J. B. KIRBY.

LAKE OR POND.

APPLICATION FILED NOV. 24, 1919.

1,376,889.

Patented May 3, 1921.

2 SHEETS—SHEET 1.

Fig. 1

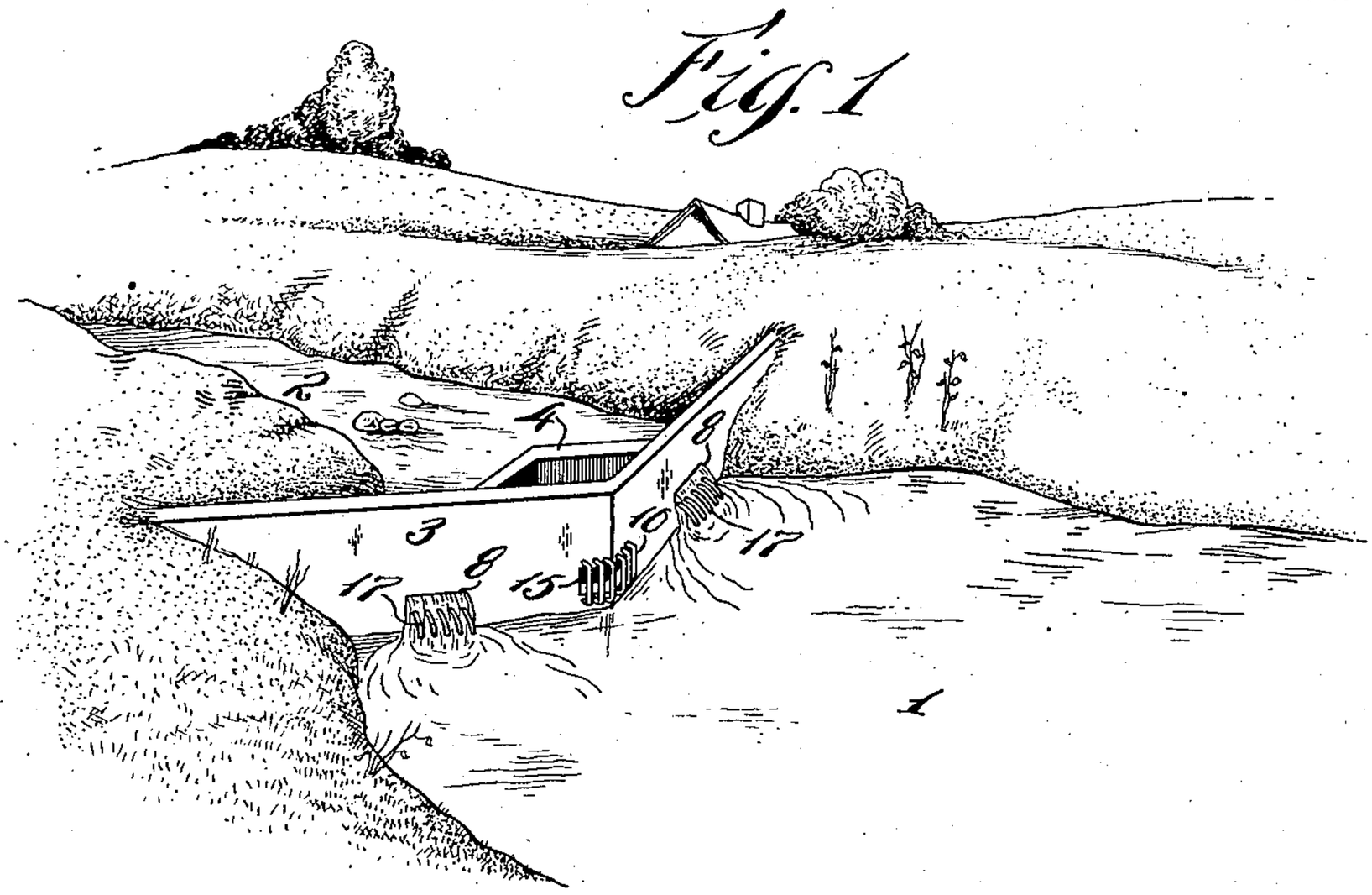


Fig. 2

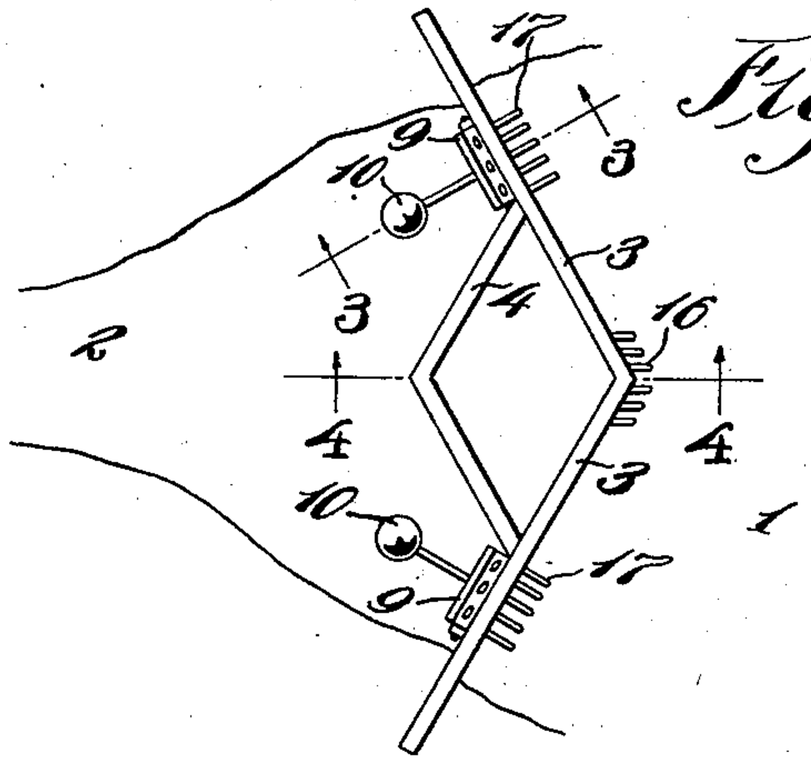


Fig. 3

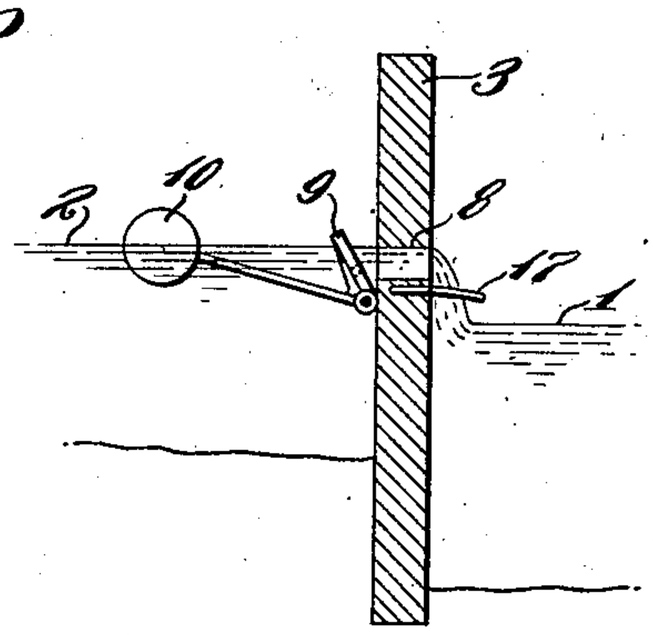
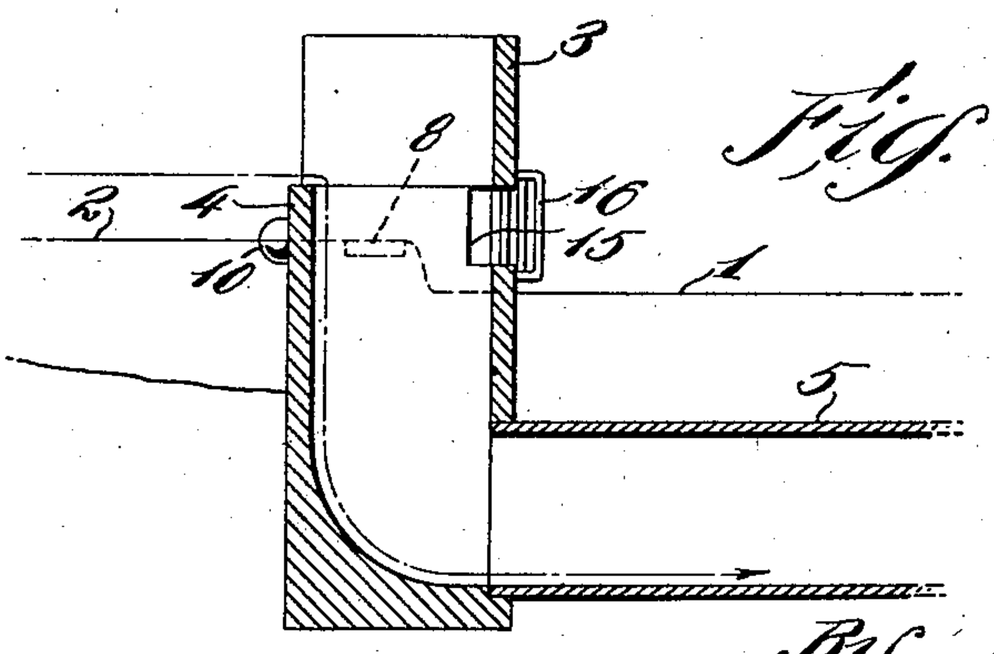


Fig. 4



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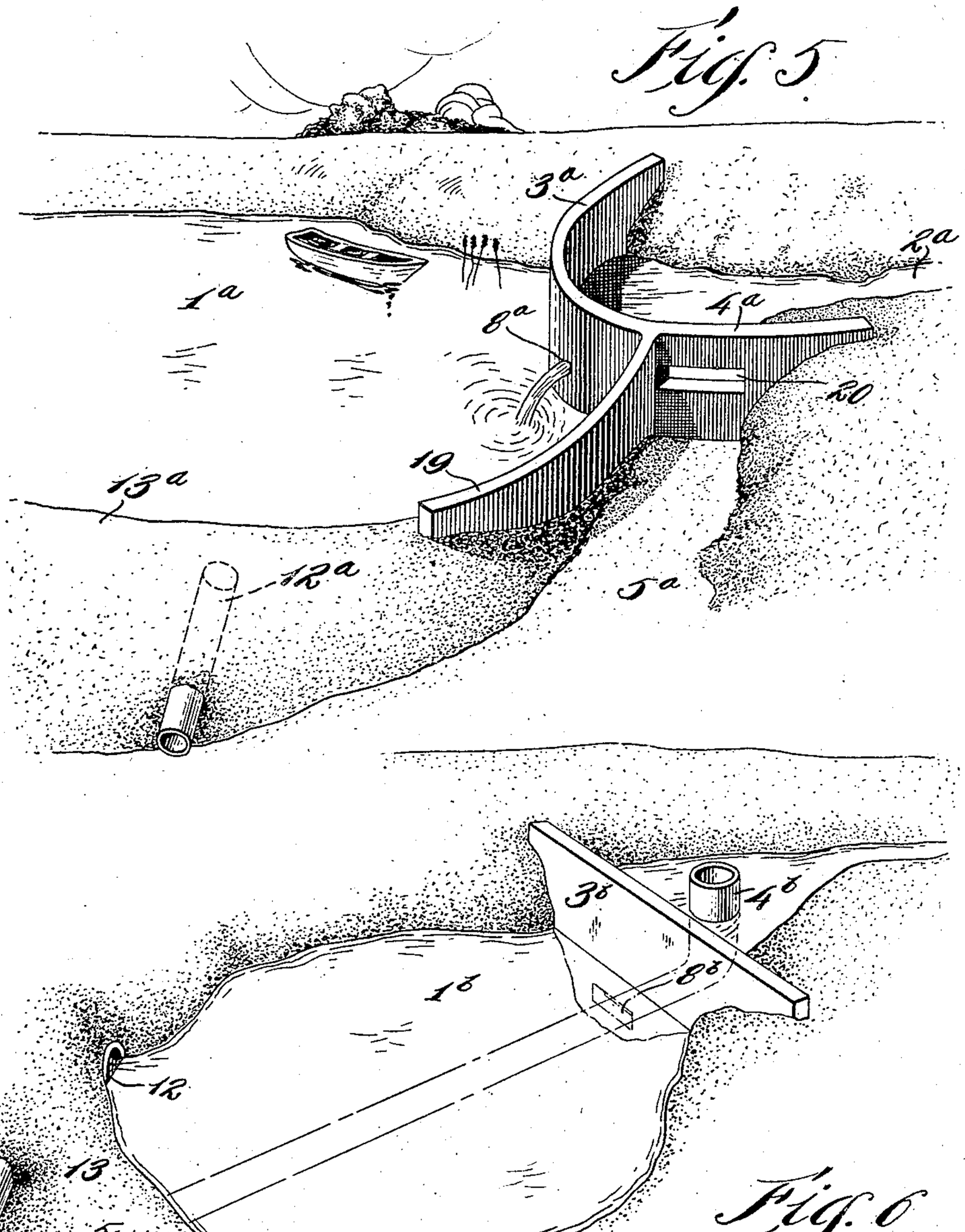
2 SHEETS—SHEET 2.

Fig. 5



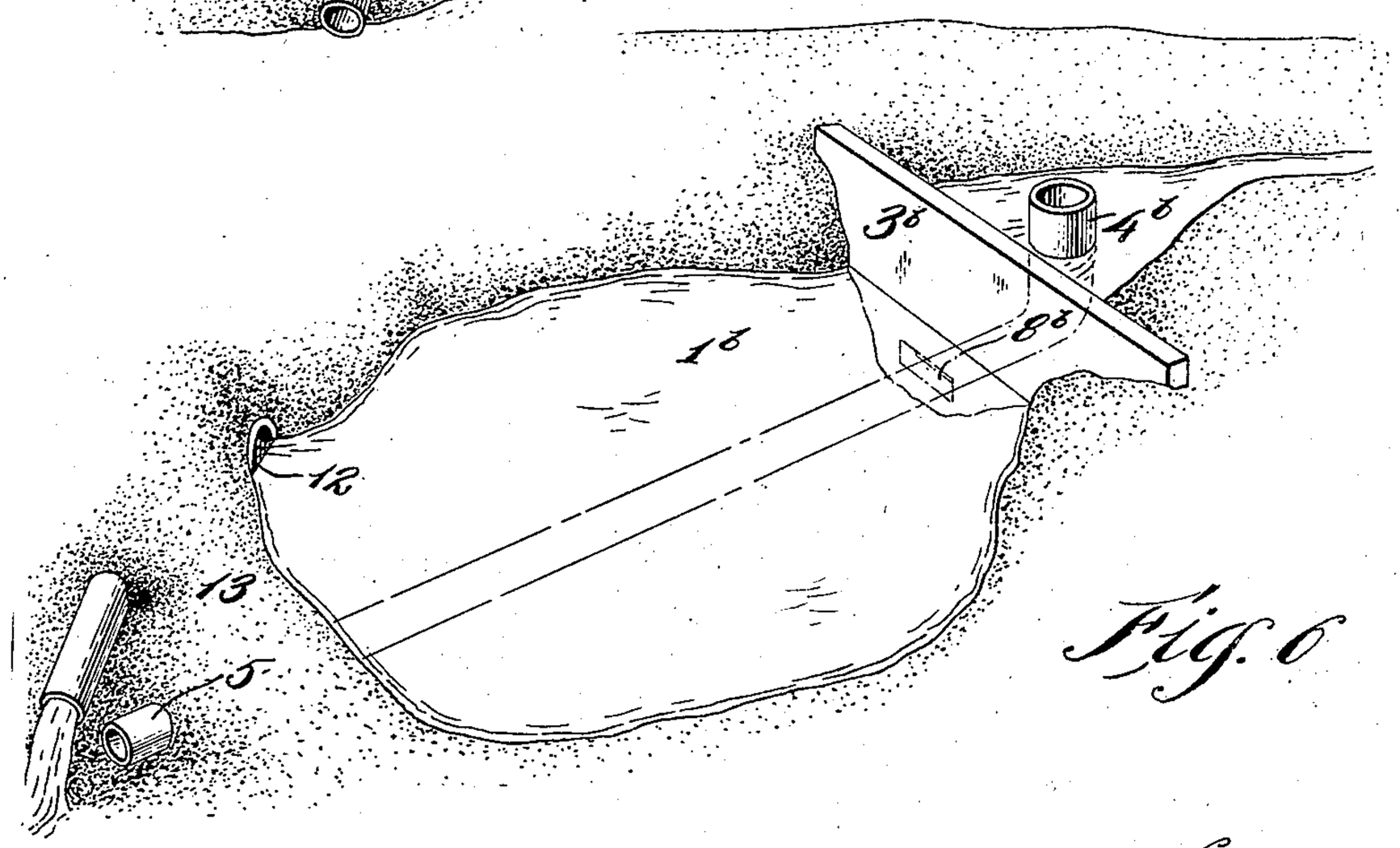


Fig. 6

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UNITED STATES PATENT OFFICE.

JAMES B. KIRBY, OF CLEVELAND, OHIO.

LAKE OR POND.

1,376,889. Specification of Letters Patent. Patented May 3, 1921.

Application filed November 24, 1919. Serial No. 340,145.

To all whom it may concern:

Be it known that I, JAMES B. KIRBY, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Lakes or Ponds, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to lakes or ponds and especially to those of the artificial type as frequently constructed for bathing or landscape purposes, for fish-preserves, duck-ponds, ice-formation, and the like. The customary mode of creating such a pond artificially is to build a dam across a narrow valley and permit the run-off water to collect in the basin so formed up to a height determined by a suitable spill-way, all of the water falling into or running down the valley passing through this lake and over the spill-way. Owing to the mud and detritus which washes into such lakes at flood seasons or after heavy rains, the same become rapidly polluted with a soft muck which is extremely unpleasant for bathing, inimical to the better kinds of fish, and often fills up the lake in a short time.

The objects of the present invention are the provision of a new and improved construction for artificial lakes whereby the first cost can be greatly decreased, the life of the lake greatly prolonged, the fouling of the water nearly or quite prevented, and the deposition of sediment completely avoided; the provision of new and improved means for keeping offensive material from finding its way into such a lake; the provision of means for permitting food fish to enter the lake while preventing the cultivated fish therein from escaping; while further objects and advantages of the invention will become apparent as the description proceeds.

In the drawings accompanying and forming a part of this application, I have illustrated certain embodiments of my said invention although it will be understood that these are intended to be illustrative only of my general idea since the particular physical structure in which it is embodied may vary greatly and will, in fact, be seldom alike in two instances. In these drawings Figure 1 is a view of the head of an artificial lake embodying my improvement, showing one of the feeding streams and the means for controlling the same; Fig. 2 is a top plan view of the dam shown in Fig. 1; Figs. 3 and 4 are vertical sectional views corresponding to the lines 3—3 and 4—4 of Fig. 2; and Figs. 5 and 6 are perspective views of other artificial lakes showing modified embodiments of my invention.

The essence of my invention consists in permitting the entrance into the lake of only the fair-weather amount of water from the tributary streams, and side-tracking the storm water through an independent channel, thus avoidingthe entrance of the polluted water into the lake and also avoiding the necessity of constructing the spill-way of a size and character to withstand the flow of such a large volume of water. Indeed by employing my invention, the dam can frequently consist merely of a dirt-fill without any stone or concrete construction whatever; or if, for reasons of safety, it is desired to provide for emergency overflow, a thin concrete plate will serve the temporary purpose without necessitating the solidity of construction required for a continuous overpour of water. The saving in the cost of such a fill over that of a concrete dam is ordinarily several times the cost of the conduit or by-pass channel.

Describing first by reference characters the features illustrated in the first four figures, 1 represents the body of the lake at normal level and 2 represents a tributary stream. Between the stream and lake I erect a suitable dam 3 of sufficient height never to be overtopped by the water; and upon the upper side of such main dam I provide a secondary dam 4 of lower height. Communicating with the space between the dams 3 and 4 is a conduit 5 which leads to a place of suitable discharge, and is made of a size to accommodate the entire inflow of the stream 2 under flood conditions. Ordinarily this conduit is merely laid on the ground along the bottom of the valley before the lake is created, its upper end connected to the dam 3 so as to carry away the usual water flow, and the lower end

subsequently bridged by an ordinary earth-fill as shown in Fig. 6.

In the dam 3, outside of the limits of the auxiliary dam 4, are formed one or more apertures 8 of a size to take the normal fair-weather flow of the tributary stream. These apertures are generally located at a point above the level of the lake 1 and below the top of the auxiliary dam 4. This normal flow being of clear water, the water in the main lake will be kept replenished and purified at all times. Upon any rise of the tributary stream, however, the apertures 8—8 will be unable to carry the overload, wherefore the water will rise behind the main dam until it overflows the auxiliary dam and escapes by way of the conduit 5, carrying with it the main part of the sediment and mud which accompanies storm water.

Owing to the fact that such storms are frequently of short duration and the water quickly becomes clear it is seldom necessary to close the apertures 8 during this period owing to their small size as compared with the entire run-off; but in cases where the storm-water condition is long continued or wherein the condition of the soil is such that streams become muddy even upon a small rise, I provide suitable valves 9 for the same, operated by floats 10 in such wise as to obstruct the apertures upon any rise of the water above the top of the secondary dam 4.

The normal overflow of the lake 1 is taken care of very simply by means of an overflow pipe 12 passing through or near the fill 13, and ordinarily need be made very little larger than enough to dispose of the normal; however, in order to accommodate any overplus such as might occur by reason of a heavy shower draining directly into the lake rather than through its tributaries, I have in Figs. 1, 2 and 4 shown the face of the dam 3 as provided with an auxiliary outflow opening 15 located slightly above the normal level of the lake and opening into the space defined between the two dams. It is entirely feasible, structurally, to accommodate the entire overflow of the lake in this way, provided only that some means be employed to distribute the inflowing water to a point sufficiently distant to produce a proper circulation of the water in the pond. The lower dam is preferably higher than the upper dam so that under flood conditions the latter can be submerged and all water escape through the conduit 5.

I have shown the aperture 15 as provided with bars 16 to prevent the escape of fish from the lake 1, and have shown the apertures 8—8 as provided with teeth 17 for the same purpose, the latter being located below these apertures and projecting horizontally through the stream so as to prevent fish from leaping the current without preventing minnows from entering the lake.

It is not necessary that the storm-water by-pass be a closed conduit or that it pass beneath the pond. In Fig. 5, I have shown it as in the form of an open canal 5^a, this being a particularly convenient arrangement when the valley makes a sudden turn. In this case, the main dam is indicated at 3^a, while 19 represents a buttress which forms one side of the canal and runs into the embankment 13^a. The auxiliary dam is shown at 4^a, being here of the same height as the main dam but having an opening 20 therein at a point below the top of the main dam, while the latter has an aperture 8^a therein at a still lower level for the passage of the normal water supply from the tributary stream 2^a. The overflow pipe is shown at 12^a and delivers into the canal 5^a at a lower point.

In the embodiment shown in Fig. 6 the auxiliary dam 4^b consists merely of the upturned end of the conduit 5, located at any suitable point behind the main dam 3^b and sufficiently below the top thereof so as not to permit the latter to be overflowed. The main dam is here shown as formed with the fair water opening 8^b at a point below the main lake level so as to avoid any danger of its stoppage by ice.

It will be understood that my invention is capable of embodiment in a great number of physical structures and I do not confine myself in any way except as specified in the claims hereto annexed.

Having thus described my invention, what I claim is:—

1. In combination, a pair of dams spaced along an open water-course, a conduit communicating with said water-course and extending thence to a point below the lower dam, means for permitting the flow past the upper dam of the amount of water ordinarily flowing in said water-course in fair weather, and means for diverting into said conduit all water in excess of such fair weather amount.

2. In combination, a pair of dams spaced along a water-course and a by-pass conduit extending from the upper dam to a point below the lower dam, said conduit opening into the water-course at its upper end at a level between that of the lake and the top of the uppermost dam, and said uppermost dam having an opening therethrough below the inlet mouth of said conduit sufficient to receive the normal fair weather flow of water in said water-course, and means for preventing fish from passing through said opening up stream, while permitting them to pass through down stream.

3. In combination, a pair of dams spaced along a water-course, and a by-pass conduit extending from the upper dam to a point below the lower dam, there being an overflow past the lower dam at a level below the top of either dam, and the upper dam having

an opening therethrough sufficient to accommodate the fair weather flow of water in said water-course, said conduit opening into the water-course above said upper dam at a level above that of said overflow and also above that of the opening in the upper dam.

4. In combination, a pair of dams spaced along a water-course, and a conduit independent of said water-course extending from the upper dam to a point below the lower dam, there being an overflow past the lower dam at a level below the top of either dam, and the upper dam having an opening therethrough sufficient to accommodate the fair weather flow of water in said water course at a level above that of said overflow, said conduit opening into the water-course above said upper dam at a level above that of said opening and below the top of the dam.

5. The combination with an artificial lake having a tributary water-course, of a dam across said water-course above said lake, there being a passageway for water from said tributary to said lake past said dam and located at a level below its top, said passageway being of a capacity to accommodate the normal water flow in said tributary and a conduit independent of said lake communicating with said tributary at a level between the top of the dam and the level of the first passageway and discharging at a point outside of said lake and having a capacity sufficiently great to accommodate the storm-water flow in said tributary.

6. The combination of an artificial lake having a tributary water-course, of a dam across said water-course above the lake, there being a passageway from said tributary to said lake located at a level below the top of said dam and having a capacity substantially equal to the clear-weather flow in said water-course, and a by-pass conduit opening into said water-course above said dam at a level intermediate said first passageway and the top of said dam, said conduit discharging at a point outside of said lake.

7. In combination, a pair of dams spaced along a water-course and a by-pass conduit extending from the upper dam to a point below the lower dam, there being an overflow past the lower dam at a level below the top of either dam and the upper dam having an opening therethrough at a level above that of said overflow sufficient to accommodate fair-weather flow of water in said water-course, and a plurality of spaced rods or wires located beneath the discharge mouth of said opening and traversing the stream which flows therethrough, said by-pass conduit opening into the water-course above said upper dam at a level above that of said opening and below the top of the dam.

8. The combination with an artificial lake having an open tributary water-course, of means for permitting the admission into said lake of the normal fair-weather amount of water from said water-course, and means for automatically diverting all flow through said water-course in excess of such amount prior to its reaching said lake and for discharging the same outside of said lake.

9. The method of maintaining unsullied the waters of an artificial lake which is fed by an open tributary water-course, which consists in admitting to said lake only the normal fair-weather flow of water in said water-course, and diverting all flow in excess thereof, prior to its entrance into said lake.

10. In combination, a pair of dams spaced along a water-course and a by-pass conduit independent of said water course extending from the upper dam to a point below the lower dam, said by-pass conduit opening into the water-course at a point above the upper dam at a level between that of the lake and the top of such upper dam and said upper dam having an opening therethrough below the inlet mouth of said by-pass channel sufficient to receive the normal fair weather flow of water in said water-course and means for preventing fish from passing through said opening up stream, while permitting them to pass through down stream.

11. In combination, a pair of dams spaced along a water-course, and a by-pass conduit extending from a point above the upper dam to a point below the lower dam, there being an overflow past the lower dam at a level below the top of either dam, and the upper dam having an opening therethrough sufficient to accommodate the fair weather flow of water in said water-course, said conduit opening into the water course above said upper dam at a level above that of said overflow and also above that of the opening in the upper dam, and means for automatically stopping the flow through said opening during the time that water is flowing through said conduit.

12. In combination, a pair of dams spaced along a water-course and a by-pass conduit communicating with said water course above the upper dam and leading to a point below the lower dam, there being an overflow past the lower dam at a level below the top of either dam and the upper dam having an opening therethrough at a level above that of said overflow sufficient to accommodate the fair weather flow of water in said water-course, means for preventing fish passing through said overflow in either direction, and means for preventing fish from passing upstream through said opening.

13. The method of maintaining pure the waters of an artificial lake which is fed by an uncovered tributary stream which consists in permitting the entrance into the lake

from said stream of only the fair weather amount of water flowing therein, and diverting out of said tributary prior to reaching said lake all water in excess of that amount.

14. The method of producing a clear water artificial lake which consists in constructing spaced dams across a water-course, permitting only the fair weather amount of water to flow past the upper dam, and diverting all water in excess of that amount past both dams.

In testimony whereof, I hereunto affix my signature.

JAMES B. KIRBY.