H. W. FALKER.

COAL AND ORE WASHER.

APPLICATION FILED SEPT. 7, 1912.

1,055,731.

Patented Mar. 11, 1913.

3 SHEETS—SHEET 1.

Fig. 3.

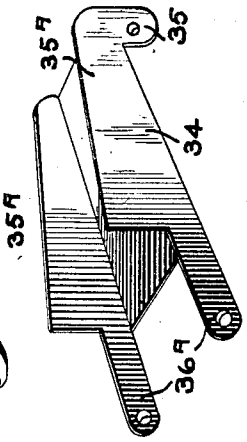


Fig. 2.

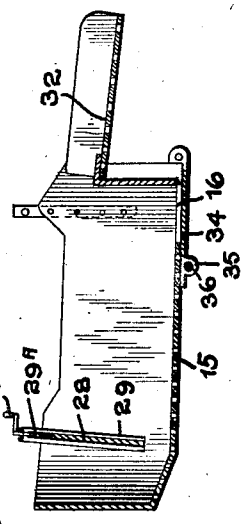
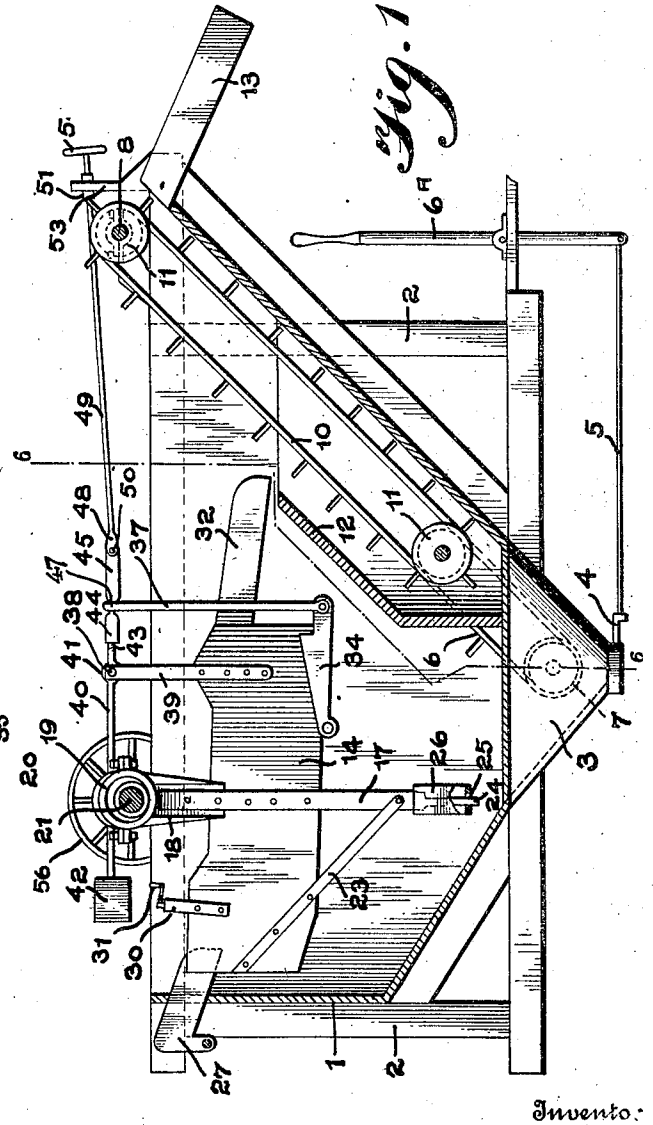


Fig. 1.



Witnesses

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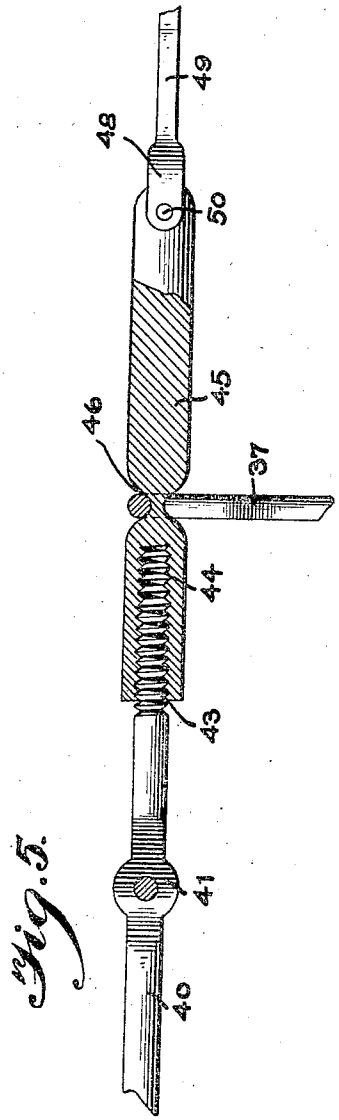

Fig. 5.

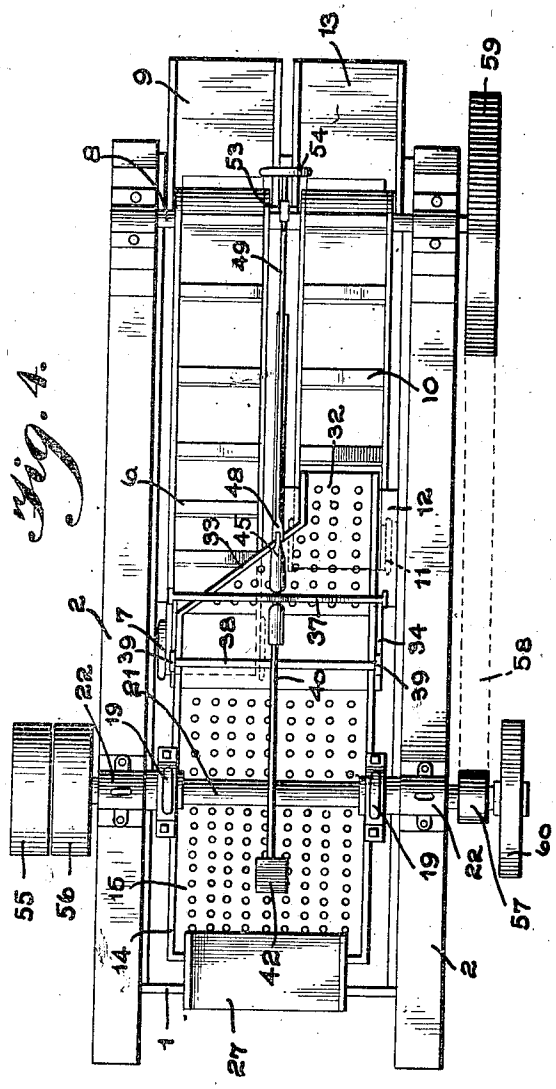

Fig. 4.

Witnesses

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3 SHEETS—SHEET 3.

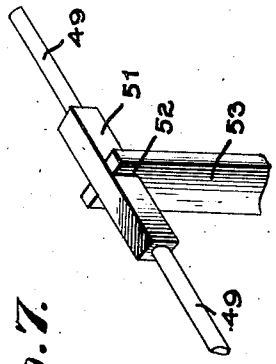

Fig. 7.

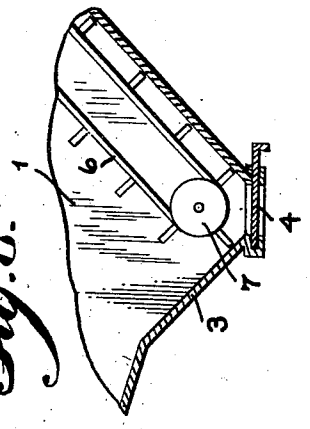

Fig. 8.

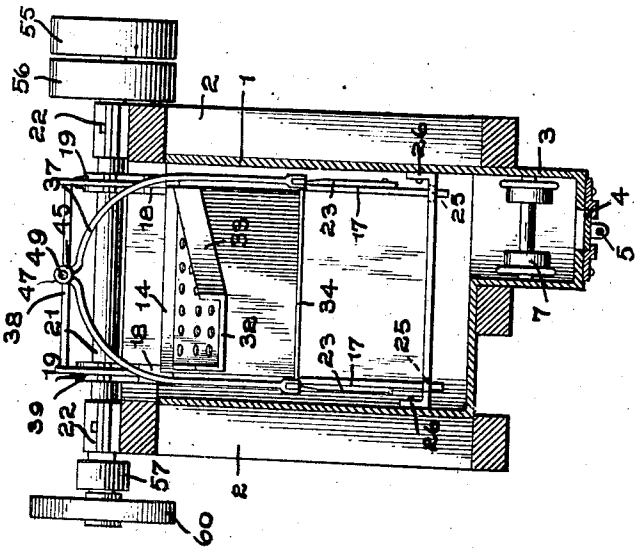

Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

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COAL AND ORE WASHER.

1,055,731. Specification of Letters Patent. Patented Mar. 11, 1913.

Application filed September 7, 1912. Serial No. 719,067.

To all whom it may concern:

Be it known that I, HENRY W. FALKER, a citizen of the United States, residing at Ashland, in the county of Schuylkill and State of Pennsylvania, have invented certain new and useful Improvements in Coal and Ore Washers, of which the following is a specification.

My invention relates to improvements in coal and ore washers, the object of the invention being to provide a coal and ore washer of the jigger type with improved means for imparting a gyrating motion to the jig pan, and provide improved means for automatically discharging the material having the highest specific gravity when the weight of the latter overcomes the balancing means connected with the discharge gate of the jig pan.

A further object is to provide improved means for adjusting the balance weight of the jig pan discharge gate, so that the latter may be controlled in accordance with the material being washed to attain just the desired product.

A further object is to provide an improved arrangement of jig pan and conveyers which facilitates the repair of any part that may need attention, and which results in a washer of extreme simplicity, yet one that is most efficient in operation.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1 is a view in section through the washing tank at one side thereof, but showing the jig pan and its coöperating parts in elevation. Fig. 2 is a view in longitudinal section of the jig pan. Fig. 3 is a perspective view of the jig pan discharge gate. Fig. 4 is a top plan view. Fig. 5 is a view partly in elevation and partly in longitudinal section illustrating the means for adjusting the balance of the jig pan discharge gate. Fig. 6 is a view in cross section on the line 6—6 of Fig. 1. Fig. 7 is a detail perspective view illustrating the manner of supporting the shaft for adjusting the jig pan discharge gate, and Fig. 8 is a view in longitudinal section through the slush box.

1 represents a washing tank which is supported in suitable structural frame work 2, and is of general hopper shape, so that the heavier particles gravitate into a hopper-like slush box 3 in the bottom of the tank and at one side thereof, and this slush box 3 is provided with a sliding gate 4 which is connected by a rod 5 with a lever 6^A, so that it may be opened when desired.

An endless conveyer 6 extends around suitable rotary devices 7 in the slush box 3, and also around rotary devices on a drive shaft 8 at the top of the tank and at one end thereof, so that the material which falls in the slush box is conveyed up to one end of the tank and discharged through a chute 9. A shorter conveyer 10 is located beside conveyer 6 and extends around rotary devices 11 in a receptacle 12 located near the bottom of the tank, and into which the coal is discharged as will be hereinafter described. This conveyer 10 is driven by rotary devices 11 on the shaft 8 and discharges the coal into a chute 13 beside chute 9, so that the coal and refuse are discharged side by side through different chutes, and may be cared for in any approved manner. Furthermore, it will be noted that the conveyers are located side by side, and both are in convenient reach so that they may be readily repaired in the event of trouble.

14 represents my improved jig pan, which is of general rectangular form, of sheet metal, and provided with a perforated bottom 15, the latter having a discharge opening 16 at its outlet end. The pan 14 is supported with its bottom at an incline from its inlet end downwardly to its outlet end, so that the contents feed along the perforated bottom. Vertical bars 17 are secured to the opposite sides of the pan 14, and at their upper ends are secured in hangers 18. These hangers 18 are provided with straps 19 positioned around eccentrics 20, the latter fixed to a shaft 21 extending transversely across the tank and supported in suitable bearings 22 on the top thereof. The bars 17 are strengthened by diagonal braces 23, and their lower ends are reduced as shown at 24 and extend through openings 25 in a transverse bar 26 secured at its ends to the sides of tank 1. These reduced ends 24 of the bars 17 are of such a length that while they move longitudinally in the openings 25 in bar 26, they do not move entirely out of the openings, but hold the pan 14 in its

operative position and guide it in the general gyrating motion which is given the pan by the action of the eccentrics 20.

The material to be washed is directed to one end of the pan by a chute 27, and a vertically movable gate 28 is supported in guides 29 in the sides of the pan so as to control the flow of the material under said gate and along the bottom of the pan. This gate 28 is adjusted vertically by means of a screw 29A which extends through a yoke bar 30 secured to the sides of the pan, and said screw is provided on its upper end with a crank arm 31 to facilitate its adjustment.

The coal passes along the bottom 15 of the pan, and due to the motion of the pan, the heavier particles move to the bottom thereof and the coal which is the lighter, remains on top and is continuously fed over a discharge chute 32 at the discharge end of the pan. This chute 32 is in a plane appreciably above the bottom and one side wall inclines as shown at 33, so that the coal is discharged onto the conveyer 10 and into the receptacle 12 and cannot fall into the main portion of the tank.

The bottom of chute 32 is preferably perforated, and as the entire apparatus is running in water, these perforations will facilitate the movement of the coal over the surface of the chute.

The discharge of the slate, rock, and other heavier material through the opening 16 is controlled by my improved gate 34. This gate 34 is provided at one end with perforated ears 35 which are pivotally connected to a cross rod 36 fixed to the bottom of pan 15, and said gate is provided with inclined relatively sharp flanges 35A at its side edges which overlap the side edges of the pan and serve to effectually cut off as the gate is closed. Forwardly projecting perforated arms 36A are provided at the free end of the gate, and to these arms a yoke 37 is pivotally connected.

A transverse rod 38 is supported above the pan 14 in uprights 39, and on this rod 38, a rod 40 is fulcrumed. In other words, the rod 40 is perforated in its flattened intermediate portion 41 to receive the rod 38, and one end of this rod 40 is provided with a weight 42. The said rod 40 at the opposite side of its fulcrum is screw-threaded as shown at 43, and screwed into a threaded socket 44 in one end of a bar 45. This bar 45 is formed with an annular recess 46 to receive the reduced intermediate portion 47 of yoke 37 and the end of said bar 45 is secured in the bifurcated end 48 of a shaft 49 by means of a pin 50. The shaft 49 is provided with a hand wheel 54 to turn the same. To hold this shaft 49 against accidental rotary movement, it is provided with an angular block 51 which is normally seated in an angular recess 52 in the upper end of a bracket 53 fixed to one end of the tank. It will thus be noted that the pivotal connection of the several parts above described does not interfere with the ordinary movement of the pan, yet allows the upper end of yoke 37 to be adjusted toward and away from the fulcrum point of rod 40. This allows the operator to adjust the parts, so that the gate will open properly. In other words, while the weight 42 is designed to maintain the gate 34 in closed position, it is overcome by the weight of material on the gate, and the latter opens to discharge such material and is again closed by the weight.

If the gate is not operating properly, it is simply necessary to turn shaft 49, and this can be done by elevating the block out of the recessed bracket 53 and returning it to this position when properly adjusted.

In operation, the material to be washed is fed over chute 27 into one end of the pan, and passes under gate 28 and is fed longitudinally of the pan by reason of the gyrating motion imparted thereto by the eccentrics. The coal which is of lesser specific gravity remains at the top and passes through chute 32 onto conveyer 10. The slate, rock, and material of heavier specific gravity find their way to the bottom of the pan, and when the weight thereof upon gate 34 overbalances weight 42, the gate will automatically open, discharge a portion of the contents of the pan, and be returned to closed position. This heavier material passes into the slush box 3, and is carried by a conveyer 6. The operation of washing the coal is therefore a continuous one, the clean coal being discharged through chute 13, and the refuse material through chute 9.

It is to be understood that the entire apparatus is running in water, and by reason of the gyrating or parabolical motion imparted to the pan, the contents are thoroughly agitated in the pan, and the washing operation is easily and effectually carried out.

While the apparatus may, of course, be driven in various ways, I have shown fast and loose pulleys 55 and 56 respectively on the shaft 21. These pulleys are connected by a belt (not shown) with any suitable source of power and a relatively small pulley 57 on shaft 21 is connected by a belt 58 with a relatively large pulley 59 on shaft 8.

The balance wheel 60 is preferably provided on shaft 1, and when shaft 21 is driven all of the operating parts of the mechanism will be simultaneously set in motion.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and

alterations as fairly fall within the spirit and scope of the appended claims.

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

1. In a coal and ore washer, the combination with a tank, of a transverse shaft across the tank, two eccentrics on said shaft, straps on the eccentrics, vertical bars secured to the straps, a pan secured to the bars between the ends of the latter, and means for holding the lower ends of said bars against swinging movement, substantially as described.

2. In a coal and ore washer, the combination with a tank, of a transverse shaft across the tank, two eccentrics on said shaft, straps on the eccentrics, vertical bars secured to the straps, a pan secured to the bars between the ends of the latter, and guides for the lower ends of said bars below said pan, substantially as described.

3. In a coal and ore washer, the combination with a tank, of a shaft extending across the tank, eccentrics on the shaft, straps on the eccentrics, vertical bars secured to the straps, a pan supported solely by the bars to which a gyrating motion is imparted by the eccentrics, a transverse bar positioned in the tank and having openings therein, and said first-mentioned bars having reduced ends movable in said openings, substantially as described.

4. In a coal and ore washer, the combination with a tank, of a pan located in the tank and having a perforated bottom, upright bars secured to the sides of the tank, a transverse bar secured to the tank and having openings therein receiving the lower ends of the upright bars, and means connected with the said upright bars whereby a gyrating motion is imparted to the pan, substantially as described.

5. In a coal and ore washer, the combination with a tank, of eccentrics supported above the tank, straps on the eccentrics, bars secured to the straps and hanging therefrom, a transverse bar secured in the tanks and having openings in which the lower ends of said first-mentioned bars are movable, and a pan located at an incline and having its side walls secured centrally between the ends of the pan to said first-mentioned bars between the ends of the latter, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY WILLIAM FALKER.

Witnesses:

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WILLIAM SCHNEIDER, Jr.