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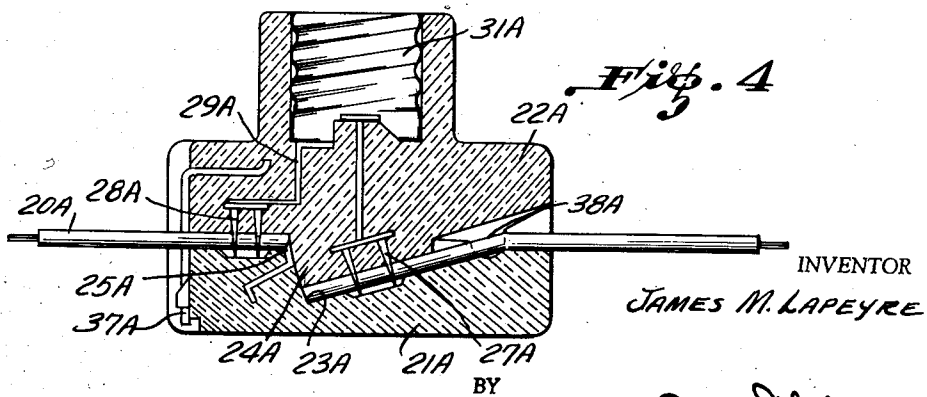
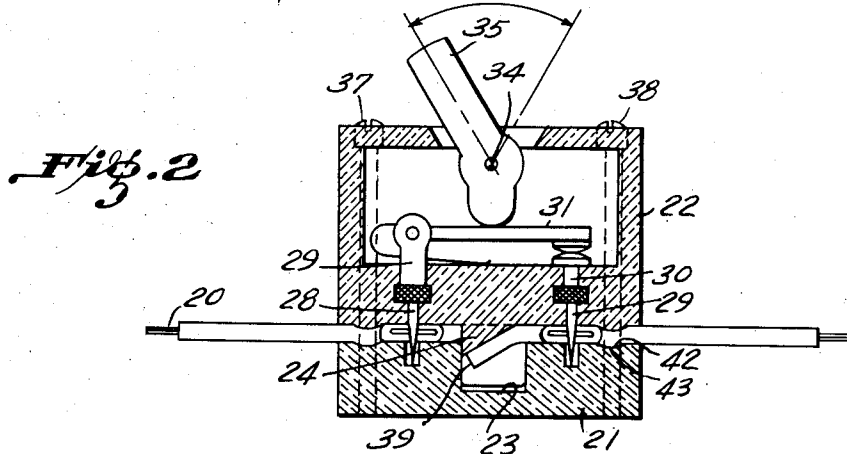
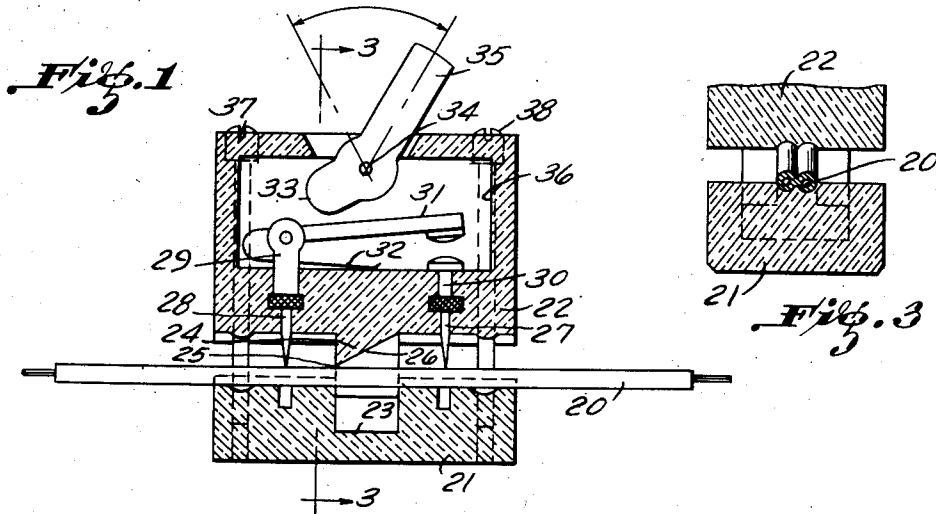
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2,802,083

SELF CONNECTING CIRCUIT INTERRUPTOR DEVICES

Filed Sept. 4, 1956

2 Sheets-Sheet 1



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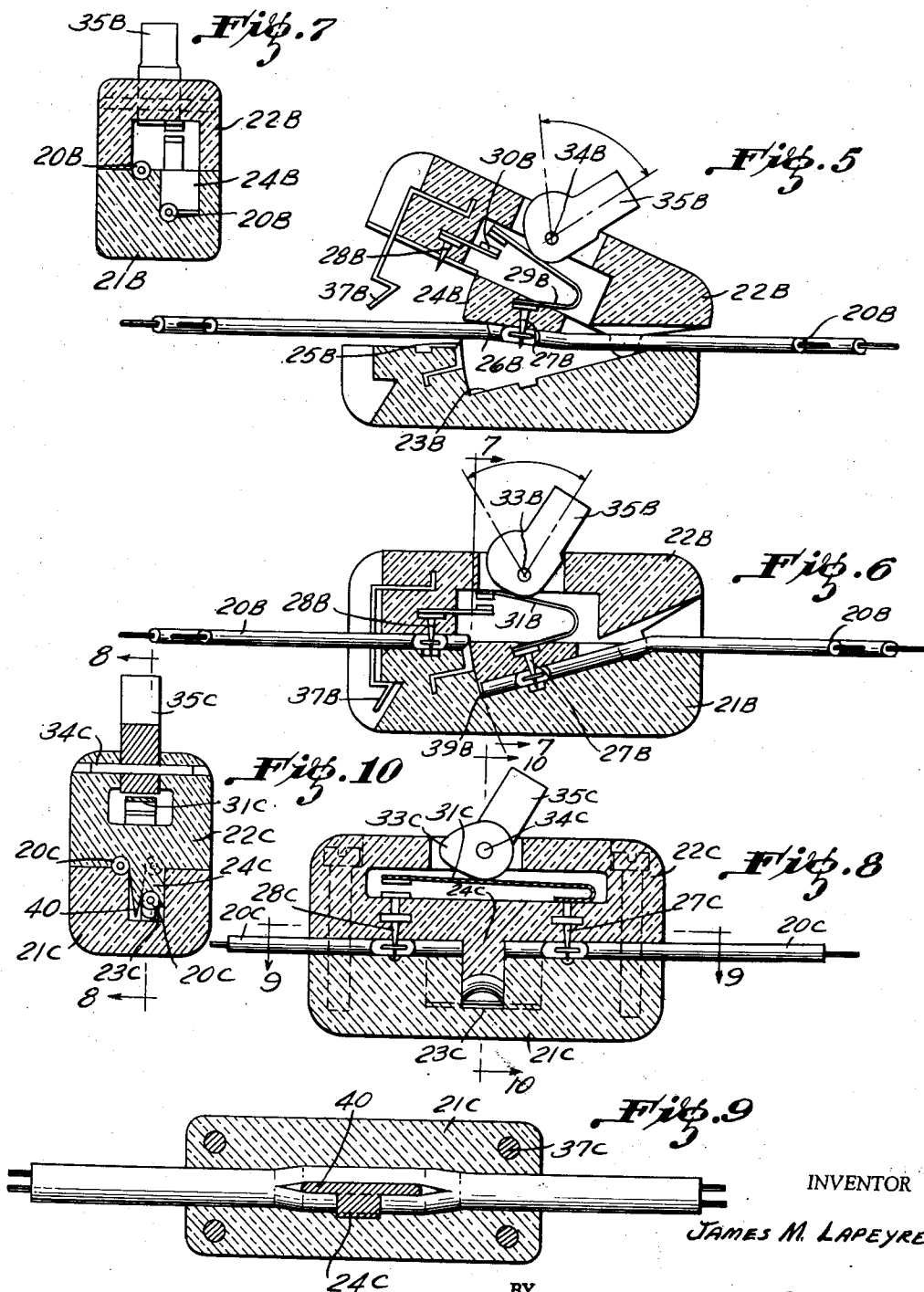
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SELF-CONNECTING CIRCUIT INTERRUPTOR DEVICES

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15 Claims. (Cl. 200—168)

The present invention relates to self-connecting circuit interruptor devices for use with an electrical conductor and has for an object to provide a device which will permit the quick series connection of a circuit interruptor for the purpose of installing fuses, lamps, circuit breakers, blinkers, instruments and the like without the need of cutting tools, screw drivers or the like requiring the circuit worked to be deenergized.

A further object of the present invention is to provide an assembly composed essentially of two members movable relative to each other which when moved together with the conductor therebetween will shear the conductor and drive conductor piercing members into electrical contact with each end of the sheared conductor inserting a switch or other circuit interruptor in the line of flow of current through the conductor not requiring the cutting of the conductor, the skinning and trimming of the ends of the wire, the twisting of the ends of the severed conductor about the terminal posts of switches, etc.

A still further object of the present invention is to provide a block type device having conductor shearing means in the form of a shearing projection on one block cooperating with the walls and recess of the other to sever the conductor when the two blocks are urged together.

A still further object of the present invention is to provide a device of the character described which is simple in construction, easy to operate, does not require additional tools to install, and which may be installed in a minimum of time without de-energizing the circuit into which the device is inserted.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

Figure 1 is a transverse section of a self-connecting circuit interruptor device constructed in accordance with the present invention in the preparatory position prior to connecting the same in circuit.

Figure 2 is a view similar to Figure 1 with the device in the assembled condition having sheared the conductor and connected itself in circuit.

Figure 3 is a fragmentary vertical section taken on the line 3—3 in Figure 1.

Figure 4 is a vertical section of a modified form of self-connecting circuit interruptor device constructed in accordance with the present invention.

Figure 5 is a longitudinal section of a further modified form of self-connecting circuit interruptor device constructed in accordance with the present invention in a position prior to being connected in circuit with a conductor.

Figure 6 is a view similar to Figure 5 with the two members of the device in assembled relationship having sheared the conductor and connected a switch in series with the conductor.

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Figure 7 is a vertical section taken on the line 7—7 in Figure 6.

Figure 8 is a longitudinal section of a still further modified form of self-connecting circuit interruptor device constructed in accordance with the present invention in the assembled condition.

Figure 9 is a horizontal section of the form of invention shown in Figure 8 taken on the line 9—9 in Figure 8.

Figure 10 is a transverse section taken on the line 10—10 in Figure 8.

Referring more particularly to the drawings and for the moment to Figures 1 through 3 inclusive, 20 designates an electrical conductor which may be either a single conductor or a plurality of conductors laid side by side. The circuit interruptor device consists of a first member 21 and a second member 22 of suitable insulating material. The member 21 is provided with a recess 23 for receiving therein a conductor shearing projection 24. The conductor shearing projection 24 has a sharp piercing or cutting wall 25 and an inclined or camming wall 26. The upper or second member 22 has imbedded therein a pair of conductor piercing members 27, 28 having sharp ends adapted to penetrate the insulation on the conductor 20 and make electrical contact with the conductor therein. The upper ends of the conductor piercing members 27, 28 are connected to the terminals 29, 30 of a switch 31. A spring 32 biases the switch arm 31 to a normally open condition. The switch arm 31 is caused to assume a closed position by virtue of a cam 33 rocking about a pivot 34 under the influence of a snap or toggle lever 35. The switch assembly 31 is housed within a hollow upper portion 36 in the upper or second member 22. The upper and lower or first and second members are maintained in contact with one another by virtue of retaining screws 37, 38. When it is desired to place the form of invention shown in Figures 1 through 3 inclusive in circuit, the conductor is laid between the upper and lower members 21, 22 as shown in Figure 1 and the upper member 22 is forced down against the lower member 21 causing the projection 24 by virtue of its shearing edge 25 to sever the conductor at 39, the wall 26 camming the severed conductor away from the top wall of the bottom member 21. When these two members are urged together the projection 24 enters the recess 23, thereby causing a shear of the conductor and simultaneously driving the sharp points of the conductor piercing members 27, 28 into electrical contact with the conductor 20. The path of electrical circuit through the circuit interruptor is then from the conductor 20 in the left hand end of Figure 2 up through the conductor piercing member 28, the switch terminal post 29, the switch arm 31, down the contact 30 through the conductor piercing member 27 and on out through the conductor 20 on the right hand end of Figure 2.

It will be readily appreciated that upon rotation of the lever arm 35 from the position shown in Figure 1 to that shown in Figure 2, the switch arm 31 will be urged to a closed circuit position thereby forming a continuous path of electrical continuity from one side of the device to the other.

Referring now to Figure 4, a modified form of the invention is shown for connecting fuses or lamps in circuit with a conductor. Similarly to the previously described construction the base or lower member 21A is provided with a recess 23A for receiving therein a projection 24A carried by the cover member 22A. A conductor shear member or knife 25A is placed adjacent the recess 23A whereby the projection 24A may urge the conductor 20A against the knife 25A and shear same. The upper member 22A is pivoted to the lower member 21A as at 38A. When the upper member 22A is urged toward the base member 21A the projection

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24A and knife 25A sever the conductor forcing one leg thereof into recess 23A while simultaneously driving the conductor piercing members 27A, 28A into electrical contact with the conductor. This form of the invention is provided with a socket to receive a fuse or the like and the continuity path is from the left hand end of Figure 4 through conductor piercing member 28A, lead 29A, socket 31A, through the fuse or lamp (not shown) through lead 30A, conductor piercing member 27A, thence through the conductor 20A to the right hand end of Figure 4.

Referring now to the form of invention illustrated in Figures 5, 6 and 7, 21B designates the base or lower member having a recess 23B therein to receive the projection 24B carried by the upper or cover member 22B which is hinged at one end thereof as at 38B. The lower member 21B is provided with a conductor shearing member 25B embedded in the lower member 21B and positioned to cooperate with the projection 24B to shear the conductor 20B when the base and cover members are urged into mating engagement. The projection 24B is provided with an inclined wall 26B to direct the severed conductor away from the retained conductor 20B at the left hand end of Figures 5 and 6. Upon rotation of the upper member 22B towards the lower member 21B about the pivot 38B, the conductor piercing members 27B and 28B are urged into piercing engagement with the conductor 20B while the projection 24B presses the conductor 20B against the shear member 25B, severing the same as shown in Figure 6. When the device assumes the position of Figure 6 it is retained in this condition by a lock or detent snap member 37B which seats over an undercut ledge in the lower member 21B to retain the unit in the locked or closed electrical contact condition. When it is desired to complete the circuit from the left hand end of Figure 6 to the right hand end thereof, the switch lever 35B is rotated presenting the cam 33B against the switch arm 31B and urging the switch contacts into a closed condition, thereby giving a path of continuity from the conductor at the left hand end of Figure 6, conductor 20B, through the conductor piercing member 28B through the switch 31B, conductor piercing member 27B and out through the conductor 20B on the right hand end of Figure 6. Where it is desired to employ the device of the present invention with a twin lead conductor as illustrated and it is only desired to place the switch in one leg of the circuit, the projection 24B need only be wide enough to assure the severing of one of the pair of conductors. If a heavy duty switch is desired, both conductors may be severed and employed as would the same be with a single conductor.

Referring now to a still further modified form of the present invention, attention is directed to Figures 8, 9 and 10 in which the base member 21C is provided with a recess 23C for receiving therein the projection 24C carried by the upper member 22C. When the upper member 22C is urged into mating engagement with the lower member 21C, the projection 24C severs the conductor and enters the recess 23C thereby breaking one of the legs of a twin lead conductor. The conductor piercing members 27C, 28C engage the conductor 20C in electrical contact to complete a circuit through the switch 31C which may be actuated by a lever 35C pivoted about a pivot 34C to cause the nose or cam 33C to bear against the switch arm 31C and close the circuit. In this form of invention it is desired to sever but one of two conductors and to first separate the conductors prior to shearing of one of the conductors. To this end I provide a separating projection 40 best seen in Figures 9 and 10. This projection 40 engages the conductor 20 prior to the projection 24C engaging the same. This directs one of the conductor leads 20C to one side and presents it to the shearing action of the projection

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24C without interfering with the electrical continuity of the other lead through the switch in uninterrupted, unbroken continuity.

Another purpose of this projection or separating means 40 is to adapt the device for receiving dual conductors of different widths and diameters of electrical cords which are made up with two conductors joined therebetween by a thin plastic or rubber bridge. It is most desirable to separate the conductors where the insulating materials are joined prior to attempting shearing of one of the conductors.

Referring more particularly to the form of invention illustrated in Figures 1 through 3 inclusive, a projection 42 and cooperating recess 43 is formed to the left and right side of the switch upper and lower blocks. These cooperating members 42, 43 act as a locking means which causes a deformity in the electrical conductor 20 when the lower member 21 and the upper member 22 are clamped together with assembly screws 37, 38. This anchors the conductor 20 firmly in place. Since the piercing type connectors are not sufficiently good anchoring devices to prevent movement of the conductor when it would be given or subjected to a mechanical jerk or pull the anchoring device shown at 42, 43 plays an important part in the mechanical structure. While I have shown but this one form of retaining or locking means, other forms embodying a positive gripping action on the ends of the conductor opposite the sheared portion would fall within the scope of the instant invention.

The members 21, 21A, 21B, 21C and the members 22, 22A, 22B, and 22C may be of a plastic insulating material or any other suitable insulating material from which a switch housing may be made.

While I have shown herein but four forms of the invention known to me at the present time, I reserve the right to all modifications falling within the scope of the following claims.

What I claim is:

1. A self-connecting circuit interruptor device for use with an electrical conductor comprising a first member, a second member movable relative toward said first member, conductor shearing means associated with said first and second member and adapted to shear a conductor lying therebetween upon relative movement of the two members into engagement with each other, electrical circuit means associated with one of said members and being adapted to be in electrical contact with said conductor on opposite sides of said shearing means when said first and second members are moved together, and circuit interruptor means in circuit with said electrical circuit means whereby to selectively open and close the circuit through the sheared conductor going into and out of said device.

2. A self-connecting circuit interruptor device as claimed in claim 1 wherein said electrical circuit means includes a pair of spaced apart conductor piercing members.

3. A self-connecting circuit interruptor device as claimed in claim 1 wherein said circuit interruptor means includes a switch assembly in circuit with said electrical circuit means.

4. A self-connecting circuit interruptor device as claimed in claim 1 wherein said first and second members are hinged together at one end.

5. A self-connecting circuit interruptor as claimed in claim 1 wherein said conductor shearing means comprises a shear projection carried by one of said members cooperating with a recess in the other of said members to shear the conductor lying therebetween.

6. For use with an electrical conductor, a self-connecting circuit interruptor device comprising a pair of relatively movable members of insulating material, conductor shearing means projecting from one of said members, said other member having a recess therein receiving said shear-

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ing means, circuit continuity means carried by one of said members piercing said conductor for completing the circuit through said device, and means in said circuit continuity means for selectively opening and closing the circuit through said device.

7. A self-connecting circuit interruptor device comprising a pair of relatively movable members of insulating material, means associated with both said members to shear a conductor placed therebetween, and means associated with said members and the sheared portion of said conductor to establish a circuit through said device which may be interrupted at will.

8. A self-connecting circuit interruptor device for use with an electrical conductor comprising a pair of relatively movable members of insulating material, conductor shearing means associated with said movable members adapted upon urging of said movable members together to shear said conductor, circuit continuity means associated with said movable members and the two portions of the sheared conductor to provide a path for electric current around the sheared portion of the conductor, and circuit interruptor means in circuit with said circuit continuity means for selectively opening and closing the circuit through the conductor.

9. A self-connecting circuit interruptor for use with a conductor comprising a pair of relatively movable members of insulating material, a conductor shear projection on one of said members, said other member having a recess therein receiving said projection, circuit continuity means carried by one of said members, conductor piercing means in circuit with said circuit continuity means at opposite sides of said shear projection, and circuit interruptor means in circuit with said circuit continuity means between said conductor piercing means.

10. A self-connecting circuit interruptor as claimed in claim 9 wherein said relatively movable members are hinged together at one end and closure retaining means is associated with the unhinged ends of said members to maintain said conductor piercing means in electrical contact with said conductor.

11. A self-connecting circuit interruptor for use with an electrical conductor comprising a base block of insulating material having a recess therein, a cover block for said base block, a shearing projection extending off the bottom of said cover block and being receivable in said recess, said conductor passing between said base block and said cover block, conductor piercing means extending between said blocks and piercing said conductor at each side of said shearing projection, circuit interruptor means between said conductor piercing means, and actuating means associated with said cover block and said circuit interruptor means to selectively open and close the circuit through said conductor.

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12. A self-connecting circuit interruptor for use with an electrical conductor comprising a base member of insulating material having a recess therein, conductor severing means upstanding from said base member adjacent said recess, a cover member of insulating material hinged at one end to said base member, a conductor severing projection carried by said upper block and positioned thereon to cooperate with said conductor severing means and said recess in said base member, circuit connecting means carried by said upper member engaging said conductor at each side of said conductor severing means, circuit interruptor means in circuit with said circuit connecting means, and retaining means associated with base and cover member to retain said members in closed relationship to maintain said circuit connecting means in electrical contact with each end of said severed conductor.

13. A self-connecting circuit interruptor for use with a plural lead conductor the leads of which are arranged side by side comprising a base member of insulating material having a recess therein, a cover member, a conductor shearing means extending from said cover member and received in the recess of said base member, conductor separating means adjacent said shear means, and conductor piercing means carried by said upper member and engageable with said sheared conductor on opposite sides of said conductor shearing means, and circuit interruptor means in circuit between said conductor piercing means.

14. A self-connecting circuit interruptor device as claimed in claim 1, further comprising means operatively associated with said first and second members and said electrical conductor to maintain said circuit connecting means in electrical contact with each end of said conductor and to retain the conductors in contact with said electrical circuit means when said switch and conductor are subject to mechanical stresses and pulls on the conductor.

15. A self-connecting circuit interruptor device for use with an electrical conductor as claimed in claim 1, further comprising complementary conductor deflecting means carried by said first and second members and cooperating with said conductor to partially deform and lock said conductor between said first and second members when said first and second members are in assembled condition with said electrical circuit means penetrating the conductor to resist mechanical separation of said electrical circuit means from disassociation with said conductor.

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