Aug. 28, 1956 H. B. PEABODY 2,761,029

DOUBLE THROW MOMENTARY CONTACT SWITCH

Filed July 1, 1954

Fig. 1

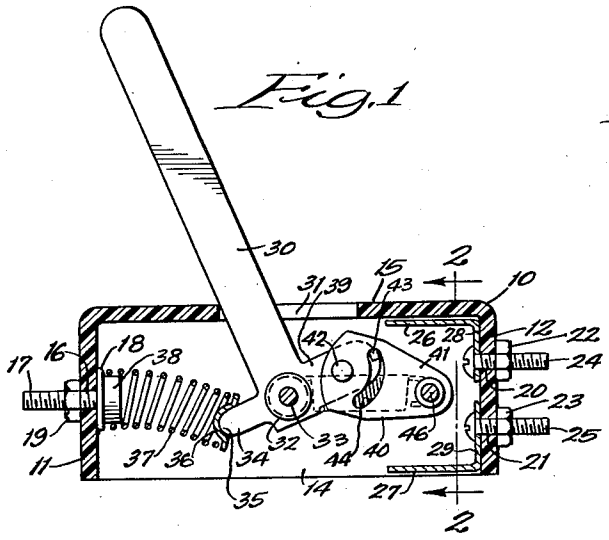


Fig. 2

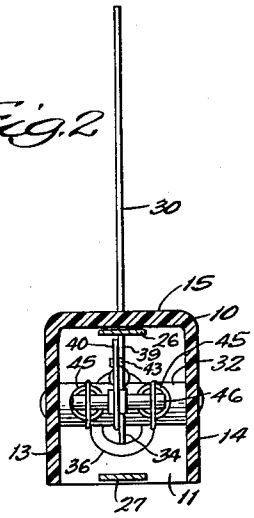


Fig. 3

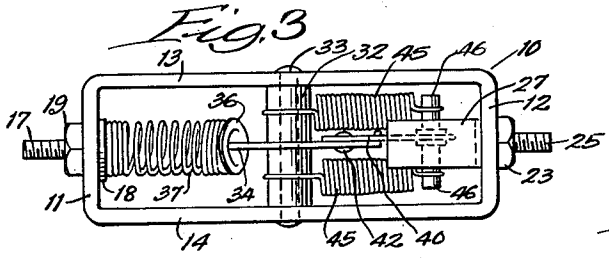


Fig. 5

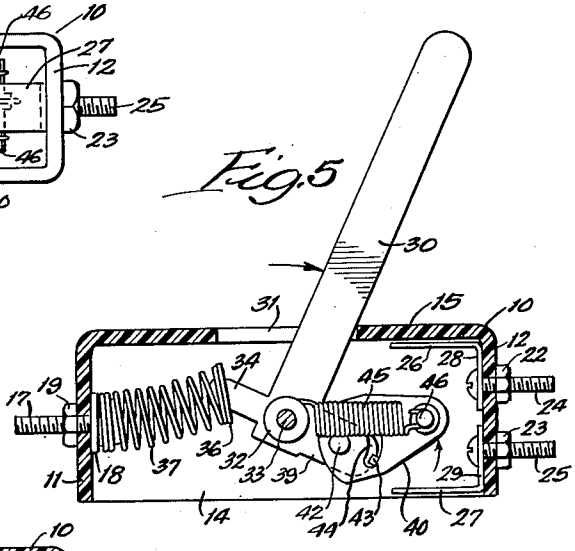
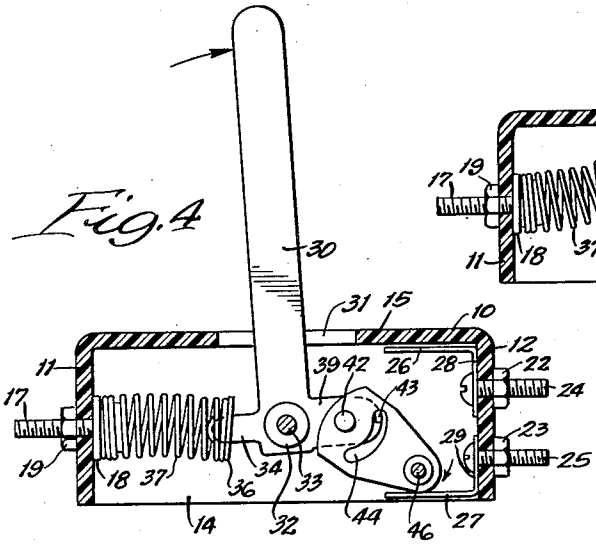


Fig. 4



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United States Patent Office

2,761,029

Patented Aug. 28, 1956

2,761,029

DOUBLE THROW MOMENTARY CONTACT SWITCH

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Application July 1, 1954, Serial No. 440,610

6 Claims. (Cl. 200—67)

This invention relates to a double throw, momentary contact switch and it is an object of this invention to produce a double throw switch which makes contact for electrical circuit momentarily alternatively between two separate and independent circuits for use in the operation of solenoids and the like operating members in a communication or transportation system, such as model railroads. While the switch mechanism embodying features of this invention is particularly adapted for solenoid operation in model railroading, it will be understood that momentary contact double throw switches of the type which will hereinafter be described may be used for other switch or current control purposes.

It is another object of this invention to produce a momentary contact switch of the type described in which the contacting members are brought into contacting relation one with another in a manner to insure the completion of a circuit.

These and other objects and advantages of this invention will hereinafter appear and for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the acompanying drawing in which—

Figure 1 is a sectional elevational view lengthwise through the contact device illustrating the arrangement of parts embodying features of this invention;

Figure 2 is a sectional elevational view taken along the line 2—2 of Figure 1;

Figure 3 is a view from the bottom side of the switch mechanism shown in Figure 1;

Figure 4 is a sectional elevational view similar to that of Figure 1 showing the arrangement of parts during an intermediate portion of the operating cycle, and

Figure 5 is a sectional elevational view similar to that of Figure 1 showing the arrangement of parts upon completion of the operating cycle.

A momentary contact, double throw switch embodying features of this invention comprises a rectangular housing **10** formed of insulation material, such as plastics or the like, having forward and rearward end walls **11** and **12** respectively, side walls **13** and **14**, and a top wall **15**.

One end wall **11** is formed with an opening **16** in the central portion thereof through which the threaded shank **17** of a bolt extends with the head portion **18** adjacent the inner wall and in which a nut member **19** threadably engages the threaded end portion **17** to secure the bolt in position of use as a lead-in post for the electrical circuit. The other end wall **12** is formed with a pair of vertically disposed spaced openings **20** and **21** in the central portion thereof each of which similarly receives a nut and bolt member **22** and **23** to form spaced outlet posts **24** and **25** respectively. Contact plates in the form of strips of electrical conductive material extend forwardly in vertically spaced apart relation adjacent the top and bottom of the housing. The upper plate **26** is connected to the upper contact post **24** and the lower plate **27** is connected to the lower contact post **25** as by means of a portion **28** downturned

from the edge of the upper plate which is received in contacting relation between the head of the bolt **22** and the inside wall of the housing. The lower plate **27** is similarly formed with an upturned end portion **29** which is received in contacting relation between the head of the lower bolt **23** and the housing.

An elongate operating handle **30** which extends downwardly through an elongate longitudinally disposed slot **31** in the central portion of the top wall **15** of the housing is secured at its lower end upon a hub **32** which is mounted for rotational movement on a shaft **33** which is fixed at its ends to the side walls of the housing for extension crosswise of the housing through the central portion thereof. Extending rearwardly from the lower end portion of the operating handle is an arm **34** having a rounded end portion **35** which is adapted to be received in a cup plate **36** fixed to the end of a compressed coil spring **37** having its other end portion anchored about a stud **38** extending inwardly from the head of the inlet contact post **17**. Thus the spring **37** functions to urge the arm to rock towards its extreme rearward or forward position of adjustment responsive to displacement of the end portion **35** of the arm above or below the center line of the spring.

Another arm **39** which extends forwardly from the lower end portion at the pivot of the operating handle **30** pivotally mounts a rocker plate **40** on the end portion thereof for rocking movement independent of the handle between an upper and a lower contacting position of adjustment. The rocker plate comprises a rounded plate having a triangularly shaped forwardly extending rounded end portion **41**. A post **42** extending laterally from an intermediate portion of the arm **39** is received in an opening in the rearward end portion of the rocker plate for pivotally mounting same on the operating handle. Pivotal movement of the plate **40** between its upper contact position and its lower contact position is controlled by a stop pin **43** extending laterally from the end portion of the arm **39** into a curvilinear slot **44** in the rocker plate having its pivot at about the center of curvature of the slot.

The rocker plate is resiliently urged into one or the other of its positions of adjustment as by means of a pair of coil springs **45** arranged in parallel relation on each side of the rocker plate **40** having one end anchored onto stub shafts **46** extending laterally in opposite directions from the forward end portion of the rocker plate while the other end is anchored on the hub **32** of the operating handle.

Having described the construction, illustration will now be made of the operation to effect momentary contact between the rocker plate **40** and the contact plates **26** and **27**.

When starting with the elements arranged as shown in Figure 1 of the drawing with the operating handle **30** in its rearward position of adjustment, the rocker plate **40** will be in its lower contacting position but out of contact with any of the plates **26** or **27**. In this position, the coil spring **37** resiliently urges the operating handle in the direction toward its rearward position of adjustment and the coil springs **45** function to urge the rocker plate resiliently towards its bottom plate contacting position limited by the stop **43** in the upward end portion of the curvilinear slot **44**.

As the operating handle **30** is displaced manually forwardly, the rocker plate **40** is carried more or less as an integral part with the arm **39** until the curvilinear end portion **41** engages the bottom contact plate **27** to complete the circuit through to the bottom terminal **25**, as illustrated by the position of the parts in Figure 4 of the drawings. As the displacement of the operating handle **30** is continued forwardly, the end portion of

the plate is stopped against any further downward movement by the contacting plate 27 so that the arm 39 is positively shifted independently relative thereto whereby the pin 43 is displaced downwardly through the slot 44 as the rocker plate 40 is rocked about its pivot 42. During the initial portion of such relative movement, the rocker plate 43 is displaced endwise while in resilient engagement with the bottom contact plate 27 thereby to improve the contacting relation therebetween for completing the electrical circuit.

As the pin 43 passes beyond the center of the slot 44, the springs 45 shift their load to the opposite side of the pivot 42 with the result that the rocker plate 43 is snapped automatically upwardly into its upper contacting position, responsive to the resilient forces effective from the springs. This then removes the curvilinear end portion 41 of the rocker plate from the lower contact plate 27 to maintain a spaced relation therebetween even when the operating handle is adjusted to its full forward position, as illustrated in Figure 5. When in this new position, the rocker plate becomes prepositioned automatically in its upper plate contacting position so that it will engage the upper contact strip 26 with the described frictional sliding engagement under load. During the initial portions of the return movement of the operating handle 30 to its original position the pin 43 will be displaced upwardly in the slot 44 until it passes beyond the center, whereupon the spring means take over again automatically to cause the rocker plate to snap out of contact with the upper strip 26 and into its lower plate contacting position.

It will be apparent from the foregoing that I have provided a simple and efficient means for establishing momentary contact wtih one of two contact positions alternatively and that means are provided for insuring that a contacting relation is established with the plates during actuation of the operating handle.

It will be understood that changes may be made in the details of construction, arrangement and operation and in the means for mounting the various members for rocking movement within the switch housing and that other means may be employed for resiliently urging the various elements to their operating positions without departing from the spirit of the invention, especially as defined in the following claims.

1. A double throw, momentary contact switch comprising a housing, an operating handle mounted for shifting movement between a rearward and forward position about an axis in the housing, an arm rigid with the operating handle and extending substantially perpendicularly from the axis of rotation thereof, a rocker plate pivotally mounted on the arm for rocking movement relative thereto between an upper contacting position and a lower contacting position in which positions the end portions of the rocker plate is offset in the respective directions from alignment with the pivot, means resiliently connecting an outer end portion of the rocker plate with the operating handle in alignment with its pivot whereby the rocker plate is urged to rock from one contacting position to the other in response to displacement of the end portion mounting the resilient means from one side to the other over its pivot, and a pair of contact plates spaced one from the other by an amount to be engaged by the rocker plate during an intermediate portion of the movement of the operating handle from one position to the other whereby the rocker plate is turned about its pivot on the arm in the opposite direction relative the arm on the operating handle during continued movement of the operating handle until the end portion mounting the resilient means is offset in the opposite direction from the pivot whereby the rocker plate snaps towards its other contacting position out of contact with the plate.

2. A double throw, momentary contact switch comprising a housing, a T-shaped operating handle mounted for shifting movement between a rearward and forward position about an axis in the housing intermediate the arms of the T, a rocker plate pivotally mounted on one of the arms for rocking movement relative thereto between an upper contacting position and a lower contacting position in which positions the end portion of the rocker plate is offset in the respective directions from alignment with the pivot, means resiliently connecting the outer end portion of the rocker plate with the operating handle in alignment with its pivot whereby the rocker plate is urged in the direction towards one of its contacting positions corresponding to the direction of offset of the end portion mounting the resilient means from the rocker plate pivot, and a pair of contact plates spaced one from the other by an amount to be engaged by the end portion of the rocker plate during an intermediate portion of the movement of the operating handle from one position to the other whereby the rocker plate is turned about its pivot in the opposite direction relative the arm during continued movement of the operating handle until the end portion mounting the resilient means is offset in the opposite direction from the pivot whereby the rocker plate snaps in the direction toward its other plate contacting position out of contact with the plate.

3. A double throw switch as claimed in claim 2 in which a compression spring means operatively engaging the other arm of the T-shaped handle resiliently urges the operating handle in the direction corresponding to the direction of the operating handle to one side or the other of the center of its movement between said positions.

4. A double throw switch as claimed in claim 1 in which the resilient means urging the rocker plate to its upper and lower contacting positions comprises a coil spring anchored at one end onto an end portion of the rocker plate and at the other end upon the operating handle substantially in alignment with its axis.

5. A double throw, momentary contact switch as claimed in claim 1 which includes means for limiting the movement of the rocker plate between its upper contacting position and its lower contacting position.

6. A double throw, momentary contact switch as claimed in claim 5 in which the means for limiting the movement of the rocker plate between its positions of adjustment comprises a pin in one extending into a curvilinear slot in the other for operative engagement therebetween.

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