W. J. DEVERS.

SLATE PICKER.

APPLICATION FILED DEC. 11, 1907.

900,087.

Patented Oct. 6, 1908.

3 SHEETS—SHEET 1.

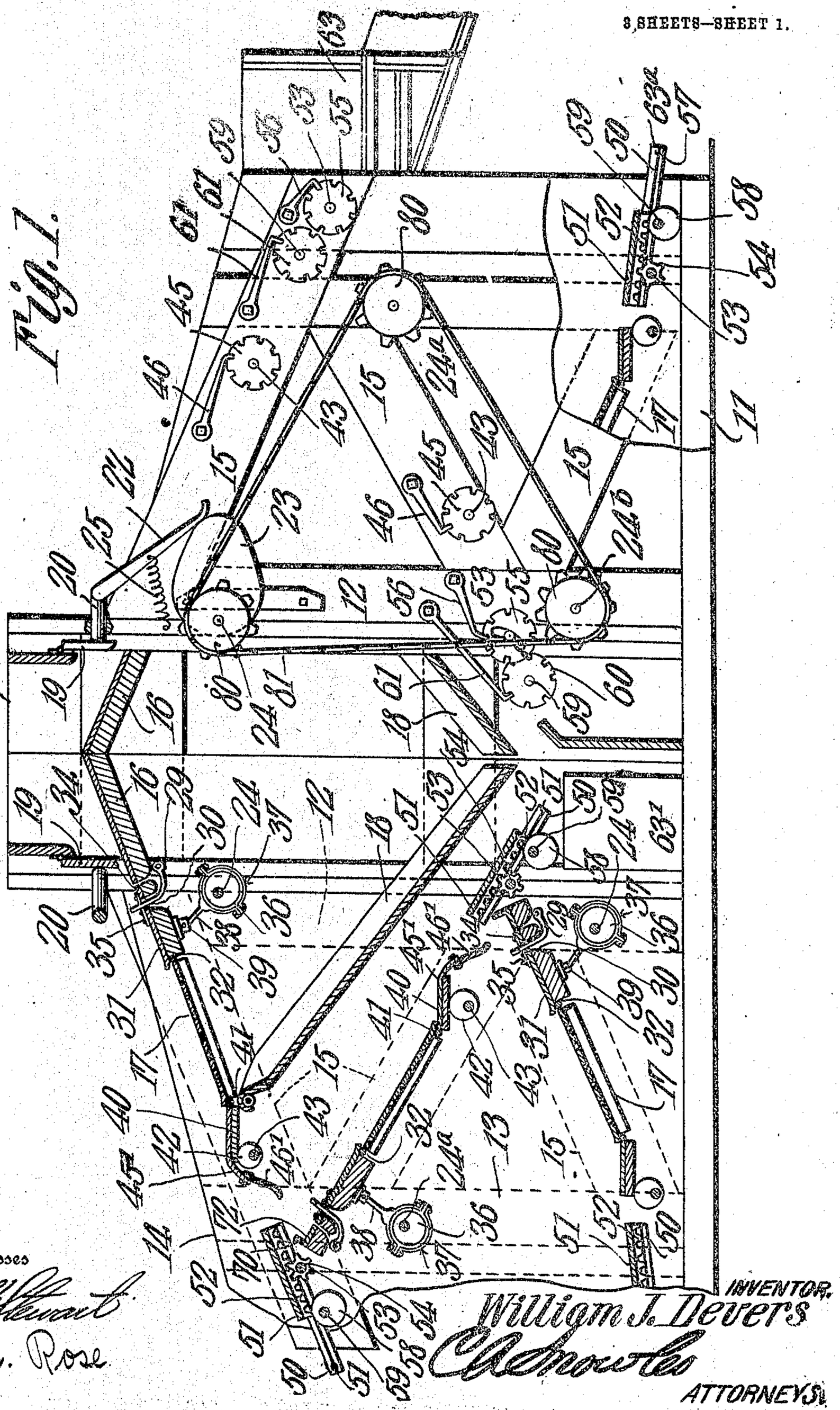

Fig. 1.

Witnesses

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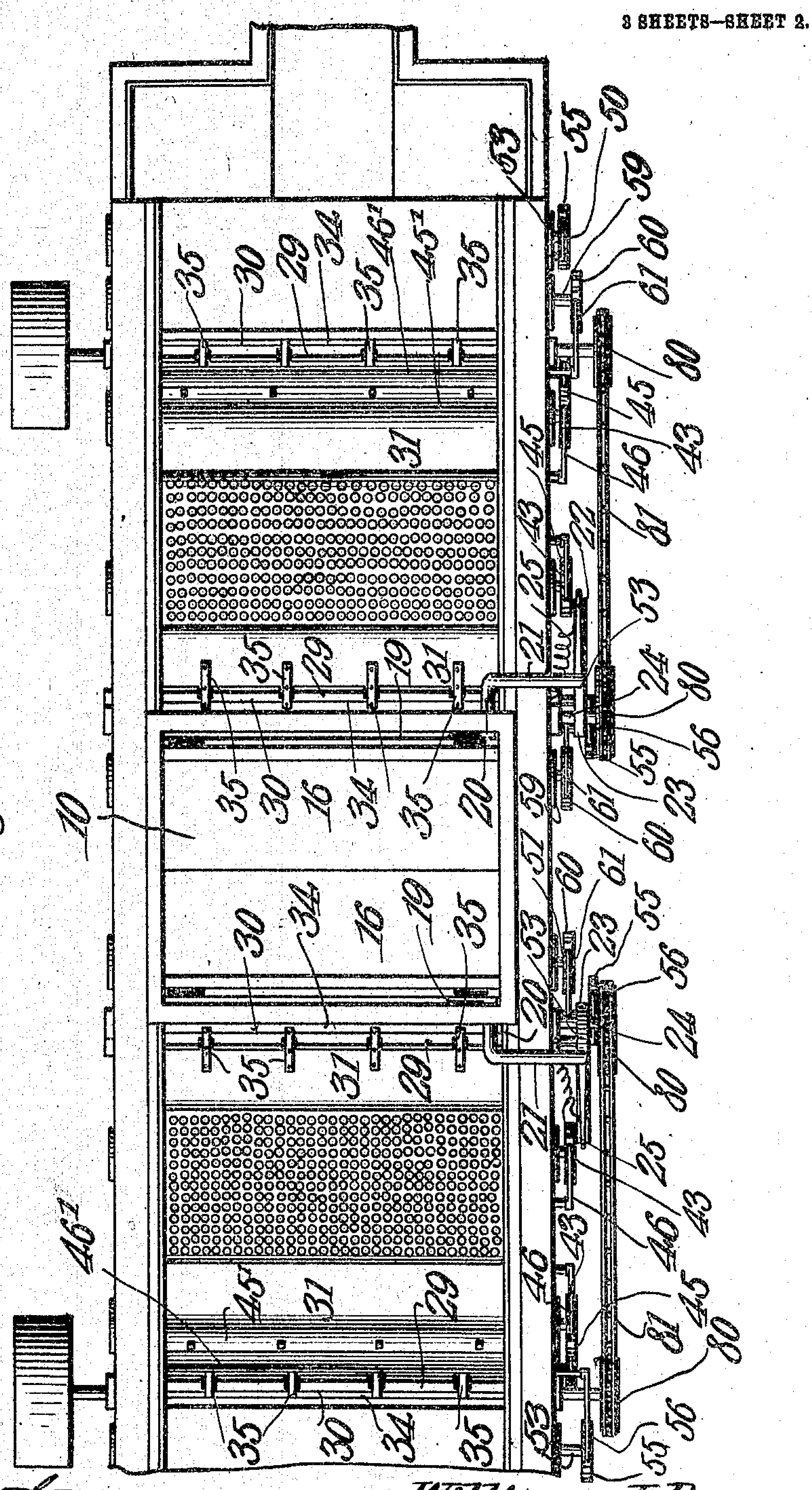
3 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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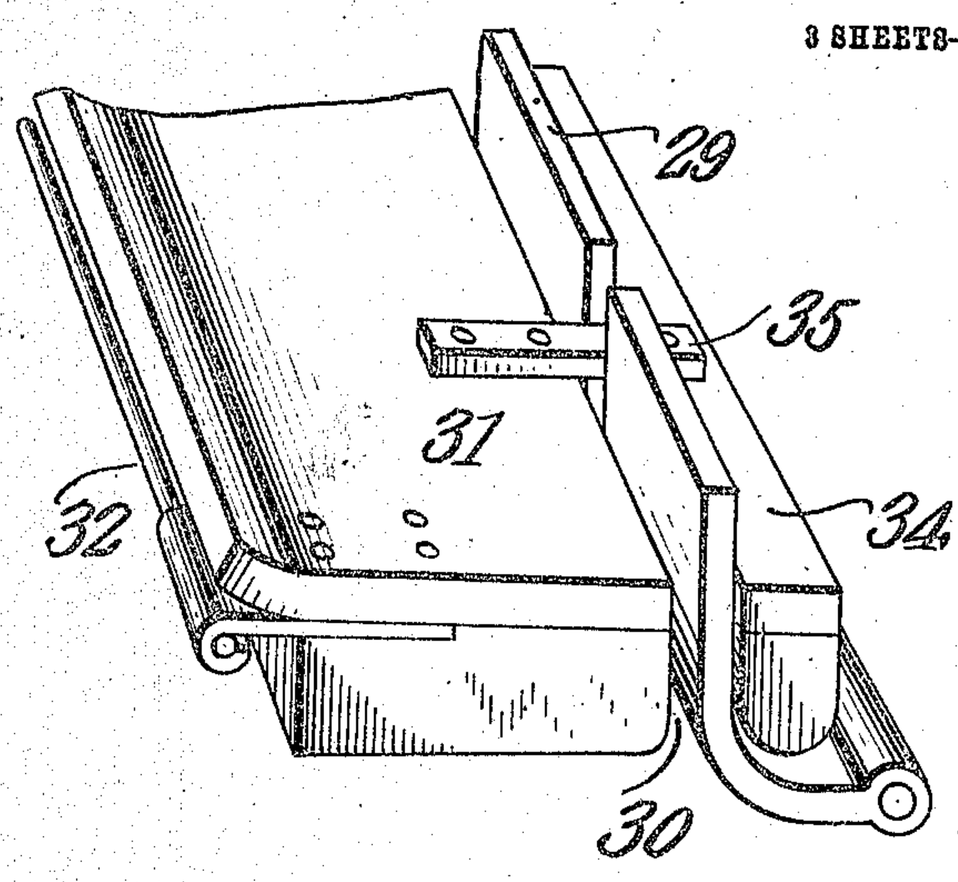

Fig. 3.

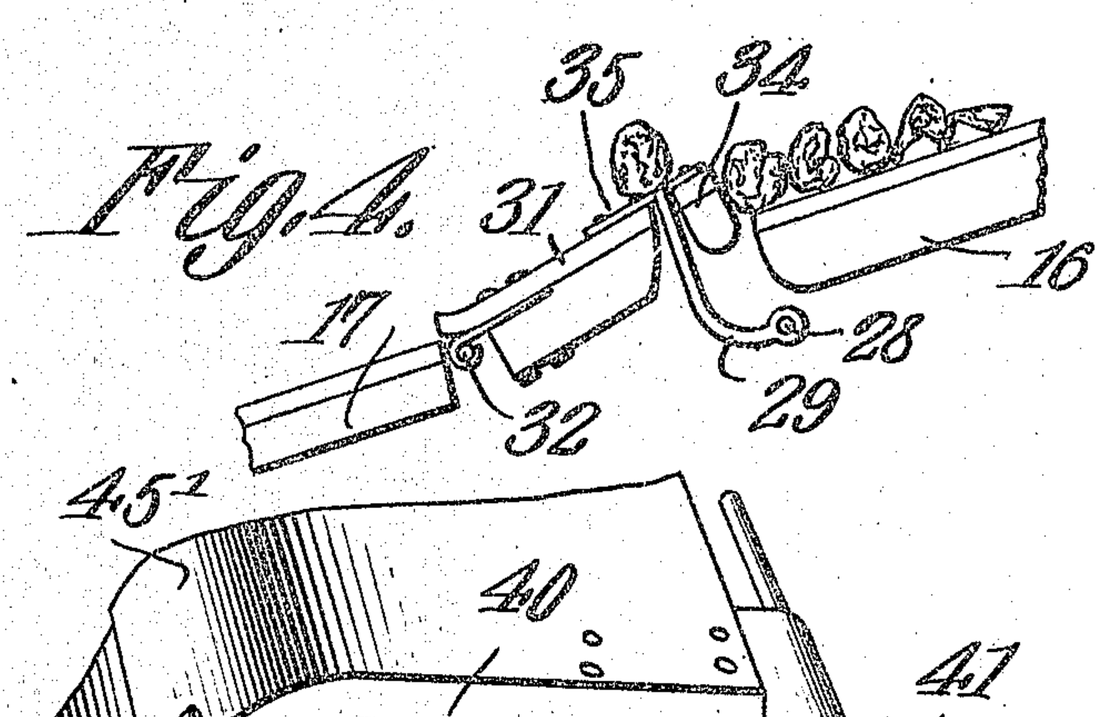

Fig. 4.

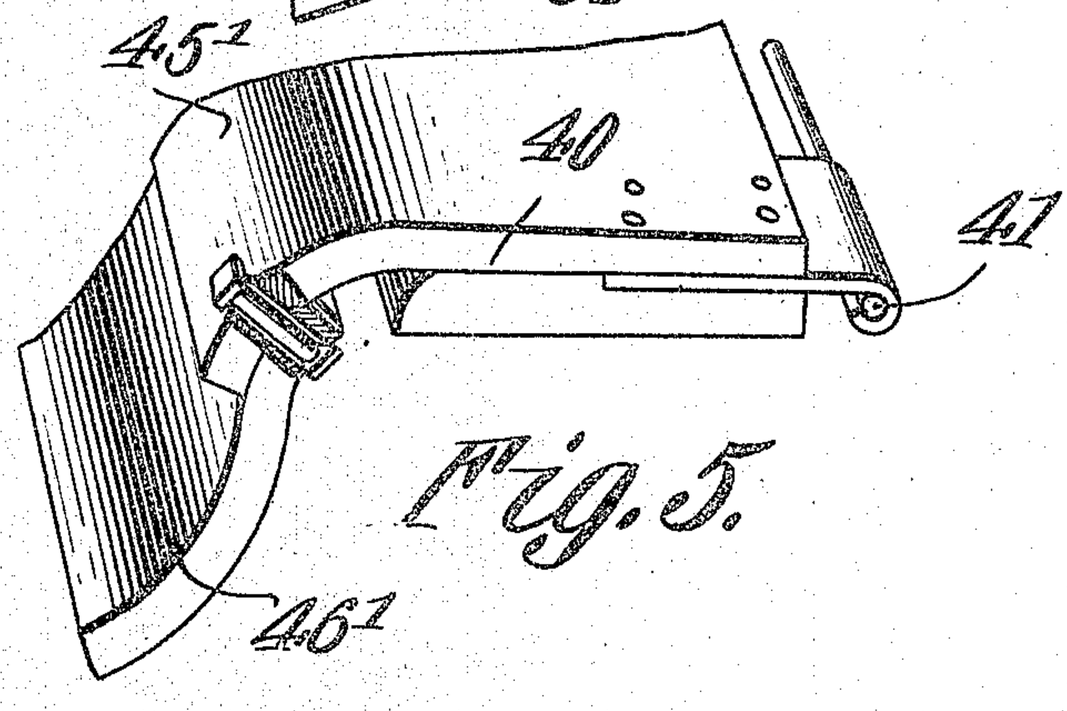

Fig. 5.

Witnesses

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SLATE-PICKER.

No. 900,087. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed December 11, 1907. Serial No. 406,117.

To all whom it may concern:

Be it known that I, WILLIAM J. DEVERS, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented a new and useful Slate-Picker, of which the following is a specification.

This invention relates to machines of that class employed for separating slate from coal.

The principal object of the invention is to provide a mechanism of improved construction in which the coal as it comes from the breaker is allowed to travel over an inclined chute having at its lower end an opening or passage for the slate, advantage being taken of the difference in specific gravities of the coal and slate in order to insure the falling of the slate at the proper point, while the lighter coal will travel across the opening and be delivered into a suitable receptacle.

A further object of the invention is to provide means for controlling the feed of the coal on to the chute, the feed being intermittent, so that there will be only a small quantity of material being treated at one time.

A still further object of the invention is to provide means for sub-dividing the quantity fed into rows, that is to say, a single row extending the full width of the chute will be allowed to travel down the chute at each operation, so that the lumps of coal and slate will be free to flow in separate courses without crowding or interference by a flowing mass of material, and in this way the individual members of the row will be allowed to travel at independent speeds, the lighter coal traveling faster than the slate, so that the coal will acquire sufficient momentum to jump across the slate passage.

A still further object of the invention is to provide an improved means for adjusting the angle of the discharge end of the chute for the purpose of retarding the flow of material to a greater or less extent, and further, to provide means for adjusting the width of the slate passage in accordance with the condition of the coal.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a sectional elevation of a slate picker constructed in accordance with the invention, a portion of the structure being shown in side elevation. Fig. 2 is a top plan view of the device. Fig. 3 is a detail perspective view of one of the stop plates and adjacent parts. Fig. 4 is a side elevation of the same showing the coal in position thereon. Fig. 5 is a detail perspective view of one of the curved plates used for separating the coal and the slate.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

It is preferred in practice to make the pickers double, and feed the same from a central hopper or chute 10 that leads directly from the breaker or other source of supply. The pickers are shown as located on opposite sides of this central hopper, one being illustrated in side elevation and the other in section.

The general framework comprises sills 11 and a plurality of standards 12 and 13, which are connected at the top by inclined side bars 14 and at suitable intervals by obliquely disposed braces 15. The bottom of the hopper 10 is provided with inclined bottom boards 16 which incline downward toward the sides of the hopper in both directions from a central point, in order to direct the coal on to inclined chutes 17, and each of these chutes is provided with perforations which act as screens in order to permit the passage of the culm and slack, which passes down an inclined chute 18 to any convenient point of discharge.

At each side of the hopper is pivoted a discharge gate 19 that is forced to open position by the weight of the coal in the hopper and is moved to closed position by a rocker arm 20 carried by a shaft 21 that is journaled in the upper portion of the frame. At one end of this shaft is an arm 22, the lower end of which is engaged by a cam 23 on a transversely disposed shaft 24, the cam serving at each rotation to positively move the gate to closed position. Movement of the arm in the opposite direction is effected by a spring 25 which turns the rock shaft and moves the arm 20 from engagement with the gate, so that the latter is free to swing to open posi-

tion and permit the passage of a quantity of coal. The feed is thus intermittent and only a small quantity of coal is allowed to pass at each opening movement of the gate and the slate is separated from this small mass before another quantity is fed.

Pivoted on the stationary shaft 28 at a point under the discharge end of the bottom member 16 is a stop plate 29 that projects up through a slot 30 in a pivot plate 31 and serves to stop the downward movement of the coal which is allowed to pass beyond the gate, and during the operation of the machine, the lumps of coal and slate which form the row immediately in contact with the stop plate are lifted over said plate and allowed to travel by gravity down the chute 17. Another row will then pass into engagement with the stop plate and this row is lifted over the plate after the first row has nearly completed its downward movement over the chute, so that there is nothing to interfere with the free movement of the lumps which form each row, and each lump of coal or slate is free to follow its own course without crowding or interference by lumps from a flowing mass.

The plate 31 is pivoted on a transversely disposed pin or bolt 32, and to its forward upper end is secured a bar 34, the two being connected by straps 35 and maintained in spaced relation to form the slot 30 for the passage of the stop plate 29, and this stop plate is recessed at intervals for the passage of the connecting bars 25.

Mounted on the shaft 24 are eccentrics 36 having straps 37 which are connected by rods 38 to pivot ears 39, on the lower faces of the plates 31, and each time the shaft 24 rotates, the plate 31 will be swung upward in order to carry up that row of coal and slate which is resting on the bar 34, the plate being elevated to a point above the top of the stop plate, so that the row of coal and slate is free to slide by gravity in the direction of the chute 17, and owing to the angle to which the plate is moved, this row of material will receive an initial impetus which will insure its rapid travel over the chute 17.

The quantity of coal allowed to pass at each opening movement of the gate is, of course, greater than would be sufficient to form a single row against the stop plate, and the coal which is pressing against the row immediately in engagement with the stop plate is held back by engagement with the approximately vertical face of the bar 34 when the latter moves up to discharge position. When the plate 31 and the bar 34 are lowered into alinement with the bottom plate 16, the mass of coal will again flow down by gravity against the stop plate placing another row in position on the bar 34 in readiness for the next operation of the latter.

After leaving the bottom of the chute 17, the coal and slate pass on to a chute section or plate 40 that is pivoted on a rod 41 extending transversely of the frame, and said plate rests on a pair of eccentrics 42 that are carried by a horizontally disposed shaft 43 journaled in the frame. One end of the shaft projects beyond the frame and carries a hand wheel 45, the periphery of which is notched for the reception of a locking pawl 46. When it is desired to adjust the angular position of the plate 40, the pawl 46 is elevated from engagement with the hand wheel and the latter is turned to adjust the position of the eccentrics 42, and in this manner the plate 40 may be moved to any angular position in order to retard the flow of material to any desired extent. The plate 40 is preferably formed of metal and has a downwardly extending curved lip 45' to which is loosely connected a plate 46' of ogee form in cross section. This plate and lip form a guard or apron which will prevent the slate from falling into contact with the eccentrics or shaft and which will serve under all positions of adjustment of the plate to properly guide the material into contact with a lower separating mechanism, hereinafter described.

Secured to the side members 14 of the frame at a point beyond the plate 40 is a pair of bars 50 carrying an inclined plate 51, to the lower face of which are secured racks 52, and these racks are engaged by pinions 53 on a shaft 54 that extends out through one side of the frame and is provided with a hand wheel 55 that is notched for the reception of a locking pawl 56. By removing the pawl 56 from engagement with the wheel, the latter may be turned and the plate 51 may be moved toward and from the plate 40 in order to adjust the width of the slate passage between the two, the width of this passage being adjusted in accordance with the condition of the material being fed. The side bars 50 which support the plate 51 are pivoted on pins 57 and are arranged to rest on cams 58 which are carried by a shaft 59, and this shaft extends to a point outside the frame and is provided with a hand wheel 60, the periphery of which is notched for the reception of a locking pawl 61. By moving the pawl out of engagement with the cam groove, the latter may be turned for the purpose of altering the inclination of the carrying bars 50 and consequently altering the inclination of the plate 51. In this connection it may be observed that the shaft 54 is carried by bearings which are formed in the bars 50 and the passage formed in the frame for said shaft 54 is elongated in order to allow said shaft to swing with the plate and rack bars.

In the operation of the device as thus far described, the plate 19 will be opened at intervals and a small quantity of coal will be allowed to flow down in the inclined plate 16 the flow of coal being checked by engage-

ment with the stop plate 29. The lumps of coal and slate which immediately engage the plate 29 and rest on the bar 34 are raised as the bar 34 and plate 31 tilt upward, and this row will then travel down the plate 31 and pass on to the chute 17, the initial impetus imparted by the angle of the plate 31 being such as to carry the load of coal over the chute. As the coal is lighter than the slate, it will tend to travel ahead, the heavier slate lagging behind while the coal acquires sufficient momentum to carry it across the slate passage. The slate flowing more slowly and being further retarded by the plate 40 will drop down through the passage in advance of the plate 51, while the coal continues onto the receiving hopper 63.

In actual practice, a quantity of the coal will fall through the passage with the slate, and in order to save this coal, the material is led over a second, and then a third separating mechanism, each of these being of precisely the same construction as that above described, each of them including a stop plate to separate the material into rows, the lifting mechanism for carrying the row over the plate, the chute, and the other devices, the coal that is separated from the slate at the second operation passing to a bin 63′, and the coal separated at the third operation being discharged at 63^a into any suitable receptacle.

The coal which falls through the passage between the plates 40 and 51, strikes against a plate 70, the rear end of which has a vertically extended flange forming a guard. To the lower rear portion of this plate is secured a block 72, and this block carries a number of forwardly projecting bars 73 each having a longitudinally arranged slot 74 near its forward end. Mounted on the bars 73 is a block 75, carrying a plate 76 that is immediately under the plate 70, and which is secured in place by bolts 77 passing through the slots 74, so that the plate 76 may be adjusted from and toward the lifting bar 34′ of the second separating means, and thus compensate for any expansion or contraction, or warping of the parts.

The several shafts 24, 24^a and 24^b which operate the lifting plates are provided with sprocket wheels 80 which are connected by a link belt 81, and one of said shafts is connected to any suitable driving mechanism.

I claim:—

1. In a slate picking machine, an inclined chute, a stop plate against which the mixed slate and coal engages, and means for elevating that row of lumps of coal and slate nearest the stop plate and delivering the same over the plate into the chute.

2. In a slate picking machine, an inclined chute, a stop plate extending transversely across the chute and against which the mass of mixed coal and slate rests, a vertically swinging bar arranged immediately to the rear of the plate and serving to support that row of lumps nearest the plate, and means for elevating said bar to discharge the row of lumps over the top of the plates onto the chute.

3. In a slate picking machine, an inclined chute, a stop plate extending transversely across the chute, a narrow bar arranged immediately to the rear of the plate, and means for elevating said bar to carry up beyond the top of the plate the lumps of coal and slate which are in engagement with the plate.

4. In a slate picking machine, an inclined chute, a stop plate extending transversely across the chute, a pivotally mounted member having a slot for the passage of the plate, that portion of the member beyond the plate forming a narrow bar for the support of the row of lumps resting against the plate, and means for swinging said plate upward to carry the lumps above the level of the top of the plate.

5. In a slate picking machine, an inclined chute, a stop plate extending transversely across the chute, a pivotally mounted member arranged at the upper portion of the chute, and slotted for the passage of the plate, and a revoluble eccentric connected to said member and arranged to swing the same upward to a point beyond the top of the plate.

6. In a slate picking machine, an inclined chute, a pivotally mounted member at the upper portion of the chute and comprising a pair of sections spaced from each other, bars connecting said sections, a stop plate extending through the space between the sections and recessed for the passage of the bars, and means for moving said member upward to a point beyond the top of the plate.

7. In a slate picking machine, an inclined chute, a retarding plate disposed at the end of the chute and having a downturned lip, a curved plate loosely secured to said lip, a support for the lower edge of said curved plate, means for adjusting the angular position of the retarding plate, an inclined receiving plate spaced from the retarding plate, means for adjusting the receiving plate toward and from the retarding plate, and means for adjusting the angular position of said receiving plate.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM J. DEVERS.

Witnesses:
F. P. BENJAMIN,
MARTIN CLARK.