

May 18, 1943

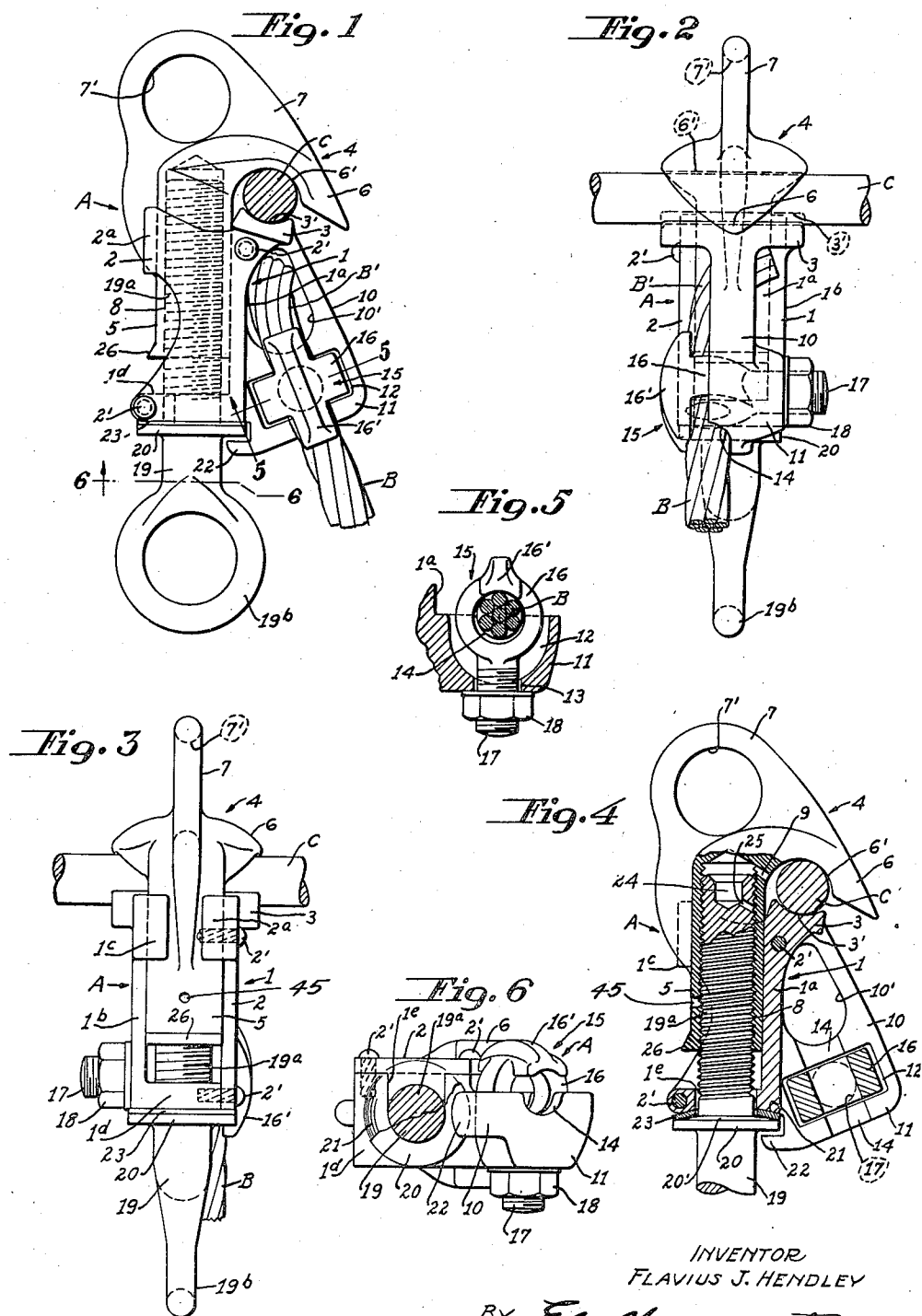
F. J. HENDLEY

2,319,602

CLAMP

Filed March 10, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 8

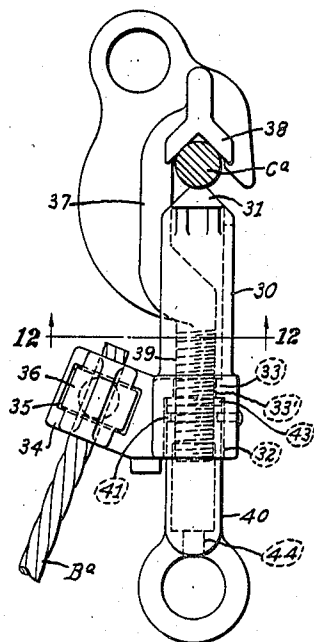


Fig. 7

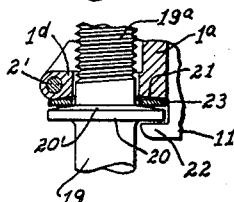


Fig. 9

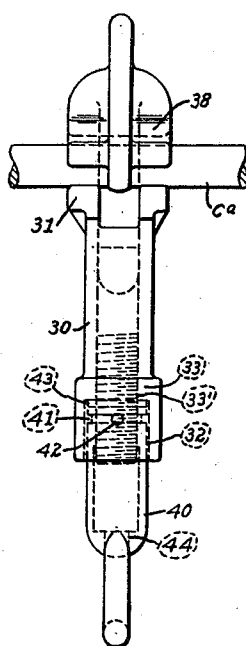


Fig. 13

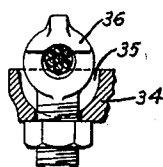


Fig. 10

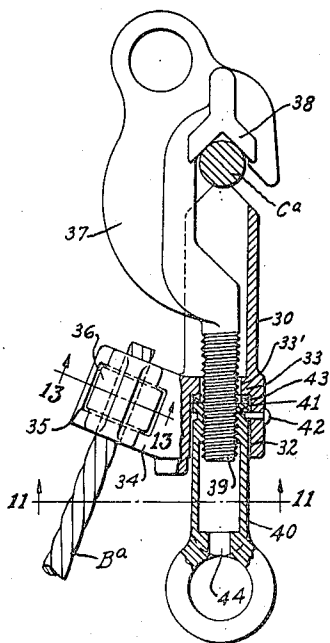


Fig. 11

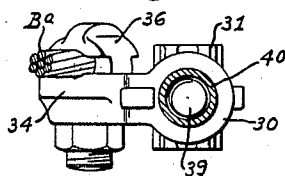
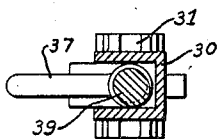


Fig. 12



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2,319,602

CLAMP

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Application March 10, 1941, Serial No. 382,490

9 Claims. (Cl. 173-273)

This invention relates generally to clamps and more specifically to clamps of the type adapted for use in the construction, maintenance and repair of power transmission and other electrical systems, particularly for the purpose of electrically and mechanically connecting auxiliary conductors to main lines, the predominant object of the invention being to provide an improved clamp of this type which, because of its improved construction and arrangement, is capable of performing its intended function in an improved and highly efficient manner.

Fig. 1 is a side elevation of one form of the improved clamp showing same in association with a main line and having an auxiliary conductor associated therewith.

Fig. 2 is a front elevation of the clamp and conductor assembly illustrated in Fig. 1.

Fig. 3 is a rear elevation of the clamp and conductor assembly illustrated in Figs. 1 and 2.

Fig. 4 is a fragmentary view partly in side elevation and partly in vertical section of the improved clamp shown in Figs. 1 to 3, inclusive, said clamp being shown in association with a main line.

Fig. 5 is a fragmentary section taken on line 5-5 of Fig. 1.

Fig. 6 is a section taken on line 6-6 of Fig. 1, the main line and auxiliary conductor being omitted.

Fig. 7 is a fragmentary section showing the spring washer of the clamp illustrated in Figs. 1 to 6, inclusive, as said spring washer appears when the clamp is not in its operative conductor-clamping condition.

Fig. 8 is a side elevation of another form of the invention, showing same as it appears in association with a main line and having an auxiliary conductor connected thereto.

Fig. 9 is a front elevation of the clamp and conductor assembly illustrated in Fig. 8.

Fig. 10 is a view similar to Fig. 8, but illustrating a portion of the clamp in vertical section.

Fig. 11 is a section taken on line 11-11 of Fig. 10.

Fig. 12 is a section taken on line 12-12 of Fig. 8.

Fig. 13 is a section taken on line 13-13 of Fig. 10.

In the drawings, wherein are shown for the purpose of illustration, merely, two embodiments of the invention, A designates, in Figs. 1 to 7, inclusive, the improved clamp generally. The clamp A includes a body portion 1 which is provided with a pair of integral walls 1a and 1b that

are disposed in substantial rectangular relation, the wall 1a being located at the front of the clamp and the wall 1b being located at a side thereof. The wall 1b of the body portion 1 has formed thereon, at the upper end thereof, an inwardly extended lug 1c, and the body portion 1 includes a bottom wall 1d wherein an opening 1e is formed (Figs. 4 and 6), said opening being shaped as shown to the best advantage in Fig. 6 and being open at a side of said bottom wall of said body portion. At the side of the body portion 1 opposite to the side thereof at which the wall 1b is located the body portion is provided with a removable side plate 2 which is secured in place by suitable fastening devices 2' which extend through apertures formed through the side plate and are seated in apertures formed in parts of the body portion. The side plate 2 has formed thereon a lug 2a which corresponds in shape and arrangement to the lug 1c and is aligned therewith transversely of the body portion (see Fig. 3). The body portion 1 includes as an integral part thereof a jaw 3 which is provided with a concave conductor seat 3', said jaw being disposed at the upper end of the wall 1a and being of substantial length (Fig. 2) so as to provide a full conductor seat free from obstructions.

Supported by the body portion 1 is a jaw 4 which includes a portion 5 that is elongated vertically and is of rectangular cross-sectional shape. Curved upwardly slightly and extended forwardly from the upper end of the portion 5 of the jaw 4 is a part 6 of said jaw 4 which overhangs the jaw portion 3 of the housing portion 1 and is provided with a concave conductor seat 6', said conductor seat 6' of the part 6 being adapted, as will presently appear herein, for movement into and out of conductor clamping relation with respect to the conductor seat 3' of the jaw 3 of the housing 1. The jaw 4 includes also a web 7 which extends upwardly from the part 6 of the jaw 4, and rearwardly and upwardly relative to the rear face of the portion 5 of said jaw, said web having an opening 7' formed therein which is intended to receive a part of a suitable tool employed in applying the clamp to an overhead conductor. The portion 5 of the jaw 4 has formed therein an opening 8 the wall of which is provided with screwthreads, said opening being open at the lower end of the jaw portion 5 and closed at its upper end, except for an aperture 9 which communicates with said opening at its inner end and is open at the outer face of the jaw portion 5 adjacent to the point where the forward

face of said jaw portion 5 merges into the conductor seat of the jaw part 6.

Formed on the body portion 1 of the clamp A is an extension 10 which receives in contact therewith an auxiliary conductor B which is to be mechanically and electrically connected to the main line C with which the clamp is associated. The extension 10 is preferably, though not necessarily, formed integral with the body portion 1 of the clamp and inclines outwardly and downwardly therefrom, said extension having an opening 10' formed through its upper portion. The lower, or outer, portion 11 of the extension 10 is of increased width and has a cup-shaped cavity 12 formed therein as shown to the best advantage in Fig. 5, there being an opening 13 formed through a side wall of the portion 11 of the extension 10 which leads into the cavity 12, and portions of the extension above and below the cavity 12 having formed therein arcuate depressions 14 which provide seats for the auxiliary conductor B. Associated with the portion 11 of the extension 10 is a conductor clamping member 15 (Fig. 5) which includes an eye portion 16, and a screw-threaded shank 17 that extends from said eye portion. The eye portion of the member 15 is normally partially disposed within the cavity 12 of the portion 11 of the extension 10, and the screw-threaded shank of said member 15 extends through the opening 13 and has a nut 18 mounted thereon which engages a face of said portion 11. Also the eye portion 16 of the member 15 is provided with an elongated portion 16' which is provided at its inner face with a conductor seat that is adapted to engage the auxiliary conductor B.

When it is desired to attach an auxiliary conductor B to the extension 10, the nut 18 is unscrewed to permit the eye portion 16 of the member 15 to be moved outwardly relative to the cavity 12 of the portion 11 of said extension. An end portion of the auxiliary conductor is then passed through the eye portion 16 of the member 15 and the nut 18 is rotated to draw the eye portion 16 of the member 15 inwardly of the cavity 12 thereby drawing the conductor seat of the elongated portion 16' of said eye portion 16 into tight contact with the auxiliary conductor and forcing said auxiliary conductor into tight contact with the arcuate conductor seats 14 of the extension portion 11. In order to provide additional mechanical support for the auxiliary conductor B the end portion thereof may be bent, as shown at B' in Figs. 1 and 2, and extended through the opening 10' of the extension 10.

The clamp A includes also an operating element 19 which is screwthreaded throughout its upper portion as indicated at 19a and is provided at its lower end with an eye portion 19b, there being an outstanding flange 20 at the lower end of the screwthreaded portion 19a which is provided with a convex top face 20'. It is to be noted also that the lower end of the body portion 1 is provided with a concave face 21 which is related to the convex face of the flange 20 of the operating element 19, and that the extension 10 includes a projection 22 which underlies a portion of said flange 20 (see Fig. 4). Interposed between the related convex and concave faces 20' and 21 is a spring washer 23 which serves a function to be hereinafter set forth. The screw-threaded portion 19a of the operating element 19 is screwthreadedly disposed in the opening formed in the portion 5 of the jaw 4, said screw-threaded portion having a cavity 24 formed in its

upper portion as shown in Fig. 4. Also the screw-threaded portion 19a of the operating element 19 has a passageway 25 formed therein which communicates with the cavity 24 at its inner end and is open at the screwthreaded outer surface of said portion 19a.

In the use of the clamp shown in Figs. 1 to 7, inclusive, rotation of the operating element will adjust the jaw 4 longitudinally of the body portion 1, because of cooperation of the screw-threads within the opening 8 in the portion 5 of said jaw 4 and the screwthreads of the portion 19a of the operating element 19. During such adjustment of the jaw 4 the portion 5 thereof is guided by the wall 1a of the body portion and the opposed lugs 1c and 2a, and by the wall 1b of said body portion and the opposed removable side plate 2 thereof, the outward movement of the jaw 4 being limited by contact of the abutment 26, formed on the portion 5 of said jaw at the lower end thereof, with the lugs 1c and 2a. When it is desired to apply the clamp to an overhead conductor C, with the auxiliary conductor already attached thereto as previously explained herein, the operating element is operated to move the part 6 of the jaw 4 away from the jaw 3 a sufficient extent to permit the clamp to be applied to the conductor so that the conductor C is interposed between the conductor seats of the jaw 3 and jaw part 6. The operating element 19 is then rotated in the appropriate direction to draw the jaw part 6 downwardly and thereby clamp the conductor between the conductor-seats of the jaw part 6 and the jaw 3, as shown to the best advantage in Figs. 1 and 4. When the jaw part 6 and the jaw 3 move into clamping engagement with the conductor C the spring washer 23 is deformed, between the convex and concave faces 20' and 21, from the condition shown in Fig. 7 to the condition shown in Fig. 4, whereby a frictional locking action is obtained which tends to lock the operating element 19 against unintended rotation. Also the tendency of the washer to return to its undeformed condition, as shown in Fig. 7, serves to retain the conductor seats of the jaw part 6 and the jaw 3 in close contact with the conductor therebetween even though there be a slight unintended unscrewing of the operating element 19.

An important feature of the clamp structure illustrated in Figs. 1 to 7, inclusive resides in the fact that the greater part of the screwthreaded portion 19a of the operating element 19 is enclosed within the portion 5 of the jaw 4. Because of this arrangement the enclosed part of the screwthreaded portion of the operating element is protected from atmospheric conditions which, in the absence of such protection, would tend to corrode or otherwise deteriorate the screw-threaded portion of the operating element, and from mechanical blows which would injure the screwthreads. This protection of the greater portion of the screwthreaded part of the operating element 19 is important because the protected portion of the operating element must be rotated with respect to the screwthreads of the opening 8 of the portion 5 of the jaw 4 when the jaws of the clamp are being adjusted to remove the clamp from the conductor C. Therefore, because the part referred to has been protected and is not corroded, deteriorated or otherwise injured, it may be freely rotated relative to the screwthreads of the opening 8 without the binding and locking effect which would be encountered if the screwthreaded portion of the operat-

ing element were in a corroded condition or otherwise impaired.

Additionally the cavity 24 formed in the upper portion of the operating element is designed to receive a body of grease, red lead, or other suitable coating material, which may be squeezed through the passageways 9 and 25 when the screwthreaded portion 19a of the operating element 19 is adjusted inwardly of the opening 8, to coat and protect the conductor C and the screwthreads of the operating element and the opening 8. In the use of grease in the cavity 24 the co-operating screwthreads will be lubricated.

Another important feature of the invention is that the removable side plate 2 which forms a part of the body portion 1 of the clamp facilitates assembly of the clamp, inasmuch as the portion 5 of the jaw 4 is merely passed laterally into the body portion with the side plate removed, after which said side plate is arranged in place and secured therein by the fastening devices 2'. Also the fact that the auxiliary conductor B is attached to the clamp at the forward face thereof instead of at the rear face of the clamp, as has been the case heretofore, facilitates application of the clamp to an overhead conductor with the auxiliary conductor attached to the clamp, because an auxiliary conductor so attached to the clamp is less likely to interfere with the free movements of the person applying the clamp.

The form of the invention illustrated in Figs. 8 to 13, inclusive, includes a body portion 30 which is provided at its upper end with a conductor-receiving jaw 31, and at its lower end with a cavity 32 (Fig. 10) which is open at the lower end of the body portion and is provided with a top wall 33 having an opening 33' formed therethrough. Extended from the lower portion of the body portion 30 is an extension 24 having a cup-shaped cavity 35 formed in its outer portion, said outer portion of said extension having a clamping member 36 associated therewith which resembles the clamping member 15 of Fig. 5 in the construction and mode of operation and serves to electrically and mechanically connect an auxiliary conductor B₂ to said extension.

Associated with the body portion 30 is a movable member 37 having a jaw portion 38 which overhangs the jaw 31 of the body portion, said jaw 31 and jaw portion 38 being illustrated in Figs. 8, 9, and 10, in clamping engagement with a conductor C_a. The member 37 is provided at its lower end with a screwthreaded shank 39 which extends through the opening 33' of the top wall of the cavity 32 and into said cavity, said screwthreaded shank of the member 37 being aligned with the jaw portion 38 and a portion of said member between the screwthreaded shank and the jaw portion 38 being offset laterally relative to the axis of the screwthreaded shank.

Arranged at the lower end of the body portion 30 of the clamp shown in Figs. 8, 9, and 10, is an operating element 40 which extends upwardly into the cavity 32, said operating element comprising a tubular upper portion which is internally screwthreaded through its upper portion and is provided with an eye portion at its lower end. The tubular portion of the operating element 40 embraces the lower portion of the screwthreaded shank 39 of the member 37 with the internal screwthreads of said tubular portion of the operating element in engagement with the screwthreads of the shank. Also the tubular portion of the operating element 40 is provided with an external groove 41 into which the inner end

portion of a pin 42 extends, said pin being supported by the wall portion of the body portion which embraces the cavity 32. Interposed between the lower face of the wall 33 of the body portion 30 and the top face of the operating element 40 is a spring washer 43, and formed in the portion of the operating element located at the lower end of the tubular portion thereof is an opening 44 through which moisture may drain from the interior of said tubular portion.

The construction of the clamp illustrated in Figs. 8 to 13, inclusive, differs from the construction of the clamp illustrated in Figs. 1 to 7, inclusive, in that the screwthreaded shank 39 of the first-mentioned clamp is formed on the movable member 37 and is screwthreadedly embraced by the tubular portion of the operating element 40, while in the second-mentioned clamp the screwthreaded shank is formed on the operating element and screwthreadedly engages the jaw 4. However, the clamp of Figs. 8 to 13, inclusive, possesses the same advantage obtained because of the construction and arrangement of the clamp of Figs. 1 to 7, inclusive, in that the lower portion of the screwthreaded shank 39 is protected by the tubular portion of the operating element 40 from corrosion and other deterioration and from mechanical blows. Thus the operating element of the clamp of Figs. 8 to 13, inclusive may be freely rotated relative to unimpaired screwthreads of the shank 39 after the clamp has been in use for a long period of time, so as to release the clamp from a conductor. Also the portion of the screwthreaded shank 39 which must be traversed by the internally screwthreaded portion of the operating element when the jaws are separated to release the clamp from a conductor, is neither in compression or tension when the clamp is in use, and therefore strains resulting from the clamping action of the clamp will not distort said portion of the screwthreaded shank in a manner to interfere with free operation of the operating element with respect thereto.

By referring to Figs. 3 and 4 it will be noted that the portion 5 of the jaw 4 has formed through a portion thereof an aperture 45 which is open at its outer end at the outer surface of said portion 5 and at its inner end at the screwthreaded face of the opening 8. This aperture serves as an inlet for coating material which is being introduced into the opening 8, the screwthreaded portion 19a of the operating element 19, being backed outwardly relative to the opening 8 to an extreme point below the aperture 45, whereupon the coating material may be introduced into the opening 8 through the aperture 45, for instance, by being squeezed therethrough from a collapsible tube resembling a tooth paste tube. When the coating material has been introduced into the opening 8 as described, the screwthreaded portion 19a is adjusted inwardly of the opening 8 to close the aperture 45 to prevent escape of coating material from the opening 8 through said aperture 45.

I claim:

1. A clamp comprising a body portion having a part which provides a jaw, a member having a part which provides a second jaw, said member being guided by said body portion for movement relative to said body portion and said jaws of said body portion and said member being related for clamping operation, an operating element cooperating with said body portion and having a screwthreaded shank which screwthreadedly engages said member for subjecting said member to move-

ment with respect to said body portion, and a spring washer disposed between a portion of said body portion and a portion of said operating element, said portion of said body portion being provided with a concave face and said portion of said operating element being provided with a convex face and said spring washer being deformed between said faces when the operating element is manipulated to adjust the jaw of said member to the clamping position.

2. A clamp comprising a body portion having a part which provides a jaw, a member having a part which provides a second jaw, said member being guided by said body portion for movement relative to said body portion and said jaws of said body portion and said member being related for clamping operation, operating means adapted to subject said member to movement with respect to said body portion, said operating means including an operating element having a screwthreaded shank which is extended into an opening formed in said member in such manner that a portion of said screwthreaded shank which moves in screwthreaded relation with respect to the screwthreads of said opening when said member is moved relative to said body portion is embraced by said member so as to be protected thereby, and a spring washer disposed between a portion of said body portion and a portion of said operating element, said portion of said body portion being provided with a concave face and said portion of said operating element being provided with a convex face and said spring washer being deformed between said faces when the operating element is manipulated to adjust the jaw of said member to the clamping position.

3. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said body portion being provided with portions providing a guideway in which a part of said member is disposed for sliding movement, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement.

4. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said body portion being provided with portions providing a guideway in which a part of said member is disposed for sliding movement, means for limiting outward relative movement of said body portion and said member, said member being provided

with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement.

5. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said body portion being provided with portions providing a guideway in which a part of said member is disposed for sliding movement and a part of said guideway being removable to permit introduction into said guideway of said part of said member, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement.

6. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said body portion having a front wall, opposed side walls, and inwardly extended lugs formed on said opposed side walls, all of which provide a guideway in which a part of said member is disposed for sliding movement, and one of said opposed side walls being removable to permit introduction into said guideway of said part of said member, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said

body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement.

7. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said body portion having a front wall, opposed side walls, and inwardly extended lugs formed on said opposed side walls, all of which provide a guideway in which a part of said member is disposed for sliding movement, and one of said opposed side walls being removable to permit introduction into said guideway of said part of said member, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement, and in abutment formed on said member which is adapted to be engaged by said lugs on said body portion to limit outward relative movement of said body portion and said member.

8. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening

where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement, said screwthreaded shank of said operating means having a passageway formed therein through which coating material may be squeezed from the screwthreaded opening of said member by relative movement of said member and said screwthreaded shank to coat the screwthreads of said shank.

9. A clamp comprising a body portion and a member arranged in engagement with each other for relative straight-line movement, said member being provided with a screwthreaded opening formed therein which is completely closed by integral portions of said member except for the lower end of said screwthreaded opening where said screwthreaded opening is open at the lower end of said member, clamping jaws formed on said body portion and said member respectively which move with said body portion and said member toward and from clamping relation, operating means adapted to subject said body portion and said member to relative movement, said operating means including a screwthreaded shank which is screwthreadedly extended upwardly into said screwthreaded opening of said member so as to be hooded therein, and means for engaging said operating means with said body portion at a point beneath said screwthreaded shank of said operating means, said engaging means being of such character that said operating means may be rotated with respect to said body portion whereby rotation of the screwthreaded shank of said operating means within the screwthreaded opening of said member will subject said body portion and said member to relative guided straight-line movement, said member having a passageway formed therein which is so positioned that coating material may be squeezed through said passageway from the screwthreaded opening of said member by relative movement of said member and said screwthreaded shank to coat a conductor being engaged between the jaws of the clamp.

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