Jan. 26, 1943. K. E. MORTON 2,309,472

FISH SCREEN

Filed March 25, 1941 2 Sheets-Sheet 1

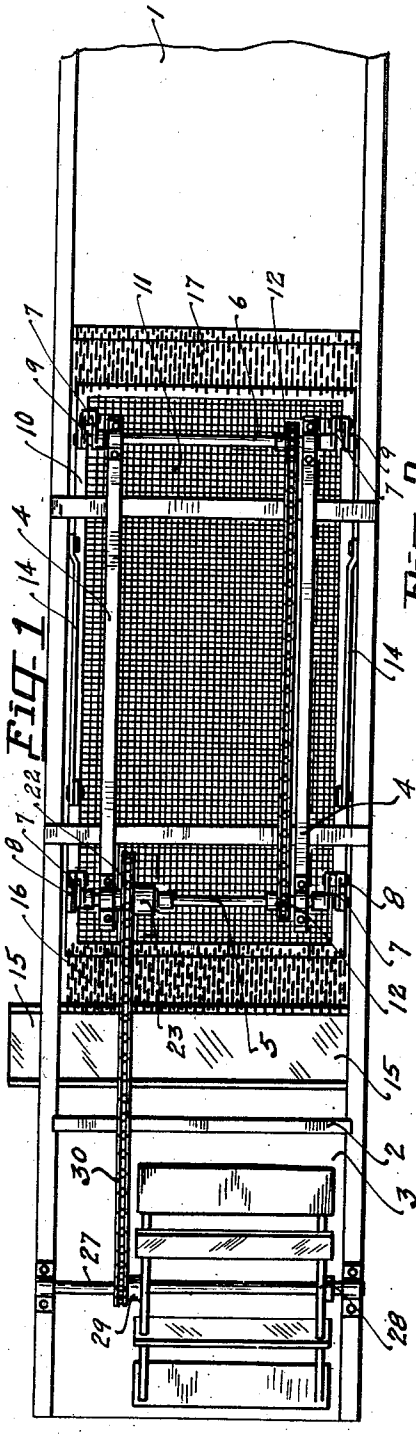


Fig. 1

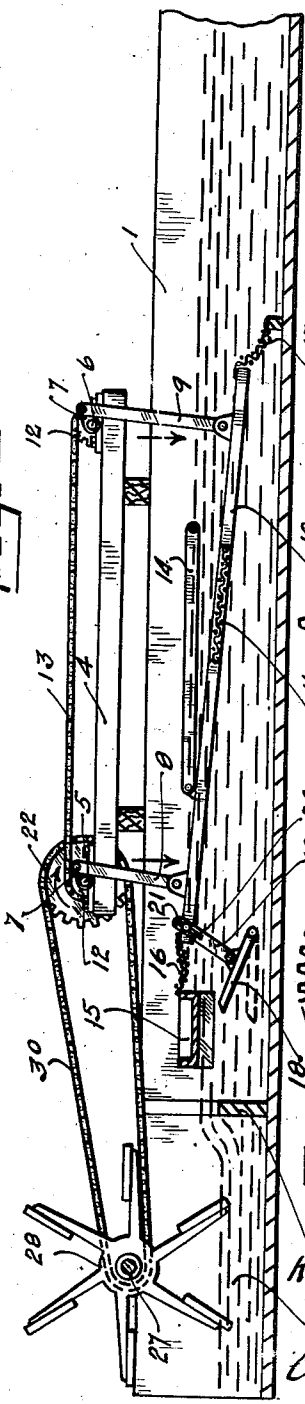


Fig. 2

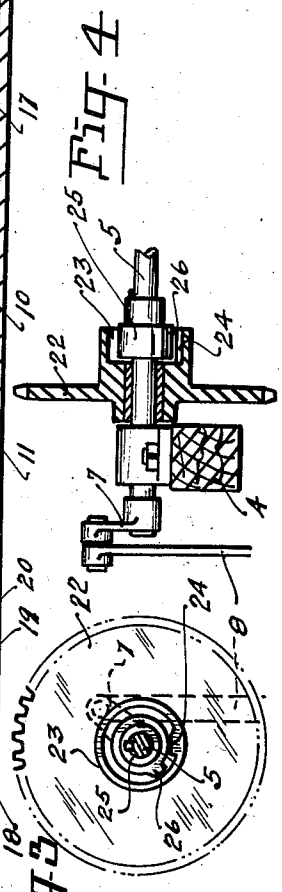


Fig. 4

Fig. 3

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FISH SCREEN

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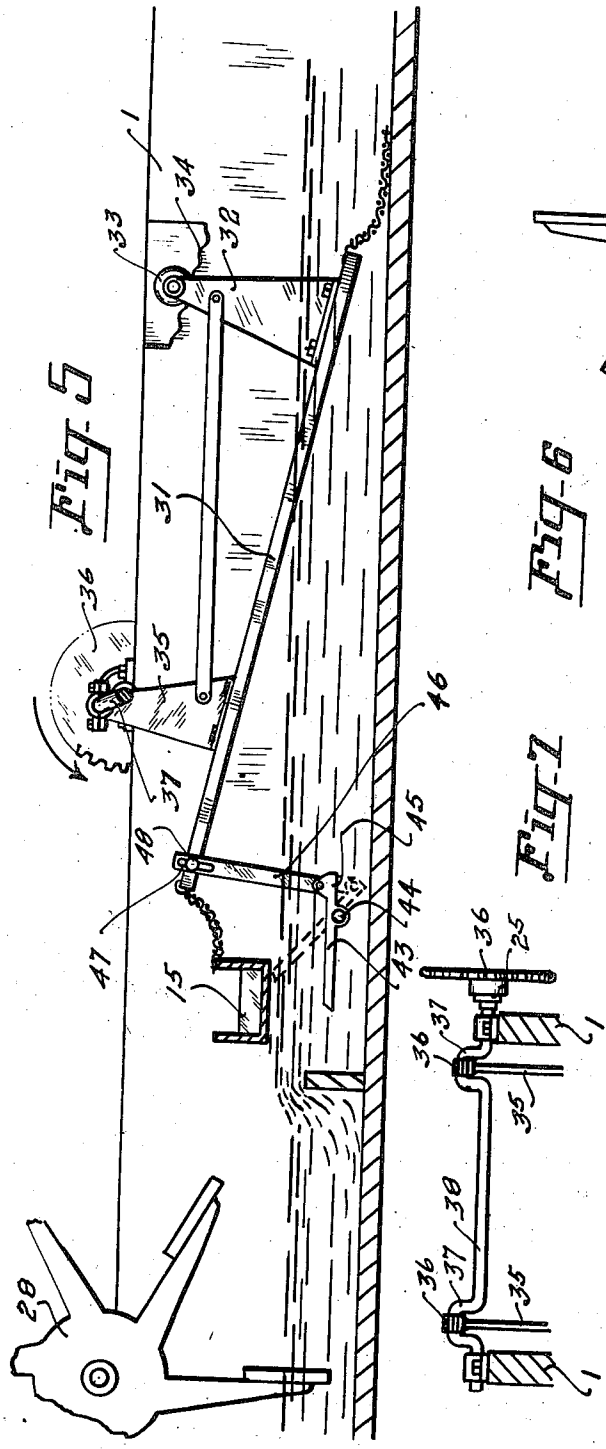


Fig. 5

Fig. 7

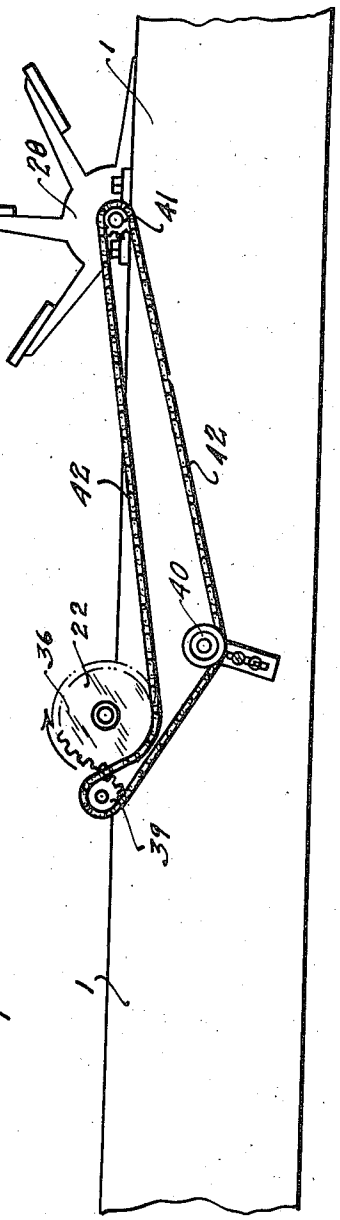


Fig. 6

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FISH SCREEN

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Application March 25, 1941, Serial No. 385,057

4 Claims. (Cl. 210—172)

My invention relates to improvements in fish screens of the drop screen type, wherein a screen is arranged in an inclined plane across a stream or flume and is intermittently raised and dropped. The purpose of the dropping being to force water through the meshes of the screen which will float and clear debris collecting upon the upper side thereof.

An object of the present invention is to provide an improved operating means for raising and dropping such screen.

An object of the invention is to provide an operating means employing rotative elements rather than reciprocative elements, thereby reducing wear and at the same time causing the operation to become practically noiseless.

These and other objects of the invention will be readily seen upon reading the description following, aided by the accompanying drawings, wherein:

In the drawings:

Figure 1 is a plan view of the invention wherein it is mounted within a water conveying flume.

Figure 2 is a transverse cross section of Figure 1.

Figure 3 is a side elevation of the drop wheel.

Figure 4 is a cross section of the mechanism shown in Figure 3.

Figure 5 is a cross section of another embodiment of the invention.

Figure 6 is a cross section showing the paddle wheel connection.

Figure 7 is a detail of the crank shaft connection.

In the drawings similar characters refer to similar parts throughout the several views.

Referring now to the drawings, numeral 1 indicates a water conveying flume, having upstream and downstream respectively at right and left in the view. A low check dam 2 extends across the flume, and below this is a tailrace 3. Mounted upon the flume is a frame 4. Journaled at each end of frame 4 are shafts, numbered 5 and 6 respectively. Keyed to the ends of the shafts are the crank arms 7. Pivotally connected to the free ends of the crank arms, are the links 8 and 9, links 8 are connected to the crank arms on shaft 5, while links 9 are connected to the crank arms on shaft 6.

Pivotally connected to the lower end of links 8 and 9 is the rectangular screen frame 10 supporting screen 11. Links 8 are shorter than links 9, so that frame 10 and screen 11 are supported at an inclination with the lower end upstream. It is to be understood that frame 10 extends from side to side of the flume 1, but it does not touch the flume. Hence when shafts 5 and 6 are rotated the crank arms 7 and links 8 and 9 will raise and lower the frame and screen. Shafts 5 and 6 are to rotate in unison, and to this end each have keyed thereon a sprocket 12 over which is trained the chain 13. The crank arms are also keyed to operate in unison, that is to say they all raise or lower the screen simultaneously. To reduce back and forth movement, lengthwise of the flume, links 14 are provided. Each link has one end pivoted to the flume and the other end pivoted to frame 10. However, if it is desired to have a rocking motion to the frame, links 14 may be dispensed with.

Extending transversely within the flume 1 and having a discharge to the exterior thereof is a trough 15. Connected between the downstream end of the frame 10 and the upstream edge of the trough 15 is a loose screen 16. Also extending between the upstream end of the frame 10 and the bottom of the flume is a similar loose screen 17. Screens 16 and 17 are sufficiently loose to permit free up and down movement of the screen frame 10.

Pivotally mounted proximate the bottom of the flume is a deflector board 18. This pivots back and forth as shown by full and broken lines in Figure 2. This is connected by a link 19 to frame 10. The connection between link and frame is by slot 20 and pin 21, in order that the downward movement of frame and screen will not be hindered by link 19.

Freely mounted upon shaft 5 is a sprocket wheel 22 provided with a hub cavity 23. Projecting from the wall of the cavity is a dog 24. Keyed upon shaft 5, and substantially within cavity 23 is a roll 25 having a projecting dog 26. Hence, when sprocket 22 is rotated, preferably to the right as indicated, it will revolve freely until dog 24 engages dog 26, thereafter it will rotate shaft 5 and consequently shaft 6.

Mounted upon the flume over the tailrace portion is a shaft 27 supporting a paddle wheel 28 whose bottom paddles are submerged in the tailrace. Thus it will be seen that movement of water in the tailrace will revolve the paddle wheel, and its sprocket 29, and that such rotation will be transmitted through chain 30 to sprocket wheel 22 and thence to shafts 5 and 6.

If the screen 11 were to remain stationary, it would in a short length of time become clogged with floating debris collecting thereon. Hence the reason for raising and lowering such screen is to force water through its meshes which will

disengage the debris collecting thereon. In operation, rotation is transmitted from paddle wheel 20 to sprocket wheel 22. This rotates freely on shaft 5 until dog 24 engages dog 26. Thereafter both shafts 5 and 6 are rotated, rotating crank arms 7 and raising frame 10 and screen 11. After crank arms 7 have passed upper dead center the weight of the frame and screen accelerates the rotation of shafts 5 and 6, these shafts being able to rotate freely as the dog 26 is ahead of dog 24. This allows the screen to descend at a speed considerably greater than its upward movement. This rapid downward movement forces water through the screen meshes liberating clinging debris. As the screen ascends the deflector is raised retarding the flow of water below the trough 15 and deflecting it into such trough, thus carrying floating debris from above the screen to the trough and away.

Figures 5, 6 and 7 illustrate another embodiment of the invention. This consists of the screen and its frame 31. Mounted to the upstream end of the frame 31, one at each side, and projecting upwardly is a bracket or arm 32, which at this upper ends carry trunnions or rolls 33. These rolls travel in a trackway 34, in the wall of the flume, which trackway is corrugated or uneven, so that as the rolls move back and forth the upstream end of the screen bumps up and down. Spaced from the down stream end of the screen is another pair of brackets or arms 35. The upper ends of the latter arms have journals 36 which are journaled to the cranks 37 of the crank shaft 38. Also mounted on shaft 38 is a sprocket wheel 22 and roll 25 which cooperate and operate as heretofore described. Wheel 22 need not necessarily be toothed for chain, it can be grooved for a belt. Figure 6 shows the belt and pulley (or chain and sprocket) hookup for rotating wheel 22. This consists of idler pulleys 39 and 40, driven pulley 41 keyed to paddle wheel 20, and chain 42.

It will be seen from the foregoing that as the crank shaft 38 is rotated the downstream end of the screen will have a sort of circular movement, moving to the left and the down stream end will have an up and down bumpy movement as the rolls 33 travel back and forth in the trackway 34. This rotary motion is designed to constantly move debris from the upstream end of the screen over the down stream end into the trough which operates as heretofore explained.

Mounted transversely in the flume is a deflector 43. This is pivoted to the flume at 44 a space from its upstream edge to provide a lever like portion 45. To this portion is pivotally connected the link 46. The upper end of the link has a slot 47 receiving the pin 48 projecting from frame 31. As the down stream end of the screen moves downwardly, pin 48 engages the bottom of slot 47 pressing lever portion 45 down and the major portion of the deflector up as shown by the broken lines, this acts as a dam causing water in the flume to back up and also flow into trough 15 carrying debris therewith.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having described my invention, I claim

1. A fish screen, comprising a screen frame carrying a screen at an inclination to the horizontal, a pair of shafts mounted above the frame, crank arms mounted to the shafts, links connecting the crank arms with the frame, means for rotating the shafts in unison, a roll keyed upon one of the shafts, a sprocket wheel loosely mounted upon the same shaft, said wheel having a hub cavity within which a substantial portion of the roll is located, a dog projecting from the cavity wall of the wheel, a dog projecting from the roll engageable by the first dog, the engagement of said dogs when the wheel is rotated transmitting rotation to the shafts and allowing said shafts to rotate freely with respect to the wheel when the crank arms have passed high dead center.

2. A fish screen, comprising a flume, a bypass trough leading transversely from the flume, a screen disposed at an inclination to the horizontal plane in the direction of the flow of the stream and positioned within the flume, a pair of shafts mounted above the flume and provided with crank arms connected to the screen, means for rotating the shafts in unison, said crank arms raising and lowering the screen when rotated, a deflector board pivoted in the flume and connected to the screen and rising to a position to deflect water into the trough when the screen is raised, a sprocket wheel loosely mounted upon one shaft, a roll keyed on the same shaft, a dog projecting from the wheel, a dog projecting from the roll engageable by the first dog, the engagement of said dogs when the wheel is rotated transmitting rotation to the shafts and allowing the shafts to rotate freely with respect to the wheel when the crank arms have passed high dead center.

3. A fish screen, comprising a screen disposed at an inclination, a pair of shafts mounted above the screen and provided with crank arms connected therewith, means for rotating the shafts in unison, links connecting the crank arms with the screen, said crank arms raising and lowering the screen when rotated, a sprocket wheel loosely mounted upon one shaft, a roll keyed on the same shaft, a dog projecting from the wheel, a dog projecting from the roll engageable by the first dog, the engagement of said dogs when the wheel is rotated transmitting rotation to the shafts and allowing the shafts to rotate freely with respect to the wheel when the crank arms have passed high dead center.

4. A fish screen, comprising a screen disposed at an inclination, a pair of shafts mounted above the screen and provided with crank arms connected therewith, means for rotating the shafts in unison, links connecting the crank arms with the screen, said crank arms raising and lowering the screen when rotated, links pivotally connected to the lateral edges of the screen to restrict longitudinal movement thereof, a wheel loosely mounted upon one shaft, a roll keyed on the same shaft, a dog projecting from the wheel, a dog projecting from the roll engageable by the first dog, the engagement of said dogs when the wheel is rotated transmitting rotation to the shafts and allowing the shafts to rotate freely with respect to the wheel when the crank arms have passed high dead center.

KENNETH E. MORTON.