

H. W. FALKER, F. SCHULTZ & J. F. WAGNER.

ORE AND COAL WASHER.

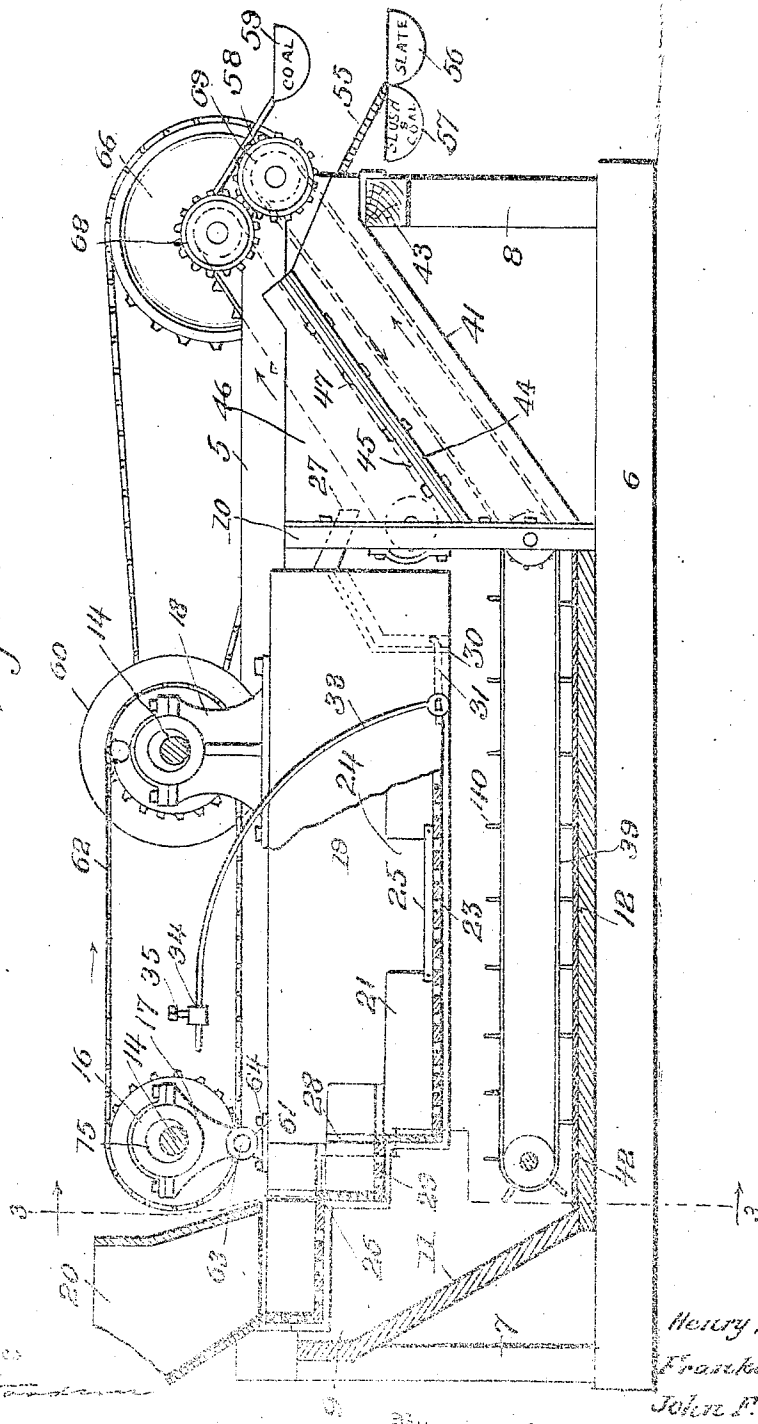
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977,087.

Patented Nov. 29, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



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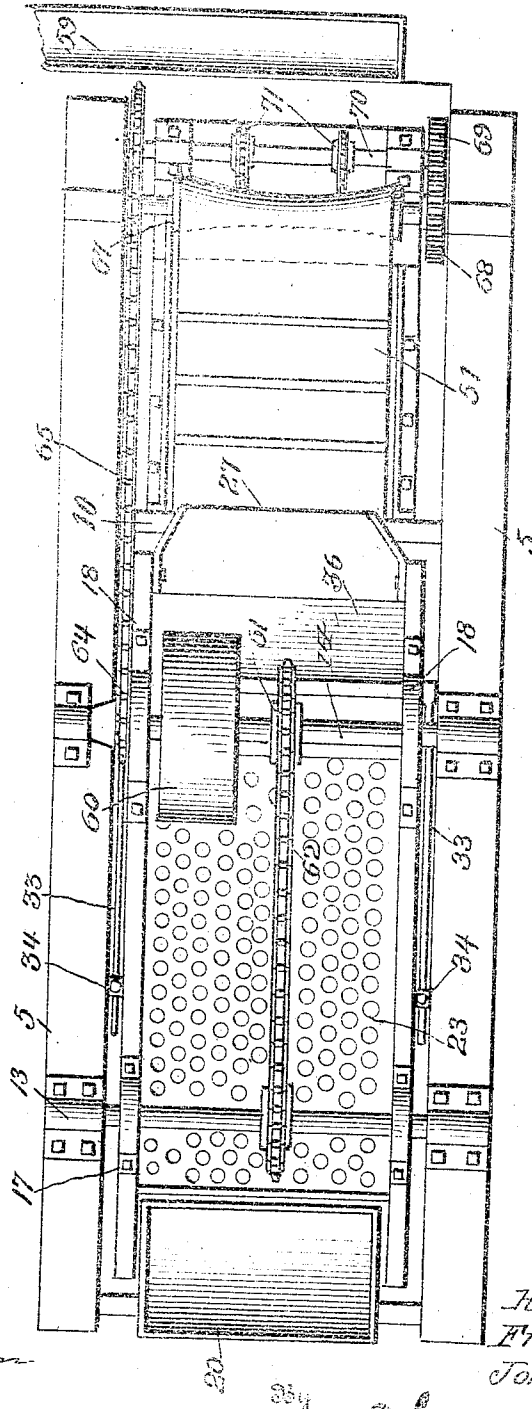
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3 SHEETS—SHEET 2.

Fig. 2.



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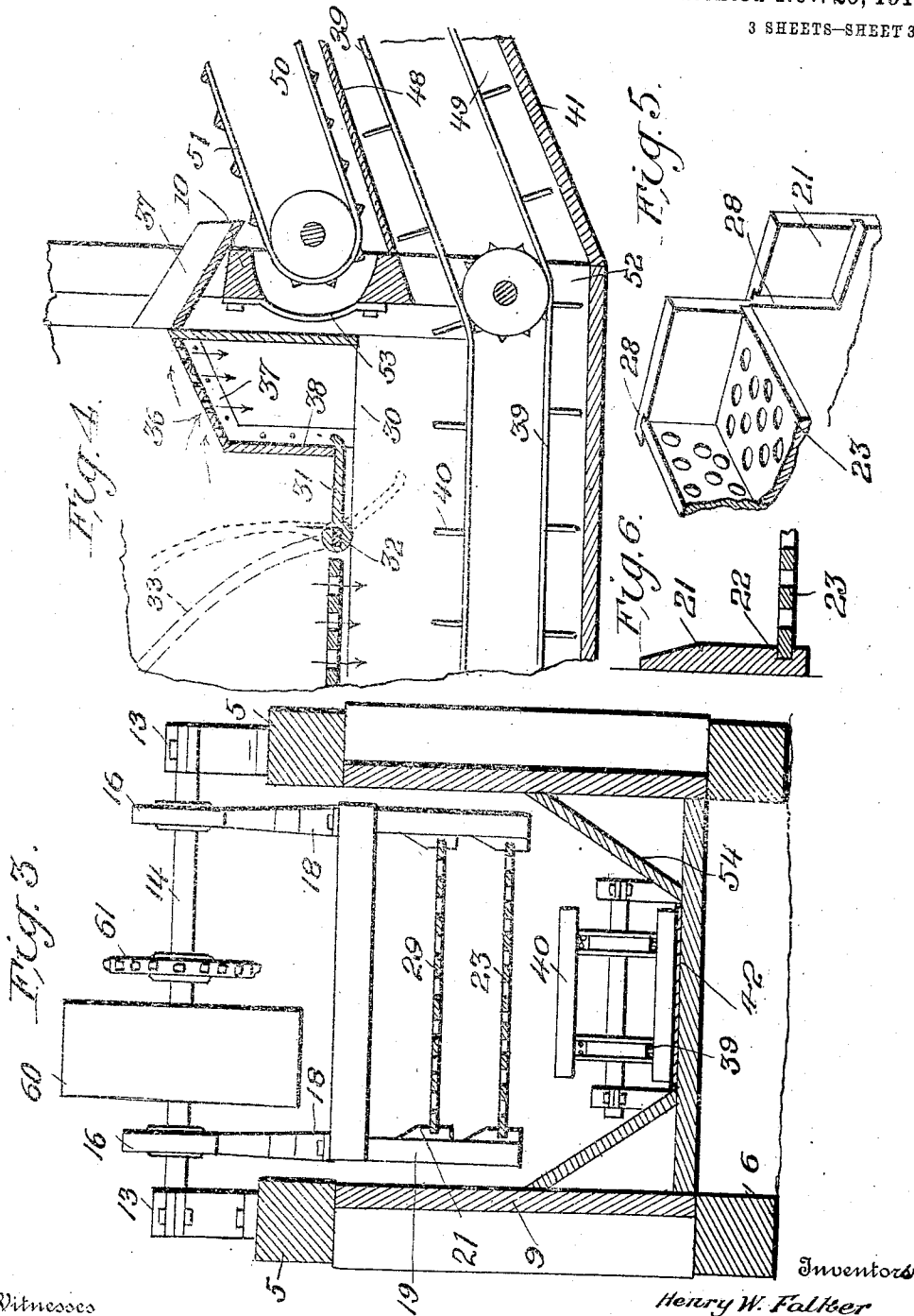
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

HENRY W. FALKER, OF ASHLAND, AND FRANKLIN SCHULTZ AND JOHN F. WAGNER, OF TAMAQUA, PENNSYLVANIA.

ORE AND COAL WASHER.

977,087.

Specification of Letters Patent.

Patented Nov. 29, 1910.

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To all whom it may concern:

Be it known that we, HENRY W. FALKER, FRANKLIN SCHULTZ, and JOHN F. WAGNER, citizens of the United States, said FALKER residing at Ashland and SCHULTZ and WAGNER at Tamaqua, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Ore and Coal Washers, of which the following is a specification.

This invention relates to ore and coal washers and more particularly to that class of machines known as jiggers.

The object of the invention is to provide a jigger of simple, compact and durable construction, in which the separation of slate and other foreign matter from the coal is effected more thoroughly and economically than heretofore.

A further object is to provide a coal separator, the jig pan of which is mounted for both vertical and horizontal movement in the washing tank, said pan having its rear end stepped so as to impart a rolling movement to the coal over the bed of slate and thus permit the ready discharge of the coal at the front of the machine.

A further object is to provide a novel form of gate or cradle for automatically controlling the discharge of slate from the jig pan to the washing tank, the construction of the jigger being such as to permit the separation of both cube and flat or flake slate.

A still further object of the invention is generally to improve this class of devices so as to increase their utility, durability and efficiency.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation partly in section of an ore and coal jigger constructed in accordance with my invention; Fig. 2 is a top plan view of the same; Fig. 3 is a transverse sectional view taken on the line 3—3

of Fig. 1 and looking in the direction of the arrow; Fig. 4 is an enlarged detail vertical sectional view of the forward portion of the machine; Fig. 5 is a detail perspective view of the stepped end of the jig pan or box; Fig. 6 is an enlarged vertical sectional view showing the manner of retaining the movable screen sections in position on the bottom of the jig pan or box.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The machine comprises a supporting frame including upper and lower longitudinal sills 5 and 6 connected in any suitable manner by uprights 7 and 8 preferably disposed at the opposite ends of the machine, as shown.

Mounted on the supporting frame is a stationary washing tank 9, the front of which is formed by a transverse partition 10, while the rear end thereof is inclined downwardly at 11 in the direction of the bottom 12.

Journaled in suitable bearings 13 on the upper sill 5 are spaced transverse shafts 14, each being provided with eccentrics 15 which engage corresponding eccentric straps 16 carried by suitable hangers or brackets 17 and 18.

Suspended from the hangers 17 and 18 and mounted for both vertical and horizontal movement within the washing tank 9, is a jig box or pan 19 adapted to receive the coal and slush from the feed spout 20, the latter being disposed at the rear end of the jig box, as shown.

Secured to the opposite side walls of the jig box or pan 19, are cleats 21 having transversely alined seating grooves 22 formed therein and adapted to receive a plurality of removable screen sections 23, which latter constitute the bottom of the jig pan. The cleats on each side of the pan are cut away at 24 so as to permit the removable screen sections 23 to be readily introduced within the seating grooves 22 and adjusted laterally within the grooves so as to cover the bottom of the pan, the screen section at the openings 24 being retained in position by a removable strap or bar 25.

The rear end of the jig box or pan 19 is stepped, as indicated at 26 so that when the pan is operated, the steps 26 will impart

a rolling movement to the coal over the bed of slate in the bottom of the pan and thus to permit the ready discharge of the free coal through a spout 27 at the front of the pan.

The cleats 21 at the steps 26 are formed with intersecting grooves 28 so as to permit the insertion and removal of the screen sections 29 constituting the treads and risers of the steps, it being here noted that the screen sections forming the tread and riser of each step overlap so as positively to prevent accidental displacement of said screen sections during the movement of the jig pan.

The bottom of the jig pan at the front end thereof is provided with an opening 30 through which slate and other refuse is discharged into the bottom of the washing tank, the discharge of slate through the opening 30 being automatically controlled by a rocking gate or cradle 31. The gate or cradle 31 is journaled in the opposite sides of the jig pan and is provided with terminal angular portions 32 adapted to receive the correspondingly angular sockets of governor arms 33. The arms 33 are curved upwardly and rearwardly on opposite sides of the jig box or pan, there being counterpoises or weights 34 slidably mounted on the free ends of the arms and secured in adjusted position by set screws 35.

Arranged within the jig pan at the front thereof is an inclined screen 36 having an attaching flange 37 and provided with a vertically disposed imperforate portion 38, the lower edge of which constitutes a stop for the cradle or gate 31.

The upper surface of the inclined screen 36 is disposed in alinement with the base of the chute 27 so that as the coal is fed over the screen 36 to the discharge spout 27, the slush and fine particles will pass through the perforations in the screen 36 and fall through the opening 30 into the washing tank 9.

The gate or cradle 31 is movable to open or partially open position by the weight of the bed of slate in the bottom of the jig pan, thus effectually preventing the accumulation of slate at the discharge opening and interfering with the proper operation of the machine.

Mounted for rotation in the washing tank 9 immediately below the jig box or pan, is an endless conveyer 39, the flights 40 of which are adapted to successively engage the slate deposited on the bottom of the washing tank and carry the same upwardly through a spout 41 to a suitable point of discharge.

The conveyer 39 is preferably in the form of a drag, while the flights 40 sweep over a wear plate 42 fastened to the bottom 12 of the tank, said wear plate serving to pre-

vent injury to the bottom of said tank when the conveyer is in operation.

The lower end of the trough 41 is secured to the partition 10, while the upper end thereof rests on a transverse supporting beam 43, said trough being provided with a laterally extending flange 44 which engages a corresponding flange 45 on a casing section 46, the parts being rigidly united by bolts or similar fastening devices 47 extending through the flanges 44 and 45, as shown.

The metal at the flange 45 is extended transversely across the top of the trough 41 to form a partition 48, thus to divide the trough into superposed chambers 49 and 50, one of which is adapted to receive the upper inclined leg of the conveyer 39, while the other receives a relatively short conveyer 51.

An opening 52 is formed in the end wall or partition 10 of the washing tank to permit the passage of the upper leg of the conveyer 39, while a guard plate 53 is secured to the partition above the opening 52 in order to house and protect the adjacent end of the conveyer 51.

Secured to the side walls of the washing tank 9 are inclined plates 54, which serve to direct the slate, slush and refuse from the jig pan downwardly into the path of movement of the flights on the conveyer 39, as best shown in Fig. 3 of the drawings.

Disposed at the upper end of the trough 41 is a downwardly inclined perforated plate 55 which receives the slate from the conveyer 39 and directs the same into a suitable discharge chute 56, there being a chute 57 disposed beneath the perforated plate 55 to receive the slush and fine coal passing through the perforations in said plate.

An inclined plate or trough 58 is also preferably disposed at the upper end of the conveyer 50 for directing the coal on the conveyer into a chute 59 similar in construction to the chutes 56 and 57.

Secured to one of the transverse shafts 14 is a wheel or pulley 60, which latter may be connected through the medium of a belt with any suitable source of power, there being a sprocket wheel 61 secured to each shaft and connected by a sprocket chain 62 for transmitting motion from one shaft to another.

It will here be noted that the rear hangers 17 are pivotally connected at 63 with suitable brackets 64 secured to the upper edge of the jig box or pan, such a construction permitting free oscillatory movement of the pan in both a vertical and horizontal plane, while at the same time permitting the hangers 17 to be adjusted laterally to effect the tension of the sprocket chain 62 when desired.

Keyed or otherwise rigidly secured to one of the transverse shafts 14 is a sprocket wheel 64, which engages a sprocket chain 65, 130

said sprocket chain passing over a relatively large sprocket wheel 66 secured to the adjacent driving roller 67 of the conveyer 50. A gear wheel 68 is secured to the other end of the roller and meshes with a corresponding gear wheel 69 carried by the upper shaft 70 of the conveyer 39, there being spaced sprocket wheels 71 secured to the shaft 70 for the purpose of imparting movement to said conveyer.

Thus it will be seen that when the material is introduced through the spout 20 in the jig box or pan, the slate will gravitate to the perforated bottom of the pan, while the coal will roll over the top of the bed of slate and be discharged through the spout 27 at the end of the pan, in the manner before stated, the vertical movement of the pan in the washing tank causing the water to effect a thorough washing of the coal and the separation of the slate therefrom.

The stepped portion 26 of the pan has the effect of kicking or feeding the coal in a forward direction and also has a tendency to turn the light particles of slate within the jig box and present said slate edge down, thus permitting the separation of flat or flake slate as well as cube slate.

As the slate accumulates on the perforated bottom of the pan, the weight of the slate will open or partially open the gate or cradle 31 and allow the slate to drop by gravity into the bottom of the tank 9 so as to be taken up by the conveyer 39 and deposited on the inclined plate 55 for delivery to the slate chute 56, the slush and fine coal passing through the perforations in the plate 55 for delivery to the chute 57.

During the gyratory movement of the jig pan or box, the free coal discharged through the spout 27 will be deposited upon the conveyer 50 and thence be directed by the inclined plate or chute 58 into the coal chute 59 so that the same may be conveyed to a bin or other suitable point of discharge.

Having thus described the invention, what is claimed as new is:

1. In combination, a tank, a jig screen suspended within the tank and having its feed end provided with steps, the treads and risers of which are perforated, and means for gyrating said screen in a vertical plane.

2. In combination, a tank, a jig screen suspended within the tank and having its feed end provided with steps, the treads and risers of which are perforated, that portion of the screen between the steps and the discharge end thereof being substantially in one plane, and means for gyrating said screen in a vertical plane.

3. In combination, a tank, a jig screen suspended within the tank and having its feed end provided with steps the treads and risers of which are perforated, that portion of the screen between the steps and discharge

end thereof being substantially in one plane and provided with an opening, means for automatically controlling the discharge of the heavier material through said opening into the tank, separate discharge means at the other end of the screen for the heavier and lighter grades, and means for gyrating said screen in a vertical plane.

4. In combination, a tank, a jig screen suspended in the tank and having its feed end provided with steps the treads and risers of which are perforated, that portion of the screen between the steps and the discharge end thereof being formed of a plurality of flat removable perforated sections, separate discharge means for removing the heavier and lighter grades at the end of the screen opposite the steps, and means for gyrating said screen in a vertical plane.

5. In combination, a tank, a jig screen suspended within the tank and having its feed end provided with steps, the treads and risers of which are perforated and its side-walls provided with cleats having guiding grooves formed therein, removable screen sections seating in said guiding grooves, a portion of the cleat on each side of the screen being cut away to permit the insertion and removal of the screen sections.

6. In combination, a tank, a jig screen suspended within the tank and having its feed end provided with steps, the treads and risers of which are perforated, cleats secured to the side-walls of the screen and provided with seating grooves, removable screen sections seated in said grooves and forming the bottom of the screen, there being recesses formed in the cleats to permit the insertion and removal of the screen sections, and a retaining device extending across the recesses in the cleats, and means for gyrating the screen in a vertical plane.

7. In combination, a tank, a jig screen suspended within the tank and having its side-walls at the feed end thereof provided with intersecting grooves, removable screen sections seated in said grooves and forming a plurality of steps, there being longitudinally disposed grooves formed in the side-walls of the screen between the steps and the discharge end thereof, removable screen sections seated in the last mentioned grooves and forming when assembled a substantially flat surface between the steps and the discharge end of the screen, and means for gyrating the screen in a vertical plane.

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

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JOHN F. WAGNER. [L. S.]

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