June 24, 1930. T. R. MARTIN 1,766,526

ELECTRIC SWITCH

Filed April 9, 1928 3 Sheets-Sheet 1

Fig. 1.

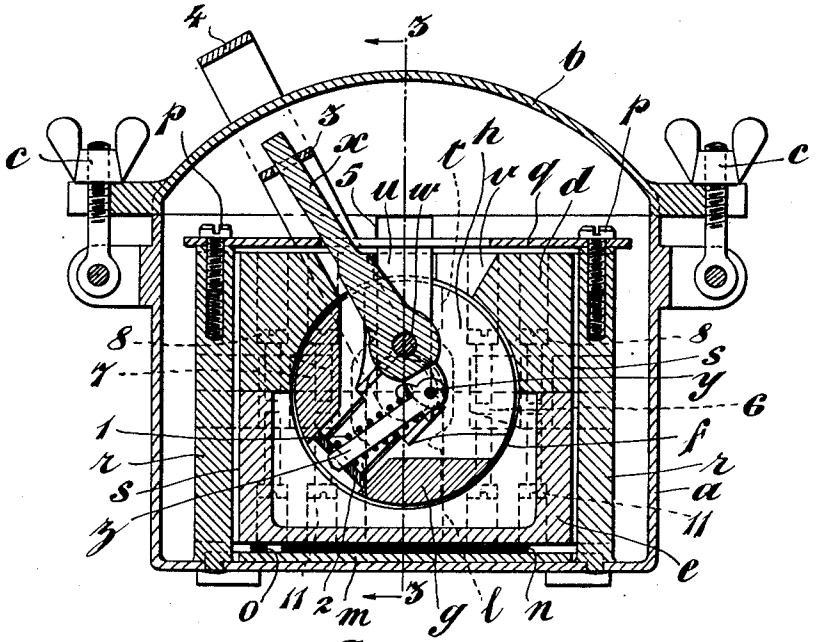
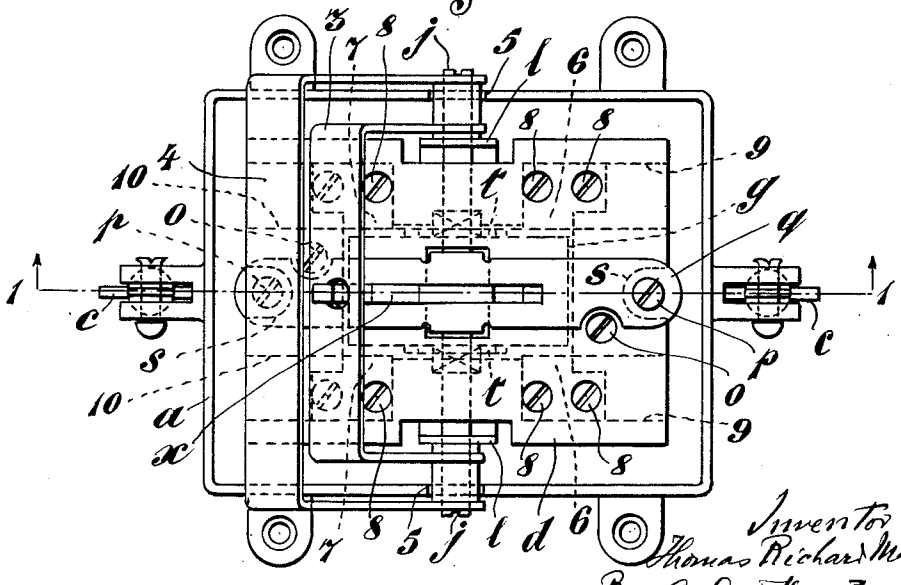


Fig. 2.



Inventor:
Thomas Richard Martin,
By Alfred Hume
his Atty.

June 24, 1930. T. R. MARTIN 1,766,526

ELECTRIC SWITCH

Filed April 9, 1928 3 Sheets-Sheet 2

Fig. 3.

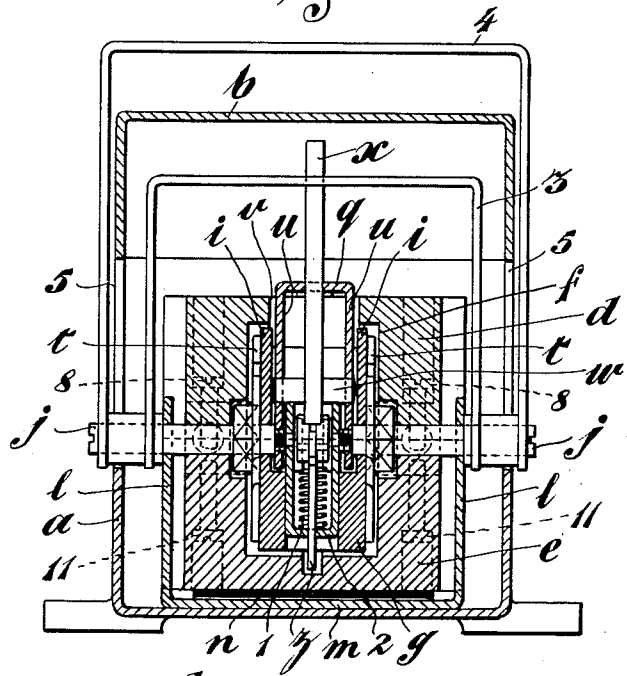


Fig. 4.

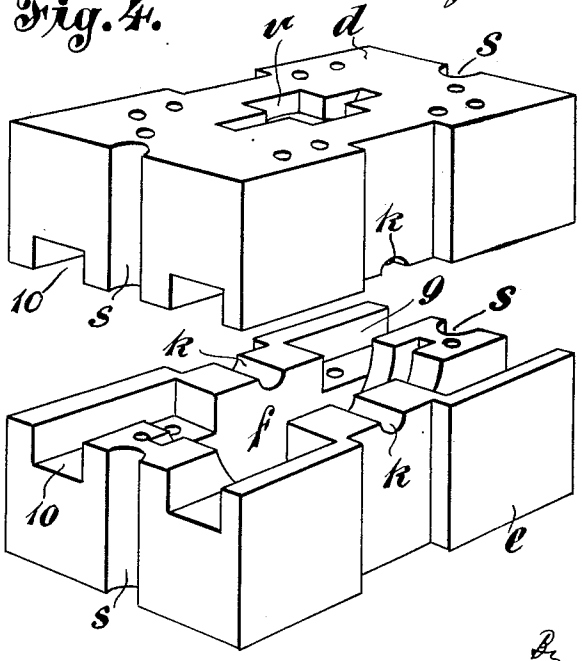
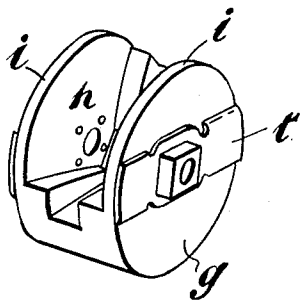


Fig. 5.



Inventor;
Thomas Richard Martin
By
his Atty

June 24, 1930. T. R. MARTIN 1,766,526

ELECTRIC SWITCH

Filed April 9, 1928 3 Sheets-Sheet 3

Fig. 6.

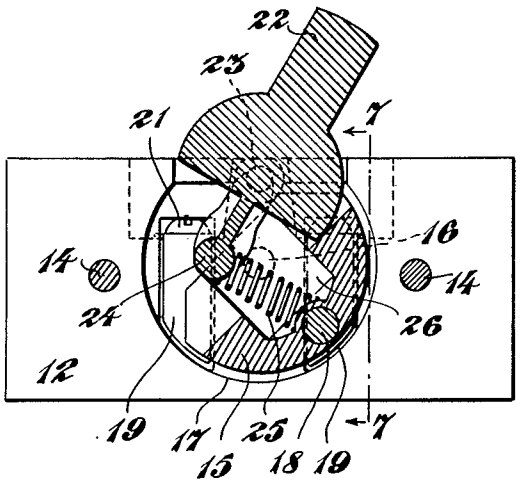


Fig. 7.

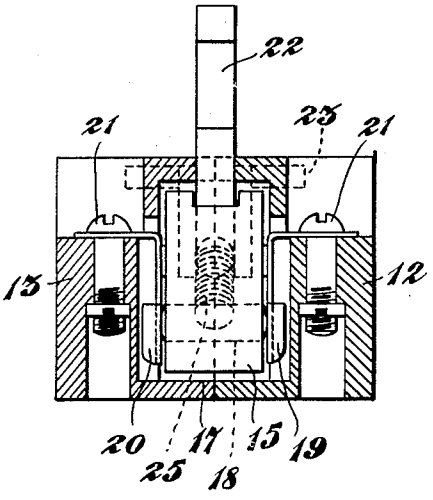
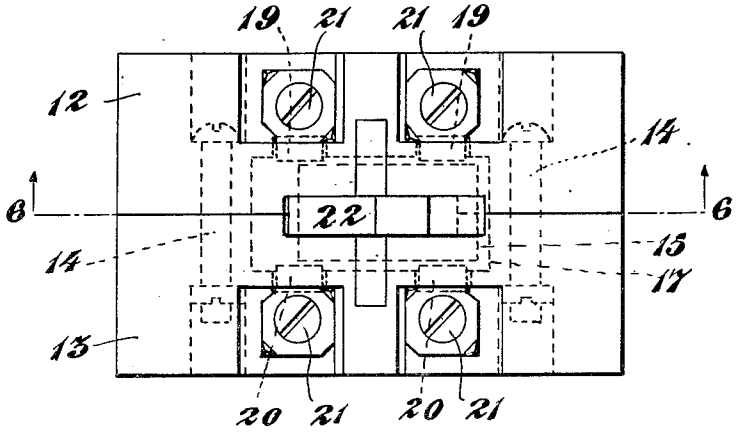


Fig. 8.



Inventor:
Thomas Richard Martin
By Clifford Shenton
his Atty.

Patented June 24, 1930

1,766,526

UNITED STATES PATENT OFFICE

THOMAS RICHARD MARTIN, OF TYSELEY, BIRMINGHAM, ENGLAND

ELECTRIC SWITCH

Application filed April 9, 1928, Serial No. 268,649, and in Great Britain May 21, 1927.

This invention has reference to improvements in electric switches, and is applicable to different types of switch, for example, ironclad switches, tumbler switches, and plug switches.

The object of the invention is to provide an arrangement and mounting for the movable contacts of the switch which shall reduce to a minimum the possibility of arcing or sparking in the action of making and breaking contact, and which further results in a substantial encasement both of the contacts and also of the operating mechanism within an insulated internal chamber in the switch housing.

This invention consists of an electric switch wherein the movable contacts are mounted upon or within or relative to a co-operating rotary member formed of insulating material, the said parts of the switch being so arranged that arcing takes place wholly or substantially within an internal chamber formed in an insulating housing or body of the switch, the said rotary member preferably being in the form of a recessed or compartmented wheel or drum adapted to substantially enclose the operating mechanism, the axis of which wheel or drum is mounted in the walls of the said chamber containing the wheel or drum, the formation of the rotary member and its disposition within the said chamber eliminating or reducing the arcing of the switch contacts.

In order that this invention may be clearly understood and readily carried into practice, reference may be had to the appended explanatory sheets of drawings, upon which:—

Figure 1 is a sectional front elevation of an ironclad switch in accordance with the invention, the section being taken on the line 1—1 of Figure 2, and the switch being illustrated in its open or "off" position.

Figure 2 is a plan of the switch with the detachable cover removed.

Figure 3 is a sectional end elevation of the switch, the section being taken on the line 3—3 of Figure 1, but with the operating mechanism in an intermediate position.

Figure 4 is a perspective view of the parts of the divided insulating housing body of the switch.

Figure 5 is a perspective view of the rotary drum element of the switch.

Figure 6 is a sectional front elevation of a tumbler switch in accordance with the invention, the section being taken on the line 6—6 of Figure 8.

Figure 7 is a sectional end elevation of the tumbler switch, the section being taken on the line 7—7 of Figure 6.

Figure 8 is a plan of the tumbler switch illustrated in Figures 6 and 7.

In applying the invention to an ironclad type of electric switch, as illustrated in Figures 1 to 5, the switch mechanism proper is contained within a metallic casing *a* having a domed cover *b* which is detachably secured by wing bolts *c*. In constructing and assembling this switch mechanism a substantially rectangular housing body made of insulating material is divided horizontally into upper and lower parts *d* and *e*, and this two-part housing is formed with an internal cylindrical chamber *f* which is adapted to enclose a rotary drum *g* also made of insulating material, this drum *g* having an angular compartment *h* contained between a pair of side flanges *i*, and being mounted loosely upon an aligned pair of spindles *j* which are accommodated within recesses *k* in the walls of the housing and are supported non-rotatably in bearings provided by bracket arms *l* upstanding from a baseplate *m*. The two-part housing is detachably secured within the casing *a* and upon the baseplate *m*, with an interposed insulation *n*, by means of screw studs *o* and *p*, the studs *p* passing through a cross-piece *q* into engagement with an opposite pair of fixed side pillars *r*, and the parts *d* and *e* of the housing being formed with upright end recesses *s* so as to be slidably accommodated between the pair of fixed pillars. Mounted upon the end faces of the drum *g* are the movable contact arms or blades *t*, these being rotatable with the drum by means of the switch-operating mechanism to make or break contact when in predeter-

mined positions relative to the fixed current-carrying terminals of the switch.

The rotation of the drum *g*, with its contact arms or blades *t*, is effected by means of a spring-controlled quick make and break mechanism which is substantially contained within the interior compartment *h* of the drum. In constructing and assembling this quick make and break mechanism, the spindles *j* are connected at their inner ends by a bridge or yoke constituted by a pair of arms *u* dependent from the crosspiece *q* and passing into the interior compartment *h* of the drum through a shaped slot *v* in the top of the housing. These arms *u* provide bearings for the main pivots *w* of a toggle lever *x* which at its inner end is pivotally jointed at *y* to a complementary toggle link *z* which is slidably mounted under the influence of a spring 1 within a bracket member 2 fixed into the drum, the toggle lever *x* having at its outer end a slotted connection to a lever 3 located within the casing and controlled by an external lever 4, these levers 3 and 4 being of inverted U formation and being mounted on the outer ends of the spindles *j*, which latter are slidably accommodated within upright slots 5 in the sides of the casing so as to permit of removal of the entire switch mechanism from the casing when the crosspiece *q* and fixing studs *o* and *p* have first been removed.

The pairs of fixed contacts 6 and 7, which are connected by terminal screws 8 to the flexible leads, are located within the housing in end recesses 9 and 10 on diametrically opposite sides of the cylindrical chamber *f* and drum *g*, and are secured therein by screw studs 11, each pair of fixed contacts 6 and 7 being engaged by a movable contact arm or blade *t* when the switch is in the closed position, the movable contact arms or blades *t* being located at right angles to the line of the fixed contacts 6 and 7 when the switch is in the open position as illustrated in Figures 1 to 3.

It will be seen that the rotary drum *g* and movable contact arms or blades *t* are closely encased within an insulated internal chamber *f* of the switch housing in such a manner that when the switch is in the open position the movable contact arms or blades *t* are effectively insulated from the other metallic parts of the switch, and in such a manner also as to minimize arcing or sparking in the action of making or breaking contact, which make and break action is practically instantaneously effected by means of the spring-controlled toggle mechanism, which is also substantially encased within the housing and rotary drum.

In the further example in which the invention is applied to a simpler form of tumbler switch, as illustrated in Figures 6 to 8, the insulating housing is divided vertically into complementary parts 12 and 13 secured together by studs 14, and the rotary drum 15 of insulating material, pivoted at 16, is likewise encased within internal cylindrical chamber 17 of the housing, the drum in this case carrying movable contacts provided by the extremities of a pin 18 fitted logitudinally through a peripheral part of the drum, for engagement with one or other of two pairs of fixed contacts 19 and 20 located in the sides of the housing and connected by terminal screws 21 to the flexible leads. The operating member of the switch is in this case a lever or dolly 22 pivoted at 23 and having an extension arm 24 constituting the main toggle lever, the complementary toggle link consisting of a spring 25, and the toggle mechanism being substantially contained with an interior compartment 26 of the drum.

It will be seen that this form of tumbler switch is substantially similar to the iron-clad switch previously described, both as regards its quick make and break action, and also as regards its encasing and insulating arrangements for preventing or minimizing arcing or sparking.

What I claim as my invention and desire to secure by Letters Patent is:—

1. An electric switch, comprising in combination a rotary drum-like body of insulating material, movable contacts mounted on an insulating face or faces of said rotary body, a closed housing of insulating material having an internal chamber inclosing said rotary body and movable contacts, fixed contacts located in said chamber to cooperate with said movable contacts, a fixed insulating face or faces located within said chamber in opposed adjacency to said rotatable insulating face or faces so as to form therewith an arc-quenching and arc-restricting area or areas, an internal compartment within said rotary body, a spring-controlled quick make and break device inclosed within said compartment for operating said rotary body in either direction to open or close the switch, and external means for actuating said quick make and break device.

2. An electric switch, comprising in combination a rotary drum-like body of insulating material, movable contacts mounted on an insulating face or faces of said rotary body, a divided closed housing of insulating material, an internal chamber formed within the complementary parts of said housing so as to enclose said rotary body and movable contacts, fixed contacts located in said chamber to cooperate with said movable contacts, a fixed insulating face or faces located within said chamber in opposed adjacency to said rotatable insulating face or faces so as to form therewith an arc-quenching and arc-restricting area or areas, a metallic casing enclosing said housing, bearing spindles for

said rotary body extending through the walls of the chambered housing and through said casing, an internal compartment within said rotary body, a spring-controlled toggle device enclosed within said compartment for operating said rotary body to ensure an independent snap action of the contacts both in the opening and in the closing movements of the switch, a toggle lever arm extending from said compartment so as to project externally from said housing, a lever mounted upon said bearing spindles in operative connection with said toggle lever arm within said casing, and a lever mounted upon said bearing spindles for actuation of the switch mechanism from the exterior of the closed casing.

3. An electric switch comprising in combination a rotary drum-like body of insulating material, movable contacts mounted on an insulating face or faces of said rotary body, a divided closed housing of insulating material, an internal chamber formed within the complementary parts of said housing so as to enclose said rotary body and movable contacts, fixed contacts located in said chamber to cooperate with said movable contacts, a fixed insulating face or faces located within said chamber in opposed adjacency to said rotatable insulating face or faces so as to form therewith an arc-quenching and arc-restricting area or areas, a metallic casing enclosing said housing, open upright slots in the side walls of said casing, bearing spindles for said rotary body extending through the walls of the chambered housing and through said slots in the casing, an internal compartment within said rotary body, a spring-controlled toggle device enclosed within said compartment for obtaining a quick make and break action of said rotary body, a toggle lever arm extending from said compartment so as to project externally from said housing, a lever mounted upon said bearing spindles in operative connection with said toggle lever arm within said casing, a lever mounted upon said bearing spindles for actuation of the switch mechanism from the exterior of the closed casing, and means for securing the divided chambered housing within said casing, the switch mechanism being removable as a complete unit from the casing on said securing means being first released.

4. An electric switch comprising in combination a rotary drum-like body of insulating material, movable contacts mounted on an insulating face or faces of said rotary body, a divided closed housing of insulating material, an internal chamber formed within the complementary parts of said housing so as to enclose said rotary body and movable contacts, a pair of upright recesses formed in opposite exterior walls of said housing, fixed contacts located in said chamber to cooperate with said movable contacts, a fixed insulating face or faces located within said chamber in opposed adjacency to said rotatable insulating face or faces so as to form therewith an arc-quenching and arc-restricting area or areas, a metallic casing enclosing said housing, a pair of fixed pillars upstanding within said casing for slidable engagement with said upright recesses, open upright slots in the side walls of said casing, bearing spindles for said rotary body extending through the walls of the chambered housing and through said slots in the casing, an internal compartment within said rotary body, a spring-controlled toggle device enclosed within said compartment for obtaining a quick make and break action of said rotary body, a toggle lever arm extending from said compartment so as to project externally from said housing, a lever mounted upon said bearing spindles in operative connection with said toggle lever arm within said casing, a lever mounted upon said bearing spindles for actuation of the switch mechanism from the exterior of the closed casing, a cross-piece located over said housing, and screw studs passing through said cross-piece into engagement with said pillars so as to secure the divided chambered housing within said casing, the switch mechanism being removable as a complete unit from the casing on said studs being first released.

In witness whereof I have hereunto set my hand.

THOMAS RICHARD MARTIN.