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G. R. BROWN ET AL

2,195,295

TUMBLER SWITCH

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Fig. 1.

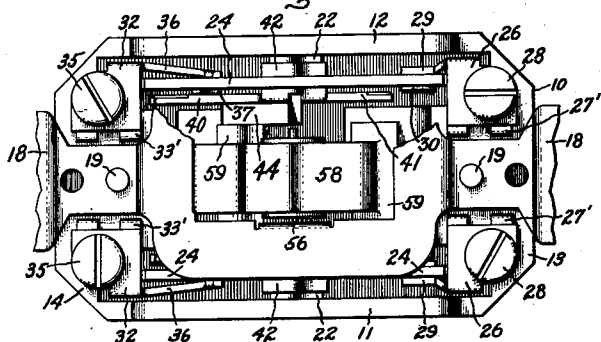


Fig. 2.

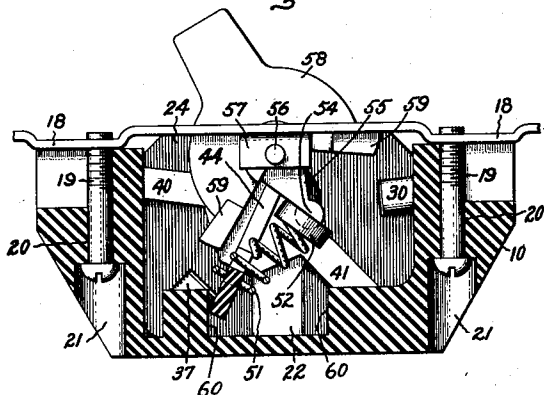


Fig. 3.

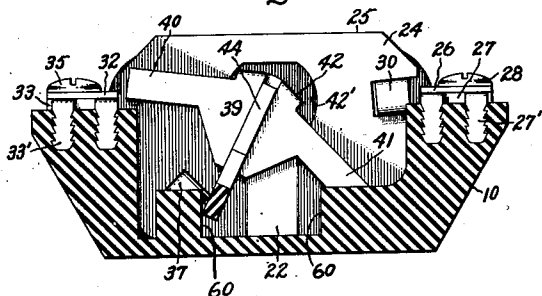
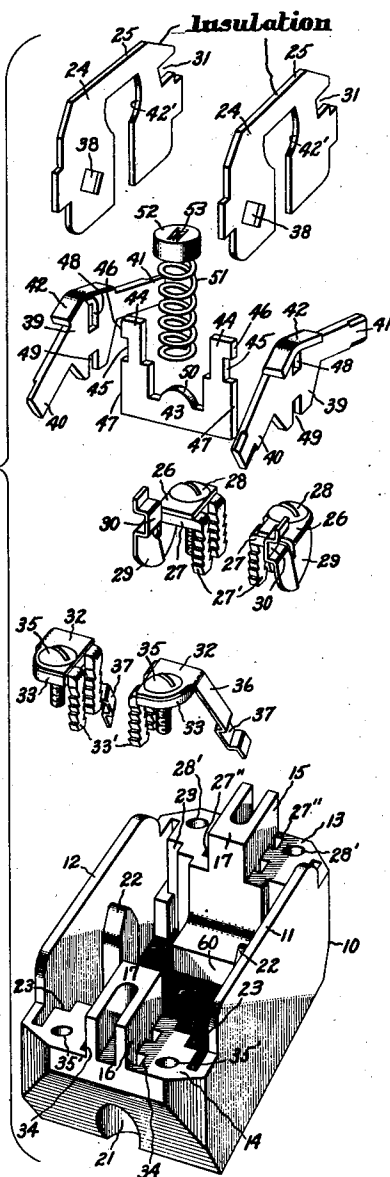


Fig. 4.



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TUMBLER SWITCH

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6 Claims. (Cl. 200—67)

This invention relates to a tumbler switch having pivoted switch arms with contacts adjacent each end in which means is provided to shorten the arc formed between the switch blades and contacts upon interruption of the circuit. The switch structure is provided with barriers through which the contacts extend and as the switch blades wipe past the contacts the barriers act to shorten or extinguish the arcs occasioned by interruption of the circuit between the blades and contacts.

Referring to the drawing, Fig. 1 is a plan view of the assembled switch with the supporting strap broken away; Fig. 2 is a partial cross-sectional view of the switch in open position showing the spring operating mechanism; Fig. 3 is a cross-sectional view through the switch housing with the spring and operating mechanism removed, while Fig. 4 is an exploded view of the switch elements.

The tumbler switch herein described is of the double pole type and comprises a housing 10, which may be formed of molded composition, or the like, having side walls 11 and 12 and end walls 13 and 14, the end walls being provided with upstanding abutments 15 and 16. The abutments provide flat faces 17 to receive the supporting strap 18 which is secured tightly against the faces by means of the screws 19. The screws project through openings 20 formed in each of the sides 13 and 14 and the heads of the screws are hidden in recesses 21 forming extensions of the openings 20. The side walls 11 and 12 of the housing are provided with shoulders 22 forming bearing surfaces for the switch blades, to be described hereinafter. A slot 23 is formed on each side of the end walls 13 and 14 of the switch housing and the slots are adapted to receive barrier members 24, one being placed on each side of the housing.

The barrier members are formed of insulating material and may be punched from fiber sheets, or the like. A flat upper surface 25 is formed on the top of each barrier member which makes contact with the under side of the strap so that the barrier members are clamped securely in position by the strap as the bolts 19 are tightened. In operative position the barrier members are spaced from the walls 11 and 12 of the housing, this space being occupied by the bearings 22 and by the contact members, now to be described.

Opposed pairs of contacts are placed upon each of the end walls 13 and 14 and extend downwardly into the spaces between the barriers and side walls. Contacts 26 are spot welded to

bases 27 having depending lugs 27' which are inserted in openings 27'' formed in the housing 10. The lugs are serrated to grip the housing. Each contact 26 is provided with a terminal screw 28 which is adapted to receive the lead wires and which when screwed down nests in an opening 28' formed in the housing. In addition, each contact is provided with an upstanding arm 29 which is provided with a punched-out contact surface 30. With the contacts in position on the housing the contact surfaces 30 project through slots 31 formed in the barrier member. Similarly, the end wall 14 receives contacts 32 spot welded to bases 33 formed with serrated depending lugs 33' which are inserted in openings 34 in the wall 14; each contact has a terminal screw 35 nesting in opening 35' and is formed with a depending contact arm 36. The contact arms are formed with contact surfaces 37 which may be struck out from the arms 36. When the contacts are mounted in position upon the wall the contact surfaces 37 project through openings 38 formed in the barrier members in order to make contact with the switch blades. It will be noticed that the arms 29 of the contacts 26 extend above the contact body while the arms 36 of the contacts 32 depend below the contact body; in this manner, the contact surfaces 30 and 37 are spaced vertically, as shown by Figs. 2 and 3, so that the switch blades 39 may be oscillated to engage the contact surfaces when disposed in an angular position.

The switch blades 39 are identical in construction and are mounted on each side of the housing in proximity to the barriers 24. The blades take the form of a "walking beam," the extended arms of which are formed with beveled contact portions 40 and 41 which engage the contact faces 37 and 30, respectively. Upon the upper part of the blades integral extensions are bent outwardly to form pivots 42 which extend through openings 42' in the barriers and rest upon the bearings 22 of the housing walls.

The mechanism to operate the switch blades includes an insulating carrier member 43 having upstanding arms 44 at each end. The arms are notched at 45 so that the sides form tenons 46 and 47 which fit into mortices or openings 48 and 49, respectively, formed in the switch blades. This construction gives a close interlocking fit between the blades and the carrier member and permits them to be assembled easily during construction of the switch. An abutment 50 projects upwardly from the carrier member 43 between the arms 44 and receives the lower coll

of an operating spring 51. The upper end of the spring is provided with a cap 52 having a recess 53 which receives the circular end abutment 54 of the actuating arm 55 so that the spring is compressed between the carrier and the actuating arm. By disposing the spring and actuating arm between the arms of the carrier member a compact arrangement of structure is had thereby reducing the overall dimensions of the switch. The actuating arm is pivotally mounted upon the strap 18 by means of the pin 56 passing through lugs 57 bent downwardly from the supporting strap and has a handle 58 at its outer end. The handle may be formed of molded composition, or the like, and may be molded about the actuating arm 55. Opposite sides of the handle are formed with flat stop surfaces 59 which engage the underside of the strap 18 and limit the degree of oscillation of the handle as it is moved to and fro to operate the switch. Similarly, in order to limit oscillation of the carrier member and the switch blades, abutments 60 are formed at each end of the housing with which the carrier member co-acts and between which it may oscillate.

With the construction shown and described the spring 51 is normally compressed between the carrier member and the actuating arm and thereby transmits movements of the handle to the carrier member and switch blades. The switch blades and handle are disposed normally at an angle to each other and on the same side of the vertical so that as the handle is moved clockwise the carrier member and switch blades will be moved counterclockwise, the blades being supported upon the bearings 22. Counterclockwise movement of the carrier member is effected quickly and surely under the snap action of the spring which is compressed to a high degree by the arm 55 as it moves clockwise, the circular end 54 of the arm making rotary contact with the recess 53.

The switch blades, carrier member, spring and handle are disposed centrally of the switch housing between the barrier members while the contact arms are placed in the spaces between the barrier members and the walls of the housing with the contact faces projecting through the barriers to be engaged by the switch blades. With this construction the barrier members act to shorten the arc between the switch blades and contact faces as these elements are separated upon opening of the switch. The arc is limited to the space adjacent the inside surface of the barrier and in this manner protection is afforded the walls of the housing against carbonization.

What we claim as new and desire to obtain by Letters Patent of the United States is:

1. In a tumbler switch, a housing having grooves therein and a pivot bearing formed on a wall thereof, a barrier resting in said grooves and having openings formed therein, said barrier being spaced from said wall, a contact arm mounted on said housing having a portion resting within said space and protruding through one of said openings, a contact blade co-acting with said arm and having a bearing portion protruding through another of said openings to rest on said pivot, and means to actuate said contact blade.

2. In an electric switch, a housing of insulating material having a recess therein forming side and end walls, the side walls being provided with pivot bearings and the end walls being provided with grooves, barrier members of insulating ma-

terial resting in said grooves and being spaced from the side walls of said recess, said barrier members having openings formed therein, contact arms mounted on the end walls of said housing and extending within the spaces between the barrier members and side walls and having contact portions projecting through some of the openings in said barrier members, contact blades coacting with the contact portions projecting through said openings, said contact blades having bearings portions extending through others of the openings in said barrier members and resting on said pivots for pivotally supporting said contact blades, and means including a carrier member secured to said blades for operating the same.

3. In an electric switch, a housing of insulating material having a recess therein forming side and end walls, one of the side walls being provided with a pivot bearing and the end walls being provided with grooves therein, a barrier member of insulating material resting in said grooves and being spaced from the side wall of said housing, said barrier member having openings therein, contact arms mounted on the end walls of said housing and extending within said spaces with contact portions projecting through some of the openings in said barrier member, a contact blade coacting with said contact portions and having a bearing portion extending through another opening in said barrier member and resting on said pivot for pivotally supporting the contact blade, and means to actuate said contact blade.

4. In an electric switch, a housing of insulating material having a recess therein providing side and end walls, the side walls being provided with pivot bearings and the end walls being provided with grooves therein, barrier members of insulating material resting in said grooves and being spaced from the side walls of said housing within said recess, said barrier members having openings formed therein, contact arms mounted on the end walls of said housing and extending within said spaces with contact portions thereof projecting through some of the openings in said barrier members, an assembly comprising a carrier member and spaced contact blades thereon, said contact blades cooperating with the contact portions of said contact arms, said assembly having bearings extending through others of the openings in said barrier members and engaging said pivots for pivotally mounting said assembly within said recess, and means for oscillating said assembly.

5. In an electric switch, a housing of insulating material having a recess therein provided with side and end walls, the side walls being provided with pivot bearings, barrier members of insulating material resting in said recess and being spaced from the side walls thereof, said barrier members having openings formed therein, contact arms mounted on the end walls of said housing extending within the spaces between the barrier members and side walls and having contact portions projecting through some of the openings in said barrier members, an assembly comprising a carrier member and spaced contact blades mounted thereon, said contact blades cooperating with the contact portions of said contact arms, said assembly having pivots extending through others of the openings in said barrier members and cooperating with said pivot bearings for pivotally mounting said assembly within said recess, means for operating said as-

sembly and a mounting strap secured to the top of said housing and engaging the edges of said barrier members for holding them in position.

- 5 6. In an electric switch, a housing of insulating material having a recess therein forming side and end walls, one of the side walls being provided with a pivot bearing, a barrier member resting in said recess and being spaced from the side wall of said housing, said barrier member
- 10 having a plurality of openings therein, one of said openings being in alignment with said pivot bearing, contact arms mounted on the end walls

of said housing and extending within said space with contact portions thereof extending through others of the openings in said barrier member, a contact blade coacting with the contact portion of said contact arms, said contact blade 5 having a bearing portion extending through said one opening in the barrier member and engaging said pivot for pivotally supporting said contact blades, and means including a carrier member secured to said blade for actuating the same. 10

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