

No. 677,567.

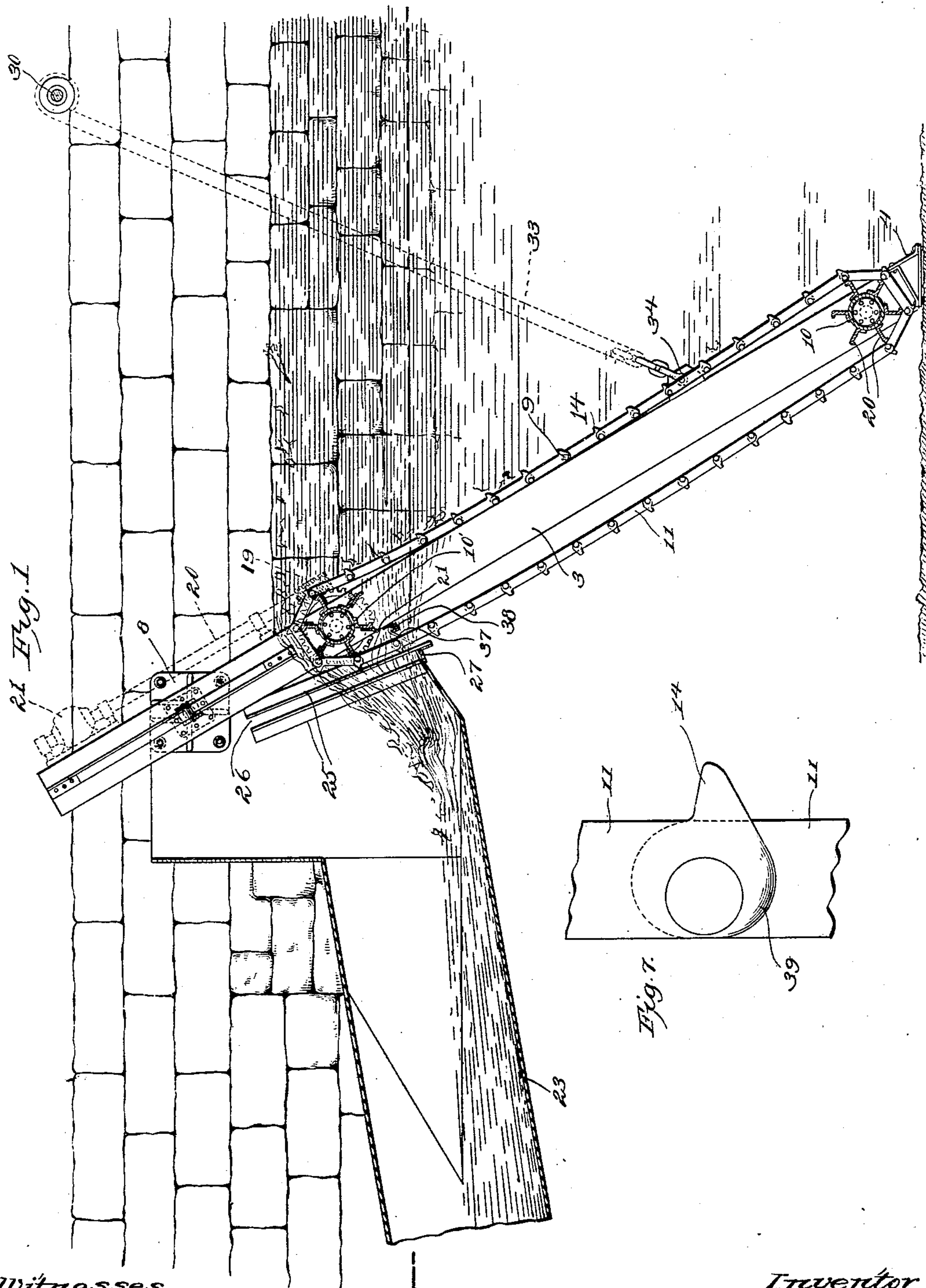
Patented July 2, 1901.

J. R. FREEMAN.
FLUME SCREEN.

(Application filed Feb. 18, 1901.)

(No Model.)

3 Sheets—Sheet 1.



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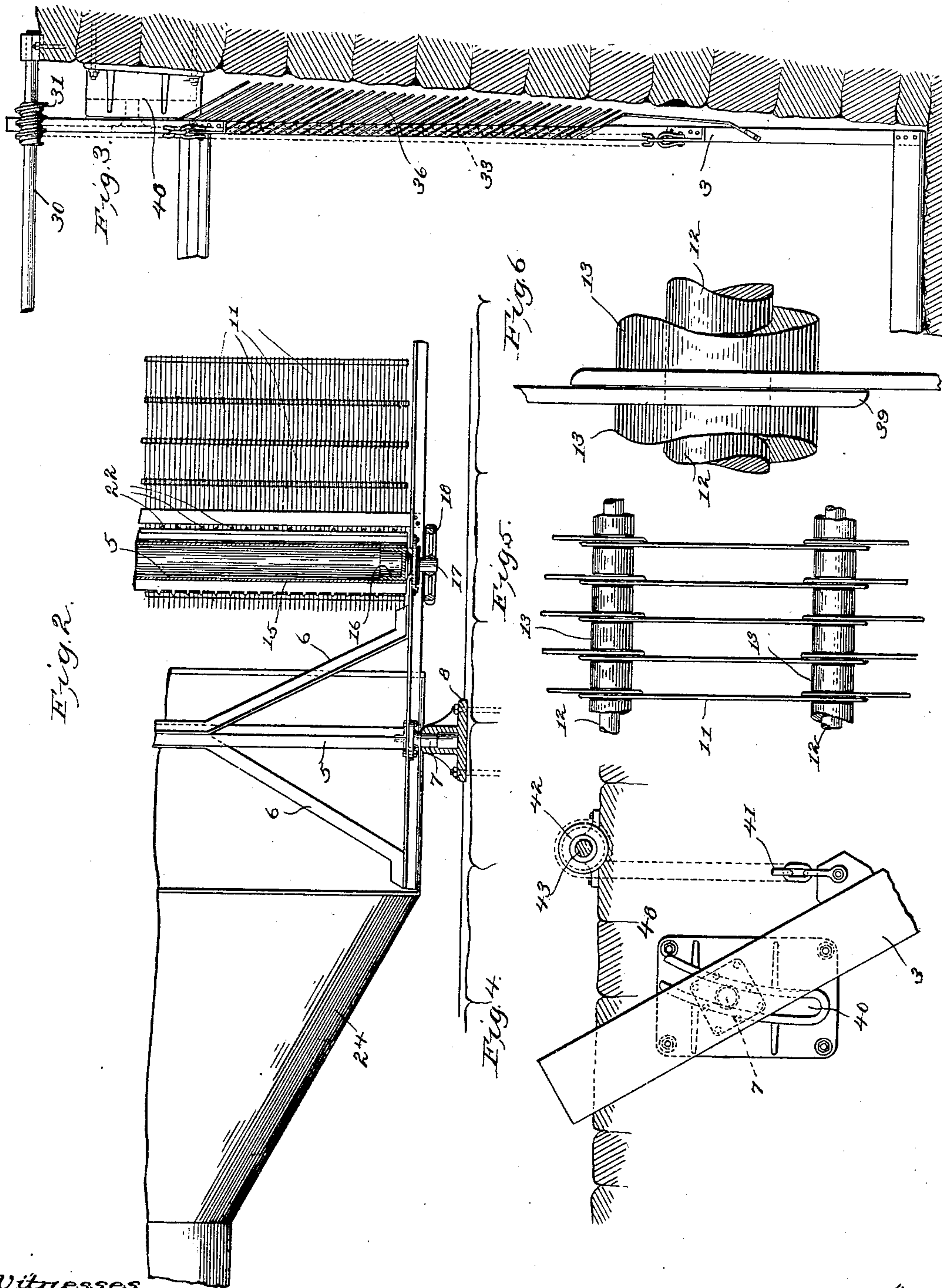
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3 Sheets—Sheet 2.



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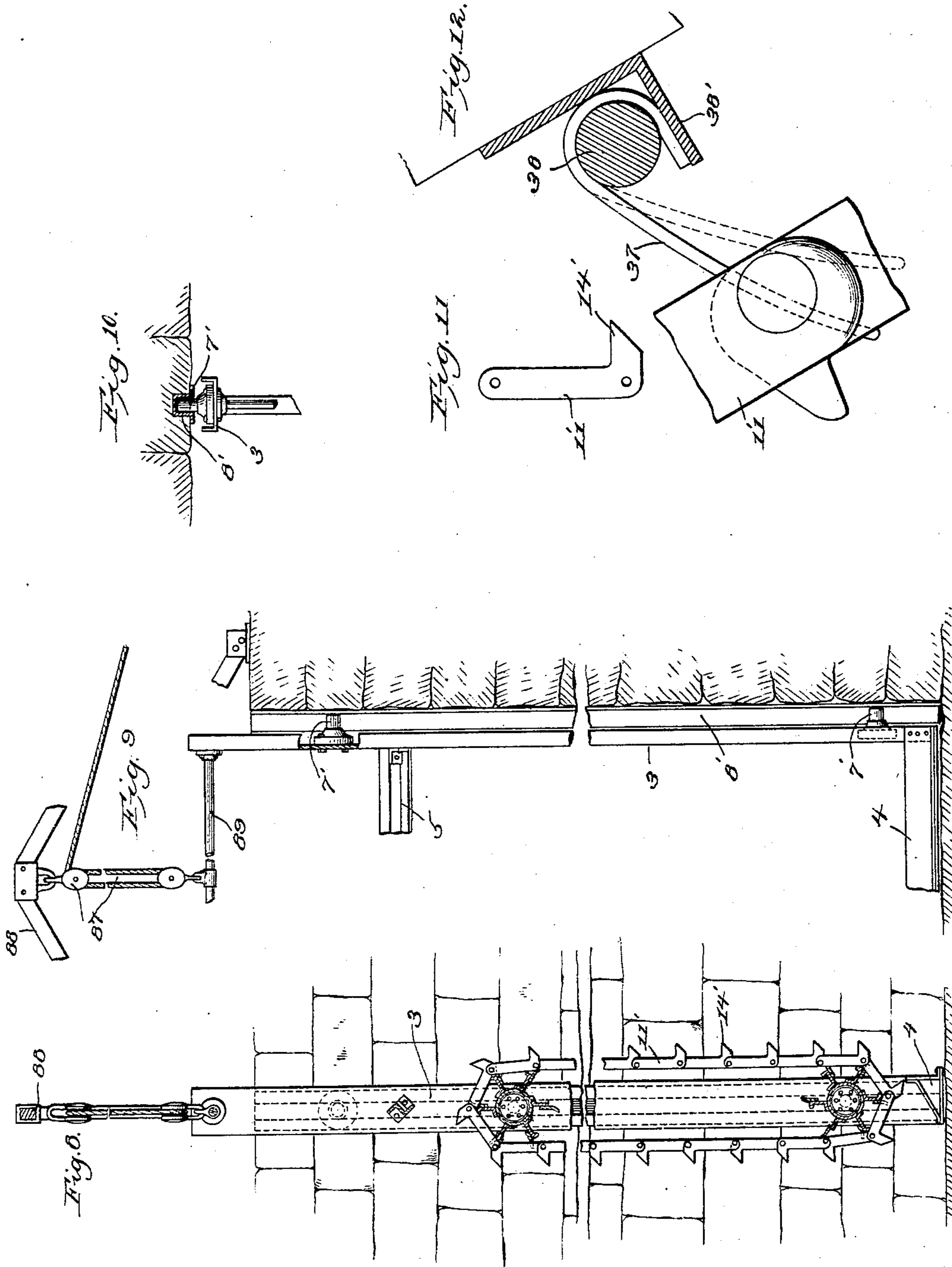
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JOHN R. FREEMAN, OF PROVIDENCE, RHODE ISLAND.

FLUME-SCREEN.

SPECIFICATION forming part of Letters Patent No. 677,567, dated July 2, 1901.

Application filed February 18, 1901. Serial No. 47,721. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. FREEMAN, a citizen of the United States, and a resident of Providence, in the county of Providence and State of Rhode Island, have invented an Improvement in Flume-Screens, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to flume-screens such as are used in flumes or raceways for preventing any sticks, leaves, broken ice, or other rubbish from passing through the raceway to the water-wheel or other intakes, as to pumps, suction, &c. Heretofore such screens have generally been in the form of grids which are stationarily mounted in the flume or canal; but with such stationary grids or screens the rubbish which is too large to pass there-through will collect on the screen, and it is therefore necessary to provide some suitable apparatus or mechanism for the removal of such rubbish, and various devices for this purpose have been devised.

Another disadvantage of the stationary grid or screen is that if any portion thereof becomes broken or needs renewing it is necessary to withdraw the water from the canal in order to render the screen accessible.

It is the object of my invention to overcome these disadvantages by providing a screen which brings the rubbish to the surface of the water for easy removal, which is self-cleaning, and which may be quickly and easily lifted bodily or entirely removed from the canal when it is desired to inspect the same. With this object in view my invention comprises a rotary screen, preferably in the form of an endless screening-apron, which is supported upon two drums or other bearings, the said screening-apron being provided with a series of projections, which catch, engage, and lift the sticks, leaves, broken ice, or other rubbish to the surface of the water and deposit the same into a suitable waste-pipe.

The rotating screen is supported upon a suitable frame, which is preferably removably mounted in the canal either by pivotally suspending said frame from a point near the top of the canal or by sliding said frame

into suitable guides at opposite sides of the canal, and suitable mechanism may be provided to raise the frame out of the water whenever it is desired to inspect the screen or renew any parts thereof which may be broken.

Referring to the drawings, Figure 1 shows a portion of the canal or flume with my improved screen in longitudinal section, the ordinary water-level being shown by the dotted line. Fig. 2 is a partial plan view of Fig. 1. Fig. 3 shows one side of the flume or canal and one side of the frame for my screen, with the means for preventing any foreign material from passing between the screen and the side wall of the flume. Fig. 4 shows one way of pivotally suspending the screen-frame to accommodate varying heights of water in the canal. Fig. 5 is an enlarged view of a portion of the screen. Figs. 6 and 7 are details hereinafter to be described. Fig. 8 is a vertical section of a modification wherein the screen-frame is slidably mounted in the canal instead of being pivotally suspended therein. Figs. 9 and 10 are details showing the guides for the slidably-mounted frame. Fig. 11 shows a modified form of link which may be used with the slidably-mounted screen, and Fig. 12 is a detail hereinafter described.

One simple form of my invention is shown in the accompanying drawings, wherein the screen is in the nature of a rotary screen which is supported on a frame, said frame being preferably removably sustained in the flume or canal either by pivotally suspending the same from a point near the top of the canal, as shown in Fig. 1, or sliding the frame longitudinally into place, as shown in Figs. 8 and 9. As illustrated, the frame comprises the side bars 3, which are secured together at the lower end by a suitable cross-piece or shoe 4, preferably of triangular shape, which cross-piece forms a foot or support for the frame and rests upon the bottom of the canal, as shown in Figs. 1 and 8. The top of the frame has extending across the same and connecting the side bars 3 the cross-bar 5, which is preferably suitably braced by means of the braces 6, as illustrated in Fig. 2, and the said frame carries the rotatable or revolving screen, which is shown in the form of an endless apron 9, which is supported upon suit-

able drums or other bearings 10 10', journaled in any suitable way at the lower and upper ends of the frame, as best seen in Fig. 1. Fig. 5 shows an enlarged portion of the screen, and from this figure it will be seen that it comprises a series of links 11, which are pivoted at each end upon rods 12, said rods being of a total length equal to the width of the screen, and suitable sleeves or separators 13, which are sleeved over the rods, are placed between the adjacent links, thus spacing them a proper distance apart. Each link has at one end the nose or hook portion 14, the said hook serving to catch hold of and lift the sticks, broken ice, and other foreign matter from the canal and deposit the same into a waste-chute, as hereinafter described.

Referring to Fig. 2, wherein the upper drum 10' is shown in section, it will be seen that the same comprises the central cylindrical hub 15, which is supported at each end upon suitable castings 16, the said castings having integral therewith the stub-shaft 17, which projects through and is journaled in any suitable way in the side pieces 3 of the frame. On the end of one of the stub-shafts 17 is mounted a gear or clutch, which may be driven in any suitable way to rotate said drum 10'.

One simple form of driving mechanism is shown in dotted lines, and it comprises a suitable motor 21, which is connected to drive the shaft 20, having thereon a worm 19, which meshes with a gear 18 on the shaft 17, the said motor thus operating to rotate the upper drum 10' and give motion to the rotary screen. Each drum has extending longitudinally thereof a series of radial blades 20, which engage the endless apron at the joints thereof, and the upper drum has attached to the blades 20 the plates 21, which, as shown in Fig. 2, are provided with a series of projections 22, the said projections engaging the screen between the links thereof, and thus positively rotating the same as the drum 10' is rotated.

The flume or canal is provided with a waste-pipe 23, the upstream end of which is flaring, as shown at 24 in Fig. 2, and forms a hopper-like receptacle situated immediately adjacent the drum 10', so that any refuse which is caught by the horns 14 is carried up over the drum and deposited into the hopper-like end 24 of the chute 23. It will be understood that the chute 23 conducts and deposits the refuse material in some suitable place outside the canal.

Suitable guideways 25 are secured at each side of the canal, forming between them a groove 26, in which flash-boards (not shown) may be inserted to regulate the amount of water which will waste over the edge 27 of the hopper 24 or to prevent all waste when the screen is not being rotated.

In Fig. 1 the water is shown at high-water level, and consequently there is a comparatively large amount of waste into the chute 23. The ordinary water-level is indicated by the dotted line in Fig. 1, and it will be seen

that under ordinary conditions there will be practically no water wasted into the chute 23. The amount of waste may be lessened or entirely stopped by inserting flash-boards in the groove 25.

It is oftentimes very desirable to examine the screen and to be able to have access thereto for various purposes, as when it is necessary to renew broken parts, without withdrawing the water from the canal, and in order to do this I provide means whereby my screen may be raised out of the canal and clear from the water. The drawings illustrate two simple ways of accomplishing this, Fig. 1 showing a construction wherein the frame is pivotally suspended from a point near the top of the canal and Figs. 8 and 9 illustrating a slightly different construction, in which the frame is removably held in suitable vertical guides in the side walls of the canal. Referring to Fig. 1, it will be seen that the side pieces 3 of the frame have secured to the outside and near the top thereof in any suitable way and projecting therefrom suitable trunnions 7, which rest in bearings 8, secured to the side walls of the canal in any suitable way. Preferably the seats in the bearings 8 which receive the trunnions 7 will be in the nature of open slots, whereby the said frame may be readily removed from the said bearings whenever desired. Extending across the top of the canal is a suitable shaft 30, on which are mounted the spirally-grooved drums 31, the said drums having secured thereto chains or other suitable connections 33, which chains are in turn connected to the side pieces 3 of the frame, near the lower ends thereof, as at 34. With this construction it will be obvious that by rotating the shaft 30 the chains 33 will be wound upon the drums 31, and the frame, with the screen, will be swung about the trunnions and be lifted out of the water. Obviously the same result may be accomplished by any other suitable hoisting device. Figs. 8 and 9 illustrate another manner of removably mounting the frame in the canal, and in this embodiment of my invention the side walls of the canal have suitable U-shaped guideways 8', extending preferably vertically, as shown, and the side pieces 3 of the frame have the guiding-lugs 7', which engage said guideways. By lifting the frame bodily in a vertical direction the same may obviously be removed from the canal, and it may be replaced by simply sliding it longitudinally into place. Any suitable hoisting mechanism may be employed to raise or lower the screen-frame, that shown being a simple block and tackle 87, suspended from a suitable support 88, spanning the canal, the said block and tackle being connected to a cross-piece 89 on the frame. In Fig. 8 the waste-chute 23 and the spring-fingers hereinafter described are omitted for the sake of clearness, and in Fig. 9 the screen is omitted for the same reason.

In some instances the side walls of the canal or flume are slanting, as shown in Fig. 3, and

in order to prevent any large substances from passing between the side pieces 3 of the frame and the side walls I preferably attach to each side piece 3 a series of blades 36, (seen in Fig. 3,) said blades forming a stationary grid.

It sometimes happens that a stick or other substance gets caught between the links of the screening-apron, and to dislodge the same I provide a series of spring-fingers 37, which project beyond the links of the apron, each having one end bent around a rod 38, which extends across underneath the frame and is attached at its ends to the side pieces 3 thereof, the said ends of the fingers being sustained on the projecting portion 38' of an angle-iron, (see Fig. 12,) which also extends across the frame and is suitably secured to the side pieces 3. Preferably I will have two of these spring-fingers between adjacent links, and owing to the elastic nature of the said fingers they will give or yield under the influence of the rods 12, but will spring out between the links as the said rod passes off the ends of the fingers, and thus dislodge any material that may get caught between the links. As shown in Fig. 6, the lower end of each link is curved somewhat, as at 39, in order that the fingers may readily slip off the ends thereof.

It is sometimes desirable to raise the top of the screen to accommodate varying heights of water, and one convenient way of accomplishing this is by providing the frame with a sliding pivotal connection, as seen in Fig. 4, wherein the casting 48 is provided with the elongated curved slot 40, in which the trunnions 7 are supported, and a chain or other flexible connection 41 is connected to the side pieces 3 near the top thereof and operated by means of a suitable hoisting device, such as drum 42 upon a shaft 43. It will be noted that by giving the trunnion-slot 40 a curvature of proper form the correct distance and relation between the edge 27 of the waste-chute and the back face of the screen may be preserved whatever the height of the top edge of the screen.

In the embodiment of the invention wherein the screen is vertical I preferably make the nose or hook 14' longer than would be necessary when the screen is inclined, as in Fig. 1, such modified form of link being shown in Fig. 11 and designated as 11'. This longer hook 14' is preferable in the vertically-arranged screen, as the short hook would not sufficiently engage the rubbish to lift it vertically.

From the above description it will be seen that my screen is a rotating screen, and by making the same with the projections or hooks 14 it is a self-cleaning screen, the said projections operating to lift the foreign material and by reason of the motion of the screen deposit the same in the hopper-like end 24 of the waste-chute 23. When it is desired to inspect the screen or renew any parts thereof, the same may be lifted out of the water and

rendered accessible without drawing the water from the canal, as is necessary in a stationary screen. Furthermore, the height of its top may be varied to correspond with varying heights of water.

Various changes may be made in the structure of the device without departing from the spirit of my invention.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A flume-screen having an endless revolving screening-surface provided with a series of projections to catch the foreign material.

2. A flume-screen comprising an endless screening-apron composed of a series of links pivoted together, and means to support and rotate the same.

3. A flume-screen comprising an endless screening-apron composed of links pivotally connected together, each of which has a projection thereon to engage and lift the foreign material.

4. In a flume-screen, a frame, drums secured thereto and extending across the flume, an endless screening-apron supported on said drums, and means to rotate one of said drums, said apron being provided with a series of projections to catch and lift the foreign material.

5. In a flume-screen, a supporting-frame, a pair of drums secured thereto, an endless screening-apron supported by said drums, said apron being composed of links pivotally connected together, each having a hook or projection extending outwardly therefrom, and means to rotate one of said drums.

6. In a flume-screen, a frame removably mounted in, and extending across a flume or canal, and an endless rotating screening-apron supported on said frame, said apron having extended from its surface a series of projections.

7. In a flume-screen, a frame removably mounted in, and extending across a flume, or canal, an endless rotating screening-apron supported on said frame, said screening-apron having a series of projections thereon to catch and lift the rubbish, and means to rotate the said apron.

8. In a flume-screen, a pivotally-suspended frame which is adapted to normally rest on the bottom of the flume, an endless rotating screening-apron supported on said frame, and means to swing the frame about its pivotal point, whereby the screen may be removed from the frame.

9. In a flume-screen, a pivotally-suspended frame having a pair of drums thereon, an endless screening-apron supported on said drums, a hopper or platform adjacent the upper drum to receive the rubbish from the screen, means to rotate one of the drums and means to swing the frame about its pivotal point.

10. In a flume-screen, a pivotally-suspended frame, an endless revolving screen carried

thereby, means to rotate said screen, and a series of spring clearing-fingers carried by the frame and projecting through the screen.

11. In a flume-screen, a pivotally-suspended
5 frame, a pair of drums carried thereby, an endless screening-apron supported on said drums, said apron comprising a series of links pivotally connected together, each link having a projection extending outwardly there-
10 from to engage the rubbish, means to rotate one of said drums, and a series of spring clearing-fingers carried by said frame and projecting through the screen.

12. In a flume-screen, a pivotally-suspended
15 frame, an endless screening-apron carried thereby, means to vary the elevation of the top of the screen, and means to swing the screen about its pivotal point and thus raise the same from the flume.

20 13. In a flume-screen, a pivotally-suspended frame having a pair of drums thereon, an endless screening-apron supported on said drums,

said apron comprising a series of links pivotally connected together and suitably spaced apart, each of said links having a projection
25 extending outwardly therefrom, means to rotate one of said drums, and a hopper or platform adjacent the upper drum adapted to receive the rubbish from the screen.

14. In a flume-screen, a pivotally-suspended
30 frame, an endless revolving screen supported thereby, and means to revolve the screen, said frame having a grid at either side thereof and rigid therewith, said grid filling the space between the sides of said frame and the
35 side walls of the flume or canal.

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

JOHN R. FREEMAN.

Witnesses:

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LOUIS C. SMITH.