Nov. 27, 1934. A. E. FREEL 1,981,997

TIME INDICATING DEVICE

Filed Aug. 7, 1930

Fig. 3.

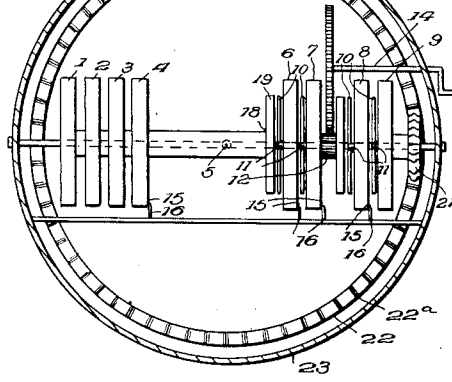


Fig. 2.

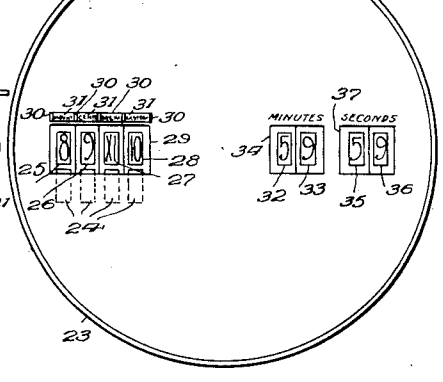
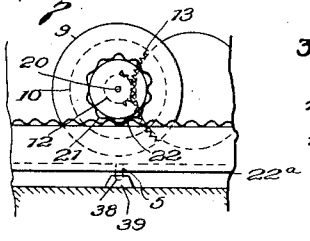


Fig. 4.



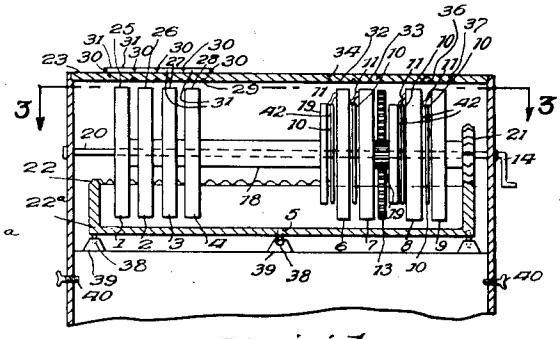


Fig. 1.

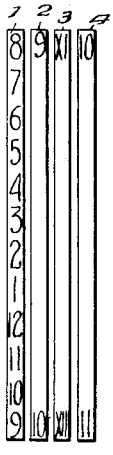


Fig. 6.

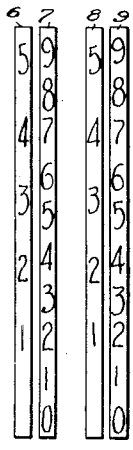


Fig. 6a.

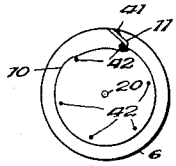


Fig. 5.

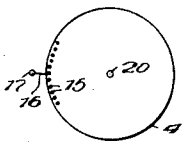


Fig. 5a.

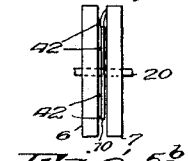


Fig. 5b.

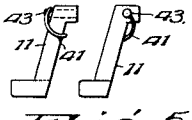


Fig. 5c.

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TIME INDICATING DEVICE

Albert E. Freel, Owensboro, Ky.

Application August 7, 1930, Serial No. 473,645

1 Claim. (Cl. 58—125)

My invention relates to improvements in time indicating devices and has to do, more particularly, with that class of devices in which time is indicated by roll-carried numerals visible through windows in an opaque face.

The primary object of my invention is to provide a time indicating apparatus which is rugged and unlikely to require repair.

Another object of my invention is to provide a time indicator which is capable of installation on any conventional chronometric prime mover whether electric, spring or otherwise driven.

A further object of my invention is to provide a time indicator which will directly indicate exact time, yet which is simple and inexpensive to manufacture.

Further objects and objects relating to details and economies of construction will definitely appear from the detailed description to follow. In one instance I accomplish the objects of my invention by the means set forth in the following specification. My invention is clearly defined in the appended claim. A structure constituting a preferred embodiment of my invention is illustrated in the accompanying drawing forming a part of this specification, in which:

Figure 1 is a horizontal sectional view through my preferred form of time indicator, showing the relationship of the several indicating rolls;

Fig. 2 is a face view of the indicator shown in Fig. 1;

Fig. 3 is vertical sectional view on the line 3—3 of Fig. 1 showing the mechanism of my preferred time indicating device;

Fig. 4 is a detail view of the second indicating roll, its pinion gear and a portion of the ring gear;

Fig. 5 is a side view of one of the indicating rolls as associated with the pins of the adjacent roll driven thereby and the pawl and cam elements which provide the appropriate driving connection;

Fig. 5*a* is a side view of one of the indicating rolls and the pin and spring means which prevent overrunning of the roll;

Fig. 5*b* is a detail view of two rolls upon a portion of their supporting shaft, and the cam and pawl driving connection;

Fig. 5*c* is a combined side and end view of one of the pawl elements;

Fig. 6 is a projected view of the numeral carrying peripheral surfaces of the four hour-indicating rolls; and

Fig. 6*a* is a projected view of the numeral carrying peripheral surfaces of the minute and second indicating rolls.

In the several views, like numerals denote like parts.

Referring to the numbered parts of the drawing, my preferred apparatus comprises a face plate and housing member 23 having set screws 40 for its securement to the case of a chronometric prime mover (not shown). Windows 25, 26, 27, 28, 32, 33, and 35, 36, are provided in the face plate 23 and rolls 1, 2, 3, 4; 6, 7; and 8, 9, are respectively visible therethrough and indicate respectively: the mountain standard hour, the central standard hour, the eastern daylight saving hour, the eastern standard hour; the minute past the indicated hour; and the second past the indicated minute. Name plates 31 for the respective hour windows are secured thereover by means of clips 30. Shutters 24 are also provided for closing any desired hour window or windows to exclude the respective time indicated therethrough. Beveled glass windows 34 and 37 are provided for the minute and second windows respectively. A large ring gear 22 having bearing on four roller or ball bearings 38 supported upon four mountings 39, has a bore 5 which is mounted upon the shaft of a chronometric prime mover (not shown) and is rotated at fixed speed thereby. Mounted in the cylindrical wall of the face plate 23 is a stationary shaft 20 upon which are mounted, free to rotate thereon, hour indicating rolls 1, 2, 3, and 4, minute indicating rolls 6 and 7, and second indicating rolls 8 and 9. A pinion gear 21 meshed with the ring gear 22 in the ratio of 1 to 6 is directly secured to, and drives the second roll 9, so that, as it turns, each of its numerals 0 to 9 indicates one second of elapsed time. Upon the side of roll 9 adjacent its periphery is a pin 43 upon which a pawl 11 and its spring 41 is carried, which pawl is engageable with six evenly spaced pins 42 disposed upon the side wall of roll 8. A cam element 10, keyed to stationary shaft 20, is disposed between rolls 8 and 9 and permits pawl 11 to engage one pin 42, and move roll 8 one sixth of a revolution each time roll 9 makes a complete revolution. Roll 8 is provided with six evenly spaced numerals which move up progressively with the numerals on roll 9 to jointly indicate the sixty seconds in each minute. Means consisting of a weak spring 16, and a series of pins 15 on each of rolls 8, 7, 6 and roll 4 on hollow shaft 18 prevent overrunning of the several rolls. Roll 8 is also provided with a spring urged pawl member 11 similar to that on roll 9. A cam element 10 keyed to shaft 20 is likewise

provided, which cam allows pawl 11 to engage the ten pins 42 in a blank roll 19 in the same manner as the relationship provided between rolls 9 and 8, except that there being ten pins on blank roll 19, said roll 19 is related to roll 8 in the ratio of 1 to 10. Roll 19 itself bears no numerals, but is directly connected to minute roll 7 through the medium of a gear wheel 12, the function of which is later to be explained. Roll 7 bears numerals 0 to 9 and is associated with roll 6, which indicates tens of minutes, by a pawl 11, cam 10, and six pins 42 in identically the same ratio and functional relationship as that existing between rolls 9 and 8 and therefore need not be specifically explained. A second blank roll 19 is associated with roll 7 by means of a pawl 11, cam 10, and 10 pins 42 in exactly the same relationship existing between the first blank roll 19 and roll 8. By means of a hollow shaft 18 having free bearing upon shaft 20, the second mentioned blank roll 19 is coupled to and drives a tier of four hour indicating rolls 4, 3, 2, and 1 which have their peripheries provided with numerals so related to one another as to indicate time in several systems, those illustrated being, respectively, eastern time, eastern daylight saving time, central standard time and mountain standard time. For the purpose of resetting the minute and hour rolls in the event of stoppage or inaccurate running of the chronometric prime mover (not shown) there is provided a large gear 13 and a hand crank 14, which large gear is meshed with small gear 12 coupled to minute roll 7. Appropriate setting of the rolls may thereby be accomplished in a short space of time.

Briefly, the operation of the device is as follows: Assuming the several rolls are set to show the proper time, motion is imparted from ring gear 22 to the "units" member or roll 9 of the "seconds" indicating rolls and from the latter through the pawl and pins to the "tens" roll 8 of the "seconds" rolls. In turn, the units and tens rolls 7 and 6 of the minute-indicating rolls are actuated and likewise, through hollow shaft 18, the rolls 1, 2, 3 and 4, are revolved, the movement of all the rolls 1 to 4 and 6 to 9 being in proper timed relation to the motion of the prime mover. In this way, the four rolls 1 to 4 will simultaneously exhibit the various times, such as mountain standard time, central standard time, eastern daylight saving time and eastern standard time. However, by moving shutters 24 to conceal any desired roll or rolls or rolls 1 to 4, only the desired time will be exhibited.

While I have thus described what I consider a preferred embodiment of my invention, I am aware that many changes may be made therein without departing from the essential scope and spirit of my invention. I, therefore, claim my invention broadly as indicated by the appended claim.

What I claim is:

In a time indicator, a face plate having windows therein, a stationary shaft behind said face plate, time indicating rolls freely mounted on said shaft and visible through the windows of said face plate, means coupling the several rolls in chronometric sequence, a pinion gear coupled directly to the roll indicating the smallest division of time, said gear being disposed adjacent the periphery of said face plate, and a ring gear concentric with said face plate and engaged with said pinion, said ring gear being dished inward of its periphery to accommodate said rolls, and having means at its center adapted for mounting upon the shaft of a constant speed prime mover, and said face plate having a cylindrical flange attached thereto, enclosing said ring gear, rolls, and pinion, and supporting said shaft.

ALBERT E. FREEL.