

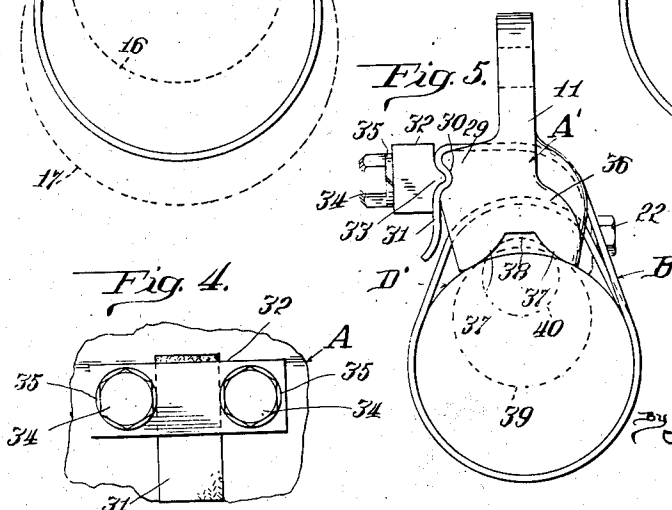
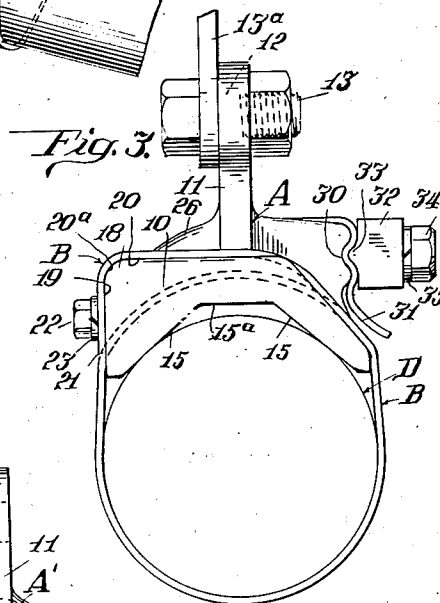
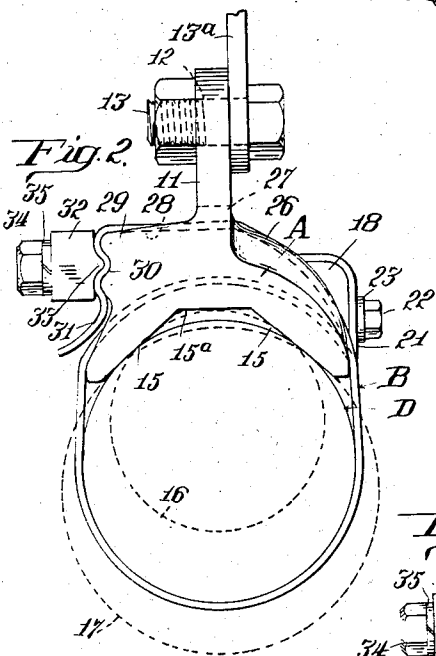
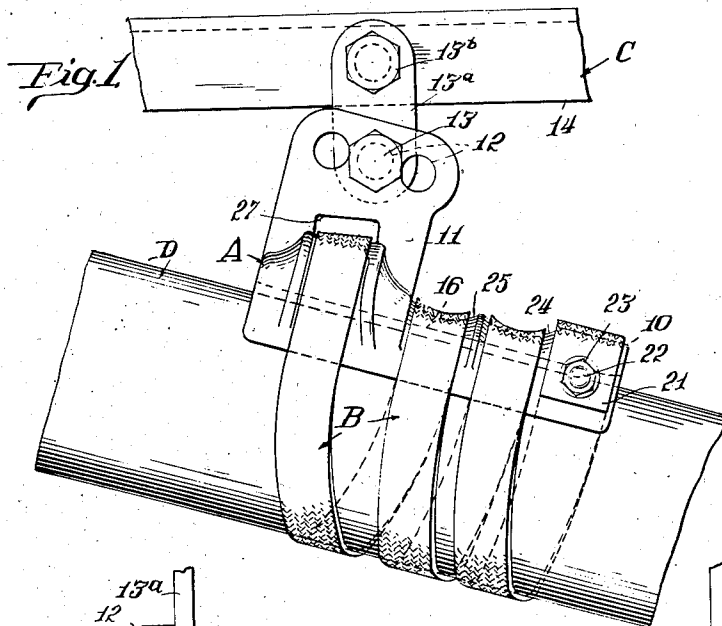
Jan. 8, 1935.

J. H. STARR

1,986,861

CABLE SUPPORTING CLAMP

Filed Sept. 11, 1933



Inventor,

James H. Starr

By Thomas H. Ferguson
Attorney

UNITED STATES PATENT OFFICE

1,986,861

CABLE SUPPORTING CLAMP

James H. Starr, Oak Park, Ill., assignor to Electrical Engineers Equipment Company, a corporation of Illinois

Application September 11, 1933, Serial No. 688,871

8 Claims. (Cl. 248—33)

The present invention relates to cable supporting clamps of the class wherein a flexible retaining member is wrapped about the cable being supported. The invention is worked out especially with reference to electric cables having metallic sheaths. Certain factors are desirable in clamps which are to be used with such cables. These factors include the following:

1. The clamp must not exert large localized pressure upon the cable as to do so might injure the insulation or the metallic sheath.

2. The clamp must support the cable and prevent relative movement of the cable and clamp even when the cable is subjected to large longitudinal forces.

3. The clamp should be suitable for the support of cables varying in diameter over a relatively wide range due to the fact that there are no standard outside diameters for cable, and if the clamp is inapplicable except to a specific diameter an infinite number of sizes is necessary.

4. The clamp should firmly grip the cable applying the grip over large area and should maintain a reasonably uniform pressure over a relatively large portion of the diameter, regardless of thermal expansion of the clamp parts.

The principal object of the invention is to provide a supporting clamp of the class mentioned which shall possess these several desired factors.

Another object of the invention is to provide the clamp with a relatively light flexible supporting ribbon and to so arrange the same with reference to the other parts that it will make more efficient contact with the supported cable than has been possible with ribbon type clamps heretofore proposed.

Another object is to provide such a structure that the same will securely grip the cable in all positions from vertical to horizontal and thus provide a firm and secure holder for cables in all the situations in which they may be found in practice.

Still another object is to provide clamps which shall be simple in construction, economical to manufacture, highly efficient in operation and otherwise entirely satisfactory to the trade.

The various features and objects of the invention will be more fully understood upon reference to the following detailed description taken in connection with the accompanying drawing wherein preferred embodiments of the invention in two sizes are disclosed, the scope of the invention being particularly pointed out in the appended claims.

In said drawing, Fig. 1 is a side elevation of

a supporting clamp constructed and arranged in accordance with the present invention, the same being shown in association with an angle iron support and a sheathed cable which it carries; Fig. 2 is an end elevation of the same viewed from the left as the parts are seen in Fig. 1; Fig. 3 is a similar elevation viewed from the right as the parts are seen in Fig. 1, but omitting the angle iron; Fig. 4 is an elevation of a portion of the structure showing more particularly the bar for securing one end of the cable ribbon to the main clamping member; and Fig. 5 is a view similar to Fig. 2 of a slightly modified structure suited to holding cables of less diameter. Throughout these views like characters refer to like parts.

At the outset, it may be stated that the novel structure comprises essentially a main cable fitting clamping member and a flexible retaining ribbon, the former being designated A, A' and the latter B, B' in the different embodiments of the invention. The clamping member is adapted to be secured on the one side to a supporting member or structure C and on the other side it fits snugly against the surface of the cable which it supports, two sizes of cable being indicated in full lines and designated respectively D, D'. Each ribbon, B or B', is wrapped about the clamping member, A or A', and the associated cable, D or D', a plurality of times, three complete circular turns being shown in the embodiment more fully illustrated. The ends of the ribbon are suitably secured to the main clamping member, one end preferably being normally secured thereto and the other end secured in place after the ribbon has been tightly drawn about the clamping member and cable with the requisite number of turns.

Examining these parts more in detail, it will be seen that the clamping member A is a simple casting having a main, rather elongated, body portion 10 provided with an upstanding web 11. The latter is apertured at 12 for the passage of one or more retaining bolts 13 which extend not only through the openings 12 but through similar openings in some part of the supporting structure C. In the instance shown, the latter comprises a simple angle iron 14 and a link 13^a. A bolt 13 is passed through one of the openings 12 in the web 11 and a like opening in the lower end of the link 13^a. A similar bolt 13^b passes through openings in the upper end of the link and the vertical web of the angle iron 14 and secures the link to the angle iron. Obviously other ways of connecting the parts in place may

be employed. The way shown is merely illustrative. Obviously, too, the cable D may extend in many different directions ranging from vertical to horizontal. In such cases one or other of the outer openings 12 might be employed as the bolt opening. Even in the angular position shown, the left opening 12 might be used as well as the central opening. These connections may be varied as the different conditions of service may require.

The body 10 of the member A is provided on its cable side with surfaces which provide a re-entrant space for the lodging of the cable. These surfaces comprise two angularly disposed faces 15 and an intervening surface 15^a. These may take different forms although in this embodiment they are plane faces. They extend lengthwise of the body 10 and in the direction of the cable D when the latter is in assembled relation. The faces 15 theoretically make line contacts with the sheath of the cable D. Their arrangement also enables a number of differently sized cables to be used with the same clamping member.

At this point it may be mentioned that the cables D, D', are sheathed with lead or other material and contain electrical conductors arranged in any desired way. The cable, in itself, forms no part of the present invention. Suffice it to say that its lead sheath or other metallic covering only need be considered since the invention has to do only with preventing undue wear or cutting or rupture of the same, as before indicated. For these reasons the cables D, D', are shown only in outline.

The range in cable size is indicated clearly in Fig. 2 wherein the dotted circles 16 and 17 show the outlines of two cables of quite different sizes. It will be noted that the smaller cable, indicated by the line 16, enters further into the reentrant space between the faces 15 than does the larger cable, indicated by the line 17. In fact, it practically contacts with the intervening surface 15^a. The cable D is of intermediate size, occupies an intermediate position upon the faces 15.

The ribbon, B or B', is a flexible metallic ribbon, preferably braided. The strands which go to make up the ribbon are composed of copper or like flexible and ductile metal. When these strands are braided together they form a flat ribbon which is very flexible and durable and yet one which will not cut into the sheath of the cable. Preferably, the strands of the ribbon are tinned before being braided into the final form. Of course, a ribbon for the purpose intended may be variously constituted and still meet all the requirements of the present device. Preferably, however, it should be laterally and longitudinally flexible like the braided ribbon just described.

At one end of the body 10 of the clamping member A is a shoulder 18. This shoulder is provided with a plane vertical face 19 and an upper flat face 20. These faces, which are joined by an intervening curved surface 20^a, are adapted to receive the end 21 of the flexible ribbon B. The latter is held to the body 10 by a tap bolt 22 and associated lock washer 23. This bolt passes through an opening in the end 21 of the ribbon and enters a threaded opening in the adjacent portion of the shoulder 18. It will be noted that the shoulder faces 19, 20 are arranged at practically a right angle to each other so as to provide a sharp turn for the ribbon as it extends up over the face 19, over the curved surface 20^a and then laterally along the face 20 on the top of the body

As clearly shown the ribbon B then extends down around the cable D and up over the body 10 at a point adjacent to the end 21. For receiving the ribbon and properly holding it against undue longitudinal movement, that portion of the top of the body 10 over which the ribbon passes is hollowed out to form a saddle-like surface 24. After passing over the surface 24 the ribbon continues on through another turn about the clamping member A and cable D and on up over a second saddle surface 25 upon the top of the body 10 of the clamping member. The final turn of the ribbon extends from the saddle surface 25 on down around the cable and up over the curved surface 26 adjacent to the web 11 of the clamping member A.

The ribbon then continues through an opening 27 in the web and on over a flat and substantially horizontal surface 28 upon the shoulder 29. The latter is similar to the shoulder 18 but located at the opposite end and side of the body 10. The shoulder 21 has a corrugated surface 30 which extends generally in a vertical direction with its corrugations extending likewise of the body 10. The corrugated face 30 is adapted to receive the end 31 of the binding ribbon B and to make the final connection between the ribbon and the clamping member. To bring about this securing of the end 31 to the member A, bar 32 is employed. This bar has a longitudinal rib 33 along its inner face. This rib is accurately shaped with reference to the corrugations of the face 30 to securely clamp the intervening ribbon end 31 in place. The bar 32 is suitably apertured for the passage of two tap bolts 34 which pass freely through the openings in the bar into threaded engagement with tapped openings in the adjacent shoulder 29. Lock washers 35 cooperate with the bolts 34 to press the bar 32 firmly against the ribbon end 31. The latter, due to the pressure applied by the bar, takes a shape conforming to the corrugated face 30 and is firmly held in place upon the casting A by the bar. The bar 32 and associated parts constitute a clamp for the braided ribbon B.

Obviously when cables of smaller diameter than the cable D are employed with the clamping member A, the free end 31 of the ribbon will extend farther out beyond the holding bar 32. On the other hand, if the diameter of the cable be larger than the one illustrated then the free end 31 of the ribbon will be shorter.

In the modification shown in Fig. 5, the member A' has a web 11 just as before, but the body 36 is narrower and the reentrant surface is provided by slightly curved faces 37, and the face 38 which unites the faces 37 is at a considerable distance from the lower extremities of the body 36.

As a result of this shaping of the reentrant portion of the body 36, it is possible to fit the clamping member to cables of much smaller diameter than those illustrated in the other figures. As shown, the cable D' contacts with the surfaces 37 near their lower ends. On the other hand, if a cable having a diameter such as indicated by the line 38 were used, then the contacting points would be further up along the surfaces 37. A still further example of cable size is illustrated by the dotted line 40. In this instance the cable lies well within the opening provided by the re-entrant surfaces 37 and is more nearly in contact with the surface 38.

In this form of the invention, which is really but a smaller size of the embodiment illustrated in the other figures, the ribbon B' is secured at

one end by a bolt 22 and at the other end by a plate 32 with the associated screws 34 and washers 35. In other words, the way in which the ribbon B' is secured to the clamping member A' is the same as in the case of the ribbon B and the clamping member A. The principal purpose of illustrating the modification is to show how readily a large number of cables of varying sizes can be fitted by a limited number of standard sizes of cable supports, when constructed in accordance with the present invention.

From a simple inspection of the drawing, and more particularly Figs. 1 and 3, it will be seen that at the points at which the ribbon B tangentially engages the cable, D or D', the direction of the ribbon is substantially at right angles to the longitudinally superficial elements that go to make up the surface of the cable. In other words, the approach and recession of the ribbon are at substantially right angles to the axis of the cable. This insures less strain, other things being equal, than would exist with a more acute angle of approach and recession, such as we find in some prior art structures. The less strain allows a lighter, and hence a more flexible, ribbon to be used.

It should also be noted that to obtain the maximum advantage in the operation of the clamp, it is important that the flexible ribbon maintain intimate contact with the cable sheath at all times, even when the cable is displaced slightly in a longitudinal direction relative to the clamp, as might occur were the cable shifted from a horizontal position to a vertical one while held by the clamp, or were the cable to settle after being initially installed in a vertical position.

Since the ribbon illustrated is flexible both laterally and longitudinally, any longitudinal movement of the cable relative to the clamp will not result in distortion of the ribbon relative to the cable but will leave it in full width contact with the cable surface. This is in decided contrast to a stiff band which is inflexible laterally. Such a band whenever there is relative movement between the cable and the clamp will more or less disengage the surface of the cable and thereby reduce the area of contact between the ribbon and sheath. As stated, applicant's construction avoids this.

In carrying out my invention, it will be apparent that many alterations and modifications may be made in the structures disclosed without departing from the spirit and scope of the invention. I therefore do not wish to be limited to the exact details presented, but aim to cover by the terms of the appended claims all those alterations and modifications which rightly come within the purview of my invention.

I claim:

1. A cable supporting clamp comprising a main clamping member adapted to engage one side of the cable to be supported and in turn to be secured to a suitable support, and a laterally and longitudinally flexible supporting ribbon secured at one end to said member and adapted to be wrapped substantially helically a plurality of times about the assembled cable and main clamping member and to have its free end finally secured to said member while remaining in close engagement with the supported cable throughout their contacting areas even though the cable be displaced slightly in a longitudinal direction relative to the clamp.

2. A cable supporting clamp comprising a main clamping member having a reentrant surface for

engaging with the surface of the cable to be supported and adapted in turn to be secured to a suitable support, and a laterally and longitudinally flexible supporting ribbon secured at one end to said member and adapted to be wrapped substantially helically a plurality of times about the assembled cable and main clamping member and to have its free end finally secured to said member while remaining in close engagement with the supported cable in all relative positions of the parts, said ribbon extending at its points of tangency with the cable surface in directions each substantially at right angles to the longitudinal elements of the cable surface at said respective points.

3. A cable supporting clamp comprising a main clamping member adapted to be secured on one side to a suitable support and having on its other side a reentrant surface for lodging the cable to be supported, said reentrant surface comprising at least two smooth cable engaging faces extending lengthwise of said member and the cable positioned therein, said faces being tangential to longitudinal elements of the cable surface when the latter is in assembled position, and a laterally and longitudinally flexible supporting ribbon secured at one end to said member and adapted to be wrapped substantially helically a plurality of times about the assembled cable and main clamping member and to have its free end finally secured to said member while remaining in close engagement with the supported cable in all operative positions of the parts.

4. A cable supporting clamp comprising a main clamping member adapted to be secured on one side to a suitable support and having on its other side smooth reentrant walls for engaging with the surface of the cable to be secured thereto, a laterally and longitudinally flexible supporting ribbon secured at one end to one side of said clamping member and thence passing over the outer surface of said clamping member to its opposite side and thence, when a cable is being held, around the cable and clamping member substantially helically a plurality of times and finally again across said clamping member, and means for attaching said ribbon to said clamping member after it has finally passed across the same.

5. A cable supporting clamp comprising a main clamping member adapted to be secured on one side to a suitable support and having on its other side smooth reentrant walls for engaging with the surface of the cable to be secured thereto, a laterally and longitudinally flexible supporting ribbon passed around said clamping member and the associated cable substantially helically a plurality of times with its ends extending across the outer surface of said clamping member near its opposite ends and then perpendicularly thereto over its sides with sharp turns at the points of change in direction, and means for firmly securing the ribbon ends to sides of said clamping member.

6. A cable supporting clamp comprising a main clamping member adapted to be secured on one side to a suitable support and having on the opposite side reentrant walls for engaging with the outer surface of the cable to be secured thereto, a flexible braided metallic ribbon passed around said clamping member and the associated cable a plurality of times with its ends extending across the one surface of said clamping member near its opposite ends and then perpendicularly thereto over its sides with sharp turns at the points of change in direction, and means for

firmly securing the ribbon ends to said sides, said ribbon having tinned ends for the better securing of said ribbon to said clamping member.

7. A cable supporting clamp comprising a main member adapted to be secured on one side to a suitable support and having on its other side a reentrant space for receiving the cable, said space being bounded by angularly disposed surfaces, two at least of which surfaces are convexly curved outwardly relative to the body of the clamp, said angularly disposed curved surfaces being smooth and serving to engage the cable along lengthwise elements of the same, and a laterally and longitudinally flexible ribbon for tightly binding the cable to said main member in said reentrant space against said angularly disposed smooth curved surfaces, said ribbon having several turns each embracing the cable and said main member, the surface curvatures of said engaging surfaces allowing for the securing of cables of greatly varying diameters in tight engagement at all times with said main member and the ribbon turns.

JAMES H. STARR.