July 6, 1965 O. H. DICKE 3,192,703

AUTOMATICALLY RATE REGULATED TIMEPIECES

Filed June 14, 1963 2 Sheets-Sheet 1

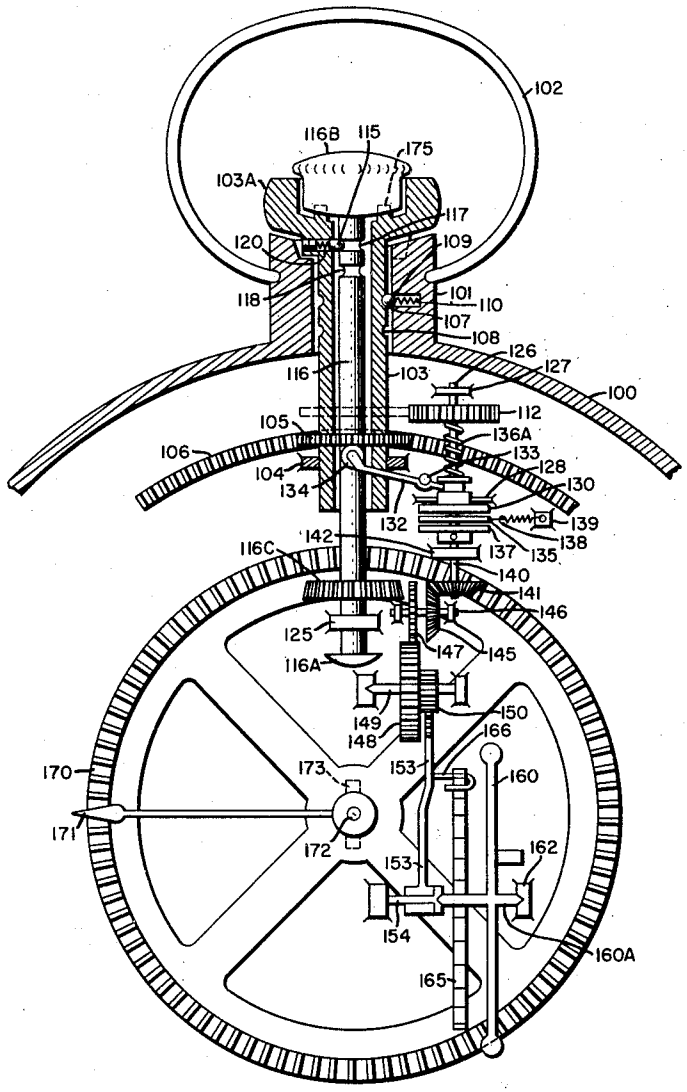


FIG. 1

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Fig. 2

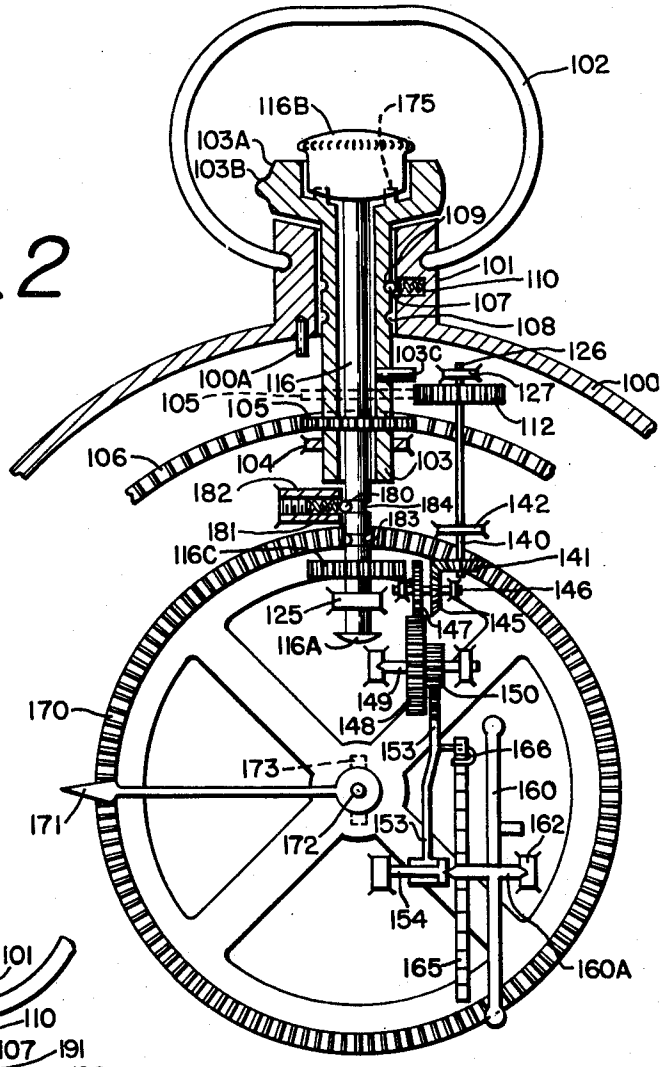
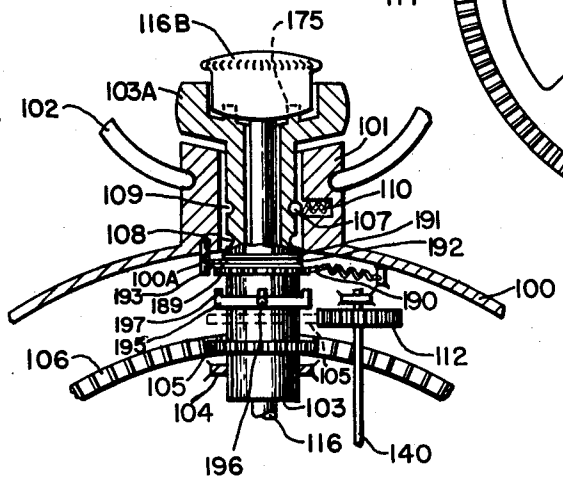


Fig. 2A



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AUTOMATICALLY RATE REGULATED TIMEPIECES

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20 Claims. (Cl. 58—35.5)

This application is a continuation-in-part of applicant's prior copending application Serial No. 12,751 filed March 4, 1960, which matured into Patent No. 3,106,819 on October 15, 1963.

This invention relates to automatic rate regulation for clocks and watches and particularly to rate regulation of any extent, limited to a maximum change in rate regulation for any one setting of such clock or watch, together with means for affording setting of such clock or watch without changing the rate regulation adjustment, that is, afford either automatic rate regulation of any extent a limited extent or of zero extent, at the wish or behoove of the person setting such clock or watch.

When clocks or watches are provided with means for accomplishing automatic rate regulation in response to manual setting of such clock or watch, it is experienced that after a plurality of such settings of such clock or watch, it is regulated to substantially perfect time keeping and obviously this adjustment should not be disturbed It is also quite common for such clock or watch, after it has been automatically rate regulated to substantially perfect timekeeping, that the time-piece may need setting either because the timepiece has stopped, by reason of lack of mainspring energy, or because the timepiece needs setting because a substantial error has accumulated because the timepiece has not been set for a long time. Also, especially in the case of watches, it is quite common that a person wears one wrist watch during week days and another wrist watch on Sundays, or special occasions, in which both watches stop for lack of mainspring energy, and if they are then set the rate adjustment is adjusted automatically to cause the timepiece to keep poorer time than it did before such setting.

In view of the foregoing and other important considerations it is proposed, in accordance with the present invention, to afford means whereby the operator or user, of the clock or watch, may set the timepiece in any one of a plurality of ways to obtain automatic rate regulation of either a limited or zero extent, as desired, for any particular setting. For instance, if the user sets his watch on a Sunday morning, after not having used his watch during the past week, he may set it in a manner, or by means whereby setting without automatic rate regulation is accomplished. He might do likewise if he knows his watch keeps almost perfect time, but wishes to set it because a noticeable inaccuracy in its time indication exists because the error exists because it has accumulated over a long period of time without intervening setting. If a person that wears a wrist watch during weekdays which may or may not be self-regulating, but on Sundays wears a wrist watch which is self regulated in response to manual setting, it is very annoying to be compelled to set the wrist watch knowing that it has gradually been rate regulated automatically to substantially perfect timekeeping and it becomes repulsive to set such watch and thereby disturb its perfect timekeeping quality.

One object of the present invention therefore is to provide the wearer of a watch the choice of either obtaining limited, unlimited rate or zero rate adjustment in response to his manual setting of the watch.

Also, in both forms of the present invention it is proposed to employ a combined rate regulating and winding

sleeve and knob and a setting stem passing through said sleeve, and provided with a knob so that, if the sleeve is withdrawn the stem is also withdrawn, so that both rate regulation and setting are both accomplished but if only the stem is withdrawn, setting only will be accomplished by turning such stem and its knob.

Another object of the present invention (in order to simplify its construction) proposes to employ a simple limiting means to limit both the setting and the rate regulating adjustment as a result of turning the sleeve when withdrawn. This is permissible since additional setting may be accomplished by merely pushing in the sleeve and allowing the stem to remain withdrawn.

Other objects, purposes and characteristic features of the invention will become more apparent from the following specification as the description of the invention progresses, when considered in the light of the accompanying drawings in which:

FIG. 1 shows a front view, partly in cross-sectional elevation, of a pocket watch, embodying the invention, with many of the parts conventionally illustrated, and with the drive train, mainspring and escapement pallet omitted;

FIG. 2 shows a similar view as FIG. 1 of a modified form of pocket watch, embodying the invention, in which the rate regulating limiting feature not only limits the extent of rate regulation, but also the extent of setting that may be accomplished during a single withdrawal of the setting sleeve; and

FIG. 2A shows a modification of FIG. 2 for performing an additional function.

Structure FIG. 1.—In FIG. 1 has been illustrated the structure disclosed in FIG. 4 of said prior application Ser. No. 12,751 filed March 4, 1960, which matured into Pat. No. 3,106,819 on Oct. 15, 1963. Referring to FIG. 1 the casing **100** of a pocket watch, or a wrist watch, embodying the invention, although the structure is equally applicable to a shelf clock, an alarm clock or an automobile clock, has been illustrated. This casing is provided with a stem **101** having a ring or bale **102** pivoted therein. This stem **101** has rotatably, and slideably, mounted therein a combined winding and rate regulating sleeve **103** terminating at the top in a combined winding and rate regulating knob **103A**. The sleeve **103** is also pivoted in bearing block **104** and has a pinion **105** secured thereto, which pinion normally engages, and is in mesh with, the winding gear **106** which may wind a mainspring (not shown). When this sleeve **103** is withdrawn a distance to cause the ball **107** to lie in groove **108**, instead of groove **109**, as illustrated, the pinion **105** is moved out of mesh with winding gear **106** and is moved into mesh with rate regulating gear **112**. The ball **107** is pressed inwardly by the compression spring **110**. In a similar manner the ball **115** may be pressed into grooves **117** or **118** in shaft **116** by the spring **120** contained in a pocket in the sleeve **103**. The shaft or setting stem **116** is pivoted in sleeve **103** and also in bearing block **125** and is provided with a head **116A** at the lower end and a setting knob **116B** at the upper end.

Below the setting head **116B** is a circularly arranged series of notches to form teeth which will mesh with the teeth **175** in the upper hollow of winding button **103A** so that when both buttons **103A** and **116B** are either both in the normal position or both in the withdrawn position these knobs or buttons are locked together and it is only when inner knob **116B** is alone withdrawn that these knobs may be turned independently.

The rate regulating gear **112** is secured to shaft **126**, which is pivoted in bearing blocks **127** and **128**. The lower end of this shaft **126** has slideably keyed thereto a

clutch-plate 130 provided with a peripheral groove in which the free end of lever 132 engages. This lever 132 is pivoted at 133 and is biased in a clockwise direction about pivot 133 to bias the clutch plate 130 against the clutch plate 135, by a spring 136A, so as to cause clutch plate 135 to tend to engage clutch plate 137. Normally the gear 105 engages the roller 134 pivoted into the end of lever 132 to hold the clutch plates 130, 135 and 137 apart, but when the sleeve 103 and knob 130A (and stem 116 with them) are withdrawn this roller 134 is free to be lifted by spring 136A to cause engagement of these clutch plates 130, 135 and 137. The lower clutch plate 137 is secured to shaft 140 pivoted in bearing block 142 which has secured thereto a bevel gear 141 continuously in mesh with bevel gear 145 on shaft 146 pivoted in bearing blocks and containing a spur gear 147 meshing with spur gear 148, secured on shaft 149 and having integral therewith a pinion 150 engaging the teeth of a gear sector 153, pivoted on a trunnion 154. The balance wheel 160 is pivoted coaxially with the gear sector 153 on trunnion 154 and bearing block 162. The balance wheel 160 includes a shaft 160A on which is mounted a hairspring 165. The gear sector 153 has a crank-line extension 166 which has its free end hook-shaped or bifurcated to engage the outer turn of the hair-spring 165, so that a change in adjustment of this gear sector 153 about its pivot causes a change in the effective length of this hairspring and a change in the oscillating frequency of the balance-wheel-hairspring oscillating system. The train of gears driving the gear sector 153 in response to turning of the winding-setting button 103A is such that when button 103A is turned in a direction to set the time indicating hand 171 forward the hook or bifurcated crank pin 166 is moved in a direction to shorten the effective length of the hairspring 165 and increase the oscillating frequency of the balance-wheel-hairspring-oscillatory system.

It will be observed that the middle clutch-plate 135 has an extending handle, which handle is biased to an intermediate position between two stop pins 138 by a tension spring 139, as shown more clearly, in FIG. 7 of prior application Ser. No. 596,067 (now Pat. No. 2,949,728). The setting stem 116 has secured thereto a spur pinion 116C which is normally out of mesh, but when stem 116, by pulling out knob 116B, is withdrawn, either alone of with knob 103A and sleeve 103, this spur pinion 116C meshes with minute gear 170 secured to minute hand 171. This gear 170 is also frictionally connected to the minute shaft 172 of the gear train (not shown) by friction slip clutch 173. This gear 170 and minute shaft 172 are driven through the medium of slip clutch 173 by a gear train driven by the mainspring (not shown) wound up through the medium of mainspring gear 106 and retarded by an escapement-wheel and escapement pallet (not shown) controlled by balance wheel 160. It will be noted that the lower end of stem 116 is provided with a head 116A. This has been resorted to, to prevent the stem 116 being withdrawn too far, as could easily happen if stem 116 were first withdrawn and then followed by withdrawal of sleeve 103 with the two tentatively locked together by the ball 115 held in groove 117 by spring 120.

In regard to the gear train (not shonw) above referred to, the main spring is held against retrograde (backward) rotation by means well known in the art. This gear train includes a minute gear which rotates at substantially one revolution per hour which is fastened to the shaft 172. This shaft 172 is free to rotate in minute wheel 170, which has minute hand 171 fixedly connected thereto, except for the provision of slip clutch including a spring 173 fixedly connected to shaft 172 and which frictionally engages the hub of minute wheel 170, so that hand 171 may be set to a different minute position by rotating gear 170 through the medium of gear 116C, causing slipping of slip clutch 173. The minute wheel 170, as well known in the art, may rotate an hour hand (not shown) at a speed one-twelfth as fast as the speed at which gear 170 is rotated.

Operation of FIG. 1.—Let us assume that knob 116B is alone withdrawn and minute hand 171 is correctly set with the minute hand of a standard clock, such for instance, as a synchronous electric motor clock. Let us now assume that on the following day it is found that the minute hand is two minutes slow with respect to the minute hand on the standard clock. The user of the wrist watch may unconsciously wind the mainspring by turning knob 103A and may then proceed to set the watch by pulling out knob 103A and then set the minute hand 171 forward until the two minute hands are in agreement. When the knob 103A was withdrawn, it pulled the stem 116 and its knob 116B out with it, to cause pinion 116C to mesh with minute gear 170, to bring about such setting of the minute hand 171. The withdrawal of sleeve 103 also caused the pinion 105 to be shifted from winding gear 106 to rate regulating gear 112. Also the lifting of pinion 105 allowed the roller 134 to move upward due to the action of spring 136A to thereby cause the three clutch plates 130–135–137 to engage each other due to the action of compression spring 136A. It is thus seen that turning of the knob 103A when withdrawn not only causes the small knob 116B, locked thereto by teeth, to also be withdrawn to allow setting of the minute hand 171, and in turn the hour hand (not shown) but also causes engagement of gears 104 and 112 and the coupling of clutch plates 130–135–137 to cause adjustment of the rate regulating gear sector 153 through the medium of gears 141, 145, 147, 148 and 150. It should be understood, however, that the maximum possible rotation of clutch plate 135, due to stop pin 138, may have caused slippage between clutch plates 130 and 135 during the latter part of the setting of the minute hand two minutes forward. In other words, just as much rate regulation adjustment would result when the minute hand was set forward two minutes worth as if it were set forward one hour. This is desirable and is resorted to in order to avoid over correction in rate adjustment if the watch when it is set to a great extent, as after the watch has stopped for lack of mainspring energy. If the wearer of the wrist watch is, however, aware of the fact that his wrist watch is adjusted to substantially perfect time-keeping already he may, when he desires to set his watch, withdraw only the small knob 116B and its associated stem 116, to set the minute hand 171 without causing any change in the rate regulation adjustment, namely, rate regulation to a zero extent. The structure is such that when the timepiece is set forward the rate regulating means is adjusted to increase the speed of the timepiece and visa versa.

Structure FIG. 2 modification.—A modified form of applicant's invention has been illustrated in FIG. 2. Since many of the elements of the structure shown in FIG. 2 are the same as like parts of FIG. 1 these parts have been assigned like reference characters and need not be again described.

In the FIG. 2 structure the slip clutch 130–135–137 of FIG. 1 has been entirely omitted, as has also its restoring structure including lever 132, roller 134, spring 136A, centering spring 138, anchor post 139, and shafts 126 and 140 now constitute a single shaft 140. This slip clutch structure is no longer required since limited turning of the sleeve 103 and its knob 103A is now in FIG. 2 imposed by the provision of a pin 103C in sleeve 103 extending radially outwardly. This pin 103C imposes limited turning of this sleeve 103 and knob 103A by reason of the fact that when this sleeve 103 is withdrawn for setting and rate regulating purposes, it strikes the pin 100A. In other words, not only is the extent of adjustment of rate regulation, during a single withdrawal and turning of sleeve 103, limited, but a similar limitation is imposed upon the setting of the time hand 171 so long as the sleeve remains in its withdrawn posi-

tion. However, if the sleeve 103 alone is later pushed in, that is, the stem 116 is retained in the withdrawn position, additional setting, without accompanying rate adjustment, may be accomplished by turning knob 116B which is now unlocked from knob 103A. In order to make this partial setting with accompanying rate regulation followed by setting without accompanying rate regulation a rather simple maneuver, depressing of sleeve 103 is required. The stem 116 in FIG. 2 has been provided with a detent latching it to the casing 100 by a spring pressed ball 180 pressed by spring 181 and housed in a block 182 extending in from casing 100 and may engage one or the other of grooves 183 and 184 surrounding the stem 116. In the FIG. 1 structure the detent for latching of the stem 116 was existent between this stem 116 and the sleeve 103, whereas in the FIG. 2 structure this detent latching is between the stem 116 and the casing 100. The FIG. 2 structure will not cause the stem 116 to be pushed in when the sleeve 103 and its knob 103A is pushed in, as may easily be the case in the FIG. 1 structure. The knob 103A is provided with a protruding extension or bump 103B located 180 degrees displaced from the pin 103C, for purposes to be pointed out later. Also, the mainspring gear 106 is preferably provided with a pawl (not shown) for preventing this gear being operated in a counter-clockwise direction by the mainspring for obvious reasons.

Operation of FIG. 2.—At this point it should be remembered that in the FIG. 1 structure, when knob 103A is withdrawn and turned, both limited rate regulation and unlimited setting is accomplished. In the FIG. 2 structure, however, when knob 103A is withdrawn and turned limited turning of sleeve 103 is imposed by the stop structure including pins 100A and 103C, and since sleeve 103 is locked to stem 116 by teeth 175 limited turning is also imposed on stem 116 to impose limited setting of the watch.

Let us now assume that the timepiece of FIG. 2 has its mainspring fully wound and that its time hands, only one of which has been illustrated, are set with the time hands of a time standard, such as a synchronous electric motor clock. Let us further assume that a few days later it is found that the timepiece has gained one minute with respect to the same time standard. The wearer of the timepiece will now withdraw the knob 103A, FIG. 2, and in so doing will withdraw the knob 116B with it. Since these two knobs 103A and 116B are now locked together, through the medium of teeth 175 of knob 103A engaging notches in knob 116B, the turning of knob 103A will also turn knob 116B. Before the stem 103 was withdrawn however the knob 103A was first turned to a position where the hump, bump or sub-knob 103B is located at the extreme left when facing the dial (not shown) of the timepiece. This is resorted to so that the knob 103A may be turned substantially 170°, either forward or backward, before the pin 103C strikes the pin 100A. The wearer may now withdraw and turn knob 103A to an extent where his time hand 171 comes into agreement with the minute hand of the time standard, and we will assume that this will require less turning than is necessary for pin 103C to strike pin 100A. This setting of the time hand 171 backward will also cause turning of gear 105, which was, and still is, in mesh with gear 112, thereby causing turning of shaft 140, gears 141, 145, 147, 148 and 150 and rate regulating gear sector 153, resulting in a rate regulating adjustment of the timepiece to cause it to run slower. The wearer of the timepiece will now push down on knob 116B and thereby return both of the knobs 103A and 116B to their normal non-retracted position, also called the winding position for watch employing a mainspring.

Let us now assume that the wearer of the timepiece has forgotten to wind the timepiece so that it stops, or in case it is a self-winding watch he was so inactive that the mainspring became unwound to a point where the timepiece stopped. If the watch is adjusted to keep good time and the wearer is alert, he will withdraw only the knob 116B so as to cause gear 116C to engage the minute gear 170 and will turn this knob 116B to an extent to bring the time hand 171 into conformity with the minute hand of the time standard. He may now depress the knob 116B to return it to its normal non-retracted position. If, however, the wearer of the timepiece of FIG. 2 is not alert he will withdraw the knob 103A and will withdraw knob 116B with it. He will now turn knob 103A in an effort to set the timepiece, but will find that he can turn knob 103A, and knob 116B with it, only to an extent of 170° when pin 103C strikes pin 100A. This will limit his setting of the time hand and will also limit the extent of adjustment of the rate regulating adjustment. He may now depress only knob 103A which will return this knob 103A to its normal depressed position but will leave the knob 116B in its retracted position. He may now by turning knob 116B complete the setting of the time hand 171 without any accompanying rate regulating adjustment.

Since, by the engagement of the stop pin 100A by the pin 116C alerted the wearer of the timepiece he probably would have returned the knob 103A back to a position where the sub-knob, or bump 103B, is at the extreme left side, when facing the dial, before pushing down on knob 103A alone, leaving knob 116B retracted, as a result of which the temporarily wrong adjustment of the rate regulation adjustment means would have been corrected, and with the knob 116B still retracted he may now proceed with the setting of the time hand without any adjustment of the rate regulating structure.

It should be noted that in this FIG. 2 structure, grooves around the stem 116 are parts of spring detent structure for spring pressed locking of this stem 116 to the casing 100 of the watch. This structure was resorted to, to cause this stem 116 to remain retracted when the button 103A is pushed down after it had been retracted and retracting knob 116B with it. This structure makes it very easy to continue hand setting without accompanying rate adjustment. This structure will, in fact, make it practicable to leave to projecting ridge or rim off of the top of knob 116B, which was placed there to facilitate the withdrawal of knob 116B alone, in that temporary withdrawal of knob 103A will result in movement of knob 116B to its retracted position, and this manipulation may be resorted to when it is desired to set the watch without any accompanying rate regulation.

The FIG. 2 structure is a much simpler and less expensive construction and accomplishes the same ultimate results as the FIG. 1 structure.

In the FIG. 2 structure a certain amount of alertness is required if a 170 degree turn, in either direction, of knob 103A is desired in that the knob 103A should, before it is retracted, be turned so that bump 103B is at the extreme left when facing the dial. In order to avoid the necessity of this alertness a modified form of the invention has been shown in FIG. 2A.

Structure of FIG. 2A.—The FIG. 2A structure is the same as the FIG. 2 structure except that the bump 103B and stop pin 103C have been omitted; and there has been provided a biased gear 189, biased to its normal orientated position, by a spring 190, and provided with hub 191 having a groove 192, into which projects a guide member 193 fastened to stop-pin 100A, and a gear 195 having four sidewise extending teeth 197, although more or less may be used, meshing with the teeth of gear 189 when the knob 103B is withdrawn. This latter gear 195 is secured to sleeve 103 by a pin 196. It should be noted that the spring 190, for biasing gear 189 to its normal position, is fastened to a long tooth of gear 189. That is, this tooth is longer than the rest of the teeth, and serves as a stop member which will strike stop-pin 100A

when gear 189 has been turned from normal to an extent of 170 degrees in either direction.

Operation of FIG. 2A structure.—The operation of the FIG. 2A structure is the same as that of the FIG. 2 structure except that there is no need of turning the knob 103A to any particular position before this knob 103A is dithdrawn. That is, when it is desired to set and rate regulate the watch it is merely necessary to withdraw knob 103A whereupon the teeth 197 of gear 195 will engage spaces between the teeth of gear 189, and detent balls 107 and 108 will engage the groove 108 of sleeve 103 and groove 193 of stem, 116, respectively. The knob 103A may now be turned and sleeve 103 and stem 116 will turn with it since knobs 103A and 116B are still locked together by the engagement of teeth 175 of knob 103A engaging notches in knob 116B. The operator will turn this knob 103A until the time indication of the watch is in agreement with the time indication of the clock standard above mentioned. Should the long tooth of gear 189 however strike stop pin 100A before this is accomplished he may depress knob 103A, without depressing knob 116B, and then complete his setting operation by turning knob 116B and without accompanying rate regulation. If the wearer of the watch is convinced that the watch is already rate regulated to good time keeping he may withdraw the knob 116B only and thereby accomplish setting of the time hand without accompanying rate regulating adjustment. The hub 191 having a groove 192 engaged by support member 193 have been added to gear 189 in order to prevent the dropping of this gear 189 when the knob 103A is returned to its normal non-retracted position. When knob 103A is pushed in after a setting and rate regulation operation, the spring 190 will return the gear 189 to a position where its long tooth is displaced 180 degrees from the stop-pin 100A, namely its normal position. It should be understood that any element not absolutely necessary in the invention disclosed may be omitted within the scope of the invention.

It should be understood that the three forms of applicant's invention shown are merely examples of what forms his invention may take, and that his inventions are not limited to these specific forms, and that various departures from these disclosures may be taken within the scope of the invention so long as these departures or changes come within the scope of the appended claims.

What I claim as new is:

1. A semi-automatically rate regulated timepiece comprising; a casing; time measuring mechanism in said casing; rate regulating means in said casing which may be adjusted to determine the speed at which said time measuring mechanism shall operate; a time indicating hand operatively connected to and driven by said time measuring mechanism; a sleeve rotatably and longitudinally slideably mounted in an opening in said casing; a stem supported coaxially in said sleeve for independent rotary motion and for endwise sliding motion; means for locking said stem against independent rotary motion with respect to said sleeve when said stem and sleeve both assume either their normal pushed-in or their abnormal retracted position; means for operatively coupling said stem for transferring rotary movement of said stem to rotary movement of said time hand when said stem in a retracted position; and means for operatively connecting said sleeve for transferring rotary movement of said sleve to movement of said rate regulating means when said sleeve is in a retracted position.

2. A semi-automatically rate regulated timepiece as claimed in claim 1; supplemented by a detent for tentatively holding said sleeve in either its normal pushed-in or its abnormal retracted position.

3. A semi-automatically rate regulated timepiece as claimed in claim 1 supplemented by a detent for tentatively holding with respect to said casing said stem in either its normal pushed-in or its abnormal retracted position.

4. A semi-automatically rate regulated timepiece as claimed in claim 2; supplemented by a detent for tentatively holding said stem against endwise movement with respect to said sleeve when said sleeve assumes any longitudinal position.

5. A semi-automatically rate regulated timepiece as claimed in claim 1; supplemented by stop means in said casing for limiting the extent of rotation of said sleeve in either direction when said sleeve is retracted to its abnormal position.

6. A semi-automatically rate regulated timepiece as claimed in claim 1; supplemented by an operating knob at the external end of the stem so that said sleeve cannot be retracted without also retracting said stem; means for coupling said sleeve to said rate regulating means for rotary movement thereof when said sleeve is retracted and including a slip clutch which is provided with stop means for limiting the extent of operation of said rate regulating means for a single retraction of said sleeve followed by rotation of said sleeve for each retraction and rotation of said sleeve; whereby continued rotation of said sleeve after said slip clutch begins to slip will cause additional setting of said time hand without accompanying rate regulation, due to the fact that rotation of said sleeve will cause rotation of said stem by reason of the said locking means.

7. A semi-automatically rate regulated timepiece as claimed in claim 5; supplemented by an operating knob at the external end of the stem claimed in claim 1 so that retraction of said sleeve also causes retraction of said stem, whereby manual rotation of said sleeve after having been retracted causes limited setting of said time hand and limited adjustment of said rate regulating means, and whereby pushing-in of said sleeve, allows additional setting of said time hand by rotation of said stem without accompanying rate regulation by rotating said knob.

8. A semi-automatically rate regulated timepiece as claimed in claim 5; supplemented by the provision of an operating knob at the external end of the stem claimed in claim 1, so that retraction of said sleeve is accompanied by retraction of said stem; restoring means including a spring for restoring the stop means claimed in claim 5 to normal after each pushing-in of said sleeve so as to allow additional limited rotation of said sleeve upon a second retraction of said sleeve; whereby retraction of said sleeve and rotation thereof allows limited setting of the time hand and limited adjustment of the rate regulating means of claim 1, and the pushing down of said sleeve allows additional rotation of said stem and additional setting of said time hand without accompanying rate regulation.

9. A semi-automatically rate regulated timepiece as claimed in claim 1; supplemented by two detent means, one for tentatively holding said sleeve and the other for tentatively holding said stem in either the normal pushed-in or the abnormal retracted position with respect to said casing; and supplemented by an operating knob on said stem so that retraction of said sleeve will also cause retraction of said stem but by reason of the detent on said stem the pushing in of said sleeve will not cause pushing-in of said stem.

10. A semi-automatically rate regulated timepiece as claimed in claim 9; supplemented by stop means for limiting the extent of rotation of said sleeve when said sleeve is in its retracted position but will not limit the extent of rotation of said sleeve when said sleeve assumes its normal non-retracted position; whereby retraction of said sleeve causes retraction of said stem and whereby if followed by rotation of said sleeve causes both setting of said time hand and adjustment of said rate regulating means to a limited extent, and if followed by restoration of said sleeve end-wise to its normal non-retracted position leaves said stem in its retracted position and turning thereof results in additional setting of said time hand without accompanying rate regulation.

11. A semi-automatically rate regulated timepiece comprising; a casing; time measuring mechanism in said casing; a mainspring for driving said time measuring mechanism; rate regulating means in said casing for controlling the speed of said time measuring mechanism and which may be adjusted to determine the speed at which said time measuring mechanism shall operate; a time indicating hand operatively connected to, and driven by, said time measuring mechanism; a sleeve rotatably and longitudinally slideably mounted in an opening in said casing; a stem supported coaxially in said sleeve for independent rotary motion and for end-wise sliding motion; means for locking said stem against independent rotary motion with respect to said sleeve when said stem and sleeve both assume either their normal non-retracted or their abnormal retracted position; means for operatively coupling said stem for rotary moveemnt of said time hand by rotary movement of said stem when said stem is retracted; and means operatively connecting said sleeve for transferring rotary movement of said sleeve to rotary movement of said mainspring for winding said mainspring when said sleeve is in its normal non-retracted position and for operatively connecting said sleeve for transfer of rotary motion to said rate regulating means for adjustment thereof when said sleeve assumes its retracted position.

12. A semi-automatically rate regulated timepiece as claimed in claim 11; supplemented by a detent for tentatively holding said sleeve in either its normal non-retracted or its abnormal retracted position.

13. A semi-automatically rate regulated timepiece as claimed in claim 11; supplemented by a detent for tentatively holding with respect to said casing said stem in either its normal non-retracted position or its abnormal retracted position.

14. A semi-automatically rate regulated timepiece as claimed in claim 12; supplemented by a detent for tentatively holding said stem against end-wise movement with respect to said sleeve when said sleeve assumes any longitudinal position.

15. A semi-automatically rate regulated timepiece as claimed in claim 11; supplemented by stop means in said casing for limiting the extent of rotation of said sleeve in either direction when said sleeve is retracted but allowing rotation thereof when it assumes its normal non-retracted position.

16. A semi-automatically rate regulated timepiece as claimed in claim 11; supplemented by an operating knob at the external end of the stem so that said sleeve cannot be retracted without also retracting said stem; means for coupling said sleeve for rotary movement of said sleeve to said rate regulating means when said sleeve is retracted and including a slip clutch which is provided with stop means for limiting the extent of operation of said rate regulating means for a single retraction of said sleeve followed by rotation of said sleeve for each retraction of said sleeve; whereby continued rotation of said sleeve after said slip clutch begins to slip causes additional setting of said time hand without accompanying rate regulation; due to the fact that rotation of said sleeve will cause rotation of said stem by reason of the means for locking claimed in claim 11.

17. A semi-automatically rate regulated timepiece as claimed in claim 15; supplemented by an operating knob at the external end of said stem claimed in claim 11 as a result of which retraction of said sleeve also causes retraction of said stem, whereby manual rotation of said sleeve after such retraction causes limited setting of said time hand and limited adjustment of said rate regulating means, and whereby returning of said sleeve to its non-retracted position without returning said stem to its non-retracted position allows added setting of said time hand by rotation of said stem without causing a further adjustment of said rate regulating means.

18. A semi-automatically rate regulated timepiece as claimed in claim 15; supplemented by the addition of an operating knob at the external end of the stem claimed in claim 11 so that retraction of said sleeve is accompanied by retraction of said stem; restoring means including a spring for restoring the stop means claimed in claim 15 to normal after each return of said sleeve to its normal non-retracted position to allow additional limited rotation of said sleeve upon a second retraction of said sleeve; whereby retraction of said sleeve and rotation thereof allows limited setting of the time hand and limited adjustment of the rate regulating means and the return of said sleeve to its non-retracted position allows additional rotation of said stem and additional setting of said time hand without accompanying rate regulating adjustment.

19. A semi-automatically rate regulated timepiece as claimed in claim 11; supplemented by two detents one for tentatively holding said sleeve and the other for tentatively holding said stem in either the normal non-retracted or the abnormal retracted position with respect to said casing; an operating knob on said stem at its external end large enough so that retraction of said sleeve will also result in retraction of said stem but by reason of the detent for holding said stem to said casing the return of said sleeve to its normal non-retracted position will cause said stem to remain in its retracted position for possible setting of said time hand.

20. A semi-automatically rate regulated timepiece as claimed in claim 19; supplemented by stop means in said casing for limiting the extent of rotation of said sleeve in either direction and in turn said stem when said sleeve assumes its retracted position, but will allow free rotation of said sleeve and stem when said sleeve is returned to its normal non-retracted position with said stem still assuming its retracted position; whereby retraction of said sleeve causes retraction of said stem and if the sleeve is then rotated causes both setting of said time hand and adjustment of said rate regulating means, but both to a limited extent only, and whereby if this is followed by restoring of said sleeve to its normal non-retracted position leaves said stem in its retracted position so that its knob may be turned to accomplish additional setting of said time hand without accompanying rate regulating ad-

No references cited.

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