Jan. 26, 1943 J. ROGOFF 2,309,607

UNITARY CLAMP ASSEMBLY

Filed July 30, 1940

Fig. 1

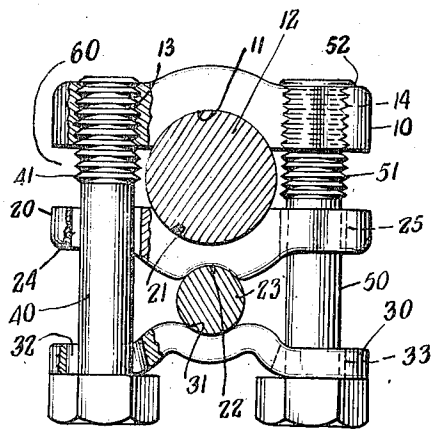


Fig. 2

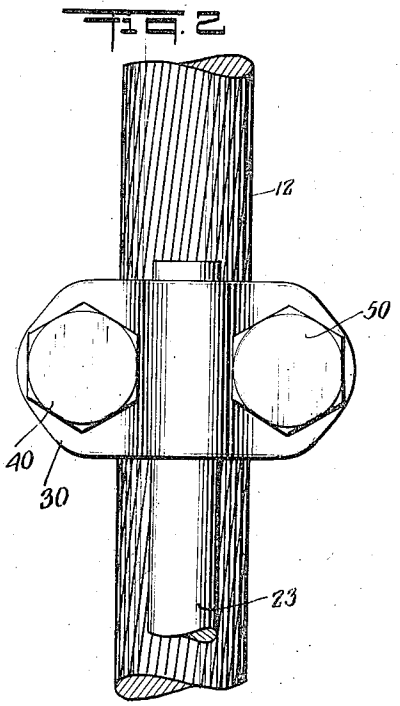


Fig. 3

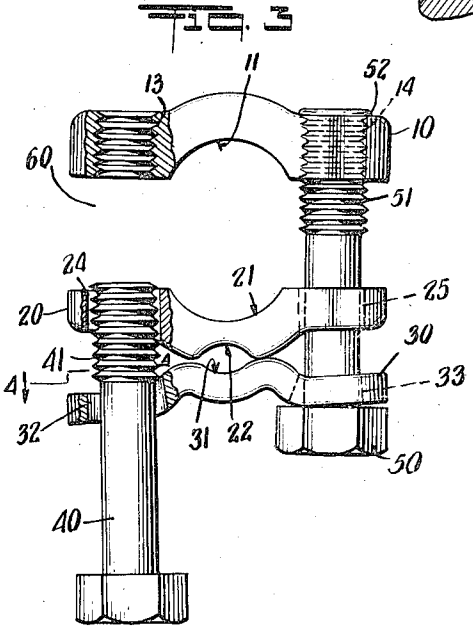
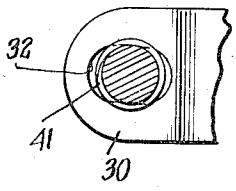


Fig. 4



INVENTOR.
JULIAN ROGOFF

BY Harry Ernest Rubens

ATTORNEY.

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UNITARY CLAMP ASSEMBLY

Julian Rogoff, New York, N. Y., assignor to Burndy Engineering Company, Inc., a corporation of New York

Application July 30, 1940, Serial No. 348,346

1 Claim. (Cl. 173—273)

My invention relates to electrical connectors to join copper conductors to aluminum cable or aluminum cable, steel reinforced (ACSR).

Aluminum cable, steel reinforced (ACSR) is used extensively for current distribution in rural electrification. Because the aluminum is extremely malleable, it is readily damaged when a clamp is used to take taps from the ACSR line. Since the spans in rural electrification are quite long, vibration of the conductor has a tendency to cause it to fail at such points of damage or at points of support. As a result it is general practice to protect the ACSR conductor at points of support with "armor rods." These are, simply a group of short aluminum wires, about 3 or 4 feet long, which are clamped about the circumference of the ACSR conductor. At the center of these wires the conductor is supported by the suspension clamp and taps from the ACSR are made by clamping the connector over the armor rods. The instant type of electrical connector is especially suitable for clamping tap conductors to the armor rods which protect the ACSR conductor.

The principal object of my invention is to provide a clamp which can be quickly and easily installed even on pole tops or other inconvenient locations where linemen must work.

Another object of my invention is to provide a connector which has all its parts held together in assembled relationship even when open to receive the conductors. In this manner, loose parts which may drop or be lost are eliminated.

Another object of my invention is to provide a low cost assembly.

Still another object of my invention is to provide a means for maintaining constant pressure on the conductors even though the conductors may flow or creep under the applied pressure.

Another object of my invention is to provide means for inhibiting or retarding the galvanic corrosion which may result from contact between aluminum and copper conductors in outdoor atmospheres.

A further object of my invention is to avoid a complete magnetic circuit about the conductors which might be a result of making all parts of ferrous materials.

I accomplish these and other objects and obtain my new results as will be apparent from the device described in the following specification, particularly pointed out in the attached claim, and illustrated in the accompanying drawing, in which:

Fig. 1 is a side elevation of my preferred form of clamp.

Fig. 2 is a bottom elevation of the same.

Fig. 3 is a side elevation, partially in section illustrating the unitary assembly.

Fig. 4 is a partial view of one end of the spring plate.

Referring more particularly to the drawing, reference numeral **10** designates a cap plate, preferably made of iron for economy, and galvanized thereafter. It is provided with a central transverse groove **11**, for engaging an armor rod **12**, and end tapped holes **14** and **13** on either side of the groove.

The central plate **20**, preferably made of copper alloy and galvanized, is similarly provided with a corresponding groove **21**, with a groove **22**, on the opposite side thereof, for the copper conductor **23**, and two end apertures **24** and **25**. On the springy plate **30**, the third element, preferably made of phosphor bronze, is a cable groove **31** for the opposite side of the conductor **23**, and end holes **32** and **33**, for entrance of two bolts **40** and **50** preferably made of galvanized steel, and provided with rolled threads **41** and **51** respectively.

In order to prevent the parts from becoming separated when the clamp is opened for insertion of the conductors, bolt **50** is preferably threaded through the cap **10** and the end of the screw is peened over as at **52** to prevent its withdrawal. The threaded portion **41** of the other bolt **40** is passed through the hole **32** in the spring plate **30** and the hole in the plate is then reduced in diameter as indicated in Fig. 4 so as to permit the shank of the screw **40** to slide freely therein, but to such an extent that the threaded portion of the bolt cannot drop through the hole. This is true because the shank of a rolled thread screw is slightly smaller in diameter than the major diameter of the threads.

When the connector is to be installed, the bolt **50** which has the end peened over is withdrawn as far as it will go. The other bolt **40** is then unthreaded entirely and it will drop down until the threads encounter the edge of the hole **32** in the spring plate **30**. This will leave an opening **60** in the side of the connector through which the armor rods over the ACSR can pass. The free end of plate **20** can then be lifted for lateral entrance of conductor **23**, if necessary.

The most popular sizes of ACSR are #2 and #4. In order to make my clamp universal, I have designed a single size to accommodate both these conductors over the armor rods. This

means that the threaded portion of the bolts must be longer in order to clamp the small as well as the large size. But because the threaded portion of the bolts are longer, the bolt **40** which drops down to provide the open side will extend higher, and will normally prevent the clamp from being installed on a continuous conductor. In order to provide enough room for proper clearance, the peened bolt should be increased in length so that it can be withdrawn the necessary additional amount. I have found that the peened bolt **50** should be at least one-eighth inch longer than the other bolt.

Where aluminum and copper conductors are connected outdoors, some provision must be made to retard the galvanic corrosion which attacks the aluminum. The aluminum and copper form a galvanic battery in the presence of an electrolyte, which may be set up by moisture or by a corrosive atmosphere A small local current is set up with the aluminum acting as the anode and gradually being corroded away. By inserting the separator **20** consisting of a galvanized copper alloy plate between the conductors, this action is retarded. The zinc is close to aluminum in the electrochemical series and the groove **22** in which the copper wire rests is ground free of galvanizing permitting the copper wire to come in contact with the copper surface of the separator. Thus the solution potential between the copper and aluminum is cut down into smaller steps existing between aluminum and zinc, and between zinc and copper and, therefore, the galvanic corrosion rate is slowed down.

In order to avoid a complete magnetic circuit about the conductors, with resultant hysteresis losses and heating, I make my connector with parts so arranged that there is never a full ring of ferrous parts about the conductors. Even when both conductors to be joined are aluminum, I provide at least one part, such as one screw, made of non-magnetic material. This prevents serious heating of the clamp which in turn may prove very harmful to the conductors.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and, therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claim, and by means of which, objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of the many that can be employed to attain these objects and accomplish these results.

What I claim and desire to secure by Letters Patent is as follows:

An electric connector for joining a tap conductor to a continuous main cable, comprising a cap plate having a transverse groove formed in the bottom face of its intermediate portion, the end portions of said cap plate being formed with threaded openings, a central plate having a transverse groove formed in the upper face of its intermediate portion complemental to the transverse groove formed in the bottom face of the cap plate, said grooves coacting to receive and hold therebetween the main cable, said central plate being formed with an additional transverse groove in the bottom face of its intermediate portion, the end portions of the central plate having bolt receiving openings extending therethrough, a bottom spring plate having a transverse groove formed in the upper face of its intermediate portion complemental to the transverse groove formed in the bottom face of the central plate to receive and hold therebetween a tap conductor, said bottom plate being formed with bolt receiving openings in the end portions thereof, and bolts extending through the respective registering openings in the plates, the heads of the bolts adapted to engage the bottom plate and the threaded ends of said bolts being threaded through the threaded openings in the cap plate for maintaining the plates in clamped engagement with the main cable and tap conductor, one bolt being longer than the other, the upper end of the longer bolt being peened over to prevent disengagement of said longer bolt from the cap plate, the shorter bolt being capable of withdrawal from the cap plate to permit entrance of the main cable between the cap and central plates, the opening in the bottom plate through which the shorter bolt passes being smaller than the diameter of the threaded portion of the shorter bolt to prevent the threaded end of said shorter bolt from dropping through the hole provided therefor in the bottom plate, yet permit the sliding movement of the unthreaded portion of the shank of the shorter bolt therethrough.

JULIAN ROGOFF.