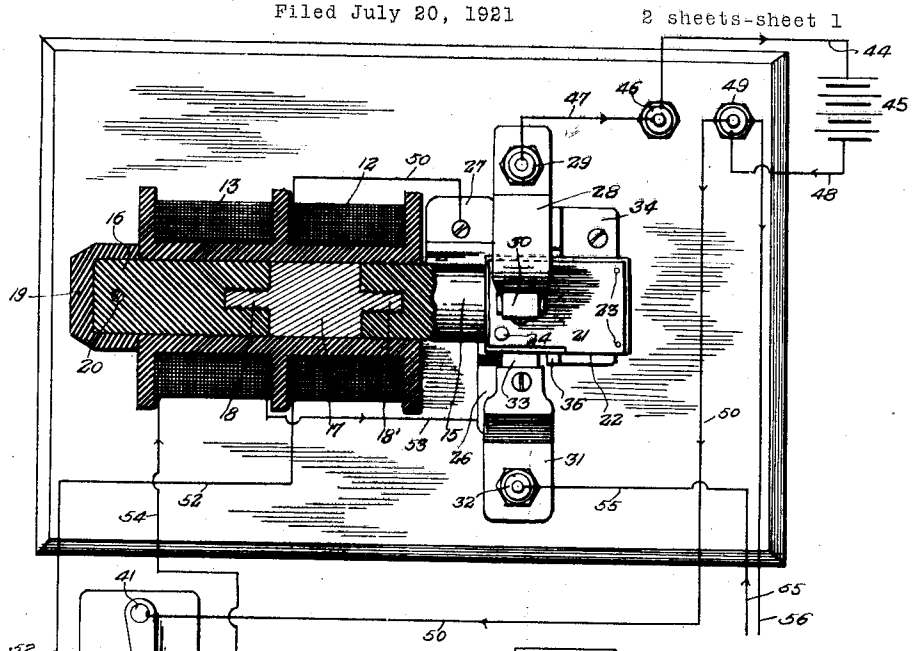
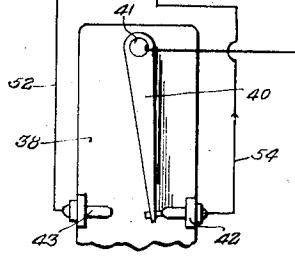
Mar. 6, 1923. 1,447,917

E. M. WILSON

ELECTRIC SWITCH

Filed July 20, 1921 2 sheets-sheet 1





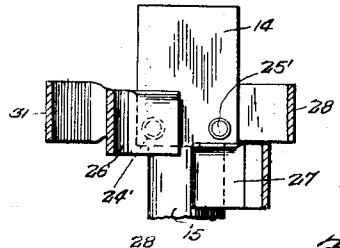


Fig. 1.

Fig. 6

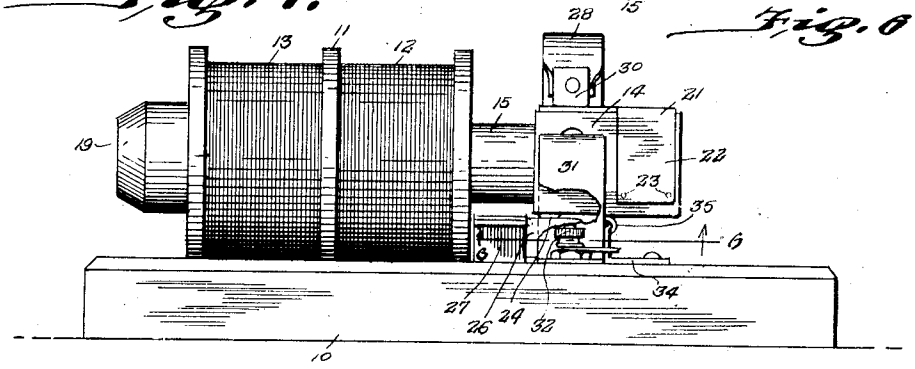


Fig. 2.

Inventor

E. M. Wilson

By

Geo. P. Kimmel Attorney

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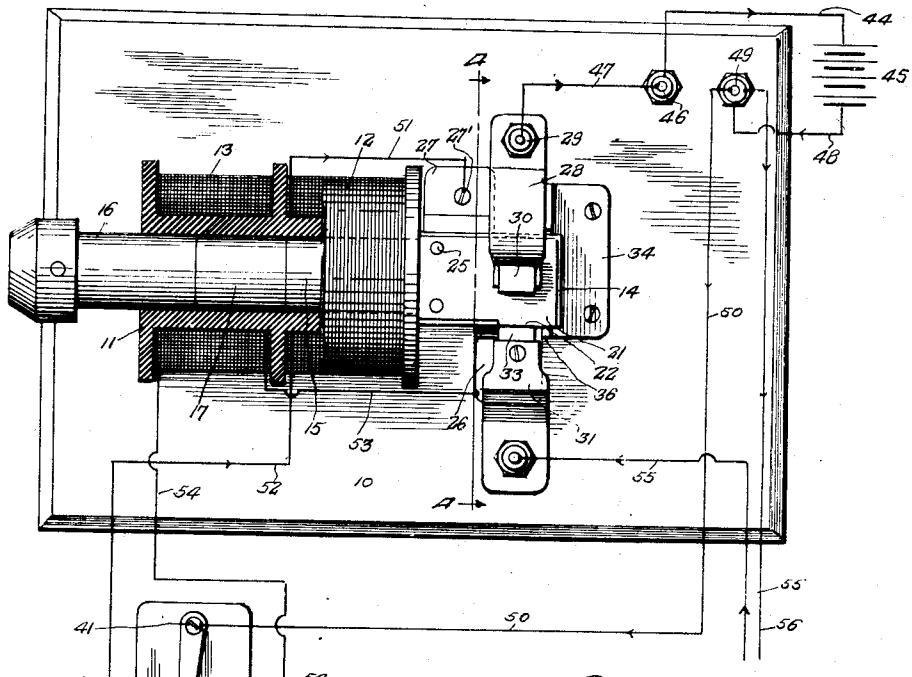


Fig. 3.

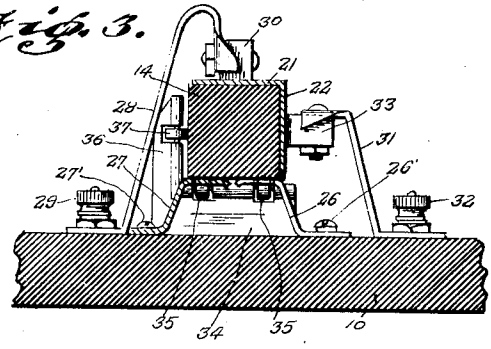


Fig. 4.

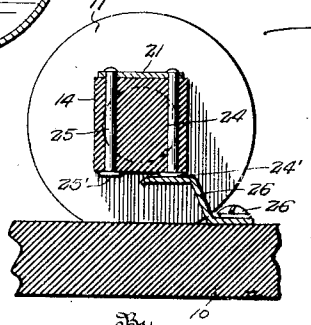


Fig. 5.

Inventor
E. M. Wilson

By Geo. P. Kimmel. Attorney

Patented Mar. 6, 1923. 1,447,917

UNITED STATES PATENT OFFICE.

ERNEST M. WILSON, OF SANDPOINT, IDAHO.

ELECTRIC SWITCH.

Application filed July 20, 1921. Serial No. 486,171.

To all whom it may concern:

Be it known that I, ERNEST M. WILSON, a subject of the King of England, residing at Sandpoint, in the county of Bonner and State of Idaho, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

This invention appertains to certain improvements in electric switches generally, and has for its principal object to provide for an automatic type of the same, and one of an extremely simplified and efficient construction and arrangement of parts capable of use wherever a comparatively sensitive and quick responsive automatic switching means can be advantageously employed.

Another object of the invention is to provide for an automatic switch device or apparatus, and one especially designed for quick response to maximum and minimum temperatures for the cutting off and on of current correspondingly, and which is adapted for use in connection with any and all forms of electrically heated devices or apparatus such as melting pots or the like.

With the foregoing and other objects in view, the invention resides in the certain novel and useful construction and arrangement of parts as will be hereinafter more fully described, set forth in the appended claims, and illustrated in the accompanying drawings, in which:—

Figure 1 is a top plan view, partly in section, of the preferred emobdiment of the switch, and showing a desired manner of connecting the same in circuit.

Fig. 2 is a side elevation thereof,

Fig. 3 is a view similar to that of Fig. 1, but showing the parts thereof in a reverse operative position from that as shown in Fig. 1,

Fig. 4 is a fragmentary transverse section taken on the line 4—4 of Fig. 3,

Fig. 5 is a fragmentary section taken on the line 5—5 of Fig. 3, and,

Fig. 6 is a fragmentary horizontal section taken on the line 6—6 of Fig. 2.

Referring to the drawings, wherein similar characters of reference designate corresponding parts in the several views thereof, the preferred embodiment of the invention is shown therein as connected in circuit with an electrically heated melting pot *a*, whereby to illustrate one instance of the practical application of the same, and wherein the current used for heating the melting pot is adapted to be automatically cut on and off therefrom correspondingly with a fall and rise of temperature thereof, a thermostat being utilized for effecting the operation of the switch for controlling the flow of current in the supply circuit in which the melting pot, thermostat and switch are connected.

The switch device or apparatus per se comprises a base 10, of a suitable insulating material, preferably of rectangular or oblong form, and mounted at one side of the transverse center of the upper face thereof, and on the longitudinal center of the same, is a spool-like body 11, also of an insulating or non-magnetic material, which is formed to provide a pair of annular channels in which are wound solenoidal coils 12 and 13. Movably mounted in the bore of the solenoidal body 11 is a plunger end switch block which is formed to provide a head portion 14, preferably square in cross section, and intermediate an integral shank section 15 and a detachable shank section 16, both of the latter sections being preferably circular in cross section. The detachable shank section 16 of the plunger and switch block, is to be connected to the integral shank section 15, by means of an iron core piece 17, which is circular in cross section and of an even diameter to that of the shank sections 15 and 16, the opposite ends of the core piece 17 being reduced to provide circular extensions or studs 18 and 18′ which are threaded in the complementally threaded openings formed in the opposed ends of the said shank sections, whereby to form a substantially rigid and solid plunger and switch block construction, the entire shank section being of a length to extend through the bore of the solenoidal body 11 in a direction outwardly of the inner end thereof, and has fitted on its free projected end portion, i. e., the free end of the detachable shank section 16, a cap-like member 19, of the same material as that of the head section 14, the integral shank portion 15 and the detachable shank portion 16, and is secured in position thereon by means of a bolt or screw 20, whereby to act as a stop for limiting the movement of the plunger and switch block as a whole in one direction of its movement. The head end 14 of the plunger and switch block has its upper face entirely covered by a contact plate 21, which is provided at its forward end with an an-

gularly bent portion 22 which extends downwardly of one of the side faces of the head 14, the forward end of the contact plates 21 and the contacting section 22 thereof being secured in position by means of nails, screws or the like 23, and the rear end of the contact plate 21 by means of transversely spaced screws or bolts 24 and 25, which pass downwardly through the head portion 14 of the plunger and switch block and have their lower ends headed as at 24′ and 25′, respectively, and projecting outwardly of the bottom face of the head portion 14 for wiping contact with a pair of spaced and oppositely disposed spring contact fingers or members 26 and 27, which are secured in slightly offset position one with respect to the other on the base 10, by means of screws or bolts 26′ and 27′, respectively. Rising at one side of the head end 14 of the plunger and switch block is a spring contact arm 28 which is secured to the base 10 by means of a binding post 29, and which has its upper end angularly bent to support at its free end portion a contact block 30, of a suitable conducting material, the same being tensioned by the resiliency of the spring arm 28 in wiping contact with the contact plate 21 on the upper face of the head portiton 14, while at the other side thereof is a second spring contact arm 31, which is, in turn, secured to the base 10 by means of a binding post 32, and carries at its upper angularly bent end a contact block or member 33, and supports the same in position for wiping contact with the contact plate extension 22 on one side face of the headed portion 14. Arranged in spaced relation with respect to the inner end of the solenoidal body 11 and extending transversely beneath the head portion 14 of the plunger and switch block is a supporting member or plate 34, which is secured to the base 10 and has its upper edge provided with a pair of spaced rollers 35, arranged in rolling contact with the under face of the head portion 14, and is provided with an upstanding arm portion 36 at one end thereof and rising in parallel relation to and at one side of the head portion 14 opposite to that on which the contacting section plate 22 is carried, and a roller 37 is journaled in this arm 36 and the same is adapted to bear against the side face of the head portion 14 complemental thereto.

In this instance of the application of the switch device or mechanism thus provided, a melting pot *a* is provided with a suitable thermostatic device, such as is shown in Figs. 1 and 3 of the drawing, and the same comprises a plate 38 rising above the pot and is provided with a depending portion 39 which preferably extends downwardly within the pot, and mounted on one side of the plate 37 is a switch arm 40 of an expansible or contractible metal, the same being secured as at 41, and adapted to have its free depending end portions operate between a pair of fixed contacts 42 and 43 which are spaced apart to either side of the vertical center of the plate 37.

The electrical circuit connections of the combined apparatus is, as follows:—A conductor 44 leads from one side of a suitable source of current supply 45 to a main binding post 46, which is, in turn, connected by a conductor 47 to the binding post 29 of the contact strip or arm 28, while a conductor 48 leads from the other terminal of source of current supply and connects to a second main binding post 49, which, in turn, is connected, by means of a conductor 50, to the fastening screw 41 of the arm 40 of the thermostatic device. One terminal of the solenoidal coil 12 is connected by means of a conductor 51 to the fastening screw 27′ of the spring contact 27, and the other terminal of the same, by means of a conductor 52 to the thermostatic contact 43, while the solenoidal coil 13 is connected, by means of a conductor 53 to the screw fastening 26′ of the spring contact 26, and, by a conductor 54 to the other side of the thermostatic contact 42. Current is led to the melting pot *a* by means of a conductor 56 connecting the main binding post 49, and by a conductor 55 leading from the binding post 32 of the contact strip or arm 31. In the operation of the apparatus thus constructed, arranged and connected one in circuit with the other and as shown in Fig. 1, with the thermostatic switch arm 40 connecting the fixed contact 42, current from the source of supply will flow by way of conductor 48 to binding post 49, conductor 50 to thermostatic switch arm 40, contact 42, conductor 54 to coil 13, by conductor 53 from coil 13 to spring contact 26, by way of screw 24 to contact plate 21 on the plunger or switch arm head portion 14, contact block 30, spring arm 28, binding post 29 by conductor 47 to main binding post 46, and by conductor 44 to the source of current supply 45, when the coil 13 is energized and will act on the iron core portion 17 of the plunger or switch arm to draw the same to the position as shown in Fig. 3. As shown, in Fig. 1, the circuit of the coil 12 is broken by reason of the screw 25 being out of contact with the spring contact 27, and the circuit to the melting pot *a* is also broken by reason of the contact block 33 being out of contact with the plate extension 22, and the thermostatic switch arm has moved to the contact 42 by reason of the melting pot being cold or having cooled down to a point below that of the predetermined temperature. With the plunger or switch arm having been drawn to its intermost position as shown in Fig. 3, under the action of the coil 13, the circuit of the latter is broken by reason of the contact screw 24 being moved out of contact with the spring contact 26,

while the circuit is closed through the melting pot *a* by reason of the contact plate extension 22 having beeen moved into contacting relation with respect to the contact block 33. Upon the heating up of the melting pot *a* the thermostatic arm 40 will move toward and finally contact the fixed contact point 43, during which movement both coils 12 and 13 are deenergized, when current will now flow by way of conductor 48 from the source of current supply 45, to main binding post 49 and by conductor 56 to the melting pot *a*, and by conductor 55, from the latter, to the binding post 32, contact strip 31, contact block 33, contact plate extension 22, contact plate 21, contact block 30, spring arm or strip 28, binding post 29, conductor 47 to main binding post 46, and by conductor 44 to the source of current supply 45. Current will divide from the main binding post 49, and will flow by way of conductor 50 to the thermostatic arm 40, to fixed contacts 43, by conductor 52 to coil 12, by conductor 51 to spring contact 27 to contact screw 25, to contact plate 21, contact block 30, spring arm or strip 28, binding post 29, by conductor 47 to main binding post 46 and from thence by conductor 44 to the other terminal of the source of current supply 45, when the coil 12 will be energized and ready to act to draw the plunger or switch arm back to the position as shown in Fig. 1.

From the foregoing, it will be readily apparent that the invention provides for an extremely simplified and comparatively inexpensive construction of switching device or apparatus; one embodying refined features of mechanism and electrical construction, arrangement and assembly of parts, and one which is of great efficiency and durability, and which requires a minimum of care and attention during the operation of the same after being installed, and the thermostat associated therewith initially adjusted for operation at a predetermined temperature.

It is well understood that, while the automatic switch device or apparatus has been described and illustrated herein in specific terms and details of construction and arrangement, various changes in and modifications of the same may be resorted to without departing from the spirit of the invention, or the scope of the claims appended hereto.

Having thus fully described the invention, what is claimed, is:—

1. An automatic switch, comprising a base, a pair of alined solenoidal coils mounted on the longitudinal center of said base and to one side of the transverse center thereof, stationary contacts mounted on said base and connecting a main circuit, a plunger movably mounted within said coils, switching contacts carried by said plunger and cooperative with said stationary contacts, one of said stationary contacts being permanently contacted by one of the said switching contacts, a second pair of stationary contacts carried on said base connected in circuit with each of said coils, a second set of switching contacts carried on said plunger and having common connection with the other of said switching contacts having permanent contacting engagement with one of the said first mentioned stationary contacts, said second set of switching contacts being arranged to alternately make and break the circuit with respect to the said second pair of stationary contacts correspondingly with the movements of said plunger, and means for automatically connecting and disconnecting said coils to and from the said main circuit alternately one with respect to the other for actuating said plunger.

2. An automatic switch comprising a pair of solenoidal coils, stationary contacts connecting a main circuit, a plunger movably mounted within said coils, switching contacts carried by said plunger and cooperating with said stationary contacts, one of said stationary contacts being permanently connected by one of said switching contacts, a set of stationary contacts connected in circuit with one of said coils, a set of switching contacts carried on said plunger and having common connection with the other of said switching contacts carried by the plunger and further having permanent contacting engagement with one of said first mentioned stationary contacts, said set of switching contacts being arranged to alternately make and break the circuit with respect to said set of stationary contacts correspondingly with the movements of said plunger, and means for connecting and disconnecting said coils to and from the main circuit alternately one with respect to the other to cause the actuation of said plunger.

In testimony whereof, I affix my signature hereto.

ERNEST M. WILSON.

Witnesses:
ALLEN P. ACHER,
DORA SWANSON.