May 19, 1942. D. C. ROCKOLA 2,283,288

GOVERNOR

Filed July 17, 1941

Fig. 1

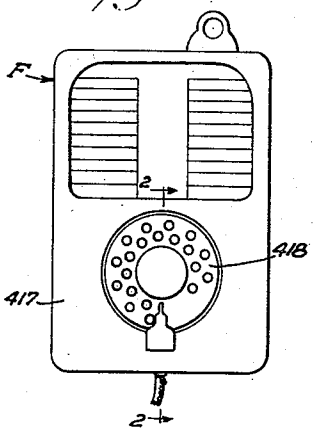


Fig. 2

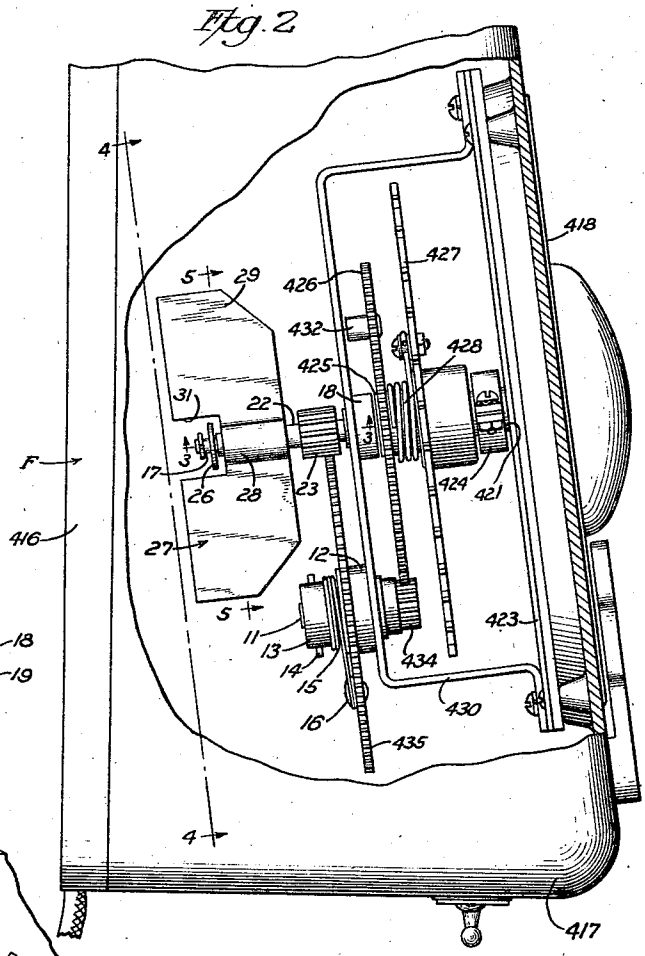


Fig. 3

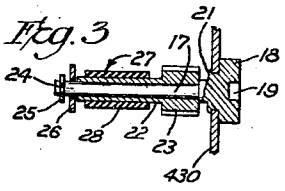


Fig. 4

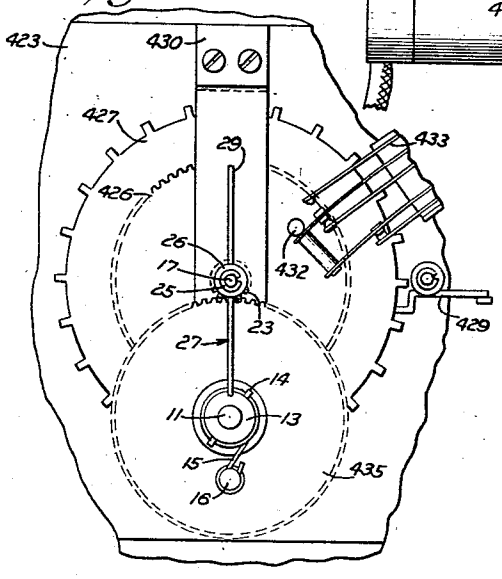
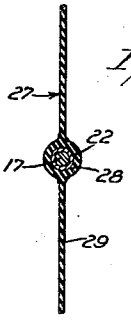


Fig. 5



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UNITED STATES PATENT OFFICE

2,283,288

GOVERNOR

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Application July 17, 1941, Serial No. 402,799

4 Claims. (Cl. 188—183)

This invention relates in general to governors, and more particularly to improvements in an air brake type of governor.

In certain types of selectively rotatable control devices, such as that disclosed in the co-pending application for United States Letters Patent of David C. Rockola et al., Serial No. 390,774, filed April 28, 1941, it is necessary to limit the speed of rotation to insure proper operation of the phonograph or other selector means controlled thereby. The manually operable member in such a device is intended to be selectively rotated in one direction by hand, and to be returned in the opposite direction to normal position by a suitable spring which is tensioned by the manual operation thereof. Some operators, however, may return the rotatable member manually to normal position in an attempt to rotate the same faster than would the tensioned spring.

A principal object of this invention therefore, is the provision of improved means for governing the speed of rotation of the control member in such a selectively operable device.

Another important object of the invention is the use of an air brake in such a governor comprising a novel fan or blade element of rubber or other suitable resilient material.

A further object of the invention is the provision of a novel arrangement and construction of the parts of such a governor which greatly facilitates its manufacture and assembly with the selective control device.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

In the drawing:

Figure 1 is a front elevational view of a selective control unit embodying the features of the invention;

Fig. 2 is a side view taken substantially on the line 2—2 of Fig. 1, with part of the casing of the unit broken away;

Fig. 3 is a detail horizontal sectional view taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a rear view taken substantially on the line 4—4 of Fig. 2; and

Fig. 5 is a detail section taken substantially on the line 5—5 of Fig. 2.

Referring more particularly to the drawing, reference character F represents a selectively rotatable control device for the selector means (not shown) of a multi-record phonograph, such as that fully illustrated and described in the co-pending application of David C. Rockola et al., Serial No. 390,774, filed April 28, 1941. While the present invention is particularly applicable to the remote control actuating means or control device F of said application, it will be apparent from the following description that it may be employed advantageously with any similar type of control device.

In the embodiment shown, this control device F is enclosed within a casing having a base 416 which may be secured to a wall or other supporting means in any suitable manner, and a top portion 417 hingedly connected thereto. On the exterior of the front wall of the top portion 417 there is provided a dial structure 418 which comprises a dial having a number of finger apertures and a suitable stop for coooperation with the finger or other object inserted in such apertures to rotate the dial. The dial 418 is rigidly secured to a shaft 421 which extends into the interior of the casing formed by the base and top portions 416, 417. A suitable coil spring (not shown) is interconnected between the dial 418 and a plate 423 supported by the top portion 417 of the casing, such spring functioning to return the dial to normal position after it has been rotated a desired distance in a clockwise direction, viewing Fig. 1. The shaft 421 is provided with a switch actuating arm 424 (Fig. 2) which cooperates with a normally open switch for a purpose which is of no import with respect to the present invention. The shaft 421 is also provided with a sleeve 425 rigidly secured thereto and having a gear 426 mounted on one end thereof. The sleeve 425 also serves as a bearing for an interrupter wheel 427 which is freely rotatable thereon. A spring 428 is secured to the interrupter wheel 427 and engages the sleeve 425 so as to cause rotation of the wheel with the gear 426 in one direction, while permitting relative rotation of the gear and wheel in the other direction. The interrupter wheel 427 is provided with a plurality of spaced lugs around its circumference which are arranged to engage a pawl 429 (Fig. 4) supported upon a suitable stud extending outwardly from the plate 423. The pawl 429 permits the wheel 427 to turn in a clockwise direction, as viewed in Fig. 4, but serves as a stop to prevent any appreciable rotation of the wheel in the opposite direction. Thus, when the dial 418 is initially moved (clockwise in Fig. 1 and counter-clockwise in Fig. 4) by inserting a finger or object within one of its apertures, the inter-

rupter wheel 427 is moved only a very short distance and until one of the projections on its periphery engages the pawl 429. The gear 426, of course, moves with the dial 418 at all times. When the dial 418 is then released, the frictional engagement between the dial and the interrupter wheel 427, by means of the shaft 421, the sleeve bearing member 425, the gear 426 and the spring 428, will cause the interrupter wheel 427 to be rotated in unison with such return rotation of the dial 418 and the gear 426. The gear 426 is provided with a stud 432 which, in the position of rest or normal position of the parts, serves to hold a switch 433 in a particular position. By means of a bracket 430 which is secured to the plate 423, and will be referred to more in detail hereinafter, a small gear or pinion 434 is mounted in mesh with and for rotation by the gear 426. The shaft carrying the gear 434 also rotatably supports a larger gear 435 which forms a part of the governor mechanism of the present invention.

The reference characters so far employed are identical to those used in said co-pending application to indicate the same parts as are illustrated herein. The operation of these parts has been so described as to afford a greater understanding of the cooperation of the present invention therewith, so that further reference to particular details of the control device F will not be made. The instant invention comprises an improved governor particularly adapted for use with such a selectively operable control device.

The small gear 434 is formed integrally with a shaft or elongated hub 11 extending through and rotatably supported by a bearing member 12 which is mounted in any desired manner in a suitable recess in the bracket 430. A sleeve 13 is provided on the inner end of the shaft 11 to retain the gear 435 in proper position thereon, and is secured to the shaft 11 by a pin 14. One end of a coil spring 15 is secured to the gear 435 by a stud 16, and the other end of the spring is wound around and embraces the outer surface of the sleeve 13. With this arrangement, rotation of the shaft 11 and sleeve 13 in a counterclockwise direction, as viewed in Fig. 4, will cause tightening of the coiled portion of the spring 14 on the sleeve to rotate the gear 435. At the same time, the spring 15 will permit rotation of the gear 435 in the opposite direction relative to the sleeve and the shaft 11. Consequently, if the gear 435 is being driven in such counter-clockwise direction by the shaft 11 and the small gear 434, and rotation of the latter is stopped by virtue of the return of the dial 418 to normal position, continued rotation of the gear 435 relative to the members 11, 13 and 434 will be permitted. This feature is employed for the purpose of enabling continued rotation of the governor mechanism after the dial 418 has come to rest in normal position so that the kinetic energy of the governor will not be directed against the means for stopping the dial 418 in normal position.

The bracket 430 is provided with a suitable aperture adjacent the center thereof through which a stub shaft 17 extends. As is best illustrated in Fig. 3, the outer end of the shaft 17 comprises an enlarged bearing portion 18 having a central recess 19 formed therein for the purpose of receiving the inner end of the shaft 421. This outer bearing portion 18 is disposed against the outer surface of the bracket 430, and the shaft is secured to the latter by upsetting portions thereof against the inner surface of the bracket, as indicated at 21. The inner end of the stub shaft 17 is further reduced to provide a bearing for a sleeve or hollow shaft 22 which has a small gear or pinion 23 formed integrally therewith at its outer end, the sleeve 22 thereby constituting an elongated hub of the pinion 23. The pinion 23 is in mesh with the gear 435 so as to be rotated thereby. Adjacent its inner end, the shaft 17 is provided with a circumferential groove 24 within which a suitable split washer 25 is removably disposed to limit axial movement of a ring 26 which is mounted upon the shaft 17 to prevent endwise displacement of the sleeve 22 therefrom. A fan or air brake element, which is indicated generally by reference numeral 27 and is made of rubber or any other suitable resilient material, is provided with a hollow hub portion 28 formed integrally therewith and adapted to resiliently engage the outer surface of the sleeve 22. The hub portion 28 of the fan element 27 thus functions to alone secure the fan element to the sleeve 22. As illustrated herein, the fan element 27 comprises a pair of diametrically opposed blades 29 formed integrally with the hub portion 28. In order to provide the necessary resistance to rotation, the blades 29 extend inwardly or rearwardly beyond the end of the shaft 17, and are cut away at 31 (Fig. 2) to provide clearance for the sleeve retaining ring 26.

With the above described governor mechanism, initial manual rotation of the dial 418 and the gear 426 in the selective operation of the control device F beyond a certain speed will be resisted by the fan element 27. The primary function of this governor mechanism, however, is to limit the speed of rotation of the dial 418, the gear 426, and the interrupter wheel 427 during movement of the latter as the dial is spring returned to normal position. The governor mechanism also functions to resist excessive speed of rotation of the several parts when an operator attempts to return the dial 418 to normal position manually at a greater speed than would normally result from the operation of the spring return means. As has been previously noted, when the several rotatable members of the control device F are stopped in their normal position after operation thereof, the spring connection 15 between the gear 435 and the pinion 434 will permit continued rotation of the gear 435, the pinion 423 and the fan element 27. The energy stored in the governor during the operation thereof will thus be expanded solely in its continued operation, after stopping of the pinion 434, to rotate the air brake 27. One of the most important advantages of the instant construction lies in the fact that the use of a rubber fan element prevents physical injury to an operator who has opened the casing 417, 416 for the purpose of making adjustments or repairs. The use of a metal bladed fan element, as in the device of the application hereinbefore referred to, has resulted in physical injury in numerous reported cases. Another distinct advantage of the present construction is found in the ease of assembly thereof, particularly when considered as a part of the control device F. In other words, with the arrangement of the parts as illustrated herein, the mechanism of the control unit F which is mounted upon the shaft 21 may be first assembled in the casing portion 417. The mechanism comprising the instant governor may be separately assembled upon the bracket 430 exteriorly of the device. And it then becomes a

relatively simple matter to attach the bracket **430** to the plate **423**.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A governor for a device having a rotatable member, comprising a pinion rotatable with said member, a gear mounted for rotation by said pinion in one direction and freely rotatable relative thereto in the other direction, a second pinion in mesh with said gear and having an elongated hub, and a rubber fan element having a hollow hub portion formed integrally therewith for resiliently engaging the outer surface of said elongated hub.

2. A governor for a device having a rotatable member, comprising a pinion rotatable with said member and having an elongated hub, a gear rotatably mounted on said hub, a coil spring secured at one end to said gear and engaging said hub at the other end to cause rotation of said gear by said pinion in one direction and to permit rotation of said gear relative to said pinion in the other direction, a second pinion in mesh with said gear, and a fan element having an integral hub portion resiliently secured to said second pinion to govern the speed of rotation of said member, said spring enabling continued rotation in one direction of said gear, said second pinion and said fan element upon stopping of said member and said first pinion.

3. In combination with a device having a shaft supporting a rotatable member, a governor for controlling the speed of rotation of said member, comprising a bracket adapted to be secured to said device, a stub shaft extending through and secured to said bracket and having a recess in one end to receive and support one end of said first shaft, a gear mounted on the other end of said stub shaft and rotatable by said member, and a fan element secured to said gear to govern the speed of rotation of said member.

4. In a governor, a stationary shaft having a reduced outer end portion, a sleeve rotatably mounted on said reduced end portion and having a gear formed at one end thereof, means mounted on the outer end of said shaft to retain said sleeve thereon, and a rubber fan element having an integral and hollow hub portion resiliently engaging the outer surface of said sleeve and cut away at one end to provide clearance for said retaining means.

DAVID C. ROCKOLA.