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DRIVING MECHANISM OF THE BARREL TYPE

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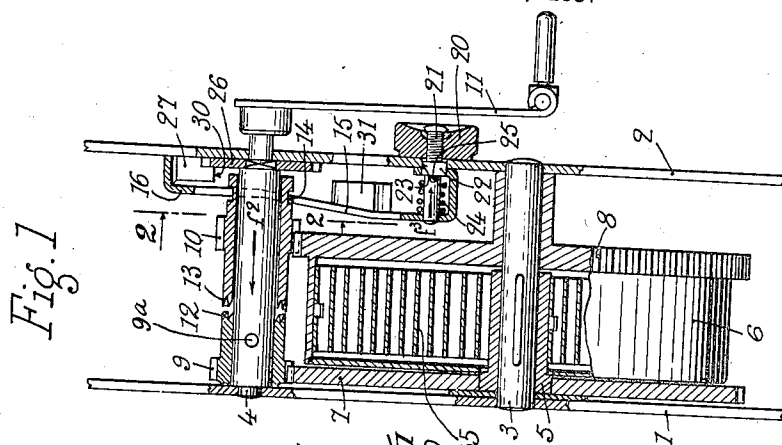


Fig. 1

Fig. 2

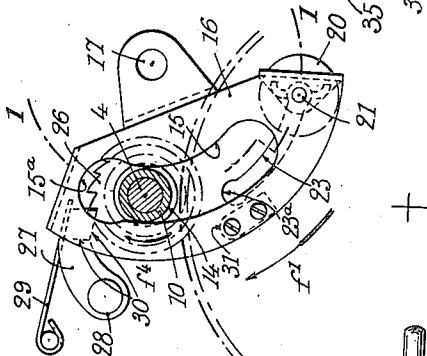


Fig. 3

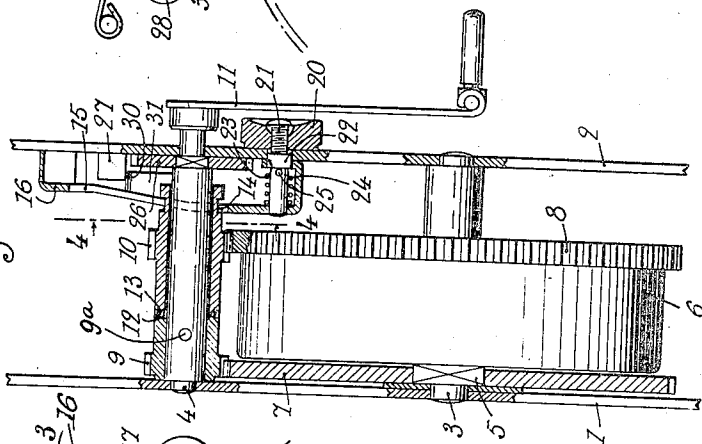
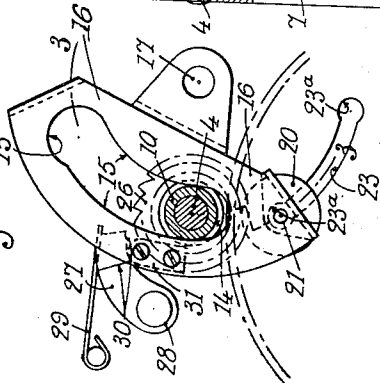


Fig. 4



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DRIVING MECHANISM OF THE BARREL
TYPE

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6 Claims. (Cl. 185—39)

The present invention relates to a driving mechanism of the spring and barrel type, which is chiefly characterized by the fact that it is so constructed that it will permit, at will, and whatever be the state of tension of the spring, of winding up the said spring in view of a subsequent automatic operating of the mechanism, or of driving the whole mechanism, as a single unit, by hand, and hence the device or devices with which it is connected and which it is adapted to operate, in which case the spring is put out of action and remains in the state of tension which prevailed at the beginning of the hand driving.

In the case of an apparatus operated by a handle, the arrangement is such that without requiring any change in its position, the handle can be used equally well for winding up the spring or for driving the hand-operated mechanism.

According to one embodiment, the said handle is connected, as to rotation, with the collar (or shaft) and it is provided with means for connecting—as to rotation—the said collar with the barrel, and this will make a direct connection between the two ends of the spring which are respectively joined to the said collar and the barrel, thus forming a unit piece which can be rotated by the handle.

To the shaft of the said handle is (for instance) keyed a pinion engaging a toothed disc which is keyed to the said collar. Another pinion, which is loose and is slidable on the shaft of the handle, and forms a gear set which is in constant engagement with a toothed disc mounted on the barrel, may be connected by clutch teeth, slidable keying, or the like, to the shaft of the handle.

According to another characteristic, means are provided in order that the locking of the said collar with reference to the barrel shall ensure automatically the release of the usual ratchet device of the collar, so that the hand operating can take place equally well in either direction.

Further characteristics of the mechanism will be set forth in the following description.

The invention further relates to the various uses of the aforesaid mechanism, and chiefly for view-taking cinematographic apparatus provided with dual control.

In the known apparatus for dual control, when it is desired to change over from the spring motor control to manual control by a handle, in order to change the speed of the view-taking or to reverse the motion or for any other reason, it is necessary to release the engagement of the spring with the mechanism, or to relax the spring. It

is further required to employ a handle which is different from the winding handle.

On the contrary, with the improved mechanism according to the invention, the mechanism can be driven, at will, by the spring or by hand, without any change in the position of the handle, and irrespective of the tension of the spring at the time in question.

In the accompanying drawing, which is given solely by way of example:

Fig. 1 is a vertical section of the spring barrel combined with a section, on the line 1—1 of Fig. 2, of a mechanism in conformity with the invention associated with said barrel and in the position for operation by means of the spring and for winding the said spring.

Fig. 2 is a corresponding front view, partly in section on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section of the mechanism, in the position for operating by hand, on the line 3—3 of Fig. 4.

Fig. 4 is a corresponding front view, partly in section on the line 4—4 of Fig. 3.

In the embodiment herein represented, two plates 1 and 2 which support the whole mechanism, have mounted between them two shafts 3 and 4 adapted for rotation between the said plates.

To the shaft 3 is keyed the collar 5 to which the usual spring 35 is attached at one end, the other end being attached to the barrel 6 loosely mounted on shaft 3.

The collar 5 and the barrel 6 carry toothed discs 7 and 8, which participate respectively in their rotation.

It should be noted that it is by means of the toothed disc 8 of the barrel 6 that the mechanism drives the parts to be actuated, which are not shown.

The toothed discs 7 and 8 respectively engage pinions 9 and 10 which are mounted on a shaft 4, and on the end of this latter is keyed an operating handle 11. The pinion 9 is keyed to the shaft 4 by means of a key 9a; the pinion 10 is loose upon said shaft, but it may be connected with the latter by a lengthwise movement, without ceasing to engage the ring 8 of the barrel 6. For this purpose, the pinions 9 and 10 are provided on their adjacent faces with claws or clutch teeth 12—13 which may be brought into engagement by a lengthwise movement of the pinion 10 on the shaft 4. Such movements of the pinion 10 are ensured, for example, by the following device.

The pinion 10 comprises at the end farthest from the said teeth 13, an extended part having

a groove 14 to which are engaged the edges of an aperture 15 formed in a member 16 which is pivotally mounted on an axle 17 (Figs. 2 and 4) secured to the plate 2. The aperture 15 has the form of an arc whose centre is located on the axis 17; the member 16 is not flat, but it is spaced from the plate 2 when proceeding from top to bottom, and thus when the member 16 is rotated about the axis 17 in the direction of the arrow f^1 (Fig. 2), it will oblige the pinion 10 to move in the direction of the arrow f^2 (Fig. 1), but when the member 16 turns downwardly, it will bring the pinion 10 to the right. One end of the aperture 15 is enlarged at 15^a (Figs. 2 and 4), in order to insert the pinion 10.

The pivoting movements of the member 16 on the axle 17 are effected by means of a knob 20. The said knob 20 is screwed upon a rod 21 having a shoulder 22 and extending through a curved slot 23 which is formed in the plate 2 and whose centre is located on the axis 17. The effective portion of said slot has a diameter which is less than that of the said shoulder 22; its ends are enlarged at 23^a in order to receive the said shoulder 22 which is urged in the direction of the arrow f^3 (Fig. 1) by a spring 24 which bears upon the member 16 and upon a pin 25 mounted on the rod 21.

The said mechanism is completed by a ratchet-wheel 26 which is keyed to the shaft 4 and co-operates with a pawl 27 pivotally mounted on an axle 28 secured to the plate 2. The pawl 27 is urged against the ratchet-wheel 26 by a spring 29, and it comprises an end part 30 adapted to be raised with said pawl against the action of said spring by a projection 31 mounted on the cam-shaped member 16 when said member 16 is brought into its upper position.

The operation of the said mechanism is as follows. When it is desired to wind up the spring, and also when the barrel 6 turns under the action of the said spring which thus bears against the collar 5 which is maintained by the wheels 7, 9, the shaft 4 of the wheel 26, and the pawl 27, the system will have the position shown in Figs. 1 and 2. The member 16 is now in its lower position, in which it is held by the shoulder 22 of the rod 21, which is engaged in the end 23^a of the slot 23. The member 16 holds the pinion 10 loose on the shaft 4. In order to wind up the spring, the handle 11 and the shaft 4 are turned in the direction of the arrow f^4 (Fig. 2), this being allowed by the ratchet device 26—27. This movement is imparted to the pinion 9, and the latter, which engages the wheel 7, will now wind up the spring. The barrel 6 is held stationary during this operation by any suitable means, such as the known stopping device for the usual film-driving mechanism, in the case in which the said mechanism is employed for view-taking cameras.

When the said mechanism is to be operated by hand, the member 16 is turned about its axis 17 in the direction of the arrow f^1 (Fig. 2) after releasing the said member by unscrewing the knob 20, and after pushing this knob in order to disengage the shoulder 22 from the slot 23 against the reaction spring 24. The member 16 is again held in the raised position as shown in Figs. 3 and 4 when the said knob 20 is released, as the shoulder 22 is now driven by the spring 24 into the upper enlarged part 23^a of the slot 23. During the movement of the member 16 in the direction of the arrow f^1 , the slot 15 will force the clutch of the pinion 10 against the pinion 9 without disengagement from the wheel 8, and the

teeth 12 and 13 of the clutch device will now be engaged. When the proper contact takes place, and only at this time, the projection 31 of the member 16 will release the pawl 27 from the ratchet 26. It should be noted that when the member 16 is brought to its lower position, the pawl 27—urged by the spring 29—makes contact with the ratchet 26 before the clutch teeth 12, 13 are released. The handle 11 may now be turned in either direction, thus driving the whole mechanism, comprising the barrel 6 and the collar 5 which thus form a single gear device, since they can have no relative motion.

During the whole time of the manual operation the spring maintains the same tension, i. e., the one which it has at the beginning of this operation.

Obviously, the said invention is not limited to the embodiment herein described and represented, which is given solely by way of example. It is evident that it is also feasible to make use of a suitable device for changing the rate of rotation of the handle employed for the manual operation of the apparatus, with reference to the rate of rotation of the same handle when used for winding up the spring, without departing from the principle of the invention. It is simply necessary, for instance, to insert one or more intermediate pinions between the pinion 10 and the disc 8.

The shaft 4 may be eventually combined, either directly or through sets of gearing or other transmission devices, with two handles, keys or like devices, which are independent, one being used to drive the said shaft for winding up the spring, and the other to drive the same shaft, after joining the two pinions 9 and 10 (or other devices) in order to provide for a direct driving by hand.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. In combination a main rotatable shaft, a barrel loosely mounted on said main shaft, and provided with a toothed ring adapted to transmit movement to a mechanism, a spring connected at one end with said barrel and at the other end with said main shaft and adapted when tensioned to rotate said barrel with respect to said shaft, a toothed wheel having the same diameter as said toothed ring and secured on said main shaft, an auxiliary rotatable shaft, two pinions having the same diameter, the first pinion being keyed on said auxiliary shaft and meshing with said toothed wheel and the second pinion being loosely and slidably mounted on said auxiliary shaft and meshing with said toothed ring, cooperating connecting means on said first and said second pinion adapted to operatively connect and disconnect said pinions, operating means adapted to rotate said auxiliary shaft, a ratchet wheel keyed on said auxiliary shaft, a stationary axle, a pawl pivoted on said axle and adapted to be engaged with said ratchet wheel, and a manually operated pivoted lever engaging said second pinion and adapted to bring said second pinion into and out of engagement with said first pinion.

2. A combination according to claim 1, further comprising a projecting member carried on said pivoted lever and adapted to bring said pawl out of engagement with said ratchet wheel.

3. In combination a frame, a shaft rotatably mounted in said frame, a barrel loosely mounted on said shaft and adapted to transmit movement to a mechanism, a spring connected at one end

5 with said barrel and at the other end with said shaft and adapted when tensioned to rotate said barrel in one direction with respect to said shaft, operating means adapted to rotate said shaft, a ratchet wheel operatively connected with said shaft, a spring pressed pawl pivoted to said frame and adapted to be engaged with and to be disengaged from said ratchet wheel and adapted when engaged with said ratchet wheel to prevent said shaft from rotating in a direction opposite to said one direction, and clutching means between said shaft and said barrel adapted to rotate said barrel positively at the same speed as said shaft, whereby said barrel may be rotated in said one direction either under the action of said spring when said clutching means are in the inoperative position, or under the action of said operating means without change in the tension of said spring when said clutching means are in the operative position.

20 4. In combination, a frame, a shaft rotatably mounted in said frame, a barrel loosely mounted on said shaft and adapted to transmit movement to a mechanism, a spring connected at one end with said barrel and at the other end with said shaft and adapted when tensioned to rotate said barrel in one direction with respect to said shaft, operating means adapted to rotate said shaft, a ratchet wheel operatively connected with said shaft, a spring pressed pawl pivoted to said frame and adapted to be engaged with and to be disengaged from said ratchet wheel and adapted when engaged with said ratchet wheel to prevent said shaft from rotating in a direction opposite to said one direction, clutching means between said shaft and said barrel adapted to rotate said barrel positively at the same speed as said shaft, and selective means adapted to bring either of

said pawl and clutching means into the operative position, whereby said barrel may be rotated only in said one direction when said pawl is in the operative position, and said barrel may be rotated in both directions under the action of said operating means without change in the tension of said spring when said pawl is in the inoperative position and said clutching means in the operative position.

5 5. A combination according to claim 3, in which said clutching means between said shaft and said barrel comprises two toothed wheels of the same diameter respectively secured to said shaft and to said barrel, an auxiliary shaft adapted to be rotated by said operating means, 15 two pinions having the same diameter mounted on said auxiliary shaft and meshing respectively with said toothed wheels, means securing to said auxiliary shaft the pinion meshing with the wheel secured to the main shaft, and means adapted to 20 removably connect with said auxiliary shaft the pinion meshing with the wheel secured to said barrel.

25 6. A combination according to claim 4, in which said clutching means between said shaft and said barrel comprises two toothed wheels of the same diameter respectively secured to said shaft and to said barrel, an auxiliary shaft adapted to be rotated by said operating means, 30 two pinions having the same diameter mounted on said auxiliary shaft and meshing respectively with said toothed wheels, means securing to said auxiliary shaft the pinion meshing with the wheel secured to the main shaft, and means adapted to removably connect with said auxiliary 35 shaft the pinion meshing with the wheel secured to said barrel.

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