G. C. HACKSTAFF.

ORE CONCENTRATING JIG AND COAL WASHER.

APPLICATION FILED JAN. 29, 1907.

922,419. Patented May 18, 1909.

Fig. 1.

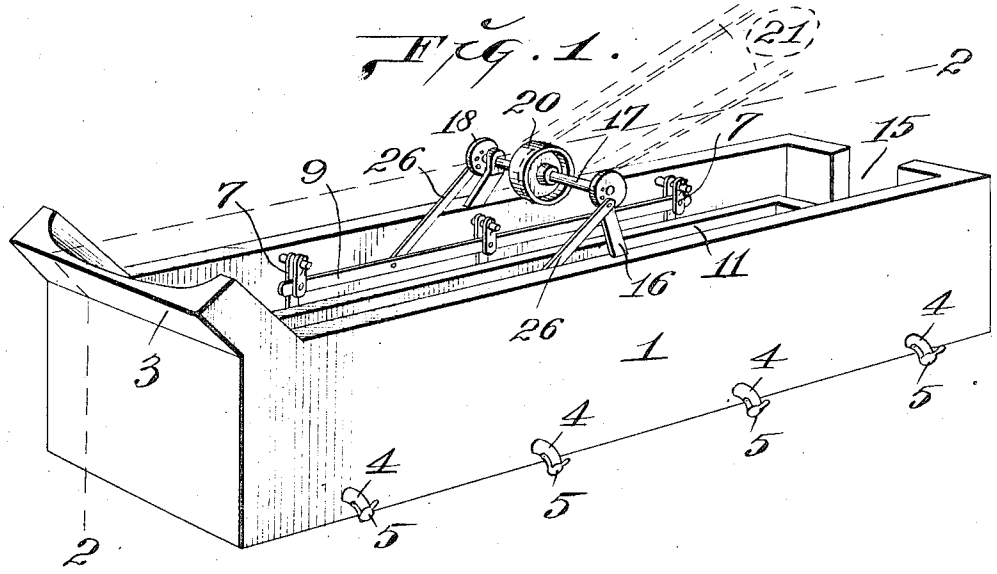


Fig. 2.

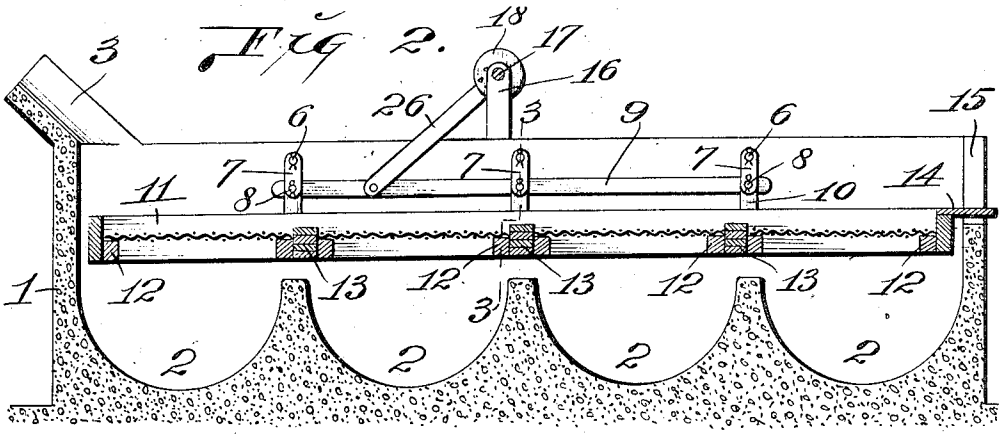


Fig. 3.

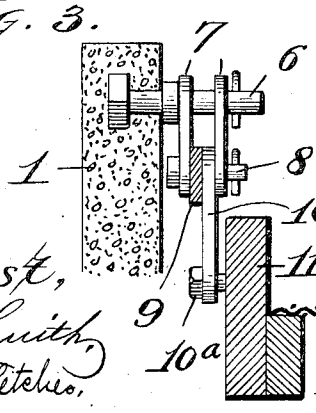
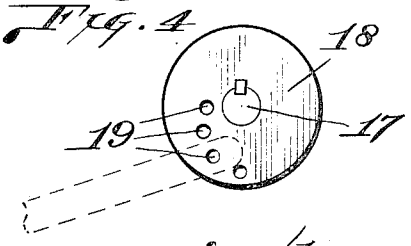


Fig. 4.



Attest,
M. P. Smith,
H. J. Fletcher.

Inventor,
Geo. C. Hackstaff.
By Higdon & Longan, attys.

UNITED STATES PATENT OFFICE.

GEORGE C. HACKSTAFF, OF DENVER, COLORADO.

ORE-CONCENTRATING JIG AND COAL-WASHER.

No. 922,419. Specification of Letters Patent. Patented May 18, 1909.

Application filed January 29 1907. Serial No. 354,752.

To all whom it may concern:

Be it known that I, GEORGE C. HACKSTAFF, a citizen of the United States, residing in the city of Denver, county of Denver, and State of Colorado, have invented certain new and useful Improvements in Ore-Concentrating Jigs and Coal-Washers, of which the following is a specification containing a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to an improved ore concentrating jig and coal washer, and embeds in its construction a tank or receptacle having arranged in its bottom a plurality of transversely disposed troughs, or hutches, which are provided with discharge spouts, and over which is suspended within the tank or receptacle an oscillatory screen which receives the material to be washed. The tank or receptacle is preferably constructed of concrete, or a mixture of cement, sand, and stone, in proper proportions, which is allowed to harden, thus providing an extremely rigid, strong, and durable tank.

One of the objects of my invention is to provide a comparatively simple means whereby an oscillatory movement is imparted to the screen in order to properly agitate the ore which is submerged under water in the tank in order to cause the heavier or metallic particles to gravitate to the bottom of the screen or to the troughs, and which method is also employed to effectually wash coal, or a similar product. The water, after passing over and through the material, is allowed to discharge from the tank, carrying with it the refuse and lighter particles of material.

To the above purposes, my invention consists in certain novel features of construction and arrangement of parts, which will be hereinafter more fully set forth, pointed out in the claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a perspective view of a concentrating jig or washer of my improved construction; Fig. 2 is a vertical section taken longitudinally through the jig and washer, and approximately on the dotted line 2—2 of Fig. 1; Fig. 3 is an enlarged detail section taken on the line 3—3 of Fig. 2; Fig. 4 is an enlarged detail view of one of a pair of eccentrics I make use of in carrying out my invention.

Referring by numerals to the accompanying drawings:—1 designates the tank, or receptacle, which is preferably made in rectangular form, of cement or analogous plastic material, and having formed in its bottom a series of transversely disposed troughs, or hutches, 2; and formed at the upper corner, at one end of the receptacle, is an integral chute 3, which receives the material which is fed into the tank or receptacle. Arranged in the front wall of the tank and leading from the bottom of the troughs or hutches 2 are discharge spouts 4, of ordinary construction, provided with cut off valves 5. Fixed in the side walls of the tank or receptacle and projecting inwardly therefrom are pintles 6, on each of which is journaled a pair of links 7, and passing through the lower ends of each pair of links is a bolt 8.

9 designates a longitudinally disposed bar which is arranged between the lower ends of the pairs of links on each side of the tank, and through which bar pass the bolts 8, and pivotally connected to the bolts 8 are the upper ends of links 10, the lower ends of which are journaled upon pins or bolts 10^a, which are seated in the side rails of a rectangular screen frame 11, which is horizontally disposed within the tank or receptacle immediately above the troughs or hutches, 2.

Removably positioned in the frame 11 are rectangular screen frames 12, between which are arranged the transversely disposed partitions 13, and fixed on the right hand end of the screen frame is a horizontally disposed discharge plate or bolt 14, which extends through a discharge opening 15 formed in the end of the tank or receptacle, opposite from the end provided with a chute 3.

Extending upwardly from the side walls of the tank 1, and at a point midway between the ends thereof, are standards 16, in the upper ends of which is journaled for rotation a transversely disposed shaft 17, on the ends of which are fixed disks 18, in each of which is formed a plurality of apertures 19, the latter being arranged at various distances from the center of the shaft 17.

Fixed on the center of the shaft 17 is a pulley 20, which receives a driven belt 21, and connected to the disks 18 by bolts passing through a corresponding pair of the apertures 19 are the upper ends of pitmen 26, the lower ends of which are pivotally connected to the longitudinally disposed bars 9

In the practical operation of my improved concentrating jig and washer, the ore, coal,

or other material t be concentrated or washed is delivered i any suitable manner to the chute 3, and discharges therefrom onto the left hand end of the screen. The shaft 17 is rotated at a suitable speed by means of the belt 21 traveling over the pulley 20, and the pitmen 26 connected to the disks 18 impart an oscillatory motion to the bars 9. The bars 9, being pivotally connected to the pins 8, and said pins connecting the corresponding pairs of links 7 and single links 10, impart a toggle link motion to said links, and in turn simultaneously oscillate and elevate the screen frame 11. This screen frame, with the material thereon, during its operation, moves gradually upwardly and toward the right hand, and the motion during each individual movement is accelerated toward the extreme limit of movement toward the right, and said motion is reversed as the screen frame swings downwardly to its original position; and which action constantly agitates the material on the screen, and by a succession of short quick impulses continually shifts the material toward the right hand end of the screen, during which action said material is very thoroughly concentrated and washed, and the heavier metallic particles gravitated to the bottom of the screen, and the more finely divided particles pass through said screen and are deposited in the bottom of the troughs or hutches 2, while the refuse and lighter particles are carried to the right hand end of the screen and finally pass over the discharge plate 14.

By changing connections between the upper ends of the pitmen 26 and the disks 18, the oscillatory motion to the screen may be varied, as desired.

The water to carry out the washing and concentrating action can be supplied to the tank in any suitable manner, and when it is desired to discharge the contents of the troughs or hutches, the valves 5 at the ends of the discharge spouts 4 are opened.

By constructing the tank or receptacle of concrete, or analogous plastic material, and locating the same on a suitable base, all vibration of said tank or receptacle is done away with, and much better results are obtained during concentration and washing than where an unstable tank of wood or sheet metal is made use of, which latter vibrates readily when the mechanism for oscillating the screen is in action.

The toggle links 7 and 10 are simple, strong, and durable, are easily placed in position, and provide means for imparting the proper oscillatory movement to the screen frame.

I claim:—

1. The combination with a jig tank divided into a series of transversely arranged compartments, of pins projecting inwardly from the side walls of the tank adjacent the top edges thereof, a pair of links depending from each pin, a horizontally disposed bar connecting the entire series of links on each side of the tank, a single link depending from each bar at the point where the same joins the pairs of links, a screen suspended from the lower ends of the second sets of links, a transversely disposed shaft arranged for rotation in bearings above the center of the tank, disks fixed on the ends of the shaft, and pitmen pivotally connected at their lower ends to the horizontally disposed bars, and the upper ends of said pitmen being adjustably connected to the disks on the shaft.

2. An apparatus of the class described, comprising a jig tank divided into a series of transversely arranged compartments, pins fixed to the side walls of the tank adjacent the top thereof, and projecting inward, a pair of depending links pivotally arranged on each pin, a pin passing through the lower ends of each pair of links, a horizontally disposed bar arranged between the lower ends of each series of links on each side of the tank and the pins in the lower ends of the links passing through the horizontally disposed bars, a single link pivotally connected at its upper end to the pin in the lower ends of the pair of links, a screen suspended from the lower ends of the single links, bearings arranged on the tank above the center thereof, a shaft journaled in said bearings, disks fixed on the ends of said shaft, pitmen adjustably connected to the disks, and the lower ends of which pitmen are pivotally connected to the horizontally disposed bars.

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

GEORGE C. HACKSTAFF.

Witnesses:
M. P. SMITH,
E. L. WALLACE.