Jan. 8, 1935. J. G. PETERSON 1,987,025

ELECTRIC SWITCH

Filed June 17, 1930

Fig.1.

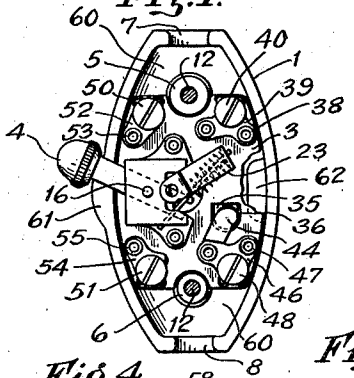


Fig.2.

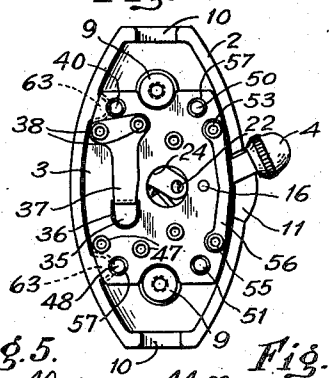


Fig.3.

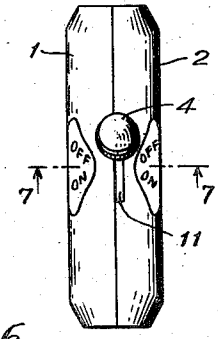


Fig.4.

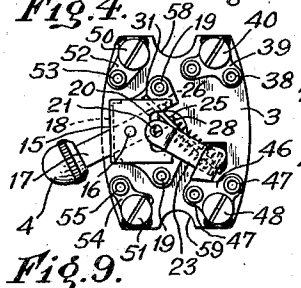


Fig.5.

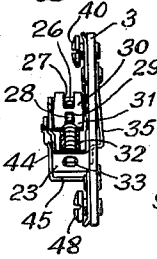


Fig.6.

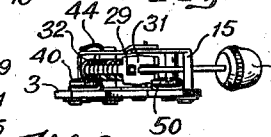


Fig.7.

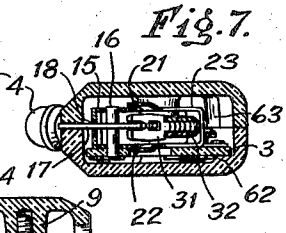


Fig.8.

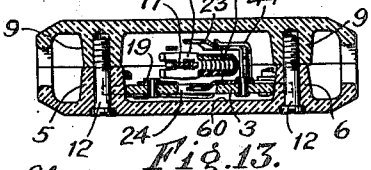


Fig.9.

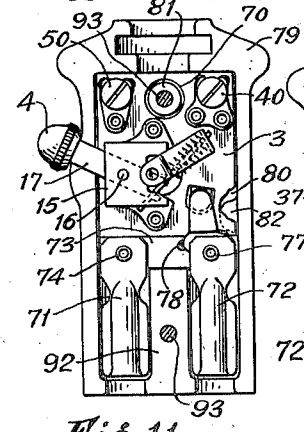


Fig.10.

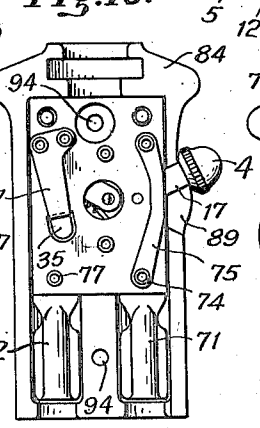


Fig.13.

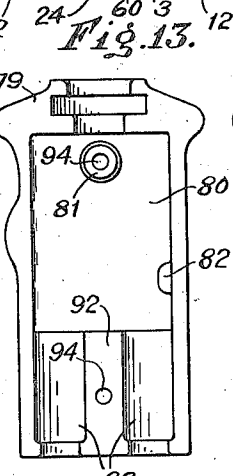


Fig.14.

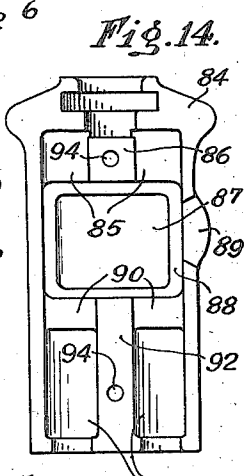


Fig.11.

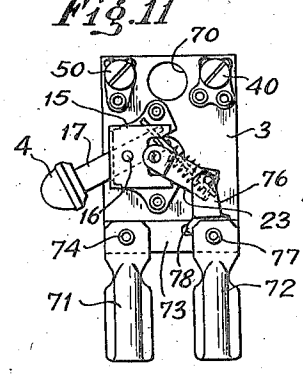


Fig.12.

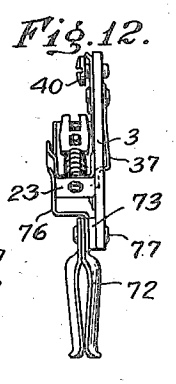
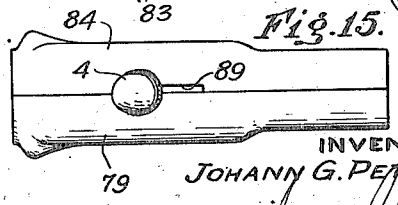


Fig.15.



INVENTOR
JOHANN G. PETERSON

BY

ATTORNEY.

Patented Jan. 8, 1935

1,987,025

UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH

Johann G. Peterson, West Hartford, Conn.

Application June 17, 1930, Serial No. 461,810

26 Claims. (Cl. 200—67)

My invention relates to electric switches.

It has among its objects ot provide an improved electric switch, and, more particularly, an improved snap switch of a type adapted to be used in through switches, heater plug switches, or the like. A further object of my invention is to provide an improved switch of large current carrying capacity and having improved and simplified contact mechanism adapted to prevent injurious arcing arising from jumping or following of the arc along the main portion of a stationary contact when the movable contact is thrown. A still further object of my invention is to provide such an improved switch of an improved and simplified unit type wherein all the mechanism and connections are carried in an improved manner on an improved and simplified base and are insertable or removable therewith as a unit in the switch casing, while the unit is further capable of being very inexpensively manufactured and also conveniently adapted to use in various relations. These and other objects and advantages of my invention will, however, hereinafter more fully appear.

In the accompanying drawing, I have shown for purposes of illustration two embodiments which my invention may assume in practice.

In the drawing,—

Figure 1 is a plan view of a through switch constructed in accordance with my improvement, the cover being removed, and the mechanism being in off position;

Figure 2 is a similar view of the reverse side of the switch unit in position in the cover member;

Figure 3 is a side elevation of the assembled switch enclosed between its casing members;

Figure 4 is a plan view of the switch unit, the mechanism being in on position;

Figure 5 is a side view of the construction shown in Figure 4;

Figure 6 is an end view of the construction shown in Figure 4 as seen from the top of that figure;

Figure 7 is a transverse sectional view on line 7—7 of Figure 3 showing the switch unit in position in the casing;

Figure 8 is a longitudinal sectional vew of the switch mechanism enclosed in the casing;

Figure 9 is a view similar to Figure 1, showing a modified construction of heater plug switch type;

Figure 10 is a view similar to Figure 2 but showing this modified construction;

Figure 11 is a plan view similar to Figure 4, but showing this modified construction;

Figure 12 is a side view similar to Figure 5, but showing the modified construction;

Figure 13 is a plan view of the casing member shown in Figure 9 with the switch unit removed therefrom;

Figure 14 is a similar view of the casing member shown in Figure 10, and

Figure 15 is a side elevation of this modified construction, showing the mechanism in the casing.

Referring first to the construction shown in Figures 1 to 8 inclusive, it will be noted that I have shown my invention embodied in a longitudinally divided through switch casing comprising a casing member 1 and a cover member 2. Herein, the switch mechanism is carried on a thin flat insulating base 3 and is operative by a swinging actuating button 4 projecting laterally from the casing. It will also be noted that it is in the form of a self-contained unit disposed between projections 5 and 6 on the casing member 1 which are spaced from conductor apertures 7 and 8 in the opposite ends of the latter, while the casing member 2 is provided with corresponding projections 9, conductor apertures 10, and a slot 11 in which the actuating member 4 is movable. Also, the two casing members 1 and 2 are held together by suitable means such as screws 12 carried by the member 1 and extending through the projections 5 and 6 and threaded into the opposite projections 9 in a well known manner.

Referring more particularly to my improved switch mechanism, it will be noted that as shown in Figure 4, the same is of an improved construction of the well known toggle type. Herein, the same comprises a usual frame 15 carrying a pivot 16 and having spaced horizontal portions disposed above and below a horizontally disposed shank 17 carrying the actuating button 4, while a horizontal slot 18 in the vertical portion of the frame 15 limits the movement of this member 17. This frame 15 herein has lateral extensions on its base riveted at 19 to the insulating base 3. Further, as usual in such constructions, the top of the frame has a cut-away portion 20 and a struck up lug 21 intermediate the ends of the same while the bottom of the frame is similarly cut away and provided with a down turned lug 22 corresponding to the lug 21 and similarly located, and both of the lugs 21, 22 act as journals for a swinging toggle actuated contact member 23 of a usual U shape and operatively connected to be swung by the member 17 as hereinafter described. Herein, it will also be noted that an aperture 24 is provided in the insulating base 3 and that the depending pivot portion 22 extends into this opening as does the adjacent portion of the member 23. It will also be noted that the member 17, which is horizontally disposed and moves about the pivot 16, is provided with a slot 25 in its inner extremity forming a bifurcated portion having rounded ends, of which one,

26, moves in a slot 27, and the other, 28, into a wider, shorter spaced slot 29 in the vertical enlarged end 30 of a co-operating toggle member 31 carrying a coiled spring 32 and having a reduced shank pivoted at 33 in a well known manner in the opposite end of the movable contact member 23.

Referring more particularly to the contact means associated with the movable contact member 23, it will be noted that I herein provide a flat depressible and resilient contact portion 35 adapted to be swept over and engaged by the bottom of the swinging contact member 23 and carried in and normally projecting through a correspondingly shaped aperture 36 in the insulating plate 3. More particularly, it will be noted that this portion 35 is in the form of an extension extending through the aperture 36 and carried on a resilient plate 37 normally in contact with the opposite face of the plate 3 and extending lengthwise of the latter. As shown, 37 is attached to said opposite face by rivets 38 which, herein, also act to connect a plate 39 carrying a binding post 40 to the face of the plate 3 over which the contact 23 swings. Thus it will be noted that the contact portion 35 is normally projected up through the aperture 36 and depressed whenever the contact 23 is swung into contact therewith, while when the swinging contact is reversely operated to pass off of the portion 35, the latter portion is released and springs back into its normal or raised position, while the body 37 of this contact portion is spaced at all times from the swinging contact 23 by a shield of insulation provided by the insulating plate 3.

Attention is also directed to the fact that due to my improved construction of resilient contact just described and the increased range of possible movement thereof, it is made possible to improve, simplify and cheapen the other contact engaging the swinging contact 23. Herein, this other contact is in the form of a rigid contact having a rigid portion 44 engageable with the top of the swinging contact 23 and a depending rigid shank portion 45 which is herein in turn struck up from a rigid terminal plate 46. As shown, the latter is attached by rivets 47 to the plate 3 and also carries a binding post 48 which is disposed on the same side and surface of the plate 3 as the binding post 40, but at the opposite end of the plate 3. Thus it will be noted that at the same time that an excellent contact between the stationary and movable contacts is obtained and following of the arc along the body portion 37 of one stationary contact is effectually prevented, it is also made possible to utilize only one resilient stationary contact and have the other stationary contact rigid and formed integral with the terminal plate carrying the binding screw.

As regards the unit construction, it will also be noted that herein the insulating plate 3 is provided on its opposite side from the binding post 48, with binding posts 50 and 51, of which the former is mounted on a plate 52 attached by a rivet 53 to the plate 3, while the latter is mounted on a plate 54 attached by a rivet 55 to the plate 3, and both are spaced from and on opposite sides of the frame 15. Herein, both are also connected by a through connection 56 in the form of a thin conducting strip also attached to the plate 3 by the rivets 53 and 55. As shown, this strip 56 is preferably slightly bowed outward between its ends to clear the pivot 16, but is not extended quite to the edge of the plate 3, all in such manner as to enable this strip to be effectually insulated while being carried by the plate 3. It will also be noted that suitable enlarged apertures 57 are provided in the corners of the plate 3 to permit the threaded ends of the binding post to move freely therein. Attention is also directed to the notches 58 and 59 provided in the opposite ends of the plate 3 between the plates 39 and 52 and 54 and 46, respectively, and to the location of the several binding screws on the longitudinal corner projections thus formed. Thus it will be observed that the insulating plate 3 has not only all of the switch mechanism but all of the terminal connections and the through connection of the switch, carried thereon and attached thereto in such manner as to form a single simple unitary mechanism insertable or removable as a whole in the casing 1, 2.

Referring more particularly to the casing in which this unit is mounted, it will be noted that herein the casing member 1 has a flat bottom 60 from which the projections 5 and 6 extend. It will also be observed that of these projections, the projection 5 is substantially larger than the projection 6, while the notch 58 in the plate 3 is larger than the notch 59 at the opposite end of that plate. Thus it will be noted that the unit may be very readily assembled in the base 1 when the larger notch is fitted on the larger projection, while improper assembly is prevented. It will also be noted that when assembled in correct position, the portion 17 of the actuating member rests upon and is supported by a curved flange 61 in which the unit is fitted and which surrounds the bottom 60 and is of equal height all around the latter between the conductor apertures. Attention here is also directed to the provision of a flat topped lug 62 on the bottom 60 which engages the back of the insulating plate 3 at a point adjacent the resilient contact carrying member 37 though spaced from the latter. Thus, it will be evident that portion 37 is enabled to move freely toward and from the bottom 60 when its portion 35 is engaged by the swinging contact 23, without restricting the movement of the portion 35, while the lug 62 also co-operates with the portion 17 in providing a stable support for the unit within the casing member 1. Here it will also be observed that one side of the casing member 2 is provided with a pair of spaced corresponding but substantially higher unit positioning lug members 63 which co-operate with the structure heretofore described in locating the unit against lateral movement between the casing members 1 and 2 when the switch unit is in position between the casing members 1 and 2 with the conductors connected to the several binding posts.

As regards the operation of the device, it will be evident that when the same is suitably connected in a manner usual in through switches, the circuit will be made or broken depending upon the direction of movement of the actuating member 4. Thus, when the latter is in the position shown in Figure 1, the circuit will be open, while when the same is swung from that position downward into the position shown in Figure 4, the circuit will be closed. More particularly considering the operation, the contact 23 will be swung from its off position in the manner usual to a toggle operated switch, to bring its bottom surface into contact with the resilient contact portion 35. This depresses the latter in the aper-

ture 36. At the same time, the upper portion of the contact 23 will engage the rigid contact portion 44 of the co-operating stationary contact. Here it will be noted that an excellent contact is obtained irrespective of the rigidity of the contact portion 44, due to the increased range of movement of the resilient contact portion 35 which with its body 37 is freely movable throughout a new and extended range of movement without being limited to a short range of movement by engagement with the casing, as in preceding constructions. It will further be evident that when the actuating member 4 is reversely actuated to break the circuit, the contact 23 will move freely from between the contact portions 44 and 35. When this occurs, at the same time that the contact portion 35 springs back through the aperture 36 to normal position, its body portion 37 will be effectually shielded from the swinging contact 23 by the intervening insulation of the plate 3 so that the arc will be broken promptly and cannot follow the contact 23 along this portion 37 with consequent damage and danger as in preceding constructions. At the same time, it will be evident that through the improved terminal plates and binding screws provided, the terminal connections are effectually insulated, while through the improved through connection carried on the plate, it is made possible to provide a unit construction in which it is possible to cut the conductors and much more readily and quickly connect the ends thereof to the binding screws than is the case where one conductor must run through the switch casing.

As a result of my improvement, it will be observed that I have obviated all necessity for providing special passage ways or walls in the outer casing members such as heretofore have been provided in an ineffectual effort to prevent the arc following along the stationary contact. At the same time, I have effectually prevented such following of the arc and also obtained an effective contact between the swinging contact and the stationary contacts while providing only a single resilient stationary contact and enabling the co-operating stationary contact to be rigid and therefore economically formed integral with its terminal plate carrying the binding post. It will also be noted that while these advantages are obtained, the construction is in the form of a unit adapted to be very conveniently and inexpensively manufactured and conveniently assembled and used while the casing members enclosing the unit are of an exceedingly simple and inexpensive construction and are further adapted to be made from inexpensive dies subject to a minimum of wear. These and other advantages of my improvement will, however, be clearly apparent to those skilled in the art.

In Figures 9 to 15, I have illustrated a modified construction wherein my improved switch unit is embodied in a heater plug switch. More particularly, it will be noted that in this construction the switch mechanism per se is exactly the same as previously described. Also the unit is the same, save that instead of the notches 58, 59, a single hole 70 is provided in the insulating plate 3, and the latter is of an elongated, more truly rectangular shape, and carries spring socket members 71, 72. Referring more particularly to the carrying means for the latter, it will be noted that a short piece of insulation 73 is seated on that end of the switch carrying surface of the plate 3. Also, a rivet 74 serves to connect the through connection 75 to both elements of the socket 71, while the rigid contact 76, corresponding to the contact 44, lies beneath the two portions of the socket 72 and on top of the insulating strip 73 and is secured thereto by a rivet 77 and held in position by a lug 78 on the portion 76 received in a corresponding aperture in the portion 73.

As regards the casing members, it will be noted that the member 79 has a flat bottomed chamber 80 adapted to receive the plate 3, a projection 81 on its bottom extending through the hole 70, and a lug 82 corresponding to the lug 62 heretofore described, while communicating more shallow chambers 83 are provided to receive the socket members 71 and 72. The other casing member 84 is provided with chambers 85 on opposite sides of a higher portion 86 through which the connecting screw extending into the projection 81 extends and is also provided with a flat bottomed chamber 87 having a surrounding slightly higher flange 88 and communicating actuating slot 89, while the rivet carrying ends of the sockets 71, 72 extend over still higher portions 90, and the socket members 71 and 72 are disposed in deeper pockets 91 spaced by a usual septum 92 and screws 93 are extended through suitable apertures 94 in this septum and in the portions 81 and 86 to hold the parts together.

In this construction, it will be evident that the operation of the mechanism will be the same as previously described, and that the mechanism may be inserted or removed as a unit as previously described while also carrying the socket members 71 and 72 with it.

While I have in this application specifically described two forms which my invention may assume in practice, it will be understood that these forms of the same have been shown for purposes of illustration, and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new an desire to secure by Letters Patent is:—

1. In a switch, a movable contact, co-operating stationary contacts both supported on the same side of said movable contact's path of movement, and an insulating shield carrying all of said contacts underlying said movable contact and one of said stationary contacts and overlying the body portion of the other stationary contact while exposing the contact surface thereof.

2. In a switch, a swinging contact, oppositely extending co-operating contacts both supported on the same side of said movable contact and its path of movement including a resiliently mounted contact, disposed lengthwise under said path, and an insulating shield carrying all of said contacts underlying said movable contact and one of said stationary contacts and overlying all but the movable contact engaging portion of said resilient contact.

3. In a switch, a movable contact, co-operating contacts including a resiliently mounted contact, and an insulating base carrying said movable contact on one face and said co-operating contacts on opposite faces and having an aperture therein through which the contact portion of said resiliently mounted contact normally projects into the path of said movable contact.

4. In a switch, an apertured insulating plate, a movable contact thereon, a co-operating stationary contact on the same face of said plate, and a co-operating resiliently mounted stationary contact having its movable contact engaging por-

tion projecting through said plate and having its body portion movable away from said plate by said movable contact, said stationary contacts being supported on said plate on the same side of said movable contact's path of movement.

5. In a switch, an apertured insulating plate, a movable contact thereon, a co-operating stationary contact on the same face of said plate, and a co-operating resiliently mounted stationary contact having its movable contact engaging portion projecting through said plate and having its body portion extending lengthwise under the path of said movable contact and moved toward and from the latter as said movable contact is operated, said stationary contacts being supported on opposite sides of said plate on the same side of said movable contact's path of movement.

6. In an electric switch, an apertured insulating base, a movable contact carried on one face thereof, a co-operating rigid contact also carried on said face over the aperture in the base, and a co-operating contact carried on the opposite face of said base having a resiliently mounted contact portion normally protruding through the aperture in said base into the path of said movable contact.

7. In a switch, a movable contact, co-operating contacts engageable by said movable contact in one position thereof comprising a rigid contact and a resiliently mounted contact, and an insulating shield carrying said movable and rigid contacts on one face thereof and said resiliently mounted contact on the opposite face thereof and having an insulating portion between the body portion of said resiliently mounted contact and the path of movement of said movable contact.

8. In a switch, operating mechanism having an actuating member and a contact movable thereby in substantially the same plane therewith, an insulating plate having a substantially horizontal face carrying said mechanism, a co-operating stationary contact on the same face of said plate engaging one face of said movable contact, and a co-operating resilient stationary contact on the opposite face of said plate having a contact portion engageable with the opposite face of said movable contact and its body portion underlying said plate.

9. In a switch, operating mechanism having a contact movable thereby, an insulating plate carrying said mechanism, a co-operating stationary contact carried by said plate engaging one face of said movable contact, a co-operating resilient stationary contact carried by said plate having a contact portion engageable with the opposite face of said movable contact and its body portion underlying said plate, and terminals for said contacts on the same face of said plate as said first mentioned co-operating contact.

10. A switch unit for through switches having casings comprising an insulating plate receivable in said casings, switch mechanism carried by one face thereof having a movable contact member, co-operating contacts on said plate engageable by said movable contact, terminal connections for said co-operating contacts on said face, a through connection carried by said plate, and terminal connections for said through connection on the same face of said plate as said first mentioned terminal connections.

11. A switch unit for plug switches having casings comprising an insulating plate receivable in said casings, switch mechanism carried by one face thereof having a movable contact member, co-operating contacts on said plate engageable by said movable contact, terminal connections for said co-operating contacts on said face, a through connection carried by said plate, and terminal connections for said through connection on the same face of said plate as said first mentioned terminal connections, said through connection being disposed on the opposite face of said plate from its terminal connections.

12. A switch unit comprising a single insulating plate disposed in substantially a single plane and carrying switch mechanism on the upper surface thereof disposed and operating in planes substantially parallel to said plate, terminal connections therefor on one face of said plate, a through connection thereon, and terminal connections for the latter on the same face of said plate as said first mentioned terminal connections and switch mechanism.

13. A switch unit comprising a single insulating plate disposed in substantially a single plane and carrying switch mechanism on the upper surface thereof disposed and operating in planes substantially parallel to said plate, terminal connections therefor on one face of said plate, a through connection thereon, and terminal connections for the latter on the same face of said plate as said first mentioned terminal connections and switch mechanism, said through connection being on the opposite face of said plate from said switch mechanism.

14. A switch unit for plug switches having casings comprising an insulating plate disposable in the latter and disposed in substantially a single plane, snap switch mechanism on said plate comprising a single movable contact on one face thereof, actuating means supported on the same face and having a movable finger operated actuating member projecting laterally beyond said plate intermediate the ends thereof and movable parallel thereto, and co-operating contacts carried on said plate on opposite faces thereof and engageable by said movable contact, and a through connection on the opposite face of said plate from said actuating member.

15. A switch unit comprising a single insulating plate carrying switch mechanism having a movable contact member, terminal connections for said mechanism, a through connection, and terminal connections for the latter, said through connection being on the opposite face of said plate from said switch mechanism and said switch mechanism including a resilient stationary contact carried on the same face of said base as said through connection and having a contact portion projecting through said base and engageable by said movable contact member.

16. A switch comprising a frame, a horizontally disposed actuating member pivoted therein and having a bifurcated end, a vertically disposed swinging contact member pivoted on said frame, a vertically disposed toggle member having one end resiliently mounted inside the free end of said contact member and having spaced slots in its opposite end receiving the bifurcated ends of said actuating member, a base carrying said elements and having an aperture therein, and contacts carried by said base and connectible by said swinging contact member having one contact extending through said aperture.

17. A switch comprising a frame, a horizontally disposed actuating member pivoted therein and having a bifurcated end, a vertically disposed swinging contact member pivoted on said frame, a vertically disposed toggle member resiliently mounted in said contact member and having

spaced slots receiving the bifurcated ends of said actuating member, a base having an aperture therein and carrying said frame in horizontal position on one face thereof with said actuating member projecting laterally beyond said base intermediate the ends thereof, and co-operating stationary contacts carried on opposite sides of said base having one contact extending through said aperture and connectible with the other contact by said movable contact.

18. A switch comprising a frame, a horizontally disposed actuating member pivoted therein and having a bifurcated end, a vertically disposed swinging contact member pivoted on said frame, a vertically disposed toggle member resiliently mounted in said contact member and having spaced slots receiving the bifurcated ends of said actuating member, a base having an aperture therein and carrying said frame in horizontal position on one face thereof with said actuating member projecting laterally beyond said base intermediate the ends thereof, co-operating stationary contacts carried on opposite sides of said base having one contact extending through said aperture and connectible with said other contact by said movable contact, and a through connection likewise carried by said base.

19. A switch comprising a frame, a horizontally disposed actuating member pivoted therein and having a bifurcated end, a vertically disposed swinging contact member pivoted on said frame, a vertically disposed toggle member resiliently mounted in said contact member and having spaced slots receiving the bifurcated ends of said actuating member, a base having an aperture therein and carrying said frame in horizontal position on one face thereof with said actuating member projecting laterally beyond said base intermediate the ends thereof, co-operating stationary contacts carried on opposite sides of said base and having one contact extending through said aperture and connectible with the other contact by said movable contact, and a through connection likewise carried by said base, said through connection and stationary contacts having binding posts at the opposite ends of said base.

20. A switch comprising a frame, a horizontally disposed actuating member pivoted therein and having a bifurcated end, a vertically disposed swinging contact member pivoted on said frame, a vertically disposed toggle member resiliently mounted in said contact member and having spaced slots receiving the bifurcated ends of said actuating member, a base having an aperture therein and carrying said frame in horizontal position on one face thereof with said actuating member projecting laterally beyond said base intermediate the ends thereof, co-operating stationary contacts carried on opposite sides of said base and having one contact extending through said aperture and connectible with the other contact by said movable contact, and a through connection likewise carried by said base, said through connection and stationary contacts having binding posts at the opposite ends of said base and said through connection being on the opposite face of said base from said frame.

21. In combination, a casing comprising complementary casing members, and a switch unit between said members comprising a single insulating plate having a substantially plane top surface, switch mechanism carried by the top surface of said plate and having an actuating member operable from the exterior of said casing, and a through connection likewise carried by said plate and removable therewith as a unit.

22. In combination, a casing comprising complementary casing members, a switch unit between said members comprising an insulating base and switch mechanism thereon having an actuating member operable from the exterior of said casing, and means for insuring positioning of said unit in a predetermined position in said casing members having projections of different size at opposite ends of said casing members, and co-operating apertures of different size in the opposite ends of said base and receiving said projections.

23. In combination, a casing comprising complementary casing members, a switch unit between said members comprising an insulating plate carried wholly within one of said casing members, and switch mechanism on said plate having an actuating member operable from the exterior of said casing, and means insuring positioning of said unit in a predetermined position in said casing members having projections of different size at opposite ends of said casing and co-operating apertures of different size in the opposite ends of said plate and receiving said projections.

24. In combination, a casing comprising complementary casing members, a switch unit between said members comprising a single substantially flat insulating plate wholly within one of said casing members, and switch mechanism carried by one face of said plate and having an actuating member operable from the exterior of said casing, means on said plate and the casing member carrying said plate for inhibiting longitudinal shifting of said plate, and means on both of said casing members engaging opposite faces of said plate and inhibiting lateral shifting of said plate.

25. In combination, a casing comprising complementary casing members having a slot therebetween, a switch unit between said members comprising a single insulating plate and switch mechanism thereon having an actuating member projecting laterally through said slot midway between the ends of said casing, and co-operating means on said casing members engaging opposite surfaces of said plate on the side thereof remote from said slot and co-operating with said slot and actuating member in positioning said plate in said casing.

26. In combination, a casing comprising complementary casing members, a switch unit enclosed between said members comprising a single insulating base having an aperture therein and switch mechanism on said base having an actuating member operable from the exterior of said casing and projecting from said base and casing intermediate the ends thereof and contact member movable on one external face of said base, and co-operating contacts on opposite external faces of said base including a resilient contact on the opposite face from said movable contact and movable through said aperture, and means on said casing for positioning said base in said casing while permitting free movement of said resilient contact in said aperture.

JOHANN G. PETERSON.

CERTIFICATE OF CORRECTION.

Patent No. 1,987,025. January 8, 1935.

JOHANN G. PETERSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 2, for "ot" read to; page 3, second column, line 43, for "an" read and; and line 57, claim 2, after "contact" strike out the comma; and page 5, second column, line 63, claim 26, for "and" read , a ; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of March, A. D. 1935.

Leslie Frazer

(Seal) Acting Commissioner of Patents.