

[54] **EXTENSIBLE CHAIN SAW**

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[51] Int. Cl. **B27b 17/02**

[58] Field of Search 143/32 M, 32 R, 43 B,
143/43 R; 30/166, 167

[56] **References Cited**

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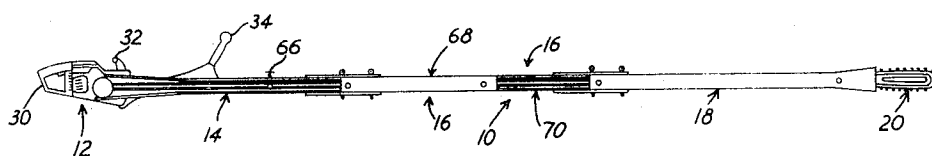
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[57] **ABSTRACT**

Provision is made of light but strong and rigid, optionally usable, sectional means, adapted to be interposed between the motor unit and the cutting chain unit of a conventional chain saw, for extending the saw to different selected lengths, whereby a man standing on the ground may cut through branches of substantial thickness, located at substantial distances above the ground.

7 Claims, 9 Drawing Figures



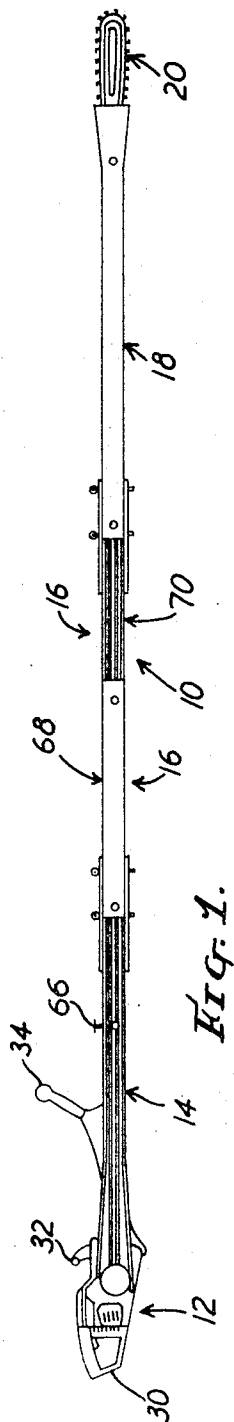


Fig. 1.

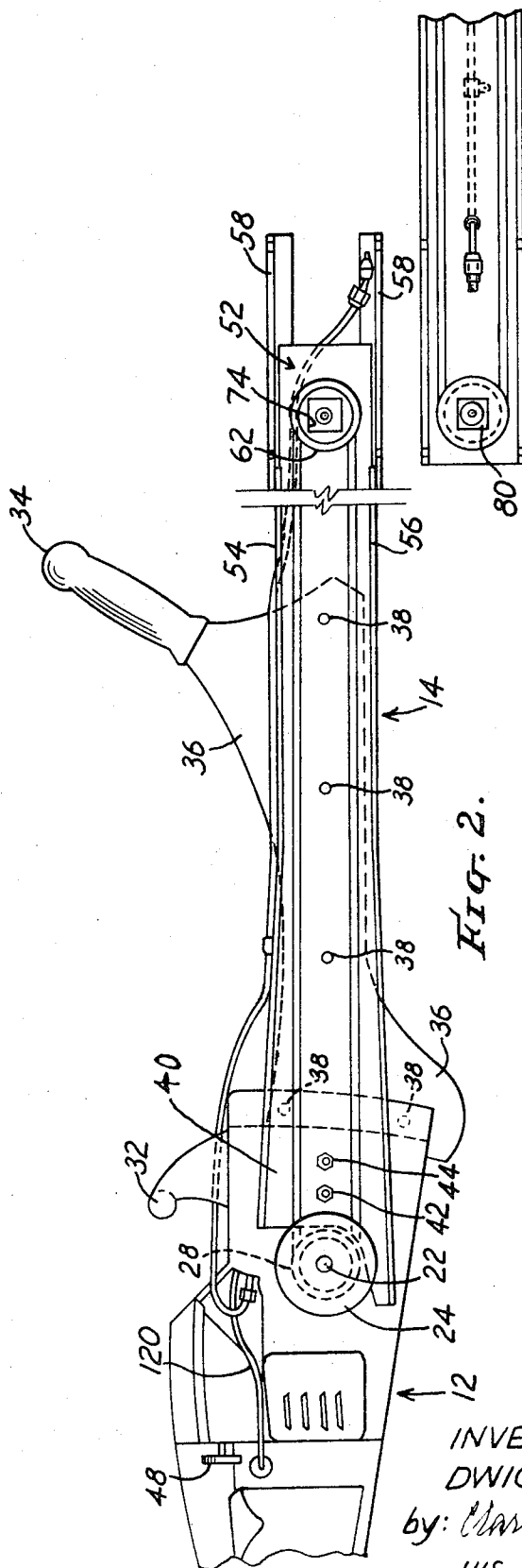


Fig. 2.

Fig. 3.

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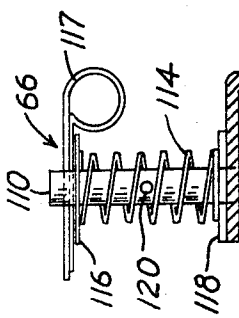
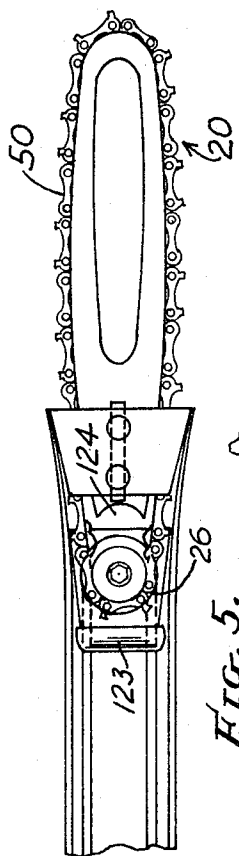
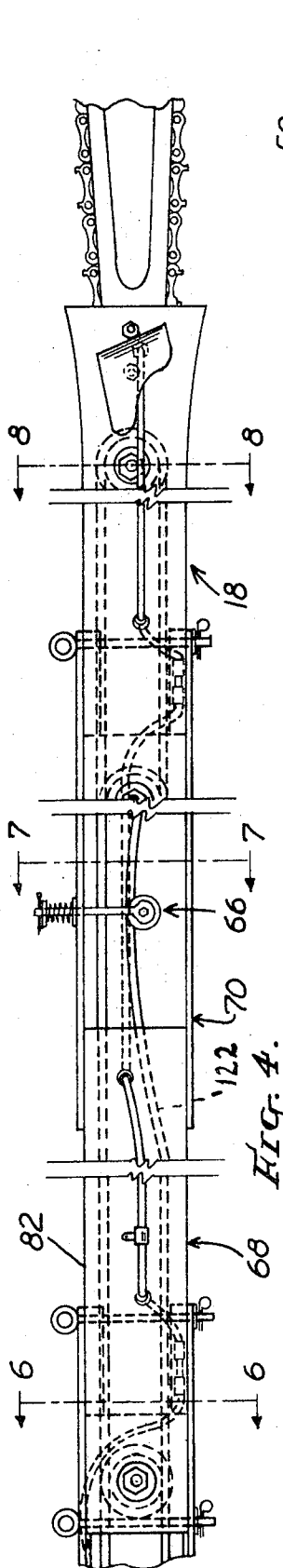


Fig. 5.

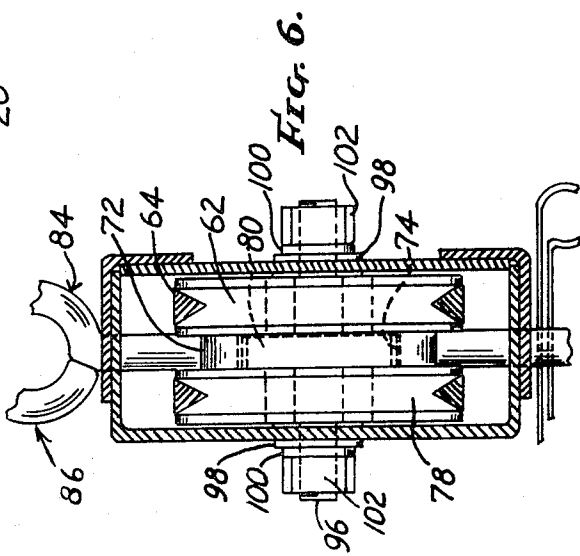


Fig. 6.

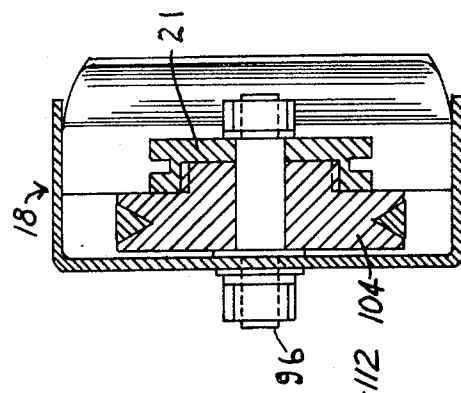


Fig. 8.

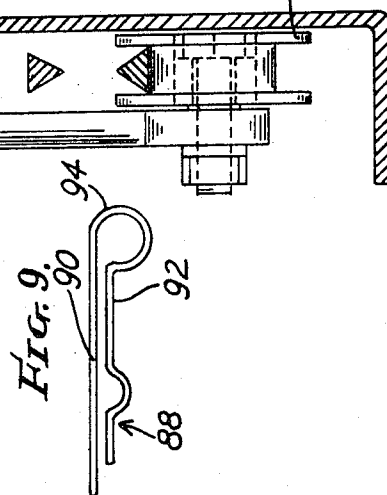


Fig. 9.

Fig. 7.

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EXTENSIBLE CHAIN SAW

This invention relates to improvements in chain saws, whereby a saw consisting essentially of a motor unit, a cutting chain unit, and means for driving the cutting chain unit, through a centrifugal clutch, directly from the motor unit, may be extended to locate the cutting chain unit at selected predetermined distances from the motor unit by the interposition between the motor unit and the cutting chain unit of two or more saw extending sections, each of which includes (a) a rigid frame portion, (b) belt and pulley driving means, and (c) cutting chain lubricating means, the last mentioned being adapted to be connected in a line of tubing for transmitting lubricant from the motor unit to the cutting chain unit. By providing a choice of lengths, the saw may be adjusted to cut, not only in the conventional way, but also at selected distances from the motor, and from handles by which the saw is held.

A saw of this kind has many fields of use. It can be used on tree farms for removing limbs to a height of 18 feet, for causing the trees in their further growth to produce a better grade of lumber or plywood. It can be used by road crews to remove overhanging limbs. Power and telephone companies can use it with advantage for the removal of limbs that interfere with power and telephone lines. It can be used by orchardists for removing limbs that are useless or hard to harvest. It can be used by gardeners and tree service specialists who assist home-owners with regard to landscaping.

It is a feature that the cutting chain is driven from the motor through pulleys whose axes of rotation are parallel to the output shaft of the motor, so that no torque is involved which tends to twist the saw about a lengthwise extending axis.

Other objects and advantages will hereinafter appear.

In the drawing forming part of this specification,

FIG. 1 is a small scale, comprehensive view in side elevation of a practical and advantageous, extended chain saw which embodies features of the invention;

FIG. 2 is a fragmentary view in side elevation of the motor unit with a conventional cover plate omitted and an inner terminal extension unit applied thereto, the extension unit being broken away intermediate its ends, for compactness of illustration;

FIG. 3 is a fragmentary view showing one end of an intermediate extension unit which is adapted for connection to the terminal extension unit of FIG. 2, the unit of FIG. 3 being turned over as compared with the showing of FIG. 2, so that the mating parts of the two structures are exposed to view alongside one another;

FIG. 4 is a fragmentary view in side elevation showing a fragment of the cutting chain unit, the outer terminal extension unit, and a portion of an intermediate extension unit which is broken away intermediate its ends for compactness of illustration;

FIG. 5 is a fragmentary view of the structure partially shown at the right hand end of FIG. 4, but with the structure turned over to reveal the other side;

FIG. 6 is a view in sectional elevation, taken on the line 6—6 of FIG. 4, looking in the direction of the arrows;

FIG. 7 is a view in sectional elevation, taken on the line 7—7 of FIG. 4, looking in the direction of the arrows;

FIG. 8 is a sectional view taken on the line 8—8 of FIG. 4 looking in the direction of the arrows; and

FIG. 9 is a detail view of a type of cotter pin employed at a number of points in the extended chain saw organization.

The extended saw 10 of FIG. 1 comprises a motor unit 12, a first or inner terminal extension unit 14, an intermediate two-section or duplex extension unit 16, a second or outer terminal extension unit 18, and a cutting chain unit 20.

The motor unit 12 and the cutting chain unit 20 are of conventional construction, and they will not be described in any substantial detail. They are made complementary to one another, so that the cutting chain unit may be applied directly to the motor unit 12 for operation by the latter. A centrifugal clutch 24 of the motor unit 12 is formed with a side hub of non-circular configuration, onto which a drive sprocket 21 of the cutting chain unit 20 is normally fitted in driven relation to said hub.

The saws of different manufacturers differ in detail, and the extension unit 18 may be varied at its inner end to match the details of each manufacturer's motor unit.

The motor unit 12 includes an internal combustion engine which has an output shaft 22, the axis of which extends at right angles to the lengthwise dimension of the extension structure. The shaft 22, through centrifugal clutch 24, would normally drive an input sprocket 26 of the cutting chain unit. As shown, however, the clutch 24 drives an input pulley 28 which is substituted on the shaft 22 and interfitted with an output member of the centrifugal clutch.

The unit 12 normally includes handles 30 and 32, but the unit 14 provides a further handle 34, the latter handle being part of a relatively rigid and massive carrier plate 36. The carrier plate 36 is suitably affixed to the body of the unit 12 by bolt and nut combinations 38. It is also affixed to a rigid channel member 40 of the extension unit 14 by bolt and nut combinations 42 and 44. The unit 12 also includes an oil reservoir (not shown) and a manually operated oil ejecting plunger 48, the purpose of the plunger being to squirt oil from time to time, in limited quantities, onto the cutting chain 50 of the unit 20. It is good practice to bring the oil reservoir up to a full condition each time that the gas tank of the motor is filled.

As best seen in FIG. 2, the inner terminal extension unit 14 comprises a channel member 52 whose open side faces the observer in that figure. Upper and lower flanges 54 and 56 are cut away at a distance back from the outer end of the channel member 52, and reinforcing angle bars 58 are suitably secured by welding or riveting to the member 52, including the flanges 54 and 56 thereof.

A pulley 62 is mounted upon the side wall of channel member 52 in the area where the flanges 54 and 56 are cut away, and a flexible belt 64, desirably triangular in cross-section, as shown, is trained to run upon the pulleys 28 and 62. Although no belt tightener is shown in FIG. 2, a belt tightener 66 is indicated in FIG. 1, and one or more belt tighteners are provided in every section and subsection of the extension structure. Each belt tightener 66 is like the one shown in FIG. 7. Since the belt tightener of FIG. 7 is shown as part of an intermediate section, it will be described in detail in connection with that section.

A single two-part extension section 16 is shown in FIG. 1, consisting of an inner or left-hand subsection 68 and an outer or right-hand subsection 70. The solid face of subsection 68 and the open face of subsection 70 are toward the observer in FIG. 1.

The purpose in making section 16 consist of two oppositely facing subsections is to make the outer end of subsection 70 identical with the outer end of section 14. Thus, the section 18 can be attached directly to section 14, or it can be connected to 14 through one or more two-piece sections like 18, all without turning 18 over. If 18 had to be turned over, the cutting chain 20 would then have to be turned over relative to 18 in order to keep the chain running in the forward, or cutting, direction. The difficulty can be appreciated if one visualizes the section 18 turned over and connected directly to subsection 68. The chain would still run clockwise, as viewed in FIG. 1, but the backs of the chain teeth would be leading.

The inner end of subsection 68, with its solid side toward the observer (not as seen in FIG. 3), is fitted end to end against the cut-away ends of the flanges 54 and 56 and in overlapping relation to the projecting end of member 52. The pulley 62 has a pulley spacing projection 72 formed on its nearer face, in which projection a non-circular recess 74 (shown as square) is formed. A similar pulley 78, which forms the input pulley of subsection 68, is formed with a non-circular projection 80 which desirably fits snugly in the recess 74 of pulley 62. The interfitting projections on the pulleys 62 and 78 serve both as a driving connection and as a means for spacing the pulleys from one another and for causing belts which run upon the respective pulleys to travel in distinct planes.

The channel members 52 and 82 of section 14 and subsection 68, respectively, are secured to one another through angle members 58 and through pins 84. The pins 84 are formed at their upper ends with eyes 86 for easy extraction and are cottered at their lower ends, desirably by cotter pins 88 of the special form shown in FIG. 9.

Each cotter pin 88 has two legs 90 and 92, connected through a loop 94. The leg 90, which is straight, extends beyond the end of leg 92. Only the leg 90 is passed through the pin 84. The leg 92 is formed with a half loop which extends halfway around the pin 84 and serves to retain the cotter pin in place without requiring any portion of the cotter pin to be strained beyond its elastic limit. The cotter pins can therefore be used again and again, and with a minimum of effort.

The overlapping ends of the members 82 and 52 are also united by a pin 96 which serves as an axle for the pulleys 62 and 78. Smooth washers 98, lock washers 100, and nuts 102 are provided upon opposite ends of the pin.

The subsection 70 of section 16 is essentially a mirror image of subsection 68, the construction is essentially the same, and the means of connection is the same as that between 68 and 14. The same thing is true of the connection between subsection 70 and section 18.

The connection between the section 18 and the cutting chain unit is generally like that between other adjacent sections, save that, as shown in FIG. 8, a pulley 104, forming part of the extension unit 18, and a

sprocket 21, forming part of the saw unit, are located side by side and interfitted as seen in FIG. 8.

The belt tightener of FIG. 7, which is typical of the belt tighteners used in every section, is shown in association with the subsection 70. A pin 110 having an eye in the lower end to serve as a bearing for a tightener pulley 112, extends upward through the upper horizontal flange of the associated channel member. A compression coil spring 114 surrounds the upper end of the pin 110, being disposed between upper and lower washers 116 and 118. The upper washer is retained in place by a cotter pin 117 which is passed through the upper extremity of the pin 110. The pin 110 is desirably formed with more than one transverse bore for selective adjustment of the cotter pin to increase or diminish the belt tightening force exerted by the spring as desired. One additional bore is indicated at 120.

The oil line, which has been briefly referred to, includes a first section of brass tubing 122 which would normally connect directly with the tubing of the cutting chain unit. In the illustrated organization it is adapted to be joined through a union coupling with a tubing section 122 of section 14. There is a similar section of tubing and an associated union, forming parts of each section or subsection. In each instance, the tubing is held snugly against the external surface of the associated channel member for protecting it against snagging on tree branches. Each section of tubing has a length appropriate to the length of the channel member with which it is associated.

At the delivery end of the oil line suitable oil guards 123, 124 and any other necessary guards for keeping the oil and sawdust off of the belt are provided, but no claim is made to such details as features of novelty, and a detailed showing and description are deemed unnecessary.

I have described what I believe to be the best embodiments of my invention. What I desire to cover by letters patent is set forth in the appended claims.

I claim:

1. An extended chain saw including, in combination,
 - a. a motor unit,
 - b. a cutting chain unit adapted for direct attachment to the motor unit, and
 - c. interposable sectional saw extending means comprising inner and outer terminal sections which include light but rigid channel members adapted, respectively, for rigid operative attachment to the motor unit and the cutting chain unit, respectively, and to one another,
 each section also including pulley and belt means through which the cutting chain is driven from the motor, and lubricant conducting means through which the cutting chain is lubricated from the motor unit.
2. An extended chain saw as set forth in claim 1 in which the sectional saw extending means includes at least one intermediate section interposed between the terminal sections, said intermediate section including belt and pulley means, rigid frame means, and lubricant transmitting means interposed, respectively, between the corresponding means of the terminal sections.
3. An extended chain saw as set forth in claim 2, in which the belt and pulley means of each section includes at least an input pulley, an output pulley, a belt

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trained on the input and output pulleys, and belt tightening means.

4. An extended chain saw as set forth in claim 3, in which the belt tightening means of each section or unit includes a pulley engaged with one run of the belt of that section, spring means for pressing the pulley against the engaged run of the belt, and means for selectively adjusting the pressure of the pulley against such belt run.

5. An extended chain saw as set forth in claim 2 in which the connected channel members of any two successive sections or subsections must face in opposite directions, and in which any intermediate section or sections includes a pair of subsections in which the channel members of the subsections face in opposite directions, so that the outer terminal section may be connected without modification to the outer subsection of said pair in precisely the same manner and condition in which it could have been connected directly to the

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inner terminal section, and the inner terminal section may be connected without modification to the inner subsection of said pair in precisely the same manner and condition in which it could have been connected to the outer terminal section.

6. An extended chain saw as set forth in claim 1 in which the motor of the motor unit has an output shaft that extends transversely of the length of the extended chain saw, and the pulley means of each extending section are mounted to turn upon axes parallel to the axis of the motor output shaft.

7. An extended chain saw as set forth in claim 2 in which the output pulley of one section and the input pulley of an adjoining section have interfitting, non-circular parts that serve both to provide an operative driving connection between the pulleys and means for spacing the pulleys from one another.

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