Jan. 19, 1926. 1,570,037

J. K. BLUM ET AL

PULVERIZED FUEL APPARATUS

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Fig. 1a

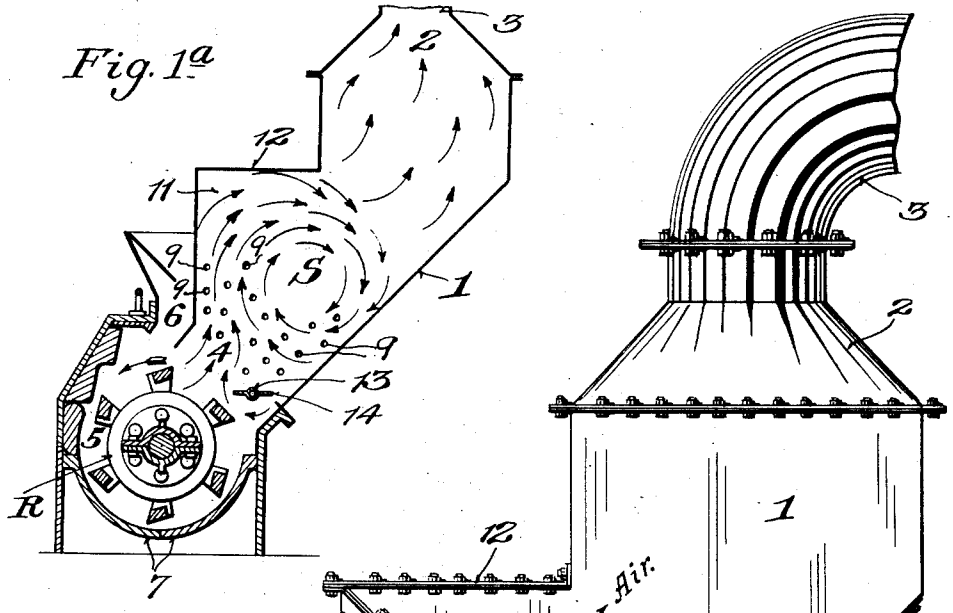


Fig. 1.

WITNESSES

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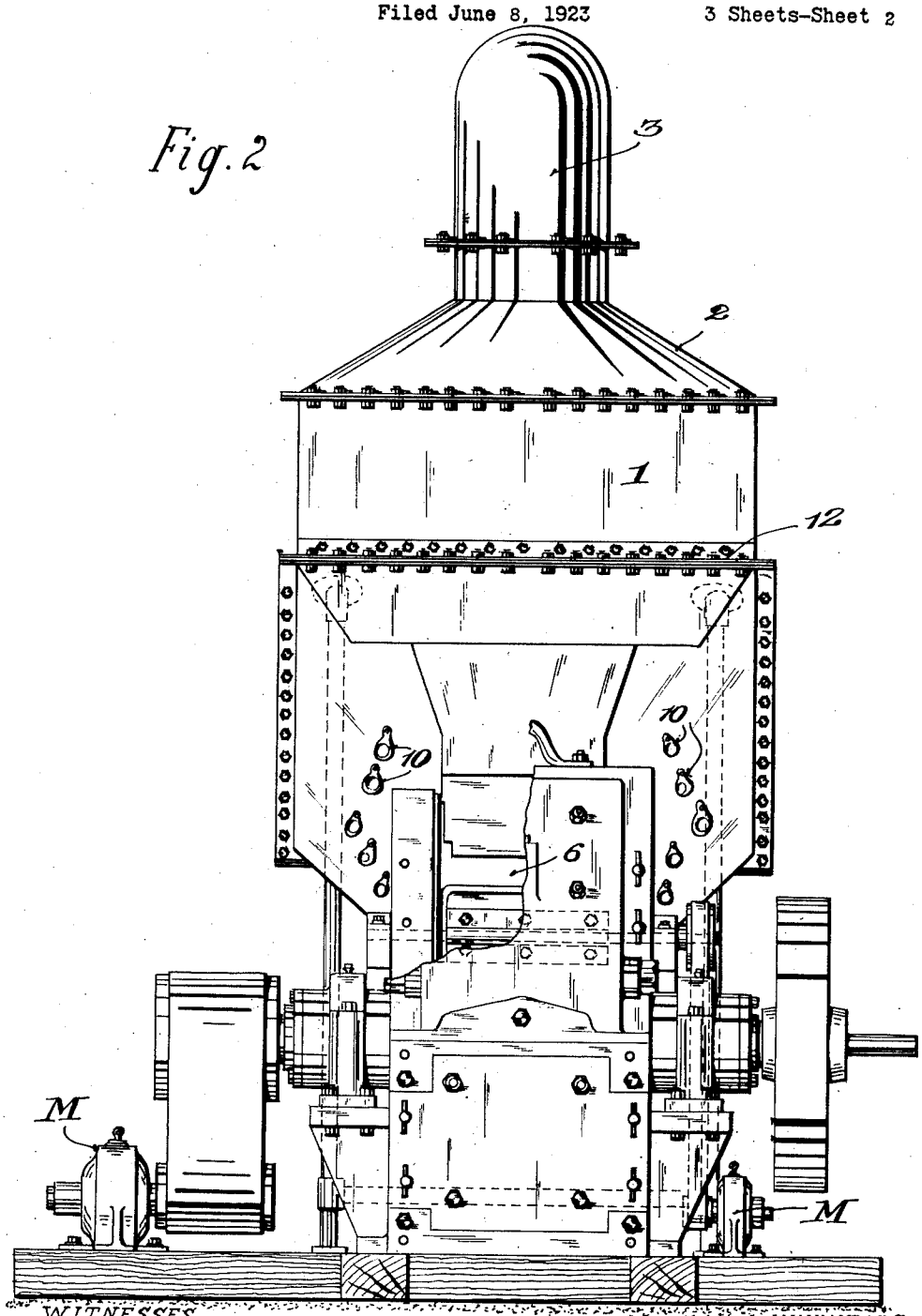
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Fig. 2



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Fig. 3

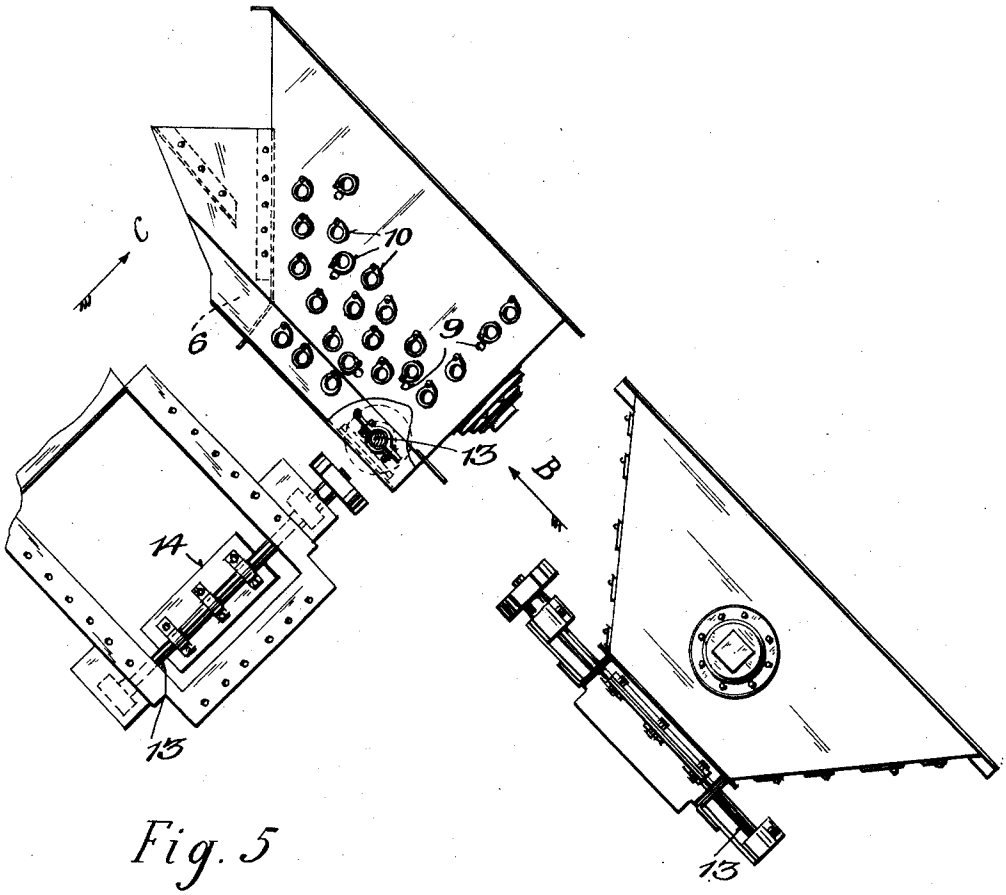


Fig. 5

Fig. 4

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UNITED STATES PATENT OFFICE.

JOSEPH K. BLUM, OF SCARSDALE, AND DANIEL L. BRAINE, OF BROOKLYN, NEW YORK, ASSIGNORS TO K-B PULVERIZER CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PULVERIZED-FUEL APPARATUS.

Application filed June 8, 1923. Serial No. 644,230.

To all whom it may concern:

Be it known that we, JOSEPH K. BLUM and DANIEL L. BRAINE, citizens of the United States, residing, respectively, at Scarsdale, in the county of Westchester, State of New York, and Brooklyn, Kings County, State of New York, have invented certain new and useful Improvements in Pulverized-Fuel Apparatus, of which the following is a specification.

This invention relates to pulverized fuel apparatus, particularly the type shown in pending application Serial No. 493,837 filed August 20, 1921, in connection with which is practiced the process disclosed in my pending application Serial No. 496,777 filed August 29, 1921, and has primarily for its object certain practical improvements in the construction of the separating chamber and its associated parts to obtain a better and more reliable functioning of the apparatus.

To that end the present invention primarily contemplates a novel form of separating chamber provided with supplemental air supplying means and a tailings return device coordinated to insure a thorough admixture of the fines with the air currents before such mixture is carried toward the burner, and also to insure an effective separation of the coarser particles and the return of the latter as tailings to the disintegrator for further pulverization.

A further object of the invention is to provide a construction which affords precise and positive regulation of the process by controlling the volume, velocity and pressure of the air to effect separation of the fines from the coarser particles or tailings which latter require regrinding, and the thorough mixture of the air with the fines.

With these 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 illustrating the present improvements.

Figure 1ª is a diagrammatic sectional view of the apparatus.

Figure 2 is a side elevation of the machine shown in Figure 1.

Figures 3, 4 and 5 are details of parts showing the tailings return device.

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

As indicated, the present invention primarily relates to the enlarged separating chamber of the apparatus which is designated generally by the reference letter S. This separating chamber is relatively capacious and usually disposed at an upward inclination, the same being of a box-like form, having an inclined bottom wall 1, which at its upper end preferably connects with the discharge conduit 2 for the fines, said discharge conduit 2 being in communication with the conducting pipe 3 which carries the mixture of air and fines to the burner of the furnace.

At its lower end the capacious box-like separating chamber S communicates through the casing outlet 4 with the disintegrating chamber 5 provided at its top with a feed opening 6 arranged to deliver the material preferably into the top of the casing, and having a screenless bottom 7. Within the disintegrating chamber is mounted the pulverizing rotor R which may be of any desired construction though preferably of a hammer type, serving forcibly to impel the pulverized material upwardly through the casing outlet 4 into the separating chamber.

According to the present invention it has been found that independent air supplying means properly located is very important, especially so when the source of air supply is provided within the lower end or receiving portion of the separating chamber S.

In practice we have found the best results can be accomplished by providing the walls of the separating chamber S at and adjacent its lower receiving end with a multiplicity of supplemental air inlets 9 which may be covered and uncovered, and therefore controlled by means of shutters or equivalent cut-offs 10. This construction in

conjunction with the suction fan of the apparatus shown in the process application referred to provide means whereby precise and positive regulations may be obtained of the volume, velocity and suction of air, and it has been found in the actual working of the apparatus that the use of supplemental air inlets in this location induce and promote whirls or eddies, of the air currents carrying the material discharged from the distintegrating chamber, within that part of the separating chamber lying vertically above the discharge outlet from the disintegrating chamber. To facilitate this action the separating chamber is specially formed to provide what may be termed an eddy box 11, offset upwardly from the main passageway through the chamber S and having a horizontal or substantially horizontal top deflecting wall 12 which partly assists in starting and maintaining the whirl or eddy as indicated by the arrows in Figure 1 of the drawings. It, therefore, will be observed that the eddy box 11 of the separating chamber is disposed above and in vertical communication with the casing outlet 4 of the disintegrating chamber, or in other words the eddy box is in open communication with the outlet from the disintegrating chamber and lies within a vertical plane intersecting the middle part of the said outlet. Because of that particular arrangement of the eddy box with reference to the outlet in the disintegrating chamber the unseparated material is projected, by the mechanical force of the rotor, directly upwardly into the eddy box toward and against the top wall thereof, thereby making it possible to set up a whirl or eddy of the material within the lower part of the separating chamber which permits the fines to be drawn off by the suction of the air and the larger particles to be started downward toward the kicker or tailings return device hereinafter referred to.

The practical effect of the construction and action referred to is to cause a very thorough admixture of the fines with the air currents and causes the coarser material or tailings to be rejected from the mixture and to be thrown against the inclined bottom wall 1 of the separating chamber which starts the return thereof toward the disintegrating chamber.

As the tailings gravitate to the lower end of the wall 1 they are forcibly returned to the disintegrating chamber by the tailings return device 13 which is preferably located at or over the lower end of the inclined bottom wall 1 of the separating chamber, and also disposed within the throat or outlet 4. This device has the oppositely extending paddles or blades 14 which serve to return the rejected material back to the pulverizer for further treatment, and may, as shown, be operated in any suitable manner as by the motor M.

From the foregoing it will be apparent that a novel and distinctive feature of the present invention is the provision of an enlarged separating chamber arranged between the outlet of the disintegrating chamber and the discharge conduit for the fines, the said enlarged separating chamber including an eddy box for inducing and promoting a whirlpool of the disintegrated material thereby serving effectually to throw down the larger particles and facilitate the carrying out of the finer particles. In connection with the handling of the rejected material or tailings, the tailings return device 13 provides effective means for guarding against the accummulation of tailings on the inclined wall 1 and insures the positive return thereof to the disintegrating chamber.

Without further description it is thought that the features and advantages of the present improvement will be readily apparent to those skilled in the art and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or scope of the appended claims.

We claim:

1. In a pulverized fuel apparatus, a disintegrator chamber with the rotor therein and having an outlet for pulverulent material, a suction discharge conduit for the fines, and an enlarged separating chamber disposed obliquely and connecting said outlet with said suction conduit, said enlarged separating chamber being unobstructed throughout and provided adjacent said outlet with supplemental air inlets and above said inlets with a substantially horizontal top deflecting wall.

2. In a pulverized fuel apparatus, the disintegrator chamber with the rotor therein and having an outlet for pulverulent material, a discharge conduit for the fines, an enlarged separating chamber interposed between said outlet and said conduit, said chamber being provided with a supplemental air inlet at and adjacent the outlet from the disintegrating chamber.

3. In a pulverized fuel apparatus, the disintegrator chamber with the rotor therein and having an outlet for pulverulent material, a discharge conduit for the fines, an enlarged separating chamber interposed between said outlet and said conduit, said chamber being provided with valved supplemental air inlets at and adjacent the outlet from the disintegrating chamber.

4. In a pulverized fuel apparatus, the disintegrating chamber with a rotor therein and having an outlet for pulverulent material, a discharge conduit for the fines, an

enlarged separating chamber interposed between said outlet and said conduit and provided with supplemental air inlets adjacent said outlet, and a mechanically operated return device for the rejects arranged adjacent said supplemental air inlets and the outlet from the disintegrating casing.

5. In a pulverized fuel apparatus, the disintegrator chamber with a rotary hammer therein and provided with an outlet for pulverulent material, a discharge conduit for the fines, a separating chamber interposed between said outlet and said conduit, and provided with supplemental air inlets, adjacent said outlet, and a rotary return device for rejects arranged to operate adjacent the path of the hammers across said outlet from the disintegrating chamber.

6. In a pulverized fuel apparatus, the disintegrator chamber with a rotary hammer therein having an outlet for pulverulent material, a discharge conduit for the fines, an enlarged separating chamber interposed between said outlet and said conduit, and a rotary bladed return device for rejects mounted at the lower side of said outlet adjacent the hammer path across the same.

7. In a pulverized fuel apparatus, the disintegrator chamber with a rotary hammer therein having an outlet for pulverulent material, a discharge conduit for the fines, an enlarged separating chamber interposed between said outlet and said conduit, and a rotary bladed return device for rejects arranged to operate adjacent the path of the hammers across said outlet from the disintegrating chamber.

8. In a pulverized fuel apparatus a chamber having a disintegrating rotor therein, a laterally and upwardly extending separating chamber arranged at the discharge side of the rotor and a driven tailings return device arranged at the point of communication between the separating chamber and the rotor chamber.

In testimony whereof they hereunto affix their signatures.

JOSEPH K. BLUM.
DANIEL L. BRAINE.