J. F. HAY.

COMMINUTED FUEL FEEDER.

APPLICATION FILED JAN. 3, 1914.

1,160,283.

Patented Nov. 16, 1915.

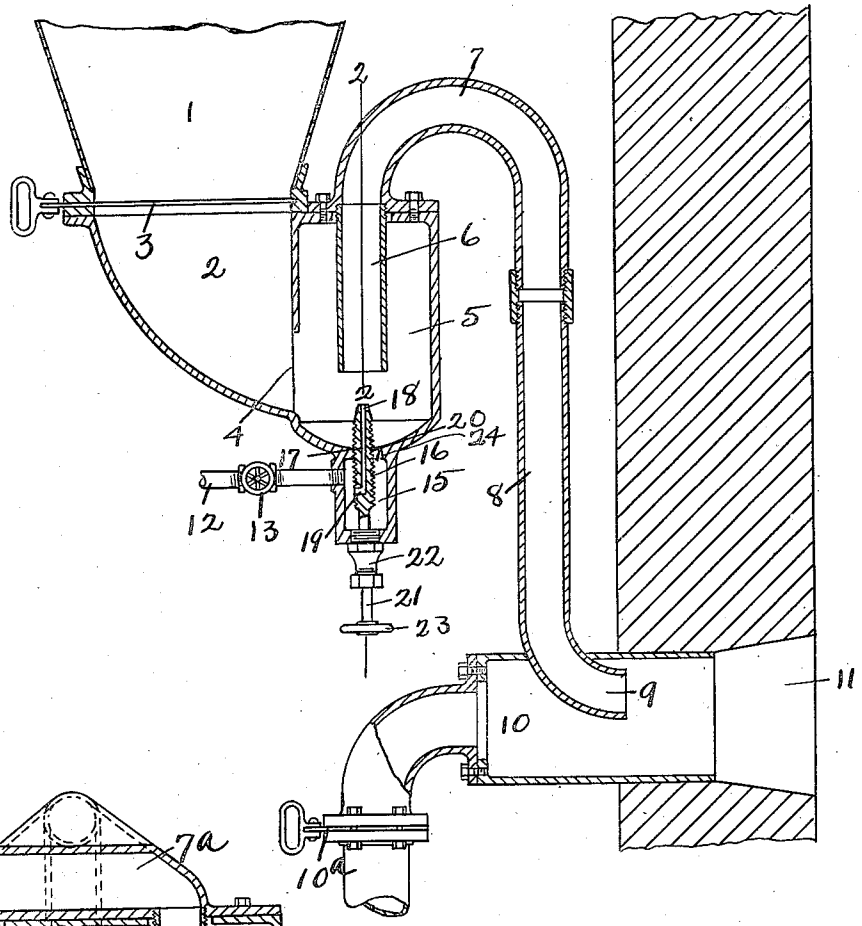


FIG. 1.

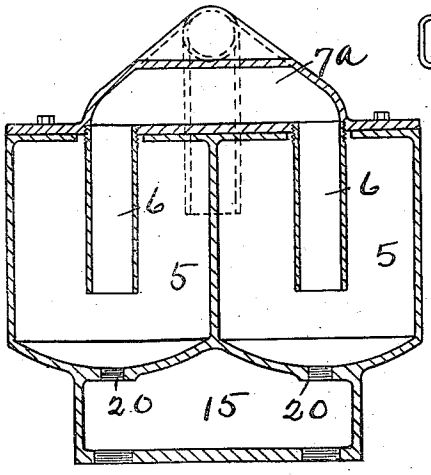


FIG. 2.

WITNESSES:

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COMMINUTED-FUEL FEEDER.

1,160,283. Specification of Letters Patent. Patented Nov. 16, 1915.

Application filed January 3, 1914. Serial No. 810,173.

To all whom it may concern:

Be it known that I, JOHN F. HAY, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Comminuted-Fuel Feeders, of which the following is a specification.

This invention relates to comminuted fuel feeders and consists in certain improvements in the construction thereof as will be hereinafter fully described and pointed out in the claims.

Great difficulty has been experienced in the feeding of comminuted fuels such as powdered coal so as to get a continuous and uniform feed.

The object of the present invention is to provide a device which will feed comminuted fuel such as powdered coal continuously and uniformly and in large and small quantities as desired.

The invention is illustrated in the accompanying drawings as follows:—

Figure 1 shows a central vertical section through a feeding device. Fig. 2 a vertical section through a feed pipe showing a plurality of feeding chambers, the line of section corresponding to the line 2—2 in Fig. 1.

1 marks the hopper to which the comminuted fuel is delivered for use, 2 a deflecting passage, and 3 a gate valve or slide for cutting off the feed from the hopper. The passage 2 communicates through an opening 4 with a feed chamber 5. A feed pipe 6 extends from near the bottom of the feed chamber 5 upwardly and is connected with a passage 7 forming a return bend with a downwardly extending pipe 8. The pipe 8 terminates in an elbow 9 which gives a discharge opening in a horizontal direction in the air pipe 10, the air with the comminuted fuel leading to the furnace opening 11. The air in the pipe 10 is low pressure and is controlled by a valve 10^a, the air being of large volume but of few ounces pressure. High pressure air is supplied through the pipe 12 by way of a valve 13 to an air chamber 15 below the feed chamber 5. A screw threaded stem 16 is arranged in a screw threaded opening 20 in the bottom of the chamber 5. This stem has the passage 17 extending through it terminating in a nozzle 18, the nozzle being positioned to direct a jet axially of the feed pipe 6. The passage 17 is connected with the chamber 15 by a lateral opening 19. The stem 21 extends from the screw threaded stem 16 through a gland 22 in the bottom of the chamber 15. The stem 21 is provided with a handle 23 by means of which the stem 16 and nozzle 18 may be adjusted relatively to the end of the feed pipe 6, that is, may be brought nearer or more remote from the bottom of the feed pipe. In practice the pressure of air delivered through the pipe 12 will preferably be seventy or eighty pounds, and the jet from the nozzle 18 under this high pressure is directed to the feed pipe 6 in an axial direction.

One of the great difficulties in feeding comminuted fuel or powdered coal by the direct application of air to it is the tendency of the coal to completely fill the feed pipe so as to be discharged in a practically solid mass while the normal feed requires but a small portion of this. This tendency ordinarily termed "racing" in devices of this type is entirely obviated by the present structure. At the same time a very much larger quantity of fuel can be fed with continuously uniform results with this device than those in common use heretofore. The comminuted fuel passing from the hopper by way of the passage 2 is deflected into the chamber 5 and into the path of the jet from the nozzle 18 so that this air under high pressure operates upon the comminuted fuel by impact thus breaking it up and preventing the formation of a complete seal in the pipe 8. At the same time, the jet passing into the pipe 6 acts sufficiently as an ejector from the chamber 5 to draw the fuel which has been agitated by the jet into the feed pipe so as to be delivered from the end 9. This assures a practically uniform feed at all times, the high pressure jet preventing the massing of the comminuted fuel in the feed pipe and at the same time being capable of delivering large quantities of fuel under uniform conditions.

By adjusting the position of the nozzle 18 relatively to the bottom of the feed pipe 6 the quantity of fuel fed may be regulated as desired, the amount fed decreasing as the nozzle is moved toward the end of the pipe 6. Preferably the end of the nozzle should be placed a distance below the end of the pipe 6 greater than the radius of the pipe 6. For some feeds, however, it will be adjusted in a higher position.

In Fig. 2 a section is shown wherein two feed chambers are arranged side by side,

the pipes 6 leading to a bend 7^a in the form of a manifold so that several feed pipes will be delivering to one discharge pipe 8 or opening 9.

I prefer to provide a small opening 24 leading from the chamber 15 to the bottom of the chamber 5. The purpose of this small opening is to agitate any comminuted fuel that may tend to pack in the chamber 5 below the nozzle 18 and to assist in the agitation thereof. This opening may be made by a loose fit of the stem 16 if desired.

What I claim as new is:—

1. In a comminuted fuel feeder, the combination of an upwardly extending feed pipe; a jet nozzle directing its jet into the feed pipe to create ejector effect in said pipe, said nozzle being located below the end of the feed pipe a distance as great as the radius of the feed pipe; means for delivering the comminuted fuel subjected to atmospheric pressure into the path of the jet by gravity; and an air delivery pipe into which the feed pipe enters.

2. In a comminuted fuel feeder, the combination of an upwardly extending feed pipe, a high pressure nozzle of minute size relatively to the feed pipe directing its jet into said feed pipe to create ejector effect with said pipe, said nozzle being located below the end of the feed pipe a distance as great as the radius of the feed pipe, and means for delivering comminuted fuel subjected to atmospheric pressure into the path of the jet by gravity, and a low pressure air pipe into which the feed pipe enters.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN F. HAY.

Witnesses:
B. M. HARTMAN,
V. C. HESS.