March 29, 1966 A. FOTI 3,243,561

ALUMINUM DISCONNECT SWITCH BLADES
HAVING COPPER BEAVERTAIL CONTACTS

Filed March 31, 1964 2 Sheets-Sheet 1

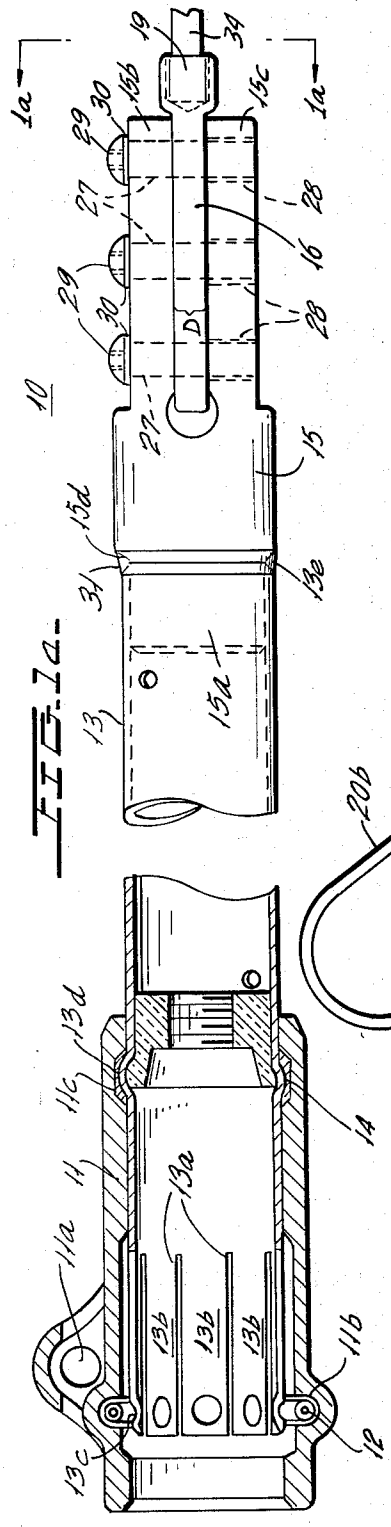

FIG. 1a.

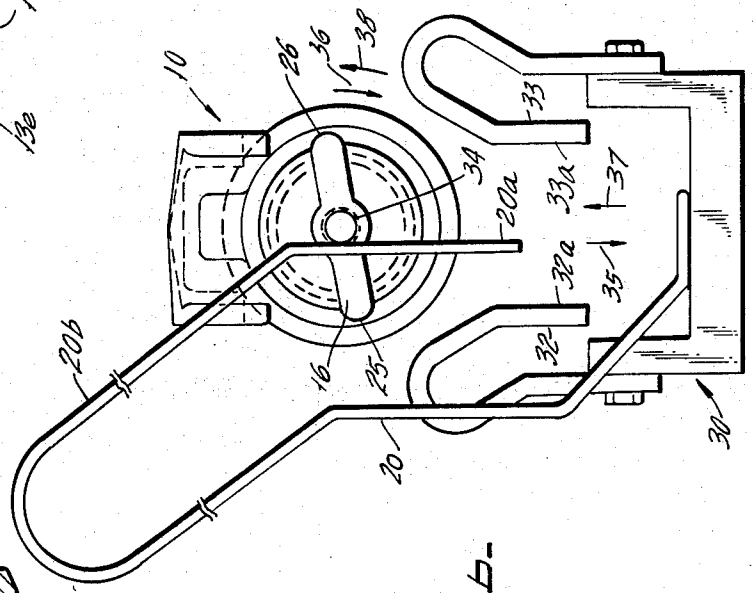

FIG. 1b.

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FIG. 2a.

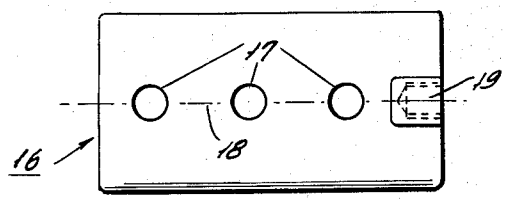
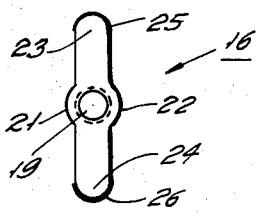


FIG. 2b.



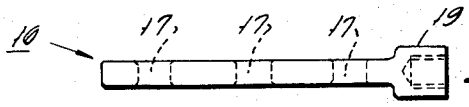


FIG. 2c.

FIG. 3a.

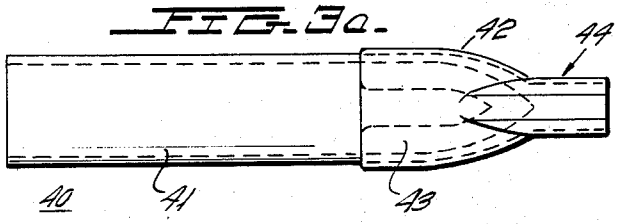


FIG. 3b.

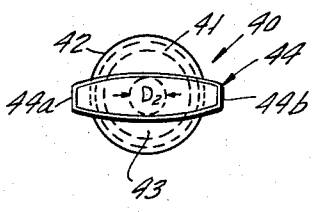


FIG. 4a.

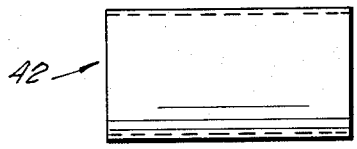


FIG. 4b.

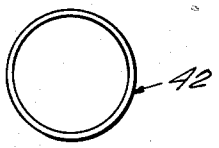


FIG. 5a.

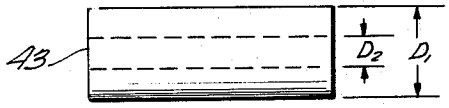


FIG. 5b.

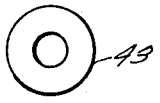


FIG. 6a.

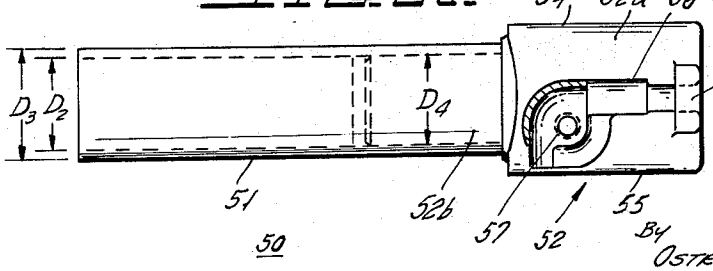
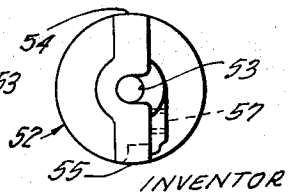


FIG. 6b.



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3,243,561

ALUMINUM DISCONNECT SWITCH BLADES HAVING COPPER BEAVERTAIL CONTACTS

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Filed Mar. 31, 1964, Ser. No. 356,228
15 Claims. (Cl. 200—166)

The instant invention relates to electrical switches and more particularly to outdoor high-voltage switches which are of a dual-metal construction and wherein the dual-metal inner face is formed in a novel manner to prevent the occurrence of electro-galvanic corrosion.

The transition from outdoor electrical switches manufactured from copper to aluminum outdoor switches has taken place due to the fact that the use of aluminum in manufacturing such outdoor switches has numerous advantages over outdoor switches constructed of copper. For example, aluminum has the favorable properties of being lightweight, having high strength, excellent corrosion resistance, ease of fabrication, low erection and maintenance costs, permit the use of substantially lighter supporting structures, excellent electrical and thermal conductivity, non-sparking and non-magnetic characteristics, and also has a relatively low cost per pound as a raw material.

However, since numerous portions of the switch which have relative movement with respect to each other and must carry large magnitudes of current through the relatively movable parts, it cannot be favorably constructed of aluminum. This has led to the construction of outdoor high-voltage switches which are made of aluminum and which have the conductive portions which are relatively movable, made of copper, so as to retain the desirable characteristics of both metals in a switch.

One typical outdoor high-voltage switch made of aluminum and which is provided with conducting portions which are relatively movable, made of copper, is set forth in great detail in copending application Serial No. 114,271, entitled Dual-Metal Electric Switch, filed April 19, 1961, by A. Foti, now United States Patent 3,206,568, issued September 14, 1965, and assigned to the assignee of the instant invention. The above mentioned copending application, which teaches such a dual-metal structure, further discusses the manner in which the aluminum and copper are bonded to one another. The bonding is an extremely critical operation since failure to provide a proper bond exposes the switch structure to electro-galvanic action which may occur upon exposure of the switch to rain, snow, or water from any source whatsoever.

In addition to the electro-galvanic action which may occur by exposure of the outdoor electrical switch to the elements, it is also important that the bonding operation provides a dual-metal structure having the ability to resist impact loading to which the inner face may be subjected during abnormally fast switching operations, or through any other causes.

The instant invention details bonding operations between copper and aluminum, which in addition to preventing the occurrence of electro-galvanic actions, further provides a dual-metal switch in which the movable dual-metal elements have extremely high resistance to impact loading with no appreciable effect to the inner face so as to provide an electrical switch structure having an extremely long, useful operating life.

One arrangement taught by the instant invention is comprised of providing a forged copper beavertail member for use with the jaw of the electrical outdoor switch. The portions which will cooperate with the switch jaw

are then suitably silver plated. All exposed surfaces of the beavertail member, with the exception of the silvered contact surfaces, are then hot tin dipped. The copper beavertail member is then mounted between the extending cooperating arms of a beavertail support member which receive the rearward end of the forged beavertail member. The surfaces of the supporting arms making physical contact with the beavertail member are wire-brushed under an inhibiting compound to remove any high resistance oxide coatings. The assembly is then bolted securely under predetermined torque specifications to apply the appropriate pressure between the beavertail holder and the beavertail member. Spring washers, provided with the fastening means, assure retention of proper pressure, both when the assembly experiences wide temperature excursions and when the assembly is exposed to physical impact during the usage thereof. The hot tin dipping operation serves as a suitable barrier between the copper and aluminum engaging surfaces so as to eliminate any possibility of electro-galvanic corrosion.

An alternative arrangement which may be employed is that of providing a copper tube which is completely hot tin dipped over the exterior surface and/or both interior and exterior surfaces. The copper tube is then placed over one end of a piece of aluminum pipe. An aluminum rod, having a substantially narrow aperture, extending longitudinally therethrough, is then inserted within the aluminum pipe and has a first end thereof aligned with the free end of the copper tube. The entire assembly is then cold-forged, or formed into the desired beavertail shape. Upon completion of the forging, or forming operation, the copper contact sleeve is spot welded to the aluminum blade. The spot welding takes place by placing the assembly in an environment of inert gas such as, for example, argon. If desired, the contact surfaces of the beavertail formed by the forging operation, may be silvered and the balance of the exposed copper surfaces will be hot tin dipped so as to provide suitable protection from electro-galvanic corrosion between the copper and the aluminum.

Still another suitable arrangement consists of providing an aluminum tube which is pressure-fitted with a beavertail member which may be tinned over its entire surface. The assembly is then spot welded in an environment of inert gas at several spots at the press fit junction of the two metals. The copper beavertail member may be a casting or a forging. If it is desired to have silver surfacing, the surfacing operation may be performed prior to the tinning operation previously described. The copper beavertail member may be substituted by an aluminum beavertail member, which is welded to the aluminum tube after the press fit engagement has been made. The aluminum beavertail member is then coated with a deposit of silver contact strips, or members, to the aluminum beavertail, in a manner not susceptible to electro-galvanic corrosion.

Still another concept is that of removing the hot tin dipper copper tube in the forged assembly, thus using only all aluminum parts. The aluminum rod, which is forged to form the beavertail structure is then provided with silver contact surfaces which are bonded thereto so as to prevent any electro-galvanic corrosion at the inner face thereof.

All of the above embodiments provide a movable switch blade structure having a beavertail member with the engaging contact surface thereof being a low resistance metal such as silver or copper, which is bonded in such a manner as to prevent any occurrence of electro-galvanic corrosion. In addition thereto, the bonding processes employed provide a structure which has high resistance to physical impact so as not to affect the bonding at the inner face between the dissimilar metals.

It is therefore one object of the instant invention to provide a novel switch blade structure for electrical switches of the outdoor type wherein the switch blade assembly is comprised of two dissimilar metals bonded in such a manner as to prevent the occurrence of any electro-galvanic corrosion.

Still another object of the instant invention is to provide a novel switch blade structure for electrical switches of the outdoor type wherein the switch blade assembly is comprised of two dissimilar metals bonded in such a manner as to prevent the occurrence of any electro-galvanic corrosion and wherein the assembly has extremely high resistance to any physical impacts which may be sustained.

Still another object of the instant invention is to provide a novel switch blade structure for high-voltage electrical switches of the outdoor type wherein the switchblade assembly is comprised of two dissimilar metals bonded to one another wherein the metal making contact with the switch jaw is hot tin dipped along the surfaces thereof which make engagement with the other metallic member to prevent electro-galvanic corrosion.

Still another object of the instant invention is to provide a novel switch blade structure for high voltage electrical switches of the outdoor type wherein the switch blade assembly is comprised of two dissimilar metals bonded to one another wherein the metal making contact with the switch jaw is hot tin dipped along the surfaces thereof which make engagement with the other metallic member to prevent electro-galvanic corrosion and wherein suitable fastening means are provided to firmly bond the elements to one another.

Still another object of the instant invention is to provide a novel switch blade structure for high-voltage electrical outdoor switches wherein the switch blade assembly is comprised of two dissimilar metals which are spot welded to one another in such a manner as to prevent electro-galvanic corrosion between the engaging surfaces of the metals.

Still another object of the instant invention is to provide a novel switch blade structure for high-voltage electrical outdoor switches wherein the switch blade assembly is comprised of two dissimilar metals which are spot welded to one another in such a manner as to prevent electro-galvanic corrosion between the engaging surfaces of the metals with the spot welding operation being performed in an environment of an inert gas.

Still another object of the instant invention is to provide a novel switch blade assembly for high voltage electrical outdoor switches wherein the swtich blade assembly is comprised of an aluminum beavertail member and aluminum tubing which are welded to one another wherein the beavertail member is provided with silver contact surfaces on the region of the beavertail member which makes engagement with the switch jaw.

Still another object of the instant invention is to provide a novel switch blade assembly for high voltage electrical outdoor switches wherein the switch blade assembly is comprised of an aluminum beavertail member and aluminum tubing which are welded to one another wherein the beavertail member is provided with silver contact surfaces on the region of the beavertail member which makes engagement with the switch jaw and wherein the bonding between the aluminum and silver surfaces is performed in a manner to prevent any electro-galvanic corrosion therebetween.

These and other objects of the instant invention will become apparent when reading the accompanying description and drawings in which:

FIGURE 1*a* shows a side view of a switch blade assembly designed in accordance with the principles of the instant invention.

FIGURE 1*b* is an end view of the assembly of FIGURE 1*a* entering its cooperating jaw member.

FIGURES 2*a*, 2*b* and 2*c* are top, side and end views, respectively, of the beavertail member employed in the assembly of FIGURES 1*a* and 1*b*.

FIGURES 3*a* and 3*b* are side and end views, respectively, of an alternative embodiment for the switch blade assembly of FIGURES 1*a* and 1*b*.

FIGURES 4*a* and 4*b* are side and end views, respectively, of the copper tube employed in the assembly of FIGURES 3*a* and 3*b*.

FIGURES 5*a* and 5*b* are side and end views, respectively, of the aluminum tube employed in the assembly of FIGURES 3*a* and 3*b*.

FIGURES 6*a* and 6*b* are side and end views, respectively, of still another alternative embodiment for the switch blade assembly.

Before consideration is given to a detailed description of the instant invention and for the purpose of simplifying the instant invention, the previously mentioned copending application entitled "Dual-Metal Electric Switch" is incorporated herewith by reference thereto. This copending application shows in detail a high-voltage outdoor electrical switch which may embody the novel switch blade assembly of the instant invention. For the purposes of the instant invention it is sufficient to understand that the beavertail member (to be more fully described) cooperates with a stationary jaw member with which it makes sliding engagement during the time in which the electric switch is in the closed position. When operating the switch to the open position, the beavertail member, in addition to being lifted out and away from the jaw member, is first rotated to further enhance the repetitity of the disengagement operation, thus providing engaging surfaces which make sliding contact with one another at any time in which the switch is operated to either its opened or closed position. The figures of the instant invention will be limited to a showing of the switch blade assembly with the exception of FIGURE 1*b*, which shows a simplified version of the switch assembly jaw.

Referring now to the drawings of the instant application, FIGURES 1*a* and 1*b* show a blade assembly **10** which is comprised of a blade trunnion **11** having a suitable aperture **11***a* for pivotally linking a crank arm thereto, such as, for example, the crank arm **55**, shown in FIGURE 2 of the aforementioned copending application. A suitable groove **11***b* is provided in the interior of blade trunnion **11** for receiving a garter spring **12**. Elongated slots **13***a* are provided at the left-hand end of tube **13** to permit the left-hand end of tube **13** to undergo a small amount of deflection. In addition thereto, each finger **13***b* formed between slots **13***a* is provided with a depressed or indented portion **13***c* for providing high pressure spot contact with the cooperating blade hinge member, not shown.

Tube **13** is further provided with a circumferential bulging surface **13***d* extending entirely around its pheriphery so as to be seated within a circumferential groove **11***c* provided in blade trunnion **11**. A suitable weather seal **14** is provided in this groove to prevent any entrance of foreign elements therein.

The right-hand end of blade tube **13** is bevelled at **13***e* and has a first end **15***a* of beavertail support member **15** inserted therein. The beavertail support member **15** is a solid aluminum member having first and second extending arms **15***b* and **15***c* projecting in a direction opposite end **15***a*. The arms **15***b* and **15***c* provide a narrow opening D for receipt of the beavertail member **16**.

Beavertail member **16** is shown in greater detail in FIGURES 2*a*–2*c* and is a substantially flat, solid member having a plurality of apertures **17**, the centers of which lie along the longitudinal axis **18** of beavertail **16**. The forward end of beavertail **16** is provided with a tapped aperture **19** for the purpose of receiving a stainless steel member which is employed as an arcing rod and which cooperates with a stationary arcing horn **20** to be more fully described, for the purpose of transferring

any arc which may be formed from the main cooperating contacts to be arcing contacts to prevent undue wearing of the main contacts.

The forward end of beavertail **16** is provided with two arcuate surfaces **21** and **22** on the opposite sides of the beavertail member and surrounding the aperture **19**. The beavertail **16** may be forged and is further preferably cold-pressed after the forging operation to attain a predetermined hardness. The arcuate shaped edges **23** and **24** are then silver plated to provide the silver surfaces **25** and **26**. Beavertail **16** is then hot tin dipped over all of the remaining surface, except for the silver plated contact surfaces **25** and **26**.

The beavertail **16**, after being forged, cold-pressed, silver-plated and hot tin dipped, is positioned in the manner shown in FIGURE 1*a* with the tapped aperture **19** extending away from the beavertail support member **15**. The apertures **17** of beavertail **16** are positioned in alignment with the apertures **27** and **28** in extending arms **15***b* and **15***c*, respectively. Apertures **28**, in arm **15***c*, are tapped for the purpose of threadly engaging the fastening bolts **29**. Spring washers **30** are positioned between the heads of bolts **29** and the upper surface of extending arm **15***b*.

In the area where the finished beavertail member **16** is in engagement with the beavertail support **15**, the aluminum surfaces of projecting arms **15***b* and **15***c* engage beavertail **16**, and are freed of high resistance oxide coatings by wire brushing or abrading under an inhibiting grease, after which the tinned copper contact **16** is bolted securely in place with the bolts **29**. The bolts are drawn to specified torques to provide the desired pressure between beavertail support **15** and beavertail **16**. Preferably 25–35 foot-pounds of torque is desirable. The spring washers **30** assure retention of this proper pressure when the metallic elements experience wide temperature excursions. In addition thereto, the spring washers assure proper pressure during periods when the beavertail member may experience any physical impact.

Beavertail support **15** is bevelled at **15***d* and is electric arc-welded **13***e* to aluminum blade tube **13**. The overall assembly **10** provides a mechanically and electrically sound structure. The assembly is secure from electro-galvanic corrosion, will dependably maintain contact pressure between the engaging aluminum and copper surfaces at the bolted connections, is mechanically rigid so as to be free from damage due to impact loading and at the same time meets the objective of using basically aluminum switch members, but at the same time retaining the usage of copper contacts due to the distinct advantages derived therefrom.

Considering specifically FIGURE 1*b*, the relationship between the blade assembly **10** and the jaw assembly **30** is shown therein. The jaw assembly used therein may be of the type described in the aforementioned copending application and is comprised of a substantially U-shaped base member **30** which is suitably designed to act as the terminal pad, in a manner not shown. The extending arms of the U-shaped aluminum member **30** have secured thereto first and second contact members **32** and **33** which are designed so as to have copper contact surfaces, in the manner described in the aforementioned copending application. Affixed to the U-shaped aluminum member **30** in a suitable manner is an arcing horn **20**, the free end **20***a* of which engages a straight elongated moveable arcing horn **34**, which is threaded into tapped aperture **19** of the beavertail member **16**.

The closing operation of the blade assembly is such that when the blade assembly **10** moves downward in the direction shown by arrow **35**, the blade assembly rotates about its central axis in direction of arrow **36**, closing the beavertail member **16** to have its upper and lower faces substantially arranged in the horizontal direction so that its arcuate silver covered surfaces **25** and **26** engage the surfaces **32***a* and **33***a* of contact members **32** and **33**, respectively. When the switch is opened, the blade assembly **10** moves upward in the direction shown by arrow **37** and concurrently therewith the beavertail **16** rotates in the counterclockwise direction as shown by arrow **38**, so that while the free end of the blade assembly (i.e., the beavertail end) is moving away from the contact members **32** and **33**, the silver coated surfaces **25** and **26** due to the rotational movement of the beavertail **16** are also moving away in a circular direction. It can be noted that due to the length of the free end **20***a* of stationary arcing horn **20**, this free end is always in engagement with the movable arcing horn **34**. Thus, when the beavertail **16** is no longer in electrical contact with the contact members **32** and **33**, the current path is transferred from beavertail **16** and contact members **32–33** to stationary arcing horn **20** and movable arcing horn **34**. As the blade assembly **10** continues to move in the upward vertical direction of arrow **37** (considering FIGURE 1*b*), the diagonal portion **20***b* of arcing horn **20** causes the distance between itself and the movable arcing horn **34** to increase so as to lengthen the arc path for the ultimate extinction thereof.

An alternative embodiment for the blade assembly **10** is designated by numeral **40** and is shown in FIGURES 3*a* and 3*b*. This blade assembly **40** is comprised of several parts—first, a hollow, tubular, aluminum member **41**. Tubular member **41** receives a tubular copper member **42**, shown in FIGURES 4*a* and 4*b*, which is first hot tin dipped so that its exterior surface and/or its interior and exterior surfaces and ends thereof are completely coated. The copper tube **42** is then slipped over the right-hand end of tubular aluminum member **41**, in the manner shown in FIGURE 3*a*.

An aluminum tube **43**, shown in FIGURES 5*a* and 5*b*, is inserted into the tubular aluminum member **41**, in the manner shown in FIGURE 3*a*. Tube **43** has an exterior diameter D_1, and an interior diameter D_2 which is substantially less than the diameter D_1, so as to provide a fairly thick, rigid tube as opposed to a thin, cylindrical shell.

At the initial assembly stage, all of the members **41–43** have cylindrical shapes. The entire assembly comprised of these cylindrically shaped members are then cold-forged, or formed to the beavertail shape, which can best be seen at the right-hand end of FIGURE 3*a*, and the end view of FIGURE 3*b*. The beavertail, or elongated oval type shape **44** of FIGURE 3*b* can be seen to substantially resemble the beavertail configuration **16** of FIGURE 1*b*.

After completion of this cold-forging operation which is preferably performed through the usage of a high-tonnage press, the copper contact sleeve, or tube, **42**, is spot welded to the aluminum blade **41** in an environment of an inert gas such as, for example, argon. The spot welding provides a reliable electrical connection between the copper and the aluminum. The contact surfaces of the arrangement **40**, shown in FIGURES 3*a–5b* may be optionally silvered along the surfaces **44***a* and **44***b*, shown in FIGURE 3*b*, in the manner previously described with respect to the beavertail **16** of FIGURE 2*c*. The balance of the exposed copper surfaces may be hot tin dipped for protection from electro-galvanic corrosion between the copper and aluminum, or as previously described, the entire sleeve is tinned all over prior to assembly thereof. The integration and operation of the blade assembly **40** into the electrical switch arrangement such as, for example, the arranegment shown in the aforementioned copending application, would be substantially similar to that shown in FIGURE 1*b*. The opening of diameter D_2 may be threaded to receive a movable arcing horn of the type described with reference to FIGURE 1*b*.

Referring now to FIGURES 6*a* and 6*b*, there is shown therein another alternative embodiment **50** of a blade

assembly which is comprised of a tubular aluminum member **51** having an outer diameter D_3 and an inner diameter D_2. Its right-hand end is bored to an inner diameter D_4 which is just slightly greater than the inner diameter D_2. A beavertail member **52** is comprised of a main beavertail shaped portion **52***a* similar to the configurations **16** and **44** described previously and is provided with a cylindrically shaped extension **52***b* at its left-hand end which is pressure fitted into the right-hand end of tube **51**. The beavertail member **52** is a copper member which may either be cast or forged for the formation thereof. A suitable aperture **53** is provided at its free end for receipt of a movable arcing horn of the type previously described. The arcing horn while not shown here has a substantially J shaped configuration. The aperture **53** provided in beavertail member **52** communicates with a substantially J shaped cavity **56** which is provided for seating and securing an arcing horn to the beavertail member **52**. A second aperture **57** is provided within the base of cavity **56** and is designed to receive suitable fastening means (not shown) for securing an arcing horn to the beavertail member **52**.

After the press fit is made between elements **51** and **52**, these elements are spot welded along the press fit junction in at least several spots thereof. The welding is done in an environment of an inert gas. Silver surfaces may be provided along the edges **54** and **55** of beavertail **52** in the same manner as previously described. To further enhance the ability of the assembly **50** to eliminate electro-galvanic corrosion, the copper beavertail member **52** may be hot tin dipped in the same manner as previously described.

As a further embodiment, it is also possible to substitute for the copper beavertail member **52** of assembly **50**, a beavertail member formed of aluminum. The aluminum, cast or forged, beavertail can then be welded to the blade tubing **51** in the same manner as described after the press fit engagement has been made. The construction presents a practical embodiment for use in an electric switch construction such as that described in the aforementioned copending application. However, in order to provide durable contact surfaces, it is necessary to deposit silver contact strips along the edges **54** and **55** of the aluminum beavertail so as to make the dual-metal inner face unsusceptible to electro-galvanic corrosion.

In the same manner, the assembly **40** of FIGURES 3*a* and 3*b* may be altered by providing an aluminum tube in place of the copper tube **42** in order to form the blade assembly shown in FIGURES 3*a* and 3*b*. In this respect, in order to provide satisfactory contact surfaces, the surfaces **44***a* and **44***b* may be provided with silver contact strips or surfaces to enhance the conductivity value of the blade assembly **40**.

Each of the above described arrangements meet the requirements of providing a mechanically sound and electrically good conductivity joint between all dissimilar metal inner faces. Each assembly is properly treated to prevent electro-galvanic cororsion and has the additional characteristics of being able to resist severe mechanical impact.

Although there has been described a prefererd embodiment of this novel invention, many variations and modifications will now be apparent to those skilled in the art. Therefore, this invention is to be limited, not by the specific disclosure herein, but only by the appending claims.

What is claimed is:

1. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion.

2. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms.

3. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said rigid metallic member being formed of copper.

4. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said first and second arms having apertures arranged in alignment with one another; said beavertail means metallic member having apertures in alignment with the apertures in said arms when positioned therebetween; fastening means being threaded through said apertures for rigidly securing said beavertail means to said support means.

5. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for

rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said first and second arms having apertures arranged in alignment with one another; said beavertail means metallic member having apertures in alignment with the apertures in said arms when positioned therebetween; fastening means being threaded through said apertures for rigidly securing said beavertail means to said support means; arcing horn means secured to said beavertail means and projecting in said first direction away from said support means.

6. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said arcuate edges being silver plated.

7. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member; said support means having a tubular shape at one end thereof and surrounding said elongated tubular member; tube means positioned within said support means; said tube means and the opposite end of said support means being forged to form an oval cross-section.

8. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member; said support means having a tubular shape at one end thereof and surrounding said elongated tubular member; rigid tube means positioned within said support means; said rigid tube means and the opposite end of said support means being forged to form an oval cross-section; said support means being formed of copper and said rod means being formed of aluminum.

9. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member; said support means having a tubular shape at one end thereof and surrounding said elongated tubular member; rigid tube means positioned within said support means; said rigid tube means and the opposite end of said support means being forged to form an oval cross-section having two opposing arcuate surfaces and two opposing flat surfaces joining the edges of said arcuate surfaces, two opposite surfaces of which are substantially flat with the remaining two surfaces being arcuate in shape.

10. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said flat, rectangular surfaces being coated with tin.

11. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member; said support means having a tubular shape at one end thereof and surrounding said elongated tubular member; rigid tube means positioned within said support means; said rigid tube means and the opposite end of said support means being forged to form an oval cross-section having two opposing arcuate surfaces and two opposing flat surfaces joining the edges of said arcuate surfaces, two opposite surfaces of which are substantially flat with the remaining two surfaces being arcuate in shape; said arcuate surfaces being coated with silver.

12. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; beavertail means secured to said tubular member; said beavertail means comprising a metallic member having a cylindrically shaped first end inserted within the second end of said tubular member; the second end of said beavertail means being formed integral with said cylindrical shaped first end; said second end having first and second substantially flat, rectangular shaped surfaces; first and second sides of said surfaces being joined by arcuate shaped edges, said elongated tubular member and said beavertail means being formed of different metallic substances.

13. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; support means secured to said tubular member and having first and second projecting arms each extending in a first direction; beavertail means mounted between said first and second arms; means for rigidly securing said beavertail means to said arms; said beavertail means and said support means being formed of different metallic substances; coating means covering substantially the entire surface of said beavertail means for preventing the occurrence of electrogalvanic corrosion; said beavertail means comprising a rigid metallic member having first and second substantially flat, rectangular surfaces; first and second parallel sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces engaging said first and second arms; said beavertail means being formed of copper.

14. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; beavertail means secured to said tubular member; said beavertail means comprising a metallic member having a cylindrically shaped first end inserted within the second end of said tubular member; the

second end of said beavertail means being formed integral with said cylindrical shaped first end; said second end having first and second substantially flat, rectangular shaped surfaces; first and second sides of said surfaces being joined by arcuate shaped edges; said first and second surfaces being coated with tin; said elongated tubular member and said beavertail means being formed of different metallic substances.

15. Blade means for outdoor high-voltage switches and the like comprising a blade assembly having means for mounting said blade assembly to a switch near one end thereof; said blade assembly further comprising an elongated tubular member; beavertail means secured to said tubular member; said beavertail means comprising a metallic member having a cylindrically shaped first end inserted within the second end of said tubular member; the second end of said beavertail means being formed

integral with said cylindrical shaped first end; said second end having first and second substantially flat, rectangular shaped surfaces; first and second sides of said surfaces being joined by arcuate shaped edges; said arcuate edges being coated with silver; said elongated tubular member and said beavertail means being formed of different metallic substances.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,243,561 March 29, 1966

Arem Foti

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 9, line 59, for "rod" read -- rigid tube --.

Signed and sealed this 17th day of December 1968.

(SEAL)
Attest:

dward M. Fletcher, Jr.
ttesting Officer

EDWARD J. BRENNER
Commissioner of Patents