

G. BOWERS.
REVOLVING SCREEN.
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1,043,196.

Patented Nov. 5, 1912.

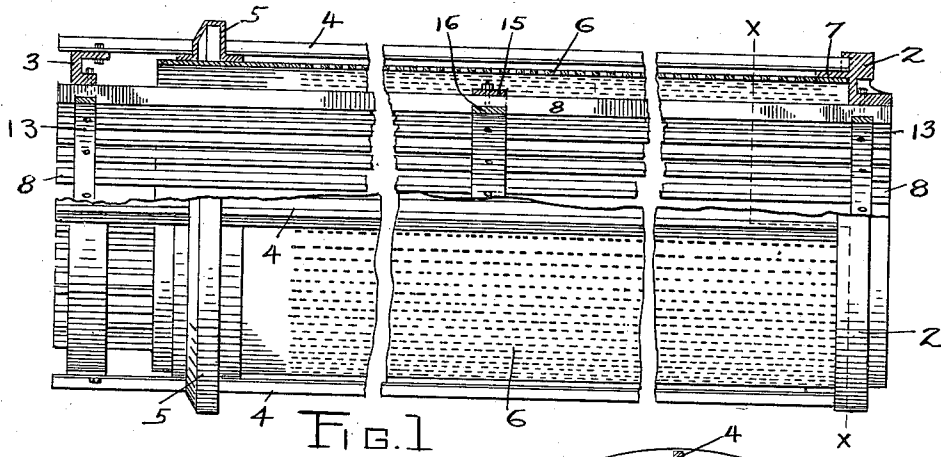


FIG. 1

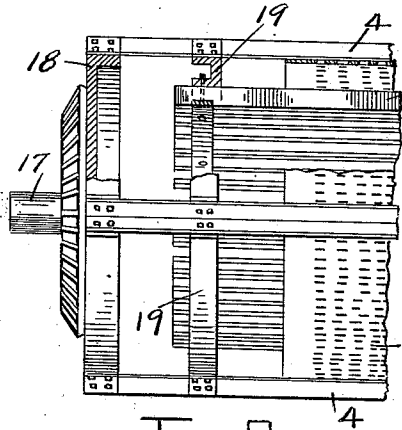


FIG. 2

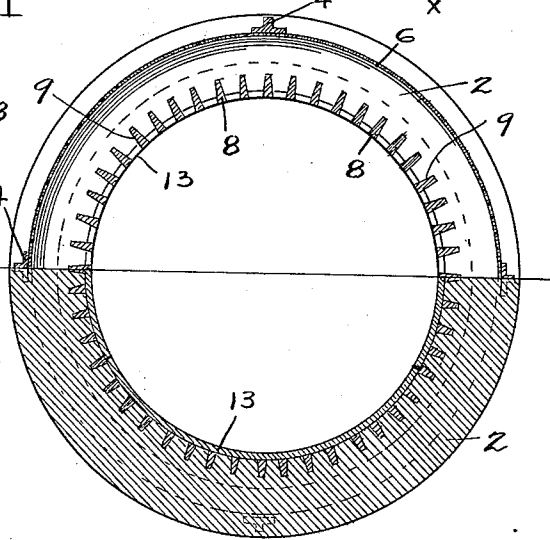


FIG. 3

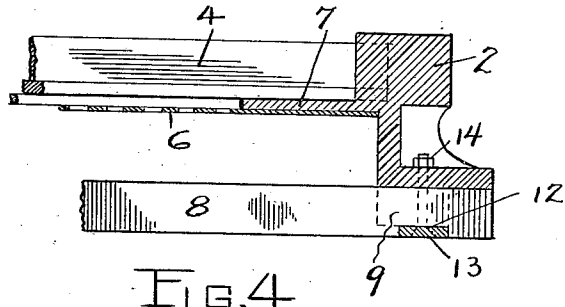


FIG. 4

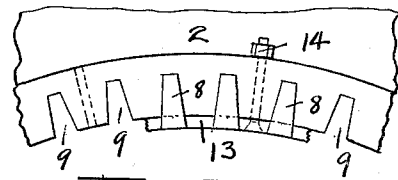


FIG. 5

WITNESSES:

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REVOLVING SCREEN.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE BOWERS, a citizen of Great Britain, and a resident of the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Revolving Screens, of which the following is a specification.

The invention relates to revolving screens which are used in mining, dredging and rock crushing operations to separate the boulders and large rocks from the finer material.

The object of the invention is to provide an improved means for protecting the screens from the action of the boulders and other large rocks that are encountered.

A further object of the invention is to provide improved means for securing the protecting bars in place, so that they are firmly held against displacement and can readily be removed when worn.

Another object of the invention is to provide an improved protecting bar, which by virtue of its shape adds greatly to the efficiency of the apparatus, and which can be turned end for end in the apparatus to equalize the wear on both ends.

In revolving screens of this character which are not provided with protecting bars, the wear on the screen plates is excessive and the screen plates must be renewed very frequently. These screen plates are very expensive and the continued renewal thereof renders the operation of the screen costly. It has heretofore been proposed to protect these screen plates with round bars arranged within the apparatus and spaced apart so that only the finer material can gain access to the screen plate. In this manner, the wear caused by the large rocks and boulders has been taken up by the round bars and the screen plates have been protected to that extent. These round bars extended longitudinally for the length of the apparatus and were supported by circular heads at the ends of the screen by engaging in circular holes in said heads. This method of attaching the bars did not allow them to be easily removed when desired and it is one of the objects of this invention to provide an improved means of attachment.

In the present invention I employ bars of rectangular or trapezoidal cross section set on edge. I prefer to use the bars of trapezoidal cross section, known as the grizzly bars, set with the widest of the parallel edges facing toward the center of the screen. The adjacent sides of two adjacent bars slope away from each other outwardly so that any material which passes through the opening between the inner edges of the bars falls directly onto the screen and is not jammed and held between the bars. As these bars wear they present substantially the same surface to the material and so do not flatten as is the case with round bars.

With these and other objects in view, as will more fully hereinafter appear, the invention consists of certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

Referring to the drawings: Figure 1 is a longitudinal view of an open end screen partly in section showing the manner of holding the bars in place. Fig. 2 is a longitudinal view partly in section of the discharge end of the closed end screen. Fig. 3 is a cross section taken on the line $x-x$ Fig. 1. Fig. 4 is a detail of part of the end of a screen showing the means of attaching the bars in place. Fig. 5 is a fragmentary detail of the head ring, showing the slots and several bars in place.

In the drawings, for the purpose of convenience, I have shown the screens horizontal, but it is understood that the screen is operated in an inclined position with the receiving end elevated. I have also omitted the carrying rollers on which the screen revolves as their construction is well understood and does not enter into this invention.

Referring to Fig. 1, wherein is illustrated an open end screen, the apparatus consists of the head ring 2 and the tail ring 3 which are united and held rigidly together by the longitudinal beams 4, which are preferably composed of angle irons or T-irons. The

head ring 2 is of smooth circular outer contour and is used as a tread ring. The tread ring 5 which supports the tail end of the apparatus is spaced apart from the tail ring 3 and is secured to the longitudinal beams 4. Secured to the head ring 2 and the inner surface of the tread ring 5 is the screen cylinder 6, which is of any suitable mesh, depending upon the work to be performed. The head ring 2 is provided with a flange 7 which serves as a means for attaching the screen cylinder 6 thereto. The screen cylinder also bears against the flanges on the inner side of tread ring 5 to serve as a support for the cylinder at the lower end. The screen cylinder is preferably unperforated at that part which lies adjacent to the tread ring 5, so that the screened material will not fall upon and hinder the operation of the tread rollers upon which the apparatus is carried. Sufficient space is left between the lower end of the screen cylinder 6 and the tail ring 3 to allow the coarse material on the screen which has not passed through the perforations, to be discharged.

Arranged within the apparatus and generally concentric with the screen cylinder is a cylindrical cage formed of longitudinally arranged bars 8. These bars 8 extend for the entire length of the apparatus, and are spaced apart circumferentially a suitable distance so that the large rocks and boulders cannot pass between the bars and come in contact with the screen cylinder. The spacing of these bars depends on the mesh of the screen and the character of the work.

The distance between the outer edges of the bars and the screen cylinder is in excess of the distance between the adjacent bars so that all material which has passed through the cage has an unobstructed movement over the screen as the apparatus is revolved. The bars are made rectangular or trapezoidal in cross section and are placed on edge so that they present their greatest strength to the action and forces exerted by the rocks and boulders. I prefer however, to use bars of trapezoidal cross section arranged with the widest of the parallel faces toward the center of the cage. This arrangement causes the opening between the adjacent bars to increase outward and prevents the rocks from becoming lodged between the bars.

The bars 8 are held in place by the head and tail rings 2-3. These rings are provided on the inner circumference with grooves or slots 9 which are shaped to receive the bars. These slots are of less depth than the width of the bar, so that a small portion of the bar projects beyond the rings. The bars are provided with a cut away portion or seat 12 adjacent the ends and in position to register with the head and tail rings

when the bars are in place. The depth of the seat in the bar is equal to the distance that the bar projects above the rings 2-3. The bars are held into the grooves in the rings 2-3 by the strap or ring 13 which engages in the seat 12 in the bars and bears against the rings 2-3. Bolts 14 passing through rings 2-3 and through the straps 13 securely hold the bars in place. The straps 13 are made in segments of a circle so that any bar can be removed without interfering with the other bars. When the bars become worn at one end more than at the other they may be removed and turned end for end.

When it is desirable the bars may be clamped at the center to prevent any tendency to spread. Clamping rings 15-16 are arranged for this purpose, the rings 16 being seated in slots in the inner face of the bars, similar to ring 12.

In the closed end screen shown in Fig. 2, the general construction is the same with the exception that the tail tread ring is displaced by the shaft 17 and the head 18. The tail ring 19 which supports the discharge end of the cage is spaced apart a sufficient distance from the head 18 to allow the large rocks to be discharged between the end of the cage and the head.

In the operation of an apparatus of this character, the large boulders do not come in contact with the screen plates with the result that lighter screens may be used and the principal expense heretofore encountered greatly lessened. Another advantage of the apparatus is that it divides the material into three grades. The finer material is conveyed in one direction and the coarser in another. Heretofore, when only one separation was made the large boulders were dumped directly onto the conveyer belt with the result that the belt deteriorated very rapidly. In the present case, the material which has passed through the cage but not through the screen is deposited on the belt before the large boulders and this material which is comparatively fine acts as a buffer to the boulders and preserves the conveyer belt.

I claim:

1. In a revolving screen of the character described, a head ring, a tail ring, beams connecting said rings, a screen cylinder supported between said beams, said head and tail rings being provided on their inner faces with radially opening grooves, bars of greater depth than said grooves seated therein, and extending from ring to ring, said bars being provided adjacent their ends with transverse grooves, and straps seated in said grooves and secured to said rings.
2. In a revolving screen of the character described, a head ring provided with grooves

spaced apart circumferentially on its inner face, a tail ring provided with similar grooves, bars having grooves adjacent the ends adapted to seat in the grooves in the rings, the depth of the two grooves equaling the depth of the bar, straps adapted to seat in the grooves in the bars, and means for securing said straps to the head and tail rings.

GEORGE BOWERS.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
