Nov. 26, 1940. E. HANSEN 2,223,104

ROTARY SCREEN

Filed Feb. 28, 1939 3 Sheets-Sheet 1

Fig. 1.

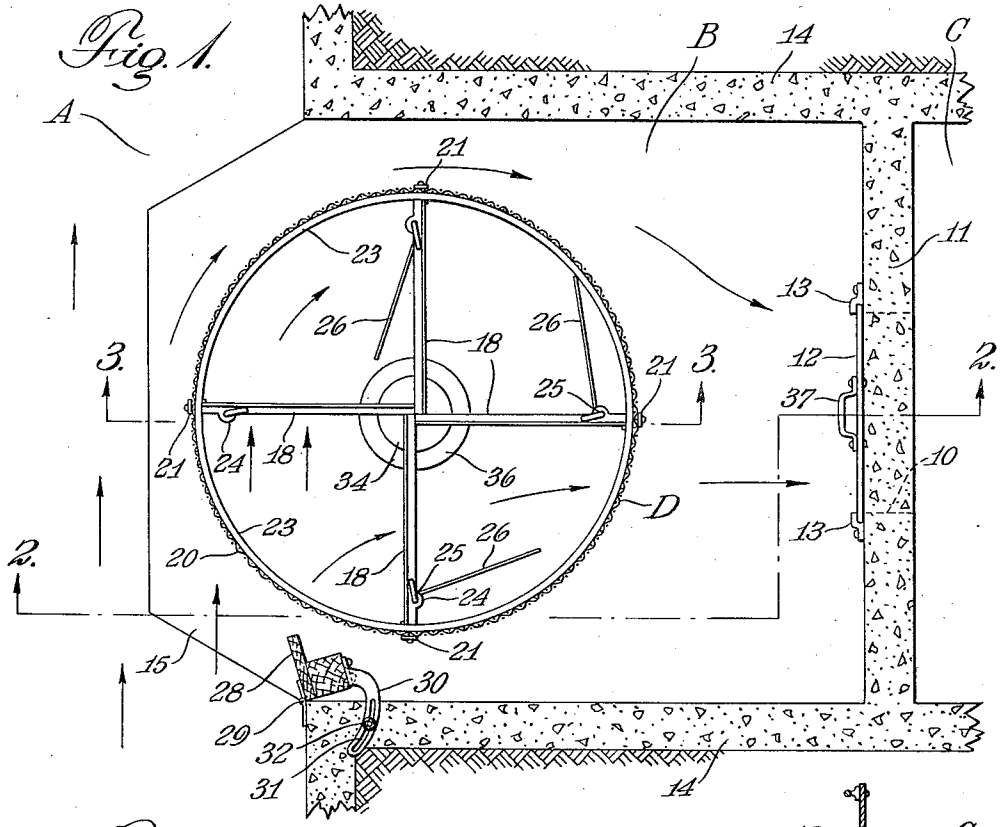
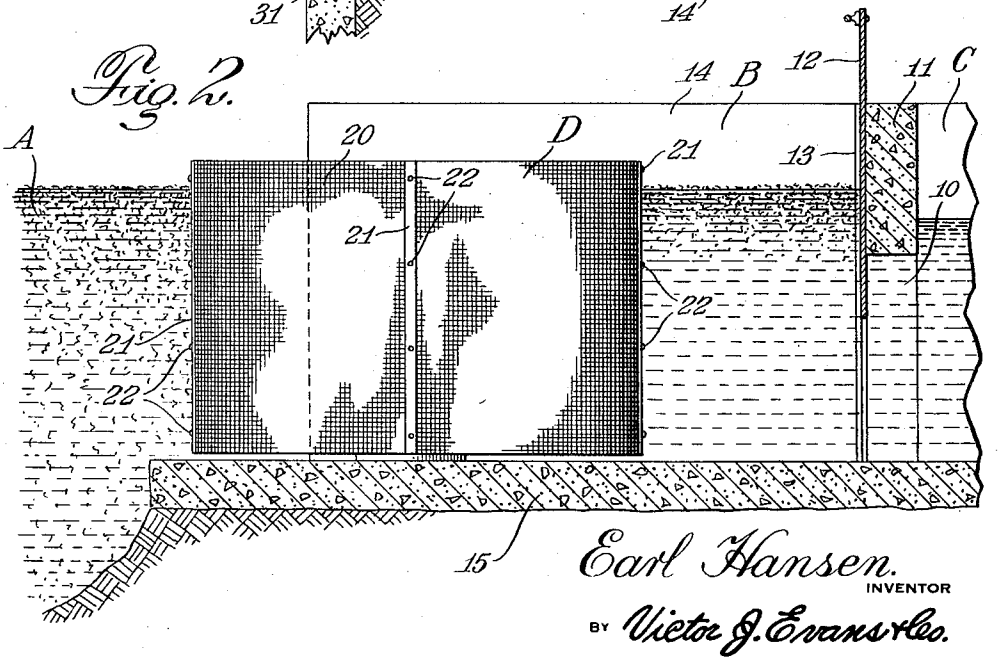


Fig. 2.



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ROTARY SCREEN

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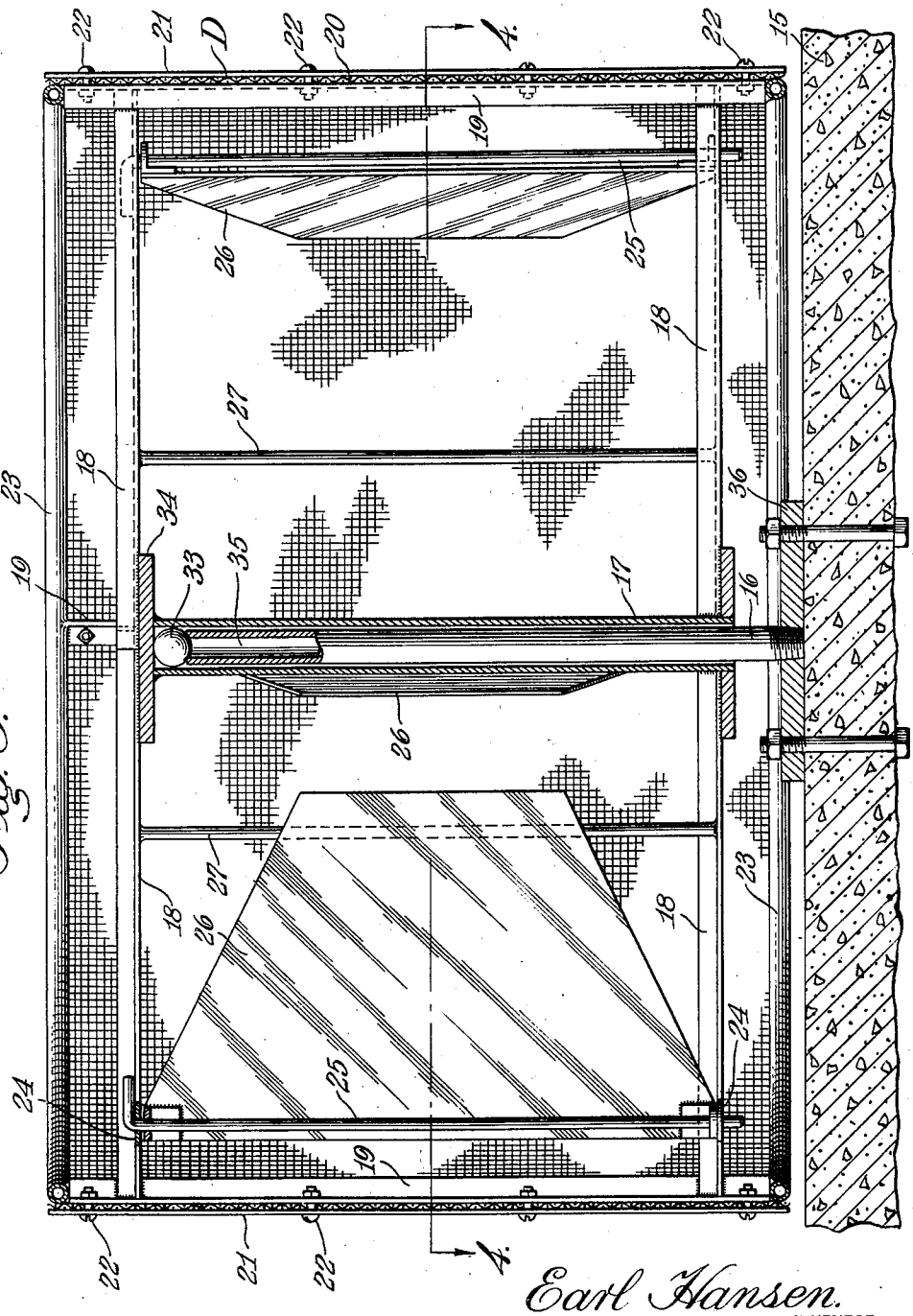

Fig. 3.

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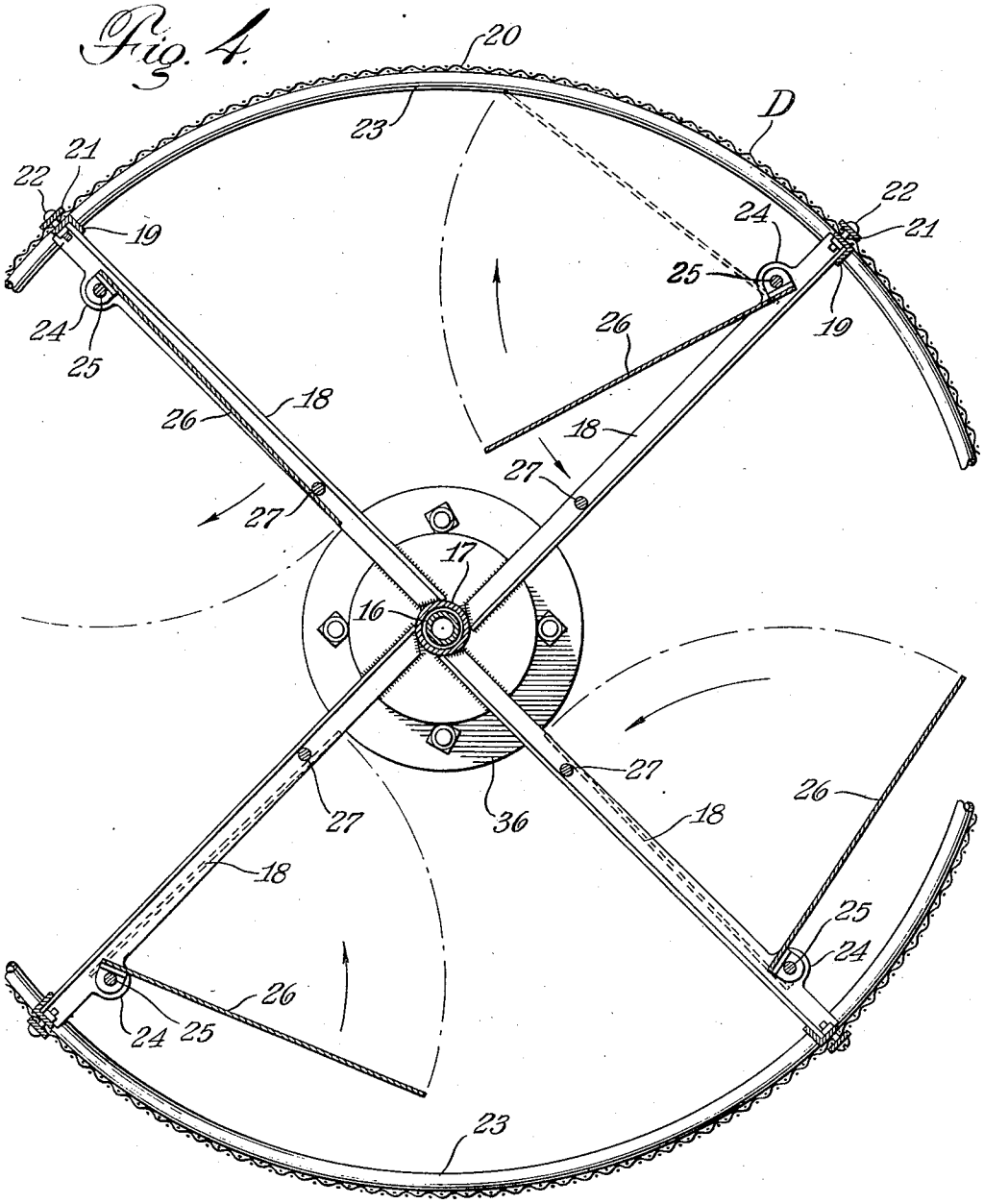
Fig. 4.



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Patented Nov. 26, 1940 2,223,104

UNITED STATES PATENT OFFICE

2,223,104

ROTARY SCREEN

Earl Hansen, Mabton, Wash.

Application February 28, 1939, Serial No. 259,039

3 Claims. (Cl. 210—173)

The invention relates to a rotary screen and more especially to a bladed rotary water driven screen.

The primary object of the invention is the provision of a screen of this character, wherein moss, algae, debris or the like within a body of water will be forced down stream with the current flow within a canal, river or other waterway from which there is taken a supply to an irrigating ditch through an intake box, weir or the like and in this way eliminating the deposit of such moss, algae, debris or the like within the ditch utilized for irrigating purposes.

Another object of the invention is the provision of a screen of this character, wherein the water flow constitutes the power in that the current of the stream propels the said screen and in the rotation of such screen in association with blades, matter such as moss, algae, debris or the like collected thereon will be expelled therefrom under a whirling action set up by the screen so that this moss, algae, debris or the like will be continued down stream with the water current without causing the choking of a lateral waterway from such stream used for irrigating.

A further object of the invention is the provision of a screen of this character, wherein the construction thereof is novel, particularly in the arrangement of blades within a reticulated body or cylinder so that water power operates the screen for its rotation relieving accumulations at the outer side of the screen and effecting the down stream course thereof with the current flow in a canal, river or the like.

A still further object of the invention is the provision of a screen of this character, which is simple in its construction, thoroughly reliable and efficient in operation, automatic in the working thereof, and inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, which disclose the preferred embodiment of the invention and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1 is a fragmentary top plan view of a waterway and a lateral water course leading therefrom showing in association the screen constructed in accordance with the invention.

Figure 2 is a sectional view taken approximately on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is an enlarged detail sectional view taken on the line 3—3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a sectional view taken on the line 4—4 of Figure 3 looking in the direction of the arrows.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, A designates generally a portion of a canal, river or the like having water flow therein in the direction of the arrows indicated in Figure 1 while B denotes an intake box, weir or the like for communication with an irrigating ditch C, the intake opening 10 establishing communication between the box, weir or the like B and the ditch C being formed in a vertical wall 11 of said ditch. This opening is controlled by a flow gate 12 fitting guides 13 for vertical slidable movement. The ditch C receives the water from the canal, river or the like A through the intake box, weir or the like B and such ditch constitutes a lateral waterway with respect to the current flow within said canal, river or the like.

Within the box, weir or the like B equally spaced from the opposite side walls 14 thereof in proximity to the canal, river or the like A and rising vertically from the foundation or bed 15 of said box, weir or the like is a tubular stationary vertically disposed shaft 16 for the rotatable fitting therewith of a center hub 17 for the rotatable screen D.

The hub 17 of the screen D has suitably joined therewith diametrically opposed radially extending upper and lower spider arms 18 which are joined in any suitable manner at their outer ends with inner perpendicular angle bars 19 with respect to a cylindrical reticulated or wire mesh screen body 20. This body 20 is held against the bars 19 and made secure by clamping strips 21 outside of the said body and having fasteners 22 passed therethrough and engaged with the bars 19. These bars 19 at their upper and lower ends are joined with top and bottom tubular rings 23 maintaining cylindrical contour to the screen body 20.

Formed with the arms 18 concentric to the hub 17 are laterally offset pivot eyes 24, these being vertically aligned adjacent to the outer ends of the arms 18 and releasably accommodate pivot pins 25 for horizontally swinging water impact blades 26 adapted for movement toward and away from stop rods 27 vertically fitted between and to the said arms 18 to lie in the path

of movement of the blades 26. The blades 26, when contacting with the rods 27, will be disposed radially in conformity to the lay of the arms 18 within the screen body 21 and in this position receive impact from the water through current flow thereof within the canal, river or the like A. When the blades are swung away from the rods 27 on loosening full impact of the water in the current flow thereof and in the canal, river or the like A will feather the turbulent whirling stream of water set up by the rotary screen operating within the box, weir or the like B and in this manner eliminating any resistance to the water power imposed upon the said screen for the propulsion by the current flow present within said canal, river or the like. The screen D of the structure before set forth should be set within the box, weir or the like B for rotation on a vertical axis so that approximately one quarter of its diameter is in the flow of the current water within the canal, river or the like A and thus the blade 26 on that side of the screen with its one quarter diameter in the flow of the current will be in contact with the rod 27 next thereto for receiving the impact of the current flow and thus causing the screen D to revolve the remaining blades within the screen body 20 being now in feathering positions to relieve resistance in the rotary motion of the said screen D. As the screen revolves, moss, algae, debris or the like within the current flow becomes deposited on the outside of the screen until that area of the screen body covered by the said moss, algae, debris or the like approaches parallelism with the current flow in the canal, river or the like thence this deposit will be washed off by the water passing through the screen body 20. At this point the blade in that position previously stated swings free from the current and idles around away from the rods 27 next thereto in the rotation of said screen so as not to create any resistance to the rotation of the said screen. It is obvious that the water current within the canal, river or the like A is the power medium for propelling the screen and in the rotation of the latter the blades, which have previously lost impact from the current flow will feather the water in its twisted circulation within the screen D and the box, weir or the like B, respectively. The moss, algae, debris, or the like within the canal, river or the like A when lodging upon the screen body 20 is dislodged and caused to be carried down stream within the said canal, river or the like without flowing into the box, weir or the like B for deposit within the ditch C.

On the side wall 14 of the box, weir or the like B up stream with respect to the current flow of water within the said canal, river or the like A is arranged an adjustable deflector plate 28, being hinged at 29 to the said wall at the point of communication of the box, weir or the like with the canal and adjustment of this deflector plate 28 is had by a slotted bracket arm 30 fixed thereto with the slot 31 therein accommodating a fixed set screw 32 anchored in the wall 14 next to said plate 28, the latter being designed to deflect the current flow in the canal, river or the like A in the direction of the screen to vary the impact of such current flow against a blade 26 in its path interiorly of the screen body 20 of the rotatable screen D and in this manner the speed of rotation of the latter is regulated. At the same time the deflector plate 28 avoids the entrance of moss, algae, debris or the like into the box, weir or the like B at the upstream side thereof from the canal, river or the like A.

The screen body 20 is open at the top and bottom of the rotary screen and the shaft 16 at the upper end thereof has loosely seated thereon a bearing ball 33 with which contacts a disk-like cap or head 34 on the hub 17, which latter telescopes over the said shaft 16, as is clearly shown in Figure 3 of the drawings, and in this manner free rotation of the screen D is assured with minimum friction. The shaft 16 forms a lubricant container in that the center bore 35 therein receives a quantity of lubricant (not shown) for lubrication of the ball 33 in the working of the screen D. The shaft 16 has mounting at 36, the latter being suitably fixed or anchored in the bed 15 for the proper positioning of the screen D as hereinbefore stated.

The gate 12 at its upper end is fitted with a hand grip 37 so that said gate can be conveniently raised and lowered for regulating the flow of water into the ditch C from the box, weir or the like, the water being admitted from the canal, river or the like A.

It is preferable to have the blades 26 taper from their pivotal ends toward their free ends, as illustrated in Figure 3 of the drawings.

The lower open end of the screen body 20 is disposed in close relation to the bed 15 of the box, weir or the like and the height of the screen D is such that the screen body 20 thereof extends above the high water level in the canal, river or the like and the box, weir or the like, respectively, so that water will not overflow the said screen D in the working thereof and in this way eliminating any interference with the working of the blades for impact and feathering positions of the same.

In the operation of the screen, the screen body D rotates on a vertical axis and its rotation horizontally is in a direction following the direction of the flow of water or current within a stream. Such screen body travels at a rate of speed slightly less than the speed of travel of the water of a stream so that any objects or material flowing downstream and in the same direction of rotation of the screen body will be carried along in the stream by the current or flow thereof. When passing the outer edge of a deflector blade 26 downstream, such objects or material will be carried to a point well downstream upon the surface of the screen body, being held thereto until washed off by water passing through the mesh of the said screen body at a point that is in line with the outer edge of the deflector blade or parallel with the stream or just before the latter reaches this point. The deflector blade 28 is adjusted, not by any set rule other than to adjust it to the best performance of the screen in the working thereof. This deflector blade causes whatever objects or material, that is to say, debris, that is in the water to be deposited on the already downstream traveling area of the screen body at a point that is well downstream from that portion furthermost upstream or transverse to and at right angles with respect to the said stream. The debris will not go around the screen body as the current flow and the direction of travel of the said screen body are both downstream.

What is claimed is:

1. A rotary screen for an intake box to an irrigating ditch communicative with the body of water having downstream flow current, comprising a vertically disposed tubular shaft fix-

edly arranged within the box adjacent to and centered with respect to the point of communication of the said box with the body of water and forming a lubricant container, a ball seated upon said shaft and adapted to be lubricated by content thereof, a rotary reticulated screen body having a central hub telescoped over the said shaft, a disk-like head centered with respect to the said hub and contacting said ball, the screen body being extended a distance within the body of water at the point of communication thereof with the box, impact blades within said screen body and having their outer ends pivoted adjacent to the inner periphery of the said screen body for horizontal swinging movement, abutments built within the screen body and disposed inwardly of the pivots for said blades for contact by the latter and also holding the said blades radially within the screen body when in contact therewith for effecting rotation of the screen body in a direction of the downstream flow of the said body of water, and an adjustable deflector plate mounted at the point of communication of the box with the body of water next to the upstream side of the screen body and adapted for deflecting debris within the body of water outwardly away from the box at the upstream side of the screen body.

2. A rotary screen for an intake box to an irrigating ditch communicative with the body of water having downstream flow current, comprising a vertically disposed tubular shaft fixedly arranged within the box adjacent to and centered with respect to the point of communication of the said box with the body of water and forming a lubricant container, a ball seated upon said shaft and adapted to be lubricated by content thereof, a rotary reticulated screen body having a central hub telescoped over the said shaft, a disk-like head centered with respect to the said hub and contacting said ball, the screen body being extended a distance within the body of water at the point of communication thereof with the box, impact blades within said screen body and having their outer ends pivoted adjacent to the inner periphery of the said screen body for horizontal swinging movement, abutments built within the screen body and disposed inwardly of the pivots for said blades for contact by the latter and also holding the said blades radially within the screen body when in contact therewith for effecting rotation of the screen body in a direction of the downstream flow of the said body of water, an adjustable deflector plate mounted at the point of communication of the box with the body of water next to the upstream side of the screen body and adapted for deflecting debris within the body of water outwardly away from the box at the upstream side of the screen body, and an adjustable gate arranged with the said box at that side next to an irrigating ditch.

3. A rotary screen for an intake box to an irrigating ditch communicative with the body of water having downstream flow current, comprising a vertically disposed tubular shaft fixedly arranged within the box adjacent to and centered with respect to the point of communication of the said box with the body of water and forming a lubricant container, a ball seated upon said shaft and adapted to be lubricated by content thereof, a rotary reticulated screen body having a central hub telescoped over the said shaft, a disk-like head centered with respect to the said hub and contacting said ball, the screen body being extended a distance within the body of water at the point of communication thereof with the box, impact blades within said screen body and having their outer ends pivoted adjacent to the inner periphery of the said screen body for horizontal swinging movement, abutments built within the screen body and disposed inwardly of the pivots for said blades for contact by the latter and also holding the said blades radially within the screen body when in contact therewith for effecting rotation of the screen body in a direction of the downstream flow of the said body of water, an adjustable deflector plate mounted at the point of communication of the box with the body of water next to the upstream side of the screen body and adapted for deflecting debris within the body of water outwardly away from the box at the upstream side of the screen body, an adjustable gate arranged with the said box at that side next to an irrigating ditch, and means for adjustment of the said deflector plate and holding it in a determined adjusted position.

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