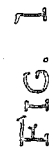


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FLUID VELOCITY VIBRATORY MOTOR

2 Sheets-Sheet 1



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FIG. 2

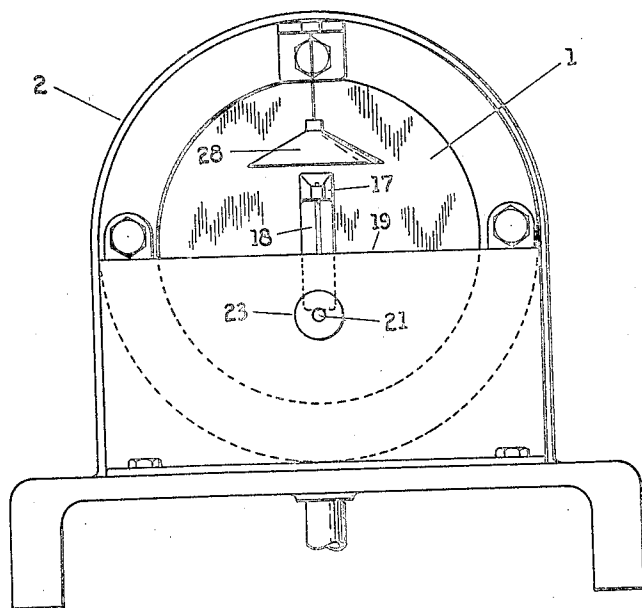
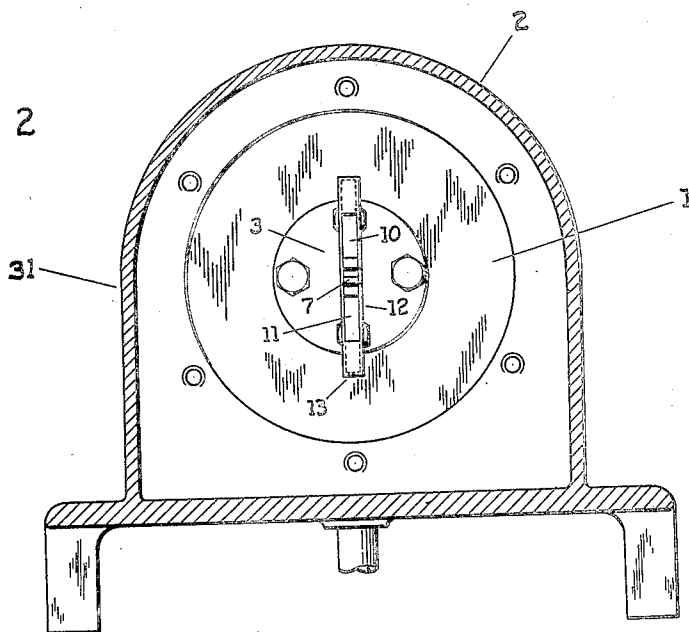


FIG. 3

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FLUID VELOCITY VIBRATORY MOTOR

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12 Claims. (Cl. 253—17)

The invention is in the class of motors in which mechanical movement is maintained by the discharge of a liquid or vaporous fluid against a movable machine element, and is more specifically a device which operates by the action of fluid directed under pressure through a nozzle, against a vibratable part such fluid making a primary and subsequent secondary or reactionary impact against such part, the time between said impacts being determined by the velocity and distance of fluid travel between said primary and secondary impacts, and the normal vibratory period of the part being in synchronism with the time of fluid travel between said impacts; and the invention consists substantially in the construction, combination, and arrangement of the features hereinafter pointed out and recited more particularly in the claims.

It is a primary object of the invention to construct a device of this class of dual character so that the discharged fluid exercises force in both directions upon the vibrated part in both vibratory movements.

It is also a primary object to provide a mechanism which maintains both or either, direct utilizable mechanical motion and electrical current generating movement.

It is also an important object to embody with such device a means to vary the vibratory period of the vibrated element in accordance with the fluid velocity as determined by the pressure under which it is released, and to provide a throttle valve to vary the rate at which the fluid is discharged.

It is a further object to provide a mechanism of this class capable of producing mechanical movement and electric current where both are required in conjunction with any one apparatus driven by the invention.

The above and other objects are attained by the structure illustrated in the accompanying drawings of which:

Figure 1 is a sectional and partly diagrammatic view;

Fig. 2 is a cross sectional view taken in the proximity of line 2—2 of Fig. 1; and

Fig. 3 is a view of the forward end of the device.

Similar characters of reference designate similar parts throughout the different views.

Referring to Fig. 1 the numeral 1 indicates a vertical diaphragm type spring the edges of which are clamped to the frame 2, and from the central portion of which the normally horizontal tongue 3 extends rearwardly, the forward end of said tongue being finally secured to said diaphragm

which serves as a spring support for same. The nozzle 4 which is conveniently supported through the rear wall 5 of the frame 2 is spaced rearwardly of said tongue directed forwardly in line with same.

The fluid receiving vane 6 is secured to said tongue across the end thereof, and is normally in vertical position in this example of the invention. Said vane forms a horizontal keel 7 across its interior said keel normally facing the nozzle 4 and said keel being in the discharge path of said nozzle.

The keel 7 is formed by the junction of the oppositely curved upper deflector 8 and lower deflector 9, the upper deflector 8 curving forwardly and upwardly into continuation with the upper vertical floor section 10 of the vane 6, and the lower deflector 9 serving forwardly and downwardly into continuation with the lower floor section 11, which is in alignment with said upper floor section.

The vane 6 has side walls 12 which border the deflectors 8 and 9, and floor sections 10 and 11, said side walls forming vertical channels across which the dams 13 are formed and the upper and lower extremities of said vane, said dams extending at right angles from said floor sections and then abruptly curving and continuing toward the keel 7 for a distance along the rearward edges of the side walls 12.

In starting the operation of the device the throttle 14 is opened releasing fluid under pressure from the conduit 15 which communicates with a pressure source of fluid supply (not shown) the released fluid being directed through the conduit 16 and nozzle 14 against the keel 7 and deflectors 8 and 9. In actual practice in starting it has been found unnecessary to intentionally construct or adjust the device so that the keel 7 is off center with the center of said nozzle to expose one of said deflectors more to the discharge fluid than the other, although it is assumed that through ordinary imperfections in workmanship and material, said keel never perfectly divided the discharged fluid in the starting of the device. For this reason the total fluid pressure against one of said deflectors is greater than the other which causes the vane 6 to swing in the opposite direction, the fluid then being directed by the one deflector to along the respective floor section 10 or 11, and against the respective dam 13 which reverses the movement of said vane and starts the vibration of same on the tongue, 3, the spring 1 yielding and returning, accordingly. Said vane is thus moved in the other direction until the other

deflector is more exposed to the discharged fluid, which accelerates the movement of the vane in the same direction, said fluid then subsequently striking the respective dam 13, and starting movement of said vane in the direction first caused by the fluid striking more of the said one deflector, and the cycle of operation is again repeated, and alternately during operation.

On the opposite side of the spring 1 and jig saw yoke 17 is secured, and extends forwardly therefrom for operating the jig saw 18, through the saw table 19, by which arrangement it will be understood that said yoke is vibrated by the tongue 3 through said spring and that the said jig saw is operated by the action of the fluid discharged against the vane 6 as above described.

In order to influence the spring as to its independent vibratory inclination in adjusting the same to respond to the vibratory period coincident to that of the vane 6 acting under fluid discharged at a given pressure, an adjusting spring 20 is tensioned between the lower end of the saw yoke 17 and a point forwardly thereof, the forward end of said adjusting spring being conveniently engaged by the hook bolt 21, which extends through the forward supporting wall 22 of the saw table 19 to threaded engagement with the nut 23 which is on said bolt and can be adjusted thereon to vary the tension of said adjusting spring as desired. In this connection it should be noted that said adjusting spring is tensioned at an angle to the said yoke 17 and tongue 3 by which it will be understood that said adjusting spring is also used to normally influence the spring 1, to normally position the keel 7 slightly out of alignment with the medial line of the nozzle 4, through the tongue 3, to aid in initially starting the vibration of the vane 6 as above discussed.

The circular magnetic core 24 is rigidly suspended to the lower surface of the saw yoke 17, said core being curved approximately about the center of movement of said frame, the spring 1 and tongue 3. Said core is surrounded by the coil 25 and spaced therefrom, said coil being correspondingly curved. Said coil is nested in the corresponding magnetic field 26 which is mounted on the floor 27 of the frame 2. It will be seen that the core 24 is oscillated in said coil by said saw yoke when vibrated as above described, and that electrical current is thus set up in said coil which serves to illuminate the ordinary light bulb 28 through the conductors 29 and ground connections 30, by which arrangement it will be understood that light current is thus generated for the operator using the saw 18.

Between the spring 1 and wall 5 the side walls 31 of the frame 2 form an enclosure for the vane 6 said spring and wall 5 closing opposite ends of said enclosure and forming therewith a fluid proof compartment which prevents the promiscuous scattering of fluid from said vane, the drain 32 being provided in the floor of said compartment for the escape of such fluid.

Referring to Fig. 1 the dotted lines 33 and dot-and-dash lines 34, indicate extreme opposite operating positions of the frame 17, tongue 3 and vane 6.

While the description and drawings illustrate in a general way a certain structure which may be employed in carrying the invention into effect, it is evident that many modifications can be made in the various details without departing from the scope of the appended claims, it be-

ing understood that the invention is not restricted to the particular example shown.

The invention claimed is:

1. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, and a means serving to vibratably mount said vane and the impact of water from the nozzle causing vibration of said keel across the path of said nozzle.

2. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, and side walls bordering said keel, floor sections, and a means serving to vibratably mount said vane and the impact of water from the nozzle causing vibration of said keel across the path of said nozzle.

3. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, and a means serving to vibratably mount said vane and the impact of water from the nozzle causing vibration of said keel across the path of said nozzle; and a means to regulate the flow of water through said nozzle.

4. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, a means serving to vibratably mount said vane and the impact of water from the nozzle causing vibration of said keel across the path of said nozzle, and a means to adjustably influence said means to vibratably mount said keel off center with said nozzle a more or less amount as desired to aid in starting the movement of said vane.

5. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, a means serving to vibratably mount said vane and the impact of water from the nozzle causing vibration of said keel across the path of said nozzle, and a means to transmit motion from said keel to a power operated mechanism.

6. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, dams formed on the outer ends of said floor sections, a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle, and a fluid draining compartment surrounding said vane, a part of the wall structure of said compartment being formed by said means to vibratably mount the vane.

7. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, and a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle.
8. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, and side walls bordering said keel, floor sections, and a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle.
9. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, and a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle; and a means to regulate the flow of water through said nozzle.
10. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane

floor sections transverse to the path of said nozzle, a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle, and a means to adjustably influence said means to vibratably mount said keel off center with said nozzle a more or less amount as desired to aid in starting the movement of said vane.

11. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle, and a means to transmit motion from said keel to a power operated mechanism.

12. A motor comprising a fluid nozzle and a vane consisting of a keel normally in the path of said nozzle and pointed theretoward, said keel spreading in opposite directions and forming vane floor sections transverse to the path of said nozzle, a means serving to vibratably mount said vane and the impact of the water from the nozzle causing vibration of said keel across the path of said nozzle, and a fluid draining compartment surrounding said vane, a part of the wall structure of said compartment being formed by said means to vibratably mount the vane.

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