

(No Model.)

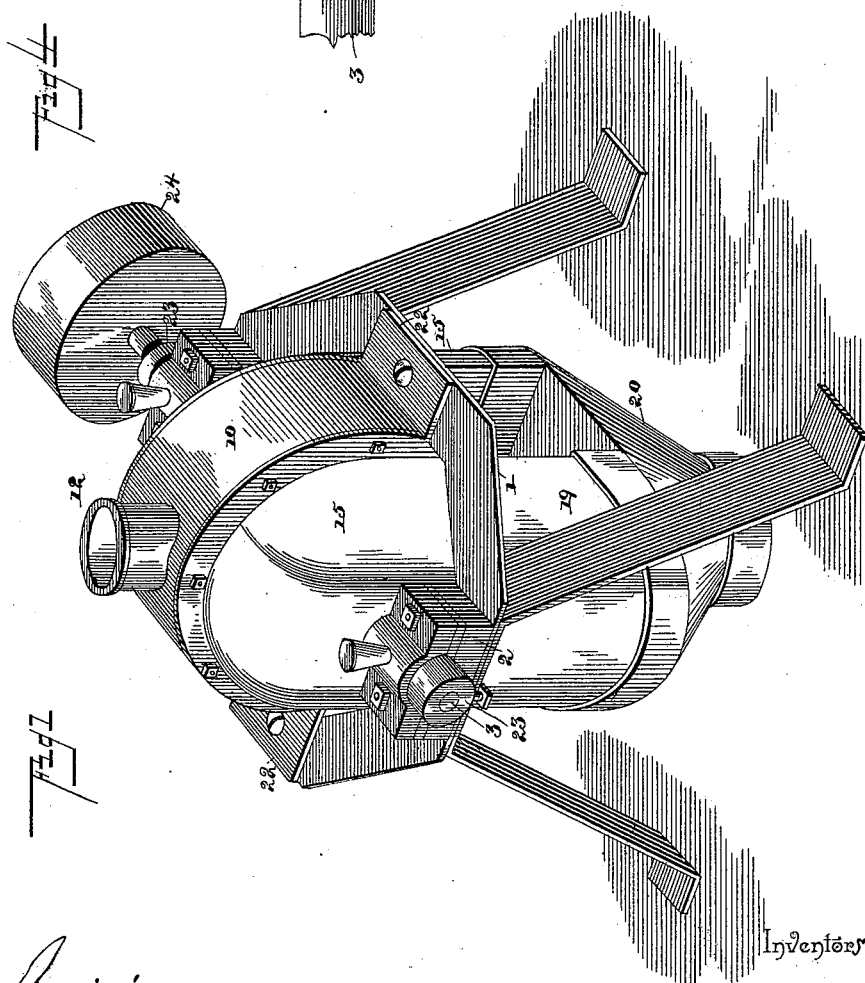
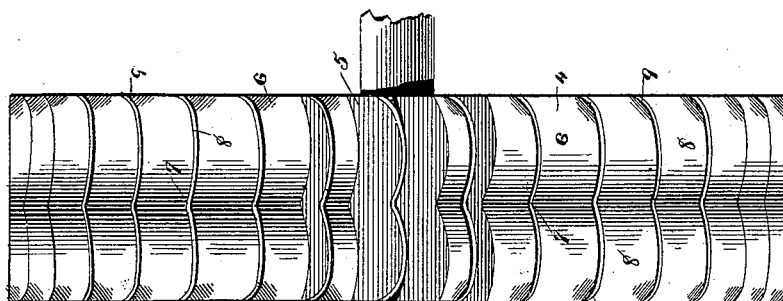
2 Sheets—Sheet 1.

W. B. McPHERSON & W. CAHOON.

HYDRAULIC MOTOR.

No. 421,605.

Patented Feb. 18, 1890.



Witnesses

*John Smirre*  
*Wm. Bagger*

By their Attorneys,

*William B. McPherson*  
*Wesley Cahoon*

*Cahoon & Co.*

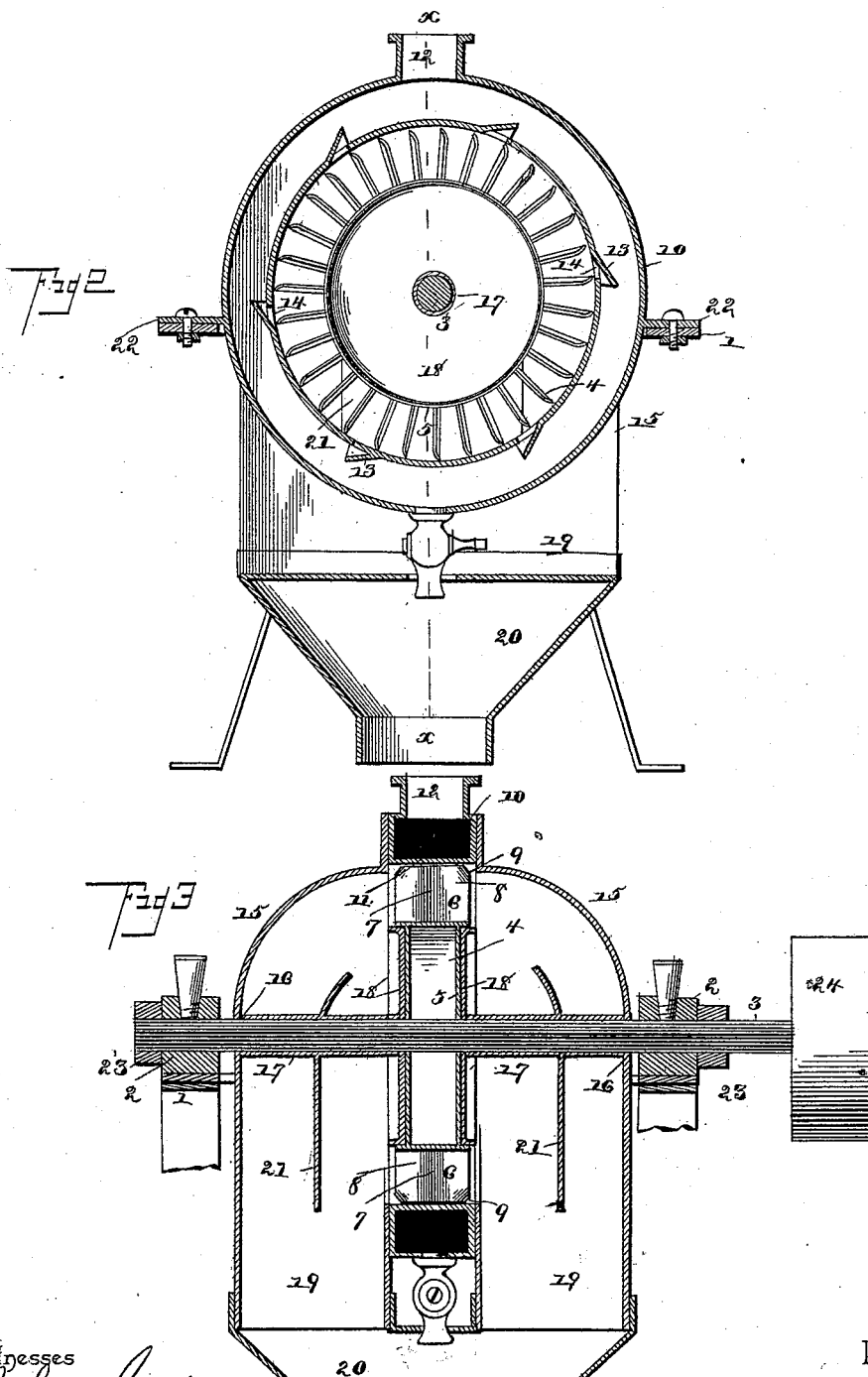
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# UNITED STATES PATENT OFFICE.

WILLIAM B. MCPHERSON AND WESLEY CAHOON, OF DEADWOOD, (DAKOTA TERRITORY,) SOUTH DAKOTA.

## HYDRAULIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 421,605, dated February 18, 1890.

Application filed July 26, 1889. Serial No. 318,708. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM B. MCPHERSON and WESLEY CAHOON, citizens of the United States, residing at Deadwood, in the county of Lawrence and Territory of Dakota, have invented a new and useful Hydraulic Motor, of which the following is a specification.

This invention relates to hydraulic motors; and it has for its object to construct a machine of this class adapted to be run by water under pressure, and which shall be so constructed as to obviate the end or lateral pressure upon the shaft or axis of the wheel, which is an objectionable feature in many of this class of machines as ordinarily constructed.

The invention consists in the improved construction of the bucket-wheel and its casing, which latter forms a receptacle or reservoir for the water; in the combination, with the said bucket-wheel and casing, of deflecting-plates to prevent the water discharged from the wheel from reacting against the latter; and in the improved construction and arrangement of details, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of our improved hydraulic motor, parts of the casing of the same having been broken away for the purpose of showing the construction more clearly. Fig. 2 is a vertical longitudinal sectional view taken at right angles to the shaft or axis. Fig. 3 is a vertical transverse sectional view taken on the line  $x x$  in Fig. 2. Fig. 4 is a front elevation of the bucket-wheel.

Like numerals of reference indicate like parts in all the figures.

A suitably-constructed frame 1 is provided with bearings or boxes 2, in which is journaled the shaft 3, carrying the bucket-wheel 4 of my improved hydraulic motor. Said bucket-wheel consists of a central hub or disk 5, having radially-extending plates or buckets 6 6, located equidistantly around its periphery. Said buckets consist of plates of metal or other suitable material, the upper sides of which are provided with central longitudinal ridges 7, adjacent to which are

formed channels or corrugations 8 8, one on each side. The outer corners of the said plates or buckets are curved upwardly, as shown at 9 9, thus imparting to the channels 8 8 the form and character of scoops and a tendency to discharge the water at the sides of the plates or buckets, the object of which will be perfectly understood when the nature of the water-casing and the method of discharging the water upon the bucket-wheel, which will be hereinafter described, are taken into consideration.

The bucket-wheel is surrounded by an annular casing 10, the inner wall of which 11 is as nearly in contact with the outer edges of the buckets as it may be without interfering with the operation of the bucket-wheel. The upper end of said casing is provided with an inlet 12, which is connected with the water-supply, and the said casing has a series of interiorly-arranged chutes 13 13, arranged in the direction of rotation of the wheel and having openings 14, which face the uppersides of the radial plates or buckets.

Bolted or otherwise suitably secured to the outer walls of the annular casing 10 are the shells or guards 15, the outer ends of which are provided with openings 16 for the passage of the ends of the shaft. Tubular casings 17 for the said shaft are secured to the inner sides of the guard-plates 15, and the inner ends of said tubular casings are provided with circular disks 18, of a diameter about equal to that of the hub of the bucket-wheel, with which the said plates are nearly in contact. The tubular casings 17 and disks 18 are for the purpose of preventing the water discharged from the bucket-wheel from escaping through the sides of the shells or guards around the projecting ends of the shaft. The shells or guards have downwardly-extending escape-passages 19, which are connected by means of a suitably-constructed funnel 20, through which the water is eventually discharged.

Suitably mounted upon the tubular casings 17, which surround the shaft, are a pair of deflecting-plates 21, one of which is arranged on each side of the wheel, and the upper ends of which have concave inner sides, said upper ends being also curved in an inward direction.

These plates are for the purpose of preventing the water discharged at the side of the wheel from reacting against the latter and thereby impeding its operation.

5 The annular casing 10 of our improved hydraulic motor is provided with laterally-extending lugs 22, adapted to rest upon the upper edge of the frame 1.

10 The boxes or bearings 2 of the shaft are provided with oil-cups or lubricators of suitable construction, through which the said bearings may be automatically supplied with lubricating material. The projecting ends of the shaft are provided with collars 23, to retain  
15 said shaft in position in its bearings without any tendency to lateral movement, whereby the hub of the bucket-wheel might be carried into frictional contact with either of the disks 18; and one of the projecting ends of said shaft  
20 is provided with a band wheel or pulley 24, from which motion may be transmitted, by means of a belt or band, to the machinery which is to be driven.

The operation and advantages of our improved hydraulic motor will be readily understood from the foregoing description, taken in connection with the drawings hereto annexed, by those skilled in the art to which it appertains. It will be seen that the water entering the annular casing completely fills the  
30 latter and is discharged through the openings 14 of the chutes 13 around the entire rim or periphery of the wheel. The water being discharged with great force and at right angles to the buckets will cause the  
35 wheel to be rotated with great rapidity and power. Owing to the fact that both sides of the buckets are open for the discharge of water, and also to the improved construction of  
40 the buckets, as herein described, the water will be discharged equally on both sides and without any tendency to lateral strain or pressure upon the shaft, which is apt to occur in water-wheels of this character where  
45 the discharge of water is on one side only.

The general construction of our improved water-wheel is simple and inexpensive, and it is practical and efficient in operation.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a hydraulic motor, the combination of an annular casing having interiorly-arranged chutes and slots or discharge-openings, a bucket-wheel arranged within the said casing, the shells or guard-plates, the tubular casings secured to the latter surrounding the shaft of the bucket-wheel and having disks at their inner ends, and the concave deflecting-plates mounted upon the said tubular casings adjacent to the sides of the bucket-wheel, substantially as and for the purpose set forth.

2. The combination of the frame, the shaft journaled in the same and carrying the bucket-wheel, the annular casing or water-chamber having laterally-extending lugs supported upon the frame, said water-chamber being provided with interiorly-arranged chutes and slots or discharge-openings, the shells or guard-plates, the tubular casings secured to the latter and surrounding the shaft of the bucket-wheel, the deflecting-plates mounted upon said tubular casings, and the funnel connecting the lower ends of the shells or guard-plates, substantially as set forth.

3. In a hydraulic motor, the combination, with a bucket-wheel having radiating plates or buckets provided with longitudinal ridges, longitudinal grooves adjacent to said ridges, and upturned outer corners, of an annular casing or water-chamber surrounding said bucket-wheel and having interiorly-arranged chutes and slots or discharge-openings, and deflecting-plates arranged adjacent to the sides of the bucket-wheel to prevent water discharged from said wheel from reacting against the latter, substantially as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

WILLIAM B. McPHERSON.  
WESLEY CAHOON.

Witnesses:

M. STERN,  
S. M. HOUGHTON.