Feb. 26, 1952 J. BERGMAN 2,587,277

SETTING MECHANISM FOR DIRECT READING NUMERAL CLOCKS

Filed Jan. 5, 1949 2 SHEETS—SHEET 1

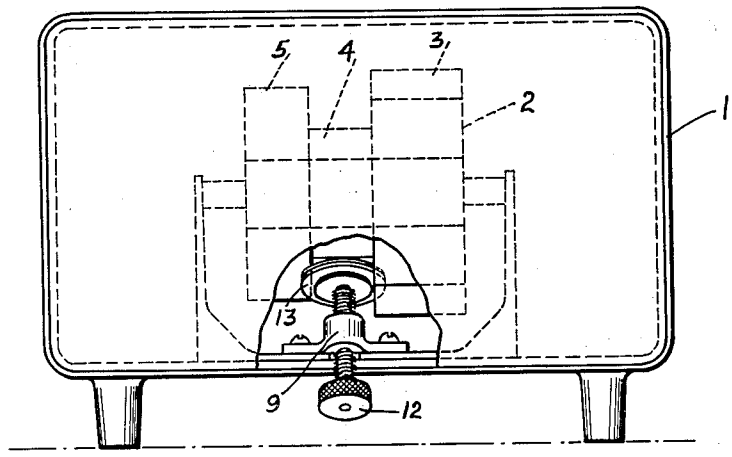



Fig. 1.

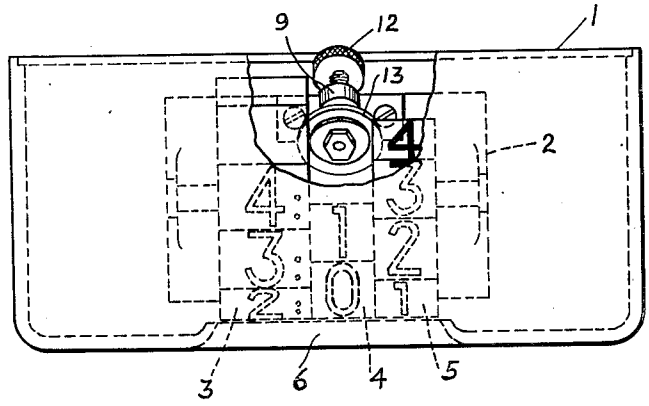



Fig. 2.

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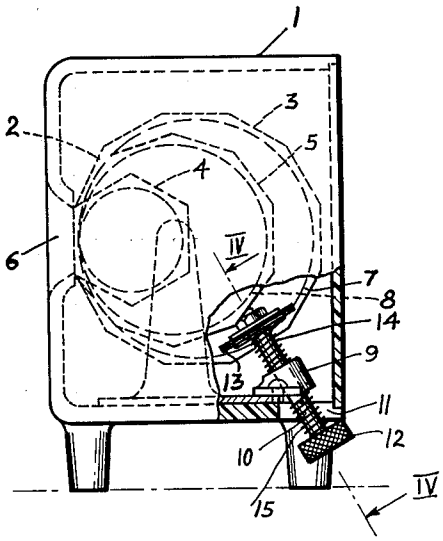



Fig. 3.

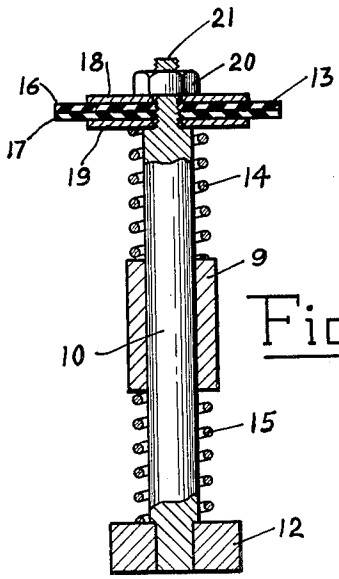



Fig. 4

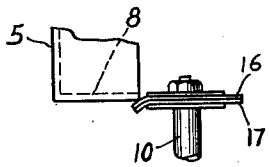



Fig. 5.

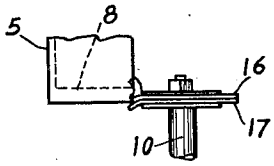



Fig. 6.

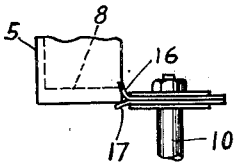



Fig. 7.

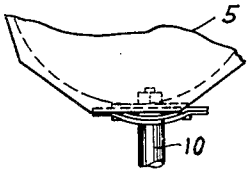



Fig. 8.

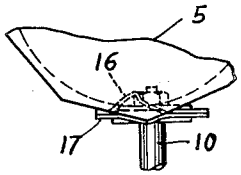



Fig. 9.

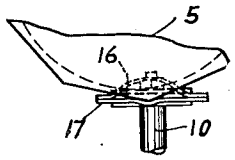



Fig. 10.

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# UNITED STATES PATENT OFFICE

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## SETTING MECHANISM FOR DIRECT READING NUMERAL CLOCKS

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Application January 5, 1949, Serial No. 69,356

12 Claims. (Cl. 58—80)

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This invention relates to setting mechanism for numeral clocks of the direct reading type.

Numeral clocks of the direct reading type are well-known and are commonly provided with separate wheels for indicating time in minutes, tens of minutes, and hours, the wheels being provided with indicating numerals on the periphery thereof. The wheels are driven in a step-by-step manner such that the time indicated thereby changes every minute, and the time is thus continuously indicated in direct reading numerals. One form of direct reading numeral clocks is shown in United States Patent No. 1,990,645, issued February 12, 1935, to F. A. Greenawalt.

Direct reading numeral clocks of the type with which this invention is concerned are driven by electrical synchronous motors. In case of interruption of the electric current, it is necessary to reset the clock to the time of day after the supply of electric current to the clock is re-established. Such clocks heretofore have had an undesirable feature in that no satisfactory form of mechanism has been devised for setting the reading given by the clock. The setting of the clock has been a manual operation requiring the insertion of one's fingers into the casing containing the indicating wheels in order to rotate such wheels to a position indicating the time of day.

One of the principal objects of this invention is to provide a setting mechanism for direct reading numeral clocks which will eliminate the necessity of gaining access to the interior of the clock casing for the purpose of effecting the setting operation.

A further object of the invention is to provide a setting mechanism for a direct reading clock with a single operating member which projects through an opening in the clock casing, and which may be operated manually to move the time indicating wheels to any desired position.

Another object of the invention is to provide a setting mechanism which comprises an operating disc which may be moved axially to place it in operative engagement with a time indicating wheel so that rotation of the disc will be effective to rotate the time indicating wheel with which it is engaged.

Other operations and advantages of the invention will become apparent from the following description.

In the drawings there is shown a preferred embodiment of the invention. In this showing:

Fig. 1 is an elevational view of a clock from the back thereof, a portion of the casing being broken away to illustrate more clearly the setting mechanism;

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Fig. 2 is a top plan view of the clock shown in Fig. 1, a portion of the casing being broken away to more clearly illustrate the setting mechanism;

Fig. 3 is an end elevational view of the clock shown in Figs. 1 and 2, a portion of the casing being broken away;

Fig. 4 is an enlarged sectional view of the setting mechanism illustrated in Figs. 1 through 3.

Figs. 5 through 7 are fragmentary views in side elevation illustrating respectively the manner in which the rubber washers of the setting device engage with the peripheral portion of a time indicating wheel as the setting device is rotated; and

Figs. 8 through 10 are views similar to Figs. 5 through 7, respectively, looking from the left of Figs. 5 through 7.

Referring to the drawings, the numeral 1 indicates the casing of a clock having a time indicating unit 2 mounted therein. The time indicating unit 2 forms no part per se of this invention, and only those parts thereof necessary to an understanding of this invention have been illustrated. The time indicating unit 2 is of the type shown in the above mentioned Patent No. 1,990,645, to which reference is hereby made for a more complete description of the structure thereof. For the purposes of this invention, it will be sufficient to point out that the time indicating unit 2 includes indicating wheels 3, 4 and 5 having indicating numerals on the periphery thereof as best shown in Fig. 2. The numerals on the wheels 3, 4 and 5, respectively, indicate time in hours, tens of minutes, and minutes, and are driven by a timed drive (not shown) in a step-by-step manner such that they continuously indicate the time of day through an opening in the clock casing as explained in the above mentioned patent. Due to the different number of numerals which must be provided on the peripheries of wheels 3, 4 and 5, such wheels are not of the same size. In order that the numerals on the wheels will line up in a common plane adjacent the opening 6, it is necessary that such wheels be supported for rotation about spaced parallel axes as will be readily apparent from the showing of Fig. 3.

Since the wheel 4 has only six numerals thereon and thus has the smallest diameter, there will be a space between the wheels 3 and 5 at the back of the casing 1. Due to the difference between the diameter of the hour wheel 3,

which is provided with twelve numerals, and the diameter of the minute wheel 5, which is provided with ten numerals, the peripheral portions 7 and 8 of the wheels 3 and 5 will be spaced radially from each other. The peripheral portions 7 and 8 are essentially annular in shape and are spaced axially from each other by reason of the ten-minute wheel 4 between the wheels 3 and 5, and are spaced radially relative to each other by reason of the difference in diameter of the wheels 3 and 5. The radial spacing of the annular peripheral portions 7 and 8 is at the back of the clock or in one relative angular position of the wheels 3 and 5. In a manner which will become apparent, the spacing of the annular peripheral portions 7 and 8, which is inherent in the structure of the above mentioned patent, is utilized by the setting mechanism of this invention.

The mechanism for manually setting the positions of the wheels 3, 4 and 5 comprises a support 9 secured to the casing 1, and having a cylindrical opening therein for the reception of an operating rod 10. The lower end of the rod 10 extends downwardly and outwardly through an opening 11 in the casing 1, and is provided with a knurled knob 12 which is accessible for manual operation. The upper end of the rod 10 extends to a position axially between the wheels 3 and 5, and is provided with an operating disc 13 positioned radially between the annular wheel portions 7 and 8.

As best shown in Fig. 3, the axis of the disc 13 and rod 10 extends in a direction which is generally perpendicular to the rotational axes of the time indicating wheels 3 and 5. This angular arrangement of the axis of the disc 13 is desirable in order that its edges will present the greatest area possible for frictional driving engagement with the parts 7 and 8.

As will be best apparent from the showings of Figs. 1 and 2, the disc 13 has a diameter greater than the spacing between the wheels 3 and 5 so that one edge of the disc 13 will engage with the annular peripheral portion 8 of the wheel 5 when the rod 10 is moved axially upwardly, and an opposite edge thereof will engage with the annular portion 7 of the wheel 3 when the rod 10 is moved axially downwardly. A spring 14 having one end bearing against the support 9 and its other end bearing against the supporting structure for the disc 13, and a spring 15 having one end bearing against the support 9 and its other end bearing against the knob 12 are provided for biasing the rod 10 axially to a position in which the disc 13 is out of engagement with both of the annular surfaces 7 and 8. When it is desired to set the position of the wheels 3 and 5, the rod 10 is moved axially against the biasing action of the springs 14 and 15 to engage the disc 13 with the peripheral portion 7 or 8 on the time indicating wheel to be moved. When the disc 13 is engaged with either of the peripheral portions 7 and 8, rotational movement thereof will be effective to rotate that wheel carrying the peripheral portion with which the disc 13 is engaged. The disc 13 is preferably formed from a rubber or rubber-like material in order to increase the frictional driving connection between it and the wheel with which it is engaged.

Although a solid rubber disc 13 may be employed, it is preferred that the disc 13 be constructed as shown in Fig. 4. In this showing, the disc comprises a pair of concentric rubber washers 16 and 17 which are mounted concentrically and in an abutting engagement with each other on the rod 10 by metal washers 18 and 19 which operate to clamp the washers 16 and 17 together. A nut 20 having threaded engagement with a reduced end portion 21 on the rod 10 is provided for clamping the parts together. The washers 18 and 19, in addition to clamping the rubber discs 10 and 17 together, function to stiffen the disc structure 13 and prevent undue flexing thereof upon engagement with the peripheral portions 7 and 8. This action is desirable when a solid rubber disc 13 is employed in place of the abutting rubber washers 16 and 17.



The action of the washers 16 and 17 provides a desirable feature from the standpoint of their frictional driving engagement with the peripheral portions 7 and 8. This action has been illustrated in the showings of Figs. 5 through 10. Fig. 5 illustrates the flexing action of the washers 16 and 17 which takes place when the rod 10 is moved axially to initially engage the washers with the peripheral portion 8. As the rod 10 is rotated to rotate the wheel 5, the upper washer 16 is distorted as shown in Figs. 6 and 9. This distortion takes place during the initial rotational movement of the rod 10. The distortion of the washer 16 is effective to place its edge above the peripheral portion 8, and continued rotation of the rod 10 causes the washer 16 to ride up to a position in which it engages with the upper surface of the peripheral portion 8 on the wheel 5 as shown in Figs. 7 and 10. In this relative position, the washers 16 and 17 straddle the peripheral portion 8 and are effective to materially increase the frictional driving engagement thereof with the edge of the peripheral portion 8.

The operation of the disc 13 to effect a clock setting movement of the wheels 3, 4 and 5 is very simple. If the minute wheels 4 and 5 are to be set, it is merely necessary to press upwardly on the knob 12 and then rotate the knob until the wheel 5 presents the desired figure at the opening 6. If the reading of the wheel 4 is to be changed, rotation of the knob 12 is continued and the step-by-step driving mechanism (not shown) between the wheels 4 and 5 as described in the above mentioned patent will be effective to rotate the wheel 4 one-sixth of a revolution for every full revolution of the wheel 5. If the reading presented at the opening 6 by the numerals on the hour wheel 3 is to be changed, it is merely necessary to pull downwardly on the knob 12 to engage the disc 13 with the peripheral portion 7 and thereafter rotate the knob 12 until the hour wheel 3 presents the desired figure at the opening 6.

From the foregoing, it will be apparent that the setting mechanism of this invention provides an exceedingly simple form of apparatus for setting the relative positions of the wheels of a direct reading numeral clock. Attention is particularly invited to the fact that this setting mechanism enables the relative positions of the time indicating wheels to be adjusted without the necessity of gaining access to the interior of the clock casing. It will also be noted that the knob 12 is the only part of the setting mechanism to which access must be had for effecting a setting operation, and that this part projects through an opening in the clock casing to a position in which it is readily accessible for operation. Attention is also invited to the fact that the setting mechanism is ineffective to interfere with the operation of the timed driving mechanism for

the clock. In the event that the springs 14 and 15 fail to return the disc 13 to a position out of engagement with the annular parts 7 or 8 after a setting operation, the wheels 3, 4 and 5 may operate in a normal fashion without interference from the setting mechanism. In such case, rotation of the time indicating wheels by their timed drive will merely rotate the disc 13 and its mounting rod 19 without interrupting the timing movement of the indicating wheels.

While I have illustrated and described one specific embodiment of my invention, it will be understood that this is merely by way of illustration, and that various changes and modifications may be made therein within the contemplation of my invention and under the scope of the following claims.

I claim:

1. In a direct reading numeral clock, a pair of wheels having time indicating numerals thereon mounted for rotation about spaced parallel axes, and an adjusting member movable to different positions in which it is selectively operable to adjust the position of said wheels.

2. In a direct reading numeral clock, a pair of wheels having time indicating numerals thereon mounted for rotation about parallel axes, a disc mounted for rotation about an axis substantially perpendicular to said parallel axes, and means for moving said disc axially to different positions in which it is frictionally engaged with peripheral portions of said wheels so that rotation of the disc will be effective to rotate the wheel with which it is engaged.

3. In a direct reading numeral clock, a pair of axially spaced wheels of unequal diameter respectively having annular portions rotatable therewith, said annular portions being spaced radially with respect to each other at one relative angular position thereof, and a disc rotatable in the space between said annular portions and movable axially into engagement with selected ones of said annular portions to rotate and adjust the position of said wheels.

4. In a direct reading numeral clock, a pair of axially spaced wheels of unequal diameter respectively having annular portions rotatable therewith, said annular portions being spaced radially with respect to each other at one relative angular position thereof, a rubber disc mounted in the space between said annular portions for rotation about an axis extending generally radially with respect to said wheels, and an operating member mounting said disc which is axially movable to move said disc into frictional engagement with selected ones of said wheels and rotatable to adjust the position of the wheel with which it is engaged.

5. In a direct reading numeral clock, a pair of axially spaced wheels of unequal diameter respectively having annular portions rotatable therewith, said annular portions being spaced radially with respect to each other at one relative angular position thereof, a rubber disc mounted in the space between said annular portions for rotation about an axis extending generally radially with respect to said wheels, an operating member mounting said disc which is axially movable to move said disc into frictional engagement with selected ones of said wheels and rotatable to adjust the position of the wheel with which it is engaged, and means resiliently biasing said operating member to a normal position in which said disc is out of engagement with both of said wheels.



6. A clock as claimed in claim 4 wherein said disc comprises a pair of concentric abutting rubber washers.

7. In a direct reading numeral clock, a casing, a pair of wheels having time indicating numerals thereon mounted for rotation in said casing, an adjusting member mounted for movement to different positions in said casing for operative engagement with selected ones of said wheels, and an operating member mounting said adjusting member and having a part extending to a position without said casing rendering it accessible for manual operation.

8. In a direct reading numeral clock, a casing, a pair of wheels having time indicating numerals thereon mounted for rotation in said casing, a rotatable disc axially movable to different positions in said casing for operative engagement with selected ones of said wheels, and an operating rod mounting said disc and having a part extending to a position without said casing rendering it accessible for manual operation to rotate said disc and thereby the wheel with which the disc is selectively engaged.

9. A clock as claimed in claim 8 wherein said disc comprises a pair of concentric abutting washers.

10. In a direct reading numeral clock, a casing, a pair of wheels having time indicating numerals thereon mounted for rotation in said casing, a rotatable disc axially movable to different positions in said casing for operative engagement with selected ones of said wheels, an operating rod mounting said disc and having a part extending to a position without said casing rendering it accessible for manual operation to rotate said disc and thereby the wheel with which the disc is selectively engaged, and resilient means biasing said rod axially to a position in which said disc is out of engagement with both of said wheels.

11. In a direct reading numeral clock, a casing, a pair of wheels mounted for rotation in said casing about spaced parallel axes, said wheels having unequal diameters and being respectively provided with annular portions rotatable therewith, said annular portions being spaced radially with respect to each other at one relative angular position thereof, and means for adjusting the positions of said wheels comprising a disc positioned in the space between said annular portions and movable axially between two positions in which respectively an edge on one side thereof engages with one of said wheels and an edge on a diametrically opposite side engages with the other of said wheels, a rod on which said disc is mounted, a support carried by said casing in which said rod is rotatable and movable axially, said casing having an opening through which an end of said rod projects, and springs biasing said rod axially to a position in which said disc is out of engagement with both of said wheels.

12. A setting device for a direct reading numeral clock having a wheel with time indicating numerals on its periphery which comprises an adjusting member mounted for rotation about an axis which is substantially perpendicular to the axis of rotation of said wheel, and a disc carried by said member and frictionally engageable with a peripheral portion of the wheel so that rotation of the disc by said member will be effective to rotate the wheel, said disc comprising a pair of concentric abutting washers adapt-

ed to straddle the peripheral wheel portion upon rotation thereof by said member.

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