E. E. CARPENTER.

COMBINED SCREEN AND ELEVATOR.

APPLICATION FILED JAN. 10, 1918, RENEWED AUG. 13, 1919.

1,318,264.

Patented Oct. 7, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

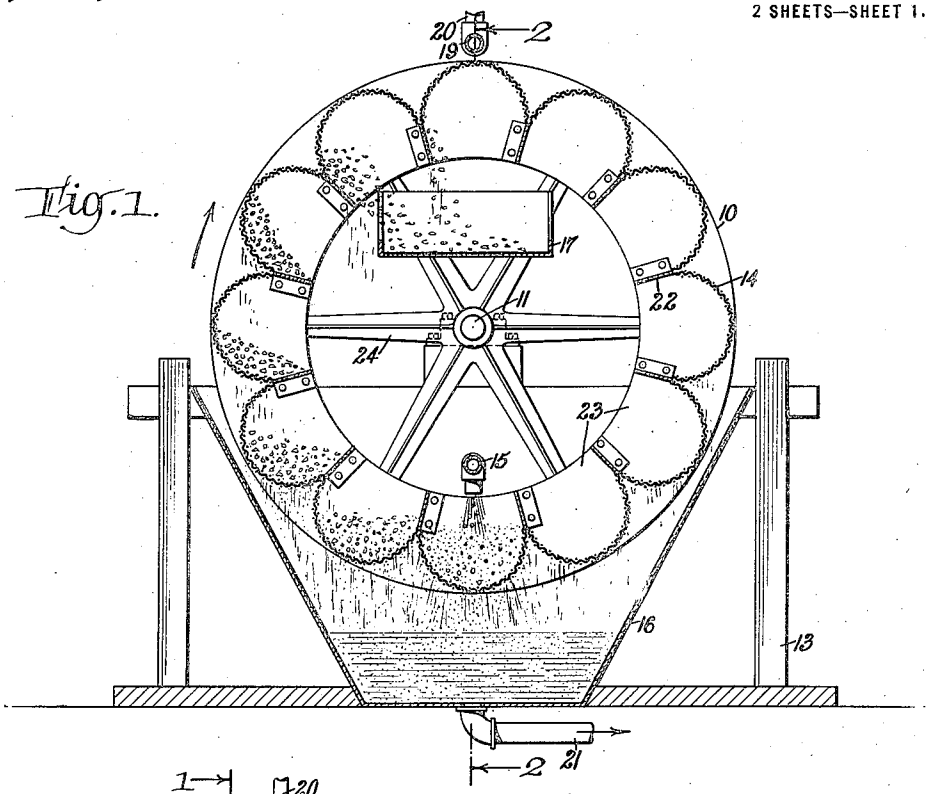


Fig. 2.

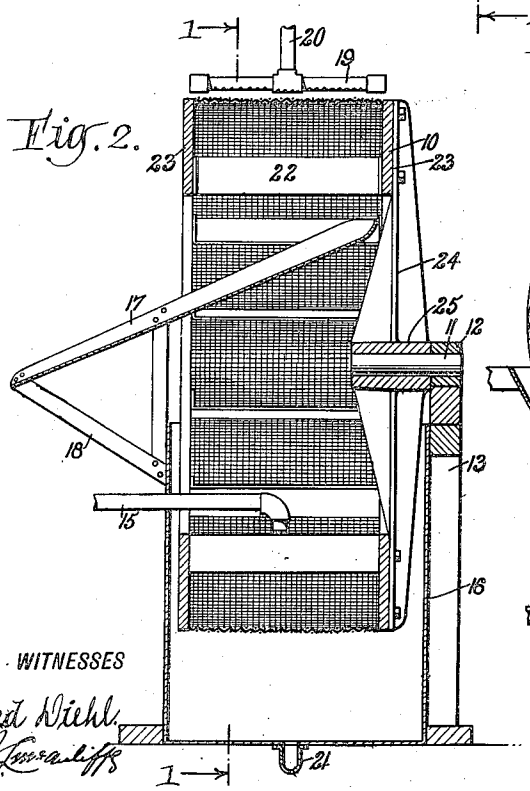
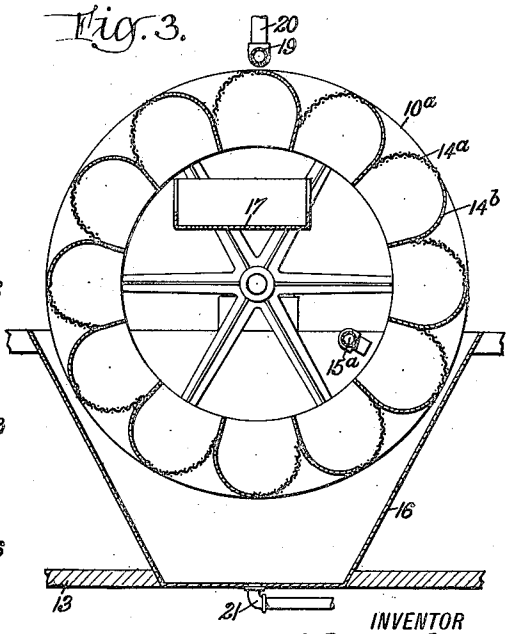


Fig. 3.



WITNESSES

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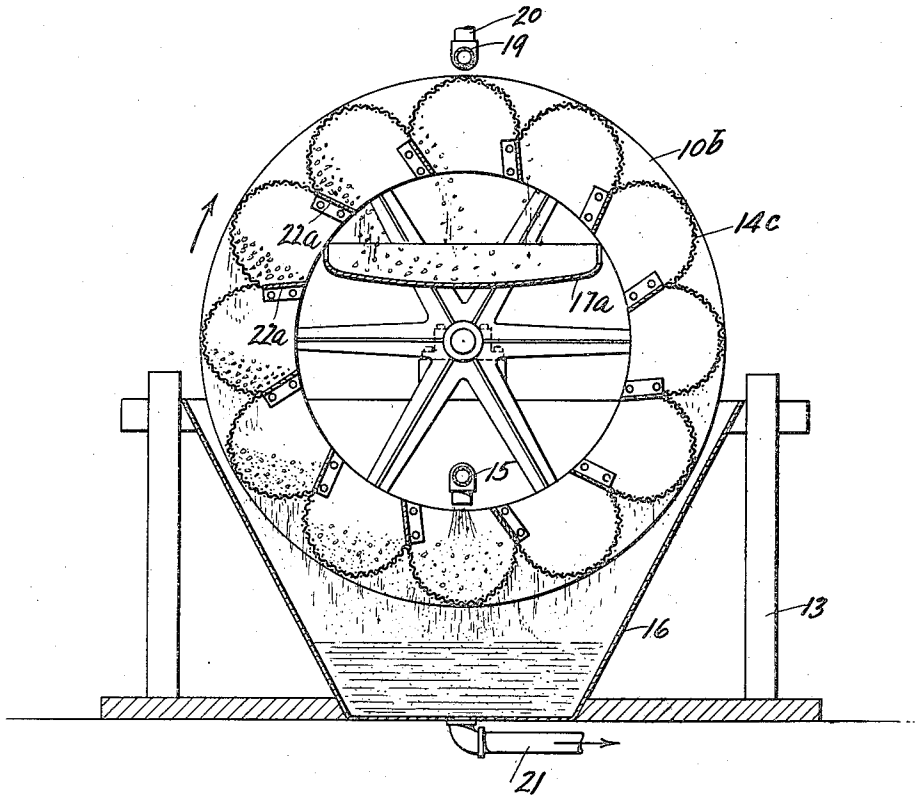
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2 SHEETS—SHEET 2.

Fig. 4.



WITNESSES

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COMBINED SCREEN AND ELEVATOR.

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To all whom it may concern:

Be it known that I, EDWIN E. CARPENTER, a citizen of the United States, and a resident of Wonder, in the county of Churchill and State of Nevada, have invented a new and Improved Combined Screen and Elevator, of which the following is a full, clear, and exact description.

My invention while capable of wider use is more especially intended for elevating and screeing ores, an object being to provide a screen adapted to have delivered thereto the material from a tube mill or ball mill, or other crushing or grinding machine, and arranged to carry upwardly such of the material as shall not have been reduced sufficiently fine for the further treatment of the ore, whereby the elevated coarse material may be discharged on means from which it may be returned to the mill or other crushing or grinding machine.

The invention also has for an important object to provide a combined screen and elevator in the form of a wheel provided with a novel form and arrangement of elevating and screening buckets, whereby to promote the effective separation of the finer and coarser materials.

Reference is to be had to the accompanying drawings forming a part of this specification in which similar reference characters indicate corresponding parts in all the views, it being understood that the drawings are merely illustrative of one example of the invention.

Figure 1 is a sectional front elevation of a combined screen and elevator embodying my invention, the section being taken on the line 1—1 Fig. 2;

Fig. 2 is a transverse vertical section on the line 2—2, Fig. 1;

Fig. 3 is a view similar to Fig. 1 but illustrating another form of the buckets, the view being on a reduced scale;

Fig. 4 is also a view similar to Fig. 1 but illustrating a further modification of the buckets.

In carrying out my invention in accordance with the illustrated example a wheel designated generally by the numeral 10 is provided and mounted to turn about a horizontal axis for which purpose in the illustrated form a trunnion 11 is provided on the wheel at the rear side, the trunnion turning in a bearing 12 in any suitable framework 13, it being understood that the bearing will have such a length and the wheel have sufficient strength to turn while supported at the rear side only, without the employment of a shaft extending entirely through the wheel, the arrangement referred to being preferred.

The wheel 10 is formed with an annular series of buckets 14. It will be observed that the buckets are so formed as to constitute separate pockets about the wheel, the wall of each bucket being curved at the periphery and extending inwardly toward the interior of the wheel, thereby presenting in addition to the peripheral wall, front and rear walls considering the direction of travel of the bucket. The peripheral wall merges on curved lines into the side walls, the arrangement serving to promote a rolling of the material within the bucket toward the open side of the bucket, said open side being disposed toward the interior of the wheel. The bucket receives its charge of material when below the axis of rotation of the wheel, and the charging may be done in any suitable manner. In practice, however, I provide a launder or delivery pipe 15, it being understood that the material is ground wet and flows through the pipe 15 into a bucket 14 at the lower side of the wheel. Beneath the wheel 10 a receiving box 16 is provided for the fine material escaping through the buckets. In the turning of the wheel for example in the direction of the arrow, Fig. 1, the finer material will gradually escape through the buckets until the coarser material that is prevented from passing through the bucket is carried above the axis of rotation of the wheel.

In order that the coarse material dumped from the bucket at the top of the wheel may be carried outwardly through the open front of the wheel for delivery to any desired point, such as the upper end of a ball mill (not shown), I provide an inclined apron 17 which extends into the wheel beneath the uppermost buckets, in position to receive the dumped coarser material. Conventional supports 18 are indicated for the apron 17.

In order to wash out any material clinging to the walls of the buckets, especially at the periphery, I provide means to deliver a stream or a spray of water or suitable solution onto the same, there being indicated a transverse sprayer head 19 which is connected with a source of water supply by a pipe 20. It will be observed that the sprayer

19 is disposed above the top of the wheel and in vertical line with the apron 17, whereby not only will the buckets be washed successively as they reach the top but the washing water will fall through the bucket onto the apron 17, thereby assisting in the carrying off of the dumped coarser material.

To carry off the fine material from the receptacles 16 a discharge pipe or launder 21 is provided leading to any desired point of delivery. In practice I prefer to form the buckets 14 of a curved piece of wire mesh or screen plate, the ends of which are secured to walls 22 extending transversely between rings or annular frame members 23 at the periphery of the wheel, said walls, in the form shown in Fig. 1, being approximately radial. The ring 23 at the back of the wheel 10 is directly secured to the arms of a spider 24 in the illustrated form, the said spider having a hub 25 in which the trunnion 11 is keyed or otherwise made rigid.

In the form shown in Fig. 3 the main features are the same as in the first described construction, the wheel 10^a, however, being modified to adapt it to be self-turning under the gravity of the material delivered to the buckets. The buckets 14^a in the modified form are made with that side 14^b, which constitutes the bottom of the bucket, when descending, imperforate, and the launder or delivery pipt 15^a is positioned to deliver the material to the descending bucket after it has passed the horizontal plane passing through the axis of rotation of the wheel. With the described arrangement two buckets will be practically filled with the material which is not permitted to escape to any appreciable degree until the bucket approaches the lowermost position and is about to ascend so that the two completely charged buckets will overbalance the ascending buckets.

In the form illustrated in Fig. 4, the wheel 10^b as well as the supporting structure and other features except the buckets 14^c and the discharge chute 17^a correspond with the construction shown in Fig. 1. The separating walls 22^a of the buckets 14^c instead of being disposed approximately radial as in Fig. 1 range at such an angle to the radial that on the ascending side of the bucket, said separating walls will not reach a horizontal position until the rear side or bottom of the bucket approaches the chute 17^a and said walls will assume a position dipping toward the chute as the latter is passed. The arrangement prevents the escape of the coarser material being carried in the bucket until the latter discharges to the chute. In said Fig. 4 also the chute 17^a is preferably rounded in cross section at the bottom.

I would state in conclusion that while the illustrated examples constitute practical embodiments of my invention, I do not limit myself strictly to the mechanical details herein illustrated, since manifestly the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

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

1. An elevator and screen including a wheel mounted to turn about a horizontal axis, and an annular series of screening buckets thereon each having that side toward the interior of the wheel open for the charging and discharging of the bucket, each of said buckets presenting a separate screening wall rounded at the outer or peripheral side of the bucket, and imperforate walls presenting plane surfaces and forming continuations of the peripheral walls of adjacent buckets, said imperforate walls extending inwardly toward the interior of the wheel at the front and rear sides of the bucket considering the direction of travel of the bucket.

2. An elevator and screen including a wheel mounted to turn about a horizontal axis, and an annular series of screening buckets thereon each having that side toward the interior of the wheel open for the charging and discharging of the bucket, imperforate separating walls between adjacent buckets and common thereto, the separating walls presenting plane surfaces, and separate peripheral walls for the respective buckets, each of less radius than the general radius of the wheel and emanating from the respective separating walls so that the latter constitute continuations of adjacent peripheral walls, the peripheral wall of each bucket having openings therein for screening the material.

EDWIN E. CARPENTER.