(No Model.)

E. R. STILWELL.

DUPLEX WATER WHEEL CYLINDER GATE.

No. 588,502. Patented Aug. 17, 1897.

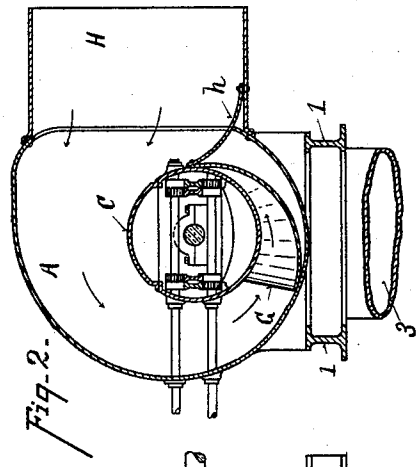


Fig. 2.

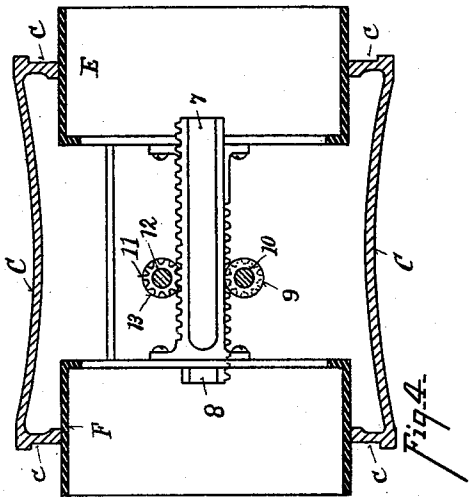


Fig. 4.

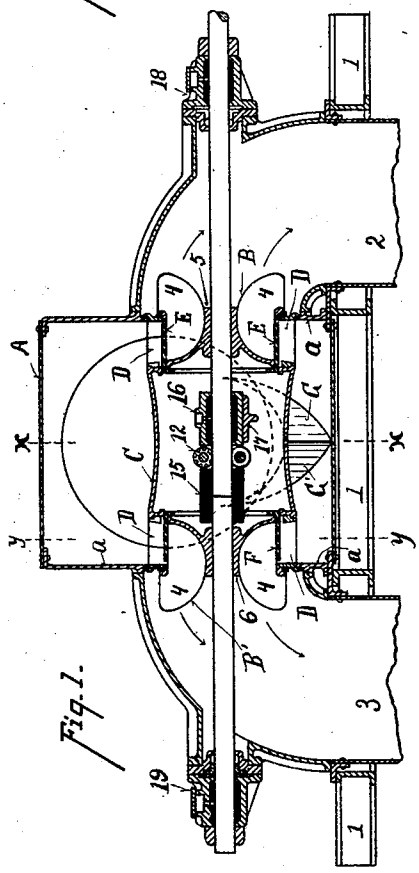


Fig. 1.

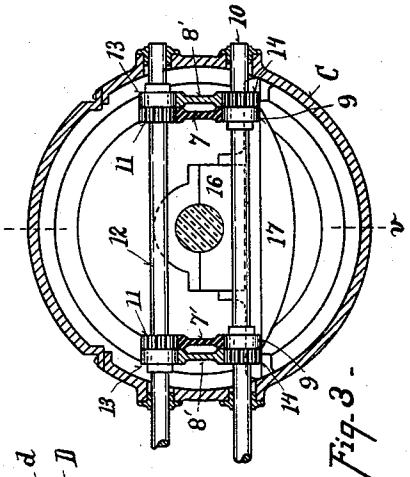


Fig. 3.

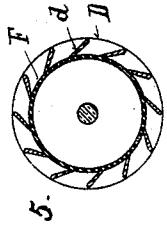


Fig. 5.

Witnesses
C. W. Miles.
Oliver B. Kaiser.

Inventor
Edwin R. Stilwell
by Wood Boyd
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

EDWIN R. STILWELL, OF DAYTON, OHIO, ASSIGNOR TO THE STILWELL-BIERCE & SMITH-VAILE COMPANY, OF NEW JERSEY.

DUPLEX-WATER-WHEEL CYLINDER-GATE.

SPECIFICATION forming part of Letters Patent No. 588,502, dated August 17, 1897.

Application filed November 5, 1896. Serial No. 611,160. (No model.)

To all whom it may concern:

Be it known that I, EDWIN R. STILWELL, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Duplex-Water-Wheel Cylinder-Gates, of which the following is a specification.

My invention relates to that class of turbine wheels in which two wheels are mounted upon a horizontal shaft.

One of the objects of my invention is to provide a scroll-casing for supplying the water to both wheels.

Another object of my invention is to provide ring-gates which are supported within a common cylinder between the two wheels and of sufficient length to allow said gates to be retracted within the cylinder for a full gate-opening.

Another object of my improvement is to employ said barrel or cylinder to serve as the inside wall of the scroll and also as a base for supporting both sets of chute-cases.

Another object of my invention is to employ said barrel or cylinder as a bearing-support and also as a support for the gate-operating mechanism.

The features of my invention will be more fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is a longitudinal central vertical section of my improvement in position for use. Fig. 2 is a section on line *x x*, Fig. 1. Fig. 3 is an enlarged section of the central cylinder or barrel and gate mechanism shown in Fig. 2. Fig. 4 is a section on line *v v*, Fig. 3. Fig. 5 is a section of one of the chute-cases on line *y y*, Fig. 1.

1 represents a supporting-beam which may rest on the floor of the room.

2 3 represent the draft or the discharge tubes.

A represents a scroll-case for supplying water to both wheels.

C represents a barrel or cylinder which forms the inner end of the chute-cases D, one of which is shown in section, Fig. 5.

d represents the chute-plates, one end of said chutes being rigidly connected to the head-plate *c* of barrel C and the other end of said chutes being connected to a plate *a*, and to which plate the draft-tubes are respectively attached.

The plates *a* and the chute-cases are duplicates of each other at the opposite ends of the wheel-case and form the outer ends of the chute-cases, and the barrel C forms the inner ends of said cases.

4 represents the buckets of the wheels, secured to their respective hubs 5 6 in the usual manner.

E F represent cylindrical gates which are mounted and moved by mechanism, which are retracted into the barrel C for admitting water on the wheels, and are moved outward, entering a recess between the edge of the bucket and the chute-cases for cutting off the water. Each of these gates is provided with two rack-bars.

7 7′ represent rack-bars attached to gate F, and they project longitudinally out and enter an opening in gate E, being supported upon collar-guides 9 9 on shaft 10. These rack-bars are moved by pinions 11 on shaft 12. Rack-bars 8 8′ are likewise provided with collar-guides 13 on shaft 12 and have engagement with pinions 14 on shaft 10. Said shafts 10 and 12 are driven simultaneously to open and close the gates of both water-wheels.

15 represents a coupling for connecting the water-wheel shafts together.

16 represents a bearing supported upon a bridge 17, which is rigidly connected to the inner walls of barrel C, thereby forming a central bearing for both wheels.

18 represents a bearing secured to the draft-tube 2. 19 represents the outer bearing at the opposite end of the case secured to the draft-tube 3.

G G′ represent scroll guide-plates located centrally at the terminal end of the chute-cases, so as to deflect the water into the chute-cases respectively. The wheel may be planted on the floor of the flume or it may be mounted upon a separate platform and a supplying-pipe H used to connect the scroll-case A with the flume.

h represents a deflecting-plate in the outer end of the scroll-casing A for directing the water into the scroll-chute, as indicated by arrows.

In the construction of casing shown the barrel of cylinder C is made to perform several important offices. This barrel forms the inner wall of both chute-cases, and for this purpose it is located at one side of the scroll-case. It is rigidly connected to the chute-cases D. To these chute-cases are connected annular plates *a*. These parts, being rigidly connected together, form an arch which spans the scrollway, thereby making a very strong support for the wheel and the inner bearing of the water-wheel shafts of both wheels. The barrel or cylinder also has a recess into which to retract the cylindrical gates E F. It also forms an inner wall of the scroll-case A between the two wheels. It is not essential to have its periphery of the form here shown.

Having described my invention, I claim—

1. In a water-wheel, the combination with an inner barrel-casing disposed at one side of the center of said outer casing, deflecting-plates spanning the smaller passage between the barrel and outer casing and forming the terminals of the scrollway, a chute-case attached to each end of said barrel, annular openings within said chute-cases and ring-gates fitting in said annular openings and adapted to move outward into the chute-cases, and inwardly into the barrel-casing, substantially as specified.

2. In a water-wheel casing, the combination of two chute-cases, a barrel-casing connected to the adjacent ends of said chute-cases, a scroll-casing surrounding the chute-cases and barrel-casing and having annular flanges *a* connected to the outer ends of the chute-cases and forming an arch-support for the water-wheels and casing, and deflecting-plates separating the smaller passage between the barrel-casing and outer casing, substantially as described.

3. The combination with the outer casing and the inside barrel-casing C, of ring-gates E, E, movably fitted in the opposite ends of the barrel-casing, shafts passing transversely through the casing, oppositely-movable racks attached to said gates and guided over collar-bearings arranged on said transverse shafts, and pinions fixed on the said shafts and engaging said racks to open and close the gates, substantially as described.

In testimony whereof I have hereunto set my hand.

EDWIN R. STILWELL.

Witnesses:

W. R. WOOD,

OLIVER B. KAISER.