

No. 703,254.

Patented June 24, 1902.

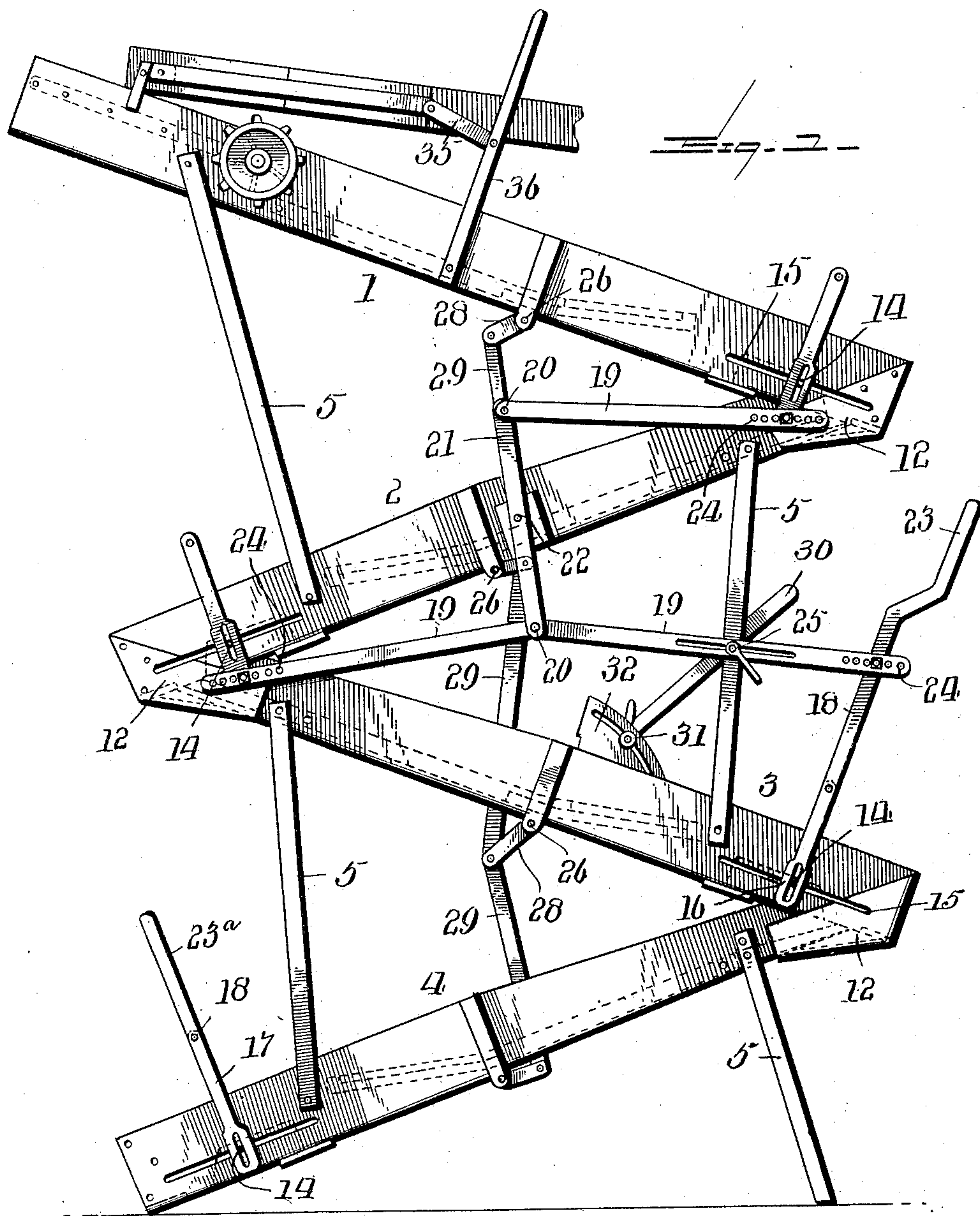
W. J. HAMILTON.

COAL SEPARATOR.

(Application filed Sept. 30, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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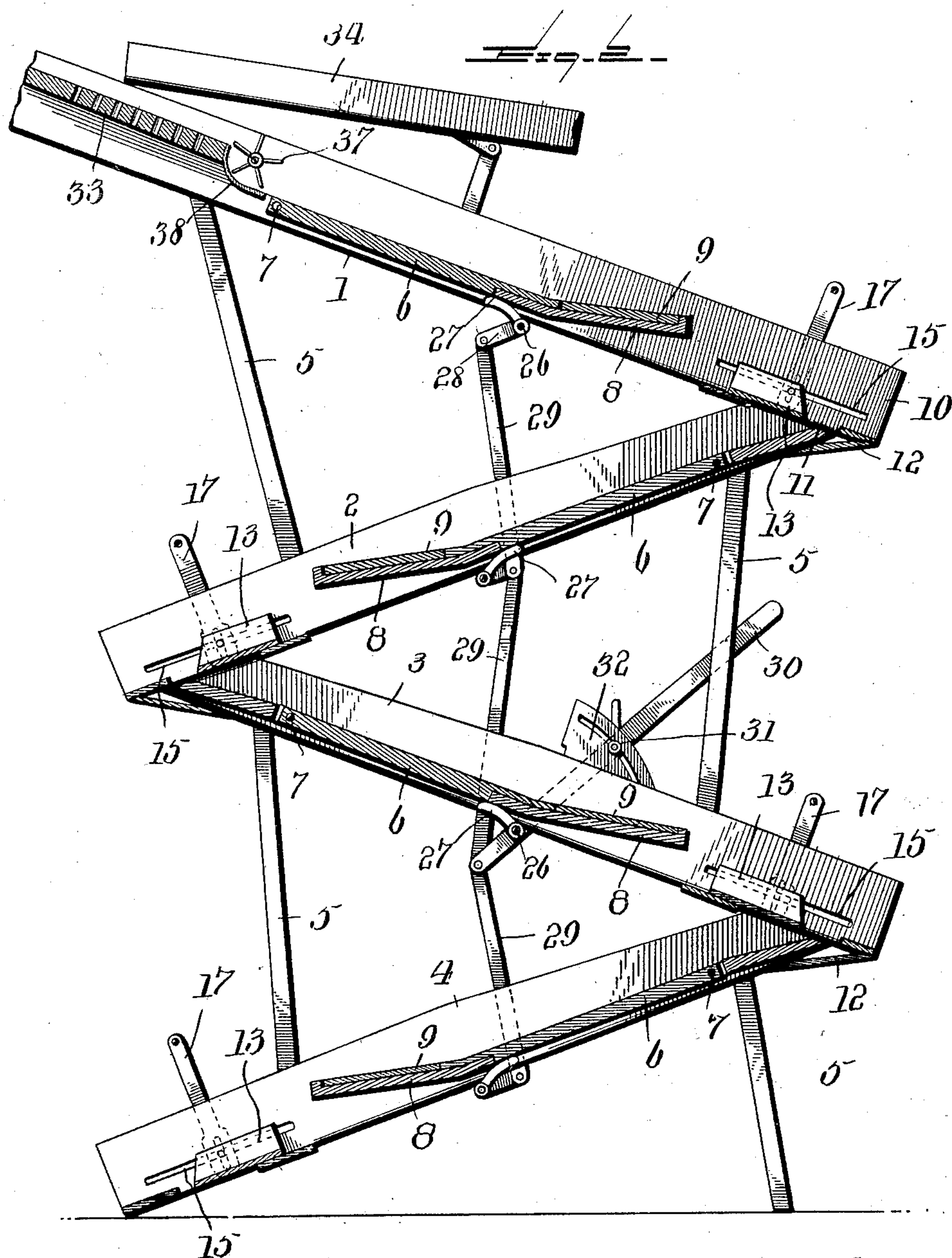
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# UNITED STATES PATENT OFFICE.

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TWO-FIFTHS TO THOMAS R. HUGHES, OF SCRANTON, PENNSYLVANIA.

## COAL-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 703,254, dated June 24, 1902.

Application filed September 30, 1901. Serial No. 77,071. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM J. HAMILTON, a citizen of the United States, residing at Carbondale, 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 coal-separators, and has special reference to that type of machines designed for the separation of slate from coal.

To this end the invention contemplates a simple and practical construction of separator embodying means for thoroughly and effectively separating the slate from all grades of coal with which it may be intermingled.

A further object of the invention is to provide novel means for effecting the adjustment of the adjustable or movable elements synchronously, whereby there will be a perfect uniformity of adjustment throughout the entire series of chutes of which the separator is composed. In this connection the invention also has in view such a novel arrangement of adjusting devices as to provide for effecting all of the adjustments by simply the use of one or two levers.

A further object in this connection is to also provide means whereby the area of the bottom discharge-opening of one chute may be made different from the others, as the conditions may demand.

With these and many 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.

The essential features of the invention are necessarily susceptible to embodiment in different modifications; but the preferred construction of the machine is shown in the drawings, in which—

Figure 1 is a side elevation of a coal-separator embodying the improvements contemplated. Fig. 2 is a vertical longitudinal sectional view thereof.

Like numerals of reference designate corresponding parts in both figures of the drawings.

In carrying out the invention it is of course understood that any desired number of chutes may be employed, according to the general character of the material to be treated to the separating action of the machine, and also the chutes may be arranged in any preferred successive order or arrangement so long as each chute is arranged so as to communicate with and discharge into the next succeeding one; but a preferred arrangement of the chutes and the one usually resorted to in practice is shown in the drawings, in which the machine is shown as embodying in its general organization a plurality of inclined chutes 1, 2, 3, and 4, arranged one above the other within the same vertical plane, but disposed in zigzag or staggered relation, whereby the material passes alternately back and forth in different directions as it falls from one chute to the other during the course of its travel through the machine. The several inclined chutes are rigidly held together in any suitable manner and may be braced by means of braces or supports 5, fastened to adjoining chutes, and any suitable framework may necessarily be associated with the chutes to provide a structure capable of performing the work required, although for illustrative purposes it has been deemed sufficient to simply show the braces or supports directly connecting the adjoining chutes. Each of the inclined chutes is in the form of a rectangular trough open throughout from end to end and at the top, and each chute also has arranged therein for a greater portion of its length an adjustable inclined bottom section 6, having a pivotal support at its upper or higher end, as at 7, upon a pivot-rod or equivalent pivotal or hinged support and carrying at its lower end an upwardly-deflected delivery-apron 8, which preferably is provided with a retarding-slab 9, of slate or other stone, and serving to prevent acceleration of the slate as it passes off the apron 8, while not interfering with the quicker movement of the coal. The said delivery-apron 8 is of less inclination than the main portion of the adjustable bottom section 6, and immediately beyond and below the plane of the said apron 8 each chute is provided contiguous to the lower coal-discharging end 10



with a bottom discharge-opening 11 in direct communication with the upper receiving end of the next succeeding chute, and at this point the contiguous ends of adjoining chutes are fitted with side guard-plates 12, which prevent the material as it falls through the bottom discharge-opening 11 from continuing out through the end of the chute. In each chute there is also associated with the bottom discharge-opening 11 thereof a slidable regulating-gate 13, preferably of an open-box formation and designed to catch the falling material as it comes from the delivery-apron 8, adjacent thereto, and each regulating-gate 13 has projected from the sides thereof engaging studs 14, working through longitudinal slots 15 in the sides of the chute and loosely engaged by the slotted lower ends 16 of swinging adjusting-links 17, mounted upon pivotal supports 18, arranged over the adjacent portion of the chute. Exclusive of the regulating-gate 13 for the lowermost chute of the series all of said gates are designed to be adjusted in unison to provide for covering and uncovering the discharge-openings 11 to any desired extent. To accomplish this, the links 17 upon one side of the machine have connected therewith the adjusting-bars 19, which bars are in turn pivotally connected, as at 20, to opposite ends of a connecting-lever 21, pivotally mounted intermediate its ends, as at 22, upon one of the chutes. In this connection it is to be noted that the bar 19, associated with the links for the gate of the upper chute, is pivoted to the upper end of the lever 21, while the bars 19, associated with the next succeeding two chutes, are pivoted to the lower end of the lever. To provide for the movement in unison of all of these parts, one of the links 18 is shown as extended into an operating-handle 23, which when adjusted secures a synchronous adjustment of all of the regulating-gates excepting the one in the bottom chute. The adjustment of this latter regulating-gate may be accomplished by having one of the links 17 therefor extended into a handle 23<sup>a</sup>.

The adjusting-bars 19, at their point of connection with the links 18, are provided with a series of adjustment-holes 24, whereby any one of the regulating-gates 13 may be set differently from the others should it be desired or required by the character of material being treated. A fastening device 25 is preferably associated with one of the bars 19, whereby the entire series of synchronously-operating gates may be held fast in any position.

The adjustable bottom sections 6 of the entire series are adjusted uniformly and synchronously. There is arranged beneath each bottom section 6 a pivot-shaft 26, carrying an adjusting-cam 27, working beneath and against the adjacent bottom section 6 to provide for the raising and lowering thereof. Each pivot-shaft 26 has extended therefrom a link-arm 28, and the link-arms 28 for all of the shafts 26 are connected together by a series of toggle-bars 29. To one of the toggle-

joints or to one of the pivot-shafts 26 is connected an operating-lever 30, carrying a fastening device 31, having adjustable connection with the locking-segment 32, mounted upon one of the chutes. It will thus be seen that the manipulation of the lever 30 accomplishes a simultaneous adjustment of all of the bottom sections 6, and the device 31 holds them fast in the adjusted position.

The uppermost chute 21 is the receiving-chute, and at the upper receiving end thereof is fitted therein a perforated receiving-plate 33, onto which the material is deposited. Arranged above this plate and above the upper chute 1 is a pivotally-supported overchute 34 to receive the heavier portions of coal as they bound off of the receiving-plate 33. The inclination of the overchute may be controlled through the medium of adjusting-links 35, pivotally connected therewith and also operatively related to an adjusting-lever 36.

A winged feeder 37 is arranged in the interval between the plate 33 and the bottom section 6 of the upper chute. This feeder moves over an apron 38, that works the material onto the uppermost bottom section. The coal is supposed to jump across the bottom discharge-openings 11 and out of the discharging end of the chute; but in practice some will fall through the openings 11 with the slate, and consequently a series of chutes is usually necessary to effect a complete and thorough separation.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described machine will be readily apparent without further description, and it will be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a separator of the class described, a series of chutes each having an adjustable bottom section, and means for simultaneously effecting an adjustment of all of said sections.

2. In a separator of the class described, a series of chutes each having a pivotal adjustable bottom section, common adjusting means for effecting a synchronous adjustment of all of the bottom sections, and common fastening means for holding all of said sections set in their adjusted position.

3. In a separator of the class described, a series of chutes each having a pivotal adjustable bottom section, a shaft carrying an adjusting-cam for each bottom section and a link-arm, a series of toggle-bars connecting the several link-arms, and an operating-lever connected with said toggle-bars and having a fastening device.

4. In a separator of the class described, a series of chutes having bottom discharge-openings and regulating-gates therefor, and



means for synchronously adjusting the several gates.

5 5. In a separator of the class described, a series of chutes having bottom discharge-openings and slidable regulating-gates therefor, and common adjusting mechanism for all of said gates, said mechanism including means for individually setting each gate independently of the others.

10 6. In a separator, a series of chutes having bottom discharge-openings, slidable regulating-gates for said openings, pivotally-supported adjusting-links having operative con-

nection with the gates, an oscillatory connecting-lever, a series of adjusting-bars connected 15 respectively with said lever and with said links, a single operating-handle, and a fastening device associated with one of the adjusting-bars.

In testimony whereof I affix my signature 20 in presence of two witnesses.

WILLIAM J. HAMILTON.

Witnesses:

E. D. YARRINGTON,  
J. R. VANDERFORD.