

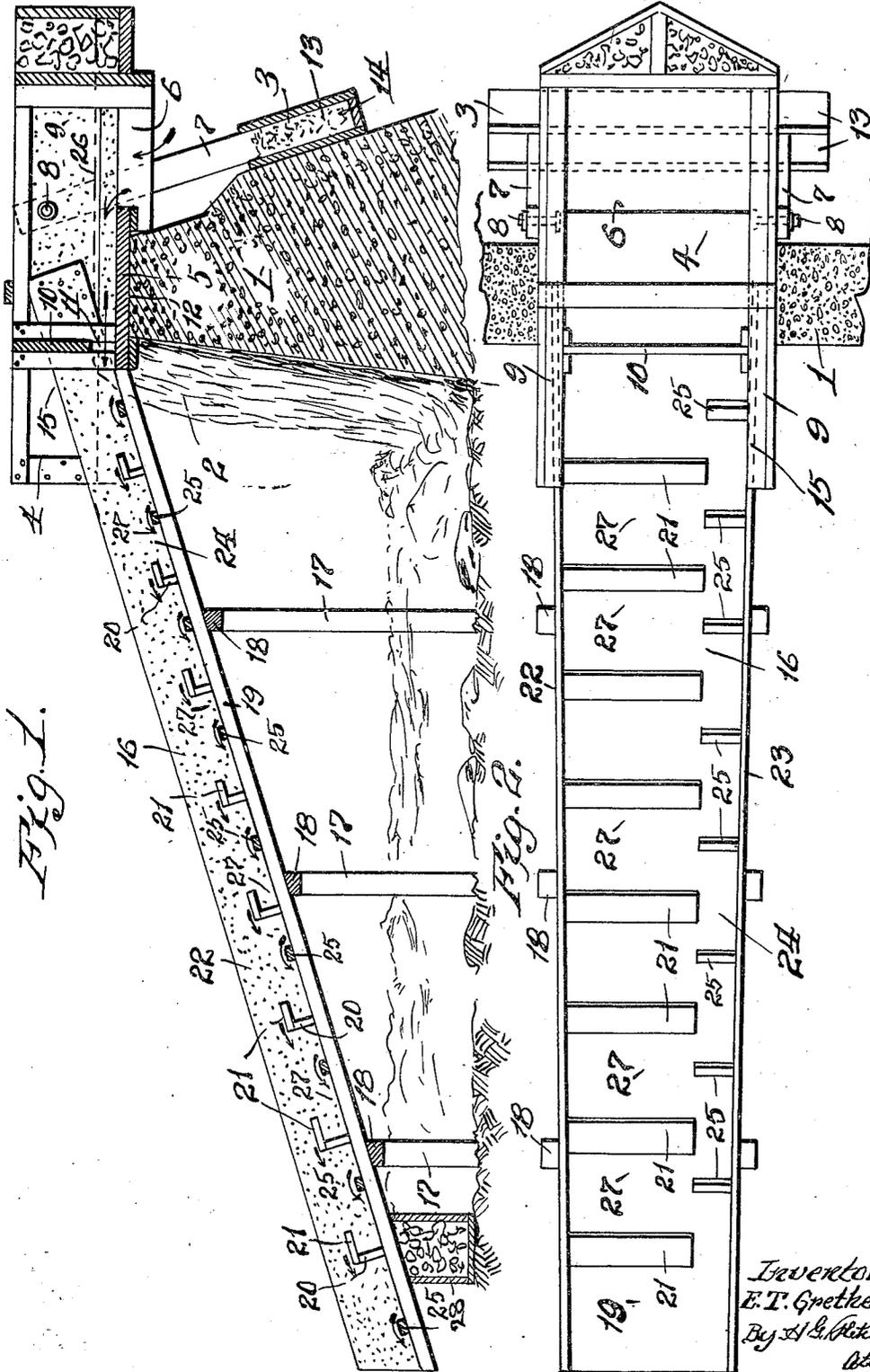
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HYDROSTEP FOR FISH STREAMS

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# UNITED STATES PATENT OFFICE

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## HYDROSTEP FOR FISH STREAMS

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This invention relates to an improvement in hydrosteps used in connection with dams of streams so that fish can traverse the step and surmount the dam, the primary object 5 of the invention being for the purpose of providing the step with improved means for providing a water raceway capable of being traversed by the fish as they travel up-stream and with means for providing water pockets 10 which are disposed offset from the raceway.

Another object of the invention is in providing a hydrostep with a raceway and water retarding means which form part of the step.

A further object of the invention is in providing a hydrostep with means whereby water pockets which are relatively quiet or calm which are arranged adjacent the water raceway so that the fish can enter the pockets from the raceway and remain there for a 20 period of resting before again entering the raceway for the purpose of surmounting the water dam in the stream.

Other and further objects will appear in the specification and be specifically pointed 25 out in the appended claims, reference being had to the accompanying drawings, exemplifying the invention, and in which:—

Figure 1 is a longitudinal section of this improved hydrostep having the bottom wall 30 thereof in side elevation and showing the application of this improved step to the dam of a water stream.

Figure 2 is a plan view of Fig. 1.

Referring by numerals to the accompanying 35 drawings, 1 designates a dam over which the waterfall 2 traverses, and secured on top of the dam in a horizontal position by an anchoring member 3 is a crib 4, the bottom 5 of the crib having an opening 6 formed therein at the up-stream end thereof. The anchoring member 3 is provided with a pair of depending side pieces 7, each being swing- 40 ably secured at their upper ends at 8 to the sides 9 of the crib, said crib having an end board 10 disposed intermediate of the length thereof, said board terminating a distance 45 from the bottom 5 of the crib, thereby providing a water outlet 11.

In mounting the crib 4 on top of the dam 50 it is preferable to provide a depression or

ditch designated at 12 on the top of the dam, and the crib is floated down-stream into position on top of the dam, care, however, being taken to first board over the openings 6 and 11 to give it as much buoyancy as possible, 55 and as the crib nears the dam, the anchoring member 3 which has been held in an approximate horizontal position is lowered into the water and the water pressure will engage the boarding or side 13 of the lower end of the 60 member 3, thereby forcing the anchoring member against the dam. If desired, a quantity of sand can be placed in the pocket 14 which is formed in the lower end of the member 3, the then weighted end of the an- 65 chor assisting the lowering operation, and after the member 3 has been lowered against the dam, the weighted sand therein and the water pressure against the boarding 13 will hold the crib in position on top of the dam. 70

Secured to the discharge end 15 of the crib and in communication with the outlet 11 is a chute 16, said chute being secured in a downwardly inclined position from the crib 75 by the vertical posts 17 and the cross sills 18, the lower end of said chute being engaged in the water stream at a distance below the waterfall.

The crib 16 is wider at its upper end than at its lower end, and transversely disposed 80 in said chute and extending upwardly from the bottom 19 thereof, are a series of spaced apart vertically inclined members 20, each having an over and upwardly extending portion 21, said members 20 and their respective 85 portions 21 abutting against the side wall 22 of the chute, whereas the opposite ends of said members 20 and portions 21 are each disposed a distance away from the side wall 23 of the chute, thereby providing a longi- 90 tudinally extending runway or raceway 24 on one side of the chute. Disposed in staggered relation to the members 20 on the bottom of the chute 19 and abutting the side wall 23 of the chute, are a series of water 95 baffling strips 25.

When this improved hydrostep is placed in position as described, the water above the dam will enter the opening 6 by reason of the bottom 5 of the crib 4 being disposed a 100

distance beneath the water surface 26, the water after entering and traversing over the bottom 5 of the crib flowing through the outlet opening 11 into the chute 16 and the water in addition to traversing the runway 24 will flow over the portions 21 into the pockets or dwells 27 provided between respective pairs of members 20, the portions 21 of said members 20 on account of their upwardly inclining positions, preventing any appreciable water falls being formed in the pockets 27 as the water will glide over the surface of the portions 21, said portions 21 also tending to hold the water back in the respective pockets 27. This arrangement of pockets provides relatively quiet bodies of water therein.

As it is well known how fish have a natural bent to travel up-stream particularly during the migratory season, the fish will enter the body of water traversing the runway 24 from the stream and travel along the runway, and in event that the fish become exhausted by reason of the current in the runway being too strong, they will enter into one or other of the pockets 27 where they will remain for a period of time before again upwardly traveling the runway. It is obvious that certain fish may enter into each respective pocket as they alternately leave the runway 24. The fish upon entering the crib will pass downwardly through the current surging through the opening 6 of the crib and into the body of water above the dam.

It is obvious that the fish can travel downstream by entering the crib through the opening 6.

It is to be noted that the members 20 are less in height adjacent the upper end of the chute than the members at the lower end of the chute. This is for the purpose of retarding the water so that there will be a sufficient depth of water in the chute, the entire length thereof, the converging of the side walls of the chute assisting the retarding of the water and maintaining the sufficient water depth.

It is preferable to camouflage the chute 16 and crib 4 by painting them a dark color such as brown, and to sand-cast them so as to present a natural appearance thereto.

Inasmuch as the lower end of the chute 16 engages the water stream, a ballast box 28 is secured to the lower end thereof for preventing the chute being lifted by the current of the stream, said box being filled with a ballast such as rock.

What I claim is:—

1. A hydrostep to be placed in water streams comprising a chute, and a series of vertically disposed members extending from the bottom of said chute and arranged transversely thereof, and a runway disposed lengthwise of said chute on one side thereof.

2. A hydrostep comprising a chute disposed inclined so as to entrain water from a

dam, said chute having a series of transversely disposed vertically inclined members spaced apart from one another thereby providing water pockets in said chute, and a runway formed longitudinally in said chute in communication with said water pockets.

3. A hydrostep for a water dam comprising an inclined chute having a series of transversely disposed spaced apart members, each of said members having an overextending portion formed on the top thereof, and a longitudinally extending runway formed in said chute.

4. A hydrostep for a water dam comprising an inclined chute having a series of transversely disposed spaced apart members, said members adjacent the upper end of said chute being of lesser height than the members adjacent the lower end of said chute, and a longitudinally extending runway formed in said chute at one side of said members.

5. A hydrostep for a water dam comprising an inclined chute having a series of transversely disposed spaced apart members extending upwardly from the bottom of the chute, each of said members having an overextending portion formed on the top thereof, said members adjacent the upper end of said chute being of lesser height than the members adjacent the lower end of said chute, and a longitudinally extending runway formed in said chute.

6. A hydrostep for a water dam comprising an inclined chute having a series of transversely disposed spaced apart members, each of said members having an overextending portion formed on the top thereof.

7. A hydrostep comprising a chute disposed inclined so as to entrain water from a dam, said chute having a series of transversely disposed vertically inclined members spaced apart from one another thereby providing water pockets in said chute, a runway formed longitudinally in said chute in communication with said water pockets, and baffling strips in said runway disposed in staggered relation to said members.

8. A hydrostep comprising a chute disposed inclined so as to entrain water from a dam, said chute being wider at its upper end and having a series of transversely disposed vertically inclined members spaced apart from one another thereby providing water pockets in said chute, and a runway formed longitudinally in said chute in communication with said water pockets.

9. A hydrostep for a water dam comprising an inclined chute which is wider at its upper end than at its lower end and having a series of transversely disposed spaced apart members, each of said members having an overextending portion formed on the top thereof, and a longitudinally extending runway formed in said chute.

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