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TENSION ADJUSTING MEANS FOR CHAIN SAWS

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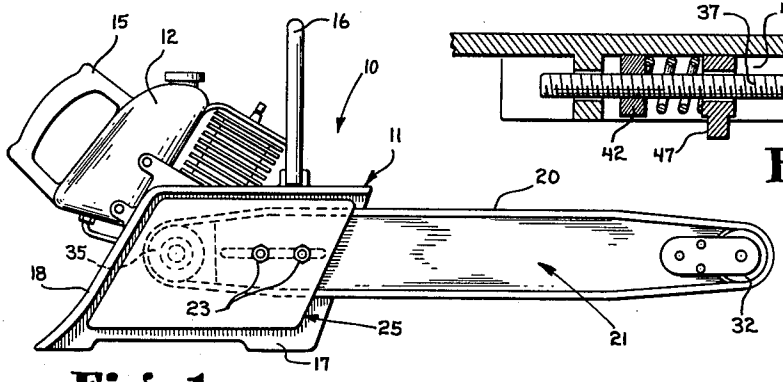


Fig. 1.

Fig. 5.

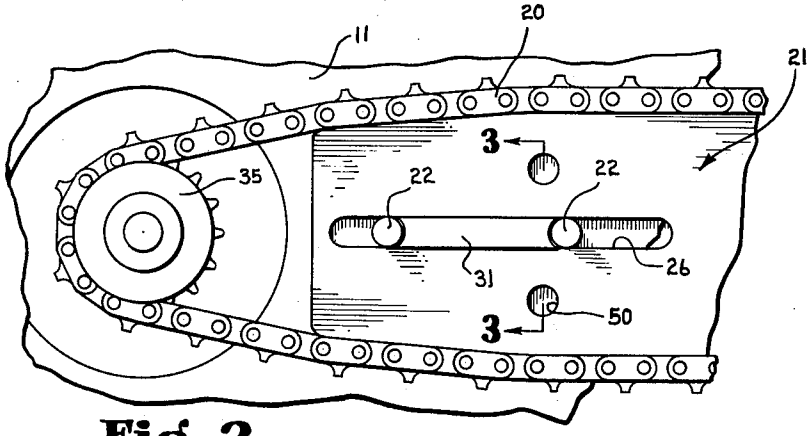


Fig. 2.

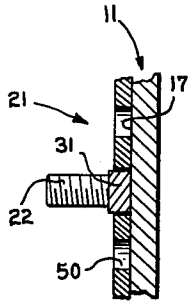


Fig. 3.

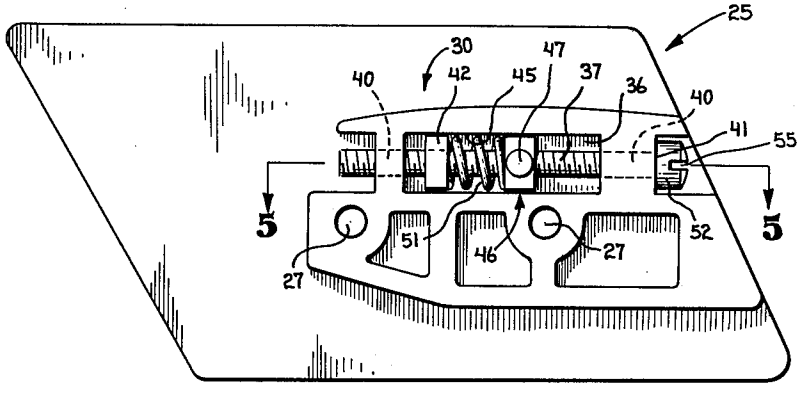


Fig. 4.

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TENSION ADJUSTING MEANS FOR CHAIN SAWS

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This invention relates generally to that type of apparatus known as "chain saws."

One problem present in the construction and operation of chain saws is the fact that chain tension must be repeatedly readjusted while the saw is being used. In conventional saws, such readjustment is a relatively complicated operation. Nuts, which secure the chained mounting blade or bar to the frame, must be released, the position of the blade adjusted and the nuts retightened with the blade in proper position. Various solutions to this problem have been proposed. The U.S. patent to Blum, 2,296,240, discloses one such solution whereby the desired predetermined chain tension can be quickly reset by merely twisting a sleeve. It will be noted, however, that while the Blum device is a substantial step forward in the art, making easier the adjustment of chain tension, still this adjustment is not automatic in the Blum device.

A primary object of the present invention is to provide a chain saw including improved means for adjusting the tension of the chain.

Still another object of the present invention is to provide a chain saw including means for maintaining the tension of the chain at proper tautness for a relatively long period of time without retightening.

One relatively recent improvement in chain saws is the use of a pulley at the distal end of the blade to reduce friction and to make easier the travel of the chain on the blade. One reason why this improvement is not universally accepted is the fact that it is highly susceptible to "derailing" or dismounting of the chain when the chain is loose. Consequently, a further object of the present invention is to provide an improved chain saw which maintains the chain at proper tautness for a longer period of time and is, therefore, highly adapted to the use of a pulley mounted on the distal end of the saw blade.

Related objects and advantages will become apparent as the description proceeds.

One embodiment of the present invention might include a chain saw having an endless toothed chain, a frame, a drive sprocket rotatably mounted on the frame and supporting the chain, a blade reciprocably mounted on the frame and supporting the chain, and spring means acting between the blade and the frame and resiliently urging the blade against the chain to maintain the chain taut.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

FIG. 1 is a side elevation of a chain saw embodying the present invention.

FIG. 2 is an enlarged view similar to FIG. 1 with the cover or cover plate of the chain saw removed.

FIG. 3 is a fragmentary section taken along the line 3—3 of FIG. 2 in the direction of the arrows.

FIG. 4 is a detail view of the inside portion of the cover or cover plate of FIG. 1.

FIG. 5 is a section taken along the line 5—5 of FIG. 4 in the direction of the arrows.

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawing and specific

language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to the drawings, there is illustrated a chain saw 10 including the usual frame 11 having a motor 12 (which in the illustrated embodiment is a gasoline motor) mounted thereon. The saw is provided with conventional handles 15 and 16 fixed to the motor and frame. The frame includes a flat quadrilateral plate portion 17 which is bordered on two sides by a guard 18, the guard 18 being in the form of a flange which projects perpendicularly relative to the plate portion 17 and protects the user's hands and body from the moving chain 20.

A blade or bar 21 is provided for supporting the chain 20 and is mounted upon the frame 11 by means of a pair of spaced studs 22. The studs 22 are threaded and project perpendicularly from the flat frame portion 17. The cover plate 25 is fixed in position upon the studs 22 by nuts 23 whereby the cover plate protects the user's hands and body from the moving chain 20.

The blade 21 is provided with an elongated slot 26 through which the studs 22 project. The studs project through suitable bores 27 in the cover 25 and extend through a ribbed portion 30 on the back of the cover plate as illustrated in FIG. 4. Received between the studs 22 is a spacer 31. As is best illustrated in FIG. 3, the spacer 31 has a thickness which is greater than the blade 21. Consequently, when the nuts 23 are tightly threaded up against the cover plate, the cover plate is still held in sufficiently spaced relation relative to the frame 11 to permit reciprocation of the blade 21 upon the studs. At the distal end of the blade 21, there is provided a pulley 32 upon which the chain rides. The chain is driven by a drive sprocket 35 rotatably mounted upon a frame and driven by the motor 12.

The present invention uses the concept of maintaining a spring tension against the blade 21 to urge it away from the drive sprocket 35 and to maintain the chain tight. The present invention further includes the concept of providing adjustment means for adjusting the spring action in order that the chain tension can be adjusted to a desired value. This concept is embodied in the structure primarily illustrated in FIGS. 2, 4 and 5.

Referring to FIG. 4, the ribbed portion 30 defines a recess 36 which opens inwardly and receives a screw 37 which extends generally parallel to the slot 26 and to the direction of reciprocation of the bar 21. The screw 37 also extends through coaxial apertures 40 in the ribbed portion 30 and bears against the abutment surface 41 on the ribbed portion. A nut 42 having an external polygonal shape is threadedly received upon the screw 37 and, when the screw is rotated, engages the walls 45 of the recess 36 so as to prevent rotation of the nut whereby the nut moves longitudinally of the screw.

Also received upon the screw 37 but loosely reciprocal thereon is a lug member 46 which is generally cylindrical but has a projecting lug 47 integral therewith. The lug 47 projects perpendicularly relative to the plate 21 into a suitable aperture 50 through the plate, the suitable aperture having the same configuration, that is, cylindrical, as the lug 47.

Received upon the screw 37 between the nut 42 and the lug 46 is a coil spring 51. The screw 37 has an enlarged headed end 52 with conventional screw driver engageable slot 55 therein. It will be noted that when the cover plate 25 is assembled upon the saw as in FIG. 1, the head 52 of the screw is easily accessible to a screw driver. When the chain saw is assembled, the lug 47 bears against the aperture 50 of the bar urging the bar toward its distal end. The studs 22 act as guide means determining the direction of reciprocation of the blade 21. The force tending to hold the blade against the chain and to hold the chain taut is exerted from the frame through the cover plate which is fixed to the frame through the abutment surface 41 which bears against the head 42 of the screw through the screw through the nut 42 which is retained against longitudinal movement on the screw by the threads through the spring 51 and thence through the lug member 46. It can be appreciated that the spring force acting against the blade and tending to hold the chain taut can be adjusted by rotating the screw 37 which causes the nut 42 to move longitudinally on the screw and thus to adjust the compression of the spring 51.

It will be appreciated from the above description that the present invention provides an improved means for adjusting the tension of the chain. The screw can be rotated to such a position that even though the lug moves longitudinally of the screw by a certain distance, the force exerted by the spring remains substantially the same. This condition is, of course, achieved by tightening up the screw to a substantial extent. Thus, even though the various parts of the saw may loosen and get out of proper adjustment, it is not necessary to adjust the position of the blade as frequently as in conventional saws.

The present invention has been found to have a number of advantages not present in conventional chain saws. It has been found that breakage resulting from shock to the chain striking objects is substantially reduced. Also, as the various parts of the saw wear such as the chain and the sprocket, there is no adjustment required. Further, the present invention is highly adaptable to saws now in use because it requires relatively few additional parts and uses the original bar and chain of the saw.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention and the scope of the claims are also desired to be protected.

The invention claimed is:

1. In a chain saw including an endless toothed chain, a frame, a drive sprocket rotatably mounted on said frame and supporting said chain, a pair of spaced threaded studs fixed to said frame, a blade having an elongated slot and received on said studs with the studs projecting through said slot and a guard cover received on said studs, and nuts retaining said cover on said studs, the improvement which comprises a spacer having a thickness greater than the thickness of said blade and received between said frame and cover and spacing said cover from said frame a sufficient distance to permit reciprocation of said blade on said studs, and spring means acting between said cover and blade and urging said blade against said chain.

2. In a chain saw including an endless toothed chain, a frame, a drive sprocket rotatably mounted on said frame and supporting said chain, a pair of spaced threaded studs fixed to said frame, a blade having an elongated slot and received on said studs with the studs projecting through said slot, said blade also supporting said chain, a guard cover received on said studs, and nuts retaining said cover on said studs, the improvement which comprises a spacer having a thickness greater than the thickness of said blade and received between said frame and cover and spacing said cover from said frame a sufficient distance to permit reciprocation of said blade on said studs, a screw mounted on said cover having an enlarged headed end located outside of said recess bearing against said cover, said screw extending away from the distal end of said blade, a nut threadedly received upon said screw, said nut having a polygonal external periphery engageable with the walls of said recess whereby rotation of said screw moves said nut longitudinally of said screw, a lug member loosely slidable upon said screw and positioned distally of said blade relative to said nut, said lug member having a lug projecting perpendicularly of said blade, said blade having an aperture receiving the lug of said lug member, and a coil spring received on said screw between said lug member and said nut.

3. A chain saw comprising an endless toothed chain, a frame, a drive sprocket rotatably mounted on said frame and supporting said chain, a pair of spaced threaded studs fixed to said frame, a blade having an elongated slot and received on said studs with the studs projecting through said slot, a pulley rotatably mounted on the distal end of said blade and supporting said chain, a guard cover received on said studs, nuts retaining said cover on said studs, a spacer having a thickness greater than the thickness of said blade and received within the slot of said blade between said studs, said spacer being received between said frame and cover and spacing said cover from said frame a sufficient distance to permit reciprocation of said blade on said studs, said cover having an inwardly opening recesss on the inward face thereof and having coaxial bores leading into said recess, said bores having an axis which is parallel to said slot, a screw extending through said bores and said recess, said screw having an enlarged headed end located outside of said recess bearing against said cover, a nut threadedly received upon said screw, said nut having a polygonal external periphery engageable with the walls of said recess whereby rotation of said screw moves said nut longitudinally of said screw, a lug member loosely slidable upon said screw and positioned distally of said blade relative to said nut, said lug member having a lug projecting perpendicularly of said blade, said blade having an aperture receiving the lug of said lug member, and a coil spring received on said screw between said lug member and said nut, the head of said screw having screw driver engageable surfaces which are easily accessible to a person outside of said cover.

4. In a chain saw including an endless toothed chain, a frame, a drive sprocket rotatably mounted on said frame and supporting said chain, a pair of spaced threaded studs fixed to said frame, a blade having an elongated slot and received on said studs with the studs projecting through said slot, said blade also supporting said chain, a guard cover received on said studs, and nuts retaining said cover on said studs, the improvement which comprises a spacer having a thickness greater than the thickness of said blade and received within the slot of said blade between said studs, said spacer being received between said frame and cover and spacing said cover from said frame a sufficient distance to permit reciprocation of said blade on said studs, said cover having an inwardly opening recess on the inward face thereof and having coaxial bores leading into said recess, said bores having an axis which is parallel to said slot, a screw extending through said bores and said recess, said screw having an enlarged headed end located outside of said recess bearing against said cover, a nut threadedly received upon said screw, said nut having a polygonal external periphery engageable with the walls of said recess whereby rotation of said screw moves said nut longitudinally of said screw, a lug member loosely slidable upon said screw and positioned distally of said blade relative to said nut, said lug member having a lug projecting perpendicularly of said blade, said blade having an aperture receiving the lug of said lug member, and a coil spring received on said screw between said lug member and said nut, the head of said screw having screw driver engageable surfaces

which are easily accessible to a person outside of said cover.

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