

Oct. 9, 1923.

J. K. BLUM

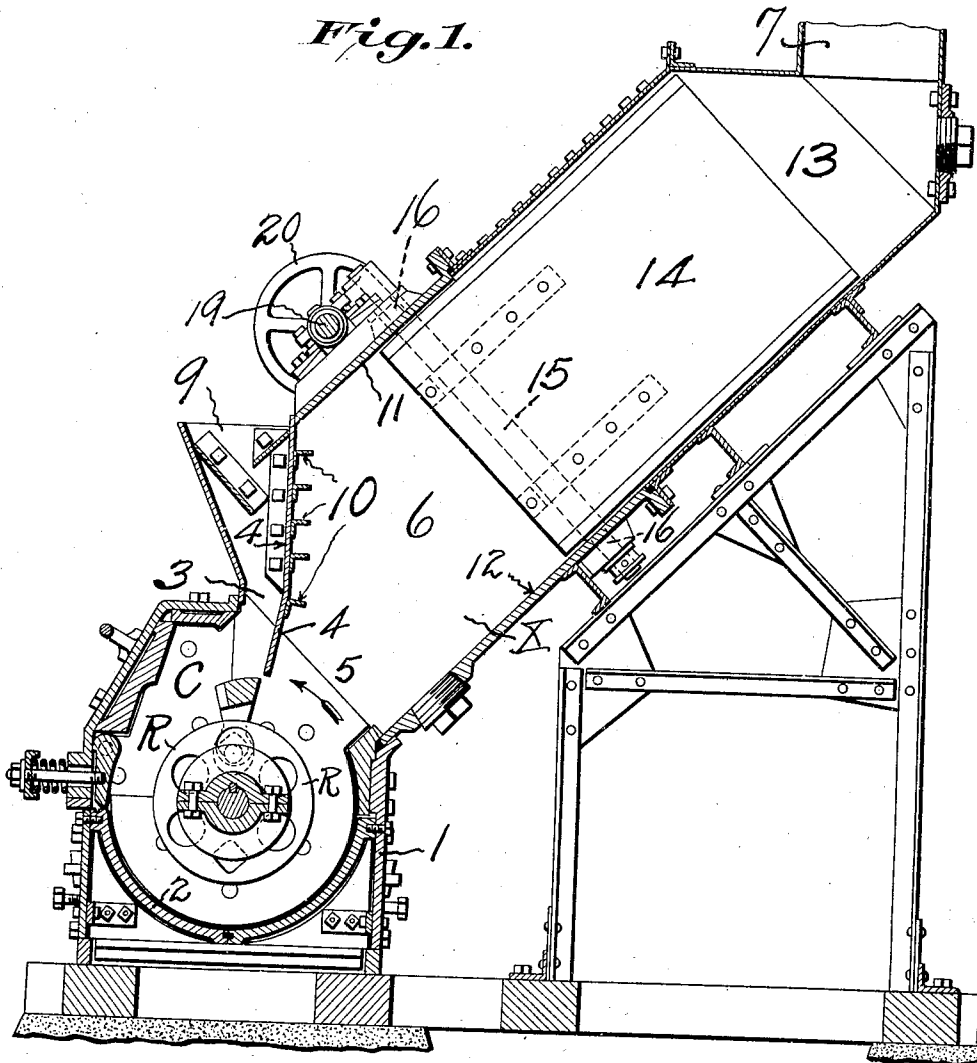
1,469,877

DISINTEGRATOR

Filed Aug. 20, 1921

2 Sheets-Sheet 1

Fig. 1.



Inventor

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WITNESSES:-

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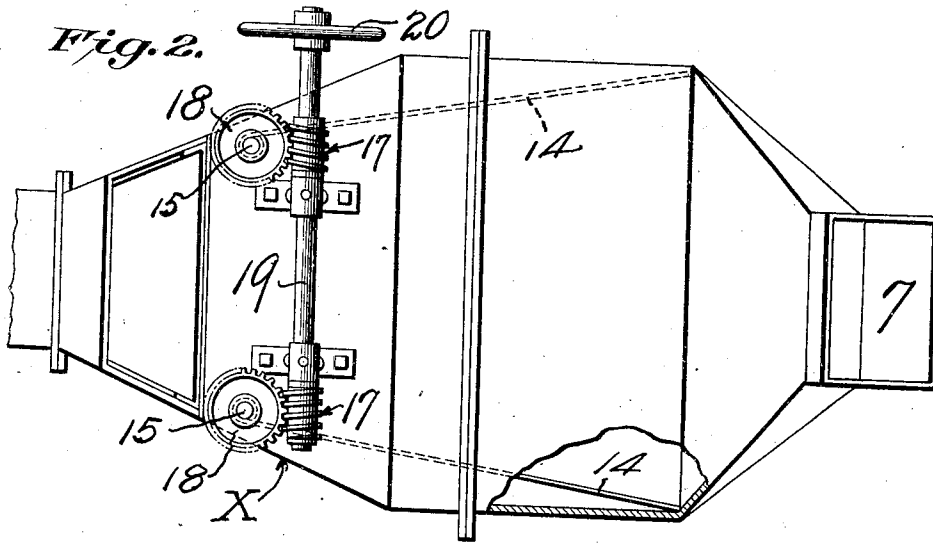
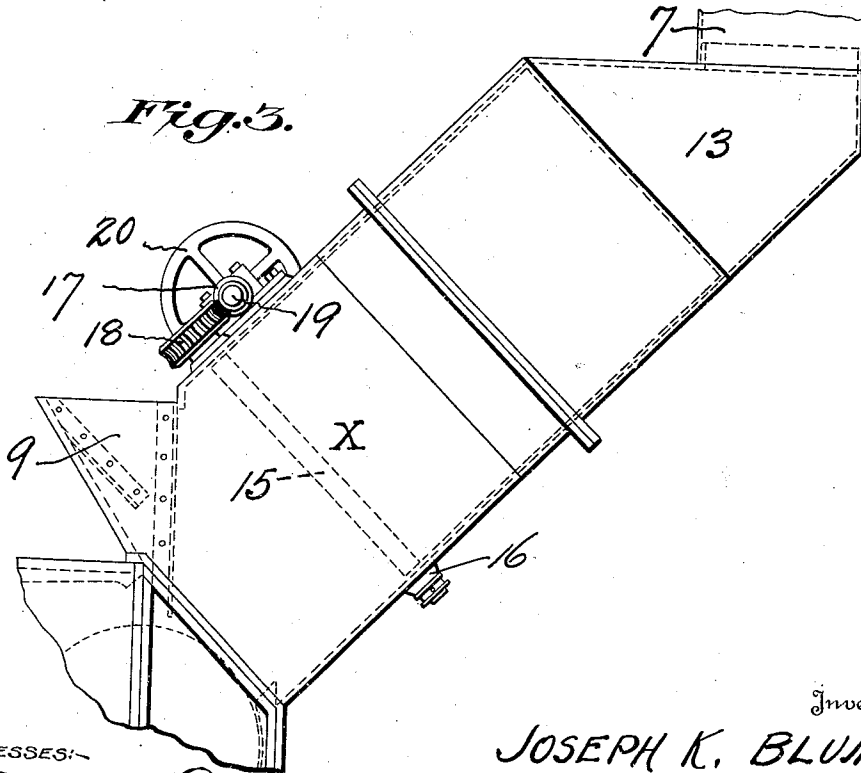
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2 Sheets-Sheet 2



WITNESSES:-

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Patented Oct. 9, 1923.

1,469,877

UNITED STATES PATENT OFFICE.

JOSEPH KLEE BLUM, OF GREENBURG, NEW YORK, ASSIGNOR TO K.-B. PULVERIZER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

DISINTEGRATOR.

Application filed August 20, 1921. Serial No. 493,837.

To all whom it may concern:

Be it known that I, JOSEPH K. BLUM, a citizen of the United States, residing at Greenburg, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Disintegrators, of which the following is a specification.

This invention relates to the subject of disintegrators and more particularly to an improved construction and design of the invention covered by my Patent No. 1,384,821 dated July 19, 1921.

A primary object of the invention is to provide a novel construction and arrangement of elements intended to constitute a practical means of preparing pulverized fuel for direct delivery to a burner nozzle. To that end, the machine of the present invention is so constructed that the pulverized material is cast upwardly into an enlarged chamber under the impulse of the disintegrator so that the "fines" can be completely drawn out by a large volume of air moving at relatively slow velocity through the separating chamber. At the same time the improved construction of machine provides for intercepting the material projected from the disintegrator device in such a manner as to facilitate the return of the heavier and coarser particles to the pulverizing chamber for further treatment.

A further object of the invention is to provide an organization of parts including means for varying the interior area of the separating chamber whereby the air currents and the pulverized material may be controlled with such nicety as to insure thorough separation of the fines from the heavier particles in condition for burning. In that connection, the invention also provides a construction wherein wet material may be crushed in the mill and still a proper separation effected between the fines and the coarser particles.

With this and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts, hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is shown in the accompanying drawings in which

Figure 1 is a vertical sectional view,

partly in elevation of the improved apparatus.

Figure 2 is a top plan view of the separating chamber, part of the casing being broken away to more clearly show one of the throttling wings.

Figure 3 is a side elevation of the separating chamber.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying forward the invention, certain fundamental features are preserved, namely, the casing 1 having a screenless bottom 2, and provided with a feed-opening 3 arranged to deliver the material, preferably into the top part of the casing. In combination with those parts the invention utilizes certain distinctive features which are important to insure a complete release and separation of the "fines" from the coarser particles, the return of the latter to the pulverizing chamber for further treatment, and the carrying out of the "fines" with the air currents to the point of burning. The said distinctive features include the disintegrating chamber C with the rotor R therein, and a partition 4 located at the upper part of the casing and separating the inlet 3 from the casing outlet 5. Furthermore, the arrangement of the partition 4 is such that it forms one wall of a separating chamber 6 of a greater cross sectional area than that of the outlet 5 from the disintegrating chamber and also of a greater cross sectional area than that of the discharge conduit 7 through which the fines are discharged for conveyance to the burner. Accordingly, the present invention is based upon and includes the fundamental combination of the disintegrating chamber having a screenless bottom, a discharge conduit for the fines, and an enlarged separating chamber arranged to constitute the inlet to the said discharge conduit, the said separating chamber having a wall 4 so disposed that it will intercept material projected from the rotor.

The disintegrating rotor R may be of any desired construction, though preferably of the hammer type and operating within the disintegrating chamber over the screenless bottom in close proximity to the partition 4 thereby serving to forcibly impel the pulverized material upwardly into the separating chamber 6, and also generating air cur-

rents and discharging the same through the suspended material, causing the fines to be removed or separated from the heavier particles and discharged through the conduit

5 7. Of course, it will be understood that independent air supplying means may be utilized, and for best results it has been found that the air-currents, however generated, should be of large volume and relatively
10 slow velocity, as by maintaining air currents of that kind thorough separation and air-mixing with the fines are obtained, and wet materials may be pulverized and the grades thereof successfully separated.

15 According to the present invention the construction of the separating chamber is an important feature, since as previously pointed out, the control of the air currents is necessary to insure proper separating conditions. It will be observed that the partition 4 is preferably so arranged as not only to constitute a proper barrier or separator between the inlet 3 and the outlet 5, but also forms substantially a vertical wall member
20 for the hopper 9 which supplies or feeds into the opening 3. At the inside of the chamber 6 the partition or wall 4 may be provided with a plurality of offstanding arresting plates or rebound abutments 10 for checking heavy particles that may be thrown
30 in that direction, while leaving the main part of the chamber entirely free and unobstructed for receiving the main body of the finer material ejected from the disintegrating chamber and permitting the air to freely exercise its function as the separating vehicle for the fines. The separating chamber 6 is relatively capacious, and preferably is disposed at an upward inclination, the same being of box-like form, having the inclined top wall 11 and the inclined bottom wall 12, which at its upper end preferably contracts at 13 to join with the discharge conduit for the fines.

45 The internal area of the chamber 6 may be varied to regulate and control not only the air currents but also the separating action therein by the means of suitable instrumentalities, such for example as by a pair of oppositely arranged adjustable throttling wings 14. As it will be observed from the drawings, the said throttling wings 14 may be arranged at opposite sides of the separating chamber, and constitute in effect adjustable side walls for the chamber, though it is preferable, as shown, to completely house
50 said wings in the chamber.

It will further be observed from Figure 2, for example, that the separating chamber 6 preferably is of comparatively greater width at its intermediate portion than at the outlet 5 from the disintegrating chamber, and at the point where the chamber joins with the discharge conduit 7 for the fines. However,
65 in all forms of construction, the separating

chamber is of relatively large size, and of decidedly larger cross-sectional area than either the inlet 5 to it or the outlet 7 from it, but in order that all conditions of use in connection with different materials may be properly met it is desirable to have adequate means for varying the internal area of the said chamber. This is done by use of the throttling wings referred to, thus providing the machine with an adequate adjustment to properly control the volume of air and material which passes through the separating chamber.

Any suitable and convenient adjusting means may be employed for changing the position of the throttling wings, and to that end the same may be pivotally supported at their rear ends on the pivot shafts 15 journaled as at 16 at the bottom of the separating chamber and projecting through the upper side of the casing to connect with any desired type of manually operating adjusting means. A preferred type of adjusting means is shown to advantage in Figures 2 and 3, from which it will be observed that the said shafts 15 may be provided with the worm gears 17 which in turn mesh with the worm pinions 18 on a main operating shaft 19. The said worm pinions 18 have their flights oppositely arranged so that from the rock shaft 19 by the hand wheel 20 or its equivalent a uniform rotary movement will be imparted to each gear, therefore uniformly shifting the shafts 15 carrying the wings 14.

As the shafts 15 are located adjacent the diverging side walls X of the receiving end of the separating chamber, and the tips of the throttling wings 14 extend in relatively close proximity to the contracted portion 13 of the chamber, it will be apparent that upon shifting the wings on their pivots, the space therebetween may be varied as desired to thereby vary the width of the passageway through the separating chamber, and consequently vary the internal area of the chamber according to the requirements and condition of the material under treatment.

It will now be seen that the separating chamber widens divergently from its inlet 5 which is the discharge outlet for the disintegrating chamber and narrows convergently toward the discharge outlet 7 for the fines. The advantage of that form of construction resides in provision thereby being made for the pulverized material being thrown directly through the opening or duct 5 into a space expanding in size fanlike. Consequently, the mass of material ejected from the pulverizing chamber is free to disperse and scatter in the receiving end of the separating chamber, thereby permitting the air currents to more readily pick out the fines and become intimately mixed therewith, providing in the case of coal a fuel ready for

burning when conveyed through a nozzle. Furthermore, it will be seen that the top wall and the bottom wall of the separating chamber incline upwardly and extend practically the full distance from the flared receiving end X to the contracted discharging end 13. This construction is important because heavy particles of the material which may not be intercepted by the checks 10 are given a full opportunity to ricochet from the top wall 11 to the bottom wall 12 and back again to the pulverizing chamber for further treatment on to the rotor.

While there are shown in the drawings several detail features of construction in connection with the said hopper for the pulverizing chamber, and particularly in connection with the pulverizing chamber itself, it will be understood that the present invention is not limited to any of those details because the essential features herein described may be associated with pulverizers of different construction than the one shown in the drawings, and also changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

I claim:

1. In a pulverizer, the disintegrating chamber with a rotor therein, and having a feed-opening and a discharge outlet for pulverulent material, a discharge conduit for the fines and an enlarged separating chamber interposed between said outlet and said conduit and having at its receiving end a partition separating the inlet of the disintegrating chamber from its outlet and provided at one side with rebound abutments.

2. In a pulverizer, the disintegrating chamber with a rotor therein, and having an outlet for pulverulent material, a discharge conduit for the fines, an enlarged air separating-chamber constituting the inlet to said discharge conduit and means for varying the internal area of said separating chamber.

3. In a pulverizer, the disintegrating chamber with a rotor therein and having an outlet for pulverulent material, a discharge conduit for the fines, an outwardly project-

ing enlarged air separating-chamber in communication with the disintegrating chamber outlet and constituting the inlet to the said discharge conduit, and means for controlling the volume and velocity of material and air currents passing through such separating chamber.

4. In a pulverizer, the disintegrating chamber with a rotor therein, a discharge conduit for the fines, an enlarged air separating-chamber communicating with the disintegrating chamber and with said discharge conduit and means for varying the internal area of the separating chamber, said means including an adjustable throttling wing.

5. In a pulverizer, the disintegrating chamber with a rotor therein, a discharge conduit for the fines, an enlarged air separating-chamber communicating with the disintegrating chamber and with said discharge conduit, means for varying the internal area of the separating chamber, said means comprising a pair of relatively adjustable throttling wings arranged within the chamber at opposite sides thereof and means exterior to said chamber for adjusting the position of said wings.

6. In a screenless type pulverizer, a disintegrating chamber having a feed-opening, a disintegrator in said chamber, a discharge conduit for the fines, a relatively capacious separating chamber constituting the inlet to the discharge conduit, a partition constituting one wall of the feed opening for the disintegrator and extending into substantial proximity with the periphery of the disintegrator, said partition constituting one wall of the separating chamber and cooperating with the casing at its lower end to form the outlet from the disintegrating chamber and the mouth of the separating chamber, and a plurality of rebound abutments carried by the face of said partition opening into the separating chamber.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOSEPH KLEE BLUM.

Witnesses:

HILDA MOSES,
A. J. BANUBL, Jr.