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2,546,240

WATER MOTOR

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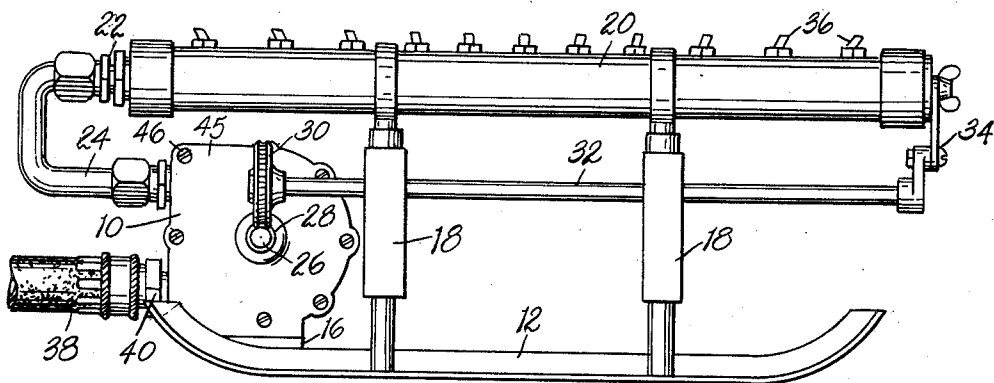


FIG. 1

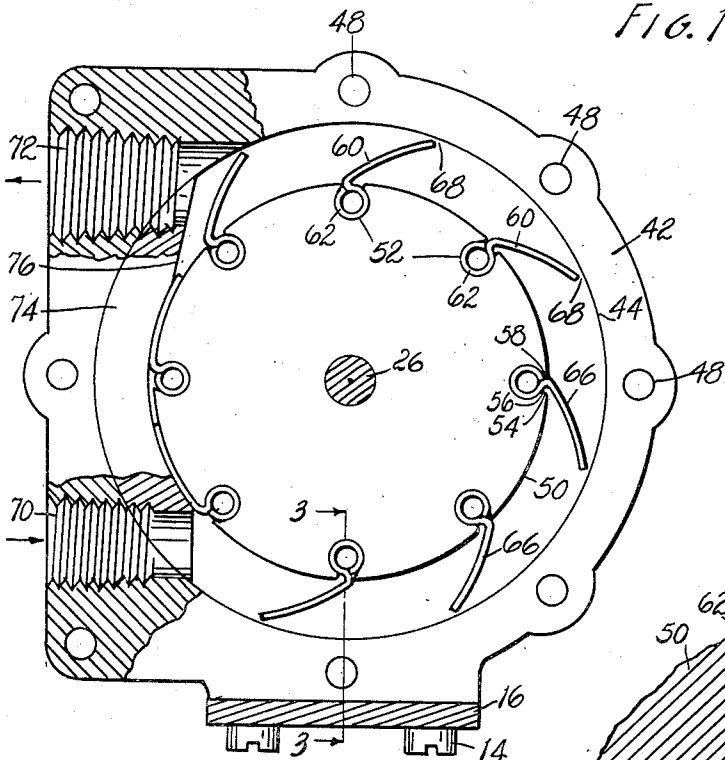


FIG. 2

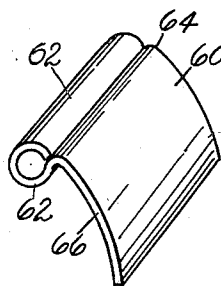


FIG. 5

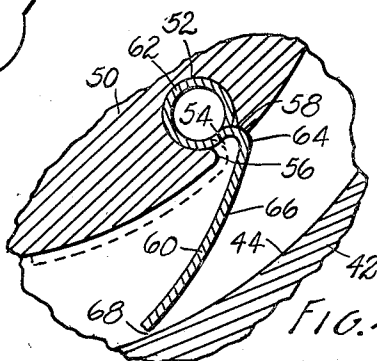


FIG. 4

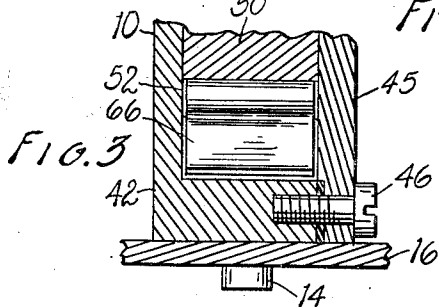


FIG. 3

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UNITED STATES PATENT OFFICE

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WATER MOTOR

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2 Claims. (Cl. 253-136)

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The main objects of this invention are:

First, to provide a water motor in which the parts are subject to little frictional wear.

Second, to provide a water motor in which the various parts do not require accurate machining.

Third, to provide a water motor which may be easily and inexpensively assembled.

Other objects and advantages of this invention will be apparent from the consideration of the following description and accompanying drawings of which there is one sheet and in which:

Fig. 1 is an elevational view of a motor embodying my invention installed on a lawn sprinkler.

Fig. 2 is an elevational view partially broken away of the motor with the cover plate removed.

Fig. 3 is a fragmentary view mainly in section on line 3-3 in Fig. 2.

Fig. 4 is an enlarged fragmentary sectional view showing the details of construction of the rotor and vanes of the motor and the relation of the vanes to the rotor and casing or cylinder.

Fig. 5 is a perspective view of one of the vanes.

My invention is particularly adapted for use and is therefore shown in connection with a lawn sprinkler. However, it may obviously be used in other connections.

As illustrated, the motor generally indicated at 10 is mounted upon skids 12 by means of cap screws 14 which secure the motor to the cross-piece 16. The skids carry supports 18 on which the spray pipe 20 is pivotally mounted.

The spray pipe is provided at 22 with a swivel connection to the outlet pipe 24 from the motor. The shaft 26 of the motor is connected by means of a worm gear 28 to the gear wheel 30 secured to one end of the shaft 32. Suitable oscillating linkage 34 at the opposite end of the shaft 32 is arranged to oscillate the spray pipe 20 so that water issuing from the nozzles 36 is directed over a large area. The usual type of garden hose 38 is attached to the inlet connection 40 of the motor.

Considering now the details of the construction of the motor, attention is directed particularly to Figs. 2, 3, 4, and 5. It will be seen that the motor consists of a block 42 having a shallow cylinder 44 formed therein. The open end of the cylinder is arranged to be closed by the cover plate 45 which is held in place by the cap screws 46 secured to the tapped holes 48 positioned around the periphery of the motor block. The shaft 26 is pivotally supported in the center of the cylinder by suitable bearings in the end of the block and in the cover plate 45.

Secured to the shaft for rotation therewith is a cylindrical rotor 50 having a series of cylindrical apertures formed around its outer edge. The apertures 52 are parallel to the shaft 26 and open

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to the outer edge of the rotor through the generally radially extending slots 54.

With particular attention to Fig. 4 it will be noted that the slots 54 have a sharply curved surface on one edge as at 56 while the opposite edge 58 is shaped to form a relatively flat abutment. The holes 52 and slots 54 are arranged to receive a series of vanes 60. It will be noted that the inner ends of the vanes are formed into cylindrical portions 62 and arranged to fit snugly but rotatably within the holes 52. From the cylindrical portion 62 the vanes are bent in a reverse curve portion 64 into the arc-shaped impeller portion 66. The impeller portion of the vanes is of such radius as to lie flatly along the cylindrical surface of the rotor 50. The return bend 58 of the vanes is arranged to abut on its inner surface against curved surface 53 of the slot 54 when the vane is in retracted position. The outer edge of the return bend 64 is arranged to engage the abutment 58 formed on the opposite edge of the slot 54 and limit the outward movement of the curved section of the vane. The vanes and slots are so designed that the outer edges of the vanes will approach closely to but will not touch the surface of the cylinder 44. This leaves a slight clearance as at 68 so that neither the vane nor the surface of the cylinder is subject to wear. It will be noted from Fig. 3 that the vanes 60 are somewhat narrower than the depth of the cylinder 44. Therefore, there will be no friction between the sides of the vanes and the cover plate and bottom of the cylinder.

The motor block 42 has a flat edge through which the threaded inlet passage 70 and outlet passage 72 are formed. It will be noted that the inlet and outlet passages are parallel but are spaced inwardly from the circumference of the rotor 50. Thus the stream of water entering through the inlet passage enters the cylinder adjacent to the junction of the rotor and the divider block and will be directed against the edge of the vane 60 as it lies against the surface of the rotor 50. As each vane progressively comes into the stream of incoming water it will be swung laterally outwardly to be acted upon by the full force of the water to turn the rotor.

A divider block 74 is positioned in the cylinder 44 between the inlet and outlet openings. The block 74 is arc-shaped to fit between the cylinder wall and the rotor and is of such dimensions as to just permit the passage of the vanes 60 when they are folded against the surface of the rotor. The upper edge of the divider block is provided with a sloping face 76 which is arranged to engage the vanes as the rotor turns and fold them back against the surface of the rotor.

From the above construction it should be apparent that the machining of the cylinder 44 and rotor 50 need not be held to overly close toler-

ances. Neither need the vanes 60 be extremely accurately manufactured since the clearance between the surface of the cylinder 44 and the vanes permits of some inaccuracies in production of the motor.

I have illustrated and described my invention in a highly practical embodiment thereof. There has been no attempt to show other adaptations, as it is believed that this disclosure will enable those skilled in the art to embody the invention as may be desired.

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

1. A rotor for a water motor comprising a cylindrical member defining a series of longitudinally extending cylindrical apertures opening to the surface of said cylinder in radially extending slots, and sheet metal vane members having cylindrical folded portions positioned in said openings and arc-shaped end portions of the same radius as the surface of said cylindrical member, said vanes having reverse bend portions between the cylindrical portions and arc-shaped portions thereof arranged to abut against the edges of said slots to limit outward movement of said arc-shaped portions.

2. In a water motor, the combination of a cylinder having angularly spaced inlet and exhaust ports, an abutment between said ports having a

curved face concentric with the curvature of the cylinder, and a cylindrical rotor having a plurality of transverse bearing recesses and slot-like openings from said recesses to its periphery, and curved vanes having a curvature corresponding to the curvature of the rotor and having inwardly offset journals engaged in said bearings to permit the vanes to collapse against the periphery of the rotor, the abutment being spaced from the periphery of the rotor to permit the vanes to pass therebetween when the vanes are collapsed, said vanes having shoulders engageable with the leading edges of said slot-like openings to limit the outward movement of said vanes so that the outer ends of said vanes will closely approach but not quite touch said cylinder.

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REFERENCES CITED

20 The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
423,935	Le Duc	Mar. 25, 1890
791,596	Waxel	June 6, 1905

OTHER REFERENCES

American Inventor, April 1906, vol. 15, No. 4, page 101.