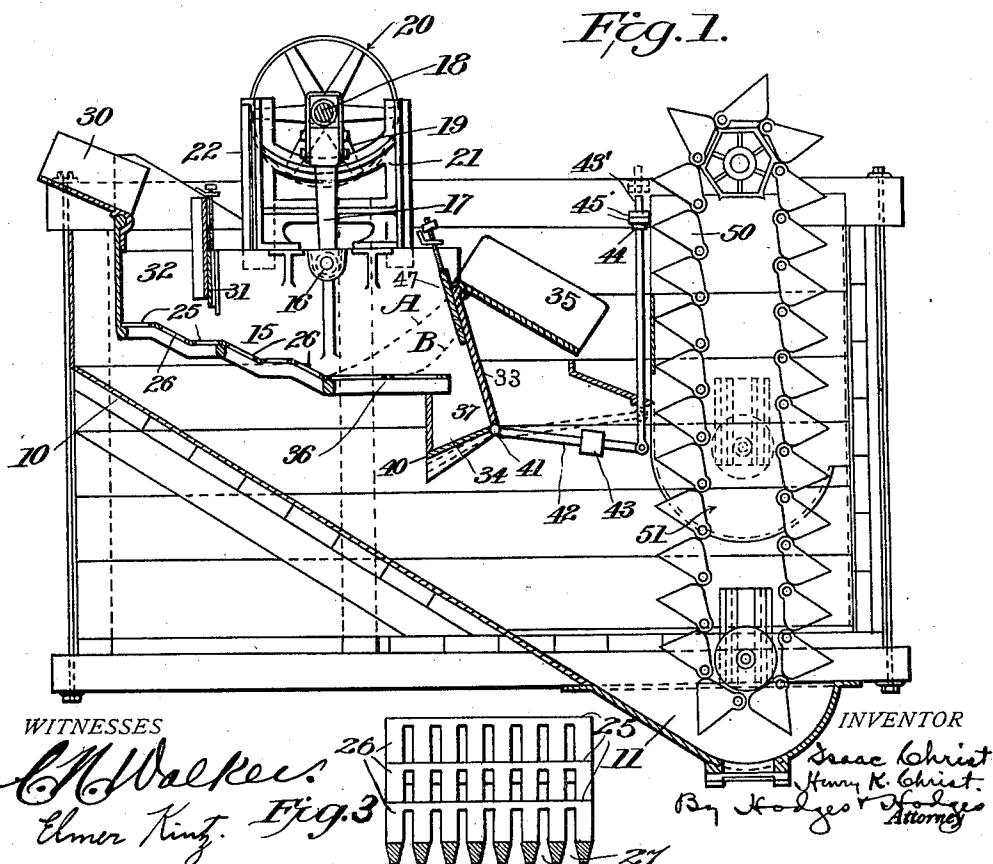


1,030,231.



UNITED STATES PATENT OFFICE.

ISAAC CHRIST, OF TAMAQUA, AND HENRY K. CHRIST, OF MAHANOEY CITY,
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SEPARATING APPARATUS.

1,030,231.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed July 6, 1911. Serial No. 637,218.

To all whom it may concern:

Be it known that we, ISAAC CHRIST and HENRY K. CHRIST, citizens of the United States, residing, respectively, at Tamaqua and Mahanoy City, in the county of Schuylkill and State of Pennsylvania, have invented new and useful Improvements in Separating Apparatus, of which the following is a specification.

This invention relates to apparatus for separating the heavier mine products from the lighter.

The invention has particular reference to that type of such apparatus generally termed jigs, in which the action or separation is effected by utilizing the differences in specific gravity of the varying grades of material which are to be operated upon. In this connection it will be understood that while my invention is particularly adapted for the treatment and separation of coal, I do not desire to limit myself in this particular, as it may be utilized for the treatment and separation of other minerals.

One of the objects of the present invention is to provide an improved jig or separator adapted to stratify the different grades of material and to automatically separate them in the course of its operation.

A further object is to provide a jig with improved means for automatically discharging the heavier material from beneath the lighter material.

A further object is to provide improved means for effecting the discharge of the heavier material in a direction opposite to the normal travel of the materials being separated, whereby the separation is rendered more effective.

A further object is to provide an improved bottom for the jig whereby the minerals to be treated are fed forward without undue agitation of the water in which the jig is usually submerged, and adapted to effectively stratify the material as it is fed.

A further object is to provide a jig with a bottom so constructed that impurities and refuse are separated and discharged as the material is fed forward.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—Figure 1 represents a longitudinal sectional view of a separating apparatus in which my inven-

tion is embodied. Fig. 2 is a plan view thereof. Fig. 3 is a detail view illustrating the bottom of the jig.

Referring to the drawings, 10 designates a water tank of any suitable or preferred construction, the sides and bottom thereof converging to the well 11 which receives the refuse material. The separator proper is of the same general type as that illustrated in Letters Patent 534,466, granted to Isaac Christ, February 19, 1895, and comprises a jig pan 15 provided with bosses 16 to which are pivotally connected the crank arms 17 of a power shaft 18 supported in suitable bearings 19 mounted on the sides of the tank 10. Power is applied to the crank shaft 18 from any suitable source, not shown, a pulley 20 being illustrated as secured to said shaft to effect rotation thereof. In this manner an up and down movement is imparted to the jig pan by rotation of the shaft 18. In order to prevent lateral and longitudinal movement of the jig pan 15 the latter is provided with guide members 21 which engage grooved guides 22 secured to the sides of the tank, said grooved guides in effect serving as tracks to guide the guide member in its reciprocation.

The bottom of the jig pan is provided with a series of horizontal sections 25 in different planes united by sections 26, inclined approximately at an angle of 45°, although I do not desire to limit myself to this exact inclination. Said bottom is also provided throughout its length with a plurality of elongated slots 27, the walls of said slots being flared, or wider at the bottom than at the top. A supply chute 30 is secured to the upper edge of the rear or receiving end of the jig, and adjacent said chute is an adjustable gate 31, the space between said chute and said gate forming what we term an initial compartment, or primary material receptacle 32 within which all the material to be separated and classified is, at the outset, deposited. The position of the lower edge of said gate determines the level of the material as it is fed into the main portion of the jig pan. The opposite or forward end 33 of the jig pan is rearwardly inclined and provided at its upper edge with a discharge chute 35 for the lighter material, and the bottom of the pan at the same end is provided with an opening 34 for discharging the heavier

material. The lowermost section 36 of the bottom of the pan is somewhat longer than the other horizontal sections 25, and overhangs the pocket 37 leading to the discharge opening 34. The opening 34 is normally closed by a gate 40 pivoted at 41 and arranged to discharge toward the receiving end of the jig and said gate is provided with an arm or extension 42 which is provided with a counterweight 43, said weight being adjustable so as to nicely balance said gate. To the end of arm 42 is pivoted an upright rod 46 which may be guided in any suitable manner, said rod being provided with a shoulder or abutment 44 to support weights 45. These weights are preferably in the form of round disks perforated to receive the rod, and are adapted to be readily placed upon or removed from the latter to compensate for the weight of the material to be supported by said gate. To regulate the depth of the material in the jig pan I provide an adjustable plate 47 in line with the end wall 33. The separated materials may be withdrawn from the tank in any suitable manner. We have shown the chute 35 as discharging into an endless conveyer 50, and a similar conveyer 51 extending down into the well 11 to remove the slate or other refuse. It will be understood that we do not desire to limit ourselves in this particular.

The operation is as follows:—The tank is filled with water to the desired depth, and power applied to pulley 20 to rotate crank shaft 18. The effect of this rotation is to impart an up and down motion to the jig while in the water. While the jig is in motion coal or other material is fed over the chute 30 into the chamber 32, and passes beneath the gate 31. As it passes along the stepped bottom of the jig pan by reason of the vibrations imparted in the reciprocation of the latter the lighter material tends to move to the top, and the heavier material to the bottom. The motion of the jig also forces the water through the slots 27 further agitating the material and tending to turn the long pieces of slate or other heavy material parallel with the longitudinal line of the pan. This action permits relatively long pieces of slate to drop through the slots 27 and pass to the well 11. The inclined sections of the bottom cause the material to be fed along smoothly and said material is not disturbed by sharp or sudden falls as it would be if the connecting portions 26 were more abrupt. Thus the stratification of the material is not interfered with and yet the latter is irresistibly fed forward by gravity. At the discharge end the material eventually assumes the shape indicated by the dotted line A, the overhanging portion of the step 36 and the inclined end wall 33 influencing this line.

Thus the slate and heavier material drop into pocket 37, and are supported by the gate 40 and the weights 45, the lighter material passing over the top of the pile and into the discharge chute 33. When the weight of the material in the pocket 37 becomes heavier than the weights 45, the gate 40 will drop and permit the material in the pocket 37 to drop into the tank, the surface of the material assuming the general contour indicated by the dotted line B. This again is influenced by the overhanging portion of the step 36 and the wall 33. As soon as sufficient material has been deposited to permit the weights 45 to close the gate 40, the operation continues as before.

By employing the inclined end wall 33 and the overhanging section 36, the line of separation is higher toward the discharge end than toward the receiving end. Thus the discharge of the heavier material is "against the current" or opposite the normal movement of the materials through the jig, and a seal is always maintained between the separated materials. In the absence of the overhang of the lower step 36 the line of discharge between the bottom of the jig and the discharge chute 33 would be broken and hence a certain percentage of the lighter material would find its way into the pocket 37.

If, during the operation of the jig, the supply of coal ceases, the tendency of the water is to force forward the heavy particles of slate remaining in the jig. In that class of jigs in which the gate controlling the slate discharge is arranged to dump in a forwardly direction the forward current or action of the water tends to carry the slate over the discharge chute. The force of the current also serves to force the gate open prematurely. We overcome these disadvantages by pivoting the gate 40 at its forward end so as to discharge rearwardly, and also by employing the pocket 37.

Having thus explained the nature of our invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what we claim is:—

1. A jig pan provided with a discharge pocket adjacent its forward end, the bottom of said pan being provided with a forwardly extended portion overhanging said pocket, a gate forming the bottom of said pocket and mounted to effect a rearward discharge of the contents of said pocket, and means for compensating for the weight of material to be supported by said gate.

2. A jig pan provided with a discharge opening, a pivoted gate normally closing said opening, said gate being mounted to effect a rearward discharge when open, and means for counterbalancing said gate.

3. A jig pan provided with a discharge

opening, a rearwardly extended gate normally closing said discharge opening, means for pivotally supporting said gate at its forward end, the rear end of said gate being
5 free, and means for counterbalancing said gate.

10 4. A jig pan provided with a discharge pocket, a gate forming the bottom of said pocket, means for pivotally supporting said gate to effect a rearward discharge of the contents of said pocket, and counterbalancing means connected with said gate.

15 5. A jig pan provided with a bottom formed of sections in different planes united by inclined sections and a discharge pocket adjacent its forward end, said bottom having a forwardly extended portion overhanging said pocket, a discharge chute for the lighter material, and a gate mounted to effect a rearward discharge of the material
20 within said pocket.

25 6. A jig pan provided with a bottom formed of sections in different planes united by inclined sections, a wall depending from said bottom and cooperating with one end of the pan to form a pocket at the forward or discharge end of said pan, the bottom being provided with a forwardly extended portion overhanging said pocket, and a gate
30 forming the bottom of said pocket, said gate

being mounted to effect a rearward discharge of the contents of said pocket.

7. A jig pan provided with a bottom formed of sections in different planes united by inclined sections, and a discharge pocket
35 adjacent its forward end, said bottom being provided with longitudinal slots, a pocket being formed at the forward or discharge end of said pan, said bottom being provided with a forwardly extended portion overhanging
40 said pocket, and a gate forming the bottom of said pocket, said gate being mounted to effect a rearward discharge of the contents of said pocket.

8. A jig pan provided with a forward end
45 wall, a discharge pocket adjacent the latter, the bottom of said pan being provided with a forwardly extended portion overhanging said pocket, and means for effecting a rearward discharge of the contents of said
50 pocket.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

ISAAC CHRIST.
HENRY K. CHRIST.

Witnesses:

SAMUEL R. BEARD,
REBECCA S. BEARD.