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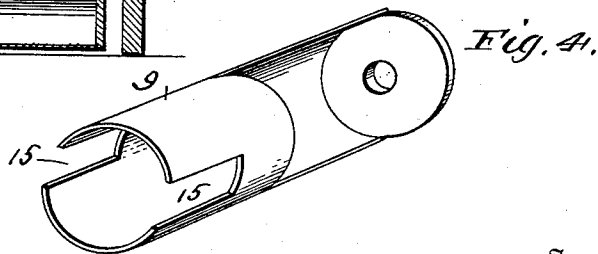
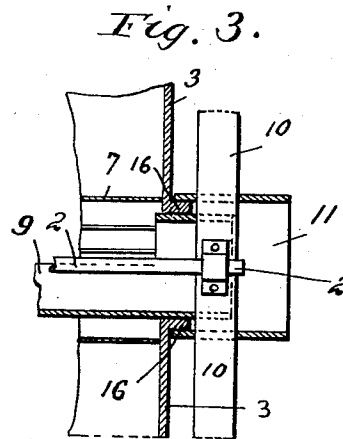
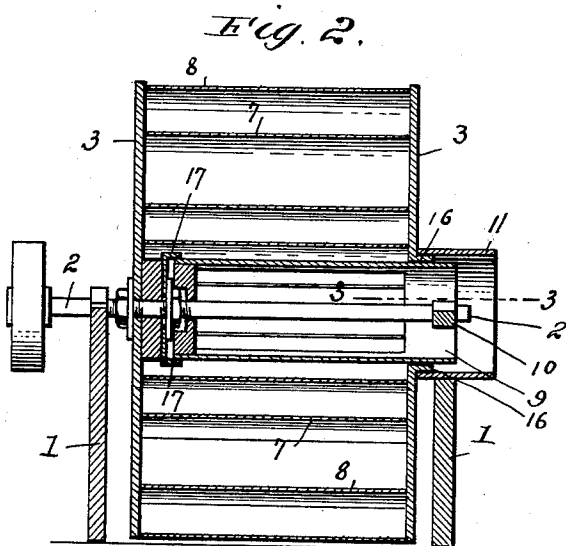
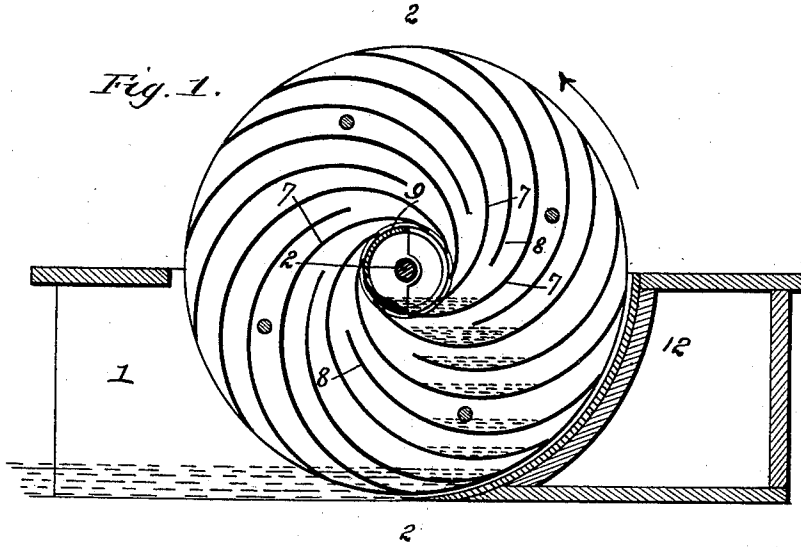
Patented Aug. 23, 1898.

B. S. BIRDSALL.
LIQUID ELEVATING WHEEL.

(Application filed Jan. 29, 1898.)

(No Model.)

2 Sheets—Sheet 1.



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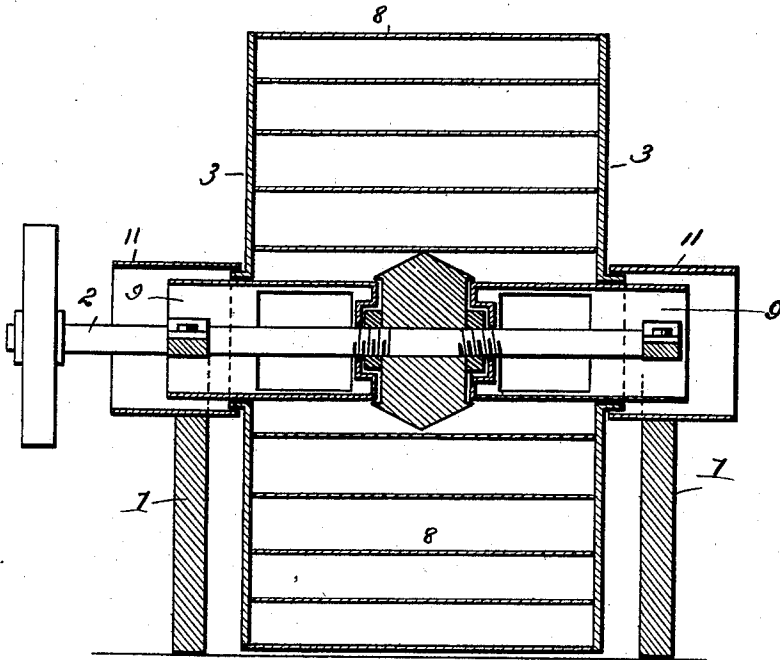
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2 Sheets—Sheet 2.

Fig. 5.



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UNITED STATES PATENT OFFICE.

BENJAMIN S. BIRDSALL, OF RACELAND, LOUISIANA.

LIQUID-ELEVATING WHEEL.

SPECIFICATION forming part of Letters Patent No. 609,655, dated August 23, 1898.

Application filed January 29, 1898. Serial No. 668,407. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN S. BIRDSALL, a citizen of the United States, residing at Raceland, in the parish of La Fourche and State of Louisiana, have invented certain new and useful Improvements in Liquid-Elevating Wheels, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a vertical sectional view of the wheel. Fig. 2 is a vertical sectional view taken on line 2 2 of Fig. 1; Fig. 3, a horizontal sectional view on line 3 3 of Fig. 2, and Fig. 4 a detail perspective view of the central discharge-tube. Fig. 5 is a vertical sectional view showing the manner of discharging the water upon both sides of the wheel.

This invention relates to a wheel adapted to be placed in a stream or any other body of water or other liquid, to be operated by any suitable power to raise the water thereof; and it has for its objects to simplify the construction and to provide a water-elevator which will require a minimum amount of power.

The invention consists in the novel combination and arrangement of parts hereinafter described, and particularly pointed out in the claims appended.

Referring to the various parts by numerals, 1 designates the parallel sides of a suitable supporting structure between which is placed the wheel. Journaled in bearings secured in these walls is a horizontal transverse shaft 2. Rigidly secured to this shaft and working between said walls is the wheel, which consists of the two end disks 3, arranged a suitable distance apart. Between these disks are secured outward-extending curved wings 7, whose outer ends extend to the periphery of the disks, their inner ends terminating at points in a circle around the center of the disks and a suitable distance from said center. These wings extend entirely across the space between the disks, their side edges being secured to said disks, and are arranged so that the convex side of one wing lies next to or faces the concave side of the adjacent wing. Arranged alternately between the wings are a series of supplemental curved wings 8, whose inner

ends terminate short of the inner ends of the main wings 7. These wings 8 extend to the periphery of the disks at points midway between the wing 7 and approximately conform to the curvature thereof.

The wings 7 and 8 act as scoops—that is, in operation they extend into the water a suitable distance—and during the rotation of the wheel each wing takes up a quantity of water, and as the wheel rotates in the direction indicated by the arrow the water will be gradually raised and run to the center of the wheel, where it enters the central discharge-pipe, hereinafter described, and then flows out the open end thereof.

To receive the water from the scoops, a central stationary cylindrical tube 9 is fitted within the wheel, said tube being of such diameter that the inner ends of wings 7 are substantially flush with its outer circumference. This tube extends the entire width of the wheel and is closed at its inner end and is supported at said closed end on the shaft 2. Its outer end is open and extends through a circular opening in one of the disks 3 and is notched at 15 to fit over the beam 10, which supports one end of the shaft 2. This tube within the wheel is divided vertically, and the right-hand half is removed, the left-hand half forming a wall which prevents the water which is flowing out of the emptying-scoops from passing back into scoops which have not reached the position in which they discharge their contents. The right-hand side of the tube, it will therefore be seen, is open to receive the water from the discharging-scoops, and the scoops begin to discharge their contents when their inner ends reach the open side of the tube. As will be readily understood, as soon as any water enters the discharge-tube it will be immediately discharged at the open end thereof. From the disk 3, through which the tube 9 projects, and surrounding said tube closely extends a flange 16. Over the projecting end of the tube 9 its inner end, fitting the flange 16, is secured a short tube 11. This latter tube is apertured horizontally for the passage of the beam 10, its outer edge extending a suitable distance beyond the outer end of the discharge-tube and beyond the beam 10 to conduct the water to any desired place of discharge. In this

way a closed conduit is formed by means of which the water may be conveyed beyond the journal of shaft 2 without any appreciable loss of water.

5 One end of shaft 2 is extended, and a suitable driving-pulley is secured thereon, by means of which the wheel may be rotated by any suitable power.

10 In order that the water will not leave the scoops before they are raised above the water-level, a segmental breast-wall 12 is arranged close to the periphery of the wheel at the point where the scoops rise from the water. This wall extends to the bottom of the supporting-walls 1 and below the lower edge of the wheel and serves to increase the quantity of water taken up by the scoops.

15 It will be readily understood that water may be discharged from both sides of the wheel, if desired, as shown in Fig. 5, in which construction the apparatus is practically made double—that is, the wheel is attached at its center to the shaft—and from the central hub two stationary discharge-tubes extend outward, one through each side of the wheel, the conducting-tubes 11 and other parts being also duplicated.

20 It will be observed that in the operation of the wheel each scoop takes up a quantity of water which will of course be determined by the depth the wheel is set in the body of water, (and it may be set at any desired depth,) and as each scoop rises the water in it settles into its lowest part and is gradually carried to the center of the wheel, where it discharges, each successive scoop beginning to discharge before the preceding one empties itself, thereby keeping up a continuous discharge through the spout or tube. The supplemental scoops increase the capacity of the wheel without increasing the number of discharge-openings.

25 By the arrangement shown and described a very simple apparatus is produced which will require no valves or movable parts within the wheel and which may be operated with a minimum of power, the water being lifted but about half the diameter of the wheel.

30 It will be observed that the wheel is attached to the shaft only at the side opposite the discharge-opening and that it is supported almost entirely at that point, practically relieving the tube 11 from the weight of the wheel and water within the same. Of course the wider the wheel the greater will be the strain upon the tube 11 unless the bearing on the shaft be correspondingly increased. It will also be observed that a stationary circular flange 17 is carried at the closed side of the wheel and projects far enough inward to embrace the closed end of the stationary tube, the function of this flange being to prevent the water leaking to any great extent in behind said closed end.

35 It will be observed that an essential feature lies in curving the scoops outward in the direction of the rotation of the wheel and in employing in combination therewith a cen-

tral stationary discharge-tube so constructed that it will receive the water from the scoops discharging and close those of the scoops that have not yet discharged, the tube being preferably supported at its inner end on the shaft. In this manner of constructing the wheel no valves are required in the water-passages, and the water is lifted almost directly upward toward the center of the wheel, whereby the wheel may be operated with but little power.

70 Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

80 1. In a water-elevating wheel, the combination of a support, the horizontal shaft journaled thereon, a wheel carried by said shaft, said shaft extending centrally through the wheel and rigidly attached to the same, one side of the wheel being open, a series of water-passages extending from the periphery of the wheel to near the center thereof, and curving outward in the direction of rotation and a stationary discharge-tube supported centrally within the wheel and extending outward through the open side thereof, said tube being provided with an opening extending longitudinally of it and coincidentally with the discharge ends of the water-passages, the closed portion of the tube closing the passages not discharging as and for the purposes set forth.

2. The combination of a support, a water-wheel comprising side disks and intermediate partitions, these partitions curving outward in the direction of rotation and forming water-scoops, a shaft journaled on the support and extending centrally through the wheel and rigidly attached thereto at one side, a stationary central tube inclosing the shaft and supported at its inner end on the shaft and at its outer end upon the support at a point outside of the wheel, this discharge-tube being provided with an opening running longitudinally of it to receive the water from the scoops.

3. In a rotary water-elevator, the combination of a support, a shaft, a water-wheel carried by said shaft, said wheel being provided with main curved scoops or wings extending from its periphery to near its center, a stationary discharge-tube supported within the wheel and provided with an opening to receive the water from the scoops, said tube extending out through the side of the wheel and being suitably supported, and a series of curved supplemental wings interposed between the aforesaid scoops or wings and extending from the periphery of the wheel to a point short of the discharge ends of the main scoops, as and for the purposes set forth.

4. In a rotary water-elevator, the combination of a support, a shaft, a wheel carried by said shaft, said wheel being formed with wings which act as water-scoops, a stationary discharge-tube at the center of said wheel, the inner ends of said wings terminating close to the exterior surface thereof, said tube be-

ing open on one side to receive the water from the scoops and closed on the other side to prevent it returning to the scoops which have not yet reached a position to discharge their contents, substantially as described.

5 5. In a rotary water-elevator, the combination of a support, a shaft, a wheel carried by said shaft, said wheel being formed with wings which act as water-scoops, a stationary discharge-tube at the center of said wheel, the outer end of said tube extending through a flanged opening at one side of the wheel, said projecting end being notched at 15 to receive a beam of the support, a tube 11 apertured for the passage of said beam, and having its inner end embracing the flanged opening in the wheel and its outer end extending beyond the beam and beyond the outer end of the central discharge-tube, substantially as described.

20 6. In a rotary water-elevator, the combination of a support, a shaft journaled there-

on, a wheel carried by said shaft and rigidly attached thereto, a central opening being formed at one side of the wheel, this opening 25 being provided with an outward-projecting flange, a series of water-passages extending from the periphery of the wheel to near its center, a stationary discharge-tube supported upon the shaft centrally within the wheel 30 and extending outward through the opening in the side thereof, a support for the tube beyond the wheel, and a stationary tube 11 inclosing the outer end of said central tube and embracing and supporting the outward-extending flange on the wheel, as and for the 35 purposes set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

BENJAMIN S. BIRDSALL.

Witnesses:

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