

No. 784,307.

PATENTED MAR. 7, 1905.

J. V. CULLINEY.  
FEEDING APPARATUS FOR COAL DUST.

APPLICATION FILED JULY 11, 1903.

2 SHEETS—SHEET 1.

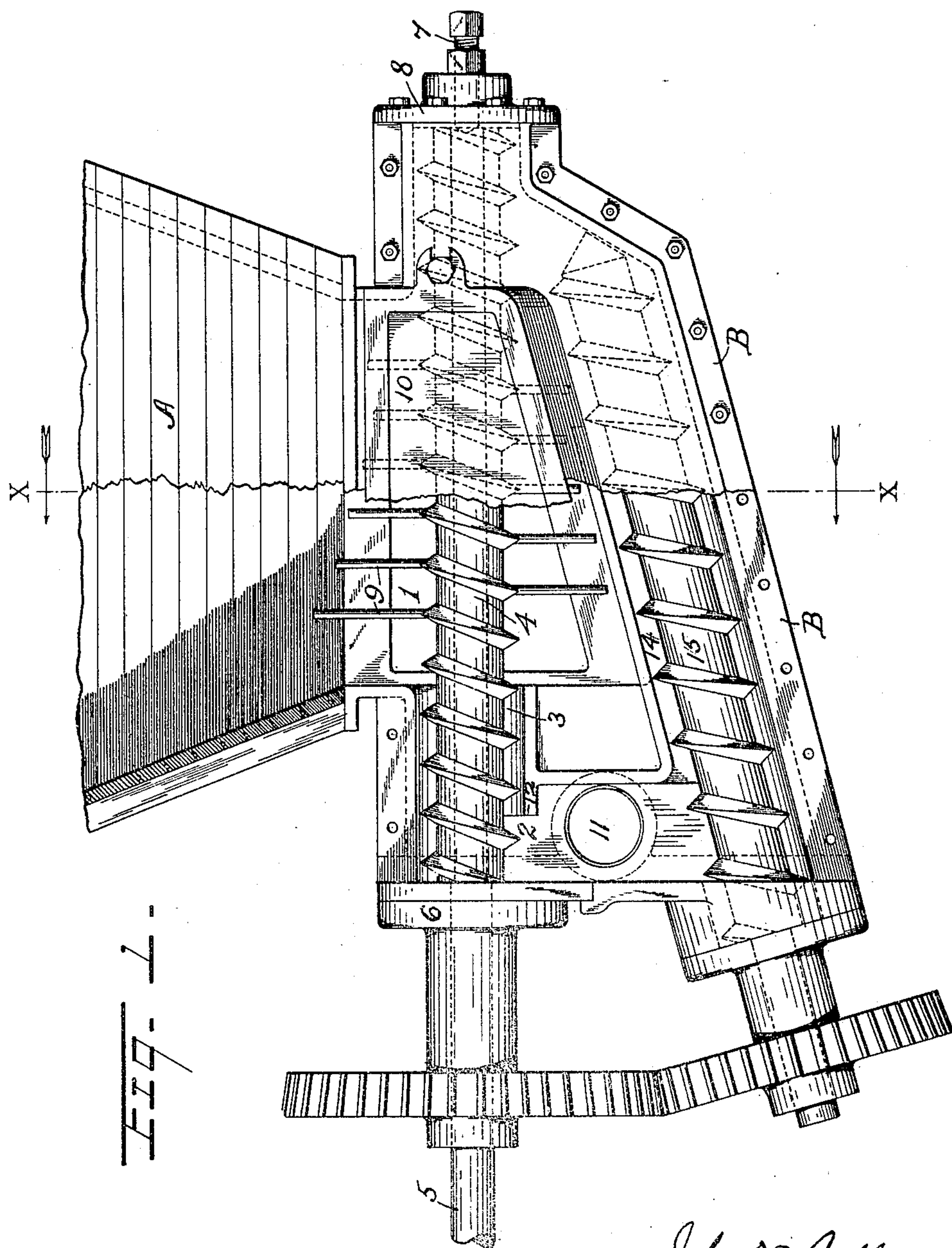


FIG. 1.

Witnesses

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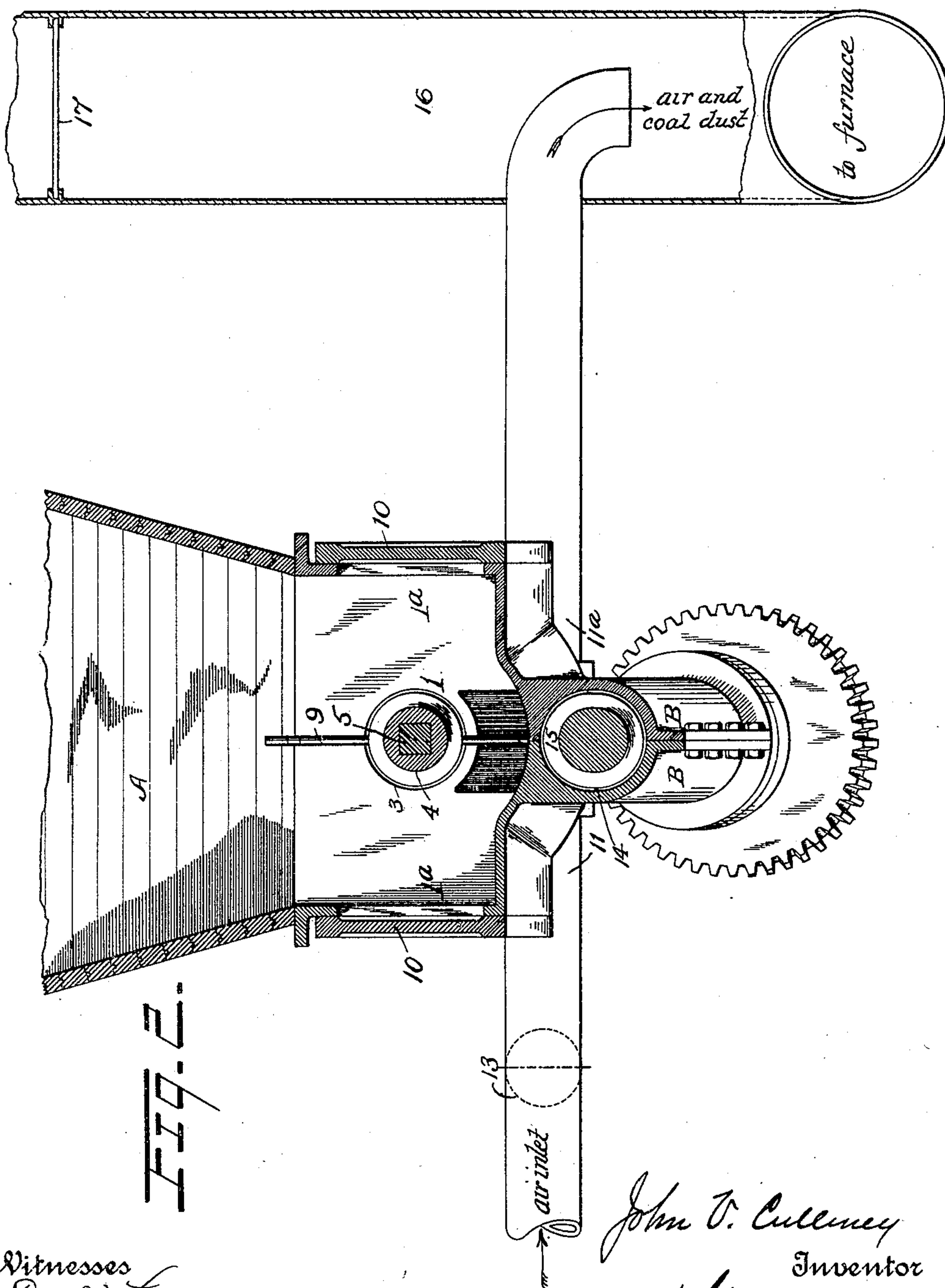
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Witnesses  
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# UNITED STATES PATENT OFFICE.

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## FEEDING APPARATUS FOR COAL-DUST.

SPECIFICATION forming part of Letters Patent No. 784,307, dated March 7, 1905.

Application filed July 11, 1903. Serial No. 165,129.

*To all whom it may concern:*

Be it known that I, JOHN V. CULLINEY, a citizen of the United States of America, and a resident of Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Feeding Apparatus for Coal-Dust, of which the following is a specification.

My invention relates to the feeding of coal-dust or like comminuted fuel to furnaces; and my main object is to provide for securing an easily-regulated uniform feed of fuel mingled with a proper proportion of air by means of a simple and reliable automatically-operated apparatus.

To this end my invention consists in an improved construction and arrangement of feeding mechanism whereby the comminuted fuel is subjected while falling in a steadily-fed stream to the action of an air-blast which seizes upon such portion thereof as is required to properly feed the fire and delivers the same to the latter with a sufficient mixture of air for perfect combustion, the amount of fuel so fed and the proportion of air blended therewith being readily regulated to suit different requirements and any excess of fuel which escapes the feeding action of the air-blast being automatically returned thereto with requisite accretions from the hopper.

The preferred construction of apparatus illustrated in the accompanying drawings embodies the several features of my invention, which are fully described in connection therewith and are specifically pointed out in the claims.

Figure 1 is a side elevation of the main portion of my improved feeding apparatus, a part of the casing being broken away to more clearly show the interior arrangement. Fig. 2 is a cross-sectional view of the same, taken on the line *x x* of Fig. 1 and indicating the course of the conduits connecting therewith.

A represents a hopper to which the comminuted fuel is furnished by any suitable means during the operation of the feeding apparatus and from which it is supplied through a bottom opening therein to my im-

proved feeding mechanism. This mechanism comprises a casing preferably formed of two similar main sections B B, bolted together, as shown, and provided with partitions arranged to form the several communicating compartments or chambers required therein. The main or conveyer chamber 1 is located directly below the hopper-opening and is arranged in communication with an air-conduit chamber 2 through a cylindrical passage-way 3. A horizontal conveyer-screw 4, which passes loosely through this passage-way and extends rearwardly through the chamber 1, is preferably formed in several sections strung upon the squared body of a shaft 5, which is mounted at its forward end in a casing-head 6 and is centered at its rear end upon the conical end of a screw 7, adjustable in a rear casing-head 8. The intermediate portion of this conveyer-screw within the chamber 1 is provided with a series of radially-projecting agitator-pins 9 of such length as to swing clear of the walls of said chamber when the screw is rotated and serving to continuously agitate the fuel in said chamber and in the hopper-outlet. In order to further utilize these agitators, I form the chamber 1 with lateral extensions 1<sup>a</sup>, adapted to serve as receptacles for any foreign or uncomminuted material which may be introduced through the hopper and which will be thrown outward by the rotating agitators into said receptacles, thereby avoiding the clogging or breakage otherwise liable to occur from this cause. To provide for readily removing such foreign material, I employ swinging or removable cover-plates 10 on each side of the casing.

The passage-way 3 from the chamber 1 communicates with the second chamber 2, which is located below the open forward end thereof and which I herein refer to as an "air-conduit" chamber, it being provided with transversely-alined inlet and outlet conduits 11 and 11<sup>a</sup>, respectively, and thereby forming an interposed enlargement of said conduit. The purpose and effect of this arrangement is to deliver a steadily-fed stream of fuel through the passage 3 over the forward edge 12 of the



passage-wall, which is located directly above the axial line of the air-conduits 11 11<sup>a</sup>, so that said stream of fuel shall fall directly into the crossing blast of air and be subjected to the action of said blast, so that a portion thereof, determined by the regulated volumes of the falling stream of fuel and of the air-blast, shall be mixed with and carried onward with the latter to the furnace.

10 The quantity of fuel delivered by the conveyer-screw is regulated by varying its speed of rotation in any ordinary manner, while the volume of the air-blast is regulated by means of a suitable valve 13, so as to take up the required amount of fuel, so that when properly adjusted a uniform feed is automatically maintained.

To provide for automatically returning to the action of the conveyer-screw 4 that portion of the falling stream of fuel which is not taken up and carried onward to the furnace by the air-blast, an excess-fuel chamber 14 is formed in the lower part of the casing and arranged in communication at opposite ends with said air-conduit chamber 2 and conveyer-chamber 1, and a cooperating conveyer-screw 15 is suitably located in said chamber 14 and rotated from the main conveyer-shaft 5, as shown, so as to constantly push the excess fuel which drops into the forward end of said chamber 14 rearward and upward into the communicating conveyer-chamber 1, to be again subjected to the action of the conveyer-screw 4 and fed onward with other fuel supplied directly from the hopper through the passage 3 to the renewed action of the air-blast. It will be readily seen that the excess fuel, owing to the additional action thereon of the cooperating screw 15 and of the conveyer-screw, with its agitators, will be more thoroughly reduced or pulverized, so as to be more readily and advantageously taken up by the air-blast.

In order to insure the furnishing to the furnace of a proper amount of air for combustion, with the mixed coal-dust and air delivered through the air-blast conduit 11<sup>a</sup>, I so arrange the latter as to deliver the mixed blast therefrom to the furnace through an inclosing air-flue 16, which is provided with a suitable air-inlet valve 17, whereby the additional inflow required for proper combustion may be readily regulated.

The specific construction shown and described may evidently be modified without departing from my invention.

What I claim is—

1. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a horizontal fuel-delivery passage, an air-conduit chamber located beneath the terminus of said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, and a conveyer-screw entering said passage

and arranged to deliver a falling stream of fuel between said aligned inlet and outlet conduits.

2. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a horizontal fuel-delivery passage, an air-conduit chamber located beneath the terminus of said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, and a conveyer-screw entering said passage and having its rearward portion located in said conveyer-chamber beneath the hopper-opening and provided with agitators.

3. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a horizontal fuel-delivery passage, an air-conduit chamber located beneath the terminus of said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, a conveyer-screw entering said passage and arranged to deliver a falling stream of fuel between said aligned inlet and outlet conduits, and means below said conduits arranged to catch and return the excess of said stream of fuel to said conveyer mechanism.

4. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a fuel-delivery passage, an air-conduit chamber communicating with said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, and a conveyer-screw entering said passage and having its rearward portion located in said conveyer-chamber beneath the hopper-opening and provided with agitators, said conveyer-chamber having a lateral extension beyond the swing of said agitators adapted to serve as a receptacle for foreign material.

5. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a horizontal fuel-delivery passage, an air-conduit chamber located beneath the terminus of said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, a conveyer-screw entering said passage and arranged to deliver a falling stream of fuel between said aligned inlet and outlet conduits, an excess-fuel chamber located below and affording communication between said air-conduit and conveyer chambers, and a cooperating feed-screw in said excess-fuel chamber arranged to reconvey the excess fuel to said conveyer-chamber.

6. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer-chamber communicating therewith and provided with a horizontal fuel-delivery passage, an air-conduit chamber located beneath the terminus of said delivery-passage and having transversely-aligned inlet and outlet air-conduits therefrom, a conveyer-screw entering said passage and arranged to deliver a falling stream of fuel



between said alined inlet and outlet conduits, an excess-fuel chamber located below and affording communication between said air-conduit and conveyer chambers, and a cooperating feed-screw in said excess-fuel chamber arranged at an incline to said conveyer-screw and adapted to convey the excess fuel to the rear portion of the latter.

7. A feeding apparatus for comminuted fuel comprising a hopper, a conveyer mechanism arranged to deliver a falling stream of fuel therefrom, an air-blast conduit arranged

across the path of said falling stream of fuel, a supplemental air-admission flue through which said conduit discharges into the furnace, and regulating means substantially as set forth.

Signed at Lebanon, Pennsylvania, this 7th day of July, 1903.

JOHN V. CULLINEY.

Witnesses:

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