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CENTRIFUGAL CONTROL DEVICE

Original Filed May 30, 1944

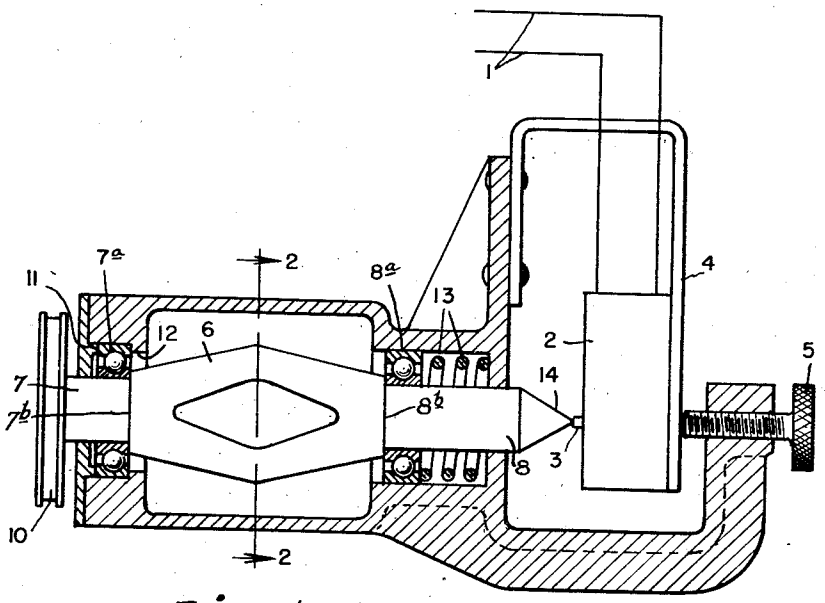


Fig. 1

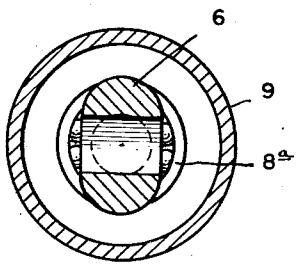


Fig. 2

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CENTRIFUGAL CONTROL DEVICE

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5 Claims. (Cl. 200—80)

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The present improvements, relating as indicated to centrifugal control devices, have more particular regard to a form of centrifugally operated governor suitable for the control of reeling mechanism for reeling fine wire, or other mechanism in which automatic and sensitive variation of speed of operation is important.

This application is a division of our copending application filed May 30, 1944, Serial No. 537,998, in which the present improved centrifugal control device is shown in association with such a wire reeling mechanism. However, it will be understood that the device is not limited to use in such particular association.

As indicated, one object of the present invention is to provide a form of centrifugal governor which will be extremely sensitive in operation, and particularly so at high speeds of revolution. Another object is to provide a device of the character in question which will be simple and compact in construction, with no parts likely to get out of order.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a longitudinal sectional view of our improved control device; and

Fig. 2 is a transverse section thereof, the plane of the section being indicated by the line 2—2, Fig. 1.

As illustrated in Fig. 1, the device is shown as arranged to control an electrical relay circuit 1, such control being effected through a microswitch 2 of familiar construction and so not illustrated in detail. This switch includes a contact element 3 which may be arranged so that in its normal position the relay circuit will be held either closed or open as desired. The switch as a whole is mounted on one end of a U-shaped resilient arm 4, the position of which may be adjusted by means of a knurled screw 5 so as to vary the setting of said contact member 3 in relation to the adjacent end of the governor proper now to be described.

The main element 6 of said governor consists simply of a short bar section turned at its ends to provide suitable journals 7 and 8 for rotative

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mounting in bearings 7a and 8a in the main frame or housing 9 of the device. Facing such journals respectively, said element is further formed with shoulders 7b and 8b which cooperate with said bearings as will be presently described. Bar 6 is split longitudinally intermediate of such journal ends in a median plane and the respective portions adjacent such split are spread outwardly a sufficient distance so as to be affected by the centrifugal force generated upon rapid rotation of the governor, such rotation being imparted thereto through the medium of a pulley 10 affixed to one such journal end, or by any other suitable driving means. Rotation at a sufficiently high rate of speed will cause a slight increase in the amount of spread of the respective portions of the split governor element 6 and will correspondingly shorten the overall length of the latter.

It will be noted that bearing 7a adjacent the outer end of the governor to which pulley 10 is affixed is seated between abutments 11 and 12 so as to be held in fixed position; accordingly said bearing (e. g. the inner raceway of the ball bearing shown), by engaging the corresponding shoulder 7b on member 6, serves to restrain said member against endwise movement in the corresponding direction, i. e. to the left as shown in Fig. 1. On the other hand bearing 8, wherewith the other shoulder 8b on member 6 similarly engages, is free to partake of axial movement in housing 9, a spring 13 being interposed between such bearing and the adjacent wall of the housing. The governor is thus held in fixed endwise position with respect to said abutments 11 and 12, while its inner end 14, which is designed to operate the microswitch 3 is free to partake of the slight axial movement required to actuate said switch when the overall length of the governor is shortened by the centrifugal spreading of the split body thereof. The expansive action of spring 13 it will be seen not only serves to retain the ball bearing 8 in contact with the adjacent shoulder 8b on member 6 but at the same time to retain the shoulder 7b on the opposite end of said member in close contact with bearing 7. Accordingly smooth even rotation of said member is at all times insured, while the shortening or lengthening thereof due to variation in the speed of rotation will be accurately translated into endwise movement of its inner end 14.

Assuming that the mechanism to be actuated through relay circuit 1, e. g. a speed change device for a wire reeling mechanism, is to be thus actuated by the closing of microswitch 2, the

setting of the latter will be such that contact element 3 will be engaged by the inner end 14 of the governor, and the switch held open, when the governor is idle; however, upon rotation of the latter at a predetermined rate of speed, end 14 thereof will be withdrawn a sufficient distance to permit said contact element to close the switch. A governor constructed and operating in accordance with the foregoing description has been found satisfactory in use where the speeds involved are as high as 10,000 to 15,000 R. P. M.

Other modes of applying the principle of our invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any on the following claims or the equivalent of such stated means be employed.

We therefore particularly point out and distinctly claim as our invention:

1. A centrifugal governor comprising a one-piece, longitudinally split rotatable member, the portions of said member adjacent the split therein being radially displaced, and bearings wherein the respective ends of said member are journalled, one of said bearings restraining the corresponding end of said member against endwise movement and the other permitting such movement.

2. A centrifugal governor comprising a rotatable member, said member being axially contractible under the influence of centrifugal force, bearings wherein the respective ends of said member are journalled, one of said bearings restraining the corresponding end of said member against endwise movement in outward direction and the other permitting such movement in both directions, and a spring cooperating with said last-mentioned bearing to press said member against said first-mentioned bearing.

3. A centrifugal governor comprising a rotatable member, said member being longitudinally split on a median plane intermediate its ends and the respective portions of said member adjacent the split therein being radially displaced, and bearings wherein the respective ends of said member are journalled, such ends being formed with outwardly directed shoulders adapted to contact with said bearings respectively one of said bearings being fixedly positioned and the other being

capable of endwise movement to permit corresponding movement of the adjacent end of said member, and a spring cooperating with said last-mentioned bearing to press the shoulder on the opposite end of said member against said first-mentioned bearing.

4. A centrifugal governor comprising a rotatable member, said member being axially contractible under the influence of centrifugal force, bearings wherein the respective ends of said member are journalled, one of said bearings restraining the corresponding end of said member against endwise movement in outward direction and the other permitting such movement in both directions, a spring cooperating with said last-mentioned bearing to press said member against said first-mentioned bearing, and a control switch having an actuating element, said switch being supported so as to position such element in alignment with the movable end of said member.

5. A centrifugal governor comprising a rotatable member, said member being axially contractible under the influence of centrifugal force, bearings wherein the respective ends of said member are journalled, one of said bearings restraining the corresponding end of said member against endwise movement in outward direction and the other permitting such movement in both directions, a spring cooperating with said last-mentioned bearing to press said member against said first-mentioned bearing, a resilient arm disposed opposite such movable end of said member, a control switch carried by said arm and having an actuating element, said switch being supported so as to position such element in alignment with the movable end of said member, and a set screw engaging said arm to adjust the position of the latter and thus of such contacting element.

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The following references are of record in the file of this patent:

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