(No Model.)

O. J. WOODARD.

WATER POWER APPARATUS.

No. 589,678. Patented Sept. 7, 1897.

Fig. 2.

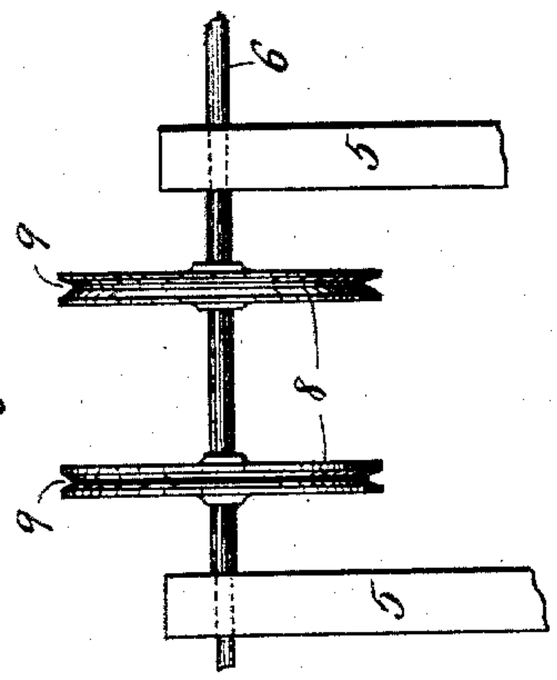


Fig. 3.

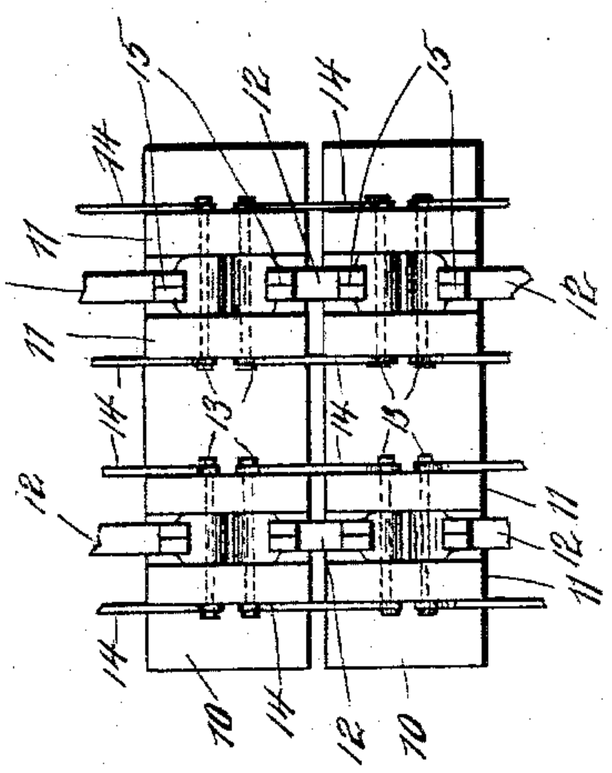
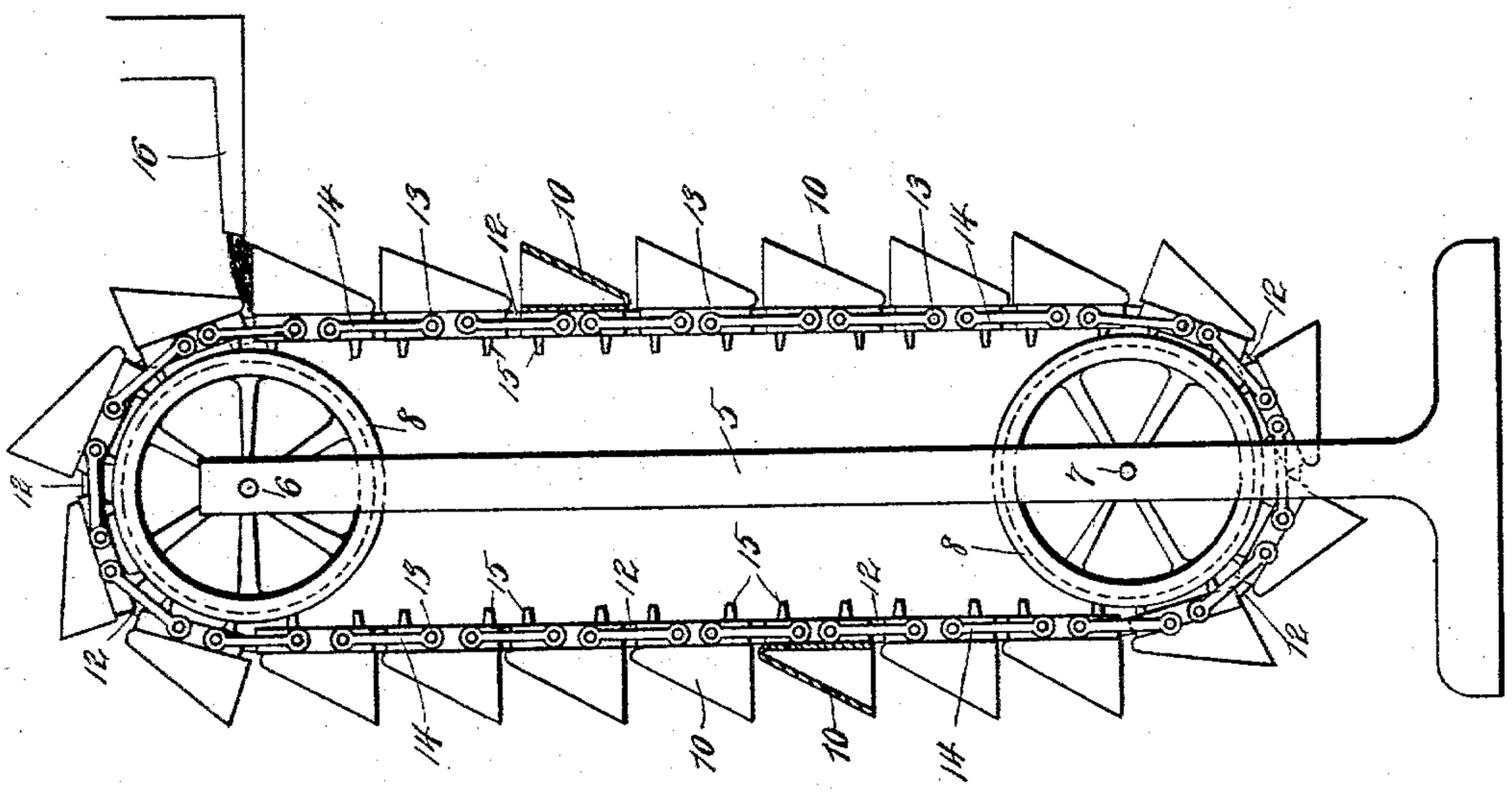


Fig. 1.



WITNESSES

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WATER-POWER APPARATUS.

SPECIFICATION forming part of Letters Patent No. 589,678, dated September 7, 1897.

Application filed January 26, 1897. Serial No. 620,745. (No model.)

To all whom it may concern:

Be it known that I, ORSON J. WOODARD, a citizen of the United States, residing at Mannsville, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Water-Power Apparatus, of which the following is a full and complete specification, such as will enable those skilled in the art to which it appertains to make and use the same.

This invention relates to chain water-wheels; and the object thereof is to provide an improved device of this class which is simple in construction and operation and by means of which a maximim of efficiency is secured with a minimum amount of power.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a side view of my improved chain water-wheel; Fig. 2, a view at right angles to Fig. 1 of a detail of the construction, and Fig. 3 a back view of two of the buckets of the chain and showing the method of connecting and operating the same.

In the drawings forming part of this specification the separate parts of my improvement are designated by the same numerals of reference throughout the several views, and in the practice of my invention I provide any suitable frame, which, as shown in the drawings, consists of two vertical standards 5, in which are mounted an upper and a lower shaft 6 and 7, and each of the shafts 6 and 7 is provided with two wheels 8, the perimeter of each of which is provided with a deep annular groove 9, which is triangular in form in cross-section. I also provide a chain of buckets which consists of separate buckets 10, which are triangular in form in cross-section and the wider portions of which are open, and secured to the back of each of these buckets and adjacent to each end thereof are cross-strips 11, and mounted between the cross-strips 11 are links 12. The links 12 overlap the space between said buckets and are pivotally connected with the strips 11 by bolts or strips 13, and mounted on the outside of said strips 11 and pivotally connected therewith by the same bolts or pins are supplemental links 14, which also overlap the spaces between each of the buckets. Each of the links 12 is provided with two inwardly-directed wedge-shaped teeth 15, and in the operation of the device these wedge-shaped teeth move in the grooves 9 of the wheels.

My improved chain water-wheel works on the principle of an "overshot" wheel, and in practice I provide means, as shown at 16, for discharging the water into the buckets 10 as nearly as possible at the top of the frame, whereby I secure the greatest percentage of power from the amount of water employed, and in the operation of the device the sides of the chain move up and down vertically and the water therefor falls vertically, and the arrangement of the buckets is such that all the water is discharged therefrom at once at the bottom of the frame.

It will also be understood that the buckets may be pressed or supported transversely in any desired manner and by any desired means, and any desired number of the chains may be employed, and said chains, the various parts thereof, and the various parts of the entire apparatus may be made of any desired material.

In practice I prefer to form the buckets about nine or ten inches across at the top and from three to four at the bottom, and these buckets can be readily filled when they are moving at the rate of ten feet to the second, which is much greater than in a device of this class as ordinarily constructed, and with my improved construction there is no water wasted between the points where the buckets are filled and where the water is discharged therefrom.

The wheels 8 are preferably rigidly secured to the shafts 6 and 7, and these shafts may be provided with the most approved bearings, and there will consequently be but little friction produced in the operation of the device, and one of these shafts may be provided with a power-wheel by means of which the power may be applied, and the teeth 15 on the links 12, which move in the grooves 9 of the wheels 8, act in the manner of a belt and will not slip, and the friction thereof is comparatively small, and if the links and teeth and the grooves in the wheels are properly made the wear will also be reduced to a minimum.

My improved chain water-wheel is simple in construction and operation and is perfectly

adapted to accomplish the result for which it is intended, and by means thereof the greatest amount of power may be secured in proportion to the amount of water employed.

The strips 11 may be composed of wood or any desired material, and it will be apparent that the buckets may be secured to said strips in any desired manner.

Having fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a water-power apparatus, the combination with two suitably-supported shafts, each of which is provided with two wheels, each of which is peripherally grooved, of a bucket-chain, consisting of separate buckets, the backs of which are provided with two sets of transverse strips, which are secured thereto, and links which are mounted between said strips, and pivotally connected therewith, and which overlap the space between the buckets, said links being each provided with inwardly-directed wedge-shaped teeth which operate in the annular grooves in said wheels, substantially as shown and described.

2. In a water-power apparatus, the combination with two suitably-supported shafts, each of which is provided with two wheels, each of which is peripherally grooved, of a bucket-chain, consisting of separate buckets, the backs of which are provided with two sets of transverse strips, which are secured thereto, and links which are mounted between said strips, and pivotally connected therewith, and which overlap the space between the buckets, said links being each provided with inwardly-directed wedge-shaped teeth which operate in the annular grooves in said wheels, and said strips being also provided with supplemental links which are pivotally connected with the outer sides thereof, and which overlap the spaces between the buckets, substantially as shown and described.

3. In a water-power apparatus, the combination with two suitably-supported shafts, each of which is provided with two wheels, each of which is peripherally grooved, of a bucket-chain, consisting of separate buckets, the backs of which are provided with two sets of transverse strips, which are secured thereto, and links which are mounted between said strips, and pivotally connected therewith, and which overlap the space between the buckets, said links being each provided with inwardly-directed wedge-shaped teeth which operate in the annular grooves in said wheels, and said strips being also provided with supplemental links which are pivotally connected with the outer sides thereof, and which overlap the space between the buckets, the links which are mounted between the strips and provided with teeth, being connected with the said strips by the same pins or bolts by which the supplemental links are connected therewith, substantially as shown and described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 20th day of January, 1897.

ORSON J. WOODARD.

Witnesses:

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