

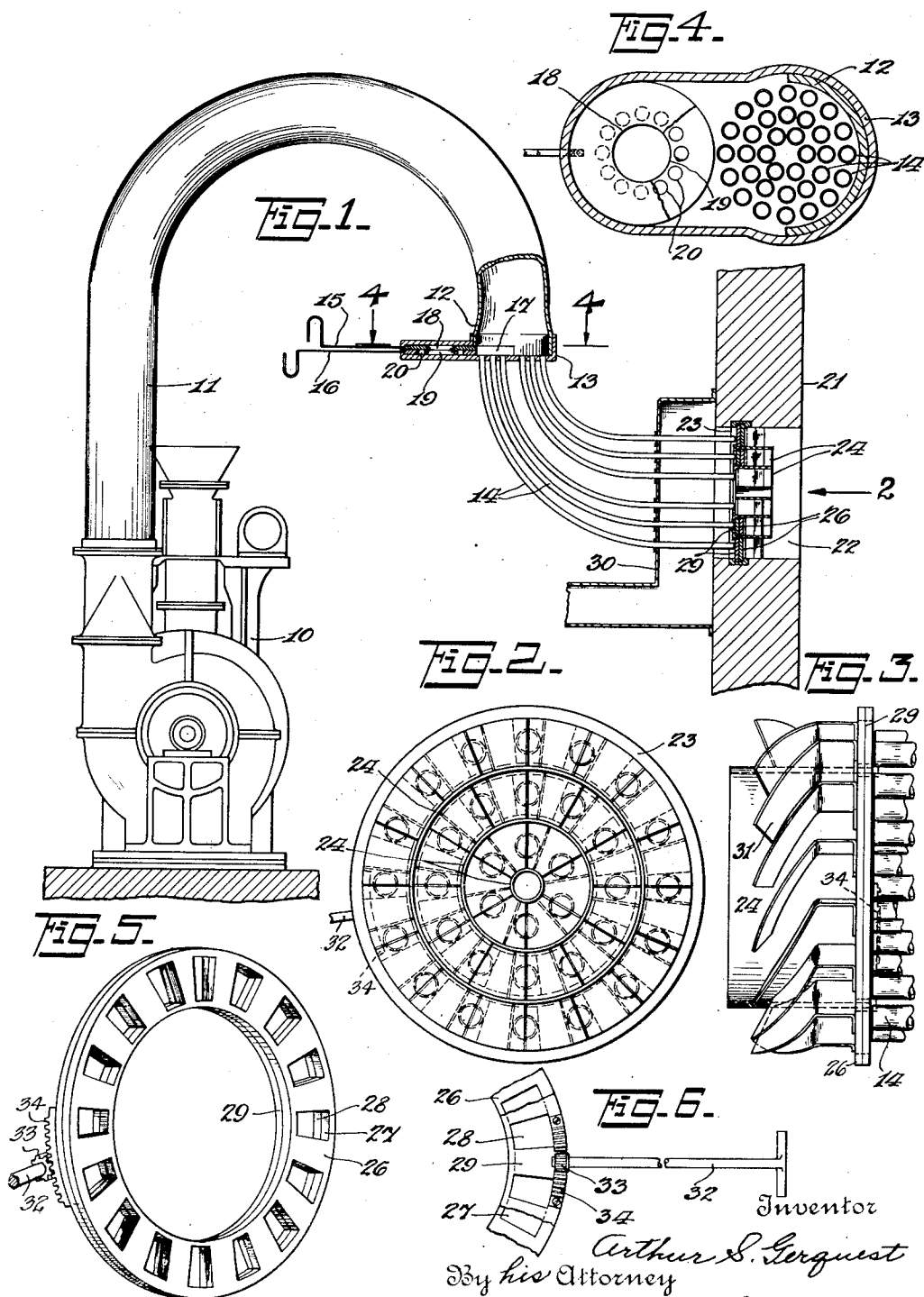
Sept. 6, 1932.

A. S. GERQUEST

1,875,808

PULVERIZED COAL BURNING DEVICE

Filed Aug. 22, 1928



Inventor
Arthur S. Gerquest
By his Attorney
W. A. Sparkes

UNITED STATES PATENT OFFICE

ARTHUR S. GERQUEST, OF HASBROUCK HEIGHTS, NEW JERSEY, ASSIGNOR TO PEABODY ENGINEERING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

PULVERIZED COAL BURNING DEVICE

Application filed August 22, 1928. Serial No. 301,239.

This invention relates to pulverized coal burning devices, and one of the principal objects of the invention is to produce a device of this nature wherein the delivery of fuel to the burner shall be substantially uniform throughout the delivery area.

Another object of the invention is to provide readily adjustable and highly efficient means for controlling the delivery of both primary and secondary air to the combustion point.

Another object is to provide novel means for setting up a turbulent mixing and swirling action at the combustion point.

Other objects will be apparent from the description as it proceeds. All of these objects are attained by means, one embodiment of which is shown in the accompanying drawing, in which:

Fig. 1 is an elevation, partly in section, of a device including my invention.

Fig. 2 is a view of the burner proper, looking in the direction indicated by the arrow 2 in Fig. 1.

Fig. 3 is a side elevation of the parts shown in Fig. 2.

Fig. 4 is a view taken on line 4—4 of Fig. 1.

Fig. 5 is a detail perspective view of one set of secondary air controls or shutters.

Fig. 6 is a fragmentary detail view showing one of the adjusting means for the secondary air control.

Like characters of reference refer to like parts in all views.

Referring to the drawing in detail, and to Fig. 1 in particular, 10 represents generally a coal pulverizing mill which may be of any suitable and well known construction and which includes a blower mechanism whereby the pulverized coal is blown through a transport pipe 11. Now, it is known that when pulverized coal is blown through a vertical pipe, the fuel stream is substantially uniform, that is, the comminuted coal is so evenly mixed with the primary air, as to form a substantially homogeneous supply stream. However where there is a bend in the transport pipe, the particles of coal tend to settle and stratify at the shorter radius,

or to rebound from side to side of the pipe. The supply stream is therefore, not uniform where the transport pipe is curved or horizontal. I take advantage of the uniformity at vertical positions by attaching my device to the transport pipe 11 at a vertical portion indicated at 12.

At 12, as shown in Figs. 1 and 4, I attach a housing member 13, in which are secured inlet ends of a plurality of distribution tubes 14. These tubes are arranged in alignment with the transport pipe and in three concentric series; and means are provided for cutting out either one or two series of these tubes at the will of the operator. Mounted in the housing 13, is a pair of slides 15 and 16, the transport pipe 11 being cut away at 17 to permit sliding movement of members 15 and 16. The slide 15 is provided with a central aperture 18, while the slide 16 is provided with a similar central aperture 19 and also with a concentric series of apertures 20.

When slides 15 and 16 are therefore in their innermost positions, the apertures 18 and 19 register with each other and clear the inner series of pipes 14, so that this series of pipes remains effective; the apertures 20 are in register with the intermediate series of pipes 14, but the slide 15 at this time closes apertures 20 and thereby the registering tubes 14, and slide 16 covers the outer series of tubes 14. It will therefore be seen that when both of the slides 15 and 16 are pushed in, the central series of pipes 14 is the only series effective; and that when the slide 16 only is moved in, the two innermost series are effective, or more properly, the outer series of pipes 14 is the only one rendered ineffective.

Of course, when the fuel inlet is thus cut down the air inlet at the blower must be cut down sufficiently to properly regulate the velocity of flow through the tubes 14 which remain effective. Only three adjustments of the tubes 14 are shown, but it is understood that by adding similar parts, any desired number of adjustment zones could be had.

Referring now particularly to Figs. 1, 2 and 3, the burner per se will be considered. The furnace wall is indicated at 21 and is

formed with an aperture 22 in which the burner proper is seated. This burner consists essentially of an annular member 23 seated in the wall 21 at aperture 22, and a plurality of cylindrical walled burner tubes 24.

5 Mounted between and secured to members 23 and 24 are stationary plates 26 formed with apertures 27 which may register with similar apertures 28 in a movable ring plate 29. Tubes 14 have their lower portions supported in the secondary air duct 30 with their ends arranged adjacent to respective apertures 27—28. Baffle plates or vanes 31 are secured either to the stationary ring plates 15 26 or to the burner tubes 24 and divide the space between the said burner tubes into separate mixing chambers for the several tubes 14. The baffle plates are so arranged and of such contour that they cause a violent turbulence, thereby effecting intimate and uniform 20 mixing of the coal-laden primary air with the secondary air admitted by the air duct 30, and also effecting a swirling motion of the whole fuel stream, which retards the travel 25 of the fuel across the combustion chamber. In order to prevent the burning of the baffle plates, they are preferably faced with refractory material.

Whenever the amount of primary air is reduced by operation of members 15 and 16, it is desirable to concomitantly reduce the amount of secondary air admitted through apertures 27—28. The means for this purpose is shown in Fig. 6 as including an operating 35 handle 32 supported in any suitable manner and carrying a gear pinion 33 which meshes with a gear segment 34 mounted on plate 29.

By operating member 32, gear 33 will 40 act with segment 34 so as to turn the respective plate 29 until its apertures 28 no longer register with the correlated apertures 27, thereby cutting off the intake of secondary air through such apertures 27—28. It will 45 be understood that there is a separate adjusting device for each plate 29.

Having now described what I consider to be the preferred form of embodiment of my invention, it is obvious that many parts could 50 be modified or changed without in the least affecting the principles and operation of my device, and I therefore do not limit myself to the exact structure shown, nor to anything less than the whole of my invention as herein 55 set forth.

I claim:

1. In combination, a fuel supply pipe having a housing at its outlet, a plurality of distributing tubes, each connected at one end 60 to said housing, a burner to which said tubes are connected at their other ends, a shutter supported in said housing, and means for moving said shutter to close some of said distributing tubes from the supply pipe.
- 65 2. In combination, a fuel supply pipe hav-

ing a housing at its outlet, a plurality of distributing tubes, each connected at one end to said housing and arranged in a plurality of independent series, a burner to which said tubes are connected at their other ends, a shutter supported in said housing and means 70 for moving the same to close some of the series of tubes from the supply pipe, a source of secondary air for combustion leading to the burner, and a register for controlling the amount of said air admitted to the burner. 75

3. In combination, a fuel supply pipe having a housing at its outlet, a plurality of distributing tubes each connected at one end to said housing, a burner to which said tubes 80 are connected at their other ends, a shutter supported in said housing and means for moving the same to close some of said tubes from the supply pipe, a source of secondary air for combustion leading to the burner, a 85 register disposed in proximity to the discharge ends of said tubes for controlling the amount of said air admitted to the burner, and baffle plates secured to said register. 90

In testimony whereof I affix my signature.

ARTHUR S. GERQUEST.

95

100

105

110

115

120

125

130