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FLUID FUEL BURNER AND COMBUSTION AIR LOUVER

Filed Feb. 12, 1951

2 Sheets-Sheet 1

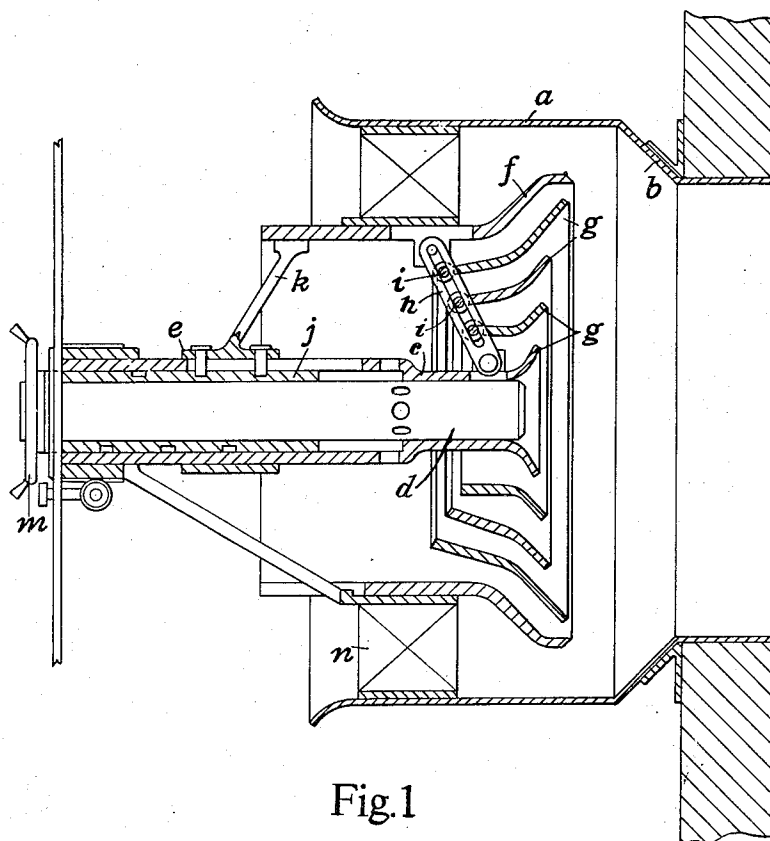


Fig. 1

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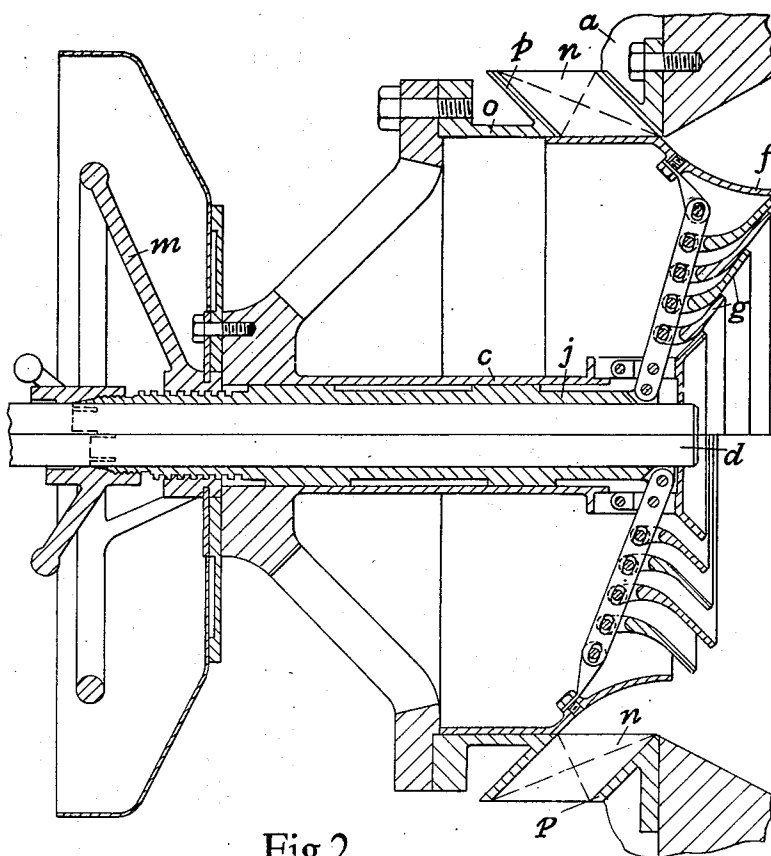


Fig.2

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UNITED STATES PATENT OFFICE

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FLUID FUEL BURNER AND COMBUSTION
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3 Claims. (Cl. 158-1.5)

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This invention relates to apparatus for the combustion of liquid, gaseous, or pulverised fuel in boilers, furnaces, or engine combustion chambers, and has for its object to provide improved means for regulating the admission of air to the combustion region.

The invention comprises the combination with an air duct surrounding a fuel injection nozzle, of a plurality of annular and concentric louvres, such that the effective cross-sectional area of the duct can be varied by relative axial movements of the louvres.

In particular the invention comprises an arrangement of louvres as specified in the preceding paragraph, in which the outer louvre is also adapted to control the flow of secondary air through a duct which surrounds the louvres.

In the accompanying drawings:

Figure 1 is a sectional side elevation illustrating one embodiment of the invention.

Figure 2 is a sectional side elevation illustrating another embodiment of the invention, the lower half of this drawing showing the louvres fully open, and the upper half showing them fully closed.

Referring to Figure 1, there is provided a cylindrical air duct *a* which adjacent to its discharge end is formed with an internal annular shoulder *b*, so that the said end is of smaller diameter than the inlet end. Within this duct is coaxially mounted a fixed sleeve *c* in which is mounted a fuel nozzle *d*.

On the sleeve *c* is slidably mounted a sleeve *e* which carries an outer tubular louvre *f* which divides the said duct so as to form two air passages, the outer one being the subsidiary air passage, and the inner one being the main air passage. At its discharge end the said louvre *f* is splayed outwardly, or bell-mouthed, and its lip is adapted to co-operate with the above mentioned shoulder *b* for regulating the air flow through the subsidiary air duct.

Within the said tubular louvre *f* and adjacent to its discharge end are mounted a plurality of concentric and relatively short annular louvres *g*, each of which (and also the adjacent end of the sleeve *c*) is bell-mouthed so that the main air streams flowing horizontally between the louvres are deflected outwardly from the nozzle.

The louvres are all interconnected by a plurality of (for example three) equi-spaced radial links *h* (of which only one is shown) which at their ends are pivotally attached to the sleeve *c* and outer louvre *f*, the inner louvres being connected to the links by pins *i* which engage slots

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in the links. The arrangement is such that axial movement of the outer louvre is accompanied by relative and progressively shorter axial movements of the inner louvres, and consequent variation of the widths of the annular spaces between the louvres.

Axial movement of the outer louvre *f* can be effected in any convenient manner, as for example by means of a rotatable bush *j* carried by the nozzle *d* and having a helical slot and pin connection with the slidable sleeve *e*, the latter being connected to the outer louvre by one or more radial arms *k*. Rotation of the bush *j* is effected by a hand wheel *m*. Axial movement of the outer louvre is not only accompanied by movements of all the louvres for varying the main air flow, but also causes the desired variation of the subsidiary air flow through the duct *a*.

If desired there may be mounted in the subsidiary air duct, an arrangement of blades *n* for imparting a swirling motion to the subsidiary air.

In the construction shown in Figure 2, the outer louvre *f* is in part of cylindrical form and is arranged to slide in a cylindrical housing *o*, the latter having formed therein inlet passages *p* through which secondary air can flow from the secondary air passage *a*. The fixed sleeve *c* forms part of the said housing and within it is arranged the slidable bush *j* having a screw thread connection with an actuating hand wheel *m*. The inner louvre is fixed to the inner end of the sleeve *c*, and the louvres are interconnected by links as above described. One such link is shown in the drawing, and each is pivotally connected to the inner louvre, so that axial movement of the bush *j* causes the other louvres to move relatively to each other.

When the louvres are in the fully open position shown in the lower half of Figure 2, primary air can flow between the louvres, and secondary air can flow through the inlet passages *p*, the latter being provided with the air-swirling means *n*. When the bush *j* is fully retracted, the louvres are advanced as shown in the upper part of Figure 2, causing the passages *p* and also the passages between the louvres to be closed.

Either of the arrangements above described whilst more particularly intended for use with oil burners, may be used with gas or pulverised solid fuel burners.

By this invention the desired regulation of the air supply to the regions adjacent to the burner, and the intimate mixing of the air and fuel can

be effected in a convenient and satisfactory manner.

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

1. Fuel combustion apparatus comprising in combination a fuel injection nozzle, a cylindrical air duct surrounding the said nozzle, a plurality of annular and concentric louvres disposed in said duct to form a series of annular and concentric air passages therein, pivoted links interconnecting said louvres, and an axially movable member for imparting angular movements to said links, and thereby effecting relative axial movements of said louvres.

2. Fuel combustion apparatus as claimed in claim 1, in which said air duct forms with the outer louvre a subsidiary annular air passage, and is provided with an internal annular shoulder arranged so that the discharge end of the outer louvre can co-operate therewith for regulating the air flow through said subsidiary annular air passage.

3. Fuel combustion apparatus comprising in combination a fuel injection nozzle, a cylindrical

air duct surrounding said nozzle, a plurality of annular and concentric louvres disposed in said duct to form a series of annular and concentric air passages therein, said louvres having bell-mouthed discharge ends whereby air streams leaving said passages are deflected outwardly from said nozzle, pivoted links interconnecting the other ends of said louvres, and an axially movable member for imparting angular movements to said links, and thereby effecting relative axial movements of said louvres.

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