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T. E. MURRAY ET AL

COAL PULVERIZER AND BURNER

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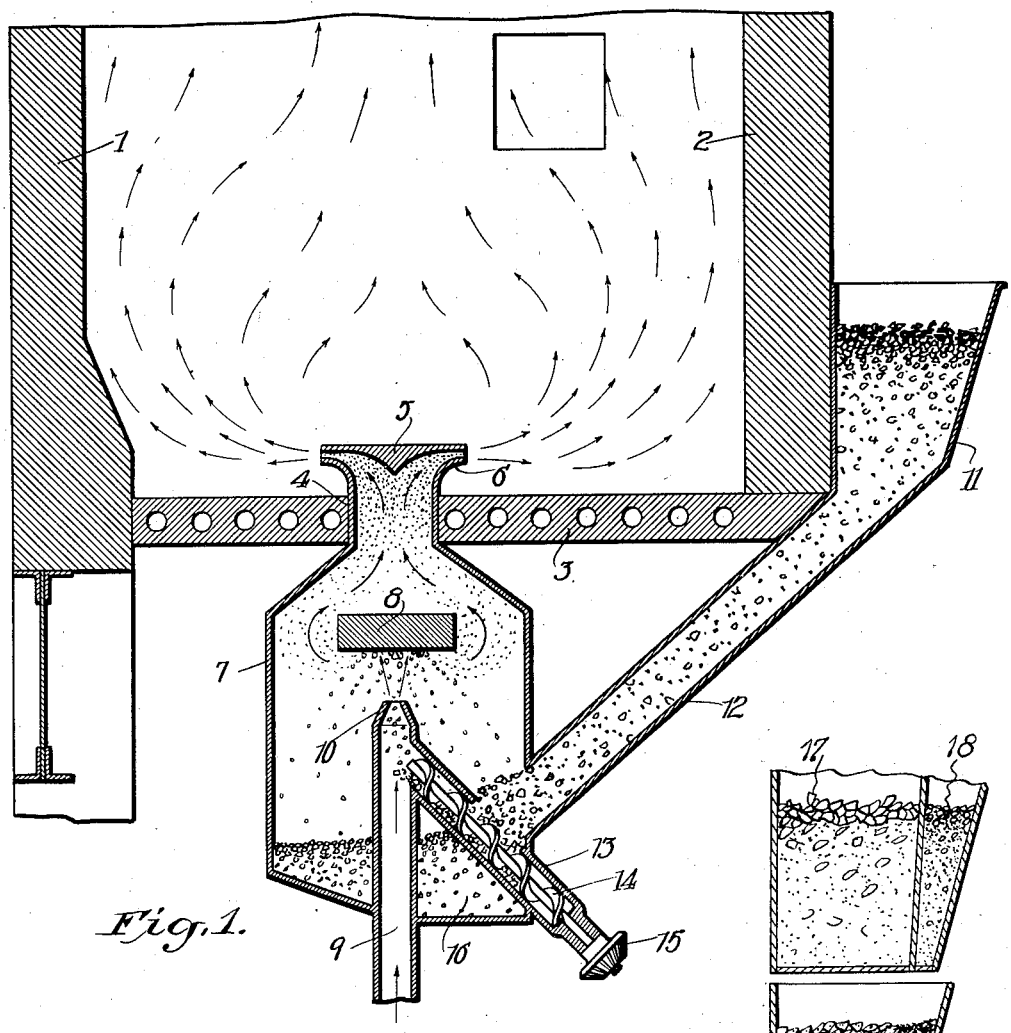

Fig. 1.

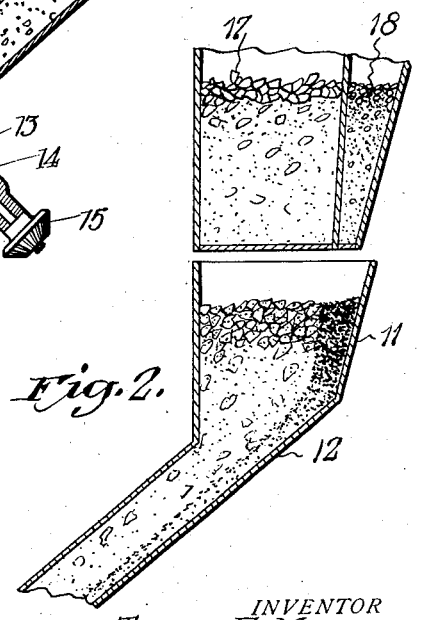

Fig. 2.

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COAL PULVERIZER AND BURNER.

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In certain previous applications of Thomas E. Murray there are described apparatus and methods for pulverizing coal and feeding it to a burner. The present invention provides a pulverizer working on a similar principle and utilizing a current of air first for breaking the coal, then for combustion.

Fig. 1 illustrates in vertical section an apparatus embodying the invention;

Fig. 2 is a similar view illustrating a modification.

The walls 1 and 2 and the floor 3 are parts of a furnace in which the pulverized coal is to be burned. The tube 4 of the burner passes up through the floor and is closed by a top plate 5 forming with the suitably flared portions of the tube nozzles 6 through which the mixture of air and pulverized coal is injected into the furnace.

The coal is pulverized in a chamber 7 immediately below the nozzle. A plate 8 of cast iron or other hard material is located in the upper part of the breaking chamber. The coal is impelled forcibly against the under face of the breaking plate by a jet or column of air forced under pressure through the tube 9 preferably constricted at the end to form a nozzle 10.

The coal is supplied from a hopper 11 and is led by a chute 12 to a feed tube 13 in which is a screw conveyor 14 the shaft of which is driven by any suitable means such as a gear 15 on its lower end. The conveyor carries the coal continuously to the air pipe 9, whence it is projected forcibly against the underside of the plate.

A portion of the coal is pulverized finely enough to be carried along with the air to its outlets through the nozzles 6, and into the furnace where the mixture of coal and air is ignited and burned. The air current will naturally carry coal particles of different sizes, some of which will be coarser than is customary in the use of pulverized coal. With this type of apparatus a considerable portion of the coal may be blown into the fire and ignited without having to be pulverized to the fineness which is requisite or customary where the coal is previously pulverized and is only fed through the nozzles by the air current. Ordinarily powdered coal is about as fine as flour; whereas with this apparatus, we can use coal of which only about 50% is so extremely fine, the remainder being considerably coarser.

The coarser particles of coal fall to the bottom of the chamber 7 in a mass 16. The feed tube 13 is open at the sides at and below the end of the chute 12, so that part of the accumulation 16 enters the tube and is carried up to be again caught in the air current and thus subjected to repeated breaking operations. The quantity which is pulverized and carried through the burner is continuously replaced by the new coal arriving through the chute 12. The chute 12 and the openings in the feed tube 13 are kept substantially full of coal so that there is little or no escape of air therethrough. The usual draft in the furnace also ensures that the air shall escape entirely or chiefly by way of the nozzles.

Any desired number of such nozzles may be arranged to project through the floor of the furnace at different points, or through the side walls by giving the proper direction to the burner tubes and nozzles. And each of such burners may have its own pulverizer and supply hopper, or a plurality of burners may be connected with a single pulverizer.

The quantity of air ejected through the nozzle 10 may be exactly that calculated for the combustion of the coal. Or the apparatus described may be supplemented by devices for providing additional air or additional pulverized coal. Or where additional pulverized coal appears necessary it may be mixed in this form with the coal supplied from the hopper 11, or may be introduced into the chamber 7 by a separate inlet. Fig. 2, for example, shows a double bin above the hopper 11 carrying a supply of coarse coal indicated at 17 and a supply of fine coal indicated at 18. The bins will have the usual openings at the bottom with gates through which the coal can be fed as required to the hopper 11. At the bottom of the chute 12 the two grades of coal will be thoroughly mixed and carried together into the air jet and through the burner.

Though we have described with great particularity of detail a specific embodiment of our invention, yet it is not to be understood that the invention is restricted to the particular embodiment of our invention described. Various modifications thereof, in detail and in the arrangement of the parts may be made by those skilled in the art without departure from the invention as defined in the folowing claims.

What we claim is:

1. The combination with a burner of a pulverizer adjacent to and communicating at its outlet with the burner and comprising a breaking plate, means for directing a jet of air against the same and means for supplying coal to the jet of air to be thereby broken against the plate.

2. A casing, one end of which constitutes a burner, in combination with means for supplying coal to said casing, means for directing a jet of air to strike the coal supplied to the casing and to blow the coal and air through the burner and a breaker between the point of application of the jet to the coal and the point of combustion against which the coal is impelled and broken by impact as it is carried in the current of air.

3. A casing, one end of which constitutes a burner with a nozzle, in combination with a breaking plate in said chamber, means for directing a jet of air against the same and a conveyor for supplying coal to the jet of air to be thereby broken against the plate, and carried with the air to the nozzle, the unbroken portion of the coal falling to the bottom of the casing and to the conveyor to be returned by the latter to the air jet and rebroken.

4. A casing, one end of which constitutes a burner with a nozzle, in combination with a breaking plate in said chamber, means for directing a jet of air against the same and a conveyor for supplying coal to the jet of air to be thereby broken against the plate and carried with the air to the nozzle, the unbroken portion of the coal falling to the bottom of the casing and to the conveyor to be returned by the latter to the air jet and rebroken, and a chute for supplying new coal to the conveyor.

5. The method of pulverizing coal and feeding it to a burner nozzle which consists in propelling the coal by an air jet against a breaking surface and directing the air and the coal pulverized thereby together to the nozzle.

6. The method of pulverizing coal and feeding it to a burner nozzle which consists in supplying a mixture of coarse and fine coal, directing a jet of air to strike the coal and to blow it against a breaking surface and directing the air and the finer particles of coal beyond said breaking surface to a burner nozzle.

In witness whereof, we have hereunto signed our names.

THOMAS E. MURRAY.
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