

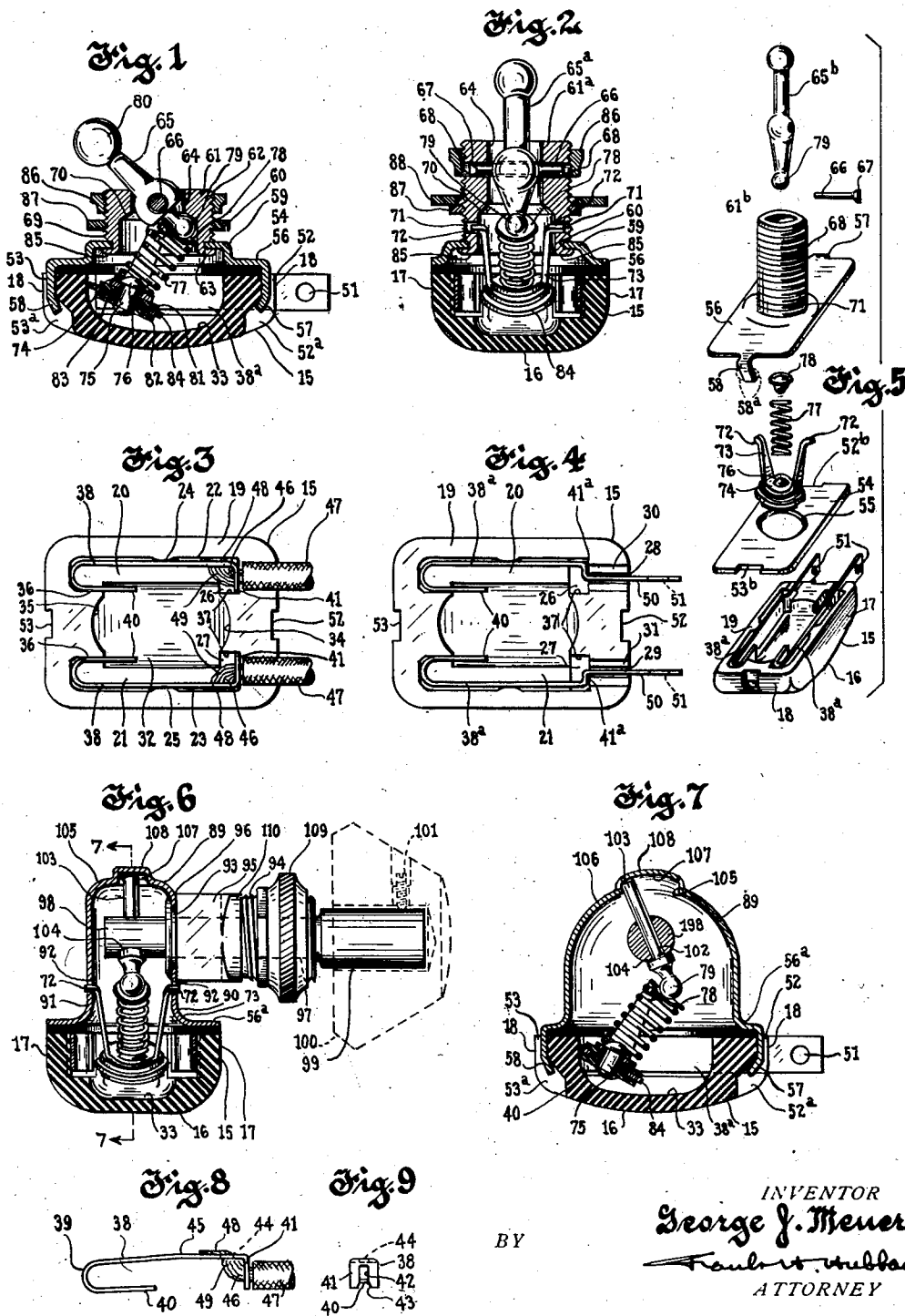
Dec. 2, 1930.

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1,783,665

ELECTRIC SWITCH

Filed Nov. 16, 1928



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ELECTRIC SWITCH

Application filed November 16, 1928. Serial No. 319,943.

This invention relates to improvements in electric switches, and the invention relates more particularly to improvements in electric snap switches of the toggle type.

5 An object of the invention is to improve and simplify the construction and operation of switches of the aforementioned character.

Another object is to provide a toggle operated snap switch composed of a minimum
10 number of parts which may be readily and quickly assembled.

Another object is to provide a toggle operated snap switch utilizing an extremely shallow base or housing, to adapt the same particularly for mounting in shallow canopies
15 or on panels necessitating the use of switches of minimum depth and size.

Another object is to provide such a switch having a novel form of cooperating stationary
20 and movable contacts adapted to insure proper control of an electric circuit.

Another object is to provide an insulating base formed to interchangeably receive different types of stationary contacts to provide
25 switches adapted to different forms of wiring.

Another object is to provide a switch of the aforementioned character having novel operating means including a rotatable shaft
30 extending at right angles to the plane of movement of the toggle mechanism.

Other objects and advantages of the invention will hereinafter appear.

The accompanying drawings illustrate certain embodiments of the invention which will now be described, it being understood that the embodiments illustrated are susceptible
35 of modification within the scope of the appended claims.

40 In the drawings, Figure 1 is a vertical sectional view of a toggle type of snap switch constructed in accordance with my invention.

Fig. 2 is a vertical sectional view taken at
45 right angles to the sectional view of Fig. 1, and showing a modified form of bushing and a relatively longer actuating toggle lever.

Fig. 3 is a top plan view of the molded insulating base, with one form of stationary
50 contacts positioned therein.

Fig. 4 is a like view of the base, with another form of stationary contacts in place.

Fig. 5 is an exploded perspective view of a switch similar to those illustrated in Figs. 1 and 2, but with a still further modified form
55 of bushing and a correspondingly elongated actuating toggle lever.

Fig. 6 is a vertical sectional view of a snap switch having the operating handle thereof
60 extending at right angles to the plane of movement of the toggle mechanism.

Fig. 7 is a vertical section on the line 7—7 of Fig. 6.

Fig. 8 is a top view of one of the stationary contacts shown in Fig. 3, prior to insertion
65 thereof into the base recess, and

Fig. 9 is an end view of the contact shown in Fig. 8.

Referring to the drawings, the numeral 15 designates the switch base, which is preferably of molded insulating material. Said base is preferably of substantially rectangular shape with rounded corners, as best illustrated in Figs. 3 and 4, and the bottom surface 16 thereof is preferably curved longitudinally and laterally to merge into the
70 vertical side and end walls 17 and 18, respectively. Said base is provided with a flat upper surface 19 and is recessed from said surface along opposite sides, as indicated generally at 20 and 21. Said recesses 20 and 21,
75 as shown, are of elongated rectangular contour, and the outer walls 22 and 23 of said recesses are respectively provided with abutments or projections 24 and 25. Said recesses are also provided at one end of base 15 with relatively shallower ledges 26 and 27, as best illustrated in Fig. 4.

Extending outwardly through said end of the base and in the same plane with said
80 ledges 26 and 27 are relatively narrow channels 28 and 29; and above but converging with said channels 28 and 29 are relatively wider channels 30 and 31.

Intersecting the adjacent or inner walls
85 of the respective recesses 20 and 21 is a relatively shorter and deeper intermediate recess 32, the bottom wall 33 of said intermediate recess being curved longitudinally of the base, as best illustrated in Figs. 1 and 7. 100

The relative shortness of the recess 32 and the curved end walls 34 and 35 thereof cooperate with the adjacent side walls of the recesses 20 and 21 to form pairs of abutments 36 and 37.

As shown in Fig. 3, the recesses 20 and 21 are adapted to receive identical combined contact and terminal members 38, said members, as best shown in Figs. 8 and 9, preferably comprising a single strip of conducting material of uniform width throughout its length.

One end of each of said members 38 is reflexed or bent, as indicated at 39, to provide a resilient contact portion 40 substantially parallel with the main body of said member. The other end 41 of said member 39 is bent at substantially right angles to the main body of the latter, and said right angularly bent portion is provided with a wire receiving slot 42 preferably having a slightly flared open end 43.

Adjacent to the bent portion 41 the main body of member 38 is provided with a wire receiving perforation, indicated in dotted lines at 44 in Fig. 8. Also the main body of member 38 is slightly bowed or angularly bent as indicated at 45 in said Fig. 8, so that said members are required to be sprung or slightly tensioned incident to insertion thereof within their respective recesses. That is to say, the bowed portions 45 will be substantially straightened out through engagement thereof with the abutments or projections 24 or 25, thereby biasing the reflexed contact portions 40 and the end portions 41 into engagement with the respective pairs of abutments 36 and 37.

Moreover, it will be apparent from Figs. 3, 4 and 5 that the main body of each of the members 38 at the left hand side of the abutments 24 and 25 is provided with clearance, whereby the resiliency of the contact portions 40, under the impact of the movable contact, is increased.

As illustrated in Figs. 3 and 8 the bared ends 46 of suitable lengths of terminal wires 47 are permanently secured to members 38 prior to insertion of the latter within the base recesses. In attaching the wire end 46 the latter is inserted through the perforation 44 to project a short distance beyond the outer side of the member 38, and the wire is then bent at substantially right angles into and toward the base of the slot 42.

The projecting end of the wire is then pressed against the outer surface of member 39, as indicated at 48 in Figs. 3 and 8, thus providing an interlock whereby the wire 47 may serve as a handle to facilitate soldering of the bared end 46 thereof to said member 38, the solder 49 being applied at the angle formed by the end portion 41 and the main body portion of member 38. Due to the construction aforedescribed it will be noted

that clearance is provided for the wire ends 48 between the members 38 and the respective outer walls of the recesses 20 and 21. The wires 47 extend outwardly through one end of base 15, being accommodated by the grooves or channels 30 and 31 aforementioned.

The combined contact and terminal member 38^a shown in the other figures is substantially like that aforedescribed, except that it is provided with a relatively short right angled bend, and extending outwardly from the latter and seated within the channel 28 or 29 is a portion 50 having a perforation 51 through which the bared end of a wire may be inserted and then looped or twisted preparatory to the soldering operation.

The insulating base 15 is preferably provided at opposite ends with grooves or channels 52 and 53 which undercut the top surface of the base, as indicated at 52^a and 53^a respectively.

As shown in Figs. 1 to 5, the base 15 may be provided with an insulating cover plate 54 which is substantially co-extensive with the top surface of said base, said plate having notches 52^b and 53^b in alinement with the grooves 52 and 53, and having a relatively large substantially circular perforation 55 for a purpose to be described.

Also co-extensive with the top surface of base 15, and overlying the insulating plate 54 is a metallic cover plate 56, said plate 56 having downwardly extending integral lugs or projections 57 and 58 which are respectively adapted to take into the grooves 52 and 53, and the ends of said lugs are bent into engagement with the undercut portions 52^a and 53^a, as best illustrated in Fig. 1. If desired the lugs 57 and 58 may be pinched or pressed outwardly, as indicated in dotted lines at 58^a in Fig. 5, or otherwise formed to provide a relatively tight fit thereof within the grooves 52, 53.

With the cover plate 56 thus secured to the base 15, the insulating plate is held in clamping engagement with the top edges of the pairs of members 38 or 38^a, the lower edges of said members resting upon the ledges 26 and 27 (Fig. 3), or upon said ledges and the bottom surfaces of channels 28 and 29 in the other figures. That is to say the main body portions and contact portions 40 of members 38 are normally held out of engagement with the bottom surfaces of the recesses 20 and 21, thus rendering said portions free to flex under the action of the bridging contactor, as hereinafter described. Moreover, the aforedescribed clamping action insures definite positioning of the members 38 or 38^a within their respective recesses.

The metallic cover plate 56 is provided with a bulged or raised portion 59 having a perforation 60 adapted to receive the reduced lower end of a bushing 61 which is threaded exte-

riorly as indicated at 62, said reduced lower end being upset or tightly overlapped against the portion 59 as indicated at 63 to secure said parts against separation or relative rotation.

5 The upper portion of bushing 61 is provided with a relatively small bore 64 within which a toggle actuating lever 65 is pivoted, as by means of the pivot pin 66, one end 67 of which is slightly upset so as to have a drive fit within one of the registering perforations 68 in the bushing (see Fig. 2).

10 The lower portion of bushing 61 is provided with a relatively larger bore 69, said bores 64 and 69 being joined by the frusto-conical or angular shoulder portion 70. Said lower portion of bushing 61 is provided, above the raised portion 59 of plate 56 and parallel with the perforations 68 with a pair of diametrically opposed perforations 71, which serve as bearings for the outwardly extending ends 72 of a U-shaped contact carrier or yoke 73.

15 The integral cross piece 74 of said carrier 73 is perforated to receive the shank 75 of a suitable rivet, the head 76 of said rivet being adapted to form an abutment for one end of a coiled compression spring 77, the other end of said spring having seated therein a cupped member 78, preferably of metal, which forms a bearing for the spherical or rounded lower end 79 of actuating lever 65. The other end of lever 65 may comprise a spherical knob 80 or a similar enlargement to facilitate manual operation of the switch.

20 Strung upon the shank 75 of the aforementioned rivet are three insulating disks 81, 82 and 83, and surrounding the disk 82 and interposed between the disks 81 and 83 is a metallic disk 84, which is adapted in one extreme position of the carrier to bridge the resilient contact portions 40 aforescribed, and in the other extreme position of said carrier to disengage said contact portions.

25 As best shown in Figs. 1 and 7, the end of the shank 75 of the rivet is upset against the lower insulating disk 83 to secure all of said insulating disks together and to the carrier 73. However, the riveting operation is preferably such as to provide relative freedom of rotation of the contactor disk 84 with respect to said carrier. An insulating bearing providing for such relatively free rotation of the contactor 84 may similarly be insured by forming the intermediate insulating disk 82 from material of slightly greater thickness than the contactor 84, so that after the usual riveting operation the insulating disks 81 and 83 will still be held out of clamping engagement with said contactor.

30 Movement of the lever 65 to opposite extreme positions is preferably limited by engagement thereof with opposite sides of the upper edge of bore 64 in bushing 61, whereas extreme movement of contactor 84 is preferably limited by engagement thereof with the curved side walls 34 and 35 at opposite

ends of the intermediate recess 32. Ordinarily, however, the resistance offered by resilient contacts 40 will prevent movement of contactor 84 into engagement with said wall 35.

35 In practice the operation of upsetting the reduced lower end of bushing 61 comprises spreading of the latter at a plurality of points in a well known manner, and as best illustrated at 85 in Fig. 2 the arrangement is such that two of these points are in vertical alignment with the perforations 71 in said bushing, thereby providing inclined entrance slots which facilitate forcible insertion of the ends 72 of the carrier 73 into said perforations or bearings. This assembling operation of the carrier 73 within the bushing involves slight flexure of the arms of the former, and as shown said arms are tapered toward the pivot ends 72 thereof to facilitate such flexing.

40 The switch illustrated in Fig. 1 is adapted for one-hole mounting in a suitably perforated canopy, panel, or the like, and one or more of the usual adjustable clamping nuts 86, 87 are provided, said nuts being threaded to cooperate with the thread 62 on bushing 61.

45 The device shown in Fig. 2 involves the use of a relatively longer bushing 61^a, with a correspondingly greater distance between the pivot perforations 68 and 71, and with consequent greater length of lever 65^a on each side of its pivot. Also, as shown in Fig. 2, a washer 88 may be provided for insuring proper clamping engagement of the securing means with respect to the perforated panel or other support.

50 In Fig. 5 a still longer bushing 61^b is employed, with corresponding differences in the length of lever 65^b on opposite sides of its pivot, and in the distance between the pivot perforations 68, 71 in said bushing.

55 It will be noted that in each of Figs. 1, 2 and 5 all parts of the switch are alike, except for the difference in dimensions of the respective bushings and the actuating levers carried thereby. Similarly in all forms of the switch the insulating bases and the insulating top plates are identical, and said bases are adapted to receive either type of combined contact and terminal members shown, both contacts of each particular type, moreover, being identical, but merely reversed with respect to each other to form a pair.

60 In the arrangement shown in Figs. 6 and 7 the corresponding parts aforescribed are designated by like characters of reference. In this instance, however, it is desired to provide for operation of the switch by means arranged at substantially right angles to the plane of movement of the toggle mechanism. Thus I have provided a top plate 56^a having a relatively high dome-shaped projection or bulge 89, the opposed substantially flat sides

90 and 91 of which are provided with alined perforations 92 forming pivot bearings for the ends 72 of the contact carrier.

Said projection 89 is provided on one side thereof with a perforation 93, which is adapted to receive the reduced end of a bushing comprising an externally threaded outer end portion 94 and a squared portion 95, said reduced end being upset, as indicated at 96 to secure the bushing and projection to each other.

The bushing is provided with a cylindrical bore 97 of equal diameter throughout its length, said bore forming a bearing for a shaft 98, one end of which extends within the projection 89, and the other end of which extends outwardly beyond said bushing. Said outer end is preferably enlarged, as indicated at 99, and a recessed knob or handle, shown in dotted lines at 100 is adapted to fit thereon, a set screw 101 or the like being employed to secure said shaft and knob against relative movement.

Shaft 98 is diametrically perforated adjacent to the inner end thereof, as shown at 102, to receive with a sliding fit the reduced portion or shank 103 of the toggle actuating lever, a shoulder 104 being provided for limiting the upward movement of the shank 103 with respect to shaft 98. The degree of oscillation or arc of travel of the upper end of said shank 103 is limited by engagement thereof with the opposite ends 105 and 106 of a slot 107 in the upper curved surface of said projection 89; engagement of said shank with the side walls of said slot also acting to hold shaft 98 against substantial longitudinal movement within the bore or bearing 97.

The slot 107 is preferably formed by slitting the top surface 108 of projection 89 to provide the cut metal edges or stops 105, 106 asforescribed, and then pressing outwardly the area between said slits, as shown in Figs. 6 and 7. Obviously, however, the slot 107 may be formed by entirely punching out the area bounded thereby, but by the arrangement illustrated the neat and finished appearance of the switch is retained.

The switch last described is likewise adapted for one-hole mounting upon an insulating panel or other suitable perforated support, a nut 109 being provided for drawing the wedge-shaped teeth 110 into engagement with the rear surface of the supporting panel (not shown). Said teeth as shown are formed by slightly dishing or undercutting the surface or shoulder 111 on said squared portion 95, so that the number of teeth will correspond with the number of points of convergence of the surface 111 with each two sides of said squared portion.

While I have shown the portion 95 as squared, it will be apparent that the same may be formed with three or any larger number of sides to provide a corresponding

number of gripping teeth, the sides in each instance being preferably tangential to the periphery of end portion 94 of the bushing.

It will be apparent to those skilled in the art that the bushings shown in Figs. 1, 2 and 5 may likewise be provided with squared or polygonal portions corresponding with that illustrated in Fig. 6, and illustration of such specific modification of the bushings of said figures is deemed unnecessary. Obviously by providing the afordescribed tooth formations the switch body or casing is positively held against any tendency to revolve or move into misalignment during final tightening of the clamping nut on the bushing. This feature is particularly desirable in an arrangement such as shown in Fig. 6 wherein suitable "On" and "Off" indicia are preferably provided on the operating knob 100 and the supporting panel.

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

1. In an electric switch, in combination, an insulating base having a recess in one face thereof, a combined stationary contact and terminal member, said member comprising a reflexed metallic strip of equal width throughout its length, the terminal end of said member being seated edgewise upon a ledge within said recess and having its upper edge substantially flush with said face of the base, a metallic cover member secured to said base, an insulating plate interposed between said cover member and said base, an oscillatable and freely rotatable contactor carried by said cover member, and means also carried by said cover member for effecting snap movement of said contactor into and out of engagement with said stationary contact.

2. In a snap switch of the toggle type, in combination, a molded insulating base having parallel recesses arranged on opposite longitudinal sides of one face thereof and a relatively wider recess between said first mentioned recesses and opening thereinto, a pair of one-piece contact and terminal members snugly fitting within said first mentioned recesses, a metallic member covering the recessed face of said base, a sheet of insulating material interposed between said cover member and said base, a contact carrying resilient metallic yoke having integral lateral projections adapted to be forcibly inserted into corresponding openings in said cover member for pivotal support of the former, an oscillatable operating member, and a coiled spring interposed between said operating member and said yoke to cause snap movement of the latter from each extreme position to the other upon corresponding movement of said operating member.

3. In a toggle snap switch, in combination, a recessed insulating base, a pair of spaced parallel contacts located within said recess

and having their upper edge portions substantially flush with the upper surface of said base, a cover plate overlying said base and adapted to retain said contacts within said recess, a hollow metallic bushing secured to said cover plate, two vertically spaced pairs of aligned openings in said bushing, a substantially U-shaped carrier the arms of which are provided with integral outward projections adapted to be forced into the lower pair of openings, a bridging contactor riveted to the lower end of said carrier, a toggle lever pivoted in the upper pair of openings and having an abutment at its lower end, an abutment on said carrier, and a compression spring interposed between said abutments to effect snap movement of said contactor into or out of engagement with said contacts upon movement of said toggle lever to opposite positions respectively.

4. In a toggle snap switch, in combination, a recessed insulating base, a pair of spaced parallel contacts located within said recess and having their upper edge portions substantially flush with the upper surface of said base, a cover plate overlying said base and adapted to retain said contacts within said recess, a hollow metallic bushing secured to said cover plate, two vertically spaced pairs of aligned openings in said bushing, a substantially U-shaped carrier the arms of which are provided with integral outward projections adapted to be forced into the lower pair of openings, a disk shaped bridging contactor rotatably secured to but insulated from the lower end of said carrier, said securing means including a rivet the head of which is adapted to provide an abutment on said carrier, a manually operable toggle lever pivoted in the upper pair of openings and having an abutment at its lower end, and a coiled compression spring interposed between said abutments to provide for snap movement of said bridging contactor to opposite extreme positions upon corresponding movement of said toggle lever.

5. In a toggle snap switch, in combination, a recessed insulating base, a pair of spaced parallel contacts located within said recess and having their upper edge portions substantially flush with the upper surface of said base, a cover plate overlying said base and adapted to retain said contacts within said recess, a hollow metallic bushing secured to said cover plate, a pair of aligned openings in said bushing, a substantially U-shaped carrier the arms of which are provided with integral outward projections adapted to be forced into said openings, a disk shaped bridging contactor rotatably secured to but insulated from the lower end of said carrier, the securing means for said contactor including a rivet the head of which is adapted to provide an abutment on said carrier, a manually operable toggle lever oscillatably sup-

ported at the upper end of said bushing and having an abutment at its lower end, a coiled compression spring interposed between said abutments to provide for snap movement of said bridging contactor to opposite extreme positions upon corresponding movement of said toggle lever, and means including a plurality of nuts having threaded engagement with said bushing for adjustably clamping said switch to a suitable support.

6. In an electric snap switch adapted for panel mounting, in combination, a shallow insulating base, resilient stationary contacts positioned edgewise within said base, a cover member overlying said base and secured thereto to clamp said contacts in position, a contactor oscillatably supported by said cover member in a relation to provide for movement of the former into and out of engagement with said contacts, a single oscillatable actuator, a spring interposed between said actuator and said contactor to provide for snap movement of the latter from each extreme position to the other, and a rotatable shaft operatively connected to said actuator and extending outwardly through said cover member in a plane substantially parallel to the upper surface of said base.

7. In an electric snap switch adapted for panel mounting, in combination, a shallow insulating base, resilient stationary contacts positioned edgewise within said base, a sheet metal cover member overlying said base and secured thereto, a contactor oscillatably supported by said cover member in a relation to provide for movement of the former into and out of engagement with said contacts, a single oscillatable actuator, a spring interposed between said actuator and said contactor to provide for snap movement of the latter from each extreme position to the other, associated means on said cover member and said actuator to limit the oscillating movements of the latter, and a rotatable shaft operatively connected to said actuator and extending outwardly through said cover member in a plane substantially parallel to the upper surface of said base.

8. In an electric snap switch, in combination, a shallow insulating base, resilient stationary contacts positioned edgewise within said base, a cover member overlying said base and secured thereto, a contactor oscillatably supported by said cover member in a relation to provide for movement of the former into and out of engagement with said contacts, an oscillatable actuator, a spring interposed between said actuator and said contactor to provide for snap movement of the latter from each extreme position to the other, a hollow bushing secured to said cover member and projecting outwardly from the latter in a plane at right angles to the plane of movement of said contactor and said actuator, a shaft rotatably supported by said

bushing, an operative connection between said shaft and said actuator, and spaced shoulders on said cover member engageable by said actuator to limit the movements of the latter and of said shaft.

5 9. In an electric snap switch, in combination a recessed insulating base, contacts positioned within said recess in spaced substantially parallel relation to each other and having their upper edges substantially flush
10 with the top surface of said base, an insulating plate overlying said contacts and having a substantially central perforation, a bulged cover member formed of sheet metal overlying said insulating plate and secured to said
15 base, a contactor and a one-piece sheet metal carrier therefor pivotally supported by said cover member and extending downwardly through said perforation, a single oscillatable actuator, a coiled spring interposed between said actuator and said carrier, and an
20 operating shaft for said actuator, said shaft extending outwardly through said cover member at substantially right angles to the plane of movement of said actuator and said
25 carrier.

10. In an electric snap switch, in combination, a recessed molded insulating base, contacts positioned within said recess in spaced
30 substantially parallel relation to each other and having their upper edges substantially flush with the top surface of said base, an insulating plate overlying said contacts and having a substantially circular opening, a
35 cover member overlying said insulating plate and secured to said base, said cover member having an integral upwardly extending dome-shaped projection, a substantially U-shaped carrier extending downwardly
40 through said insulating plate, the arms of said carrier having integral outward projections adapted to engage corresponding openings in said dome-shaped projection, a bridging contactor rotatably supported at
45 the lower end of said carrier but insulated therefrom, an oscillatable actuator, a hollow bushing secured to said dome-shaped projection and extending outwardly therefrom at substantially right angles to the plane of
50 movement of said actuator, a rotatable shaft bearing within said bushing, said shaft having a transverse opening to receive said actuator, a coiled compression spring interposed between said carrier and said actuator and tending to maintain the latter in
55 assembled relation with said shaft, and a groove in said dome-shaped projection adapted to receive the upper end of said actuator to limit the oscillating movements of the latter and to prevent longitudinal movement
60 of said shaft.

11. In an electric snap switch, in combination, a recessed molded insulating base, contacts positioned within said recess in
65 spaced substantially parallel relation to each

other and having their upper edges substantially flush with the top surface of said base, an insulating plate overlying said contacts and having a substantially circular opening, a cover member overlying said insulating
70 plate and secured to said base, said cover member having an integral upwardly extending dome-shaped projection, a substantially U-shaped carrier extending downwardly through said insulating plate, the arms of
75 said carrier having integral outward projections adapted to engage corresponding openings in said dome-shaped projection, a bridging contactor rotatably supported at the lower end of said carrier but insulated therefrom, an oscillatable actuator, a hollow bushing secured to said dome-shaped projection and extending outwardly therefrom at substantially right angles to the plane of movement
80 of said actuator, a rotatable shaft bearing within said bushing, said shaft having a transverse opening to receive said actuator, a coiled tension spring interposed between said carrier and said actuator and tending to maintain the latter in assembled relation with said shaft, a groove in said dome-shaped projection adapted to receive the upper end of
85 said actuator to limit the oscillatory movements of the latter and to prevent outward movement of said shaft, an external thread and shoulder on said bushing, and a nut co-operating with said thread and shoulder to provide for securement of said switch to a
90 suitable support.

12. In an electric switch, in combination, 100 a molded insulating base having a pair of relatively shallow spaced parallel recesses in its upper surface and extending longitudinally of the latter, said base also having a relatively shorter and deeper recess intermediate said first mentioned recesses and opening
105 thereinto whereby the latter are separated from each other at their respective ends by shouldered insulating abutments, a pair of contact members formed of strip material, each member having one end thereof reflexed into substantial parallelism with the main
110 body thereof and the other end thereof being provided with an angular bend, said contact members being inserted edgewise within their respective recesses with the reflexed ends thereof adjacent to each other but spaced
115 apart by certain of said abutments, the main body of said members adjacent to said reflexed ends being also spaced from the outer walls of said first mentioned recesses for the purpose set forth, a cover member secured to
120 said base and adapted to maintain said contact members in a position substantially flush with the upper surface of said base, a bridging contactor supported by said cover member and oscillatable within said intermediate recess, and toggle actuating means including a spring for effecting snap movement 130

of said contactor into and out of engagement with said contacts.

13. As an article of manufacture, a stationary switch contact comprising a metallic strip of substantially equal width throughout its length, one end of said strip being reflexed to provide a resilient contact portion substantially parallel to the main body thereof, the other end of said strip having a wire-gripping notch formed therein, said notched end being bent at an angle to the main body of the strip, and said strip having a wire-receiving perforation in the main body thereof adjacent to said notched end.

14. As an article of manufacture, a combined switch contact and terminal member comprising a single strip of metal of substantially equal width throughout its length, one end of said strip being reflexed inwardly to provide a resilient contact portion substantially parallel to the main body thereof, the other end of said strip having an angular inward bend to provide a shoulder, and said last mentioned end also having a perforation to facilitate attachment and soldering of a terminal wire thereto.

15. As an article of manufacture, a combined switch contact and terminal member comprising a single strip of metal of substantially equal width throughout its length, one end of said strip being reflexed inwardly to provide a resilient contact portion substantially parallel to the main body thereof, the other end of said strip having an angular inward bend to provide a shoulder, and said main body of said strip having an outwardly bowed or bent portion intermediate its ends to provide for initially tensioning said member upon insertion thereof within a substantially rectangular recess of predetermined size.

16. As an article of manufacture, a combined stationary switch contact and terminal member comprising a resilient metallic strip of substantially equal width throughout its length, one end of said strip being reflexed to provide a contact portion arranged in substantial parallelism with the main body thereof, the other end of said strip having a wire-gripping flared notch therein, said strip having a wire-receiving perforation adjacent to said notched end, the latter being bent at substantially right angles to the main body of the strip, and the latter being bowed outwardly intermediate its ends to provide for initially tensioning said member upon insertion thereof within a recess of predetermined size and shape.

17. In combination, a housing or casing for switches and the like, a hollow bushing secured to said housing, said bushing comprising an externally threaded portion and an adjacent polygonal portion having greater cross sectional dimensions than said threaded portion whereby a clamping shoulder

is provided, the clamping face of said shoulder being dished to provide wedge-shaped teeth at the points of convergence of said face with each two sides of said polygonal portion, and an adjustable clamping nut upon said threaded portion between which nut and said teeth a supporting panel may be clamped.

18. As an article of manufacture, an assembled contactor and carrier for toggle snap switches, comprising, in combination, a strip of metal bent to form a carrier of substantially U-shape with the ends of said carrier extending outwardly in alignment with each other, three perforated insulating disks at the lower end of said carrier, a circular conducting disk located between the two outer insulating disks and having an opening to accommodate the intermediate insulating disk for centering thereof by the latter, and a rivet penetrating said lower end of the carrier and said insulating disks to hold said parts in assembled relation while permitting relative rotation of said conducting disk with respect to said carrier.

19. As an article of manufacture, a molded insulating base for electric snap switches, said base being of substantially rectangular contour and having a curved lower face and a flat upper face, said upper face having a pair of substantially rectangular recesses arranged in parallel relation longitudinally of said base, a relatively shorter and deeper recess intermediate said first mentioned recesses and opening thereto, said first mentioned recesses each having a ledge at one end thereof for support of a combined contact and terminal member, and a pair of coincident notches of different shapes opening through the wall of the base to the respective ledges to adapt the switch to internal or external wiring according to the type of terminals employed.

20. In an electric snap switch, in combination, an insulating base having a recess in the upper surface thereof, stationary contacts positioned edgewise in parallel relation within said recess and having integral wiring terminal portions projecting outwardly through a wall of said base, a bulged sheet metal cover member overlying said base and secured thereto, a contactor located within said recess and movable into and out of engagement with said stationary contacts, an oscillatable actuator for said contactor, a spring interposed between said actuator and said contactor to provide for snap movement of the latter from each extreme position to the other, a hollow bushing secured to said cover member and projecting outwardly from the latter in a plane at right angles to the plane of movement of said contactor and said actuator, a shaft rotatably supported by said bushing, an operative connection between said shaft and said actuator, and

means comprising spaced shoulders engageable by said actuator to limit the movements of the latter and of said shaft.

21. In a toggle snap switch, in combination, an insulating base, a pair of one-piece combined contact and terminal members carried thereby, each of said members having a reflexed resilient contact portion, a stamped sheet metal cover member having a peripheral portion to seat against the upper face of said base, said cover member having integral inbent lugs engaging the lower face of said base to rigidly secure the former to the latter, an externally threaded hollow metallic bushing rigidly secured to said cover member, two vertically spaced pairs of aligned openings in said bushing, a punched sheet metal member bent flatwise to provide a substantially U-shaped carrier the arms of which are provided with integral outward projections adapted to be forced into the lower pair of openings, a circular bridging contactor secured to but insulated from the lower end of said carrier, the securing means for said contactor including a rivet one end of which is adapted to provide an abutment, a toggle lever pivoted in the upper pair of openings and having an abutment at its lower end, and a helical compression spring interposed between said abutments to effect snap movement of said contactor into or out of engagement with said contacts upon movement of said toggle lever to opposite positions respectively.

22. In an electric snap switch, in combination, an externally threaded hollow metal bushing having two vertically spaced pairs of aligned pivot openings, a punched sheet metal member bent flatwise to provide a substantially U-shaped carrier having tapered arms the ends of which are bent outwardly in opposite directions respectively, a bridging contactor secured to but insulated from the lower end of said carrier, the securing means for said contactor including a rivet one end of which is adapted to provide an abutment, the arms of said carrier being compressible toward each other to provide for insertion of the bent ends thereof within the lower pair of aligned openings, an actuating lever pivoted in the upper pair of aligned openings and having an abutment at its lower end, and a helical compression spring interposed between said abutments to effect snap movements of said contactor to opposite extreme positions alternately upon corresponding movements of said actuating lever.

23. In an electric snap switch, in combination, an externally threaded hollow metal bushing having a pair of aligned pivot openings, a punched sheet metal member bent flatwise to provide a substantially U-shaped carrier the arms of which have reduced ends

bent outwardly in opposite directions with respect thereto, a bridging contactor secured to but insulated from the lower end of said carrier, the securing means for said contactor including a rivet one end of which is adapted to provide an abutment, the arms of said carrier being compressible toward each other to provide for insertion of the bent ends thereof within said pivot openings, an oscillatable actuating lever supported within said bushing and having an abutment at its lower end, and a helical compression spring interposed between said abutments to effect snap movements of said contactor upon given movements of said actuating lever.

In witness whereof, I have hereunto subscribed my name.

GEORGE J. MEUER.