

March 27, 1951

W. H. LINDAE

2,546,366

SWITCH

Original Filed Aug. 22, 1946

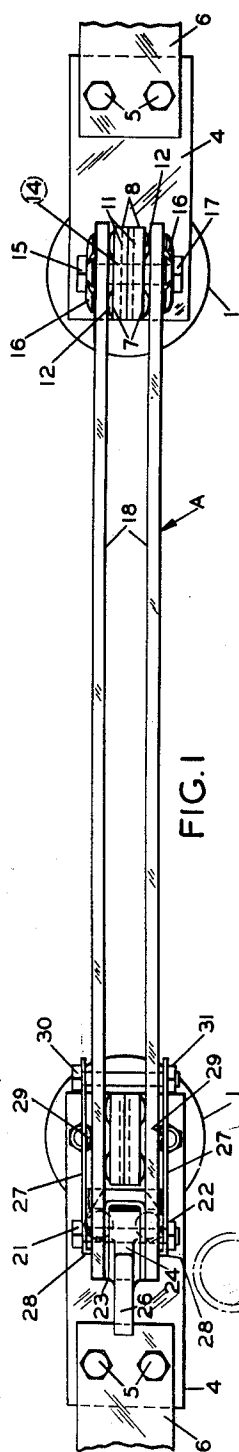


FIG. 1

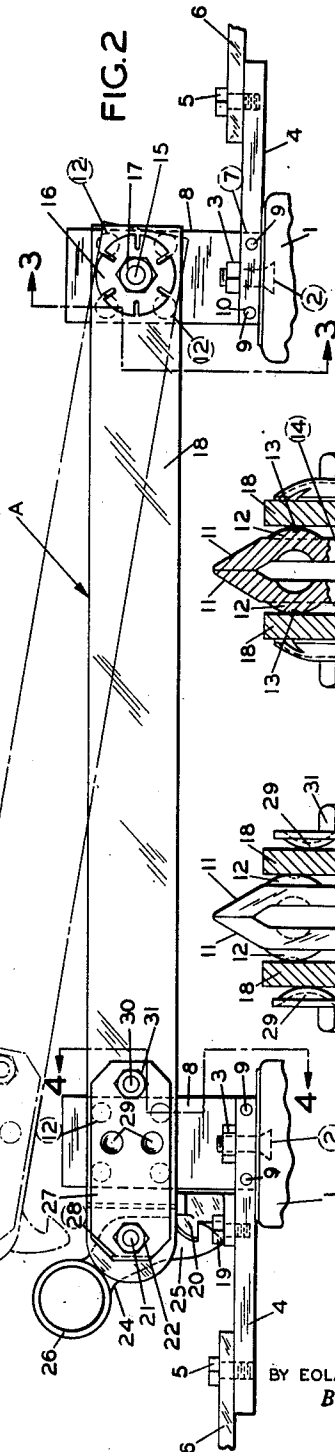


FIG. 2

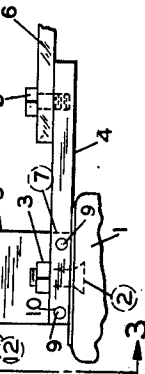


FIG. 3

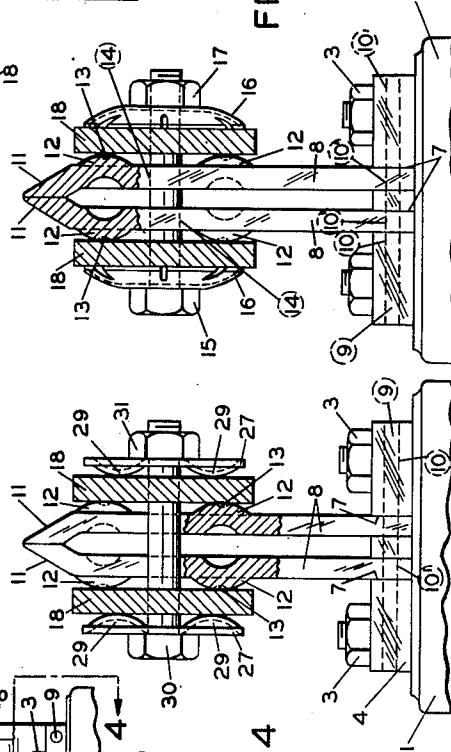


FIG. 4

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2,546,366

SWITCH

William H. Lindae, deceased, late of St. Louis, Mo., by Eola A. Lindae, administratrix de bonis non, St. Louis, Mo.; said William H. Lindae assignor of one-half to Eola Lindae and one-half to Joseph P. Pohrer

Original application August 22, 1946, Serial No. 692,341, now Patent No. 2,511,354, dated June 13, 1950. Divided and this application May 1, 1947, Serial No. 745,196

5 Claims. (Cl. 200—162)

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This invention relates in general to certain new and useful improvements in electrical switches, and more particularly, to those of the knife type, and is a division of application Serial No. 692,341, filed August 22, 1946, now Patent No. 2,511,354, June 13, 1950. The usual knife switch comprises a single blade for each circuit to be made or broken, that is, a single-pole switch comprises one blade hingedly engaged at one end between contacts pressing against both sides of the blade, which end is called the "hinge jaw," and rotatably engaging and disengaging at the other end opposed spring contacts, called the "break jaw." In the invention, however, a pair of parallel blades is employed, which engage between them, at both the "hinge" and the "break" ends, clips with spherically-rounded contact faces.

The primary object of the present invention is to provide a double knife-type electrical switch with spherical contact surfaces interposed between the blades at both the "hinge" and the "break" ends.

A further object of the present invention is to provide a switch having a plurality of spherical contact surfaces which in the actuation of the switch connect and disconnect quickly and positively.

An additional object of the present invention is to provide a switch with spherically-formed contact or bearing points reinforced with silver or other metal suitable for long-wearing electrical contacts.

Another object of the present invention is to provide a high-capacity electrical switch whose current-transmitting parts may be economically fabricated from flat metal, and are readily assembled and easily replaced.

A further object of the present invention is to provide a switch of the type stated having air ventilated contact posts for readily dissipating heat generated by contact, arcing and current conduction.

The above and other objects will become more fully apparent from the following specification, which, by way of illustration rather than limitation, sets forth preferred processes and preferred forms of apparatus constituting embodiments of the present invention, the scope of which is defined in the appended claims.

In the accompanying drawings:

Figure 1 is a top plan view of a switch constructed in accordance with and embodying the invention;

Figure 2 is a side elevational view of the switch, the "open" or disconnected position thereof being indicated in dot-dash lines;

Figure 3 is a vertical sectional view taken along line 3—3 of Figure 2; and

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Figure 4 is a vertical sectional view taken along line 4—4 of Figure 2.

Referring now in more detail and by reference characters to the drawings which illustrate a preferred embodiment of the present invention, A designates a switch comprising two pot-type, porcelain insulators 1 conventionally mounted in suitably spaced relation upon the steelwork of a transmission tower or some other supporting structure (not shown). Molded, or otherwise mounted in and projecting upwardly from the insulators 1 are studs 2, and mounted thereon by means of nuts 3 are copper terminal blocks 4 having binding posts 5 for the attachment of buss bars 6. The inner ends of terminal blocks 4 are provided with a pair of parallel milled slots 7 for tightly receiving upright contact posts 8, the latter being retained therein by press-fitted pins 9 passing through laterally drilled apertures 10, 19', in contact blocks 4 and posts 3, respectively.

Each of said contact posts 8 consists of two halves symmetrically formed from flat copper stock, their upper end-portions 11 being bent inwardly and mitered to bear tightly against each other and thereby be retained in spaced parallel relation to permit the free circulation of air therebetween for ventilation purposes. Beneath their inwardly bent upper-end portions 11, the contact posts 8 are outwardly drawn, pressed, stamped or embossed in the provision of protruding spherical portions 12, at the outer, or contacting, surfaces of which are silver inserts 13. Each pair of matching spherical portions 12 of the two symmetrically opposed halves of each post together form a substantially ball-like contact, the surface of which is concentric with the vertical plane along which the mitered upper end-portions 11 meet. In the preferred embodiment shown, there are four such ball-like contacts, although more or less than four may readily be employed where desired.

It will be noted that the posts 8 fixedly attached to the insulators 1 at both the "hinge" end (shown at right in Figure 1) and the "break" end (shown at left in Figure 1) are substantially identical. However, at the so-called "hinge" end, contact post 8 is laterally drilled as at 14 to receive hinge bolt 15 which, by means of radially split spring washers 16 and nut 17, holds the blades 18 with adjustable tension against the silver contact inserts 13 of the contact post 8 at that end. At the other, or "break" end, terminal block 4 is tapped to receive bolts 19 securing to it the fixed latch keeper 20.

The "break" ends of blades 18 are laterally drilled near their extremities to receive bolt 21 which, together with nut 22, holds between said blades 18 a channel-shaped spacer 23 and a rock-

ably mounted latch lever 24 having a hook 25 adapted to engage the latch keeper 20. At its upper end, the latch lever is provided with a ring-shaped latch handle 26. Bolt 21 also passes through, and together with nut 22 holds adjacent to the outer surfaces of blades 18, leaf springs 27 having bent outer ends 28 and inwardly protruding embossed spherical portion 29 whereby to space said springs 27 with reference to the outer surfaces of blades 18. Also mounted in and extending through the "break" ends of blades 18 is a bolt 30 provided at its threaded end with a nut 31 for connecting the inner ends of leaf springs 27. By adjusting nut 31, any desired amount of spring pressure may be exerted by the inwardly-extending spherical portions 29 of springs 27 against the outer surfaces of blades 15 in the vicinity of the engagement and electrical contact of their inner surfaces with the interposed contact post 8 at the "break" end of the switch.

The method of assembly and disassembly of the switch for the replacement of parts is apparent from the construction shown and correct alignment of the parts follows inherently from the spring pressures against the several spherical contact surfaces.

Switches constructed as disclosed herein, whether of the single-pole single-throw type as illustrated or of more complex detail, as of multiple-pole, double-throw type, operate with a minimum of friction, due to the ball-like contacts. This permits higher contact pressures, which, together with the self-aligning feature, results in more positive electrical contacts than would otherwise be possible. At the "break" end of the switch, the movement of the blades into and out of engagement with the several spherical contact faces is progressive, so that the contact is made and broken quickly.

It should be understood that changes and modifications both in the methods as well as in the form, construction, arrangement and combination of the several parts of the switch may be made and substituted for those herein shown and described without departing from the nature and principle of the present invention.

Having thus described the invention, what is claimed and desired to secure by Letters Patent is:

1. An electrical switch comprising a dielectric base-forming means, terminal ventilated contact posts mounted thereon in spaced relation to each other, a pair of blades, one on each side of said clips, a hinge bolt attaching one end of said blades to one of said contact posts, resilient separator means disposed between and adjacent the opposite ends of said blades for moving said blades simultaneously into and out of contact with the other contact post, leaf springs operatively mounted upon the blades and having inwardly-protruding surfaces for abutment against the outer surfaces of the blades, and an adjustable tension bolt connecting said springs.

2. An electrical switch comprising a dielectric base-forming means, terminal contact posts having spaced parallel portions mitered together at their upper ends and mounted on said base-forming means in spaced relation to each other, a pair of blades, said blades being disposed on opposite sides of the contact posts, a hinge bolt attaching one end of said blades to one of said contact posts, resilient separator means disposed between and adjacent the opposite ends of said blades for moving said blades simultaneously into and out of

contact with the other contact post, and leaf springs mounted on the outer surfaces of said blades, said springs having bent outer ends and inwardly projecting surfaces for spacing the springs in reference to the outer surfaces of the blades.

3. An electrical switch comprising a dielectric base-forming means, terminal contact posts having spaced parallel portions mitered together at their upper ends and mounted on said base-forming means in spaced relation to each other, a pair of blades, said blades being disposed on opposite sides of the contact posts, a hinge bolt attaching one end of said blocks to one of said contact posts, spring washers mounted on the ends of said hinge bolt for holding the blades with adjustable tension against the contact posts, resilient separator means disposed between and adjacent the opposite ends of said blades for moving said blades simultaneously into and out of contact with the other contact post, leaf springs mounted on the outer surfaces of said blades, said springs having bent outer ends and inwardly-projecting surfaces for spacing the springs in reference to the blades, and an adjusting bolt extending through the blades and connecting the inner ends of the leaf springs for regulating the amount of spring pressure exerted by the inwardly-projecting surfaces of the springs upon the blade.

4. In an electrical switch having spaced terminal contact posts and a pair of blades disposed on opposite sides of the contact posts, a leaf spring mounted on the outer surface of each of said blades, said spring having a bent outer end and an inwardly projecting surface for abutment against the outer surface of the blade whereby the spring is spaced in reference to the blade, and an adjusting bolt extending through the blade and connecting the inner ends of the leaf springs for regulating the amount of spring pressure exerted by the inwardly projecting surface of the springs upon the blade.

5. An electrical switch comprising a pair of spaced terminal contact posts having spaced parallel portions mitered together at their upper ends, a pair of blades, said blades being disposed on opposite sides of the contact posts, one end of said blades being hingedly mounted upon one of said contact posts, spring washers disposed against the outwardly presented faces of the hinged end of said blades for holding the blades with adjustable tension against the contact posts, and resilient separator means disposed between and adjacent the opposite ends of said blades for moving said blades simultaneously into and out of contact with the other contact posts.

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