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CHAIN SAW

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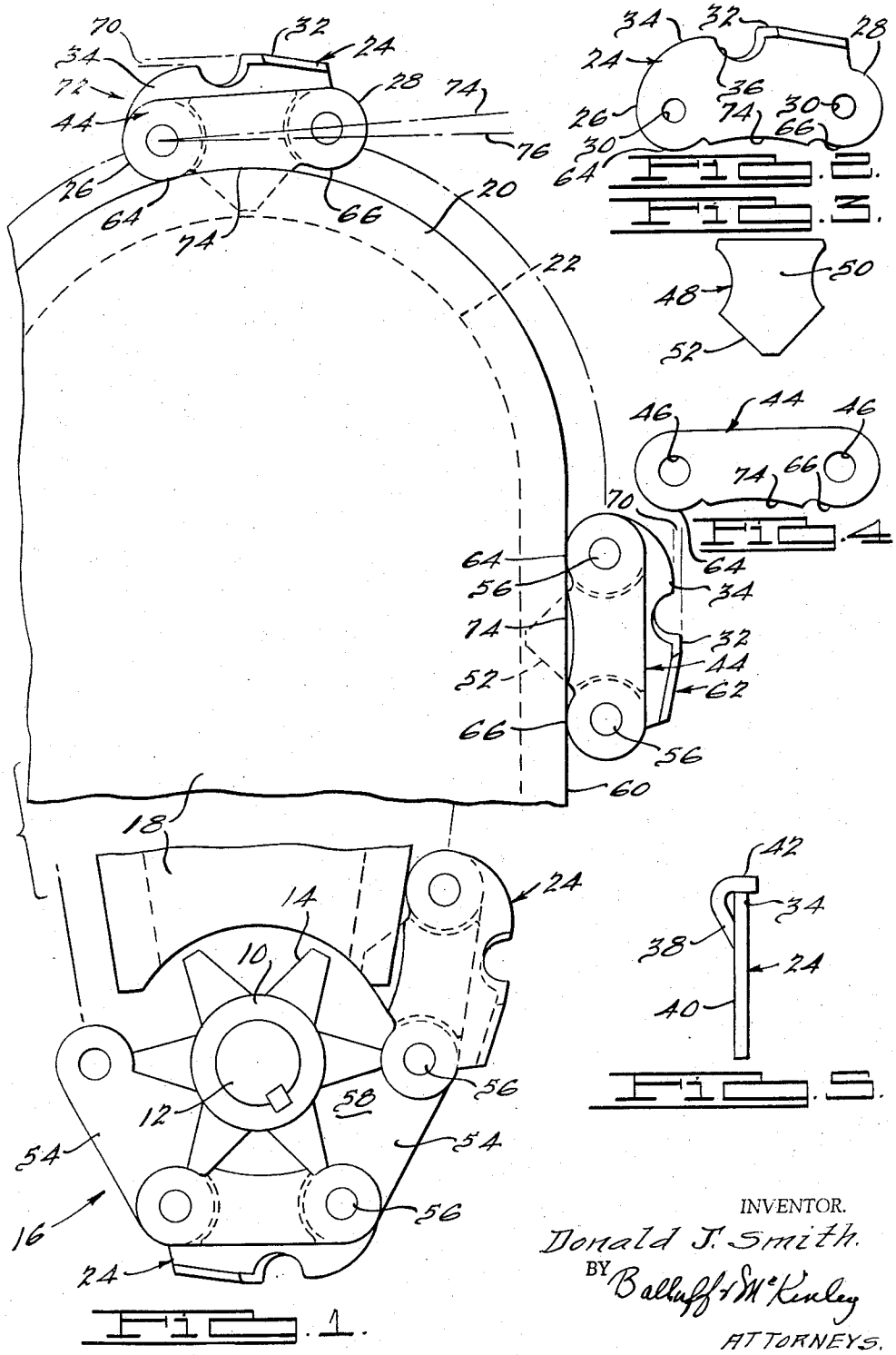


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

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CHAIN SAW

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3 Claims. (Cl. 143—135)

This invention relates to chain saws, and more particularly relates to a new and improved cutting chain for use in a chain saw.

A chain constructed in accordance with the present invention may be used with any chain saw of standard or conventional construction having a guide bar around which the chain travels during the cutting operation. Chain saws are generally equipped with a guide bar having a rounded nose portion at its outer end, and it is frequently desirable to employ a chain saw of this type in what may be termed an end boring operation in which the portion of the chain traversing the rounded nose portion of the guide bar performs the sawing operation. It has been found that with chains of conventional construction, in which each cutting link is provided with a depth gauge formed integrally therewith and located just in advance of the cutting edge of the link, end boring operations are difficult, if not impossible, because of the interference of the depth gauge with the bottom wall of the kerf being cut.

The present invention is directed to an improved cutting link for a chain saw which is formed to cooperate with the guide bar around which the chain travels in such manner as to substantially reduce or eliminate interference of the depth gauge with the kerf being cut in an end boring operation of the chain saw. This improved result is accomplished by forming the inner edge of the cutting link which engages the guide bar in such manner that the trailing end of the link is tilted outwardly away from the buide bar when the link is traversing the rounded nose portion of the guide bar.

The principal object of the invention is to provide a new and improved cutting link for a saw chain.

Another object of the invention is to provide a saw chain in which the cutting links are designed so as to substantially reduce or eliminate any possible interference of the depth gauge of the link with the kerf being cut during an end boring operation.

Other and further objects of the invention will be apparent from the following description and claims and may be understood by reference to the accompanying drawing, which by way of illustration shows a preferred embodiment of the invention and what I now consider to be the best mode in which I have contemplated applying the principles of my invention. Other embodiments of the invention may be used without departing from the scope of the present invention as set forth in the appended claims.

In the drawing:

Fig. 1 is a fragmentary elevational view of my improved saw chain showing the same mounted on the guide bar of a chain saw;

Fig. 2 is an elevational view of one of the cutting links of the chain;

Fig. 3 is an elevational view of a drive lug forming a part of the chain;

Fig. 4 is an elevational view of one of the connecting links employed in the chain; and

Fig. 5 is an end view of one of the cutting links of the chain.

Referring more particularly to the drawing, a chain saw of any conventional design may include a drive sprocket 10 keyed onto a drive shaft 12, which may be driven by a gasoline engine or in any other suitable manner. The sprocket 10 has teeth 14 which are adapted to drive the cutting chain 16 around the guide bar 18. The guide bar 18 has a rounded nose portion 20 at its outer end and is provided with a peripheral groove 22 adapted to receive the drive lugs of the chain to guide the chain in its travel around the guide bar.

The cutting chain is made up of a series of pivotally connected links, certain of which are cutting links and have cutting teeth formed thereon. It is to be understood that many of the details of construction of the several parts of the chain illustrated herein may be altered as desired and the form of chain and the sequence of the several links making up the chain illustrated in the drawings are for purposes of illustration only. In the illustrated form of chain, one of the cutting links 24 is illustrated in Fig. 2. The cutting link 24 has a leading end 26 and a trailing end 28 and a pair of pivot apertures 30 adjacent each end of the link. The link also has a cutting tooth 32 formed along its outer edge and a depth gauge 34 located in advance of the cutting tooth and separated therefrom by a recess 36. The cutting tooth portion of the cutting link 24 may be of a more or less conventional form, as illustrated in Fig. 5. A cutting tooth of this type has a shank portion 38 bent outwardly from the substantially flat main body portion 40 of the link and a laterally extending toe portion 42. The leading edge of the cutting tooth is sharpened along the shank portion 38 and the toe 42 to cut the bottom and side walls of the kerf. Alternate cutting links in the chain may be of right- and left-hand configuration, as is conventional. It is to be understood that the type of cutting tooth employed need not be as illustrated herein.

Fig. 4 illustrates a connecting link 44 having apertures 46 adjacent each end. A drive lug 48 is illustrated in Fig. 3 and includes a body portion 50 and a depending drive lug portion 52. The drive lug 48 may be welded or otherwise rigidly secured to the cutting link 24 and one of the connecting links 44 with the drive lug 48 sandwiched between the cutting link 24 and connecting link 44.

Another form of connecting link is illustrated at 54 in Fig. 1 and one of such connecting links 54 is adapted to pivotally connect successive cutting links in the chain. Each such link 54 has one end pivotally connected to the trailing end of a cutting unit by a rivet 56 and its other end pivotally connected to the leading end of the following cutting unit by a similar rivet 56. The connecting links 54 have integral drive lug portions 58, which, together with the drive lugs 48, are received between the teeth 14 of the sprocket 10 to drive the chain around the guide bar 18.

As illustrated in Fig. 1, the guide bar 18 has straight or relatively straight side edges 60 for the major portion of its length and, when the cutting chain is mounted on the guide bar, the drive lugs 48 and 58, which lie in the medial plane of the chain are received within the groove 22. The leading and trailing ends of the cutting links 24 and the connecting links 44 may be rounded or otherwise formed to provide guide bar contacting formations, or bearing surfaces, which are adapted to contact the peripheral edge of the guide bar 18 when such links are traveling along the straight side edges 60 of the bar. Referring to the cutting unit 62 shown in Fig. 1, it will be seen that the cutting links 24 and connecting links 44 engage the edge of the guide bar at

points 64 and 66, referring to the leading and trailing ends respectively of the links. In such position a line drawn between the pivotal axes of the rivets 56 will lie substantially parallel to the side edge of the guide bar, and the clearance between the outer edge of the depth gauge 34 and the cutting edge of the tooth 32, which determines the depth of the cut, is indicated at 70.

Referring now to the cutting unit 72 which is positioned on the nose portion of the guide bar 18 in Fig. 1, it will be seen that the special formation of the inner edges of the cutting link 24 and the connecting link 44 results in tilting the trailing end 28 of such links outwardly away from the edge of the guide bar when such links traverse the rounded nose of the bar. The cutting links 24 and connecting links 44 are each provided with an arcuate inner edge 74 formed on the same radius as the radius of the nose portion 20 of the guide bar. It will be noted that the curved or arcuate edges 74 of the links would, if extended, pass through the contact point 64 at the leading end of the cutting unit but that such curve when extended passes a substantial distance inwardly from the contact point 66 at the trailing end of the unit. The arcuate edge 74 in effect forms a third guide bar contacting formation, or bearing surface, lying between the formations at the leading and trailing ends of the link. By reason of such construction the trailing end of the cutting unit is tilted away from the guide bar when such cutter unit is on the rounded nose of the bar so that the clearance 70 between the depth gauge 34 and the cutting tooth 32 is maintained substantially the same as the clearance obtained when the unit is traversing one of the straight side edges of the guide bar. As will be seen in Fig. 1 with reference to the cutting unit 72, the line 74 drawn between the pivot axes of the rivets is tilted by about 3 to 5° from the position that it would normally occupy, as indicated by the line 76, if the contact point 66 remained in engagement with the edge of the guide bar while the cutting unit traverses the nose of the guide bar. Stated in another manner, the curvature of the inner edges 74 of the links 24 and 44 may be said to be such that the perpendicular bisector of a line drawn between the axes of the connecting rivets of a link which is traversing the nose of the guide bar will not pass through the center of curvature of the guide bar but will lie at an angle of about 3 to 5° to a radius of the guide bar which passes through the mid point of the line drawn between the axes of the connecting rivets.

The construction of the inner edge portions of the links forming the cutting units of the chain as described herein gives greatly improved results in end boring operations and enables the cutting links on the nose portion of the guide bar to perform their cutting function with an efficiency equal to that of the cutting links traversing the side edges of the guide bar.

This application is a continuation of my prior application Serial No. 373,107 filed August 10, 1953, now abandoned.

While I have illustrated and described a preferred

embodiment of my invention, it is understood that this is capable of modification, and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a saw chain, a cutting unit having a cutting tooth and a depth gauge formed thereon, said cutting unit having an inner edge provided with bearing surfaces adjacent each end and being arcuately curved between said surfaces, the arc on which said edge is formed, if extended, passing through the bearing surface at the leading end of the cutting unit and being spaced from the bearing surface at the trailing end of the cutting unit whereby the trailing end of the unit is tilted outwardly when said cutting unit traverses a curved path.

2. In a chain saw, a guide bar having a rounded nose portion, and a chain adapted to travel around said guide bar, said chain comprising a series of pivotally connected cutting units having a cutting tooth formed thereon, said cutting units each engaging said guide bar and having guide bar contacting formations adjacent each end and being arcuately curved between said formations, said curve, if extended, passing through the guide bar contacting formation at the leading end of the cutting unit and the formation at the trailing end of the cutting unit being spaced outwardly from an extension of said curve whereby the trailing end of the unit is tilted outwardly away from said guide bar as said unit traverses the nose portion of said guide bar.

3. In a chain saw including a guide bar having a rounded nose portion, a chain adapted to travel around said guide bar, said chain comprising a series of pivotally connected cutting units having a cutting tooth and a depth gauge formed thereon, said cutting units each having an inner edge engaging said guide bar, said inner edge having guide bar contacting formations adjacent each end and being arcuately curved between said formations, the arc on which said edge is formed corresponding to the curvature of the nose portion of the guide bar and, if extended, passing through the guide bar contacting formation at the leading end of the cutting unit, the formation at the trailing end of the cutting unit being spaced outwardly from an extension of said arc whereby the trailing end of the unit is tilted outwardly away from said guide bar as said unit traverses the nose portion of said guide bar.

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