

[54] GROUND WIRE CLIP

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 394,691, Sept. 6, 1973, abandoned.

[52] U.S. Cl. .... 174/164, 85/5 R, 85/21, 85/29, 85/49, 174/159, 248/71, 248/217

[51] Int. Cl. ... H01b 17/00, F16b 15/02, F16b 15/06

[58] Field of Search ..... 174/40 CC, 159, 164, 170; 52/155, 680; 85/5 R, 10 R, 21, 28, 29, 49, DIG. 2; 135/15 PE; 238/366; 248/71, 216, 217; 256/48

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[57] ABSTRACT

The present invention relates generally to ground wire clips for attachment to wooden poles and the like, and more particularly to a novel and very practical electrically nonconductive one piece ground wire clip. Embodiments of the present invention disclosed herein include an electrically nonconductive one piece clip having an elongate shank section and a hook shaped head section integral with one extremity of said shank section. The entering extremity of the elongate shank section is relatively sharp to facilitate driving the shank into a wooden workpiece. The hook shaped head provides a conductor accommodating recess and means is provided in the vicinity of the head for limiting the extent to which said shank may be longitudinally driven into a workpiece. Barbs or teeth disposed on opposite sides of the shank section are so arranged as to reduce to a minimum the possible fracture or severance of wooden fibers and function effectively to resist unauthorized or unintentional retrograde movement or withdrawal of the shank.

4 Claims, 10 Drawing Figures

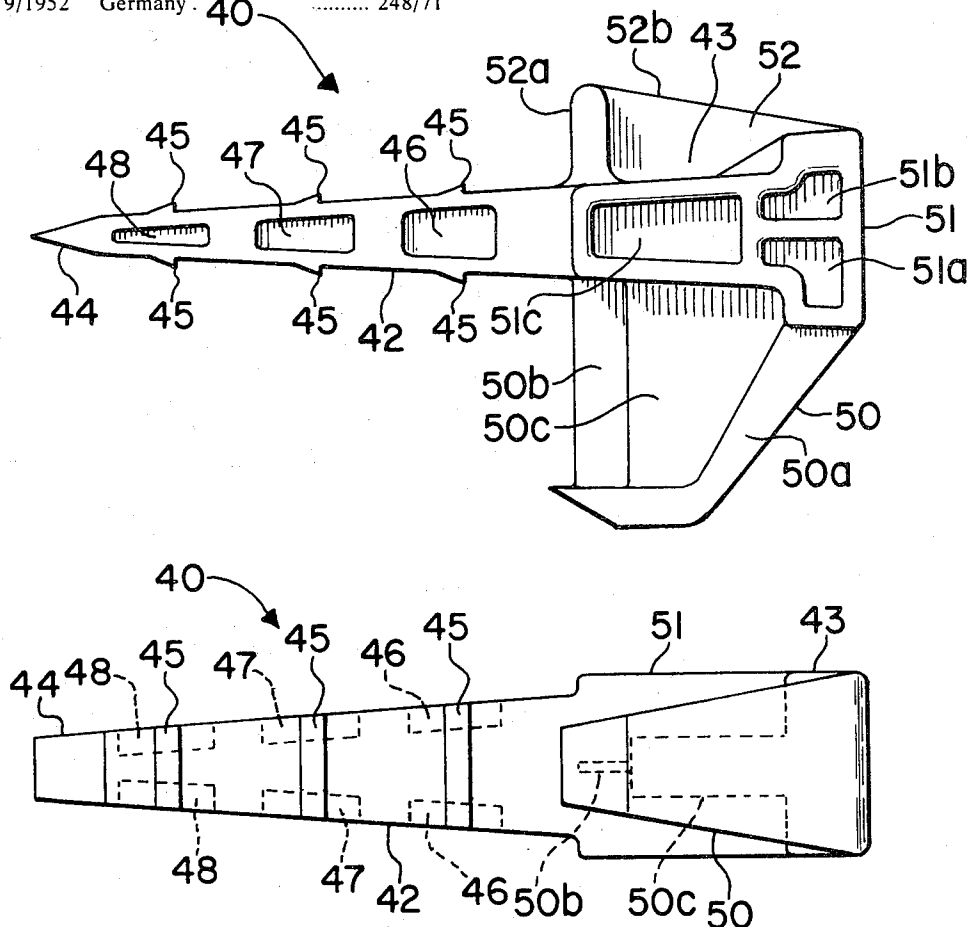


Fig. 1.

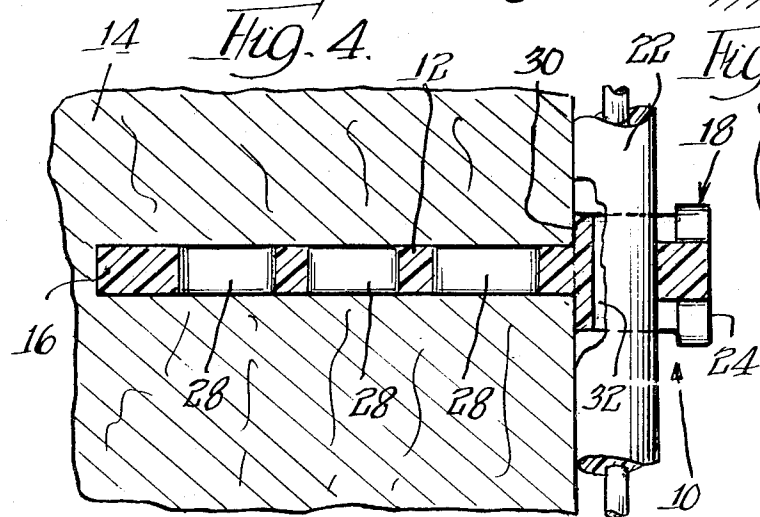
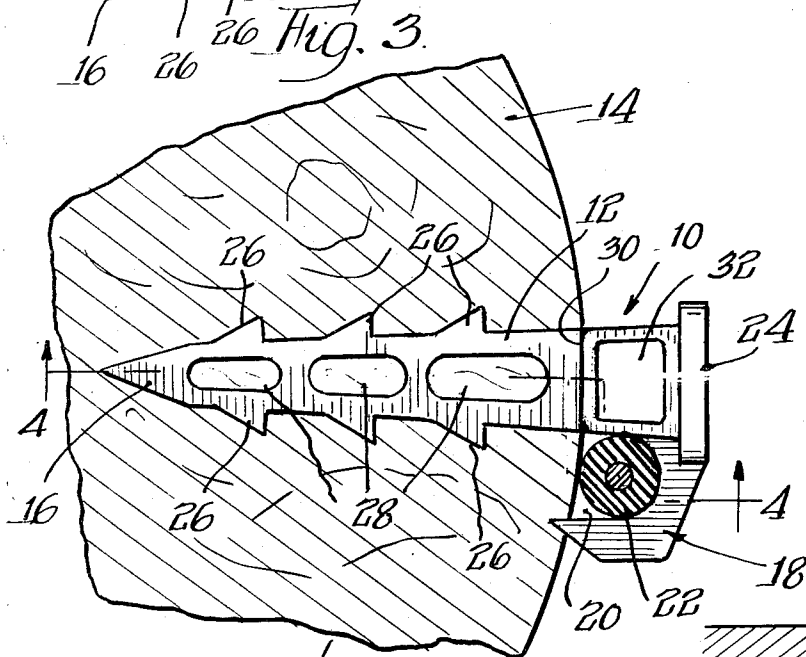
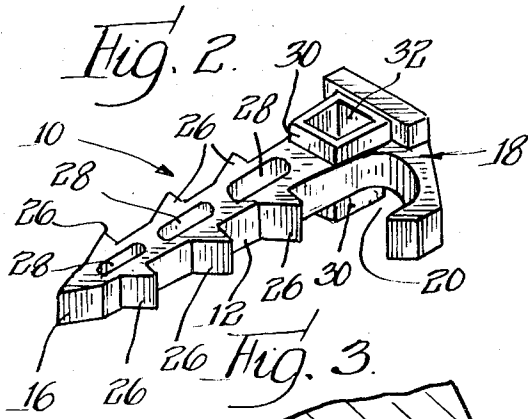
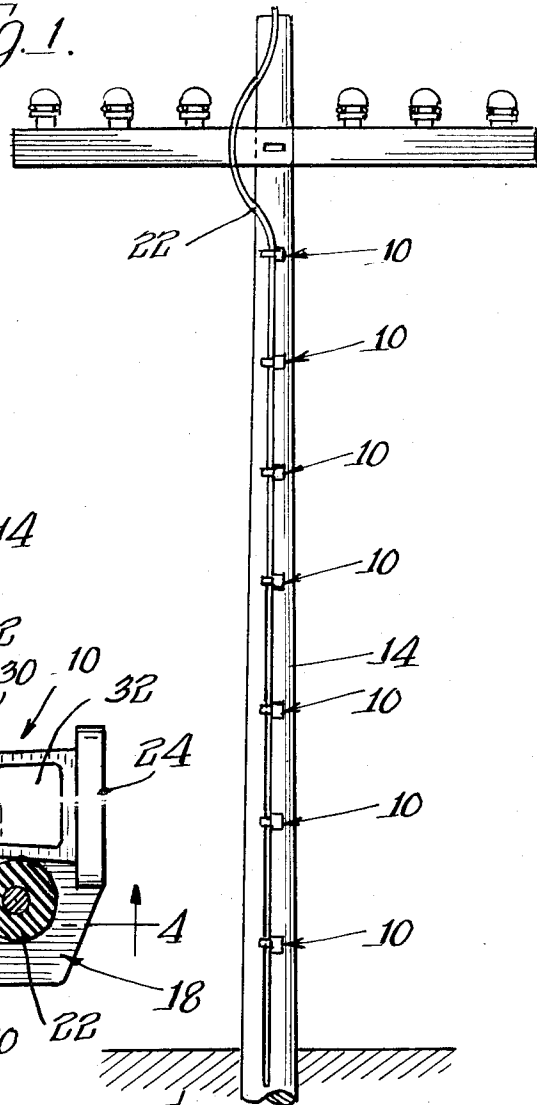
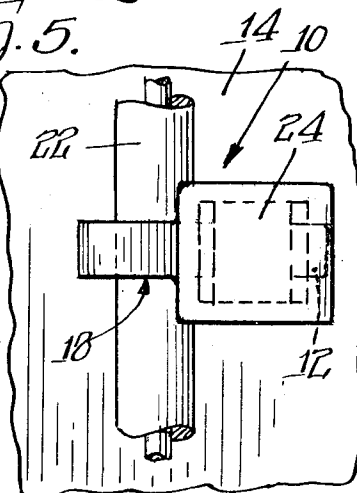
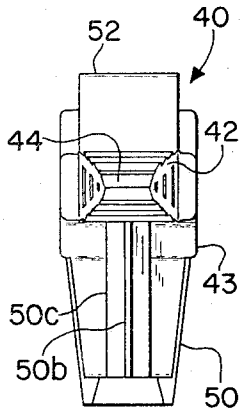
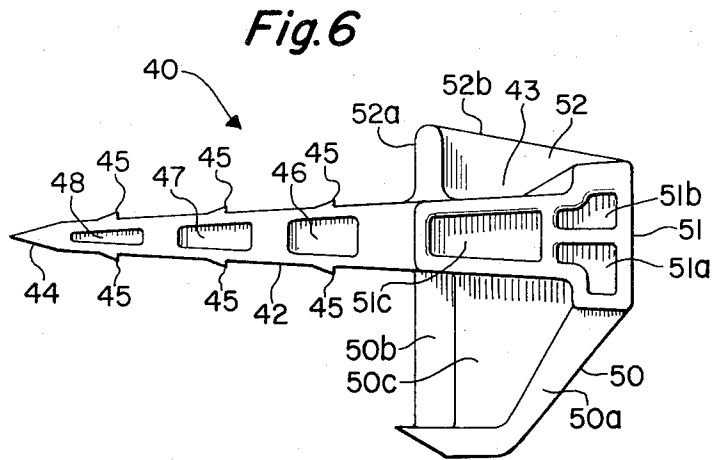


Fig. 5.

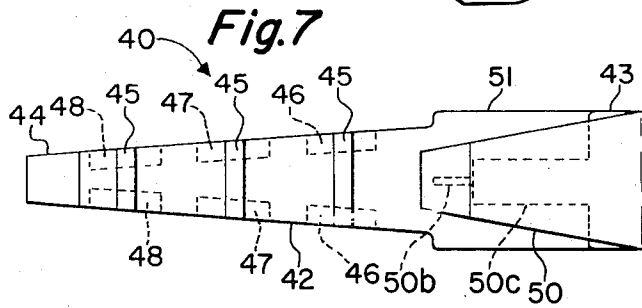




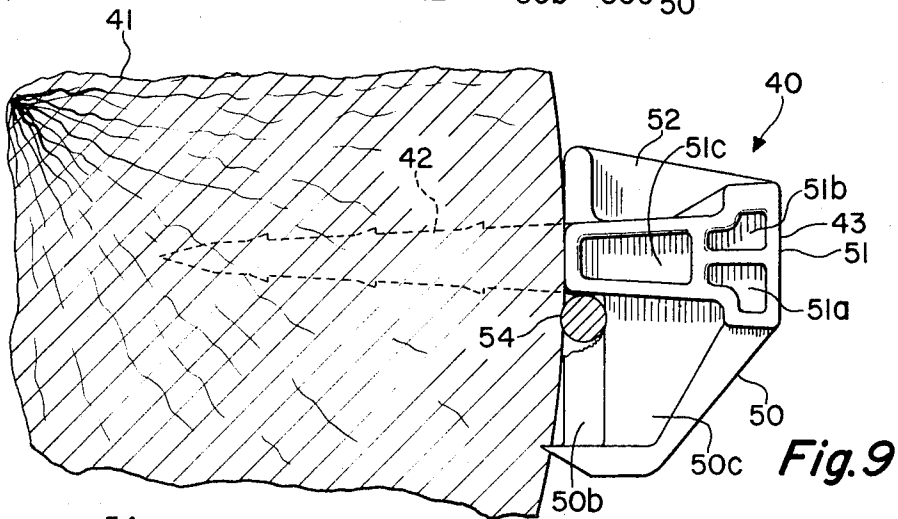
**Fig. 8**



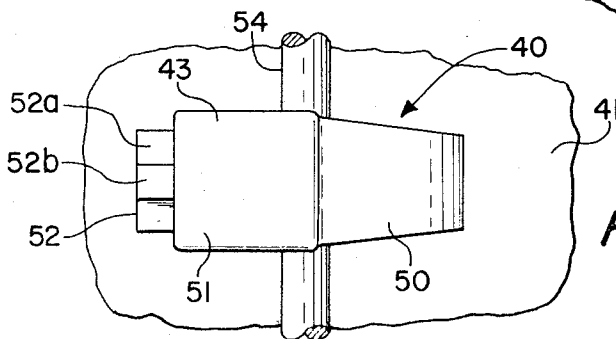
**Fig. 6**



**Fig. 7**



**Fig. 9**



**Fig. 10**

## GROUND WIRE CLIP

## CROSS REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of applicant's application Ser. No. 394,691, filed Sept. 6, 1973, now abandoned.

## SUMMARY OF THE INVENTION

It has been found that when commercially available, metallic ground wire securing clips are employed on wooden poles, the area in the vicinity of the clips is at times subjected to heat of such intensity as to actually cause burning of the wood adjacent the clips. Induced surges of high voltage conditions in the ground wire causing such intense heat may result from electrical storms and other voltage fluctuations induced by the conductors supported by the pole. To counteract this tendency of wood fibers to burn in the vicinity of conventional grounding clips, the present invention contemplates the provision of an electrically nonconductive clip which may be driven into a wooden pole.

More specifically, the present invention is directed to an improved electrically nonconductive clip of the general type referred to above which may be driven into a wooden pole without tearing or fracturing wood fibers, thereby assuring permanent attachment of ground wires and the like to said pole.

It is a further object of the present invention to provide a novel, inexpensive fastener or clip for ground wire and the like which is so arranged as to limit the extent to which an elongate clip shank may be longitudinally driven into structures such as wooden poles.

The present invention also contemplates a unique, efficiently operable clip having a novel shank arrangement which facilitates the ease with which the clip shank may be driven into a wooden pole and upon complete insertion will prevent unintentional retrograde movement or withdrawal of said shank.

## BRIEF DESCRIPTION OF THE DRAWING

The foregoing and other objects and advantages will be more apparent in connection with the accompanying drawing wherein:

FIG. 1 illustrates the manner in which clips or fasteners of the present invention are distributed along a conventional wooden transmission pole for securing a ground wire to the pole;

FIG. 2 is a perspective view of a ground wire clip of one type contemplated by the present invention;

FIG. 3 discloses the clip of FIG. 2 in operative association with a wooden pole for securing a ground wire to the pole;

FIG. 4 is a horizontal sectional view taken substantially along the line 4—4 of FIG. 3;

FIG. 5 is an elevational view taken from the right side of FIG. 4;

FIG. 6 is a plan view of another embodiment of the clip of the subject invention;

FIG. 7 is a side view of the clip shown in FIG. 6;

FIG. 8 is an end view of the clip of FIG. 6;

FIG. 9 is a view of the clip of FIGS. 6-8 in association with a wooden pole and a ground wire; and

FIG. 10 is an end view of the assembly of FIG. 9.

## DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring to the drawing more in detail wherein like numerals have been employed to designate similar parts throughout the various views, it will be seen that one embodiment of a ground wire clip contemplated by the present invention is designated generally by the numeral 10. The clip 10 is formed of suitable electrically nonconductive material such as plastic material exhibiting sufficient strength to permit a shank 12 thereof to be longitudinally hammer-driven into a conventional wooden transmission line pole 14. The entering extremity 16 of the shank 12 is relatively sharp so as to facilitate initial penetration and subsequent driving of the shank into the wooden workpiece or pole 14.

The opposite extremity of the shank 12 is provided with a hook shaped head 18. The head 18 projects laterally from the clip shank 12 and is formed with an aperture 20 for accommodating a conventional ground wire or conductor 22. The hook shaped head 18 also presents a relatively flat surface 24 against which driving pressure, as by means of a hammer, may be applied to force the clip 10 into the pole 14.

Extending from opposite sides of the shank 12 is a plurality of teeth or barbs 26. Each barb 26 is defined by acutely intersecting surfaces which will readily permit penetration of the shank 12 into the workpiece 14, and upon complete insertion the teeth surfaces facing the driven end of the clip will aggressively dig into the workpiece and prevent unauthorized or unintended withdrawal of the clip. Attention is directed to the fact that the teeth or barbs 26 are located in the vicinity of complementary recesses 28. With this structural arrangement, the shank 12 provides sufficient transverse yieldability to permit the barbs 26 to resiliently resist penetration of the workpiece 14. Once the shank 12 has been completely driven into the wooden workpiece or pole 14, the resiliency of the shank stock on opposite sides of each of the recesses 28 serves to urge the barbs 26 into firm impingement or locking engagement with the wood fibers.

In order to control the amount of pressure exerted by the hook shaped head 18 against the periphery of the ground wire or conductor 22, shoulders 30 are provided in the vicinity of the driven extremity of the clip. These shoulders are so dimensioned as to bear against the periphery of the pole 14 after the hook shaped head 18 has been firmly clamped or tightened against the periphery of the ground wire 22. Thus, by controlling the extent to which the clip shank may be driven into the workpiece, the possibility of excessive pressure against the ground wire is precluded. An aperture 32, FIGS. 2 and 3, completely transverses the head extremity of the clip or fastener. It will also be noted that the depth of the ground wire accommodating recess 20 is such as to permit the relatively sharp free extremity of the hook shaped head section to bite into the periphery of the hole 14, FIG. 3. With this arrangement, the head section 18 will be further secured against lateral displacement. This assures the maintenance of firm clamping pressure against the ground wire 22.

From the foregoing it will be apparent that the present invention contemplates the provision of a very simple yet highly efficient and novel one piece ground wire clip. The design of the clip disclosed herein is such as to enable the device to be molded from suitable plastic

material, thereby greatly reducing manufacturing costs. Obviously, the electrically non-conductive material such as plastic used in the fabrication of the present clip must be sufficiently rigid to withstand heavy hammer blows against the surface 24 of the head section 18. The above-described arrangement of barbs is such as to reduce to a minimum the possibility of wood fiber fractures. The arrangement of longitudinally disposed recesses in the shank with the barbs strategically located with respect to said recesses provides the desired degree of lateral flexibility in the shank. In the disclosed embodiment, the shank of the clip increases gradually in diameter from the entering extremity to the head section. The possibility of applying excessive clamping force to the ground wire is precluded due to the pressure of the shoulders in the vicinity of the head section.

The clip disclosed herein is formed with a chisel-like entering edge. This chisel-like edge when applied to a wooden transmission line pole is vertically disposed and thus extends in a direction substantially parallel with the wood fibers of the pole. As a result, the entering edge will not sever said fibers as the clip is hammer driven into position.

The second embodiment of the invention, shown in FIGS. 6-10, is designated generally by the numeral 40. The clip 40 is also formed of a suitable electrically non-conductive material such as a plastic material exhibiting sufficient strength to permit the clip 40 to be hammer-driven into a conventional wooden power transmission pole 41.

The clip 40 comprises a shank portion 42 and a head portion 43. As may be seen in FIGS. 6-8, the shank portion 42 is substantially rectangular in transverse cross-section, and the four sides of the shank portion 42 are tapered to a chisel point 44. The two broader sides of the chisel point 44 taper substantially to a sharp point so as to facilitate initial penetration and subsequent driving of the clip 40 into the wooden pole 41.

The two broader sides of the shank portion 42 are provided with barbs or teeth 45. Each barb includes an inclined surface directed downwardly and inwardly of the shank portion 42 in a direction toward the point 44 and a transversely disposed surface. Thus, the barbs 45 are shaped to permit relatively easy penetration of the shank portion 42 into the wooden pole 41 but will resist easy withdrawal of the shank portion 42 from the pole 41.

The two narrower sides of the shank portion 42 are provided with recesses 46, 47 and 48. The recesses 46, 47 and 48 span the barbs 45 longitudinally of the shank portion 42 and produce sufficient resiliency in the shank portion 42 in the areas at each end of the barbs to permit flexing of the ends of the barbs as the clip 40 is driven into the pole 41.

The head portion 43 of the clip 40 substantially comprises three sections, a hook section 50, a driving section 51, and a stop section 52. The driving section 51 is in axial alignment with the shank portion 42, and the hook section 50 extends from one side of the driving section 51, while the stop section 52 extends outwardly from the other or opposite side of the driving section 51. As may be seen in FIGS. 6-8, the hook section 50 and the stop section 52 extend outwardly of the driving section 51 in a plane extending longitudinally of the

clip 40 and perpendicularly through the two broader sides of the shank portion 42.

The hook section 50, the driving section 51 and the stop section 52 terminate substantially in the same transverse plane at the intersection of the head portion 43 with the shank portion 42 of the clip 40.

The hook section 50 includes a hook shaped portion 50a and two web sections 50b and 50c. The web portions 50b and 50c extend between the hook portion 50a and the driving section 51, with the web section 50b disposed contiguous to web portion 50c and adjacent web portion 50c in a direction toward the shank portion 42. The web portion 50b is substantially thinner than web portion 50c, as may be seen in FIGS. 7 and 8. The web portions 50b and 50c are frangible with the web portion 50b being obviously substantially more frangible than web portion 50c. As clip 40 is driven into a pole 41 as shown in FIG. 9, the web portions 50b and 50c will fracture about a ground wire such as a ground wire 54 to the extent necessary to accommodate the ground wire 54 dependent upon the size of the ground wire 54. Because of the difference in thickness of the web portions 50b and 50c, ground wires of smaller diameters will be firmly encircled by the web portion 50b without damaging the smaller ground wires. Larger diameter wires will cause some encircling fracturing of the web portion 50c in addition to fracturing of the web portion 50b. Larger diameter ground wires in causing fracturing of the web portion 50c will not be damaged by web portion 50c. *The driving section 51 has a broadened head portion to absorb the blows of a hammer and weight reducing depressions 51a, 51b and 51c in each side thereof.*

The stop section 43 comprises a transversely outwardly extending shoulder 52a and an integral longitudinally extending web portion 52b. The stop section 52 serves to prevent the clip 40 from being driven too deep into the pole 41.

While for purposes of illustration, specific embodiments of the invention are disclosed herein, it should be understood that modifications and changes are contemplated which come within the spirit and scope of the appended claims.

I claim:

1. A clip capable of being hammer-driven into a wooden pole to hold a ground wire against said pole, said clip comprising an integral elongated shank portion and a head portion of an electrically nonconductive plastic material, said shank portion being substantially rectangular in transverse cross-section and the side walls thereof tapering from said head portion to a chisel point at the other end thereof, a plurality of barbs on two opposite side walls of said shank portion, said barbs on each of said two opposite side walls arranged in a spaced apart relationship longitudinally of said shank portion and each of said barbs extending substantially completely transversely across said side walls, a plurality of recesses in the other two opposite side walls of said shank portion, said recesses arranged in a spaced apart relationship longitudinally of said shank portion and spanning said barbs to render at least the ends of said barbs deflectable inwardly of said shank portion, said head portion including a central driving section in axial alignment with said shank portion and a hook section and a stop section, said hook and stop sections arranged on opposite sides of said driving section and extending transversely outwardly of

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said clip, said stop section including a shoulder extending outwardly of said clip and terminating in a transverse plane substantially including the longitudinally inner end of said head portion and an integral web perpendicularly arranged between said shoulder and one side of said driving section, said hook section comprising a hook portion directed outwardly from the head end of said driving section and longitudinally of said driving section and frangible web means integrally interconnected between said driving section and said hook portion.

2. A clip as defined in claim 1, wherein said frangible

6

web means terminates substantially in said transverse plane in which said shoulder of said stop section terminates.

3. A clip as defined in claim 1, wherein said frangible web means of said hook section is of increasing thickness in a direction toward the head end of said clip.

4. A clip as defined in claim 1, wherein said two opposite side walls of said shank portion carrying said barbs are substantially wider than said other two opposite side walls of said shank portion.

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