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H. J. H. HUBER

ELECTRIC SWITCH LINING

Filed Jan. 21, 1921

Fig. 1.

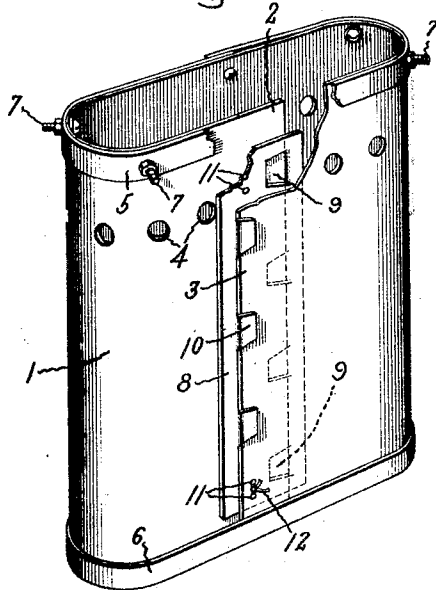


Fig. 2.

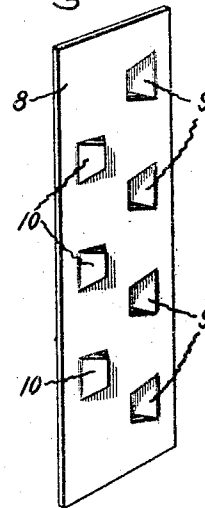


Fig. 3.

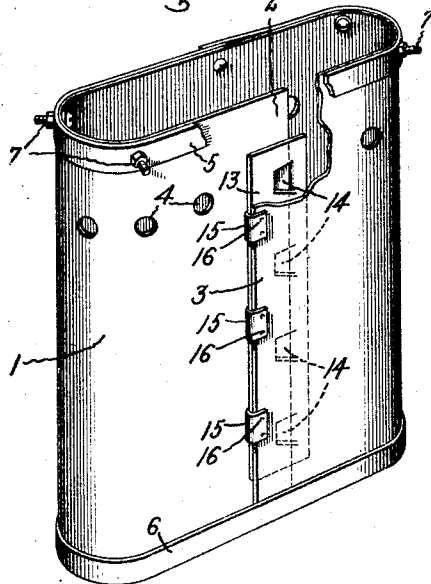
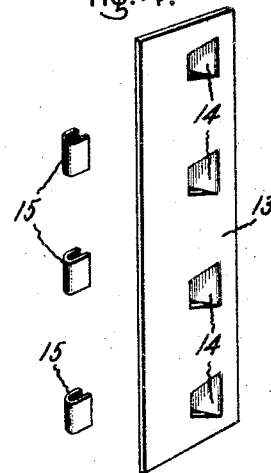


Fig. 4.



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UNITED STATES PATENT OFFICE.

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ELECTRIC-SWITCH LINING.

Application filed January 21, 1921. Serial No. 438,999.

To all whom it may concern:

Be it known that I, HERMAN J. H. HUBER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric-Switch Linings, of which the following is a specification.

My invention relates to improvements in insulating linings for electric switches of the type having relatively movable cooperating contacts separable in an insulating fluid such as oil or the like and more particularly to means for securing the overlapping edges of such linings.

Switch linings, as commonly made, comprise a sheet of flexible insulating material bent into tubular form with overlapping edges. For relatively short linings the overlapping edges may be secured by a metal clip at each end of the lining as the metal clips are then far enough removed from the switch contacts to prevent short circuits to the switch tank, and the overlapping edges will be held in close contact by the metal end clips so that electric currents will not follow through between the overlapping edges of the lining. With longer linings, the overlapping edges tend to bulge and separate intermediate the ends of the lining, thus rendering the lining ineffective to bar the passage of current between the switch contacts and the tank. The use of metal fasteners through the middle portion of the lining to prevent separation of the overlapping edges is not permissible as the metal fasteners would be too near the live contacts of the switch. To overcome this difficulty, it was customary to shellac the overlapping edges of the lining binding them together in any suitable manner and letting them stand until thoroughly dry, usually several days, and then removing the binding. This operation consumed too much time and utilized too much working and storage space as the linings had to be made directly in tubular form and stored in that shape until desired for use.

One of the objects of my invention is, therefore, to provide an insulating fastening device for insulating linings, which is preferably secured to one edge of the lining sheet while the same is flat to permit storing the linings in a flat condition until desired

for use whereby the storage or packing space required is minimized.

Another object of my invention is to provide an insulating fastening device which secures the overlapping edges of an insulating lining sheet when bent into tubular form so as to prevent any bulging or separation of the overlapping edges that would allow the passage of electric currents between the overlapping edges.

A further object of my invention is to provide an insulating fastening device for securing the overlapping edges of insulating linings whereby the time and space required for the production of the linings is greatly decreased.

My invention will be better understood from the following description taken in connection with the annexed sheet of drawings, and its scope will be pointed out in the appended claims.

Figure 1 is a perspective view of a switch lining with a part thereof broken away, illustrating an embodiment of my invention; Fig. 2 is a perspective view of my fastening device as embodied in Fig. 1; Fig. 3 is a perspective view of a switch lining with a part thereof broken away, illustrating a modification of my invention; and Fig. 4 is a perspective view of my fastening device as embodied in Fig. 3.

Referring now to Figs. 1 and 3, a switch lining 1 formed from a substantially flat sheet of flexible insulating material bent into tubular shape is shown with the inner and outer edges 2 and 3, respectively, overlapping. In order to permit the escape of gases formed within the lining 1 when the switch contacts are opened the lining is provided with vents 4. Top and bottom end rings 5 and 6, respectively, may be secured to the lining to assist in maintaining its tubular shape, and in order to maintain the proper spacing between the lining and the walls of a switch tank, the top ring 5 is preferably secured to the sheet 1 by bolts 7 projecting outwardly from the lining. This construction may also be used on the bottom ring if desired.

In Fig. 1 the overlapping edges 2 and 3 of the lining 1 are shown, secured to each other by one form of my fastening device, shown separately in Fig. 2. This form of my invention comprises, preferably, a sub-

stantially flat strip 8 of insulating material provided with two rows of sheared projecting portions or ears 9 and 10 which project in opposite directions from the opposite
5 faces of the strip 8. The ears 9 and 10 are preferably staggered, as in this way the net section of the strip 8 is maintained more uniform and maximum strength for a minimum of material is assured.

10 In applying the form of my fastening device shown in Figs. 1 and 2, one edge 3 of the insulating lining sheet 1 is inserted, preferably before the lining sheet is bent into tubular form, between the strip 8 and one of
15 the rows of projecting portions or ears, say for instance the ears 10. In order to prevent any possibility of the strip 8 working loose from the lining 1 in handling, the strip 8 is further secured to the lining 1. This is preferably done by punching holes 11 through
20 the ends of the strip 8 and the overlapping edge 3 of the lining in contact with the strip 8, inserting a lacing or tying member 12, such as cord or the like, through the holes
25 11, and tying the loose ends of the member 12. The lining sheet 1 is now bent into tubular form and the free edge, in this case the inner edge 2 of the lining 1, is inserted between the strip 8 and the row of engaging
30 ears 9. Obviously, it is immaterial which edge of the lining 1 is first secured to the strip 8. The top and bottom rings 5 and 6 are now secured to the ends of the lining 1 to help in maintaining the tubular shape of
35 the lining.

In Fig. 3 the overlapping edges 2 and 3 of the lining 1 are shown secured to each other by a modified form of my fastening device, shown separately in Fig. 4. This
40 form of my invention comprises, preferably, a substantially flat strip 13 of insulating material provided with a row of sheared projecting portions or ears 14 projecting from one face of the strip, and a plurality
45 of metal clips or fasteners 15.

In applying the modified form of my fastening device shown in Figs. 3 and 4, the face of the strip 13, opposite the face from which the ears 14 project, is superposed on
50 the lining sheet 1, preferably before it is bent into tubular form, with the edge 3 of the sheet 1 in coincidence with the edge of the strip 13 opposite the ears 14. These coincident edges are then fastened together
55 by the clips 15 which may be indented as at 16 to insure a better grip on the strip 13 and the lining 1. The lining sheet 1 is now bent into tubular form and the free edge of the lining is made the inner overlapping edge 2
60 so as to insure a layer of insulation between the interior of the lining 1 and the clips 15. The inner edge 2 is then inserted between the strip 13 and the ears 14 and, as before, the end rings 5 and 6 are secured to the lining.
65 It is therefore clear that my fastening

device maintains close contact between the overlapping edges 2 and 3 of the lining 1 and the fastening strip 8 or 13 because provision is made throughout the length of the
70 strip for securing the overlapping edges of the lining thereto. Obviously with the maintenance of such close contact between the overlapping edges of the lining and the fastening strip, the danger of short circuits
75 from the switch contacts to the tank is minimized as the bulging or separation of the overlapping edges of the switch lining is prevented.

Inasmuch as the ears of the fastening strips project but little from the strips, it is obvious that when the fastening strips are
80 secured to the lining sheets while flat, these sheets may be stored or packed in a condition which requires the minimum of storage space. It is also clear that the operation of
85 assembling the linings is greatly facilitated, as my fastening device affords a rapid and convenient means for securing the overlapping edges of the lining without the time consuming shellacing operation heretofore
90 mentioned.

Although I have shown and described my invention in considerable detail, I do not wish to be limited to the specific details
95 thereof, as shown and described, but may use such modifications in, substitutions for, or equivalents thereof, as are embraced within the scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States, is:— 100

1. The combination with an insulating sheet adapted to be bent into tubular form with overlapping edges, of an insulating
fastening device adapted to be secured to one edge of said sheet and provided with
105 means adapted to engage the other edge of said sheet when the same is bent into tubular form, whereby the overlapping edges of said sheet are maintained in close contact with
110 said fastening device.

2. The combination with an insulating sheet adapted to be bent into tubular form with overlapping edges, of an insulating
strip intermediate said overlapping edges and means for securing each of said overlap-
115 ping edges to said strip, whereby said overlapping edges are held in close contact with said strip.

3. The combination with a flexible insulating sheet adapted to be bent into tubular form with overlapping edges, of an insulating
fastening device for securing said overlapping edges secured to one edge of said
120 sheet and provided with a plurality of engaging portions adapted to receive the other edge of said sheet when the same is bent into
125 tubular form, whereby the overlapping edges of said sheet are held in close contact with said fastening device.

4. The combination with the lining for a 130

switch tank of an insulating fastening device for securing the edges of said lining when the same are overlapped, comprising means for securing said device to one edge
5 of said lining and a plurality of projecting portions on said device adapted to engage the other edge of said lining, whereby the overlapping edges of said lining are held in close contact with said fastening device.

10 5. The combination with a switch lining of tubular form with overlapping portions, of means for securing said overlapping portions comprising a substantially flat insulating strip provided with two rows of op-
15 posed sheared portions projecting from opposite faces of said strip adapted to engage the overlapping portions of said lining, whereby said overlapping portions are maintained in close contact with said strip.

20 6. A switch lining comprising a flexible insulating sheet adapted to be bent into tubular form with overlapping edges, and a sheet fastening device for securing said

overlapping edges comprising an insulating strip provided with two rows of engaging
25 ears projecting in opposite directions from opposite faces of said strip, said rows of ears being adapted to engage the overlapping edges of said sheet when the same is bent into tubular form, whereby said over-
30 lapping edges are held in close contact with said strip.

7. The combination with a flexible insulating sheet of tubular form with overlapping edges, of an insulating fastening strip
35 intermediate said overlapping edges provided with two rows of sheared engaging portions projecting in opposite directions from opposite faces of said strip and cooperatively engaging said overlapping edges,
40 whereby the same are held in close contact with said strip.

In witness whereof, I have hereunto set my hand this 20th day of January 1921.

HERMAN J. H. HUBER.