

[54] **TIME CORRECTION DEVICE FOR ELECTRONIC TIMEPIECES**

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58/85.5

[51] **Int. Cl.**..... **G04c 3/00, G04b 19/30**

[58] **Field of Search**..... **58/23 R, 23 A, 33-35,**
58/50 R, 85.5; 200/51.07

[56]

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[57]

ABSTRACT

In an electronic timepiece having a plurality of display elements, a primary manually operable switch member is provided for selecting at least one of the display elements for independent setting or correction and a second manually operated switch element is provided for setting or correcting said selected one or more display elements.

15 Claims, 17 Drawing Figures

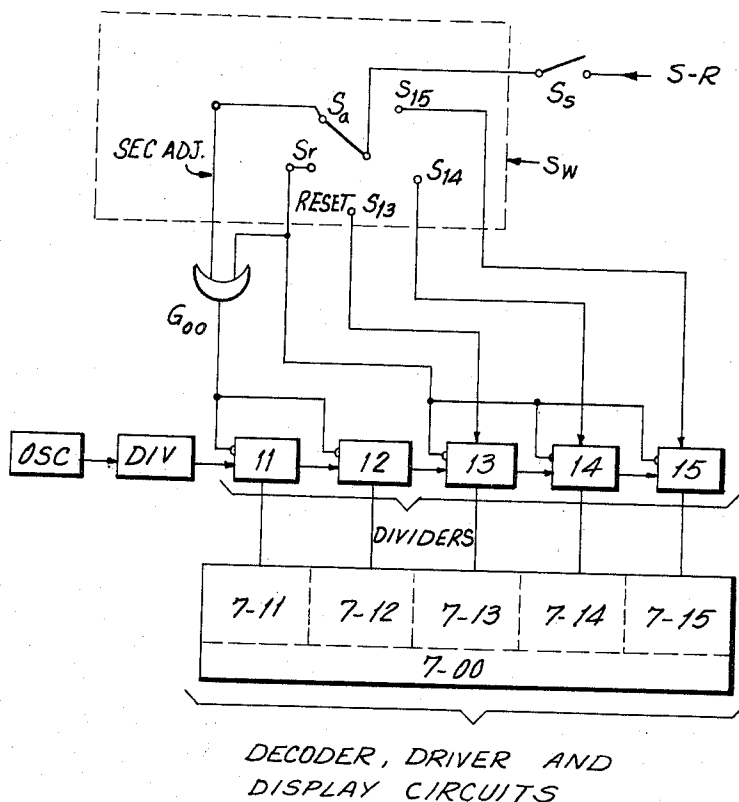


FIG. 1
PRIOR ART

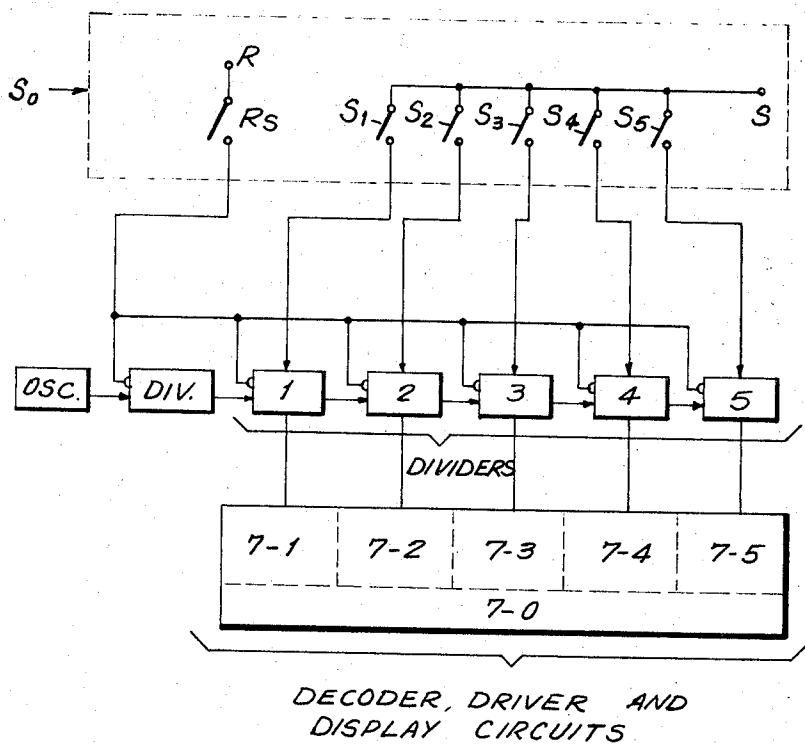
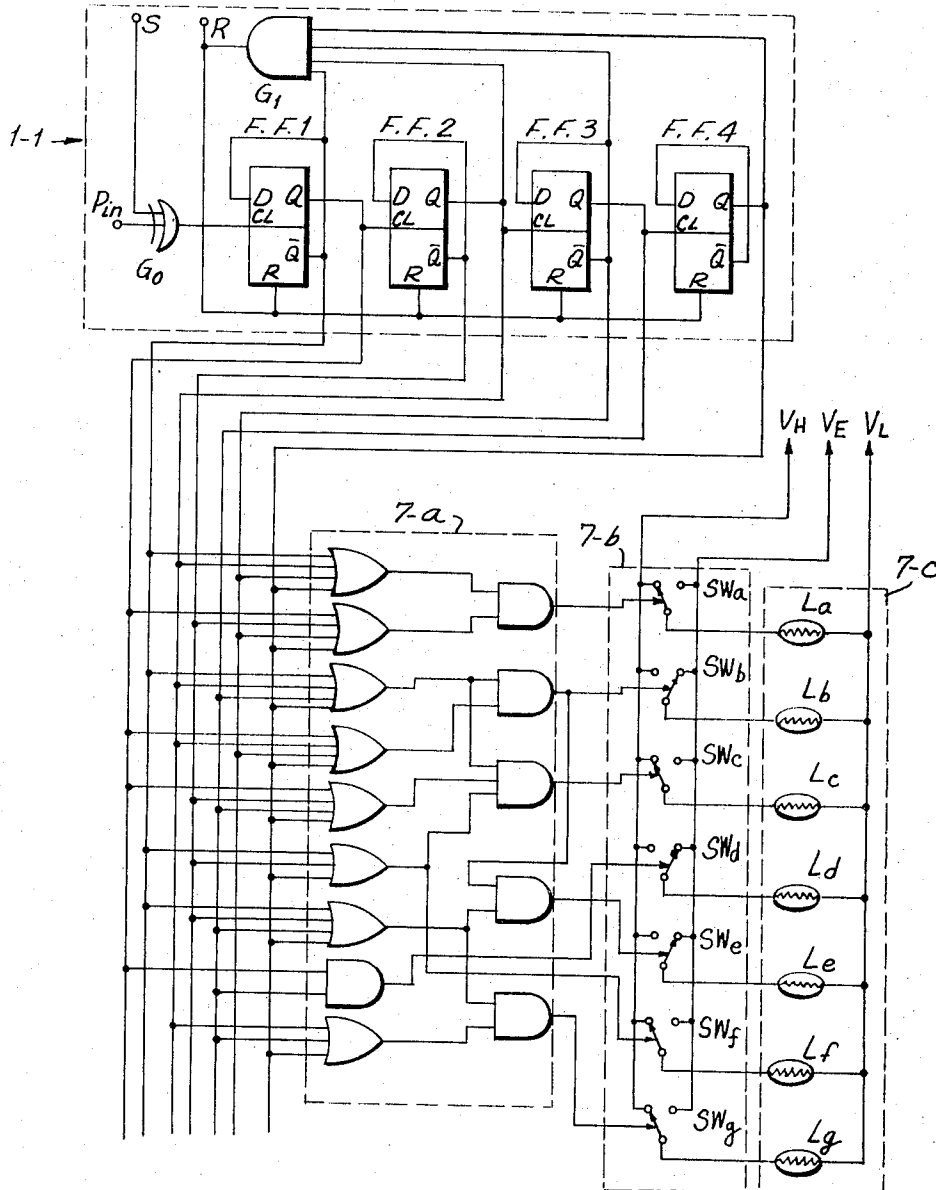


FIG. 2

PRIOR ART



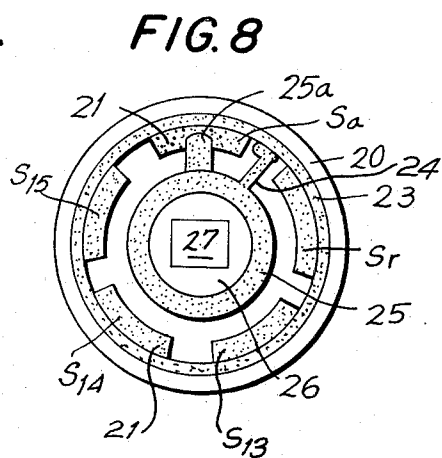
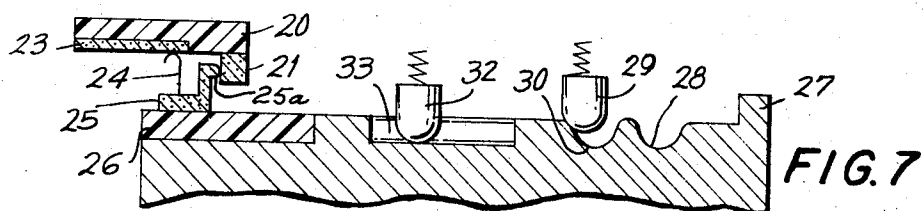
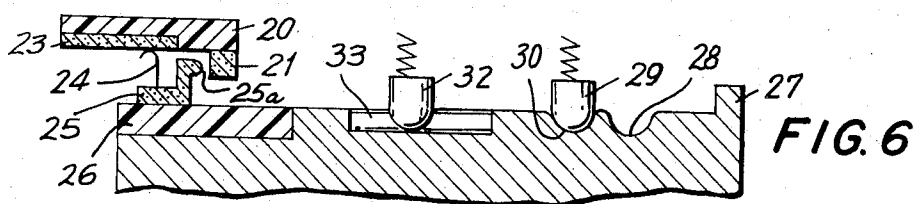
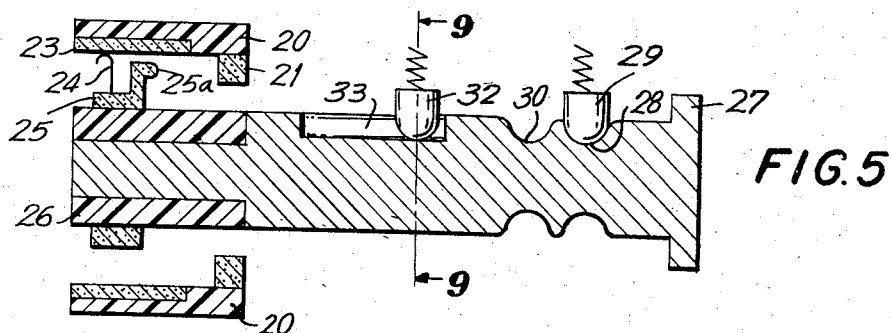


FIG. 9

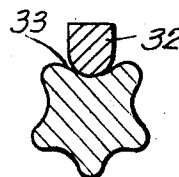


FIG. 10

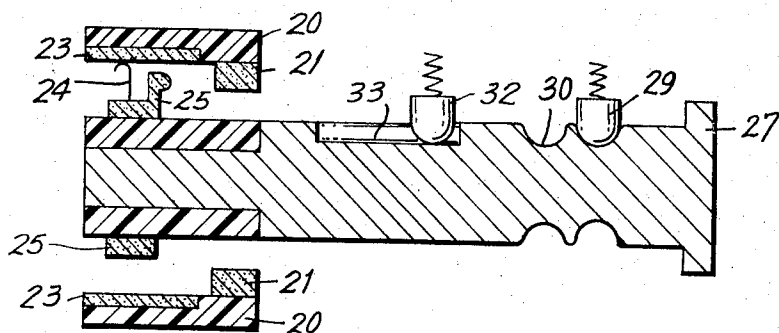


FIG. 11

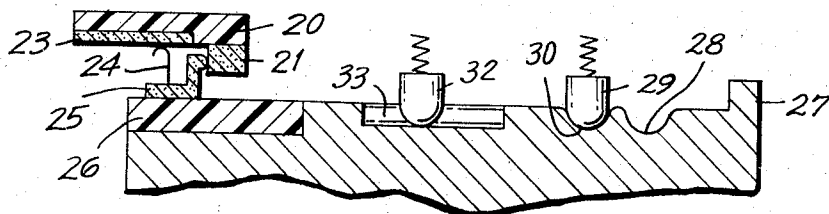


FIG. 12

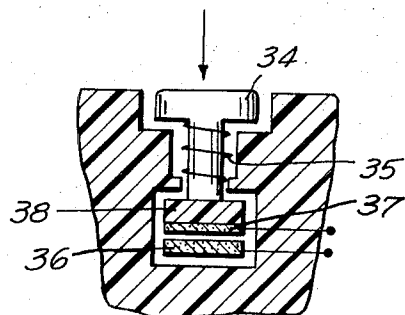


FIG. 13

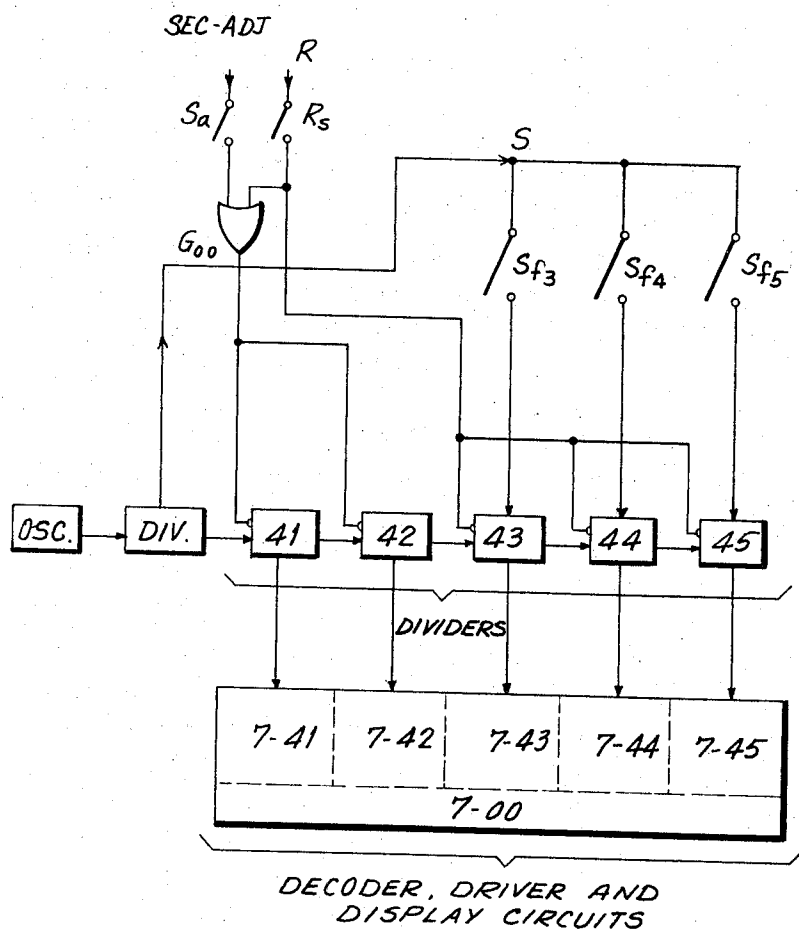


FIG. 14

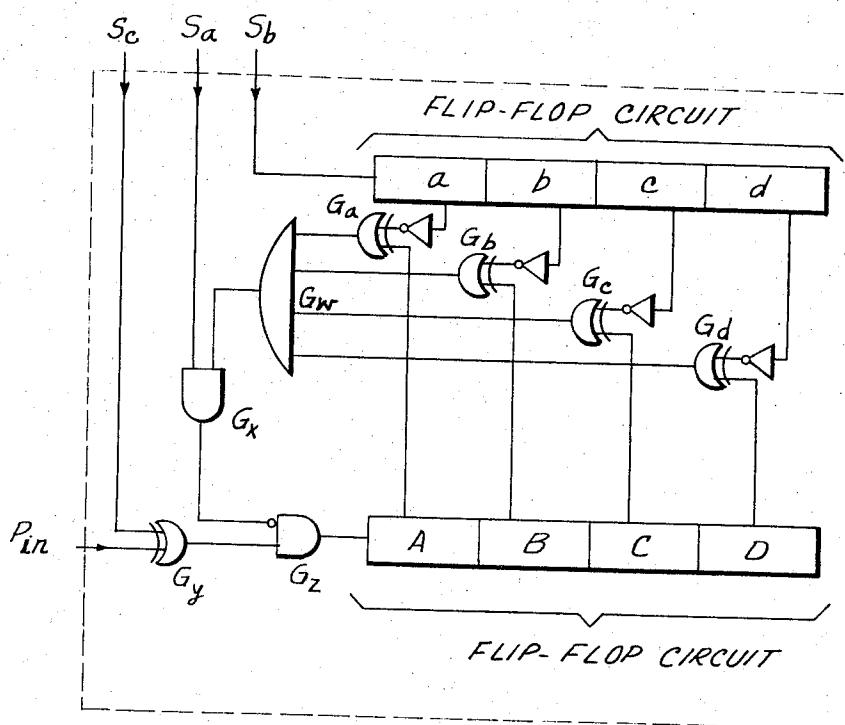


FIG. 15

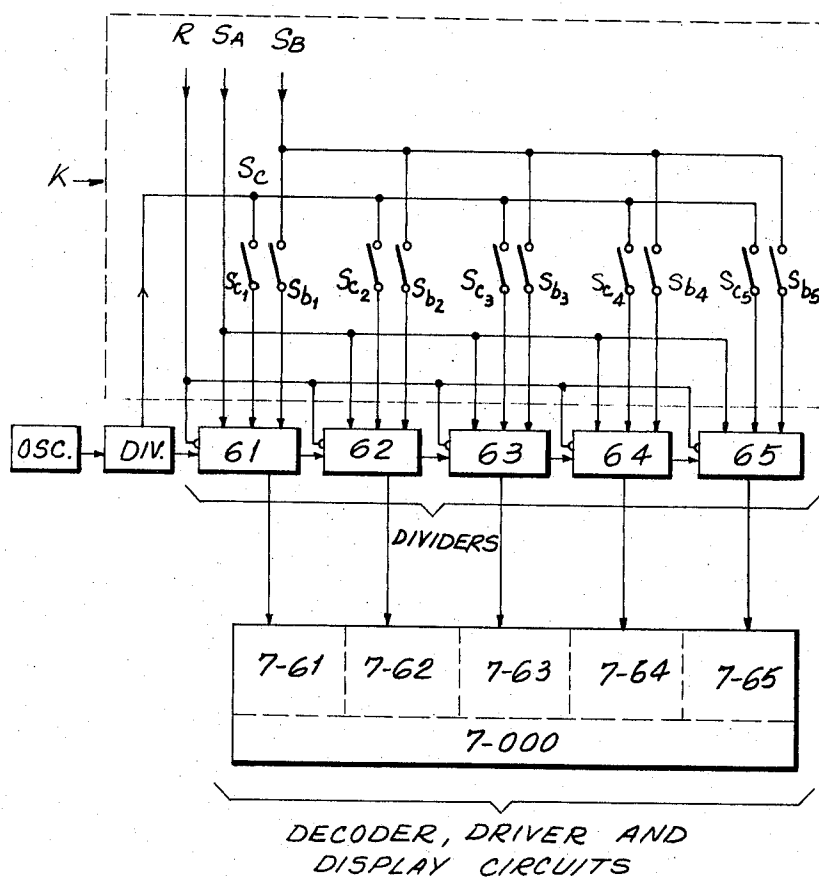


FIG. 16

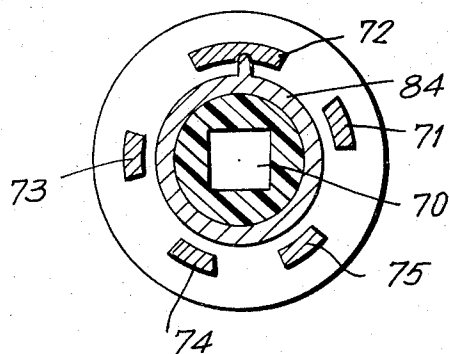
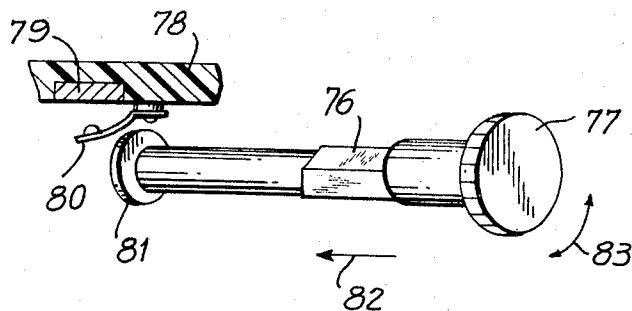


FIG. 17



TIME CORRECTION DEVICE FOR ELECTRONIC TIMEPIECES

BACKGROUND OF THE INVENTION

This invention relates to electronic timepieces having digital display systems, wherein the time indicated by said digital display system is manually correctable. Such digital display systems are generally provided with separate displays for at least 1 minute, 10 minute, and 1 hour digits, and require means for independently correcting each of said digits and for the simultaneous return-to-zero correction of all of the digits. Electronic timepieces of this type are generally formed from solid state devices and do not include mechanical or movable members in their functional components. Such watches are driven solely by electronic circuitry. Substantial effort has been devoted to improving such digital display electronic timepieces, with most of the effort being devoted to accuracy, energy source, life and the like. However, little effort has been devoted to ease of use of the timepiece and the accuracy and quickness with which setting and correction can be achieved. The complex electronic circuitry required in the functioning components of such electronic timepieces inevitably results in complex and difficult to operate time correcting circuitry. Where separate push-button switches are provided for the correction of each digit of the time display system, a substantial space must be provided for the required switches while the provision of a large number of switches makes the operation complicated, leading to mistakes in time correction.

By providing fewer and more readily used time correcting switch elements, the foregoing difficulties have been avoided.

SUMMARY OF THE INVENTION

Generally speaking, in accordance with the invention, an electronic timepiece is provided having a plurality of display elements and time keeping and driving circuit means associated with each of said display elements. A primary manually operable switch means is provided having a common displaceable contact selectively alignable with each of a plurality of fixed contacts, each of said fixed contacts being operatively coupled to at least one of said time keeping and driving circuit means, for selecting between at least two of said display elements to be corrected. A secondary manually operable switch member is provided for selectively applying a setting or correction signal to the time keeping and driving circuit means associated with the display element to be corrected.

Said primary switch member may be a rotary switch having a rotatably mounted shaft bearing said movable contact, said fixed contacts being spaced circumferentially about said shaft in the path of said movable contact. Indexing means may be provided for positioning said movable contact in registration with each of said fixed contacts. Said shaft may be axially displaceable to move said movable contact into and out of engagement with the aligned fixed contact to define a portion of said secondary switching member, said secondary switching member also including means for applying said setting and correction signal to said fixed contact. Further axial indexing means may be provided to axially position said shaft.

The electronic timepiece in accordance with the invention may be provided with oscillator circuit means for producing a high frequency time standard signal and frequency divider circuit means consisting of a plurality of stages for sequentially dividing said high frequency time standard signal to low frequency time keeping signals at a selected group of said stages. Each stage of said selected group of stages of said frequency divider circuit means is coupled to a separate display element through driving circuit means. Means including manually operable switch means is provided coupling at least one of said selected stages with an intermediate stage for the selective separate application of said intermediate frequency signal to one or more of said selected stages for the setting thereof. Each of said selected stages may be provided with a corresponding auxiliary divider circuit, means including setting switch means for selectively applying a setting signal to said auxiliary divider circuits for permitting the setting of said auxiliary divider circuits at a selected value by the manual manipulation of said setting switch means, and gate means coupled to said divider stage and its associated auxiliary divider circuit for detecting the respective states thereof and connected to receive the signal from the prior stage, said intermediate frequency signal and a correction mode signal. The gate means is adapted, in response to said correction mode signal, to apply said intermediate frequency signal to said divider stage until said divider stage and the associated auxiliary divider circuit are in the same state, and to thereafter prevent the application of said intermediate frequency signal and the signal from the prior stage to said divider stage. Said gate means is also adapted to permit said divider stage to return to normal operation upon opening of the switch means applying said intermediate frequency signal and the removal of said correction mode signal.

Accordingly, it is an object of this invention to provide means for improving the operability of the time correction devices for electronic timepieces.

A further object of the invention is to provide time correcting switch means which minimize the number of components and simplify time correction.

Still a further object of the invention is to provide a time correcting device for an electronic watch which permits accurate quick-feed correction, as well as permitting periodic automatic correction.

Still other objects and advantages of the invention will in part be obvious and will in part be apparent from the specification.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the constructions hereinafter set forth, and the scope of the invention will be indicated in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the invention, reference is had to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a block diagram of an embodiment of an electronic timepiece incorporating a conventional push button time correcting arrangement;

FIG. 2 is a detailed circuit diagram of the dividing circuit, decoder circuit, driver circuit and display element of one stage of the electronic watch of FIG. 1;

FIG. 3 is a top plan view of a display element in accordance with the invention formed from a seven bar array;

FIG. 4 is a block diagram of an embodiment of an electronic watch in accordance with the invention;

FIGS. 5, 6 and 7 are sectional views of one embodiment of the primary and secondary switch members in accordance with the invention at three respective positions thereof;

FIG. 8 is an end view of the switch element of FIG. 5;

FIG. 9 is a sectional view taken along line 9—9 of FIG. 5;

FIGS. 10 and 11 are sectional views of a further embodiment of a switch member in accordance with the invention shown at two positions thereof;

FIG. 12 is a sectional view of still a further embodiment of a switch member in accordance with the invention;

FIG. 13 is a block diagram of an electronic timepiece having a manually operated quick-feed correcting circuit in accordance with the invention;

FIG. 14 is a block diagram of a circuit for preventing over count during time correction;

FIG. 15 is a block diagram of an electronic timepiece incorporating the circuit for preventing over count of FIG. 14 and having an automatic quick-feed correcting circuit;

FIG. 16 is a sectional view of a portion of a switch member in accordance with the invention; and

FIG. 17 is a partially perspective partially sectioned view of further components of the switch member of FIG. 16.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, an electric timepiece including a time correcting circuit based on the One-Step method utilizing conventional push-button switches is depicted. In said electronic watch, a high frequency time standard signal is generated by a high precision standard oscillator (OSC) which may be formed from a crystal vibrator, a tuning fork vibrator or the like. Said high frequency time standard signal is converted into a pulse signal of one second frequency by divider circuit DIV formed from a plurality of flip-flop stages. The 1 second signal thus produced is applied to a decimal divider circuit 1 which produces a pulse signal once every 10 seconds. The 10 second signal is applied to a 1/6 divider circuit 2 which produces a pulse signal once every minute. The 1 minute signal is applied into a decimal divider circuit 3 which produces a pulse signal once every 10 minutes. The 10 minute signal is applied to a 1/6 divider circuit 4 which produces a pulse signal once every hour. The 1 hour signal is applied to a 1/12 divider circuit 5 which produces a pulse signal once every 12 hours. The respective 1 second, 10 second, 1 minute, 10 minute and 1 hour signals enter a decoder, driver and display circuit module 7-0. Said module includes display elements 7-1, 7-2, 7-3, 7-4 and 7-5, each representative of a single digit of digital time indication, and each being driven by one of the respective 1 second, 10 second, 1 minute, 10 minute and 1 hour signals. Said display elements are preferably of the seven bar array type and may be formed from luminous diodes, liquid crystal materials, EL, or the like. The respective display elements are driven by decoder and

driver circuits in accordance with the state of the respective divider circuits 1, 2, 3, 4 and 5.

One column of the decoder, driver and display circuitry associated with one digit, specifically with the one second digit, is illustrated in FIGS. 2 and 3. The seven bar display, which permits digital display of numbers from 0 to 9 in accordance with input signals applied thereto is depicted in FIG. 3. The numeral 2 is displayed in the drawing. The decoder circuit selects the segments to which voltage is applied to render them visible in response to the state of the associated divider stage, the voltage being applied to the selected segments by the driver circuit. The output of each divider stage is a binary coded signal, which is decoded by said decoder circuit. In FIG. 2, gate circuit 7-a represents a decoder circuit, switch circuit 7-b represents the driver circuit, while block 7-c represents the display element consisting of segments L_a , L_b , L_c , L_d , L_e , L_f and L_g , as further illustrated in FIG. 3. Block 1—1 of FIG. 2 represents the decimal decoder stage which receives the 1 second signal and produces the 10 second signal at the last Q output thereof. Said decimal divider stage consists of four binary circuits FF_1 , FF_2 , FF_3 and FF_4 . The binary coded output from said decimal divider circuit enters the decoder circuit 7-a. Each of the binary circuits FF_1 , FF_2 , FF_3 and FF_4 is a delay flip-flop having a logical expression $Q_{n+1} = D_{n+1} - 1 = D_n$ where n represents the operating condition of the circuit before the input pulse (time signal P_{in}) enters, and $n+1$ represents the operating condition after the input pulse enters. Accordingly, each binary flip-flop circuit is constructed by connecting the Q and D terminals together. Gate circuit G_1 transforms each output of the binary circuits FF_1 , FF_2 , FF_3 , and FF_4 into 0, 0, 0, 0 (0 in decimal numeration) when each output is 1, 0, 1, 0 (9 in decimal numeration) as a resetting operation, thereby also producing the 10 second signal.

R is a reset signal which resets dividing circuit 1—1. S is a correcting signal which sets the display element at a desired time indication. G_o is an exclusive type gate for receiving correcting signal S and time signal P_{in} .

At normal operating conditions, correcting signal S is set at a low (0) and input signal P_{in} is applied to the divider circuit without modification. When the time is to be corrected, the number of input pulses increases by the number of pulses of the correcting signal S, each additional pulse indexing the divider circuit to permit time correction. Each of the divider stages receiving the 10 second, 1 minute, 10 minute and 1 hour signals can similarly be corrected.

Referring again to FIG. 1, the time correction portion of the electronic timepiece depicted is designated as S_o . As used herein, the term "correct" refers to both the return-to-zero correction of all of the columns (1 second, 10 seconds, 1 minute, 10 minutes and 1 hour) and the separate and individual setting of each column to a desired time indication. R is the reset signal for resetting all of the columns simultaneously, and further resets the divider circuit DIV when push-button switch R_s is closed, thereby performing return-to-zero correction.

To set each display element to a desired time, the push-button switch S_1 , S_2 , S_3 , S_4 , or S_5 coupling the correcting signal S to the respective one of divider circuits 1, 2, 3, 4 or 5 is closed once for each pulse to be added to the respective divider circuit. Thus, the user operates each of the switches S_1 , S_2 , S_3 , S_4 , and S_5 until all

of the display elements display the desired time. However, the arrangement of FIG. 1 offers disadvantages when incorporated in a wrist watch due to the space required for the push-button switches and the large number of switches required. Further, the use of so many switches complicates the operation of the watch and makes it easy to err in time correction.

Referring now to FIG. 4, an electronic timepiece in accordance with the invention is depicted. As in the case of the circuit of FIG. 1, a precision standard oscillator OSC produces a high frequency time standard signal which is applied to a dividing circuit DIV and which produces a signal every second. Divider stages 11, 12, 13, 14 and 15 are respectively decimal, 1/6, decimal, 1/6 and 1/12 divider circuits for respectively driving 1 second, 10 second, 1 minute, 10 minute and 1 hour digits of a digital display. The decoder, driver and display circuit 7-00 correspond in construction to the corresponding elements depicted in FIGS. 2 and 3. The time correction device of the circuit of FIG. 4 includes a switch S_w which selects the column or digit to be corrected, or whether the return-to-zero correction operation is to be performed, said switch being manually operable and of the rotary type. Switch S_s is a signal switch for transmitting the signal S-R to the column selected by switch S_w . Fixed contact S_r of switch S_w is a reset contact, and when engaged by the moving contact and when switch S_s is closed, resets each of dividing circuits 11, 12, 13, 14 and 15 simultaneously, thereby performing the return-to-zero correction function. Fixed contact S_a is a reset contact for second correction only, and when engaged by the movable contact, and when switch S_s is closed, resets only the 1 second and 10 second display elements regardless of the setting of the 1 minute, 10 minute and 1 hour display elements, an alternate return-to-zero correction function. Gate G_{00} serves to separate the simultaneous reset of all of the columns from the reset of the 1 second and 10 second columns only.

Contacts S_{13} , S_{14} and S_{15} of switch S_w are respectively connected to divider stages 13, 14 and 15 for the separate and individual correction of the 1 minute, 10 minute and 1 hour digits. When the moving arm engages one of contacts S_{13} , S_{14} and S_{15} , the associated display element can be corrected in accordance with the One-Step method by turning switch S_s on an off.

An embodiment of a rotary type switch in the nature of a winding-crown incorporating both switches S_w and S_s as depicted in FIGS. 5, 6, 7, 8 and 9. This switch includes a winding crown or shaft 27 formed with two axial grooves 28 and 30 therein which cooperate with spring loaded fixing button 29 to longitudinally fix the winding crown in one of two positions respectively depicted in FIGS. 5 and 6. The switch section consists of a movable contact 25 which rotates with the winding crown and five fixed contacts 21 corresponding respectively to contacts S_a , S_r , S_{13} , S_{14} , and S_{15} of FIG. 4, as more particularly depicted in FIG. 8. To maintain the rotatably mounted winding stem 27 so that the movable contact 25 is in registration with one of the fixed contacts 21, the central region of winding crown 27 is cut into a star shape 33 as depicted in FIG. 9. A spring loaded fixing button 32 engages said star shaped portion 33 for maintaining the rotative stability of the winding crown. A conductive brush 24 is mounted on movable contact 25 for conducting current from said

rotating movable contact through ring 23 to the source of signal S-R.

When the time is to be corrected, the column to be corrected is selected as by aligning movable contact 25 with one of fixed contacts S_{13} , S_{14} and S_{15} or the second correcting or reset functions are selected, such selection being achieved by rotatably positioning winding crown 27. Further, the winding crown is displaced to the right as viewed in FIG. 5 to the position depicted in FIG. 6 with fixing button 29 engaged in annular groove 30. Movable contact 25 and the aligned fixed contact 21 are brought closer together, but not in engagement. By pulling the winding crown to the right a further incremental distance, as depicted in FIG. 7, portion 25a of movable contact 25 engages the aligned fixed contact 21, thereby producing a signal switch function. When the winding stem is released, the bias force of fixing button 29 against the side wall of groove 30 displaces the winding crown to the left as viewed in FIG. 7 back to the position depicted in FIG. 6. Thus, the pulling and releasing of the winding crown serve to operate the switch. Insulating members 20 and 26 are provided for supporting the respective contacts and conductive ring.

A further switch member embodiment in accordance with the invention as depicted in FIGS. 10 and 11. The embodiment of FIG. 10 is similar to the embodiment of FIG. 5 and differs therefrom only in that movable contact 25 engages the aligned fixed contact 21 when the winding stem 27 is positioned so that fixing button 29 rests in annular groove 30. The gentle slope on the wall of groove 30 of FIG. 5 is not required in the embodiment of FIG. 10.

A separate push-button may be used for switch S_s , as depicted in FIG. 12. The switch of FIG. 12 is a push-button switch wherein push-button 34 has a conductor 37 mounted for engagement against conductor 36 as the push-button is depressed. The push-button is normally biased in the off position by spring 35. Switch S_s may also be represented by a torque switch which turns on when rotated clockwise and turns off when rotated counter clockwise.

The correcting switch arrangement in accordance with the invention substitutes one or two manually operable switch members for the plurality of push-buttons used in the conventional watch arrangement, thereby minimizing the space required for the switch mechanisms in the watch. Further, mistake in operation of the time correction arrangement is less likely to occur due to accidental engagement of the push-button due to the provision of the longitudinal indexing arrangement represented by grooves 28 and 30 and the fixing button 29.

Referring now to FIG. 13, a further improvement in the time correcting arrangement in accordance with the invention is depicted utilizing the quick-feed method of time correction.

In the circuit of FIG. 13, the oscillator-divider chain represented by oscillator OSC, divider DIV and divider stages 41, 42, 43, 44 and 45 corresponds in structure and function to the oscillator-divider chain of FIG. 1. Similarly, the decoder, driver and display circuits 7-00, having separate display segments 7-41, 7-42, 7-43, 7-44 and 7-45 correspond in structure and operation to the decoder, driver and display circuits of FIG. 1. The time correcting arrangement of the circuit of FIG. 13 includes a reset switch R_s which serves to simultaneously

reset divider stage circuits 41, 42, 43, 44 and 45 by application of reset signal R when said reset switch is turned on. In this manner, return-to-zero correction is achieved. Switch S_a is provided for second correction and serves to reset only the 1 second and 10 second stages 41 and 42 without regard to the setting of the 1 minute, 10 minute and 1 hour stages 43, 44 and 45. Switch S_a applies a reset signal SEC-ADJ to divider stages 41 and 42 through OR gate G_{00} , the reset signal R from switch R, also being passed through said OR gate. It is noted that return-to-zero operations are performed since setting to the desired time is more easily accomplished after such return-to-zero operation. Switches S_{b3} , S_{b4} and S_{b5} are respectively coupled to the 1 minute, 10 minute and 1 hour divider stages 43, 44 and 45 for selectively applying a correcting signal S of an intermediate frequency derived from a stage of divider circuit DIV. The time on the 1 minute, 10 minute and 1 hour display elements can be separately corrected by quick-feed when the switch associated with the display element to be corrected is turned on.

However, one difficulty with the circuit of FIG. 13 is the danger that the time indication at a particular digit may be advanced beyond the desired time if a hand operated quick-feed device is utilized. For example, the time may be set to 12:20:00 when the desired time is 12:00:00. This possible defect is eliminated in the embodiment of FIGS. 14 and 15 wherein the intermediate frequency signal stops automatically at the moment that the desired time is displayed. Referring first to FIG. 15, the electronic watch depicted is provided with an oscillator-divider chain including oscillator OSC, divider DIV and divider stages 61, 62, 63, 64 and 65 corresponding to the oscillator-divider chain of FIG. 1 in function, but differing in structure as will more particularly be described below. The decoder, driver and display circuit 7-00 incorporating display elements 7-61, 7-62, 7-63, 7-64 and 7-65 correspond in structure and operation to the decoder, driver and display circuits of FIG. 1. The electronic circuit of FIG. 15 includes a time correcting device K.

Referring now to FIG. 14, the structure of the modified 1-second divider stage is depicted A, B, C and D represent a binary flip-flop chain representative of the main decimal divider stage. An auxiliary decimal divider consisting of flip-flop chain a , b , c , and d is also provided, structured to correspond to the main divider stage chain. When the 1 second digit is to be corrected separately, the desired figure is set in the auxiliary divider circuit a , b , c and d by a One-Step process by the pulsing of correcting signal S_b . Thus, if a reading of 5 seconds is desired, the output of flip-flops a , b , c and d must be respectively set to 0, 1, 0, 1 (5 in decimal numeration). A correcting signal S_c is then applied to the main dividing chain A, B, C, D through gate G_w . When each output of flip-flops A, B, C and D corresponds to the corresponding outputs of flip-flops a , b , c and d as previously set, the respective outputs of gates G_a , G_b , G_c , and G_d become high and the output of AND gate G_w becomes high. A correction mode signal S_a representative of the performance of the time correction function is applied to a gate G_x so that when signal S_a is high, the output of gate G_x is high and the output of gate G_z is low regardless of the other input signal to said gate, said other input signal being the output of gate G_y . The other input to gate G_x is from the output of AND

gate G_w and is high when the states of the auxiliary and main divider circuits are identical.

To render divider stage 61 operational again, the correcting signal S_c is first turned off, and next, the correcting mode signal S_a is turned off to show the end of the correction operation. Due to the presence of the gate G_x , when the correcting mode signal S_a is turned off, gate G_z is rendered conductive and the main divider stage A, B, C and D is rendered responsive to the input signal P_{in} from the previous stage. The decoder, driver and display element circuits depicted in FIG. 2 would be connected to the main divider stage A, B, C, D.

Referring again to FIG. 15, switches S_{b1} , S_{b2} , S_{b3} , S_{b4} and S_{b5} couple the correcting signal S_b selectively to the corresponding auxiliary divider circuits of divider stages 61, 62, 63, 64 and 65 for setting said auxiliary divider circuits. Correction mode signal S_a is made high during the correction process. Switches S_{c1} , S_{c2} , S_{c3} , S_{c4} , and S_{c5} are quick-feed correcting switches for selectively applying the intermediate frequency correcting signal S_c from divider circuit DIV and the corresponding divider stages 61, 62, 63, 64 and 65. The provision of the circuit of FIGS. 14 and 15 avoids over counting due to the presetting provision of the auxiliary divider circuits. Signals S_a , S_b , and S_c of FIG. 15 correspond to signals S_a , S_b , and S_c of FIG. 14.

The circuit of FIGS. 14 and 15 permits automatic time correction by means of using a correct-time broadcasting signal as the correction signal S_b applied to the auxiliary divider circuit. Furthermore, the circuit of FIGS. 14 and 15 can be used in a stop watch to measure lap time since the output of the main divider stage always changes coincidentally with the output of the auxiliary divider if a clock pulse is used as the S_b input and only switch S_{b1} is turned on.

Still a further time correction switching arrangement is depicted in FIGS. 16 and 17. In said arrangement, a winding crown 77 is provided with a rotary switching mechanism depicted in FIG. 16, and a push-type switch mechanism as depicted in FIG. 17. Winding crown 77 is provided with a squared portion 76 which is received within a square window 70 in the rotary switch element. A movable contact 84 is displaced relative to circumferentially spaced fixed contact 71, 72, 73, 74 and 75 by rotating winding crown 77 in the direction of arrow 83.

Fixed contacts 71, 72, 73, 74 and 75 may correspond, for example, to switches S_{b1} , S_{b2} , S_{b3} , S_{b4} and S_{b5} . When crown 77 is longitudinally displaced in the direction of arrow 82, after a desired column is selected by rotating the crown, end member 81 engages movable contact 80 against fixed contact 79 to close an electrical circuit. Movable contact 80 and fixed contact 79 are mounted on insulating base 78 and would have leads connected thereto. The switch defined by contact 79 and 80 may be connected to divider DIV to provide the quick-feed correction signal S_c to the switches represented by contacts 71, 72, 73, 74, 75 and 84.

The arrangement in accordance with the invention permits the selective correction of each display element through the use of only one winding crown. At one rotary position of the winding crown, all of the display elements are set to zero, or at other rotary positions of the winding crown, separate display elements may be separately corrected, with the respective display elements being quickly corrected in a step wise

manner. Two separate crowns may be utilized if desired.

The arrangements in accordance with the invention reduces erroneous time corrections and simplifies the performance of the time correction functions as compared with the One-Step method.

It will thus be seen that the objects set forth above, and those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above constructions without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

What is claimed is:

1. An electronic timepiece comprising oscillator circuit means for producing a high frequency time standard signal; multi-stage frequency divider means for dividing said high frequency time standard signal to produce a low frequency timing signal at each of a plurality of said divider stages; display means for the digital display of time including a display element for each digit of time to be displayed; means driving each of said display elements in response to a timing signal of one of said divider stages; and time correction means including a manually operable selector switch means having a movable contact and at least two fixed contacts, each of said selector switch means fixed contacts being connected to at least one of the divider stages producing said time keeping signals, and a manually operable secondary switch means for applying a correction signal through said selector switch means to the selected divider stage for correcting the display element associated with the selected divider stage, said selector switch means and said secondary switch means having a common switch member displaceable in a rotational direction to operate said selector switch means and displaceable in a longitudinal direction to operate said secondary switch means.

2. An electronic timepiece as recited in claim 1, wherein said selector switch means is a rotary switch having a rotary switch element having said movable contact mounted thereon for rotation thereby, said fixed contacts being circumferentially spaced in the path of said movable contact, at least a portion of said rotary element defining said switch member and being longitudinally displaceable for actuating said secondary switch means.

3. An electronic timepiece as recited in claim 2, wherein said secondary switch means has a fixed contact and a movable contact, said secondary switch means movable contact being mounted on said switch member for engagement against said secondary switch means fixed contact upon the longitudinal displacement of said switch member.

4. An electronic timepiece as recited in claim 3, said rotary switch element including a contact holding element formed with a shaped central aperture therethrough and bearing said selector switch means movable contact and said switch member, said switch member being formed with a portion shaped for receipt within said contact holding element central aperture so

that said switch member may be longitudinally displaced independent of said contact holding element and may carry said contact holding element with it when rotatably displaced.

5. An electronic timepiece as recited in claim 1, wherein said selector switch means movable contact is mounted on said switch member for displacement therewith, said selector switch means fixed contacts being circumferentially spaced about said selector member, said switch member being rotatably displaceable to align said movable contact with one of said fixed contacts, said switch member being longitudinally displaceable to bring said movable contact into operative engagement with said aligned fixed contact, thereby defining said secondary switch means.

6. An electronic timepiece as recited in claim 5, including indexing means for positioning said switch member in a plurality of discrete rotary orientations, one of said orientations being aligned with each of said fixed contacts.

7. An electronic watch as recited in claim 6, including indexing means for longitudinally positioning said switch member at at least two positions.

8. An electronic timepiece as recited in claim 7, wherein said longitudinal indexing means includes a pair of spaced circumferential grooves, a corresponding pair of fixing buttons, and spring means for biasing said fixing buttons against said circumferential grooves.

9. An electronic timepiece as recited in claim 8, wherein said circumferential grooves serve to longitudinally position said switch member at a first position at which said movable contact is out of engagement with the aligned fixed contact and a second position at which the movable contact engages the aligned fixed contact.

10. An electronic timepiece as recited in claim 8, wherein both of said pair of grooves and fixing buttons serve to position said switch member so that said movable contact is out of engagement with said fixed contact, one of said grooves and fixing buttons being positioned so that said movable contact engages said fixed contact when said switch member is longitudinally displaced just passed said groove, said fixing button cooperating with a wall of said groove when said switch member is released to automatically reposition said switch members so that said movable contact is out of engagement with the aligned fixed contact.

11. An electronic timepiece as recited in claim 1, wherein at least two of said fixed contacts are coupled to only one of said divider stages, another of said fixed contacts being coupled to all of said divider stages, for the simultaneous return-to-zero thereof.

12. An electronic timepiece as recited in claim 11, wherein still another of said fixed contacts is coupled to the divider stage associated with the 1 second and 10 second timing signal for the simultaneous return-to-zero of said 1 second and 10 second divider stages without regard to the setting of the other of said divider stages.

13. An electronic timepiece as recited in claim 1, wherein said correction signal is an intermediate frequency signal taken from one of said divider stages.

14. An electronic timepiece comprising oscillator circuit means for producing a high frequency time standard signal; multi-stage frequency divider means for dividing said high frequency time standard signal to pro-

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duce a low frequency timing signal at each of a plurality of said divider stages; display means for the digital display of time including a display element associated with each divider stage producing a time signal to be displayed; means driving each of said display elements in response to a timing signal of one of said divider stages; and a time correction switch including a manually operable selector switch means having a movable contact and at least two fixed contacts, each of said fixed contacts being connected to at least one of said divider stages producing said timekeeping signals and a manually operable secondary switching means for selectively applying a correction signal through said selector switch means to the selected fixed contact of said selector switch means for correcting the display element associated with the selected divider stage, whereby the time standard signal applied to said divider means by

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said oscillator means and said timing signals applied to said display elements by said divider stages are not interrupted during the selective application of said correction signal by said secondary switch means.

15. In an electronic timepiece, a time correction switch comprising a manually operable selector switch means having a movable contact and at least two fixed contacts and a manually operable secondary switch means for applying a correction signal through said selector switch means to the selected fixed contacts, said selector switch means and said secondary switch means having a common switch member, wherein said switch member is rotatably displaceable to operate said selector switch means and longitudinally displaceable to operate said secondary switch means.

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