June 26, 1928. 1,675,292

G. A. BURGESS

ELECTRICAL TIME SWITCH

Filed June 7, 1926 2 Sheets-Sheet 1

Fig. 1.

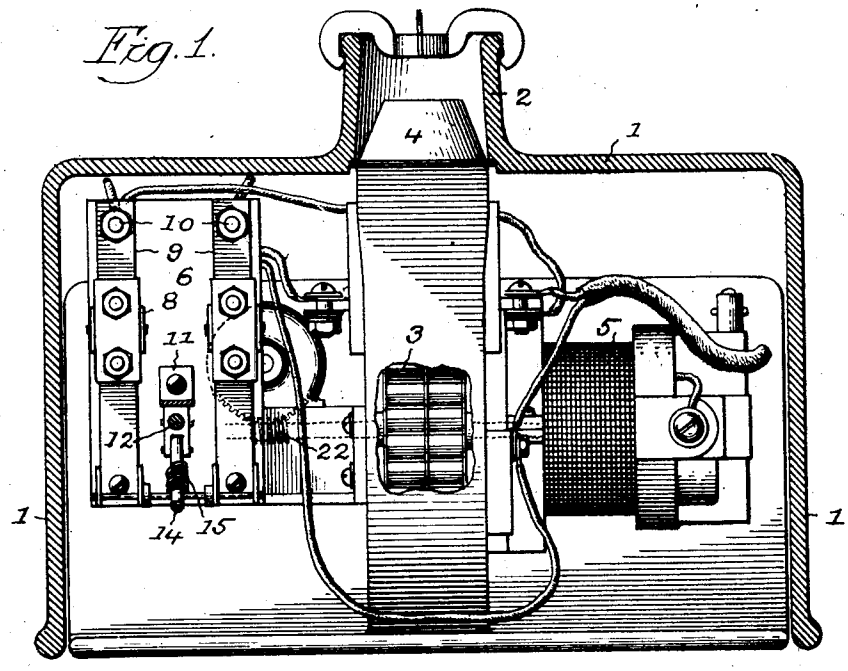
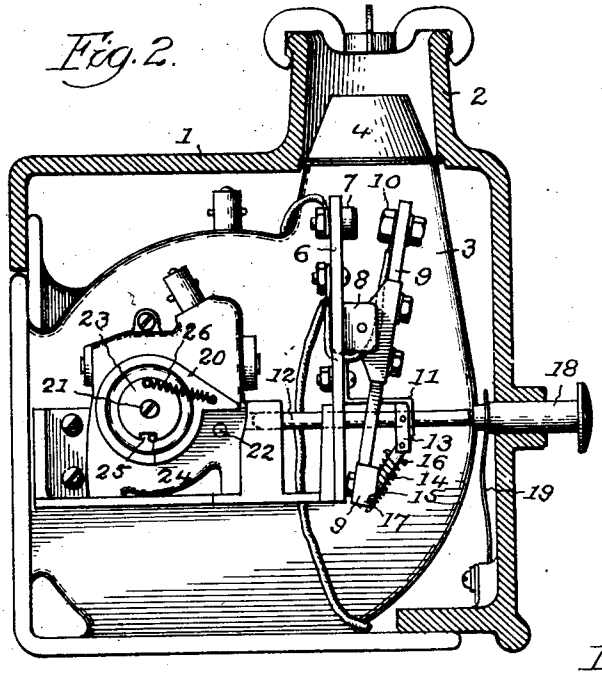


Fig. 2.



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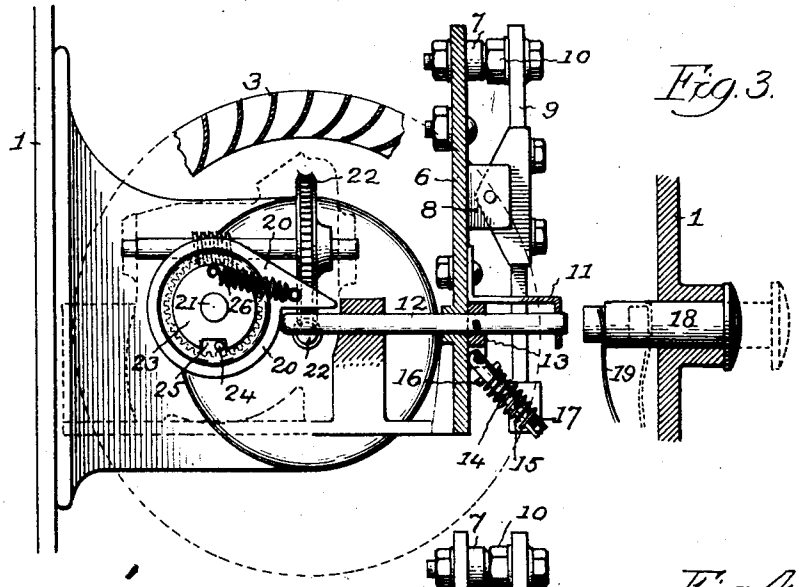


Fig. 3.

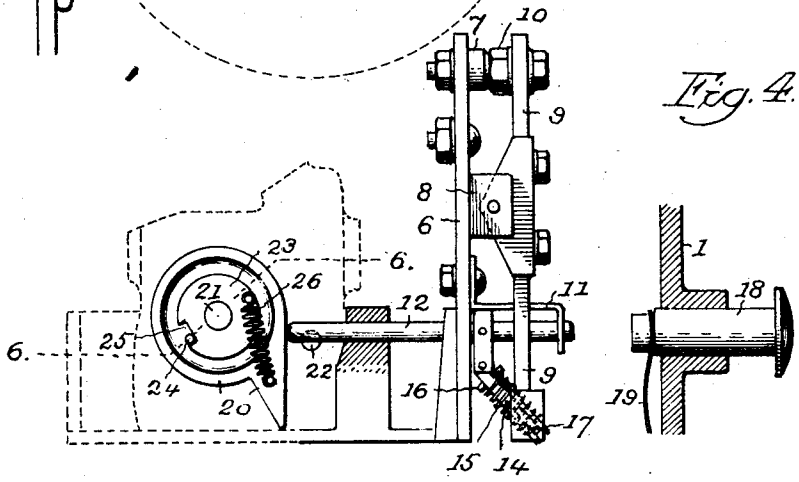


Fig. 4.

Fig. 5.

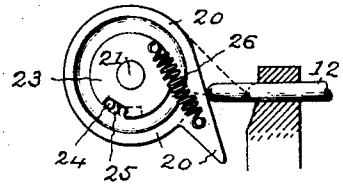
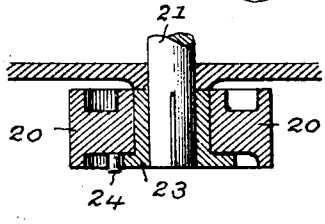


Fig. 6.



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Patented June 26, 1928. 1,675,292

UNITED STATES PATENT OFFICE.

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ELECTRICAL TIME SWITCH.

Application filed June 7, 1926. Serial No. 114,058.

This invention relates to that class of electrical time switch mechanisms, in which a closing of the circuit is effected manually and the opening of the circuit is effected automatically in a predetermined period of time by operative connections with the motor of a blower or like apparatus with which the switch mechanism is associated. And the present improvement has for its object: To provide a structural formation and combination of the operative means of a switch mechanism of the type above described with a revolving part of the apparatus with which it is associated, whereby the opening movement of the switch mechanism is effected is attained in a certain and effective manner without liability of the mechanism failing to complete its full stroke or operation, and the consequent rendering the apparatus inoperative, all as will hereinafter more fully appear.

In the accompanying drawing:—

Fig. 1, is a front elevation, with the enclosing housing in section, of a hot air blast apparatus to which the present invention is applied.

Fig. 2, is an end elevation of the same with said housing also shown in section.

Fig. 3, a fragmentary sectional elevation of the parts in a position different from that shown in Fig. 2.

Fig. 4, is a like fragmentary sectional elevation showing the parts in another different position.

Fig. 5, is a detail sectional elevation, showing the operating cam of the switch mechanism in a different position from that shown in Figs. 2, 3 and 4.

Fig. 6, is a detail section of the operating cam and associated parts, on line 6—6 Fig. 4.

Like reference numerals indicate like parts in the different views.

In the type of electrical switch mechanism employed in the present invention, the usual operating cam or wiper by which the movable contact member of the switch mechanism is forced to an open position, there existed a liability of said cam or wiper coming to a rest, with the outer or operating end in the path of the operating stem of said movable contact member, thus interfering with or entirely preventing the succeeding and normal manual actuation of said stem to effect a subsequent closing movement of said movable contact member.

The prevention of such defective operation of an automatic time switch mechanism is the main purpose of the present improvement, which in the preferred combination of parts shown in the drawing, involves a detail formation and arrangement of parts applied to a hot air dryer for lavatory uses, as follows:

The enclosing housing 1 with its outlet nozzle 2, and enclosed rotary air mover or fan 3, as well as the associated electrical air heating unit 4 and operating electric motor 5 are of any ordinary construction and arrangement in use at this time in the type of hot air driers above referred to.

The switch mechanism for opening and closing the electro-motive circuit to the motor 5 and electrical heating unit 4, is preferably of the "snap" type and of any usual and suitable detail construction, preferably of a construction as follows:—

The supporting plate 6 of the switch mechanism is fixedly secured in an upright position within the enclosing housing 1, and carries near one end the pair of insulated stationary contact members 7 of the switch, and in separated relation to said members 7, a pair of pivot lugs 8, in which a branched lever 9 carrying at one end the pair of movable contact members 10 of switch mechanism, is pivotally mounted. The base plate 6 also carries a combined stop and guide bracket 11, to afford stop and guiding engagement for a sliding push rod 12 that has operative connection with the lever 9 of the movable contact members 10, by means as follows:—

Upon the push rod 12 and between the base plate 6 and the bracket 11, a collar 13 is fixedly attached, and has pivotal connection at an end of a spring toggle link 14, as shown. At the other end the toggle link 14 has a sliding and pivoted connection to the end of the lever 9 aforesaid, at the end opposite to the end of said lever which carries the contact members 10 of the switch.

The spring element 15 of the toggle link 14 has abutment at one end against a collar or cross pin 16, on the toggle link 14, and at its other end against a like cross pin 17 carried on the lower end of the lever 9 aforesaid, and as usual in many snap switch

mechanisms in general use, and with such spring adapted to function in the ordinary manner, to wit:—

The spring element 15, is compressed in an initial movement of the movable contact carrying lever 9 in either direction, and then to complete its expansion and in a rapid manner the last portion of the movement of said lever to attain the usual snap action in the make and break movement of the switch mechanism.

In the construction shown, the push rod 12 receives an initial manual movement in one direction to close the switch circuit, preferably by means of a separate headed plunger 18, slidably arranged in a wall of the inclosing housing 1 in aligned relation with the push rod 12 and with its inner end having operative contact with the adjacent end of said push rod. A spring 19 is associated with the plunger 18 to return the same to its normal outward position after being pushed inward by hand in effecting a closing of the circuit of the switch mechanism and the starting up of the motor and associated parts of the apparatus.

By means of the described separated construction of the push rod 12, and plunger 18, said plunger will only operate to aid in the switch closing operation, and cannot be used from the outside of the apparatus, to tamper with the closed condition of the switch mechanism by meddling or mischievous parties.

The opposite and automatic opening movement of the switch mechanism is of the periodic type, and in the present construction is attained by a revolving cam or wiper arm 20 mounted on a countershaft 21, which in turn is operatively connected by a train of speed reducing gearing 22 with the power shaft of the motor 5, so that with a normal speed of said motor the cam or wiper arm 20 will make a complete revolution in a period of one minute, more or less. The cam or wiper arm 20 is arranged in operative relation to the end of the push rod 12 opposite to the end of the push rod in operative engagement with the carrying lever 9 of the movable contact members of the switch and is adapted to engage and impart the heretofore described initial movement to said push rod 12, in the opening or circuit breaking movement of the switch mechanism, in which the final movement of the parts is effected by the spring toggle connections 14, 15, heretofore described.

A material part of this improvement consists in so mounting the cam or wiper arm 20 on the countershaft 21, so that the outer point or end of said cam or wiper arm will not be left in the path of the push rod 12, with a stoppage of the motor 5 by the breaking of its circuit. To such end the hub of the cam or wiper arm 20 is loosely mounted on a hub 23 fixed on the countershaft 21 aforesaid, with the independent turning movement between said hubs restricted by a stud 24 and an elongated recess 25 carried by and formed in the respective hubs.

Co-acting with the parts so arranged, a spring 26 has connection at its respective ends to the respective hubs aforesaid, with a normal tendency to maintain the stud 24 in an inoperative position in the recess 25 and with said spring as the operative connection between said hubs to attain a movement of the cam or wiper arm 20, during the inoperative portion of the revolution of said cam or wiper arm. When, however, the active portion of such revolution begins, with the active portion of the cam or wiper arm coming into operative contact with the end of the push rod 12, the fixed hub 23 will turn in advance of the hub portion of said cam or wiper arm and bring the aforesaid stud 24 into driving contact with an end of the elongated recess 25, so that the two hubs will complete their revolution in unison and in a positive manner. During such portion of the revolution the cam or wiper arm 20 effects the described initial opening movement of the switch mechanism.

With the outer point or end of the cam or wiper arm 20 reaching the end of the push rod 12, the spring 26 is free to draw such end or point of the cam or wiper arm out of the path of said push rod, and restore the relation between the hub of the cam or wiper arm 20 and its carrying hub 23, first set forth, ready for a succeeding cycle of operations of the apparatus.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent, is:—

1. The combination in a time switch mechanism of the type described, of a make and break switch the movable member of which is of the snap type, with the snap connection comprising a toggle link and spring arranged intermediate of said movable member and a switch operative element, a push rod forming a part of the switch operating means and having operative connection with the movable switch member through the toggle link and spring aforesaid, a rotary cam having intermittent operative engagement with said push rod, and a motor driven shaft carrying said cam and having alternating operative engagement therewith, a spring and a stud and an elongated recess constituting the means of engagement.

2. The combination in a time switch mechanism of the type described, of a make and break switch, a push rod operatively associated with the movable contact member of said switch, a rotary cam having intermittent operative engagement with said push rod, a motor driven shaft carrying said cam and having alternating operative engage-

ment therewith, a spring and a stud and an elongated recess constituting the means of engagement, and a manually actuated spring plunger having push engagement with said push rod, the stroke of said plunger being a division of the normal stroke of the push rod.

3. The combination in a time switch mechanism of the type described, of a make and break switch the movable member of which is of the snap type, with the snap connection comprising a toggle link and spring arranged intermediate of said movable member and a switch operating element, a push rod forming a part of the switch operating means and having operative connection with the movable switch member through the toggle link and spring aforesaid, a rotary cam having intermittent operative engagement with said push rod, a motor driven shaft carrying said cam and having alternating operative engagement therewith, a spring and a stud and an elongated recess constituting the means of engagement, and manually actuated spring plunger having push engagement with said push rod, the stroke of said plunger being a division of the normal stroke of the push rod.

4. The combination in a time switch mechanism, of an enclosing casing, a circuit controlling switch of the snap or sudden opening and closing type, a rotary cam having a throw less than the extent of movement of the movable member of the switch and adapted for operative engagement with the movable member to effect a partial opening movement of the same, and a manually actuated plunger mounted in a wall of the enclosing casing and having a throw less than the extent of movement of the movable member of the switch and adapted for operative engagement with the movable member to effect a partial closing movement of the same, the final opening and closing movements of the movable member being of the sudden type under the influence of its operating spring.

5. The combination in a time switch mechanism of an enclosing casing, a circuit controlling switch of the snap or sudden closing and opening type, a rotary cam having operative connection with the movable contact member of the switch, said movable member having movement in a rectilinear path, a motor driven shaft having operative engagement with said cam by means of a limited loose connection which includes as a part a spring tending to yieldingly maintain the cam in a forward position in relation to the motor driven shaft.

6. The combination in a time switch mechanism of an enclosing casing, a circuit controlling switch of the snap or sudden closing and opening type, a motor driven shaft, a circular hub fixed on said shaft, a ring carrying a cam projection for operative connection with the movable contact member of the switch, said ring being loosely mounted on the aforesaid hub with its independent movement limited by a stud and elongated slot connection between the parts, and a spring tending to yieldingly maintain said ring in an advanced position on said hub.

Signed at Waukegan, Illinois, this 3rd day of June, 1925.

GEORGE A. BURGESS.