitable nozzle which may atomize or discharge the fuel in a spray may be used. The nozzle 18 is attached to a fuel pipe 20 leading to a source of fuel under pressure (not shown).

A relatively large main air passage 22 completely surrounds the lower portion of the movable member 8 and blades 13, and is integral with the main air outlet opening 24. The air for combustion is admitted into passage 22 through ports 23 in the casing 1. Immediately surrounding the nozzle 18, and formed in the member 8, is a subsidiary air passage 25 communicating with the main air passage 22 through conduits 26. An arcuate grid-like grating 27 is formed at the lower central portion of the member 8 surrounding the end of the nozzle and this serves to split the air passing from the subsidiary chamber into thin streams. A pipe 28 connecting to a source of cooling fluid (not shown) is positioned to discharge the fluid into the lower inner portion of member 8 and any suitable discharge means for the cooling fluid such as pipe 29 is provided.

By rotating the adjustment member 12, or by other means, the member 8 may be shifted axially and it may assume any position intermediate the upper position shown and the extreme lower position shown in dotted lines. As the member 8 slides in the housing 4 the pin 10 follows the slot 11 and member 8 is given a slight rotation. The bushing 5 also slides with the member 8 but is prevented from rotating by the pin 6 which

engages the slot 7. Since the pins 15 of the blades 13 engage fixed openings in the bushing 5, the rotation of the memper 8 imparts a rotary motion to the blades. The blades direct the air in a rotary flowing motion through the passage 22, the effect of which may be varied by adjusting the blades. The area of the main air outlet 24 is controlled by the position of the lower end of member 8 which is due to the axial adjustment thereof.

If the pin 16 is removed, the member 8 may be shifted axially without rotation and the size of the air outlet opening may be adjusted independently of the position of the blades. The adjustment is then preferably by hand. Similarly, the blades may be set independently of the size of the main air outlet by rotating the member 8 by hand.

The combustion air may be blown through the opening 23 or it may be sucked in and it may pass partly through the main outlet 24 when the member 5 is in a raised position, the other part going through the conduits 26 and the grating 27. When the member 8 is in the position indicated in dotted lines, all of the air passes through the conduits 26 and the grating 27. The grating 27 divides the air passing therethrough into a plurality of streams which are directed towards the fuel issuing from the nozzle. In this way, particularly when the fuel is injected downwardly, the parts of the burner immediately surrounding the nozzle are protected from overheating and acquiring an accumulation of carbon.

As shown in the drawing, the mounting of the blades on the movable inner member 6 facilitates dismantling and the blades may be automatically turned about their axes with axial movement of the member 8 in such a manner that the most favorable degree of rotation of the air may be obtained for each area of the main air outlet 24. In other words, the area of the main air outlet opening 24 and the degree of rotation imparted to the air can be adjusted in dependence upon one another in such manner that the burner tends to produce combustion free from smoke at all loads, even when only a small excess of air is employed.

It is to be understood that the construction more particularly described above is given by way of example only and that modifications may be made without departing from this invention.

I claim:

1. A fuel burner which comprises a casing having an air inlet port and an air outlet opening, a plurality of guide blades, a movable member slidable with respect to the casing on which the blades are mounted, a nozzle positioned to discharge fuel through the outlet opening, an air passage in the casing, said blades being in the air passage, means for adjusting the blades to impart different rotary effects to the air flowing through the passage, and means for varying the size of the air outlet opening.

2. A fuel burner which comprises a casing having at least one air inlet port and an air outlet opening for the discharge of air, a movable member mounted in the casing and slidable with respect thereto, a plurality of guide blades attached to the movable member, an air passage in the casing whereby air may pass from the inlet port in contact with the blades and be discharged from the air outlet opening, a fuel nozzle located adjacent the air outlet opening, means for slidably moving the movable member to vary the size of the air outlet opening and means for adjusting the guide blades as the size of the air outlet opening is varied.

3. A fuel burner which comprises a casing having at least one air inlet port and a main air outlet opening for the discharge of air, a movable member slidably and rotatably mounted in the casing, a plurality of adjustable guide blades mounted on the movable member, a main air passage in the casing in which air from the port flows over the blades and is discharged out of the main air outlet opening, means for sliding the movable member to vary the size of the main air outlet opening, means for rotating the movable member with respect to the casing and simultaneously adjusting the guide blades, and a burner nozzle mounted in the slidable member and arranged to discharge fuel through the main air outlet opening.

4. A fuel burner according to claim 3, in which the movable member is provided with a subsidiary air passage arranged to supply air around the discharge portion of the nozzle, and a conduit is provided connecting the main air passage with the subsidiary air passage for supplying air thereto.

5. A burner according to claim 3, in which a subsidiary air passage is formed in the movable member and a grid is provided in the lower portion of the movable member for the discharge of air in streams adjacent the discharge end of the nozzle.

6. A burner in accordance with claim 3, in which means are provided for moving the movable member in the axial direction of the burner and simultaneously adjusting the guide blades.

7. A fuel burner which comprises a casing having at least one air inlet port and a main air outlet opening for the discharge of air, a housing member attached to the casing at the upper portion thereof having a central opening, a bushing mounted in the central opening, a movable member mounted in the bushing and rotatable with respect thereto, a plurality of guide blades adjustably mounted on the movable member, a main air passage around the movable member connecting with the port and the main air outlet, said guide blades being in the main air passage, means for sliding the bushing and movable member as a unit, means for rotating the movable member with respect to the bushing to effect an adjustment of the guide blades, and a nozzle mounted in the movable member positioned for the discharge of fuel through the main air outlet opening.

8. A burner in accordance with claim 7, in which the movable member is provided with a subsidiary air passage and with a conduit connecting the subsidiary air passage to the main air passage, said movable member being formed and arranged to close the main air outlet and force the passage of the air through the subsidiary air passage.

9. A fuel burner which comprises a casing provided with an air inlet port, a main air passage arranged to communicate with the inlet port and an air outlet opening for the discharge of air from the main air passage, a plurality of adjustable guide blades mounted in the passage, a fuel nozzle arranged to discharge fuel through the air outlet opening, rotary means for adjusting the positions of the guide blades, slidable means for varying the size of the air outlet opening, and interconnecting means so operatively interconnecting the rotary means and the slidable means that the positions of the guide blades and the

size of the air outlet opening may be adjusted simultaneously.

10. A fuel burner according to claim 7 which comprises a subsidiary air passage in the movable member, a conduit for passing air from the main air passage to the subsidiary air passage, said nozzle being slidable with the movable member, and a grid at the discharge end of the movable member through which air from the subsidiary air passage is discharged adjacent the discharge end of the nozzle.

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