Feb. 1, 1966 LE ROY MILLER ET AL 3,231,945

WASHER GAIN FOR TIMBER STRUCTURES

Filed Feb. 5, 1962

Fig. 1.

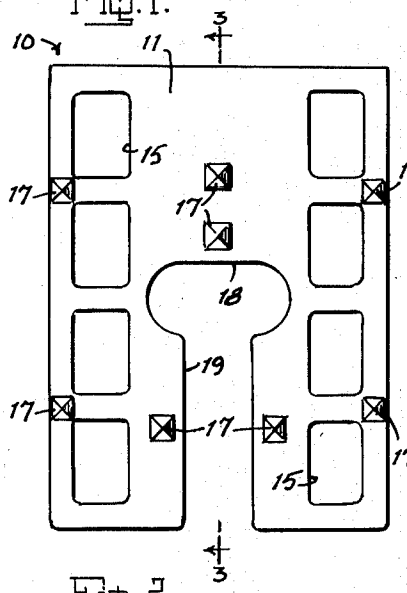


Fig. 3.

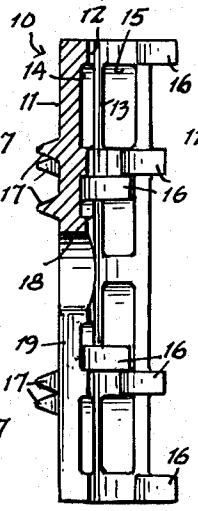


Fig. 4.

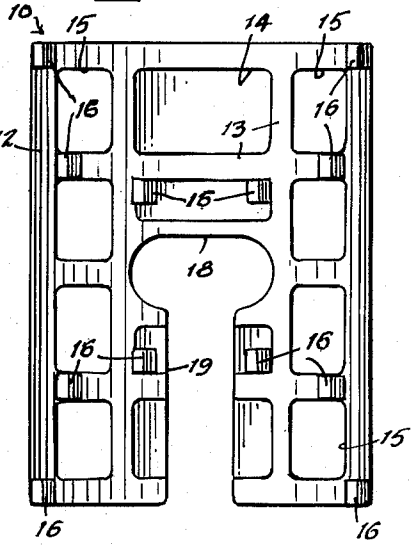


Fig. 2.

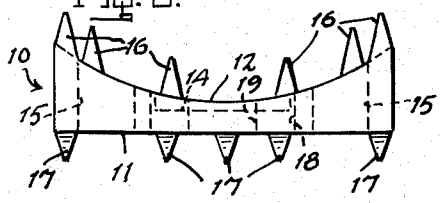


Fig. 5.

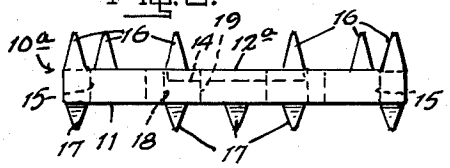


Fig. 6.

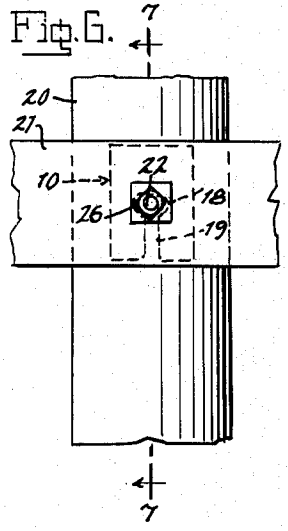


Fig. 7.

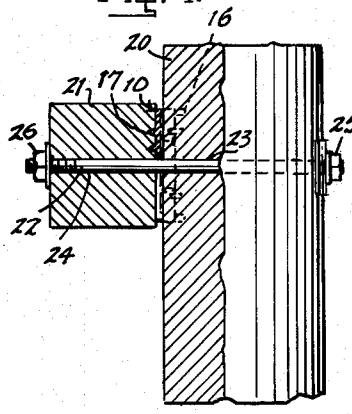
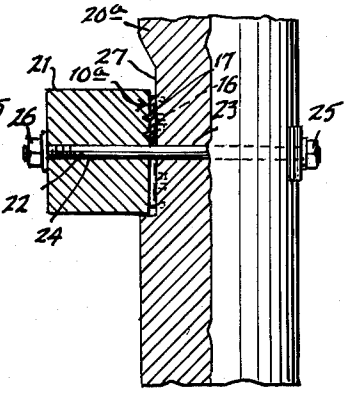


Fig. 8.



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WASHER GAIN FOR TIMBER STRUCTURES

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The present invention relates to a washer gain for timber structures, particularly for positioning between a transmission line wood pole and a wood cross arm connected to the pole by a through bolt. In many installations the cross arm and pole are in direct wood-to wood contact without the interposition of a washer gain, and as a result of exposuse to weather, load strains, and the like, the wood-to-wood contacting surfaces suffer deterioration effects such as rot, looseness, voltage leakage, etc. In order to correct this condition it is desirable to interpose a washer gain between the pole and the cross arm. Heretofore this has required the removal of the cross arm in order to permit the placing of a washer gain upon the through bolt in contact with the pole, the cross arm then being re-engaged with the through bolt and secured by tightening the nut upon the through bolt.

An object of the present invention is to provide an improved washer gain having an open end slot extending vertically from its lower edge to a transverse through bolt receiving slot, whereby the washer gain may be inserted between the pole and the cross arm with the through bolt engaged therethrough simply by backing off the through bolt nut to allow the cross arm to be drawn away from the pole sufficiently to enable the gain to be dropped into place between the pole and the cross arm, whereupon the through bolt nut may be tightened to secure the position of the gain.

A further object is to provide a washer gain having a transversely disposed through bolt receiving slot to enable the position of the gain to be laterally adjusted with respect to the through bolt to accommodate irregularities in the surface of the pole. Another object is to provide a washer gain having prong means for imbedding in the pole and cross arm to secure the position of the gain against down slotting. A further object is to provide a washer gain having prong means disposed in such relation to the vertical open end slot as to prevent spreading of the slot and possible weakening and fracture of the gain.

Other objects and advantages will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it will be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention and the scope of the appended claims.

In the drawings:

FIG. 1 is a front elevation of a washer gain according to the invention;

FIG. 2 is a top plan view;

FIG. 3 is a vertical sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a rear elevation;

FIG. 5 is a top plan view of a modified form of washer gain according to the invention adapted for engagement with the flat surface of a gain cut into a round wood pole;

FIG. 6 is a front elevation, partially broken away and on a reduced scale, showing the washer gain in place between a round wood pole and a cross arm;

FIG. 7 is a view partially in side elevation and partially in vertical section taken along the line 7—7 of FIG. 6;

FIG. 8 is a view similar to FIG. 7 and showing the modification of FIG. 5 in position between a cross arm and the flat gain surface of a round wood pole.

Referring to the drawings, and more particularly to FIGS. 1–4, the washer gain 10 according to the exemplary embodiment of the invention illustrated therein is in the form of a malleable iron casting of rectangular outline having a forward planular face 11 for engagement with the flat surface of a rectangular cross-section cross arm and a concavely cured rearward face 12 for substantially conforming engagement with the surface of a round wood pole, this rearward face being preferably in the form of a grid formation 13 provided by suitably placed rectangular recesses 14 in the rearward face of the gain and rectangular holes 15 extending therethrough, the latter serving to reduce the weight of metal employed and also to provide openings in the forward face 11. The rearward grid surface and the openings in the forward face provide a structure which allows the wood fibres of the pole and the cross arm to slightly imbed into the gain upon tightening of the through bolt, whereby an interlock is obtained between the gain and the wood surfaces to resist relative displacement of the gain. Additionally the rearward face of the gain is provided with suitably placed prongs 16 for imbeding into the pole and the forward face 11 is provided with suitably placed prongs 17 for imbedding into the cross arm.

Substantially centrally of the gain there is provided a transversely elongated through bolt receiving opening 18 opening at its lower side to a vertical slot 19 extending to the lower edge of the gain, the opening 18 and slot 19 providing in effect an open end T slot. It is pointed out that at least certain of the prongs 16 and 17 are disposed at opposite sides of the vertical slot 19, so that when they are imbedded in the pole and cross arm the lower portion of the gain at each side of the slot 19 is effectually anchored to resist strains which might tend to spread the slot with the possibility of weakening and fracture of the gain.

As shown in FIGS. 6 and 7 the gain is interposed between a vertical round wood pole 20 of substantially circular cross section and a wood cross arm 21 of rectangular cross section, the cross arm being connected to the pole by a through bolt 22 engaged through horizontal holes 23 and 24 in the pole and cross arm and secured by nuts 25 and 26 upon the respective ends of the through bolt. As above pointed out the gain is adapted to be placed in position without removing the cross arm from the through bolt, and to this end the nut is backed off to allow the cross arm which has previously been in contact with the pole to be spaced outwardly from the pole a sufficient distance to allow the washer gain to be dropped into place, the through bolt being received in the open end vertical slot 19 as the gain drops into place and finally being positioned in the transversely elongated opening 18. The transverse clearance provided by the opening 18 enables the washer gain after it has been dropped into place to be adjusted sideways with respect to the through bolt to accommodate any irregularities in the round wood surface of the pole. When in place the nut 26 is tightened causing pressure to be exerted to tightly clamp the washer gain in place with the prongs 16 and 17 respectively imbedded in the pole and the cross arm.

In FIG. 5 there is shown a modified form of washer gain 10*a* adapted for use where the pole 20*a* is provided with a flat surface gain 27 cut therein. In this case the rearward surface 12*a* of the gain is in a flat plane parallel

to the planular forward face **11** so that it will conform to the flat surface of the cut gain **27**.

By reference to FIGS. 6, 7 and 8, it will be seen that the outboard weight of the cross arm **21** supported upon the through bolt tends to overturn the cross arm in a counter-clockwise direction as seen in FIG. 7, causing the inner side of the cross arm to move inwardly toward the pole below the through bolt and to move outwardly from the pole above the through bolt, thus exerting a pressure upon the portions of the gain at each side of the vertical slot which increases toward the lower edge of the gain. As a result the wood pole surface tends to move into the slot with increasing force toward the lower end of the slot and thus exerts lateral outward pressure upon the walls of the slot which, if unrestrained, would tend to weaken or fracture the upper portion of the gain in line with the slot. This, however, is prevented by the specific arrangement of the prongs **16** and **17** laterally at each side of the slot which imbed into the wood surfaces of the pole and cross arm and thus anchor the portions of the gain at each side of the slot against spreading.

What is claimed is:

1. In combination, a vertical wood pile, a horizontal through bolt extending through said pole and projecting from one side thereof, a horizontal wood cross arm having a horizontal through bolt receiving hole extending transversely therethrough and engaged by said through bolt, tightening means cooperating between said through bolt and said pole and cross arm for drawing said cross arm toward said pole, and a washer gain interposed between said pole and said cross arm comprising a body having a forward cross arm engaging face and a rearward pole engaging face, there being a transversely elongated through bolt receiving opening extending through said body centrally between its side edges in which said through bolt is received and being of a length substantially greater than the diameter of said through bolt, and there being a vertical slot extending downwardly from the lower edge of said opening centrally between its ends to form therewith a T-slot, said vertical slot being of a width at least equal to the diameter of said through bolt and opening to the lower side of said body to permit vertical engaging and disengaging movement of said body through passage of said through bolt into and out of said opening through said vertical slot, and a plurality of wood penetrating prongs projecting from each of said forward and rearward faces for imbedding into said wood pole and cross arm, at least certain of said prongs of each of said faces being disposed laterally outwardly at each side of said through bolt receiving slot.

2. In combination, a vertical round wood pole of substantially circular cross section, a horizontal through bolt extending through said pole and projecting from one side thereof, a horizontal wood cross arm having a horizontal through bolt receiving hole extending transversely therethrough and engaged by said through bolt, tightening means cooperating between said through bolt and said pole and cross arm for drawing said cross arm toward said pole, and a washer gain interposed between said pole and said cross arm comprising a body having a forward cross arm engaging face and a rearward pole engaging face concavely curved between its side edges to substantially conform to the round surface of said pole, there being a transversely elongated through bolt receiving opening extending through said body centrally between its side edges in which said through bolt is received and being of a length substantially greater than the diameter of said through bolt, and there being a vertical slot extending downwardly from the lower edge of said opening centrally between its ends to form therewith a T-slot, said vertical slot being of a width at least equal to the diameter of said through bolt and opening to the lower side of said body to permit vertical engaging and disengaging movement of said body through passage of said through bolt into and out of said opening through said vertical slot, and a plurality of wood penetrating prongs projecting from each of said forward and rearward faces for imbedding into said wood pole and cross arm, at least certain of said prongs of each of said faces being disposed laterally outwardly at each side of said through bolt receiving slot.

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