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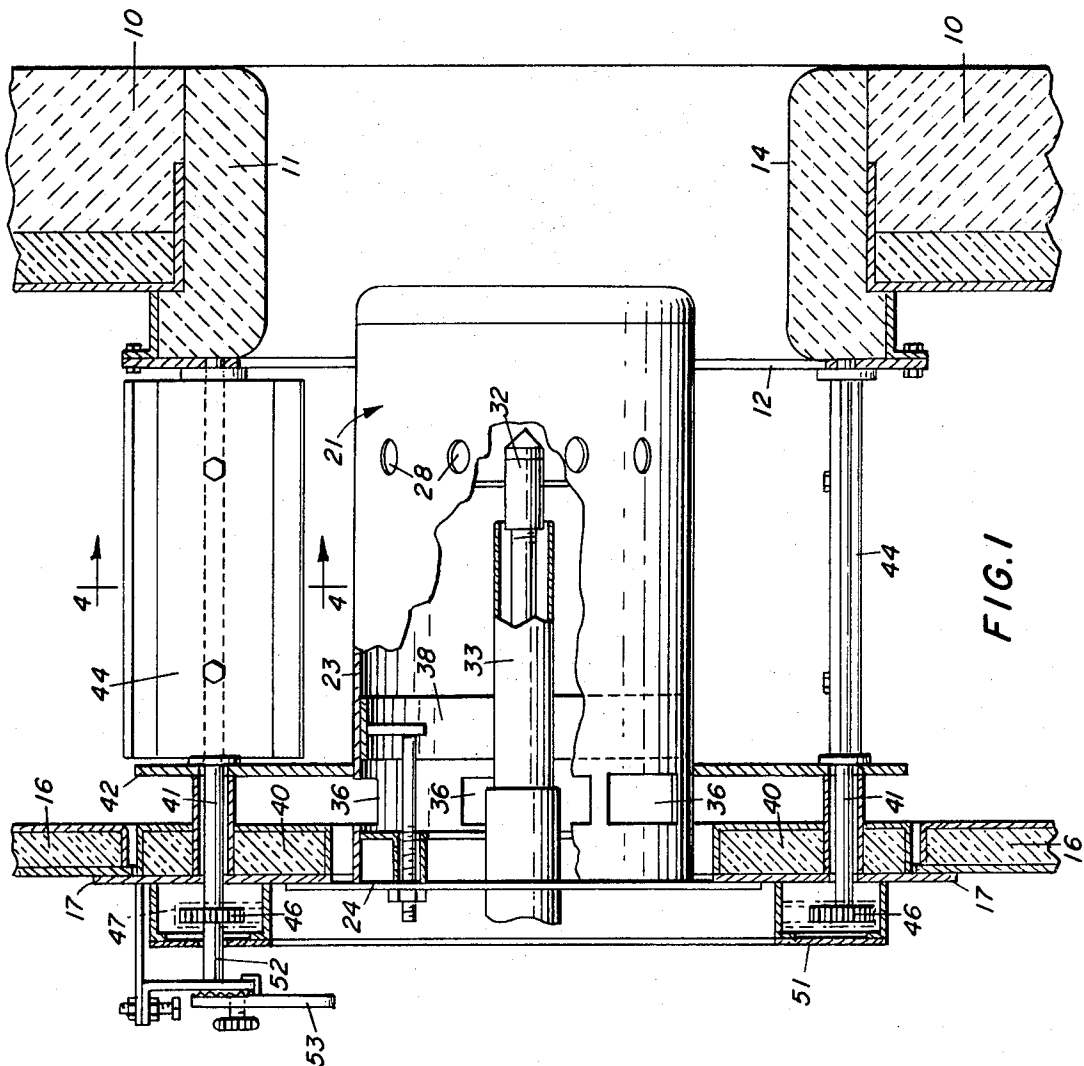
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FUEL BURNER ASSEMBLY

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2 Sheets-Sheet 1



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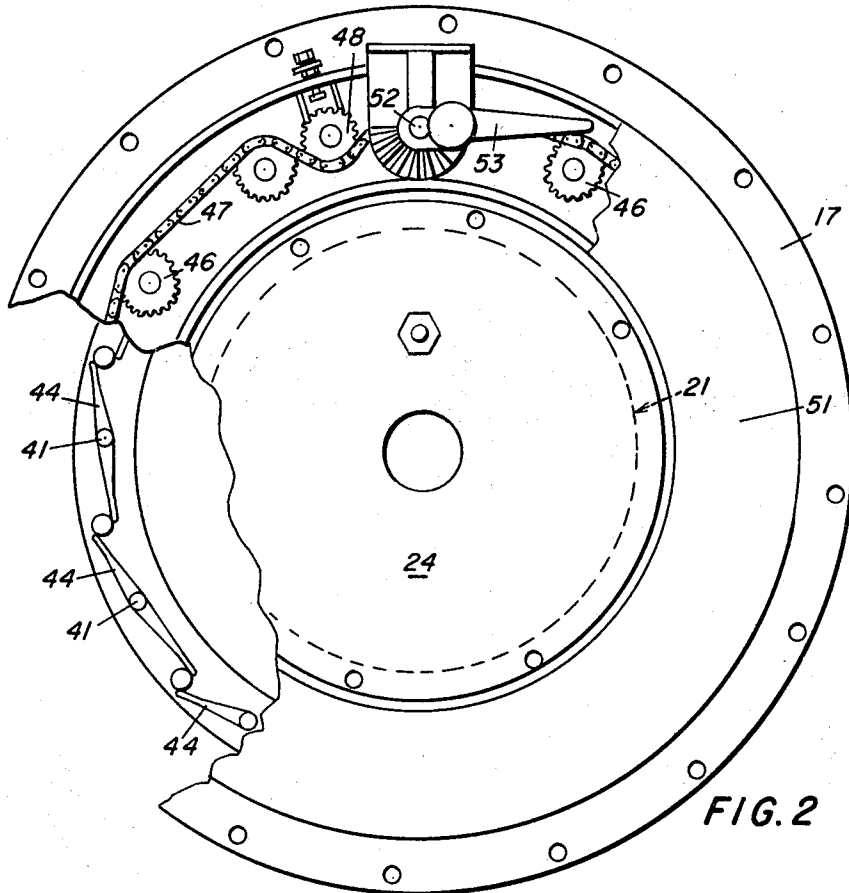


FIG. 2

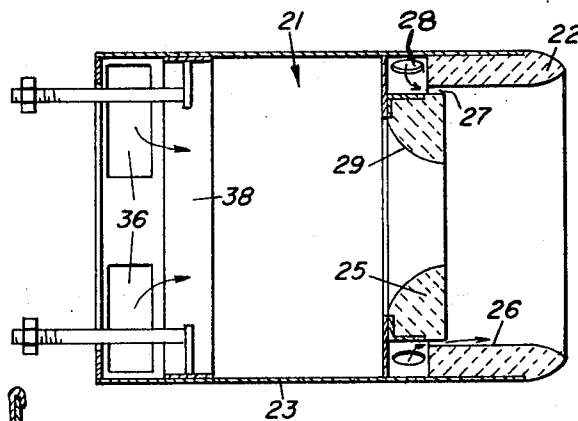


FIG. 3

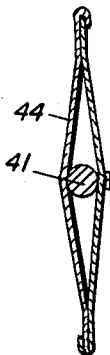


FIG. 4

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FUEL BURNER ASSEMBLY

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4 Claims

ABSTRACT OF THE DISCLOSURE

A burner assembly for the combustion of liquid fuel wherein a plurality of circumferentially spaced vanes are adjustable to control whirling movement of secondary air and an assembly designed to prevent circumferentially moving air from moving into a regenerative tile which forms a part of the assembly.

The present invention relates to a fuel burner assembly for the combustion of liquid fuel and the invention more specifically pertains to vanes which may be adjusted to control circumferential components imparted to the secondary air which moves over the exterior of a regenerative tile within which combustion of the liquid fuel is initiated.

An object of the invention is to provide a fuel burning assembly which is adaptable for automatic operation wherein the firing may vary from ten percent to one hundred percent of the designed heat release and to provide high temperature in the area immediately downstream of the atomizing mechanism for the liquid fuel and within a regenerative tile and to avoid circumferential movement of air within the regenerative tile to prevent the formation of coke and to provide adjustable vanes which impart circumferential movement of the air moving into the furnace over the exterior of the regenerative tile.

Other objects and features of the invention will be appreciated and become apparent to those skilled in the art as the present disclosure proceeds and upon consideration of the accompanying drawings wherein an embodiment of the invention is disclosed.

In the drawings:

FIG. 1 is a sectional view of a burner assembly exhibiting the invention.

FIG. 2 is an end elevational view with portions broken away to illustrate parts of the adjusting mechanism for the vanes which control movement of the secondary air.

FIG. 3 is a sectional view of the regenerative tile.

FIG. 4 is a sectional view of one of the vanes and taken on the line 4—4 of FIG. 1.

There is shown at 10 a portion of a furnace wall and which may form a part of the boiler structure. A burner tile 11 is mounted in an opening in the furnace wall, as shown in FIG. 1. A ring shaped member 12 assists in holding the burner tile 11 in place and forms a portion of the support for the adjustable vanes as hereinafter described. A wall 16 is spaced upstream from a furnace wall and provides a part of a housing which forms a wind box for air which has to move into the furnace through the opening 14 in the burner tile. An annular front plate 17 is supported on the wall 16.

A regenerative tile shown generally at 21 includes a ceramic liner 22 as shown in FIG. 3 which is supported within a metal casing 23 attached to a front plate 24 by any suitable means which in turn is secured to the plate 17 in any suitable manner. The regenerative tile has a disc shaped ceramic member 25 supported within the casing 23. It is of smaller diameter than the inner annular surface 26 of the liner 22 to provide an annular opening 27 between the perimeter of member 25 and the inner

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annular surface 26. A plurality of circumferentially spaced ports 28 in the casing 23 adjacent the perimeter of the disc shaped member 25 for the entry of air into the regenerative tile. The disc shaped member 25 has a central opening 29. The upstream end portion of the casing 23 is provided with a plurality of circumferentially spaced openings 36. An annular shield 38 is mounted within the casing and it is adapted to be moved axially of the regenerative tile assembly so as to adjust the open areas of the openings 36. A nozzle 32 and a suitable atomizing mechanism is adapted to deliver droplets of the liquid fully through the opening 29.

A plurality of circumferentially spaced shafts 41 are mounted for rotation in bearings carried by the ring 12 and annular member 42. The shafts 41 extend through the wall portion 40 at the upstream end of the burner assembly. A vane 44 is mounted on each shaft so as to turn therewith. In one rotated position of all of the shafts 41 the vanes 44 overlap each other as shown in FIG. 2. A sprocket wheel 46 is mounted on the outer end of each shaft 41. A sprocket chain 47 trained about all of these sprocket wheels is maintained in a taut condition by an idler sprocket 48 (FIG. 2). The sprocket chain and the sprocket wheels are encased in an annular housing 51 carried by the front wall portion 40. An extension 52 carried by one of the shafts 41 extends outside of the annular housing. A control lever 53 mounted on the shaft extension 52 serves to rotate the associated shaft 41 and move the sprocket chain 47 to rotate all of the vanes 44 in unison.

In operation the rotated position of the vanes 44 controls the circumferential component imparted to the air which moves over the exterior of the regenerative tile 21 and through the opening 14 in the burner tile 11. There is some movement of the air inwardly through the ports 28 but this air is downstream of the unspun air admitted through the openings 36. The openings 36 admit air for movement into the interior of the regenerative tile 21. The annular member 42 prevents any circumferential movement of air as created by the vanes 44 from moving into the interior of the regenerative tile through the openings 36. Thus the air moving over in the exterior of the nozzle assembly 32 does not develop coke on the interior of the regenerative tile 21 and the liquid fuel burns and attains a relatively high temperature before it escapes from the downstream end of the regenerative tile.

While the invention has been described with reference to a particular organization of elements making up a fuel burner assembly it will be appreciated that changes may be made in the general organization as well as alterations in the various elements. Such modifications and others may be made without departing from the spirit and the scope of the invention as set forth in the appended claims.

What is claimed and desired to be secured by Letters Patent is:

1. In a burner assembly for the combustion of liquid fuels, a burner tile having an opening therein, a regenerative tile of smaller external diameter than the opening in said burner tile with the major portion positioned upstream of the burner tile, means for developing atomization of the liquid fuel within the regenerative tile, a plurality of circumferentially spaced vanes mounted for individual rotation about the exterior of the regenerative tile, means for adjusting the rotated position of said vanes to alter the circumferential components imparted to the air moving between the vanes whereby the extent of the whirling movement of air as it moves over the downstream end of said regenerative tile and through the opening in said burner tile is controlled and said regen-

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erative tile having openings in the upstream end portion for the entry of air devoid of circumferential movement.

2. In a burner assembly for the combustion of liquid fuels according to claim 1 including means between the upstream ends of said vanes and the openings in the regenerative tile preventing air passing between the vanes from entering the upstream end portion of the regenerative tile.

3. A burner assembly for the combustion of a liquid fuel comprising a burner tile having an opening there-
through, a regenerative tile supported with a downstream
open end disposed within said opening and with the
major portion thereof upstream of the burner tile, means
for atomizing a liquid fuel within said regenerative tile
downstream of the open end, means comprising an an-
nular opening for admission of air about said regenerative
tile and circumferentially spaced overlapping vanes adapt-
ed to be rotated to open and close the opening, the last
said means communicating with means for admission of
air into the regenerative tile adjacent its upstream end
and with the opening through the burner tile, and means
for preventing air having circumferential movement im-
parted thereto by said vanes from entering the upstream

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end of the regenerative tile, whereby the atomized fuel is ignited while within the confines of the regenerative tile and while protected thereby from circumferential movement of air through the opening in the burner tile.

4. The burner assembly of claim 3 wherein the regenerative tile is enclosed in a cylindrical casing, the means for admitting air into the upstream end of the regenerative tile comprises a plurality of circumferentially spaced openings in the casing, and means comprising a ring adapted to slide over said openings and vary the cross-section thereof.

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