June 3, 1952 P. H. KAUFMANN 2,598,701

TIMING DEVICE

Filed Sept. 24, 1949

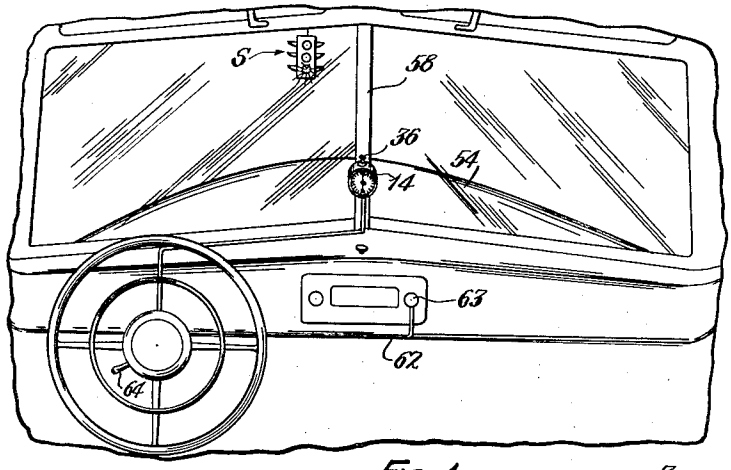


FIG. 1

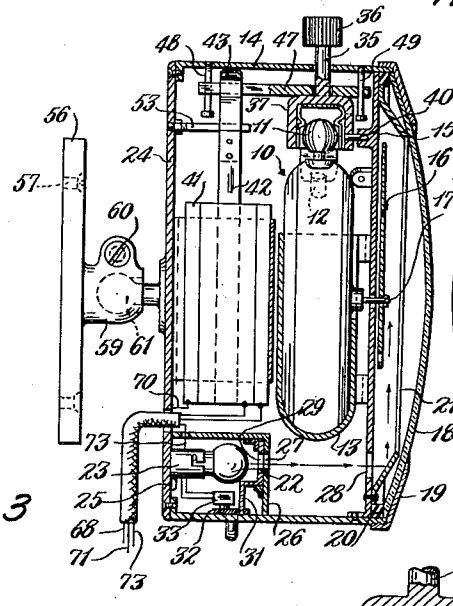


FIG. 3

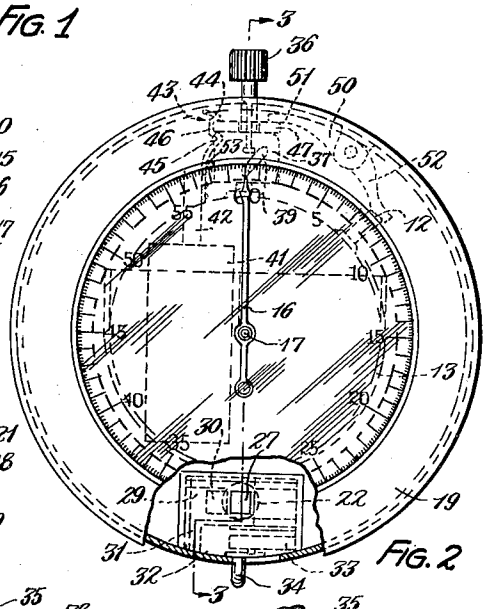


FIG. 2

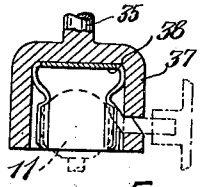


FIG. 4

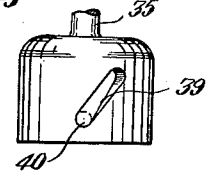


FIG. 6

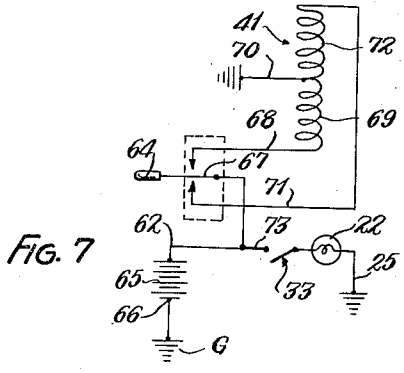


FIG. 7

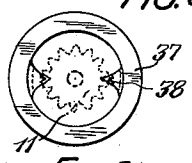


FIG. 5

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Patented June 3, 1952

2,598,701

UNITED STATES PATENT OFFICE

2,598,701

TIMING DEVICE

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Application September 24, 1949, Serial No. 117,604

14 Claims. (Cl. 161—15)

1

This invention relates to a timing device and, more particularly, to a remotely controlled stopwatch type mechanism which is especially adapted for use in a motor vehicle to facilitate timing of various occurrences such, for example, as the cyclic or interval timing of traffic signals.

In the control of vehicular traffic it is common practice to employ fixed time traffic signals. Such signals have a predetermined time cycle so that the intervals of time available for movement of traffic in any one direction is predetermined and does not vary regardless of the presence or absence of vehicles desiring to proceed in a transverse direction. When operating a vehicle through an area provided with such signals, frequent starting and stopping is ordinarily necessary in response to operation of such signals. This repeated starting and stopping is wasteful of gasoline, irksome to the drivers, and is conducive to accidents due to the frequent necessity for abrupt stops and tendencies to "beat the light" or "run the light," that is, to start through the signal controlled intersection before the "go" signal has been given or to continue through the intersection upon a change from a "go" to a "stop" interval. Furthermore, since it requires more time for a vehicle at rest to be placed in motion and travel through an intersection than it does for a vehicle in continuous motion, at even a slow speed, to travel the same distance, fixed time signals frequently seriously impede the movement of traffic.

Many, if not all, of the above difficulties could be lessened or completely removed if the operator of a vehicle had some means to determine the cycle of a traffic signal or how long a given interval thereof would last. Thus, if when approaching a signal showing red the operator of a vehicle knew that the signal would soon change to green, he could reduce his speed and thus arrive at the intersection at the time of change, thereby eliminating a stop and start. Conversely, if when approaching a go or green signal, the operator knew it was about to change to stop or red, he would be prepared therefor and would slow down gradually so as not to be faced with the necessity of either making an abrupt stop or running the light. Also when stopped for a traffic light or signal, it would not be necessary for the operator to have the gears shifted and hold the clutch disengaged for long periods of time in order to insure a quick start upon change of the signal. Instead, if the operator knew when the light was about to change, he could wait until that time to prepare for movement and still would make as rapid a start as the driver who had had his gears shifted and his clutch disengaged for almost the entire signal interval.

In an attempt to remove some of the above-mentioned difficulties resulting from the use of

2

fixed time signal lights, attempts have been made in some instances to employ traffic controlled lights. However, where signals are relatively close together, the most common installations employ fixed time traffic signals or lights which are synchronized or sequentially timed so that a vehicle moving at a fixed speed will pass through the series of signals without stop. Unfortunately, even though the signals have been synchronized, sufficient notice is frequently not given as to the proper speed at which to drive or traffic conditions are such that uniform movement at such speed is impossible. In either case, the result is that, after having been stopped at one such synchronized signal, it is thereafter practically impossible to again achieve the proper speed and hence it is necessary to stop at nearly every light. Furthermore, where the signals or lights are isolated or where they are relatively close together but not synchronized, there is no way of determining either the total cycle of the signal or the length of individual stop and go intervals without the use of a timing device, since the cycle and/or intervals vary from installation to installation, depending upon traffic needs at the particular location. Unfortunately, however, conventional timing devices, readily available upon the market, are not suitable for use by an operator of the motor vehicle without seriously distracting his attention from the operation of the car.

An object of this invention is to provide a timing device which is adapted to be mounted in a vehicle substantially in the field of vision of the operator while observing the road, the device being readily operable to effect starting, stopping, and resetting thereof by electromagnetic means so that the operation of the timing mechanism may be effected at a point remote therefrom, which point is conveniently located with respect to the vehicle operator.

Another object of the invention is to provide a timing device which is adapted to be mounted in a vehicle and is readily operated by a minimum of attention, thereby enabling the vehicle operator to readily determine time intervals of traffic signals and of other occurrences and regulate the vehicle operation accordingly without the necessity of diverting attention from the road or from the operation of the vehicle.

A further object of the invention is to provide a timing device which is adapted to be mounted in a motor vehicle in a position for easy visibility by the operator. The said timing device being provided with start-stop and reset mechanisms selectively operable by a single electromagnetic means which is selectively energizable from the battery of the vehicle under control of switch means located for convenient operator actuation without the necessity of the latter shift-

ing his position or releasing the steering wheel.

An additional object of the invention is to provide a timing device having a spring-driven mechanism and separately operable start-stop and reset means, a single push-pull type electromagnet being provided for selective actuation of said start-stop, or reset means under control of manually operable switching means.

Another object of the invention is to provide a timing device of the type defined in the preceding object and wherein a means is provided for partially winding the spring of the timing mechanism whenever the said reset means is actuated.

It is also an object of the invention to provide a timing device as defined in the preceding object and wherein means are provided for preventing winding of the spring of said timing mechanism after the latter has reached a predetermined tension, even though the reset means should thereafter be operated.

Still another object of the invention is to provide a timing device of the type described and which is provided with a novel means to control illumination of the face thereof, the degree of illumination being adjustable by means of a movable shutter operating in conjunction with switch means controlling energization of a lamp forming a part of illuminating means.

The invention further resides in certain novel features of construction and combination and arrangements of parts, and further objects and advantages thereof will be apparent to those skilled in the art to which it pertains from the following description of the present preferred embodiment thereof, described with reference to the accompanying drawing in which similar reference characters represent corresponding parts in the several views and in which:

Fig. 1 is a fragmentary, somewhat schematic view of the portion of the interior of a motor vehicle as seen from the driver's seat illustrating the present preferred position of the timing device of this invention and of the switch means for controlling operation thereof;

Fig. 2 is a front elevational view of the timing device of this invention, the device being in an enlarged scale with respect to the illustration in Fig. 1 and a portion thereof being broken away to more closely show the means controlling illumination of the face of the device;

Fig. 3 is a sectional view taken substantially on the line 3—3 of Fig. 2;

Fig. 4 is a fragmentary enlarged sectional view illustrating the rewind means and safety slip clutch for the timing device, the winding stem and knob of the stop-watch mechanism as well as the stationary pin cooperating with the reset and rewind member being indicated in dot-dash lines;

Fig. 5 is an elevational view of the portion of the mechanism illustrated in Fig. 4 and as seen from the bottom of that figure;

Fig. 6 is a side elevational view of the portion of the apparatus illustrated in Fig. 4 as seen from the right hand side of that figure; and,

Fig. 7 is a simplified schematic wiring diagram illustrating one manner in which the novel timing device may be connected for operation by energy derived from the battery of the vehicle.

In accordance with this invention the time interval indicating mechanism per se may be, and is here illustrated as, a conventional stop-watch mechanism, generally designated 10. The particular mechanism illustrated is of the type having a knurled depressible knob 11 on the winding stem, rotation of which prior to complete depression, effects winding of the spring for the mechanism while the depression of the knurled knob or member 11 effects resetting of the hand of the mechanism to starting position. The stop-watch mechanism 10 is also provided with a start-stop controlling member, which in the present form, is illustrated as a push pin 12 extending through the side of the casing. As is well known in the art, the pin 12 is normally urged outwardly of the casing by a spring therein and, when the pin 12 is initially pressed inwardly, the mechanism starts and continues to run until the pin 12 is again depressed. When the mechanism is stopped by means of pin 12 the indicating hand will retain its reading and, if not reset, will resume operation from this point upon the next depression of the pin 12. However, depression of the knob 11 resets the hand to its initial starting position and this may be effected either after the hand has been stopped by operation of the pin 12 or while the mechanism is running. In the event the indicating hand is reset without stopping the timing mechanism, the hand will immediately start to move again upon release of the knurled member or knob 11.

The stop watch 10 is supported by means of a suitable support or mounting brackets, such as 13, within a casing member 14 which may be made of any suitable material and of a shape such as to provide a pleasing appearance while providing the necessary rigidity for support of the mechanisms about to be described. Because the dial or face of the conventional stop watch and the sweep hand thereof are relatively small, making it difficult to discern the readings thereon at distance therefrom, the usual glass or crystal, the face or dial, and the sweep hand have been removed. In place thereof a much larger face or dial 15 is provided in the casing and the sweep second hand 16 is of correspondingly larger size. Since the hand 16 is relatively light weight, the size of it and of the dial 15 may be readily chosen to be such as to be readily visible from the operator's seat even though the mechanism is mounted adjacent the windshield as indicated in Fig. 1. In the event the shaft 17 of the stop watch is not sufficiently long to provide for the spaced dial and hand mounting as shown in Fig. 3, this shaft may be provided with a suitable extension, such as a tubular member press fitted thereon, as is well known in the art. The face of the casing 14 is provided with a suitable lens or glass 18 which is held in place by a rim member 19 in a conventional manner as, for example, by having a threaded flange on the latter engaging with threads on the casing 14. A suitable ring 20 of rubber, fiber or the like is preferably provided between the glass 19 and the face or dial 15.

Intermediate the lens 18 and the face or dial member 15 is an annular member 21 having an inclined flange portion extending diagonally from the dial 15 to the glass 18. The inside of this member 21 is preferably formed of light reflecting material or has a light reflecting surface provided thereon as, for example, by painting the member white or forming the latter of polished metal, and serves to spread artificial illumination over the face 15 from a lamp 22 mounted in the rear of the housing 14. As is shown in Figs. 2 and 3, the lamp 22 may be of the bayonet type

received in a socket 23 which is supported upon a removable back 24 for the housing 14, the shell of the socket 23 being grounded to the housing 14 as, for example, by a wire or connection 25.

The lamp 22 is enclosed within a compartment or shell 26 within the lower portion of the housing 14 and the forward portion of this shell or housing is provided with an opening or slot 27 in alignment with the lamp 22. The opening 27 is also in alignment with an opening or openings 28 through the lower part of the dial 15, these openings being so located as to be normally obscured by the ring member 19 and annular member 21. The angle of inclination of the flange on the member 21 is such as to direct the rays of light over the dial 15 as is indicated by the arrows in Fig. 3.

Control of the extent of artificial illumination of the dial 15 is provided, in the present form of the device, by a slidable shutter or vane member 29 which is slidably guided upon the inner face of the forward wall of shell or housing 26. This shutter or vane has an opening 30 therein which may be selectively brought into full or partial registry with respect to the opening 27 to thereby vary the amount of illumination passing therethrough from maximum to zero. In order to effect this movement of the shutter 29, the latter is preferably provided with a downwardly extending projection 31 and connected to the lower end of the latter is a slidable link 32 which may be arcuate, as shown, when the case 14 is arcuate, the connection between the members 31 and 32 being effected, for example, by having the former pass through a slot in the latter. Actuation of the shutter 29 and control of energization of lamp 22 are simultaneously effected by connecting the link or slide 32 to the actuating member of an electrical switch 33 which is interposed in the energizing circuit for the lamp 22. This switch 33 is preferably of the slide operated type, with the actuating member 34 thereof extending through an opening in the slide or link 32 and through an opening in the lower wall of the casing 14.

It will be apparent from the construction just described that operation of the actuating member 34 for the switch 33 in one direction will move the slide 29 to bring the openings 27 and 30 into registry, whereas movement in the opposite direction moves the said openings from registry, the latter position being that illustrated in Fig. 2. The switch 33, as hereinafter described, is interposed in the energizing circuit for the lamp 22 and is so connected that movement of the actuating member in the direction bringing the openings 27 and 30 into registry effects energization of the lamp, while movement of the member 34 in the opposite direction deenergizes the lamp. The switch 33 ordinarily has sufficient lost motion of its actuating member 34, after operating the switch to off or on position, to permit sufficient movement of the shutter 29 to give the desired degree of illumination. More specifically, the extent of movement of the shutter 29 should be such that when the switch 33 closes the circuit to the lamp the openings 27 and 30 will be just coming into partial registry, the overtravel of the actuating member 34 in this direction permitting the shutter 29 to be moved to any desired extent with the maximum position thereof being that in which the openings 27 and 30 are in alignment. Conversely, movement of the switch actuator 34 in a direction for deenergizing the lamp will first move the shutter 29 so that the openings 27 and 30 are substantially out of register before the switch operates to deenergize the lamp. In the event insufficient lost motion or overtravel is present in the switch 33 for enabling the above-mentioned extent of movement of the shutter, the desired extent of movement may be readily achieved by interposing a motion amplifying linkage between the button or actuator 34 and the projection 31 in place of the simple link connection shown.

Slidably extending through an opening in the upper portion of the housing 14 and coaxial with the stem of the watch mechanism 10 is disposed an auxiliary stem member 35, the outer end of which is preferably provided with a knurled knob 36. The shank of this auxiliary stem member is relatively long and the lower end is provided with a cup-shaped member 37 which fits over the knurled button or knob 11 of the clockwork mechanism with a clearance. Intermediate the inner walls of the cup member 37 and the outer surface of the knob 11 is a spring member 38 which is suitably secured to the interior of the cup member in any desired manner. This spring member 38 is approximately U-shape with the sides or legs thereof having portions adapted to enter between the grooves or knurls of the knob 11 as shown in Figs. 3, 4 and 5; as illustrated, the legs of the member 38 are substantially V-shape in cross section to facilitate their entry between the knurling on the knob 11. The interior diameter of the cup member 37 and the dimensions of the spring member 38 and of the knob 11 are such that the legs of the spring member are normally engaged within the knurls or grooves of the knob 11 as indicated, and hence, when the auxiliary stem 35 is rotated, the knob 11 will likewise be rotated, thereby effecting a winding action on the spring in the timing mechanism 10. However, the spring 38 is so selected as to size and strength that, when the actuating spring, not shown, of the clockwork mechanism has been fully wound, the resistance to turning of the knob 11 is sufficient to cause the legs of the spring 38 to disengage from the knurls of the knob 11 and latch idly thereover. There is thus provided a safety or slip clutch preventing overwinding of the actuating spring for the clockwork mechanism.

As mentioned heretofore, the mechanism 10 is of the type such that depression of the knob 11 effects a resetting of the hand 16. Consequently, moving the stem 35 inwardly of the casing 14 as, for example, by pressing upon the knob 36, will effect the said resetting of the hand 16. In addition to the resetting operation by depression of the stem 35, this motion may also be utilized to effect a partial winding of the actuating spring for the clockwork 10. This may be achieved, for example, by providing an inclined slot 39 in the side of the cup member 37 in which slot is disposed a pin 40 stationarily supported upon the back of the dial or face member 15. Consequently, when the stem member 35 is depressed, the pin 40, acting within the slot 39, causes a partial rotation of the cup member 37 and this, in turn, through the spring 38, partially rotates the knob 11 in a direction effecting winding of the spring for the mechanism 10. It will be understood that this winding operation occurs in that portion of the axial movement of the knob 11 occurring before the movement has effected disengagement of the winding gears within the clockwork 10.

While the watch or clockwork 10 may be reset

and its spring wound in the manner described by direct operation of stem 35, this is frequently not convenient for an operator of the vehicle in which the device is installed. Therefore, a means is provided for remote actuation of the reset and winding mechanisms as well as of the start-stop mechanism. This is effected in the present embodiment by providing a push-pull type electromagnetic means 41 which is supported within the housing 14 with its armature 42 extending substantially vertically and normally maintained in a central position by spring means not shown. Attached to the armature 42 is a member 43, preferably formed of flat spring material. This member 43 has spaced cam portions 44 and 45 on either side of a notched or recessed portion 46, see Fig. 2. This notched or recessed portion 46 of the spring 43 is adapted to engage over a substantially horizontally extending bar 47 which is guided for vertical movement within the housing 14 by spaced pins 48 and 49 secured to the housing and passing through openings in the bar 47. This bar 47 has an opening or slot therein through which the stem 35 passes, as is apparent in Fig. 3. In addition to the parts just mentioned, a bell crank lever 50 is pivoted intermediate its ends to the inner wall of the housing 14 with one arm 51 of this lever extending over the bar 47 while the other arm 52 of the lever engages the push button or pin 12 of the stop-watch or clockwork mechanism 10.

The construction just described is such that when the electromagnetic means 41 is energized in a manner causing it to attract its armature 42, the latter move downwardly thereby causing the spring member 43 to move the bar 47 downwardly which being guided for parallel movement by the pins 48 and 49, moves the auxiliary stem 35 and cup member 37 downwardly. During this downward movement, the pin 40 effects a partial rotation of the cup member 37, due to the engagement of the pin in the slot 39, with resulting partial rewinding of the actuating spring in the clockwork or stop-watch mechanism 10. Likewise, the downward movement of the bar 47, and hence of cup member 37, eventually effects resetting of the hand 16 of the mechanism by the conventional reset means not shown.

In a conventional stop-watch mechanism, such as indicated 10, depressing of the knurled knob 11 resets the hand 16 but the latter does not again begin movement until the knob 11 has been released. In order that resetting of the hand 16 may be effected in this mechanism and the latter allowed to immediately restart movement of the hand even though the electromagnetic means 41 remains energized, the casing 14, in this instance the back cover 24 thereof, is provided with a pin 53 which extends adjacent the spring member 43 and acts upon the cam surface 45 to cam the member 43 from engagement with the bar 47 as soon as the armature 42 has moved downwardly a distance sufficient to effect resetting of the watch mechanism. Hence, the bar 47 and the knob 11 are free to return to their upper positions under influence of the conventional return spring within the mechanism 10 even though the electromagnetic means 41 be continuously energized. Upon deenergization of the electromagnetic means 41 and return of the armature 42 to its normal position under influence of the usual spring means, not shown, the spring member 43 can readily reengage its notch or recessed portion 46 with the bar 47 due to the cam shape of the portion 44 of the spring member which coacts with the bar to facilitate positioning of the two members, as will be readily understood.

Energization of the electromagnetic means in a direction which effects movement of the armature 42 upwardly, causes the spring member 43 to move the bar 47 upwardly. This rocks the bell crank lever 50 causing the arm 52 thereof to depress the button or pin 12. In the event the hand 16 is at rest when the button 12 is depressed, this will start the latter and a continued energization of the electromagnetic means 41, maintaining the button 12 depressed, does not interfere with this operation. However, normally the electromagnetic means 41 is only momentarily energized and upon deenergization returns to its initial position. When it is desired to stop the hand 16, the electromagnetic means 41 is again energized in the direction which forces the armature 42 upwardly so that the bell crank lever 50 is again rocked in a direction depressing the button 12. The hand 16 will then stop at the indicium representing the elapsed time and will retain that reading until the knob 11 of the mechanism 10 has been depressed. This may be effected, as previously described, by energizing the electromagnetic means 41 in the reverse direction.

A timing device constructed in accordance with this invention is intended to be mounted within the field of vision of the operator of the motor vehicle while the latter is viewing the roadway in the normal manner through the windshield, the timing device being located, however, so as not to obscure or interfere with a view of the roadway. For this reason, the mechanism is preferably not mounted at dashboard level since this would necessitate the operator removing his eyes from the road to see the device. Instead, the mechanism is mounted above the dashboard sufficiently high so as to be clearly visible but without extending across and obscuring any portion of the roadway which is visible beyond the hood 54 of the automobile. In the present embodiment the timing device is shown as mounted in a car having a divided windshield, the mounting being effected by means of a mounting plate 56 having screw holes 57 through which fasteners may be inserted for attaching to the center strip 58 of the windshield. This plate 56 is provided with an integral socket member 59 preferably of split or divided construction and provided with a clamping screw 60 extending through integral ears, as is well known in the art. The rear plate 24 of the timing device is provided with a ball member 61 which is received within the socket 59 and enables the timing device to be adjusted to various inclinations and angular positions for ease in observation. Where a vehicle has no central strip 58 in its windshield, the timing device may be mounted upon a suitable bracket extending upwardly from the dashboard, upon one of the side posts of the windshield frame, or upon other members as will be readily understood.

Energy for operating the reset, start-stop, and winding mechanisms of the timing device is obtained from the vehicle battery, connection thereto being made in any desired manner as, for example, by a connection to the rear of the ammeter or, as indicated, by means of a connecting wire 62 provided with a suitable plug 63 insertable in the usual cigarette lighter on the dashboard. The switch means for controlling energization of the timing device may be located where convenient. In the present form of the device this

switch means is shown as a single lever, two-way switch mounted upon the steering column, a spring or the like being provided to normally return the operating handle or lever to its central or non-operated position. In order that there may be no confusion between the switch for operating the timing device, the direction indicating switch, or the usual gear shift lever, the operating arm 64 for the switch means of the timing device is preferably quite short and may be substantially like those used in toggle switches. Moreover, this arm or lever 64 is located in a position similar to that indicated in Fig. 1; that is, so as to be at a position intermediate that of the turn indicating switch and the gear shift levers, not shown, which normally extend substantially diametrically opposite each other from opposite sides of the steering column.

A simplified wiring circuit or diagram for the device is illustrated in Fig. 7 from which it will be seen that the battery 65 of the motor vehicle has its one terminal 66 grounded to the frame of the car, indicated G, as is conventional practice. The other terminal of the battery 65, being connected with the previously mentioned cigarette lighter, is therefore shown as connected to the wire 62 which is in turn connected with the movable blade 67 of the switch operated by the handle 64. One of the stationary terminals of this switch is connected by a wire 68 to one terminal of the coil 69 within the electromagnetic means 41, the other terminal of this coil being grounded through the wire 70. The second stationary contact of the switch controlled by the handle 64 is connected by a wire 71 to one terminal of the other coil 72 of the electromagnetic means 41, the second terminal of this coil 72 likewise being grounded through the wire 70. The switch 33, which controls the energization of the lamp 22, is adapted to connect the latter to a current supplying wire such as 73 which is connected to the wire 62, the shell of the lamp socket 23 being grounded by the wire 25 as previously described.

It is believed that the operation of this circuit will be readily apparent in view of the above description and hence need not be traced in further detail. Suffice it to note that operation of the switch button 34 closes the switch 33 energizing the lamp 22 and simultaneously adjusts the size of the opening for the passage of light to illuminate the face of the dial 15. Operation of the handle 64 in one direction causes switch blade 67 to close the circuit through the wire 71 to the solenoid 72 thereby moving the armature 42 inwardly of the electromagnetic means 41, thus depressing the cup shaped member 37 so that rewinding of the actuating spring of the mechanism 10, as well as resetting of the hand 16, is effected. Operation of the switch handle 64 in the opposite direction closes a circuit through the blade 67 and wire 68 energizing solenoid 69 thereby causing the armature 42 to move upwardly or outwardly elevating the bar 47 and rocking the lever 50 to depress the button 12. This either stops or starts the clockwork mechanism as previously described.

The timing device of this invention may be utilized in a variety of different manners to facilitate operation of a motor vehicle through areas controlled by traffic signals such as S, see Fig. 1. By way of example, let it be assumed that the vehicle is approaching such a traffic signal S and that nothing is known about this traffic signal with respect to its total time cycle or the duration of the intervals of stop and go in the direction in which the vehicle is moving. While approaching the signal from a distance, the operator will no doubt see it change several times before reaching the immediate vicinity thereof. At one such change, as for example from green to red, the operator immediately actuates the switch handle 64 in the direction causing the latter to close the circuit through the wire 68 to the solenoid 69 thereby energizing the latter, moving the armature 42 outwardly as just described. This rocks the bell crank lever 50 operating the pin 12 to start the timing device. When the traffic signal S next flashes from red to green, the operator may stop the timing mechanism if he desires to determine the duration of the green interval. In this case, he then operates the handle 64 in the same direction as before, again energizing solenoid 69 rocking the bell crank lever 50 and operating button 12. If, however, the operator desires to determine the entire cycle of the light, he does not operate the handle 64 at this time but allows the timing mechanism to continue in operation until the signal light S has gone from green through red to green. The operator may then stop the mechanism, as just described, and from the reading thereof he will know the length of time for a complete cycle and, if he has observed the reading when the change occurred from red to green or from green to red, he knows the length of each interval thereof.

Ordinarily, the traffic signal may be observed for a considerable distance before a vehicle is adjacent thereto and hence several changes of the light may occur before the vehicle is close enough to have its movements controlled thereby. This provides ample time to determine the total cycle or the interval of the green or go signal so that the operator of the vehicle may, if the road be free of traffic, regulate his speed to a value such that he arrives at the traffic light while the latter is green and with sufficient of the green interval remaining to allow him to proceed through the light at a safe rate of speed. If, however, the congestion of traffic be such that the operator cannot freely choose his speed and hence he arrives at the traffic light while the latter is red, he can readily determine the length of time he shall have to wait for the latter to change to the green interval and hence will be ready to start instantly without the necessity of indulging in the dangerous practice of leaving his car in gear with the clutch held disengaged.

If, instead of merely stopping the timing device, as just described, the operator wishes to determine the duration of each time interval of a traffic signal, he may, for example, start the timing mechanism by actuating the switch handle 64, as previously described. At the end of one interval, for example the red, the operator then actuates the handle 64 in the opposite direction to energize the solenoid 72 thereby attracting the armature 42 so that the knob 11 of the stop watch mechanism 10 is depressed, resetting the hand 16 to zero. The hand 16 will immediately start moving again, timing the next interval of the traffic light, whether or not the solenoid 72 remains energized since, as described above, the spring 43 is disengaged from the bar 47 by the pin 53 so that slowness on the part of the operator in actuating the switch 64 is immaterial. Hence, by simply operating the switch 64, it is possible to effect a determination of the time interval for a complete

cycle of a traffic signal without removing the eyes from the road or releasing the steering wheel. This enables the operator to utilize his car in a more advantageous and efficient manner since he may now prevent loss of time due to necessity of frequent stopping and starting at traffic lights and, moreover, he may operate in a safer manner since he will not have to make abrupt stops or chance the danger of running through a changing light.

While the device has been illustrated and described as employed for use in timing traffic signals in certain specific manners, it will be apparent that a timing device as described may be utilized for timing such lights by other procedures. Moreover, the timing device may be used for other purposes, such as for example, checking the speedometer of the vehicle or for timing any other interval associated with the operation of the car. Since the length of time the hand 16 is in operation during timing of a given traffic signal, or the like, is relatively small, the repeated actuations of the cup shaped member 37, as a result of movement of the bar 47 in resetting the hand 16, will ordinarily keep the spring of the mechanism sufficiently wound. If, however, the rewinding associated with the resetting is insufficient, necessary winding may be effected at any desired time by repeated partial rotations of the knob 36 through the application of the operator's fingers thereto.

Although one embodiment of the device has been illustrated and described in considerable detail, it will be apparent that the invention is not limited to the exact details shown and described but that adaptations and modifications may be made therein. For example, instead of employing a stop watch or clockwork mechanism 10 having a push button 12 for effecting starting and stopping of the hand 16, a timing mechanism may be employed which utilizes a slide for this purpose. In this event, the nature of the bell crank lever 50 would, of course, be slightly altered. Also, in place of employing a sliding shutter in conjunction with the switch button 34 to control the degree of illumination supplied to the dial 15, a combined resistance and on-off switch, such as frequently employed in radios, may be utilized, thereby controlling the amount of current flowing to the lamp 22. Furthermore, the stop watch mechanism 10 herein illustrated and described, has been shown as provided only with a seconds indicating hand 16. It will be understood, however, that a minute hand may likewise be employed as in conventional timing mechanisms, if desired. In addition, the safety or slip clutch feature represented by the spring 38 may take a variety of different forms and in place of a single switching means operated by an arm such as 64, two separate switches may be employed, if desired. These and a variety of other adaptations and modifications of the device will readily occur to those skilled in the art after having had the advantage of this description and drawing and hence the invention is not to be considered as limited to the specific features shown and described.

Having thus described the invention, I claim:

1. A timing apparatus for use in a motor vehicle, the said apparatus comprising a casing adapted to be mounted in the vehicle within the normal field of vision of the operator thereof, a dial supported in said casing and divided into units representative of time intervals, an indicating hand movable over the face of said dial, spring actuated clockwork mechanism supported in said casing and connected to said hand to move the latter, the said mechanism including means for effecting starting and stopping of said hand and means for rewinding the actuating spring, electromagnetic means supported by said casing and including a movable armature, means within said casing operatively interconnecting said armature with said means for controlling starting and stopping of the indicating hand so that actuation of said start-stop means is effected by the movement of said armature, means operatively interconnecting said armature with the rewinding means to effect actuation of the latter when the armature is moved, means controlling energization of said electromagnetic means including switch means adapted to be mounted in said vehicle at a position which is conveniently accessible by the operator of the vehicle, and conductors for interconnecting the storage battery of the vehicle with said switch means and with said electromagnetic means in a manner such that starting and stopping of said hand and rewinding of the actuating spring are effected by actuation of said switch means.

2. A timing apparatus as defined in claim 1 wherein the said casing is provided with a mounting means including a ball and socket joint whereby the said casing is readily positionable to facilitate viewing of the dial thereof.

3. A timing apparatus as defined in claim 1 wherein the said switch means includes an elongated operating arm adapted to be mounted on the steering column of the vehicle.

4. A timing apparatus as defined in claim 1 and further comprising means within said casing for illuminating the said dial, the last-mentioned means including an electric lamp, switch means controlling energization of said lamp including a manually movable actuating member and means operated by said member for varying the illumination imparted to said dial by said lamp.

5. A timing apparatus for use in a motor vehicle, the said apparatus comprising a casing adapted to be mounted in the vehicle within the normal field of vision of the operator thereof, a dial supported in said casing and divided into units representative of time intervals, an indicating hand movable over the face of said dial, spring actuated clockwork mechanism supported in said casing and connected to said hand to move the latter, the said mechanism including means for rewinding the actuating spring, a means for effecting starting and stopping of said hand and a means for effecting resetting of said hand, electromagnetic means supported by said casing and including an armature movable in either of two opposite directions in response to selective energization of said electromagnetic means, means within said casing operatively interconnecting said armature with said means for controlling starting and stopping of the indicating hand in a manner such that movement of said armature in one direction effects actuation of said start-stop means, means operatively connecting said armature with the rewinding and resetting means in a manner such that movement of said armature in the reverse direction effects resetting and winding of the mechanism, and means for effecting selective energization of said electromagnetic means to selectively move said armature in either of said directions, the last named means including switch means adapted to be mounted in said

vehicle at a position which is conveniently accessible by the operator of the vehicle and conductors for interconnecting the storage battery of the vehicle with said switch means and with said electromagnetic means.

6. In combination with a spring actuated stop-watch mechanism having a stem member adapted to be rotated for effecting winding of the actuating spring of the mechanism and axially moved to effect control of an indicating hand of the mechanism, a member stationary with respect to the said mechanism and interengaged means carried by said stem member and said stationary member cooperating to produce a partial rotation of said stem member in response to axial movement thereof whereby the spring of said mechanism is partially rewound each time said stem member is axially moved to effect control of said indicating hand.

7. The combination as defined in claim 6 and wherein the said interengaged means includes an inclined cam surface upon one of said members cooperating with a projection upon the other of said members.

8. In a combination with a spring actuated stop-watch mechanism having a stem adapted to be rotated for effecting winding of the actuating spring of the mechanism and axially moved to effect control of an indicating hand of the mechanism, a member operatively connected with said stem for rotary and axial movement therewith and means cooperating with said member to effect a partial rotation thereof and of said stem when said member is moved in an axial direction, the operative connection of said member to said stem including slip clutch means between said stem and member permitting rotation of said member relative to said stem when the actuating spring of said stop-watch mechanism is fully wound thereby preventing injury thereto when said member is actuated to effect control of said indicating hand after the said spring is fully wound.

9. The combination defined in claim 8 and further comprising electromagnetic means operatively connected to said member for effecting movement thereof when said electromagnet is energized and means including a manually operable electrical switch for energizing said electromagnetic means whereby control of said indicating hand and rewinding of said spring may be effected at a location remote from said mechanism.

10. In combination with a stop-watch mechanism having a movable member controlling movement of the indicating hand of the mechanism, electromagnetic means operatively connected to said movable member to operate the latter when said means is energized, operator actuated means for effecting energization of said electromagnetic means, and means automatically disengaging the said operative connection between said member and electromagnetic means when the latter has moved the former a predetermined distance whereby control of movement of said indicating hand is independent of the speed of operation of said operator actuated means.

11. A timing apparatus comprising a spring actuated stop-watch mechanism having a stem rotatable for winding the actuating spring thereof and depressible for control of the indicating hand of the mechanism, a member operatively connected with said stem for rotary and axial

movement therewith, means cooperating with said member to effect a partial rotation thereof and of said stem when said member is moved in an axial direction, electromagnetic means operatively connected with said member to produce an axial movement thereof when the said electromagnetic means is energized, means for selectively energizing said electromagnetic means, and means disengaging the said operative connection between said electromagnetic means and said member after a predetermined movement thereof whereby the length of time said member and stem are held depressed is independent of the length of time said electromagnetic means remains energized.

12. An apparatus as defined in claim 11 and wherein the operative connection between said stem and said member includes means permitting slippage of said member relative to said stem when the actuating spring of the stop-watch mechanism is fully wound.

13. An apparatus for use with a spring actuated stop-watch mechanism having a stem which is rotatable for effecting winding of the actuating spring of the mechanism and is depressible for effecting a control operation with respect to the indicating hand of the mechanism, the said mechanism also having a manually movable member to perform a different control operation with respect to the said indicating hand, the said apparatus comprising a member operatively connected to said stem member to rotate and move axially therewith, means cooperating with said member to produce partial rotation thereof and of said stem when said member is axially moved, a pivoted member having a portion thereof operatively associated with the said manually movable member of the mechanism to effect operation thereof, a single actuating member operatively associated with said stem and with said pivoted member in a manner to effect movement of said pivoted member when said actuating member is moved in one direction and to effect operation of said member connected to said stem when the said actuating member is operated in the opposite direction, and means for effecting selective movement of said actuating member.

14. An apparatus as defined in claim 13 and wherein the said means for effecting selective movement of the said actuating member is an electromagnetic means selectively energizable for movement of said actuating member in either of two opposite directions.

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