Aug. 13, 1940. G. KENDE 2,211,466

GOVERNOR

Filed March 25, 1939

Fig. 1.

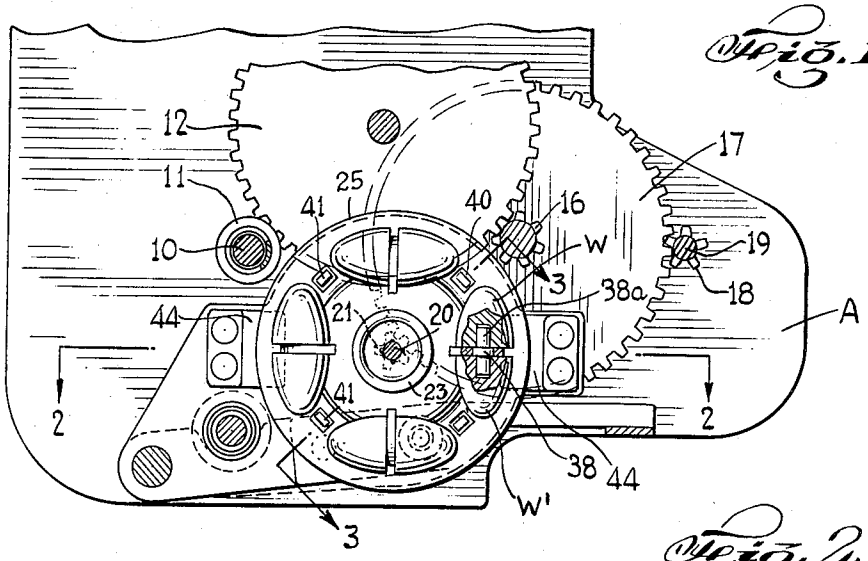


Fig. 2.

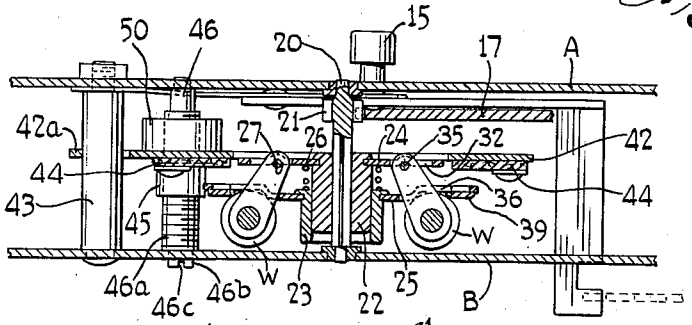


Fig. 3.

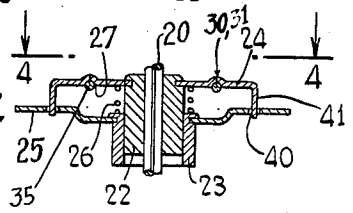


Fig. 4.

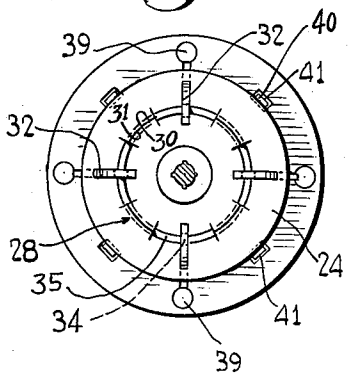
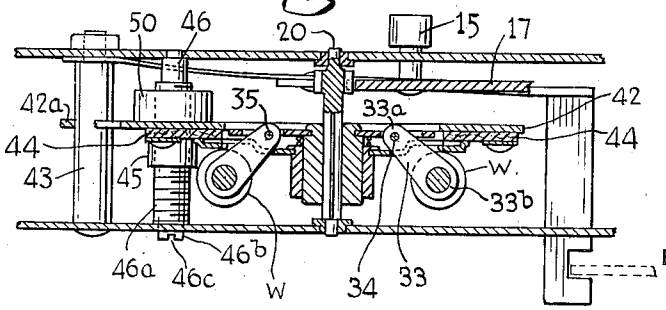


Fig. 5.



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2,211,466

GOVERNOR

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Application March 25, 1939, Serial No. 264,259

13 Claims. (Cl. 188—187)

This invention relates to governors. More particularly my invention relates to improvements in the construction of governors adapted for use in connection with driving mechanism for motion picture apparatus and the like.

One of the objects of my invention is to provide an improved governor of the character described, which shall be so constructed and arranged whereby a relatively large centrifugal force may be developed in a relatively limited space.

Another object of my invention is to provide an improved governor construction of the character described, having novel means for adjusting the speed of operation of said governor without the necessity of disassembling the parts thereof.

Still another object of my invention is to provide a governor construction of the character described which shall comprise relatively few and simple parts, which shall be easy to assemble, which shall occupy a relatively small amount of space and which shall be rugged in construction and which, at the same time, shall operate with a high degree of efficiency.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangements of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the claims.

In the accompanying drawing, in which is shown one of the various possible embodiments of this invention,

Fig. 1 is a sectional view of a portion of a motion picture camera driving mechanism showing the governor of my invention applied thereto.

Fig. 2 is a cross sectional view taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is a cross sectional view taken substantially on the line 4—4 of Fig. 3, and

Fig. 5 is a view similar to Fig. 2, but illustrating a step in the operation of the governor mechanism of my invention.

Referring now in detail to the drawing, there is disclosed in Figs. 1, 2 and 5 a portion of the driving mechanism of a motion picture camera of any suitable construction, such as for example, the type fully described and disclosed in the copending application Ser. No. 135,410, filed April 7, 1937 for Motion picture cameras. The said driving mechanism may comprise a spring motor (not shown) supported between a pair of parallel plates A and B and adapted to drive a take-up spool shaft 10 through a suitable chain of gearing 11 and 12.

The rotation of the shaft 10 may be controlled by a push button device 15 mounted in the plate A, which at the same time controls the operation of the intermittent film advancing mechanism and shutter (not shown) which is simultaneously operated from the spring motor through the chain of gearing 12, 16, 17 and 18, to drive the shaft 19. To regulate the speed of operation of the said intermittent film advancing mechanism and reciprocating shutter in addition to the take-up spool, I have provided the following governor construction.

Journaled between the plates A and B is a shaft 20, having mounted thereon for rotation therewith a pinion 21, which is in mesh with the gear 17 of the above described driving mechanism. It is thus seen that when the push button 15 is operated to effectively actuate the driving mechanism, the shaft 20 will be simultaneously rotated. Fixed to the shaft 20 by any suitable means, such as a force fit or by splining as shown in the drawing, is a hub member 22. Freely mounted on the hub 22 for sliding movement in an axial direction is a collar 23. Fixedly mounted on the hub 22 for rotation therewith is a disc 24. Fixedly mounted on the collar 23 for rotation therewith is a second disc 25 of larger diameter than the disc 24. It is noted from the above described construction that the disc 24 is held against axial movement while the disc 25 is so mounted that it may move toward and away from the disc 24. A spring 26 encircling the hub 22 is interposed between the discs 24 and 25 to normally urge their separation. The amount of axial movement of the disc 25 in a direction away from the disc 24 is limited by a plurality of pairs of weights W, W', mounted on the disc 24 in the manner now to be described.

The disc 24 is provided with an annular inwardly disposed recessed groove 27, spaced from the periphery thereof. At circumferentially spaced points 28 of the groove 27, there are provided circumferential perforations made by striking out the material from the body of the disc 24 to form adjacently disposed lips 30 and 31 on opposite sides of the groove 27. The disc 24 is also provided with a plurality of circumferentially disposed slotted apertures 32 arranged in spaced relationship from each other and transversely with respect to the groove 27. The said apertures 32 are designed to receive therein the ends 33a of the links 33. The said link ends 33a are provided

with apertures 34 and are held in assembled relationship with the disc 24 by means of a wire ring member 33, which is designed to rest in the groove 27 and between the lips 30 and 31 and which wire member 35 passes through the apertures 34 in the link ends 33a of each of the links 33.

The disc 25 is provided with slotted apertures 36 circumferentially spaced and arranged in corresponding alignment with each of the slotted apertures 32 in the disc 24. The free ends of the links 33 are adapted to freely pass through the apertures 36 in the disc 25. The ends 33b of the links 33, opposite to the ends 33a are provided with apertures into which there are fixedly mounted the shafts 38. (See Fig. 1.) The shafts 38 are provided with reduced portions 38a which project outwardly from the links 33 on opposite sides thereof. On the last named extending shaft portions 38a, the weights W, W' are adapted to be mounted in any suitable manner, such as for example, by a force frictional fit as shown in the drawing.

It is thus seen from the above described construction that the axial movement of the disc 25 away from the disc 24 caused by the spring 26 is limited by the weights W, W'.

It is therefore seen from the above described construction that when the shaft 20 is caused to be rotated by the operation of the motion picture drive mechanism as hereinbefore described, the disc 24 being mounted on the hub 22, which is fixed to the shaft 20, will rotate simultaneously therewith. Due to the fact that the links 33 and weights W, W', interconnect the disc 25 with the disc 24, the said disc 25 will rotate together with the disc 24. When the discs 24 and 25 are thus rotated, the weights W, W' due to the centrifugal force developed will be caused to move in an outward direction with respect to the shaft 20 and to pivot about the link ends 33a. The outward movement of the weights W, W' will cause the disc 25 to move in a direction toward the disc 24 against the action of the spring 26, as shown in Fig. 5 of the drawing. It is noted that the greater the speed of rotation of the shaft, the further will the disc 25 be moved toward the disc 24.

To facilitate the movement of the disc 25 toward the disc 24 by the weights W, W', as above described, there is provided on the disc 25 rounded projecting portions 39 disposed adjacent the slotted apertures 36 and directly in the path of the weights W, W'. Thus it is seen that when the weights W, W' are caused to move due to the centrifugal force developed, they will contactively engage the raised projections 39 and facilitate the movement of the disc 25 against the action of the spring 26.

To maintain the proper alignment between the discs 24 and 25, there is provided in the disc 25 a plurality of circumferentially spaced apertures 40, into which there is adapted to be freely received angularly arranged projecting portions 41 of the disc 24, as clearly shown in Fig. 3 of the drawing.

Designed to cooperate with the disc 25 is a brake member 42, which is permanently fixed at one end 42a thereof to a separating post 43 fixedly mounted between the plates A and B. The brake member 42 is so positioned with respect to the disc 25 so that upon a predetermined amount of movement of said disc 25 toward the disc 24, it will frictionally engage the member 42, and thus limit the speed of rotation of the shaft 20, which in turn, will limit the speed of rotation of the spool shaft 10 and the film feeding and shutter operating shaft 19. If desired, a strip 44 of leather, fiber or similar material may be attached to the member 42, so that when the shaft 20 reaches a predetermined speed of rotation, the disc 25 will be moved into frictional engagement with the member 44 to thus retard the increased speed of operation of the driving mechanism and to thereby retain the said speed at a uniform rate.

By my invention, I have also provided means whereby the brake member 42 may be adjusted to govern any speed desired without disassembling the governor mechanism. To accomplish this, I have provided the member 42 with an aperture, in which there is fixedly received, by means of a forced fit, an internally threaded collar member 45. Also attached to the shaft 46 is a shoulder member 50 which is adapted to abut the brake member 42. Passing through the collar member 45 and having the opposite ends thereof mounted in the plate A and B is a shaft 46, a portion 46a of which is externally threaded to correspond to the internal threads of the collar 45. The portion 46b of the shaft 46 which projects through the plate B is provided with a notch 46c. It is thus seen that when the shaft 46 is rotated in one direction by any suitable means, such as a screw driver placed in the notch 46c, the effective portion of the brake member 42 will be caused to move to change the distance between the disc 25 and the layer of leather or fiber 44.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, and means comprising pivotally mounted weights for causing simultaneous rotation of said movable disc with said fixed disc, upon rotation of said shaft.

2. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, and means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of rigid links each being pivotally mounted at one end thereof to said fixed disc and having the other end thereof freely projecting through an aperture in said movable disc.

3. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of

discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar for relative movement therewith, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, means for causing simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of rigid links each being pivotally mounted at one end thereof to said fixed disc and having a weight member fixed to the other end thereof.

4. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, means for causing simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of rigid links each being pivotally mounted at one end thereof to said fixed disc, and having the other end thereof freely projecting through an aperture in said movable disc, a weight member attached to the last named projecting portion of each link, said weight member being larger than said last named movable disc aperture whereby said weight may contactively engage said movable disc to urge the same in a direction toward said fixed disc.

5. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, means for causing simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links each being pivotally mounted at one end thereof to said fixed disc and having the other end thereof freely projecting through an aperture in said movable disc, a weight member attached to the last named projecting portion of each link, said weight member being larger than said last named movable disc aperture whereby said weight may contactively engage said movable disc to urge the same in a direction toward said fixed disc, and a spring for normally urging said discs apart.

6. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said fixed disc, means for causing simultaneous rotation of said slidable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links each being pivotally mounted at one end thereof to said fixed disc and having the other end thereof freely projecting through an aperture in said movable disc, a weight member attached to the last named projecting portion of each link and a raised area on said movable disc adjacent each weight member, said raised areas being so disposed that upon rotation of said shaft the centrifugal force generated will cause said weight members to contactively engage said raised areas to push said movable disc toward said fixed disc.

7. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said fixed disc, means for causing simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links each being pivotally mounted at one end thereof to said fixed disc and having the other end thereof freely projecting through an aperture in said movable disc, weight members on said last named projecting portion of each link and a stationary brake member disposed in the path of slidable movement of said movable disc so that after the said shaft has reached a predetermined speed of rotation, said movable disc will frictionally engage said brake member.

8. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted disc being movable in a direction toward and away from said first named fixed disc, means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links each being pivotally mounted at one end thereof to said fixed disc, means including members cooperating with the other end thereof for attaching said link to said movable disc, a stationary brake member disposed in the path of movement of said movable disc so that after the said shaft has reached a predetermined speed of rotation, said movable disc will frictionally engage said brake member, and means for changing the position of said brake member with respect to said movable disc to change the governing speed.

9. In a governor device of the character described, a rotatably mounted shaft, a collar fixed to said shaft for rotation therewith, a pair of discs mounted on said collar, one of said discs being fixed to said collar for rotation therewith and the other of said discs being freely mounted on said collar, said freely mounted collar being movable in a direction toward and away from said first named fixed disc, means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links each being pivotally mounted at one end thereof to said fixed disc, means including members cooperating with the other end thereof for attaching said link to said movable disc, a stationary brake member disposed in the path of movement of said movable disc so that after the said shaft has reached a predetermined speed of rotation, said movable disc will frictionally engage said brake member, and means for changing the position of said brake member with respect to said movable disc to

change the governing speed, said last named means being independent of the operation of said shaft and said disc.

10. In a governor device of the character described, a rotatably mounted shaft, a pair of discs mounted on said shaft, one of said discs being fixed to said shaft for rotation therewith, and the other of said discs being freely mounted on said shaft and movable in a direction toward and away from said fixed disc, means for normally urging said discs apart, means comprising a plurality of pivotally mounted rigid links for causing simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, apertures in one of said discs and projections on the other of said discs in alignment with and adapted to be freely received in said apertures upon movement of said movable disc to insure simultaneous rotation of said discs, and centrifugal weights supported by said links for effecting the movement of said freely mounted disc.

11. In a governor device of the character described, a rotatably mounted shaft, a pair of discs mounted on said shaft, one of said discs being fixed to said shaft for rotation therewith and the other of said discs being freely mounted on said shaft, said freely mounted disc being movable in a direction toward and away from said fixed disc, means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising a plurality of links, each having an aperture adjacent one end thereof, means for pivotally mounting said links on said fixed disc, said last named means comprising a wire ring member disposed adjacent said fixed disc and freely passing through said link apertures.

12. In a governor device of the character described, a rotatably mounted shaft, a pair of discs mounted on said shaft, one of said discs being fixed to said shaft for rotation therewith and the other of said discs being freely mounted on said shaft, said freely mounted disc being movable in a direction toward and away from said fixed disc, means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising an annular recess in said fixed disc, a plurality of circumferentially spaced apertures in said fixed disc, said last named apertures being disposed in portions of said recess, a wire ring member received in said recess, a plurality of links, each having one of its ends projecting through one of said disc apertures and each link having apertures in said last named projecting portion, said wire ring member passing through said link apertures.

13. In a governor device of the character described, a rotatably mounted shaft, a pair of discs mounted on said shaft, one of said discs being fixed to said shaft for rotation therewith and the other of said discs being freely mounted on said shaft, said freely mounted disc being movable in a direction toward and away from said fixed disc, means responsive to speed for effecting such movement of said freely mounted disc as well as to cause simultaneous rotation of said movable disc with said fixed disc upon rotation of said shaft, said last named means comprising an annular recess in said fixed disc, a plurality of circumferentially spaced apertures in said fixed disc, said last named apertures being disposed in portions of said recess, a wire ring member received in said recess, a plurality of links, each having one of its ends projecting through one of said disc apertures and each link having apertures in said last named projecting portion, said wire ring member passing through said link apertures, and means for maintaining said wire ring in said recess.

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