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CARBURETING NOZZLE FOR BURNING POWDERED COAL

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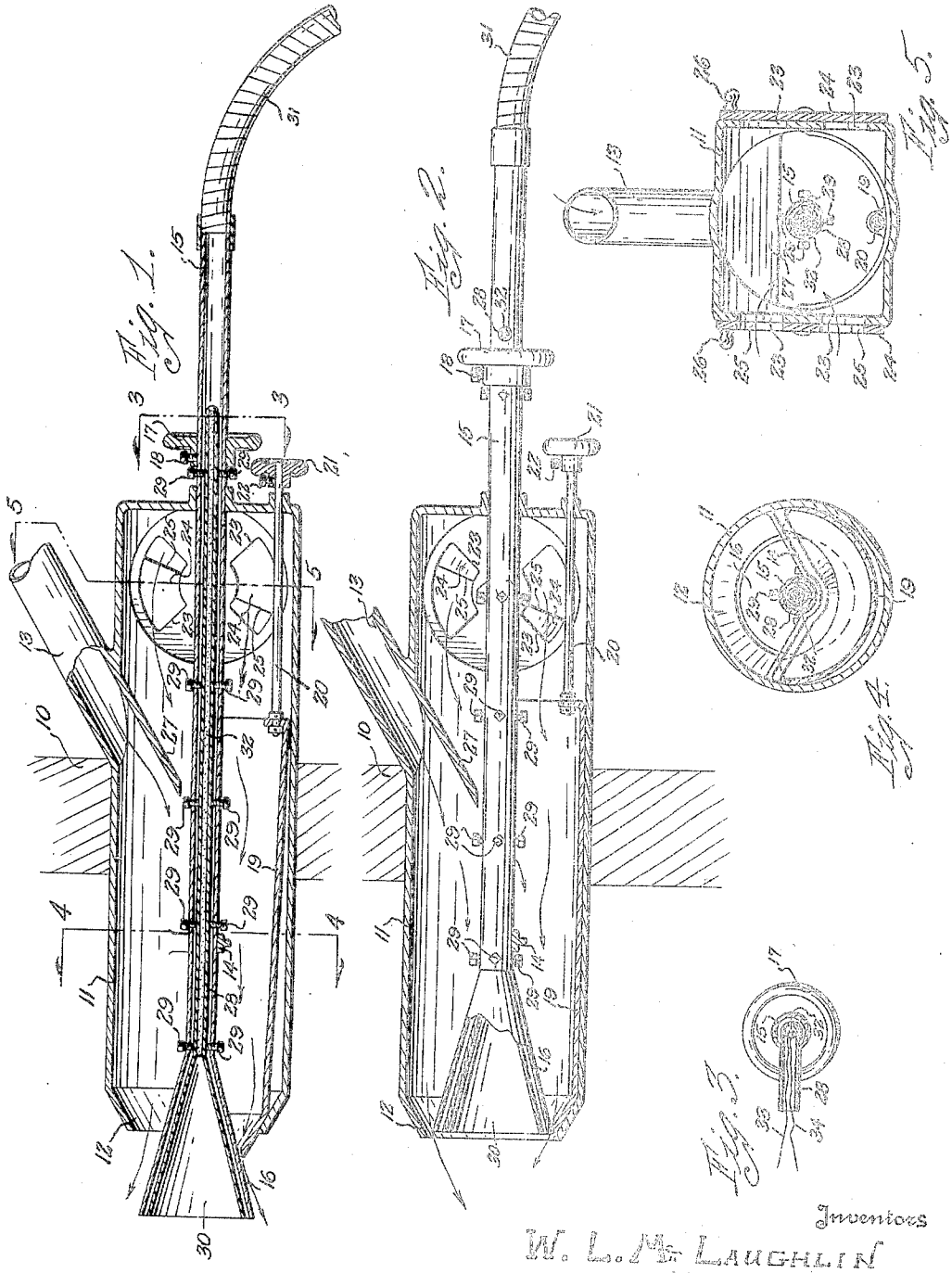


Fig. 1.

Fig. 2.

Fig. 5.

Fig. 4.

Fig. 3.

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CARBURETING NOZZLE FOR BURNING POWDERED COAL

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The principal object of this invention is to provide a device for properly and successfully projecting powdered coal and the like into a combustion chamber.

More specifically the object of this invention is to provide a carbureting nozzle for burning powdered coal, comprising, a housing for projecting the coal and air into the furnace, an adjustable nozzle in the open end of the housing, and a generating means in said nozzle.

A further object is to provide a carbureting nozzle for burning powdered coal that is under the control of the operator at all times.

A still further object of this invention is to provide a powdered coal burner that may easily and quickly be adjusted to feed any desired amount of air, either hot or cold, with the powdered coal.

A still further object is to provide a powdered coal burner that permits adjustment for placing and regulating the flame at various points inside the combustion chamber.

A still further object is to provide a powdered coal burner that is economical in manufacture and durable and efficient in use.

These and other objects will be apparent to those skilled in the art.

Our invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in our claims and illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal sectional view of our device mounted in the wall or door of a furnace and so adjusted that the flame therefrom will be diffused and spread outwardly from the nozzle.

Fig. 2 is a longitudinal sectional view of our device mounted in the wall or door of a furnace and so adjusted that the flame therefrom will be directed to a point just in front of the nozzle.

Fig. 3 is a cross sectional view taken on line 3—3 of Fig. 1 and illustrates the preheating means.

Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 1 and more fully illustrates the interior of our device.

Fig. 5 is a cross sectional view taken on line 5—5 of Fig. 1 and illustrates the adjustable air inlet vents in the side of the housing of the device.

It is well known that fuel is consumed with the highest efficiency when reduced to a powder and combined with the proper proportions of air. Machines for pulverizing fuel such as coal, have been perfected to such an extent, that powdered fuel can be economically obtained for commercial purposes. The devices now on the market, however, for projecting this fuel into the furnace, are very crude and inefficient, usually consisting of nothing more than a pipe leading into the combustion chamber through which the coal is blown by an air blast. These devices have no means for regulating the relative amount of air and coal, and the flame in the chamber can not be placed or regulated inside the same. We have overcome these disadvantages as will be appreciated by those skilled in the art.

We have designated the wall or door of the furnace by the numeral 10. Passing through an opening in this wall is the cylindrical shaped housing of our device, designated by the numeral 11 and having its forward end open. The numeral 12 designates the inwardly extending marginal edge of this forward end, the purpose of which will hereinafter be explained. This housing may be round, square, or of any desired shape. Extending into the housing 11 and toward the forward end of the same is the coal and air inlet pipe 13, leading from the ordinary coal and air mixer, not shown. As this coal and air enters the housing under pressure, it will normally pass out of the opening in the forward end of the housing. Slidably mounted in the center of the rear end of the housing 11 and on the bracket member 14 integrally formed on the inside of the housing, is the pipe 15, having the outwardly flaring cone nozzle 16 formed on its forward end. By this arrangement, if the pipe 15 is slid forwardly in the housing as shown in Fig. 1, the coal impregnated air will pass

out easily around the nozzle 16 and be guided outwardly in all directions therefrom. If the pipe 15 is slid backwardly as shown in Fig. 2, the coal impregnated air will pass around the nozzle, but because of the inwardly extending marginal edge 12, will be focused at a point directly in front of the forward end of the housing 10. By the foregoing it will readily be seen that the sliding adjustment of this nozzle makes it possible for the operator to place, or regulate the flame inside the combustion chamber at will. The numeral 17 designates a handle member secured to the pipe 15 by the set screw 18, to facilitate the reciprocation of the pipe 15.

By actual practice, it is found that the air passing from the housing will be more heavily charged with coal at the bottom of the housing than at the top. This varies with the degree of fineness of the coal and the pressure of the air. To overcome this we have provided the guide pan 19, slidably mounted in the bottom of the housing as shown in Figs. 1 and 2. If the coal is relatively heavy to the air, this pan should be slid forwardly, thereby directing a certain amount of this heavy laden air upwardly into the air that is not so heavy with coal. The reciprocating of this guide pan is done by the rod 20, having one end secured to the pan, and its other end passing through and slidably mounted in the rear end of the housing 11. The numeral 21 designates a handle member on the free end of this rod, secured thereto by the set screw 22.

The numeral 23 designates air holes in each side of the housing 11. Rotatably mounted on each side of the housing 11, is a disc 24 having openings 25 capable of registering with the openings 23 when rotated to proper positions. The numeral 26 designates a handle member on each of these discs to facilitate the rotating of the same. By this arrangement, if the air entering though the pipe 13 is permeated with more powdered coal than is desired, it is merely necessary to allow air to pass into the housing 11 through the openings 23. To aid in directing the air and coal entering from the pipe 13 toward the forward end of the housing 11, thereby producing a suction in the rear of the housing, we have provided the baffle member 27.

The numeral 28 designates a pipe secured in the center of the pipe 15, as shown in Fig. 1, by the cap screws 29. The rear end of this pipe 28 passes through the side wall of the pipe 15, and its forward end has formed thereon a cone member 30, inside and held apart from the cone nozzle 16. By this construction, if gas is forced into the pipe 15, through the flexible pipe 31, it will pass, first, between the pipe 28 and the inside of the pipe 15, then between the cone member 30 and the nozzle 16, then out into the furnace at the marginal edge of the nozzle. If this gas is ignited its flame will be adjacent the powdered coal leaving the housing 11, and will in turn ignite the powdered fuel. As soon as the coal starts to burn the gas should be turned off. If the device is to be used in a furnace where no natural gas is available, oil, such as distillate, is forced into the pipe 15. This oil is readily turned into artificial gas, for the purpose desired, by having the resistance coil 32 inside the pipe 28, having its lead wires 33 and 34 in electrical communication with a battery or other source of electrical energy not shown.

Although we have described our invention for the burning of powdered coal, the same principle may be used to burn other fuel, such as oil and gas. In fact if powdered coal is not available, either oil or gas may be fed through the pipe 13 and successfully and efficiently used until powdered coal can be obtained.

Some changes may be made in the construction and arrangement of our improved carbureting nozzle for burning powdered coal without departing from the real spirit and purpose of our invention and it is our intention to cover by our claims, any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

We claim:

1. In a device of the class described, an elongated horizontal housing open at its discharge end and having a bottom and top, an air and powdered fuel inlet pipe terminating inside said housing, a forwardly and inwardly extending flange integrally formed on the open discharge end of said housing, a cone shaped member arranged coaxially with said housing, slidably mounted in said housing and having its flared end adjacent to and extending in the same direction as the discharge end of said housing, a powdered fuel and air guide pan member having its end toward said discharge end of said housing bent upwardly and being outwardly parallel with said inwardly and forwardly extending flange, a handle member secured to said pan for manually sliding the same inside said housing, a second cone shaped member inside said first mentioned cone shaped member having its outer wall spaced apart from the inner wall of said first mentioned cone shaped member, and a pipe communicating with the space between said two cone shaped members.

2. In a device of the class described, an elongated horizontal housing open at one end and having a bottom portion and a top portion, an air and powdered fuel inlet pipe terminating inside said housing, an adjustable cone-shaped member arranged coaxially in said housing and having its flared end extending in the same direction as the open end

of said housing, an upwardly extending adjustable guide pan member slidably mounted in the bottom of said housing for directing the air and powdered fuel upwardly around the said cone member, and a handle member extending through said housing wall for manually actuating the said pan member.

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