May 16, 1939. B. J. McCLEARY 2,158,468

WATCH RATING RECORDER

Filed April 5, 1937 2 Sheets-Sheet 1

Fig. 1.

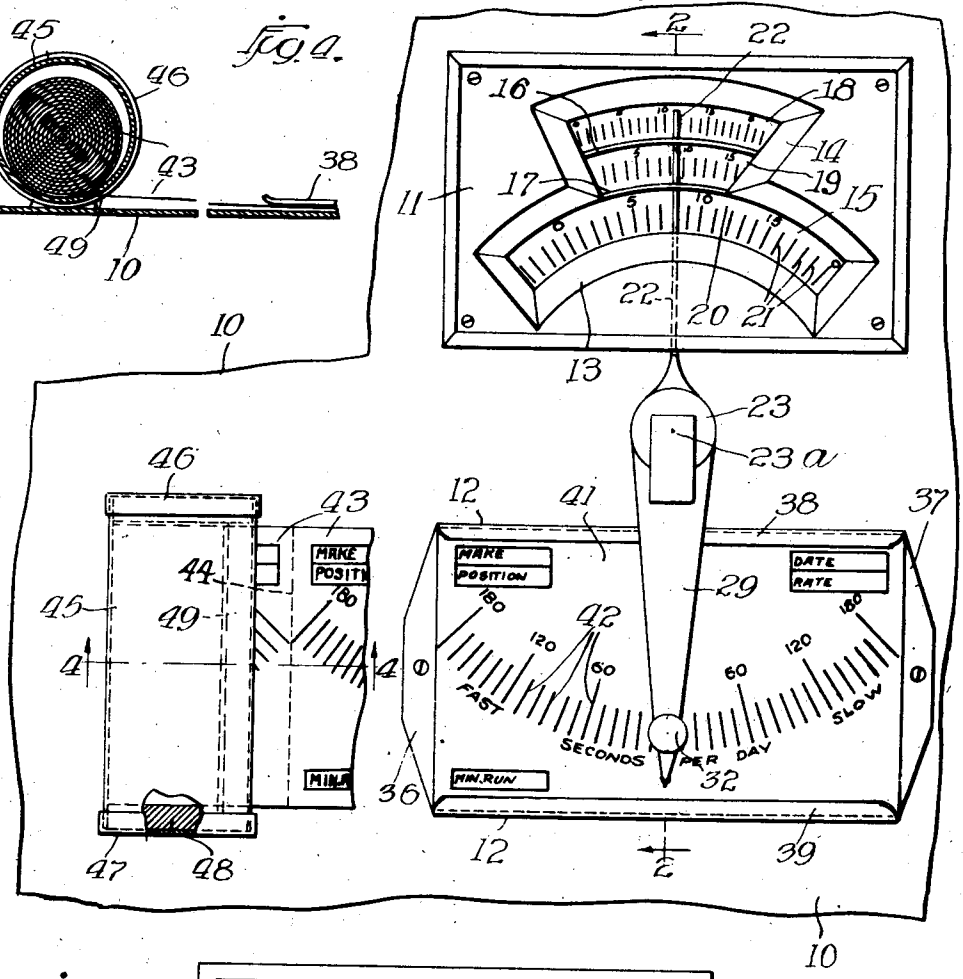
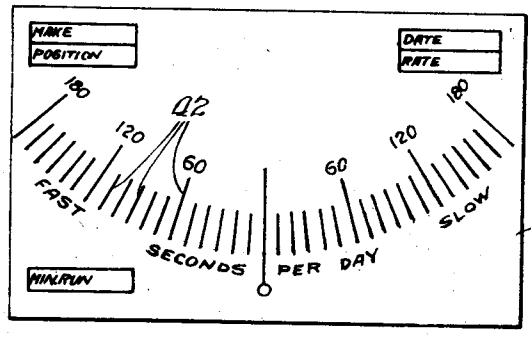


Fig. 4.

Fig. 3.



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Fig. 5.

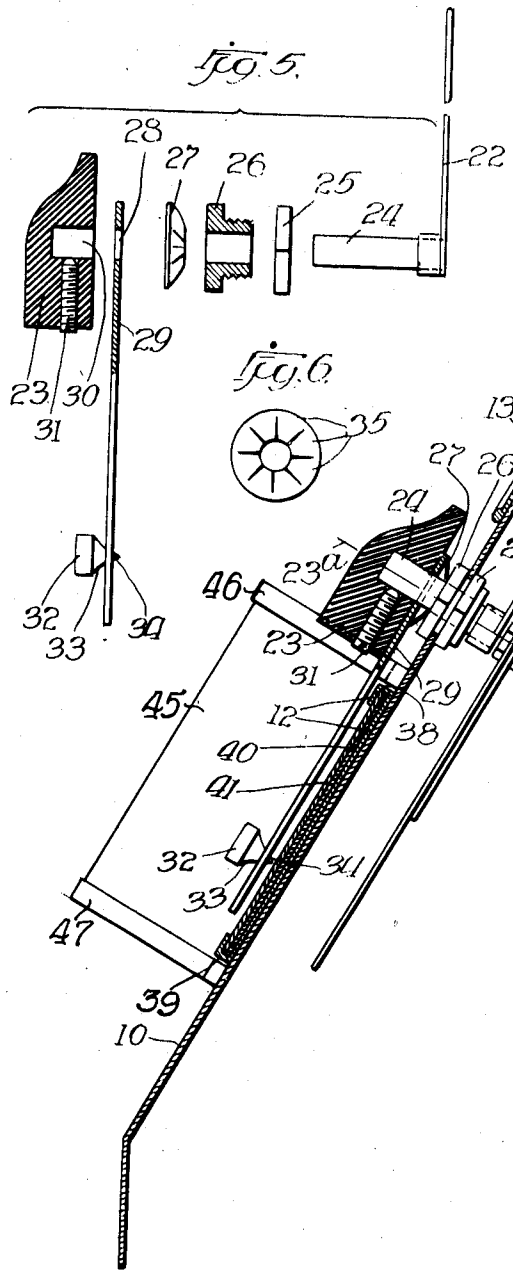


Fig. 6.

Fig. 2.

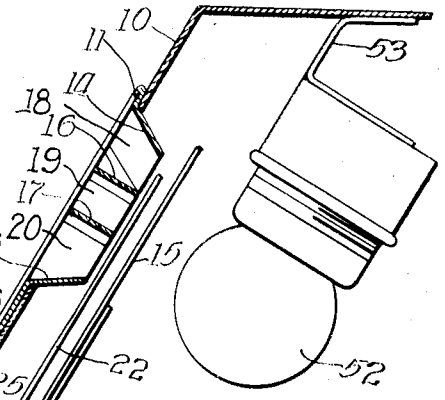
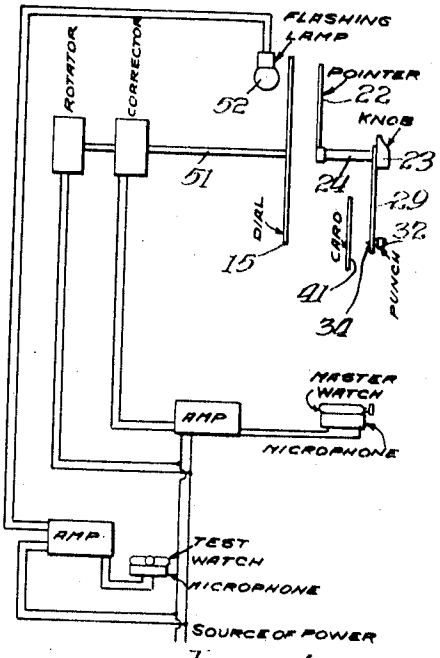


Fig. 7.



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2,158,468

WATCH RATING RECORDER

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Application April 5, 1937, Serial No. 135,199

1 Claim. (Cl. 234—63)

The invention relates to a watch rating recorder and particularly to mechanism for making a record of ratings from a stroboscopic watch rating instrument.

One of the principal objects of the invention is to make a permanent record of the rate of the watch being tested so that the permanent record showing such rate may be kept by the jeweler or other person using such stroboscopic watch rating instrument, or the record may be given to the customer of the jeweler or other person desiring to have such a permanent record. It will be obvious that a permanent record of the rate of the watch being tested would be desirable to many persons since they could then have a definite confirmatory record of the performance of the tested watch.

Due to the inherent construction of the stroboscopic watch rating instrument, the rotating dial used which is mounted on the shaft of a motor within the instrument casing is graduated in units representing other than whole numbers of seconds for a 24 hour rating. In making computations to ascertain the units representing 24 hour watch ratings to be produced in 1 minute, the computations are made so that when five groups of twenty units each are employed, as they must be when using a standard five tick watch, then the number of seconds in 24 hour watch ratings requires that the units shown on the rotating dial of the stroboscopic watch rating instrument shall represent 14.4 seconds per unit for a 24 hour rating when the stroboscopic watch rating instrument is operated for a 1 minute test period.

Since the reading and ascertainment of the rating is complicated because of the representation of 14.4 seconds per unit for a 24 hour rating when the instrument is operated for a 1 minute test period the reading of the stroboscopic watch rating instrument becomes a much simpler matter by the use of the invention and in addition thereto a permanent record of the reading is made.

This advantage is secured by the use of the frictionally held and operated arm in association with the dial pointer and the record medium which may be in the form of a card or a continuous sheet or roll on which is printed a scale marked or graduated in simple units such as 10 seconds and marked every sixth unit in minutes.

The change in value per unit on the scale of the permanent record is accomplished by marking the scale of the permanent record in a suitable ratio so that the units representing 10 seconds each on the permanent record will be a direct conversion of the units representing 14.4 seconds each on the scale of the rotating dial of the stroboscopic watch rating instrument.

The invention will be further understood by reference to the accompanying drawings showing the preferred embodiment of the invention and showing the record as made by the extension arm on a card showing also a container and paper roll for recording purposes, but it will be understood that I do not limit myself to the exact construction shown and illustrated but in the claim hereinafter set forth, I intend to cover all variations and modifications of the invention.

In the drawings:—

Figure 1 is a front elevational view of a section of the outer casing of the stroboscopic watch rating instrument illustrating a portion of the rotating dial, the record card, the dial pointer and record extension arm and also showing the added feature of the roll of record paper and its container tube attached to the face of the casing.

Figure 2 is a longitudinal sectional view of the structure of the invention on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a front elevational view of the card which may be placed in a card frame like that shown in Figure 1 or the indicia of which may be placed in the successive sections of the paper roll also shown in Figure 1.

Figure 4 is a cross-sectional view showing the paper roll and its container on the line 4—4 of Figure 1.

Figure 5 is a disassembled view partly in section and partly in elevation of the separate parts of the dial pointer extension arm and their connections.

Figure 6 is a front elevational view of the friction connector, washer or disk used in making the connection betwen the dial pointer and the extension arm.

Figure 7 is a diagrammatic view of the dial pointer and extension arm and their connections in association with the apparatus and the electrical circuit of the stroboscopic watch rating instrument.

The mechanism of the invention includes features which are placed on the front face of the casing of the stroboscopic watch rating instrument or as it has been termed "time micrometer". The section of the casing 10 has the rotating dial face plate or frame 11 which is suitably secured to the face of the instrument above the permanent dial record frame 12.

The face plate 11 is provided with the enlarged segmental frame portion 13 and the segmental portion 14 of reduced size above it. These segmental frame portions 13 and 14 constitute a window through which the markings or graduations on the rotating dial 15 may be read. Division braces 16 and 17 which are curved, extend across the window and are secured to the respective sides of the segmental frame portion 14.

Due to this construction of the two segmental frame portions 13 and 14, three different types and styles of markings or graduations may be placed on the rotating dial 15 which may be seen through the spaces 18 and 19 of the segmental frame portion 14 and the space 20 in the segmental frame portion 13. Markings or graduations 21 are shown on the rotating dial 15 which may be seen through the space 20.

The graduations or markings 21, visible through space 20, are to be used for example, when testing or rating watches whose balance wheels give five beats per second. The graduations or markings visible through space 19, are for use for example, when testing or rating watches whose balance wheels give five and a half beats per second. The markings or graduations, visible through a space 18, are for use for example, when testing or rating watches whose balance wheels give six beats per second.

A dial pointer 22 connected with a turning knob 23 on the axis 23*a*, as shown in Figs. 2 and 5 and as described hereinafter, extends from the knob 23 over the spaces 18, 19 and 20 to furnish an index of the readings of the rotating dial 15 through the various spaces 18, 19 and 20.

The pointer or index 22 is rigidly and firmly secured to the pointer shaft 24. The shaft 24 extends through the threaded nut 25, the casing 10 (shown in Figure 2), the threaded sleeve 26, the friction disk or washer 27, the aperture 28 in the pointed extension arm 29 and into the aperture 30 of the handle or knob 23. The knob 23 is preferably shaped with the oblong finger portion as shown in Figs. 1, 2 and 5. After the pointer shaft has passed through the various securing members just described, into aperture 30, it is held in place by the threaded screw 31.

The extension arm 29 is provided with the push button 32 which has the tapered portion 33 extending through the extension arm 29 and terminating in a sharpened point or punch 34. The friction disk or washer 27 is constructed with a plurality of cuts which aid in forming the segments 35. It will be understood that although the use of the frictional connector or disk is of the utmost importance in connection with this invention, no claim is made to the construction of the particular connector or washer used and it will be understood that any good form of frictional connector, disk or washer may be used in connection with the apparatus of the invention. From this construction as particularly shown in Figures 2 and 5 of the drawings, it will be seen that the extension arm 29 may be moved on the shaft 24 independently of movement of the shaft itself and the pointer 22 through the medium of the friction connector or washer 27.

While the pointer or index 22 is permanently secured to the pointer shaft 24 and the handle or knob 23, the pointer 22 may be manually operated or swung on the axis 23*a* by turning the knob 23 either to the right or to the left. It is rotatably held in the casing 10 by the nut 25 and threaded sleeve 26 as more particularly shown in Figure 2 of the drawings.

The permanent dial record frame 12 is suitably secured to the casing of the instrument below and in alignment with the rotating dial frame. Securing extensions 36 and 37 are placed at the sides of the frame through which fastening screws may be placed. The top and bottom edges 38 and 39 may be turned inwardly to hold in position in the frame 12, a backing 40 which may be of felt or other suitable resilient material and a printed dial permanent record card 41. The ends of the holding and guiding flanges 38 and 39 are suitably turned and formed for the purposes of permitting the ready reception and removal of the card 41 in the frame 12.

The permanent record card 41 is provided with the dial markings or graduations 42 and indicia as to whether the watch being tested runs fast or slow and how many seconds per day it runs fast or slow, the number of minutes the watch has run in connection with the test, the make of the watch, the position it has been placed in, the date of the test and the rate, or any other suitable information which should be placed on a permanent record of this character. After the permanent record has been made on the card 41, it may be removed from between the guiding flanges 38 and 39 and handed to the customer or filed and a new card put in its place.

In addition to the printed permanent record dial card 41 a printed permanent record dial paper roll 43 may be used. The paper roll 43 is printed with a succession of facsimiles of the card 41 appearing on its face. Each facsimile is identical with that shown in Fig. 3. A perforation or marking as shown at 44 is placed along the entire paper roll 43 at proper spacing to mark off each printed dial section. The paper roll is placed in the tube or container 45 which is suitably fastened to the face of the instrument at one side of the permanent record frame 12.

The tube 45 preferably of metal is constructed with the top cap 46, the base cap 47, the base plate 48 and the paper slot 49. When the paper roll 43 is to be used instead of the card 41, the end portion of the roll 43 is placed in the permanent record frame 12 between the inwardly extending guide flanges 38 and 39 and drawn into position until the markings or perforations 44 outlining the portion of the roll to be used register with the ends of the frame 12. After the permanent record has been made on the roll portion that portion may be separated from the roll and handed to the customer or be placed in a file. In the event that the user of the instrument wishes to use only the card 41 for his permanent record, the tube 45 and the roll 43 may be removed from the instrument.

The rotating dial 15, which is provided with the strengthening and supporting backing 50, is permanently secured in a suitable manner on the motor shaft 51. A neon flash lamp 52 is secured to the lamp bracket 53 fastened to the interior of the casing 10. The lamp is placed back of the window spaces 18, 19 and 20 to provide the desired instantaneous flash to illuminate the dial 15.

It will be understood that the scale on the dial 15 is concentrically arranged with the segmental scale on the card 41. It is therefore necessary that the motor shaft 51 and the pointer shaft 24 be coaxially arranged with reference to the scale on the rotating dial and that the card holder 12 be placed on the instrument casing at a certain place with respect to the axis of the extension

arm 29 so that the marked readings on the card 41 be accurate with respect to the readings on the rotating dial.

The diagrammatic illustration appearing in Figure 7 shows the manner in which the invention is associated with the conventional stroboscopic watch timing circuit, used in watch rating machines, such as is referred to in this case. The pointer 22 with the pointer shaft 24 is shown connected to the pointed extension arm 29, operated by the knob 23 and having the punch or marker 32. These are shown with relation to the card 41 and the rotating dial 15 connected to the motor shaft 51.

The ticking of the master watch is impressed on a tick responsive device such as a microphone connected in the customary way to an amplifier of a suitable type to operate the correction device in order that the speed of the dial be maintained at the proper rate. The ticking of the watch to be tested is impressed on another microphone connected to a suitable amplifier whose output is connected to the flashing neon lamp. Both amplifiers are connected to an electrical supply source. The action of the rotating dial in connection with the flash neon lamp creates the stroboscopic phenomenon which is the basis of this type of watch rating instrument. A motor is connected to the same electrical supply source which is used in conjunction with the corrector as a prime mover for the rotating dial.

With reference to the operation of the invention in connection with stroboscopic watch rating instruments, it will be understood that the indication of the rate of a watch in seconds, fast or slow for 24 hours, is a numerical difference in the apparent positions of illuminated numbers on the rotating reference dial. As stated, the rotating reference dial 15 is illuminated by the watch tick actuated neon flash lamp 52. The rotating reference dial 15 contains reference numbers of which there are five groups, each group reading from 0 to 20. In Figure 1 of the drawings there is shown one of these groups reading from 0 to 20 and a portion of another group. It has not been considered necessary for an understanding of the invention to show all of the groups.

In the operation of the stroboscopic watch rate instrument, the pointer or index 22 is set over a reference number which is flashing on the rotating dial. Any reference number may be selected. This may be done by grasping the knob 23 to which the pointer 22 is fixedly secured. Preferably the pointer or index 22 is set over a zero marking of any one of the five groups of numbers which show in the space 20 on the rotating dial. The setting is by means of the knob 23 to which the pointer is secured.

One minute later the new position taken by the zero as shown on the dial determines the rate of the watch whether fast or slow and how fast it is or how slow it is. If the zero has apparently drifted to the right, the watch being tested is running fact. If the zero on the dial has apparently drifted to the left, the watch is running slow. In the stroboscopic watch rating instrument considered in this case, each division of drift per minute represents 14.4 seconds for a 24 hour rating.

Continuing the description of the operation of the instrument to make a record of the actual watch rating, the pointed extension arm 29 is set so that the pointer or punch 34 is over the center zero of the printed graduation or scale on the card 41 or the roll 43 as the case may be. This movement of the extension arm 29 to have the sharpened point or punch 34 over the printed scale on the card while at the same time the pointer 22 is in the location where it was placed to be over the zero of the rotating reference dial is made possible by the friction connection of the pointer 22 and the extension arm 29 by means of the friction connector or disk 27.

As stated, at the end of 1 minute, or any other given amount of time, the zero on the rotating dial will have moved either to the right or the left, unless the watch is keeping perfect time when the zero will not move either to the right or to the left. Thereupon the pointer or index 22, by means of the knob or handle 23 will be manually swung over the new position of the apparent zero on the rotating dial 15. This new position, if the zero has apparently drifted to the right, indicates that the watch being tested is running fast and if the zero has apparently drifted to the left the new position will be to the left, indicating that the watch is running slow.

When the pointer or index 22 is moved either to the right or to the left, it simultaneously carries with it, because of the frictional connection due to the friction disk 27, the pointed extension arm 29 and without any manual movement by the operator of the extension arm 29. In other words, the extension arm 29 is automatically swung either to the right or to the left of the zero on the permanent record card when the pointer or index 22 is manually moved by means of the knob or holder 23. A record can then be made showing the amount of the drift of the apparent zero on the rotating dial 15 by depressing the push button 32.

The drift is indicated on the rotatable dial 15 in graduations totaling 100 divisions on the dial in five groups of twenty units, each representing 14.4 seconds per unit having 24 hour rating when the stroboscopic watch rating instrument is operated for a 1 minute test period and automatically transmitting the reading thereof to the permanent dial card record 41 where the scale or dial is marked in simple units such as 10 seconds each and marked every 6th unit in minutes, thereby transmitting a reading of a scale marked with certain sized divisions to another scale marked with different sized divisions.

Naturally, since the two members 22 and 29 are simultaneously swung when the point or index 22 moves to the right, the extension arm 29 moves to the left, and when the point or index 22 moves to the left the extension arm 29 moves to the right. This is clearly indicated in the words "fast" and "slow" on the permanent card dial 41. After the pointer 22 and the extension arm 29 have been moved, force is applied to the marking button 32 to cause the punch or point 34 to make a mark in the scale or dial of the card 41, either on the fast side or the slow side from the central zero as the case may be. It will be understood that the mark to be made on the card may either be a punching such as would be made by the point 34, or a sharpened pencil or pen point of suitable construction might be used.

After the permanent record card has been marked, it may be removed from the frame 12 and becomes a permanent record of the reading of the stroboscopic watch rating instrument. In case the roll of paper 43 is used, the section of the roll containing the scale or dial between the perforations 44 and as marked by the marking device may be torn off and becomes a record of the reading of the instrument.

When the next watch to be tested is substituted for the watch which has just been tested, the point or index **22** and the pointed extension arm **29** may be swung to their initial zero positions, the one over the zero marking on the rotating dial and the other over the zero marking on the card whereupon the same operation as has been described for the testing of the first watch may be repeated.

It will be understood that there are 100 marks or graduations on the illuminated rotating dial divided into units to represent 14.4 seconds per unit for a 24 hour rating when the stroboscopic watch rating instrument is operated for a 1-minute test period, and it will also be understood that the markings or graduations of the record card **41** and also the roll **43** if carried out to a complete circle would be 144 markings of 10 seconds per unit and marked every 6th unit in minutes, and it will be further understood that the graduation of the record card **41** is placed at such a distance from the axis of the extension arm **29** that although there is variation in the valuations of the divisions of the two graduations, the reading of the dial below the pointer **22** and the reading of the record card **41** when marked by the point or punch **34** are identical for all practical purposes.

It will be further understood that the size or dimension of each of the unit spacings on the permanent record card determines the distance at which the graduated scale of the card must be from the axis **23***a*, it being further understood that whatever the distance at which the graduated scale of the card or sheet may be placed from the axis **23***a*, it is always concentric with the graduated scale of the rotating dial.

Having thus described the invention what I claim and desire to secure by Letters Patent is:

A watch rating recorder, said watch rating recorder being adapted for stroboscopic watch rating instruments, said recorder comprising a movable card, said card having two sections showing graduations representing seconds units, the zero second graduation being substantially in the lower central portion of said card, the graduations extending on each side of said zero second representation showing ascending seconds units, one set of said graduations to show fast watch rating, the other set of graduations to show slow watch rating, a card frame, said frame being adapted to hold and position said card, a pivoted arm, said arm bearing a punch at its outer end, said punch being adapted to mark either said graduations representing the fast seconds units on one side of the zero graduation or the slow seconds units on the other side of the zero graduation, said seconds units graduations being arranged segmentally on said card with relation to the axis of said pivoted arm, a dial frame, a rotating dial, said rotating dial having graduations, said graduations representing different values than the graduations on said card, the graduations on said dial being concentrically arranged with respect to the graduations on said card, said card frame and said dial frame being in substantially the same plane, a second arm or pointer pivotally secured on the same axis with said first mentioned arm, a metallic friction member, said arm or pointer being adapted to swing over said dial graduations, said punch arm and said pointer arm being frictionally joined together by means of said metallic friction member so that they may be operated as a single unit, or the punch arm and the dial pointer may be swung independently of each other, the apparent displacement of a reading on the rotating dial being represented by a punch mark on the graduations upon said card.

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