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C. W. DAKE.

GOVERNING MEANS FOR TURBINES.

APPLICATION FILED MAR. 22, 1906.

Fig. 1.

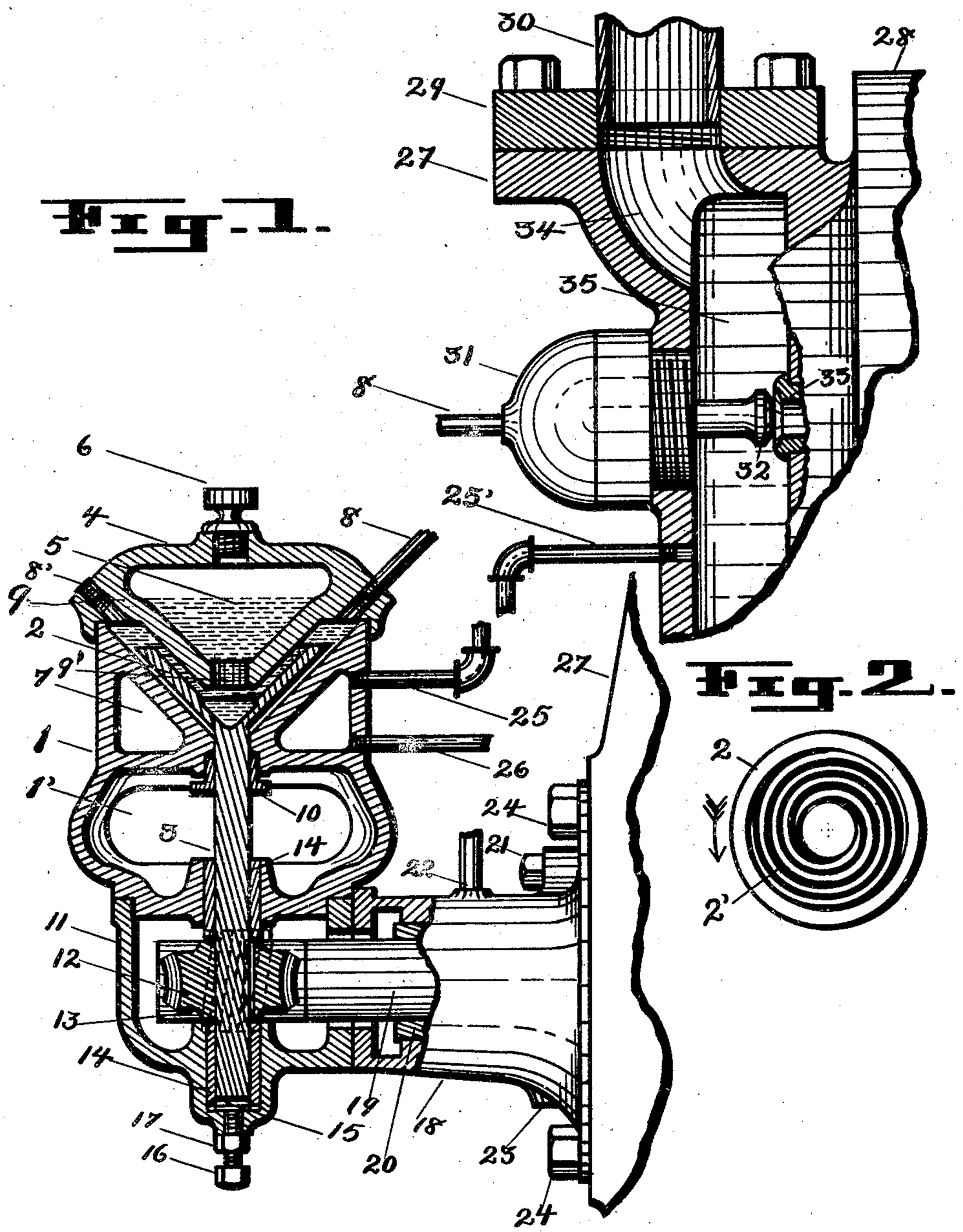

Fig. 2.

WITNESSES:

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GOVERNING MEANS FOR TURBINES.

No. 845,060. Specification of Letters Patent. Patented Feb. 26, 1907.

Application filed March 22, 1906. Serial No. 307,462.

To all whom it may concern:

Be it known that I, CHARLES W. DAKE, a citizen of the United States, residing at Grand Rapids, in the county of Kent, State of Michigan, have invented certain new and useful Improvements in Governing Means for Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to improvements in governing means for elastic-fluid turbines, although the governor means can be applied to control engines of any type.

My invention is especially designed, however, for use in governing elastic-fluid turbine-engines in which the turbines are run at a high rate of speed.

Objects relating to details of construction will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a detail sectional view, in broken section, through a complete governor embodying the features of my invention; and Fig. 2 is a plan view of the funnel-shaped receptacle 2 within my improved governor.

Similar numerals of reference refer to similar parts throughout both the views.

Referring to the numerals of reference, the main casing 1 of my improved governor is supported on a suitable base-piece 11, which is secured to a bracket 18, which is secured, preferably, to the side plate 27 of a turbine-engine by screws 24, which serves as a support for the same.

A funnel-shaped chamber is formed in the upper part of this casing, within which is a funnel-shaped receptacle 2, supported on a vertical shaft 3, which extends down into suitable bearings and is adjustable up and down by the screw 16, retained in place by the lock-nut 17. This vertical shaft 3 is revolved by a worm-gear 12, engaging a worm 13 (indicated by dotted lines in Fig. 1) on the main shaft 19 of the turbine. The shaft 19 of the engine is provided with a bushing 20, and lubricant is supplied thereto by a pipe 22.

Suitable bushings 14 are mounted on the shaft 3, which provides a suitable bearing for the same.

A stuffing-box 10 is around the shaft 3 and is accessible through openings 1′.

A steam-jacket 7 connects by pipes 25 25′ to the casing 27 of the turbine, and a pipe 26 leads therefrom to insure circulation of steam or other elastic fluid in the jacket 7.

Extending down into the revoluble receptacle 2 is the funnel-shaped bottom of a receptacle 9, having an opening 9′ at the center. This bottom forms an annular space around the revoluble funnel-shaped receptacle 2. This receptacle is accessible by removing the plug 8′. A pipe or tube 8 leads from the upper part thereof and connects with the pipe 8′, leading to the governing or throttling valve mechanism 31, which controls the supply of steam to the nozzles of the engine. The valve-seat of this governor-valve appears at 33 and is controlled by the valve 32, as clearly appears in the upper portion of Fig. 1.

Steam is supplied to the turbine at 30 through the plate 29 into the casing 27, the steam being delivered into the turbine-casing 28 and controlled by the valve 32.

The upper side of the revoluble receptacle 2 is provided with concentric spiral corrugations 2′, which take hold of the liquid.

Within the receptacle 9 I place mercury 5, which descends into the revolving conical receptacle 2 at 9′.

The annular receptacle and the pipe 8 leading to the controlling means 31 of the valve are filled with a lighter liquid, such as glycerin.

The details of this controlling mechanism 31 appear in an application concurrent herewith.

When the engine is started, the shaft 3 is of course revolved, the mercury within the conical receptacle is forced outward by the centrifugal force, and the supply is maintained by the mercury descending through the center of the receptacle-bottom 9 at 9′ until, as the pressure continues, the lighter liquid is forced out through the pipe 8 and acts upon the valve-controlling means 31 to close the valve 32 against its seat. As this shuts off the supply of elastic fluid to the engine, the speed of the same decreases and the mercury is allowed to settle down into the receptacle, and the controller 31 permits the valve to open and supplies steam to the throttle to again increase the speed. A series of

these controlling means may be provided and connected to operate successively at different pressures, if desired, so that the control of the engine is complete by this means.

Having thus described my improved governing means, I desire to state that it can be greatly varied in its structural details without departing from my invention. I have shown my preferred means of gearing the same down to proper speed; but other means could of course be adopted with satisfactory results. I have shown the same in what appears to me as a very simple and effective form. The centrifugal action of the fluid might be secured with other forms of receptacle. I have shown the form that appeals to me as the most satisfactory and effective.

The pressure could of course be obtained by mere revolutions of the fluid within the receptacle; but I have preferred to supply an ample reservoir that would deliver into the revolving part and maintain the supply.

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

1. In a governor for an engine, the combination of a governor-casing supported by a suitable means; a revoluble funnel-shaped receptacle, corrugated on its upper surface, on a vertical shaft within the casing; a worm-gear and worm as means for driving the same; a reservoir above the revolving receptacle, with a central aperture at the bottom; a heavy fluid, as mercury, within the receptacle and reservoir; a pipe connected to the annular chamber surrounding the funnel-shaped receptacle, filled with a lighter fluid, as glycerin; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting for the purpose specified.

2. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble receptacle on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a reservoir above the revolving receptacle, with a central aperture at the bottom; a heavy fluid, as mercury, within the receptacle and reservoir; a pipe connected to the annular chamber surrounding the receptacle, filled with a lighter fluid, as glycerin; a governor-valve; and controlling means for the governor-valve, to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

3. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble funnel-shaped receptacle corrugated on its upper surface, on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a heavy fluid, as mercury, within the receptacle; a pipe connected to the annular chamber surrounding the funnel-shaped receptacle, filled with a lighter fluid, as glycerin; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

4. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble receptacle on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a heavy fluid, as mercury, within the receptacle; a pipe connected to the annular chamber surrounding the receptacle, filled with a lighter fluid, as glycerin; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

5. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble funnel-shaped receptacle, corrugated on its upper surface, on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a reservoir above the revolving receptacle, with a central aperture at the bottom; a pipe connected to the annular chamber surrounding the funnel-shaped receptacle; a liquid within the said receptacle and pipe; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

6. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble receptacle on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a reservoir above the revolving receptacle, with a central aperture at the bottom; a pipe connected to the annular chamber surrounding the receptacle; a liquid within the said receptacle, reservoir, and pipe; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

7. In a governor for an engine, the combination of a governor-casing supported by suitable means; a revoluble funnel-shaped receptacle corrugated on its upper surface, on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a pipe connected to the annular chamber surrounding the funnel-shaped receptacle; a liquid within the said receptacle and pipe; a governor-valve; and controlling means for the governor-valve to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

8. In a governor for an engine, the combi-

nation of a governor-casing supported by suitable means; a revoluble receptacle on a vertical shaft within the casing; means, as a worm-gear and worm, for driving the same; a pipe connected to the annular chamber surrounding the receptacle; a liquid within the said receptacle and pipe; a governor-valve; and controlling means for the governor-valve, to be controlled by the pressure of the liquid in said pipe, all coacting substantially as described and for the purpose specified.

9. A governor for an engine, consisting of a revolving funnel-shaped receptacle corrugated on its upper surface; means for revolving the same; a fluid within the receptacle; a casing surrounding the same; and a connection for utilizing the pressure of the liquid developed by centrifugal force, for controlling the governor-valve, as specified.

10. A governor for an engine, consisting of a revolving funnel-shaped receptacle, corrugated on its upper surface; means for revolving the same; a fluid within the receptacle; and means for utilizing the centrifugal force to control the engine, for the purpose specified.

11. A governor for an engine consisting of a receptacle having a central aperture; a revolving receptacle supported on a vertical axis centrally beneath the aperture of the first-named receptacle; a liquid within said receptacle; and connections for utilizing the centrifugal force developed by the revolving receptacle, coacting for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

CHARLES W. DAKE. [L. S.]

Witnesses:

FRED L. CHAPPELL,

CLARA A. SABIN.