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A. A. BLUEMLE ET AL

2,148,801

SWITCH

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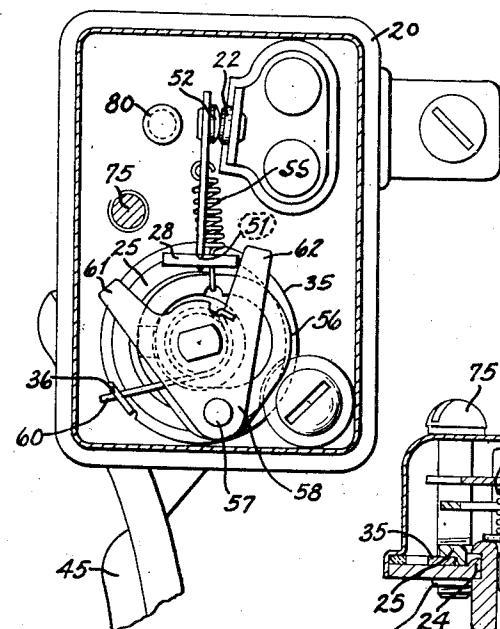
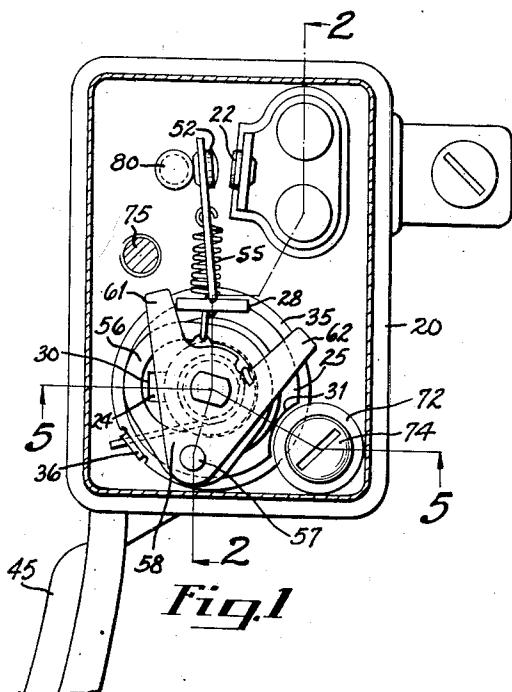


Fig. 3

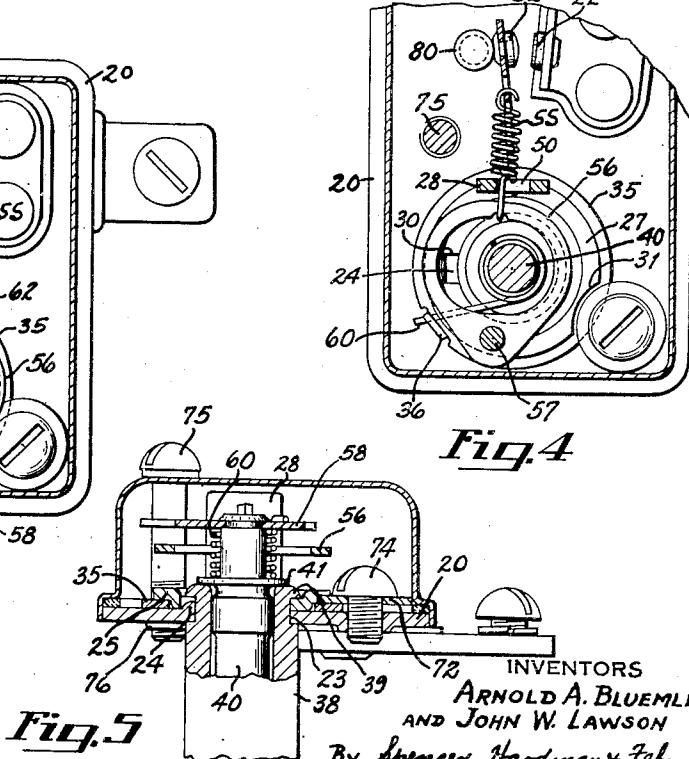


Fig. 5

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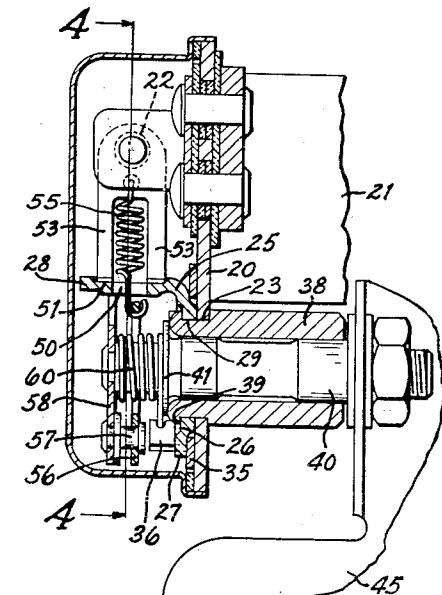


Fig. 2

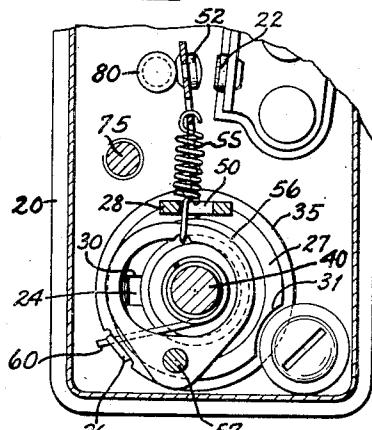


Fig. 4

## UNITED STATES PATENT OFFICE

2,148,801

## SWITCH

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## 17 Claims.

(Cl. 200—81)

This invention relates to electric switches and more particularly to switches with a snap action adapted for use on automotive vehicles.

An object of the present invention is to provide a simple but very reliable type of snap action switch construction which can be readily mounted and inserted in an electric circuit.

Another object of the invention is to provide a switch mechanism having an air vane whereby air currents impinging against the vane automatically control the position of the movable contact and that on change of said contact from an open position to a closed position of the switch, or vice versa, the movement of the movable contact will be with a snap action.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is an enlarged plan view of the switch embodying the present invention with the cover in section.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 1 showing the switch in a closed position.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 1.

Referring to the drawing 20 designates a supporting base formed with an ear 21 for mounting the base upon a suitable support, not shown. The base carries a stationary contact 22 which is preferably insulated from the base as shown and is provided with any suitable means of circuit connections.

The base 20 is provided with an aperture 23 and has a projection or a raised portion 24, see Fig. 5, formed by a punch press operation. A stop-plate 25 is secured to base 20. This stop-plate is formed with a cup shape portion 26 provided with an annular flange 27 and an arm 28 which is disposed substantially at right angles to the cup portion. The bottom wall of the cup-shaped portion is provided with an aperture 29 and a notch 30, the notch cooperating with the projection 24 to properly position stop-plate 25 upon the base 20. The annular flange 27 is provided with a peripheral notch 31.

Mounted to turn on the exterior surface of the cup-shaped portion 26 is a spring-plate 35 provided with an ear or lug 36. The plate 35 is held

upon the base by the annular flange 27 of the stop-plate 25. The stop-plate is securely held in position on the base 20 by a sleeve 38 having a reduced portion which passes through apertures 23 and 29 of the base 20 and the plate 25, respectively, the reduced portion being peened against the inner surface of the bottom wall of cup-shaped portion 26, as at 39, making the junction thereof secure.

The sleeve 38 provides a bearing for a shaft 40. The shaft has a collar 41 formed on one end thereof, said collar resting against the peened over portion of the sleeve to limit the axial movement of the shaft to the right, as viewed in the drawing. The other end of the shaft projects beyond the sleeve 38 and carries a vane 45. This vane is preferably located in the path of air currents that are produced by the fan located in the front of and operated by the engine of an automotive vehicle.

The arm 28 of the stop plate 25 is provided with an opening 50 and diametrically disposed V-shaped bearing grooves or recesses 51. A movable contact member 52 having spaced arms 53 provided with knife edges are pivotally supported in the grooves 51. The movable contact member is connected by a floating tension spring 55, said spring having one end extending through the aperture 50 of the arm 28 and anchored to a pear-shaped plate 56 and positioned on one side of dead center so as to provide a typical toggle action for making and breaking a circuit. The line of tension of the spring is substantially midway between the arms 53 and the grooves 51 of the arm 28 so as to produce an equal pressure on the two bearings 51 and maintain the switch member 52 in its proper position.

The pear shaped plate 56 surrounds the shaft 40 and is moved from right to left or left to right, depending upon the direction of rotation of the shaft 40, by a stud or pin 57 projecting from a stop plate 58. The plate 58 is fixed to the end of the shaft 40, the shaft being provided with a reduced portion having flat sides which is adapted to extend through a correspondingly shaped opening in the plate 58 and spun over the plate to secure same to the shaft, as clearly shown in Fig. 2. The plate is also provided with spaced arms 61 and 62 between which projects the arm 28 of the stop-plate 25. The arms 61 and 62 cooperate with the arm 28 for limiting the rotation or oscillation of the shaft thereof.

A return spring 60 surrounds the shaft 40 and is disposed between the plate 58 and the collar 41, one end of the spring is anchored to the arm 55.

62 and the other end is anchored to the lug 36 to normally hold the arm 61 against the arm 28, the normal position of the switch. The tension of the spring 60 may be adjusted by turning the spring plate 35 about the cup-shaped portion of the stop plate 25. The plate 35 is held in a desired position of adjustment by a washer 72 and a screw 74 which clamps the plate 35 against the base. By loosening the screw the plate 35 can be rotated in either direction of rotation.

10 The switch mechanism is enclosed with a cover plate the same to be secured in position by a suitable screw 75, threaded into the base member 20 as at 76.

15 In operation, the movable elements of the switch are normally in their positions shown in Fig. 1. When high velocity air currents, produced by a fan not shown, impinge against the vane 45, the vane will move in a counterclockwise direction against the tension of the spring 60. This movement of the vane will cause the shaft 40, stop-plate 58 and the spring-plate 56 to also move in a counterclockwise direction, but the movable contact 52 will remain in engagement with a stop 80, carried by the base 20, until the air currents are strong enough to rotate the elements 45, 58 and 56 far enough to cause the spring 55 to pass its dead center. When this occurs the spring will snap the movable contact 25 52 from the position shown in Fig. 1 to that of Fig. 2 into engagement with the stationary contact 22. The elements 45, 40, 58 and 56 can continue to rotate until the arm 62 engages arm 28 which limits the rotation of the shaft in the 30 counterclockwise direction. When the shaft is moved in a return or clockwise direction by the spring 60 due to low velocity air currents, the movable contact member 52 will remain in engagement with the stationary contact until the 35 spring 55 is again moved past dead center in the return or backward direction. When this happens the movable contact member 52 will be separated from the stationary contact 22 thrown against the stop 80 with a snap action.

40 45 While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

50 What is claimed is as follows:

1. A switch mechanism comprising a support having a projection provided with an opening; a movable contact pivoted on the projection; a movable member; a shaft journaled in the support and extending through the movable member; a spring extending through the opening and connected to the movable contact and the movable member to impart a snap action to the movable contact; means carried by the shaft for actuating the movable member upon turning of the shaft to shift the spring connections past the pivoted point of the movable contact and yieldable means for resisting movement by the shaft in one direction, said yieldable means operable for rotating the shaft in the opposite direction upon the release of the means which urges the shaft in the first mentioned direction.

2. A switch mechanism comprising, a support having a projection provided with an opening; a movable contact pivoted on the projection; a movable member; a shaft rotatably supported with respect to the support and extending through the movable member; a spring located within the opening and connected to the movable contact and the movable member; and

means carried by the shaft for actuating the movable member upon turning of the shaft to shift the spring past the pivotal point of the movable contact, said means having provisions cooperating with the projection to limit the turning of the shaft.

3. A switch comprising in combination; a base; an adjustable bracket carried by the base and having an arm extending at right angles from the base, said arm provided with an opening; a stationary contact carried by the base; a movable contact pivoted on the arm; a movable plate; a rotatable shaft supported from the base and having one end extending through the plate; a spring extending in the opening of the arm and having one end anchored to the movable contact and the other end to the movable plate above the shaft for imparting a quick throw to the movable contact into and out of engagement with the stationary contact; and means operative upon turning of the shaft for actuating the plate to shift the spring past the axis of the movable contact means for rotating the shaft in one direction; and spring means for rotating the shaft in the opposite direction upon release of the means for rotating the shaft in the first mentioned direction.

4. A switch comprising in combination; a base having a projection provided with an opening; a stationary contact carried by the base; a movable contact pivoted on the projection; a movable plate; a shaft journaled in the base and having one end extending through the plate; a spring extending through the opening and connected to the movable contact and the plate for imparting a snap action to the movable contact; means operative upon turning of the shaft for actuating the plate to shift the spring past its dead center; a lever carried by the shaft and responsive to air currents to rotate the shaft in one direction; and spring means for rotating shaft in the opposite direction as the air currents recede.

5. A switch comprising in combination; a base having a projection and provided with an opening; a stationary contact carried by the base; a movable contact pivoted on the projection; a movable plate; a shaft journaled in the base and having one end extending through the plate; a spring extending through the opening and connected to the movable contact and the plate for imparting a snap action to the movable contact; and means operative upon turning of the shaft for actuating the plate to shift the spring past the axis of the movable contact, and said means having provision cooperating with the projection to limit the rotary movements of the shaft in either direction of rotation.

6. A switch comprising a stationary contact and a bracket provided with an opening and having V-shaped grooves in section on opposite sides of the opening; a switch member normally in engagement with the stationary contact and having spaced apart knife edge portions pivoted in the grooves; a movable member; a floating spring extending through the opening and resiliently connecting the movable member and the switch member between the spaced portions for maintaining the knife edge portion within the V-shaped grooves; a rotary shaft; and means associated with the shaft for actuating the movable member to shift the spring past its dead center whereby the switch member is separated from the stationary contact with a snap action.

7. A switch comprising, a stationary contact, a bracket provided with an opening and having

5 V-shaped grooves in section on opposite sides of the opening; a switch member normally in engagement with the stationary contact and having spaced apart knife edge portions pivoted in the grooves; a movable member; a floating spring extending through the opening and resiliently connecting the movable member and the switch member between the spaced portions to maintain the knife edge portions within the 10 grooves; a stop for limiting the movement of the switch member away from the contact; a rotary shaft; and means rotatable with the shaft for actuating the movable member to shift the spring past its dead center whereby the switch member is snap actuated.

6 8. A switch comprising in combination; a base member; a stationary contact carried by the base member; a bracket supported on the base member and having an arm disposed substantially at right angles to the plane of the base member, said arm provided with an opening and having V-shaped grooves in section on opposite sides of the opening; a movable contact member having spaced apart knife edge portions pivoted in the grooves; a stop for limiting the movement of the movable contact member away from the stationary contact; a movable apertured plate; a coiled spring having one end extending through the opening of the arm and anchored to the movable plate and the other end anchored to the contact member between the spaced portions; a shaft rotatably mounted on the base member and having one end extending through the opening of the plate; and means carried by the shaft for actuating the plate to shift the spring past the pivoted axis of the movable contact member.

7 9. A switch comprising in combination; a stationary contact; a bracket; a movable contact pivoted upon the bracket; a movable member; spring means connected to the switch member and the movable member; a shaft; means carried by the shaft and connected to the movable member to swing the movable member on rotation of the shaft to shift the spring means past its dead center whereby the movable contact is snap actuated after a predetermined movement of the shaft; means for urging the shaft in one direction of rotation; and yieldable means for automatically moving the shaft in the opposite direction of rotation in accordance with the bias of said yieldable means upon retraction of the urging means.

8 10. A switch comprising in combination; a support; a stationary contact carried by the support; a movable contact normally engaging the stationary contact and pivotally supported relative thereto; a movable element; spring means connected to the movable contact and the element; a shaft rotatably supported with respect to the support; means carried by the shaft and connected with the element so as to swing the element on rotation of the shaft to shift the spring means past its dead center whereby the movable contact is snap actuated from and into engagement with the stationary contact; means for urging the shaft in one direction of rotation; and yieldable means for resisting the movement of the shaft in that one direction of rotation and automatically moving the shaft in the opposite direction of rotation in accordance with the bias of the yieldable means upon retraction of the urging means.

9 11. A switch comprising in combination; a support; a stationary contact carried by the sup-

10 port; a movable contact normally engaging the stationary contact and pivotally supported relative thereto; a movable element; spring means connected to the movable contact and the element; a shaft rotatably supported with respect to the support; means carried by the shaft and connected with the element so as to swing the element on rotation of the shaft to shift the spring means past its dead center whereby the movable contact is snap actuated from and into engagement with the stationary contact; means for urging the shaft in one direction of rotation; resilient means for resisting the movement of the shaft in that one direction of rotation and operating to move the shaft in the opposite direction in accordance with the stress of the resilient means upon retraction of the urging means; and means associated with the element cooperating with means on the support to limit the turning of the shaft in either direction of rotation.

11 12. A switch comprising in combination; a stationary contact; a movable contact pivotally supported relative to the stationary contact and normally engageable with the stationary contact; a movable member; a spring connected to the movable contact and the member for imparting a snap action to the movable contact; a rotatable shaft; means operative upon a predetermined movement of the shaft for actuating the movable member to shift the spring past its dead center; power means for rotating the shaft in one direction; and spring means for rotating the shaft in the opposite direction as the power means is reduced.

12 13. In a snap action switch the combination comprising, a pivoted contact; a movable member; a spring connected to the movable contact and the movable member; a rotatable shaft; means associated with the shaft, said means upon a predetermined movement of the shaft causing the said movable member to shift the spring past its dead center whereby the pivoted contact is snap actuated; power means for rotating the shaft in one direction; and resilient means for rotating the shaft in the opposite direction as the power means is reduced.

13 14. A switch mechanism comprising, a support; a movable contact pivoted relative to the support; a movable member; a shaft rotatably supported with respect to the support and extending through the movable member; spring means connected to the movable contact and the movable member; and means carried by the shaft for swinging the movable member upon turning of the shaft to shift the spring means past the pivoted point of the movable contact, said means having provisions cooperating with means on the support to limit the turning of the shaft.

14 15. A switch mechanism comprising; a support; a movable contact pivoted relative to the support; a movable member; a shaft rotatably supported with respect to the support; spring means connected to the movable contact and the movable member; and means carried by the shaft and connected with the movable member, said means operating to swing the movable member upon turning of the shaft to shift the spring means past its dead center whereby the movable contact is snap actuated and said means having provision cooperating with means on the support to limit the turning of the shaft in either direction of rotation.

15 16. A switch mechanism comprising a sup-

port; a movable contact pivoted relative to the support; a movable member; a shaft rotatably supported with respect to the support and extending through the movable member; spring means connected to the movable contact and the movable member; a plate carried by the shaft and having a connection with the movable member, said connection operating to swing the movable member transversely to the axis of the shaft to shift the spring means past its dead center whereby the movable contact is snap actuated; and means associated with the plate cooperating with means on the support to limit the turning of the shaft in either direction of rotation.

15 17. A switch mechanism comprising; a support provided with a projection; a movable con-

tact pivoted upon the projection; a movable member; a shaft rotatably supported with respect to the support and extending through the movable member; spring means connected to the movable contact and the movable member; a plate carried by the shaft and having a connection with the movable member for swinging the movable member upon the turning of the shaft to move the spring means past its dead center whereby the movable contact is snap actuated; and means carried by the plate cooperating with the projection to limit the turning of the shaft in either direction of rotation.

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