June 30, 1953 K. C. JENNE 2,643,428

GUY HOOK FOR ATTACHMENT TO TRANSMISSION LINE POLES OR THE LIKE

Filed June 5, 1951

2 Sheets-Sheet 1

Fig. 1.

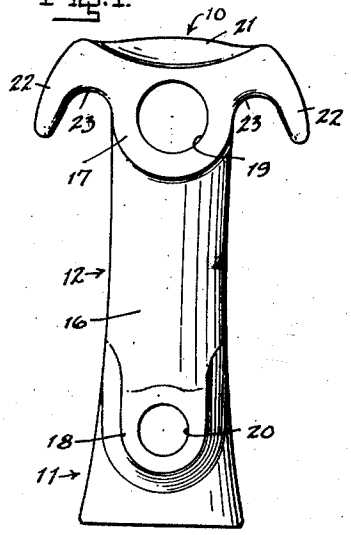


Fig. 2.

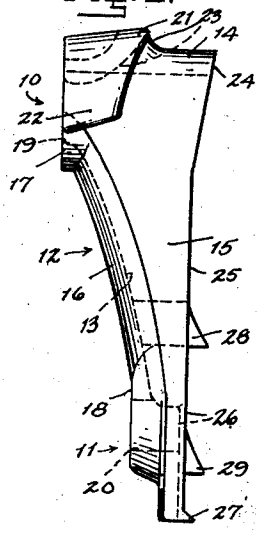


Fig. 3.

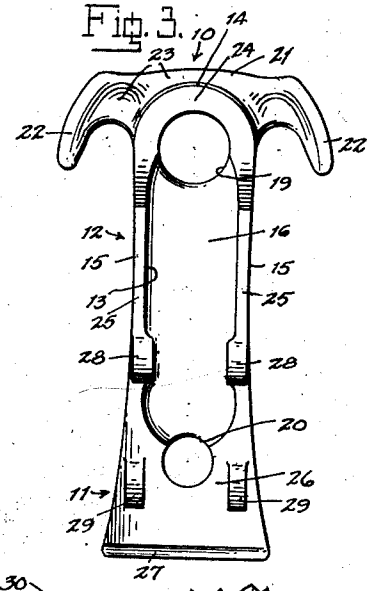


Fig. 4.

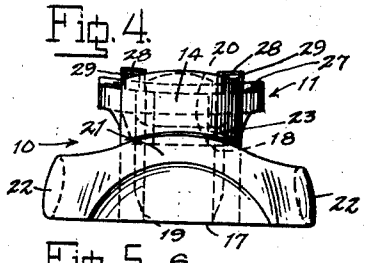


Fig. 5.

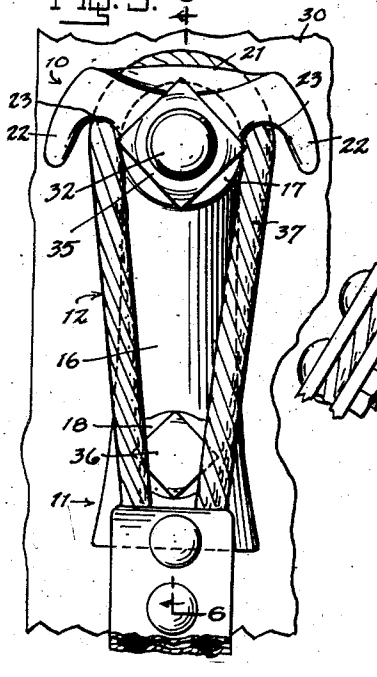
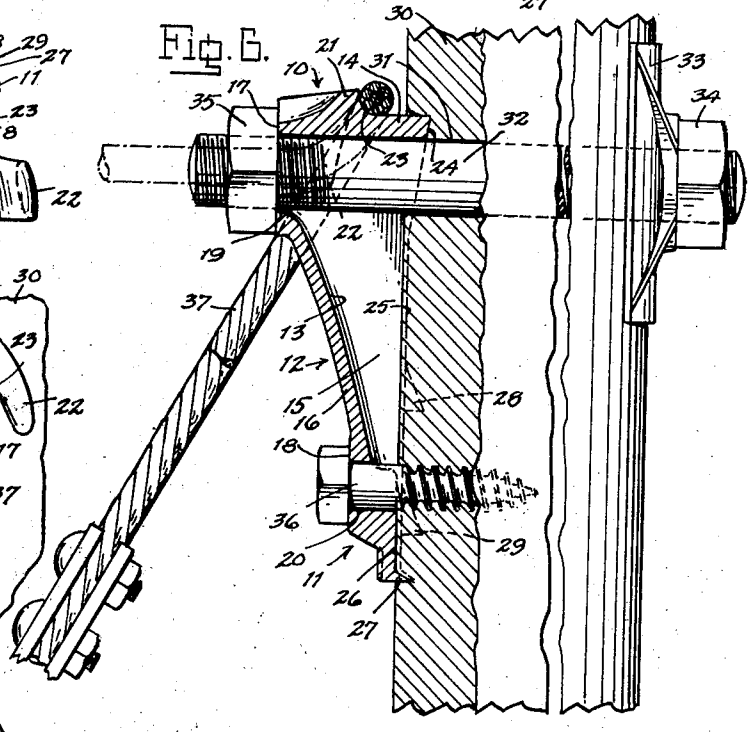


Fig. 6.



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Fig. 7.

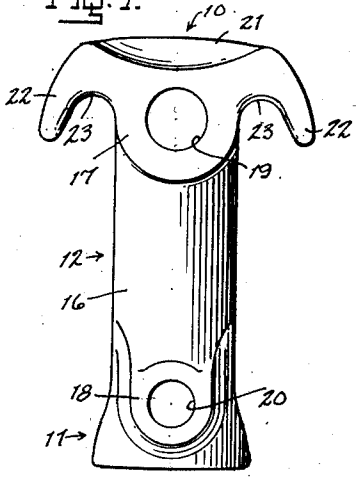


Fig. 8.

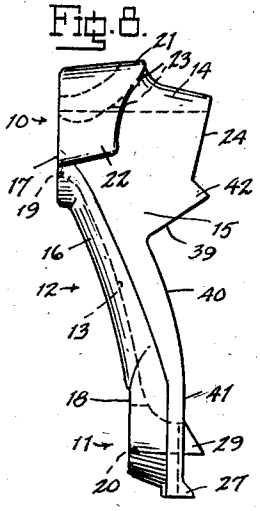


Fig. 9.

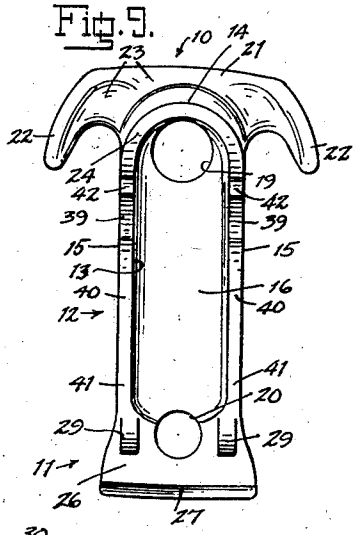


Fig. 10.

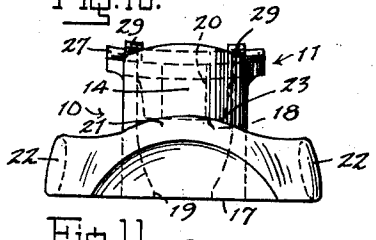


Fig. 11.

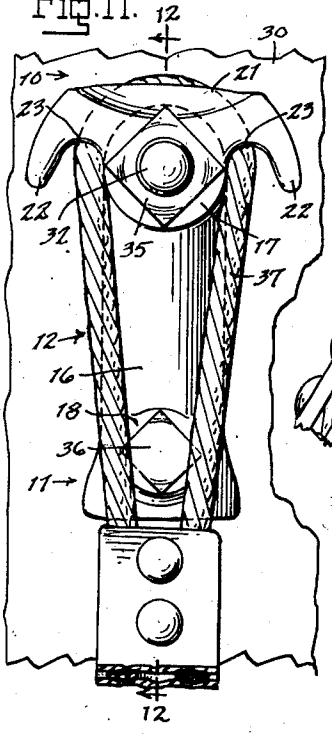
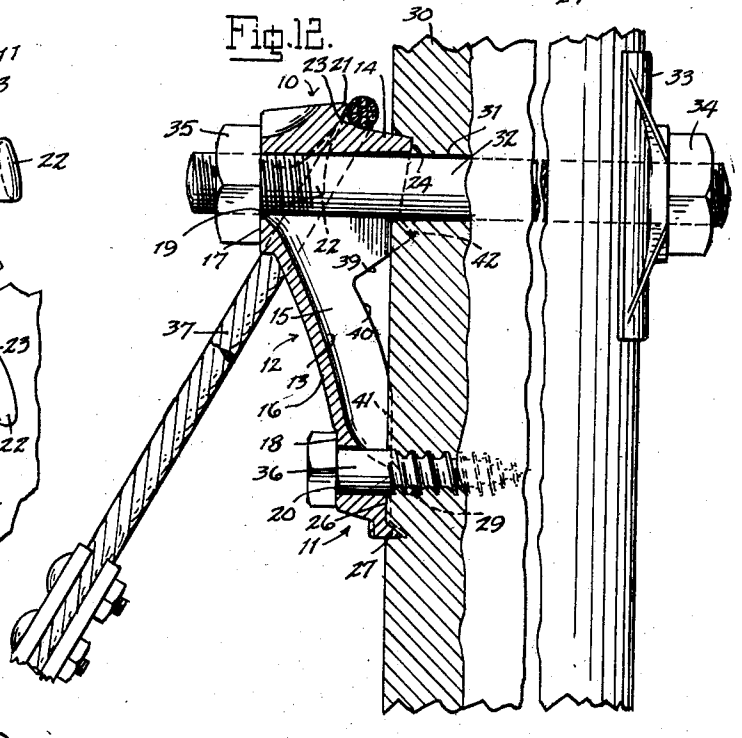


Fig. 12.



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2,643,428

GUY HOOK FOR ATTACHMENT TO TRANSMISSION LINE POLES OR THE LIKE

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Application June 5, 1951, Serial No. 230,036

7 Claims. (Cl. 24—115)

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The present invention relates to a guy hook for attachment to transmission line poles or the like, and in particular constitutes an improvement over the guy fixture disclosed in the patent to R. B. Williams No. 1,855,564, granted April 26, 1932, reissued as Reissue Patent No. 18,163, dated October 4, 1932.

The guy fixture as disclosed in the Williams patent consists of an upper hub portion, engaged by the through bolt extending through the pole and about which hub portion the loop of the guy cable is engaged, and a downwardly extending heel portion engaging the vertical surface of the pole below the through bolt and secured to the pole by a lag screw or spike. The inner surface of the hub portion is vertically disposed and transversely curved to substantially conform to the curved surface of the pole, and in practice is tightened against the pole by tightening of the nut on the end of the through bolt, without any appreciable indentation of the pole in the area directly surrounding the through bolt. Resistance to the vertical component of the load imposed by the guy cable is offered by the engagement of the heel with the pole, as well as by the through bolt and the lag screw or spike, with the result that under heavy loading there is a tendency for the inner surface of the hub portion to pull away from the surface of the pole, lessening the effective frictional area of contact between the fixture and the pole, and increasing the vertical component of load on the heel and on the lag screw. This results in a tendency for the fixture and the lag screw to slot down the pole. As the guy fixture slots down the pole the resistance it affords to the vertical component of the load is decreased with a consequent increase in the load upon the through bolt so that bending may take place. When this occurs there will be further slotting down of the fixture, as well as the likelihood of splitting the pole as the through bolt bends and is pulled down into it. These conditions have been particularly pronounced in recent years, when the practice in the field has been to increase pole loading with the development of guy cables and through bolts of increased tensile strength on a p. s. i. basis, and these factors have brought about at least a commensurate increase in the loads imposed on the guy hooks.

It is an object of the present invention to provide a guy hook having incorporated therein means whereby a greater commensurate resistance to the vertical component of the load imposed upon the guy hook is transferred to the pole through its cooperative engagement with the pole, with a consequent reduction in the tendency of the guy hook to slot down the pole and an attendant reduction in through bolt bending. It is particularly proposed to provide wedge means upon the inner side of the guy hook for engagement with the pole in the area contiguous to and surrounding the through bolt, such wedging means being adapted through tightening of the securing nut of the through bolt to become imbedded in the pole to thus form a wedge between the securing nut and the pole to provide greater stability and resist downward movement of the guy hook. The wedging means has the further effect of compressing the wood of the pole in surrounding relation to the through bolt to thus reduce the tendency of the pole to split. It also constitutes a pre-compressive means to permit maximum initial tension to be placed on the through bolt without overturning the guy hook.

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It is further proposed to provide an improved arrangement of spurs adapted to engage the pole at points at each side of the vertical plane of the pole extending through the axis of the through bolt, to thus further resist splitting of the pole through the down load of the through bolt. Another object is to provide an improved heel structure having a transverse spur rib for imbedding in the pole at a point directly below the lag screw, providing further resistance to slotting down the pole.

A further object is to provide an improved form of hook structure for engagement by the loop of the guy cable, providing for a more secure retention of the loop against accidental disengagement, as well as for easier installation and removal. It is also proposed to provide hook means which will enable the guy cable to be pulled off at any angle up to 90° with the pole, thus enabling the guy hook to be used to secure substantially horizontal head guys as well as down guys.

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 be finally pointed out in the claims.

In the drawings:

Fig. 1 is a front elevation of a guy hook, according to the invention.

Fig. 2 is a side elevation.

Fig. 3 is a rear elevation.

Fig. 4 is a top plan view.

Fig. 5 is a front elevation of the guy hook installed upon a pole and with a guy cable engaged therewith.

Fig. 6 is a vertical sectional view, taken along the line 6—6 of Fig. 5.

Fig. 7 is a front elevation of a modified form of guy hook, according to the invention.

Fig. 8 is a side elevation thereof.

Fig. 9 is a rear elevation.

Fig. 10 is a top plan view.

Fig. 11 is a front elevation showing the guy hook illustrated in Figs. 7 to 10 installed upon a pole and with a guy cable engaged therewith.

Fig. 12 is a vertical sectional view taken along the line 12—12 of Fig. 11.

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

Referring to the drawings, and more particularly to Figs. 1 to 6 thereof, the guy hook illustrated therein, which is preferably formed of malleable cast iron, comprises an upper hub portion 10, a lower heel portion 11 and an intermediate connecting portion 12. The guy hook is of generally channel shape at its rearward side, the rearwardly facing cavity 13 being enclosed by the substantially semi-cylindrical upper wall 14 of the hub portion and by the side walls 15—15 and the front wall 16 of the intermediate portion 12, said front wall being inclined downwardly and inwardly from the forward wall 17 of the hub portion to the forward wall 18 of the heel portion 11.

The forward wall 17 of the hub portion has a vertically disposed planular bearing surface for engagement by the tightening nut of the through bolt, as will presently more fully appear, and is provided with a hole 19 for receiving the end of the through bolt, the passage for the through bolt being extended from said hole through the upper end of the cavity 13. The heel portion 11 is provided with a hole 20 for receiving the lag screw, as will presently more fully appear, and its forward wall 18 has a vertically disposed planular bearing surface for engagement by the head of the lag screw.

A rib 21 is formed upon the upper side of the hub portion 10 and is extended at each side in the form of downwardly extending hooks 22—22, the rearward surface of the rib and the rearward and under surfaces of the hooks forming a substantially semi-circular downwardly and outwardly inclined groove 23 for receiving the loop of the guy cable, as will presently more fully appear.

The rearward surface 24 of the hub portion 10 is in the form of an inverted U surrounding the rearward end of the through bolt passage, and is in a downwardly and forwardly inclined plane which converges downwardly with respect to the vertical plane of the forward bearing surface 17, so that the hub portion forms a wedge structure. The lower ends of the inclined surface 24 connect with the upper ends of the vertically disposed rearward edges 25—25 of the side walls 15 of the intermediate portion, and these connect with the rearward surface 26 of the heel portion, which surface is concavely curved to substantially conform to the curvature of the pole. At its lower edge there is provided a transversely disposed tooth-like rib 27 adapted to dig into the pole upon securing the guy hook thereto, as will presently more fully appear. Spurs 28—28 are provided intermediate the upper and lower ends of the rearward edges 25 of the intermediate portion for digging into the pole, and similar spurs 29—29 are formed upon the heel portion in spaced relation at the sides of the hole 20. These spurs are outwardly spaced from the central vertical plane passing through the axis of the through bolt hole 19 and the lag screw hole 20, so that when they dig into the wood of the pole they provide clamping means to resist splitting along the central vertical plane passing through the axes of the through bolt and lag screw.

Referring to Figs. 5 and 6 the pole 30 is provided with a diametrically extending hole 31 for the through bolt 32, the threaded ends of which project from the ends of the hole 31, a curved washer 33 being engaged upon one end of the bolt and secured by a nut 34, and the guy hook of the invention being engaged upon the other end. The through bolt is engaged through the hole 19 of the hub portion and the nut 35 upon the end of the through bolt is tightened against the bearing surface 17 to the point where the wedge surface 24 becomes imbedded in the wood of the pole and the vertically disposed edge surfaces 25 come into firm contact therewith. At the same time the lag screw 36 is screwed into the pole through the hole 20 of the heel portion 11, and is tightened in cooperation with the tightening of the nut 35 to the point where the spurs 28 and 29 and the rib 27 imbed themselves into the pole.

It will be observed that the hub portion constitutes a positive wedge between the pole 30 and the nut 35 in surrounding relation to the end of the through bolt, and which will effectually resist downward movement of the guy hook upon the imposition of a vertical component of force thereon such as results from the pull of a guy cable. Also it will be observed that the imbedding of the wedge portion in the pole permits a substantially greater tension to be placed upon the through bolt by tightening of the nuts 34 and 35, and that the structure of the wood of the pole is impacted or compressed in surrounding relation to the through bolt thereby substantially increasing the resistance to splitting, such as might result from a downward bending of the through bolt into the wood of the pole.

The spurs 28 and 29 provide substantial resistance to downward slotting movement of the guy hook, and also act as clamps at each side of the central vertical plane of the pole passing through the axis of the through bolt, providing additional resistance to splitting. The transverse rib 27 digs into the pole along a transverse line directly beneath the lag screw, providing further resistance to splitting.

A loop 37 of the guy cable is engaged over the hub portion within the groove 23 and is carried forward at the desired guying angle beneath the respective hook portions 22. The ratio between the vertical dimension of the hub portion and the horizontal distance between the side surfaces of the hook portions is such that the loop 37 may be formed before installation and conveniently and easily engaged with the hub portion by first holding it in a horizontal position and slipping it over the hub behind the rib 21 and the hooks, and then swinging it downwardly to a vertical position, whereupon it may be pulled forwardly to bring the sides of the loop beneath the hooks. In this position the guy loop is securely held against accidental displacement by virtue of the interlocking engagement of the hooks with the sides of the loop. The forward and downward inclination of the groove 23 and the relatively high disposition of the hooks upon the hub is

such that the guy cable may, if desired, be extended from the guy hook at any desired angle up to 90° of the pole, this position being indicated by the dot-and-dash lines in Fig. 6.

The wedging action of the guy hook is such that it becomes in effect a substantially fixed part of the pole, so that the vertical component of the load imposed thereon is taken to a large extent directly by the guy hook and transferred to the pole, with the result that bending strain on the through bolt is greatly reduced and substantially all of the strain thereon is resolved into axial tension. The effect of the wedging action is to provide increased resistance as the load is increased, so that slotting down on the pole will be resisted under normal loads imposed as well as under loads substantially in excess of normal, thus providing a safety factor in excess of the rated load capacity of the guy hook. While the wedging action of the guy hook with respect to the surface of the pole and the nut 35 provides substantially positive resistance against downward movement on the pole, additional resistance is provided by the cooperative action of the heel portion, the spurs, and the lag screw. The spaced side edges 25—25 provide firm contact along substantially spaced vertical lines with pole surfaces of different diameters and surface contours, thereby effectually resisting turning movement of the hook in the event that unequal side strains are imposed thereon.

In Figs. 7 to 12 I have illustrated a modified form of the invention wherein the side walls 15—15 of the intermediate connecting portion 12 have their rearward edges recessed, the recesses being of substantially angular form with their upper edge portions 39 at a downward and forward angle, and their lower edge portions 40 curved downwardly and rearwardly in substantial conformity to the curve of the front wall 16 and merging at their lower ends into vertically disposed edge portions 41—41 which connect with the inner surface 26 of the heel portion 11. The upper edge portions 39 project rearwardly to form the lower sides of spurs 42—42 provided at the lower ends of the side portions of the inclined wedging surface 24, these spurs 42 being adapted to be imbedded in the pole, as shown in Fig. 12, at points at each side of the through bolt and closely contiguous thereto to provide clamping means to resist splitting.

This embodiment of the invention is designed for lighter guy wire loading than the form of the invention shown in Figs. 1 to 6, such lighter loads permitting a substantial reduction in the weight of metal as well as a reduction in the height dimension. To this end the intermediate connecting portion 12 is materially reduced in weight by the recessing of its rearward edges while still maintaining supporting strength by its channel form. The over-all height as well as the weight are substantially reduced by reducing the vertical dimension of the heel portion 11, the relatively lighter loads imposed on the hook making possible a substantial reduction in the pole contacting area of the rearward surface 26 of the heel portion.

What is claimed is:

1. A guy hook for attachment to transmission line poles or the like, comprising an upper hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, a lower heel portion having a substantially vertically disposed laterally curved pole engaging surface, a tooth-like pole digging rib extending along the lower edge of said heel, and an intermediate connecting portion extending between said hub portion and said heel portion, said hub portion having a forward vertically disposed bearing surface, for engagement by said through bolt nut or the like, and a rearward surface disposed above and at each side of said through bolt passage and inclined in downwardly converging relation to said forward bearing surface whereby said hub portion is adapted, when said rearwardly inclined surface is imbedded in the pole, to constitute a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt.

2. A guy hook for attachment to transmission line poles or the like, comprising an upper hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, a lower pole-engaging heel portion having a passage therethrough for receiving a headed lag screw, and an intermediate connecting portion extending between said hub portion and said heel portion, said hub portion having a forward vertically disposed bearing surface, for engagement by a through bolt or the like, and a rearward surface disposed above and at each side of said through bolt passage and inclined in downwardly converging relation to the forward bearing surface of said hub portion whereby said hub portion is adapted, when said rearwardly inclined surface is imbedded in the pole, to constitute a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt.

3. In a guy hook for attachment to wood transmission line poles or the like, a hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, and comprising, a forward vertically disposed bearing surface for engagement by said through bolt nut or the like and having an opening constituting the forward end of said passage, a top wall having an inner wall surface constituting the upper side of said passage and an outer wall surface having a cable loop retaining formation intermediate the ends of said passage, and a rearward surface laterally opposite to said forward bearing surface having an opening constituting the rearward end of said passage, said rearward surface being inclined in downwardly converging relation to said forward bearing surface with its upper end presenting a wood-embedding edge, said edge adapted on tightening of said through bolt to be embedded in the wood of said pole whereby said hub constitutes a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt.

4. In a guy hook for attachment to wood transmission line poles or the like, a hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, and comprising, a forward vertically disposed bearing surface for engagement by said through bolt nut or the like and having an opening constituting the forward end of said passage, a top wall having an inner wall surface constituting the upper side of said passage and an outer wall surface having a cable loop retaining formation intermediate the ends of said passage, and a rearward surface disposed above and at each side of the rearward end of said passage and being inclined in downwardly converging relation to said forward bearing surface with its upper end portion above said passage forming a sharp corner with said outer wall surface and

presenting a wood-embedding edge, said edge adapted on tightening of said through bolt to be embedded in the wood of said pole whereby said hub constitutes a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt.

5. In a guy hook for attachment to wood transmission line poles or the like, a hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, and comprising, a forward vertically disposed planular bearing surface for engagement by said through bolt nut or the like and having an opening constituting the forward end of said passage, a top wall having an inner wall surface constituting the upper side of said passage and an outer wall surface having a cable loop retaining formation intermediate the ends of said passage, and a rearward planular surface disposed above and at each side of the rearward end of said passage and being in an inclined plane in downwardly converging relation to the vertical plane of said forward planular bearing surface with its upper end portion above said passage forming a sharp corner with said outer wall surface and presenting a wood-embedding edge, said edge adapted on tightening of said through bolt to be embedded in the wood of said pole whereby said hub constitutes a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt.

6. A guy hook for attachment to wood transmission line poles or the like, comprising an upper hub portion having a passage therethrough for receiving a through bolt provided with a retaining nut or the like, a lower heel portion having a substantially vertically disposed pole engaging surface concavely curved between its side edges and an intermediate connecting portion extending between said hub portion and said heel portion, said hub portion comprising a forward vertically disposed bearing surface for engagement by said through bolt nut or the like

and having an opening constituting the forward end of said passage, a top wall having an inner wall surface constituting the upper side of said passage and an outer wall surface having a cable loop retaining formation intermediate the ends of said passage, and a rearward surface disposed above and at each side of the rearward end of said passage, said rearward surface being inclined in downwardly converging relation to said forward bearing surface with its upper end portion above said passage forming a sharp corner with said outer wall surface and presenting a wood-embedding edge, said edge being rearwardly of a projected vertical plane passing through said side edges of said heel portion, and said edge adapted on tightening of said through bolt to be embedded in the wood of said pole whereby said hub constitutes a downward-movement-resisting wedge between the pole and the nut or the like of the through bolt, and the hub portion, by creating an overturning moment downwardly, seats the heel portion inwardly against said pole simultaneously with said embedding of the hub portion.

7. The invention as defined in claim 6 further characterized in that said heel portion has spurs for digging into said pole.

KENNETH C. JENNE.

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