

March 19, 1940.

J. A. HESS

2,194,166

GOVERNING MECHANISM

Filed Nov. 2, 1938

2 Sheets-Sheet 1

FIG. I.

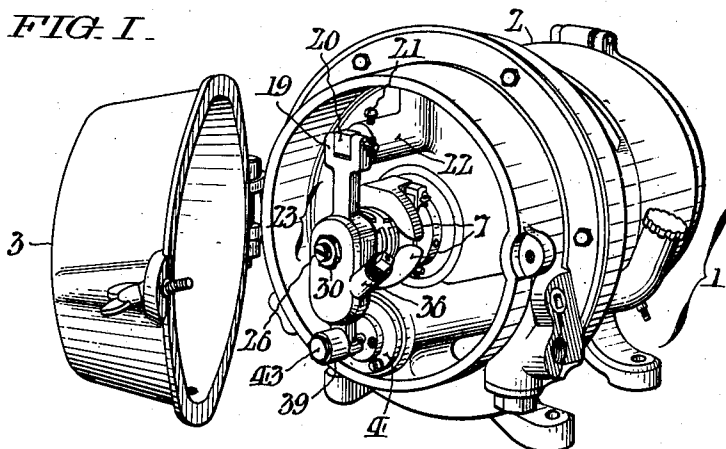
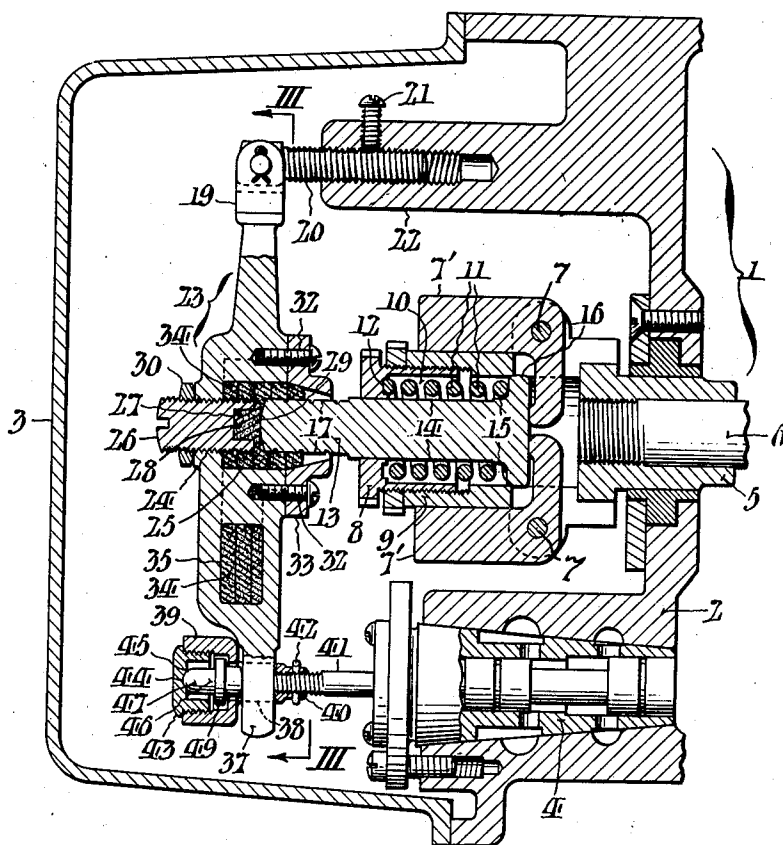


FIG. II.



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FIG. III.

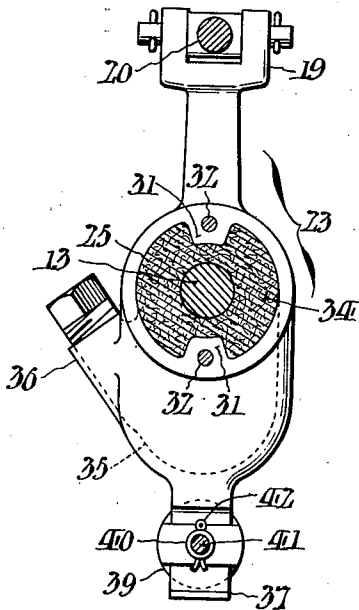


FIG. IV.

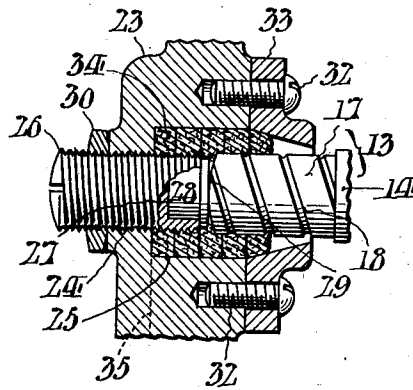


FIG. VI.

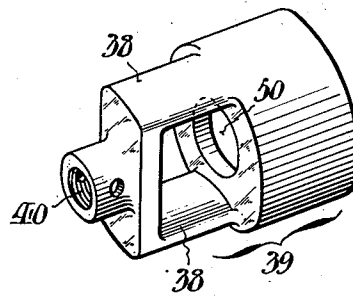


FIG. V.

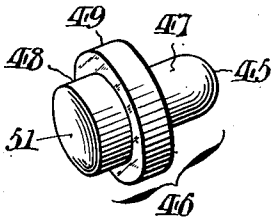
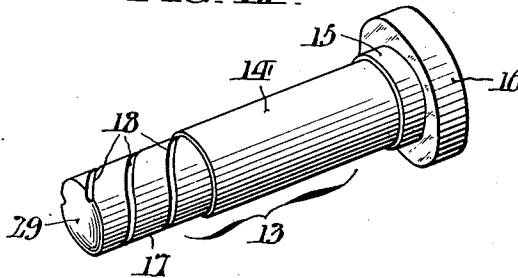


FIG. VII.



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GOVERNING MECHANISM

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Application November 2, 1938, Serial No. 238,298

2 Claims. (Cl. 264-15)

This invention relates to governor mechanism, and, more particularly, to the type responsive to speed variations of a centrifugal device adapted to control the admission of motive medium to turbo-generator units.

Mechanism of the indicated kind usually comprise a governor device and a pivoted lever arm influenced by the speed of the turbine shaft, for effecting variable actuation of a suitable valve controlling supply of motive medium to the turbine, said lever including a removable and durable contact member engaging the shaft at one end. In the assembly of the rotary parts of such mechanism, the spring is often not definitely located with respect to the governor shaft and the surrounding surfaces. As a result, such spring is liable to frictionally engage the governor stem or surrounding surfaces and thereby cause objectionable interference with proper functioning of the governor, as well as unnecessary wear of said parts. In addition, the motion of the governor is often transmitted to the lever arm aforesaid by aid of a rotatable ball mounted in said arm which contacts the governor stem confronting end, and in order that such parts may coact satisfactorily, said ball must be accurately centered in respect to the axis of said stem, thereby involving skill and great care in assembling, otherwise operating trouble frequently arises at this point due to misalignment of such parts. Furthermore, the regulating action of the lever arm is ordinarily communicated to the motive fluid valve stem by a yoke-connection at the end of said lever arm, remote from its pivot, and any sidewise or vibratory motion thereat causes undesirable wear with a co-related effect upon the valve movable member relative to its body portion.

The primary object of the present invention is to eliminate the foregoing disadvantages by provision, in combination with governing mechanism of the kind referred to, of an improved lever arm construction including novel contact means; also by definitely locating the governor spring so that it is positively prevented from rubbing adjacent inner and outer surfaces, thereby practically eliminating wear and ensuring more sensitive action than heretofore obtainable in a similar mechanism.

Another object is to form and locate the contact portions of the lever arm, relative to the cooperative members of the governing mechanism, so that the general efficiency and durability of the latter is substantially increased.

A further object of this invention is to provide means, of the kind indicated in the two preceding paragraphs, which will coact satisfactorily without an associated lubricant supplying device.

Other objects and attendant advantages will

be apparent from, or particularly noted in, the following detailed description of a typical embodiment of the invention; as illustrated by the accompanying drawings; while the concluding claims more specifically define the novel features of said invention.

In the drawings, like characters of reference are applied to corresponding parts in all the views.

Fig. I is a perspective view looking toward the governing mechanism outer end of a turbo-generator embodying the present improvements, and with the associated cover in open position to better illustrate otherwise hidden structure.

Fig. II is a sectional illustration taken longitudinally through the governing mechanism with a broken portion of the casing and cover.

Fig. III is a vertical section on the plane III-III of Fig. II with a retainer member or packing-gland cover removed.

Fig. IV is an enlarged sectional detail of the governor stem contact hereinafter fully described.

Fig. V is a perspective view of the turbine motive fluid supply valve and lever arm floating contact.

Fig. VI is an enlarged perspective view of the governor valve yoke housing for the floating contact of Fig. V; and,

Fig. VII is a perspective view of the governor stem.

Referring more in detail to Figs. I and II of the drawings, the governor portion of a standard type of turbo-generator unit for locomotive headlights is comprehensively designated 1, the same including a casing 2, end cover 3, motive fluid supply valve 4, and a rotary bearing 5 which is suitably enlarged to form a weight driving rotor frame and in which one end of the turbo-generator or unit armature-shaft 6 is fixed; said bearing 5 also affording support at 7 for the centrifugal governor elements 7', all in accordance with known art and forming no part of the present improvements.

In accordance with this invention, the adjustable member 8 of the governor casing 9 is preferably made of greater inside and outside diameters, than at present prevailing, to afford an increased clearance or bore 10 for the spring 11, and said member is formed at the bottom of the bore 10 with an annular groove 12 into which the adjoining end of the spring 11 fits, thus definitely positioning the latter thereat in respect to the governor stem 13. The governor stem 13, as best shown in Fig. VII, embodies a plain shank portion 14, a shoulder 15 adjoining the head 16 for definite location of the adjoining end of the spring 11, and a slightly reduced shank extension 17 having a surrounding spiral groove 18, for a purpose hereinafter considered. Now it will be

readily seen that by sustaining the spring 11 intermediate the groove 12 and shoulder 15, as well as by provision of the larger clearance bore 10, said spring is so held at all times as to clear the stem 13 and governor casing member 8, both interiorly and exteriorly, thereby eliminating frictional wear and ensuring more sensitive governor regulation.

Pivotaly suspended by its upper forked end 19, from an adjusted member 20 securable by a set-screw 21 and carried by the projection 22 in the unit casing 2, is a lever arm 23 having at a predetermined intermediate position a screw-threaded hole 24, through the outer end of a recess 25, and in which engages an adjusting member or screw 26 with its inner end axially bored at 27 for reception of a circumferentially flanged fibrous material plug or insert 28 for continuous contact with the confronting convexed end 29 of the governor stem extension 17. It is to be observed the adjusted screw 26 is provided with a lock-nut 30; also that the lever arm recess 25 is formed with inwardly-opposing lugs 31 affording attachment, as by screws 32, for a packing retainer-gland 3. The packing 34 preferably comprises continuous wick, some of which may be in direct communication with an oil cavity 35, formed in the lower medial part of the lever arm 23 and having an associated filler connection 36, so that the surface of the fibrous plug 28, contacting with the governor stem end 29, is constantly maintained thoroughly lubricated by capillary attraction, in an obvious manner. It is furthermore noteworthy that by spiralizing the groove 18 in a reverse direction to the normal rotation of the governor-stem 13, said groove will function to prevent creepage and seepage of lubricant outwardly from the packing 34, in addition to feeding it back again to the contacting surfaces aforesaid. Also it is to be borne in mind the lever recess 25 may be packed with suitable fibrous material gaskets not needing lubricating oil for their efficient use, or in other words the filler connection may be dispensed with or not used. Referring now to the operative connection between the lever arm 23 and the motive fluid supply valve 4, the lower end or tongue portion 37 of said arm is appropriately shaped for coaction between the opposing elliptic-section parts 38 of a yoke 39, having an internally screw-threaded section 40 at one end adapted for adjustable and rigid attachment to the correspondingly threaded end of the inwardly-influenced fluid supply valve stem 41, for example as by a suitable cotter device 42. It is also to be seen yoke 39 at its other end is interiorly screw-threaded for reception of a hollow cap 43 having a concaved axial recess 44 affording bearing for the outer convexed end 45 of a floating contact member 46. This floating member 46, as best seen in Fig. V, preferably embodies axially aligned oppositely directed stud-like portions 47, 48, respectively, of differential diameters, and an intermediate collar section 49. The stud part 47 embodies the hemispherically convexed end 45 engageable in the concaved recess 44 of the cap 43, and the part 48 freely passes through an axial aperture 50 in the yoke 39, and has a convexed end 51 of greater curvature than the end 45 for contact with the tongue portion or lower end 37 of the lever arm 23. Thus it will be readily understood that the inner end

or stud part 48 of the floating member 46 is free to move laterally within certain limits, defined by the diameter of the aperture 50, hence a reasonable amount of sidewise vibration of the lever arm 23 can be absorbed without appreciable wear and without transmission of such vibrations to the valve piston stem 41. Furthermore, by the improved coactive relation of the adjuster member or screw 26, fiber contact 28 and lock nut 30, it will be obvious that slight final voltage adjustments of the generator armature-shaft 6 may be made while the turbo-generator is running; and that the fluid supply valve stem 41 being inwardly influenced, maintains the lever plug or insert 28 in continuous contact with the governor stem 13 while the mechanism is operating.

From the foregoing description the operation of the governing mechanism disclosed will be self-evident, and it is to be remarked the improved construction of the lever arm 23 and associated parts render said mechanism far more sensitive and accurate in operation, while the disadvantage arising from vibratory transmission prevalent in previous mechanisms, of similar nature, are eliminated, and the necessity for frequent renewals or local adjustments of the operatively coacting parts is likewise dispensed with.

Furthermore, it will be apparent the mechanism described fully justifies the objects stated in the opening paragraphs of this specification; and while a preferred embodiment has been disclosed it is to be understood that detail changes and variations in adapting the invention to other forms of governing mechanism than the specific type referred to are included herein.

Having thus described my invention, I claim:

1. In governing mechanism including a rotary member and casing revoluble with and actuated by speed responsive mechanism, said member being adapted for axial movement in opposition to a yieldable spring opposing axial movement of the rotary member and a pivoted lever coactive with said member to actuate an associated power control, the combination of means definitely sustaining the reactive element with operative clearance against engaging the rotary member and its casing, means for supplying lubricant to the lever engaging end of the rotary member, a spiral groove around part of the rotary member effective to return lubricant to its lever engaging end, and an adjustable non-metallic element carried by the pivoted lever for coactive contact with the rotary member adjoining end.

2. In governing mechanism including a rotary member and casing revoluble with and actuated by speed responsive mechanism, said member being adapted for axial movement in opposition to a yieldable spring opposing axial movement thereof; the combination of a pivoted lever coactive with said member to actuate an associated power control; said lever being formed with a cavity for lubricating medium and into which the rotary member projects; and the rotary member has its aligning adjacent portion formed with a spiral groove, the direction of which is reversed in respect to the normal rotative direction of said member; whereby the lubricating medium is prevented from seepage out of and is effectively returned to the pivoted lever cavity.

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