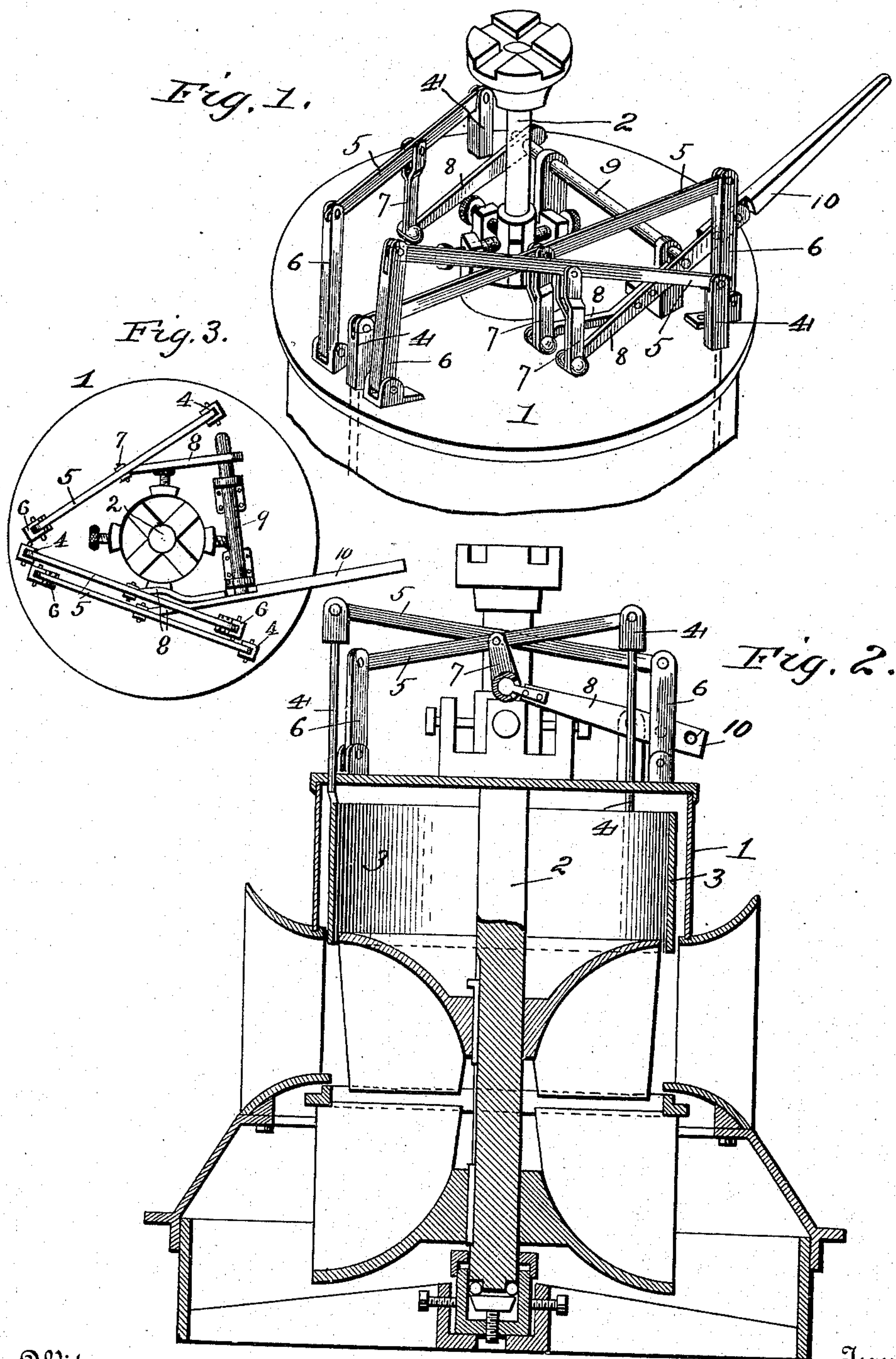


(No Model.)

W. H. ELMER.
TURBINE.

No. 565,848.

Patented Aug. 11, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM H. ELMER, OF BERLIN, WISCONSIN.

TURBINE.

SPECIFICATION forming part of Letters Patent No. 565,848, dated August 11, 1896.

Application filed May 16, 1896. Serial No. 591,856. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. ELMER, a citizen of the United States, residing at Berlin, in the county of Green Lake and State of Wisconsin, have invented certain new and useful Improvements in Turbines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention has for its object to provide a simple system of levers for lifting the cylindrical gate employed in that class of turbines in which the water enters at the side of the casing, the advantage of the present construction being that the gate may be lifted easily and without tilting or binding, as more fully hereinafter set forth.

15 In the drawings, Figure 1 is a perspective view of the upper part of the casing; Fig. 2, a vertical section of the complete turbine; and Fig. 3 is a plan view reduced in size.

Referring to the drawings by numerals, 1 is the cylindrical casing, 2 the vertical shaft carrying the wheel, and 3 is the cylindrical gate embracing the upper part of the wheel and working vertically between the inlet-openings at the side of the casing and the wheel. Attached to the upper edge of the gate at equidistant points are three vertical rods 4, which pass up through openings in the top of the casing, and are shouldered near their upper ends to restrict the downward movement of the gate. Pivotally attached to the upper end of each of these rods is a lever 5, which extends across the top of the casing and is pivotally attached at its opposite end to a vertical link 6, which is in turn pivotally connected to the casing at its lower end to permit it to swing in the same plane with the lever. The three levers are precisely the same length, and the vertical links are also of even length, and two of the levers are arranged on one side of the center and one on the other side thereof. Pivotally attached to the middle of each lever is a depending link 7, whose lower end is pivotally connected to the inner end of a vertically-working arm 8, attached rigidly to a rock-shaft 9, this shaft being journaled on top of the casing and arranged diagonally thereof.

50 All the arms 8 are in perfect alinement with each other, and their pivotal points are pre-

cisely the same distance from the center of the rock-shaft. It will be observed that the levers and rock-shaft form a triangle, the levers forming two sides thereof and the shaft the remaining side. The rock-shaft is operated by a lever 10, connected to it rigidly in a suitable manner.

For convenience the two of the arms 8 nearest each other are rigidly connected together before attachment to the rock-shaft, as shown, and for the purpose of better adjustment, to compensate for wear, and freer movement the end of each of the arms is connected to its link by a sort of ball-and-socket joint, as shown.

In operation it will be perceived the rocking movement of the rock-shaft is communicated to the levers through the medium of the arms and links, all the levers being moved exactly in unison. The power is applied to the levers midway their respective lengths, whereby they will all be moved up or down, as the case may be, in perfect unison, and the vertical supporting-links at the ends of the levers permit them to move longitudinally sufficiently to avoid binding by reason of the direct vertical movement of the gate-rods. This arrangement of devices insures the gate-ring being raised and lowered in a direct vertical line and concentrically with the wheel-shaft, thereby avoiding the usual tilting and binding which have always been a source of trouble in this class of turbines.

85 The ball-and-socket connections between the levers 8 and the links is a good feature, as they permit the links to slightly oscillate to accommodate the peculiar movements of the levers 5. It will be observed that the balls are carried on the ends of the arms 8 and the sockets on the lower ends of the links.

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

95 1. The combination of a casing, a turbine wheel and shaft, a ring-gate adapted to move vertically, a plurality of rods connected thereto at equidistant points, a plurality of levers each being pivotally connected at one of its ends to one of said rods, said levers being of equal length and extending across the top of the casing, vertical pivotal links supporting the opposite ends of said levers, a

pivotal link connected to each lever midway
its length, and means for raising and lower-
ing said levers through the medium of said
links, said means consisting of a rock-shaft
5 provided with arms, these arms being con-
nected to the lower ends of said links by ball-
and-socket devices, substantially as de-
scribed.

2. The combination of a casing, a turbine
10 wheel and shaft, a ring-gate adapted to move
vertically, a plurality of vertical rods con-
nected thereto at equidistant points, a plu-
rality of levers each being pivotally connected
at one of its ends to one of said rods, said

levers being of equal length and extending 15
across the top of the casing, vertical pivotal
links supporting the opposite ends of said
levers, a pivotal link connected to each lever
midway its length, and means for raising and
lowering said levers through the medium of 20
said links, as and for the purpose set forth.

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

WILLIAM H. ELMER.

Witnesses:

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LOUIS C. PECK.