

[54] **CHAIN SAW BRUSH CUTTING
ACCESSORY**

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[56] **References Cited**

UNITED STATES PATENTS

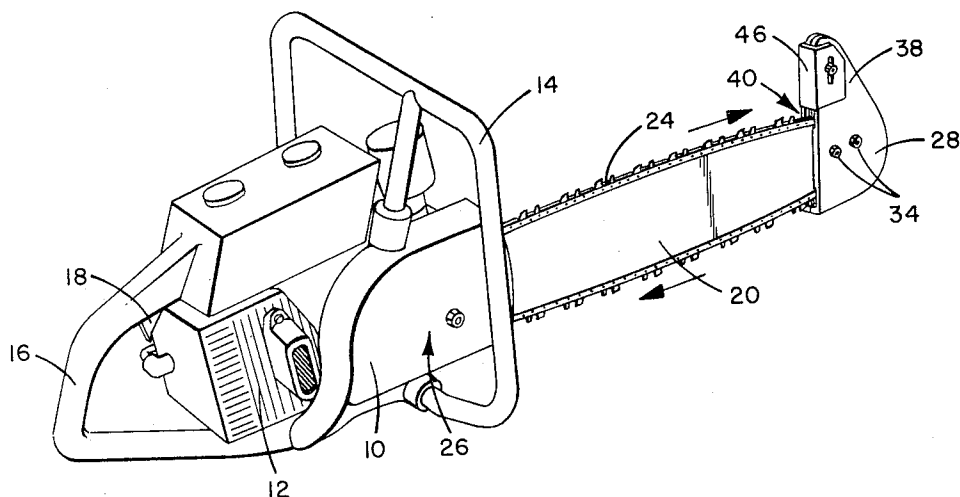
2,797,717	7/1957	Budd	143/32 F
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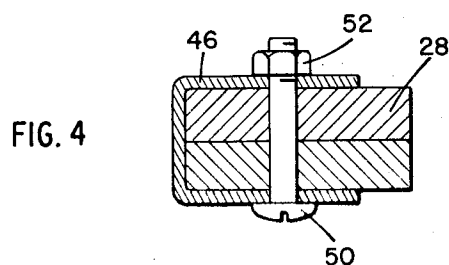
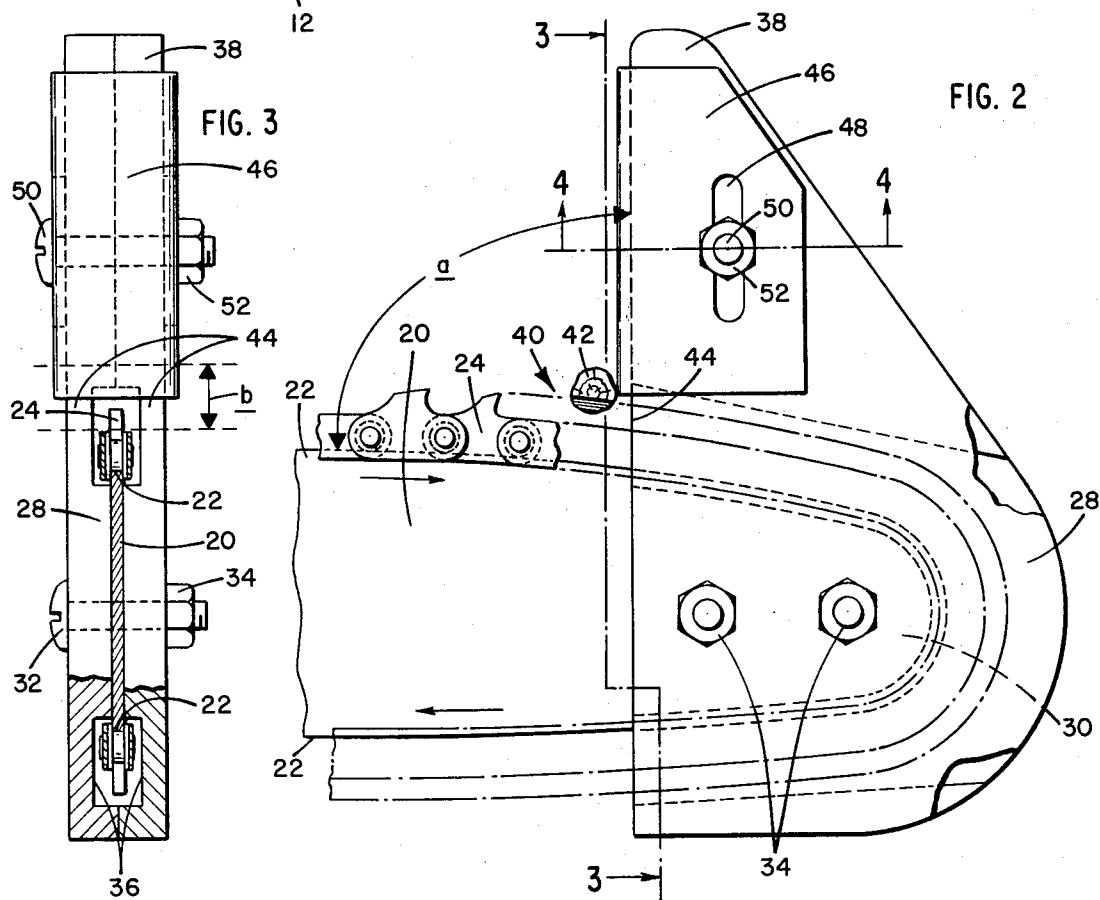
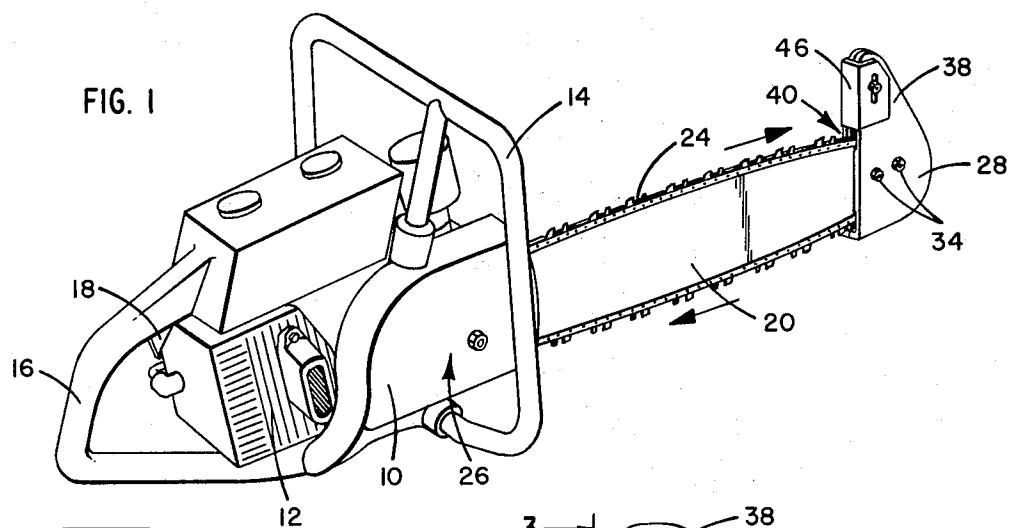
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Attorney—C. Yardley and Chittick et al.

[57] **ABSTRACT**

A brush cutting accessory device removably mounted on a power chain saw to facilitate the cutting of low lying brush and small whippy limbs. The accessory device includes a hollow tip enclosure mounted on the free outer end of the chain guide bar to enclose and shield the outer end of the cutting chain. The accessory device also includes a brush guide which extends upwardly from the hollow tip enclosure. The brush guide is shaped and positioned to support and to guide brush and limbs into shearing engagement with the upper outward run of the cutting chain in the area where the chain enters the hollow tip enclosure.

10 Claims, 4 Drawing Figures





CHAIN SAW BRUSH CUTTING ACCESSORY

BACKGROUND OF THE INVENTION

This invention is concerned with the problem of cutting low lying brush with a power chain saw, while still permitting normal chain saw operations utilizing the full length of the cutting chain. A conventional chain saw is primarily designed to cut tree trunks and rigid or supported tree limbs, etc. with a downward saw motion using the lower inward run of the cutting chain. However, the cutting of flexible brush located near the ground has always presented a problem because such brush tends to move along with, rather than be cut by, the moving cutting chain.

If the operator attempts to cut the brush with the lower inward run of the cutting chain, the brush tends to fly towards the operator, occasionally even striking him in the face. Also, the torque reaction caused by the lower chain run's grabbing on the brush forces the tip of the chain saw downwardly into contact with the ground or against rocks thereby dulling the cutting chain. On the other hand, if the operator attempts to cut the brush with the upper outward run of the cutting chain, the brush tends to fly away from the operator without being cut in the process.

Several previous patents have attempted to solve these problems, but none, in my opinion, has been completely successful. In particular, Budd, U.S. Pat. No. 2,797,717 and Hayden, U.S. Pat. No. 2,925,105 have both shown power chain saws having spurs and stops, respectively, mounted on the cutting chain support for facilitating the cutting of small brush. However, neither Budd nor Hayden solved the problem of the cutting chain tip striking obstructions near the ground and neither suggested combining a tip enclosure with a brush guide in a cooperative relationship.

SUMMARY OF THE INVENTION

This invention solves the two-fold problem of cutting bendable brush and of protecting the free outer end of the cutting chain from obstructions. This solution is accomplished by preferably utilizing an accessory unit which can be simply and inexpensively manufactured and which can be quickly and easily bolted onto the chain saw guide bar and just as easily removed. The accessory device of this invention also functions as a safety device to prevent dirt or rocks from being hurled by the cutting chain tip towards the operator or towards other nearby workers.

The chain saw accessory device of this invention is, in the preferred embodiment, a pair of hollow split castings or stampings which are bolted onto the chain guide bar to enclose and protect the chain as it goes around the outer bar tip. Extending upwardly from the hollow tip enclosure is a brush guide which snags the brush and supports and guides it into engagement with the cutting chain at a point where the upper outward run of the cutting chain enters the hollow tip enclosure. The bendable brush is stabilized by the brush guide so that it can be sheared by the chain's cutting teeth and the result is a positive cutting action even on very flexible brush and limbs.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the chain saw embodying the invention;

FIG. 2 is a view in elevation of the free outer end of the chain guide bar to which is attached the hollow tip enclosure and brush guide;

FIG. 3 is a view in section taken along line 3—3 of FIG. 2; and

FIG. 4 is a view in section taken along line 4—4 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 shows a power chain saw of conventional design which has a housing 10 and a power drive unit 12 mounted within the housing 10. The drive unit is typically a small, gasoline-fueled, internal combustion engine. A tubular front handle 14 is secured by struts to housing 10 at a number of spaced points and extends around three sides of the housing. A tubular rear handle 16 is secured to the housing and encloses a trigger switch 18 which controls the engine speed of power drive unit 12.

A chain guide bar 20 has an elongated, flat and slightly elliptical shape and has a smooth peripheral guide track 22. Chain guide bar 20 is adjustably mounted on housing 10 and carries an endless cutting chain 24 on its peripheral guide track 22. An unshown sprocket wheel 26 is mounted for rotation within housing 10 and is drivably engaged by power drive unit 12. The cutting chain 24 loops around sprocket wheel 26 and is driven thereby. Thus, it will be understood that power drive unit 12 can be controlled by trigger switch 18 to drive cutting chain 24 to run outwardly from housing 10 on the upper side of the chain guide bar 20 and inwardly toward the housing on the lower side of the chain guide bar.

An unshown adjustment mechanism is provided within housing 10 to move sprocket wheel 26 towards and away from chain guide bar 20 in order to take up or increase the slack in the cutting chain. The cutting chain consists of a large number of small toothed links which are pivotally pinned together and which straddle and slide over the peripheral guide track 22 of chain guide bar 20. The foregoing description of the power chain saw has been entirely conventional. However, the brush cutting accessory device which comprises this invention will now be described.

A hollow tip enclosure 28 is affixed to chain guide bar 20. One of the two primary purposes of tip enclosure 28 is to enclose and protect the cutting chain 24 as it passes around the outer end 30 of chain guide bar 20. Tip enclosure 28 shields the chain from contacting the ground or any other obstruction. This is especially important when cutting low lying brush as will be seen later. The hollow tip enclosure 28 may be fabricated in many ways and this invention is not limited to any fabrication process.

The drawings show a hollow tip enclosure embodiment which is basically two halves which are designed to fit together and are adapted to be mounted onto the free outer end 30 of the chain guide bar 20 by two bolts 32 and two nuts 34. Hollow recesses or grooves are formed in the inner walls 36 of tip enclosure 28 to permit cutting chain 24 to freely pass into and out of the tip enclosure. It will be appreciated that instead of fabricating the tip enclosure in two halves, as shown, the tip enclosure can be made in one piece, as by casting. The important point is that the tip enclosure must

be quickly and easily mountable upon the chain guide bar and must shield the outer end of the cutting chain from striking the ground when cutting low lying brush.

The second primary purpose of hollow tip enclosure 28 is to support a brush guide 38. This support function can be effected in one of two ways. Either the guide 38 can be formed integrally with enclosure 28 or the guide 38 can be an independent element mounted on enclosure 28. In the drawings, the enclosure 28 and guide 38 are integral.

The purpose of brush guide 38 is to snag and guide flexible brush and limbs and to supportably feed them into engagement with cutting chain 24 at the point 40 where the upper outward run of the cutting chain enters the hollow tip enclosure 28. This is accomplished when the operator swings the saw in the plane of the chain guide bar 20 and engages a limb 42 with the guiding edge 44 of the brush guide 38. Guiding edge 44 is a smooth continuous bearing surface (or a pair of parallel surfaces) which may be straight or concave. However, guiding edge 44 should extend upwardly from a first point on the tip enclosure 28 adjacent to the upper outward run of the cutting chain 24 to a second point spaced above the upper outward run of the cutting chain 24. A line running through these first and second points forms an angle α (see FIG. 2) with respect to the upstream upper outward run of cutting chain 24. Angle α is preferably approximately 90° although angles ranging from approximately 75° to 100° also produce acceptable results. As the brush is snagged and guided downwardly along guiding edge 44, it is supported and fed into cutting chain 24. Sometimes, brush limb 42 will strike the cutting chain 24 before it contacts edge 44, in which event guiding edge 44 acts as a support or cam to feed the limb against the cutting chain at point 40. Regardless, it is the cooperative relationship of the moving cutting chain 24 and the fixed guiding edge 44 at their mutual point of intersection 40 which causes brush limb 42 to be supportably fed into and cut by the chain.

In order to effectively guide flexible brush limbs into the cutting chain 24, the brush guide 38 must have at least one guiding edge 44 which (itself or in association with tip enclosure 28) extends from below the teeth of cutting chain 24 to above the teeth of cutting chain 24. In FIG. 3, this critical feeding area is labeled *b*. Additionally, it is believed that superior results are obtained when another movable element is added to brush guide 38. This optional element is an adjustable channel 46 which is made of a soft metal such as aluminum. Channel 46 has a pair of slots 48 formed therein disposed parallel to guiding edge 44. A bolt 50 and nut 52 cooperate to mount channel 46 on tip enclosure 28 and permit the channel to be rigidly located at various positions along guiding edge 44. The purpose of channel 46 is to reduce the open area above the cutting chain, thereby preventing brush ends from being drawn and jammed into the hollow tip enclosure.

Channel 46 is made of soft aluminum so that it can be easily cut by the cutting chain 24 without dulling or damaging the cutting chain. Thus, as the chain slackens during use, the channel will be cut by the chain and, after the chain has been re-tightened and the channel has been lowered a few times, the channel may be periodically discarded and replaced. It will be un-

derstood, however, than channel 46 is an optional feature of this invention.

In operation, the operator cuts sturdy logs and limbs, etc. in the normal manner, i.e. by depressing the saw so that any part of the entire lower run of the cutting chain cuts through them. However, when the operator wants to cut low lying brush or small whippy limbs, he swings the saw in the plane of the chain guide bar and feeds the brush into intersection point 40 where the cutting action occurs. This brush cutting operation can be easily done at ground level without the usual fear of dulling or breaking the cutting chain because of the presence of hollow tip enclosure 28 which acts as a protective shield for the outer end of the cutting chain. Thus, this invention affords protection for the cutting chain at the outer end, safety for the operator and also provides an efficient means for cutting flexible brush on the upper outward run of the cutting chain.

The above description obviously suggests many possible variations and modifications of this invention which would not depart from its spirit and scope. It should be understood, therefore, that the invention is not limited in its application to the details of structure specifically described or illustrated and that within the scope of the appended claims, it may be practiced otherwise than as specifically described or illustrated.

I claim:

1. In a chain saw of the type having
 - a housing,
 - a power drive unit mounted in the housing,
 - a sprocket wheel rotatably mounted in the housing and drivably engaged by the power drive unit,
 - a chain guide bar having its inner end affixed to the housing adjacent the sprocket wheel, the chain guide bar having its free outer end extending away from the housing,
 - an endless cutting chain slidably carried on the periphery of the chain guide bar and driven by the sprocket wheel to run outwardly from the housing on the upper side of the chain guide bar and to run inwardly toward the housing on the lower side of the chain guide bar,
 - a rear handle mounted on the housing and extending in an opposite direction from the chain guide bar, the rear handle enclosing a trigger switch for actuating the power drive unit, and
 - a front handle mounted on the housing and extending above and around at least one side of the housing,
- the improvement therein comprising a brush cutting accessory device adapted to be attached to the chain saw, said improvement comprising:
 - a. a hollow tip enclosure attached to the free outer end of the chain guide bar and enclosing the cutting chain as it passes around the outer end of the chain guide bar, said hollow tip enclosure having inner walls spaced from the cutting chain to provide running clearance therebetween, said tip enclosure having outer walls for shielding the chain from contact with external obstructions, and
 - b. a brush guide mounted on said hollow tip enclosure, said brush guide extending upwardly from a first point on said tip enclosure adjacent to the upper outward run of the cutting chain to a

second point spaced above the upward outward run of the cutting chain, said brush guide further having a continuous guiding edge facing the housing, said guiding edge being adapted to support and to guide brush and limbs into engagement with the cutting chain at the location where the upper outward run of the cutting chain enters said hollow tip enclosure.

2. The chain saw of claim 1 wherein a line running through said first and second points forms an angle in the range of approximately 75° to 100° with respect to the upstream upper outward run of the cutting chain.

3. The chain saw of claim 1 wherein said hollow tip enclosure and said brush guide comprise an integral assembly having two facing split sections, said sections being joined together.

4. The chain saw of claim 1 wherein said hollow tip enclosure and said brush guide comprise a single integral casting.

5. The chain guide of claim 1 wherein said hollow tip enclosure completely encloses the outer end of the chain guide bar as well as those portions of the outward

and inward runs of the cutting chain which are carried on the periphery of the outer end of the chain guide bar.

6. The chain guide of claim 1 wherein said guiding edge of said brush guide includes a movable element which is adjustably mounted on said brush guide and is adapted for slidable movement towards and away from the cutting chain.

7. The chain saw of claim 6 wherein said movable element is made from a soft metal capable of being cut by the cutting chain.

8. The chain saw of claim 1 wherein said hollow tip enclosure and said brush guide are detachably mounted on the chain saw.

9. The chain saw of claim 1 wherein the brush and limbs are cut by the upper outward run of the cutting chain.

10. The chain saw of claim 1 wherein said brush guide has two said guiding edges which are spaced to either side of the cutting chain and which are parallel to each other.

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