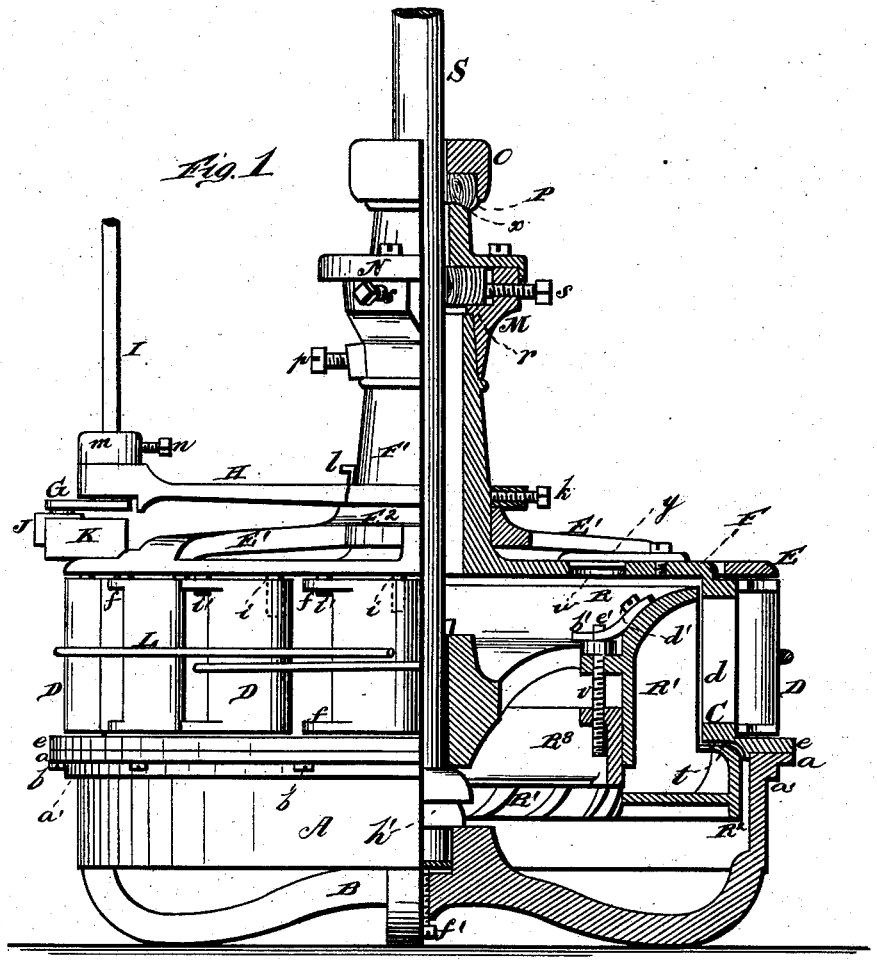
2 Sheets—Sheet 1.

J. SCHUESSLER.

Turbine Water-Wheel.

No. 205,145. **Patented June 18, 1878.**

Fig. 1



WITNESSES

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2 Sheets—Sheet 2.

J. SCHUESSLER.

Turbine Water-Wheel.

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Fig. 2.

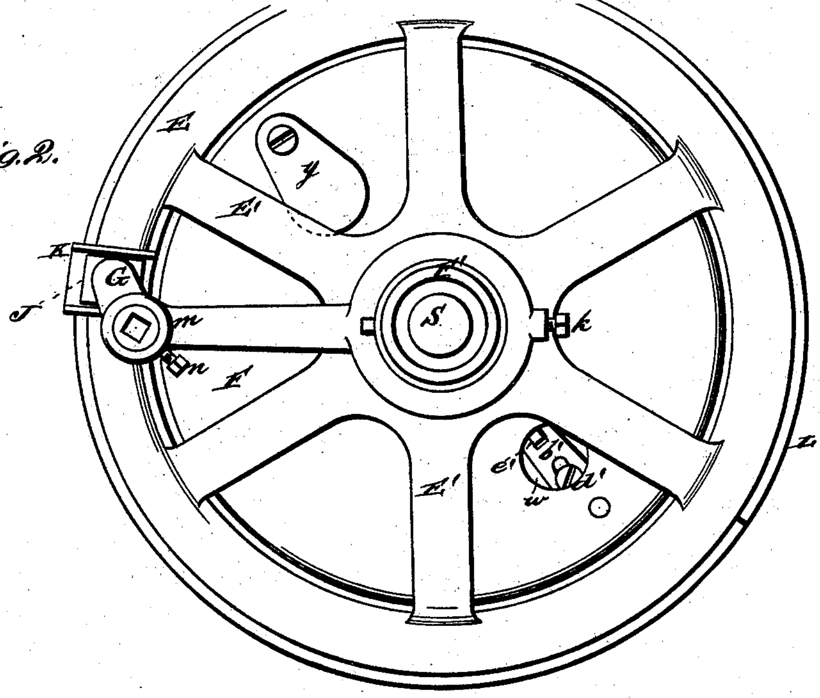
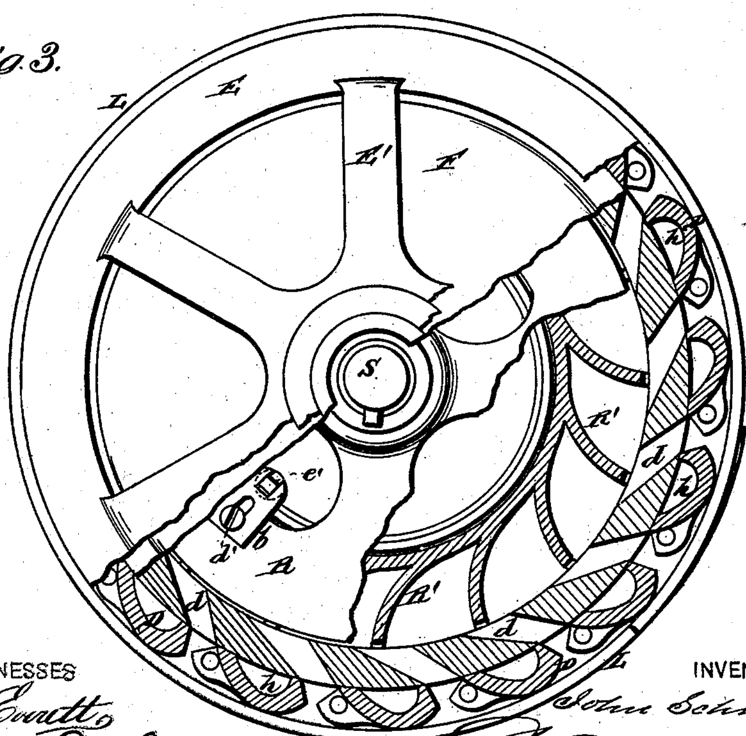


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN SCHUESSLER, OF ATTICA, INDIANA, ASSIGNOR OF ONE-FOURTH HIS RIGHT TO ELIAS SCHUESSLER, OF SAME PLACE.

IMPROVEMENT IN TURBINE WATER-WHEELS.

Specification forming part of Letters Patent No. **205,145**, dated June 18, 1878; application filed March 30, 1878.

To all whom it may concern:

Be it known that I, JOHN SCHUESSLER, of Attica, in the county of Fountain and State of Indiana, have invented a new and valuable Improvement in Water-Wheels; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a vertical section of my water-wheel. Fig. 2 is a plan view, and Fig. 3 is a horizontal section, thereof.

The nature of my invention consists in the construction and arrangement of a water-wheel, as will be hereinafter more fully set forth.

The annexed drawing, to which reference is made, fully illustrates my invention.

A represents the lower part of the casing, with the bridge-tree B formed in one piece. The part A has an outwardly-projecting flange, *a*, around the top, with an offset, *a'*, on the under side of said flange, to rest on the floor and keep the heads of the screw-bolts *b* off the the floor, which screw-bolts connect the flange *a* to a similar flange, *e*, around the lower part of the port or chute casing C, thus holding said two casings firmly together.

The casing C is formed with sixteen ports or chutes, *d*, or more, according to the diameter of the wheel, which will give the water the right direction to the wheel. The casing C is bored out on the inside, so that the wheel will revolve in it after being turned off, and so that it will leave the middle bridge between the ports or chutes above one-third of the width of said ports or chutes. The casing C is also turned off on the outside, so that the valves or gates D can be fitted to it closely and form a water-tight joint. These valves or gates correspond in number to the number of chutes *d*, and each valve is, at top and bottom, provided with an ear, *f*, to form hinges, so that the valve can be reversed, and used both for a right and left wheel. They are also hollow on the inside, in order to reduce friction, as shown at *h*, to receive pins *i*. These pins *i*, as well as the pins *i'*, which enter the ears *e* of the valves, are fastened in a revolving ring, E, which is formed with arms E^1 and a central hub, E^2, said hub being bored out to encircle the neck or pedestal F′ on top of the casing F, this casing F being bolted to the port or chute casing C.

The revolving ring E has two pins, *i i'*, for each valve or gate. The short pin *i'* goes into a hole in the ear *e*, while the long pin *i* goes into the hollow *h*, said hollow or cavity forming a shoulder on each side. These pins will hold the valves or gates to the revolving ring E, so that when rotated back and forth it will have the required throw to move the gates far enough to open and close the chutes *d*. The ring is operated by a crank, G, which is held in a bearing at one end of an arm, H, the other end of which is bored out and fits the neck F′, and is held thereto by a set-screw, *k*, and a key, *l*. The arm H answers the double purpose of holding the crank G in position, and also to hold the revolving ring E down on the casing F and on the valves or gates *d*.

The crank G has a square hole in the upper end, and answers as a socket to receive the gate-rod or valve-rod I, by means of which the gates or valves are opened and closed, as required. The crank has a collar, *m*, on its upper end, held by a set-screw, *n*, so as to support the weight of the crank and rod. The lower end of the crank fits into a square box, J, with a round hole in it to fit the lower end of the crank, and this box works in a groove or grooved jaw cast on the revolving ring E, so that when the crank is turned the box J will move out and in the jaw K, and thus move the ring E to open and close the valves.

The valves or gates D are held to their seat by the pressure of the water, and in addition I employ a spring-ring, L, surrounding the entire series of valves or gates, which will hold them in place when opened or closed without any pressure on them; and if there should be any obstruction in any one or more of the ports or chutes of the casing C, this spring-ring will allow such valve or valves to swing open on its hinge, so as to slide over such obstructions, and by doing so the remainder of the valves or gates can be closed and the wheel stopped.

On the upper end of the neck F′ is secured

the bearing or follower box M, by means of a set-screw, *p*. In this box are wooden followers *r r*, which are tightened to the wheel-shaft by set-screws *s s*. On the top of the box M is bolted a cover or head, N, which is formed with an upwardly-projecting hub, said hub being turned at the top, as shown at *x*, to form a joint with a metal collar, O. This collar is bored out to fit the wheel-shaft, and counterbored in the under side to receive a wooden collar, P, which is turned to fit the hub of the head N. The collar O, filled with wood P, will keep all sand, gravel, or mud out of the box M, thereby preventing the cutting of the wheel-shaft. The collar O will revolve with the wheel-shaft, and its own weight will keep it down on the hub of the head N.

The wheel consists, principally, of an upper rim, R, a series of buckets, R^1, and an exterior band, R^2, around the lower ends of the buckets. These buckets are straight from the upper rim R down to the band R^2, and lean far enough ahead so as to form a right angle when they are placed even with the middle bridge between the ports or chutes *d*. The buckets are curved and flaring down to the lower end of the band R^2. The curved part of the bucket runs back past the straight line of the bucket behind it, so as to give it a downward backward discharge.

The band R^2 is cast solid to the buckets, and forms at the top an inward flange, *t*, toward the straight parts of the buckets, which will make a joint to the lower end of the port or chute casing C. The wheel also opens on the lower part of the inside of the buckets, so as to give it a variable discharge, which is effected by means of a movable ring, R^3, operated by adjusting-screws *v v*. These screws are worked through hand-holes *w w* in the top casing F, which holes are covered by plates *y y*, held by suitable screw-bolts. The wheel can be turned so as to bring the adjusting-screws *v* to correspond with the hand-holes *w*, and then they can be worked with a suitable wrench, so as to raise and lower the movable ring R^3, as required. By raising the ring R^3 the wheel will discharge more water and give more power, and by lowering said ring it will discharge less water and decrease the power.

After the movable ring R^3 has been set so as to give the required power, the adjusting-screws *v v* are kept from working loose by means of straps or keepers *b'*, which have oblong holes in one end to receive screw-bolts *d'*. In the other end of each keeper is a square hole, to fit over the square ends *e'* of the adjusting-screws *v* and rest on the shoulder or collar of the same, so that when the screw-bolts *d'* are loosened the keepers can be turned off from the adjusting-screws, and when said screws have been adjusted the keepers can be slid up against the square ends *e'*, and then fastened by the screw-bolts *d'*, and thus prevent the adjusting-screw *v* from turning.

S is the wheel-shaft, which is fastened to the wheel by a key, and runs on a wooden step, *h'*, placed in the center of the bridge-tree B, which step can be set up by a set-screw, *f'*, through the bottom of said bridge-tree. The shaft S runs up through the follower-box M and collars O P far enough to receive a coupling for suitable shafting.

By means of the band R^2 on the wheel all the water is kept on the wheel until it leaves the wheel, and therefore keeps all the friction from the lower casing; and, being larger below the ports or chutes *d*, it will discharge the water full and give it a greater velocity or speed.

What I claim as new, and desire to secure by Letters Patent, is—

1. A water-wheel consisting of the rim R, series of buckets R^1, and exterior bottom band R^2, the buckets being straight from the rim to the top of the band, and then inclined, as described, and the band provided at the top with the interior flange *t*, all substantially as and for the purposes herein set forth.

2. A water-wheel provided with an interior adjustable band to make a variable discharge, as herein set forth.

3. In combination with a water-wheel, the interior adjustable band R^3, adjusting-screws *v*, and the casing F, with band-holes *w* and covering-plates *y*, all substantially as and for the purposes herein set forth.

4. The sliding slotted plates *b'*, with fastening-screws *d'*, in combination with the adjusting screws *v*, having square ends *e'*, for the purposes herein set forth.

5. In combination with the follower-box M and wheel-shaft S, the cover or head N, with projecting hub, and the gravitating metal collar O, with interior wooden collar P, for the purposes herein set forth.

6. The reversible valves or gates D, formed with concavities *h* on their inner sides and a perforated ear, *e*, at each end, in combination with the ring E, having projecting pins *i* and *i'* for each valve, substantially as and for the purpose set forth.

7. The combination of gate, operating-ring E, with radial arms E^1, central hub E^2, and grooved jaw K, the arm H, crank G, and box J, all substantially as and for the purposes set forth.

8. The spring-ring L, in combination with the valves or gates D, for the purposes set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN SCHUESSLER.

Witnesses:
RUBEN REAMER,
GEORG CUSSCHMANN.