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FEEDING APPARATUS FOR PULVERIZED COAL.

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1,319,348. Patented Oct. 21, 1919.

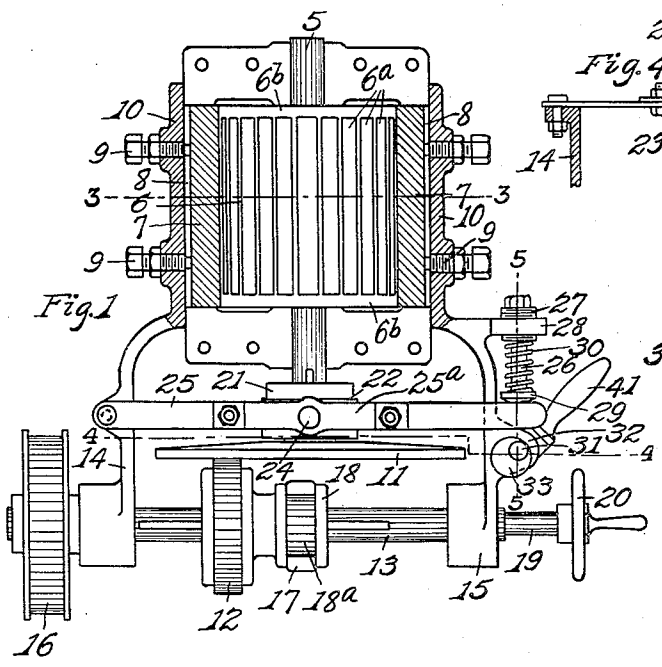


Fig. 1

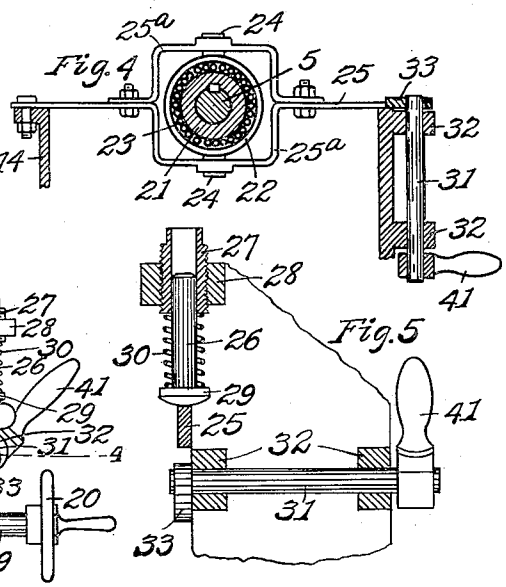


Fig. 4

Fig. 5

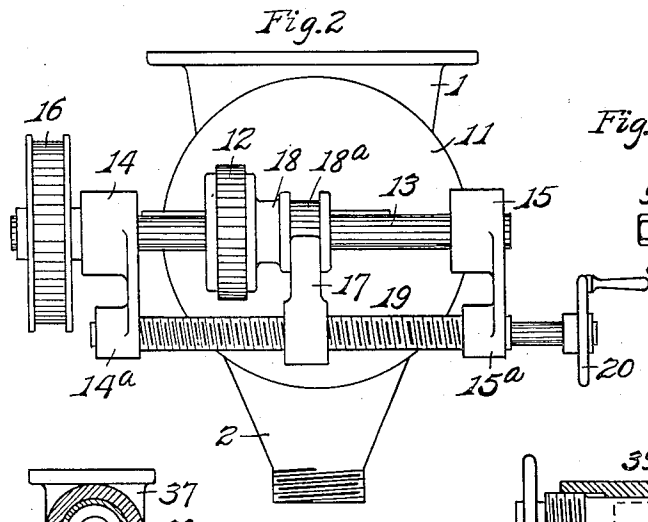


Fig. 2

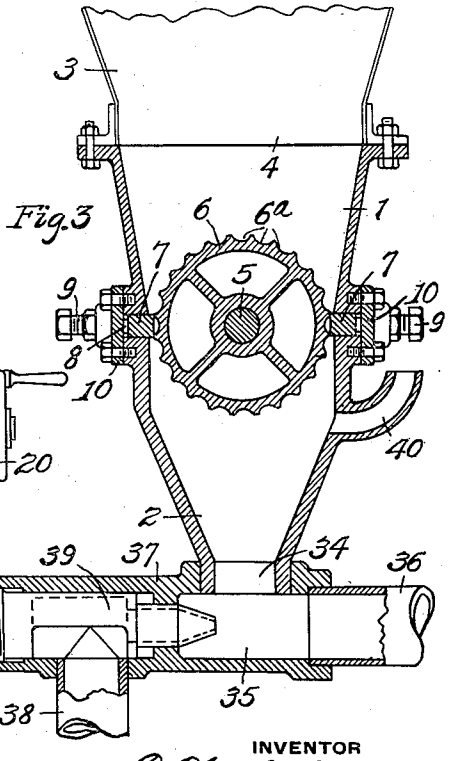


Fig. 3

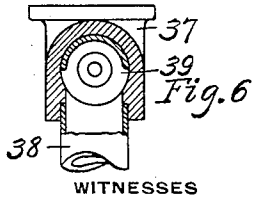


Fig. 6

WITNESSES

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FEEDING APPARATUS FOR PULVERIZED COAL.

1,319,348. Specification of Letters Patent. Patented Oct. 21, 1919.

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To all whom it may concern:

Be it known that I, CHARLES W. KINTER, a citizen of the United States of America, and resident of Wellsburg, county of Brooke, and State of West Virginia, have invented certain new and useful Improvements in Feeding Apparatus for Pulverized Coal, of which the following is a specification.

This invention relates broadly to feed regulators, and more specifically to a regulatable delivery apparatus or feeder for conveyers of pulverized materials.

The primary object of the invention is to provide a delivery apparatus whereby powdered, or pulverized, coal may be continuously supplied at a constant regulatable rate, or in regulatable uniform quantities, for introduction into a furnace.

A further object is to provide a pulverized coal feeding apparatus by which the coal is supplied mechanically and positively from a storage bin, or without the employment of variable air pressure.

A still further object is to provide a device of the character mentioned by means of which the rate of supply of the powdered material may be positively and accurately varied as occasion may require.

With these and other important objects in view, all of which will hereinafter be made apparent, the invention resides in the features of construction, arrangement of parts and combinations of elements which will hereinafter be exemplified, reference being had to the accompanying drawings, in which—

Figure 1 is a top plan view of the invention with the hopper or casing thereof in partial horizontal section;

Fig. 2 is an end elevation of the invention;

Fig. 3 is a transverse section on line 3—3, Fig. 1;

Fig. 4 is a detail section on line 4—4, Fig. 1;

Fig. 5 is a detail section on line 5—5, Fig. 1; and—

Fig. 6 is a cross section of the air control valve.

Referring to said drawings, in which like designating characters distinguish like parts throughout the several views—

1 and 2 indicate, respectively, the upper and lower sections of a hopper, or hopper-like casing, which is suitably attached at its upper end to a storage bin or container 3 for pulverized coal, the same occupying such position with respect to a delivery opening 4 in said bin that coal gravitates thereto through said opening. Said sections 1 and 2 have corresponding end flanges providing for rigid attachment thereof, and provided in said flanged ends are bearings in which is journaled a shaft 5 having fixed thereon a feed drum 6. Said drum has a longitudinally fluted periphery with the flutes 6^a disposed in spaced relation and of less length than the drum so as to provide adjacent to each of the ends of the latter an annular surface 6^b of true cylindrical form. Disposed in the horizontal axial plane of the drum 6 at each of the opposite sides of the latter is a longitudinally extending bar 7 which has its inner edge seated against the periphery of the drum, or against the annular surfaces 6^b of said drum. Said bars are designed to completely fill the lateral spaces between the casing and the ribs by which the flutes 6^a of the drum are separated. Said bars are adjustably disposed in channels 8 provided therefor between flanges carried by the adjacent lateral edges of the hopper sections 1 and 2, set screws 9 directed through face-plates 10 being disposed against the outer edges of said bars for adjusting the latter with respect to the drum to compensate for wear. Said face plates 10 are suitably mounted upon the adjacent lateral flanges of the hopper sections in closing relation to the channels 8, as shown.

Carried by an end of the drum shaft 5 is an outwardly facing power-transmission disk 11. A relatively smaller disk 12 located at right angles to said disk 11 is disposed with a point on its periphery in engagement with the outer face of the last-mentioned disk, so that the latter will be frictionally driven through rotation of said disk. Said disk 12 is splined upon and longitudinally shiftable along a drive-shaft 13 which is journaled in brackets 14 and 15 carried by the hopper or casing. Said shaft 13 may be driven in any suitable manner, but as herein shown carries a pulley or belt wheel 16 adapted to be connected by belt to a line shaft.

The speed of the drive-shaft 13 is constant, but the speed of rotation of the drum may be varied to any extent desired by shifting the disk 12 along said shaft 13, it being obvious that the speed communicated

thereby to the disk 11 will be increased as the disk 12 approaches its center, and vice versa. For effecting shifting movement of said disk 12 I employ a shifter yoke 17 of which the forked end is seated in embracing or straddling relation to the neck portion 18a of a hub 18 carried by said disk. The opposite end of said yoke is mounted upon and movable along the threaded portion of a worm screw 19 which is journaled in extensions 14a and 15a of the brackets 14 and 15 and which carries upon one end a crank or hand wheel 20 whereby it may be rotated.

The disk 11, which is splined upon and longitudinally movable to a limited extent along the drum shaft 5, has an inwardly extending boss or hub 21. Disposed in embracing relation to said hub is a non-rotatable collar 22, ball-bearings 23 being preferably employed between said hub and said collar for reducing to a minimum friction which results from rotation of the hub with respect to said collar. Said collar carries oppositely disposed trunnions 24 which have fitted thereon yoke members 25a forming parts of a transverse horizontally disposed lever 25 which has one end pivotally mounted at a suitable point on the bracket 14 and has its opposite end seated against the end of a yieldable thrust member whereby it is normally maintained in a position in which the face of the disk 11 is presented in frictional engagement with the disk 12.

The said thrust member comprises a pin 26 which is slidably mounted within a sleeve or bushing 27 which is adjustably mounted in a laterally disposed arm or bracket 28 carried by the hopper casing at a suitable point. Said pin has on its outer end a head 29 between which and the adjacent end of the bushing 27 is disposed a compression spring 30 whereby tension is exerted for holding said pin thrust outward with its head 29 in seating relation to the inner face of the adjacent end of the lever 25 for normally maintaining said lever and the therewith-associated disk 11 in an outwardly thrust position wherein the latter rests against the periphery of the disk 12. A small rod or shaft 31 is disposed vertically in suitable bearings, as 32, carried by the hopper casing and has fixed on one end thereof a cam 33 which is adapted to be carried by rotation of said shaft 31 into engagement with the lever 25 for moving the latter inward against the tension of the spring 30, as when it is desired to disengage the disk 11 from the constantly rotated disk 12 for stopping the feed drum. On the end of the shaft 31 opposite the cam 33 is a lever 41 whereby rotation of said shaft is effected by hand.

The lower end of the casing section 2 has a discharge opening 34 through which the pulverized material is conducted to a small chamber 35 from which said material is conducted by air pressure through a pipe or pipes 36 leading to the burners which discharge into the furnace. Said chamber 35 is formed within a casing 37 having the conductor pipe 36 leading horizontally from one end thereof. A pipe 38 leading from an air pressure line, or other suitable source of air supply, opens into said casing 37 at an angle to the latter, and a suitable air control valve, as 39, is interposed between the point at which said pipe enters said casing and the chamber 35, said valve being adapted for adjustment to regulate the volume of the blast of air employed for carrying the material admitted to said chamber 35.

A suitable vent, as 40, is preferably provided at a suitable point in the casing section 2, the same being designed to admit air above the material in said section.

In practice, the powdered material is fed through the hopper at a uniform rate by rotation of the drum, which rate may be varied to any extent desired by shifting the transmission disk 12 with respect to the disk 11 for increasing or decreasing the speed of said drum. The force of the blast employed for introducing the material in the furnace may be accurately regulated by adjustment of the control valve 39.

What is claimed is—

1. A feeder for pulverized coal, comprising, in combination with a hopper-inclosed feed drum and adjustable means at opposite sides of said drum for controlling the rate of feed, of a shaft upon which said drum is carried, a variable speed gearing associated with said shaft, said gearing including a pair of friction disks of which one is positively driven and the other is frictionally driven through contact of its space with the periphery of said positively driven disk, said positively driven disk being shiftable across the face of the frictionally driven disk for varying the rotative speed of the latter, and the frictionally driven disk being carried by and movable on the drum shaft to the extent that it may be disengaged from the positively driven disk, yieldable means normally maintaining the frictionally driven disk in frictional engagement with said positively driven disk, and manually movable means whereby said frictionally driven disk may be shifted against the tension of its holding means.

2. A feeder for pulverized coal, comprising, in combination with a hopper-inclosed feed drum, of a shaft upon which said drum is mounted, a drive shaft located in transversely disposed relation to said drum shaft, a disk carried by each of said shafts, said disks being disposed at right angles to each other with the periphery of the drive-shaft disk normally located in frictional driving

relation to the drum-shaft disk and shiftable upon its shaft for varying the rotative speed of the latter, the drum-shaft disk being associated with a lever whereby it may be shifted along its shaft into and out of frictional engagement with said drive-shaft disk, yieldable means acting against said lever for normally holding the latter in a position maintaining frictional driving engagement between said disks, and means whereby said lever may be moved against the tension of said yieldable means for disengaging said disks.

3. A feeder for pulverized coal, comprising, in combination with a hopper-inclosed feed drum, a shaft upon which said drum is carried, a variable speed gearing associated with said shaft, said gearing including a pair of friction disks disposed at right angles to each other, one of said disks being shiftable across the face of the other disk for changing the rotative speed of the latter, a shaft upon which said shiftable disk is slidably mounted, a worm screw journaled parallel to the last mentioned shaft, a shifter yoke adjustable upon said screw by rotation of the latter and operatively associated with said shiftable disk, means whereby the frictionally driven disk is yieldingly held in engagement with the shiftable disk, and means whereby the frictionally driven disk may be shifted against the tension of said holding means for disengaging the disks.

In testimony whereof, I affix my signature in presence of two subscribing witnesses.

CHARLES WILLIS KINTER.

Witnesses:
CLAUDE STRATFORD,
CHAS. A. CLARK.