

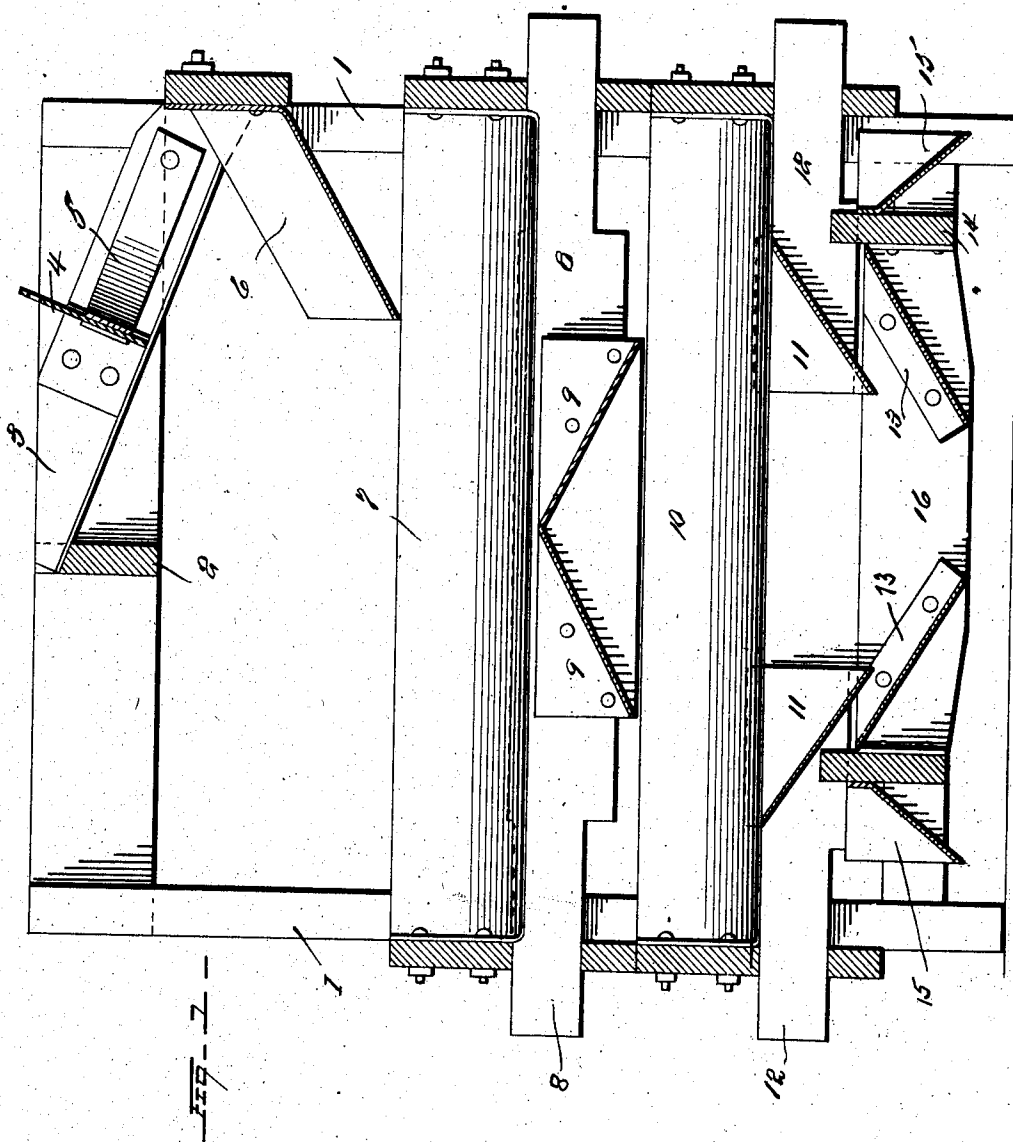
No. 839,387.

PATENTED DEC. 25, 1906.

W. HUGHES & J. THOMAS.
GRAVITY SEPARATOR.

APPLICATION FILED DEC. 5, 1905.

3 SHEETS—SHEET 1.



WITNESSES
W. F. Koff
L. O. Langworthy

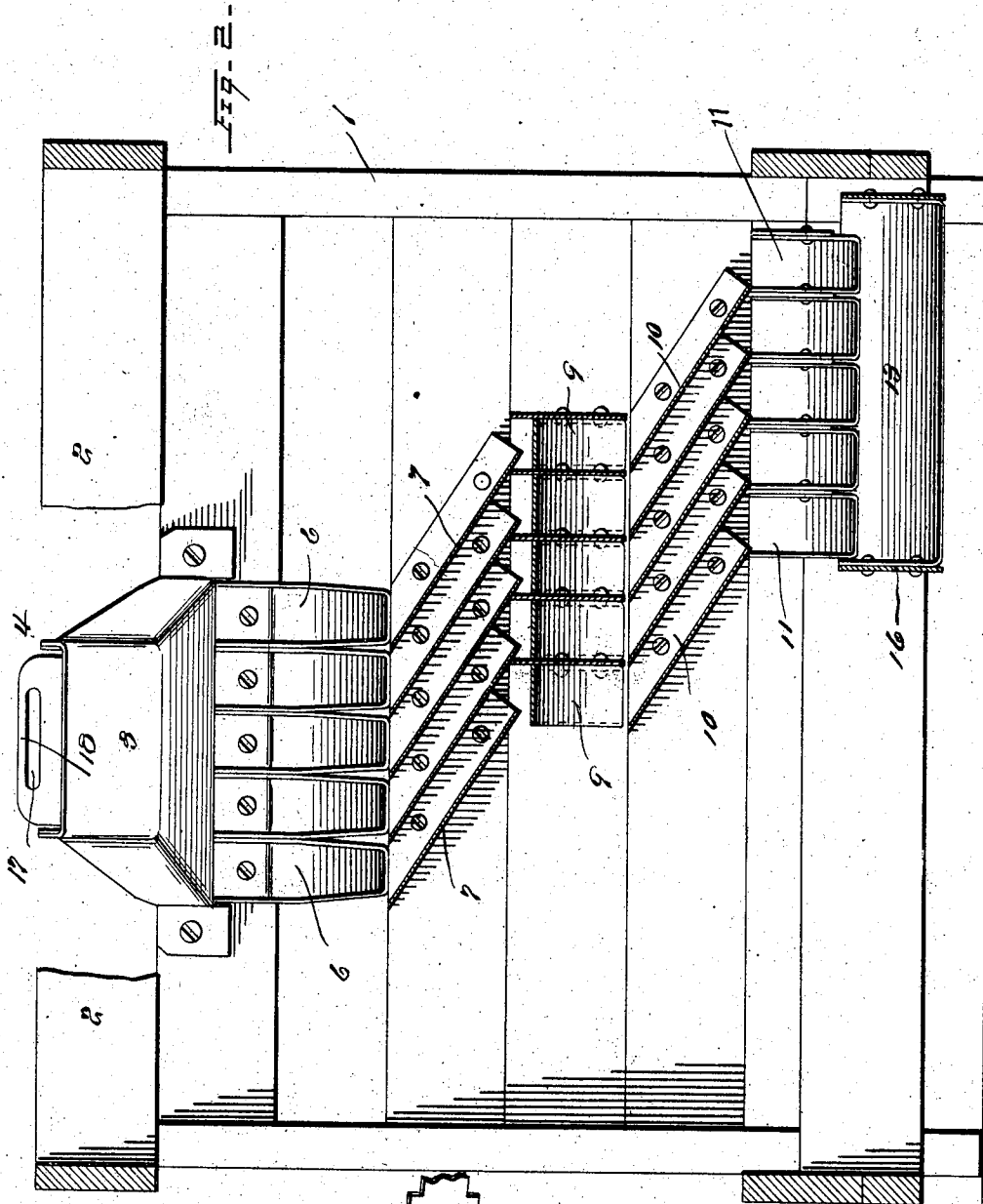
INVENTORS
William Hughes and
James Thomas
BY *Watson E. Coleman*
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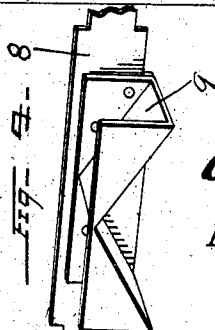
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3 SHEETS-SHEET 2.



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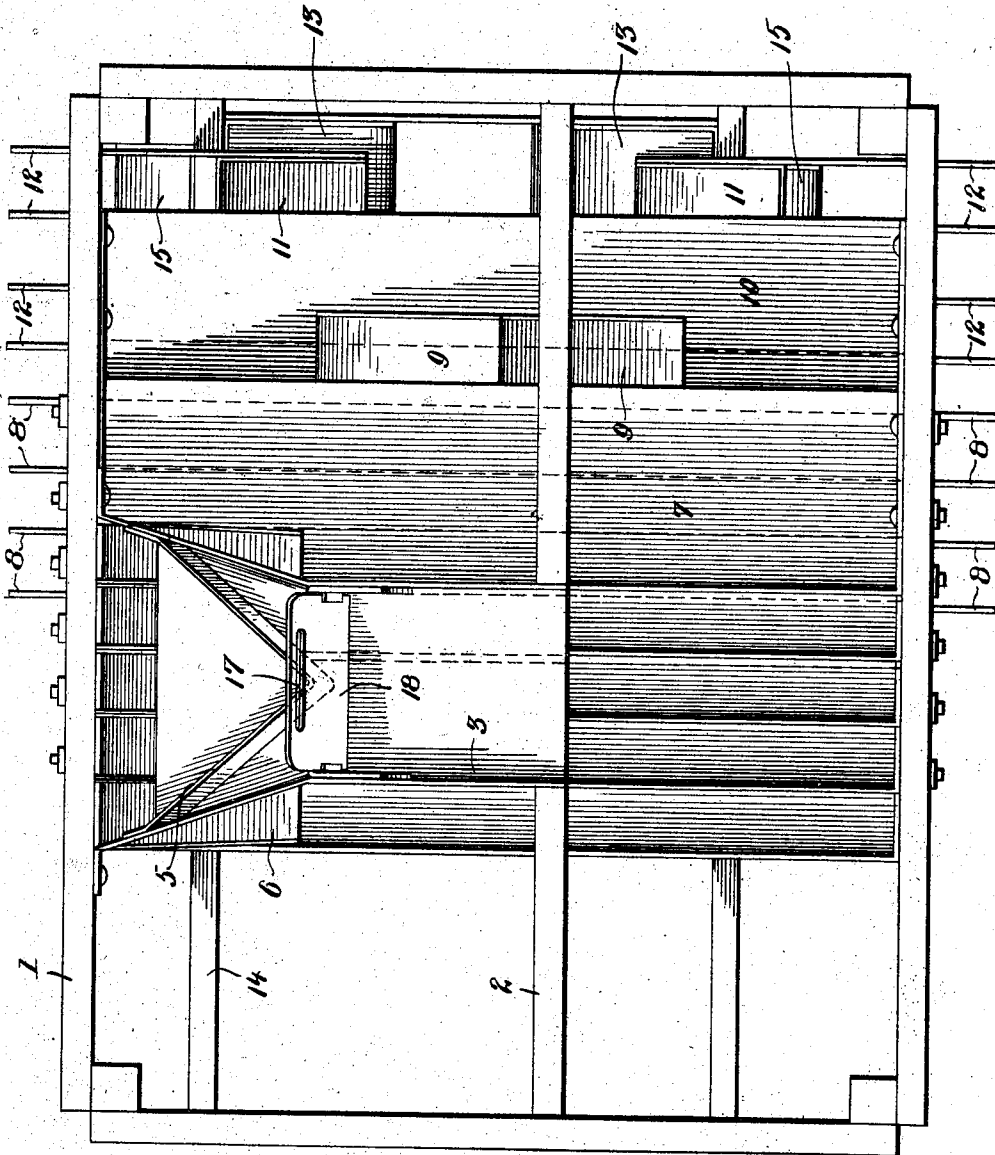
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3 SHEETS—SHEET 3.



WITNESSES:

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Fig. 3

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UNITED STATES PATENT OFFICE.

WILLIAM HUGHES AND JAMES THOMAS, OF RAVENRUN, PENNSYLVANIA.

GRAVITY-SEPARATOR.

No. 839,387.

Specification of Letters Patent.

Patented Dec. 25, 1906.

Application filed December 5, 1905. Serial No. 290,475.

To all whom it may concern:

Be it known that we, WILLIAM HUGHES and JAMES THOMAS, citizens of the United States, residing at Ravenrun, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Gravity-Separators, of which the following is a specification, reference being had therein to the accompanying drawings.

Our invention relates to gravity-separators for removing rock, slate, and other impurities from coal, one of the objects being to provide a device of the character described that shall be simple in construction and effective in operation and by means of which rock, slate, and other debris can be separated from coal at a minimum cost of labor and in less time than by the ordinary well-known methods. We accomplish this by means of a series of gravity speed-chutes and spreading-plates inclined at variable degrees according to the amount or size of rock or other foreign substances in the coal and so arranged with relation to each other that the coal descends from the chutes upon spreading-plates where, by means of gravity and frictional contact, the coal is separated from the rock and slate and is there diverted into adjustably-mounted diverging chutes so arranged with relation to the plates that the rock and other waste matter will fall into such chutes upon one side and the coal upon the other.

Other objects and advantages of our invention, as well as the structural features by means of which these objects are attained, will be made clear by an examination of the specification, taken in connection with the accompanying drawings, in which the same reference-numerals indicate corresponding portions throughout, and in which—

Figure 1 is a vertical section taken through our entire device. Fig. 2 is a vertical section taken at right angles to Fig. 1, and Fig. 3 is a top plan view of the complete separator. Fig. 4 is a detail of one of the adjustably-mounted diverging chutes.

1 designates the standards of a frame having a cross-piece 2, at the top of which is mounted one end of a gravity feed-chute 3. This feed-chute is inclined at any desirable angle, which is regulated according to the size and quality of coal and also according to the amount of foreign substance therein and is provided with a slidably-mounted gate 4, so arranged as to be raised and lowered at the will of the operator. Within this chute,

which preferably has a slightly-diverging lower end, is a V-shaped guide or spreader 5, having its ends secured to the walls of the chute and its pinnacle resting against and forming a brace for the back of the gate 4. This guide 5 is slightly elevated above the floor of the chute 3, and its purpose is to prevent the clogging of the coal in the chute and also to spread it out. From the chute 3 the coal descends into the gravity speed-chutes 6, of which we have shown five, although it is obvious there may be any desired number, said speed-chutes being removably mounted at their upper ends in any suitable manner on said frame 1. The coal passing down these speed-chutes falls upon gravity spreading-plates, of which there are a number corresponding to the number of speed-chutes. These spreading-plates are also removably mounted in the frame and are inclined at an obtuse angle therewith in degrees varying according to the size, quality, or grade of the coal and the amount of impurities or waste matter therein contained.

It is a well-known fact that some grades of anthracite and even bituminous coal contain less grit or dirt than others, and such grades will in falling upon a spreading-plate slide a farther distance than coal containing a greater amount of impurities or grit, which cause it to frictionally contact with the plate in a greater degree and be therefore caused to turn the corners at sharper angles in sliding upon the plate. The object in having the speed-chutes and the spreading-plates removably mounted in the frame is to afford means whereby they may be readily taken out when needed for repairs, renewal, or other purposes. Directly below each spreading-plate 7 and slidably mounted in the frame, by reason of having their outer ends extending through slots or openings therein, are guides 8, slidably mounted in the frame and having connected therewith diverging chutes or dividers 9, one of said chutes being arranged to catch the coal and divert it toward one side of the machine and the other being arranged to catch the rock or slate or other impurities which cross the spreading-plates in a more direct line than the coal, by reason of being frictionally retarded by said plates, and divert same to the side opposite the coal. Below these chutes 9 are other gravity spreading-plates 10, which are also arranged at obtuse angles with the frame and in degrees varying according to the size or

quality of the coal, the object of these plates being to separate from the coal the impurities—such as rock, slate, or other foreign substances—still remaining therein after it has passed the spreading-plates 7.

Below each spreading-plate 10 are the chutes 11, each being mounted on a plate or guide 12, slidably mounted in the frame and having its ends projecting beyond the outer edges thereof, whereby it may be operated. These chutes 11 are arranged directly opposite each other at each end of the plate or guide 10 and are destined to catch the impurities, which have by this time been separated from the coal, and divert same to a common center at the bottom of the frame by means of the chutes 13, mounted on a support 14, which also serves as a support for each plate or guide 12 and is provided with slots or openings in its upper edge, through which the lower edges of the plates or guides 12 are adapted to slide, one of the purposes of said support 14 being to hold the plates in operative position and to afford means whereby they may be adjusted. Mounted on the outer edge of said support is a chute 15, the purpose of which is to catch the coal, which by this time has become freed from the impurities therein by means of said spreading-plates 10. As a further means of securing the chutes 13 and 15 in operative position we provide a cross-piece 16, on which the ends of said chutes are preferably mounted in order to enable them to withstand the weight of the coal or debris. In order to afford means for raising or lowering the gate 4, we have provided it with a slot 17 at its upper end to form a handle 18.

In operation the coal to be cleaned is thrown into the chute 3 and fed as gradually as may be desirable by means of the gate 4. When said gate is raised, the coal contacts with the guide 5, and the supply to be fed is limited and regulated according to the distance between the bottom of the chute 3 and the lower edge of said guide. From the chute 3 the coal passes into the speed-chute 6, which is inclined at sufficient angle to give the desired impetus, according to the nature and amount of impurities therein. Descending the speed-chute it falls upon the spreading-plate 7, which is arranged at the necessary angle, and the coal having less grit than the rock or slate, and hence smoother, slides in a more direct line across the spreading-plate, while the rock or slate frictionally contacting with the plate turns at a sharper angle and continues downward and falls into the diverging chute 9 on one side, while the coal falls upon it on the other, from whence they both fall from the spreading-plate 10, where the same operation occurs, and from thence the coal is diverted to the outside of the machine, while the impurities remain on the inside.

The adjustable features of the diverging

chutes or dividers 9 and the chutes 11 enable the operator to so manipulate them as to bring them at the required location where the greatest quantity of impure matter thus separated from the coal will be carried to one side of the machine, while the coal falls to the opposite side.

While we have shown in the drawings accompanying the specification a series of five speed-chutes, spreading-plates, &c., it will be obvious that as many spreading-plates and speed-chutes may be employed as shall be found necessary or desirable.

It is thought from the foregoing that the construction and operation of our device will be readily understood, and further description is not deemed necessary.

While we have illustrated and pointed out a preferred embodiment of our invention, it is apparent that certain modifications of form and arrangement of parts may be had, such as will occur to the skilled mechanic or operator, and we do not, therefore, desire to be limited to the precise arrangement and construction shown.

Having thus described our said invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a separator for the purposes described, the combination, with a suitable frame, of a feed-chute, a gate slidably mounted in said chute, a V-shaped frame arranged in the chute and operating as a spreader, the pinnacle of the frame bearing against the gate and serving as a brace therefor, spreading-plates adapted to receive the coal and separate the impurities therefrom by gravity and frictional contact, and adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other.

2. In a separator for the purposes described, a feed-chute, a gate slidably mounted therein whereby the feeding of the coal to the separator is regulated, and a V-shaped frame mounted in the chute and arranged so as to operate as a spreader to spread the coal on the floor of the chute and having its pinnacle bearing against the gate and serving as a brace therefor.

3. In a separator for the purposes described, the combination, with a suitable frame, of a feed-chute, a gate slidably mounted therein, a V-shaped frame arranged in the chute and adapted to operate as a spreader, gravity speed-chutes adapted to receive the coal from the feed-chute, spreading-plates arranged to receive the coal from the speed-chutes and disposed at an angle to change its direction, and whereby the impurities are separated therefrom by means of gravity and frictional contact, and adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other.

4. In a separator for the purposes described, a feed-chute, a gate slidably mounted therein whereby the feeding of the coal to the spreader is regulated, a V-shaped frame mounted in the chute and arranged so as to operate as a spreader to spread the coal on the floor of the chute and having its pinnacle bearing against the gate and serving as a brace therefor, gravity speed-chutes adapted to receive the coal from the feed-chute, spreading-plates arranged to receive the coal from the speed-chutes and disposed at an angle to change its direction, and whereby the impurities are separated therefrom by means of gravity and frictional contact, and adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other.

5. In a separator for the purposes described, the combination, with a suitable frame, of a feed-chute, means for controlling and regulating the feed, means for spreading the coal in the chute, gravity speed-chutes adapted to receive the coal from the feed-chute, spreading-plates arranged to receive the coal from the speed-chutes and disposed at an angle to change its direction, and whereby the impurities are separated therefrom by means of gravity and frictional contact, and adjustably and slidably mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other.

6. In a separator for the purposes described, the combination, with a suitable frame, of a feed-chute, a gate vertically and slidably mounted in said chute, a V-shaped frame arranged in the chute and operating as a separator, the pinnacle of the frame bearing against the gate and serving as a brace therefor, spreading-plates adapted to receive the coal and separate the impurities therefrom by gravity and frictional contact, adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other, and stationary chutes arranged to receive and convey the coal from the separator.

7. In a device of the character described,

the combination, with a suitable frame, of a feed-chute, means for controlling and regulating the feed, gravity speed-chutes adapted to receive the coal from the feed-chute, spreading-plates arranged to receive the coal from the speed-chutes and disposed at an angle to change its direction, and whereby the impurities are separated therefrom by means of gravity and frictional contact, adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other, spreading-plates arranged to receive the coal from the diverging chutes and disposed at an angle to change its direction and whereby the impurities are separated therefrom by means of gravity and frictional contact, adjustably-mounted chutes arranged to receive and convey the impurities, and stationary chutes arranged to receive and convey the coal.

8. In a device of the character described, the combination, with a suitable frame, of a feed-chute, means for controlling and regulating the feed, gravity speed-chutes adapted to receive the coal from the feed-chute, removably-mounted spreading-plates arranged to receive the coal from the speed-chutes and disposed at an angle to change its direction, and whereby the impurities are separated therefrom by means of gravity and frictional contact, adjustably-mounted diverging chutes whereby the coal and impurities are received in their separate state and diverted from each other, removably-mounted spreading-plates arranged to receive the coal from the diverging chutes and disposed at an angle to change its direction and whereby the impurities are separated therefrom by means of gravity and frictional contact, adjustably-mounted chutes arranged to receive and convey the impurities, and stationary chutes arranged to receive and convey the coal.

In testimony whereof we hereunto affix our signatures in presence of two witnesses.

WILLIAM HUGHES.
JAMES THOMAS.

Witnesses:

JAS. GOLDEN,
ARTHUR THOMAS.