July 29, 1952 W. J. ZENNER 2,605,366

CONTACT ASSEMBLY

Filed Jan. 13, 1949

FIG. 2

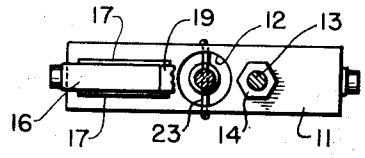


FIG. 4

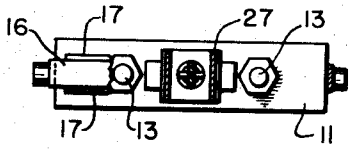


FIG. 1

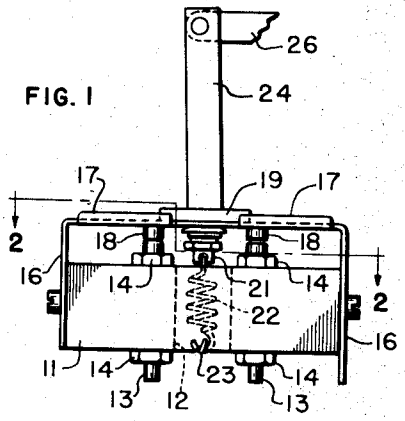


FIG. 3

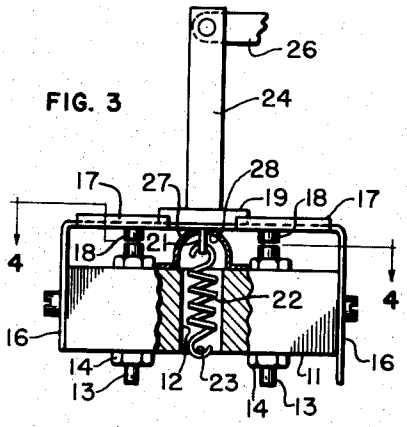


FIG. 5

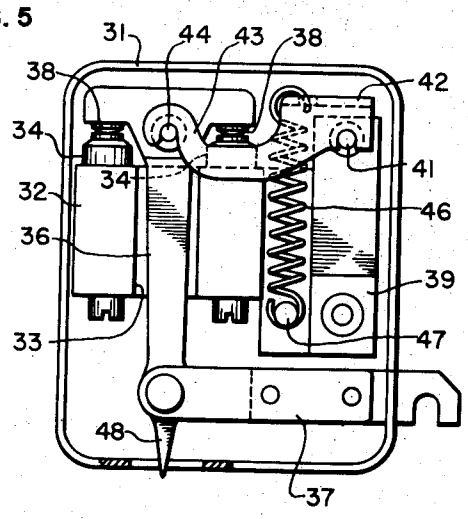
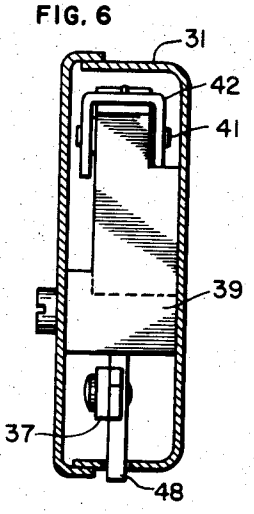


FIG. 6



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UNITED STATES PATENT OFFICE

2,605,366

CONTACT ASSEMBLY

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Application January 13, 1949, Serial No. 70,730

1 Claim. (Cl. 200—6)

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The present invention relates to electric switches, and more particularly to an improved type of electric switch for high speed operation.

The usual type of electric switch operates with a pivoted member being moved from engagement with one or the other of two contact points by some suitable operating means. Such a switch is satisfactory for many purposes, but when used as transmitting contacts in a telegraph system it does not operate satisfactorily. The main reason that the operation is not satisfactory for such use is that when the pivoted member is moved at high speed the contact made with its contact points will not be a good one, but bounce, arcing and vibration will occur, resulting in poor signals being transmitted over the telegraph system. Further, this causes pitting of the contact points in a short period of time, necessitating replacement thereof.

Accordingly, an object of the invention is to provide an electric switch which will operate satisfactorily at high speeds.

A second object of the invention is to provide an electric switch which when operated at high speeds will not bounce, arc, or vibrate.

Another object of the present invention is to provide an electric switch which will require a minimum of maintenance and replacement.

The primary cause for such bounce and vibration is because the movable member pivots about a point external from the contact points which it engages.

Thus, a still further object of the present invention is to provide an electric switch wherein the movable member does not pivot about an external point.

A still further object of the present invention is to provide an electric switch wherein the movable member pivots about the contact point with which it is placed in engagement.

The electric switch comprises generally a movable member or contact carrier, which when moved to engagement with one or the other of two stationary contact points, will be fulcrumed about the stationary contact point of the contact pair to be closed.

A full understanding of the apparatus and its operation may be had by reference to the following detailed description, when read in conjunction with the accompanying drawings, wherein

Fig. 1 is a front elevational view of one embodiment of the electric switch forming the invention;

Fig. 2 is a view, partly broken away, taken along the line 2—2 of Fig. 1;

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Fig. 3 is a front elevational view, partly broken away, showing a second embodiment of the invention;

Fig. 4 is a view taken along the line 4—4 of Fig. 3;

Fig. 5 is a front elevational view of a third embodiment of the invention; and

Fig. 6 is a side elevational view taken looking toward the left of Fig. 6.

Referring now to Figs. 1 and 2, a first embodiment of the invention is illustrated and comprises a block 11 of non-conducting or insulating material which is formed with a central bore 12 and two other bores, not illustrated, but through which pass conducting pins 13. The pins 13 are held in position by any suitable means, such as by the threaded members 14 at both the top and bottom of the block 11. The upper portion of the conducting pins 13 form stationary contact points.

Secured to the exterior of the block 11 by any suitable means is a continuous strap 16 which is formed with upturned edges 17 at two places thereof and is made of conducting material. A pair of contact points 18 are secured by any suitable means, such as soldering, to the underside of the strap 16 in appropriate positions to overlie, but not engage, the contact points formed by the upper surface of the pins 13.

An insulating block 19 is secured to the midsection of the strap 16 with respect to the block 11 in such a manner that it overlies the central bore 12 and has its extremities extending within the channel or upturned edge sections 17 of the strap 16. The block 19 is secured to the strap 16 by means of a suitable bolt 21, to the lower extremity of which is connected one end of a spring 22, the opposite end of which is fastened by a pin 23 which extends across the lower surface of the block 11. The spring 22 is sufficiently strong to urge the contact points 18 toward their associated stationary contact points but engagement is not made because of the contour of the strap 16.

Secured to the block 19 is a lever 24 of insulating material, to which is pivotally connected the contact operating lever 26, only a portion of which is shown. This latter lever 26 may be operated by any suitable means, depending on the use of the electric switch. One specific application of the instant electric switch may be as the transmitting contacts of the telegraph keyboard transmitter illustrated and described in copending application Serial No. 95,964, filed on May 28, 1949, in the name of W. J. Zenner. In such use the

lever 26 will correspond to the lever arm 112, shown in Fig. 2 of the noted application.

In Fig. 1 the switch is illustrated in a position with the left movable contact 18 in engagement with the stationary contact formed by the upper surface of the left-hand pin 13. If it be assumed that the members are being moved toward the illustrated position, it may be seen that as the lever 26 urges the lever 24 toward the left the mentioned contact points will engage each other through the application of force by the block 19, with the spring 22 keeping them in engagement with each other. As the lever 24 moves further toward its maximum travel the pressure of the contact 18 at the fulcrum point, which is the engaged contact points, will be greater increasing the tendency for the two contact points to remain in engagement.

If the succeeding telegraph impulse is such that the right-hand contact points should be in engagement the arm 26 will be moved toward the right, Fig. 1, with the lever 24 being moved similarly. Under this condition the right-hand movable contact 18 will engage its stationary contact point formed of the upper surface of the right-hand pin 13. As the two contact points engage they will become the fulcrum point for the moving member with respect to the stationary member, the contact points remaining in engagement from the initial engagement thereof, with no bounce or vibration occurring.

From the above description it may be seen that the present electric switch will operate to prevent any bounce, chattering, arcing, or vibration of the contact points once closed. This is true, not only for telegraph application, but for any use of the switch.

A second embodiment of the invention is illustrated in Figs. 3 and 4. As many of the elements of the latter disclosure are similar to those used in the first embodiment, similar identifying numerals will be used where possible, and similar elements and operations will not be described in detail.

The basic difference between the two embodiments is that the second one utilizes a dome-shaped support 27 intermediate the strap 16 at the point of connection with the block 19 and the block 11. The support 27 is formed with a circular opening 28 at the top thereof, through which the connecting pin 21 for the block 19, strap 16, and spring 22 extends. The support 27 is of sufficient height to prevent either of the contact pairs to be in engagement when the lever 24 is in a neutral position.

If it be assumed that the lever arm 26 is operated to move the lever 24 to make engagement of either of the contact pairs, the strap 16 and block 19 will ride over the curved upper surface of the support 27, but the fulcrum point for the members will still be at the closed contact pair. In this way there will still be no bounce, chattering or vibration at the closed contact pair.

A third embodiment of the invention is shown in Figs. 5 and 6, which, while formed of somewhat different mechanical elements, still utilizes the same principle of operation.

Referring now to these figures, it may be seen that an appropriate casing 31 is provided which houses a block 32 of insulating material having a central bore 33. The block 32 is also provided with two other bores through which pass and are secured two conducting pins 34, the upper surfaces of which form stationary contact points.

Extending through the central bore 33 of the block 32 is a T-shaped lever 36 which has an operating lever 37 mounted pivotally at the lower extremity thereof. A contact point 38 is secured to the underside near each extremity of the portion of the lever 36 forming the T, each of the contact points 38 being associated with one of the contact points formed by the upper surface of the pins 34.

A bracket 39 is secured to the casing 31 supporting a shaft 41 on which is mounted pivotally a U-shaped member 42 which is formed with an extending arm 43. The opposite extremity of the arm 43 is formed in a semi-circle and partially surrounds a pin 44 extending from the T-lever 36. A spring 46 is secured to the U-shaped member 42 and extends to a pin 47 on the bracket 39. The spring 46 is so connected that the U-shaped member 42 and the arm 43 will be urged normally in a counterclockwise direction, Fig. 5, urging the contact points 38 toward their associated contact points formed by the upper surface of the pins 34. The pin 44 should preferably extend from a central point of the T-lever 36 in order that a balanced pressure may be exerted with respect to both of the contact points 38.

The embodiment of Fig. 5 is illustrated with both the contact pairs closed. However, in actual practice the operating lever 37 will normally be held in such a position that only one contact pair will be closed at one time.

The embodiment illustrated in Figs. 5 and 6 operates similarly to the other two embodiments. The spring 46 normally urges the arm 43 in a counterclockwise direction, tending to exert pressure to close the contact pairs. The operating lever 37 will be in one of its two positions, or moving from one to the other, which causes the T-lever 36 to be positioned in such a manner as to cause one of the contact points 38 to fulcrum about its associated contact point formed by the upper surface of the pin 34. As a change of selection is made in the operating lever 37 the T-lever 36 will be moved from one position to the other, and as the lever 36 is not pivoted about an external point it will fulcrum about the contact pair which is desired to be closed. In this manner bounce and vibration will again be eliminated.

The spring 46 further performs the function of acting as a damper for the contact points and T-lever 36. Once the T-lever 36 has been moved and a contact pair closed, there may be some tendency for the contact pair to vibrate and be opened. However, for this to occur it is necessary that the spring 46 be extended, and as the bounce is normally not of sufficient energy to cause this it will not occur.

Further, it is desirable that the T portion of the T-lever 36 be constructed of a heavy mass. The purpose of such construction is that once the T-lever 36 is moved to one of its operated positions the heavy mass is more likely to cause the contact pairs to remain in a closed position than if a light mass element was used.

The T-lever 36, Fig. 5, has been illustrated as being formed with its lower extremity in the shape of a pointer 48. This has been done in order to provide a rapid means of adjustment of the contact pairs, as at 38. The T-lever 36 may be operated normally to its two limits of movement, to the left and right, with the maximum points of the movement of the pointer 48 being noted. It will then be possible to position the pointer 48 at the midpoint of its maximum

travels, with adjustments being made so that such would be a normal unoperated position. It is obvious from the above that any other desired setting of adjustment may also be made, if predicated on the movement of the pointer 43.

It should again be mentioned that in all of the disclosed embodiments the movable member or contact lever is not pivoted about any permanent pivot point but instead the fulcrum point of its movement will be about the contact pair which is being closed at that time.

In the telegraph application of the present electric switch one of pins 13 or 34 will be connected to positive battery and the other pin 13 or 34 will be unconnected, with the signal output being taken from the strap 16 or the T-lever 36, depending on the embodiment utilized. If it is desired to use polar signaling the second pin 13 or 34 will be connected to negative battery. It is obvious, however, that electrical connections may be made to any suitable point depending on the use desired.

It may be further noted that as the actuating lever is operated to open one contact pair and close the other one there will be an interval in the travel that both of the contact pairs will be closed. However, this will not have any adverse effect on the use in the telegraph application. If such becomes undesirable for other uses the support 27 of Figs. 3 and 4 may be designed of a suitable height to prevent this from occurring.

While the instant invention has been described in specific embodiments and for utilization with particular apparatus, it is obvious that it could be incorporated in or with apparatus of other types where similar needs are present or desired, and further is not to be limited to the specific embodiments shown but for any embodiments within the scope and spirit of the invention.

What is claimed is:

In a high speed electric switch, in combination, a casing, bracket means secured to said casing, a pair of stationary contacts secured to said bracket means, an arm mounted pivotally to said bracket means, a T-lever mounted floatably within said casing and engaged by said arm, a pair of contacts mounted on said T-lever for engagement with said stationary contacts, a tension spring connected between said bracket means and said arm for exerting a force on said arm in such a manner as to urge said T-lever contacts toward engagement with said stationary contacts, and operating means for said T-lever for imparting movement thereto for causing said T-lever to fulcrum about one or the other of said stationary contacts by engagement therewith of one said T-lever contacts, whereby a contact pair is closed, and bounce and vibration between said closed contact pair are eliminated, said operating means retaining said closed pair of contacts in such condition until operated subsequently to close the other pair of contacts.

WALTER J. ZENNER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,736,746	McShane	Nov. 19, 1929
2,182,977	Werner	Dec. 12, 1939

FOREIGN PATENTS

Number	Country	Date
613,413	Great Britain	Nov. 29, 1948