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TIME RELEASE MECHANISM

Filed Dec. 3, 1929

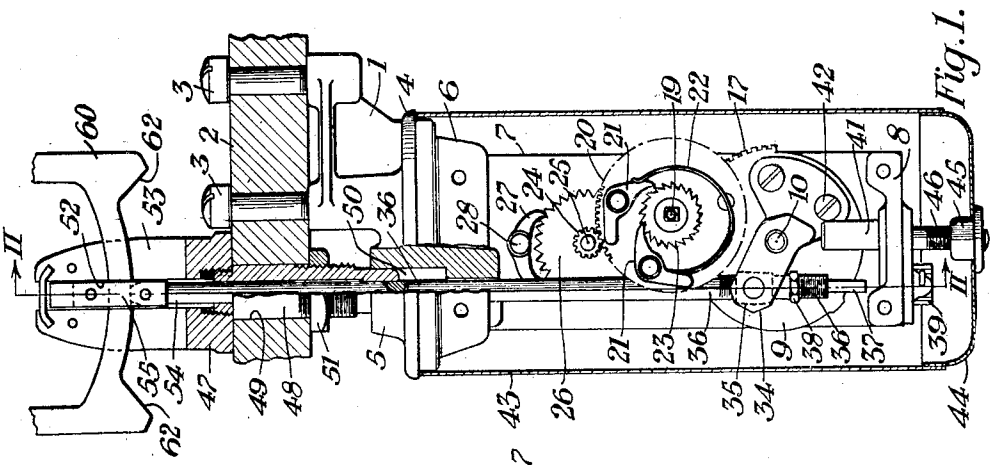


Fig. 1.

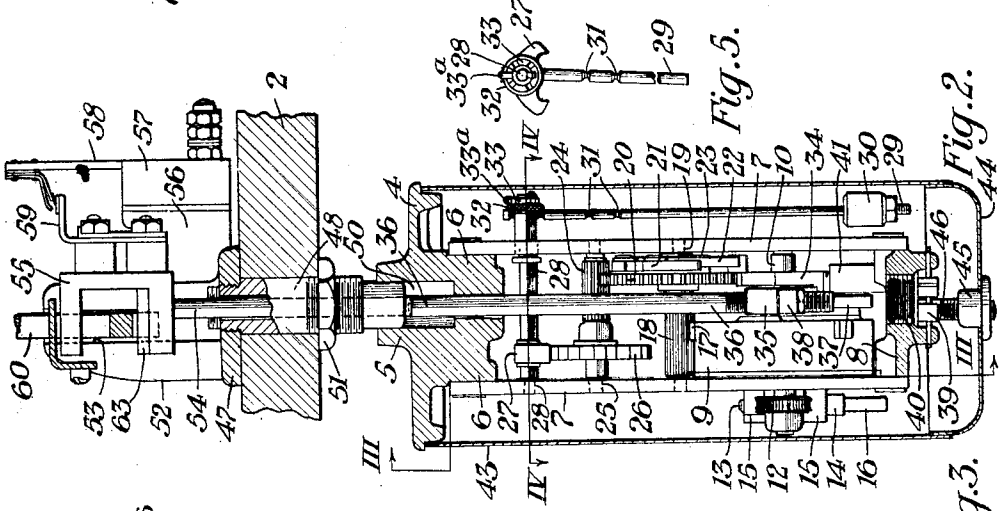


Fig. 2.

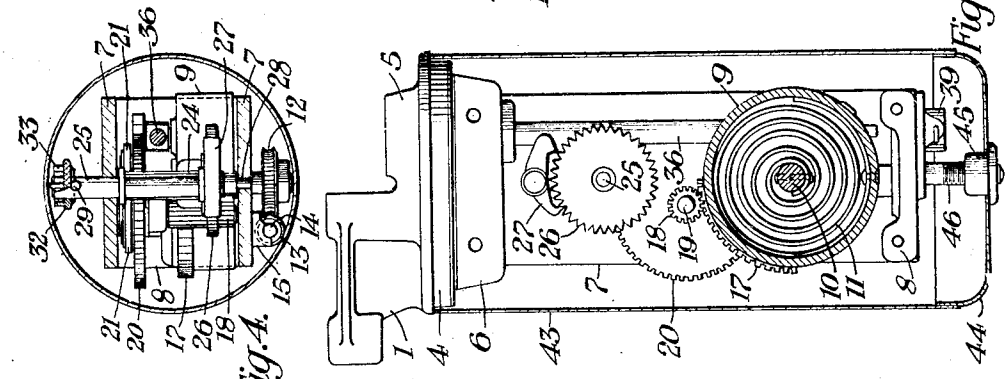


Fig. 3.

Fig. 4.

Fig. 5.

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UNITED STATES PATENT OFFICE

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TIME RELEASE MECHANISM

Application filed December 3, 1929. Serial No. 411,287.

Our invention relates to time release mechanism and particularly to devices of this type which depend for their action on a mechanical escapement mechanism. Devices embodying our invention are well adapted for use in connection with railway traffic governing apparatus, although they are not limited to this particular field.

We will describe one form of time release mechanism embodying our invention, and will then point out the novel features thereof in claims.

In the accompanying drawings, Fig. 1 is a vertical sectional view of one form of time release mechanism embodying our invention. Fig. 2 is a vertical sectional view taken on line II—II of Fig. 1, certain parts of the clockwork mechanism being shown in elevation. Fig. 3 is a vertical sectional view taken on line III—III of Fig. 2. Fig. 4 is a horizontal sectional view taken on line IV—IV of Fig. 2. Fig. 5 is a fragmentary detail view showing the means for adjusting the length of the pendulum, and also embodying our invention.

Similar reference characters refer to similar parts in each of the several views.

Referring to the drawings, a time release mechanism, constructed in accordance with our invention, is shown as comprising a bracket 1 adapted to be secured to the lower side of the table or frame 2 of an interlocking machine by means of screws 3. Formed integrally with the bracket 1 is a circular plate 4 provided with a cylindrical guide portion 5 and a pair of depending flanges 6. A pair of lateral spaced vertically extending side plates 7 are secured at their upper ends to the flanges 6 and at their lower ends to a floor plate 8, and together constitute the supporting frame of the clockwork mechanism.

A cylindrical casing 9 is rotatably mounted between the plates 7 on a normally non-rotatable shaft 10 which is mounted adjacent each end, in the plates 7. This casing houses a spiral spring 11, the inner and outer ends of which are secured to the shaft 10 and the casing 9, respectively, and tends to rotate the casing in a counter-clockwise direction, as viewed in Fig. 3. One end of the shaft 10 extends through one of the plates 7 in which it is mounted, and has a worm gear 12 fixed thereto for intermeshing engagement with the worm 13. This worm is fixed to a vertical stem 14 which is journalled in bearings 15 carried by the adjacent plate 7, above and below the worm and is provided with a squared lower end 16 for engagement by a suitable adjusting key. (See Figs. 2 and 4.) By rotating the worm 13, the gear 12 and shaft 10 may be turned in order to increase or decrease the tension of the spring 11.

The casing 9 is provided with a segmental gear 17 for intermeshing engagement with a pinion 18 fixed to a shaft 19 which is rotatably mounted at its ends in the side plates 7. A gear wheel 20 is rotatably mounted on the shaft 19 and is provided with a pair of pawls 21 which are biased by a spring 22 into engagement with the teeth of a ratchet wheel 23 fixed to the shaft 19 in juxtaposition with the rotatable gear wheel 20. The gear wheel 20 meshes with and drives a pinion 24 which is fixed to a shaft 25 journalled in the side plates 7 above the shaft 19. An escapement wheel 26 is also fixed to the shaft 25 and is adapted to be engaged by the pallets of an escapement bar 27 which is fixed to a rock-shaft 28. This shaft is journalled in the side plates 7 and is provided with means for controlling the oscillations of the shaft. As here shown, the end of the shaft is apertured to receive a pendulum rod 29. This rod is provided with a bob 30 which is threaded onto its lower end for vertical adjustment. The rod 29 is formed with a plurality of spaced grooves 31 for engagement by an annular rib 32 formed on a nut 33 which is threaded onto the end of the shaft 28. The nut 33 is preferably castellated, and is re-

tained against accidental displacement by a cotter key 33a.

The speed at which the spring 11 returns the parts to their normal position may be regulated by altering the length of this pendulum. This may be quickly accomplished either by loosening the nut 33 and then tightening it in engagement with another set of notches 31, or by screwing the bob 30 along the rod 29 or by a combination of these adjustments.

A lever arm 34 is fixed to one side of the spring casing 9 in spaced relation therewith and between this arm and the casing a nut 35 is pivotally mounted. An upwardly extending actuating rod 36 is threaded at its lower end in the nut 35 for vertical adjustment and the upper portion thereof is loosely mounted for sliding and lateral tilting movement in the guide portion 5. The rod 36 is also formed with a squared lower portion 37 for engagement by an adjusting key, by means of which it may be rotated in the nut 35 in order to effect its vertical adjustment. A lock nut 38 which is threaded onto the rod 36 for engagement with the nut 35 maintains the rod in its adjusted position. The downward travel of the rod 36 and the rotating movement of the casing 9 against the action of the spring 11, presently to be described, may be adjustably limited by a stop screw 39 against which the lower end of the rod 36 abuts when it reaches the desired limit of its downward travel. The stop screw 39 is threaded into an opening 40 formed in the floor plate 8 as shown in Fig. 2, and may not only be adjusted vertically in order to alter the length of the stroke of the rod 36 but it may be entirely removed to permit the insertion of the adjusting key through the opening 40 when it is desired to adjust the position of the rod 36 in the nut 35. The rotation of the casing 9 and the parts driven thereby in an opposite direction under the action of the spring 11, is limited by a fixed stop 41 which is mounted on the floor plate 8 for engagement by a bead 42 of one of the screws which secure the arm 34 to the casing 9. All of the mechanism hereinabove described is enclosed in a cylindrical housing 43 which is open at its upper end for engagement with the plate 4 but which is closed at its lower end by a cap 44 secured thereto. The housing is removably retained in position by a nut 45 which is soldered or otherwise secured in the cap 44 for threaded engagement with a bolt 46 depending from the floor plate 8. When it is desired to obtain access to the clockwork mechanism, the housing is turned as a unit, thus unscrewing the nut 45 from the bolt 46.

A guide member 47 is mounted on the upper surface of the table 2 and is provided with a tubular bearing portion 48 which extends downwardly through an aperture 49 in the table, in axial alignment with the rod 36, and seats within a socket 50 provided in the guide portion 5. This guide is maintained against displacement by means of a nut 51 which is threaded on to the portion 48 for engagement with the lower surface of the table and is provided with a pair of vertically extending slots 52 and 53 which intersect each other at right angles. A plunger 54 is slidably mounted in the bearing 48 and is formed with a concave lower end for seating engagement with a rounded upper end of the rod 36 and not only maintains the rod 36 centrally located out of engagement with the guide portion 5, but forms in effect a ball and socket contact therewith to permit of the slight lateral tilting movement caused by the crank action of the arm 34. The upper end of the plunger 54 carries a yoke 55 which slides in the slot 52 in the guide 47. The guide 47 is also provided with a bracket or extension 56 to which a block of insulated material 57 is suitably secured. This block constitutes the support for a pair of contact members 58 only one of which is shown in the drawing, and with which the wires forming a part of the electric signal or locking circuit of an interlocking system are adapted to be connected. The members 58 are at times bridged by a contact device 59 which is suitably secured to but insulated from the yoke 55.

The rod 54 is depressed against the action of the spring 11 in order to separate the contacts 58 and 59 and open the circuit therethrough, by means of a segment 60. This segment is mounted on the manually operated rod not shown, of an interlocking machine for swinging movement within the slot 53 of the guide 47, and is provided at each end with a cam 62. When the segment 60 is swung in either direction, one or the other of the cams 62 engages a cam surface 63 provided on the yoke 55 and forces the yoke and rod 54 downwardly. This downward movement of the rod 54 also depresses the rod 36 and rotates the casing 9 and the segmental gear 17 thereon against the action of the spring 11. The pinion 18 and ratchet wheel 23 will consequently be rotated in a clockwise direction, as viewed in Fig. 1, but the teeth of the ratchet wheel, by reason of their inclination, will pass beneath the pawls 21 without transmitting rotary motion to the gear wheel 20 which is maintained stationary by the inertia and friction of the parts with which it is connected. This movement of the parts will continue until the high part of the cam 62 is reached at which point the downward travel of the rod 36 ceases. Any tendency for the parts to override through the rapid actuation of the segment 60 is prevented by the lower end of the rod 36 engaging the stop screw 39.

When the segment 60 is swung in an oppo-

site direction, the cam 62 moves out of engagement with the cam surface 63 of the yoke 55 and releases the clockwork mechanism. This permits the spring 11 to rotate the casing 9 in a clockwise direction, as viewed in Fig. 1, and swing the arm 34 upwardly. The upward movement of the arm 34 elevates the rod 36, which in turn raises the rod 54 and yoke 55, and moves the contact member 59 into engagement with the associated contacts 58.

The return of the parts to their normal positions after being released as above described, however, is delayed so as to allow an interval of time of predetermined duration to elapse between the release of the yoke and the closing of the contacts 58—59. This is accomplished in the following manner by the escapement mechanism previously described. As the casing 9 rotates in a clockwise direction under the action of the spring 11, the motion of the casing is transmitted to the shaft 19 through the medium of the segmental gear 17 and pinion 18. This causes the ratchet wheel 23, which is fixed on the shaft 19, to rotate in a counter-clockwise direction, as viewed in Fig. 1, and causes its teeth to lock with one or the other of the pawls 21 thus rotating the gear wheel 20 in which they are mounted in a counter-clockwise direction. The gear wheel 20 rotates the pinion 24 in a clockwise direction which in turn rotates the escapement wheel 26 in the same direction. The speed of rotation of the escapement wheel 26, is retarded however, by means of the escapement bar 27 and the pendulum 29 in a well-known manner, whereby the rapidity of operation of the entire mechanism is maintained within desired limits. A predetermined time interval will therefore elapse between the instant that the cam 62 moves out of engagement with the yoke 55 and the instant that the contacts 58—59 close.

This time interval may be regulated in several ways. For example, in a device which we have constructed as above described, the time required for the contacts 58—59 to close after the mechanism is released by operation of segment 60 may be adjusted to values between five and ten seconds with a pendulum rod substantially two and one-fourth inches long. It is possible to obtain time intervals within this range by adjusting the pendulum bob 30 longitudinally along the rod 29 or by adjusting the tension of spring 11. This particular device can be adjusted for longer time intervals by employing pendulum rods of greater length. For example, by using a pendulum rod substantially four and seven-eighths inches long, if the position of the bob 30 and the tension of the spring 11 are properly adjusted, a time interval of fifty seconds will elapse before the contacts 58—59 close upon the return of the parts to their normal position. Obviously, these values will vary in different devices according to the ratio of the gears employed, the tension of the spring 11 and other factors peculiar to the particular device involved.

The notched pendulum rod, in combination with the ribbed adjusting nut 33, forms a very convenient means of adjusting the length of the pendulum and maintaining it positively against displacement in its adjusted position.

Although we have herein shown and described only one form of time release mechanism embodying our invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of our invention.

Having thus described our invention, what we claim is:

1. A time release mechanism comprising a shaft, a member mounted for rotary movement in two directions on said shaft, a spring having one end connected with said shaft and the other thereof connected with said member for rotating said member on said shaft in one direction, a reciprocable rod adjustably connected at one end with said member, means for moving said rod in one direction to rotate said member against the action of said spring, an escapement mechanism for retarding the movement of said member and rod in the other direction, and means for rotating said shaft to regulate the force exerted by said spring.

2. A time release mechanism comprising a shaft, a member mounted for rotary movement in two directions on said shaft, a spring having one end connected with said shaft and the other end thereof connected with said member for rotating said member on said shaft in one direction, a reciprocable rod adjustably connected at one end with said member, means for moving said rod in one direction to rotate said member against the action of said spring, an escapement mechanism for retarding the movement of said member and rod in the other direction, and a worm and gear mechanism for rotating said shaft to regulate the force exerted by said spring.

3. A time release mechanism comprising a frame adapted to be mounted beneath a table, a bearing in said frame, a vertically reciprocable rod mounted in said bearing, a spring carried by said frame and operatively connected with said rod for normally biasing said rod in an upward direction, a guide adapted to be mounted above said table and having a depending bearing projecting downwardly through an opening in said table and in axial alignment with said first mentioned bearing, a plunger slidably mounted in said depending bearing and supported by said rod in abutting relation

thereto, means for depressing said plunger to force said rod downwardly against the action of said spring, and an escapement mechanism for retarding the upward movement of said rod and plunger under the action of said spring, said frame and guide being removable from said table independently of one another.

In testimony whereof we affix our signatures.

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