

F. C. NAUJOKS.
ELECTRIC SWITCH.
APPLICATION FILED FEB. 8, 1917.

1,344,925.

Patented June 29, 1920.

Fig. 1.

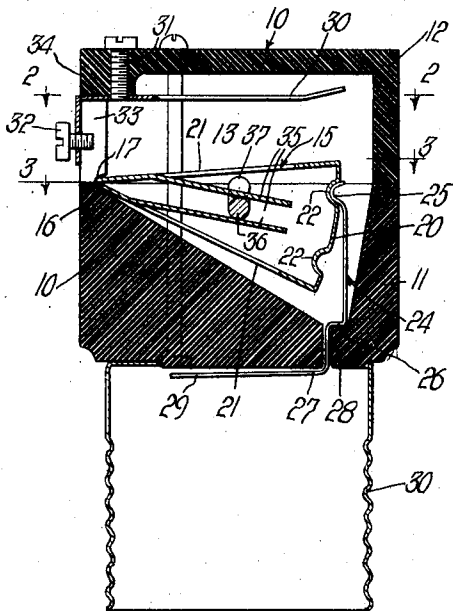


Fig. 2.

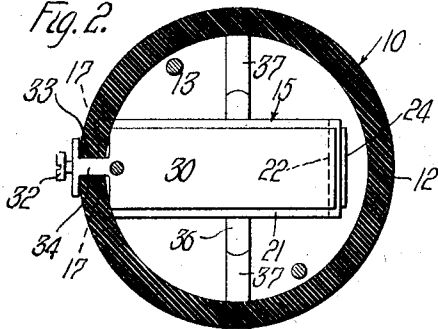


Fig. 3.

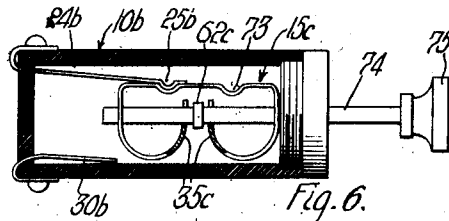
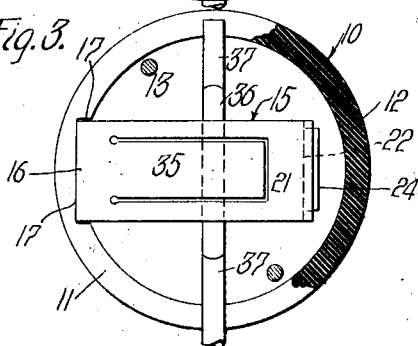


Fig. 6.

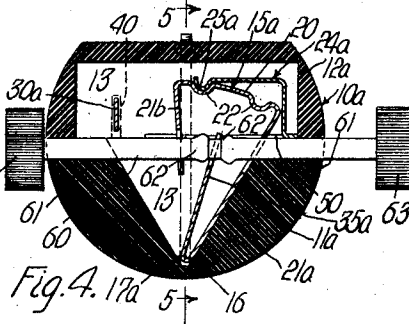
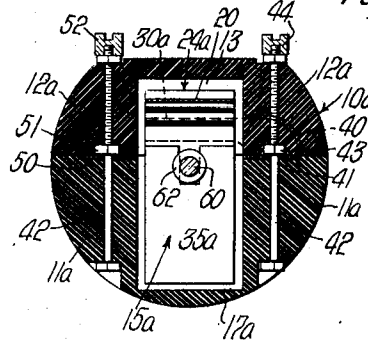


Fig. 4.

Fig. 5.



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ELECTRIC SWITCH.

1,344,925.

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To all whom it may concern:

Be it known that I, FREDERICK C. NAUJOKS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Electric Switches, of which the following is a specification.

This invention relates to electric switches; and it is a general object of this invention to provide an electric switch simple in form and operation, and containing a minimum number of parts and a minimum amount of metal, and generally inexpensive of manufacture; and also to provide, in a simple switch, a snap action to quickly make and break the electric circuit; and, in association with good and broad contacts, to make a switch of large capacity though small in size.

Although my invention is applicable to other purposes and situations, it may be very effectually applied to such switches as may be used in switch sockets and other devices of like nature, and in plug switches such as may be used as wall switches, automobile dash-board switches, etc. I therefore explain preferred forms of my switch, as applied to such situations; but without thereby limiting myself to such preferred forms. I show preferred forms in the accompanying drawings in which Figure 1 is a longitudinal vertical section showing my switch applied to a switch socket; Fig. 2 is a cross section taken on line 2—2 of Fig. 1; Fig. 3 is a cross section taken on line 3—3 of Fig. 1; Fig. 4 is a sectional view showing another form of my switch; Fig. 5 is a section taken as indicated by line 5—5 on Fig. 4; Fig. 6 is a sectional view showing another form of switch.

In the drawings I show a suitable shell 10 or 10^a preferably composed of two parts 11 and 12, or 11^a and 12^a. These parts have cavities 13 which form the chamber inclosing the operating parts of my switch. In the forms shown in Figs. 1 to 5, the movable contact or switch member is preferably a sector shaped member 15 or 15^a, which is pivoted at its apex at 16 by the simple expedient of having its apex fit into a suitably shaped notch 17 in the shell 10. In Figs. 1, 2 and 3 this notch 17 is shown as being formed partly in members 11 and

partly in the members 12; while in Fig. 4 the notch 17^a is shown as being merely the lower contracted portion of the cavity 13 in the lower shell member 11^a. This notch is, in these instances, so shaped as to confine the apex of the sector shaped member 15 against loose movement, but so as to allow the sector-shaped member the requisite amount of movement about its apex as a pivot.

In all the forms shown in Figs. 1 to 5 the sector-shaped member 15 or 15^a is preferably made of a single piece of flat or sheet metal bent to the configuration illustrated. In the form shown in Figs. 1, 2 and 3 the member 15 is formed of a strip of metal whose ends are at the apex 16. The member is formed with a peripheral portion 20 and side portions 21. The periphery 20 is preferably provided with a pair of notches or depressions 22, circumferentially spaced apart, as illustrated, and preferably extending transversely across the complete face of the periphery 20, as indicated in dotted lines in Figs. 2 and 3. A spring detent 24 has its upper end at 25 shaped so as to enter either of the notches 22; and this spring detent is of sufficient width to engage across the whole face, or substantially the whole face of the periphery 20 of the sector shaped member 15. This spring detent 24 is set in the lower shell member 11 in the manner indicated, being seated at 26 and 27 to prevent vertical movement, and fitting in the opening 28 in such a manner as to hold the part 25 pressed resiliently against the sector 15. This spring detent 24 is preferably made of a strip of resilient metal and the strip extends on out across the bottom of shell member 11, as illustrated at 29, to form the central contact for a plug, etc., which may be screwed up into the socket 30. However, the socket construction, etc., is of no consequence in my invention; and I therefore do not go into the details of its construction, nor of its electrical connections excepting through the switch.

When the sector shaped member 15 is in its lowermost position, as shown in Fig. 1, then it does not contact with any switch member except the spring detent 24; but when the member 15 is moved upwardly to a point where the spring detent engages the lower notch 22, then the upper side part or

side member 21 of member 15 will engage a preferably spring contact 30 which is set in the upper shell member 10. This spring contact is preferably made of a single
 5 straight piece of flat metal, secured by any suitable means, as by a screw 31, and extending out of the shell member 12, so that a wire connection may be made at the binding screw 32. The shell member 12 has a
 10 narrow slot 33 through which a contracted portion 34 of the member 30 passes. It will be noted that, in the specific form of structure shown, the slot 33 is directly over the notch 17 which holds the apex of sector-shaped member 15; but this slot 33 is narrower than the width of the notch 17, so that the notch 17 is not cut away to any material extent by the slot 33.

In the form shown in Figs. 1, 2 and 3 I
 20 preferably provide the member 15 with a pair of spring tongues 35, each struck out of the side parts 21 of member 15 and each projecting into the hollow interior of the member 15. Between these spring tongues
 25 35 I place the crank pin 36 of the operating crank which is formed upon the shaft 37. To the outer end of this shaft 37 the usual key, or any other operating means, may be attached or connected or mounted. The
 30 shaft 37 is so positioned, and the throw of the crank 36 is such, as to throw the member 15 between its two positions one in which the detent 24 engages the upper notch 22 and the other in which detent 24 engages
 35 the lower notch 22.

The operation of the form shown in Figs. 1, 2 and 3 is as follows:

Supposing the parts to be in the positions shown in the drawings, then when the shaft
 40 37 is rotated in either direction through a half revolution, the first action will be for the shaft to be turned against the upper spring tongue 35 and put this spring tongue in a state of tension, while the spring detent
 45 24 still holds the sector-shaped member 15 from movement. After a certain amount of rotation of the crank (say nearly all its total movement) then the crank engages with the side part 21 of member 15 and mechanically operates to positively move the
 50 member 15 against the restraint of the spring detent. This positive movement of member 15 is very small; just enough to start the detent out of the notch 22; when the tension on the spring tongue is then sufficient to force the notch entirely clear of the detent. Under the action of the spring tongue the sector-shaped member then quickly springs from its lower position to
 55 its upper position, the spring detent entering the lower notch 22. Just before the spring detent enters the lower notch 22, the upper face of member 15 engages the contact 30 and makes a good and broad electrical contact therewith across the entire
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face of part 21 of member 15, or substantially across the entire face; the contact 30 being substantially of the same width as the member 15. A good electrical contact is thus made between the contact 30 and
 70 member 15, and also between member 15 and spring detent 24; making a good electrical circuit from the binding screw 32 to the part 29. Another half revolution of the crank 36 in either direction will throw the
 75 member 15 downwardly again, the action being the same as described, only reversed. It will be seen that it is the function of the spring 35 to interpose a resilient element in the means to move the contact member 15; 80 the function of said resilient element being to accumulate a sufficient stress or tension to move the movable member quickly when the detent is once released, or partially released; with the result that the movable contact
 85 member springs or snaps from one position to the other. However, it will be understood that it is possible to make the spring element (the tongue) do all the work of releasing the detent. That is, the tongue may
 90 be stiff enough to accumulate a stress sufficient in itself to force the release of the detent before the crank reaches the end of its movement. But the positive action described has the advantage of causing the re-
 95 lease or yielding of the detent at a definite point in the motion of the parts—it makes the action more mechanically positive. The spring detent, and the notches 22, are for the purpose, and perform the function, of
 100 releasably or yieldingly holding the movable contact member 15 in either of its positions. Although I do not limit myself to the particular structure of these parts, as shown and described, yet I find that this particular
 105 structure is very efficient and very simple and economical. However, a releasable detent, or a yielding spring detent of any suitable character, will suffice.

The form of device shown in Figs. 4 and
 110 5 is essentially similar to the form just described. In this form of device I provide the sector-shaped member 15^a of substantially the same form as hereinbefore described, providing it with two peripheral
 115 notches 22, but preferably providing it with only a single spring tongue 35^a. This single spring tongue is preferably made by bending the side portion 21^a back on itself at the apex 16; and the side portion 21^b does not
 120 extend clear down to the apex, but only extends a sufficient distance inwardly from the periphery 20 to make a good contact surface adapted to engage the contact 30^a. The contact 30^a is mounted in a slot 40 in the upper
 125 shell member 12^a, projects across the cavity 13, opposite the part 21^b of sector-shaped contact member 15^a, and has a part 41 which is clamped between the shell parts 11^a and 12^a. One of the small bolts 42, which holds
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the shell parts together, passes through the part 41 and a nut 43 may be provided to screw down on the part 41 to make good electrical contact therewith; and a binding post or screw 44 may be mounted at the upper end of the bolt 42. The spring detent 24^a is shaped at 25^a, as hereinbefore explained, to engage the notches 22; and this spring detent is secured by having a part 50, preferably integral therewith, clamped between the shell members 11^a and 12^a, and making electrical contact with the other bolt 42, by means of a nut 51; a binding post or screw 52 being mounted at the upper end of this bolt.

It will be seen that the parts just described are such as to have an operation practically the same as the parts described in connection with Figs. 1, 2 and 3. The main differences between these forms (and it will be seen that there are differences of detail) in the manner of moving the movable contact member 15^a. In both cases this member is moved through the medium of a resilient element (the tongues 35 or the single tongue 25^a) but in the form of Fig. 1 I employ a rotatable means for moving the movable contact member 15^a. This reciprocating means may preferably comprise a rod 60 extending through the shell, resting in slots 61 in the lower part 11^a of the shell and having collars or enlargements at 62 lying on opposite sides of the spring tongue 35^a. A small button 63 may be provided on each end of the rod 60. When the button on one side is pushed, the movable member 15^a is moved to one position; when the button on the other side is pushed, the movable member 15^a is moved to its other position. The engagement of the collars or enlargements 62 with the side parts 21^a and 21^b furnishes the positive movement to force the release or yielding of the detent.

The form shown in Fig. 4 may be used as a pendant hanging switch; or may be used in a situation where it is permanently and rigidly mounted. It will be noted that, although I have shown two buttons 63, obviously a single button may be used as a push and pull button.

In the specific embodiments of my invention so far described, I have shown the movable switch member 15 as being preferably pivoted and moving about its pivotal point. However, it is not a necessary feature that said member move pivotally; it may move in any other suitable manner. For instance, it may reciprocate, as is shown in the form of Fig. 6. In Fig. 6 I show a shell 10^b which may be tubular and have a stationary contact 30^b at one side and a combined spring detent and contact 24^b at the opposite side. Between these two parts the movable contact member 15^b is adapted to reciprocate. This movable contact member may, in one

specific preferred form, be made of a strip of resilient metal bent to a general U-shape with a central transverse portion 70 and side portions 71 and 72. One of the side portions, as 72, may have means for engaging with detent 24^b; that is, it may have the spaced depressions 73 adapted to be engaged by the end 25^b of the spring detent. An operating rod 74 has a push and pull button 75 and connects with the transverse part 70 by passing through that part and having a pair of compression springs 76 confined between collars 77 and the part 70, on opposite sides of the parts 70. The operation of this form of switch is substantially identical with that of the other forms. When the button 75 is moved back and forth, a sufficient tension or stress is initially placed upon one or the other of springs 76, and by this stress the detent 24^b may be sprung out of the notch 73, the contact member 15^b then snapping from one position into its other position. But I prefer here, as in the other cases, to provide positive detent releasing action. This may be had by making the springs 76 to close up after a certain amount of movement; or by providing a reduced part 74^a of rod 74 to go through the part 70, the positive action taking place either when the spring closes, or when the shoulder at the end of the reduced portion reaches the part 70. In this form of device the spring action of the detent means may be partly in the spring detent itself and partly in the side 72 of member 15^b.

In Fig. 7 I show a form substantially similar to that shown in Fig. 6. The description of Fig. 6 applies to Fig. 7 excepting that in Fig. 7 the movable contact member 15^c is made in the special form illustrated, so as to provide two tongues 35^c, one on each side of a collar 62^c on rod 74. Thus this form differs from that of Fig. 6 substantially in that it provides simple spring means, the tongues 35^c, integral with the movable contact member.

In all of the forms herein described it will be seen that good and sufficient contact is made on broad surfaces, in spite of the fact that the switch mechanism is of small size and very simple. The number of parts is small, and the total amount of metal is small. Furthermore, and this is an important feature, the assembly of my switch is very simple and inexpensive. It will be seen that the operating parts are, for the most part, held in place without the use of holding screws; and that said operating parts may be easily slipped into place in the shell. Furthermore, it will be seen that there are no parts under any great stress when the switch mechanism is in either position. The spring tongues, or the springs 76, are only under stress during the moment of operation; and the spring detent and con-

tact 24 is the only part under permanent resilient stress; and this stress is small. For these reasons my switch has a long life.

I have proceeded to describe preferred forms of my switch with some particularity and detail in order to make my whole invention readily understood; but I do not thereby limit myself to the details herein described, believing my invention to be of a broader scope, as indicated and set forth by the following claims.

Having described a preferred form of my invention, I claim:

1. In a device of the character described, the combination of a movable contact member, means including a resilient element for moving said member, notches in said member spaced in the direction of movement thereof, said resilient element being formed integrally with said movable contact member, and a yielding detent means adapted to enter either of said notches.

2. In a device of the character described, the combination of a movable contact member, means including a resilient element for moving said member, notches in said member spaced in the direction of movement thereof, said movable contact member being formed of a single strip of resilient metal and said resilient element being integral therewith, and a yielding detent means adapted to enter either of said notches.

3. In a device of the character described, the combination of a movable contact member having a spring tongue, means acting on the spring tongue for moving the contact member, and spring detent means cooperating with said movable contact member to hold it in either of two positions.

4. In a device of the character described, the combination of a movable sector-shaped contact member having a spring tongue, and having circumferentially spaced depressions on its periphery, a spring detent adapted to enter either of said depressions, and means to move the contact member acting upon the spring tongue.

5. In a device of the character described, the combination of a movable sector-shaped contact member having a spring tongue and having circumferentially spaced depressions on its periphery, a stationary spring detent adapted to enter either of the depressions and thereby to releasably hold the said contact member in either of two positions, means acting on the spring tongue to move said member, and a stationary contact with which said movable contact member engages when in one of its positions.

6. In a device of the character described, the combination of a movable sector-shaped contact member having circumferentially spaced depressions on its periphery, a stationary spring detent adapted to enter either of the depressions and thereby to releasably

hold said member in either of two positions, means including a resilient element to move said member, and a stationary contact with which said member engages in one of its positions.

7. In a device of the character described, the combination of a movable sector-shaped contact member made of a single piece of flat metal bent to sector-shape, having circumferentially spaced depressions on its periphery and having a substantially central integral spring tongue, a stationary spring detent adapted to enter either of the peripheral depressions of the contact member, a stationary contact with which the movable contact member engages when in one position, and means acting on the spring tongue to move the contact member.

8. In a device of the character described, the combination of a movable sector-shaped contact member pivoted at its apex and having circumferentially spaced depressions on its periphery and having a substantially central integral spring tongue, a stationary spring detent adapted to enter either of the peripheral depressions of the contact member, a stationary contact with which the movable contact member engages when in one position, and means acting on the spring tongue to move the contact member.

9. In a device of the character described, the combination of a movable sector-shaped contact member pivoted at its apex and having circumferentially spaced depressions on its periphery and having a pair of integral centrally disposed spring tongues, a stationary spring detent adapted to enter either of the peripheral depressions of the contact member, a stationary contact with which the movable contact member engages when in one position, and a crank arranged between the two spring tongues.

10. In a device of the character described, the combination of a movable contact member, means including a resilient member formed integrally with the contact member, for moving said contact member; and yielding detent means cooperating with the movable contact member.

11. In a device of the character described, the combination of a movable contact member formed of a single strip of resilient metal; means, including a resilient member formed integrally with and of the same strip of metal as the contact member, for moving said contact member; and yielding detent means cooperating with the movable contact member.

12. In a device of the character described, a hollow body having an interior notch, a movable sector-shaped contact member pivoted in its apex in said notch, means to hold the contact member in the notch embodying a resilient element pressing against the broader end of the member, said member

having peripherally spaced notches, and said resilient element adapted to also act as a detent means by entering the notches.

13. In a device of the character described, 5 a hollow body having an interior notch, a movable contact member pivoted at one end by having its end lying in the notch, and spring detent means pressing against the other end of the member and acting as a 10 yielding detent to movement of the member about its pivoted end and also pressing the member into the notch.

14. In a device of the character described, a movable sector-shaped contact member 15 pivoted at its apex, and a spring detent engaging the circumferential end of the member, the member and detent having formations adapted to interengage to yieldingly oppose movement of the member about 20 its pivoted end.

15. In a device of the character described, the combination of a movable contact member having a spring tongue, means acting

on the spring tongue for moving the contact member, and yielding detent means to de- 25 tain the member against such movement.

16. In a device of the character described, a skeleton-form movable switch member of sector shape, a yielding detent means at the broad end of the member, and means for 30 moving the member embodying a tongue integral with the member and projecting into its interior.

17. In a device of the character described, a skeleton-form movable switch member, 35 and means for moving the member embodying a spring tongue integral therewith, and mechanism acting on the spring tongue to move the member.

In witness that I claim the foregoing I 40 have hereunto subscribed my name this 1st day of February, 1917.

FREDERICK C. NAUJOKS.

Witnesses:

ELWOOD H. BARKELEW,

JAMES T. BARKELEW.