H. R. SCHULTZ.

OIL CIRCUIT BREAKER.

APPLICATION FILED MAR. 20, 1912.

1,214,083. Patented Jan. 30, 1917.

Fig. 1.

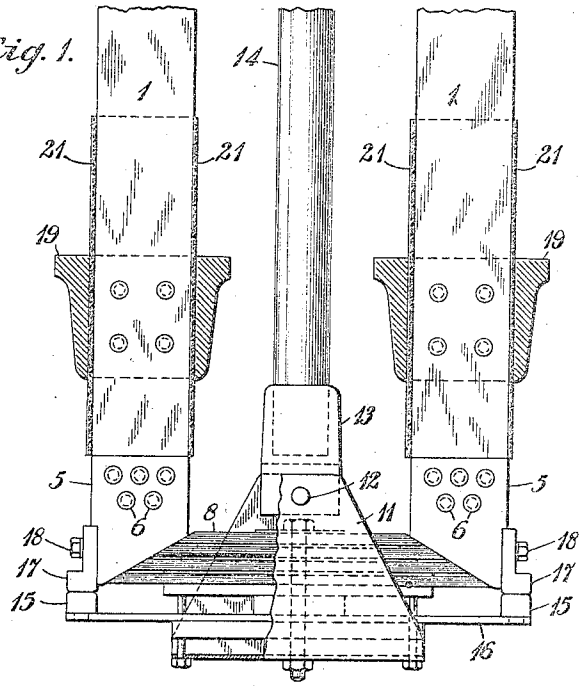


Fig. 2.

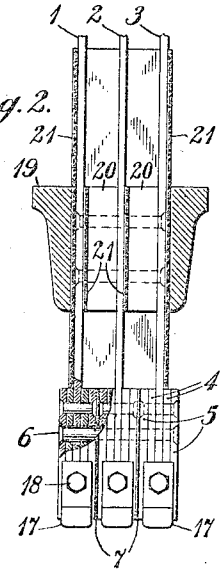
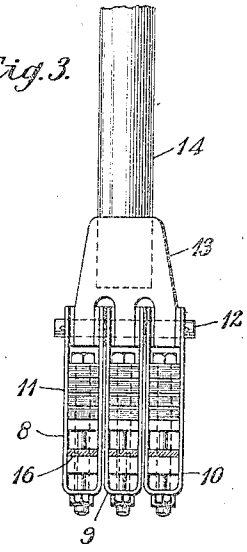


Fig. 3.



WITNESSES:

Fred H. Miller

INVENTOR

Hjalmar R. Schultz

BY

Charles Carlson

ATTORNEY

UNITED STATES PATENT OFFICE.

HJALMAR RUDMAN SCHULTZ, OF TRAFFORD PARK, MANCHESTER, ENGLAND, ASSIGNOR TO WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

OIL-CIRCUIT BREAKER.

1,214,083. Specification of Letters Patent. Patented Jan. 30, 1917.

Application filed March 20, 1912. Serial No. 685,062.

To all whom it may concern:

Be it known that I, HJALMAR RUDMAN SCHULTZ, a subject of the King of Sweden, and a resident of Trafford Park, Manchester, England, have invented a new and useful Improvement in Oil-Circuit Breakers, of which the following is a specification.

My invention relates to switches or interrupters for electric circuits and particularly to devices of this character which have their contact terminals immersed in oil or other insulating liquid.

The object of the invention is to provide an improved construction which will prevent undue heating of interrupters that are designed for carrying large currents.

It is well known that a considerable rise of temperature occurs in solid conductors of large cross-section carrying an alternating current of a certain value by reason of what has been termed the "skin effect" of the conductor, although a direct current of corresponding amount can be carried by the same conductor without undue heating. The skin effect increases with the size of the conductor, since the value of the ratio of area of cross-section to perimeter of the same increases with the increase of dimensions of the conductor. It is also well known that any joint in a conductor unless particularly well made, will occasion a local rise of temperature when a current is passing.

According to the present invention, the above disadvantages are avoided in switches and circuit interrupters by constructing each pole of a plurality of parts insulated from each other and each having the ratio of the area to the perimeter of its cross-section small enough to render the skin effect negligible. Furthermore, the stationary contact terminals and the conductors leading thereto from the terminals of the switch or interrupter are made of single pieces of metal without any joint, except where filling pieces are riveted to the stationary contact terminals for the purpose of increasing the contact surface.

In order that the nature of the invention may be clearly understood, a typical form of switch constructed in accordance therewith will now be described with reference to the accompanying drawing in which—

Figure 1 is a front elevation of the stationary and movable contact terminals of a switch or interrupter constructed in accordance with the invention. Fig. 2 is a side elevation of one of the stationary contact terminals, and Fig. 3 is a similar view of the movable contact member.

The switch shown in the drawing is designed for a current-carrying capacity of about 2000 amperes and each of the conductors forming the stationary contact terminals is constructed in three parts indicated at 1, 2 and 3, each of which is adapted to carry 660 amperes, it being found that with conductors of this size the skin effect is so small as to be negligible. The conductors are made of copper strap the thickness of which is about one-tenth of the width and the ends are thickened by having side pieces 4 and 5 riveted thereto so as to provide a sufficiently large contact surface.

The joints between the strips and the thickening pieces do not carry the main current and, therefore, are not a source of dangerous heating. In place of attaching side pieces to the conductors, the ends may be forged out or otherwise thickened if desired.

The ends of the conductors are bolted together by bolts 6, paper or other sheet insulation 7 being interposed between. The movable contact member is also composed of three parts 8, 9 and 10, each consisting of a straight brush supported in a holder 11 that is pivoted by a pin 12 to a block 13. The block 13 is secured to the lower end of an operating rod 14, and enough play is allowed for the brushes to swing easily on the pivot to permit the same to take a fair bearing on the stationary contact terminals. Each brush is preferably adjustable in its holder so as to insure that it shall make good connection with the stationary contact terminals independently of the other brushes. The ends of the movable brushes are beveled and the stationary contact terminals are cut to a corresponding angle, in the usual manner.

In the drawing, arcing tips 15 are shown as carried by a resilient bar 16 that is attached to the movable contact member, and corresponding stationary tips 17 are secured to the main stationary contact terminals by screws 18. In order to support the stationary contact terminals in their proper positions, the conductors 1, 2 and 3 are held in clamps 19 that are bolted to the main frame

(not shown), suitable distance pieces 20 and insulation 21 being inserted where necessary.

The switch shown in the drawings is of the kind that is adapted to have their contact members immersed in oil, but my invention is obviously applicable to circuit interrupters of all kinds, whether operated automatically or otherwise, and its use is not limited to interrupters for alternating electric currents, although it is specially designed for the purpose of avoiding the heating due to the skin effect as above mentioned.

I claim as my invention:

1. A terminal member for circuit interrupters comprising a plurality of side-by-side groups of superposed conductors having air ducts therebetween, a cradle for each of the said groups and a supporting member, said cradles being pivotally mounted on the supporting member.

2. A terminal member for circuit interrupters comprising a plurality of side-by-side groups of superposed conductors, a holder for each of the said groups and a supporting member, said holders being independently pivoted on the said supporting member.

3. A terminal member for circuit interrupters comprising a plurality of side-by-side groups of superposed conductors having air ducts therebetween, a holder for each of the said side-by-side groups and a supporting member, said holders being pivotally mounted on the said supporting member.

4. A terminal member for circuit interrupters comprising a plurality of side-by-side groups of conductors, a supporting member and holders for each of the said groups, said holders being pivotally connected to the said supporting members.

5. A terminal member for circuit interrupters and similar devices comprising a plurality of side-by-side groups of superposed conductors, a pivotally mounted support for each of said groups of conductors, and a member to which the said supports are pivoted.

In testimony whereof, I have hereunto subscribed my name this 27th day of February, 1912.

HJALMAR RUDMAN SCHULTZ.

Witnesses:

J. S. PECK,

MILES WALKER.