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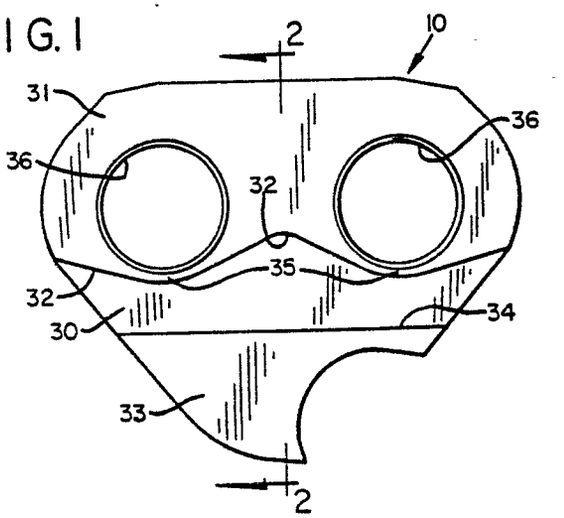
(54) Centre link for a saw chain.

(57) An articulated saw chain having pivotally interconnected centre drive links (10) and side links (14,16), the side links having bottom edges that incur splaying as a result of the side links pounding the guide bar rail edges (20) during cutting action. An inset portion (30) is provided on the centre links in the area of overlap defined by the bottom edges on being pivoted relative to the centre links. The inset portions provide added clearance to permit substantial splaying of the bar engaging bottom edge surface of the side links without interference and binding.

FIG. 1



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CENTRE LINK FOR A SAW CHAIN

This invention relates to a centre link for a saw chain.

In a typical chain saw, used for example for cutting logs, a loop of saw chain is entrained around a guide bar. The saw chain is made up of articulated links comprising a repeating sequence of centre links pivotally connected to mated pairs of side links. Certain of the side links are provided with outwardly extended cutting portions. The guide bar has a groove along its edge that receives guide or drive tangs extending inwardly from the centre links. These guide tangs ensure the travel of the saw chain around the edge of the bar. The side links slide along guide bar edges on either side of the groove, which edges are often referred to as the guide bar rails.

During cutting action, the saw chain is driven rapidly around the guide bar by a drive sprocket engaging the tangs. This action generates a pounding of the bottom edges of the saw chain side links against the rails. These bottom edges of the side links develop burrs, that is, the material of the links spreads or splays as a result of the pounding. After some time, interference occurs as a result of these burrs or splayed portions in the areas of overlap with the interconnected drive link. This is particularly troublesome as the chain travels around the guide bar ends where substantial relative pivoting or articulation of the links takes place. Initially, the links bend inwardly as the chain is wrapped around the sprocket or nose end of the guide bar from a straight reach portion of the bar. Then the bend is reversed to a lesser degree as the links return to the other straight reach portion of the bar. Inhibiting this bending action can accelerate wearing nd in some instances may increase the tendency for the chain to jump off the bar.

The present invention alleviates the binding effect generated by the above-described interference, by the provision of relieved areas in the sides of the centre or drive link. These relieved areas are configured to accommodate the full range of overlap during articulation as between the centre link and the bottom edge of the side links. Thus considerable splaying is permitted before any interference is developed. The pivoting action is considered in the configuration and thus the relieved area encompasses the area of overlap throughout the full range of relative pivoting. In general, the overlapping areas are just below the interconnecting rivets in the position where the saw chain travels along a straight reach for the bar edge. As the chain travels around the bar end, the overlapping area extends up between the rivets, that is into the mid section of the centre link between the rivets. As the chain returns to the straight reach, a slight reverse bending takes place. Thus the portion of the centre link to be relieved, for example, by coining, is preferably defined by a curved line below each rivet, which represents the path of the bottom edge of the side links relative to the centre link during articulation.

The invention is further described below, by way, of example, with reference to the accompanying drawings, in which:

Fig. 1 is a side view of a centre link in accordance with this invention;

Fig. 2 is a sectional view on view lines 2-2 of Fig. 1 but showing the centre link between an interconnected pair of side links (indicated in broken lines) entrained on guide bar rails or edges;

Fig. 3 is a side view of one of the side links of Fig. 2, illustrating splayed bottom edge portions occurring after extended use in a cutting operation;

Fig. 4 is a sectional view on section lines 4-4 of Fig. 3;

Fig. 5 is a side view illustrating the relationship of the centre link and side links when rounding the nose of a guide bar, the front rail of the bar being omitted;

Fig. 6 is a side view of an alternative form of centre link in accordance with this invention; and

Fig. 7 is a view of the centre link, specifically outlining curved areas below the rivet holes defined by the side link's bottom edge during articulation.

In Fig. 2, the link 10 of the invention is illustrated as being pivotally connected by a rivet 12 between two side links 14 and 16. The side link 16 is a cutting side link with an outwardly extended cutting portion 18. The side links 14,16 engage guide bar rails or edges 20 on either side of a groove 22 of a chain saw guide bar 24.

During cutting operation of the chain saw, the cutting side link 16 and the side link 14 connected to it, are repeatedly pivoted up and down against the bar edges 20, as indicated by arrows 26 in Fig. 2. This creates a slight splaying of the bar-engaging portions of the side links, producing splayed portions 28, indicated in Figs. 2-5.

Referring now to Figs. 1 and 5, the centre link 10 of the present invention is provided on each side with a configured inset area 30, formed for example by the process known as coining. This inset area 30 is bounded at the top by a curved upper edge 32 and below by a straight bottom edge 34. The bottom edge 34 represents the upper edge of a tang portion 33 extending into the groove 22 of the guide bar 24. The thickness of the tang portion 33 projecting into the groove 22 is matched to the groove width to enhance the stability of the

chain. The configuration of the upper edge 32 is designed to provide an adequate area 31 of the thicker material around rivet holes 36 for receiving the rivets 12. The edge 32 extends up between the rivet holes 36 to accommodate the relative pivoting of the side links, that is, the pivoting of the splayed portions 28 between the rivet holes, as illustrated in Figs. 5 and 7. This relative pivoting and thus the configuration of the edge 32 is dictated by the curved path that the saw chain takes around the nose of the guide bar 24.

In a specific embodiment of the invention, the centre drive link 10 for a 0.95 cm. (3/8 inch) pitch chain has a width in the inset area 30 of 0.02 cm. (.008 inch) less than in areas 31. In this example, the tang portion 33 is the same width as the portion 31, which as previously explained, is dictated by the bar groove width. Upon investigation, it was determined that pivoting of the links caused the splayed areas 28 of the side links to pivot to a point just short of the mid-point between the rivet centres, as illustrated in Fig. 7. Thus the apex of the upwardly curved portion of edge 32, in Figs. 1 and 5 is substantially at the mid point between the rivet holes, 36. The full thickness of the link extends below the rivet holes 36 by a distance, of 0.025 cm. (.010 inch). The inset area 30 is inset from the full thickness providing substantial increased clearance for the increasing width of the splayed portion 28, as appears from Figure 2.

The alternative embodiment of the invention illustrated in Fig. 6 is intended for use in a saw chain which will be less severely stressed than the saw chain incorporating the link 10. In the centre link of Fig. 6, full thickness is not required below the rivets, so the upper edge 32a of the inset area 30 is a straight line extending through the centres or mid points of the rivets, as shown. The coining operation is much simpler than is needed for the link 10 and the area 30 and provides access to the rivets for oil. To assist such oil flow, an oil groove 38 can optionally be provided to communicate the interior of the groove 24 to the inset area 30 and thereby to the rivet.

In either of the illustrated embodiments the coined area 30 may be extended down through the tan portion to thereby eliminate the defining bottom edge 34, the bar groove 22 being then of a width to accommodate the reduced thickness of the centre link. Such a modification has the benefit of simpler production.

Forming the rivet holes 36 in the embodiment of Fig. 6 is difficult with two different thicknesses of material through the hole area, along the solid line 32a, and the dash lines 32b of Fig. 6 indicate a further modification in which the coined area 30 includes an area over the rivet holes.

The curved areas 30 in Fig. 7 represent the desired coined area, that is, these areas represent the minimum areas as defined by the splayed portions 28 as, they pivot through a typical angular range of articulation, that is, from about 15 degrees above the axis (a line passing through the centre of the rivet holes) to about 26 degrees below the axis. The depth of the area 30 accommodates the splayed area 28 as the distance to the rivet hole shortens through wearing. It will be observed from Fig. 7 that there is a small area 40 between the two coined areas 30 where coining is not necessary. It is pointed out that in either of the embodiments of Figs. 1 or 6, a web of uncoined area can extend down the centre of the link between the areas 31 and 33. This web of uncoined material may be desirable in adding stability against side play.

Other modifications to the invention will become apparent to those skilled in the art. The scope of the invention is not limited to the illustrated embodiments, but is encompassed by the claims appended hereto.

Claims

1. A centre link (10) for use in a saw chain, the centre link being arranged to be pivotally connected in overlapping relationship with side links (14,16) having edges for engagement with guide rails of a chain saw guide bar, characterised in that the centre link has relieved areas to accommodate splayed portions of the side links formed by the engagement of the edges with the guide rails.

2. A saw chain having a centre drive link (10) and side links (14,16), the centre drive link having a drive tang (33) for reception in an edge groove (22) of a chain saw guide bar (24), and the side links having rail-engaging bottom edge surfaces for slidingly engaging guide bar rails on either side of the edge groove, the centre links and side links being pivotally connected in close side-to-side relation by connecting rivets (12) projected through front and rear rivet holes (36) to permit relative pivoting as the saw chain travels around the guide bar, thereby defining on the centre link overlap areas where the bottom edge surfaces of the side links overlap the centre drive link, characterised in that the drive link (10) has inset face portions (30) in the overlap areas to create added clearance between the side links (14,16) and the centre link (10) whereby splaying of the side links at the rail-engaging bottom edge surfaces projects into the inset portions to reduce interference and binding.

3. A saw chain as claimed in claim 1 wherein the inset areas (30) have an upper boundary (32) providing full thickness of the centre link for a designated distance below the rivet holes (36), and wherein the inset area is projected between the

rivet holes to accommodate the splayed bottom edge surfaces of the, side links during pivoting of the side links and drive link on passing around the guide bar end.

4. A saw chain as claimed in claim 1 wherein the inset areas (30) having an upper boundary (32a) that is a straight line along the length of the centre link and passing through both rivet holes (36).

5. A saw chain as claimed in claim 4 wherein the centre link has an oil groove formed in the drive tang for directing oil flow from the edge groove (22) into the inset portion and thereby into the rivet holes.

6. A saw chain as claimed in claim 1 wherein the inset areas (30) have an upper boundary defined by straight line outer or central portions on a line along the length of the centre link and passing through both rivet holes (36), with an arcuate portion (32b) extending around the upper part of each rivet hole (36).

7. A saw chain as claimed in any preceding claim wherein the inset areas (30) have a lower boundary (34) substantially corresponding to the upper edge of the drive tang (33).

8. A saw chain as claimed in claim 7 having a web of full thickness material extending between the upper and lower boundaries of the inset area at the mid point between the rivet holes.

9. A saw chain as claimed in any preceding claim wherein the inset areas (30) are inset from the full thickness portions by a distance within a range of about 0.0051 to 0.020 cm. (.002 to .008 inch).

10. A saw chain comprising a plurality of centre drive links having depending tangs, opposed face surfaces, and spaced apart pin holes, side links alternating with the drive links in the chain and having bottom edges and spaced apart rivet holes therein, and rivets extending through the holes to, pivotally interconnect the drive links and side links in face-to-face relation in such a manner that during articulation therebetween, bottom edges of the side links move through an area of overlap with face portions of a drive link, characterised by an indented portion of a face of a drive link in an overlap area to alleviate interference between lateral projections at the bottom surface of a side link and the face of the drive link in the overlap area.

FIG. 1

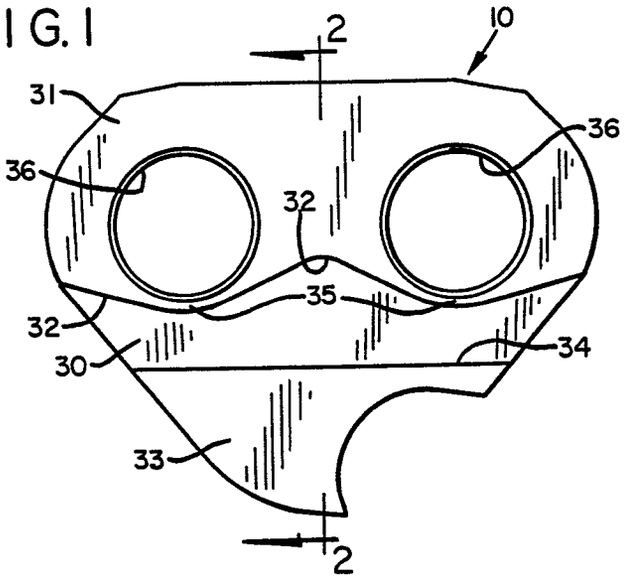

FIG. 2

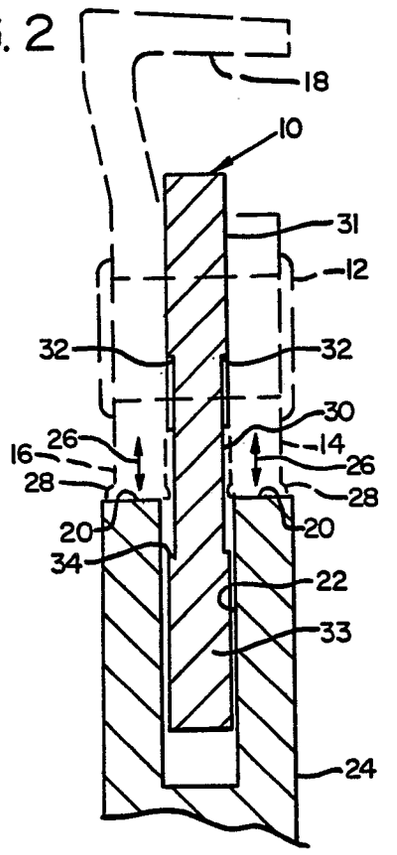

FIG. 3

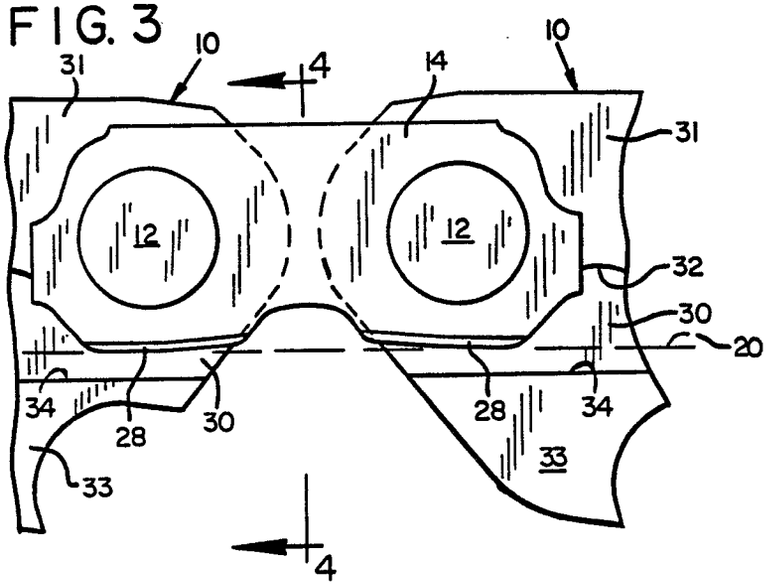

FIG. 4

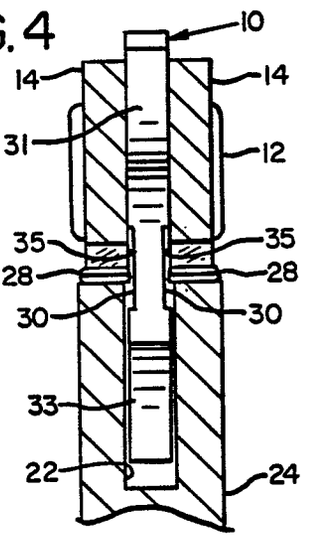

FIG. 5

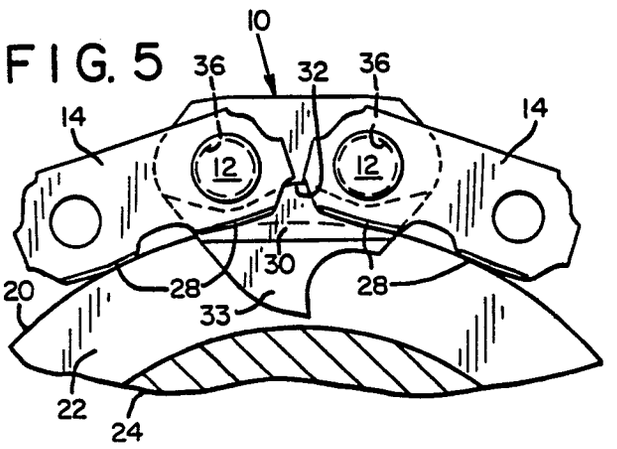

FIG. 6

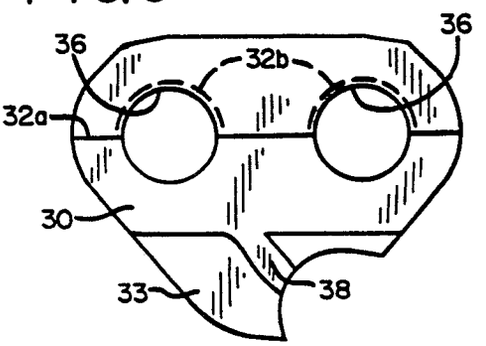

FIG. 7