

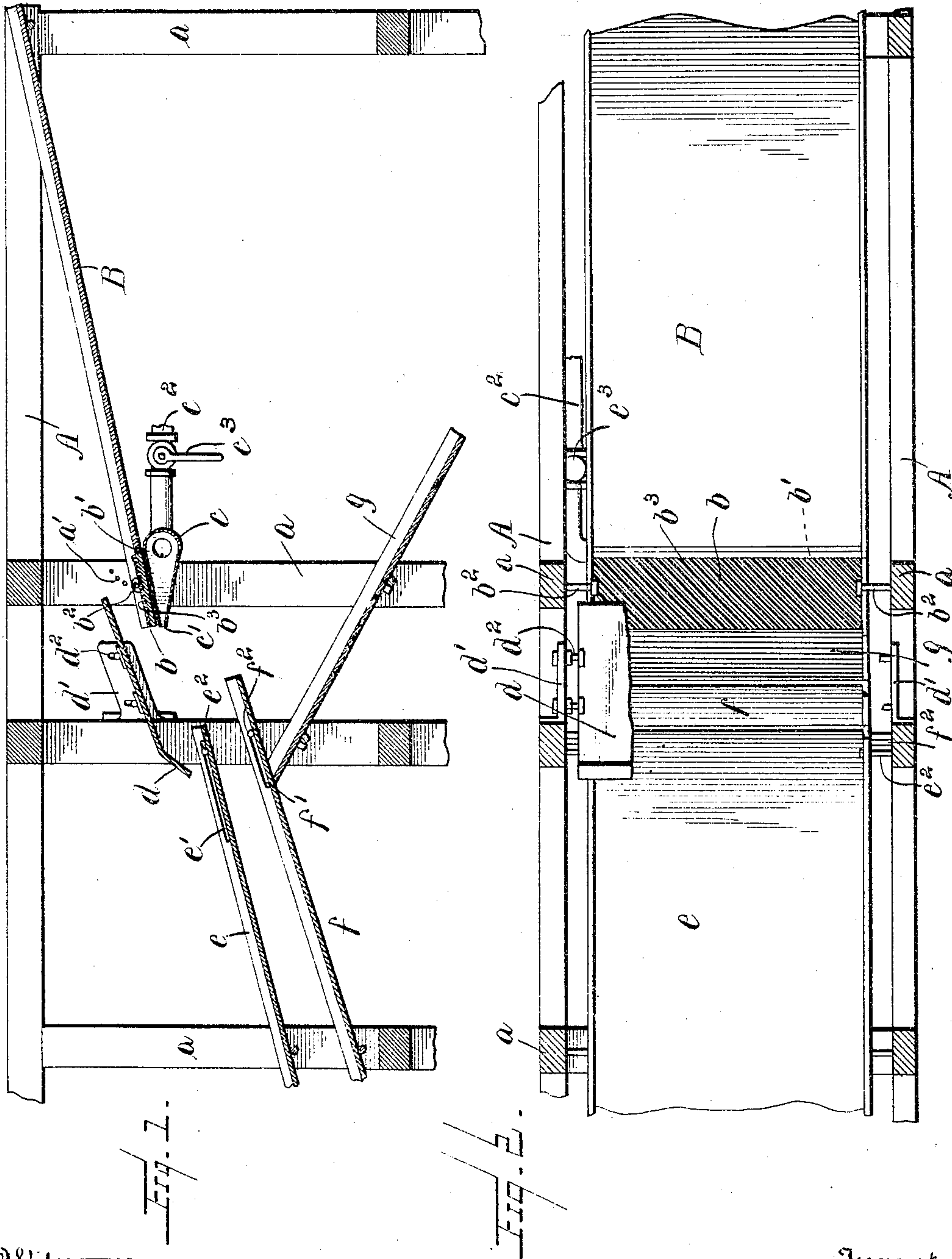
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J. & W. H. FERN.
COAL SEPARATOR.

APPLICATION FILED FEB. 11, 1904.

NO MODEL.



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UNITED STATES PATENT OFFICE.

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COAL-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 773,556, dated November 1, 1904.

Application filed February 11, 1904. Serial No. 193,133. (No model.)

To all whom it may concern:

Be it known that we, JOHN FERN and WILLIAM H. FERN, citizens of the United States of America, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Separators, of which the following is a specification.

This invention relates to mills, and particularly to a class thereunder known as "ore and coal separators."

The objects of the invention are, first, to provide a chute having a series of ways in certain stepped relation to one another, whereby the coal and the impurities or foreign substances mixed therewith may be separated and directed to ways or devices for discharging the material directed thereto; second, to provide novel means for permitting the adjustment of the several ways with relation to one another and with relation to the main chute, with which the supplemental chutes or ways are designed to coact; third, to provide novel means for retarding substances in the coal which have softer surfaces than the coal, thereby impeding or retarding the movement of the softer foreign substance and reducing its momentum, so that in its discharge from the main chute it will fall short of the supplemental chute which is designed for the purpose of receiving the coal, and this retarded material to be received on a second supplemental chute, by which it is directed to compartments or receptacles differing from those into which the coal is discharged; and this invention further contemplates the provision of novel means for dividing or grading the waste material, or that material which is separated from the coal in the first operation just mentioned; fourth, to provide novel means for accelerating the flight of the particles discharged from the main chute in order that they will more readily reach the supplemental chutes designed for their reception and discharge; fifth, to provide novel means

for confining, when desired, the flight of the material when acted on by the compressed air, thus insuring that the said air-blast will not operate to waste the coal or to cause its flight away from the supplemental chute designed for its reception; and the invention further contemplates the provision of means for controlling the air supply or pressure to be discharged so that it may be regulated to accord with the work to be accomplished.

Finally, an object of this invention is to provide a coal-separator combining main and supplemental chutes with means for retarding the movement of the products in the main chute and in the provision of novel means for accelerating the different materials according to the specific gravity of such materials, the said apparatus being comparatively simple in its construction and operation, proving efficient and satisfactory in use, and comparatively inexpensive to produce and maintain.

With the foregoing and other objects in view the invention consists in the details of construction and in the arrangement and combination of parts to be hereinafter more fully set forth and specifically claimed.

In describing the invention in detail reference will be had to the accompanying drawings, forming part of this specification, wherein like characters denote corresponding parts throughout both views, in which—

Figure 1 is a vertical sectional view of a chute and supplemental chutes, with apparatus attached thereto, embodying the invention. Fig. 2 is a plan view thereof with the baffle-plate removed.

In the drawings, A denotes a suitable rectangular frame having a series of posts *a*. The main chute B is intended to receive the coal, which is always accompanied by impurities, as it is discharged from the breaker, and this commingled coal and the impurities are supposed to slide down this chute B with a greater or less momentum, according to the angle or incline of the said chute B. At the discharge

end of the chute B we hinge a retarding-plate b , the said plate being mounted on a pivot b' in order that the said plate may be adjusted at an angle with relation to the bottom of the chute B, and this adjustment is accomplished in any suitable manner, here shown as a pin b^2 , which passes through the aperture in the side of the chute, the said pin being seated in the upright a , said upright having a series of apertures a' for the reception of the end of the pin. These parts are duplicated on each side of the chute, so that both ends of the plate b may be supported. The upper surface of the plate is corrugated diagonally, as shown in Fig. 2 and indicated by the reference character b^3 . It follows that this plate if moved to stand at an angle with relation to the chute would serve to throw the coal farther, owing to the elevation at which the coal would be discharged.

Secured to and movable with the plate b is a head c , which terminates in a discharge-nozzle c' , which extends along the under edge of the plate and is designed to act as a blower for buoying the material discharged from the chute according to the specific gravity thereof. The head c is supplied with air through the medium of the pipe c^2 , which may be in communication with a tank or other air-supply having a suitable pressure; but as this detail may be variously modified the same is not illustrated in full. A suitable valve c^3 is provided for regulating the pressure. For the purpose of preventing the air-blast from scattering the material a baffle-plate d is movable in the brackets d' through the medium of the bolts d^2 , which extend through the slots in the brackets and have binding-nuts (not shown) for retaining the said baffle-plate in certain relation to the chute B.

Supplemental chutes e , f , and g are provided the said chutes e and f having slots e' and f' , respectively, by which the said chutes are adjusted on the bolts e^2 and f^2 , respectively. The manner of this adjustment is fully shown in Fig. 1, wherein it will be readily seen that the receiving ends of these chutes may be moved with relation to the discharging end of the chute B. The supplemental chute g is inclined in an opposite direction from that of the chute f and is designed for the purpose of receiving and conveying such material which is of greater specific gravity than that received by either of the supplemental chutes e and f , while the chute f is designed and is positioned to receive material of greater specific gravity than that received by the chute e . The coal being lighter than the waste therein is also lifted or buoyed by the air-blast, so that as it is discharged by the chute B it has sufficient movement to cause it to reach the end of the supplemental chute e , while the heavier particles, such as the rock

or bone, being retarded in the first instance by the corrugated plate and being of such weight as to be acted on very lightly by the air-blast, will fall more perpendicularly and will be received on the end of the supplemental chute f or on the chute g , according to its nature—that is, the bone, being next lightest of the material and being buoyed slightly by the air-blast, would reach the supplemental chute f , while the rock, being heaviest, would land in the chute g .

From the foregoing it will be observed that a complete separation of the coal, bone, and rock will be effected at a single operation and at a single travel of the mass.

If preferred, the chutes e and f may have aprons or extensions slidable in their ends instead of having the whole chute adjustable, as described; but this is a matter of detail to which we do not wish to be limited, and hence the same is not described more minutely.

Having fully described the invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a coal-separator, a chute, a retarding-plate having a corrugated upper surface, means for pivoting the plate at the end of the chute, means for securing the plate at different adjustments, and an air-nozzle attached to the under surface of the plate and movable therewith, substantially as described.

2. In a coal-separator, a chute, a retarding-plate, hinged to the end of the chute, the ends of the plate having apertured flanges, a frame at the side of the plate, the said frame having holes, securing-pins run through the flanges and seated in the holes, whereby the said plate is adjusted, and an air-blast nozzle carried by the under surface of the plate, substantially as described.

3. In a coal-separator, a chute, a retarding-plate hinged to the end of the chute, the ends of the plate having apertured flanges, a frame at the side of the plate, the said frame having holes, securing-pins run through the flanges, and seated in the holes, whereby the said plate is adjusted, an air-blast nozzle carried by the under surface of the plate, a baffle-plate above the end of the chute, and supplemental chutes in stepped relation to the first-named chute.

4. In a coal-separator, a chute, a retarding-plate hinged to the end of the chute, the ends of the plate having apertured flanges, a frame at the side of the plate, the said frame having holes, securing-pins run through the flanges and seated in the holes, whereby the said plate is adjusted, an air-blast nozzle carried by the under surface of the plate, a bracket secured to the frame, a baffle-plate adjustable on the brackets, and supplemental chutes in stepped relation to the end of the first-named chute, substantially as described.

5. In a coal-separator, a chute, a retarding-plate having a corrugated upper surface, flanges at the end of the plate, means for hinging the plate to the end of the chute, end
5 flanges for the plate suitably apertured, a frame engaging the retaining means, and an air-blast nozzle carried by the plate, substantially as described.

In testimony whereof we affix our signatures, in the presence of two witnesses, this 10
1st day of February, 1904.

JOHN FERN.
WM. H. FERN.

Witnesses:

WILLIAM PFEIFFER,
R. W. MORGAN.