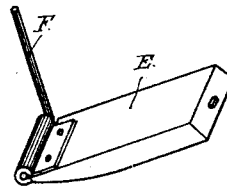
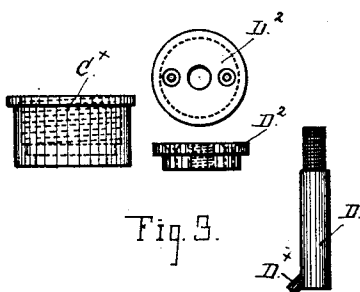
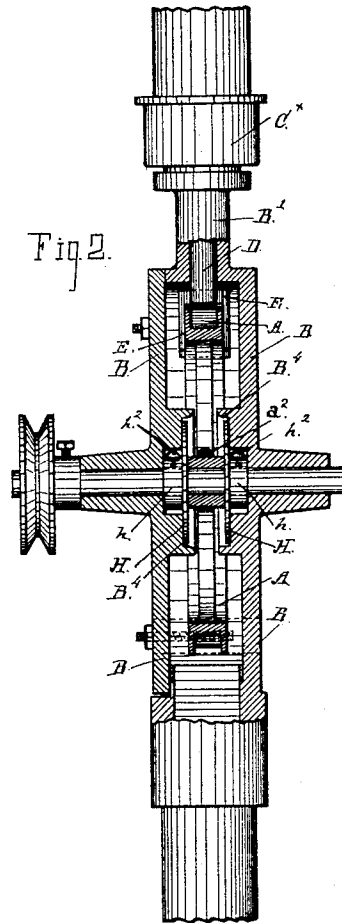
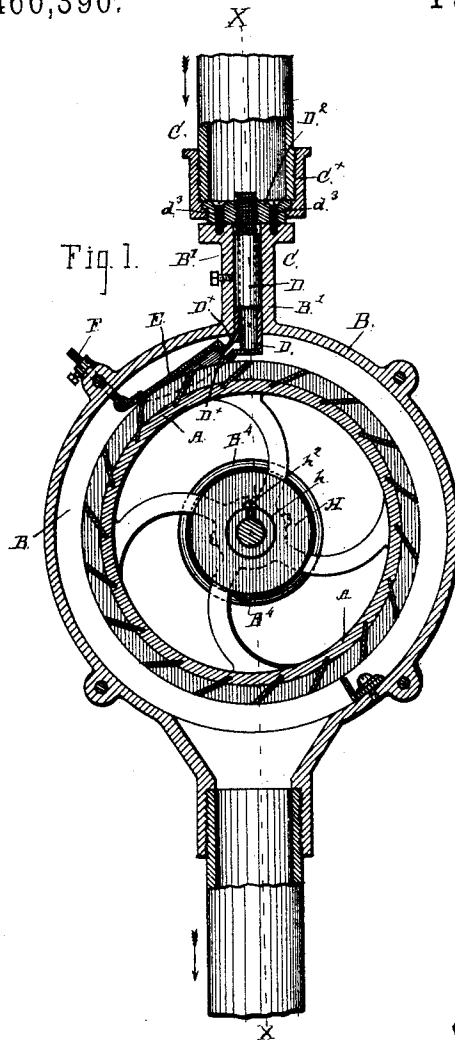


W. B. HIGGINS.
WATER MOTOR.

Patented Sept. 29, 1891.



Witnesses:

Wm Mayo.
A. M. Charlton

Inventor:

Walter B. Hoagins
By Smith & Brown
his Atty.

UNITED STATES PATENT OFFICE.

WALTER B. HIGGINS, OF SAN FRANCISCO, CALIFORNIA.

WATER-MOTOR.

SPECIFICATION forming part of Letters Patent No. 460,390, dated September 29, 1891.

Application filed January 14, 1891. Serial No. 377,758. (No model.)

To all whom it may concern:

Be it known that I, WALTER B. HIGGINS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented a new and useful Improvement in Water-Motors, of which the following is a specification.

My invention relates to improvements in water-motors of the kind having a bucket-wheel inclosed in a water-tight case, with an inlet and coupling at one side and a discharge at the opposite side of the periphery, the bucket-wheel being fixed on a shaft that extends through the case and gives motion to a gear or a pulley on the outside.

The improvements embraced in my present invention consist of an attachment or device for increasing the active force of the jet upon the wheel, consisting, mainly, of a deflecting plate and shield combined with a jet tube or nozzle of improved construction, both parts adjustable with respect to the rim of the wheel and co-operating to utilize the reaction of the jet against the bottom of the wheel-bucket and convert the same into useful force to assist in driving the wheel. The improvements include, also, means for securing a close fit and bearing of the shaft in the stationary case without excessive friction, and with economy of time and labor in fitting the wheel and shaft.

The nature of my said improvements and the manner in which I construct and apply the same will be understood from the following description and the accompanying drawings, forming part of this specification.

Figure 1 is a side view of a water-motor of this class with my improvements applied to it. The side of the case is removed to show the parts inside. Fig. 2 is a transverse section through the center of the case and wheel at about the line $x x$, Fig. 1. Fig. 3 shows in detail the jet-tube and the parts that hold and adjust it in the case. Fig. 4 is a perspective view of the shield and deflector removed from the case.

A indicates the wheel, and B the surrounding case.

C is a water-inlet, and C^x the coupling, which has a screw-threaded socket for attaching a pipe or hose.

D is a jet-tube extending into the wheel-

space of the case and terminating in a nozzle D^x , that is turned at an angle with the tube and is set to direct the jet against the back of the bucket.

E is the deflecting-plate, which is placed over the rim of the wheel at and around the point where the propelling-jet is applied. It is arranged to cover each bucket as it comes to the jet; but while it sets closely down to the rim at the outer or back end it is raised at the front end to take in the jet tube or nozzle, so that the plate thus stands diagonally across the space between the rim of the wheel and the circular rim of the case. The space beneath the plate, between its front part and the rim of the wheel, is closed in by turning down the sides of the plate and closing the end, as clearly shown in Figs. 1 and 4, the jet-nozzle being inserted through the end of the plate. As thus formed and arranged, this deflecting-plate operates to confine and apply the force of the jet in the most effective and economical manner. Its form at the front is that of an inverted bucket, and as the jet in striking the back of the wheel-bucket is reflected back it is caught by the closed end or head of the plate and caused to react against the wheel in the direction of its travel.

To adjust the outer end of the deflecting-plate, it is supported by a rod F, that passes out through the rim of the stationary case to the outside, and is held by a set-screw or by any other suitable means. Greater or less amount of clearance between the rim of the wheel and the back of the deflecting-plate for escape of the water is obtained by moving the rod from the outside of the case and then fixing it by the set-screw.

The position of the jet and the inclosing front end of the deflecting-plate is regulated by moving the jet-tube longitudinally in the neck or extension B' of the case. This adjustment is secured by fixing the tube in a screw-threaded socket in a disk D^2 , that sets in the bottom of the screw-coupling. This part D^2 also serves to hold the coupling C^x in place, and it is secured by screw d^3 against the end of the neck, sufficient play being provided between that part and the screw-coupling to let the latter piece turn loosely.

The bucket-wheel is fixed on its shaft by a

set-screw a^2 . On each side of the wheel a disk H with a long hub h is set on the shaft and held by a set-screw h^2 . The inner faces of the case have circular recesses B^1 to receive these disks and their hubs, and the disks are set to turn closely and smoothly within these stationary rims and against the faces of the recesses. This construction gives a close fit and a steady bearing for the bucket-wheel and shaft in the case without excessive friction, and it permits the wheel to be easily fitted and adjusted under conditions of variation in the castings.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the motor-wheel and its stationary case, of the jet-tube extending from the water-supply outside the shell and having a laterally-projecting nozzle, and the deflecting-plate having a closed end and turned-down sides adapted to cover the jet-nozzle and the buckets at the nozzle, as described.

2. In a water-motor, the combination, with a wheel and case therefor, of a bucket-shaped deflecting plate or attachment placed between the rim of the motor-wheel and the surround-

ing case, and a jet-tube extending from the water-supply outside the shell, having a nozzle which is arranged to deliver its jet under said plate through the head or closed end thereof against the wheel, substantially as described.

3. In combination with the motor-wheel and its case, the deflecting-plate independently adjustable at the front end with respect to the rim of the wheel, and a jet-tube with a nozzle setting into the space inclosed by the front end of the said plate and having adjustment with respect to the rim of the motor-wheel, and also affecting the adjustment of the closed end of the deflecting-plate, as set forth.

4. In a water-motor, the bucket-wheel and shaft and the disks on the sides of the wheel, adjustable on the wheel-shaft, in combination with the stationary case having recesses with standing rims formed to take the disks and extending inward beyond the rim of the wheel, as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

WALTER B. HIGGINS. [L. S.]

Witnesses:

EDWARD E. OSBORN,
CHAS. E. KELLY.