

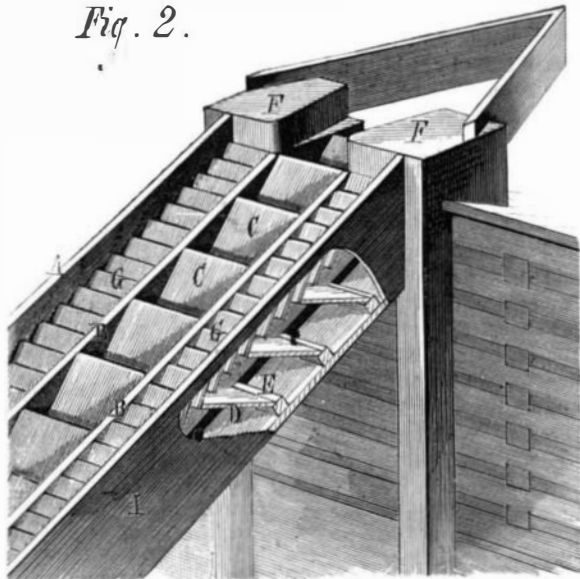
A NEW FISH WAY.

To provide a practicable passage for fish over dams or other obstructions, a current of water must be conducted from the upper level to the lower, with such velocity that fish may readily swim it, and under such conditions that they may readily find it.

Heretofore this has been accomplished in one of two ways. Either the total fall to be overcome has been broken into a succession of falls, connected by pools, as is common in the salmon ladders of Europe, or, second, the water is compelled to traverse a tortuous path down a flat incline—the tendency to increased velocity being controlled by the friction produced by the incessant changes of direction.

The greatest slope allowable for dams of any height is about one foot in twelve, and the length of the water way

Fig. 2.



McDONALD'S FISH WAY.

being about three times the length of the incline, it follows that fish, to overcome a fall of one foot, must swim a distance of thirty or forty feet, with continual changes of direction, and at every turn encountering baffling swirls or eddies.

In the fish way here illustrated and described the water is delivered down a straight sluice way having an inclination of one in three; on either side the water is banked with a slight upward and inward impulse, while down the center a current flows with uniform motion, being no faster at the foot of the way than it is at the top. The velocity of the central current may be regulated to four, three, or two miles an hour, as may be desired. The simple device by which these marvelous results are obtained will be readily understood by a careful study of the accompanying engravings.

Fig. 1 is a perspective view of the way as it appears when in operation. It is represented as built of timber, attached to a crib dam, and anchored to a rock bottom by means of iron rods. The intervening supports may be piles, as in the engravings, stone cribs, or trestles. The builder will determine the best modes of securing according to the circumstances of the particular case. At the head of the way is shown a V-shaped guard of timber, the lower edge of which is a few inches below the level of the crest of the dam. This will deflect the light floating material (sticks, leaves, etc.) and prevent any interference with the working of the way.

Fig. 2 is a perspective view of the upper portion of the way, with the side broken away to show the internal construction. Fig. 3 is a sectional view of the same.

The course of the water in the way is shown by the arrows. This fish way, when made in its simplest form, is a rectangular timber trough, two feet wide and two feet deep, inside dimensions. One end of the trough rests against the crest of the dam, the other in the pool below. The trough is firmly secured to the dam and to the bottom, and supported at intermediate points if necessary. Transverse cleats, E, three inches high, at intervals of twelve inches, are nailed to the bottom of the trough. The stringers, B, rest upon the cleats, dividing the trough into three longitudinal compartments, the middle one being twelve inches wide, the lateral compartments being five and a half inches each. The stringers are one inch boards, ten or twelve inches, set on edge. The middle section of the way is divided by the inclined portions or buckets, C, into a series of compartments, as shown in Figs. 2 and 3. The lateral sections are similarly divided by partitions or buckets, D, inclined in a reverse direction, into a

series of compartments, communicating below by the openings between the cleats, E, with the corresponding middle compartments. The division of the lateral longitudinal compartments is completed by the series of directing plates, G. The water is brought into the way through a notch or sluice in the dam, two feet wide and six inches deep, and the interior hollow floor of the way is beveled off level with the bottom of the sluice way through the dam. The shoulder blocks, F, prevent the water from the dam overriding the lateral banked eddy water.

The water passing through the sluice from the dam tends to continually sink in the middle line of buckets and emerge at the sides at a lower level the difference of head and the directing plates, G, causes it to bank up on the sides and feed back to the middle of the way. The sinking in the middle is compensated in this way, and a constant depth and constant velocity is maintained from the top to the bottom of the way.

Mr. McDonald, the patentee of this way, claims that it delivers the water down a straight sluice, and under such conditions as closely to simulate the natural flow, and that the moderate velocity of descent offers no impediment to the ascent of the most sluggish fish. It may be built on a slope of one in three, or even greater, and it need not be wider than the water way, and does not require a great amount of material in its construction. It may be adapted to any water supply, and for a given capacity secures the greatest economy in the use of water. For our small streams, to pass alewives, etc., it may be roughly built of boards, with saw and hammer, at a low cost, or it may be expanded so as to throw the entire volume of a river through it.

From its compactness and lying so close under the dam, it possesses greater immunity from freshets, and can be protected with less cost than other ways.

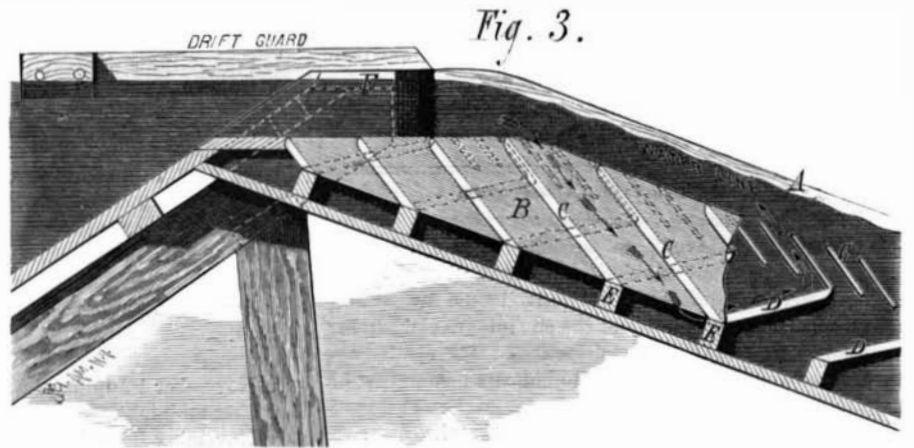
This fish way has been adopted by the Board of Public Works of Virginia, and its erection made obligatory on all dams in the State. Mr. Marshall McDonald, of Lexington, Va., the patentee of the way, is the Fish Commissioner for the State of Virginia.

A PARIS review of the sugar trade says: "Beets are worse than was expected from the appearance of the growing crops, but the amount of the deficit cannot yet be estimated."

MISCELLANEOUS INVENTIONS.

An improved bale tie, patented by Mr. Robert G. Stewart, of Augusta, Ga., consists of a cast buckle having three openings or band slots, of which the central opening is longer than the side openings, and communicates through a tapering throat with one of the side openings, and in which also the side openings are formed in a portion of the buckle which dips downwardly at a sharp angle into a different plane from the main central portion of the buckle, the buckle being designed to be used with a band whose bent ends occupy a position around the bars of the middle section, while the free ends of the band pass above the outer sections of the buckle, so that they are held by a positive bearing surface without depending upon the expansion of the bale for holding it.

Mr. William Mather, of Salford, county of Lancaster, England, has patented an improvement in apparatus for damping woven fabrics by means of a spray or sprinkling of water upon the fabric after starching or stiffening. It



LONGITUDINAL SECTION OF FISH WAY.

consists of a damping roller made of metal, with an engraved surface. The damping roller revolves in a trough containing the water, and a doctor, of India rubber or other suitable material, is applied to the damping roller to remove the excess of moisture. The fabric or other material is pressed against the damping roller by a roller supported in a swing frame.

Mr. William P. Gilmer, of Mount Airy, N. C., has patented improvements in clamps for holding the boxes under the plunger of presses for compressing plug tobacco in the boxes. The object of the invention is to enable boxes of different sizes to be clamped and held securely under the plunger and in the proper position relative thereto.

Mr. William J. Taber, of Lookout Station, Wyoming Ter., has patented an improved trap for catching bears, wolves, and other animals. The invention consists in the combination of four curved spring bars provided with hooks and a trigger, and catches. The trap is hung upon a tree, stake, or bush, so that the bait will be within reach of the animal to be caught. Dogs, wolves, bears, and many other animals will seize a piece of flesh with their jaws and bolt it down. This operates the trigger and releases the spring hooks.

An improved combined filter and supply pipe has been patented by Mr. James Gainey, of Augusta, Ga. The invention relates to improvements in the arrangement of a filter in connection with the supply pipe of a house. It consists in combining a filter with a three-way cock by means of connecting pipes, so that filtered or unfiltered water may be drawn from the same locality and at any part of the house.

Mr. Sylvanus B. Crane, of Davenport, Iowa, has patented an improved electrical passenger recorder, designed to register all of the passengers of a railway car, whether sitting upon the seats, standing between seats, sitting on the arm rests, standing in the aisle, or standing upon the steps outside of the car, and it operates upon the general principle of closing an electric circuit by the depression of the support upon which the passenger may be sitting or standing.

Mr. James Gardiner, of Mantua, N. J., has patented an improvement in the class of portable apparatus used in scalding swine. It consists of a tub or boiler having appliances for raising and lowering the carcasses of swine, and a furnace or fire box on which the tub rests.

A paper bag machine, patented by Mr. Otis E. Davidson, of Clarksville, Tenn., is an improvement in the class of machines adapted to form satchel-bottomed bags having a single lengthwise seam or lap. The invention consists in novel mechanism for feeding and pasting, and also creasing, the continuous web of paper,

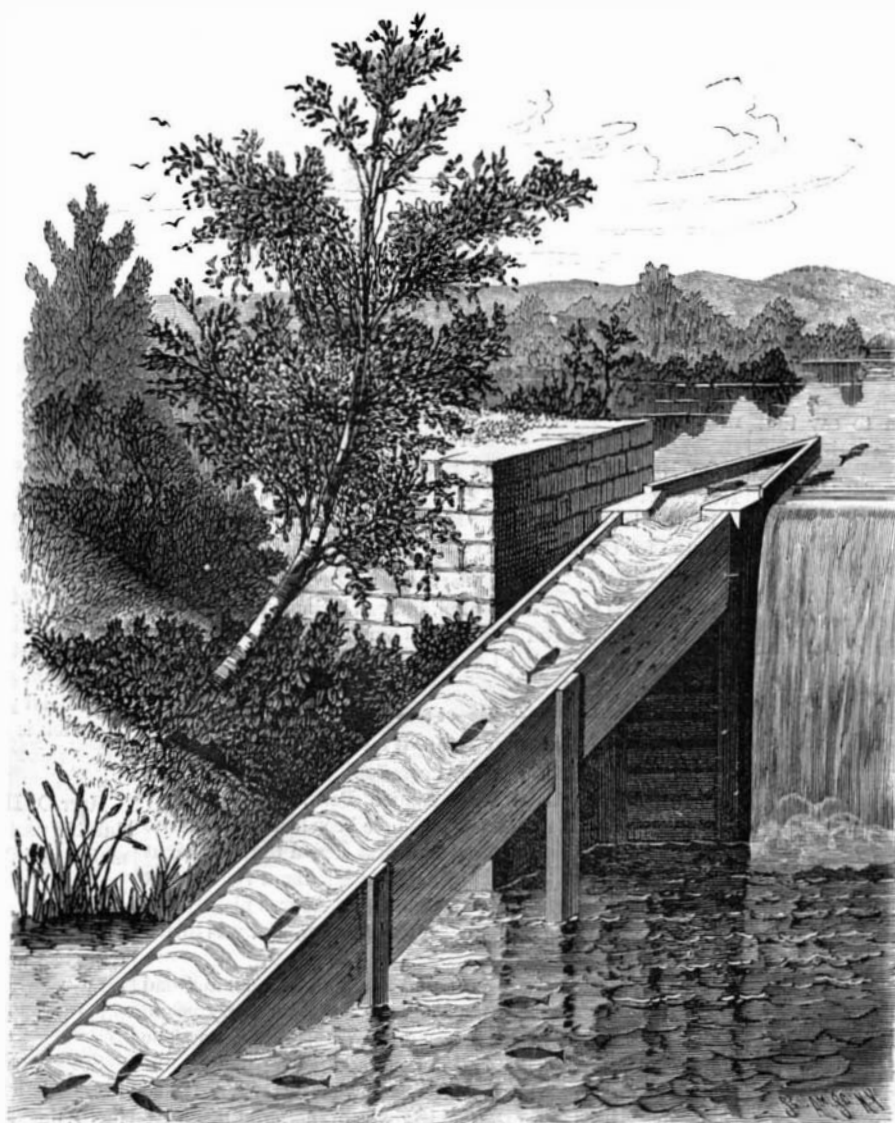


FIG. 1.—McDONALD'S FISH WAY.