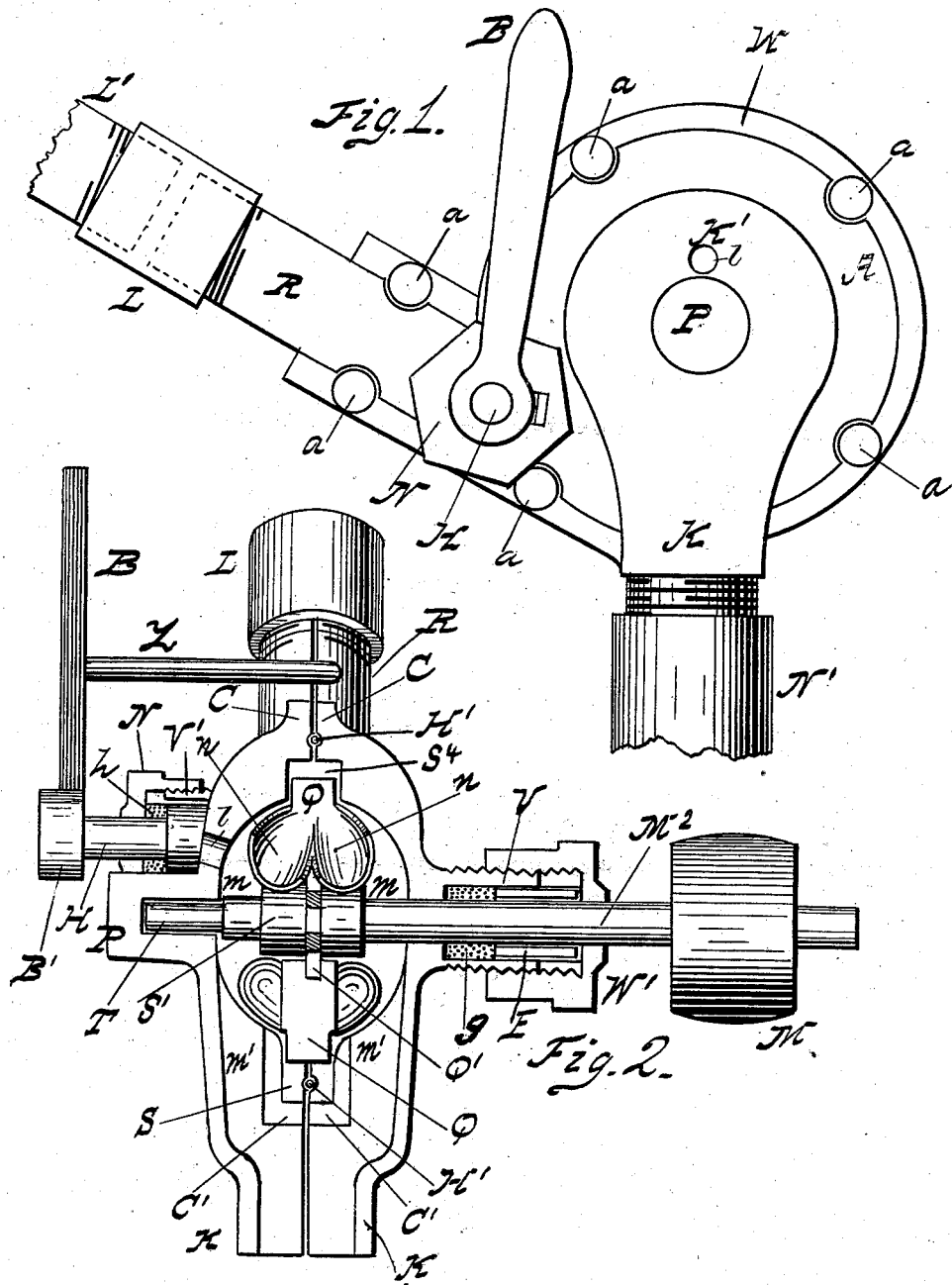


D. DRAWBAUGH.
Water-Motor.

No. 225,577.

Patented Mar. 16, 1880.



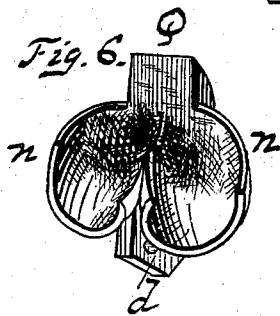
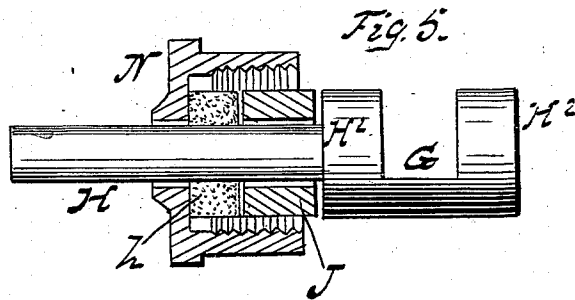
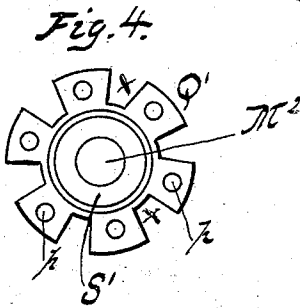
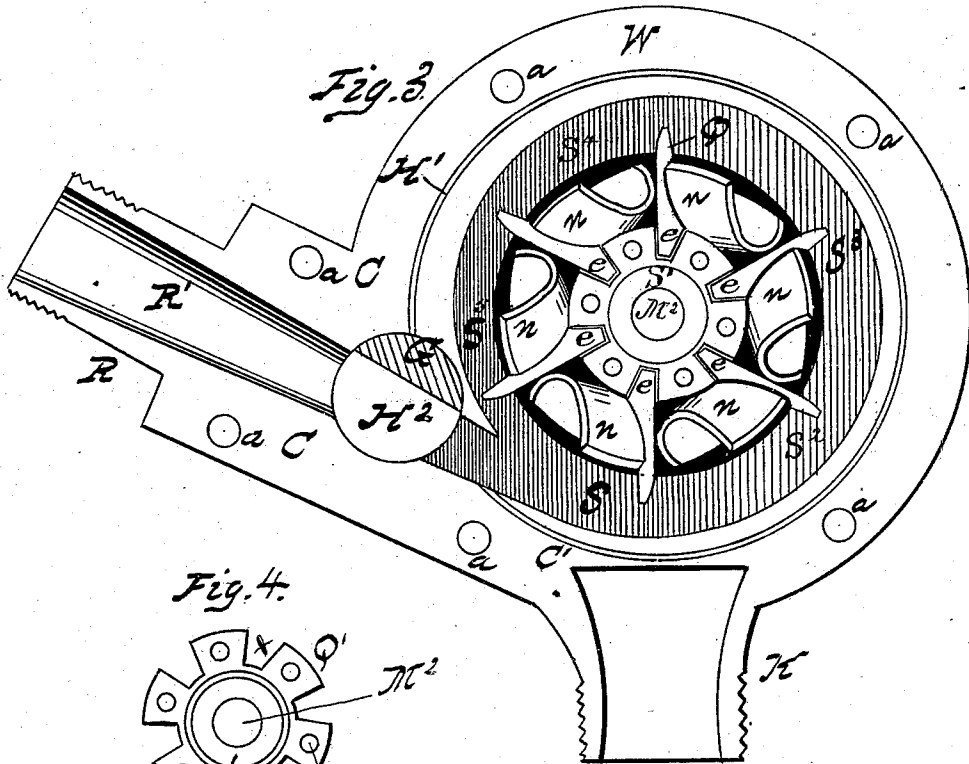
WITNESSES
E. H. Bates
J. C. Sathrop

INVENTOR
Daniel Drawbaugh
Theophilus Weaver
ATTORNEY.

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UNITED STATES PATENT OFFICE.

DANIEL DRAWBAUGH, OF EBERLY'S MILLS, ASSIGNOR OF TWO-THIRDS OF HIS RIGHT TO EDGAR W. CHELLIS, OF HARRISBURG, PENNSYLVANIA.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 225,577, dated March 16, 1880.

Application filed July 21, 1879.

To all whom it may concern:

Be it known that I, DANIEL DRAWBAUGH, of Eberly's Mills, in the county of Cumberland and State of Pennsylvania, have invented an Improvement in Water-Wheels, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to provide a water wheel or motor of such nature and construction that the full force of the water admitted thereon from a hydrant, main, or other body of water having pressure may be utilized by directing the current, by a graduated approach, all the way around onto the periphery of wheel, which is provided with transverse paddles or blades, and at the base of each of said blades deflectors to catch the current by action and reaction, and yet allow it to move with rapidity and make its exit freely, a peculiar oval-chambered casing in two main sections being employed to mount and inclose the wheel and direct the water thereon, and lead it therefrom in a novel manner.

In the accompanying drawings, similar reference-letters refer to similar parts in both plates.

Figure 1 is a perspective view of the exterior of my invention and sections of attaching-pipes. Fig. 2 is a transverse vertical section of my water-wheel casing, exhibiting, in perspective, parts of said wheel and the shaft on which it is mounted, and other parts of my device. Fig. 3 is a sectional view of the wheel-case, showing the interior thereof, and the wheel in perspective. Fig. 4 represents my wheel-hub. Fig. 5 represents, in perspective, my water-wheel gate, and in section, also, the packing devices on the stem thereof. Fig. 6 is a perspective of one of my wheel-bucket structures, composed of upright blade, deflectors, and attaching-foot.

I construct my improved wheel with a hub, S' , having centrally thereon the disk Q' , deeply notched at points x , and mounted on the shaft M^2 centrally in an ellipsoidal cavity, m , in a vertically two-parted case, $K A R$, the ellipsoid being divided through the major axis. On said hub $S' Q'$ are attached such parts as

are shown in Fig. 6, in position as shown in Figs. 2 and 3, by screws or rivets at points d , the foot e being set in a notch, x , and the deflectors or buckets n being of such conformation, as shown, so as to fill the equal subdivisions of the circle, the blades Q projecting into the space $S S^4$ of case. (Shown in Fig. 3.) Said deflectors $n n$ are arranged in pairs in front of the blades Q , as shown in Fig. 6, and are obliquely directed to shed the water aside from the middle of the wheel, while driving it by direct impact of current as well as by reaction through the current, being deflected on its way to be discharged at the passages $m m'$, as will be hereinafter more fully set forth.

The case by which my improved wheel is inclosed and mounted is composed of two nearly equal sections, similar in general features, (denoted by letters $A C W K V$ and $A C W K P$.) The base of each is a flange, $W C$, through which, by bolts or rivets a , the sections are held united, a wire, H' , inlaid on their matched faces, serving to guide them upon each other and to make the joint watertight. Each of said sections has the screw-threaded extension R , over which a joint-connector, L , is passed to attach the inlet-pipe L' , and each has also the screw-threaded extension K , over which is attached the exit-pipe N' . Each of said sections has the swell or raised part A , to give such enlargement as the cavity $m m$ requires, whereat each of said sections is recessed in semi-ellipsoidal form. One of said sections has formed on it the closed box P , in which is the bearing for end T of wheel-shaft M^2 , which has its bearing in the opposite section in the ring E , and the packing g , pressed by said ring when forced in by the capped nut W' , applied over the packing-box V , formed as a part of said section of wheel-case.

Each section has in it the exit-passage m' , separated from the inlet-channel at S by the double casing at C' , as shown in Fig. 2; and each section of said case has inlet R' , converging inward to the gate H^2 , which is inserted in a cylindrical transverse cavity, snugly filling it by its body. Said gate is cut away at

G to afford full inlet-passage when it is turned, as shown in Figs. 3 and 2.

When the handle B, attached to stem H of said gate, is turned as shown in Fig. 1, the inlet-passage is closed by said part G being 5 revolved to stand across it, and at all intermediate points between a full-closed and a full-open gate the stream is directed by said part G to rush along the outer wall of the channel or curb S, that it may not be coun- 10 teracted by itself, but pass on around the wheel, as is hereinafter fully set forth. Said gate H G H² is held in its socket by the ring J and packing h, compressed by the screw- 15 cap nut N, applied over neck V', formed on one of said case-sections, as shown in Figs. 1 and 5. A stop, Z, on handle B of said gate limits its throw both when open and when closed.

The channel S S² is the passage by which the water is admitted onto my wheel. Said channel is of uniform breadth, one-half there- 20 of being in each section of case, as shown in Fig. 2, and the wheel paddles or blades Q snugly fill the cross-section of said channel, but not its depth, except at its extreme limit 25 between S and S⁵, the floor or outer curb of said channel being a spiral, and being more remote from said blades at S than at succeeding intermediate points in its circuit, and its 30 approach being gradual, as shown in Fig. 3, its inner margin being a circle.

The object of constructing the outer curb of said channel so as to have a winding approach 35 to the said wheel is, that the water may glide around the wheel and engage it at all points in such manner that the action on the wheel may produce balanced pressure upon its bear- 40 ings and the distribution of the current so as to have a portion thereof let onto each of the wheel-blades Q and the deflectors n n thereat. The whole momentum of the stream admitted under pressure may be realized both by direct 45 action of the swirling stream in said channel, and also by the reaction while being deflected to the exit-passages m m' after concussion on the blades Q.

Moreover, when gate H² is turned to let onto the wheel less than full feed, the admitted 50 stream will pass the blades at S, and those to the rear of it, freely, and will swirl on in said channel S S² over the wheel to the more confined part of said channel, where, by having its path closed by the wheel-blades Q, concen- 55 trated plunging occurs, and the wheel is propelled thereby, both by velocity of current and by the momentum from reaction.

The driving-power is, however, not fully obtained to propel my motor, especially when it 60 is run rapidly, unless the vacuum produced about the center of the wheel is relieved by a vent to admit air into the space denoted by letter m, as otherwise the discharge through the spaces m' will be retarded by atmospheric 65 pressure at the discharge-orifice to fill said vacuum, thus producing a gurgling flow of the

issuing stream. Such vent is located at l, Figs. 1 and 2, vertically above box P and close to it, into which aperture a bent tube may be inserted with its free end directed vertically. 70 Said vent is most efficient if directly opposite in direction to the discharge-orifice. If said aperture l is, however, unprovided with said bent tube, the water will not escape thereat from the wheel-case, as there is, on the con- 75 trary, a keen current of air rushing into the case at said vent-hole, which operates to quicken the flow of the issuing stream of the used water; and it appears also to assist the propulsion of the wheel by a shifting of the lo- 80 cation of the vacuum, so that it operates by forward suction or traction upon the deflectors n, in effect like an additional stream let thereon.

The stream of air thus admitted not only 85 perfects the discharge of the used water, but it becomes a positive working factor, and the power of the motor is much increased thereby.

Having sufficiently described my invention, what I regard as new and useful, and what I 90 desire to secure by Letters Patent of the United States, is substantially as follows:

1. A water-wheel having its periphery provided with radially-projecting transverse 95 blades or paddles adapted to snugly ply in the channel of the case, by which the stream is admitted onto the wheel, and having the sides of said blades provided with deflectors for shedding aside the stream after impact on said 100 blades toward passages for discharging the water from the case inclosing the wheel, substantially as and for the purpose set forth.

2. The hydraulic motor-wheel casing constructed with the peculiar clearing-apartment of ellipsoidal form about the wheel-center, for 105 shedding the used water properly to the exits therein, and of an adjoining scroll inlet-passage extending entirely around the wheel-periphery, to admit the stream thereon undi- 110 videdly and with equal bearing on opposite sides thereof, in the manner and for the purpose set forth.

3. The wheel-case provided with central spiral inlet-channel, S S², and having mounted therein wheel with radial blades Q and deflect- 115 ors n n, the passages m m', leading out between the walls C' and K, substantially as set forth.

4. The gate G H² H B, arranged in the inlet-passage R', and held in its socket by cap- 120 nut N, bearing on ring J by compressing-packing h, and driven on extension V', and operating substantially as and for the purpose set forth.

5. The wheel-sections as shown in Fig. 6, 125 each consisting of blade Q, deflectors n n, and foot d e, in combination with nave S' Q', and screws or rivets at p, and operating substantially as and for the purpose set forth.

6. The sectional wheel consisting of nave 130 S' Q', and periphery, provided with blades Q, deflectors n n, and mounted on shaft M M², in

combination with the two-parted case C W | and seal, in presence of witnesses, this 19th
A R K, provided with inlet R', gate G H², spi- | day of April, 1879.
ral feed-channel S S², &c., and exits *m m'*, all
arranged for operation substantially as set
5 forth.

DANIEL DRAWBAUGH. [L. s.]

Attest:

In testimony that I claim the foregoing as
my invention I have hereunto set my hand

E. W. CHELLIS,
PETER STUCKER.