

W. E. HAMILTON.
METHOD OF TRANSPORTING COAL.
APPLICATION FILED FEB. 8, 1918.

1,385,447.

Patented July 26, 1921.

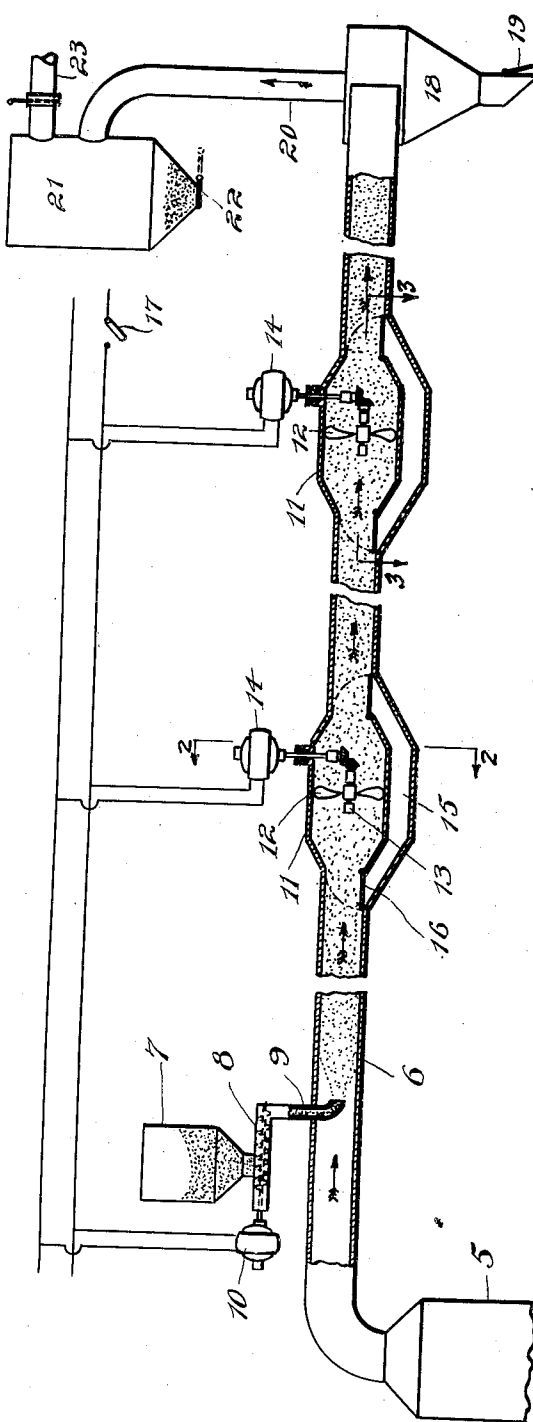


Fig. 1

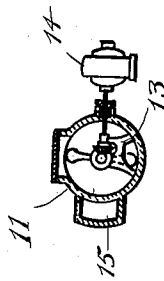


Fig. 2

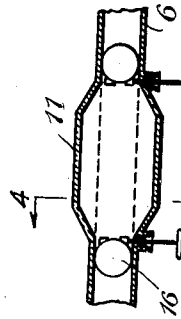


Fig. 3

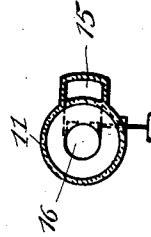


Fig. 4

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METHOD OF TRANSPORTING COAL.

1,385,447.

Specification of Letters Patent. Patented July 26, 1921.

Application filed February 8, 1918. Serial No. 215,995.

To all whom it may concern:

Be it known that I, WILLIAM E. HAMILTON, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Methods of Transporting Coal, of which the following is a specification.

The advantages arising from the use of pulverized coal, have been generally recognized, but its general use has been retarded on account of the highly explosive character of this material, particularly when mixed with air or stored in receptacles containing air. It has heretofore been proposed to pulverize the coal at the plant or point where it was to be used, but this necessitates a separate pulverizing apparatus at each plant with the possibility of explosions in the storage bins and pipes.

In accordance with this invention, I propose to pulverize the coal at a central plant, preferably at the mine, and then transport the pulverized coal to the furnaces or places where it is to be used, by blowing or drawing the coal through suitable pipes. In order that this may be safely done, without danger of explosion in the pipes or in the storage bins, I transport the coal dust through the pipes by mixing it with a gas or fluid, which will not combine with the coal to make an explosive mixture.

The objects of this invention are to provide an efficient and economical method of transporting coal; to provide an economical process of preparing and conveying fuel such as coal, coke, or other coal products; to provide a process for transporting coal and handling coal dust with little possibility of explosions; and in general to provide such an improved process and apparatus for performing the same as will be described and claimed more fully hereinafter.

In the accompanying drawings illustrating means for carrying out this process:

Figure 1 is a diagrammatical view, partly in section, showing one form of the apparatus for transporting coal;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1; and,

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3.

In carrying out this process, the coal is preferably pulverized at the mine, and then

the pulverized coal or dust transported through pipes for any desired distance. If air were mixed with the dust and used as a means of transportation, there would be a possibility of explosions in the pipe line and at the storage bins or points of discharge. In order to avoid this objection, a portion of the coal is utilized for making producer gas, by means of any well known form of producer gas plant. This producer gas is preferably washed and then introduced in the pipes for the purpose of providing a medium for carrying the coal dust.

As illustrated in the accompanying drawings, 5 represents a gas tank or reservoir for the producer gas. This tank is connected with a pipe line 6 which may be of any desired length, say up to fifty miles or more. This pipe may be made of any suitable material, and may be provided with branches if desired. The pulverized coal is carried in a supply hopper 7, which is preferably kept sufficiently full so that little or no air will be mixed with the dust. The coal is fed from the hopper 7 by means of a conveyer 8 to an inlet pipe 9 which projects into the conveyer pipe 6 so as to discharge the dust into the middle of the pipe. The screw conveyer 8 is driven by motor 10, which may be regulated so that the dust will be fed in suitable proportion to the amount of producer gas going through the conveyer pipe. In some instances, the gas may be forced through the pipe line by pressure at the source, but where the coal is to be transported for any considerable distance, I prefer to utilize booster stations at intervals along the line. These stations comprise fan chambers or enlargements 11, in the pipe 6. Propeller fans 12, preferably of the two bladed aeroplane type, are preferably used in these stations. These fans are mounted in brackets 13, and are driven by motors 14 in the manner illustrated. By-passes 15 are provided at the booster stations for carrying the coal around the enlargements when desired. These by-passes are controlled by means of doors 16 covering the openings into the main line, and also serving to close the main line. All of the fan or propeller motors 14, and the feed motor 10 are preferably connected to a main electric supply line, so that they will all be started and stopped simultaneously by the closing and opening of the switch 17.

In some instances the combined fuel gas

and coal dust will be discharged directly into the furnaces. At other times it may be desired to separate the dust from the gas and use each separately. For this purpose, a separator 18 is arranged at the end of the line 6. This separator has a discharge door 19 at the bottom for discharging coal collected therein, and has a discharge pipe 20 which carries the gas to a storage tank or reservoir 21. The reservoir is provided with a discharge slide 22 for discharging any coal which may have escaped from the separator, and is also provided with a discharge pipe 23.

The operation of this apparatus will be readily understood from this description. When the motors are started, and gas and coal are fed into the pipe line, the combined gas and coal dust will be drawn or forced through the pipe line to the point of discharge, where it may be used, either in combination or separately, as desired.

In some instances the gas may be compressed so that it will be condensed much more than under atmospheric pressure before being introduced into the pipe line. This condensed gas will serve to carry more coal, or may allow the use of smaller pipe lines.

While I have described the use of producer gas as being a preferred fluid for use in transporting the coal, my invention contemplates the use of any suitable fluid which will serve as a carrying medium without forming an explosive mixture when mixed with the coal dust.

Having thus described my invention, which, however, I do not wish to limit to the exact process or apparatus herein shown and described, except as specified in the following claims, what I claim and desire to secure by Letters Patent is:

1. The process of transporting fuel such as coal, coke, or the like, for comparatively

long distances, which consists in pulverizing the fuel, then introducing it with a carrying fluid which will make a non-explosive mixture with the fuel into a pipe line, and forcing the fluid and fuel through said pipe line.

2. The method of transporting coal long distances, which consists in introducing pulverized coal with a suitable gas, into a conveyer pipe, and forcing said gas which will make a non-explosive mixture with the coal through the pipe to the point of delivery.

3. The process of transporting coal, which consists in introducing the coal in a finely divided state, with a carrying gas into a pipe, said gas being one which will form a non-explosive mixture with the coal, and blowing said gas and coal through the pipe.

4. The process of transporting pulverized coal, which consists in introducing the coal with a gas which will form a non-explosive mixture therewith, into a pipe, and then forcing the combined gas and coal through said pipe.

5. The herein described method which consists in introducing pulverized coal and producer gas into a pipe, and forcing the gas with the coal carried thereby through said pipe.

6. The herein described method which consists in forcing producer gas through a pipe, and introducing pulverized coal into the pipe to be carried by said gas, and then separating the gas and coal at the point of delivery.

7. The herein described method of conveying coal for long distances, which consists in pulverizing coal and mixing it with a gas which will make a non-explosive mixture with the coal, then forcing the gas and coal through a pipe, and finally separating the gas from the coal.

WM. E. HAMILTON.