

July 21, 1931.

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1,815,137

TRAVELING WATER SCREEN

Original Filed Aug. 27, 1926 2 Sheets-Sheet 1

Fig. 1.

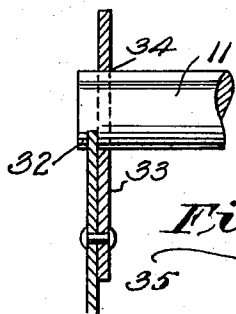
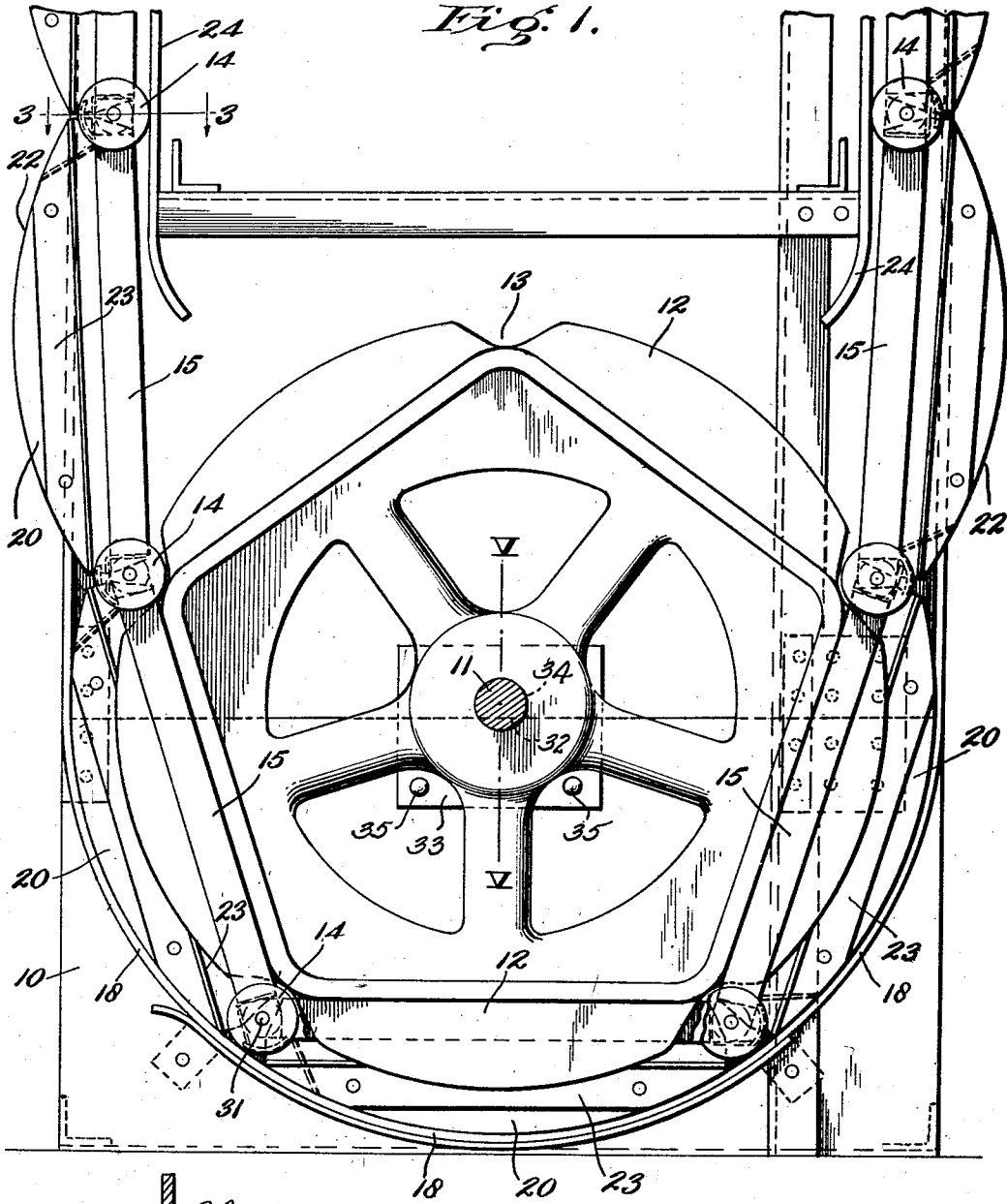


Fig. 5

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Fig. 2.

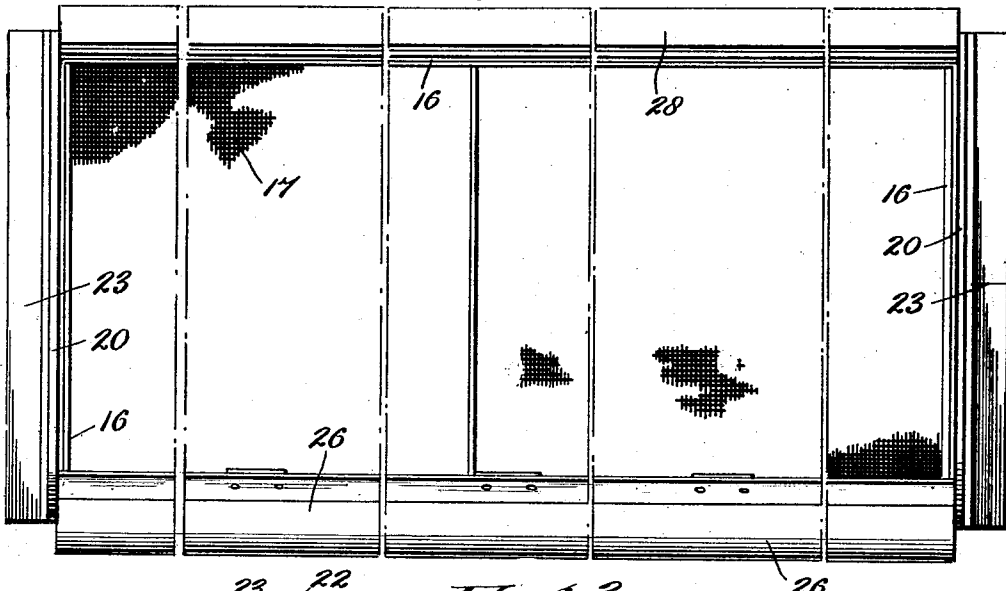


Fig. 3.

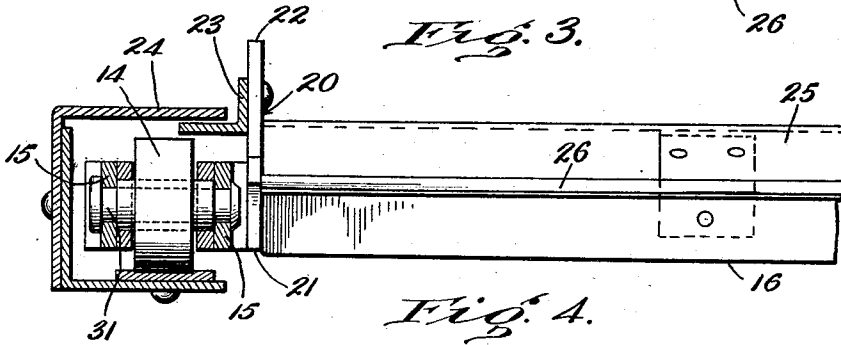
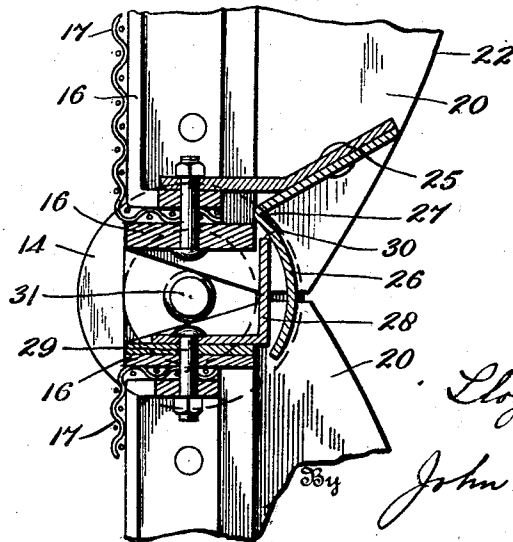


Fig. 4.



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UNITED STATES PATENT OFFICE

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TRAVELING WATER SCREEN

Application filed August 27, 1926, Serial No. 131,954. Renewed December 10, 1930.

This invention relates to improvements in seals for traveling water screens, and has for one of its objects to provide a construction of this character which will be relatively simple, comparatively inexpensive to manufacture and more efficient in use than those which have been heretofore proposed.

In traveling water screens of the well known type, such as shown, for example, in the prior Patent No. 1,514,673, granted November 11, 1924, on an application filed by G. R. Roddy, the sealing of the various parts of the screen to prevent escape of solids past the screening surface has proven to be very efficient. However, certain improvements have been discovered which will more effectively seal the foot or boot end of the screen against the escape of only a very slight amount of solid material carried by the water and which it is desired to separate therefrom. This improvement prevents solid material from flowing in between the side bars of the chain while turning around the lower or submerged sprockets of the screen, which if not prevented will allow such material to pass into the clear or screened water. Difficulty has also been experienced, at times, in preventing a portion of the solid material from building up on the transverse or horizontal edges of the screening baskets or buckets, especially if the material is at all sticky, and forcing them apart so that leakage between adjacent edges may occur. It is the primary object of the present invention, therefore, to provide more positive sealing means for preventing the leakage of material through or around the screens at these various points.

With the above and other objects in view which will appear as the description proceeds, the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the appended claims.

Referring to the accompanying drawings forming a part of this specification in which like reference characters designate like parts in all the views:

Figure 1 is a side elevation view of the

lower portion or boot of a traveling water screen of the character described, with a portion of the housing or boot omitted for the sake of clearness, and showing the seals constituting the present invention in position upon the said screen;

Fig. 2 is a front elevational view partly broken away, of one of the screen baskets or buckets showing the said seals in positions thereon;

Fig. 3 is an enlarged fragmentary transverse sectional view taken approximately on the plane indicated by the line 3—3 of Fig. 1; and,

Fig. 4 is an enlarged vertical sectional view through the pivotal connection between the adjacent screen baskets and showing the sealing means employed thereon.

Fig. 5 is a vertical sectional view on the line V—V illustrating the support of the non-rotatable shaft carrying the lower sprockets.

Referring more particularly to Fig. 1, the numeral 10 indicates the boot or lower housing of a traveling water screen of the well known construction, in which is journaled the shaft 11 carrying the lower sprockets 12 which are provided with the recesses 13 for receiving the rollers 14 of the chain links or bars 15, which have secured to them, in any suitable manner, the frames 16 of the screen baskets or buckets, as will be readily understood. The said screen baskets, as is well known in the art, comprise hollow, substantially rectangular metal frames 16 upon which is secured the wire mesh or other foraminous material 17, through which the water is adapted to pass and which serves to screen or filter the solid material therefrom, as will be readily understood.

In the prior constructions it has been found that a small amount of solid material has worked around the sides of the screen frames in the boot 10, owing to the fact that the said frames, being formed on straight lines, constitute chords of a circle when they pass around the lower sprockets 12. There has, therefore, existed in the prior constructions, a space between the screen frames and the lower curved portion 18 of

the boot 10. This space was closed to direct passage of material by the large segmental-shaped sprocket teeth. However, this does not prevent some material lodging alongside the segmental-shaped sprocket tooth and passing around and through the chain, as

5 the sprocket wheel disengages the chain. In order to prevent this leakage, by the present invention, there is provided a seal in the form of side plates or members 20, one edge of which, 21, is substantially straight and is secured to the frames of the screen baskets while the other edge thereof, 22, is curved, to form the arc of a circle, the radius of which is substantially equal to the radius of curvature of the portion 18 of the boot. It thus results that when the links 15 of the sprocket chains pass around the lower sprockets 12, as clearly illustrated in Fig. 1, the side plates or sealing members 20 will have their arcuate edges 22 brought into proximity with the curved plate bottom member 18 of the boot, and since the radius of curvature of the members is substantially the same, comparatively tight joints will be had between them which will prevent the leakage of solid matter around the screen baskets and prevent such matter from entering the interior of the screen along with the screened water which has passed through the screening material 17.

20 The sealing plates or members 20 are also provided with the angle members 23 which are adapted to coact with the vertical guard members 24 to form a side seal in the vertical flights of the screen.

25 It will be observed that the guard and sealing member 24 overhangs the chain and the rollers thereof as represented in Fig. 3—that is to say the free edge of the said member 24 extends sufficiently far inwardly from its base and toward the screen to overlie or cover the chain. It will also be seen that the outwardly projecting portion of the angle member 23 lies parallel with and close to the guard member 24, preferably opposite the inner face thereof, and that there are thus formed running joints between the outwardly extending portions of the angle members 23 and the guards 24, these joints being sufficiently close to prevent the passage of objectionable material that may be in the water being treated.

30 Endless traveling screens have heretofore been provided with running sealing joints at their edges consisting of guards, such as that designated 24 herein, the edges of which are brought close to the side plates or parts of the screen baskets, such as the plates designated 20 in the drawings thereof, the joints of the seal being between these two parts. It has been found in practice that in setting up and operating endless traveling water screens of large sizes, which are often 30 to 50 feet in length, it is practically im-

possible to so set and operate them that they hang perfectly vertical, and it frequently happens that the guards are worn away along their free edges, by the engagement of the moving parts of the screen therewith, and that such wear becomes sufficiently great to open spaces between the guards and the moving screens wide enough to permit the passage of material that the screen is supposed to take out of the water. I have therefore made the sealing joints between parallel faces, one of which is a face of the overhanging guard 24 and the other a face of a part carried by the screen. With this arrangement a sufficiently close joint for effecting the desired seal may be maintained, notwithstanding the fact that the guard piece 24 may be considerably worn away along its edge by the rubbing action of the moving parts of the screen.

70 It will be observed, best by reference to Fig. 3 of the drawings, that the joints just referred to are approximately parallel to the plane of the screening surfaces 17, in this respect differing from the sealing joints of the earlier art which have been referred to and which are in planes approximately at right angles to such screening surfaces. In the present invention the running joints between stationary guards, such as the parts indicated by 24, and the cooperating members carried by the moving screen are angular, or have two portions, one a portion that is at right angles to the plane of the screening surface, being between the edge of the stationary guard and the cooperating moving part of the screen, and the other parallel to the screening surface and between the inner face of the stationary guard and the cooperating moving part of the screen. And it will be further observed that the second portion of the joint just referred to is much longer than is the portion thereof at the edge of the stationary guard. A source of much trouble in the use of water screens of the character herein described is the presence of large numbers of very small fish at the intake side of the screen, which, following the flow of water, are able to make their way through very small passages; and it is one of the purposes of the present invention to provide a seal against the passage of such small fish. It has been found that by the use of the comparatively long sealing joints parallel to the plane of the screening surfaces, such as described, particularly where the entrances to these joints are through passages at substantially right angles to such joints small fish, and other substances as well, are very effectively prevented from passage, the sharp turn in the course that must be taken by the water in passing through said joints apparently being one of the reasons for their effectiveness as trash sealing agents. By making the main por-

tion of these sealing joints parallel to the plane of the screening surface, it is possible to very much extend or lengthen them in the direction of the flow of the water and to maintain such joints notwithstanding the fact that there may be considerable wear at the edge of the stationary guard, as has been explained. In the embodiment of the invention as herein described the angular members 23, which are secured to the side plates 20, are of a length equal to the pitch length of the chain links and screen sections carrying them, with the result that when the screen is straightened out, that is when the sections are in line with each other, the outwardly extending portions of succeeding angular pieces 23 come close together at their ends and constitute what is in effect a continuous flange that is covered by the guard member 24.

The second portion of the invention contemplates provision of a seal between the adjacent ends of the screen baskets intermediate the rollers 14. These ends, as is well known in the art, are pivotally connected through the medium of the pintles of the sprocket chains and when the baskets pass around the lower sprockets 12 the joints are necessarily opened into a V-shape, due to the pivoting action of the chain links. This will enable solid material to enter these V-shaped joints and be deposited upon the adjacent surfaces of the screen frames so that when the joints are again closed as the chains straighten out, in the vertical flight, the accumulation of solid material between the ends of the screen baskets may be sufficient to spring them and bend them out of shape.

In order to overcome this difficulty, I have secured to the transverse plate or member 25, which at present constitutes a basket lip similar to that shown in the said Patent 1,514,673, above mentioned, a plate, one edge of which, 26, is curved, as is clearly shown in Fig. 4. The companion edge of the next adjacent screen basket is provided with a transversely extending angle bar or member 28 which is rigidly secured thereto by the bolts 29 in such a position that its outer edge 30 is in close proximity to the inner surface of the curved plate or member 26.

Inasmuch as this member 26 is curved upon a radius struck from the center of the chain pintles 31 it follows that any pivoting motion of the adjacent screen sections will merely cause the edge 30 of the angle member 28 to be moved in an arc corresponding to the curvature of the inner surface of the member 26, the said edge being always maintained in close proximity to the said surface and thus serving to effectually seal the joint between the screen frames against leakage of material therethrough. Inasmuch as the solid matter is prevented by the seal from

entering between the screen frames, the bending and deforming action, above described, will not result when these seals are used, and furthermore the inner or concave surface of the plate 26 will be kept clean and free from any accumulation of sticky or other material that might tend to lodge thereon, by the repeated movements of the edge of the bar 28 over such surface, such bar thus serving not only as a seal but also as a cleaning scraper.

It will thus be seen that the present invention provides simple and effective means for sealing the side edges of the screen frames within the boot when the said frames are passed around the lower sprockets, and it also provides simple and effective means for sealing the adjacent transverse edges of the said frames against the entry and passage of material therethrough.

The lower sprockets 12, preferably turn upon a non-rotating shaft 11, and to support the latter I provide as follows: I form in the shaft near each end a kerf 32 the bottom of which is preferably straight. The width of this kerf is such as to conveniently receive the upper edge of the end wall of the boot 10, and the kerfs are located at a distance apart equal to the distance between the end walls. The shaft may thus be supported upon the upper edges of the opposite ends of the boot, the kerfs providing flat bearing surfaces for the shaft and also preventing endwise movement of the latter. In order to prevent longitudinal shifting of the shaft I employ plates 33 through which are formed cylindrical openings 34 of a size to snugly fit the shaft 11. These plates are slipped over the shaft and then secured fast to the end walls of the boot as by rivets or bolts 35. This is a very simple and effective way of mounting and securing the shaft 11.

While one form of the invention has been thus illustrated and described, it is obvious that those skilled in the art may vary the details of construction as well as the precise arrangements of parts without departing from the spirit of the invention, and, therefore, it is not wished to be limited to the above disclosure except as may be required by the claims.

What is claimed is:

1. A boot for the lower end of a traveling water screen having end walls, a non-rotating shaft adapted to support wheels for supporting the screen, in which are formed kerfs with flat bottoms in which the edges of the end walls of the boot are adapted to lie, and plates perforated to fit the shaft and through which the shaft ends are passed, the plates being secured to the end walls of the boot.

2. In a screen of the class described, the combination of an endless movable screen, chains at the edges of the screen by which it is moved, stationary guards extending in-

wardly toward the screen and overhanging the chains, and sealing members carried by the screen and outwardly extending therefrom in planes substantially parallel to the

5 planes of the screening surfaces of the movable screen, the screen-carried sealing members being parallel with the overhanging stationary guard members and forming therewith close running joints.

10 3. In a screen of the class described the combination of an endless movable screen formed of articulated sections, stationary guards extending inwardly toward the screen, and sealing members carried by the

15 screen sections and extending outwardly from the ends thereof, the screen-carried sealing members being parallel with the plane of the screening surfaces of the sections and with the overhanging stationary

20 guard members, forming therewith close-running joints.

4. In a screen of the class described the combination of an endless movable screen formed of articulated screen sections, chains

25 at the edges of the screen by which it is moved, stationary guards extending inwardly toward the screen and sealing members carried by the screen sections and extending outwardly therefrom, the sealing members

30 being each of a length corresponding with the length of the screen section to which it is secured and arranged, when the sections are in line with each other, to constitute a continuous outwardly projecting flange, the

35 faces of the screen-carried sealing members being parallel with the faces of the stationary guard members, forming therewith close running sealing joints.

5. In a screen of the class described the

40 combination of an endless movable screen formed of articulated screening sections, driving chains at the edges of the screen to which the sections thereof are connected, stationary guards extending inwardly toward

45 the screen along the course followed thereby, side plates carried by the screen sections and angle members secured to the side plates, the outwardly extending portions of the

50 angle members being parallel with and close to the stationary guard members so that there are formed close running joints between the angle members and the guards as the screen is operated.

6. An endless screen adapted to be im-

55 mersed in a moving body of liquid and operating to remove therefrom the coarser material that may be carried thereby, stationary guards extending inwardly toward the edges of the screen along straight immersed

60 portions of the screen and sealing members carried by the screen and operating to form outwardly extending continuous flanges along those portions of the course of the screen where are situated the guards, the

65 said continuous moving flanges and the sta-

tionary overhanging guards being close together and constituting relatively wide running joints that are parallel to the plane of the screening surfaces of the screen and form seals to prevent material that should

70 be taken out by the screen from passing around the edges thereof and thus escaping the screen.

7. In an endless, traveling water screen adapted to be immersed in a body of liquid and operating to remove therefrom trash material, stationary guards extending inwardly toward the edges of the screen and outwardly extending sealing members carried by the screen and arranged to move in

75 close relationship to the inwardly extending portions of the stationary guards to form close running joints between these parts, such joints being angular in shape and constituting trash seals.

8. An endless, traveling water screen such as described in claim 7 wherein the angular running joints described are located, one part between the edges of the inwardly extending portions of the stationary guards and the sealing members carried by the screen, and the other part between the faces of the stationary guards that are parallel with the surface of the screen and the sealing members.

9. An endless, traveling water screen such as described in claim 7 wherein the angular running joints described have two portions of unequal length, the longer portion being in a plane parallel with the surface of the screen, and the shorter portion in a plane at right angles thereto.

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CERTIFICATE OF CORRECTION.

Patent No. 1,815,137.

Granted July 21, 1931, to

LLOYD G. BLEYER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, lines 18 and 19, claim 3, strike out the words "plane of the screening surfaces of the sections and with the"; same page, line 36, claim 4, after the words "with the" insert plane of the screening surfaces of the sections and with the; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of September, A. D. 1931.

(Seal)

M. J. Moore,
Acting Commissioner of Patents.