

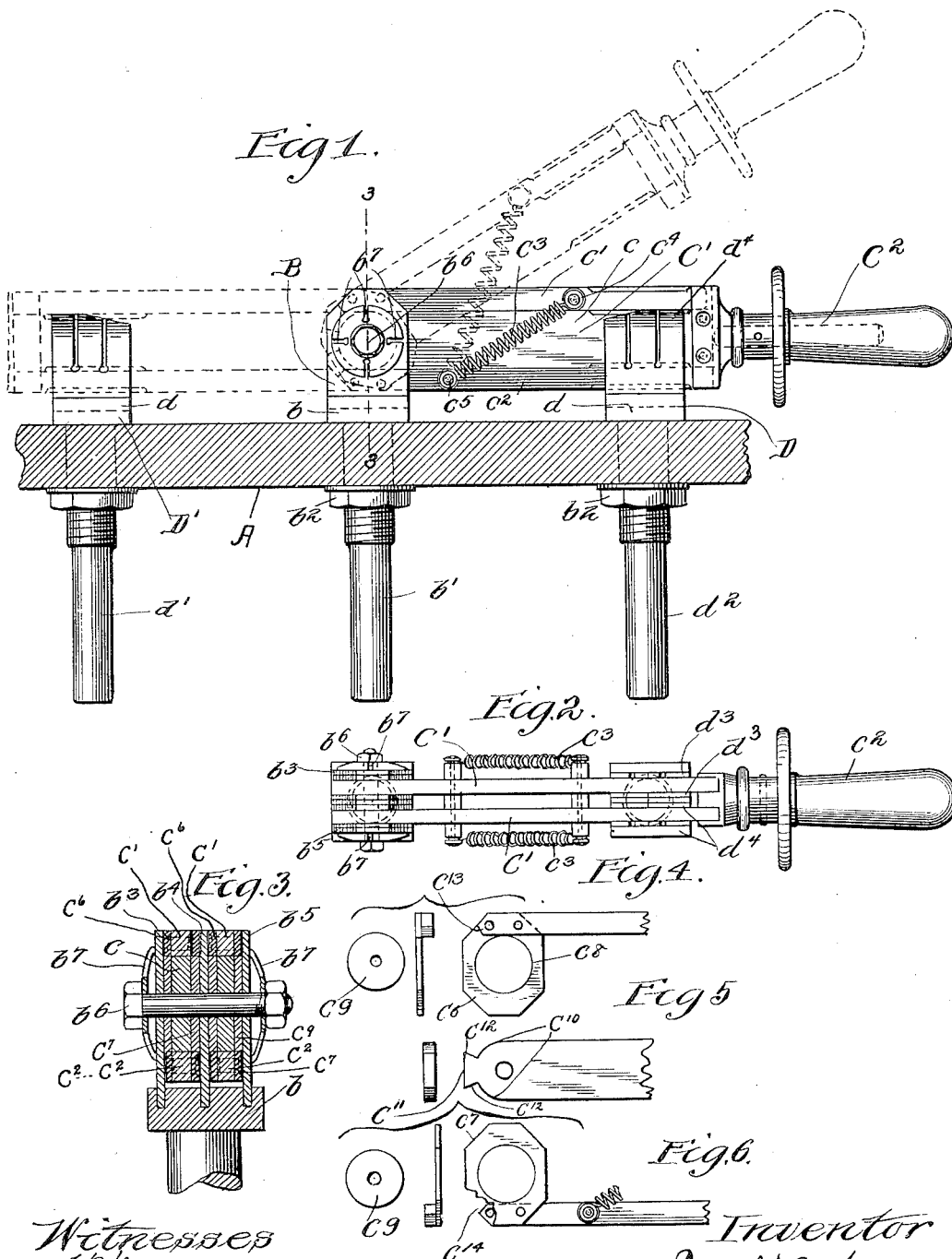
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Patented May 15, 1900.

F. L. SESSIONS.  
ELECTRIC SWITCH.

(Application filed Sept. 5, 1899.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 649,767, dated May 15, 1900.

Application filed September 5, 1899. Serial No. 729,427. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK L. SESSIONS, of Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

This invention relates to improvements in electric switches, and refers more specifically to improvements in blade-switches of the types ordinarily operated manually, the invention being equally applicable to single or double throw forms of switches.

Among the principal objects of the invention are to provide a construction whereby the breaking or final opening of the circuit at the time of opening the switch is effected by a sudden quick movement or snap action independently of the speed of movement which the operator imparts to the handle in opening the switch, thereby avoiding or minimizing to the greatest possible extent the sparking incident to the opening of the circuit; to provide a construction embodying the above characteristics and having such ease of movement between the secondary or snap-action member of the switch and its support as to insure a quick and free operation of said member, and yet so constructed and arranged as to maintain at the same time a closely-fitting joint and good contact between the switch-blade and its supports, and in general to provide a simple, practical, and improved construction in a device of the character referred to.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims, and will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a double-throw switch embodying my invention, the base being shown in vertical section. Fig. 2 is a top plan view of the switch-lever, the supporting-contact with which the switch-lever is pivotally connected, and one of the spring-blade contacts with which the switch-lever is adapted to engage, the base being omitted in this view in order to reduce the size of the figure. Fig. 3 is a transverse vertical sectional view taken on line 3 3 of Fig. 1. Fig. 4 is a fragmentary side elevation of

the pivot end of one of the secondary or snap members of the switch-blade, showing particularly the manner in which the pivot-ear is attached thereto. Fig. 5 is a fragmentary side elevation of the pivot end of the main switch-blade. Fig. 6 is a view similar to Fig. 4 of the lower snap member.

Referring to said drawings, A designates any suitable base or support of insulating material, upon which is mounted a switch-lever standard B, to which one end of a switch-lever is pivotally attached and which in the present instance constitutes in itself one of the contact devices or terminals of the switch, the base portion *b* of said standard forming the head of a conductor *b'*, which extends through the base and is provided at the under side of the latter with a clamping-nut *b<sup>2</sup>*. The switch-lever shown in the present instance is of duplex construction, consisting of two similar blades, (designated as a whole by C' C'), arranged parallel with each other and suitably held at a slight distance apart. In order to receive the end of the switch-lever and pivotally support the latter, the standard B is provided with three upright plates or blades *b<sup>3</sup> b<sup>4</sup> b<sup>5</sup>*, suitably seated rigidly in the base *b* thereof; said blades being spaced at suitable distances apart to form two adjacent sockets, within which the ends of the two members of the switch-lever are adapted to fit closely. Through the several supporting-blades and the inserted ends of the switch-lever blades is inserted a pivot pin or bolt *b<sup>6</sup>*, and in order that said blades may be caused to embrace the sides of the members of the switch-lever more closely to insure a good electrical connection convex spring-metal washers *b<sup>7</sup>* are mounted upon the pivot-bolt at each end thereof and held under compression by the head and nut of said bolt, respectively, so as to bear against the outer surfaces of the two outermost supporting-blades.

D D' designate spring-blade contact devices mounted upon the base A at opposite sides of the switch-lever standards in position to receive the outer end of the switch-lever when thrown into one position or the other, as indicated clearly in Fig. 1. The construction of the base portions *d* of these contacts and their connections with conduc-

tors  $d'$   $d^2$ , respectively, is similar to the corresponding portions of the pivot-standard B and conductor  $b'$ . The pairs of blades  $d^3$   $d^5$  and  $d^4$   $d^4$  are of the usual construction, being  
 5 made of spring metal and seated within the base portions  $d$  of the contacts parallel with each other and at such distance apart as to receive and clasp the sides of the switch-lever members  $C'$   $C'$  when the latter are forced  
 10 into engagement therewith.

Each blade  $C'$  of the switch-lever is composed of a main member  $c$ , to the free end of which the handle  $C^2$  of the switch-lever is directly attached, and one or more secondary  
 15 members, two in the present instance,  $c'$   $c^2$ , are arranged to lie in the same plane with the main member, above and below the latter, respectively, and yieldably connected with said main member in such manner as to  
 20 permit their free ends to be swung away from the main member. The yieldable connection between said parts consists in the present instance of a coiled spring  $c^3$ , connected with studs  $c^4$   $c^5$ , projecting from the  
 25 upper and lower secondary members, respectively.

Inasmuch as the outer ends of the secondary members are free to swing away from the main member of the switch-blade, except as  
 30 drawn yieldingly toward the latter by the coiled spring  $c^3$ , it will be obvious that when the switch-lever is lifted to open the switch whichever one of said secondary members happens to lie undermost will be frictionally  
 35 held by the spring-contacts until the main switch-lever has been lifted so far that the tension of the spring overcomes the frictional hold of the contact-blades or until the secondary member is otherwise started, where-  
 40 upon the spring will cause it to follow up the main member with a sudden or snap movement, thus opening the switch with the least possible opportunity of sparking between the separating parts. In order to bring about  
 45 such action of the secondary members of the switch-lever, it is necessary that the pivotal engagement of the latter with the standard should not be tight in the joints, so as to retard their free movement. It will, further-  
 50 more, be obvious that it is desirable that means be provided for positively starting the secondary members after the main member has moved a determined distance in order that the spring  $C$  be not overtaxed. In order  
 55 to insure such operation of the secondary members, the construction and arrangement of the pivotal connections are as follows:

In order that the main member  $c$  and the secondary members  $c'$   $c^2$ , which are all of  
 60 equal thickness, may lie in the same plane with each other and yet be all supported upon the same pivot-bolt, the pivot end of each of the secondary members is provided with a pivot-ear, as  $c^6$   $c^7$ , respectively, taking  
 65 the form of a washer which is rigidly attached to the side of the member and arranged to extend between one of the standard-blades,

as  $b^3$ , and the main member  $c$  of the switch-blade and encircle the pivot-bolt  $b^6$ . The pivot-ear  $c^6$  of the upper secondary member  
 70 is arranged to lie on one side of the main member, while the pivot-ear  $c^7$  of the lower secondary member is arranged to lie on the opposite side thereof.

The pivot-apertures  $c^8$  are made considerably larger than the diameter of the pivot-bolt and are adapted to receive filling-washers  $c^9$ , which are apertured to fit accurately upon the pivot-bolt, and in order that the pivot-ears of the two secondary members may not be held  
 80 clamped against free movement by the clamping action of the spring-washers hereinbefore referred to said filling-washers are made slightly thicker than the ears within which they fit, so that the latter are relieved of the  
 85 clamping pressure of the spring-washers and are free to turn upon the periphery of the filling-washers.

In order that the secondary members may be caused to move positively with the main  
 90 members after said parts have been separated to a determined angle, the end margin  $c^{10}$  of the pivot end of the main member is formed concentrically with the pivot-aperture therein, except for a projection or lug  $c^{11}$ , so  
 95 as to permit the secondary members to have the necessary pivotal movement independently of the main member. Said lug  $c^{11}$  is located centrally of the end margin of the main member and is so formed that the side  
 100 walls  $c^{12}$  thereof form shoulders, which are adapted to engage shoulders  $c^{13}$   $c^{14}$ , formed upon the end margins of the secondary members, when the members have been swung  
 105 apart to a determined angle. Obviously after the shoulders  $c^{12}$  and  $c^{13}$  or  $c^{14}$  are brought together the secondary members will be caused to move positively with the main member, so that when the switch-lever is lifted to  
 110 open the circuit whichever one of the secondary members happens to lie undermost will be held from movement by the frictional engagement of the spring contact-blades until the switch-lever has been lifted sufficiently  
 115 to bring the shoulders into engagement, whereupon the secondary member will be positively lifted to start it out of engagement with the contact-blades and will then be instantly drawn up by the coiled spring against  
 120 the main member.

It will of course be entirely obvious that in case the switch is designed as a single-throw switch but one secondary member will be required, this member being arranged at the lower side of the main member and the  
 125 coiled spring attached at its upper end to the upper portion of the main member instead of to the secondary member, as in the present case.

It will be seen from the foregoing that the  
 130 objects of the invention are fully attained by the construction described and a simple, practical, and desirable switch produced which will effectually minimize the bad results of

sparking, regardless of care on the part of the operator.

While I have herein shown what I deem to be a preferred embodiment, yet it will be understood that the details may be somewhat different without departure from the invention.

I claim as my invention—

1. The combination with a switch-blade support having one or more pivot-supporting ears to which said blade is pivotally supported and clamped, of two switch-blade members pivotally supported upon the same pivot-pin and arranged to occupy the same plane, one of said members being directly engaged with the pivot-pin and the other provided with an offset pivot-ear apertured to fit upon the periphery of a filling-washer mounted upon the said pivot-pin adjacent to the switch-blade member directly engaged therewith, said filling-washer being made slightly thicker than the offset ear, so as to relieve the latter of the clamping pressure.

2. The combination with a switch-blade support having a plurality of yieldable pivot-

ears between which said blade is pivotally supported and clamped, of two switch-blade members pivotally supported upon the same pivot-pin and arranged to occupy the same plane, one of said members being directly engaged with the pivot-pin and the other provided with an offset pivot-ear having an aperture larger than the diameter of the pivot-pin, a filling-washer constructed to fit upon the pivot-pin and within the aperture of the pivot-ear, said filling-washer being made slightly thicker than the offset ear within which it fits so as to relieve the latter of the clamping pressure of the pivot-supporting ears, and cooperating shoulders or stops upon said switch-blade members arranged to limit their oscillation independently of each other.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two subscribing witnesses, this 29th day of August, A. D. 1899.

FRANK L. SESSIONS.

Witnesses:

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