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AUTOMATIC STOPPING MECHANISM

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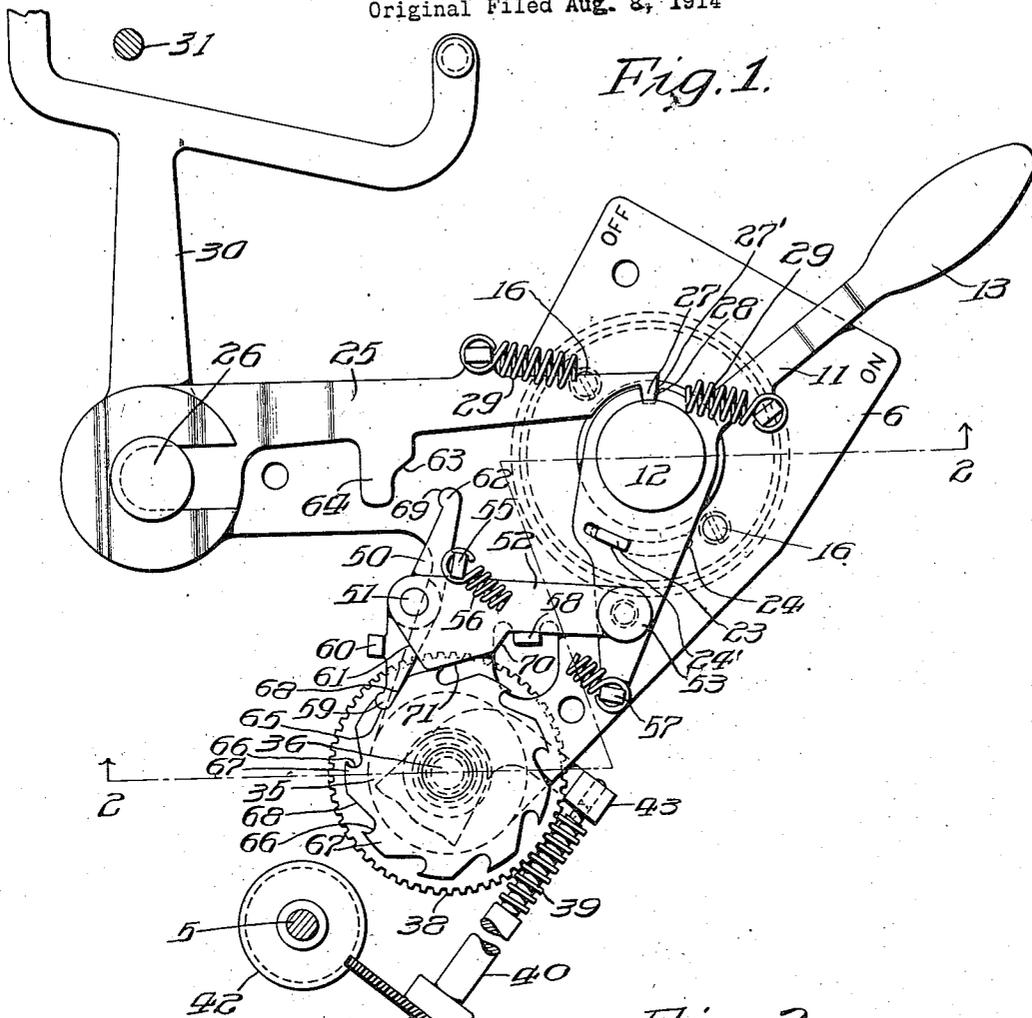


Fig. 1.

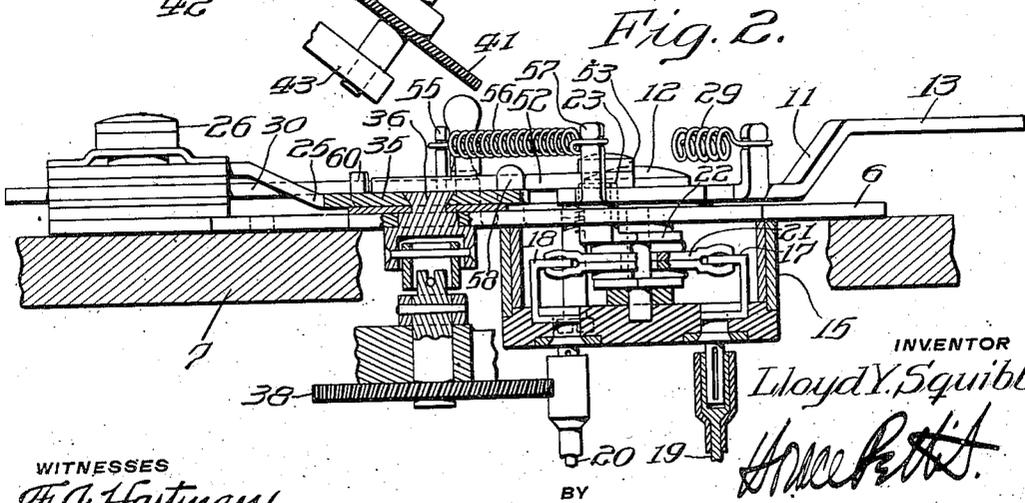


Fig. 2.

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UNITED STATES PATENT OFFICE.

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AUTOMATIC STOPPING MECHANISM.

Application filed August 8, 1914, Serial No. 855,788. Renewed May 1, 1923.

To all whom it may concern:

Be it known that I, LLOYD Y. SQUIBB, a citizen of the United States, and a resident of the city of Camden, county of Camden, State of New Jersey, have invented certain new and useful Improvements in Automatic Stopping Mechanism, of which the following is a specification.

One object of this invention is to provide in combination with stopping mechanism including an element movable from a non-stopping into a stopping position and retaining means for holding the element in a non-stopping position, improved releasing means for actuating the retaining means to release the element from a non-stopping position.

A further object of this invention is to provide improved means for automatically effecting the release of an automatic switch of an electrically actuated talking machine, after the machine has been in operation for a predetermined period slightly greater than that necessary for reproducing the sounds from the largest record capable of being operated by the talking machine, so that in case the switch should not be released immediately after the reproduction of sounds from the record, the automatic releasing or timing means would be effective to release the switch shortly afterwards to avoid a waste of current.

Other objects of this invention will appear hereinafter.

In the accompanying drawings Fig. 1 is a top plan view of an improved timing mechanism constructed in accordance with this invention and applied in combination with an automatic switch adapted for use upon a talking machine or other device; Fig. 2 is a section of the same on line 2—2 of Fig. 1;

Referring to the drawings, one embodiment of this invention is shown as applied to a talking machine including a vertical turntable spindle 5, arranged to be rotated about a fixed axis coincident with its longitudinal axis by any suitable electrical motor (not shown) and adapted to support and to rotate a turntable for carrying the usual disc

sound record in combination with an automatic switch comprising a substantially flat base plate 6, which is secured in a fixed position upon a horizontal wall or partition 7 forming a part of the casing of the talking machine. Mounted upon the base plate 6 is a switch lever or stopping member 11, which is arranged to oscillate in a fixed path about a vertical pivot 12, which projects loosely through the switch lever 11 and tightly through the base plate 6. For manually resetting the switch lever, the switch lever is provided at its outer end with a handle 13. Arranged below the base plate 6 and coaxial with and surrounding the lower portion of the pivot 12 is a cylindrical casing 15, which is rigidly clamped against the under surface of the base plate 6 by screws 16.

Arranged within the casing 15 are two stationary terminals 17 and 18, which are adapted to be electrically connected respectively to suitable wires or electrical conductors 19 and 20 forming part of the circuit of the electric motor (not shown) which actuates the turntable spindle. Within the casing 15 and loosely surrounding the pivot 12 and insulated therefrom, is a rotary laminated switch member 21 arranged to cooperate with the stationary terminals 17 and 18 to open or close the motor circuit, the switch member 21 being arranged to be oscillated in response to the oscillation of the switch lever 11 by means of a collar 22 surrounding the pivot 12 and secured to but insulated from the switch member 21, and provided with a lug 23 projecting upwardly therefrom and the upper end of which projects loosely through an arcuate slot 24 provided therefor in the base plate 6 and engages loosely in an aperture 24' provided therefor in the switch lever 11. The aperture 24' is elongated to permit of a limited amount of rotation of the switch lever 11 independently of the lug 23, so that when the switch lever is rotated anti-clockwise from an "on" position towards an "off" position, it will rotate through a short arc independently of the lug 23 and will then

impinge suddenly against the lug 23 to start the rotation of the lug 23 and the consequent rotation of the switch member 21 to "snap" the switch member 21 out of contact with the stationary terminals 17 and 18 to break the motor circuit. By having this limited movement between the switch lever 11 and the lug 23, less force is required to be applied through the spring 29 and a lighter and more easily elongated spring 29 may be used than would otherwise be required.

For automatically actuating the switch lever 11 to break the motor circuit in response to a predetermined movement of the swinging tone arm (not shown) of the talking machine, a latch or retaining member 25 is arranged above the base plate 6 to swing in a plane parallel thereto about a vertical pivot 26 extending through one end of the latch and fixedly secured in an extension of the base plate 6. The latch 25 is provided at its free end with a tooth 27 arranged to engage snugly in a corresponding notch 28 in the switch lever 11 to hold the switch lever or stopping member in a non-stopping or closed position. A spiral spring 29 is secured at one end to the switch lever 11 and at its other end to the latch 25, and is normally held in an extended condition tending to rotate the switch lever 11 in an anticlockwise direction to open the motor circuit. The spring 29 also tends to rotate the latch 25 in a clockwise direction when the tooth 27 is in engagement with the notch 28, and the spring is normally effective to hold the tooth 27 in engagement in the notch 28 when the switch lever 11 is in a non-stopping or "on" position as shown in Fig. 1. The outer side edge 27' of the tooth 27 is slightly beveled and the corresponding wall of the notch 28 is correspondingly beveled so that when the stop member 11 is forced either manually or automatically in an anti-clockwise direction the tooth 27 of the retaining member 25 will be forced out of the notch 28, and out of engagement with the abutment formed by the coacting wall of the notch 28, and the stop member 11 will be free to be moved by the handle 13 or by the spring 29 or by both to stopping position.

For automatically releasing the switch lever 11, a releasing arm 30 is arranged to swing coaxially with the latch 25 in a fixed path about the pivot 26, and cooperates in a well-known manner with the latch 25 and with a stud 31 carried by and projecting downwardly from the tone arm (not shown) to swing the latch 25 in an anti-clockwise direction to release the switch lever 11 and to permit the switch lever 11 to be swung in an anti-clockwise direction by the spring 29 when the tone arm reaches a predetermined point in its travel. The releasing arm 30 is rotatably adjustable with respect to the latch 25 to be engaged by the stud 31 to effect the release of the switch lever 11 at any desired point of movement of the tone arm, and is preferably adjusted in any particular case to effect the release of the switch lever 11 immediately after the sound reproducer carried by the tone arm has completed the reproduction of sounds recorded on the record.

To avoid a waste of current in case the releasing arm 30 of the hereinbefore described automatic switch mechanism should fail to perform its function within the proper limit of time, this invention provides improved automatic timing mechanism so combined with the hereinbefore described releasing mechanism as to positively release the switch lever 11 after the talking machine has operated for a predetermined period slightly longer than that necessary for reproducing the largest record for which the talking machine is designed.

This improved timing mechanism includes an actuating member such as a ratchet wheel 35, which is arranged in a horizontal plane spaced slightly above the plane of the base plate 6 and is rigidly secured to the upper end of a vertical ratchet shaft 36, which projects through the base plate 6, and which is arranged to be rotated about a fixed vertical axis coincident with its longitudinal axis to rotate the ratchet 35 in a clockwise direction.

The lower end of the ratchet shaft 36 is connected in any suitable manner to be rotated at a predetermined rate of speed with respect to the turntable spindle 5 of the talking machine. For instance, the lower end of the ratchet shaft 36 may be provided with a worm gear 38 rigidly secured thereto and engaging a worm 39 on one end of a horizontal shaft 40, to the other end of which is rigidly secured a worm gear 41 engaging a worm 42 coaxial with and rigidly secured to the turntable spindle 5, the horizontal shaft 40 being arranged to rotate about a fixed axis coincident with its longitudinal axis and being held against longitudinal movement in fixed terminal bearings 43.

For transmitting movement from the ratchet wheel 35 to the latch 25 to release the switch lever 11, a pawl-like "kick off" lever or releasing member 50 is arranged substantially in a plane with the ratchet wheel 35, to oscillate in a fixed plane about a vertical pivot 51 extending approximately centrally therethrough and which is rigidly secured at its upper end to one end of an arm comprising a substantially flat carrier plate or supporting member 52, which is arranged to swing in a horizontal plane slightly above the plane of the upper surface of the ratchet wheel 35 about a vertical pivot 53, which extends through the

other end of the said arm or carrier plate and the lower end of which is rigidly secured to the switch lever 11. The oscillation of the pawl-like "kick off" lever 50 with respect to the carrier plate 52 is limited in a clockwise direction by a lug or stop 55 integral with and projecting upwardly from the "kick off" lever and arranged to engage against a side edge of the carrier plate 52. An auxiliary spiral spring 56 is connected at one end to the lug 55 and at its other end to a lug 57 integral with and projecting upwardly from the switch lever 11, and tends to hold the "kick off" lever 50 at the limit of its clockwise movement with respect to the carrier plate 52. This auxiliary spring 56 also tends to swing the carrier plate 52 in an anti-clockwise direction with respect to the switch lever 11 and into engagement with a lug or stop 58 integral with and projecting upwardly from the base plate 6 and arranged to limit the anti-clockwise movement of the carrier plate 52 with respect to the switch lever 11, and the auxiliary spring 56 thus tends to hold the pawl-like outer end 59 of the "kick off" lever 50 in engagement with the ratchet 35. The inner end 62 of the "kick off" lever 50 is arranged to swing into engagement with an inclined substantially flat shoulder 63 on a projection 64 integral with and extending laterally from the latch 25 and is operative to swing the latch 25 in an anti-clockwise direction about its pivot 26 to release the switch lever 11. The active end wall 65 of the outer end 59 of the "kick off" lever 50, and the corresponding front walls 66 of the teeth 67 of the ratchet 35 are preferably substantially cylindrical and of the same radius of curvature, and the back walls 68 of the teeth of the ratchet 35 are flat and substantially tangent to the front walls 66, to provide relatively broad bearing surfaces and to insure smoothness of operation between these parts. The active end wall 69 of the inner end 62 of the "kick off" lever is also preferably cylindrical to insure smoothness of operation between the "kick off" lever and the flat shoulder 63 of the latch 25.

To insure the movement of the switch lever from an "on" to an "off" position, in case the spring 29 should fail to perform its function after the latch 25 has been released from the switch lever, the "kick off" lever 50 is provided with a lug 60 integral and rigid therewith and projecting upwardly therefrom and arranged to limit the anti-clockwise movement of the "kick off" lever 50 with respect to the carrier plate 52 by engaging against the outer end wall 61 of the carrier plate 52. In case of the remote contingency that the spring 29 should fail to perform its function of swinging the switch lever 11 from an "on" to an "off"

position immediately after the "kick off" lever 50 has performed its function of releasing the latch 25 from the switch lever 11 as will appear hereinafter, the continued rotation of the ratchet 35 rotates the lug 60 into engagement with the wall 61 of the carrier plate 52 and then causes the carrier plate 52 to push the switch lever 11 from an "on" to an "off" position.

This mechanism is also operative to release the stop member 11 from the retaining member 25 if for any reason the end 62 of the kick-off lever 50 should not engage the projection 64 of the latch or retaining member 25 and should thus fail to lift the retaining member to release the stop member therefrom. In the event that the end 62 of the kick-off lever 50 should fail to engage the projection 64 to lift the latch 25 (if, for instance, the end 62 of the kick-off lever were to be broken off or bent laterally so as to permit it to slide over or under the projection 64 without lifting the latch) then the rotation of the ratchet 35 would turn the pawl 50 about its pivot 51 until the lug 60 engages the outer end wall 61 of the plate or connection 52 whereupon the continued rotation of the ratchet 35 would move the pawl 50 and plate 52 (now rigid with respect to each other) to the right. Since the plate or connection 52 is pivoted to the arm or extension of the stop member 11, the movement of these members to the right would turn the stop member 11 in an anti-clockwise direction forcing the beveled wall or abutment of the notch 28 against the beveled end 27' of the tooth 27 and cause the said tooth to slide upwardly thereon. As soon as the tooth 27 is out of the notch 28, the spring 29 will immediately act to throw the stop member 11 to stopping position.

To permit of the resetting of the switch lever 11 from an "off" or stopping position into an "on" or non-stopping position without rotating the ratchet 35 "anti-clockwise" or backwards, the outer side edge of the carrier plate 52 is extended laterally and forms an obtuse angle providing an abruptly inclined comparatively short straight shoulder or cam surface 70 and a somewhat longer straight inclined edge wall or cam surface 71 extending from the outer end of the shoulder outwardly in a direction approximately radial with respect to the axis of the pivot 53 at the inner end of the carrier plate 52, and forming an acute angle with the longitudinal axis of the carrier plate. This shoulder 70 is so arranged that it extends outwardly from a point immediately outside of the stop 58 for the carrier plate 52 when the switch lever 11 is in an "on" or non-stopping position, and will be operative as it slides over the stop 58 to swing the carrier plate 52 suddenly in

a clockwise direction and move the outer end 59 of the "kick off" lever 50 out of the path of the teeth of the ratchet 35 as the switch lever is moved from an "on" towards an "off" position. The inclined edge wall 71 is so arranged and of such a length that it will be operative to slide over the stop 58 and hold the inner end 59 of the "kick off" lever 50 out of the path of the teeth of the ratchet 35.

The ratchet 35 and the "kick off" lever 50 and parts cooperating therewith are so proportioned that when the latch 25 is in its operative position to retain the switch lever in non-stopping position (as shown in the drawings) and the "kick off" lever 50 is in engagement with the ratchet 35, a partial rotation of the ratchet in a clockwise direction, in response to the rotation of the turntable spindle through a predetermined number of revolutions somewhat greater than necessary to reproduce the sounds from the "longest" record which the machine is adapted to receive, will cause a tooth of the ratchet to rotate the "kick off" lever 50 in an anti-clockwise direction about its pivot 51 and to move the inner end 62 of the "kick off" lever into engagement with the shoulder 63 of the latch 25 and release the latch from the switch lever 11.

During this movement of the "kick off" lever 50 in response to the clockwise rotation of the ratchet 35, and until the latch 25 is released, the carrier plate or arm 52 is rotated in a clockwise direction away from its stop 58 and about the pivot 53 which is held in a stationary position. When the latch 25 is released the switch lever 11 is ordinarily rotated in an anti-clockwise direction from an "on" into an "off" position in engagement with the free end of the latch 25, as a result of the action of the spring 29.

This movement of the switch lever 11 from an "on" into an "off" position cuts off the current from the motor, stops the operation of the motor and consequently the rotation of the ratchet 35, and moves the carrier plate or arm 52 anti-clockwise about its pivot 53 as the shoulder 70 and the inclined edge 71 successively slide over the stop 58 and simultaneously moves the outer end 59 of the "kick off" lever 50 out of the path of the teeth of the ratchet 35, thus permitting the "kick off" lever to be rotated clockwise by the auxiliary spring 56 until the stop 55 of the "kick off" lever comes into engagement with the carrier plate 52, where it remains while the switch lever is in the "off" position. When the switch lever 11 is in a stopping or "off" position, the carrier plate or arm 52 rests with the outer portion of its inclined edge 71 against the stop 58 and holds the outer end 59 of the "kick off" lever out of the path of the teeth of the ratchet 35.

When the switch lever is moved manually clockwise from a stopping or "off" position into a non-stopping or "on" position to start the motor and the rotation of the turntable spindle 5, the carrier plate 52 is also moved and its inclined edge 71 slides on the stop 58, keeping the outer end 59 of the "kick off" lever 50 out of the path of the teeth of the ratchet 35, but when, in its continued movement the abrupt shoulder 70 slides over the stop 58 the outer end 59 of the "kick off" lever moves down into engagement with the ratchet.

In the form of this invention shown in the drawings, the ratchet is provided with nine teeth and the construction is such that the manual movement of the switch lever 11 from an "off" position into an "on" position results in the movement of the "kick off" lever 50 into its initial position in which its outer end 59 is in the space between two teeth of the ratchet and substantially in contact with the front wall 66 of one of the teeth.

The ratchet 35 might, however, be provided with any other number of teeth than that shown in the drawings, and the device would still operate successfully, although in some cases the "kick off" lever 50, when in an initial operative position, would not rest with its outer end 59 in full engagement in a recess between two teeth as shown in the drawings, but would rest with its outer end 59 riding either upon the top or upon the back wall of a tooth, and the "kick off" lever would not be rotated with respect to the carrier plate 52 until the ratchet had rotated through a sufficient arc to permit the outer end of the "kick off" lever to move into full engagement between two teeth and to be engaged by the front wall 66 of one of the teeth of the ratchet. By thus varying the number of teeth in the ratchet 35, the time required for releasing the switch lever 11 through the action of the "kick off" lever 50 might be varied.

It is to be understood that this invention is not limited to the specific construction hereinbefore described, as it is evident that various changes might be made in applying the invention without departing from the spirit of the invention or the scope of the appended claims.

Having thus fully described this invention, I claim and desire to protect by Letters Patent of the United States:

1. Automatic stopping mechanism comprising an element movable from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, to a stopping position, a movable member, and releasing means arranged to be actuated by said movable member for actu-

ating said movable means to release said element, said releasing means being connected to said element and arranged to be moved out of operative engagement with said movable member by the movement of said element when released by said movable means.

2. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, to a stopping position, a rotatable member, and releasing means arranged to be actuated by said rotatable member for actuating said movable means to release said element, said releasing means being connected to said element and arranged to be moved out of operative engagement with said rotatable member by the movement of said element when released by said movable means.

3. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, to a stopping position, a rotatable member, and releasing means arranged to be actuated by said rotatable member for actuating said movable means to release said element, said releasing means comprising an element connected to and movable with respect to said first-mentioned element out of operative engagement with said rotatable member when said element is moved to an inoperative position.

4. In an automatic stop mechanism, the combination of a stopping member, retaining means to hold said stopping member in non-stopping position, a spring tending to move said stopping member to stopping position, a continuously rotating ratchet, an arm connected to said stopping member, a pawl member in engagement with said ratchet, and connections between said arm and said pawl whereby the rotation of said ratchet first moves said pawl member into rigid relation with respect to said arm, and the continued rotation of said ratchet moves said arm and pawl together to force said stopping member out of engagement with said retaining means.

5. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, into stopping position, a ratchet wheel rotatable about a fixed axis, and releasing means arranged to be actuated by said ratchet wheel for actuating

said movable means to release said element, said releasing means being arranged to be moved into and out of operative engagement with said ratchet wheel by the movement of said element.

6. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, into stopping position, a ratchet wheel rotatable about a fixed axis, and releasing means connected to said element and arranged to be actuated by said ratchet wheel for actuating said movable means to release said element.

7. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, a member pivoted to swing about a fixed axis for holding said element in a non-stopping position, means to move said element, when released from said pivoted member, into stopping position, a ratchet wheel rotatable about a fixed axis, and releasing means connected to said element and arranged to be actuated by the teeth of said ratchet wheel to actuate said pivoted member to release said element.

8. Automatic stopping mechanism comprising in combination an element pivoted to swing about a fixed axis from a non-stopping into a stopping position, means to move said element, when released from said pivoted means, into stopping position, a ratchet wheel rotatable about a fixed axis, and releasing means arranged to be moved into and out of operative engagement with said ratchet wheel by the movement of said element, and arranged to be actuated by said ratchet wheel to actuate said pivoted means to release said element.

9. Automatic stopping mechanism comprising in combination an element arranged to oscillate about a fixed axis from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, means to move said element, when released from said movable means, into stopping position, a ratchet wheel rotatable about a fixed axis, and a member arranged to engage and to be actuated by said ratchet wheel and to engage and actuate said movable means, said member being arranged to be moved into and out of operative engagement with said ratchet wheel by the movement of said element.

10. Automatic stopping mechanism comprising in combination an element arranged to oscillate about a fixed axis from a non-stopping into a stopping position, movable means arranged to hold said element in a

- non-stopping position, means to move said element, when released from said movable means, into stopping position, a ratchet wheel rotatable about a fixed axis, and releasing means including a member arranged to engage and to be actuated by said ratchet wheel and to engage and actuate said movable means to release said element, said member being connected to said element and being arranged to be moved into and out of operative engagement with said ratchet wheel by the movement of said element.
11. Automatic stopping mechanism comprising in combination an element arranged to oscillate about a fixed axis from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, a ratchet wheel rotatable about a fixed axis, a supporting member connected to and movable with respect to said element, a releasing member carried by and arranged to oscillate with respect to said supporting member and arranged to engage and be actuated by said ratchet wheel and to engage and actuate said movable means to release said element, and means to move said element when released, into stopping position.
12. Automatic stopping mechanism comprising in combination an element arranged to oscillate about a fixed axis from a non-stopping into a stopping position, movable means arranged to hold said element in a non-stopping position, a ratchet wheel rotatable about a fixed axis, means to rotate said ratchet wheel, a supporting member connected to and movable with respect to said element, a releasing member carried by and arranged to oscillate with respect to said supporting member and arranged to engage and be actuated by said ratchet wheel and to engage and actuate said movable means to release said element, and yielding means connecting said releasing member and said element.
13. Automatic stopping mechanism comprising in combination an element arranged to swing about a fixed axis from a non-stopping into a stopping position, means movable with respect to said element for holding said element in a non-stopping position, means to move said element, when released from said movable means, into stopping position, a ratchet wheel rotatable about a fixed axis, means arranged to rotate said ratchet wheel, a supporting member pivotally connected to said element and arranged to oscillate with respect thereto, a fixed stop arranged to be engaged by said supporting member, a releasing member pivotally connected to said supporting member and rotatable with respect thereto, a stop carried by said releasing member and arranged to engage said supporting member, and yielding means connecting said second mentioned stop and said element, said releasing member being arranged to be actuated by said ratchet wheel to actuate said latch, to release said element, and said supporting member being arranged to slide against said fixed stop to move said releasing member out of engagement with said ratchet wheel as said element is moved from a non-stopping towards a stopping position.
14. Automatic stopping mechanism comprising in combination an element pivoted to swing about a fixed axis from a non-stopping into a stopping position, a latch pivoted to swing about a fixed axis and arranged to engage said element to hold said element in a non-stopping position, yielding means connecting said element and said latch and tending to rotate said element from a non-stopping into a stopping position, a supporting member pivotally connected to said element and arranged to oscillate with respect thereto, a fixed stop arranged to be engaged by said supporting member, a releasing member pivotally connected to said supporting member and rotatable with respect thereto, a stop carried by said releasing member and arranged to engage said supporting member, and yielding means connecting said second mentioned stop and said element, said releasing member being arranged to be actuated by said ratchet wheel to actuate said latch, to release said element, and said supporting member being arranged to slide against said fixed stop to move said releasing member out of engagement with said ratchet wheel as said element is moved from a non-stopping towards a stopping position.
15. An automatic stopping mechanism comprising in combination a movable element normally held in non-stopping position, releasable means normally holding said element in non-stopping position, releasing means carried by said element, a ratchet wheel rotatable about a fixed axis and adapted to move said releasing means against said releasable means to release said element, and means to move said element, when released, into stopping position and said releasing means out of operative engagement with said ratchet.
16. In an automatic stopping mechanism the combination of a member movable from a non-stopping to a stopping position, means tending to move said member to said stopping position, releasable means to hold said member in said non-stopping position, a lever pivoted to said member, a rotating element, means to rotate the same, and means carried by said lever, and directly engaging with and operated by said rotating element for forcing said releasable means out of holding engagement with said movable member, said movable member when released being operative to move said lever

and said means carried thereby, out of operative engagement with said rotating element.

17. In an automatic stopping mechanism, the combination of a releasable element movable back and forth between a non-stopping and a stopping position, holding means to normally hold said element in a non-stopping position, mechanism movable with said element for actuating said holding means to release said element, driving means for actuating said mechanism and operative to move said mechanism against said holding means, and means to move said element, when released, into stopping position and to move said mechanism out of engagement with said holding means and said driving means.

18. In an automatic stopping mechanism, the combination of a stopping element movable back and forth between a non-stopping and a stopping position, means for holding said element in a non-stopping position, mechanism movable with said element for moving said holding means and releasing said element, means for actuating said mechanism, and means for throwing said actuating means and said mechanism out of operative engagement as said element moves from non-stopping to stopping position, and into operative engagement as said element moves from a stopping to a non-stopping position.

19. In an automatic stopping mechanism, the combination of a movable element, automatic means for moving said element in one direction, manual means for moving said element in the opposite direction, means for actuating said automatic means, and means for disconnecting said automatic means and its actuating means when said element is automatically moved in the first direction.

20. In an automatic stop mechanism, the combination of an electric switch, retaining means to hold said switch to close an electric circuit, a continuously rotating ratchet, an arm connected to said switch, a pawl member in engagement with said ratchet, and connections between said arm and said pawl member whereby the rotation of said ratchet first moves said pawl member into rigid relation with respect to said arm and the continued rotation of said ratchet moves, through said arm and pawl member, said switch to break the electric circuit.

21. In an automatic stop mechanism the combination of a stopping member, an arm pivoted thereon, a pawl member pivoted to said arm, actuating means engaging said pawl member to transmit motion to said stopping member, and means for disengaging said pawl member from said actuating means.

22. In an automatic stop mechanism, the combination of a stopping member, retain-

ing means for holding said stopping member at the limit of its movement in one direction, means for moving said stopping member in the opposite direction, an arm pivoted to said stopping member, a pawl member pivoted to said arm, and actuating means engaging said pawl member to release said stopping member from said retaining means.

23. In an automatic stop mechanism, the combination of a stopping member, retaining means for holding said stopping member at the limit of its movement in one direction, means for moving said stopping member in the opposite direction, an arm pivoted to said arm, actuating means engaging said pawl member to release said stopping member from said retaining means, and means for disengaging said pawl member from said actuating means.

24. In an automatic stop mechanism, the combination of a stop member movable from a non-stopping to a stopping position and having an abutment, retaining means engaging said abutment to hold said member in non-stopping position, a spring tending to move said member into stopping position, and automatic means to move said abutment with respect to said retaining means to disengage said retaining means from said abutment, whereupon said spring will throw said stop member to stopping position.

25. In an automatic stop mechanism, the combination of a stop member movable from a non-stopping to a stopping position and having an abutment, retaining means engaging said abutment to hold said member in non-stopping position, a spring tending to move said member to stopping position, a ratchet arranged to be continually rotated, a pawl in engagement with said ratchet, and a connection between said pawl and said stop member whereby the rotation of said ratchet at first moves said pawl with respect to said connection and the continued movement of said ratchet moves said pawl and through said connection moves said abutment to disengage said abutment from said retaining means.

26. In an automatic stop mechanism, the combination of a pivoted stop member having an arm extending therefrom, retaining means for holding said member in non-stopping position, a spring for moving said member to stopping position when said member is released from said retaining means, a continuously rotating ratchet, a pawl engageable with said ratchet, and a rigid connection between said pawl and said arm whereby the rotation of said ratchet first moves said pawl into rigid relation with respect to said connection and the continued rotation of said ratchet moves said pawl, said connection and said arm together to re-

lease said stop member from said retaining means.

27. Automatic stopping mechanism comprising in combination an element movable from a non-stopping into a stopping position, a member pivoted to swing about a fixed axis for holding said element in a non-stopping position, means to move said element, when released from said pivoted member, into a stopping position, a ratchet wheel rotatable about a fixed axis, and re-

leasing means connected to said element and arranged to be actuated by said ratchet wheel to release said element.

In witness whereof, I have hereunto set my hand this 4th day of August, A. D., 1914.

LLOYD Y. SQUIBB.

Witnesses:

DAVID W. EVANS,

CHARLES F. WILLARD.