Sept. 1, 1925. 1,551,894

E. McGLYNN

TIME SWITCH

Filed March 22, 1922 2 Sheets-Sheet 1

Fig. 1.

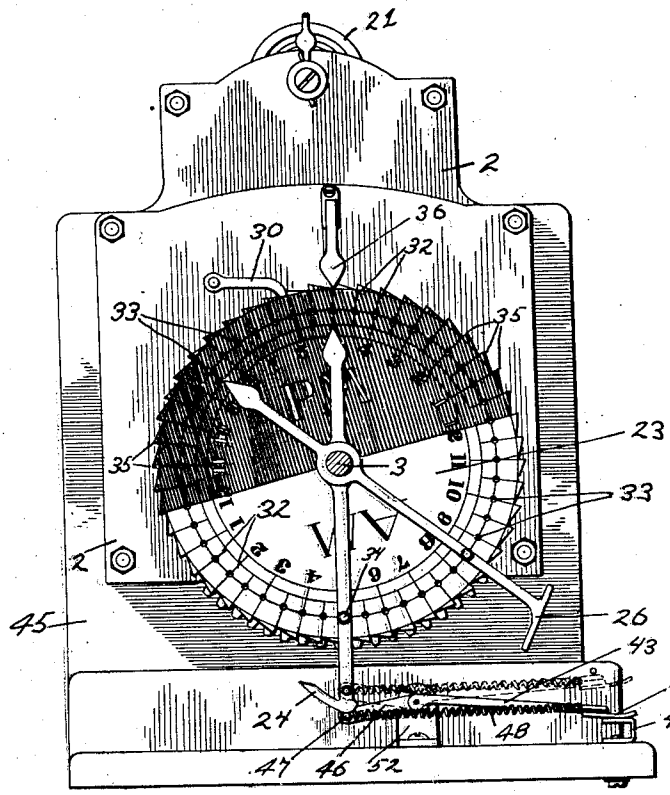


Fig. 7.

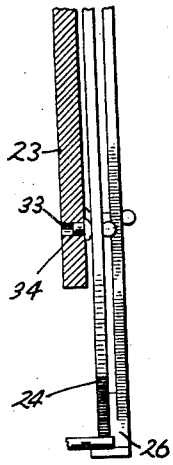
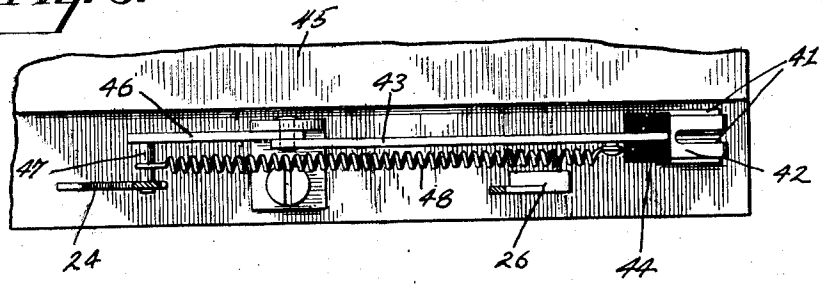


Fig. 6.



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Fig. 2.

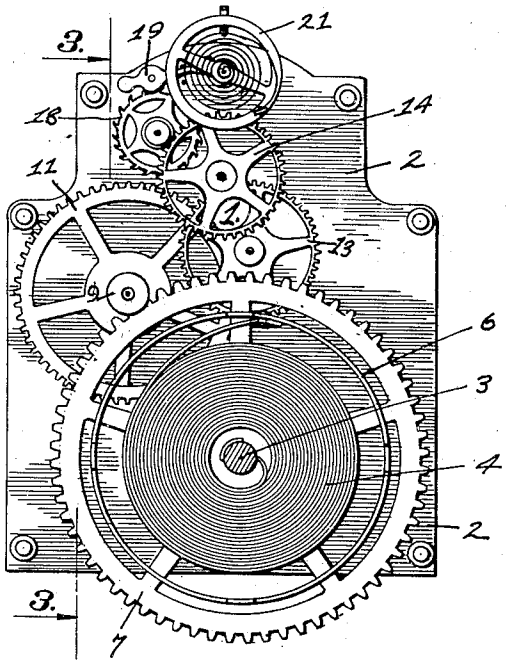


Fig. 3.

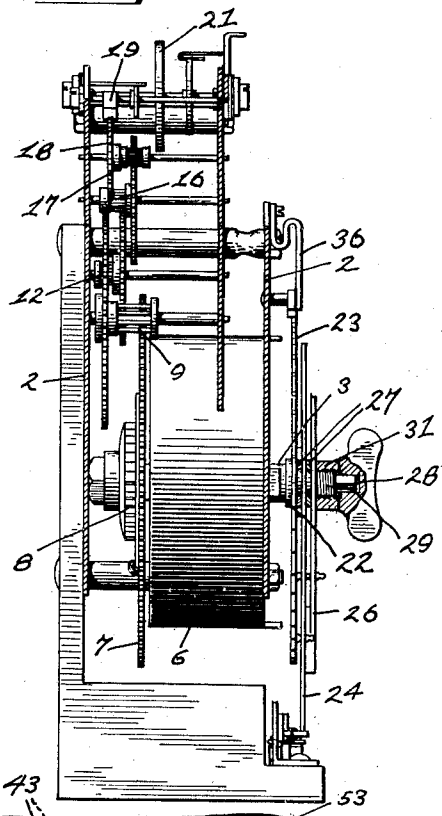


Fig. 4.

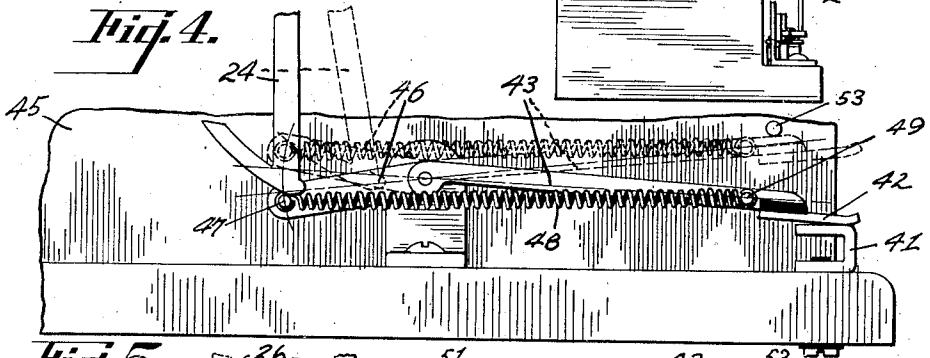
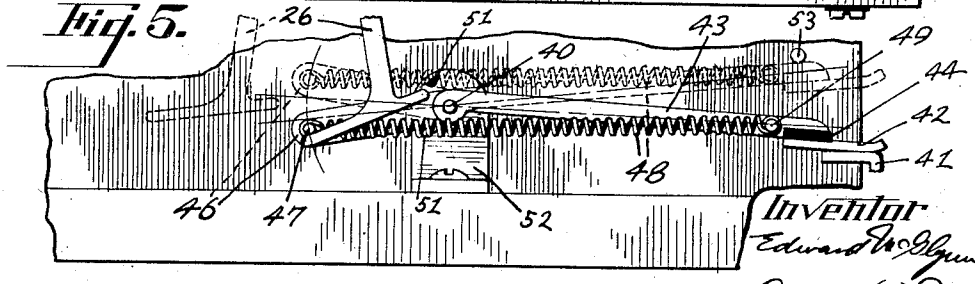


Fig. 5.



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Patented Sept. 1, 1925. 1,551,894

UNITED STATES PATENT OFFICE.

EDWARD McGLYNN, OF SAN FRANCISCO, CALIFORNIA.

TIME SWITCH.

Application filed March 22, 1922. Serial No. 545,869.

To all whom it may concern:

Be it known that I, EDWARD McGLYNN, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented a new and useful Improvement in a Time Switch, of which the following is a specification.

My invention relates to improvements in timing switches and the like wherein cams, deriving power from the main arbor of a train of timing gears, are arranged to close and open an electric contact at predetermined times.

The primary object of my invention is to provide an improved time switch adapted to increase the power available for the opening and closing of a contact.

A further object is to provide improved means for directing power from the main arbor of a train of timing gears to the opening and closing of a contact whereby a direct and accurate timing of the operation may be obtained.

Another object is to provide an improved device of rugged construction adapted to deliver the requisite power without undue strain upon the timing device, and with a minimum of adjustment.

A further object is to provide an improved device wherein contact actuating elements and a time indicating dial are actuated together from the main arbor of a train of timing gears to increase the power delivered and to facilitate the adjustment of the device for actuating an electric switch at any desired time.

A still further object is to provide an improved switch adapted to be actuated to close and open a circuit instantly at predetermined moments of time to avoid sparking at the contact points.

I accomplish these and other objects by means of the device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout said specification and drawing and in which:

Fig. 1 is a front elevation of my improved time switch.

Fig. 2 is a vertical section of the timing mechanism.

Fig. 3 is a transverse vertical section taken along the line 3—3 of Fig. 2 in the direction indicated.

Fig. 4 is an enlarged detail of one form of the switch, showing the operation of the contact closing cam.

Fig. 5 is a similar view showing the operation of the contact opening cam, the cam being shown in full lines in the closed position and in dotted lines in the open position.

Fig. 6 is a plan view of the switch as shown in Fig. 4.

Fig. 7 is an enlarged detail showing the manner in which the actuating cams are carried by the dial to raise and lower a contact arm at a predetermined time.

Referring to the drawings the numeral 1 is used to designate in general a train of timing gears mounted within a suitable housing 2 and driven from the main arbor 3 by a suitable actuating means such as a spring 4, the inner end of which is secured to the arbor 3 and the outer end to a member 6 forming a portion of the housing.

The train of gears 1 consists preferably of a main gear 7 mounted upon the main arbor 3 and provided with a suitable ratchet 8 adapted to permit clockwise rotation only of the gear.

A pinion 9 meshing with the gear 7 is connected with a second gear 11 which meshes with a pinion 12 secured upon one side of a third gear 13. A fourth gear 14 is driven from the gear 13 by means of a pinion 16, said fourth gear 14 being in turn meshed with a pinion 17 secured upon an escape wheel 18 operating in conjunction with a locking member 19 and balance wheel 21 to form an escapement by which the action of the entire train is controlled. The train is arranged in such a manner that the main gear 7 and arbor 3 will make one complete revolution each twenty-four hours.

One end of the arbor 3 extends through the front of the housing 2 and is provided with a shoulder 22 against which is positioned a dial 23 apertured at the center to rotatably engage the arbor 3. A depressing cam 24 and a lifting cam 26 are rotatably mounted upon the outwardly extending end of the arbor 3, said cams being spaced from the dial and from each other by suitable washers 27. The outer end of the arbor 3 is provided with a threaded portion 28 and a squared portion 29. A nut 31 is threaded onto the portion 28 to be advanced against the outer cam to press the cams and the dial 23 against the shoulder 22 whereby the dial will be rotated with the arbor 3.

The spring 4 is wound by means of a suit-

able key applied to the squared portion 31, the nut 31 being first slightly loosened to permit rotation of the arbor 3 in an anti-clockwise direction independently of the dial 23 which is held against rotation by means of a pawl 30 engaging ratchet teeth 35 formed upon the outer edge of the dial.

The dial 23 is provided with calibrations 32 indicating the twenty-four hours of the day and fractions thereof, one portion of the dial indicating a. m. time and the other portion indicating p. m. time. Apertures 33 are provided near the outer edge of the dial to correspond with the time calibrations, said apertures being adapted to receive pins 34 provided upon the inner side of the cams whereby said cams are maintained in fixed relation with the dial at any desired position. The cams may be independently adjusted by loosening the nut 31 sufficiently to permit the cam to be sprung outwardly from the dial to bring the pin 34 out of engagement with an aperture 33 and to be moved pivotally about the arbor 3 to the desired position, the pin thereafter being caused to engage the aperture 33 at the desired point. The frictional engagement of the dial 23 with the arbor 3 is such as to normally cause the dial to rotate with the arbor but permitting said dial to be manually turned thereabout for setting when desired. The nut 31 when tightened, rigidly secures the dial and cams upon the arbor thus insuring against slippage when the cams engage the switch in the manner hereinafter described. Time is indicated by the calibrations 32 in passing a pointer 36 secured upon the front of the housing.

The cams 24 and 26 designated as depressing and lifting cams respectively, are made in the form of arms pivotally mounted upon the arbor 3 as above described, one end extending outwardly beyond the edge of the dial, the other end being shaped as a pointer arranged to be aligned with any of the calibrations 32. The extending ends of the cams 24 and 26 are provided with oppositely inclined cam surfaces, one of which is adapted to depress a switch member to close an electric circuit, the other being adapted to lift said switch member to again break said circuit.

In the drawings I have illustrated one form of switch which shows the operation of my device. Contacts 41 suitably connected in an electric circuit are arranged to be engaged by a contacting element 42 secured upon a switch arm 43 pivotally mounted upon a pin 40 suitable insulation 44 being interposed between the element 42 and the arm 43. A link 46 is likewise pivoted upon the pin 40, said link being provided with a pin 47 extending laterally from the free end thereof. A spring 48 has one end thereof secured to the pin 47 and the other end secured to a pin 49 secured upon the free end of the arm 43. The pivotal movement of the link 46 is limited by pins 51 secured upon a bracket 52 which carries the pivot 40, and the pivotal movement of the switch arm 43 is similarly limited by the contacts 41 and a stop 53. When the link 46 is moved to a position above the center line of the arm 43, the spring will exert a pull upwardly in such manner as to move and retain the arm in its upper position, and in a similar manner, when the link is moved to a position below the center line of the arm 43, the pull exerted by the spring will tend to pull the arm downwardly to its lowermost position. The switch and timing mechanism are mounted upon a common base 45 and the switch arm 43 and the link 46 are so positioned that the pin 47 will be diametrically opposed to the pointer 36 and within the path of the cam surfaces 24 and 26.

The depressing cam 24 is so arranged that when the link 46 and pin 47 are in the upper position as shown in dotted lines in Fig. 4 of the drawings, the inclined cam surface will be moved into engagement with the pin and as the cam is rotated with the dial 23 and arbor 3, the pin will be slowly depressed until the center of the pin 47 passes the center line of the arm 43 which will occur at the instant the calibration indicated by the cam pointer registers with the time pointer 36. As soon as the pin 47 passes the center line, the spring will exert its pull downwardly and the link and arm 43 will instantly be moved downwardly to their lowermost positions and the contacts 41 thereby closed by the member 42. Thus, by moving the cam 24 to a position such that the pointer will indicate the time calibration at which it is desired to close the circuit through the switch the contact will be automatically closed when said calibration reaches the time indicator 36.

The switch is opened and the circuit broken in a similar manner by the lifting cam 26. In this case, the cam surface engages the pin 47 upon the under side and gradually lifts the link 46 upwardly until the pin 47 passes the center-line of the arm 43 as shown in Fig. 5 of the drawings. At the instant the pin passes the center line, the tension of the spring 48 will be shifted to exert an upward pull thus causing the arm to be instantly shifted to its upper position and the element 42 removed from engagement with the contacts 41. The time at which the contact is to be broken is indicated, as before, by the cam pointer and the time pointer 36. The lifting portion of the cam 26 is formed as an inwardly turned flange to permit the arm to pass the pin 47 after said pin has been displaced, this construction being best illustrated in Fig. 7 of the drawings.

From the above description it will be seen

that I have provided a device by which substantially all the power delivered to the main arbor of a train of timing gears may be utilized for opening and closing a switch, the operation being such that an instantaneous making or breaking of the circuit at a predetermined instant of time will result. In this manner all sparking at the switch contacts is avoided, and as the power delivered is relatively great, the switch may be made of a large size, or a plurality of switches operated simultaneously by a single timing element. The strain upon the timing gears is eliminated and the possibility of stopping the mechanism by an overload upon the cams is thus avoided.

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

1. The combination with a train of timing gears, actuating means applying power to the main arbor of said train of gears, and an escapement, of an electric contact and a pivotally mounted contact arm mounted adjacent said train of gears; a lever pivotally mounted upon the contact arm mounting and extending in a direction opposite to said arm; a spring having one end thereof secured to the free end of contact arm and the other end secured to the free end of the lever; and a pair of separately adjustable cams mounted upon the main arbor and actuated thereby to engage and move the lever to carry said other end of the spring to positions below and above the center line of the contact arm whereby a downward and upward pull respectively will be exerted upon said arm to close and open the switch at predetermined times.

2. The combination with a train of timing gears, actuating means applying power to the main arbor of said train of gears, and an escapement, of a dial mounted upon the main arbor and rotated therewith to make one revolution each twenty-four hours; an electric contact and a pivotally mounted contact arm mounted adjacent the dial; a lever pivotally mounted upon the contact arm mounting and extending in substantial longitudinal alignment and in an opposite direction to said arm; a spring having one end thereof secured upon the contact arm and the other end secured upon the lever; and a pair of cams mounted upon the main arbor and arranged to be separately adjusted to engage the dial at any desired point, said cams being actuated thereby to engage and move the lever in opposite direction to carry said other end of the spring to positions below and above the center line of the contact arm whereby a downward and upward pull respectively will be exerted upon said arm to close and open the switch at predetermined times.

3. A timing switch comprising a main arbor; a spring mounted upon said main arbor to normally impart rotation to said arbor in a clockwise direction, and to be wound by said arbor when rotated in an anti-clockwise direction; a train of timing gears and an escapement mounted in connection with the arbor to time the normal rotation thereof; a dial rotatably mounted upon the arbor; means for normally securing said dial upon the arbor to be rotated therewith in a clockwise direction; means for preventing rotation of the dial in an anti-clockwise direction when the arbor is rotated to wind the spring; and independently adjustable contact operating elements mounted upon the arbor and carried by the dial; a pivotally mounted contact arm movable to close and open an electric circuit; a lever pivotally mounted adjacent the contact arm and adapted to be engaged and moved by the contact operating elements; and a spring connected between opposite ends of the arm and lever for moving the contact arm to make or break the circuit when the lever is moved by the operating elements.

4. A timing switch comprising a main arbor; a spring mounted upon said main arbor to normally impart rotation to said arbor in a clockwise direction, and to be wound by said arbor when rotated in an anti-clockwise direction; a train of timing gears and an escapement mounted in connection with the arbor to time the normal rotation thereof; a dial rotatably mounted upon the arbor; a nut threaded onto the end of the arbor to normally secure the dial for rotation with said arbor in a clockwise direction, said nut being adapted to be loosened to permit the arbor to be independently rotated in an anti-clockwise direction to wind the spring; means for preventing anti-clockwise rotation of the dial; a pair of adjustable contact operating elements carried by the dial; a pivotally mounted contact arm; a lever pivotally mounted in association with the contact arm and adapted to be engaged and moved in opposite directions by the contact operating elements; and a spring connected between opposite ends of the lever and the contact arm for imparting movement from the lever to said arm.

In witness whereof I hereunto set my signature.

EDWARD McGLYNN.