

Sept. 5, 1933.

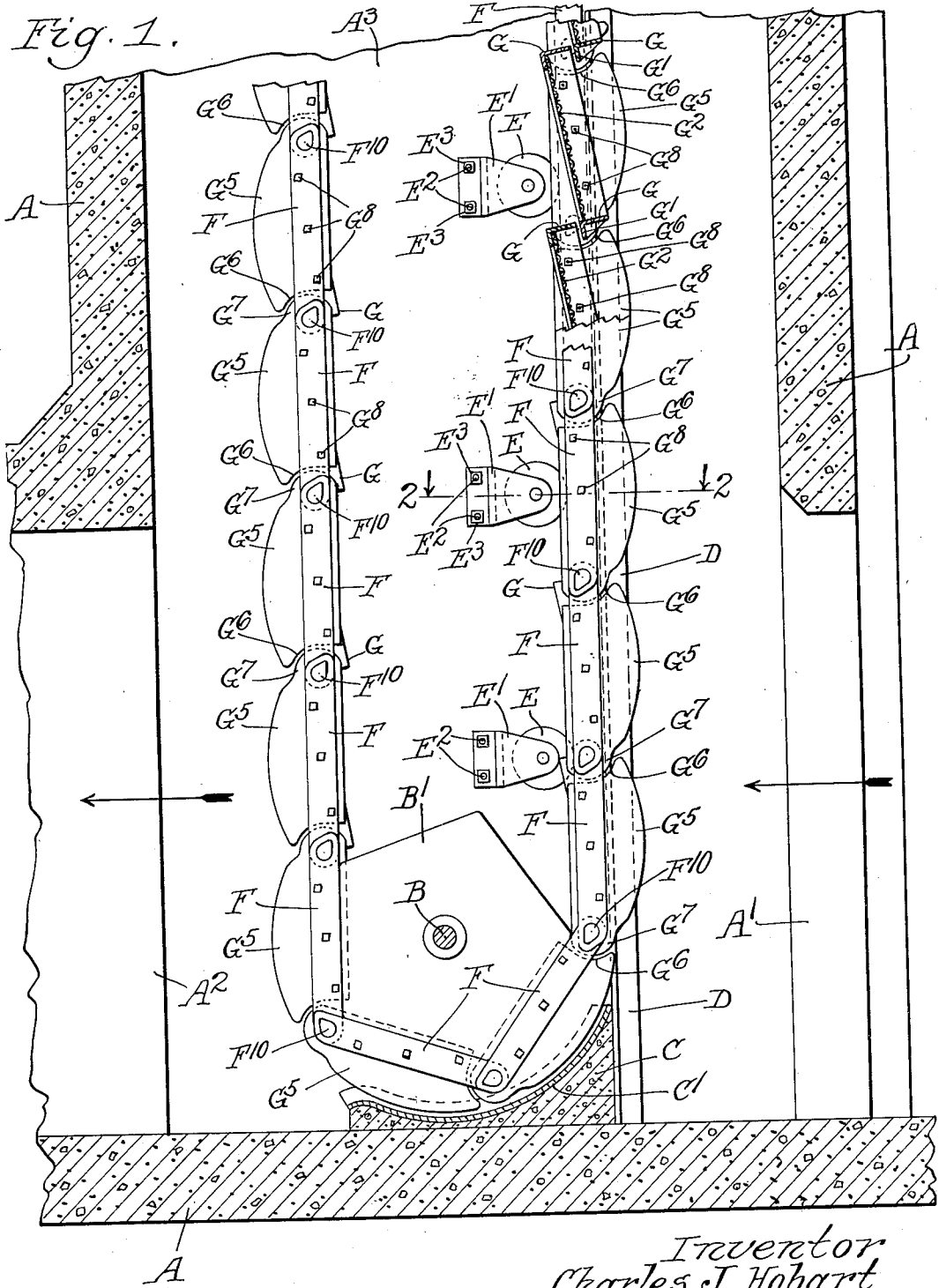
C. J. HOBART

1,925,251

TRAVELING WATER SCREEN

Filed Dec. 5, 1930

3 Sheets-Sheet 1



Inventor  
Charles J. Hobart  
by Parker & Carter  
Attorneys.

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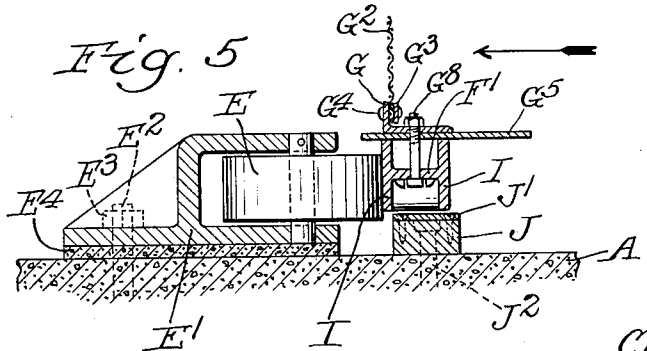
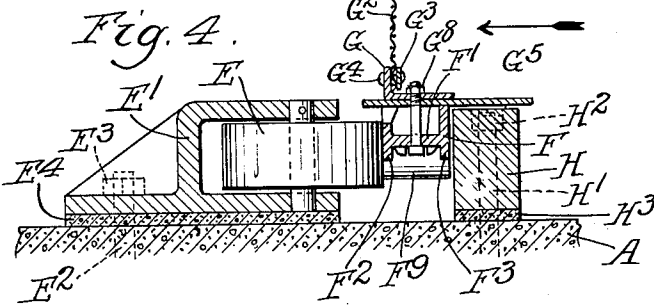
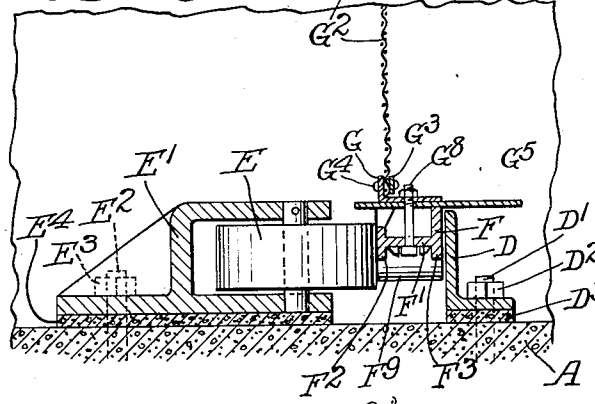
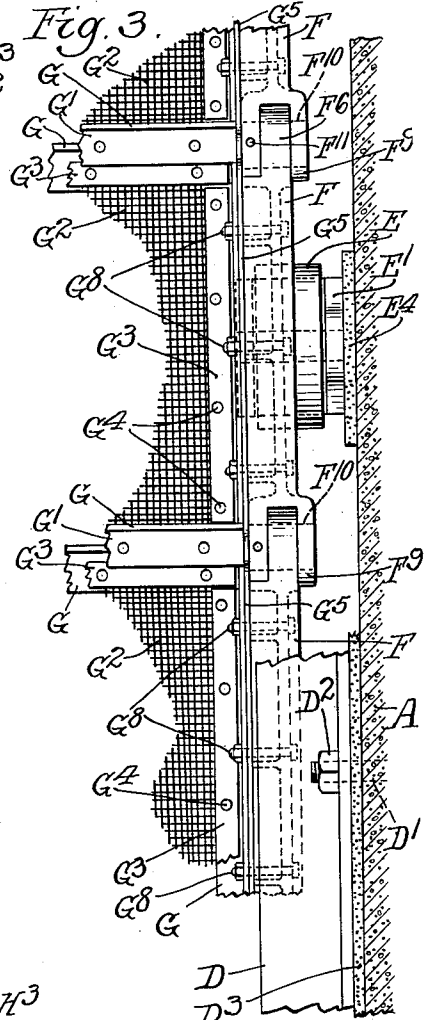
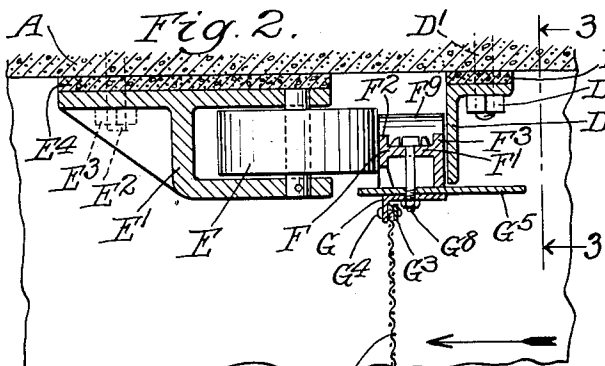
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3 Sheets-Sheet 2



Inventor  
 Charles J. Hobart  
 by Parker + Carter  
 Attorneys.

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TRAVELING WATER SCREEN

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Fig. 6.

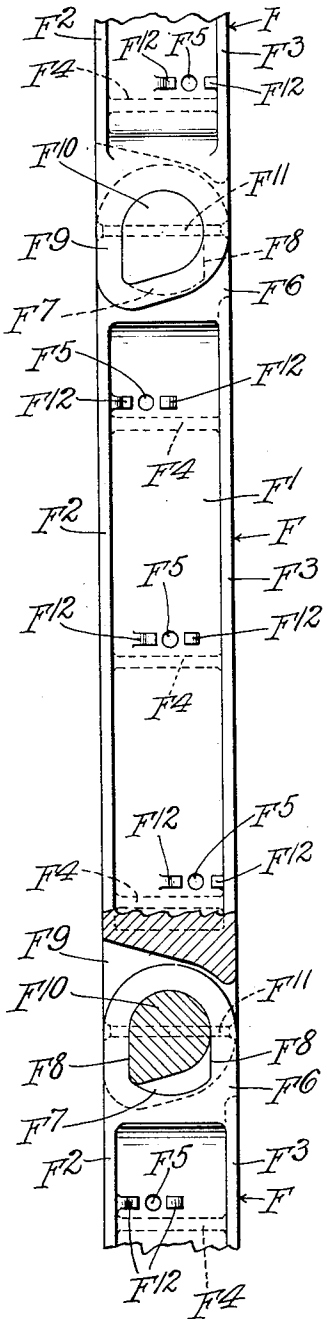


Fig. 7.

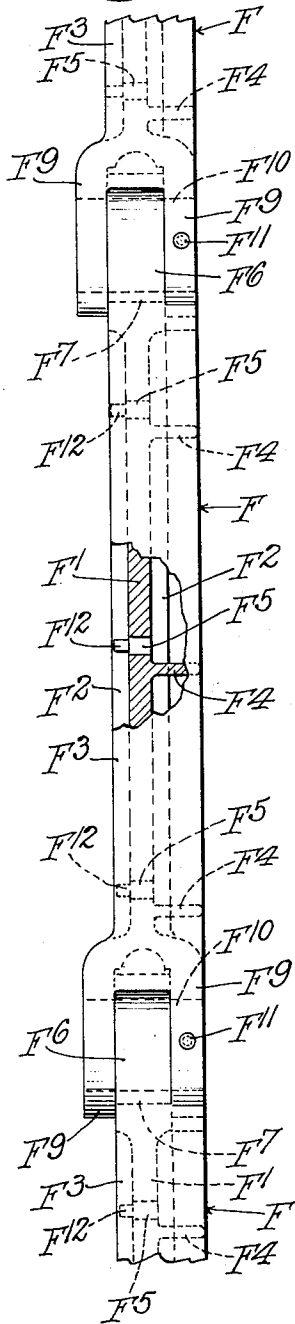
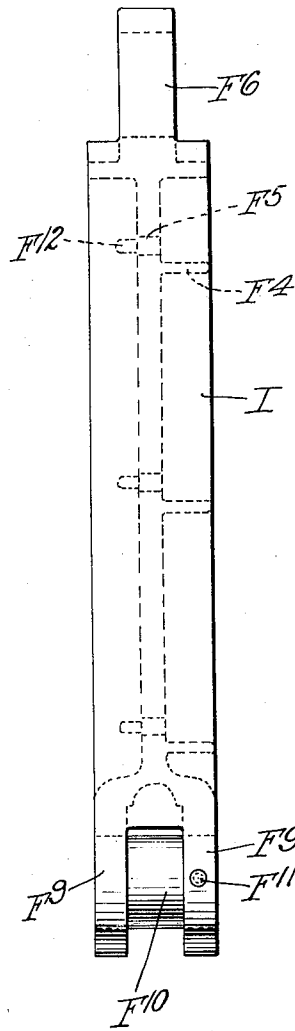


Fig. 8.



Inventor  
Charles J. Hobart  
by Parker & Carter  
Attorneys.

# UNITED STATES PATENT OFFICE

1,925,251

## TRAVELING WATER SCREEN

Charles J. Hobart, Chicago, Ill., assignor to Link-Belt Company, Chicago, Ill., a corporation of Illinois

Application December 5, 1930. Serial No. 500,389

7 Claims. (Cl. 210—175)

My invention relates to a screen construction and in the form here shown is embodied in a traveling water screen.

It has for one object to provide means for simplifying the screen construction so that it will remain rigid without the use of a guiding channel. Another object is to provide means whereby guiding channels may be dispensed with in connection with screens of this type and in which adequate sealing at the edge of the screen is provided.

Another object is to provide a sectional channel. A further object is to provide a traveling water screen in which no installed frame is necessary and in which the screen is stiffened either by the use of sectional channels or by the construction of the chain which carries it itself, or by other means apart from a fixed installed frame.

Other objects will appear from time to time in the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawings, wherein—

Figure 1 is a vertical cross section through a screen installation, showing parts of the screen in section and parts in elevation;

Figure 2 is a transverse cross sectional detail taken on an enlarged scale at line 2—2 of Figure 1;

Figure 3 is a front elevation of Figure 1 with parts in section, illustrating the chain construction;

Figure 4 is a fragmentary transverse cross section generally similar to Figure 2, showing a modified form of sealing mechanism;

Figure 5 is a sectional view generally similar to Figure 4 showing a further modification;

Figure 6 is a side view of a chain of the type shown in Figures 1 to 4, inclusive, with parts broken away and parts in section;

Figure 7 is a view of the same chain, seen from the right hand side;

Figure 8 is a view of a link of a somewhat modified form, as used in Figure 5;

Like parts are designated by like characters throughout the specification and drawings.

A,A indicate enclosing walls which enclose and support the screen and which define an intake passage A<sup>1</sup>, an outlet or discharge passage A<sup>2</sup> and a well or vertical passage A<sup>3</sup> within which the screening is mounted. The direction of movement of the water is indicated by the arrows throughout the figures.

B is a shaft carrying the sprocket B<sup>1</sup> and

mounted for movement adjacent the lower end of the chamber A<sup>3</sup>.

An apron C, having a curved sealing portion C<sup>1</sup>, is mounted adjacent the bottom of the chamber A<sup>3</sup> and below the screen and it, with the screen, forms a sealing combination at the bottom.

In the form illustrated in Figures 1 to 3, inclusive, a sealing strip D, which is in the form of an angle, is mounted on each side of the screen. It is held in place by studs and nuts D<sup>1</sup>, D<sup>2</sup>, respectively, and may be grouted into alignment as at D<sup>3</sup>.

Positioned at suitable intervals from top to bottom of the chamber A<sup>3</sup> are rollers E,E, which are supported in bearing members E<sup>1</sup>, E<sup>1</sup>, which are themselves secured to the walls A by studs E<sup>2</sup> and nuts E<sup>3</sup>, respectively. As in the case of the angles D, the members E<sup>1</sup> may be grouted as at E<sup>4</sup>.

In the form indicated in Figures 1 to 4, inclusive, a stiff backed chain, formed of links F,F, is positioned to move about the sprocket B<sup>1</sup> and about a driven wheel or sprocket adjacent its top, not here shown. The links F are formed preferably with a central web F<sup>1</sup> and inner and outer flanges F<sup>2</sup>, F<sup>2</sup>, the outer flange F<sup>3</sup> being widened at one side as shown in the drawings. Additional reinforcing webs F<sup>4</sup>, F<sup>4</sup> may be provided and perforations F<sup>5</sup> are formed through the central web F<sup>1</sup>. Each link is formed at one end with a single outwardly extending portion F<sup>6</sup> which is rounded at its outer end as shown in detail in Figure 6 and is provided with a perforation F<sup>7</sup> which is rounded at one end and is provided with two parallel flattened portions F<sup>8</sup>, F<sup>8</sup>. At its other end each of the links F is provided with two perforated projections F<sup>9</sup>, F<sup>9</sup>. F<sup>10</sup> is a pintle pin adapted to join the links as indicated in detail in Figure 6 and it is rigidly fastened to one of the members F<sup>9</sup> by a pin or rivet F<sup>11</sup> as indicated in Figures 6 and 7. The shape of the perforation or opening F<sup>7</sup> is such that it permits bending movement of the chain in one direction and prevents it in the other. This is clearly brought out in Figure 6 in which one of the members F<sup>9</sup> has been broken away to show in detail the size and shape of the opening or perforation F<sup>7</sup>, the shape of the pin F<sup>10</sup> and its position within the perforation F<sup>7</sup>. F<sup>12</sup>, F<sup>12</sup> are lugs.

This construction provides a so-called stiff back chain, that is to say, a chain which will bend in one direction and will not bend in the other. As indicated in Figure 1, this chain is so posi-

tioned with relation to the direction of flow of water that it cannot be bent in response to movement or pressure of the water. For this reason no constant guiding or supporting channel or other means is necessary to hold the chain stiff and to prevent its bending.

Fastened to each chain link F is a frame formed of members G, G'. The details of construction of this frame may be widely varied. Ordinarily the frames will be rectangular in shape. A laterally projecting lip G<sup>1</sup> is provided on these frames. This lip is provided in order that each frame may slightly overlap the one below, as indicated in Figure 1. Fastened to and supported upon the frame is a screen section G<sup>2</sup>. This section may be fastened to the frame by means of strips G<sup>3</sup> and rivets G<sup>4</sup>. Positioned on each side of each frame is a sealing member G<sup>5</sup>. These members are in outline straight along one side and curved along the other as shown. Each has one end concave as indicated in Figure 1, as at G<sup>6</sup>, and each is convex at its other end as at G<sup>7</sup>. The concave end of each sealing member thus overlies and mates with the convex end G<sup>7</sup> of the adjacent sealing member. The sealing members G and the frame construction above described may be fastened to the chain links in any suitable manner. As here shown they are bolted together by bolts G<sup>8</sup>. It will be noticed that the angles D and the sealing members G<sup>5</sup> approach each other closely and that the chain links F also closely approach the angles D. There is thus produced a sealing effect along the sides of the screen.

In Figure 4 the chain construction is the same as that shown and described above. Instead of angles D, however, vertically extending members H, which may be of wood, are used. They are fastened to the walls A by studs and nuts H<sup>1</sup>, H<sup>2</sup>, respectively, and may be grouted as at H<sup>3</sup>. In this case the sealing of the side of the screen is accomplished by the member G, the member H and the chain link F, as indicated particularly in Figure 4.

In Figure 5 a modified form of side sealing is accomplished. The chain is generally the same as that shown in the earlier figures, except that the chain links are provided with upper and lower flanges I, I, which are not cut away. Such a link is shown in edge view in Figure 8. This chain, as applied to the screen, is shown in Figure 5 and in that construction instead of the angle D or the member H, a smaller vertically running member J is provided. It may be made of wood and may have a metal strip J<sup>1</sup> along its outer or working face. It is held in position on the walls A by studs J<sup>2</sup>. In this form of my device the side sealing is accomplished by the members J and the flanges I of the chain link. As indicated in Figure 5 these parts are positioned closely to each other and they accomplish the same sealing effect as that accomplished in the forms of the device shown in the earlier figures.

In the forms of the chain illustrated in Figures 1 to 8, the pintle and link construction by means of which the bending of the chain in one direction is provided, is used. By reason of this construction the chain is non-sagging and it is not necessary to support or guide it in a continuous channel or by a continuous member. It is supported and held against displacement by the rollers E and it is so mounted with relation to the direction of flow of fluid that pressure from such flow tends to move it toward the roll-

ers. The side sealing to prevent passage of solid matter past the side of the screen is accomplished by the members G<sup>5</sup>, the chain links F or I and the cooperating members D, H or J.

The use and operation of my invention are as follows:

The screen sections are joined to the chain links so as to form in effect a plurality of screen sections pivoted together and provided with side sealing means whereby a movable screen is provided, so sealed at its sides that in all positions and whether stationary or in motion, the passage of solid material past the sides of the screen is prevented. A sealing apron is provided at the bottom which prevents the passage of solid material beneath the screen. At its upper end the screen is ordinarily extended above the surface of the liquid being screened. Since a "stiff back" chain is used, the screen can bend only in one direction. As it is shown in Figures 1 to 5, inclusive, it is positioned so that the pressure due to flow of fluid through it tends to bend it in the direction in which it is stiff and its construction thus resists this bending movement. It is free to bend in opposite direction about the sprocket B<sup>1</sup> and about the driving sprocket, not shown. By reason of this stiff back feature it is unnecessary to provide guiding channels or other guiding members to stiffen or resist movement of the chain. The rollers which are mounted at appropriate intervals serve merely to limit the movement of the chain but are not necessary to provide stiffness. By reason of this construction, therefore, no guide members need extend from top to bottom, or along the chain, and there is no frame running from the foot of the screen to the drive end and no frame members whatever connecting the foot and the drive end. The stiffness of the chain in one direction makes such parts unnecessary.

In use the parts are assembled generally as shown in Figure 1, and the chain travels so that the right hand portion, which is the portion first to come in contact with the inflowing fluid, is rising. Suitable refuse discharging and disposing means and suitable cleaning means may be provided at the upper end of the screen. They are not illustrated as they form no particular part of the present invention and are mentioned only as illustrating their possible association with the chain and screen illustrated herewith.

I claim:

1. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so positioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links may be the panels do not actually come in contact with one another.

2. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so posi-

tioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links may be, the panels do not actually come in contact with one another, sealing members projecting from each end of each screen panel perpendicular to the plane thereof and adjacent the supporting links, said members being so positioned on the panels as to maintain a working relation with one another irrespective of the angular position of adjacent panels without said members coming into contact with one another.

3. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so positioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links may be the panels do not actually come in contact with one another, guide rollers adapted to engage the chain when the links are parallel and to prevent displacement of the chain and screen in the direction of water flow through the screen while offering no opposition to the chain and screen in the opposite direction.

4. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so positioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links may be the panels do not actually come in contact with one another, sealing members projecting from each end of each screen panel perpendicular to the plane thereof and adjacent the supporting links, said members being so positioned on the panels as to maintain a working relation with one another irrespective of the angular position of adjacent panels without said members coming into contact with one another, guide rollers adapted to engage the chain when the links are parallel and to prevent displacement of the chain and screen in the direction of water flow through the screen while offering no opposition to the chain and screen in the opposite direction.

5. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so positioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links

may be the panels do not actually come in contact with one another, sealing members projecting from each end of each screen panel perpendicular to the plane thereof and adjacent the supporting links, said members being so positioned on the panels as to maintain a working relation with one another irrespective of the angular position of adjacent panels without said members coming into contact with one another, guide rollers adapted to engage the chain when the links are parallel and to prevent displacement of the chain and screen in the direction of water flow through the screen while offering no opposition to the chain and screen in the opposite direction, sealing members fixed in position adjacent the rollers adapted to cooperate with the members projecting from the screen to prevent the escape of solid material past the sides of the screen, the sealing members being permanently out of contact with all moving parts of the screen.

6. In a traveling water screen, a plurality of endless chains comprising separate chain links pivoted together, there being limiting surfaces on links and pivots so related as to prevent relative angular displacement of adjacent links with respect to one another in one direction, while permitting it in the opposite direction, screen panels, one link in each chain being in supporting relation with each panel, the panels being so positioned on the links that as the links articulate, the panels maintain a working relation while no matter what the relative positions of the links may be, the panels do not actually come in contact with one another, sealing members projecting from each end of each screen panel perpendicular to the plane thereof and adjacent the supporting links, said members being so positioned on the panels as to maintain a working relation with one another irrespective of the angular position of adjacent panels without said members coming into contact with one another, sealing members fixed in position adjacent the edges of the screen adapted to cooperate with the members thereof and thereby prevent passage of solid material therearound.

7. In a water screening system, a conduit, a plurality of fixed supporting rollers on opposed sides thereof, a screen comprising a plurality of endless chains, the lower end of each chain being located adjacent the bottom of the conduit, the upper end adjacent the top, sprockets at top and bottom of said chain, the chains comprising links and pivots, there being means integral with the links and pivots for preventing angular movement of adjacent links with respect to one another in one direction from a position of alignment while offering no opposition to angular displacement in the opposite direction, whereby the chain section between the top and bottom sprockets serve as a stiff track, the rollers being adapted to engage said chain, formed stiff track section to prevent lateral deflection of the chain as a body, screen panels supported on the chain links, the screen panels on adjacent links being so positioned that angular movement of the links may take place without changing their relative relations at their points of closest approach to one another.

CHAS. J. HOBART.