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OVERSPEED GOVERNOR

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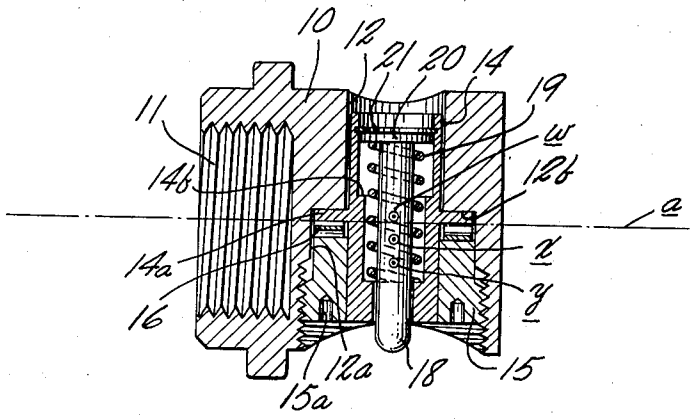


FIG. 1.

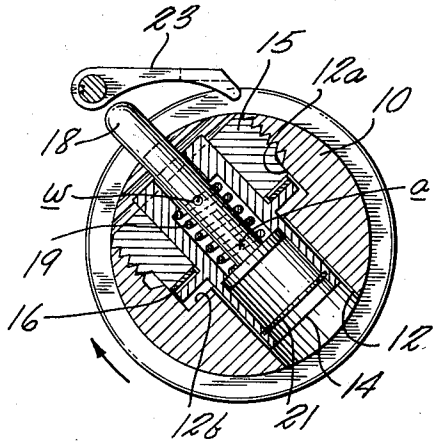


FIG. 2.

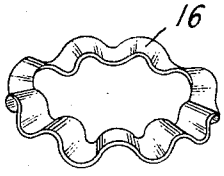


FIG. 3

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OVERSPEED GOVERNOR

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5 Claims. (Cl. 264—17)

This invention relates to overspeed governors for rotary members, and more particularly to a centrifugal governor including a movable actuator for a conventional speed control for a prime mover.

The overspeed governor comprises a slidably mounted actuator carried by the rotary member and normally urged to a position wherein the centrifugal force of rotation urges the actuator to an inoperative position. The actuator, however, is connected to a companion slidable member which is normally urged by the centrifugal force of rotation in a direction which would shift the actuator toward the operative position, except that slidable movement of the companion member is normally resisted by a spring.

With the above arrangement, the actuator is maintained in the inoperative position by the centrifugal force of rotation at allowable speeds of rotation, however, when the speed of rotation exceeds the predetermined limit, means resisting the slidable movement of the companion member is rendered inoperative, permitting the companion member to shift the actuator in such fashion that the centrifugal force of rotation urges the actuator in the opposite direction, namely toward the operative position, to actuate the control for the prime mover.

The overspeed governor of the present invention provides a highly satisfactory speed control device which may be readily mounted to the rotary member whose speed is to be governed while at the same time affording a very simple, compact and inexpensive construction.

The present invention will be more fully understood by reference to the detailed description which follows and to the accompanying drawings in which:

Figure 1 is a cross-sectional view of the present overspeed governor;

Figure 2 is a cross-sectional view taken on a plane perpendicular to the view shown in Figure 1, but showing the actuator in a different position; and

Figure 3 is a perspective view of a collapsible component of the overspeed governor shown in Figures 1 and 2.

Referring to the drawing, the overspeed governor of the present invention comprises a body or housing **10** internally threaded at one end, as at **11**, to permit the governor to be screwed on to the extreme end of a shaft whose speed is to be controlled. The axis of the overspeed governor is coaxial with the shaft whose speed is to be controlled, and the common axis is represented by the reference character *a*.

The housing is formed with a cylindrical bore **12** which intersects the axis *a* at right angles, and one end **12***a* of the bore **12** is of enlarged diameter forming a shoulder **12***b*. The bore **12** receives a sleeve **14**, and the sleeve **14** is provided with an outwardly projecting annular rim **14***a* around its outer periphery, which in the normal position of the sleeve is adapted to abut against the shoulder **12***b*. The inner periphery of the end **12***a* of

the bore **12** is threaded to receive a threaded plug **15**, and the plug **15** contains a central opening to receive the sleeve member **14** and to permit the sleeve limited movement therein.

With the plug **15** in place, the movement of the sleeve **14** within the bore **12** is limited in one direction by the engagement of the annular projecting rim **14***a* with the shoulder **12***b* and would be limited in the other direction by the end of the plug **15** were it not for a yieldable, collapsible wave washer or Belleville washer **16** interposed between the plug and the rim **14***a* which normally maintains the rim **14***a* in contact with the shoulder **12***b*.

An actuating pin **18** is slidably contained within the sleeve **14**, and the actuating pin **18** is normally urged by a compression spring **19** to a retracted or inoperative position, shown in Figure 1, wherein the head portion **20** of the pin is in contact with an annular retaining ring **21**. The opposite end of the pin **18** extends through the end of the sleeve **14**, and the pin is free to move in the said sleeve against the pressure of the spring **19** to the position represented in Figure 2, at which position the pin **18** trips the pivotal control lever **23**, thereby shutting down or reducing the speed of the prime mover. The travel of the actuating pin **18** in the operative direction is limited by a shoulder **14***b* (Figure 1) within the sleeve **14**.

Referring to Figure 1, the center of gravity of the actuating pin **18** is represented by the reference character *w*, the center of gravity of the sleeve **14** by the reference character *y*, and the center of gravity of the assembly including the sleeve, the compression spring **19** and the actuating pin **18** by the reference character *x*. In the normal position of rest the center of gravity *x* of the pin and sleeve unit and the center of gravity *w* of the actuating pin alone are on the opposite sides of the axis of rotation *a*. The position of the center of gravity *w* of the pin alone is such, therefore, that at allowable speeds of rotation the pin is urged by centrifugal force toward the inoperative position, represented in Figure 1, maintaining the head **20** of the pin in contact with the ring **21**. The center of gravity *x* of the pin and sleeve assembly, however, is disposed on the opposite side of the axis, with the result that the effect of the centrifugal force is to urge the assembly, including the pin, in the opposite direction. The movement of the unit by the centrifugal force, however, is resisted by the wave washer **16**.

In the normal position of rest, the wave washer **16** is partially compressed and therefore resists any further deformation until a definite force is reached, whereupon the washer collapses in a quick and sudden motion almost instantly with the application of but a small additional increment of force. Thus, when the speed of rotation reaches the point where the centrifugal force of the pin and sleeve assembly is capable of collapsing the ring washer **16**, the resulting sliding movement of the sleeve **14** within the slot will cause the center of gravity *w* of the pin to be shifted to the opposite side of the axis *a*, thereby reversing the effect of the centrifugal force upon the pin **18** and sliding it against the compressive force of the spring **19** to the operative position represented in Figure 2. In this position, as mentioned above, the trip lever **23** will be within the path of travel of the operative end of the pin and will, therefore, be actuated to shut down or reduce the speed of the prime mover.

It is evident that the pressure exerted on the wave washer **16** may be controlled by threadably adjusting the plug **15** to regulate the value of the centrifugal force which will collapse the washer. This adjustment of the plug is facilitated by the slots **15***a* in the exposed end of the plug which receive a suitable key.

The present invention has been shown in a single preferred form and by way of example only, and obviously many modifications and variations may be made therein without departing from the spirit of the invention. It is to be understood, therefore, that the invention is not to be limited to any specified form or embodiment except insofar as such limitations are set forth in the claims.

I claim:

1. A centrifugal governor for a rotary member comprising an actuator slidably carried by the rotary member, yielding means for urging the actuator to an inoperative position, movable companion member carried by the rotary member and engageable with said actuator, means for maintaining said companion member in a normal position, the relative positions of the actuator in inoperative position and the movable companion member in normal position being such that the effect of the centrifugal force during rotation urges the actuator toward the inoperative position while the effect of the centrifugal force on the companion member urges the actuator toward operative position, and collapsible means for resisting the slidable movement of the companion member until a predetermined speed of rotation is exceeded, whereupon the resistance of the collapsible means is overcome suddenly, permitting the companion member to shift the center of gravity of the actuator to the opposite side of the axis of rotation of the governor, whereupon the centrifugal force of rotation will urge the actuator to operative position.

2. A centrifugal governor for a rotary member comprising a sleeve member slidably carried by the rotary member, registration means for maintaining said sleeve member in an inoperative position, an actuator slidably accommodated within the sleeve member, yielding means for urging the actuator to an inoperative position, the effect of the centrifugal force during rotation of the rotary member urging the actuator toward the inoperative position, while the effect of the centrifugal force on the sleeve member urges the sleeve member and the actuator accommodated therein toward operative position, and means for resisting the slidable movement of the sleeve member until a predetermined speed of rotation is exceeded, whereupon the resisting means is overcome, permitting the sleeve member to shift the center of gravity of the actuator to the opposite side of the axis of rotation of the rotary member, whereupon the centrifugal force of rotation will urge the actuator to operative position.

3. A centrifugal governor for a rotary member comprising a housing mounted to the rotary member, a sleeve member slidably received in the housing, an actuator slidably movable within the sleeve between fixed limits, spring means urging the actuator to a position wherein the center of gravity of the actuator is so disposed with respect to the axis of rotation of the housing that the centrifugal force of rotation urges the actuator toward inoperative position, stop means for the slidable sleeve, and a restraining means normally maintaining the sleeve member in contact with said stop means, at which position the center of gravity of the actuator and sleeve assembly is disposed on the opposite side of the axis of rotation of the housing from the center of gravity of the actuator alone, the arrangement being such that at rotational speeds above the allowable limit, the centrifugal force of the assembly will overcome the restraining means, thereby permitting the sleeve member to engage the actuator and shift the center of gravity of the actuator to the opposite side of the axis of rotation, the centrifugal force thereupon urging the actuator to the operative position.

4. A centrifugal governor as set forth in claim 3 wherein the spring urging the actuator toward inoperative position is a compression spring accommodated within the sleeve member.

5. A centrifugal governor for a rotary member comprising a housing adapted to be mounted to the rotary member, an actuator slidably received in the housing, a companion member slidably received in the housing and concentrically disposed with respect to the actuator, spring means urging the actuator to a position wherein the center of gravity of the actuator is so disposed with respect to the axis of rotation of the housing that the centrifugal force of rotation urges the actuator toward inoperative position, stop means for the slidable companion member, and a collapsible ring washer which normally urges the companion member into contact with said stop means, in which position the center of gravity of the actuator and companion member assembly is disposed on the opposite side of the axis of rotation of the housing from the center of gravity of the actuator alone, the arrangement being such that at rotational speeds above the allowable limit, the centrifugal force of the assembly will cause the ring washer to collapse, thereby permitting the companion member to engage the actuator and shift the center of gravity of the actuator to the opposite side of the axis of rotation of the housing, the centrifugal force thereupon urging the actuator to the operative position.

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