

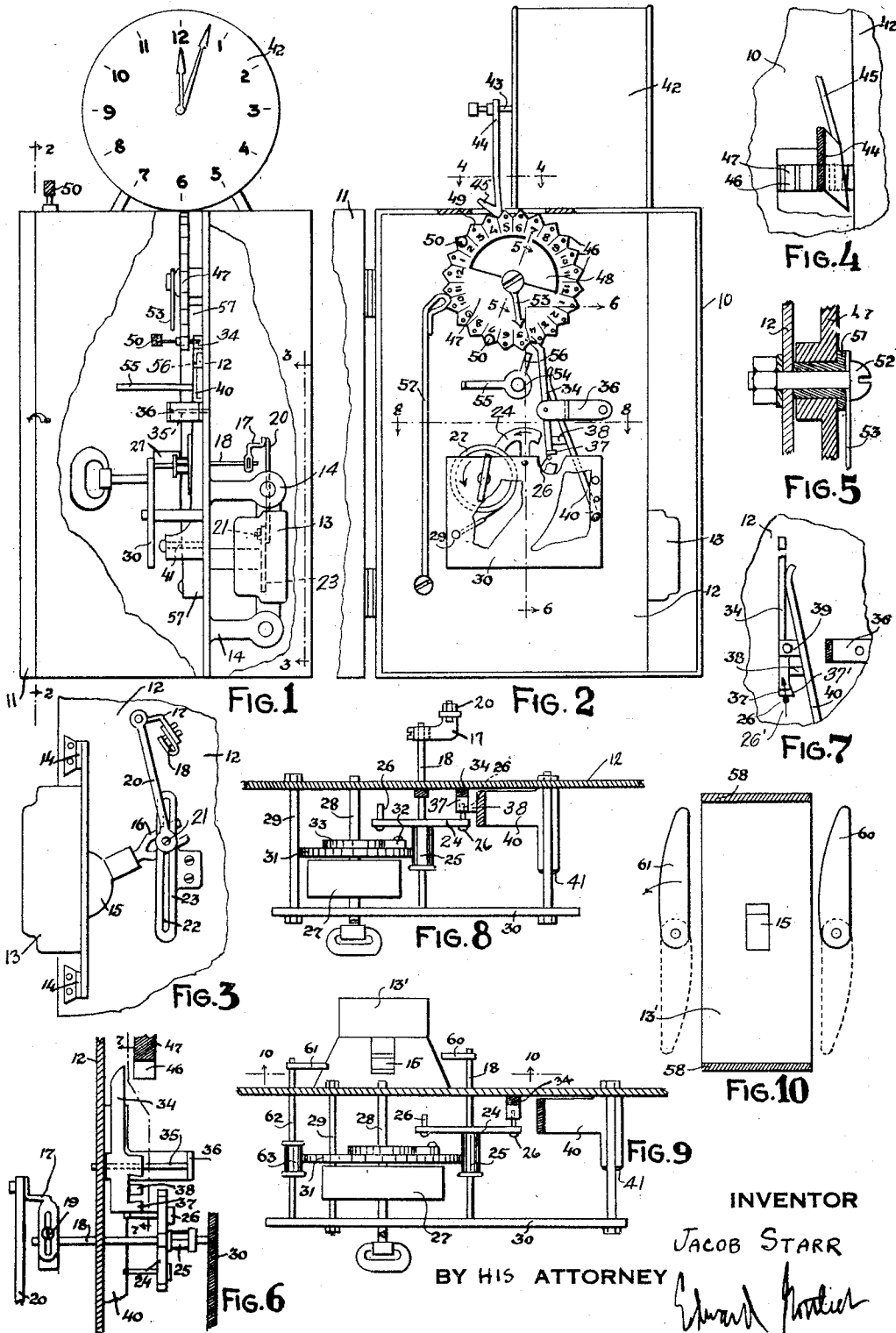
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TIME CONTROLLED SWITCH

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TIME CONTROLLED SWITCH

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This invention relates to new and useful improvements in a time switch.

The invention has for an object the construction of a time control switch which is intended particularly for raising and lowering awnings and the like and for other purposes.

As another object of this invention it is proposed to construct the control switch which is characterized by means for tending to turn a wheel, a time controlled escapement associated with said wheel, and means also associated with the wheel for moving the control lever of a customary switch.

A still further object of this invention is to construct a device of the class described which is of simple durable construction and which can be manufactured and sold at a reasonable cost.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawing, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawing forming a material part of this disclosure:—

Fig. 1 is a front elevational view of a device constructed according to this invention.

Fig. 2 is an elevational view as though taken on the line 2—2 of Fig. 1.

Fig. 3 is a fragmentary enlarged elevational view looking in the direction of the line 3—3 of Fig. 1.

Fig. 4 is a fragmentary horizontal sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 2.

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6.

Fig. 8 is a fragmentary horizontal sectional view taken on the line 8—8 of Fig. 2.

Fig. 9 is a view similar to Fig. 8 but showing a modification of the invention.

Fig. 10 is a sectional view taken on the line 10—10 of Fig. 9.

The automatic time switch is shown to consist of a box 10 having a hinged cover 11 and supporting a transverse plate portion 12 mounted therein. An electric switch 13 is supported upon one side of the plate 12 by brackets 14. The switch 13 has an operating lever 15 which may be pivoted up and down to turn on and turn off the switch. The details of the switch will not be given here since any type of commercial switch may be used which has an operating handle to pivot. A fork member 16 is mounted upon the operating lever 15.

A lever 17 is fixed upon the end of a spindle 18. This lever is made from two pieces, one of which has a slot and a clamping screw 19 engages the pieces so that the lever may be adjusted in length. A connecting rod 20 is pivotally connected upon one end of the lever 17 and at the other end is provided with a projecting pin 21 guided in a slot 22 of a bracket 23 which is attached upon the parts 12. The pin 21 engages in the fork 16 so as to cause movements of the switch operating lever 15 upon turning of the lever 17.

A wheel 24 is fixed upon the spindle 18. This wheel has a pinion portion 25. A pair of pegs 26 projects from the wheel 24 and are positioned 180° from each other.

A means is provided for tending to turn the wheel 24 and comprises a spring 27 wound around a shaft 28. The inner end of the spring is attached on the shaft and the outer end is attached upon a stationary bolt 29. A plate 30 is spaced from the part 12 and forms a support for the bolt 29, the shaft 28 and the spindle 18. A large gear wheel 31 is freely mounted upon the shaft 28 and is in mesh with the pinion 25. A spring urged pawl 32 is mounted upon the side of the gear 31 and engages a ratchet wheel 33 fixed upon the shaft 28. The arrangement is such that the shaft 28 may be turned in one direction to wind up the spring since the ratchet then merely idles past the pawl 32, and when released, the spring tends to turn the shaft 28 in the opposite direction. Thus the resiliency of

the spring is transmitted to tend to turn the wheel 24.

An escapement lever 34 is pivotally mounted by reason of being fixed upon a spindle 35 rotative at one end in the partition 12 and at the other end in a bracket 36 fixed upon the partition 12. The escapement lever has a pair of fingers 37 and 38. The finger 37 is a right angular projection on the lower end of the lever 34 in the direction of the axis of the lever. The finger 38 is a projection on the side of the lever 34 on the same end of the lever 34 as the finger 37 but nearer to the axis thereof and spaced slightly radially and extending in the same direction as the finger 37. Described in different words the finger 38 is not immediately over the finger 37 but to one side of it. The side 37', see Fig. 7, of the finger 37 nearest the finger 38 is at an inclination or bevel so that the finger 37 extends partially beneath the finger 38. One side of the lever 32 has an inclined portion 39 against which a flat spring 40 rests. This flat spring serves to hold the escapement lever in a neutral position. The flat spring 40 is supported upon a stud 41 projecting from the partition 12.

In the neutral position of the escapement lever 34 one of the pegs 26 engages against the bottom of the finger 37. Should the escapement lever be pivoted clockwise by the peg 50 as hereinafter described, viewing Fig. 7, the peg 26 will be released and the wheel 24 turn slightly until the same peg 26 engages against the finger 38. When the escapement lever moves back to its original position, the same peg 26 will be freed from the finger 38 and the wheel 24 will turn around substantially 180° until the other peg 26 strikes against and is held by the finger 37. The peg 50 engages the lever 34 only momentarily, turning it clockwise as seen viewing Fig. 7, and being biased by the spring 40, it is then returned to neutral position as soon as released by the peg 50, so that the finger 37 is ready to be engaged by the other peg 26 when the wheel 24 has completed its half revolution. To better understand the operation an arrow indicated by reference numeral 26' has been shown in Fig. 7 showing the true path taken by the peg 26. It should be noticed that in the position in which the lever 34 is shown, the peg 26 would pass the finger 38 so that the wheel 34 is shown, the peg 26 would pass the finger 38 so that the wheel 24 could rotate. The extension 37' on the finger 37 is such that when the lever 34 is pivoted clockwise the peg 26 is not released until the finger 38 assumes a position in the path of motion of the peg 26 so as to allow the wheel 24 to rotate but very slightly. It is only after the lever 34 moves back to its original position that the peg 26 is completely freed from

the escapement lever 34 and the wheel 24 rotates substantially half revolution until the other peg 26 strikes against the finger 37.

A clock means is provided for moving the escapement lever 34. This clock means comprises a clock 42 supported on the top of the box 10 and having the minute hand spindle 43 extended from the rear. A lever 44 is fixed upon this spindle and terminates at its free end in a tail cam 45 inclined slightly from the front to the rear and adapted to engage the teeth 46 of a wheel 47 which is rotatively supported upon the partition 12. Each time that the lever 44 makes one revolution, the tail cam 45 passes between a pair of the teeth on the wheel 47 and advances the wheel one tooth. The wheel 47 has twenty-four teeth which are numbered in two groups, one group representing the hours from twelve noon to twelve midnight, and the other group representing the hours from twelve midnight to twelve noon. To distinguish the two groups a portion of the disc is blackened, indicated by reference numeral 48, to represent P.M. readings. Each of the teeth 46 has transverse openings 49 through which a peg 50 may be inserted. The pegs 50 may be stored on the top of the box as illustrated in Fig. 1 when not used, and when used merely engaged through the proper opening.

The wheel 47 is rotatively supported upon a bushing 51 which is clamped by a bolt 52 upon the partition 12. A stationary hand 53 is clamped beneath the bolt head of the bushing 51. This pointer is so set that it indicates the nearest hour of any time of the day and the position one of the pegs 50 upon the wheel 47 must take at which the escapement lever 34 will be tripped. In other words the pointer is fixed in a position such that it is in line with the end of the lever 34 so that when the dial is set with the hour of the day under the pointer, the number of hours between the time indicated and the number where the plug is inserted will correspond to the number of notches in the wheel 47 between these points.

Manual means is provided for moving the escapement lever so that the phase of the switch 13 may be changed, that is, so that the switch is on or off as is desired. This means comprises a member 54 swivelly mounted upon the partition 12 and having a handle end 55 for manual gripping. This member also has a finger 56 adapted to strike against and move the escapement lever 34. More than this, in the moved position of the escapement lever 34 the finger 56 is at right angles thereto and so holds the escapement lever in its moved position. This arrangement allows the device to be rendered inoperative as far as operation of the switch is concerned even though the pegs are allowed

to remain on the wheel 47 and the clock is in operation.

The operation of the device may be understood by assuming the hypothetical case wherein it is desired to turn the switch on at seven o'clock in the daytime and turn it off at two o'clock at night. To accomplish this, pegs 50 are inserted within the teeth 46 which represent seven o'clock in the daytime and two o'clock at night. Then the wheel 47 should be turned so that the hour indicated by the pointer 53 corresponds with the correct time on the clock. With this arrangement as the clock operates, the lever 44 turns around 360° each time the minute hand of the clock makes a complete revolution, and therefore the wheel 47 will be turned one tooth each hour. When seven o'clock A. M. is reached the peg 50 on the 7 A. M. tooth will strike against the upper end of the escapement lever 34 and pivot the lower end clockwise, see Fig. 7, so that the peg 26 resting against the finger 37 is freed from the finger 37. The wheel 24 then turns slightly anti-clockwise indicated by the arrow until the just freed peg 26 is caught by the finger 38 which was moved into its path by the pivoting of the lever 34. Further turning of the wheel 47 will cause the peg 50 to drop or pass the upper end of the escapement lever 34 whereupon the spring 40 will return the escapement lever to its original position and the peg 26 which was against the finger 38 will be freed by passing between fingers 37 and 38 so that the wheel 24 rotates anti-clockwise through an angle of 180° only since the other peg 26 will be stopped against the finger 37. The turning of the wheel 24 is transmitted to the lever 17 which will also turn 180° and move the operating lever 15 of the switch to throw the switch. When the wheel 47 turns further to the position where the pin 50 from the tooth two P. M. strikes the escapement lever 34, the switch 15 will be again operated but this time to its initial position. A friction member in the form of a spring 57 is used for preventing free turning of the wheel 47. The spring 57 is supported at its rear end upon the partition 12, while the upper end engages in between a pair of teeth 46.

In Figs. 9 and 10 a modification of the invention has been disclosed in which a different arrangement has been provided for moving the control lever of the switch. More specifically, the switch 13' is supported by standards 58 upon the partition 12 in a manner so that the operating lever 15 is directed at right angles to the partition. The switch is located in between a pair of cam elements 60, 61. The cam element 60 is fixed upon the spindle 18 instead of the crank which was previously used. A second spindle 62 is rotatively supported

between the plate 30 and the partition 12 and carries the other cam element 61. A pinion 63 is fixed upon the spindle 62 and meshes with the large gear 31 but diametrically opposite the point where the pinion 25 engages. In Fig. 10 the cam elements 60, 61 have been shown in one of their positions. When the escapement operates to allow the wheel 24 to make a 90° turn each of the cam elements 60, 61 will turn simultaneously. These cam elements will turn in the same direction as indicated by the arrows to a position 180° from the original positions. This latter position is indicated by the dot and dash lines. In so turning the cam 60 will move the switch operating lever downwards. Upon the next turning of the cam elements the cam element 61 will move the switch operating lever upwards and in this manner the operation continues.

While I have illustrated and described my invention with some degree of particularity, I realize that in practice various alterations therein may be made. I therefore reserve the right and privilege of changing the form of the details of construction or otherwise altering the arrangement of the correlated parts without departing from the spirit or the scope of the appended claims.

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

1. In a device of the class described, a lever for connection with the operating lever of a switch, a wheel axially connected with said lever, pegs on the periphery of said wheel spaced 180° from each other, means for tending to turn said wheel in one direction, an escapement lever pivotally mounted and having a pair of vertically spaced fingers in adjacent vertical planes and adapted in one position of the lever to have the lower finger engage against one of said pegs, to hold said wheel from rotating and in a second position, obtained by slight pivoting of the lever, to have the same peg engage against the second finger due to its release from the lower finger and slight rotation of said wheel in said direction, said lever when moved back to its original position allowing the second finger to move free from said peg to allow turning of said wheel, until said other peg engages said lower finger, resilient means urging said escapement lever into the first mentioned position, and means for moving said escapement lever momentarily into the second mentioned position.

2. In a device of the class described, a lever for connection with the operating lever of a switch, a wheel axially connected with said lever, pegs on the periphery of said wheel spaced 180° from each other, means for tending to turn said wheel in one direction, an escapement lever pivotally mounted and having a pair of vertically spaced fin-

gers in adjacent vertical planes and adapted in one position of the lever to have the lower finger engage against one of said pegs, to hold said wheel from rotating and in a second position, obtained by slight pivoting of the lever, to have the same peg engage against the second finger due to its release from the lower finger and slight rotation of said wheel in said direction, said lever when moved back to its original position allowing the second finger to move free from said peg to allow turning of said wheel until said other peg engages said lower finger, resilient means urging said escapement lever into the first mentioned position, and means for moving said escapement lever momentarily into the second mentioned position, said escapement lever having a side portion with an inclined face, and said resilient means for urging the lever into the first mentioned position comprising a flat spring resting against the inclined face of said lever.

3. In a device of the class described, a lever for connection with the operating lever of a switch, a wheel axially connected with said lever, pegs on the periphery of said wheel spaced 180° from each other, means for tending to turn said wheel in one direction, an escapement lever pivotally mounted and having a pair of vertically spaced fingers in adjacent vertical planes and adapted in one position of the lever to have the lower finger engage against one of said pegs, to hold said wheel from rotating and in a second position, obtained by slight pivoting of the lever, to have the same peg engage against the second finger due to its release from the lower finger and slight rotating of said wheel in said direction, said lever when moved back to its original position allowing the second finger to move free from said peg to allow turning of said wheel, until said other peg engages said lower finger, resilient means urging said escapement lever into the first mentioned position, means for moving said escapement lever momentarily into the second mentioned position, and manual means for moving and holding said escapement lever into the second mentioned position.

4. In a device of the class described, a lever for connection with the operating lever of a switch, a wheel axially connected with said lever, pegs on the periphery of said wheel spaced 180° from each other, means for tending to turn said wheel one direction, an escapement lever pivotally mounted and having a pair of vertically spaced fingers in adjacent vertical planes and adapted in one position of the lever to have the lower finger engage against one of said pegs, to hold said wheel from rotating and in a second position, obtained by slight pivoting of the lever, to have the same peg engage against the second finger due to its release

from the lower finger and slight rotation of said wheel in said direction, said lever when moved back to its original position allowing the second finger to move free from said peg to allow turning of said wheel, until said other peg engages said lower finger, resilient means urging said escapement lever into the first mentioned position, means for moving said escapement lever momentarily into the second mentioned position, and manual means for moving and holding said escapement lever into the second mentioned position, comprising a member pivotally supported and having a handle, and a finger projecting from said member engageable against said escapement lever to be at right angles to the lever when the lever is in the second mentioned position.

In testimony whereof I affix my signature.

JACOB STARR.