

Aug. 17, 1943.

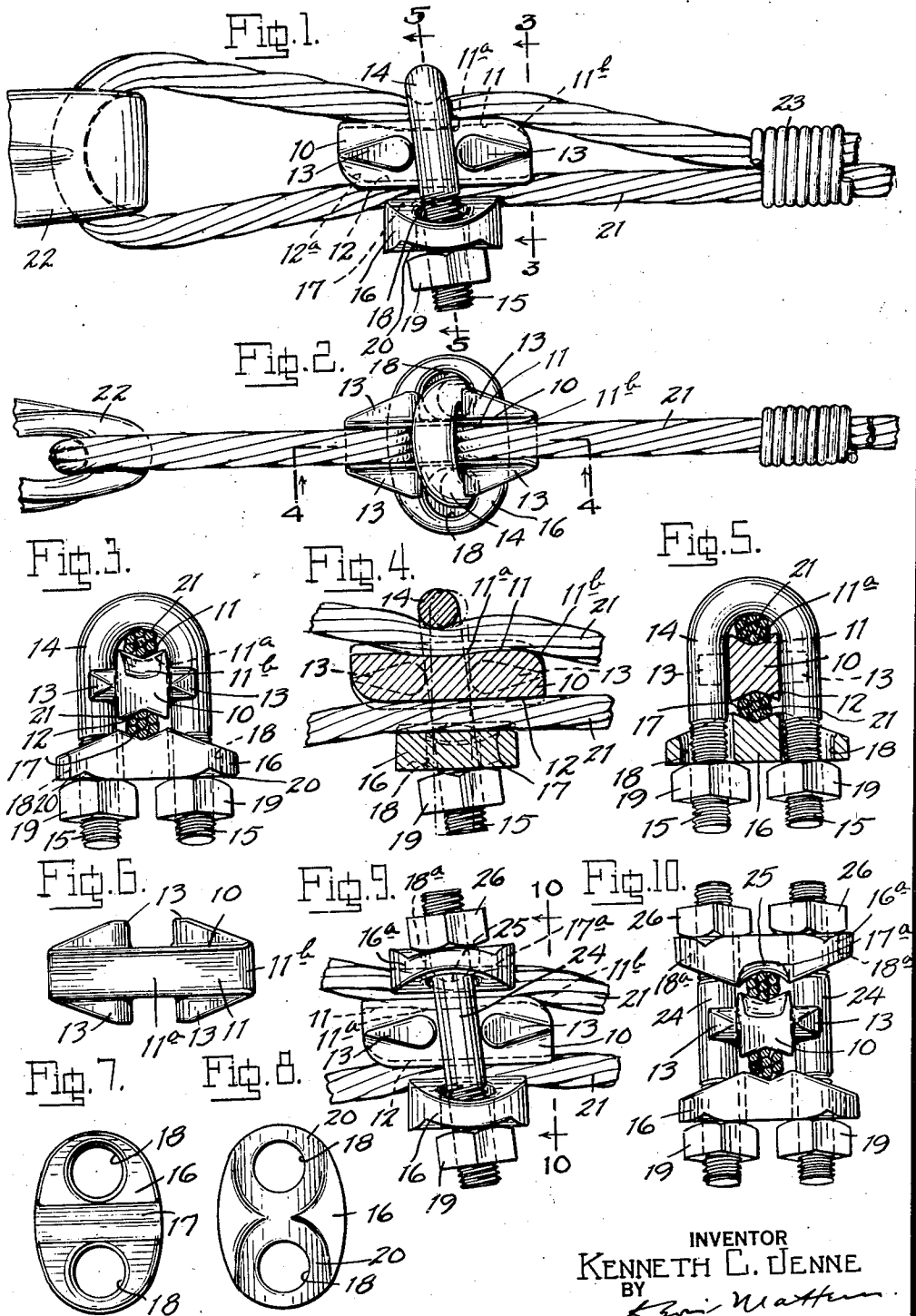
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2,327,307

CLAMP FOR GUY WIRES AND THE LIKE

Filed July 18, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 11.

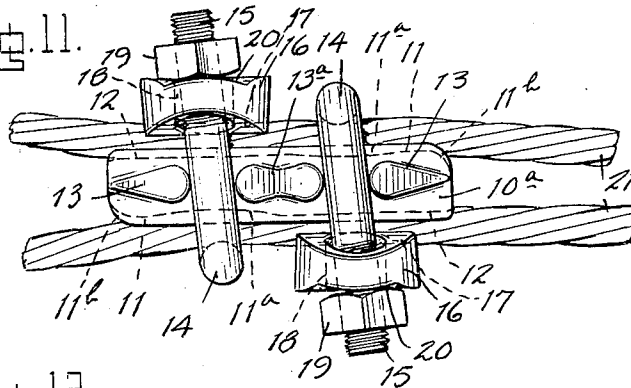


Fig. 12.

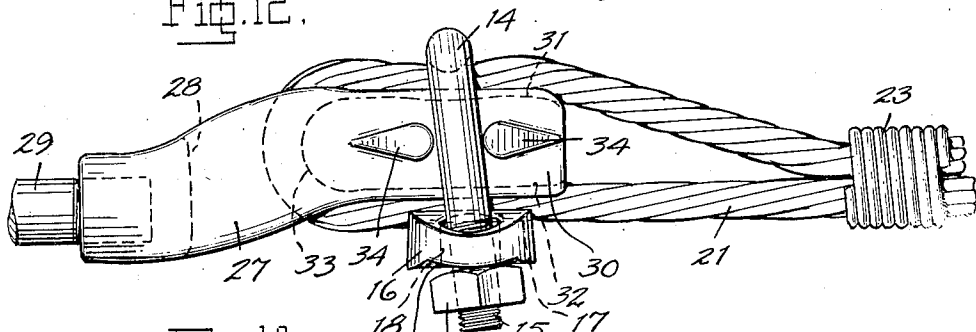


Fig. 13.

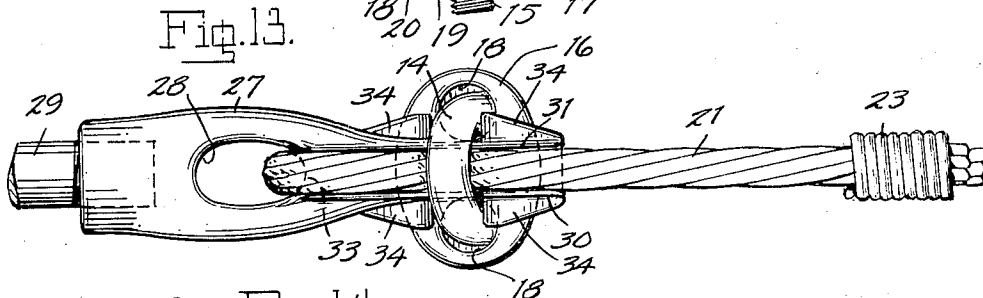
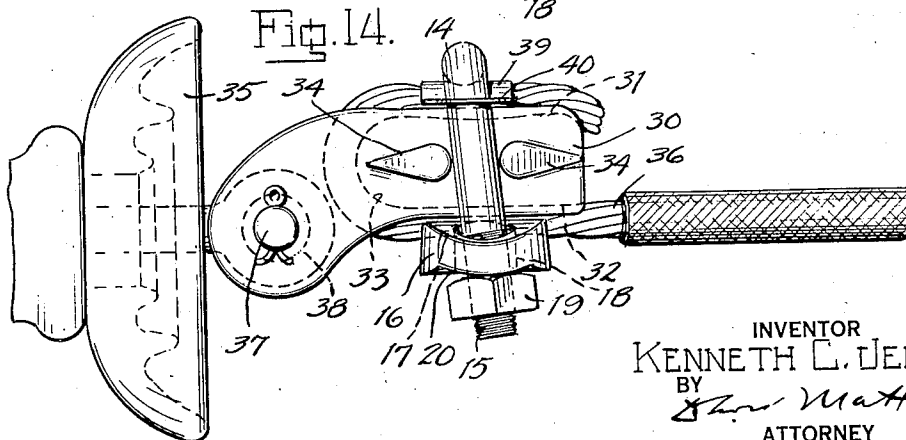


Fig. 14.



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CLAMP FOR GUY WIRES AND THE LIKE

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7 Claims. (Cl. 24-243)

The present invention relates to improvements in clamps for guy wires, and the like, and while the invention is especially effective in connection with guy wires used in the support of pole line construction, it may also find use as a dead-ending, splicing or connecting clamp for cable messenger wires, conductor wires, and other aerial wires or cables employed in connection with pole-carried transmission, distribution and communication lines.

It is an object of the invention to provide a clamp for clamping the loop end of a guy wire, so as to minimize slippage as between the strand upon the pull side of the guy wire loop and the strand upon the tail side, the stresses upon the strands at the pull and tail sides being usually unequal due to the direct pull of the guy wire upon its clamped portion at the pull side which takes the full amount of pull, as for instance 10,000 lbs., and the pull at the tail side where the wire engaged in the loop in the supporting eye of an anchor rod, or the like, and whereby the pull is divided, as for instance to 5,000 lbs. The usual type of guy wire clamp employs a structure where straight grooved clamping plates are provided at each side of the two strands of wire engaged therein, the clamping plates being connected by bolts disposed and retained vertically to the direction of the grooves, so that the clamping action is a direct compression action as between the opposed clamping plates at right angles to the direction of the strands, and depends for the most part upon frictional resistance between the straight grooved plates and the clamped wire. Excess pull upon the guy wire tends to cause slippage of the clamp, as the normal clamping action is designed to have its maximum clamping effect in relation to a rated pull.

It is an object of the present invention to provide a clamp wherein pull upon the guy wire will tend to increase the clamping effect of the clamp beyond its initial clamping strength produced by the initial manual tightening of the bolts, and whereby slippage is effectually prevented, and further to provide such clamp wherein the clamping surfaces at the pull side are in the form of relatively long straight grooved clamping members adapted to grip the wire with minimum tendency to crush and mutilate it, and to provide clamping means at the tail side arranged to positively interlock with the wire so as to deflect it slightly out of its normal straight line direction, whereby the wire is thus substantially fixed with respect to the clamp, and being at the tail side, where

the pull is substantially reduced, there is no danger of breakage at the deflected clamping point.

It is particularly proposed to provide a clamp in which the bolt means, preferably in the form of a U-bolt, is pivotally positioned with respect to an intermediate body member of the clamp adapted to be interposed between the wire strands, with a clamping plate member adjustably carried upon the ends of the U-bolt, whereby the clamping plate member is adapted to have longitudinal parallel movement with respect to the body member through the tilting of the U-bolt. Tilting of the U-bolt is produced through the pull of the guy wire and causes a reducing of the distance between the clamping plate member at one side of the intermediate body member and the U-end of the U-bolt at the other side, so that as the pull is increased the clamping action of the U-end of the bolt upon the tail strand of the guy wire is increased and at the same time the clamping plate member is forced toward the body member with increased clamping action.

A further object is to provide a clamp in which the clamping parts have divergent surfaces at each side of the main clamping areas and are entirely free of directly opposed sharp cutting portions which may tend to cut into the wire as the clamping action is increased. Another object is to provide a clamp wherein the clamping areas are distributed over relatively large surfaces, especially at the pull side, so that there is no practical danger of crushing and mutilating the clamped wire.

A further object of the invention is to provide a clamp structure in which the improved features of the invention may be conveniently incorporated in a double clamp having a pair of U-bolt members reversely arranged, and wherein pull upon the wire strand engaged in the loop is reduced consecutively from clamping plate to U-bolt on both sides of the clamp in addition to the dividing of load between the two sides of the loop, so that these several portions are arranged so that their clamping characteristics are in substantially direct relation with the successive reductions in pull upon the guy wire.

Another object is to provide, as a further modification of the invention, a clamp constituting a part of a loop engaging eye-member of an anchor rod, or the like, wherein the looped guy wire is clamped and snubbed directly by the eye-member, and to provide such eye-member wherein the clamp is offset with respect to the axis of the rod, so that the pulling axis of the rod will remain in direct line with the pulling axis of the

guy wire, without any tendency to twist or cant with respect to the rod and guy wire.

With the above and other objects in view embodiments of the invention are shown in the accompanying drawings, and these embodiments will be hereinafter more fully described with reference thereto, and the invention will finally be pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation showing a guy wire clamp, according to the invention, in operative clamped relation with respect to the loop end of a guy wire, shown looped through the eye-end of an anchor rod or the like.

Fig. 2 is a plan view thereof.

Fig. 3 is a front elevation, wherein the guy wire is shown in vertical section, taken along the line 3—3 of Fig. 1.

Fig. 4 is a vertical longitudinal sectional view, taken along the line 4—4 of Fig. 2.

Fig. 5 is a vertical transverse sectional view, taken along the line 5—5 of Fig. 1.

Fig. 6 is a detail plan view of the intermediate clamping body member.

Fig. 7 is a top plan view of the lower clamping plate member.

Fig. 8 is a bottom plan view of the lower clamping plate member.

Fig. 9 is a side elevation of a modified form of the clamp, according to the invention, wherein a pair of straight bolts are employed in place of the U-bolt employed in the first embodiment.

Fig. 10 is a front elevation, wherein the guy wire is shown in vertical section, taken along the line 10—10 of Fig. 9.

Fig. 11 is a side elevation of another modified form of the invention, wherein two reversely arranged U-bolts are employed.

Fig. 12 is a side elevation of a further modified form of the invention, wherein the clamp means is combined with a guy wire loop snubbing eye-member of an anchor rod, or the like.

Fig. 13 is a top plan view thereof.

Fig. 14 is a side elevation of a modified adaptation of the clamp illustrated in Figs. 12 and 13, and wherein the clamp forms a conductor connector for a suspension insulator.

Similar reference characters indicate corresponding parts throughout the several figures of the drawings.

Referring to the drawings, and more particularly to Figs. 1 to 8 thereof, the clamp, according to the exemplary embodiment of the invention illustrated therein, comprises an intermediate clamping body member 10 in the form of an elongated block of generally rectangular shape provided in its upper surface with a guy wire receiving groove 11, which at its end portions is of shallow V-form and at its central portion 11^a is slightly depressed and concavely rounded for the purpose of providing an intermediate recessed portion for interlockingly receiving the clamped guy wire cooperatively clamped therein by means of the U-bolt clamp, as will presently more fully appear. At its forward end the groove 11 is preferably divergent and curved downwardly, as at 11^b, so as to provide a belled-out clearance space for the guy wire extending forwardly from the clamp, whereby there will be no sharp wire-engaging corner and the angularity of the tail strand of the wire may be varied as desired.

In the underside of the clamping body member 10 there is provided a straight groove 12 of

shallow V-form in cross-section, the rearward end of this groove being divergent and rounded, as at 12^a, where the wire may extend at an angle from the clamp, the wire at the forward side being substantially in a straight line with the clamp due to the pull exerted thereon.

Upon each side of the body member 10, there are provided a pair of spaced and opposed bearing projections 13—13, the inner opposed ends of which are preferably cylindrically rounded to provide trunnion bearings for the side legs of the U-bolt clamp member 14 engaged therebetween, the engagement of the U-bolt being such that longitudinal shifting movement between the bolt and the body member is prevented, but limited swinging movement of the bolt is permitted about a transverse axis disposed approximately centrally of the body member 10. The side legs of the U-bolt are parallel and substantially close to the sides of the body member 10 and the closed upper end of the bolt extends in arched relation above the central depressed portion 11^a of the groove 11 in the upper side of the body member. The lower end portions of the side legs of the U-bolt are threaded, as at 15, and are loosely engaged with a lower clamping plate member 16, provided centrally of its upper side with a longitudinal wire receiving groove 17 of shallow V-shape in cross-section and disposed in complementary opposed relation to the lower groove 12 of the body member. The upper surface of the plate is inclined downwardly at each side of its central grooved portion and is provided at each side of the groove with vertically extending holes 18 through which the side legs of the U-bolt extend in loose relation, the size of these holes being sufficiently larger than the diameter of the side legs of the U-bolt to permit the U-bolt to assume a tilted position, as shown in Fig. 1, while this lower clamping plate remains parallel to the clamping body member 10. Upon the threaded ends of the U-bolt there are engaged tightening nuts 19—19, the upper convex sides of which have bearing engagement with convex cylindrical bearing surfaces 20—20, provided upon the underside of the lower clamping plate member 16 in surrounding relation to the holes 18, so that in any relative tilted position of the U-bolt the points of engagement of the nuts with the bearing surfaces are in a plane substantially coincident with the central axis of the U-bolt. The longitudinal dimension of the lower clamping plate member 16 is less than the longitudinal dimension of the intermediate clamping body member 10, so that the end edges of the clamping grooves of the clamping plate and body members are not directly opposed to each other and consequently will not cut into the wire clamped therebetween.

As shown in Figs. 1 and 2, the clamp is shown in operative clamped relation with a guy wire 21, the loop of which is extended through the eye-member 22 of an anchor rod, or the like, the tail strand of the loop at one side being secured to the pull strand at the other side by means of a serving wire 23. In connecting the clamp, the pull strand of the wire is engaged in the lower groove 12 of the intermediate clamping body member 10 and is clamped therein by means of the lower clamping plate member 16, the loop of the wire extending through the eye 22 and the tail strand being engaged in the upper groove 11 beneath the upper U-end of the U-bolt 14. The clamp is manually tightened by means of the nuts 19, with the clamping bolt in the vertical position as in

licated by the dot-and-dash lines in Fig. 4. Upon tightening of the guy wire, the pull upon the pull strand, which may be for instance 10,000 lbs., tends to both swing the U-bolt in the direction of the pull and press the lower clamping plate member 16 toward the intermediate clamping body member 10, at the same time compressing the tail strand of the wire between the upper U-end of the U-bolt and the intermediate depressed portion 11^a of the upper groove 11 of the body member. This action has the effect of fixing the position of the body member, so that it will not slip with respect to the loop-end of the guy wire, due to the fact that the stress on the pull strand of the wire is substantially greater than the stress on the tail strand, which is substantially reduced through the dividing action provided by engagement of the guy wire loop in the eye 22, the relatively greater stress at the pull side being directly exerted upon the lower clamping plate member 16 and the U-bolt, tending to swing the latter into tilted interlocking clamping engagement with the tail strand, the reduced stress upon the tail strand being insufficient to cause slippage of the clamped tail strand. This relation fixes the tail side of the loop with respect to the clamp, and as increased pull is exerted upon the pull side the tendency is to impart increased swing to the U-bolt and consequently to increase the clamping action upon the pull strand.

In Figs. 9 and 10 I have illustrated a modified form of the invention, in which a pair of straight bolt members 24--24 are employed in place of the U-bolt 14 shown in the first embodiment, these bolts being threaded at both ends and having engaged upon their upper ends an upper clamping plate member 16^a substantially similar to the lower clamping plate member 16, except that a clamping surface 25 of rounded arcuate form is provided centrally of the groove 17^a to substantially correspond to the clamping surface of the U-end of the U-bolt of the first embodiment, so that the cooperative clamping operation of this structure is substantially the same as in the first embodiment. The upper threaded ends of the bolts are loosely engaged through the holes 12^a of the plate 16^a and are secured by means of nuts 26.

In Fig. 11 I have shown another modified form of the invention, in which the intermediate clamping body member 10^a is adapted to have a pair of U-bolt members and a pair of clamping plate members cooperatively connected thereto, in reverse relation to each other, and for this purpose there is provided at each side of the body member a pair of bearing projections 13 at each end and a centrally disposed bearing projection 13^a, the latter having each of its ends in the form of a cylindrical trunnion-bearing surface. This embodiment of the invention provides a double clamp in which the clamping plate member in relation to each of the U-bolts is at the pull side of the strands of wires at the respective sides of the clamp, pull upon the wires causing the U-bolts to tilt in substantially similar manner to the first embodiment of the invention to cause the clamping action to be increased as the pull is increased.

In Figs. 12 and 13 I have illustrated a further modified form of the invention, in which the clamp is incorporated in the eye-member at the end of an anchor rod, or the like. The eye-member 27 provided with an eye opening 28 is screwed at one end upon the end of the anchor

rod 29, and at its other end is provided with a clamp formation 30, substantially corresponding in structure and operation to the intermediate clamping body member of the first embodiment of the invention, being provided in its upper surface with a wire receiving clamping groove 31 and in its lower surface with a wire receiving clamping groove 32, and the inner end surface 33 being of convexly rounded grooved form and constituting the forward wall of the eye opening of the eye-member, so that the loop of the wire extends over the grooved surfaces 31 and 32 and the end grooved surface 33. The portion 30 is offset from the axis of the rod 29, so that the straight pull side of the wire engaged in the lower groove 32 has its axis coincident with the axis of the anchor rod, and consequently the pull upon the wire will be in a straight line with the axis of the anchor rod. Upon each side of the portion 30 there are provided bearing projections 34 corresponding to the bearing projections 13 of the first embodiment of the invention, and which pivotally support the clamping U-bolt member 14, the upper U-end of the U-bolt being clampingly opposed to the upper groove 31, and a lower clamping plate member 16 being engaged upon the lower ends of the side legs of the U-bolt for clamping cooperation with the lower groove 32.

In Fig. 14 I have illustrated a still further modified form of the invention which is an adaptation of the clamp illustrated in Figs. 12 and 13, the clamp being adapted for attachment to a suspension insulator 35 for the purpose of connecting the conductor wire 36 thereto. In place of the eye opening 28 as provided in the modification shown in Figs. 12 and 13, the clamp is provided with a clevis connection pin 37 for attachment to the loop member 38 of the insulator, the axis of this pin being in line with the longitudinal axis of the conductor wire 36, so that the pull upon the conductor wire is in a straight line with the axis of the suspension insulator. The intermediate clamp body 30 and the lower clamping plate member 16 are formed of suitable conducting material, and preferably beneath the U-end of the U-bolt there is interposed in engagement with the tail strand of the conductor wire a contact plate 39 formed of conducting material having apertured side ears 40 through which the side legs of the U-bolt are engaged.

I have illustrated and described preferred and satisfactory embodiments of the invention, but it will be understood that changes may be made therein within the spirit and scope thereof, as defined in the appended claims.

Having thus described the invention, what I claim by Letters Patent is:

1. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, clamping means including an upper clamping part vertically opposed in spaced relation to said upper clamping surface, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, and a connecting part between said upper and lower clamping parts, pivotally positioned with respect to said clamp body member for tilting movement about a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces,

whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

2. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, pivot bearing means on said clamp body member having a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, clamping means including an upper and clamping part vertically opposed in spaced relation to said upper clamping surface, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, and a connecting part between said upper and lower clamping parts, pivotally positioned by said pivot bearing means with respect to said clamp body member for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

3. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, pivot bearing means on said clamp body member comprising a pair of longitudinally spaced trunnion bearing projections at each side of said member having a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, clamping means including an upper clamping part vertically opposed in spaced relation to said upper clamping surface, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, and connecting parts at each side of said clamp body member extending between said upper and lower clamping parts, pivotally positioned between said respective pairs of trunnion bearing projections for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

4. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, pivot bearing means at each longitudinal side of said clamp

body member having a common transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, U-bolt clamping means including an upper clamping part vertically opposed in spaced relation to said upper clamping surface, a pair of side legs respectively at each side of said clamp body member, a lower clamping part vertically opposed in spaced relation to said lower clamping surface loosely engaged with the lower ends of said side legs, and clamping nuts screwed upon the ends of said side legs below said lower clamping part, said side legs being pivotally positioned by said pivot bearing means with respect to said clamp body member for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

5. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface having a depression intermediate its ends and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, pivot bearing means on said clamp body member having a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, clamping means including an upper clamping part vertically opposed in spaced relation to said depression of said upper clamping surface and of convexly rounded form longitudinally and concavely rounded form transversely, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, and a connecting part between said upper and lower clamping parts, pivotally positioned by said pivot bearing means with respect to said clamp body member for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

6. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface and a longitudinally extending wire clamping lower surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, pivot bearing means on said clamp body member having a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, clamping means including an upper clamping part vertically opposed in spaced relation to said upper clamping surface, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, a connecting part comprising a pair of bolts respectively at each side of said clamp body member and extending between said upper and lower clamping parts, and loosely engaged therewith, and tightening nuts upon the upper and

lower ends of said bolts, said bolts being pivotally positioned by said pivot bearing means with respect to said clamp body member for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite direction longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

7. In a clamp for guy wires, or the like, a clamp body member having a longitudinally extending wire clamping upper surface, a longitudinally extending wire clamping lower surface, and a wire-snubbing end surface, said upper and lower surfaces each adapted to receive a length of wire to be clamped, and said wire-snubbing surface adapted to receive a bend of wire extending between said upper and lower lengths of wire, pivot

bearing means on said clamp body member having a transverse pivot axis intermediate the ends of said member and intermediate its upper and lower clamping surfaces, clamping means including an upper clamping part vertically opposed in spaced relation to said upper clamping surface, a lower clamping part vertically opposed in spaced relation to said lower clamping surface, and a connecting part between said upper and lower clamping parts, pivotally positioned by said pivot bearing means with respect to said clamp body member for tilting movement about said transverse pivot axis, whereby as longitudinal pull is exerted upon a length of wire clamped against one of said wire clamping surfaces the upper and lower clamping parts of said clamping means are respectively swung in opposite directions longitudinally toward said upper and lower wire clamping surfaces to respectively clamp said longitudinally pulled length of wire and a length of wire clamped against the other wire clamping surface.

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