(No Model.)

A. B. CROWELL.

HYDRAULIC MOTOR.

No. 352,229. Patented Nov. 9, 1886.

Fig. 1.

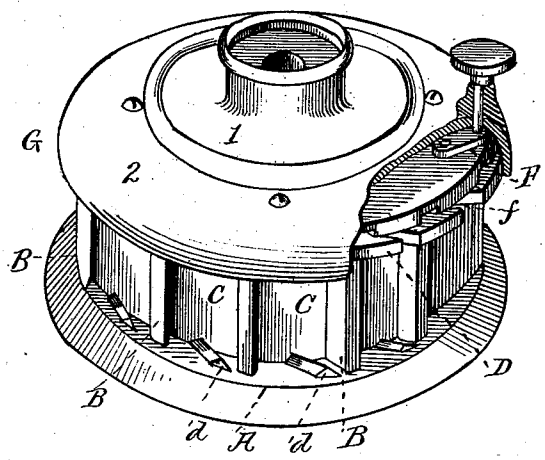


Fig. 2.

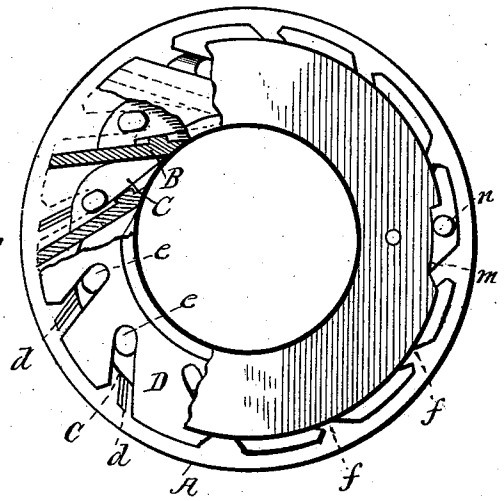


Fig. 3.

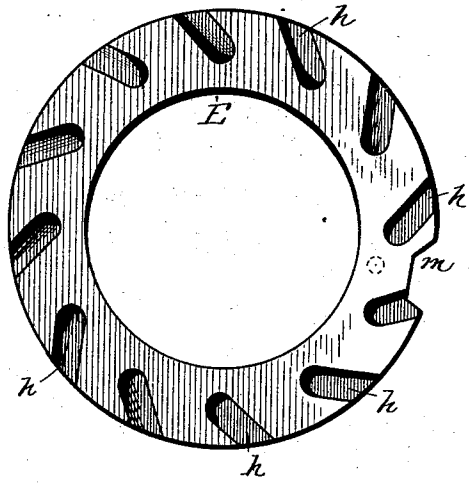
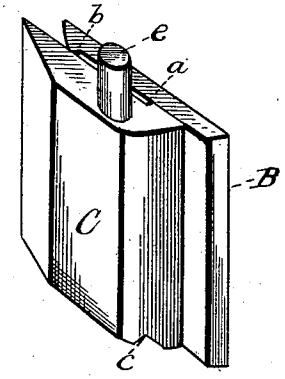


Fig. 4.



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HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 352,229, dated November 9, 1886.

Application filed March 25, 1886. Serial No. 196,440. (No model.)

To all whom it may concern:

Be it known that I, ABNER B. CROWELL, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Hydraulic Motors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in that class of hydraulic motors in which the wheel revolves in a horizontal plane, and which are ordinarily termed "turbines," the same consisting, substantially, in the parts as constructed, and in such particular features of arrangement and combinations thereof as will hereinafter be distinctly described, and pointed out in the claims.

The objects of the invention are to provide simultaneously-operating gates for opening and closing the supply orifices or inlets, by which the supply of water to the buckets is controlled, the said gates being of such peculiarity of construction as that a more perfect result is attained than in many former inventions, and, besides, their arrangement being such that on movement thereof the line or direction of the fluid is not changed or affected, other objects being more particularly pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 represents a view in perspective of a horizontal motor embodying my invention, the same having a portion of the crown-plate broken away in order to more clearly show the construction of parts. Fig. 2 is a top view thereof with the crown-plate removed, the same being also partly cut out and in section. Fig. 3 is a plan view of the cam-ring inverted, which operates the gates, in which is shown the arrangement or formation of the cam-grooves. Fig. 4 is a detail perspective view of a single gate, illustrating the form of construction thereof and the sliding connection between it and the case-partition.

Reference being had to the several parts by the letters marked thereon, A represents the base of the casing, and B designates a series of vertical partitions that form the inlet or supply orifices, through which the fluid enters to the wheel. These partitions are arranged obliquely across the base A at a slight angle to each other, as seen in Fig. 2, and each one is formed at its inner edge or side with a projection, *b*, which engages similar projections, *a*, near the outer edge of the gates, thereby serving as a stop for the latter and limiting the extent of their inward movement.

C represents the gates, which are each formed in their under side with a Λ or other shaped groove, *c*, fitting on a correspondingly-shaped rib or bead, *d*, formed on the base of the ring, about centrally of the supply-orifices and parallel to the partitions B, against which the gates slide, the upper end of each of the said gates being formed or provided at nearest its forward edge with a pin, *e*.

D designates a top plate or ring, which is formed with a series of tangential recesses, *f*, formed parallel with the inner faces of the gates, the same also coming directly over the beads *d*, the said recesses being for the accommodation and guidance of the pins *e* in the movements of the gates back and forth. In the closed position of the gates the said pins rest or abut against the inner seat or extremity of the recesses *f*, and it is obvious that in partially rotating the operating-ring the gates will all be moved forward or opened simultaneously.

E indicates the operating cam-ring, which is provided with a series of cam-grooves, *h*, equal in number to but arranged in a direction opposite the recesses *f* of the top plate, D. This ring is placed down upon the plate D in such manner as that the pins *e* will enter or fit into the grooves *h*, whereby on rotation of the cam-ring in a direction toward that occupied by the recesses *f* the gates will be moved outward, and on turning the ring backward to its former position the gates will be moved inward to close the supply-orifices. The manner of thus operating the cam-ring is by means of a crank, F, whose inner arm is attached pivotally to a small pin formed on the upper surface of the ring, while its upper arm projects upwardly through the crown-plate of the case, and is provided with a pulley, by which suitable connection may be made with the medium through which movement is derived, all being as shown.

It should be observed that the cam-ring, as

plainly shown in Figs. 2 and 3, is formed with a recess, *m*, in its edge at the point opposite the connection of the crank-arm therewith, while at a corresponding point on the top plate, D, a pin, *n*, is formed, this construction limiting the movement of the cam-ring, and thereby preventing an excess of strain to the gates, which would tend to break the pins *e*, and thus cause interruptions in the operation.

G represents the crown-plate, the same being formed in two parts, by which ready portability is obtained and ease of access had to the interior of the case for repairs. The parts constituting this ring are designated by the numerals 1 and 2, the former or central part being that through which the bucket-shaft extends, and is secured to the outer part by screws, as shown, the manner of separating or taking them apart being to remove the crown-plate entirely, taking out the screws, and lifting up the outer portion, 2.

From the foregoing description it is thought the construction and operation of my invention will be thoroughly understood; but I would herein state that while I have set forth in precise detail certain constructions and arrangement of parts, I do not wish to be strictly limited thereto, as very material changes of the same could be resorted to which would come within the scope of my invention.

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

1. The combination, in a hydraulic-motor casing, of the oblique partitions arranged at an angle to each other and formed with projections *b*, the gates provided with a corresponding projection, *a*, and pins *e*, the top plate having tangential recesses in which the pins move, and the cam-ring having grooves arranged in a direction opposite the recesses of the top plate, substantially as described.

2. In a hydraulic motor, the casing-base having the ribs *d*, and provided with the oblique partitions arranged at a slight angle to each other and having projections *b*, in combination with the gates formed on their lower edge with a groove corresponding to the ribs and provided with projection *a*, and pins *e*, the top plate, D, and cam-ring E, all arranged to operate substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ABNER B. CROWELL.

Witnesses:
J. H. REDWOOD,
LOUIS B. SCHULTE.