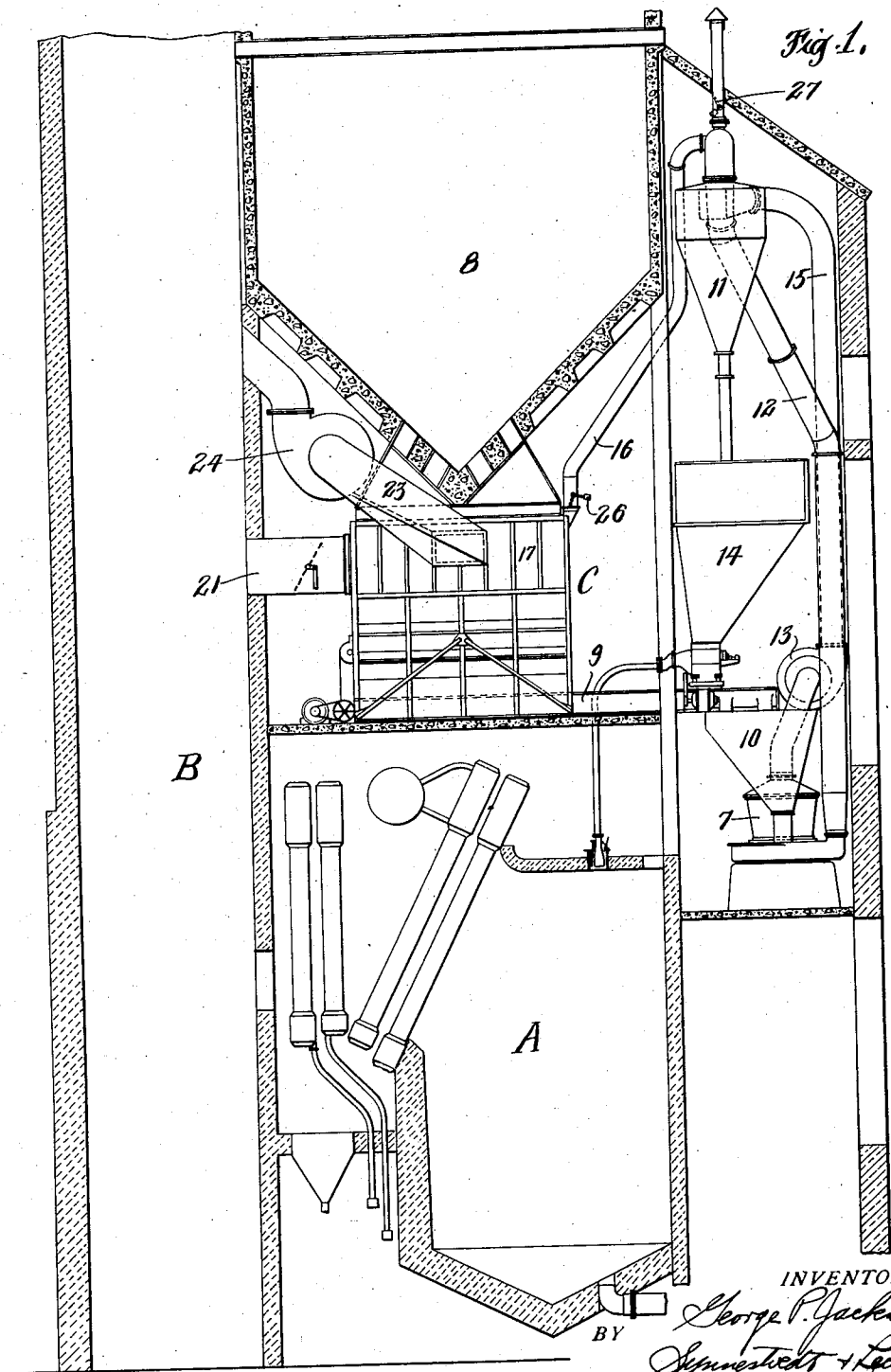
Oct. 27, 1925. 1,559,170

G. P. JACKSON

PULVERIZING APPARATUS

Filed May 19, 1923 2 Sheets-Sheet 1

Fig. 1.



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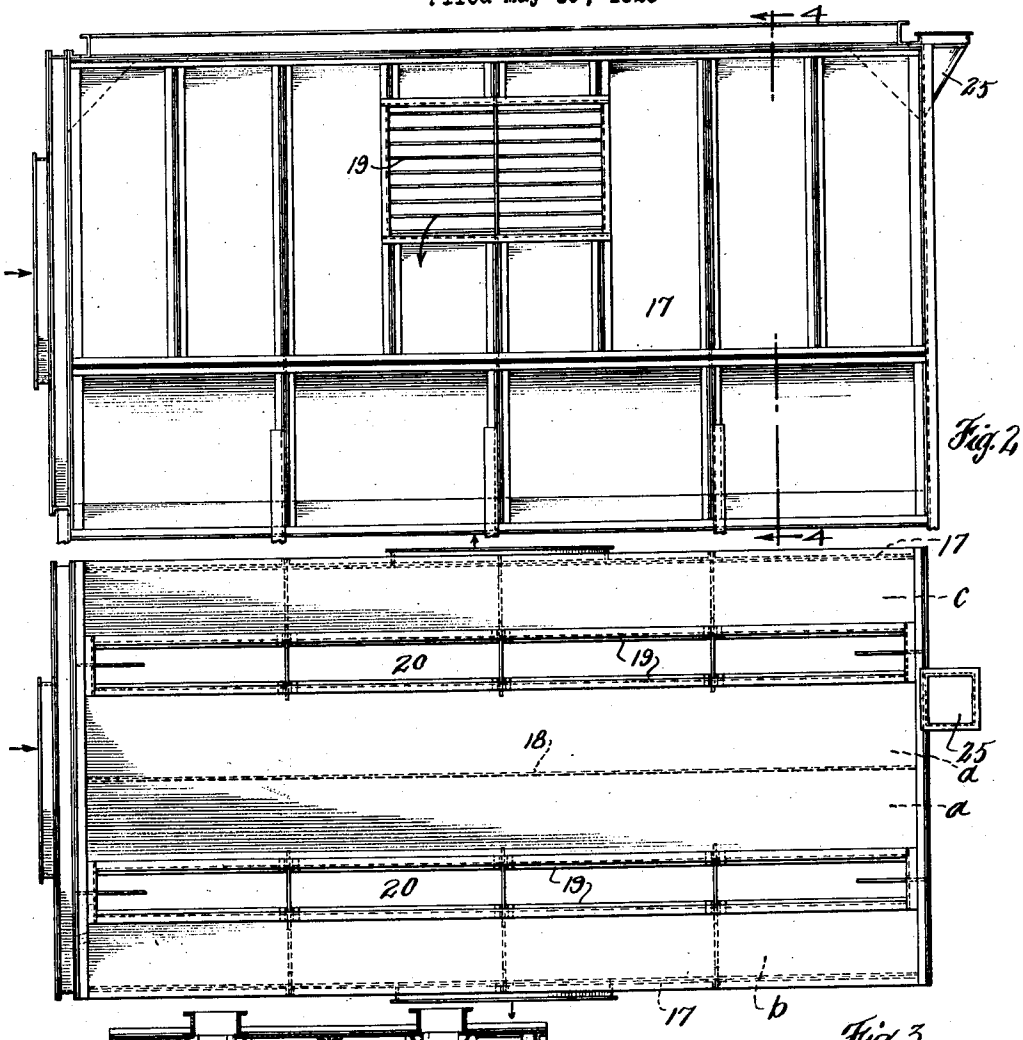


Fig. 2.

Fig. 3.

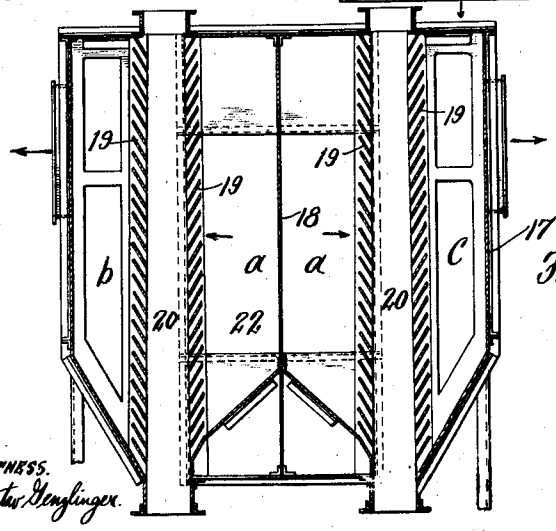


Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE P. JACKSON, OF FLUSHING, NEW YORK, ASSIGNOR TO COMBUSTION ENGINEERING CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PULVERIZING APPARATUS.

Application filed May 19, 1923. Serial No. 640,030.

To all whom it may concern:

Be it known that I, GEORGE P. JACKSON, a citizen of the United States, residing at Flushing, in the county of Queens and State of New York, have invented certain new and useful Improvements in Pulverizing Apparatus, of which the following is a specification.

This invention relates to apparatus or systems for pulverizing material and it is especially useful in connection with the pulverization of coal, in connection with which the invention will be described.

One system of pulverizing coal which has gone into considerable use involves the conducting of the lump coal (ordinarily crushed to some extent) to a pulverizer or mill in which such crushed coal is pulverized, the pulverized coal being taken from the mill by a current of air and led to a separator, in which the coal is separated from the air, the latter returning to the mill. The coal separated in the separator is led to a bin, such as a storage bin or a bin supplying a furnace. This may be termed a substantially closed system through which air circulates.

The current of air which circulates through the system is set up by means of a fan, such as a suction fan, intermediate the mill and the separator and located on the discharge side of the mill. It is preferable that only the amount of air be passed through the system which is necessary to properly convey the coal, the use of an excess quantity of air necessarily involving loss in power, back pressure, and other difficulties. However, the condition set up on the system by the fan results in a certain amount of leakage into the system, to meet which these systems have been provided with a vent for relieving the system of excess air. This vent has usually been to the atmosphere or to a second separator from which, in turn, a vent leads to the atmosphere. In either arrangement there is a loss of some of the finest coal, and this is objectionable, not only because of the monetary loss but also because of the creation of dust in the plant which is more or less of a serious problem.

In accordance with my invention I propose to vent the system through a body of material, such as a body of the coal to be pulverized, which will act in the nature of a sieve, permitting the air to pass therethrough but retaining the particles of coal carried in suspension therewith.

How this and other objects incident to my invention are accomplished, is illustrated in accompanying drawings, wherein:

Fig. 1 is a vertical section through a pulverized fuel burning stationary boiler installation, with the pulverizing system indicated more or less diagrammatically, and illustrating one manner in which such system may be vented in accordance with my invention;

Fig. 2 is a side elevation, drawn on an enlarged scale, of a dryer mechanism shown in Fig. 1 and which is utilized as the screening medium for separating the coal from the vent air;

Fig. 3 is a plan view of Fig. 2; and

Fig. 4 is a section taken on the line 4—4 of Fig. 2.

Referring now to Fig. 1, the reference letter A indicates the furnace and boiler for which the stack B is provided.

The pulverizing and coal supplying systems consists of the mill 7 to which crushed coal from the bin 8 is supplied through the dryer mechanism C, the conveyer 9 and the hopper 10. The pulverized coal is lifted in suspension from the mill to the cyclone separator 11 by the pipe 12 through the medium of a current of air set up by the fan 13. The pulverized coal, separated out of the air in the cyclone separator, passes to the bin 14 from which it is fed to the furnace. The air returning to the mill passes through the pipes 15. The excess air of the system is vented to the dryer C by means of the pipe 16.

The dryer consists of a casing or chamber 17 divided into compartments *a*, *b* and *c* by the wall 18 and the sets of louvres or slots 19. The crushed coal passes out of the bin 8 downwardly through the space 20 between the sets of louvres in the form of a column which is exposed to hot gases, as will further be pointed out. Waste gases from the stack B are conducted through the pipes 21 to the dryer, the inlet 22 being located centrally of the casing 17 so as to deliver the gases into the central spaces *a*. From these spaces the hot gases pass laterally through the louvres and the descending columns of fuel to the spaces *b* and *c* from which they are exhausted by the pipes

23 back to the stack by means of the blower 24.

The vent pipe 16 leads to an inlet 25 in one of the compartments *a* and consequently the venting air, together with any coal carried in suspension therein, must travel along with the waste gases and pass through a column of the coal being dried. This column acts as a screen or separator in which such coal carried in suspension in the vent air is retained.

There is, of course, a partial vacuum set up in the dryer by the flow therethrough and this vacuum should be such that the vent air will leave the pulverizing system. The pipe 16 is controlled by a valve 26 balanced against the vacuum of the dryer so as to be opened when the dryer is in operation. Should the dryer get out of operation or the pressure therein rise above that of the pulverizer system, this valve will close. If for any reason the valve 26 fails to open or moves to closed position because of conditions set up in the dryer, a second valve 27 is provided to relieve the pulverizing system of excess air. The valve 27 is normally closed.

What I claim is:

1. The combination with a substantially closed pulverizing and air separating system, a screen composed of material to be pulverized, and means for venting the system through such screen.

2. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, and means for venting the system through the coal to be supplied.

3. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, a dryer, and means for venting the system through the dryer.

4. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, a dryer, and means for venting the system through the dryer, together with automatic valve mechanism in the vent on the dryer side thereof.

5. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, and means for venting the system through the coal to be supplied, together with an emergency venting means.

6. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, a dryer, and means for venting the system through the dryer, together with valve means automatically opening when the dryer is in operation.

7. The combination with a substantially closed coal pulverizing and air separating system, of means for supplying the coal to the mill, a dryer, and means for venting the system through the dryer, together with valve means automatically opening when the dryer is in operation and an emergency venting means operating when the first valve means is closed.

8. The combination with a substantially closed coal pulverizing and air separating system, of a source of coal supply, means for supplying coal therefrom to the mill, and means for venting the system through the coal being supplied.

In testimony whereof, I have hereunto signed my name.

GEORGE P. JACKSON.