June 2, 1942. S. H. KAST 2,284,742

SWITCH JAW

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Fig. 1.

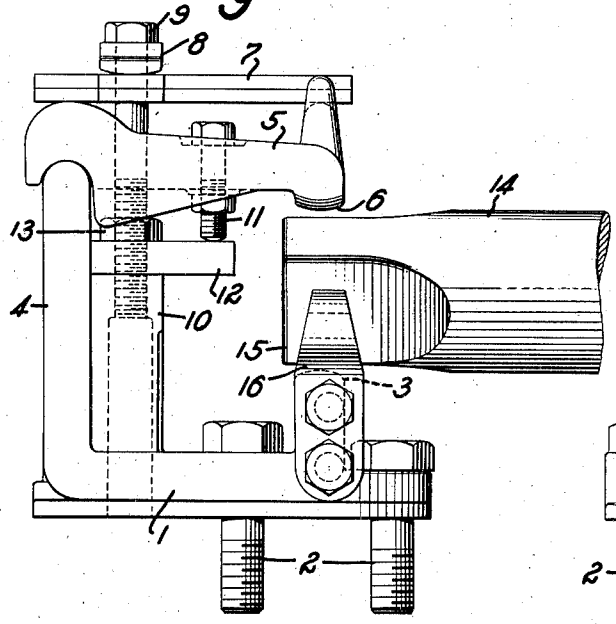


Fig. 2.

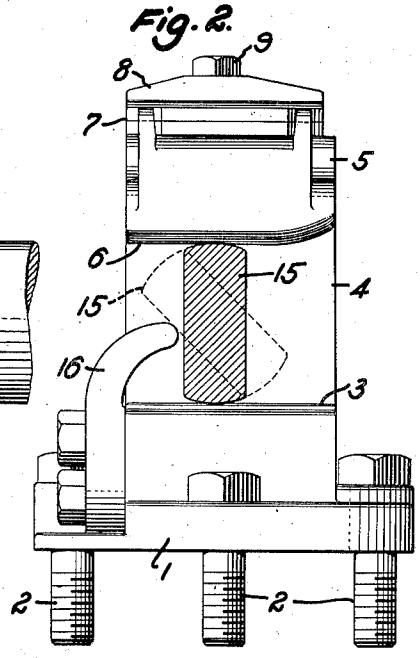
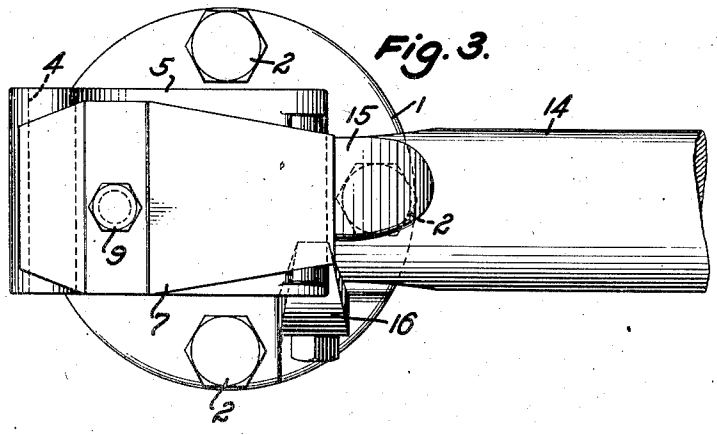


Fig. 3.



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Fig. 4.

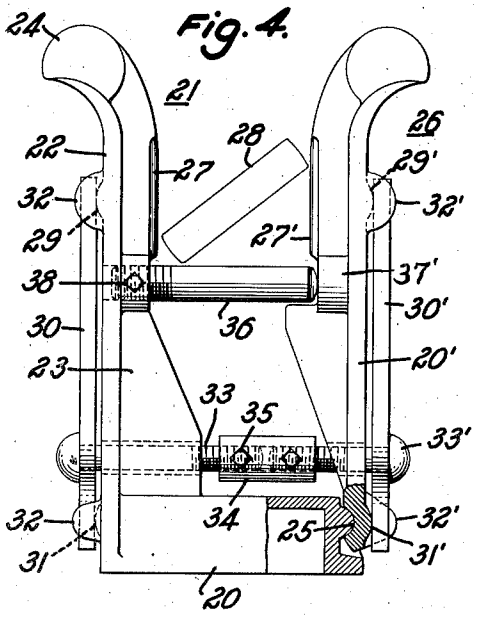


Fig. 5.

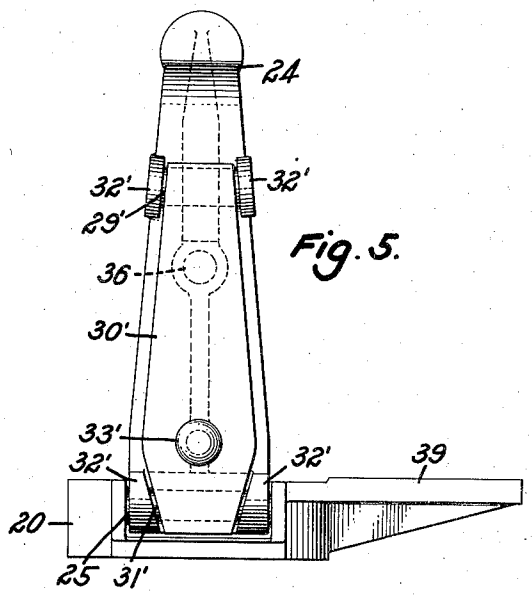


Fig. 6.

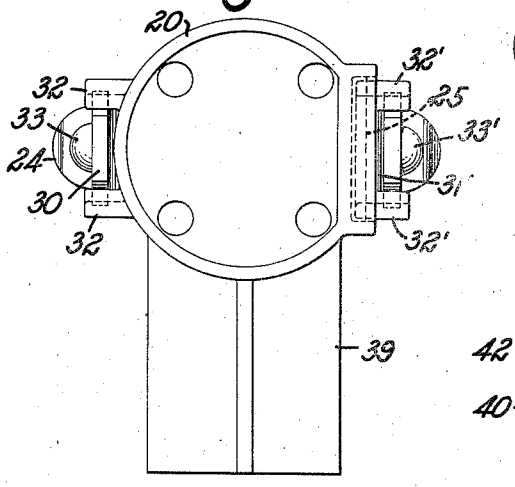
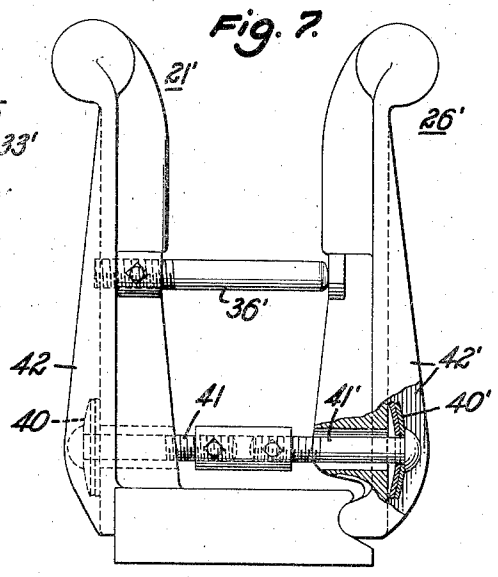


Fig. 7.



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SWITCH JAW

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Application January 13, 1941, Serial No. 374,287

8 Claims. (Cl. 200—166)

This invention relates to switch jaws and particularly to articulated switch jaws for use in high pressure contact switches.

The high pressure contact type of switch includes blade and jaw contacts that are moved freely into cooperative position just prior to the final closing movement of the operating mechanism, and are then firmly wedged into switch-closed position to establish a high pressure engagement of small contact areas of the order of point or line contacts. The contact materials must have a high electrical and thermal conductivity, but materials with these characteristics are relatively weak mechanically and do not have sufficient resilience to establish the desired contact pressures. It has been the practice to cast the contact material upon a strong spring member to form a resilient contact jaw that may be spread by the movement of a flat blade contact into wedging position across the jaw. Such switch jaws cannot be adjusted, except by grinding off the opposed contact surfaces to increase the gap, and the dimensional variations incident to the usual manufacturing processes have made it difficult and expensive to obtain the desired contact pressures.

An object of this invention is to provide a resilient switch contact jaw that may be readily adjusted to establish a desired high pressure engagement of the cooperating switch contacts. An object is to provide a switch jaw including articulated current-carrying elements of high electrical and thermal conductivity, and a spring or springs for establishing a desired contact pressure when a blade contact is forced into the jaw to spread apart the current-carrying elements. A further object is to provide an articulated switch jaw in which strong springs back up current-carrying elements of high electrical and thermal conductivity, and thus relieve such elements of the mechanical stresses arising from the wedging of a blade contact across the gap or mouth of the switch jaw.

These and other objects and advantages of the invention will be apparent from the following specification when taken with the accompanying drawings in which:

Fig. 1 is a fragmentary side elevation of a high pressure switch including an articulated switch jaw embodying the invention, the switch blade being shown within the jaw but not in fully closed position;

Fig. 2 is an end elevation of the switch in fully closed position, the position of the blade corresponding to Fig. 1 being shown in broken line;

Fig. 3 is a top plan view of the switch jaw;

Fig. 4 is an end elevation of another switch jaw, the position of the blade as it approaches closed position being shown diagrammatically in lighter lines;

Figs. 5 and 6 are side elevations and bottom plan views, respectively, of the switch jaw; and

Fig. 7 is an end elevation, partly in section, of a modification.

In Figs. 1–3, inclusive, the reference numeral 1 identifies the approximately circular base of the contact jaw casting that is to be secured to an insulator by appropriate means, for example stud 2. The casting is a soft copper or copper alloy of high electrical and thermal conductivity, and has an integral contact member 3 and an integral supporting rib 4 projecting above the base section 1. The upper edge of the rib 4 is rounded to form a pivotal bearing for the jaw member 5 of high conductivity that terminates in a rounded contact surface 6 in vertical alinement with the fixed contact member 3. A leaf spring 7, preferably laminated, bears upon the articulated jaw member 5 along lines disposed vertically above the supporting rib 4 and the contact surface 6, respectively, and is stressed by a bridge piece 8 and bolt 9 that is threaded into lug 10 that projects from the rib 4. Pivotal movement of the articulated jaws member 5 towards the base 1 is limited by an adjustable stop comprising a bolt 11 threaded into the member 5 and engaging a plate 12 that is secured to the top of the lug 10 by a nut 13 on the bolt 9.

The switch blade 14 terminates in a flattened blade contact 15 that enters freely within the jaw, as indicated by broken line in Fig. 2, and is then rotated into wedging engagement with the rounded contact surfaces of the contact members 3 and 5. The operating mechanism for effecting this movement of the switch blade is well known in the art and forms no part of the present invention. A stop 16 may be bolted to or formed integral with the base 1 to arrest the displacement of the switch blade, or the blade operating mechanism may be designed to arrest the blade displacement prior to the rotation of the blade contact within the contact jaw. The circuit connection to the jaw contact may be made in the usual manner by terminals, not shown, that are secured to the base 1 by the attaching bolts 2.

It will be apparent that the normal gap of the contact jaw may be varied by adjusting the stop bolt 11 on the articulated jaw member 5, and that the contact pressure may be adjusted

to a desired value by threading the bolt 9 to a greater or less extent into the lug 10. The jaw member 5 is not subjected to bending strains by the high pressure contact as the pressure exerted upon the contact surface 6 is transmitted directly to the outer end of the spring 7 as a substantially pure compression stress acting transversely of the outer end of the articulated jaw member 5. The only design requirements imposed upon the member 5 are those relating to electrical and thermal conductivity.

A preferred construction of an articulated contact jaw for use with a blade that travels in a vertical plane is shown in Figs. 4 to 6, inclusive. The base 20 and one side member 21 of the jaw are formed as an integral casting of a metal of good electrical and thermal conductivity. The side member 21 is approximately T-shaped in cross-section and comprises an upwardly tapering plate section 22 and an inwardly projecting central rib 23, the member flaring outwardly at its upper end and terminating in a ball end 24. The base 20 has a semi-cylindrical rib 25 that forms a pivotal bearing for the articulated side member 26 of the jaw. The articulated member is of approximately T-shape in cross-section and similar in design to the fixed jaw member. The ribs of the members 21, 26 are rounded off, as indicated at 27, 27', respectively, for engagement by the rounded edges of the flattened blade contact 28. Bosses 29, 29' are provided at the outer surfaces of the jaw members 21, 26, respectively, in transverse alinement with the points that engage the blade contact 28 in the fully closed position of the switch. Leaf springs 30, 30' bear upon the bosses 29, 29' and lower bosses 31, 31' on the base 20 and the pivoted member 26, respectively, the springs being seated between ears 32, 32' that project outwardly from the jaw members 21, 26, respectively. A turnbuckle comprising oppositely threaded bolts 33, 33' and a sleeve 34 extends through the springs 30, 30' and the ribs of the jaw members 21, 26. Set screws 35 are preferably provided to lock the sleeve 34 in the desired position with reference to the turnbuckle bolts. A stop pin 36 is threaded into a cylindrical boss of rib 23 of member 21 for engagement with a corresponding boss 37' of the member 26 to limit the closing movement of the jaw by the springs 30, 30'. A set screw 38 is threaded into the boss 37 to lock the stop pin 36 at the desired adjustment. A terminal flange 39 may project from the base 20 to receive the line connection to the contact jaw.

The described construction relieves the jaw members from bending strains as the springs 30, 30' back up the contact points and restrict the stresses on the relatively soft metal jaw members to substantially pure compression stresses. A simpler construction, as shown in Fig. 7, may be used when the jaw members have sufficient mechanical strength to resist the bending strains arising from the high pressure contact engagement.

The several parts of the Fig. 7 switch jaw are or may be similar to those of Figs. 4 to 6, inclusive, and are identified by primed numerals but will not be described in detail. The spring members comprise domed washers 40, 40' on the turnbuckle bolts 41, 41' and at the outer surfaces of the fixed jaw member 21' and the articulated member 26', respectively. Reinforcing ribs 42, 42' project outwardly from the edges of members 21', 26', respectively, to increase the resistance of the jaw members to bending moments.

It will be apparent that the invention is not limited to the particular embodiments herein illustrated and described, and that various changes may be made without departure from the spirit of my invention as set forth in the following claims.

I claim:

1. In an articulated switch jaw, a metal casting comprising a base section for mounting upon an insulator and an integral contact member projecting from the base section, a second contact member pivoted upon said base and having a contact portion extending substantially parallel to the first contact member, spring means urging said pivoted contact member towards the first contact member, and adjustable stop means limiting the angular movement of said pivoted member towards said first contact member.

2. In an articulated resilient switch jaw, the invention as claimed in claim 1, wherein said spring means comprises a spring bearing upon said pivoted contact member in line with said contact portion thereof.

3. In an articulated switch jaw, the invention as claimed in claim 1, wherein said spring means comprises a leaf spring bearing upon said pivoted contact member at spaced points adjacent its contact portion and its pivotal support, respectively, and means for adjusting the pressure exerted upon said pivoted contact member by said leaf spring.

4. An articulated switch jaw comprising a casting having an approximately circular base for mounting upon an insulator, a contact member and a supporting rib each integral with and projecting above said base, a second contact member pivotally mounted upon said supporting rib and extending substantially parallel to said base, said second contact member having a contact portion extending substantially parallel to said first contact member, spring means urging said pivoted contact member towards said first contact member, and adjustable stop means limiting the angular movement of said pivoted member towards said first contact member.

5. An articulated switch jaw as recited in claim 4, wherein said stop means comprises a member adjustable on said pivoted contact member and a cooperating stop member secured to said supporting rib.

6. In a switch contact jaw, a base having an integral contact member extending from one side thereof, a second contact member pivotally supported on the opposite side of said base and extending substantially parallel to the first contact member, spring means at the outer sides of said members, pressure adjusting means extending through said members and said spring means, and an adjustable stop limiting movement of said pivotally supported member by said spring means.

7. In a switch contact jaw, the invention as claimed in claim 6, wherein said spring means comprise spring washers.

8. In a switch contact jaw, the invention as claimed in claim 6, wherein said spring means comprise leaf springs bearing at their upper ends upon said contact members at points in line with the portions thereof to be engaged by a blade contact.

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