

R. E. HOBART.
SEPARATOR.
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1,005,428.

Patented Oct. 10, 1911.

2 SHEETS—SHEET 1.

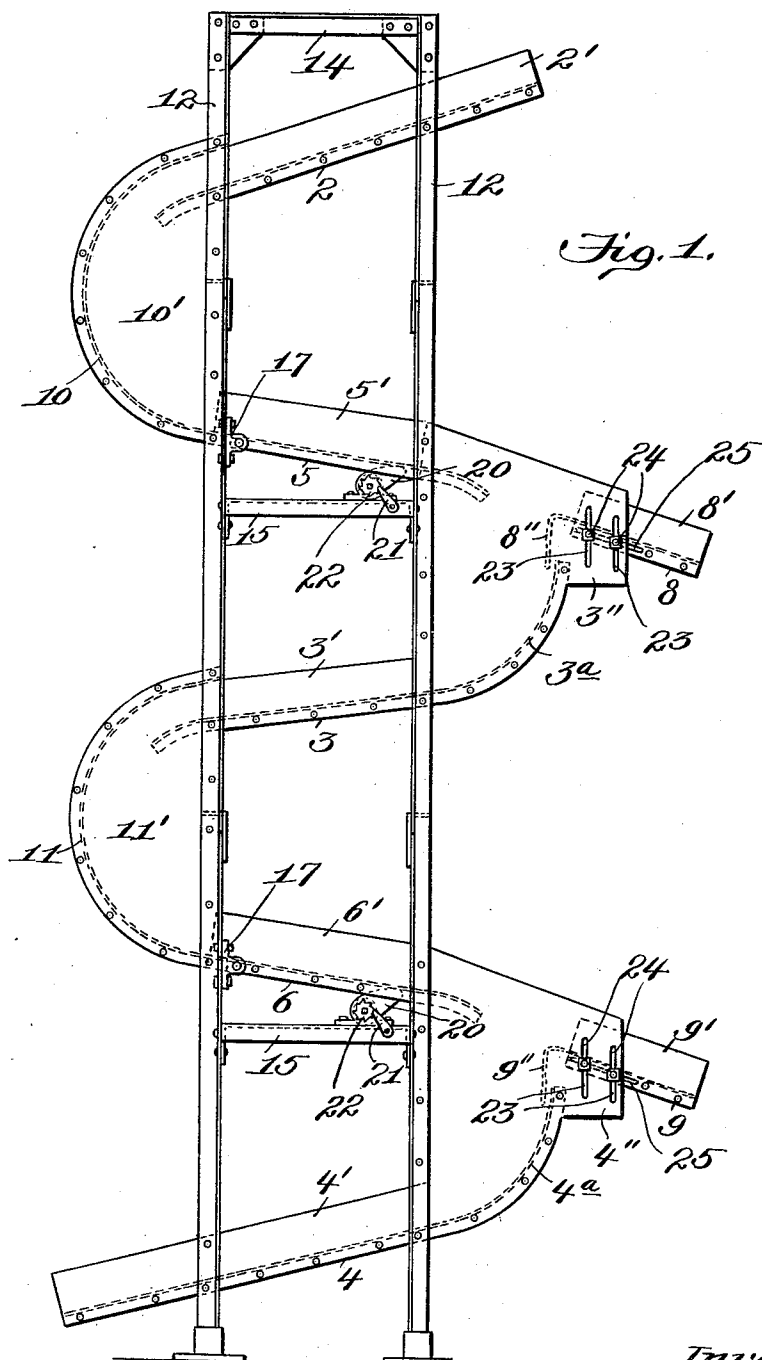


Fig. 1.

Witnesses:
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Inventor
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By *James L. Norris*
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2 SHEETS-SHEET 2.

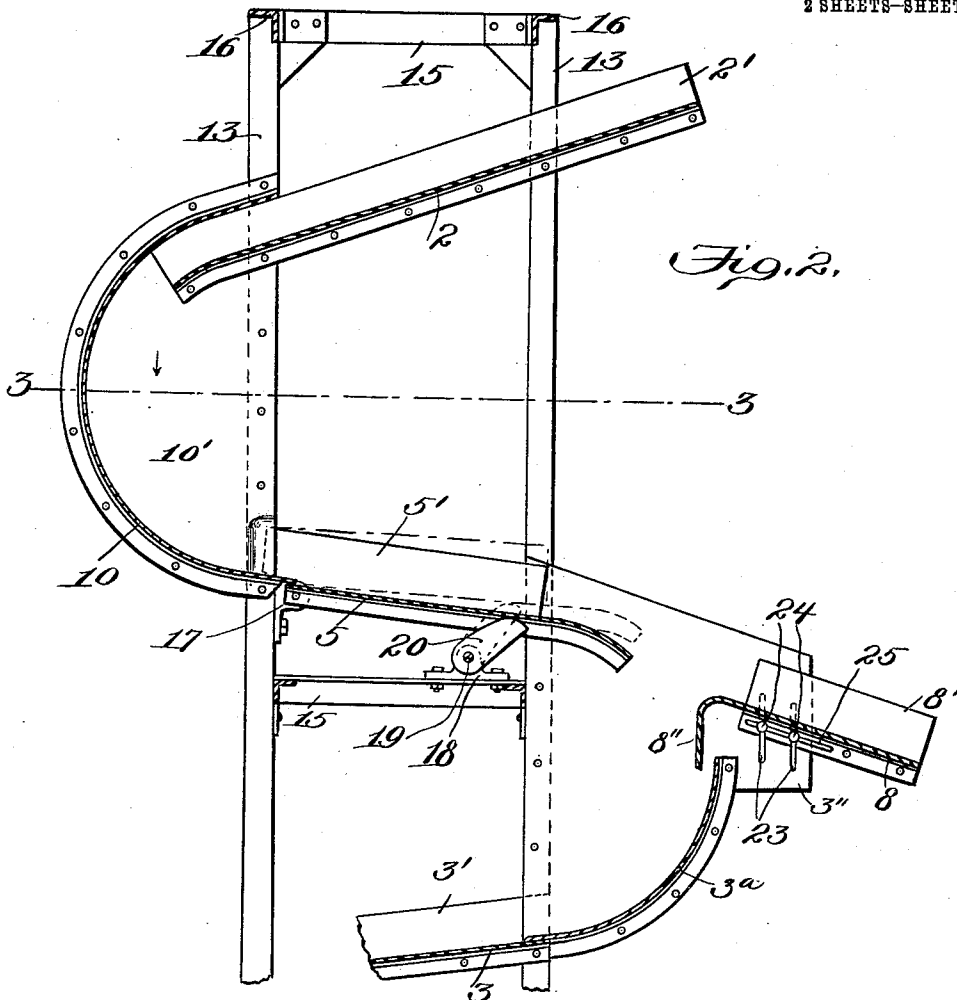


Fig. 2.

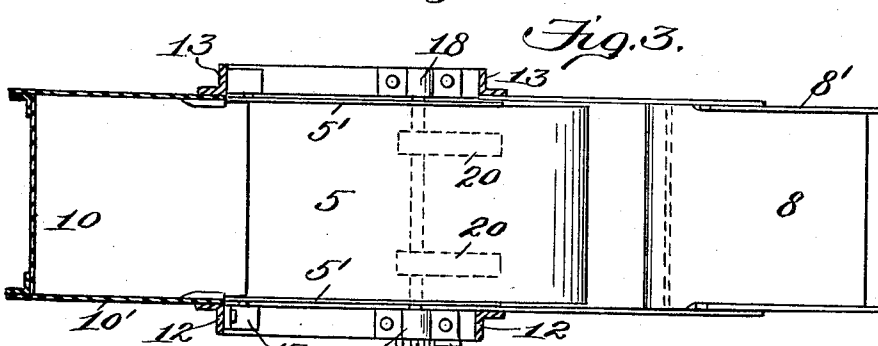


Fig. 3.

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UNITED STATES PATENT OFFICE.

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SEPARATOR.

1,005,428.

Specification of Letters Patent.

Patented Oct. 10, 1911.

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To all whom it may concern:

Be it known that I, ROBERT E. HOBART, a citizen of the United States, residing at Lansford, in the county of Carbon and State of Pennsylvania, have invented new and useful Improvements in Separators, of which the following is a specification.

This invention relates to separators.

A separator involving my invention can be put to advantageous use in several different ways; for example, it may be utilized for the separation of slate and like foreign substances from coal and, in such a use, it would constitute what is known as a "slate picker."

In the drawings accompanying and forming part of this specification I represent in detail one form of embodiment of the invention which, to enable those skilled in the art to practice the same, will be set forth fully in the following description, while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings: Figure 1 is a side elevation of a separator including my invention. Fig. 2 is a central vertical section of the upper portion of the same. Fig. 3 is a horizontal section on the line 3—3 of Fig. 2 looking in the direction of the arrow.

Like characters refer to like parts throughout the several figures of the drawings.

An apparatus including my invention comprises a supply chute, a substantially vertically-disposed bent plate one end of which extends over and is separated from the discharge end of said supply chute, a delivery chute constituting substantially a continuation of said plate, and a discharge chute to receive material, such as coal, from the delivery chute, the entering end of the discharge chute being separated from the discharge end of the delivery chute to provide an opening or outlet for other material, such as slate, which has been separated from the first-mentioned material which, in the present instance or in the case of a slate picker, is coal. The parts to which I have just referred are superposed and they may be vertically repeated, for instance, I have alluded to one set of parts which may wholly effect the separation of slate from coal. This set of parts may be duplicated or may be continued downward below the uppermost set indefinitely, this depending upon

the particular conditions to be met. In any event the different parts are vertically disposed, whereby the horizontal area occupied by the apparatus is very much less than that occupied by a continuous or substantially continuous chute; in addition to this, the parts can be sustained by a very simple framing, while, by reason of the vertical movement of the material passing through the apparatus, the momentum thereof is quite considerable.

Referring now particularly to the drawings and more especially to Fig. 1, the apparatus includes several supply chutes as 2, 3, and 4, several delivery chutes as 5 and 6, and several discharge chutes as 8 and 9. I use these several terms simply for convenience, for it will be understood that, if the lowermost chute 4 directed material against a bent place such as that hereinafter referred to, it would be a supply chute, whereas, if the said chute 4 were the final one of the apparatus, it would be a delivery or discharge chute. Between the chutes 2 and 5 is a plate as 10, while between the chutes 3 and 6 is a similar plate as 11. It will be seen that the several chutes are superposed or in vertical relation and that each is inclined, while the plates 10 and 11 are approximately vertically disposed, by reason of which the parts of the apparatus can be maintained in a comparatively small horizontal area, and this will assure also the rapid movement of the mass traveling down the apparatus. From what has been stated it will be clear that an apparatus might be composed of a chute 2, a plate 10, a chute 5, and a chute 8, or equivalent parts, or that such set of parts might be materially multiplied.

The framework for supporting the different parts to which allusion has been made may be of any desirable character, for example, it may consist of two opposite pairs of columns, the respective pairs being designated by 12 and 13. These columns may, if desired, consist of channel or L irons. The columns 12 are tied together at suitable vertical intervals by cross-bars designated in each case by 14, while the columns 13 may be connected by similar bars designated in each case by 15. The columns 12 may be connected with the columns 13 by cross-bars as 16. The framing therefore can be of a very simple yet strong character and its horizontal area is comparatively slight.

The upper portion of the vertically-disposed outwardly-bent plate 10 extends over but is separated from the discharge end of the supply chute 2, while the same statement applies to the plate 11 and chute 3. The chutes 2, 3, and 4, chutes 8 and 9, and plates 10 and 11 are in the present case immovable and each of said parts is provided with flanges along its opposite sides designated by 2', 3', 4', 8', 9', 10', and 11', respectively, these vertically-disposed flanges or walls serving to prevent lateral movement of the coal and slate. The chutes 2, 3, and 4 and the plates 10 and 11 may be, if desired, fastened directly to the columns or uprights 12 and 13, for example, by being riveted thereto. The chutes 5 and 6 have similar side flanges as 5' and 6' serving a like office. The chutes 5 and 6, however, are not immovable but are oscillatory or capable of swinging movement to provide for adjustment, and this result can be accomplished by pivoting the inner or entering ends of the chutes 5 and 6 to brackets as 17 fastened to the two opposite columns 12 and 13. The chutes 5 and 6 constitute virtually continuations of the outwardly-bent plates 10 and 11 and they are adjustable to conform to the different varieties of anthracite coal when such substance is passing through the apparatus, it being understood that some kinds of anthracite coal will travel faster over a given inclination than others, and I can obtain uniformity of final results by the adjustment of the two delivery chutes 5 and 6. I support by the lower tie-bars bearings as 18 which support for rocking motion shafts as 19, said shafts having fastened thereto between their respective ends cams as 20 which engage against the under sides of the adjustable chutes 5 and 6. By turning the shafts 19 the cams 20 will be operated to cause the raising or lowering of the said chutes 5 and 6 to secure desired adjustments, and these adjustments can be maintained by pivoted pawls as 21 engaging the teeth of ratchet wheels as 22 fastened to the two shafts 19. The pawls 21 may for convenience be pivoted to the bars 15 which support the bearings 18.

The coal-discharge chutes 8 and 9 are preferably mounted for endwise and vertical adjustments and, in the present case, said chutes 8 and 9 are supported by the widened portions 3'' and 4'' of the flanges 3' and 4', respectively. The widened portions 3'' and 4'' are shown as having vertically elongated slots denoted by 23 in each case, through which bolts as 24 pass, said bolts also extending through elongated slots as 25 in the under sides of the two chutes 8 and 9. It will be seen that the inner or receiving ends of the chutes 8 and 9 are separated from the discharge ends of the cooperating chutes 5 and 6, respectively, so as to provide openings

or slots through which slate or other refuse matter can pass. By moving the chutes 8 and 9 longitudinally the sizes of said openings can be varied and, by moving said chutes 8 and 9 upward or downward, they can be placed in proper position to receive coal from the chutes 5 and 6. Therefore the chutes 8 and 9 are capable of double adjustments. When a particular adjustment is secured it will be maintained by setting up the nuts of the bolts 24. The receiving ends of the chutes 3 and 4 are upwardly curved as shown at 3^a and 4^a, respectively, so that the upper edges thereof will extend above the trajectory of the down-moving mass of slate or other material. The curved portions 3^a and 4^a may be integral with the bodies of the respective chutes 3 and 4, if desired, or may be separate therefrom. The inner ends of the chutes 8 and 9 are provided with down-turned guards or flanges as 8'' and 9'' overhanging the upper curved ends of the chutes 3 and 4, respectively, so as to prevent slate being thrown between the chutes 8 and 3 and 9 and 4, respectively. These guards or flanges are preferably arranged in substantially upright position at the tops of the respective curved deflector plates, and the discharge end of the cooperating delivery chute is preferably provided with a downward dip so that the slate or other material which has the slower velocity will drop as it leaves the delivery chute and will strike the upright guard at an acute angle and from the top, thereby causing the material to be deflected with certainty into the next curved plate.

The coal containing the slate is initially supplied to the inclined chute 2 and gravitates down the same. The coal passes from the chute 2 against the inner curved or working surface of the plate 10, which tends to increase the momentum of the down-flowing mass. I find that the major part of the coal becomes separated from the slate while on the plate 10 due to the difference in adhesiveness between the two substances; that is to say, the tendency of the coal to adhere to the plate 10 is not as great as that of the slate. The consequence is that, when the mass or mixture reaches the chute 5, the coal will be in advance of the slate and, owing to its momentum, will jump the space or gap between the chute 5 and the chute 8 and will pass down said chute 8 to be suitably disposed of. The slate, traveling more slowly, will enter said gap or space and will fall against the chute 3. This might conclude the separation of the two constituents. Ordinarily, however, it is necessary to repeat the operation set forth, and this is accomplished in the apparatus below the chute 8. It will be understood that the passage of the slate along the chute 5 is so retarded with respect to that of the coal that

the slate will readily drop from the lip or discharge end of the chute 5 on to the receiving end of the chute 3^a. Sometimes, of course, coal passes over said discharge edge with the slate and, in this event, the two substances can be separated at a lower point in the apparatus. One operation might effect the complete separation of the coal and slate; two operations may be necessary, or, if this is not sufficient, the operations can be repeated indefinitely, limited only by the height of the apparatus.

The several chutes and plates may be of any suitable or desired width.

What I claim is:

1. A separator of the class described comprising a supply chute inclined with respect to the horizontal, a deflector curved in a vertical plane and coöperative with the lower discharge end of the supply chute, a delivery chute also inclined with respect to the horizontal and having its upper receiving end pivoted at the lower discharge end of the curved deflector and forming a continuation thereof, the lower discharge end of the delivery chute being adjustable vertically to vary the inclination thereof and thereby control the speed of the material passing thereover, such lower discharge end of the delivery chute being below the plane of the remaining surface of such chute and curved downwardly, a coal discharge chute mounted approximately in alinement with the lower discharge end of the delivery chute and spaced from such discharge end of the delivery chute to form an outlet for the relatively slower moving material, the entrance end of said discharge chute being adjustable vertically with respect to the discharge end of the delivery chute, a second supply chute having its entrance end arranged im-

mediately below the space between the delivery and discharge chutes, and a guard attached to and adjustable with the entrance end of the discharge chute and having a vertical portion which bridges the space between the entrance ends of the discharge chute and the second supply chute.

2. A separator of the class described comprising a supply chute, a deflector plate curved in a vertical plane and arranged to receive material from the supply chute, a delivery chute having its receiving end mounted pivotally and its discharge end adjustable vertically whereby the inclination of the delivery chute may be varied, the discharge end of the delivery chute being curved downwardly, a coal-discharging chute arranged as a substantial continuation of the delivery chute and spaced from the discharge end of the latter, means for adjusting the receiving end of the coal-discharging chute both vertically and longitudinally with respect to the discharge end of the delivery chute to conform to variations in the inclination of the delivery chute, a second deflector plate curved reversely with respect to the deflector plate first mentioned and having its upper end mounted in fixed relation to the entrance end of the coal-discharging chute, and a guard adjustable with the entrance end of the coal-discharging chute and extending downwardly below the upper end of the adjacent deflector plate.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT E. HOBART.

Witnesses:

SAMUEL R. BEARD,

THOMAS M. WHILDIN.