C. S. FARRER.

SLATE PICKER.

APPLICATION FILED SEPT. 28, 1912.

1,058,854. **Patented Apr. 15, 1913.**

6 SHEETS—SHEET 1.

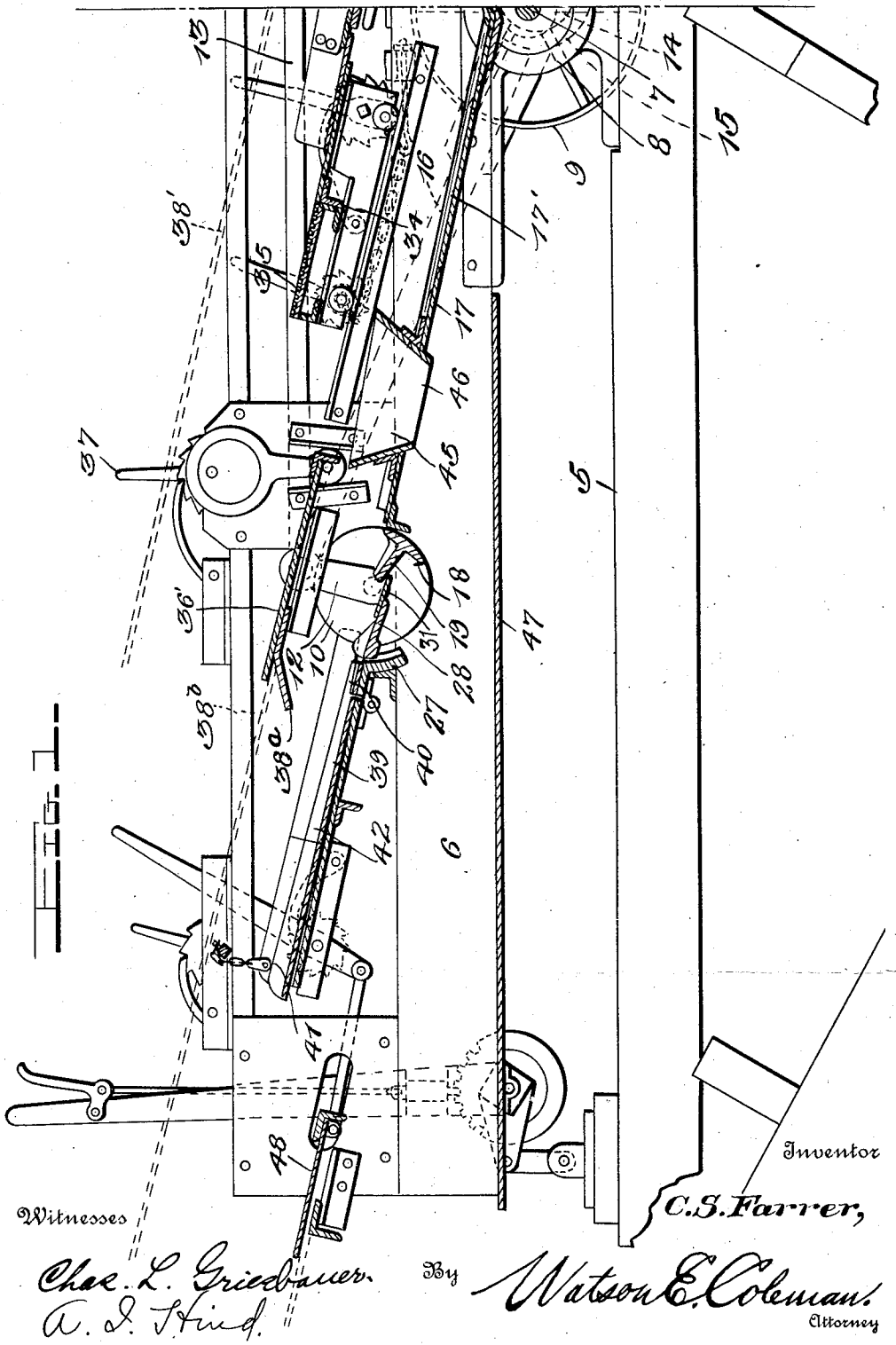

FIG. 1.

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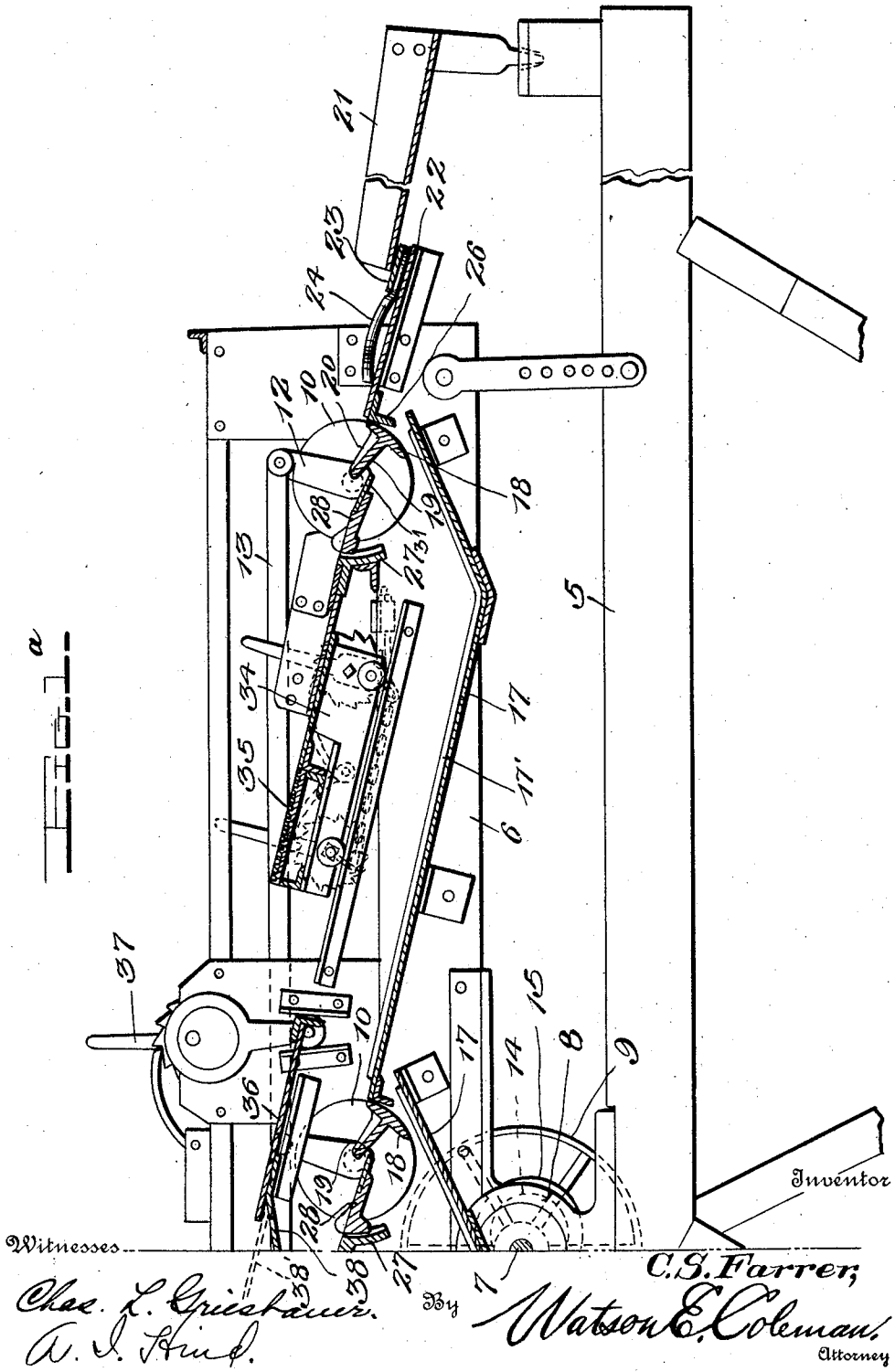

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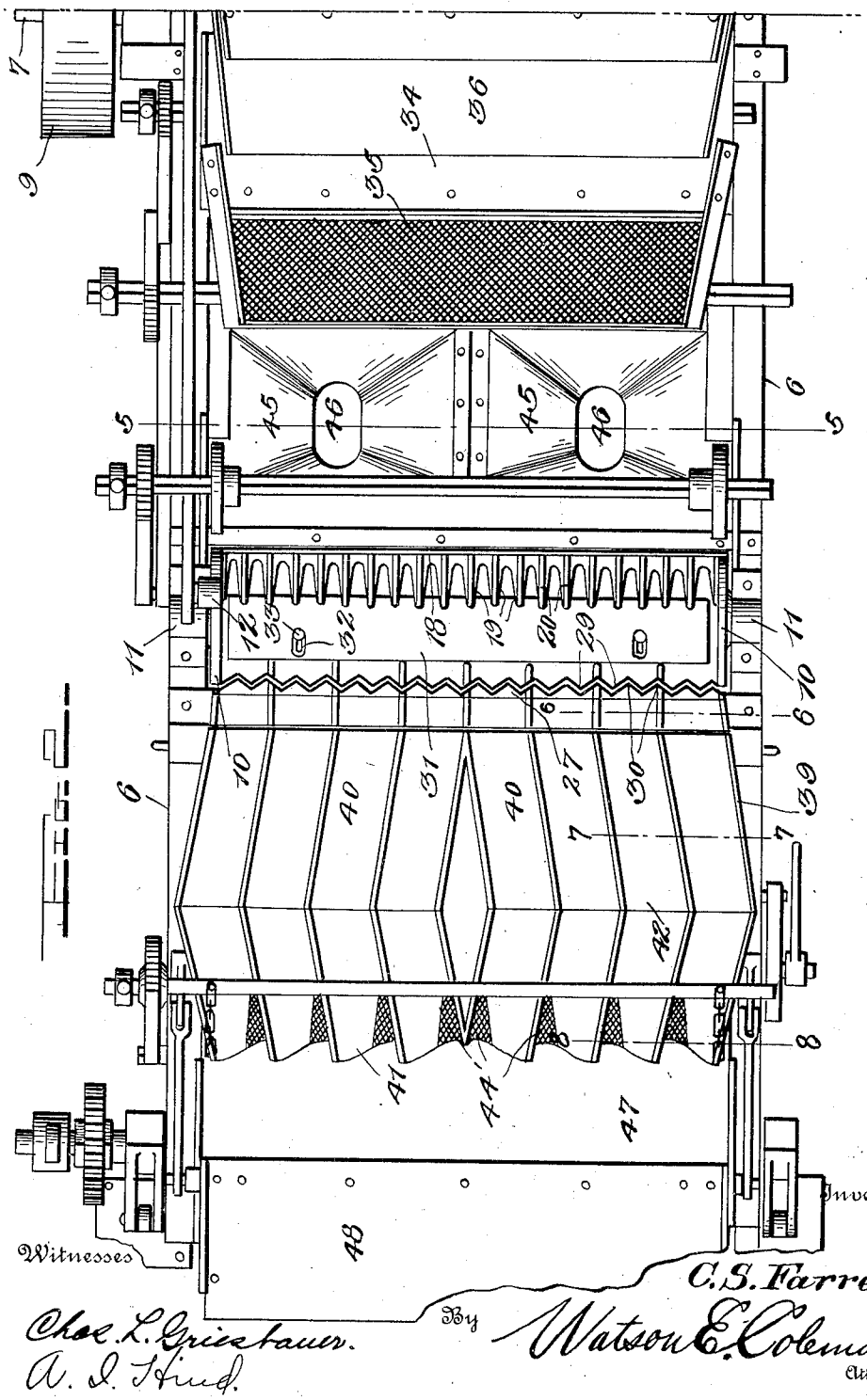

Witnesses

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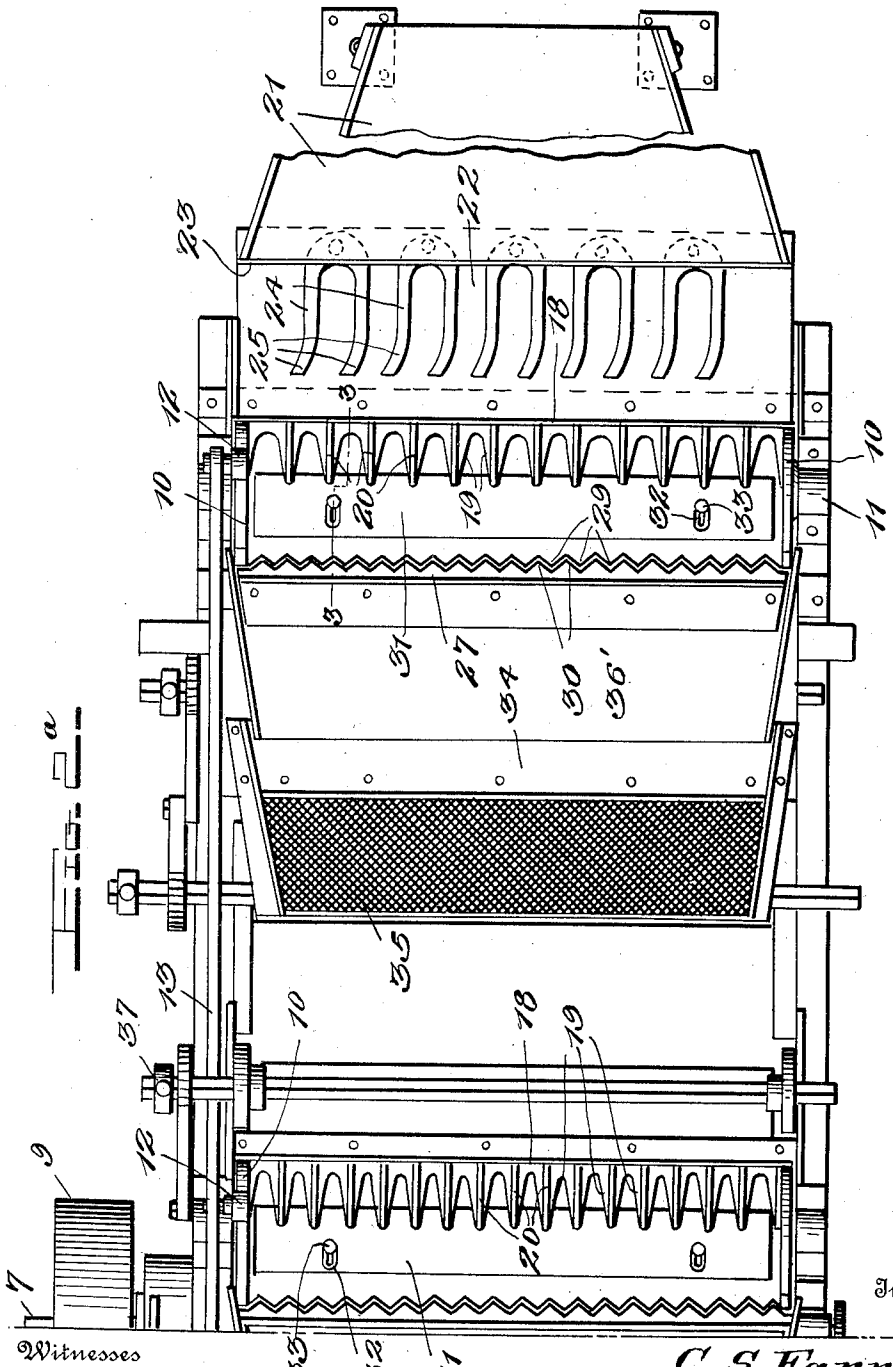

Fig. 2a

Witnesses

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6 SHEETS—SHEET 5.

FIG. 3.

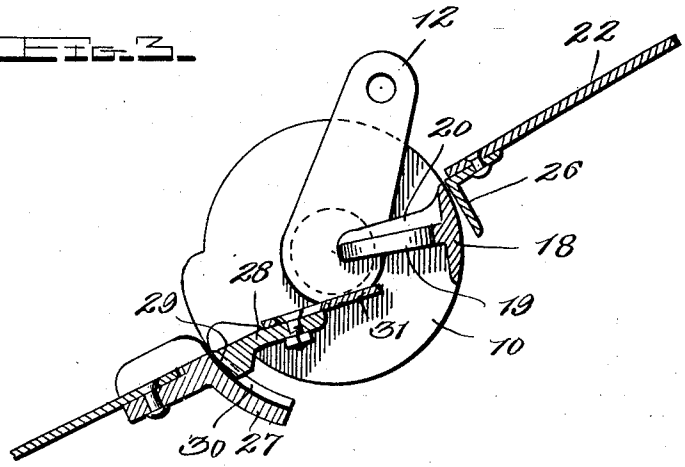


FIG. 2.

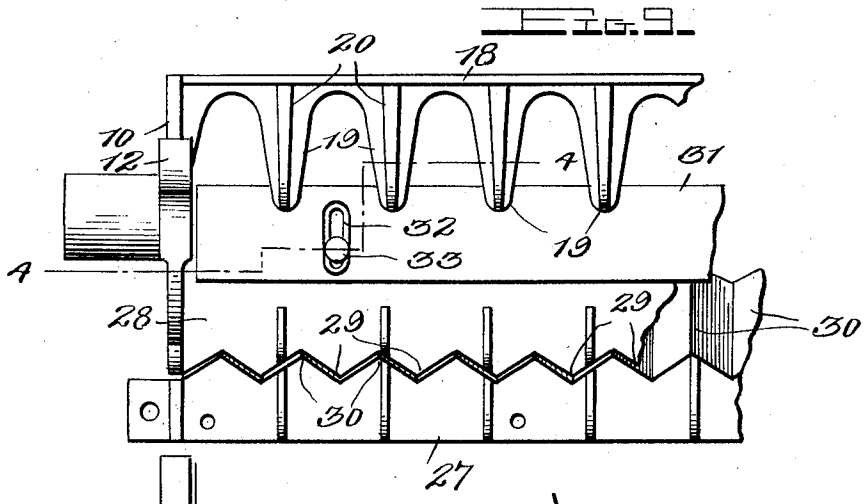
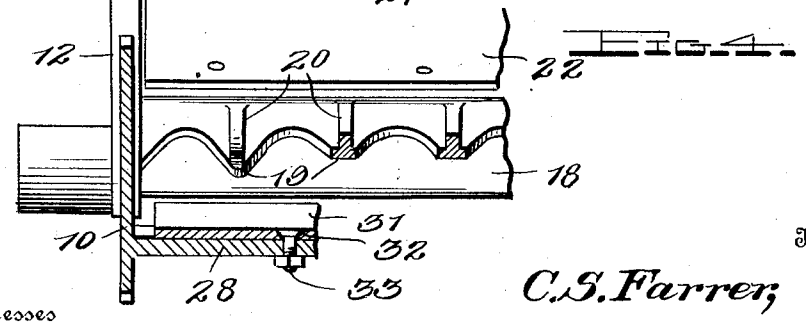


FIG. 4.



Witnesses

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6 SHEETS—SHEET 6.

Fig. 10.

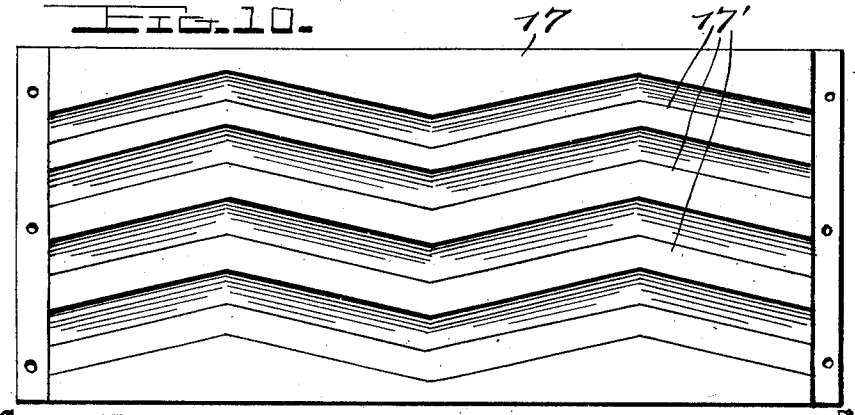


Fig. 5.

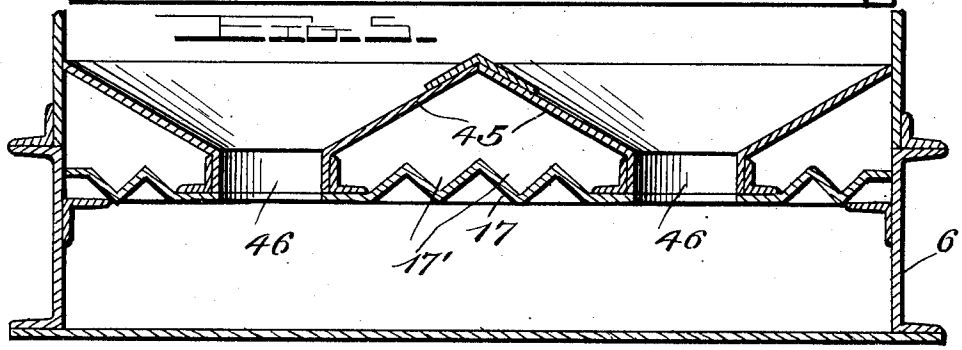


Fig. 6.

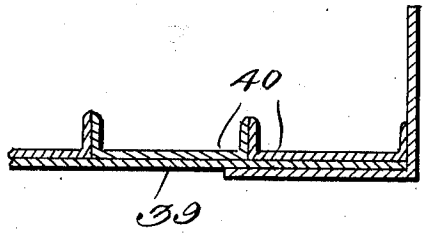


Fig. 7.

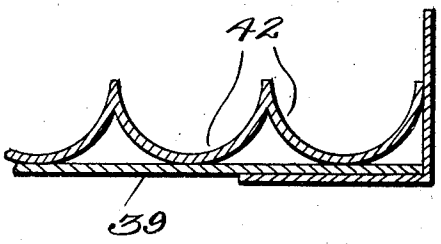
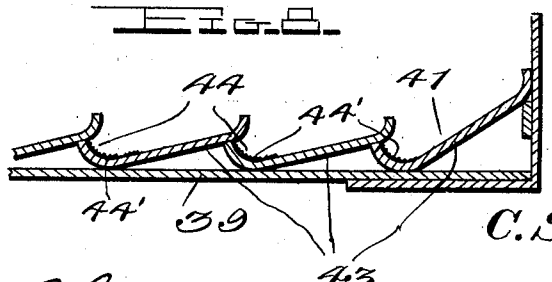


Fig. 8.



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES S. FARRER, OF DUNMORE, PENNSYLVANIA.

SLATE-PICKER.

1,058,854. Specification of Letters Patent. Patented Apr. 15, 1913.

Application filed September 28, 1912. Serial No. 722,903.

To all whom it may concern:

Be it known that I, CHARLES S. FARRER, a citizen of the United States, residing at Dunmore, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in Slate-Pickers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to a combined slate picker and coal sizing machine and has for its primary object to increase the utility and operating efficiency of machines of that type shown and described in my prior patents numbered 957,320 and 1,032,477, issued to me on May 10, 1910, and July 16, 1912, respectively.

Another object of the invention resides in the provision of a simple and novel mechanism whereby the coal is screened and sized and the slate separated therefrom in one continuous operation, the mixture of coal and slate being fed to the machine directly from the coal crusher.

Another object of the invention resides in the provision of improved retarding means whereby the slate is more effectively separated from the coal.

A further object of the invention resides in the provision of an improved oscillatory feed gate which automatically sizes the coal in the operation of the machine.

A still further object of the invention resides in the provision of a plurality of slate and coal receiving pockets each provided with means for separating the slate from the coal, one of such separating means including a plurality of discharge chutes arranged in two series, each of the chutes having angularly disposed portions of different cross sectional form to accelerate the movement of the coal at its point of final discharge and to retard the gravity movement of the remaining particles of slate so as to effect a thorough and complete separation of the slate from the coal.

A further object of the invention is to generally improve the construction of my prior patented machines without unduly complicating the same or adding materially to the cost of manufacture thereof.

With the above and other objects in view as will become apparent as the description proceeds, the invention consists in certain constructions, combinations and arrangements of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which—

Figures 1, 1ª are sectional side elevations of a combined coal sizing and slate picking machine embodying the present invention; Figs. 2, 2ª are top plan views thereof; Fig. 3 is an enlarged detail longitudinal section taken on the line 3—3 of Fig. 2ª; Fig. 4 is a transverse section taken on the line 4—4 of Fig. 9; Fig. 5 is a transverse section taken on the line 5—5 of Fig. 2; Fig. 6 is a section taken on the line 6—6 of Fig. 2; Fig. 7 is a section taken on the line 7—7 of Fig. 2; Fig. 8 is a section taken on the line 8—8 of Fig. 2. Fig. 9 is an enlarged fragmentary top plan view of the feed gate. Fig. 10 is a detail plan view of the grooved picker floor or chute plate.

In the following description, only those parts of the machine which are designed as improvements upon the patented structure and intended to be covered in the present application will be described in detail, the specific construction and arrangement of the several old parts of the machine being disclosed in my prior patents hereinbefore referred to, to which reference may be had.

In the illustrated embodiment of the invention, 5 designates a frame structure of any suitable construction upon which the slate picker is mounted for angular adjustment. In Figs. 1 and 1ª, I have shown this frame 5 disposed in a horizontal position, in order that the various parts of the machine may be illustrated on a sufficiently large scale to enable the construction and operation thereof to be readily understood. In actual use, however, the frame 5 is disposed at an inclination so that the material entering the same will gravitate downwardly from the upper end portion of the machine shown in Fig. 1ª to the lower portion illustrated in Fig. 1, from which the slate is finally discharged in the manner to be later described. The machine includes a frame generally indicated by the numeral 6 which preferably consists of parallel longitudinal channel bars connected by a plurality of transverse angle bars as clearly shown in the drawings. This frame is mounted upon a shaft 7 supported in suitable bearings 8

mounted upon the frame structure 5. A band wheel 9 is fixed upon one end of the shaft and is connected by means of a suitable driving belt to an engine or other source of power. In the frame 6 of the machine, a series of spaced oscillatory feed gates 10 are mounted, the ends of said gates being provided with circular heads and journals which are mounted in suitable bearings 11 secured upon the longitudinal side bars of the machine frame. An arm 12 is connected to one end of each of the feed gates and these arms are pivotally connected to a longitudinally extending bar 13. Upon the shaft 7 an eccentric 14 is secured which is embraced by a yoke 15 fixed to one end of a pitman 16, the other end of said pitman being pivotally connected to the arm 12 of the lowermost feed gate 10.

Beneath the feed gates 10, the inclined directing chutes 17 are mounted in the frame 6, said chutes each consisting of a plate having oppositely inclined portions. These chute plates constitute the floor of the picker and either one or all of said plates may be corrugated or grooved as indicated at 17'. It will be noted from reference to Fig. 10 that these corrugations extend longitudinally of the floor and are provided with alternately arranged outwardly and inwardly inclined portions thus producing zigzag channels or grooves. The extent of such zigzag grooves in the floor of the picker will depend upon the size of the coal and the grade or inclination of the picker floor. The purpose of this grooved floor is to check or govern the speed of the coal upon the steep grade so that the same will be properly sized and the slate separated therefrom as it passes over each of the separating gates. The opposite ends of said plates are arranged in overlapping relation as clearly shown in Fig. 1[a], the lower end of the upper chute plate being disposed above the end of the lower chute.

Each of the feed gates 10 includes a transversely disposed bar or plate 18 which is provided with spaced teeth 19, said teeth having longitudinal ribs 20 formed upon their upper surfaces for a purpose which will be later explained. The ends of the plate 18 are integrally connected to the circular heads, previously referred to, at the outer edges of said heads, and the teeth 19 extend inwardly from the plate 18. It will be noted from reference to Fig. 2[a] that the teeth of the successive feed gates are arranged in progressively closer relation from the upper to the lower end of the machine. A feed pan 21 is pivotally mounted upon the upper end of the frame structure 5. This feed pan is disposed at an inclination and gradually tapers longitudinally, the wider end of said pan resting upon an inclined chute plate 22 extending between the side bars of the frame 6. A transversely disposed bar 23 is secured upon the upper edge of the plate 22 and between this bar and said chute plate, a plurality of retarding members 24 are pivotally mounted. Each of these retarding members consists of a U-shaped rod or bar forming spaced fingers 25. This bar adjacent to the inner ends of the fingers is upwardly bent, thereby spacing said fingers from the surface of the chute plate 22. To the lower end of the inclined plate 22 and upon the under side thereof the transversely disposed angle bar 26 is secured, said bar having a depending flange as shown in conjunction with which the plate 18 of the feed gate acts to prevent passage of the coal and slate downwardly without passing over the teeth 19 of the gate. Upon the opposite side of the axis of the feed gate, a transversely disposed delivery plate 28 is integrally formed at its ends with the heads of the feed gate. An inclined bar 27 is mounted adjacent to the plate 28 and is toothed as shown at 30 to receive the corresponding teeth 29 formed upon the bar 27. Upon the plate 28 an extensible plate 31 is slidably mounted, said latter plate being provided with slots 32 through which bolts 33 mounted in the plate 28 are disposed.

The coal and slate is received from the feed gate 10 upon a longitudinally movable sliding pan 34 which is mounted and adjusted in the manner shown and described in my Patent Number 1,032,477 hereinbefore referred to. This movable pan further acts to separate the slate from the coal and includes a corrugated metal plate 35 which is provided with diagonal corrugations running in opposite directions, thereby forming upwardly projecting points or spurs. In spaced relation to the lower end of this longitudinally movable separating pan, an adjustable plate 36 is mounted between the side bars of the main frame. This plate is adjusted by means of a lever 37 to which said plate is pivotally connected at one of its ends. Upon this adjustable plate the coal is discharged from the movable separating pan 34. A plate 38 is transversely mounted in the machine frame beneath the lower end of the adjustable plate 36 and supports the intake end of a coal receiving chute 38'. The coal which passes through the teeth of the uppermost feed gate 10 and is delivered into the upper chute 17, passes down the inclined chute plate and is received upon the teeth of the intermediate feed gate. As the teeth of this latter gate are arranged in closer relation than the teeth of the first gate, the coal and slate is again separated, the smaller particles thereof dropping through said teeth into the lowermost chute 17 while the larger particles of coal and slate are delivered upon

the adjustable separating pan of the intermediate pocket. From said latter separating pan the coal is discharged upon a second adjustable plate 36′, and directed thereby into a second coal receiving chute 38ᵇ supported upon the transversely disposed inclined plate 38ᵃ. In the lower end of the machine frame, the final separating pan 39 is mounted. This latter pan is hingedly mounted at one end for vertical movement whereby its angular position may be adjusted. The free end of this pan is connected by means of chains to a transverse shaft which is mounted upon the frame of the machine and is provided with a pawl and ratchet device to hold the same against rotation. By rotating this shaft and winding the chains thereon, the free end of the pan may be raised or lowered and its inclination varied as circumstances may require.

The separating pan 39 consists of two series of inclined troughs or chutes 40 which are disposed at an inclination transversely of the machine and in relatively opposite directions upon each side of the center thereof. The lower portions of these chutes or troughs are however, convergently inclined toward the lower end of the machine as indicated at 41. As shown in Fig. 6, the upper end portions of the two series of chutes 40 which are extended longitudinally of the machine are of rectangular channel form in cross section while the outwardly inclined intermediate portions thereof are of concavo-convex cross sectional form, as shown at 42. The lower end portions of these chutes have their bottom walls 43 obliquely inclined, the wall of one trough being upwardly curved and overlapping the opposed edge of the adjacent trough. Thus a gutter or channel 44 is formed at one side of each of the troughs in its lowermost portion. Between the lowermost feed gate 10 and the second separating pan 34, the downwardly converging walls 45 are secured to the frame of the machine. These tapering walls are arranged upon opposite sides of the longitudinal center of the machine and produce substantially funnel-shaped hoppers, the lower ends of which are open as shown at 46. Into these hoppers the larger pieces of slate drop, said slate being retarded in its movement from the separating pan 34 by the corrugated plate 35 while the coal which has attained a greater momentum clears the space between the pan 34 and the separating plate 36′ in the downward movement of the material and is discharged upon the coal chute 38ᵇ.

It will be noted from reference to Fig. 3 that the plate 28 disposed upon one side of the axis of the feed gate is arranged below the plane of the toothed plate 18 so that the coal and slate after passing over the spaced teeth will fall downwardly a short distance upon the plates 28 and 31. This slight gravity movement of the material will effect the separation of such particles as may adhere to each other, thus more effectively and thoroughly separating the slate particles from the coal. After the coal and slate have been distributed upon the plate 28, the teeth 29 of said plate coöperating with the teeth 30 of the curved bar 27 in the oscillatory movement of the gate serve to spread the coal and slate so that it will be distributed in the grooves of the plate 39.

It will be noted from reference to Figs. 2 and 8 of the drawings that the surfaces of the grooves or channels 44 at the lower end of the pan 39 are corrugated or roughened as indicated at 44′. Thus it will be apparent that the heavier slate which gravitates transversely into these channels will be further retarded in its movement by friction induced by the roughened surfaces thereof while the lighter particles of coal which move at a comparatively high speed upon the higher portions of the bottom walls 43 of the chutes will attain additional momentum at their point of discharge from the pan 39 and jump the space intervening between said pan and the plate 48. The slower moving particles of slate, however, will immediately fall downward after leaving the corrugated channels 44 and be received upon the lowermost chute plate 47 from which they are discharged.

The final separation of the coal from the slate at the lowermost feed gate is maintained throughout the movement of the material in the chutes of the pan 39 so that the coal and slate move into and along the bottom walls of the chute in two separate and distinct streams. In similar machines of this character employing an oscillatory feed and separating gate where the coal and slate are fed to the retarding pan 39, the coal and slate become mixed at the point of discharge from said pan so that gravity of the heavier slate is alone depended upon to effect this final separation from the coal. This is due to the fact that the coal and slate move through the chutes of the pan in a straight line and are disposed at the same level at the discharge end of said pan. This intermixing of the coal and slate is eliminated in the present invention by the provision of the obliquely inclined bottom walls of the chutes whereby the slate is disposed at a lower elevation in the troughs 44 than the coal which moves upon the higher portions of the chute plates.

In the operation of the feed gate, upon the down stroke of the plate 28 of said gate, the coal moves from the plate into the upper portions of the chutes of the pan 39, the heavier particles of slate being caught in the pockets formed by the teeth of the plate 27.

Upon the reverse or upward stroke of the plate 28, this slate is moved upwardly and discharged into the chutes of the separating pan. Thus there is an alternate discharge of the slate and coal from the gate plate 28 to the chutes of the pan 39 and the material is maintained in this separated state during its longitudinal movement through the chutes of the pan, as above explained.

The larger particles of slate and the finer slate particles which pass between the teeth of the lowermost feed gate 10 fall upon the longitudinal bottom plate 47 and are discharged from the lower end of the machine. Between the lower ends of the longitudinal side bars of the frame 6 an adjustable inclined separating plate 48 is arranged and receives the coal from the lower ends of the troughs or chutes of the adjustable pan 39, the flat thin particles of slate which are of too large a size to pass between the teeth of the several feed gates 10, falling downwardly from the lower ends of said separating troughs upon the bottom plate 47. It will of course be understood that the construction of each of the several gates and its adjunctive parts is identical. For the purpose of sizing the coal the receiving chutes 38′ and 38ᵇ are employed but when it is desired to use the machine only as a slate picker, these chutes may be removed and the coal discharged from the separating chutes 36 and 36′ upon the several adjustable pans.

From the foregoing description, the operation of the machine will be understood as follows: The coal is fed by the feed pan 21 from the crusher in either the screened or unscreened condition to the inclined chute plate 22. The gravity movement of the heavy particles of slate is retarded by means of the fingers 25 which are pivotally mounted upon the chute plate 22. These fingers at their free ends are slightly curved laterally and are continually moved by the passage of the heavy coal. This movement of the retarding fingers loosens any coal or slate whose movement may be arrested by friction, and at the same time accelerates the movement of the comparatively light particles of coal while holding or retarding the slate. This slate and coal moves upon the first or uppermost oscillating gate 10 and the ribs 20 upon the teeth 19 of said gate turn the flat thin particles of slate edgewise so that they will pass downwardly between the spaced fingers. As the feed gate is rocked, the mixed slate and coal which has passed between the teeth thereof is thrown by the plate 18 against the downwardly curved transverse bar 27. The oscillating movement of the gate effects the forward movement of the material and sizes the same without clogging or interrupting the continuous movement of the coal and slate in any manner. By adjusting the plate 31, the amount of material passing through the feed gate may be regulated as desired as well as the size of the slate particles which it is desired shall pass between the teeth of the oscillating gate. The bar 27 and the plate 28 are toothed in order to obviate wedging of the thin slate particles between the gate and the bar 27. The inclined plate 29 directs the coal and slate from the feed gate upon the uppermost separating and retarding pan 34. The flat slate and coal are carried by means of the chute plate 17 to the next or intermediate feed gate 10 and together with the slate which falls from the separating pan, 34, is again sized or separated. The large particles of coal which were separated by the first feed gate pass from the machine over the coal chute 38′. As before stated, the second or intermediate feed gate has its teeth disposed in closer relation than the first feed gate, so that coal and slate passing therethrough will be of a finer grade. The second size coal is delivered from the lower separating pan 34 into the receiving chute 38ᵇ while the heavy particles of slate drop from the pan 34 with the second size slate which has been separated by the intermediate feed gate 10 through the openings 46 in the funnel-shaped hoppers 45. The mixed coal and slate which passes through the teeth of the intermediate gate 10 moves down the inclined chute plate 17 to the lowermost feed gate and is there again separated, the finer particles of slate falling through the teeth of said gate upon the bottom plate 47. The large heavy pieces of slate are discharged by the lower feed gate upon the pan 39, only the small and very thin pieces of slate falling between the teeth of said gate. The large flat pieces of slate and the rounder particles of coal move down in the troughs of the pan 39. The specific form of the pan 39 is devised for the purpose of lengthening the gravity movement of the slate particles at the discharge end of the pan, while shortening the movement of the particles of coal. Thus better results may be obtained in the adjustment of the separator. This is necessary because although the slate is heavier than the coal, it has been found that flat thin particles of slate which are impregnated with a lubricant will often jump or travel in a straight line for a further distance than coal, the size of the particles being substantially equal. The slate being flat and thin is lighter than the coal particles and the coal therefore tends to a gravity movement sooner than the slate. It is for the above purpose that the coal and slate is divided into like sizes and shapes, and the particles of similar sizes and shape separated. I am therefore enabled to dispense with separate screens for sizing the coal.

In the final discharge of the coal and slate

from the machine, the comparatively round particles of coal entering the concave portions of the troughs or chutes of the pan 39 will attain considerable momentum, while the flat particles of slate which do not contact with the bottoms of the concave portions of said troughs will move at comparatively slow speed as they have a greater area of frictional contact with the walls of the chutes than the coal. As the coal and slate moves into the lower inwardly inclined converging ends of the series of chutes, the slate will slide down the inclined flat bottoms of the chutes into the grooves or channels at the inner sides thereof, thus allowing the coal to pass out of said chutes, said coal having attained a greater speed of movement, as above stated. The sliding movement of the slate upon the bottoms of the inwardly inclined trough sections gradually retards its movement so that it will almost immediately gravitate downwardly after passing from the ends of said troughs and fall upon the lower plate 47 from which the slate is finally discharged. The lighter particles of coal moving at a greater speed are thrown over upon the plate 48 from which they are received into the intake end of a suitable conveying chute. In this manner a thorough separation of the slate from the coal will be assured.

It is of course apparent that the arrangement of the pockets and separating elements may be repeated as many times as desired so as to separate the coal into a corresponding number of sizes.

From the foregoing it is thought that the construction and manner of operation of my improved coal sizing and slate picking machine will be clearly understood. The features above described in detail materially increase the utility of my prior patented machine and render the same commercially more desirable, owing to the fact that the coal is both sized and the slate thoroughly removed therefrom in one continuous operation, thus eliminating excessive handling of the coal and reducing manual labor to a minimum. It will also be seen that these several improvements do not complicate the construction of the mechanism in any material sense so that the machine as a whole can be manufactured at comparatively small cost.

While I have above described and shown the preferred construction and arrangement of the various elements, it will be understood that the invention is susceptible of considerable modification in the size, proportion and arrangement of parts without departing from the essential features or sacrificing any of the advantages thereof.

Having thus described the invention, what is claimed is:

1. A unit separator for slate picking machines comprising an inclined plate provided with a plurality of zig-zag corrugations to differentially retard the coal and slate in its movement thereover, means arranged at the upper end of said plate for passing the mingled coal and slate thereover, and means arranged beyond the lower end of the plate for separately collecting the differentially retarded portions.

2. In a slate picking machine, an oscillating gate including a delivery plate, a stationary bar with which said delivery plate coacts, a series of inclined troughs extending from said bar and having channels formed in their base walls at one of their longitudinal edges, the coal and slate being alternately delivered from said bar to the troughs in the oscillation of the feed gate, the slate gravitating into said channels and frictionally engaging the side walls of the troughs whereby its movement is retarded, and a coal discharge plate arranged in spaced relation to the discharge end of said troughs to receive the coal and deliver the same from the machine, the heavier slate falling downwardly through the space between said plate and the troughs.

3. In a slate picking machine, an oscillating gate including a delivery plate, a series of inclined troughs, a stationary bar arranged between the upper ends of said troughs and the gate, said delivery plate coacting with the bar in the oscillation of the gate to alternately deliver coal and slate to said troughs, the base walls of said troughs at their discharge ends being transversely inclined to form channels in one of their longitudinal edges, the heavier slate gravitating into said channels whereby its movement in the troughs is retarded, a coal receiving plate arranged in spaced relation to the discharge ends of the troughs to receive the coal which moves at a comparatively high speed upon the higher portion of the base walls of the troughs, the slate gravitating downwardly from the discharge ends of the troughs through the intervening space between said troughs and the coal receiving plate.

4. A retarder for slate picking machines comprising a plurality of pivotally mounted fingers laterally curved at one of their ends and adapted to be oscillated by the moving coal and slate to effect a continuous movement of the coal and slate.

5. The combination with a chute, of a plurality of retarding fingers pivotally mounted at one of their ends upon the wall of said chute, the free ends of said fingers being spaced from said wall and laterally curved, said fingers being adapted to be oscillated by the moving coal and slate and adapted to accelerate the movement of the coal and retard the movement of the slate.

6. The combination with a chute, of a re-

tarder mounted therein consisting of a series of U-shaped bars forming spaced fingers, the intermediate portions of the bars being freely pivotally movable upon the wall of the chute, said fingers being spaced from the chute wall and laterally curved, the engagement of the coal and slate with said fingers oscillating the same over the wall of the chute to prevent frictional adherence of the coal and slate therewith.

7. A retarder for slate picking machines comprising two series of troughs having portions inclined in opposite directions, the discharge ends of said troughs being convergently inclined, said latter portions of the troughs having inclined base walls to form channels at one side thereof, substantially as and for the purpose specified.

8. A retarder for slate picking machines comprising two series of troughs having parallel end portions, oppositely inclined intermediate portions and convergently disposed discharge ends, the intermediate portions of the troughs being of concavo-convex form in cross section, and the discharge ends thereof having their base walls transversely inclined to form channels in one side thereof, substantially as and for the purpose specified.

9. A retarder for slate picking machines comprising a series of troughs of concavo-convex form for a portion of their length, the discharge ends of said troughs having their base walls laterally inclined, the edges of the latter portions of the troughs being upwardly bent, the higher edge of one trough being supported upon the lower edge of an adjacent trough.

10. A retarder for slate picking machines comprising two series of troughs, the troughs in one series having their discharge ends convergently disposed with relation to the corresponding ends of the other series of troughs, the base walls of the troughs of the respective series being transversely inclined in relatively opposite directions, the lower longitudinal edges of said walls being upwardly bent to form channels at one side of the troughs, substantially as and for the purpose specified.

11. A retarder for slate picking machines comprising a series of troughs, the intermediate portions of which are of concavo-convex form in cross section, the discharge ends of said troughs being obliquely inclined with relation to said intermediate portions and having their base walls disposed at a transverse inclination, one of the longitudinal edges of the discharge end of each trough being bent upwardly to form a channel at one side of the trough, substantially as and for the purpose specified.

12. A retarder for slate picking machines comprising a series of parallel troughs having their intermediate portions obliquely inclined with relation to the end portions thereof and of concavo-convex form in cross section, the discharge ends of said troughs having their base walls transversely inclined in parallel relation and bent upwardly at their edges to form channels at one side of the troughs, substantially as and for the purpose specified.

13. A separator for slate picking machines comprising a series of troughs, said troughs varying in cross sectional form at different points in their length to accelerate the movement of the coal and retard the movement of the slate, the base walls of said troughs at their discharge ends being transversely inclined to direct the slate to one side of the trough and out of the path of movement of the coal.

14. In a slate picking machine, the combination with a curved toothed plate, of a feed gate mounted for oscillatory movement and including a plate provided with teeth upon one edge to coact with the teeth of said curved plate to spread the coal and slate and alternately deliver the same from said curved plate in the oscillatory movement of the gate.

15. In a slate picking machine, the combination with spaced feed gates, of a delivery chute between said gates provided with longitudinally extending zigzag corrugations through which the coal and slate move from one gate to the other.

16. In slate picking machines, the combination with spaced feed gates, of a metallic floor or chute plate arranged between said feed gates and provided with a series of parallel longitudinal corrugations having angularly disposed portions to check the flow of the coal and slate over said floor, separating means arranged between the feed gates above the floor, and a plurality of open-bottomed hoppers mounted in the floor to receive the slate which is separated from the coal by said separating means.

17. In a slate picker, an oscillating feed gate provided with a toothed plate, a toothed bar, the teeth of which are adapted to be received between the teeth on said plate, said plate and bar coöperating in the oscillatory movement of the gate to alternately discharge slate and coal over said bar, a coal receiving plate, and means arranged between said toothed bar and coal receiving plate to maintain the coal and slate in a separated condition and discharge the coal upon said plate.

18. In a slate picker, an oscillatory feed gate, a series of troughs arranged adjacent to said gate, means with which the gate coöperates in its oscillatory movement whereby the slate and coal are alternately discharged in separate streams into said troughs each of said troughs being provided with retarding means for the slate to maintain the same

in a separated condition from the coal, a coal receiving plate spaced from the discharge ends of the troughs, the coal moving at a relatively high speed through said troughs and adapted to be received upon said plate, the heavier slate gravitating downwardly between the troughs and said receiving plate.

19. In a slate picker, an oscillatory feed gate, a plurality of troughs having their bottom walls transversely inclined at their discharge ends, means arranged between the troughs and gate to separate the coal from the slate and effect its alternate discharge into the upper ends of the troughs in the oscillatory movement of the gate, the heavier slate gravitating transversely in the troughs to the lower portions of the bottom walls thereof, a coal receiving plate arranged in spaced relation to the discharge ends of the troughs, the coal moving at a relatively high speed upon the higher portions of the bottom walls of said troughs being adapted for discharge across the intervening space and upon said plate while the slower moving mass of slate falls downwardly through the space between the ends of the troughs and said coal receiving plate.

20. In a slate picking machine, a series of inclined troughs, each including means embodied in the trough at its discharge end to direct the slate to one side of the trough and out of the path of movement of the coal, said troughs being also provided with additional means at their discharge ends to retard the gravity movement of the slate.

21. In a slate picking machine, a series of inclined troughs, the opposed edges of said troughs at their discharge ends being arranged in overlapping relation to form channels at one side of the troughs, said troughs being provided with means on the base walls of said channels to retard the gravity movement of the slate.

22. In a slate picking machine, a series of inclined troughs, each of said troughs at its discharge end being transversely inclined, the opposed edges of said troughs at their discharge ends being arranged in overlapping relation to form channels at one side of the troughs into which the slate is directed out of the path of movement of the coal.

23. In a slate picking machine, a series of inclined troughs having their discharge ends transversely inclined to direct the slate to one side of the troughs, the upper surfaces of the troughs at the lower ends of said transversely inclined portions being roughened to provide means for retarding the longitudinal gravity movement of the slate.

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

CHARLES S. FARRER.

Witnesses:

MARSHALL JONES,

JOHN R. JONES.