No. 654,654. Patented July 31, 1900.

H. T. LAWRENCE.

WATER WHEEL.

(Application filed Mar. 20, 1900.)

(No Model.)

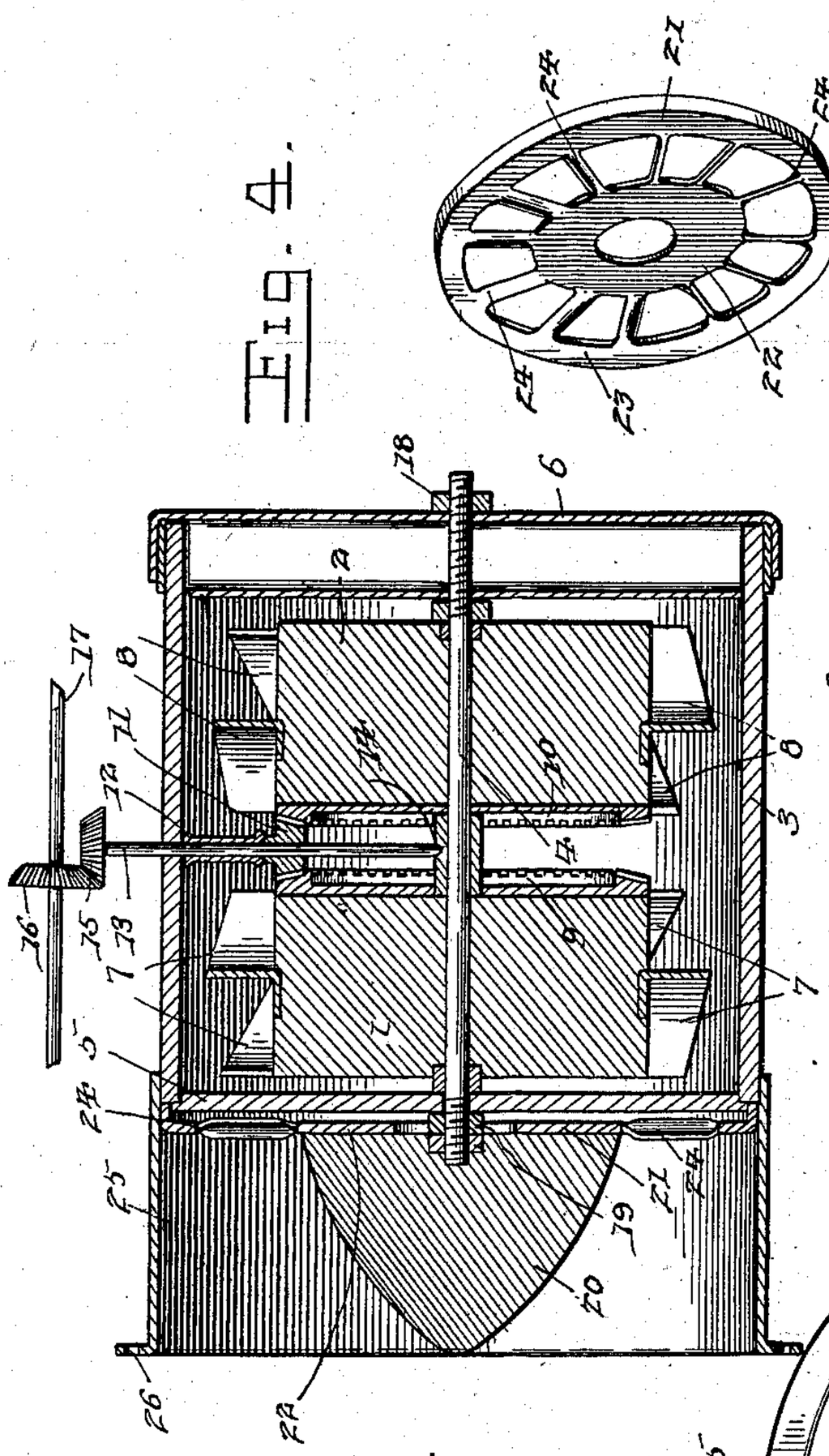

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses
F. C. Alden.
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UNITED STATES PATENT OFFICE.

HENRY T. LAWRENCE, OF LYNDON STATION, WISCONSIN.

WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 654,654, dated July 31, 1900.

Application filed March 20, 1900. Serial No. 9,441. (No model.)

To all whom it may concern:

Be it known that I, HENRY T. LAWRENCE, a citizen of the United States, residing at Lyndon Station, in the county of Juneau and State of Wisconsin, have invented a new and useful Water-Wheel, of which the following is a specification.

The invention relates to improvements in water-wheels.

One object of the present invention is to improve the construction of water-wheels and to increase their efficiency and to enable a maximum amount of power to be obtained from a given current of water.

A further object of the invention is to provide a water-wheel adapted to be operated in series and capable of being arranged in a vertical or a horizontal position.

The invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claim hereto appended.

In the drawings, Figure 1 is a longitudinal sectional view of a pair of water-wheels constructed and arranged in accordance with this invention. Fig. 2 is an end elevation. Fig. 3 is a detail perspective view of the pair of wheels. Fig. 4 is a detail perspective view of the circular frame, illustrating the arrangement of the annular series of radial deflectors.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

1 and 2 designate reversely-rotating water-wheels designed to be arranged in pairs and located within a cylindrical casing 3 and mounted for rotation upon a shaft 4, located at the center of the casing and extending longitudinally thereof. The cylindrical casing, which is designed to be arranged at a flume, is preferably constructed of sections, and it may be of any length to accommodate the desired number of water-wheels, it being apparent that one or more pairs may be simultaneously operated by the same current of water. The shaft is supported by transverse bars or braces 5 and 6, suitably connected to the opposite sides of the cylindrical casing, and the water-wheels, which are supported by the shaft, are provided at their peripheries with annular series of angularly-disposed blades 7 and 8, arranged in opposite directions, as clearly illustrated in Fig. 3 of the accompanying drawings, whereby a current of water passing through the casing will drive the water-wheels in opposite directions.

The water-wheels are spaced apart and are provided at their inner faces with gears 9 and 10, consisting of annular series of spur-teeth located at the peripheries of the wheels and meshing with a pinion 11, which is interposed between the said wheels at the top thereof when the casing is arranged in a horizontal position. The pinion 11 is provided with an extended hub or sleeve 12 and is fixed to a transverse shaft 13, extending outward through the adjacent side of the cylindrical casing and having its inner end stepped in a suitable bearing 14 at the center of the longitudinal shaft. The bearing 14 is preferably in the form of a sleeve and is interposed between the water-wheels and is adapted to space the same apart, as clearly shown in Fig. 1. The gears 9 and 10 of the inner faces of the water-wheels may be constructed in any suitable manner and may, as illustrated in Fig. 1 of the accompanying drawings, consist of complete gear-wheels secured to the adjacent faces of the body portions of the water-wheels. The outer end of the transverse shaft 13 is connected by beveled gears 15 and 16 with a longitudinal shaft 17, located outside of the casing and adapted to be connected with any number of pairs of water-wheels in the manner illustrated in Fig. 1. The longitudinal shaft 17 may be connected by gearing with any suitable machinery or device to be operated, and it is adapted to be arranged in a vertical or a horizontal position, according to the arrangement of the casing.

The ends of the central interiorly-arranged longitudinally-disposed shaft are threaded for the reception of nuts 18 and 19, located at opposite sides of the transverse bars 5 and 6 of the casing, and the front end of the central shaft supports a conical deflector 20, which is provided with interior screw-threads to engage those of the shaft. These screw-threads may be formed by a nut seated in the inner flat face of the conical deflector, which also serves to retain a transverse disk or frame 21 in position. The frame 21 consists of a central circular portion 22, a marginal rim 23,

and a series of angularly-disposed deflectors or blades 24, connecting the rim with the central circular portion and arranged around the conical deflector. The rim is provided with a flange which is extended inward against the adjacent end of the casing, as clearly shown in Fig. 1. The annular series of radial deflectors 24 extend in the opposite direction from the blades 7 of the wheel 1 to direct the constricted current of water against the faces of the said blades 7 to increase the effect of the current. The casing is provided with a cylindrical extension or section 25, and the conical deflector forms a tapering annular space between it and the said extension or section 25 for the purpose of restricting the current of water, and thereby increasing its force before it reaches the annular series of deflectors. The cylindrical extension or section 25 is provided at its outer end with an annular flange 26, adapted to be bolted or otherwise secured to another section of the casing when a series of water-wheels is employed. The current of water passing through the cylindrical casing is constricted in the annular space between the conical deflector and the cylindrical casing, and it is directed against the faces of the blades 7 of the water-wheel 1 by the annular series of angularly-disposed radial deflectors 24, which are arranged at the inner end of the tapering annular space or passage for the water.

It will be seen that the apparatus is simple and comparatively inexpensive in construction, that it is adapted to secure a maximum effect from a given current of water, and that a series of wheels may be conveniently operated by a single current of water. It will also be apparent that the water-wheels may be operated in a vertical, horizontal, or inclined position and that a comparatively-small current of water may be utilized for this purpose.

What is claimed is—

The combination of a cylindrical casing provided with a cylindrical extension or section 25, transverse bars mounted within the casing, a central longitudinal shaft supported by the said bars, water-wheels arranged within the casing on the said shaft and located between the transverse bars, the conical deflector disposed within the extension or section 25, and secured to the adjacent end of the central shaft, the circular frame arranged within the casing at the inner end of the extension or section 25 and provided with an inner disk to fit against the base of the conical deflector and having an annular series of blades and provided with an outer rim, gear-wheels mounted on the adjacent faces of the water-wheels, a transverse shaft extending through the casing and provided with inner and outer pinions, the inner pinion meshing with the said gear-wheels, and the exterior longitudinal shaft located at the outer end of the transverse shaft and provided with a pinion meshing with the outer pinion, substantially as described.

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

HENRY T. LAWRENCE.

Witnesses:
THOMAS POLLARD,
ALBERT GOEMER.