

No. 668,824.

Patented Feb. 26, 1901.

C. STONE.
TURBINE WATER WHEEL.

(Application filed Sept. 19, 1900.)

(No Model.)

Fig. 1.

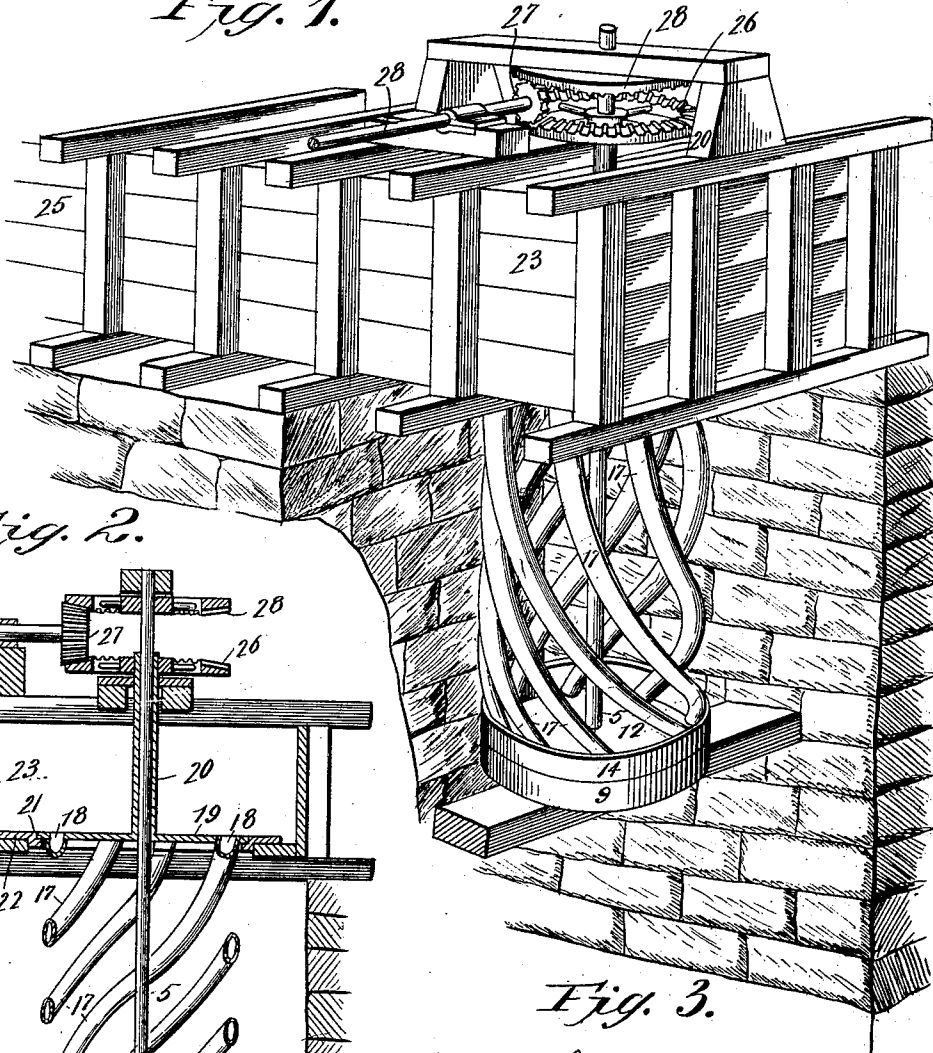


Fig. 2.

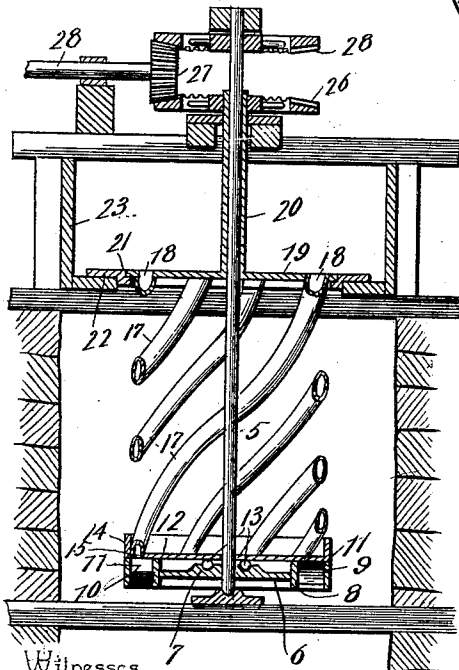
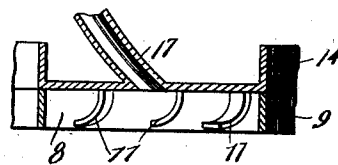


Fig. 3.



Witnesses
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COLUMBUS STONE, OF MANCHESTER, TENNESSEE.

TURBINE WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 668,824, dated February 26, 1901.

Application filed September 19, 1900. Serial No. 30,480. (No model.)

To all whom it may concern:

Be it known that I, COLUMBUS STONE, a citizen of the United States, residing at Manchester, in the county of Coffee and State of Tennessee, have invented a new and useful Turbine Water-Wheel, of which the following is a specification.

This invention relates to water-wheels in general, and more particularly to turbine water-wheels, one object of the invention being to provide a wheel wherein there will be two rotatable elements forming, in effect, a double wheel, said elements being adapted to rotate in opposite directions and being connected with a common drive-shaft to develop a maximum of energy of the water supplied thereto.

A further object of the invention is to provide such a form of wheel as will insure the effective discharge of water from both elements in such directions as will have the best results and wherein there will be a free flow of water.

Further objects and advantages of the invention will be apparent from the following description.

In the drawings forming a portion of this specification, and in which like numerals of reference indicate similar parts in the several views, Figure 1 is a perspective view showing the wheel in its operative position. Fig. 2 is a central vertical section of the wheel, the pit, and the forebay. Fig. 3 is a detail sectional view showing the discharge end of one of the water tubes or pipes and the shapes of the buckets or blades of the second element of the wheel against which the water is discharged.

Referring now to the drawings, the wheel comprises two independently-rotatable elements, of which the lower element comprises a central disk 6, having a fixed hub 7, which projects upwardly therefrom, and through which disk and hub is passed the shaft 5, to which the hub is fixed. Surrounding the disk 6 is a drum 8, to which the periphery of the disk is secured, and a second drum 9 is disposed concentric with the disk and the first drum and is spaced slightly from the first drum, as shown at 10. In this interspace 10 are disposed the blades or buckets 11, each of which consists of an arc-shaped plate sol-

dered at its edges or otherwise attached to the adjacent surfaces of the drums, with its chord at an acute angle to the plane of the disk 6, these buckets or blades being spaced equally and extending throughout the circumference of the drum 8. The buckets or blades are all disposed in the same direction circumferentially of the drum, and thus if pressure be applied to the concave faces thereof the wheel will be rotated. This structure just described forms one of the rotatable elements of the double wheel.

The second rotatable element of the double wheel comprises a disk 12, which is disposed upon the upper edges of the drums 8 and 9 and the upper edges of the blades 11, which are flush with the upper edges of the drums, said disk having direct bearing upon balls 13, which are disposed in a race in the upper face of the hub 7.

The disk 12 has a circumscribing flange 14, and within the inclosure of this flange there are formed openings 15, which lead to the interspace between drums 8 and 9 and to the blades or buckets therein, and communicating with these openings are the lower ends of pipes 17, adapted to discharge therethrough to the blades or buckets. The pipes 17 are bent to progress helically around the shaft 5, so that their lower ends lie at acute angles to the disk 6 and at substantially right angles to the chords of the arcs of the buckets, these pipes being tapered from their upper ends downwardly, so as to increase the quantity of water supplied thereto and increase the velocity of the discharge against the buckets.

The upper ends of the pipes 17 communicate with openings 18 in a disk 19, having an upwardly-directed sleeve 20, which forms a hub therefor and through which the shaft 5 is loosely passed, so that the pipes and their connected disks, which form the second rotatable element of the double wheel, may rotate together and independently of the lower rotatable element.

The disk 19 is seated in a depression 21 in a casting 22 at the bottom of a common construction of forebay 23, so that water entering the forebay through the flume 25 may have direct access to the upper ends of the pipes and whereby the disk may rotate freely in the forebay.

Upon the upper end of the sleeve 20 is fixed a bevel-gear 26, which meshes with a pinion 27 at the end of a drive-shaft 28, and with this pinion also meshes a second beveled gear 5 fixed upon the shaft 5.

The operation of the wheel is as follows: Water entering the forebay through the flume passes downwardly through the pipes 17 with a minimum of friction and a maximum speed 10 and is discharged from the lower ends of the pipes onto the buckets or plates of the lower rotatable member. The momentum of the water acts to rotate the lower element in the direction of flow of the water, while the reaction causes the upper rotatable element, including the pipes and their connected disks, to rotate in an opposite direction, the result being that the drive-shaft is rotated under the influence of a maximum of applied energy. 15

It will of course be understood that in practice modifications of the specific construction shown may be made and that any suitable materials and proportions may be used for the various parts without departing from the spirit of the invention. 20 25

What is claimed is—

1. A double power - wheel comprising a shaft, a rotatable element fixed upon the shaft and including concentric spaced drums having buckets disposed slantingly therebetween, and the inner drum having a supporting-web with which said shaft is engaged, a second rotatable element including upper and lower disks of which the lower disk lies upon the upper edges of the drums to close the interspace therebetween, said disks having perforations therein and mounted loosely upon the shaft, said disks having connecting-pipes disposed helically of the shaft and with their ends communicating with the perforations, 40 said pipes being tapered in the direction of their discharge ends, a gear connected with the upper disk, a gear connected with the shaft, and a power-wheel having a gear engaging both of the first-named gears for rotation thereby. 45

2. A double power - wheel comprising a lower rotatable element having a shaft, an upper rotatable element disposed loosely upon the shaft and comprising upper and lower disks and connecting-pipes disposed helically of the shaft, said lower element including concentric, spaced drums having buckets disposed slantingly therebetween to receive the discharge from the pipes the lower disk of the upper element being disposed upon the upper edges of the drums of the lower element, a forebay having a bottom plate provided with a depression in which the upper disk is rotatably disposed and having a central opening 60 through which the pipes are passed, a sleeve upon the upper disk and through which the shaft is passed, a gear carried by the sleeve, a gear carried by the shaft, and a power-shaft connected with and operable from the gears. 65

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

COLUMBUS STONE.

Witnesses:

E. E. BOYLE,
FRANK S. APPLEMAN.