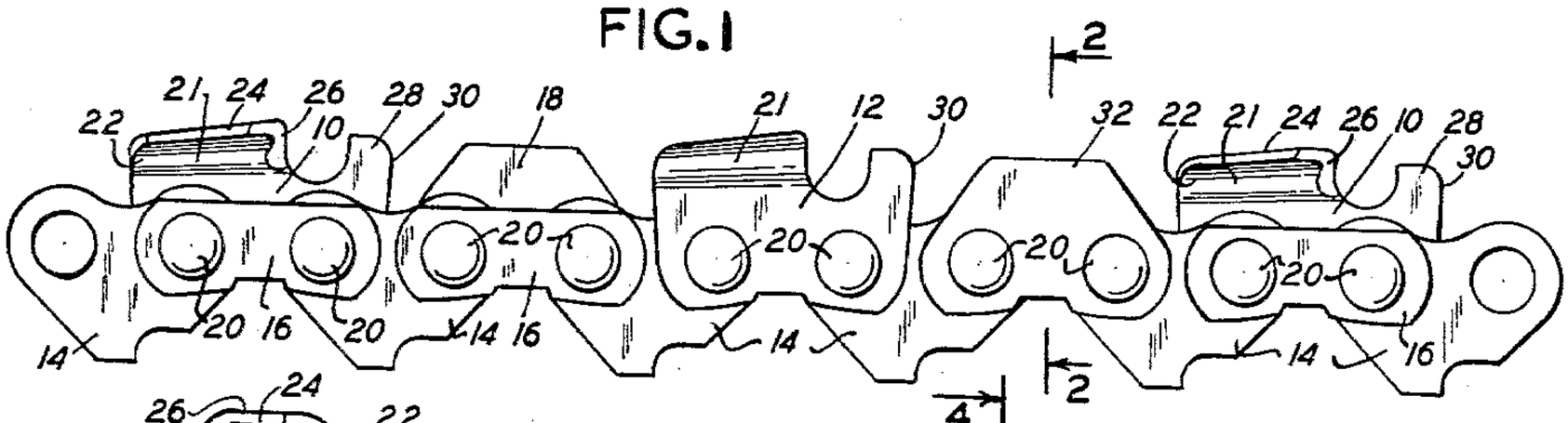
April 27, 1965 R. R. CARLTON 3,180,378

BRUSH CUTTING CHAIN

Filed May 8, 1959

FIG.1



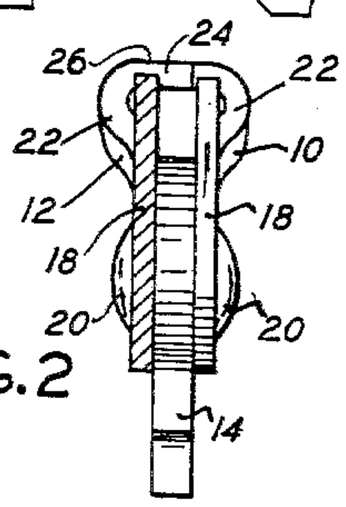


FIG.2

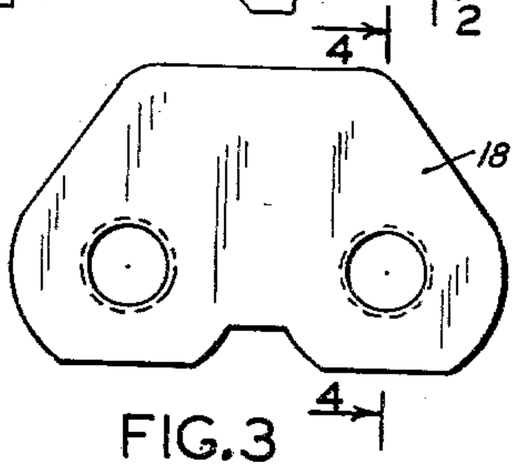


FIG.3

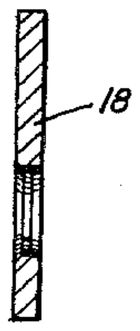


FIG.4

FIG.5

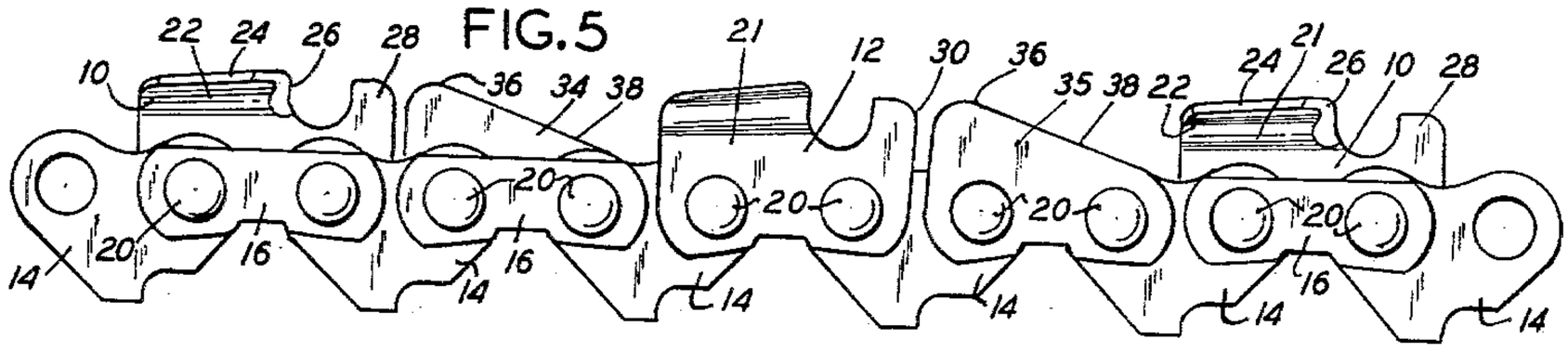
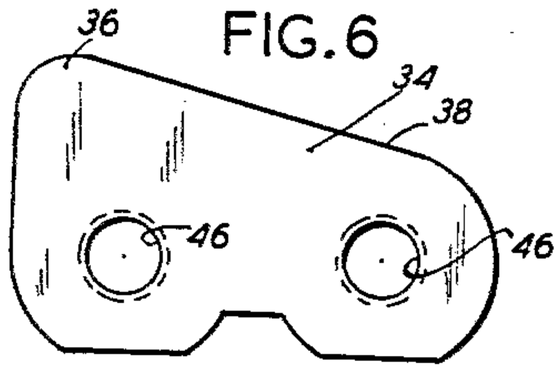


FIG.6



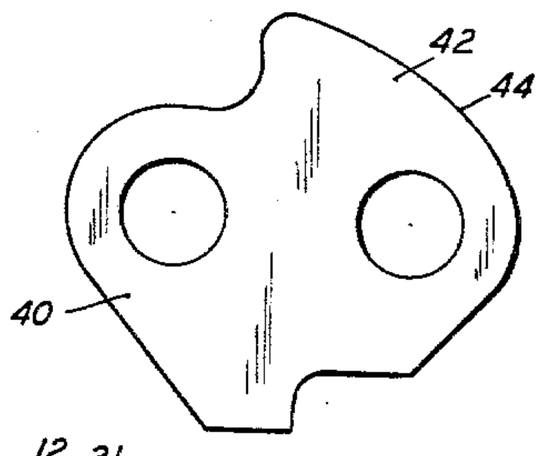


FIG.8

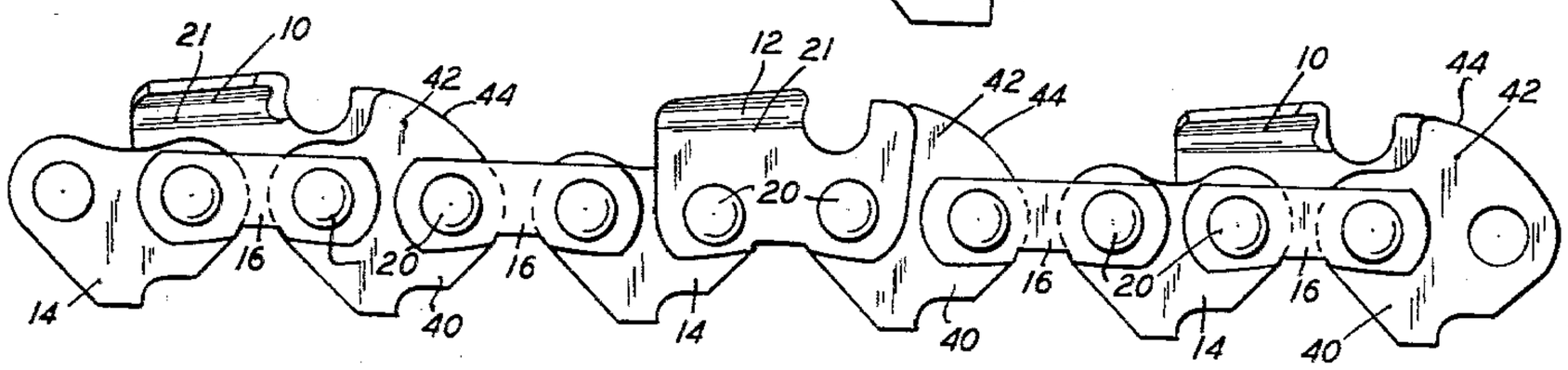


FIG.7

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BRUSH CUTTING CHAIN

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This invention relates to a brush cutting chain and more particularly to an improved saw chain particularly suitable for cutting brush when employed on a power driven portable chain saw.

Most commercial saw chains have a plurality of cutter links spaced from each other longitudinally of the chain. Such cutter links are pivotally connected to connecting links which are in turn pivotally connected to other connecting links, the connecting links including side links and center drive links. The most commonly employed saw chain has cutter links with L-shaped cutting elements integral with certain of the side links of the chain and projecting outwardly of the chain. Such cutter elements each have a shank portion curved outwardly and laterally from the side of the chain and a toe portion extending laterally of the chain from the outer end of the shank portion in a direction opposite to the lateral extension of the shank from the side of the chain. The cutter links also each have an outwardly projecting depth gauge positioned forwardly of the cutter element and spaced therefrom. Such depth gauge extends generally in the same direction as the shank of the cutter element for a distance somewhat less than the cutter element. The depth gauge is thus positioned to engage the bottom of the saw kerf to thereby control the depth of the cut made by the cutter element and prevent undue digging of the cutter element into the material being cut. Such depth gauge has a leading edge which tends to have hooking engagement with branches of the brush being cut. This results in jerky operation of the saw chain and, in extreme instances, in stalling of the chain saw motor or breakage of the saw chain.

In accordance with the present invention, a connecting link adjacent the forward end of each cutter link is provided with a guard portion shaped to prevent such hooking engagement by the associated cutter link. The guard portion may either sufficiently fill the spaces between the cutter links to prevent branches of the brush from dropping into such spaces or may be shaped to provide a portion which lift branches of the brush being cut out of such spaces. In either case, such branches clear the leading edges of the cutter links to prevent the hooking engagement above described. The spaces between the cutter links are, however, not completely filled so that space is provided for carrying chips or sawdust out of a kerf when the chain is employed for cutting branches of considerable size.

In the preferred chain, the cutter links are side links spaced from each other longitudinally of the chain a distance approximately equal to the length of one of the side connecting links of the chain. A side connecting link directly preceding each cutter link has a portion extending outwardly of the chain to form a guard portion along most of its length so as to partially fill in the space between the cutter links and prevent hooking of the cutter link on a branch. As indicated above, however, it is possible to provide either such side link or a center drive link with an upwardly and rearwardly inclined camming edge immediately adjacent the following cutter link, which portion cams any branches which would be hooked by the cutter link upwardly out of the longitudinal spaces between cutter links. In any case, room is provided for carrying sawdust out of a kerf

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in relatively large branches while at the same time preventing hooking of the cutter links upon smaller branches.

It is therefore an object of the present invention to provide an improved brush cutting chain constructed to prevent hooking of the leading edges of cutter links of the chain upon branches of the brush so as to enable the chain to be used to efficiently cut brush.

Another object of the invention is to provide an improved brush cutting chain in which connecting links positioned at least partly between cutter links spaced longitudinally of the saw chain are formed to prevent branches of the brush being cut from being hooked by forward portions of the cutter links.

A further object of the invention is to provide a brush cutting chain in which a sufficient amount of the spaces between longitudinally spaced cutter links of a saw chain are filled in by outwardly extending portions of connecting links to prevent hooking of parts of the cutter links upon branches being cut while at the same time providing room for carrying chips out of a kerf in a branch of considerable size.

A still further object of the invention is to provide an improved brush cutting chain in which connecting links having at least a portion thereof positioned in the spaces between cutter links of a saw chain are formed to move the branches of brush being cut outwardly of the chain so as to be engaged only by the outer portions of the cutter elements of the chain to thereby prevent hooking of the chain upon branches of the brush being cut.

Other objects and advantages of the invention will appear in the following description of preferred embodiments thereof shown in the attached drawing of which:

FIG. 1 is a side elevation of a saw chain in accordance with the present invention;

FIG. 2 is a vertical cross section on an enlarged scale taken on the line 2—2 of FIG. 1;

FIG. 3 is a side elevation on such enlarged scale of a single side connecting link employed in the chain of FIGS. 1 and 2;

FIG. 4 is a vertical section taken on the line 4—4 of FIG. 3;

FIG. 5 is a view similar to FIG. 1 showing a modified form of saw chain;

FIG. 6 is a view similar to FIG. 3 showing a modified link employed in the chain of FIG. 5;

FIG. 7 is a view similar to FIG. 1 showing a further modified chain; and

FIG. 8 is a view similar to FIG. 3 showing a type of center drive link employed in the chain of FIG. 7.

Referring more particularly to the drawings, the chain of FIGS. 1 to 4 includes a plurality of cutter links 10 and 12 each forming a side link of the chain. The cutter links 10 and 12 are connected to central drive links 14 by side links 16 and 18, suitably pivoted together and to the cutter links by rivets 20 extending through suitable apertures in the various links, the drive links having portions which engage the drive sprocket of the chain saw and which are received in a groove in the saw bar of the chain saw.

The cutter links 10 and 12 may be of any suitable type, those shown being of the so-called "chipper" type having a cutter element 21 extending outwardly of the chain from the body portion of the cutter link and having an outwardly extending curved shank 22 also extending laterally from a side of the cutter link and supporting a toe portion 24 extending laterally in a direction opposite to the lateral extension of the shank from the side of the cutter link. The cutting edge 26 of the chain extends along both the front edge of the shank portion 22 and the front

edge of the toe portion 24. All of the cutter links 10 or 12 may be identical except that alternate cutter links are allochiral and are positioned on opposite sides of the center links 14 of the chain. Each cutter link 10 or 12 also has a depth gauge 28 spaced forwardly of the cutter element. The depth gauge extends outwardly in the general plane of the body portion of the cutter link and has a leading edge 30 which tends to have hooking engagement with small branches of brush being cut. That is to say, the leading edge of each depth gauge extends outwardly from the chain at an angle which is substantially a right angle, but may be slightly greater or less than ninety degrees. In FIGS. 1 to 4, this hooking action is prevented by providing the side link 18 directly preceding each cutter link in the chain of FIG. 1 with an upstanding guard portion 32 which extends outwardly of the chain substantially the same distance as the depth gauges 28. That is to say, the guard portions 32 and the depth gauges 28 are in alignment and extend outwardly of the chain a slightly lesser distance than the cutter elements 21 of the cutter links.

In the absence of the guard portions 32 on the side link 18 of FIGS. 1 to 4, small branches of the brush being cut drop into the space between the cutter links 10 and 12 and have hooked engagement with the leading edges 30 of the depth gauges 28. Such action can result in breaking the chain or stalling the chain saw motor and in any event, results in extremely rough operation of the chain saw in cutting brush. With the structure of the side links 18 shown, there is not sufficient time for branches of the brush being cut to drop into the small spaces between the depth gauges 28 and their preceding links 18 and also the spaces between such links are relatively small so that branches of appreciable size are prevented from dropping into such spaces.

Another form of connecting link preventing the leading edges of a following cutter link from having hooked engagement with branches of brush being cut is shown in FIGS. 5 and 6. The cutter links 10 and 12 of the chain of these figures may be identical with the cutter links of the chain of FIGS. 1 to 4. Also, the center drive links 14 may be the same as those of the chain of FIGS. 1 to 4 and the same is true of the side links 16. The side links 34 and 35 are, however, of different shape than the corresponding side link 18 of FIGS. 1 to 4. Thus the side links 34 and 35 of FIGS. 5 and 6 have a guard portion 36 extending outwardly from the body of the side link providing an upwardly and rearwardly inclined edge 38 which cams any branches of the brush being cut outwardly. The outwardly projecting guard portion 36 terminates closely adjacent the depth gauge 28 of the following cutter link 10 or 12 and is of substantially the same height as such depth gauge so as to prevent hooking engagement with branches of the brush being cut.

A somewhat similar structure is shown in FIGS. 7 and 8 in which the cutter links 10 and 12 again may be the same as those shown in FIGS. 1 to 4, and all of the side links may be the same as the side links 16 of FIGS. 1 to 4. Certain of the center or drive links are the same as the drive links 14 of FIG. 1 but the drive links 40 pivotally connected to the forward end of the cutter links are each shaped to have an outwardly projecting guard portion 42 immediately adjacent and extending forwardly with respect to the depth gauge 28 of a following cutter link. Such guard portion 42 of each of the center drive links 40 has an edge 44 which is inclined outwardly and rearwardly of the chain to cam outwardly any branches of the brush being cut which may have dropped into the space between the cutter links 10 and 12.

The chain construction shown in FIGS. 1 to 4 is preferred since it requires a change in one part only of a standard chain. That is to say, certain of the side links which would otherwise be of the form of the side links 16 are replaced by side links 18. However, all of the side links 18 are of identical form. The form of chain

shown in FIGS. 5 and 6 provide increased chip or sawdust carrying capacity but require two different side links 34 and 35, since the rivet apertures 46 therein are countersunk on the outside of each side link. Thus alternate side links 34 and 35 are allochiral and therefore two different additional parts must be employed for the chain of FIGS. 5 and 6. In the chain of FIGS. 7 and 8, increased chip carrying capacity is also provided and all of the side links 16 may be of the same form. An additional type of drive link is, however, required and, in general, the production of an additional type of drive link results in a more expensive chain than is the case when an additional type of side link is provided, as in the structure of FIGS. 1 to 4. All of the different types of chains illustrated, however, are effective to prevent hooking of the chain upon branches of the brush being cut and result in a smooth operation when cutting brush. They are usable for cutting branches or even tree trunks of considerable size.

While I have disclosed the preferred embodiment of my invention, it is to be understood that the details may be varied and that the scope of the invention is to be determined by the following claims.

I claim:

1. A saw chain having cutter links including cutting means comprised as allochiral routers thereon, a depth gauge preceding each of said cutting means, said links being interspaced by series of alternating guide links and connecting links, said guide links also having portions for engagement with a drive sprocket of a chain saw and said cutting means all facing in the same direction, means including rivets about which said links are articulated, each pair of consecutive cutter links defining a span therebetween, and means for stabilizing the action of said chain for limiting the movement of said links toward the bottom of a kerf being cut by said chain which includes a plate-like extension projecting toward the bottom of said kerf and from one link of each of said series, said extension having a lower non-cutting surface substantially parallel to the length of said chain which surface is of such extent as compared to the extent of said span that no expanse thereof greater than the length of said non-cutting surface is left unsupported.

2. A saw chain having cutter links including cutting means comprised as allochiral routers thereon, a depth gauge preceding each of said cutting means, said links being interspaced by series of alternating guide links and connecting links, said guide links also having portions for engagement with a drive sprocket of a chain saw and said cutting means all facing in the same direction, means including rivets about which said links are articulated, an interspaced depth gauge and a preceding cutter means defining a span therebetween, and means for stabilizing the action of said chain for limiting the movement of that part of the chain at said span toward the bottom of a kerf being cut by said chain which includes a plate-like extension projecting toward the bottom of the kerf for a distance less than the extent of said cutting means and from one link of each said series, said extension having a lower non-cutting surface substantially parallel to the length of said chain which surface is of such extent as compared to the extent of said span that no expanse thereover greater than the distance between adjacent link articulations is left unsupported.

3. A saw chain having cutter links including cutting means comprised as allochiral routers theren, a depth gauge preceding each of said cutter means, said links being interspaced by series of alternating guide links and connecting links, said guide links also having portions for engagement with a drive sprocket of a chain saw and said cutting means all facing in the same direction, means including rivets about which said links are articulated, the leading edge of an interspaced depth gauge and the trailing edge of a preceding cutter means defining a span therebetween equal to the distance between three link articulations or less, and means for stabilizing the action of said

chain for limiting the movement of that part of the chain at said span toward the bottom of a kerf being cut by said chain which includes a plate-like extension projecting toward the bottom of said kerf for a distance less than the extent of said cutting means and from one link of each of said series, said extension having a lower non-cutting surface substantially parallel to the length of said chain which surface is of such extent as to divide said span into segments each of which is less than the distance between adjacent link articulations, said surface further being generally centrally disposed in said span.

4. A saw chain for a power driven chain saw, said saw chain comprising:

a plurality of chain links including cutter links spaced along said chain,

and connecting links pivotally connected to said cutter links and to each other,

certain of said connecting links being drive links having portions for engagement with a drive sprocket of a chain saw,

said cutter links each having an outwardly extending cutter element and an outwardly extending depth gauge,

all of said cutter links facing in the same direction and the depth gauge of each cutter link being at the front end of the cutter link,

the leading edge of each depth gauge extending outwardly from the chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of brush being cut by the chain,

with the connecting links at least in part preceding the depth gauge of each cutter link and having means for preventing said hooked engagement including a guard portion adjacent said leading edge and extending in the same direction as said depth gauge a distance substantially coextensive with said depth gauge.

5. A saw chain for a power driven chain saw, said saw chain comprising:

a plurality of chain links including cutter links spaced along said chain,

and connecting links pivotally connected to said cutter links and to each other,

certain of said connecting links being center drive links having portions for engagement with a drive sprocket of a chain saw,

said cutter links each being a side link having an outwardly extending cutter element and an outwardly extending depth gauge,

alternate cutter links being allochiral and all of said cutter links facing in the same direction and the depth gauge of each cutter link being at the front end of the cutter link,

the leading edge of each depth gauge extending outwardly from the chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of brush being cut by the chain,

with the connecting links at least in part preceding the depth gauge of each cutter link and having means for preventing said hooked engagement including a guard portion adjacent said leading edge and extending in the same direction as said depth gauge and in alignment with said depth gauge.

6. A brush cutting chain comprising:

a plurality of links having body portions pivotally connected together,

said links including side links having cutters thereon to form cutter links,

and including connecting links positioned between said cutter links and spacing said cutter links from each other longitudinally of said chain,

certain of said connecting links being center drive links having portions for engagement with a drive sprocket of a chain saw,

all of said cutter links facing in the same direction and each said cutter link having a depth gauge extending from the forward end of said cutter link in the general plane of the body portion of said cutter link,

said gauge having a leading edge extending outwardly from the chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of said brush,

said connecting links including side guard links, each of said guard links immediately preceding the depth gauge of each of said cutter links having means for preventing said hooked engagement including a guard portion extending in the same direction as said depth gauge a distance substantially coextensive with said depth gauge.

7. A brush cutting chain comprising:

a plurality of links having elongated body portions pivotally connected together at their ends,

said links including cutter links and connecting links,

certain of said connecting links being positioned between said cutter links and spacing said cutter links from each other longitudinally of said chain and other of said connecting links being drive links having drive portions extending in one direction from and in the general plane of the body portions of said drive links for engagement with the drive sprocket of a chain saw,

all of said cutter links facing in the same direction and each said cutter links having a part extending from the forward end of said cutter link in a direction opposite that of said drive portions,

said part being shaped to provide a leading edge extending outwardly from the chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of said brush,

said connecting links including guard links immediately preceding said part of each said cutter link,

said guard link having means for preventing said hooked engagement including a guard portion adjacent said leading edge extending in substantially the same direction and substantially the same distance as said part and at least partly filling the space between said cutter links.

8. A brush cutting chain comprising:

a plurality of links having elongated body portions pivotally connected together at their ends,

said links including cutter links and connecting links,

certain of said connecting links being positioned between said cutter links and spacing said cutter links from each other longitudinally of said chain and other of said connecting links being drive links having drive portions extending in one direction from and in the general plane of the body portions of said drive links for engagement with the drive sprocket of a chain saw,

all of said cutter links facing in the same direction and each said cutter link having a part extending from the forward end of said cutter link in a direction opposite that of said drive portions,

said part being shaped to provide a leading edge extending outwardly from the chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of said brush,

said connecting links including guard links immediately preceding and on the same side as said part of each said cutter link,

said guard link having means for preventing said hooked engagement including a guard portion adjacent said leading edge extending in alignment with and in the same direction as said part,

said guard portion having an outer edge inclined upwardly and rearwardly of said chain to cam branches of brush being cut out of the spaces between said cutter links to prevent said engagement of said leading edge of said part with said branches.

9. A saw chain for a power driven chain saw, said saw chain comprising:

a plurality of chain links including cutter links spaced along said chain,

and connecting links pivotally connected to said cutter links and to each other,

certain of said connecting links being drive links having portions for engagement with a drive sprocket of a chain saw,

said cutter links each having an outwardly extending cutter element and an outwardly extending depth gauge,

all of said cutter links facing in the same direction and the depth gauge of each cutter link being at the front end of the cutter link,

the leading edge of each depth gauge extending outwardly from said chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of brush being cut by the chain,

other of said connecting links being guard links at least in part preceding the depth gauge of each cutter link and having means for preventing said hooked engagement including a guard portion adjacent said leading edge and extending in the same direction as said depth gauge a distance substantially coextensive with said depth gauge,

the guard portion having an outwardly and rearwardly inclined outer edge beginning adjacent the front end of the guard link and terminating adjacent the rear end of the guard link to provide the outermost part of said guard portion adjacent the leading edge of the depth gauge of the next succeeding cutter link.

10. A saw chain for a power driven chain saw, said saw chain comprising:

a plurality of chain links including cutter links spaced along said chain,

and connecting links pivotally connected to said cutter links and to each other,

certain of said connecting links being center drive links having portions for engagement with a drive sprocket of a chain saw,

said cutter links each being a side link having an outwardly extending cutter element and an outwardly extending depth gauge,

alternate cutter links being allochiral and all of said cutter links facing in the same direction and the depth gauge of each cutter link being at the front end of the cutter link,

the leading edge of each depth gauge extending outwardly from said chain at an angle which is substantially a right angle and tends to cause hooked engagement with branches of brush being cut by the chain,

other of said connecting links being guard links at least in part preceding the depth gauge of each cutter link and having a means for preventing said hooked engagement including a guard portion adjacent said leading edge and extending in the same direction as said depth gauge and in alignment with said depth gauge,

the guard portion having an outwardly and rearwardly inclined outer edge beginning adjacent the front end of the guard link and terminating adjacent the rear end of the guard link.

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