

July 18, 1961

M. MERZ

2,992,660

SAW CHAIN AND BAR UNIT

Filed Aug. 22, 1955

3 Sheets-Sheet 1

FIG. 1.

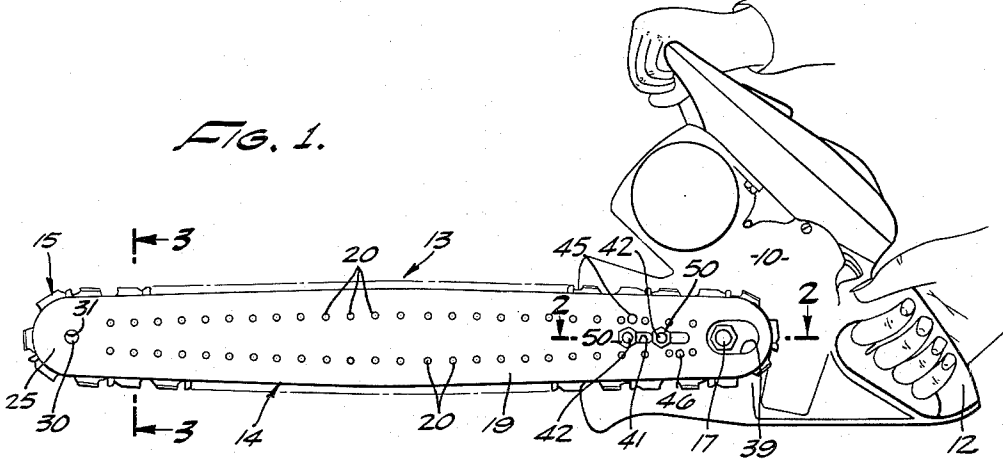


FIG. 2.

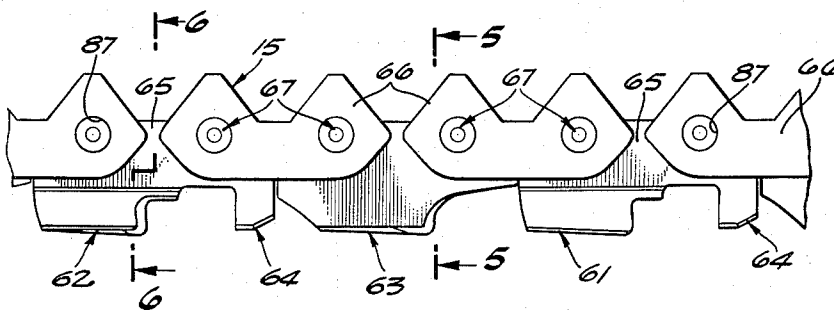
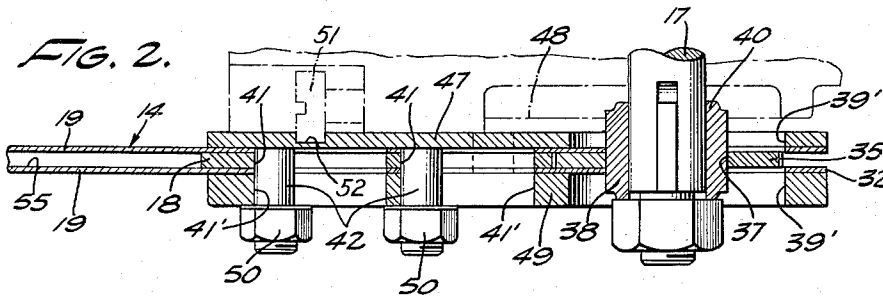


FIG. 4.

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M. MERZ
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3 Sheets-Sheet 2

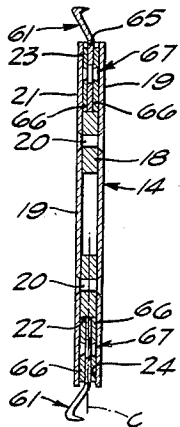


FIG. 3.

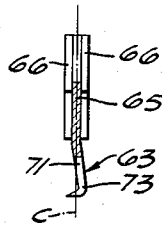


FIG. 5.

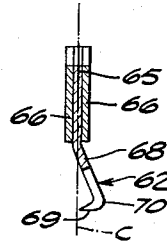


FIG. 6.

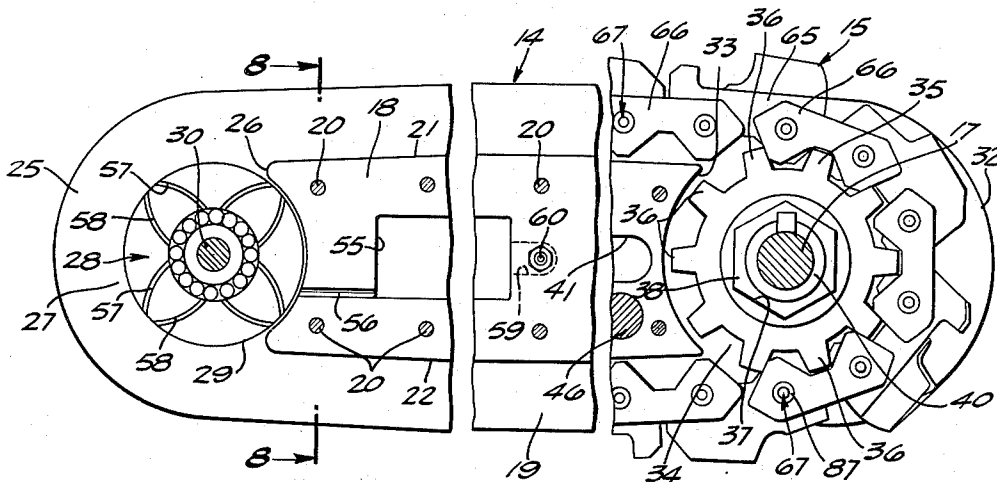


FIG. 7.

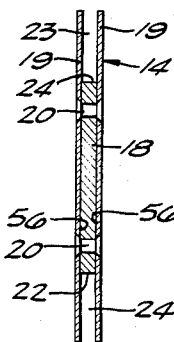


FIG. 8.

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SAW CHAIN AND BAR UNIT

Filed Aug. 22, 1955

3 Sheets-Sheet 3

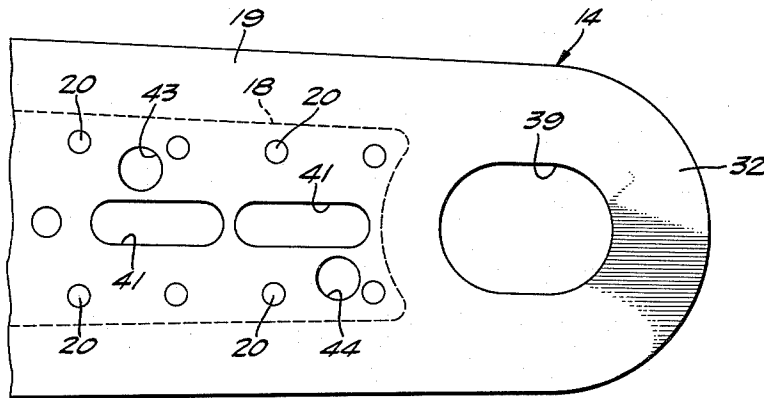


FIG. 9.

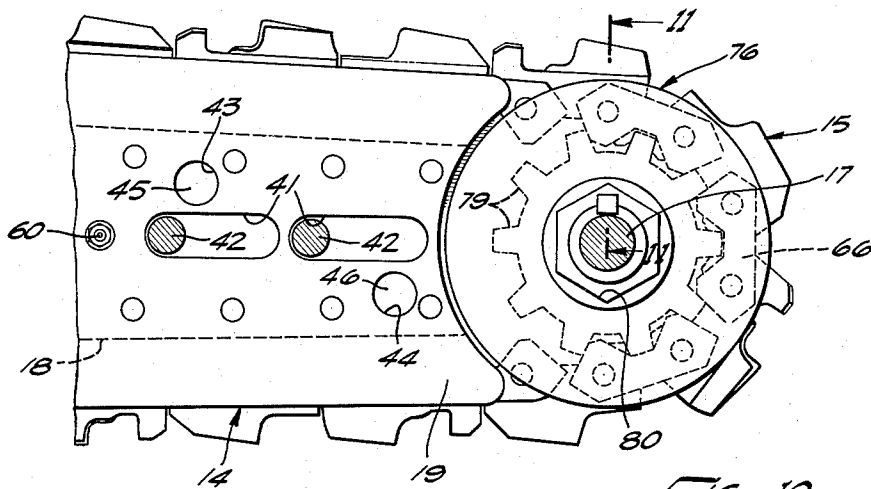


FIG. 10.

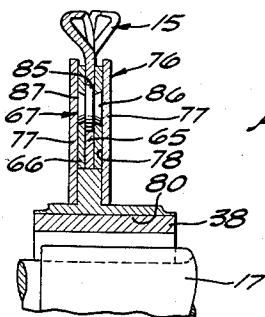


FIG. 11.

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1

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SAW CHAIN AND BAR UNIT

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3 Claims. (Cl. 143—32)

This invention relates in general to chain saws such as employed in the cutting of wood and relates in particular to a chain saw unit consisting of a saw chain and a support therefor in an assembly which is ready for attachment to a power source such as a portable engine.

In the logging industry chain saws are extensively used, each consisting of a portable gasoline engine having a flat bar or blade extending forwardly therefrom, this bar having a grooved periphery on which a toothed chain is caused to travel by an engine driven sprocket disposed at the inner end of the bar and over which the chain runs.

One of the objects of my invention is to provide a simple replaceable unit consisting of a bar, a saw chain loop in operative position on the bar and a sprocket at the inner end of the bar, which sprocket is arranged to be driven by the power output shaft of the engine when the unit is bolted in place upon the engine.

It is a further object of the invention to provide a chain saw wherein the side and center links of the saw chain travel within a groove or channel in the edge of the saw bar, instead of the side links being positioned externally of the groove as in present practice and sliding on the outer edges of the bar walls which define the groove in the edge of the bar.

It is a further object of the invention to provide a chain saw unit having a bar with an edge groove for the chain and also having at the inner end of the bar a recess which holds therein the drive sprocket for the chain.

It is also an object of the invention to provide a chain saw unit of the character described in the preceding paragraph, having a recess at the outer end of the bar in which a wheel is supported for carrying the chain around the end of the bar with minimum friction and wear.

It is a further object of the invention to provide a chain saw unit having a chain supporting bar with a recess at its front end carrying therein a wheel member for supporting the chain as it travels around the end of the bar, and also having a novel means for lubricating the bearings of the chain supporting wheel and the chain.

It is also an object of the invention to provide a chain saw unit having a novel saw chain adapted to effect a sawing operation without side drift, with minimum lateral oscillation of the saw bar which produces a kerf wider at its front end than at its rear end, and with a generally smooth cutting action. In this chain an efficient cutting action is obtained from the use of side cutters and raking cutters disposed between the side cutters.

It is a further object of the invention to provide a saw chain which will efficiently cut both hard and soft woods, by reason of the cutters having a novel form and placement so that a satisfactory cutting action is obtained in different types and hardness of wood grain structures.

Further objects and advantages of the invention may be brought out in the following part of the specification wherein small details have been described for competence of disclosure, without intending to limit the scope of the invention which is set forth in the appended claims.

Referring to the accompanying drawings which are for illustrative purposes only:

FIG. 1 is a schematic side view of a portable engine powered sawing device including my novel chain saw unit;

2

FIG. 2 is an enlarged fragmentary sectional view taken as indicated by the line 2—2 of FIG. 1;

FIG. 3 is an enlarged cross section taken as indicated by the line 3—3 of FIG. 1;

FIG. 4 is a side view of a portion of the saw chain;

FIG. 5 is a sectional view taken as indicated by the line 5—5 of FIG. 4;

FIG. 6 is a cross section taken as indicated by the line 6—6 of FIG. 4;

FIG. 7 is a side view, to enlarged scale, of the chain saw unit with the near side plate of the saw bar removed and with a portion of the saw chain removed;

FIG. 8 is a cross section taken as indicated by the line 8—8 of FIG. 7, but showing both side plates;

FIG. 9 is a fragmentary face view of the inner end of the saw bar 14;

FIG. 10 is a fragmentary view of an end of an alternative form of the saw bar; and

FIG. 11 is a cross section taken as indicated by the line 11—11 of FIG. 10.

The portable, self-powered sawing device shown in FIG. 1 includes an engine 10 having handle members 11 and 12 for use in manipulating the device. A chain saw unit 13 projects forwardly from the engine 10 and comprises a flat bar 14, a saw chain 15 in the form of a loop running around the edge of the bar, and a sprocket 35 at the inner end of the bar 14 adapted to be driven by the power output shaft 17 of the engine 10.

As shown in FIGS. 1, 2, 3 and 7 the saw bar 14 comprises a filler plate 18 and side plates 19 secured against the side faces of the plate 18 by rivets 20. The side plates 19 extend upwardly and downwardly beyond the upper and lower edges 21 and 22 of the filler plate so as to provide longitudinal channels 23 and 24 in which the links of the chain 15 reside and travel. The side plates 19 also have forwardly extending portions 25 which project beyond the front end 26 of the filler plate to form a flat cavity 27 which interconnects and is the same width as the front ends of the upper and lower channels or grooves 23 and 24. The flat cavity 27 contains therein a wheel member 28 around which the chain 15 travels in passing from the upper channel 23 to the lower channel 24. Although this wheel member 28 may be in the form of an idler sprocket I find that it may be suitably made as a disc supported for rotation by a bearing 29 carried by a pin 30 which has its ends supported in openings 31 in the extensions 25 of the side plates 19.

The side plates 19 also have extensions 32 which project inwardly beyond the inner end 33 of the filler plate 18 to form a cavity or space 34 adapted to receive a drive sprocket 35 having thereon teeth 36 for driving the chain which extends around the sprocket from the rear end of the lower channel 24 to the rear end of the upper channel 23 of the bar 14. The sprocket has a polygonal opening 37 to receive a corresponding polygonal bushing 38 which is keyed on the engine shaft 17. The extensions 32 of the side plates 19 have therein elongated openings 39, as shown in FIG. 9, to receive the cylindrical hub portions 40 of the drive bushing, the elongation of the openings 39 permitting longitudinal adjustment of the saw bar relatively to the sprocket 35, whereby tension in the chain 15 may be adjusted. The saw bar 14 has therein elongated bolt openings 41 through which stud bolts 42 on the engine may pass. The saw bar also has circular openings 43 and 44 to receive pins 45 and 46 which project from a mounting plate 47, FIG. 2, which is disposed between the inner end of the saw bar 14 and the contiguous portion 48 of the engine body. As further shown in FIG. 2 a complementary outer clamping plate 49 rests against the outer face of the inner end of the saw bar 14, or opposite from the mounting plate 47. The members 47 and 49 have openings 39' therein corresponding to the

3

opening 39 in the saw bar extensions 32, and also have slots 41' corresponding to the elongated openings 41 in the saw bar. When the nuts 50 of the stud bolts 42 are loosened, the plates 47 and 49 and the saw bar 14 may be moved leftwardly with relation to the sprocket 35 to accomplished tightening or tensioning of the chain 15. This adjusting movement of the parts 14, 47 and 49 is accomplished by an adjusting screw 51, FIG. 2, threaded into the engine body portion 48 on an axis parallel to the face of the plate 47 and being positioned so that a peripheral portion of its head will engage a depression 52 in the contiguous face of the mounting plate 47.

The chain saw unit 13 is completely assembled at the factory. The wheel member 28, sprocket 35 and the chain, in the form of a continuous loop are in their proper places in the bar 14. With the drive bushing 38 in place upon the engine shaft 17, installation of the chain saw unit 13 involves only the placing of the sprocket 35 on the bushing 38 and then clamping the bar 14 in place on the engine. There is no time lost to thread a chain loop upon a sprocket previously mounted on the drive shaft of the engine. For lubrication of the wheel member 28 and also for lubrication of the chain 15, the bar 14 is provided with a lubricant chamber or reservoir 55 consisting of an elongated opening in the filler plate 18 covered by the adjacent portions of the side plates 19. As shown in FIGS. 7 and 8 lubricant delivery passages in the form of shallow grooves 56 are formed in the outer end portion of the filter plate 18 so as to connect the lubricant reservoir 55 with the space or cavity 27 in which the wheel member 28 operates. Also, the opposite flat faces of the wheel member 28 have shallow grooves 57 and 58 therein, the grooves 57 being spiral forwardly so as to pick up oil and carry the same into the bearing; whereas the grooves 58 are spiral reversely so that they will act to carry the lubricant outwardly to the chain. Near the inner end of the bar 14 there is a grease inlet opening 59 which communicates with the inner end of the lubricant reservoir 55, and has therein a check valve 60 to prevent escape of the lubricant through the opening 59 after it has been forced into the reservoir 55 from a sort of lubricant under pressure. The lubricant is of such character that when it becomes warmed it will flow slowly through the lubricant ducts 56 to the space between the wheel member 28 and the end of the filler plate 18. A further feature of the invention is in the formation of the chain with relation to the bar 14 so that the links of he chain are contained within the provided spaces between the side plates 19 with only the cutters 61 and 62, the rakers 63 and the depth gauges 64 projecting beyond the edges of the side plates 19. The chain 15 is composed of center links 65 and side links 66 hingedly connected by rivets 67. As shown in FIG. 3, the links 65 and 66 are contained within the upper and lower channels 23 and 24 of the bar 14. The cutters 61 and 62 are formed so as to cut a kerf which is wider than the saw bar 14. The cutters 61 and 62 are extended from center links 65 and are symmetrically formed, in opposite hand relation as shown in FIGS. 3 and 6. These cutters 61 and 62 each have a plate or shank portion 68 which slopes outwardly away from the link 65 and away from the center line *c* of the chain, and a toe portion 69 which extends from the lower edge of the shank 68 inwardly toward the center line *c*. The front edges of the shanks 68 and toe portions 69 are sharpened so as to form a cutting edge 70 which may be sharpened by use of a round or rounded file. A raker 63 follows each cutter 61 and 62. As shown in FIG. 5, each raker 63 has a shank portion 71 extending from a center link 65, sloping only slightly so that its outer extremity will lie adjacent one side of the chain center line *c*. From the outer edge of the shank portion 71 a relatively narrow toe portion 72 extends toward and across the center line *c*, and the front edges of the shank and toe portions 71 and 72 are

4

likewise sharpened so as to provide the raker 63 with a cutting edge 73. The rakers 63 are slightly shorter than the cutters 61 and 62, but the cutting edges 73 thereof will cut off any wood fibres which may be left projecting from the bottom of the kerf. The gauges 64 project outwardly from the front ends of the center links 65 which carry the cutters 61 and 62. From FIG. 4 it will be perceived that the cutters and rakers 61, 62 and 63 are relatively close together lengthwise of the chain. This arrangement gives an especially good boring action to the chain saw.

In the alternative form of the invention shown in FIGS. 10 and 11, the sprocket 35 is replaced by a shrouded sprocket 76 and the inner extensions 32 of the side plates 19 are eliminated. That is to say, the side plates 19 of the bar 14, FIG. 10, do not extend from the inner end of the saw bar so as to enclose the sprocket, but the sprocket 76 has its own side plates or flanges 77 defining an annular channel 78 to receive the chain links 65 and 66 which are in engagement with the teeth 79 of the sprocket 76. The sprocket 76 has a polygonal opening 80 to fit the drive bushing 38 which has been previously secured upon the engine shaft 17.

A feature of my new chain is that the ends of the rivets 67 do not project beyond the outer faces of the side links 66 of the chain. The rivet 67 is of hollow type and as shown in FIG. 11, each rivet 67 has a central enlarged cylindrical body portion 85 with short tubular shank or stems 86 of smaller diameter than the body portion 85 and which are expanded in countersunk openings 87 in the side links 66.

I claim:

1. In a chain saw unit for use with an engine having thereon a saw bar holding means and a drive shaft extending adjacent said bar holding means: a saw bar cooperating with said holding means so as to be positioned in operation relation to said drive shaft, said bar having means for supporting a saw chain so that it may travel along its upper edge, front end and lower edge; a drive bushing positioned on said drive shaft; a sprocket having therein an opening to receive said bushing when the sprocket is placed in a position surrounding said shaft, said sprocket having interfitted relation with said bushing to permit axial movement on said bushing but retain the sprocket for rotational movement with the bushing; and side plates extending from said bar so as to lie on opposite sides of said sprocket and maintain the same in alignment with said bar and against axial movement on said bushing, at least one of said side plates having an opening therein through which said shaft passes, said opening being larger than said shaft so as to permit adjusting movement of said plates and said bar relatively to said shaft and said sprocket.

2. In a chain saw unit for use with an engine having thereon a saw bar holding means and a drive shaft extending adjacent said bar holding means: a saw bar cooperating with said holding means so as to be positioned in operative relation to said drive shaft, said bar having means for supporting a saw chain so that it may travel along its upper edge, front end and lower edge; a sprocket for moving said chain on said bar, said sprocket having an opening therein through which said shaft passes, said sprocket being axially movable relatively to said shaft; means for transmitting rotation from said shaft to said sprocket; side plates extending from said bar so as to lie on opposite sides of said sprocket and maintain the same in alignment with said bar and oppose said axial movement, at least one of said side plates having an opening therein through which said shaft passes, said opening being larger than said shaft so as to permit adjusting movement of said plates and said bar relatively to said shaft and said sprocket and co-operating means on said saw bar and said engine operable in a direction longitudinally of said saw bar to

make said adjusting movement of said plates and said bar relative to said shaft and said sprocket.

3. In a chain saw unit for use with an engine, having thereon a saw bar holding means and a drive shaft extending adjacent said bar holding means: a saw bar having upper and lower grooves along the upper and lower edges thereof; plates having portions at the front of the bar defining an idler wheel cavity communicating with the front ends of said grooves and portions at the rear end of said bar defining a sprocket-receiving cavity communicating with the rear ends of said grooves; a saw chain arranged on said bar, having link portions arranged to run in said grooves and in the outer portions of said cavities; an idler wheel supported for rotation in said idler wheel cavity to support and guide said chain as it moves from said upper groove through said cavity to said lower groove; a sprocket in said sprocket-receiving cavity and axially movable on said drive shaft for driving said chain, said sprocket being held in alignment with said grooves by said plates which define said sprocket-receiving cavity; and co-operating means on said bar and on said engine operable to move said saw bar

in a direction longitudinally thereof relative to said saw bar holding means for loosening and tightening said chain on said sprocket when said saw bar is loosely secured to said engine.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,992,660

July 18, 1961

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It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 37, for "operation" read -- operative --;
column 5, line 9, for "fronts" read -- front --.

Signed and sealed this 30th day of January 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

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Commissioner of Patents