I. D. GEIGER.

FLUID MOTOR.

APPLICATION FILED JULY 2, 1921.

1,434,336. Patented Oct. 31, 1922.

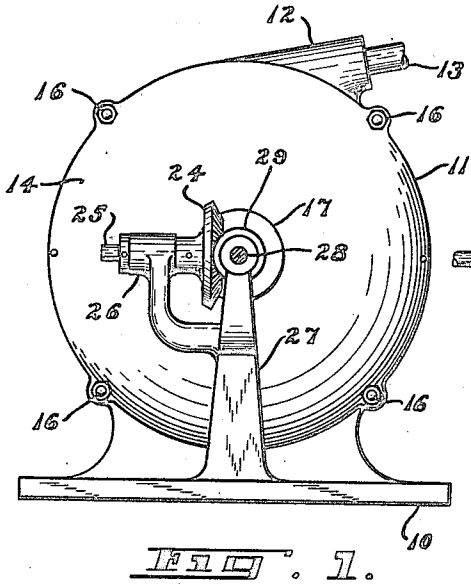


Fig. 1.

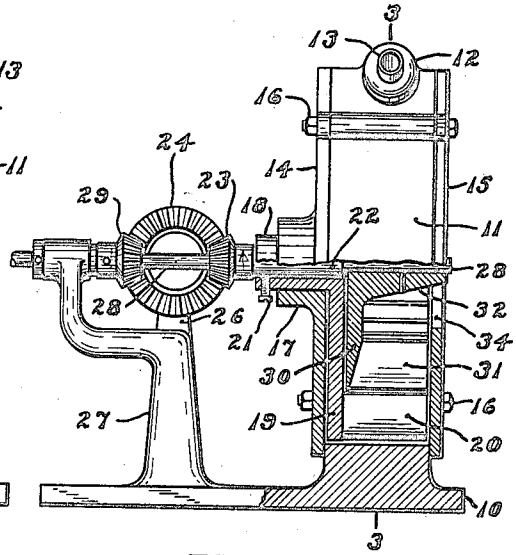


Fig. 2.

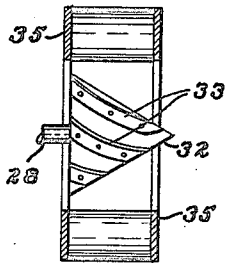


Fig. 4.

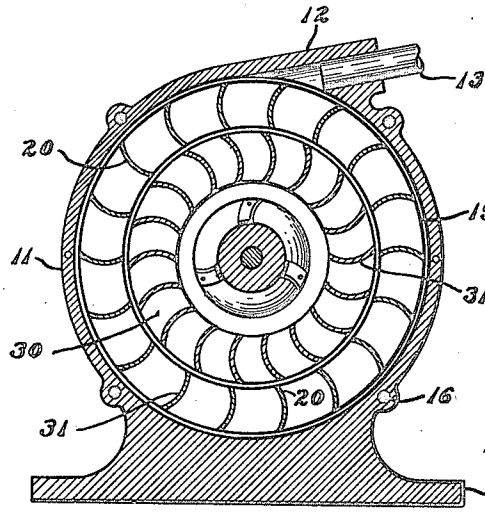


Fig. 3.

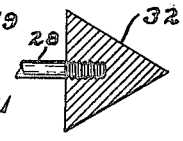


Fig. 5.

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UNITED STATES PATENT OFFICE.

IRA D. GEIGER, OF ESSINGTON, PENNSYLVANIA.

FLUID MOTOR.

Application filed July 2, 1921. Serial No. 482,204.

To all whom it may concern:

Be it known that I, IRA D. GEIGER, a citizen of the United States, residing at Essington, in the county of Delaware and State of Pennsylvania, have invented new and useful Improvements in Fluid Motors, of which the following is a specification.

This invention relates to fluid motors and it has more particular reference to that type or form of such motors which are designed to produce rotary motion through the agency of a flow of fluid under pressure or at a given head, motors of the type referred to being variously classified as water, steam or air turbines.

The main object of my invention is to provide a fluid motor which will produce a maximum amount of power from the use of a minimum amount of fluid; or in other words, every practicable iota of energy in the motive fluid whether or not it be water, steam or air under pressure, is utilized in the production of useful power.

Another object of this invention is to provide a novel construction of fluid motor that can be promptly reversed, and in which friction is reduced to an almost negligible quantity.

A further object is to provide a fluid motor characterized by certain novel features of construction, combination, form and arrangement of parts whereby superior results are accomplished than has heretofore been possible.

With the foregoing and other objects in view, as will be more apparent as this description proceeds, my invention consists essentially in the novel structure of fluid motor whereby the fluid employed is caused to exert three distinct and sequential power producing impulses in its travel from the inlet port to the exhaust or outlet from the motor.

In the further disclosure of the invention reference is to be had to the accompanying sheet of explanatory drawings constituting a part of this specification, and in which like characters of reference designate the same or corresponding parts in all the views.

Figure 1—is an end view of a fluid motor embodying the essential features of my present invention.

Figure 2—is an elevation at right angles thereto with part broken away or in section for the sake of clearness.

Figure 3—is a transverse section taken approximately on the line 3—3 in the preceding figure.

Figure 4—is an axial section through the inner rotor and the exhaust reflector hereinafter more particularly referred to; and,

Figure 5—is a sectional detail later on described.

Referring more particularly to the views which illustrate one practical application of my invention for use as a water turbine or motor, the numeral 10 designates a base with which is integrally formed the cylinder 11 provided with a tangentially disposed inlet 12 having a service connection 13 supplied from any appropriate head of water or source of water under pressure. The cylinder 11 is closed in by end plates or covers 14, 15, suitably jointed fluid-proof thereto and bolted together by through bolts 16, the former cover 14 being provided with a journal 17 in which is rotatably mounted a tubular sleeve 18 integral with an inner disc or plate 19 fitted with a series of equally spaced and laterally projecting concavo-convex wings or vanes 20, of appropriate dimensions to constitute an outer rotor having pockets curved in a direction to give a contra-clockwise or left-hand impulse to the disc 19 when the motive fluid is directed thereagainst. Secured to the aforesaid sleeve 18 as by a set-screw 21 or other appropriate locking means is an inner tubular sleeve 22 provided at its outer end with a bevel gear 23 arranged to mesh with an independent gear 24 conveniently mounted on a shaft 25 journaled in a bearing 26 integral with a standard 27 mounted on or forming a part of the aforesaid base 10.

Freely rotatable in the aforesaid sleeve 22 is a shaft 28 from which power produced by the motor is taken off and used for any desired purpose, and said shaft extends axially through the cylinder 11, being provided with a bevel-gear 29 directly opposed to the aforesaid gear 23 and similarly in gear with the independent gear 24. Mounted on and securely attached to the end of the power shaft 28 within the cylinder 11 is a second disc 30 having a series of laterally disposed concavo-convex wings or vanes 31 in number equal to the hereinbefore referred to wings or vanes 20 but of opposed curvature whereby an inner rotor is constituted, and centrally of said disc there is

formed a conical extension 32 having a series of arcuately inclined angular ribs or vanes 33 arranged in spaced relation about its conical surface. It will be noted that this conical extension 32 serves to deflect and direct the outflow of the motive fluid axially central of the exhaust opening 34—Figure 2—in the cylinder end cover 15 with a whirling or spiral action whereby the respective outer and inner rotors are maintained evenly balanced at all times.

In some instances I may make the inner as well as the outer rotor as shown in Figure 4, that is to say, I may mount the wings or vanes 31 or 20 between two spaced discs 35, such a construction tending more to retain the said wings or vanes in proper spaced relation as well as aiding in uniformly balancing the motor. Similarly I may use a conical extension 32^a as shown in Figure 5 and thread same on to the end of the shaft 28.

From the foregoing description and an examination of the drawings the operation of my improved fluid motor will be clearly apparent to those acquainted with the art but it may be briefly stated that when the motive fluid enters the inlet 13 it impacts first with the concavo-convex wings or vanes 20 and is mainly deflected therefrom against the opposed concavo-convex vanes 31 from which it is directed on to the conical extension 32 which impels said fluid with a whirling action through the exhaust outlet 34. Obviously a part of the motive fluid entering the outer rotor will be carried around therewith by the wings or vanes 20 and whilst serving materially to balance its action can be exhausted in any appropriate manner to the exhaust opening 34. It will also be noted that by the arrangement of the inner and outer rotors relative to the power shaft 28 the constant impulses of the motive fluid in its passage through the motor are directly communicated thereto and in fact I have found by careful experiment that I can obtain approximately from 80 to 90% efficiency from said motive fluid with the structure and arrangement of parts above set forth, as against the usual 50 to 60% efficiency heretofore obtained. Furthermore, I wish to emphasize the fact that whilst I have specifically described my invention in this application as a water turbine, it is to be distinctly understood that I may equally as well use steam or air under pressure as the motive fluid.

Whilst I have shown and described the best form of my invention at present known to me I wish it clearly understood that the same is not to be construed as conclusive in that various modifications in the shape, form and arrangement of the several parts may be readily evolved without departing in any material respect from the essential features thereof, and it is hereby intended to include all such reasonable modifications or other forms of the said invention as fairly fall within the scope of the appended claims.

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

1. A fluid motor comprising a cylindric casing, an outer rotor journaled in said casing and provided with laterally disposed concavo-convex wings, said rotor being freely journaled and having a gear at its outer end in mesh with an independent gear, a power shaft journaled in and freely rotatable relative to the aforesaid rotor, said power shaft having an inner rotor secured thereto provided with laterally disposed concavo-convex wings disposed in opposed relation to those on the outer rotor, and a gear on said power shaft in mesh with the independent gear but disposed in opposed relation to the first mentioned gear, and a conical extension on the power shaft disposed centrally within the inner rotor and having arcuately inclined ribs on the conical surface thereof.

2. A water turbine comprising a cylindric casing, an outer rotor journaled in said casing and provided with laterally disposed concavo-convex wings, said rotor being freely journaled and having a gear at its outer end in mesh with an independently mounted gear, a power take-off shaft journaled in and freely rotatable relative to the aforesaid rotor, said power take-off shaft having an inner rotor secured thereto provided with laterally disposed concavo-convex wings disposed in opposed relation to those on the outer rotor, a gear on said power take-off shaft in mesh with the independently mounted gear but disposed in opposed relation to the first mentioned gear, and a conical extension on the power take-off shaft arranged centrally within the inner rotor and having arcuately inclined outwardly converging vanes on the conical surface thereof.

3. A water turbine comprising a cylindric casing, an outer rotor journaled in said casing and provided with laterally disposed concavo-convex wings, said rotor being freely journaled and having a gear at its outer end and in mesh with an independently mounted gear, a power take-off shaft journaled in and freely rotatable relative to the aforesaid rotor, said power take-off shaft supporting an inner rotor including spaced annular discs having secured therebetween laterally disposed concavo-convex vanes directed in opposed relation to those on the outer rotor, and a gear on said power take-off shaft in mesh with the independently mounted gear but disposed in opposed relation to the first mentioned gear, and a conical extension on the power take-off shaft

arranged centrally within the inner rotor and having arcuately inclined outwardly converging vanes on its conical surface.

4. A water turbine comprising a cylindric casing, an outer rotor journaled in said casing and including spaced annular discs having laterally disposed concavo-convex wings therebetween, said rotor being freely journaled and having a gear at its outer end and in mesh with an independently mounted gear, a power take-off shaft journaled in and freely rotatable relative to the aforesaid rotor, said power take-off shaft supporting an inner rotor including spaced annular discs having secured therebetween laterally disposed concavo-convex vanes directed in opposed relation to those on the outer rotor, and a gear on said power take-off shaft in mesh with the independently mounted gear but disposed in opposed relation to the first mentioned gear, and a conical extension on the power take-off shaft arranged centrally within the inner rotor and having arcuately inclined outwardly converging vanes on its conical surface.

In testimony whereof I affix my signature.

IRA D. GEIGER.