

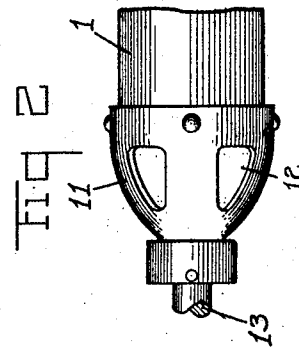
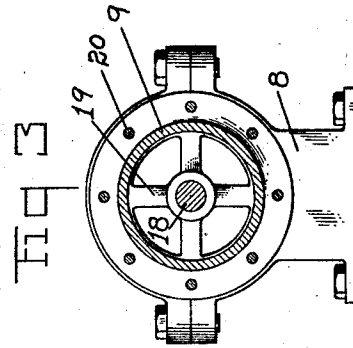
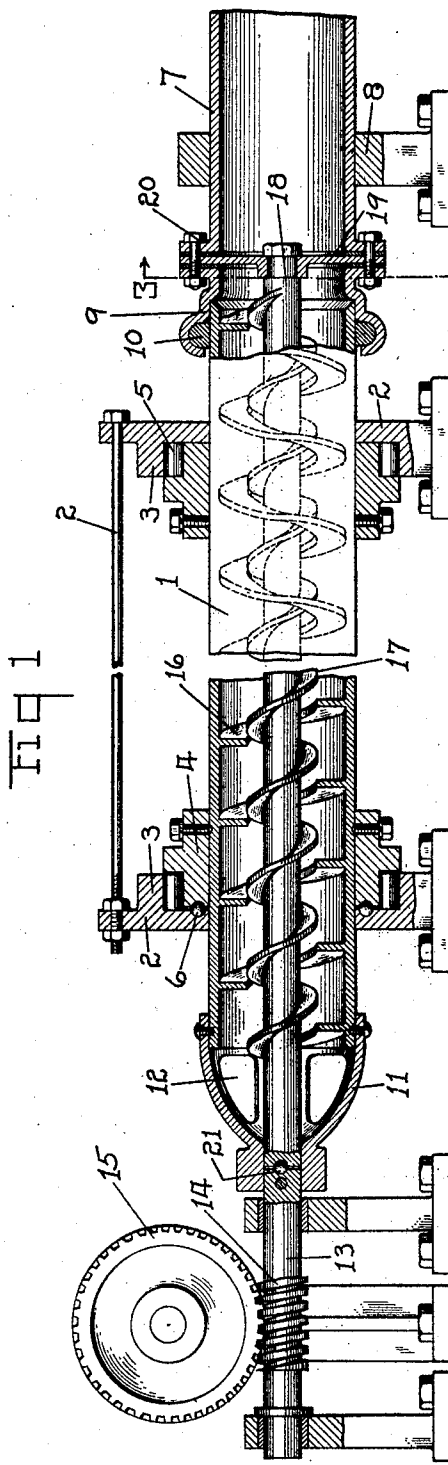
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W. T. NICHOLLS

CENTRIFUGAL WATER MOTOR

Filed Nov. 7, 1924



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## UNITED STATES PATENT OFFICE.

WILLIAM T. NICHOLLS, OF FARBER, MISSOURI.

CENTRIFUGAL WATER MOTOR.

Application filed November 7, 1924. Serial No. 748,359.

*To all whom it may concern:*

Be it known that I, WILLIAM T. NICHOLLS, a citizen of the United States, and a resident of Farber, in the county of Audrain and State of Missouri, have invented a new and useful Centrifugal Water Motor, which invention is fully described in the following specification.

My invention has for its object to provide an efficient high speed water motor that may be made at a low cost of production. The constructions embodying my invention are provided with a pair of confined spiral blades or wings so formed and positioned that they are acted on and react upon the moving water to produce rotation relative to each other. In the preferred construction, the blades are formed of extended spiral strips, one secured to the wall of the rotatable tubular member and the other secured to a fixed cylindrical member located within and coaxial with the tubular member, and having a relatively large diameter. Constructions containing the invention may be varied in their form and to illustrate a practical application of the invention I have selected a structure containing the invention as an example of such structures and shall describe it hereinafter. The structure selected is shown in the accompanying drawings.

Figure 1 of the drawings illustrates a side view and a section of the water motor selected. Figure 2 illustrates a side view of an end portion of the motor. Figure 3 illustrates a sectional view taken on the line 3—3 indicated in Fig. 1.

In the form of construction shown, the water motor is provided with a tubular member 1 that has a length considerably greater than the diameter. The tubular member may be supported either in a horizontal position or in a vertical position. In the form of construction shown it is supported in a horizontal position in the frame 2, having bearing parts or flanges 3, while the tubular member 1 is provided with collars 4, also having suitable bearing parts. The rollers 5 may be located between the collars 4 and the flanges 3 to reduce the friction. Also balls 6 may be located between one of the collars 4 and the frame 2 to provide for the end thrust caused by the pressure of the water on parts of the tubular member 1 which constitutes the rotor of the motor.

The rotor is connected with a source of supply of water under a certain amount of pressure. This connection terminates in the pipe 7 that is suitably supported by means of the pedestal or block 8. The pipe 7 has an inner diameter substantially the same as that of the inner diameter of the tubular member 1. The two are connected together by means of a connector 9 having suitable backing means such as the washer 10 of fibrous material for sealing the connection between the two. The connector 9 is bolted to the end of the pipe 7. The other end of the rotor is provided with a shell 11 having openings 12 that form the outlet for the rotor. The shell 11 is preferably dome-shaped and is secured at its edges to the ends of the tubular member 1. The outer end of the shell is keyed to a driving shaft 13. Any suitable mechanical elements may be connected to the driving shaft for transmission of the power of the motor. In the drawings is shown a worm 14 that drives a worm wheel 15.

The tubular member is provided with a spiral vane 16 that extends from one end to the other end of the tubular member and within the annular region occupied by the spiral vane 16 is located a second spiral vane 17. The spiral vanes are of opposite pitch and are so mounted as to be rotatable one relative to the other. Preferably the inner spiral vane 17 is connected to a fixed member 18 that extends throughout the length of the tubular member 1. The member 18 is secured in position at one end by means of a spider 19 that may be secured by the bolts 20 used for bolting the connector 9 to the end of the pipe 7. The other end of the member 18 is located within the outer end of the shell 11. If desired, a ball 21 may be located between the end of the member 18 and the shaft 13. The member 18 may be made solid or it may be hollow to reduce its weight, since it is preferably so formed as to have considerable diameter to take up a relatively large area within the tubular member 1. The vanes 16 and 17 in the construction shown have the same pitch but this may be varied as may be desired.

The water enters under pressure through the pipe line that terminates at the motor in a pipe having a diameter substantially the same as that of the rotor, but the passageway into the rotor is limited by the

5 vanes, whereby the full benefit of the pressure of the water is obtained. The water strikes the outer spiral vane and causes rotation of the rotor until the water becomes "dead", that is, until it moves forward no faster than the pitch of the spiral will permit while rotating. The rate of motion of that portion of the water being now reduced, the said portion of water will readily enter the region of the inner spiral vane 17 where its direction of rotation will be reversed. Its onward spiral movement due to the head of the water and the pitch of the inner vane being the same or substantially the same as that of the outer vane, and the external diameter being much smaller than the external diameter of the outer vane, the rate of rotation will increase and the said portion of water will move into the region of the outer vane where it will strike the vane at such an angle as to transmit all its energy to the outer vane and move with the vane until practically all of its kinetic energy has been transmitted to the rotor and until that portion of the water is substantially "dead" as compared to the movement of the rotor. Thus the movement of the water between the regions of the inner and outer vanes may be repeated provided the tubular member is of sufficient length. The central spiral keeps the water whirling and moving at such an angle to the outer vane that its kinetic energy will most effectively be transmitted to the rotor

of the motor. Also the friction of the whirling water on the inner surface of the rotor and its vane will cause the transmission of energy of one to the other.

I claim:—

1. In a hydraulic motor, in combination a tubular rotor, a pair of spiral vanes movable relative to each other and located one within the other to direct the water from one to the other, one of the vanes connected to the rotor, means for supporting the other vane, a pipe communicating with the source of supply and having a cross sectional area larger than that of the cross sectional area of the annular region in which the spiral connected to the rotor is located.

2. In a hydraulic motor, in combination a tubular rotor, a pair of spiral vanes movable relative to each other and located one within the other to direct the water from one to the other, one of the vanes connected to the rotor, a pipe communicating with the source of supply and having a cross sectional area larger than that of the cross sectional area of the annular region in which the spiral connected to the rotor is located, a bar having a relatively large diameter extending through the rotor and connected to a fixed part of the motor, the other of the said vanes connected to the said bar.

In testimony whereof I have hereunto signed my name to this specification.

WILLIAM T. NICHOLLS.