

No. 701,355.

Patented June 3, 1902.

J. M. KING.  
WATER WHEEL.

(Application filed Sept. 16, 1901.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

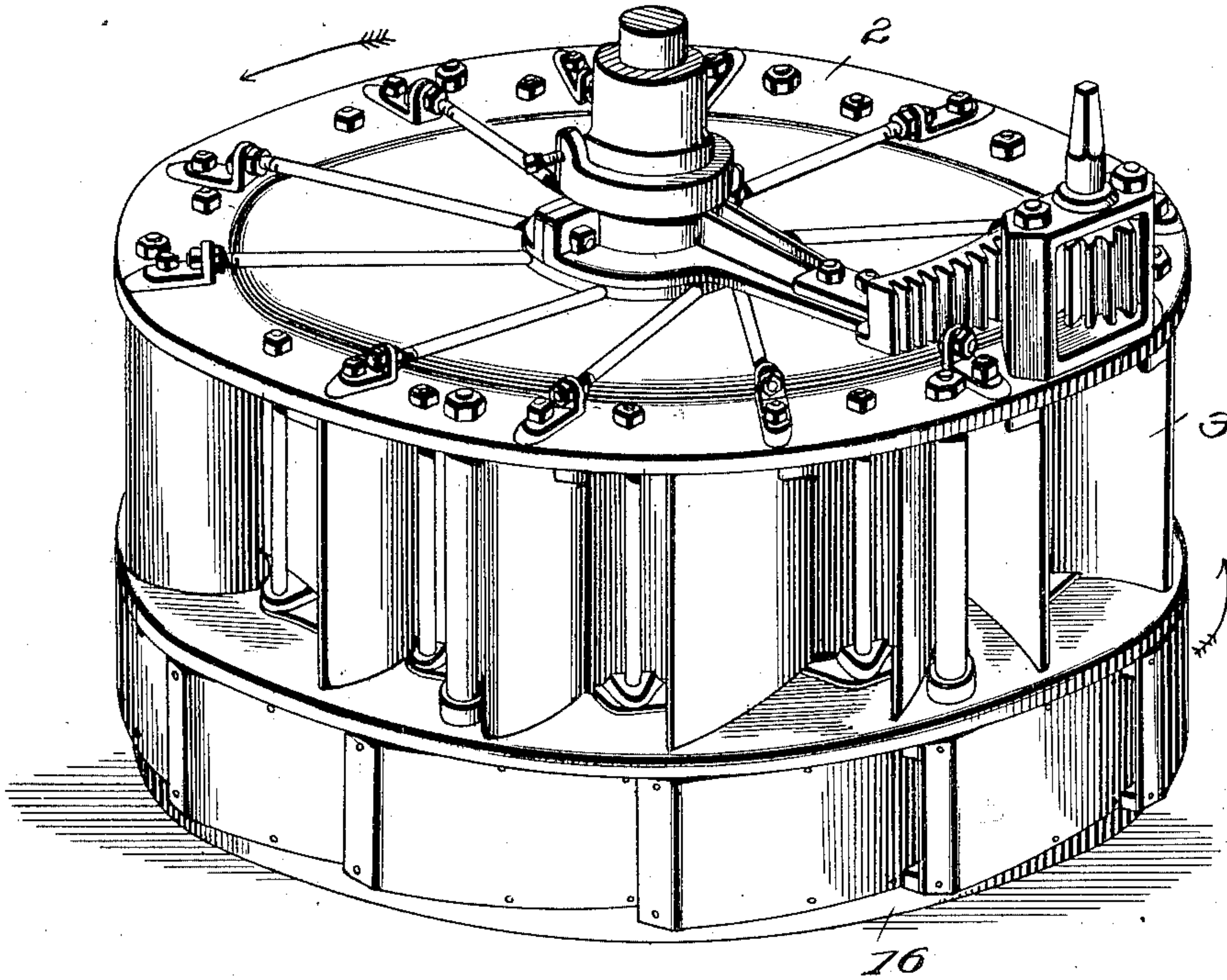
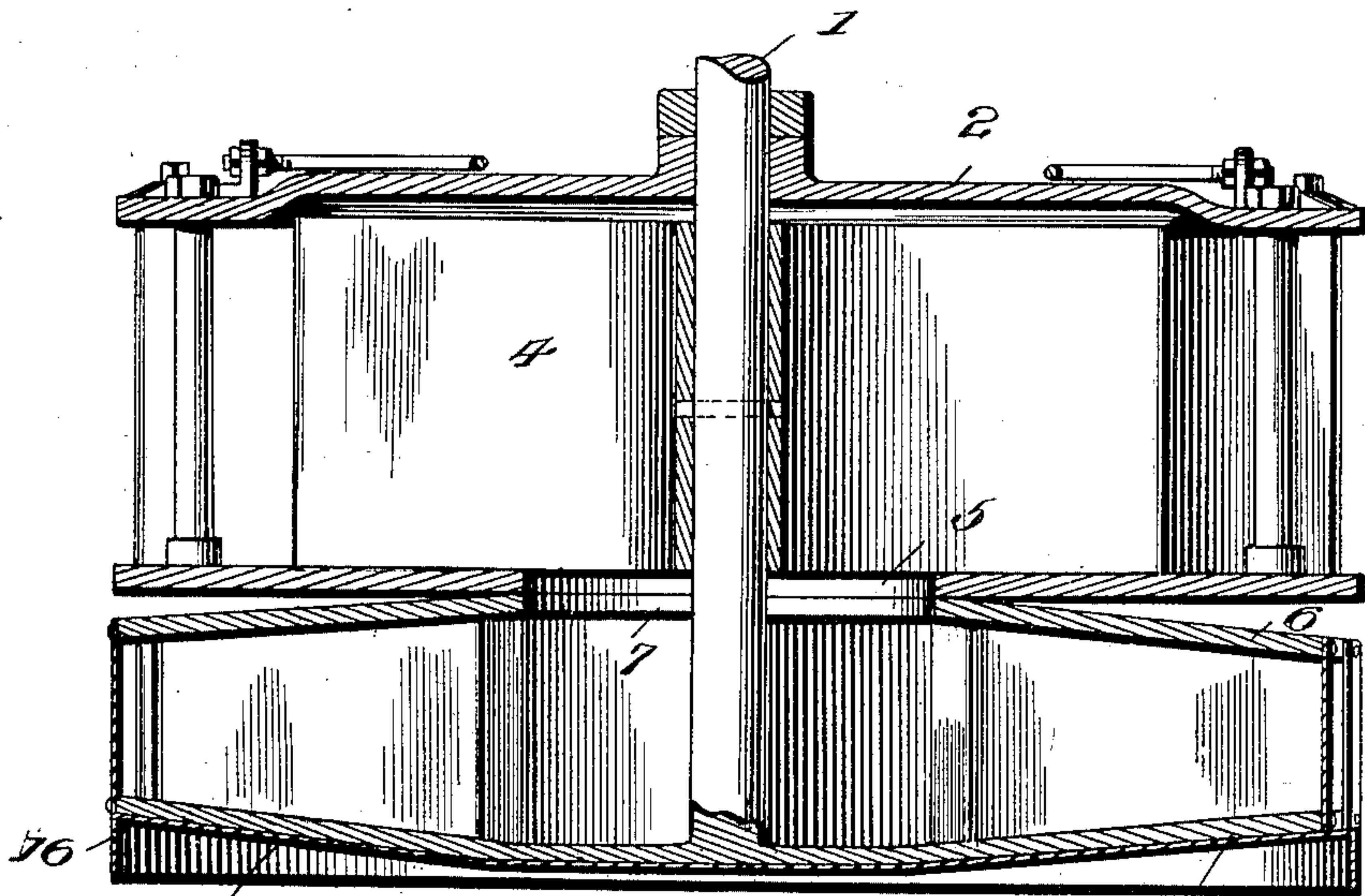


Fig. 2.



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# UNITED STATES PATENT OFFICE.

JAMES M. KING, OF ROCHESTER, MINNESOTA.

## WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 701,355, dated June 3, 1902.

Application filed September 16, 1901. Serial No. 75,540. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES M. KING, a citizen of the United States, residing at Rochester, in the county of Olmsted and State of Minnesota, have invented certain new and useful Improvements in Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention aims to utilize the rotary motion of water discharged from a turbine or other form of water-wheel for the performance of effective work in supplementing the action of the main wheel or turbine.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a turbine water-wheel, showing the invention in operative position. Fig. 2 is a vertical central section of the water-wheel forming the basis of the present invention. Fig. 3 is a horizontal section of the auxiliary wheel. Fig. 4 is a perspective view thereof, having a portion of the upper head broken away.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The turbine shown is of ordinary construction and has been selected simply to illustrate the application of the invention and is secured to a vertical shaft 1. The curb or casing 2 is provided with gates 3 for controlling the amount of water admitted to the turbine 4 in a given time, said gates being opened or closed more or less by the mechanism illustrated or equivalent means commonly employed for this purpose in water-engines of the type disclosed. The turbine wheel 4 is supplied with jets of water from the periphery, the spent water being discharged through

an opening 5 in the lower head of the casing or curb.

The water-wheel forming the subject-matter of the present invention is attached to the shaft 1, so as to rotate therewith, and is located to receive the water discharged from the turbine. In the present instance the water-wheel is arranged below the turbine, and its upper head 6 has a central opening 7, corresponding to the opening 5, with which it registers, so as to receive the spent water from the turbine. The central portion of the water-wheel is of greater depth than the outer portion in order to accommodate the bulk of water discharged from the turbine and prevent the motion thereof being impaired. The water-wheel consists of an upper head 6, a lower head 8, radial wings 9, extending from the shaft 1 to the periphery, short wings 10, having their inner ends spaced from the shaft 1, with their opposite sides beveled inward to an edge, and peripheral plates 11, connected at their longitudinal edges to the upper and lower heads and at their front ends to the wings 9 or 10. The heads 6 and 8 have their outer portions gradually converged and their peripheral edges conform to the outline of the plates 11 in longitudinal section. The wings 9 and 10 are radially disposed, the short wings 10 alternating with the long wings 9 and subdividing the space inclosed between adjacent wings 9, so as to equalize the pressure of water upon the respective closing-plates 11. The plates 11 are of a length to extend from one wing 9 or 10 to the next wing 9 or 10, and their end portions are inwardly deflected, as shown at 12 and 13, the deflected portions 12 and 13 of adjacent plates overlapping or passing by each other and spaced apart to form an outlet 14, which is inwardly diverged. The plates 11 gradually recede from the shaft 1 throughout their length, the end nearer the shaft being designated as the front end and the end farther from the shaft being referred to hereinafter as the rear end. The front ends of the plates are attached to the outer ends of the wings, whereas the rear ends are spaced from the outer end of the wings to provide for the formation of the outlets or chutes 14. By having the plates 11 receding from the shaft 1 from front to rear the water impinging against the



inner side thereof causes forward rotation of the wheel whether the latter be submerged or clear of the water in the flume or tail-stock.

In practice the water admitted to the turbine imparts motion thereto in proportion to head. The supplementary wheel attached to the shaft of the turbine receives the water from said turbine and utilizes the power which would otherwise be lost.

10 An air-chamber 15 is provided at the bottom side of the auxiliary wheel and obviates water-friction, which materially affects the motion, especially when the wheel is submerged. This air-chamber is formed by a rim 15 16, pendent from the peripheral portion of the head 8. The auxiliary wheel-diameter as a rule is much greater than that of the turbine it is placed under. However, required capacity will dictate size in every way. The diameter admits of a variety of scope, ranging 20 from near to perhaps more than twice the diameter of the wheel above it. High heads over turbine require a much less auxiliary diameter than low heads.

25 Having thus described the invention, what is claimed as new is—

1. A water-wheel comprising spaced heads, wings between the heads and joined at their edges thereto, and peripheral plates joined at 30 their edges to the heads and having their proximal ends passing by each other and spaced apart, the inner end of each plate being attached to a wing a short distance from its extremity and having the projecting portion bent inward, and the outer end of each 35 plate being bent inward, the overlapped end portions of adjacent plates being outwardly converged, substantially as specified.

2. A water-wheel comprising spaced heads,

long and short wings alternately arranged between the heads and joined at their edges thereto, the long wings extending to the axis of the wheel and the short wings having their inner ends spaced from said axis, and peripheral plates joined near their inner ends to the 45 outer extremities of the respective wings and receding toward their outer ends from the axis of the wheel and having the outer end portion of each inwardly bent, spaced from and passing by the inner end portion of the 50 proximal plate, and having the inner end of each plate inwardly bent, the adjacent bent portions being outwardly converged, substantially as set forth.

3. A water-wheel comprising spaced heads 55 having their outer portions converged, long wings extended from the center of the wheel outward, short wings radially disposed and subdividing the spaces between the long wings and having their inner ends spaced 60 from the axis of the wheel and sharpened, and peripheral plates joined at their edges to the heads and having their proximal ends passing by each other and spaced apart, said plates gradually receding from the axis of the wheel 65 toward their outer ends, and having the outer end portion inwardly bent and the inner end of each plate being attached to the outer end of a wing and inwardly bent, the proximal bent ends of adjacent wings being outwardly 70 converged, substantially as specified.

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

JAMES M. KING. [L. s.]

Witnesses:

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