

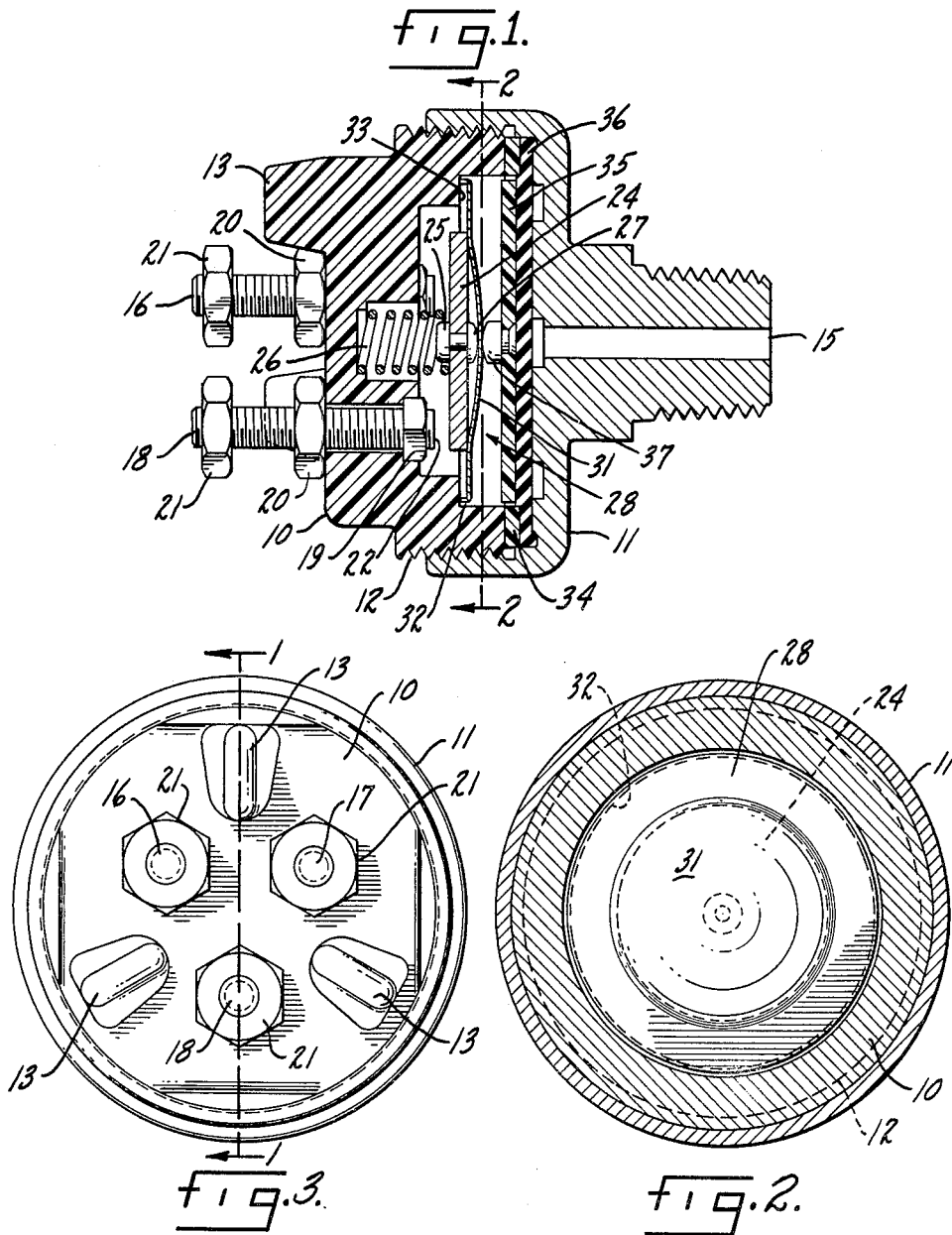
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PRESSURE OPERATED SNAP ACTION SWITCH

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PRESSURE OPERATED SNAP ACTION SWITCH
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This invention relates to a pressure operated switch, in particular, to a switch which makes contact and breaks contact by snap action means.

A primary object of this invention is a pressure operated switch in which a target contact is made and broken by a snap action member.

Another object is a switch having a member with an arched central portion which is deformed by a pressure stress and returned to its original position when the stress is removed.

Another object is a switch in which contact is made with electrical connector posts by a quick snap action when pressure stress is applied to a deformable adjacent member.

Another object is a switch wherein electrical contact with connector posts is broken by a snap action after a pressure stress is removed from a deformable member.

Another object is a pressure operated switch in which a deformable disc having a domed central portion responds to pressure stress to snap an adjoining element into contact with adjoining connector posts.

Another object is a pressure operated switch in which a deformable disc having a domed central portion responds to a relieved pressure stress and snaps back to its original form to permit an adjoining element to move out of contact with connector posts.

The foregoing objects are attained, as well as other objects which will become apparent, by the invention which will be described in detail and which is disclosed in the accompanying drawings wherein:

FIGURE 1 is an axial section view along line 1-1 of FIGURE 3,

FIGURE 2 is a view along line 2-2 of FIGURE 1, and

FIGURE 3 is an end view of the switch.

The same numbers in the various views of the drawings will identify the same elements, structures and concepts.

A housing for the switch is shown as having two components, an upper housing component 10 and a lower housing component 11. Housing component 10 may be engaged and disengaged to component 11 by a threaded inside wall of component 11. A pressure inlet 15 is at one end of the housing, connector posts such as 16, 17 and 18 are fixed at the other end, and such posts extend into the housing as shown. Component 10 is made up of an insulating material, at least in the area immediately next to the place where connector posts extend through component 10. The posts are fixed in housing component 10 by nuts such as 19 and 20. A nut 21 is shown threaded on the posts to provide a connection with a suitable electrical connector. Similar nuts are found on posts 17 and 18. Flange elements such as 13 extends from housing component 10 and provides a convenient gripping surface for turning component 10 into threaded engagement with housing component 11.

The interior of the housing contains a switch contact element 24 which is urged away from the ends 22 of the posts by a coil spring 26. Element 24 has a nub 27 fixed at about the center of element 24. The nub may be the head of a rivet fixed to element 24, and another head 25 may be on the rivet and seated within the inner diameter of spring 26 as shown. Snap action member 28 is adapted to freely contact nub 27.

The snap action member is shown in the form of a disc having a domed or arched central portion 31 and a turned

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down edge or rim 32 around the circumference of the disc. Edge or rim 32 freely sits on shoulder 33 of housing component 10.

Spaced from the contact element 24 is a backing element 35 abutting a diaphragm 36. The diaphragm shown here is circular and is held in place by the annular spacer or sealing ring 34 urged by housing component 10 pressing down on the circular edge of the diaphragm. Backing element 35 has a nub 37 which may be the head of a rivet fixed to about the center of element 35. The domed portion 31 of snap action member 28 is adapted to freely contact nub 37 which is also seen to be generally opposed to nub 27.

The snap action member is preferably manufactured from a metal having a thickness, form and inherent resiliency to provide a quick and good snap action. Metallic members will have an extended life and dependable snap-back resiliency. If desired by the practitioner, rigid or semi-rigid resilient members may be made from other materials such as synthetic plastics.

The use and operation of my invention are as follows:

A pressure switch operating, for example, on compressed air may be connected to an air brake system. When the pressure through inlet 15 builds up a sufficient stress on snap action member 28, said member will strain thereunder and arched portion 31 will invert. This change in form will move element 24 to contact posts 16, 17 and 18 to thereby close the circuit. The circuit may activate a particular system such as brake lights.

The particular stress required to deform the member will be removed when the pressure is decreased, and the snap action member 28 will resume its original form. Arched portion 31 of member 28 will snap back to the position shown in FIGURE 1, and the spring 26 will then urge element 24 out of contact with posts 16, 17 and 18.

It is seen that the snap action member 28 provides a sudden contact with the posts when the stress exceeds a certain level, and provides a sudden break of such contact when the stress falls below a certain level. The level of stress which will snap member 28 into deformed position may be selected to meet particular requirements. Also, a different snap action member having various dimensions of thickness, diameter and expanse of the arched portion 31 may be constructed according to the skill and requirements of the art. The inherent elasticity of member 28 will urge the member to resume its original form after the stress is removed.

Nub 37 will be moved with the pressure actuated diaphragm 36 and will apply a stress on snap member 28. The snap action will contact nub 27 fixed to element 24 and move such element into contact with the posts.

It is provided that rim 32 freely sits on annular shoulder 33 of annular housing component 10 since a better snap action is provided. It is further provided that member 28 is adapted to freely contact opposed nubs 27 and 37. Such a disposition of the member also leads to a better snap action. Among the many advantages of such a snap action member is the elimination of electrical arcing between the contact element 24 and posts 16, 17 and 18. Such arcing is a notorious problem when the contact element approaches electrical connectors too closely or too slowly. It will be further apparent that the free placement of the snap action member within the housing results in simpler installation and removal of the member.

The foregoing invention can now be practiced by those skilled in the art. Such skilled persons will know that the invention is not necessarily restricted to the particular embodiments presented herein. The scope of the invention is to be defined by the terms of the following claims as given meaning by the preceding description.

I claim:

1. A pressure operated snap action switch which includes, in combination, a housing, a pressure inlet to the housing, a pressure responsive means in the housing responsive to pressure changes, a contact element spaced from the pressure responsive means, a target contact in the housing, the contact element urged towards the pressure responsive means and away from the target contact, a snap action member intermediate the pressure responsive means and contact element, said member being dimensioned and having a peripheral portion in contact with said housing to close off the contact element to pressure changes developing between the pressure responsive means and said member, said member being deformable by an increased pressure stress to move the contact element against the target contact, and said snap action member being returnable to its original form by inherent resiliency when the pressure is decreased.

2. The switch of claim 1 further characterized in that the snap action member is a disc having a domed central portion, and the disc is seated on means within the housing so that the contact element is closed off to pressure changes between the member and the diaphragm.

3. The switch of claim 1 further characterized in that the snap action disc has a rimmed edge freely seated on a portion of the housing and the centrally domed portion adjoins projections on the contact element and the diaphragm.

4. A pressure operated snap action switch which includes, in combination, a housing having an air pressure inlet, a diaphragm within the housing responsive to pressure changes in the inlet, a contact element within the housing spaced from the diaphragm, a plurality of connector posts, the contact element urged by a spring towards the diaphragm and away from the connector posts, a snap action member within the housing separating the diaphragm and the contact element, said member having a raised central portion and a rimmed edge freely sitting on a portion of the interior of the housing so as to close off the contact element to pressure changes between the snap-action member and the diaphragm, and said raised portion adapted to freely contact extensions from the contact element and the diaphragm, said snap-action

member responding to increased air pressure so that the raised portion is inverted to move the contact element against the connector posts and said raised portion returned to its original form when the pressure is decreased.

5. In a pressure operated switch housing having an air pressure inlet, a diaphragm responsive to air pressure changes, a contact element spaced from the diaphragm, connector posts adjacent the contact element and the contact element biased towards the diaphragm and away from the connector posts, a snap action disk within the housing separating the diaphragm and the contact element, said disk having a domed central portion adapted to freely contact projections on the contact element and the diaphragm, and said member freely seated on an interior portion of the housing so as to close off the contact element to pressure changes occurring between the diaphragm and the snap-action member.

6. An air pressure operated snap action switch which includes, in combination, a housing having an air pressure inlet at one end, connector posts extending into the housing at the other end, said housing containing an air pressure responsive diaphragm next to the pressure inlet, a rigid backing element next to the diaphragm, a fixed nub extending inwardly from the backing element, a contact element spaced from the diaphragm and having a fixed nub extending inwardly, said contact element urged towards the diaphragm and away from the ends of the connector posts, a snap action disc within the housing separating the contact element and the diaphragm, said disc having a domed central portion adapted to freely contact the nubs from the backing element and the contact element, and a rimmed edge freely seated on an interior portion of the housing so as to close off the contact element to pressure changes occurring between the diaphragm and the snap-action member.

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