

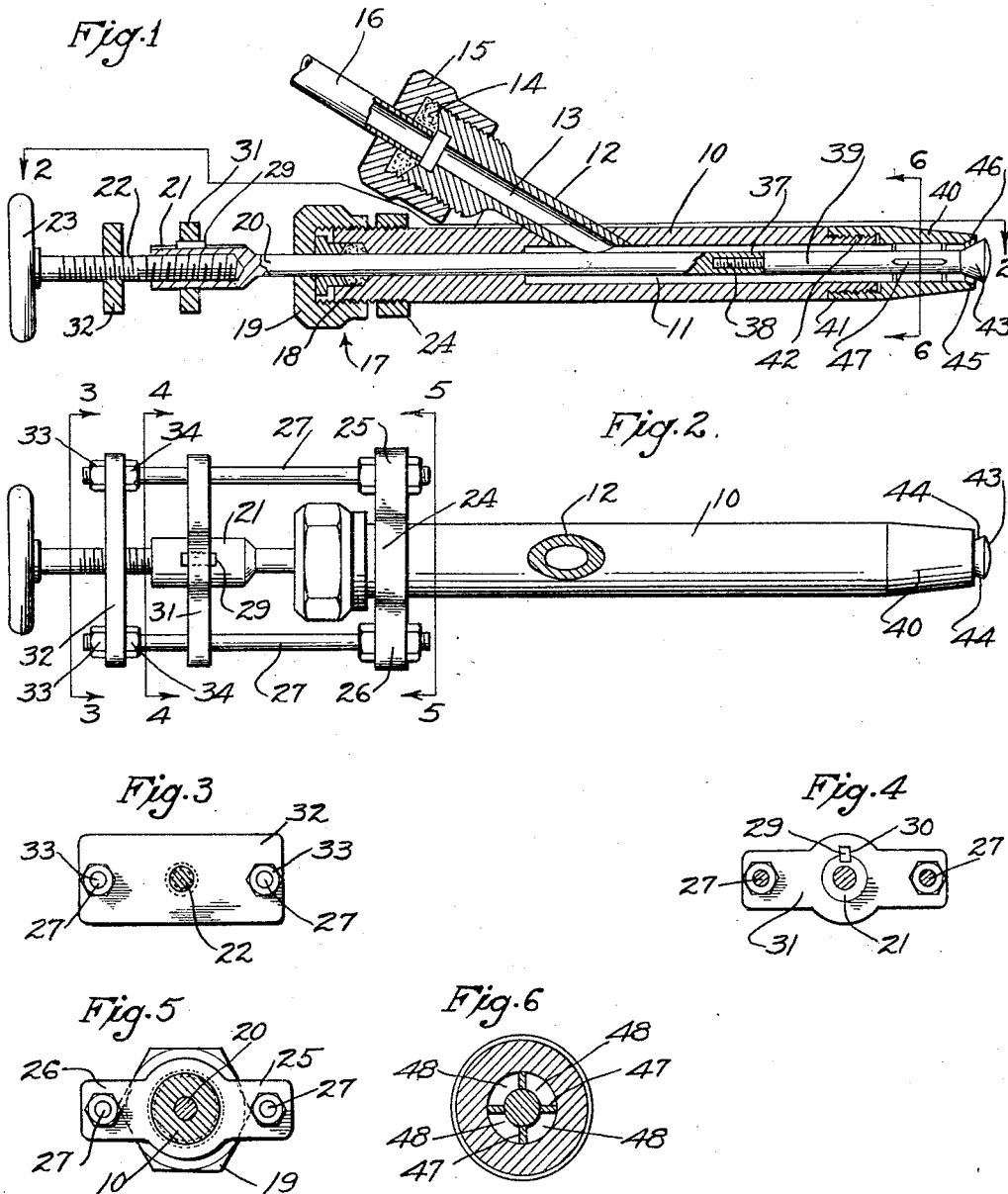
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OIL BURNER

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OIL BURNER

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This invention relates to a burner and particularly pertains to a burner for use with liquid fuel.

It is the principal object of the present invention to provide a fuel burner of the nozzle type especially adapted for use with liquid fuel and being so designed and constructed as to produce thorough atomization of the liquid as it is forced from the nozzle under pressure and is projected into a combustion chamber.

The present invention contemplates the provision of a nozzle housing having connections thereto for supplying liquid fuel under pressure and at the end of which housing is mounted an atomizing valve member controlled by an adjustable valve stem extending through the housing.

The invention is illustrated by way of example in the accompanying drawing in which:

Figure 1 is a view in central longitudinal section through the burner showing its various parts and their operative connections.

Fig. 2 is a plan view partially in section showing the adjustable burner on the line 2—2 of Fig. 1.

Fig. 3 is a view showing the end of the burner as viewed along the lines 3—3 of Fig. 2.

Fig. 4 is a view in transverse section through the regulating stem as seen on the line 4—4 of Fig. 2.

Fig. 5 is a view in transverse section showing the burner as viewed on the line 5—5 of Fig. 2.

Fig. 6 is a view in transverse section through the nozzle as seen on the line 6—6 of Fig. 1.

Referring more particularly to the drawing, 10 indicates the cylindrical body member of the burner nozzle having a central opening 11 therethrough. Formed integral therewith and communicating with said central opening is a connection pipe 12 having a liquid fuel passageway 13 therein. The connection pipe is fitted with a stuffing gland 14 and threaded cap 15 therefor by which a feed pipe 16 is secured in operative relation

to the pipe 12. Formed at the rear of the body member 10 and in continuation thereof is a packing structure 17 having a stuffing gland 18 therein and a packing box 19 threaded thereon. The stem 20 extends through the stuffing gland and is formed at its outer end with an enlarged portion 21, which is bored and threaded to receive a complementary threaded stem 22. A regulating wheel 23 is secured to the free end of the stem 22. A saddle 24 is suitably secured as by threading to the body 10 of the burner. Lugs 25 and 26 are formed on the opposed ends of the saddle and form a fixture from which parallel guides 27 extend rearwardly. The enlarged portion 21 of the stem 20 is fitted with a key 29 which slidably fits within a key way 30 in a cross head 31 through which the stem portion 21 extends. The opposing ends of the saddle 31 are bored to slidably receive the parallel guides 27 which extend through the cross head 31 and receive a cross tie 32 which is rigidly secured to the guides 27 by means of jam nuts 33 and 34. The cross tie 32 is threaded to receive the threaded stem 22.

Attention is directed to the fact that the portion of the thread extending into the enlargement 21 of stem 20 is of opposite pitch from that of the portion of the thread extending through the cross head so that alternate rotation of the threaded stem 22 will cause alternate longitudinal movement of the tip stem 20.

The portion of the stem which extends longitudinally of the bore 11 is formed with a threaded counterbore 37 at its end to receive the threaded stem 38 of a nozzle pin 39. This nozzle pin extends forwardly through a nozzle tip 40, which is formed with a threaded counterbore 41, adapted to be mounted upon a threaded extension 42 of the body member 10. The nozzle pin 39 is fitted with an enlarged tip 43 having inwardly tapering side walls 44, agreeing in angularity with tapering walls 45 formed at the mouth of the nozzle tip. The outer end of the enlarged tip 43 is of greater diameter than the diameter of the mouth of the nozzle tip and the inclined face 44 of the enlarged tip com-

bines with the inclined face of the mouth of the nozzle tip to form an outwardly flaring annular passageway 46 through which the liquid fuel from the nozzle is projected.

5 The nozzle pin 39 is formed with a plurality of radially extending ribs 47 which project longitudinally of the pin at 90° to each other, and have a length within the nozzle 40 as shown in Figs. 1 and 6 of the drawing. It

10 will thus be seen that the ribs 47 divide the annular space occurring within the nozzle tip 40 and around the nozzle pin 39 into a plurality of segmental openings 48, which insure that the liquid forced through the

15 burner structure under pressure will be uniformly distributed to the annular passageway 46 at the nozzle tip, whereby thorough uniform atomization of the fuel will take place, as it is ejected from the end of the

20 nozzle tip. This will also insure that the spray of atomized fuel oil will be conical in its formation from the end of the nozzle tip at its apex and that it will be of uniform density.

25 In operation of the present invention fuel oil is delivered to the burner under suitable pressure through the supply pipe 16. The oil is led into the bore 11 along the passageway 13 and is forced toward the nozzle end

30 of the burner structure where the ribs 47 around the nozzle pin 39 will act to uniformly distribute the liquid fuel and cause it to be forcibly ejected from the end of the burner tip through the annular passageway 46. The

35 degree of atomization, and likewise the size of the globular particles of oil will be determined by the adjustment of the enlarged tip of the nozzle pin 39, whereby the annular passageway 46 will be varied in area. This

40 adjustment is effected by rotation of the regulating wheel 23 which operates the complementary stem 22 and reciprocates the stem 20 and the pin 39 with the enlarged tip 43.

It will be readily apparent that as the

45 stem 22 advances or retracts through the fixed cross tie 32 the stem 20 into which the complementary stem 22 is threaded will cause the stem 20 to move longitudinally for the reason that the stem 20 cannot rotate because

50 of the saddle 31 which is immovable in respect to the stem 20. The key 29 in the key way 30 prevents rotation of the stem 20 and will cause the stem to be non-rotatable but will not interfere with longitudinal reciprocal

55 movement of the stem 20.

It is desirable that the relationship of the burner tip 43 and its seat 45 shall be substantially constant as far as radial movement is concerned since rotation of the burner tip

60 43 might cause the circumscribing annular fuel openings 46 to vary in width due to unequal strains in the metals of the parts and warping which might result. For this reason stem 20 is held against rotation and its

65 enlargement 21 reciprocates through the cross

head 31 and is actuated by the screw 22. It is further evident that since there is necessity for accurate regulation of the burner tip the screw adjustment at a point away from the zone of extreme heat will make it possible to minutely vary the effective area of passage way 46.

It will thus be seen that the structure here disclosed, while quite simple as to its construction and possession of few operating

75 parts, will effectively act to produce satisfactory atomization of liquid fuel with a resulting efficient combustion thereof, whereby the fuel burner will operate with great efficiency and at a minimum operating cost.

While I have shown the preferred form of my invention, as now known to me, it will be understood that various changes may be made in combination, construction, and arrangement of parts by those skilled in the

85 art without departing from the spirit of the invention as claimed.

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

1. A fuel burner comprising a tubular body having a central cylindrical bore therein, a nozzle tip detachably secured to the outer end of the body and having a central bore in longitudinal alignment with that of the body, the outer end of the bore of the

95 nozzle tip being outwardly tapered, a frusto conical valve member disposed at the outer end of said body and having its tapered wall parallel to the outwardly flaring mouth of the nozzle tip, a valve rod connected with the valve member extending longitudinally through the bore of the body, packing means at the rear of the body to accommodate said

100 rod, a saddle secured to the rear of the body and through which the body extends, a cross-tie plate in spaced relation to the saddle, parallel guide rods securing the cross-tie plate and the saddle to each other and being disposed upon opposite sides of the longitudinal center of the burner, a cross-head disposed between the saddle and the cross-tie and slidably mounted upon the guides, a head

105 formed at the outer end of the valve rod and splined through the cross-head, and an adjusting screw threaded through the cross-tie plate and threaded into the head of the valve stem with reverse threads from those in the portion extending through the crosshead whereby rotation of the adjusting screw will

110 produce reciprocation of the cross-head and the valve rod.

2. A fuel burner comprising a tubular body having a central cylindrical bore therein, a nozzle tip detachably secured to the

125 outer end of the body and having a central bore in longitudinal alignment with that of the body, the outer end of the bore of the nozzle tip being outwardly tapered, a frusto conical valve member disposed at the outer

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end of said body and having its tapered wall parallel to the outwardly flaring mouth of the nozzle tip, a valve rod connected with the valve member extending longitudinally through the bore of the body, packing means at the rear of the body to accommodate said rod, a saddle secured to the rear of the body and through which the body extends, a cross-tie plate in spaced relation to the saddle, parallel guide rods securing the cross-tie plate and the saddle to each other and being disposed upon opposite sides of the longitudinal center of the burner, a cross-head disposed between the saddle and the cross-tie and slidably mounted upon the guides, a head formed at the outer end of the valve rod and splined through the cross-head, and an adjusting screw threaded through the cross-tie plate and threaded into the head of the valve stem with reverse threads from those in the portion extending through the cross-head whereby rotation of the adjusting screw will produce reciprocation of the cross-head and the valve rod, and a connection pipe extending into the central bore of the body member and through which liquid fuel is introduced into the burner.

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