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WATER TURBINE.

APPLICATION FILED APR. 12, 1906.

Fig 1

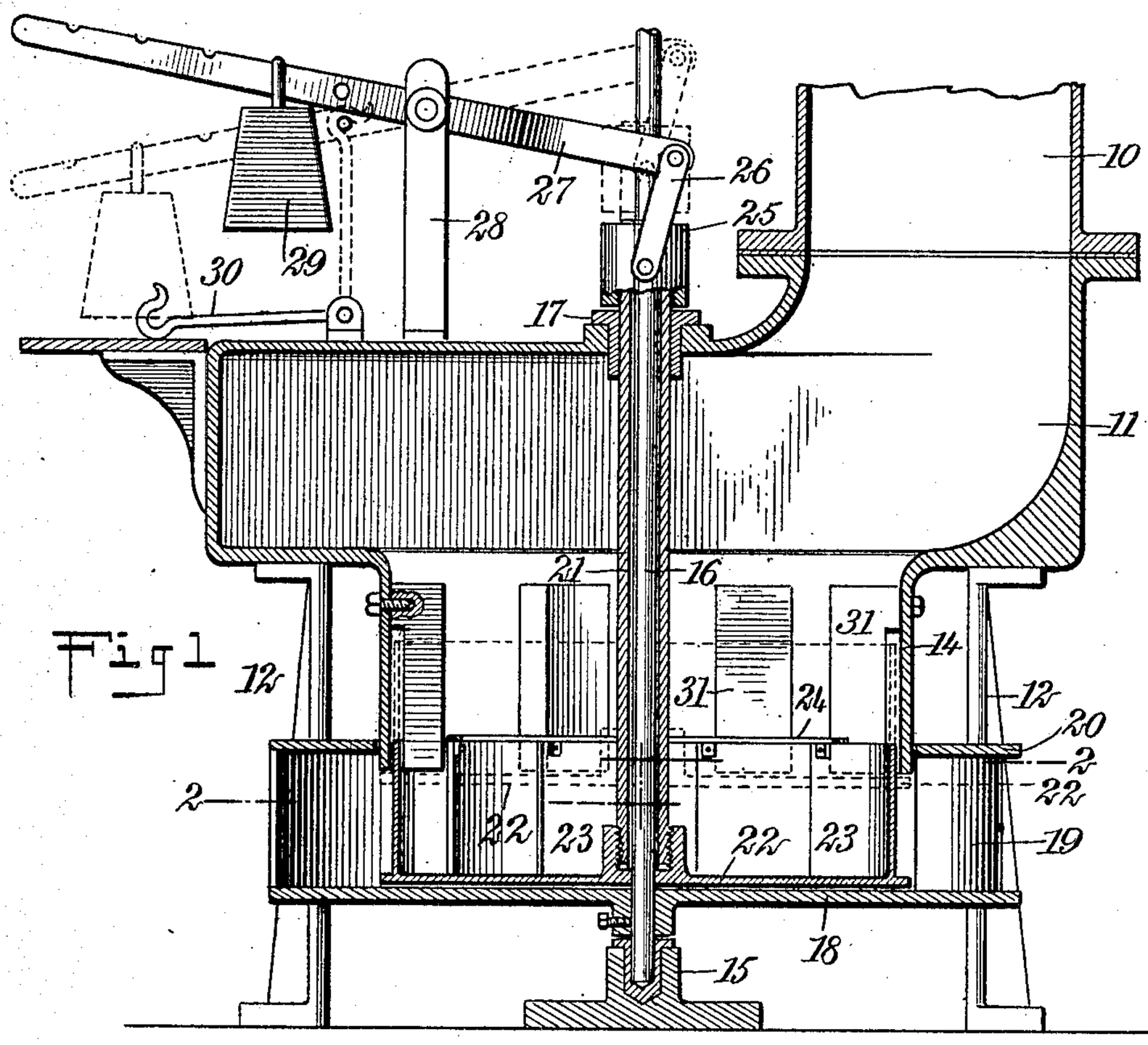
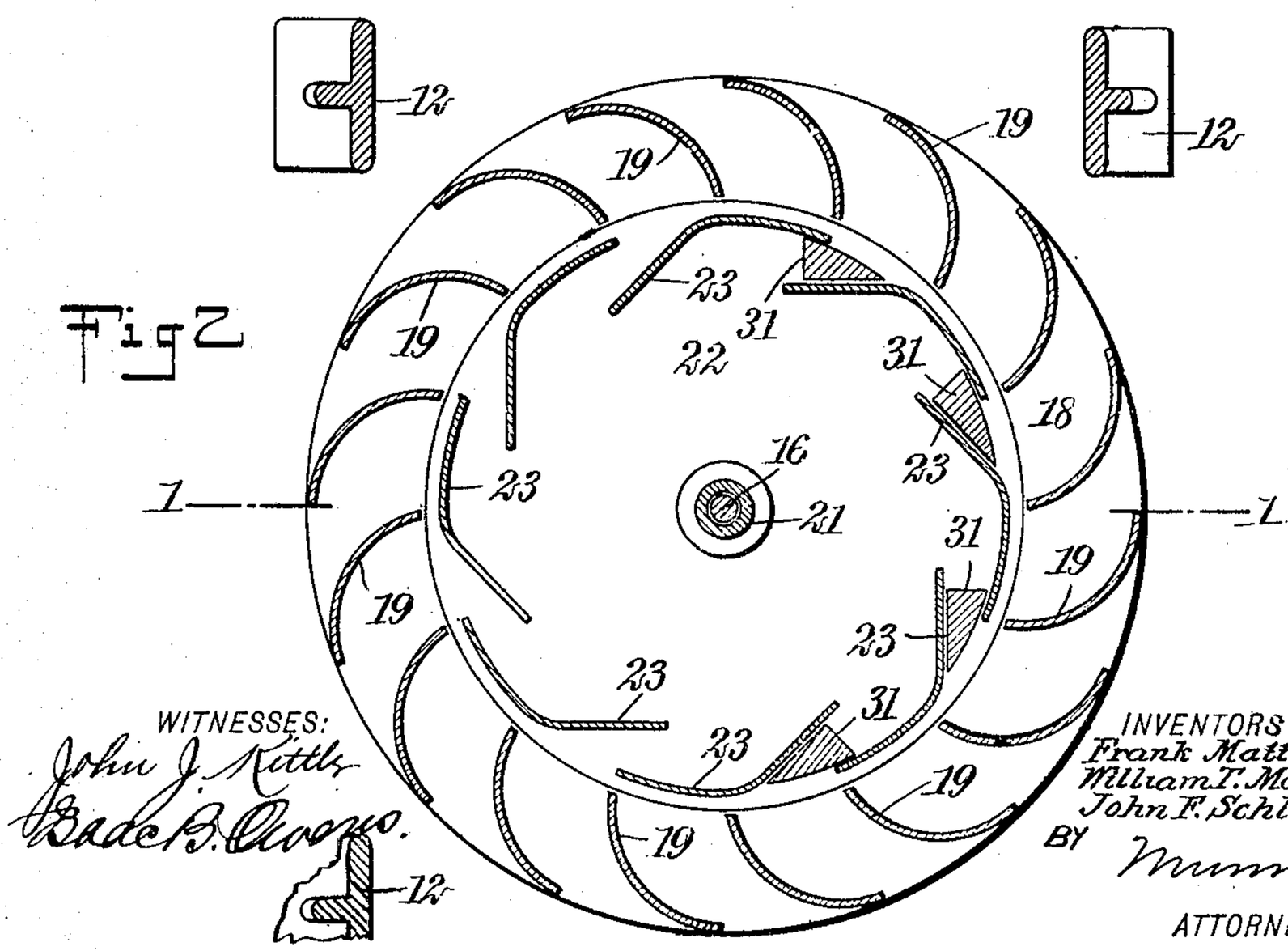


Fig 2



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FRANK MATTAUSCH AND WILLIAM T. MATTAUSCH, OF LINCOLN, AND JOHN F. SCHLOSSSTEIN, OF COCHRANE, WISCONSIN

WATER-TURBINE.

No. 871,720. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed April 12, 1906. Serial No. 311,259.

To all whom it may concern:

Be it known that we, FRANK MATTAUSCH and WILLIAM T. MATTAUSCH, both residents of Lincoln, in the county of Buffalo and State of Wisconsin, and JOHN F. SCHLOSSSTEIN, a resident of Cochrane, in the county of Buffalo and State of Wisconsin, all citizens of the United States, have invented a new and Improved Water-Turbine, of which the following is a full, clear, and exact description.

The invention relates to a water turbine intended particularly to operate around a vertical axis, although it may be arranged with its axis of rotation horizontal, if desired.

The invention resides in certain special features of construction and combination of parts, which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings which illustrate as an example the preferred embodiment of our invention, in which drawings

Figure 1 is a vertical section of the invention on essentially the line 1—1 of Fig. 2; and Fig. 2 is a horizontal section on the line 2—2 of Fig. 1.

10 indicates the flume or water supply pipe which discharges into the penstock 11. This is supported by stanchions 12, and has a downwardly extending tubular outlet 14. Below said outlet is arranged a step bearing 15 in which the turbine shaft 16 is mounted, said shaft extending vertically through the outlet spout 14 and penstock 11, and through a suitable stuffing box 17 in the top of the latter. Motion for the turbine is taken from the shaft 16. Fastened to the shaft 16 immediately above the step bearing 15 is a disk 18 which forms the web of the rotating element or wheel of the turbine. Said disk or web 18 extends horizontally and is provided at its outer portion with buckets 19 extending up from the disk or web and having their upper ends fastened to a band 20 which runs loosely around the outer side of the discharge spout 14 adjacent to the lower end thereof.

Loosely encircling the shaft 16 and extending through the stuffing box 17 is a tubular shaft 21. The tubular shaft 21 carries at its lower end a horizontally disposed disk 22 forming a gate which is capable of occupying the position shown by full lines in Fig. 1, where it is located directly above the wheel 18, or being raised to the position indicated by broken lines, in which latter position it engages the discharge end of the spout 14 closing the same. Standing on the gate 22 are a number of vanes 23 which are disposed vertically and each of which has a portion running concentric to the periphery of the water wheel, and a contiguous portion inclined inwardly with respect thereto, as shown best in Fig. 2. These vanes direct the water against the buckets 19, the water passing from over the gate 22 inward of the vanes, outward through the vanes and into engagement with the buckets, and the peculiar shape of the vanes as described causes the water to flow properly from the vanes and to engage the buckets at the most effective angle. The upper edges of the vanes are braced against each other by means of a band 24 fastened thereto, as shown best in Fig. 1. At its upper end the hollow shaft 21 is provided with an enlargement 25 to which the links 26 are pivoted. These links are joined to a forked lever 27 which is fulcrumed on an arm 28. The lever is provided with an adjustable counterweight 29 by means of which the pressure of the water on the gate may be balanced, and 30 indicates a hook or other means for holding the lever in position, as shown by broken lines in Fig. 1, in which position the gate is closed. By adjusting the counterweight 29 the pressure on the lever may be balanced so that said lever may be readily operated.

Secured within the discharge spout 14 of the penstock 11 are a number of vertically extending angular stop-waters 31, the lower portion of which are spaced from the inner sides of the spout 14 to permit the concentric portion of the vanes 23 to pass up between the stop-waters and the inner wall of the said spout. The stop-waters are of essentially triangular cross sectional form, and as shown at the right hand side of Fig. 2 are arranged to set between the outer portions of the vanes, so as to cause the water passing from the spout 14 to flow in toward the center thereof, and thence out under the stop-waters, which enables the water to be effectively directed against the buckets 19, and which prevents the water from flowing down straight and then turning sharply against the vanes, which latter operation would result in material loss of efficiency.

In the operation of the invention, the parts are adjusted as shown in Fig. 1 and the

water flowing from the penstock is drawn in by the stop-waters, and then flows horizontally toward the gate 22 and is directed by the gate 22 against the buckets 19, causing the rotor of the turbine to turn which drives the shaft 16. Power may be taken from said shaft in any desired manner. In order to stop the operation of the turbine it is necessary to adjust the weight 29 so as to balance the lever 27. Said lever may be turned down and held, if desired, by the hook 30. This moves the gate 22 into closed position, and stops the flow of water from the spout or nozzle 14.

The peculiar form of the vanes 23 insures that the water is directed against the buckets at the most effective angle, and since the water is disposed horizontally from the wheel there is no current under the turbine which would tend to destroy the function thereof. The turbine may be operated either above or under the water, and either horizontally or vertically. The horizontal position of the wheel as shown in Fig. 1 is, however, regarded as preferable since better advantage is taken of the head of water.

Having thus described the preferred form of our invention, what we claim as new and desire to secure by Letters Patent is:

1. A turbine comprising a pen stock having a tubular outlet, a shaft journaled coaxially with the outlet, a circular web secured to the lower end of the shaft, an annular series of vanes at the periphery of the web and encircling the outlet, a sleeve slidable on the shaft and provided with an enlargement at its upper end, a circular gate on the end of the sleeve, an annular series of directing vanes at the periphery of the gate, said vanes comprising each a portion concentric with the shaft and a portion inclined inwardly therefrom, stop-waters secured to the tubular outlet, links pivoted to the enlargement of the sleeve, a bracket on the pen stock, a lever pivotally mounted on the bracket and having one end secured to the links, and a weight on the opposite end for balancing the gate said gate being of a diameter greater than the end of the outlet whereby to close the same when the gate is elevated and said stop-waters being slotted whereby to permit the passage of the directing vane.

2. A turbine comprising a pen stock having a tubular outlet, a shaft journaled coaxial with the outlet, a circular web secured to the lower end of the shaft, an annular series of vanes at the periphery of the web and encircling the outlet, a sleeve slidable on the shaft, a circular gate on the end of the sleeve and normally resting within the vanes, an annular series of directing vanes at the periphery of the gate, said vanes comprising each a portion concentric with the shaft, and a portion inclined inwardly therefrom, stop-waters secured to the tubular outlet, and means connected with the sleeve whereby to lift the gate, said gate being of a diameter greater than the opening of the outlet whereby to close the same when the gate is elevated, and said stop-waters being slotted whereby to permit the passage of the directing vane.

3. A turbine comprising a penstock having a tubular outlet, a shaft journaled coaxial with the outlet, a circular web secured to the lower end of the shaft, an annular series of vanes at the periphery of the web and encircling the outlet, a sleeve slidable on the shaft, a circular gate on the end of the sleeve and normally resting within the vanes, an annular series of directing vanes at the periphery of the gate, stop-waters secured to the tubular outlet, and means connected with the sleeve whereby to lift the gate, said gate being of a diameter greater than the opening of the outlet whereby to close the same when the gate is elevated, and said stop-waters being slotted whereby to permit the passage of the directing vanes.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FRANK MATTAUSCH.
WM. T. MATTAUSCH.
JOHN F. SCHLOSSSTEIN.

Witnesses:
JOS. FLINN,
CHAS. SUHR.