Aug. 17, 1948. E. ASCOLI 2,447,151

TEMPORIZING OR DELAY DEVICE

Filed June 17, 1946

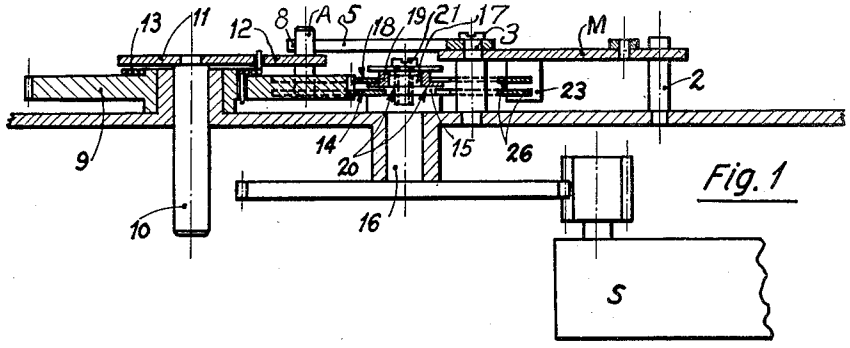
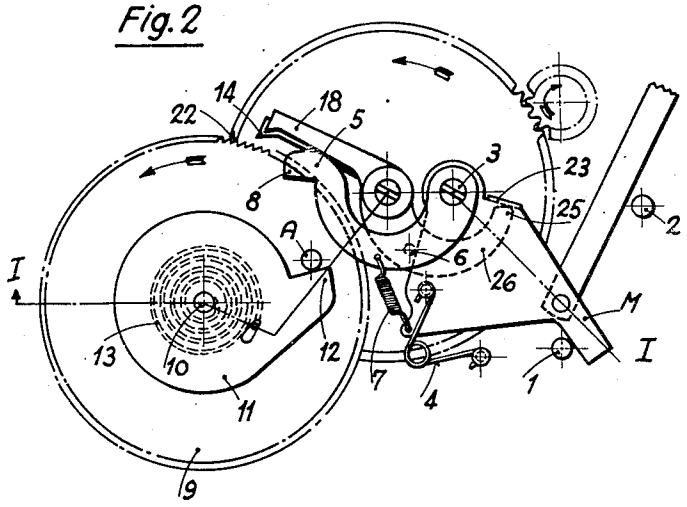


Fig. 1

Fig. 2



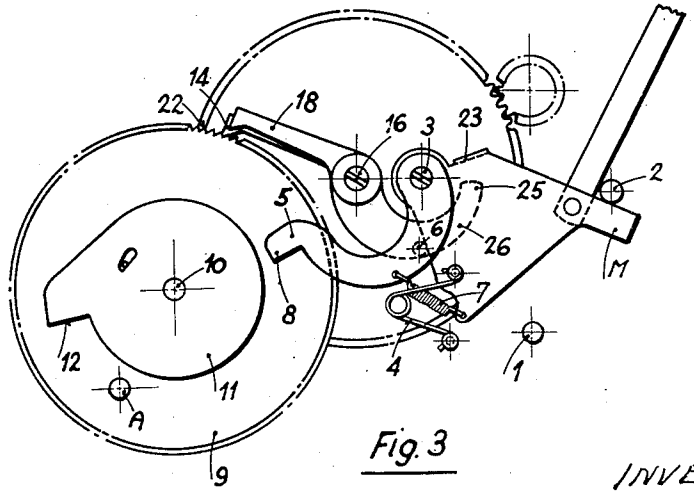


Fig. 3

INVENTOR
ENZO ASCOLI
By Emery P. Groff
Atty

Patented Aug. 17, 1948

2,447,151

UNITED STATES PATENT OFFICE

2,447,151

TEMPORIZING OR DELAY DEVICE

Enzo Ascoli, Sainte-Croix, Switzerland, assignor to Paillard S. A. (Paillard A. G., Paillard Limited), Sainte-Croix, Switzerland

Application June 17, 1946, Serial No. 677,245
In Switzerland March 21, 1946

6 Claims. (Cl. 185—40)

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There are in existence numerous temporising devices adapted to produce the operation of a member after a defined fixed or adjustable lapse of time.

Some of these devices are provided with a minute wheel work driving a member for actuating the operating member. Others, set in action by a motor rotating at a constant speed, are provided with a device for driving the actuating member provided with pawls subjected to the action of springs and cooperating with a ratchet wheel carrying the actuating member.

All these devices have a satisfactory operation as regards the precision of the temporising period of time, but nevertheless they all have a defect which in some cases may be extremely annoying. In fact both the known minute wheel works and the pawl devices are noisy.

The present invention has for its subject a temporising device provided with a rocking operating member held in its two positions by the action of a spring, an actuating member producing, after a period of time determined by the position of an adjusting member, the rocking of the operating member from one of its positions into its other position. This device tends to eliminate the disadvantage referred to by the fact that the actuating member is driven, against the action of a return spring which connects it to the adjusting member, by the acion of a feed pawl, driven in a rotary movement of translation and subjected to a friction torque in such a manner as to cooperate with a ratchet wheel carrying the said actuating member, this still being held against the action of its return spring by a retaining pawl also subjected to the friction torque tending to hold it in engagement with the teeth of the rachet wheel.

Another object of my invention is a delay device comprising a rocking operating member, a pair of spaced fixed stops, said stops serving to determine the extreme positions of said rocking member, a spring associated with said rocking member, said spring serving to move and hold said rocking member in its end positions, an actuating member cooperating with said rocking member, an adjusting member associated with said actuating member, a return spring associated with said adjusting member, a shaft, means for driving said shaft, a feed pawl on said shaft, said feed pawl driving said actuating member, a ratchet wheel connected to said adjusting member by said return spring, and a retaining pawl on said shaft, said feed pawl and said retaining pawl cooperating with said ratchet wheel, said

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feed pawl being subjected to a friction torque in such a manner as to cooperate with said ratchet wheel carrying said actuating member, said ratchet wheel being retained against the action of said return spring by said retaining pawl which is subjected to a friction torque tending to hold said retaining pawl in engagement with the teeth of said ratchet wheel.

Still another object of my invention is a delay device comprising a shaft, an operating member pivoted freely on said shaft, a pair of stops cooperating with said operating member, said stops serving to define the two end positions of said operating member, a spring associated with said operating member, said spring serving to urge said operating member into one or other of its end positions, a lever pivotally mounted on said shaft, a pin on said lever, a second spring associated with said lever, said second spring holding said pin in contact with said operating member, a nose on said lever, a second shaft, a ratchet wheel loosely mounted on said second shaft, an actuating member secured rigidly to said ratchet wheel, a member secured rigidly to said second shaft, a second nose on said member, said nose being at the same distance from said second shaft as said actuating member, a third spring fixed at opposite ends to said ratchet wheel and said member rigid with second shaft, said third spring tending to hold said nose in engagement with said actuating member, a third shaft, concentric and eccentric portions on said third shaft, a feed pawl frictionally engaging said eccentric portion, a retaining pawl frictionally engaging said concentric portion, said pawls cooperating with said ratchet wheel, tails on said pawls and a lug on said operating member, said lug cooperating with said tails.

My invention will be better understood by reference to the following specifications and accompanying drawing wherein:

Fig. 1 is a sectional view on the line I—I of Fig. 2.

Fig. 2 is a plan view showing the parts after the actuation of the operating member.

Fig. 3 is a plan view showing the parts during the operation of the device.

In the form of construction shown schematically and by way of example in the drawing the temporising or delay device is provided with an operating member M which can occupy two extreme positions defined by the stops 1 and 2. The operating member is pivoted freely on a shaft 3 and is subjected to the action of a spring 4 tending to hold it in each of its two extreme positions. The

shaft 3 carries, also pivoted freely thereon, a lever 5 carrying a pin 6 held by a spring 7 in contact with a portion of the operating member M. The lever 5 is provided with a nose 8 so positioned that for one of the positions of the member M (Fig. 3) it is in the path of an actuating member A secured rigidly to a ratchet wheel 9. The latter is pivoted freely on a shaft 10 carrying, rigidly fixed to its end, adjusting member 11 provided with a nose 12 placed at the same distance from the shaft 10 as the actuating member A. The ratchet wheel 9 is connected to the part 11 by means of a spring 13 tending to hold the nose 12 in engagement with the member A. Finally the shaft 10 carries a setting member (not shown) enabling the angular position of the nose 12 and thus of the actuating member A to be fixed at will.

The ratchet wheel is driven in rotation against the action of the spring 13 by a feed pawl 14 mounted with slight friction on an eccentric portion 15 of a shaft connected mechanically to a motor *s*. The shaft 16 is also provided with a concentric portion 17 on which is pivoted a retaining pawl 18 by means of a sleeve 19 tightened against a shoulder 20 of the shaft 16 by a screw 21. The pawl 18 is mounted with slight friction on the sleeve 19 so that when the shaft 16 is in rotation, the pawl 18 is subjected to the action of a friction torque tending to hold it in engagement with the teeth 22 of the ratchet wheel 9.

The operation of the device described is as follows:

When the device is at rest (Fig. 2) the operating member M is held by its spring in contact with its stop 1. For this position of the member M a lug 23, carried by this and acting on the ends 25 of tails 26 provided on the pawls 14 and 18, holds the latter out of engagement from the teeth 22. Thus the shaft 16 which is actuated permanently, turns idly.

On the contrary when the member M is rocked into its other extreme position (Fig. 3) defined by the stop 2, the lug 23 is out of range of the ends of the tails 26 of the pawls 14 and 18. The shaft 16, rotating in a counterclockwise direction, drives the feed and retaining pawls by friction and tends to hold their ends in engagement with the teeth 22. The rotation of the shaft 16 imparts, by reason of the eccentric portion 15, a periodic movement of rotary translation to the feed pawl 14. During this movement the end of this pawl produces an angular movement of the ratchet wheel. In fact, the friction to which it is subjected tends to cause it to pivot and to hold it in engagement with the teeth 22 and on the other hand, the movement imparted thereto by the eccentric portion 15, causes its end to carry out a to-and-fro movement along the teeth 22.

It will be clear that during its feed stroke the pawl engaging with the teeth 22 drives the wheel 9 in a counter-clockwise direction, whilst during its return movement it slides on the teeth 22, the latter being held against the action of the spring 13 by the retaining pawl 18 applied against the same by the friction torque. The amplitude of the to-and-fro movement of the pawl 14 is determined by the eccentricity of the portion 15. This is so selected as to produce a movement of the end of the pawl 14 at least equal to the pitch of the teeth 20 so as to produce, during each feed movement of this pawl, an angular feed of the wheel 9 at least equal to the pitch of the teeth 22. Thus the actuating member A previously positioned by means of the setting member (not shown) in a desired angular position, is driven progressively in the direction of the nose 8. After a period of time, which is a function of the angular position into which the nose 12 has been placed by the operation of the adjusting member 11, the member A actuates the operating member M through the medium of the lever 5. When the point of attachment of the spring 4 to the operating member is brought to the opposite side of the radius connecting the shaft 3 to the fixed point of attachment of the spring 4, this spring produces the rocking of the member M up to its stop 1 and stops the drive of the wheel 9 by the pawls 14 and 18.

These pawls 14 and 18 have in fact been raised from the teeth 22 by the action of the lug 23. The ratchet wheel 9 thus returns, under the action of the spring 13 to its initial position (Fig. 2), that is to say into the position in which the member A bears against the nose 12. Thus the temporising or delay device is again in the initial state and ready for a fresh operation under the same conditions of adjustment of the periods of time of delay as before. When the time of delay is to be adjusted at zero, the part 11 is displaced angularly in such a manner as to hold, with its nose 12, the actuating member A in such a position (Fig. 2) that it prevents the lever M from assuming any stable position other than that defined by the stop 1. When in this condition of adjustment the lever M is brought against the stop 2 by an external action, the nose 8 of the lever 5 strikes against and bears against the actuating member A, whilst the lever M continues its movement up to the stop 2 by moving away from the pin 6 and placing the spring 7 under tension. When the external action applied to the lever M ceases, this is returned to its initial position (Fig. 2) under the combined action of the springs 7 and 4. The pawls 14 and 18 remain inoperative as regards the ratchet wheel 9.

Thus the member M is swung from its position defined by stop 2 to its position defined by stop 1 after a delay beginning with the moment it is placed in the former position and when the operation of the ratchet wheel commences and therefore is the delayed member.

From the foregoing and by examination of the drawing it will be seen that the delay device described is completely silent. In fact the pawls are driven by friction in the direction of the ratchet wheel in such a manner that their engaging movement takes place at a speed corresponding with that of the shaft 16. Consequently shocks cannot be produced when for example, the retaining pawl falls. Further, the transmission ratio between the shaft 16 and the wheel 9 being solely a function of the number of teeth constituting the teeth 22, it is clear that this may be selected very large, which enables a delay device to be constructed which is adjustable between zero and a relatively long maximum period of time. Finally the form of construction described, allows of a very compact construction and having in fact a very small thickness.

To those who are skilled in the art, it will be apparent after following the present description of my invention that modifications thereof employing the principles which I have described may be made to meet particular conditions, and all such modifications which are comprehended within the scope of the appended claims are considered to be a part of my invention.

I claim:

1. A delay device comprising a rocking operat-

ing member, a pair of spaced fixed stops, said stops serving to determine the extreme positions of said rocking member, a spring associated with said rocking member, said spring serving to move and hold said rocking member in its end positions, an actuating member cooperating with said rocking member, an adjusting member associated with said actuating member, a return spring associated with said adjusting member, a shaft, means for driving said shaft, a feed pawl on said shaft, a ratchet wheel connected to said adjusting member by said return spring, and a retaining pawl on said shaft, said feed pawl and said retaining pawl cooperating with said ratchet wheel, said feed pawl being subjected to a friction torque in such a manner as to cooperate with said ratchet wheel carrying said actuating member, said ratchet wheel being retained against the action of said return spring by said retaining pawl which is subjected to a friction torque tending to hold said retaining pawl in engagement with the teeth of said ratchet wheel.

2. A device according to claim 1, including an eccentric portion on said shaft, said feed pawl being mounted on said eccentric portion with slight friction.

3. A device according to claim 1, including a concentric portion on said shaft, said retaining pawl being mounted with slight friction on said concentric portion.

4. A device according to claim 1, including tails located one on each of said pawls, said pawls being mounted with slight friction on said shaft, and a lug on said operating member, said pawls being actuated against friction torques by the cooperation of the said lug with said tails when said operating member is in its position of rest.

5. A device according to claim 1, including a second shaft on which said ratchet wheel is pivoted freely, said adjusting member being carried by said shaft, and a stop member on said adjusting member, said stop member defining the desired angular position of said actuating member and corresponding with the desired period of delay.

6. A delay device comprising a shaft, an operating member pivoted freely on said shaft, a pair of stops cooperating with said operating member, said stops serving to define the two end positions of said operating member, a spring associated with said operating member, said spring serving to urge said operating member into one or other of its end positions, a lever pivotally mounted on said shaft, a pin on said lever, a second spring associated with said lever, said second spring holding said pin in contact with said operating member, a nose on said lever, a second shaft, a ratchet wheel loosely mounted on said second shaft, an actuating member secured rigidly to said ratchet wheel, an adjusting member secured rigidly to said second shaft, a second nose on said adjusting member, said second nose being at the same distance from said second shaft as said actuating member, a third spring fixed at opposite ends to said ratchet wheel and said adjusting member, said third spring tending to hold said second nose in engagement with said actuating member, a third shaft, concentric and eccentric portions on said third shaft, a feed pawl frictionally engaging said eccentric portion, a retaining pawl frictionally engaging said concentric portion, said pawls cooperating with said ratchet wheel, tails on said pawls and a lug on said operating member, said lug cooperating with said tails.

ENZO ASCOLI.

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