Oct. 12, 1937. O. MASENG 2,095,554

ELECTRICAL DISCONNECTING SWITCH

Filed Oct. 22, 1934

Fig. 1.

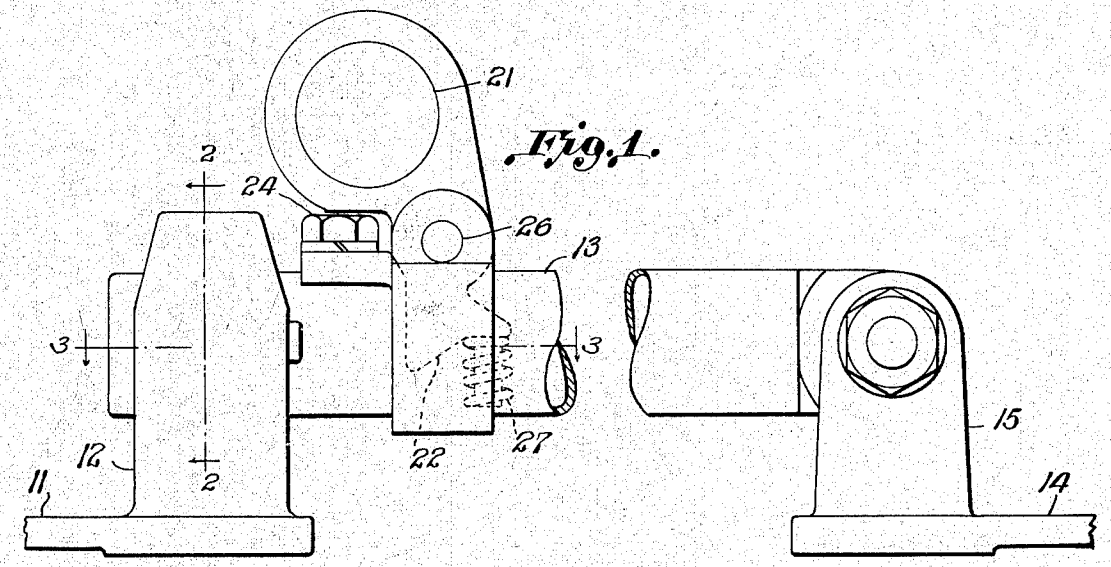


Fig. 2.

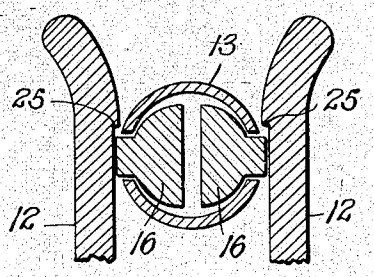
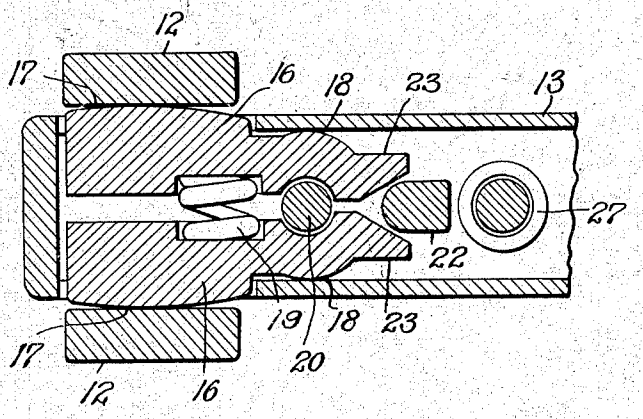


Fig. 3.



Inventor:
Olav Maseng
By Charles E. Nichols
Atty.

UNITED STATES PATENT OFFICE

2,095,554

ELECTRICAL DISCONNECTING SWITCH

Olav Maseng, Evanston, Ill.

Application October 22, 1934, Serial No. 749,329

11 Claims. (Cl. 200—169)

My invention relates to an electrical disconnecting switch and has for an object to provide an improved means of opening and closing an electrical circuit.

Yet a further object is to provide a switch free from flexible leads and soldered connections, which in cases of overloading constitute weak and dangerous points.

Yet an additional object is to provide a manually direct operated switch, having high pressure, self-aligning and self-cleaning contacts.

Yet an additional object is to provide an electrical disconnecting switch, having a combination latch and contact assembly with operating means so arranged that the switch can be opened without the usual heavy effort due to contact friction and sticking caused by atmospheric conditions when the switch is mounted outdoors.

Yet an additional object is to provide an electrical disconnecting switch of neat appearance and compact design so as to permit interchangeable use of contact, latch and blade assembly for both indoor and outdoor installations.

This invention comprises the construction, combinations and arrangement of parts hereinafter set forth, disclosed and shown on the accompanying drawing.

Fig. 1 is a side elevation of the switch.

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1.

The disconnecting switch constituting this invention, consists of a stationary receiving contact member provided with a terminal 11 and two suitably spaced upright members 12 constituting a jaw into which the contact assembly end of the blade 13 enters.

The blade member 13, conventionally hinged at the end opposite to the contact end to a stationary hinge contact member consisting in turn of a terminal 14 and two upright members 15 supporting and providing contact with the blade.

The contact and latch assembly for the switch shown, consists of two identical members 16 mounted within the blade. At one end of the members are protruding parts providing electrical contact 17 with the stationary upright members 12, while at the other end are spherical surfaces providing contact 18 between the member itself and the tubular blade. The spring 19 serves to exert the necessary pressure at the contact points. The pin 20 serves as a pivot point for, and to hold the floating contact members in place. The operating ring 21 is pivotally mounted on the blade and extends within the latter in the form of a wedge 22, normally in a free position between the extended ends 23 of the contact members 16.

When the switch is being closed, the contact points 17, when striking the stationary members 12 will be subjected to a rubbing action under high unit pressure, which will have the effect of cleaning the contact surfaces. Further, the pressure caused upon contact surface 17 by the upright members 12 will tend to rotate members 16 about pin 20, which under the pressure exerted by spring will produce a rubbing and cleaning effect at the contact surface 18. The diameter of the spherical contact surface 18 is made slightly less than the inside diameter of the tubular blade member in order to limit the effective contact surface and consequently increase the unit pressure and the effectiveness of the cleaning action by the rotational movement of member 16.

A further object in limiting the contact surfaces at 17 and 18 to 1/50 of a square inch or less is to insure correct alignment and maintenance of identical contact surfaces during subsequent operations of the switch.

The switch is normally operated by application of a force to ring member 21. During a closing operation the force applied is fully taken up by stop 24 and not transmitted to any part of the contact assembly and the protruding part of member 16 will thus freely and automatically latch with the corresponding notch 25 of the stationary upright members 12.

During the opening operation the force applied to the ring member 21 causes a rotational movement of this about pin 26, forcing the wedge shaped part 22 between the contact member extensions 23. This in turn causes a rotational movement of members 16 about pin 20, withdrawing the protruding contact part 17 towards the centerline of the blade member. This movement unlatches the switch and permits free opening. The spring 27 serves to insure withdrawal of the wedge 22 to a neutral position after the opening operation has been completed.

While the device has been described in detail it is obvious that this is not limited to the exact form disclosed and that changes may be made therein, within the scope of what is claimed, without departing from the inherent and essential features of the invention. For instance, the floating contact assembly may be mounted and held in position on the stationary receiving contact member instead of on the movable blade member as shown.

Further the arrangement may be extended to

any current rating, by suitable choice of number of floating contacts and cross-section of current carrying parts. For 1200 ampere current rating and higher, the required number of floating contact members can, for instance, conveniently be mounted and enclosed between two suitably spaced rectangular cross-section bars constituting the blade member, in a manner otherwise similar to that shown for a tubular blade.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. An electric disconnecting switch comprising a pair of spaced circuit terminals, an insulating base therefor, a bar pivoted at one end to one of the terminals, the other of said terminals having spaced portions, a pair of levers providing contact elements pivotally supported by the bar at the end portion thereof opposite its pivot, a spring tending to separate the contacts to project the end portions thereof on one side of the pivotal point to a plane beyond the respective adjacent side of the bar, a releasing means carried by the pivoted bar movable in one direction to first release the said contact elements from pressure engagement with the said spaced portions of the terminal and then turn the bar on its pivot, and a spring means normally holding the releasing means from operative engagement with the said contact elements.

2. An electric disconnecting switch comprising a pair of spaced circuit terminals, an insulating base therefor, a bar pivoted at one end to one of the terminals, the other of the said terminals having opposed portions to receive the opposite end of the bar, said portions having notches, spring-pressed contact elements carried by said opposite end of the bar and automatically engaging beneath the projections when the bar is moved thereinto, lever means for releasing the contact elements from the notches to permit the bar to be turned on its pivot axis, spring means tending to hold the contact elements in engagement with the notches, and spring means yieldably resisting movement of the lever to disengage the same.

3. In an electric disconnecting switch, a pair of circuit terminals, a base supporting the same, a tube pivoted at one end to one of the terminals, the other terminal having spaced portions between which the opposite end of the tube may be moved, a pair of contact elements within the tube, a pivot pin for the two contact elements, each of said contact elements having opposed concave portions engaging the pin and outer convex portions each contacting the inner surface of the tube, the ends of the contact elements adjacent the end of the tube having portions projectable through the respective openings in the tube wall provided therefor, a spring between the said projecting portions and the pivot point tending to turn the projecting portions outwardly, and a manually operable means carried by the tube having a portion insertable between the other ends of the contact elements to turn the same on the pivot and withdraw the said projecting portions from contact with the spaced portions of said other terminal and turn the bar on the pivot to electrically disconnect the terminals.

4. An electrical disconnecting switch comprising a pair of spaced terminals for connection in an electric circuit, a base for supporting the same in fixed relationship, a contact member hinged at one end to one of the said terminals, pivotally supported contact elements in the opposite end of the contact member, the terminal for the said end having spaced contact portions having outwardly and oppositely inclined terminal ends, a spring tending to separate the said contact elements on one side of the pivotal point and to project end portions thereof respectively beyond the plane of the respective adjacent sides of the said hinged contact member, said spaced terminals below the terminal ends each having a notch whereby on turning the hinged member with the contact elements between the terminals, the said projecting portions of the terminals engage the respective notches to prevent displacement of the hinged contact member, a releasing means carried by the contact member for releasing said contact elements from the notches against the tension of the separating spring permitting the contact member to be turned on its hinge point, and spring means tending to hold the releasing element from operative engagement with the contact elements.

5. In an electric disconnecting switch, a pair of circuit terminals, an insulating base therefor, a tube pivoted at one end to one of the terminals, the other terminal having opposed spaced portions provided with notches between which the opposite end of the tube may be moved, a pair of contact elements pivotally supported in said opposite end of the tube, said tube having opposed openings through which portions of the contact elements may respectively be moved, a spring tending to move the same to projected position and to engage in the notches when the said end of the tube and contact elements are moved between said spaced portions of said other terminal, said contact elements each having portions in engagement with the tube when in the projected position, and a releasing means comprising a lever pivoted to the tube and having a portion extending through an aperture provided therein to the interior thereof, the portion in the interior of the tube having a part engageable between the ends of the pivoted contact elements to withdraw the same from engagement with the notches, the arrangement being such that the hand of the operator in actuating the release mechanism applies pressure to the tube whereby upon release of the contact elements the tube is turned on its pivot and electrically disconnects the said terminals.

6. An electric disconnection switch comprising a pair of spaced terminals, an insulating base therefor, a tubular bar pivoted at one end to one of the terminals, the other of the said terminals having spaced portions, a pair of contact elements in the tubular bar adjacent one end, a pivot pin therefor, said contact elements each having a portion forward of the pivot and the tubular bar having openings through which said forward portions may extend, a spring tending to move the said portions of the contact elements outwardly on opposite sides of the tubular bar to project beyond the surface of the tube, the said contact elements having similar end portions rearwardly of the pivot formed with oppositely inclined V surfaces, each contact element having a concave arcuate portion on the respective opposite sides of the pivot pin and having convex arcuate portions on the outer faces normally engaging the inner wall of the tubular bar at any point of pivotal movement of the contact elements therein, said spaced portions of said other terminal having notches below the throat of the opening beneath which the contact elements engage when the tubular bar is moved to position the same therein, a release element

pivoted to the exterior of the tubular bar and having a portion extending thereinto formed with a surface to engage between the inclined surfaces of the contact elements whereby the said elements through operation of the release member are withdrawn from the notches thereby permitting the tubular bar to be swung on its pivot by the strain imposed thereon in releasing the contact elements.

7. An electrical disconnecting switch comprising a terminal for connection in an electric circuit, a contact member hinged at one end thereto, a pair of spaced terminals for the other end of the contact member having outwardly turned ends to receive the same, a pair of contact elements pivotally supported by the contact member, a spring tending to press the contact elements outwardly in opposite directions thereby causing portions of the same on one side of the pivotal point thereof to project beyond the respective faces of the contact member whereby, in turning the contact member to closed position, the said contact elements engage between the spaced terminals, said contact elements on the opposite side of the pivot point terminating respectively in opposed inclined faces forming a V space therebetween, and a releasing member pivotally supported by the contact member and having a V shaped end portion aligned with the said V space whereby on manually turning the same in one direction the contact elements are turned to disengagement with the said spaced terminals and permitting the contact member to be freely turned on its pivot.

8. An electrical disconnecting switch comprising a terminal for connection in an electric circuit, a contact member hinged at one end thereto, a pair of spaced terminals for the other end of the contact member having outwardly turned ends to receive the same, a pair of contact elements pivotally supported by the contact member, a spring tending to press the contact elements outwardly in opposite directions thereby causing portions of the same on one side of the pivotal point thereof to project beyond the respective faces of the contact member whereby, in turning the contact member to closed position, the said contact elements engage between the spaced terminals, said contact elements on the opposite side of the pivot point terminating respectively in opposed inclined faces forming a V space therebetween, and a releasing member pivotally supported by the contact member and having a V shaped end portion aligned with the said V space whereby on manually turning the same in one direction the contact elements are turned to disengagement with the said spaced terminals and permitting the contact member to be freely turned on its pivot, and spring means tending to hold said V shaped end portion of the releasing member out of operative relationship with the said inclined faces of the contact elements.

9. An electrical disconnecting switch, comprising a stationary contact member, a conventionally hinged blade member, an auxiliary contact assembly, consisting of members, pivotally supported and mounted within the free end of the blade member in such a way that a conducting and self aligning bridge, is formed between the stationary contact member and the movable blade member when the switch is closed, the closing operation automatically causing a sliding movement at the contact surfaces under high unit pressure for the purpose of cleaning the said surfaces; projections on the said pivotally supported members for automatic latching with corresponding projections on the stationary contact member when the switch is in the closed position to prevent accidental opening; means for actuating the said pivotally supported contact members to release the contact pressure between the member and the stationary contact member and unlatch the blade member permitting free opening of the switch without hindrance from contact friction or sticking due to freezing or other atmospheric conditions.

10. An electric disconnecting switch comprising a pair of spaced circuit terminals, an insulating base therefor, a bar pivoted at one end to one of the terminals, the other of said terminals having spaced portions, a pair of levers providing contact elements pivotally supported by the bar at the end portion thereof opposite its pivot, a spring tending to separate the contacts to project the end portions thereof on one side of the pivotal point to a plane beyond the respective adjacent side of the bar, and a releasing means carried by the pivoted bar movable in one direction to first release the said contact elements from pressure engagement with the said spaced portions of the terminal and then turn the bar on its pivot.

11. In an electrical disconnecting device, a separable mechanism comprising a receiving terminal having spaced portions and a hollow bar of electrically conducting material having oppositely disposed openings, a pair of contact elements positioned within the hollow bar member, said contact elements each having a portion thereof contacting the inner surface of the hollow bar and a portion spaced therefrom and projecting outwardly through the respective opening in the hollow bar and contacting the respective portion of the receiving terminal when in closed position, and a spring between the contact elements pressing the same respectively outwardly to engage the respective spaced portions of the receiving member, the said contact elements under the spring pressure each forming a self-aligning conducting bridge between the respective portion of the receiving member and the said hollow bar member.

OLAV MASENG.