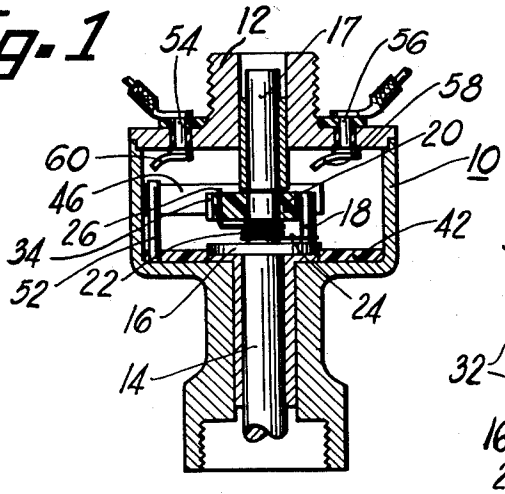
Sept. 21, 1954 J. K. TOM 2,689,892

SWITCH MECHANISM

Filed Dec. 26, 1950

Fig. 1



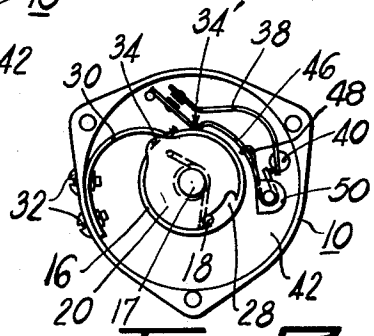


Fig. 3

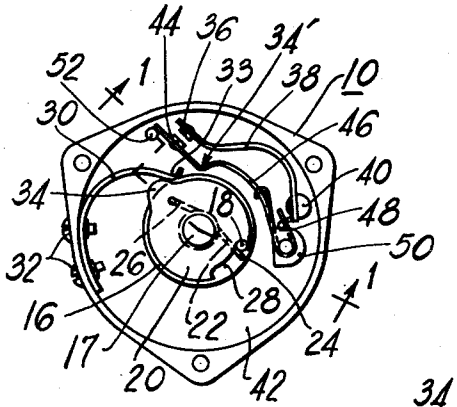


Fig. 2

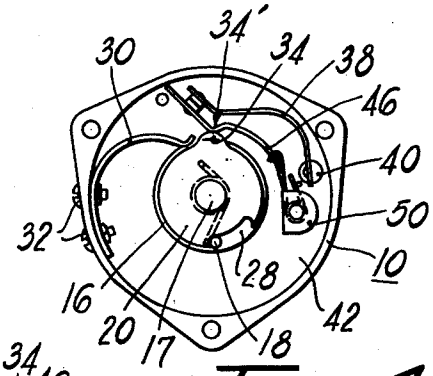


Fig. 4

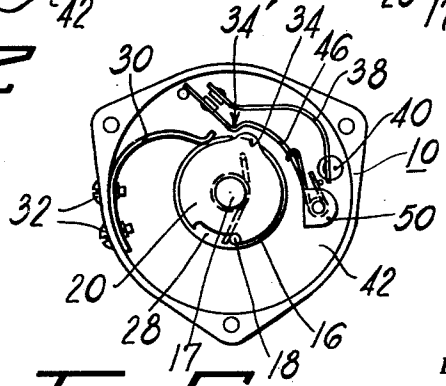


Fig. 5

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SWITCH MECHANISM

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5 Claims. (Cl. 200—74)

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This invention relates to an improved snap switch mechanism adapted for use in the controls of an automotive vehicle for example a brake control mechanism of the vehicle.

An important object of my invention is to provide a switch operating mechanism operable to insure the operation of the switch, preferably a closing thereof, and also operable to insure a fast operation of the switch. Electrical switches of various kinds are now in use and are frequently employed to control the circuit supplying current to the valve operating solenoid of the anti-creep mechanism of an automotive vehicle. However said switches are ofttimes operated by mechanism, such as centrifugally operated weights or fluid pressure responsive means, which is not uniform in operation, for example does not always operate at the same time before or after the vehicle comes to a stop. If pressure responsive means such as a diaphragm operating fluid is used to operate the switch then variations in temperature of the fluid will effect its viscosity and density thereby affecting the time of operation of the switch; and if centrifugally operable means is employed to operate the switch then such a means may be ineffective at low vehicle speeds and may not be sensitive enough for an effective operation of the switch.

It is accordingly an object of my invention to provide a switch mechanism wherein the switch of the mechanism is both certain of operation and certain of a speedy operation. The latter feature of my invention insures a switch mechanism which is free of the deleterious effects of excessive arcing of the switch.

My invention also contemplates the provision of an effective snap acting mechanism especially adapted for use in electrical switches.

It is another object of my invention to provide a simple, compact, and effective switch mechanism of relatively few parts and thereby capable of being easily serviced and constructed at a minimum of cost.

The above and other objects and features of my invention will appear more fully hereinafter from a consideration of the following description taken in connection with the accompanying drawing wherein one embodiment of the invention is illustrated by way of example.

Figure 1 is a longitudinal sectional view of the switch mechanism of my invention taken on the line 1—1 of Figure 2;

Figure 2 is a plan view of the major portion of the switch mechanism of my invention the parts thereof being in their positions just prior to a switch closing operation of the mechanism;

Figure 3 is a view similar to Figure 2 disclosing the switch operating cam member and associated parts in their cam cocked position;

Figure 4 discloses the position of the parts of

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the mechanism during the operation of the cam to close the switch; and

Figure 5 discloses the parts of the mechanism just after the operation of the switch has been completed.

Referring now to the figures of the drawing disclosing a preferred embodiment of my invention there is disclosed in Figure 1 a casing comprising a cup shaped body portion 10 and a cap member 12 the base portion of the body member being bored to receive a switch operating driving member 14 preferably a rotatable two diametered shaft of suitable material. To this driving member 14 there is secured a flange 16 having a driving pin 18 extending laterally therefrom. A switch operating driven member, preferably a cam member 20 constructed of electrical non-conductive material, is rotatably mounted on the smaller diametered portion 17 of the shaft 14 and parallel to the flange 16; and this cam member is recessed at 28 to receive the upper end of the pin 18. The recess 28 of the cam, together with cooperating parts of the switch operation mechanism, insures a certain desired lost motion operation of the mechanism which operation will become evident from the description to follow.

A coil spring 22 or other suitable yieldable member is sleeved over the shaft 14 one end 24 of the spring being biased into abutment with the pin 18 and the other end 26 of the spring being secured to the cam member 20. It follows therefore that the spring 22 is preloaded prior to assembling the parts of the mechanism. This spring 22 provides a yieldable connection between the driving and driven members of the switch operating mechanism of my invention. Completing the description of the switch operating portion of the switch mechanism of my invention a yieldable stop member 30, stronger than the spring 22, is secured at 32 to the switch casing, and said stop member is preferably crimped at its end to provide a portion 33 which is contacted by a lobe portion 34 of the cam 20.

Describing now the switch portion of the mechanism of my invention a fixed switch contact member 36 is secured to a yieldable member 38 which is secured at one of its ends to a post 40 secured to a member 42, Figure 1, of electrical non-conductive material such as Bakelite. The movable contact 44 of the switch mechanism is secured to a member 46 which is in turn yieldably secured, by a spring 48, to a post 50 which is secured to the member 42. The spring 48 serves to bias the contact support member 46 downwardly, Figures 2 to 5 inclusive, into contact with a stop 52 which is secured to the member 42. The contact support members 38 and 46 and the posts 40 and 50 are preferably of electrically conductive material thereby providing means for circuiting the flow of electricity through the switch mechanism.

The switch portion of the switching mechanism of my invention also includes the cap member **12** detachably mounted on the switch body portion **10**, said cap member serving as a support for contact posts **54** and **56**. To the post **56** there is secured an electrical conductor **58** which contacts the post **40** and to the post **54** there is secured an electrical conductor **60** which contacts the post **50**.

Describing now the operation of the mechanism of my invention it is to be remembered that the spring **22** is preloaded accordingly the end portion **24** thereof is biased into abutment with the driving pin **18** and the end portion **26** serves to bias the cam **20** into abutment with said pin, the flange **16**, pin **18**, cam **20**, and spring **22**, taking the relative positions disclosed in Figure 2; and it will now be assumed that the shaft **14** has been rotated until the cam lobe **34** strikes the end portion **33** of the stop **30**. Now it is to be remembered that the yieldable stop **30** is stronger than the spring **22** accordingly a continued rotation of the drive shaft **14** serves to place the parts of the mechanism in the position disclosed in Figure 3 wherein the preloaded spring **22** is further cocked and the pin **18** is nested within the left hand corner of the recess **28**.

Continued rotation of the drive shaft will then force cam **20** to rotate, the stop member **30** yielding to permit this operation; and after the cam lobe **34** has cleared end **33** then the cocked spring **22** will operate to quickly rotate the cam relative to the flange **16** until the pin **18** is nested within the right hand end portion of the recess **28** as disclosed in Figure 5. Now this trigger like operation or snap action serves to momentarily close the switch **36**, **44** this closing operation being disclosed in Figure 4 of the drawing. The closing is however quite momentary inasmuch as the spring **48** biases the contact support member **46** into contact with the stop **52** and when said member is in this position the contacts **36**, **44** are spaced from each other as disclosed in Figure 2.

After the switch closing operation has been completed, that is after the lobe **34** has rotated past a portion **34'** of the member **46**, the parts assume the switch open position disclosed in Figure 5; and continued rotation of the drive shaft will then rotate the cam, the shaft and cam moving as a unit; and this rotation continues until the parts again assume the positions disclosed in Figure 2.

There is thus provided an effective snap action switch mechanism which is, by virtue of the fast rotation of the cam relative to the flange **16** and the spring like operation of the support member **46**, certain of operation whether the switch **36**, **34** be opened or closed by said operation. The switch disclosed in the drawings is closed by the operation of the mechanism however said switch might be constructed to be opened by said operation. Suffice it to say that the switch mechanism of my invention is cheaply constructed, easily serviced, is effective and provides a switch mechanism wherein the switch is both certain of operation and quick of operation.

Although only one embodiment of my invention has been illustrated and described various changes in form and relative arrangement of parts may be made to suit requirements.

I claim:

1. An electrical switch mechanism comprising a casing, a switch mechanism mounted in the casing, and means within the casing for operating the switch mechanism including rotatably mounted driving means including a driving shaft and a flange member secured to the shaft, switch operating driven means rotatably mounted on the driving means, and means providing a lost motion connection between the two means including a coiled spring operatively connected to the flange member operable, after being cocked, to effect a relatively rapid movement of the driven means with respect to the driving means in the operation of operating the switch.

2. An electrical switch mechanism comprising a casing, switch means mounted within the casing and snap acting switch operating means within the casing including a drive shaft and a flange member secured to the shaft, a switch operating cam rotatably mounted on the shaft, and means, including a preloaded coil spring having one of its ends secured to the cam and the other of its ends operably connected to the flange member, providing a yieldable driving connection between the drive shaft and cam.

3. An electrical switch mechanism comprising a casing, switch means mounted within the casing, and snap acting switch operating means within the casing including a drive shaft, a driving flange secured to the shaft, a drive pin secured to the flange, a switch operating cam rotatably mounted on the shaft, and means, including a preloaded coil spring having one of its ends secured to the cam and the other of its ends abutting the pin, said means providing a yieldable driving connection between the drive shaft and cam.

4. In an electrical switching apparatus, a casing, and switch operating mechanism within the casing including driving means rotatably mounted within the casing, a switch operating driven member rotatably mounted on the driving member, means constituting a drive connection between the driven member and driving means, said connecting means including a pin mounted on a portion of the driving means and further including a yieldable means having one of its ends abutting the pin and the other of its ends secured to the driven member, together with yieldable stop means stronger than the yieldable means, said stop means cooperating with the yieldable means to control the operation of the driven member.

5. An electrical switching apparatus including a casing and switch operating mechanism within the casing including driving means rotatably mounted within the casing, a switch operating driven member rotatably mounted on the driving member, means constituting a drive connection between the driven member and driving means, said connecting means including a pin mounted on the portion of the driving means and further including a coil spring mounted on a portion of the driving member said spring having one of its ends secured to the driven member and the other of its ends abutting the pin, together with yieldable stop means stronger than the coil spring said stop means cooperating with the coil spring to control the operation of the driven member.

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