June 19, 1923. 1,459,394

E. W. GENT

CENTRIFUGAL GOVERNOR

Filed Sept. 21, 1921

Fig. 1.

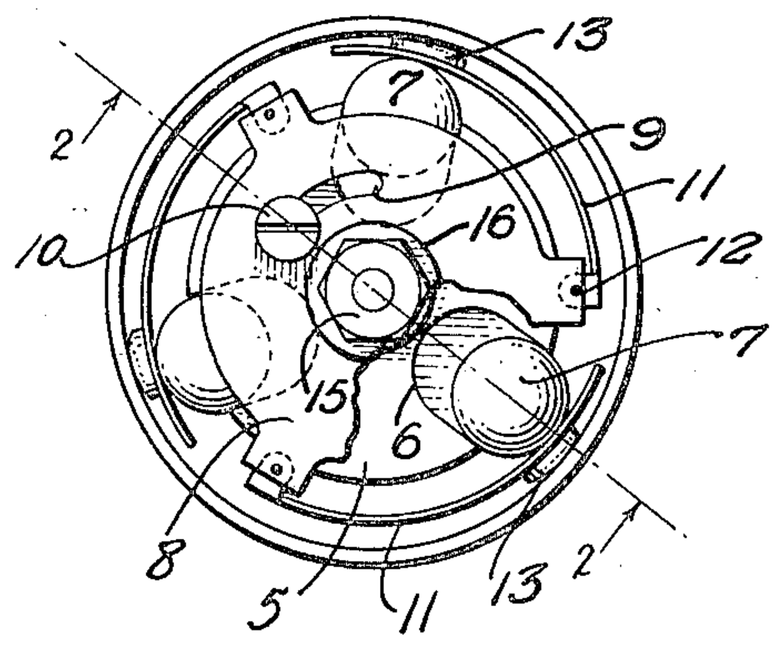
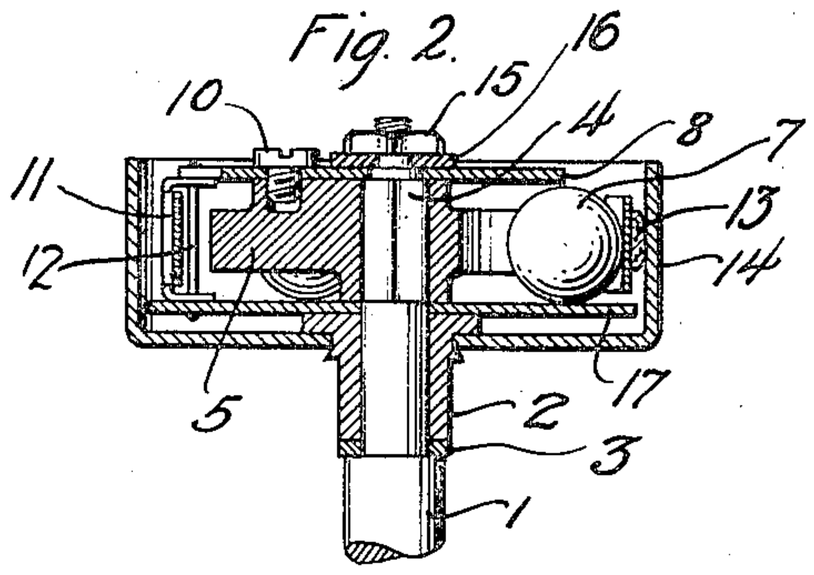


Fig. 2.



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL GOVERNOR.

Application filed September 21, 1921. Serial No. 502,247.

To all whom it may concern:

Be it known that I, EDGAR W. GENT, a citizen of the United States of America, residing at Morristown, in the county of Morris, State of New Jersey, have invented certain new and useful Improvements in Centrifugal Governors, of which the following is a full, clear, concise, and exact description.

This invention relates to speed regulating devices and more particularly to frictionally retarded centrifugal governors.

Governors of this character usually employ rotatable weights which are thrown outwardly by centrifugal force into frictional engagement with a stationary member whereby a retarding force is created in opposition to the force rotating the governor. The rotatable weights are generally restrained in their outward movement by so-called retractible springs, and the speed at which such governors operate is ordinarily regulated by varying the tension of the retractile springs, the speed of the mechanism increasing with the tension of the retractile springs and vice versa.

It has been found that governors of the aforementioned character, particularly those of very small dimensions, wherein the retractile springs are comparatively delicate, often lose their accuracy after being in service a considerable time. This is due largely to weakening of the retractile springs, which is caused partly by wear, and partly by fatigue of the metal of which the springs are made.

It is, therefore, the primary object of the present invention to provide a governor of simple and inexpensive construction without retractile springs. As ancillary to the aforementioned object, it is a further object to provide suitable means for adjusting or regulating the operation of such a governor.

These objects are accomplished by employing the combination of a centrifugally operable weight with a pivoted arm which is adapted to frictionally engage a stationary member, and means for varying the point of engagement of said weight with said arm. The use of the weight makes it unnecessary to use springs.

For a more detailed description of the invention reference will now be had to the drawing, in which Fig. 1 is a plan view of the governor, and Fig. 2 is a sectional view along the line 2—2 of Fig. 1.

One form of the invention, as described hereinafter, is of a type particularly suitable for use in automatic telephone calling devices, such as shown in U. S. Patent No. 1,161,854, issued to O. F. Forsberg, November 30, 1914, but its utility is not limited to such application.

Spindle 1 is journaled in the non-rotatable bushing 2 and a washer 3 is provided between the end of bushing 2 and the shoulder of spindle 1 to receive the thrust of the latter in one direction. The end portion 4 of the spindle 1 is squared, or, if desired, may be provided with a key way or other suitable arrangement, whereby the spider 5 is non-rotatably secured thereon. The spider 5 is provided with a plurality of peripheral slots 6 which receive the weights 7, the latter being preferably spherical and movable radially in the slots 6.

The two plates 8 and 17 tied together by the pivot pins 12 constitute a second spider which is coaxial with the spider 5 and is also mounted on the spindle 1. The latter spider, however, is not secured to the spindle. The plate 8 is provided with an arcuate slot 9 through which a screw 10 extends, the latter being tapped into the spider 5. The spider comprising plates 8 and 17 may be rotated relatively to spider 5 through an angle determined by the slot 9 and may be secured in any position within the range of this relative movement by the screw 10, as will be evident. The arms 11 are each pivotally mounted by means of the pins 12. Each of the arms 11 is preferably provided with a stud 13 of frictional material such as rubber or cork which is designed to bear against the internal annular surface of the stationary cup-shaped member 14. The latter member is staked or otherwise suitably secured to the bushing 2 and is prevented from rotating by any suitable means which it is not thought necessary to illustrate. The two spiders together with their associated parts are held on the spindle 1 by the nut 15 and washer 16.

In operation, the spindle 1 together with the spiders and their attached parts are rotated. The centrifugal force developed by said rotation causes the weights 7 to fly outward radially, whereupon they impinge on their respectively associated pivoted arms 11

with a force proportional to the speed of rotation, and the centrifugal force thus developed is conveyed to the friction studs 13. Now it will be seen that the product of the centrifugal force developed in any one of the weights 7 and the distance from the point of contact of said weight on its associated arm 11 to the pivotal point 12 of said arm constitutes a moment of force. It will also be evident that the product of the pressure of any one of the friction studs 13 against the stationary member 14 and the distance between the point of contact of said friction stud and the pivotal point 12 of the arm 11 on which the friction stud is mounted constitutes a moment of force. Considering any one weight 7 and its associated arm 11 and friction stud 13, the two moments of force must always be equal. Now since the centrifugal force developed in the weight at any given speed is a constant, regardless of the position of said weight with respect to the pivotal point 12 of its associated arm 11, it follows that the first mentioned moment of force varies with the distance between the radial line of action of the weight and the pivotal point 12, and since the distance between the friction studs 13 and the pivotal point 12 remains constant, the pressure between the friction stud 13 and the stationary member 14 will vary with each change in the angular position of the weight 7 with respect to its associated pivotal point 12.

In Fig. 1, the weights 7 are shown in their extreme position away from the pivots 12 in which position the maximum retarding force will be developed. By loosening the screw 10, the spider 5 together with weights 7 may be shifted angularly with respect to the spider comprising plates 8 and 17, and the pivotal points 12 with the result that the weights 7 may be caused to impinge on the arms 11 at points nearer the pivots 12, thus effecting a decrease in the retarding effect of the governor.

What is claimed is:

1. In a centrifugal governor, a stationary member having an annular surface, a rotatable member having a socket therein, an arm pivoted on the rotatable member and in frictional engagement with the annular surface of said stationary member, a ball fitting in the socket of the rotatable member and adapted to press against the arm and to cause it to bear upon the annular surface of the stationary member under the influence of centrifugal force.

2. In a centrifugal governor, a stationary member having an annular surface, a rotatable pivoted member in frictional engagement with the annular surface of said stationary member, a weight responsive to centrifugal force and bearing against the inner side of said pivoted member to vary its pressure upon the stationary member, and means for varying the point of application of the centrifugal force developed by said weight with respect to the point of application of the frictional retarding force of said pivoted member upon said stationary member.

3. In a centrifugal governor, a stationary member having an internal annular surface and a rotatable member comprising a plurality of pivoted arms in frictional engagement with the annular surface of said stationary member, a plurality of centrifugally movable weights, each associated with one of said arms and adapted to impinge thereon with varying pressure in response to centrifugal force, and means for adjusting the line of action of said weights with respect to the pivots of their associated arms.

4. In a centrifugal governor, a stationary annular member, a rotatable member, a lever pivotally attached to said rotatable member and frictionally engaged with said annular member, a weight rotatable about the center of said rotatable member and responsive to centrifugal force to impinge on said lever, and means for changing the point of contact of said weight with said lever whereby the retarding effect of the governor may be changed.

5. In a centrifugal governor, a stationary member having an internal annular surface, a rotatable member concentric with said stationary member comprising a spider having a plurality of peripheral slots, a weight in each of said slots movable radially therein, a second spider concentric with said first mentioned spider and adjustable angularly with respect thereto, and a plurality of arms, one for each of said weights, said arms each pivotally secured to said second mentioned spider and in frictional engagement with the internal annular surface of said stationary member, said weights responsive to centrifugal force to impinge on said arms.

6. In a centrifugal governor, a stationary member having an internal annular surface, a rotatable member concentric with said stationary member comprising a spider having a plurality of peripheral slots, a rotatable weight in each of said slots movable radially therein, a second spider concentric with said first mentioned spider and adjustable angularly with respect thereto, and a plurality of arms, one for each of said weights, said arms each pivotally secured to said second mentioned spider and in frictional engagement with the internal annular surface of said stationary member, said weights responsive to centrifugal force to impinge on said arms.

7. In a centrifugal governor, a stationary member having an internal annular surface, a rotatable member concentric with said stationary member comprising a spider having a plurality of peripheral slots, a spherical weight in each of said slots movable radi-

ally therein, a second spider concentric with said first mentioned spider and adjustable angularly with respect thereto, and a plurality of arms, one for each of said weights, said arms each pivotally secured to said second mentioned spider and in frictional engagement with the internal annular surface of said stationary member, said weights being responsive to centrifugal force to impinge on said arms.

8. A governor comprising a plurality of balls, an annular member and a plurality of frictional elements adapted to be pressed against said annular member by said balls under the influence of centrifugal force.

9. A governor comprising a ball, an annular member, and a frictional element adapted to be pressed against said annular member by said ball under the influence of centrifugal force.

In witness whereof, I hereunto subscribe my name this 9th day of September A. D., 1921.

EDGAR W. GENT.