

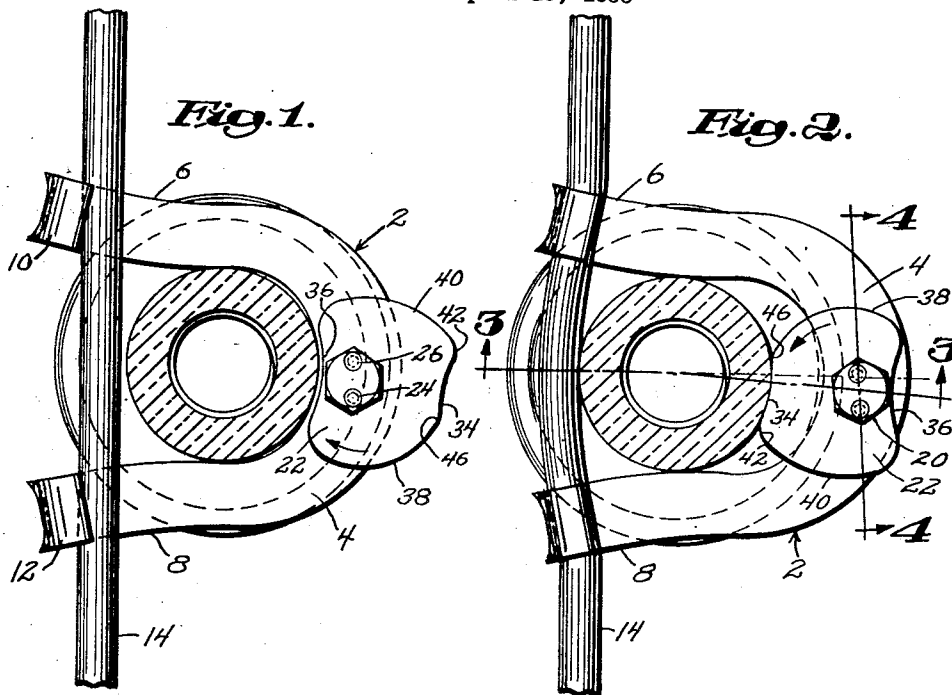
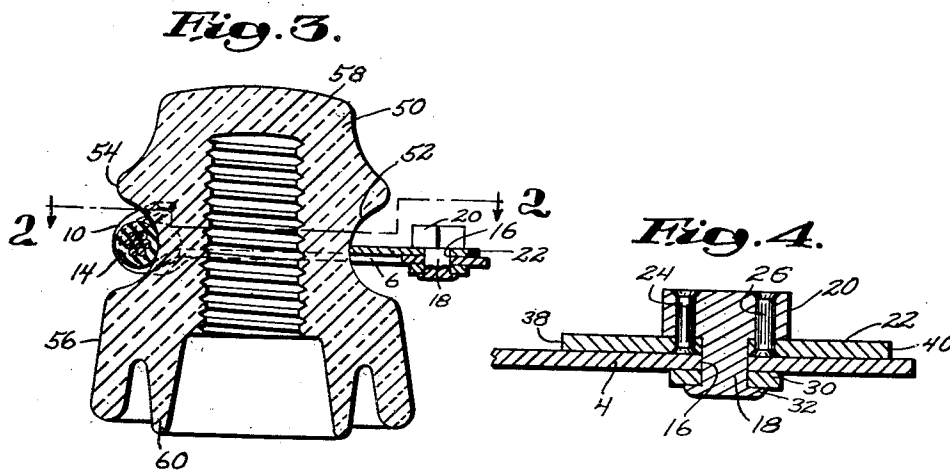
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INSULATOR CLAMP

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INSULATOR CLAMP

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6 Claims. (Cl. 174-172)

This invention relates to a new and useful clamp for detachably securing a wire to an insulator such as is ordinarily used in stringing telephone and telegraph wires, as well as electrical supply lines.

Heretofore many different types of clamps have been devised for securing electrical supply or communication lines to insulators, yet few, if any, have been accepted as evidenced by the continued and current use of soft drawn copper wire for tying electrical lines to insulators. Such clamps have failed to supplant "tie wires" because they were mechanically impractical or required special tools, or were too costly to manufacture. Nevertheless, it is believed apparent that "tie wires" are not the real answer, and that it is more desirable and advantageous from the standpoint of durability and dependability to secure electrical lines by means of clamps which are quick-acting, simple, dependable, and, most of all, inexpensive.

Accordingly, it is an object of this invention to provide a clamp for releasably securing electrical lines to insulators, which clamp is simple, dependable and inexpensive, and capable of being installed without special tools.

Another object of this invention is to provide a metal clamp for securing electrical lines comprising a yoke adapted to embrace an insulator, means carried by the yoke for supporting and retaining an electrical line or wire, a cam rotatably carried by the yoke and positioned to engage the insulator whereby to force and hold the insulator in tight engagement with the line, the cam being in slip-friction engagement with the yoke, and means fixedly secured to the cam for receiving a wrench whereby to rotate said cam despite its frictional engagement with the yoke.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a plan view, partly in section, showing a clamp constructed according to the present invention loosely mounted on an insulator and carrying an electrical line, the cam element of the clamp being in unlocked position; the section is taken substantially along line 2-2 of Fig. 3;

Fig. 2 is a plan view similar to Fig. 1, but showing the cam element of the clamp in locked position; Fig. 2 is taken along line 2-2 of Fig. 3;

Fig. 3 is a sectional view in elevation taken along line 3-3 of Fig. 2; and

Fig. 4 is an enlarged sectional view in elevation taken along line 4-4 of Fig. 2.

The insulator clamp of the present invention comprises a U-shaped yoke 2 comprising a body portion 4 and two slightly diverging legs 6 and 8 formed integral with the body portion. In plan view (Figs. 1 and 2) the yoke resembles a shackle or clevis. Yoke 2, however, differs from a shackle or clevis in that its legs have hooked ends 10 and 12. As shown in Fig. 3, the hooks are formed

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by bending the ends down and then bending them back toward the main body of the yoke, thereby to form open channels for receiving an electrical wire or conduit 14. The ends of the legs are bent down or offset so that the axis of conduit 14 will lie approximately in the same plane as the legs and body portion of the yoke. Yoke 2 is provided with an opening 16 for accommodating a rivet 18 having an hexagonal head 20. Rivet 18 passes through a cam element 22 which is interposed between rivet head 20 and yoke 2. The cam 22 is secured to rivet head 20 by means of two small rivets 24 and 26 which extend through the rivet head 18 and cam 22. The ends of rivets 26 and 28 are filed smooth so as to be flush with the top of rivet head 20 and the bottom surface of cam 22. A washer 30 is mounted on rivet 18. The end of rivet 18 is peened or flattened as at 32 to grip washer 30 so that the washer, rivet 18 and cam 22 will rotate as a unit relative to yoke 2. Grooves provided in the under surface of washer 30 will permit it to be better gripped by the flattened end of rivet 18 and cause it to rotate with the rivets. The cam 22 and washer 30 are maintained by rivet 18 in tight slip-frictional engagement with yoke 2 so that cam 22 can be rotated only by means of a wrench applied to rivet head 20.

The peripheral edge of cam 22 has two curved surfaces 34 and 36 which are of substantially the same curvature although curved surface 34 extends through a shorter arc. Curved surface 34 is described hereinafter as a locking recess. Surfaces 34 and 36 are joined by two curved surfaces 38 and 40. Curved surface 38 has a varying or spiral curvature as distinguished from curved surfaces 34 and 36 which are of substantially constant or circular curvature. Curved surface 40 also has a varying curvature. It is important to note that curved surface 40 meets surface 34 at a sharper angle than surface 38, forming an abutment or stop 42 for a purpose hereinafter described. Rivet 18 passes through cam 22 at a point much closer to curved surface 36 than curved surface 34, i. e. the radial distance from rivet 18 to surface 34 is much greater than the radial distance to surface 36 as determined, for instance, by a line drawn through the center of rivet 18 from curved surface 34 to 36. Curve 38 approaches 34 at a flatter angle than does curve 40. Moreover its junction 46 with curved surface 34 is at a shorter radial distance than stop 42 with respect to the axis of rivet 18.

The clamp heretofore described is especially adapted for use in connection with a conventional dome-shaped insulator 50 of the type shown in Figs. 1 to 3. Insulator 50 has a peripheral groove 52 defined by peripheral flange 54 and a skirt 56, the groove being located about halfway from its top 58 to its base 60.

The clamp is utilized with insulator 50 as follows: Assuming that insulator 50 is fixed to a supporting structure, such as a telephone pole or tower, and it is desired to anchor a line 14 to the insulator, the workman or lineman slips the yoke 2 about the insulator at the region of groove 52 with cam 22 in the "open" position shown in Fig. 1, i. e. with the locking recess 34 facing away from legs 6 and 8. The yoke is then positioned so that the peripheral surface of the insulator at the region of groove 52 lies up against the inside curved surface of the yoke. In this position the ends 10 and 12 of the yoke extend beyond the insulator a distance sufficiently great to permit wire or cable 14 to be slipped into place between the insulator and the hooked ends 10 and 12, as seen in Fig. 1. This is facilitated by slightly bending the wire 14. Thereafter the lineman applies a suitable wrench, such as the conventional ratchet connector wrench with which most linemen are equipped, to the hexagonal head 20 of rivet 18, and turns the rivet clockwise as seen in Fig. 1. Cam 22 and washer 30 rotate with the rivet. As the cam turns clockwise, surface 38 is brought to bear against the insulator, camming

the yoke and insulator apart from each other and forcing the insulator against line 14. This causes line 14 to be forced into the channels defined by hooked ends 10 and 12 of the yoke and deflects wire 14 from its straight line position (Fig. 1) so as to cause it to lie in groove 52 and partially embrace the insulator as shown in Figs. 2 and 3. It should be noted that the legs 6 and 8 of the yoke are not parallel to each other, but instead diverge slightly so that the hooked portions 10 and 12 are correctly positioned to receive cable 14 when the latter is bent as shown in Fig. 2. Under the turning force exerted by the wrench, cam 22 turns readily past the almost flat junction 46 of curved surfaces 34 and 38 so that insulator 50 falls into the locking recess provided by curved surface 34. Due to the curvature of the curved surface 34 the insulator rests tightly therein and holds line 14 in tight engagement with the hooked ends of the yoke. As noted previously the cam is mounted off center relative to the center line of the yoke. As employed herein the term "center line" is intended to mean a line that bisects the yoke into two substantially identical halves. This is clearly illustrated in Fig. 2 where line 3—3 is bent from the straight center line of the yoke so as to pass through the center of the insulator and rivet 18. As a result of this off-center position occupied by rivet 18, whenever the cam is forced or thrust against the insulator, e. g. by a load applied to line 14, the insulator tends to rotate the cam clockwise as seen in Fig. 2. However, clockwise rotation of the cam is prevented by stop 42 which bears against the insulator. The normally tight fit between the insulator and the cam prevents stop 42 from proceeding clockwise past the point of tangency of the cam with respect to the insulator. As a result the clamp stays locked. The greater the force with which the cam is thrust against the insulator, or vice versa, the greater the stop 42 tends to oppose clockwise rotation of the cam. Since the cam is continually thrust clockwise when urged against the insulator, there is no danger of it being turned counterclockwise. However, if for some reason the yoke is backed off from the insulator, and this will not occur so long as line 14 remains under tension, the cam will not turn counterclockwise because of the friction deliberately caused to exist between the cam and the yoke on the one hand and the washer and the yoke on the other hand. Consequently, the clamp always remains tight, no matter whether the insulator and yoke are forced closer together or further apart. When it is desired to release the clamp so as to remove conduit 14, it is only necessary for the lineman to apply his ratchet connector wrench to the rivet head 20 and turn the rivet counterclockwise. The greater leverage afforded by the lineman's wrench permits the cam to be turned counterclockwise to its open position and to restore the original loose relationship existing between the clamp, the insulator, and the wire, as shown in Fig. 1.

The term "rivet" is used herein by way of illustration rather than limitation and is to be construed as including a bolt, stub shaft, or equivalent element, adapted to be secured to the cam and to rotatably mount the cam on the yoke.

An insulator clamp constructed and described and illustrated has many advantages. It is simple in construction, fabricated entirely from steel or other suitable metal, cheap to manufacture, positive acting, dependable, durable and accommodates a large variety of types and sizes of wire or cable. Moreover, by moving the hole provided in the yoke or rivet 18, closer or further away from the insulator, the clamp can be made to accommodate a still larger number of sizes and types of wires or cables. Another obvious advantage is that the clamp requires no special tool for application.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. Therefore, it is to be understood that the invention is not limited in its application to the details

of construction and arrangement of parts specifically described or illustrated, and that within the scope of the appended claims it may be practised otherwise than as specifically described or illustrated.

I claim:

1. An insulator clamp comprising a single yoke having two hooked ends adapted to receive an electrical cable, a cam having a locking recess shaped to receive an insulator member of the type utilized to string electrical cables, and means mounting said cam on said yoke, said cam being rotatable on said yoke and being positioned to engage directly an insulator positioned between the ends of said yoke and to force said insulator into tight engagement with a cable received in said ends when said locking recess is turned toward said ends.

2. An insulator clamp comprising a single U-shaped yoke adapted to embrace an insulator element of the type utilized in stringing electric lines, the ends of said yoke being hooked to receive a cable, a cam mounted for rotation on said yoke eccentric to the center line of said yoke, said cam having a peripheral edge characterized by a camming surface of progressively increasing radius and an inwardly curved surface continuous at one end thereof with said camming surface and functioning as a locking recess for said insulator, and an abutment at the other end of said inwardly curved surface, said abutment being further removed radially than said camming surface and the curved surface of said locking recess from the axis of rotation of said cam.

3. An insulator clamp comprising a single U-shaped yoke adapted to embrace an insulator element of the type utilized in stringing electric lines, the ends of said yoke being hooked to receive a cable, a cam mounted for rotation on said yoke, said cam having a first outwardly curved edge surface extending between first and second points whose radial distance from the center of rotation of said cam increases steadily from said first point to said second point, said first surface functioning as a camming surface, said cam having a second inwardly curved surface continuous with said first curved surface from said second point, said second curved surface functioning as a locking recess and being shaped to receive an insulator, a third outwardly curved surface continuous with said second surface and meeting said second surface at a relatively sharp angle at a point further removed from the axis of rotation of said cam than the point at which said first and second curved surfaces meet, and means secured to said cam adapted to be engaged by a wrench for rotating said cam, whereby to move said locking recess into engagement with an insulator embraced by said yoke to draw a cable received by said ends into tight engagement with said insulator.

4. An insulator clamp comprising in combination a single U-shaped yoke having a base portion and two legs extending outwardly from said base portion, said legs being hooked at their free ends, said base portion being curved to receive an insulator positioned between said legs, a cam mounted for rotation on said base portion, said cam lying parallel to said base portion in slip-friction engagement therewith, the peripheral edge of said cam being of varying radius relative to the axis of rotation of said cam, said peripheral edge comprising a camming surface of progressively increasing radius of curvature, an inwardly curved surface continuous with said camming surface at its point of greatest radius and terminating in an abutment, said inwardly curved surface defining a locking recess for receiving an insulator positioned between said legs, the starting point of said curved surface being closer to the axis of rotation of said cam than its terminating point, the axis of rotation of said cam being slightly to one side of a center line bisecting said yoke into two substantially identical halves, whereby when said yoke is mounted on an insulator with the insulator residing in said locking recess, and the insulator and yoke are forced together, the insulator will tend to cause said cam to rotate in one di-

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rection only and rotation in said one direction will be prevented by virtue of said insulator being engaged by said abutment.

5. A clamp for securing an electric line to an insulator element mounted on a supporting structure, said clamp comprising in combination, a single U-shaped yoke having a base portion and two legs extending outwardly from said base portion, said legs being hooked at their free ends and said base portion being curved to receive an insulator positioned between said legs, and a cam lying parallel to said base portion and mounted for rotation thereon, said cam being in slip-friction engagement with said base portion, the peripheral edge of said cam having a camming surface, a locking recess and an abutment in the order named, said camming surface being characterized by a gradually increasing radius of curvature for engaging said insulator and forcing it toward the ends of said legs away from said base portion when said cam is rotated in a predetermined direction, said locking recess being continuous with said camming surface and shaped to receive said insulator after said insulator has been cammed away from said base portion by said camming surface upon rotation of said cam in said predetermined direction, said abutment being continuous with said locking recess and acting to prevent said cam from rotating further in the same predetermined direction when said insulator and yoke are forced toward each other.

6. An insulator clamp comprising a single U-shaped yoke having two legs and an arcuate body portion formed integral with said legs in convex relation thereto, the free ends of said legs being bent back toward said body portion to form hooks, a cam rotatably mounted on said

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body portion slightly to one side of a center line bisecting said yoke into substantially identical halves, said cam being in slip-friction engagement with said body portion, the peripheral edge of said cam being characterized by a concave surface, a camming surface, a locking recess, and an abutment in the order named, said concave surface being of substantially circular curvature and lying closer to the axis of rotation of said cam than said camming surface, said locking recess and said abutment, said camming surface having a curvature of steadily increasing radius commencing at one end of said concave surface and terminating at said locking recess, said locking recess being of substantially constant curvature commencing with said camming surface and terminating at said abutment, said abutment being further removed from the axis of rotation of said cam than said concave surface, said camming surface and said locking recess, said cam being rotatably mounted on said body portion by means of a rivet secured thereto and rotatable relative to said body portion, said rivet having a polygonal head adapted to receive a wrench whereby said cam may be rotated.

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