Sept. 27, 1955 E. C. KIEKHAEFER 2,718,908

PORTABLE POWER CHAIN SAW WITH UNIVERSAL ADJUSTMENT OF GUIDE RAIL

Filed July 30, 1952 4 Sheets-Sheet 1

Fig. 1

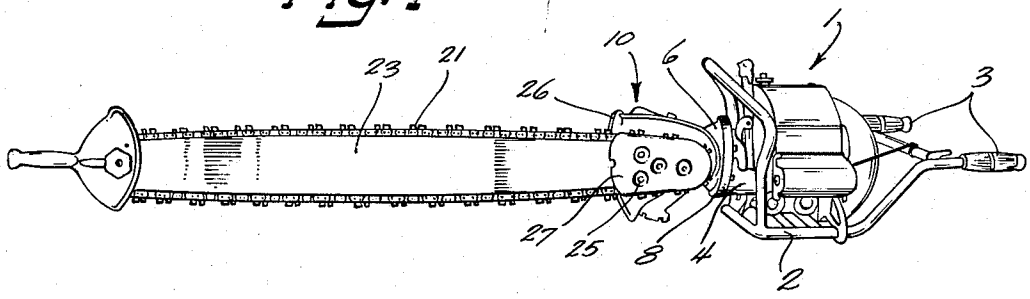
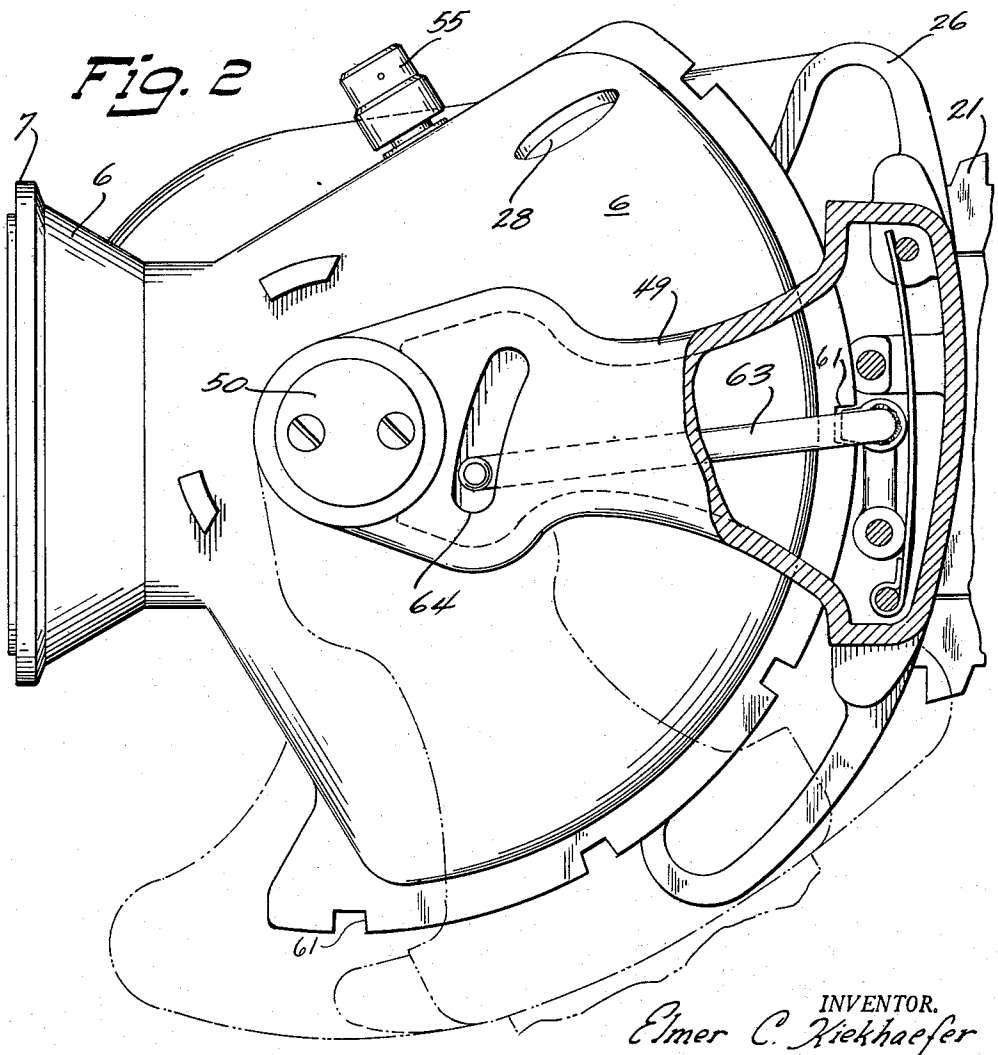


Fig. 2



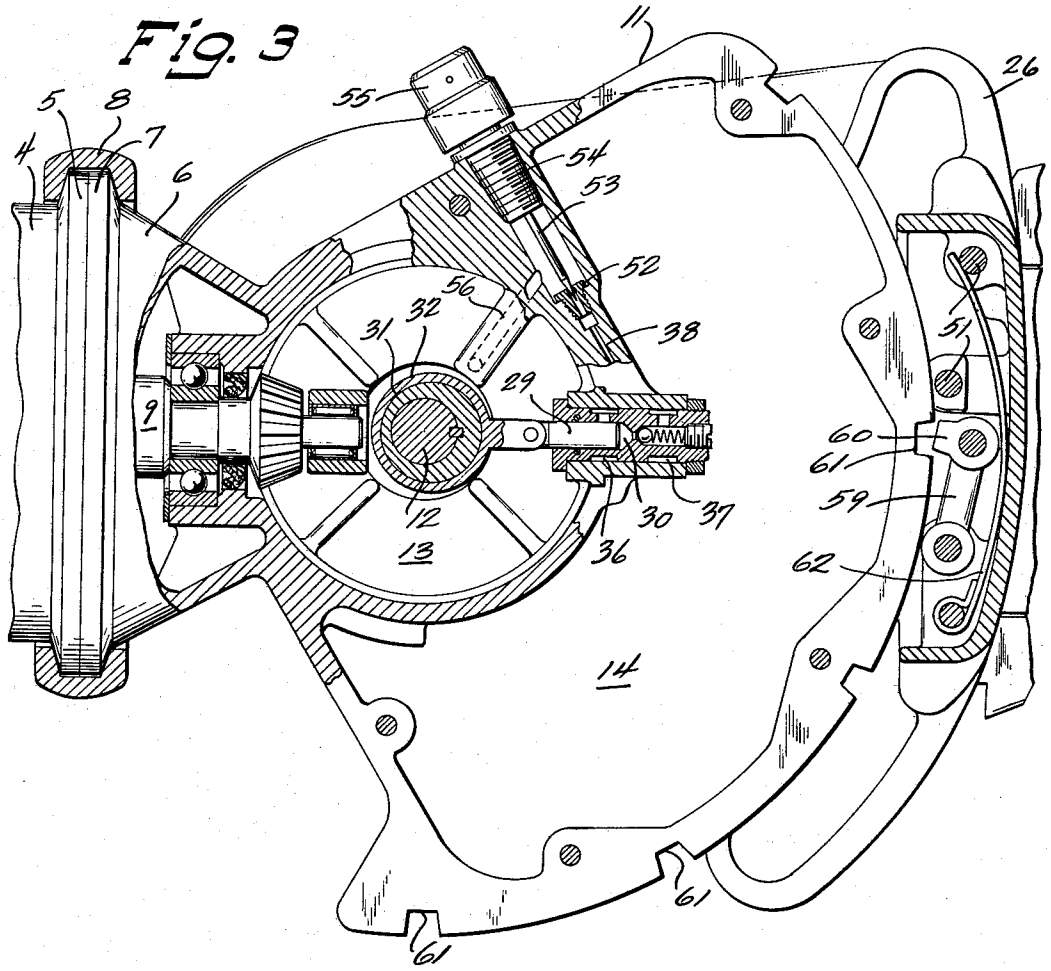
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Sept. 27, 1955 E. C. KIEKHAEFER 2,718,908

PORTABLE POWER CHAIN SAW WITH UNIVERSAL ADJUSTMENT OF GUIDE RAIL

Filed July 30, 1952 4 Sheets-Sheet 2

Fig. 3



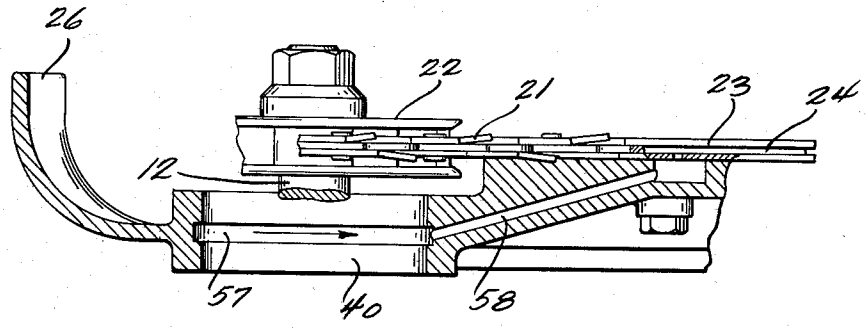


Fig. 5

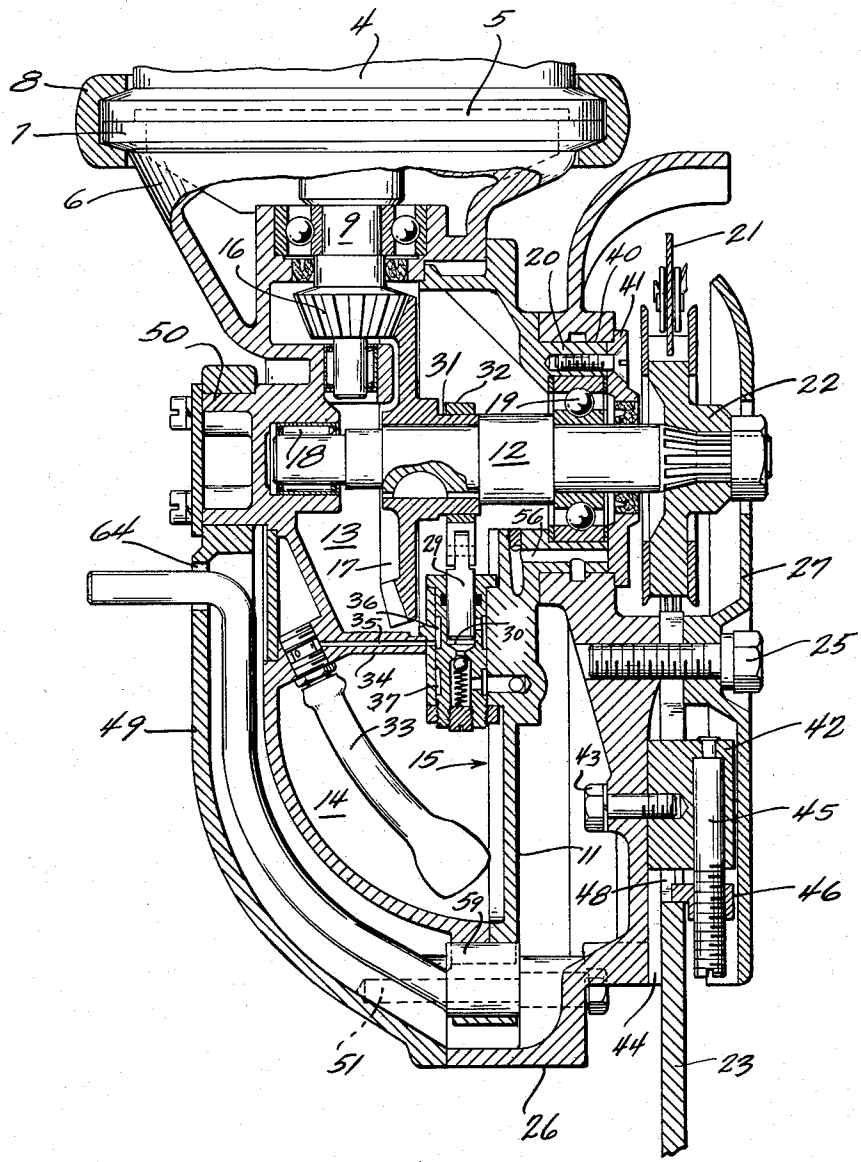
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Sept. 27, 1955 E. C. KIEKHAEFER 2,718,908

PORTABLE POWER CHAIN SAW WITH UNIVERSAL ADJUSTMENT OF GUIDE RAIL

Filed July 30, 1952 4 Sheets-Sheet 3

Fig. 4



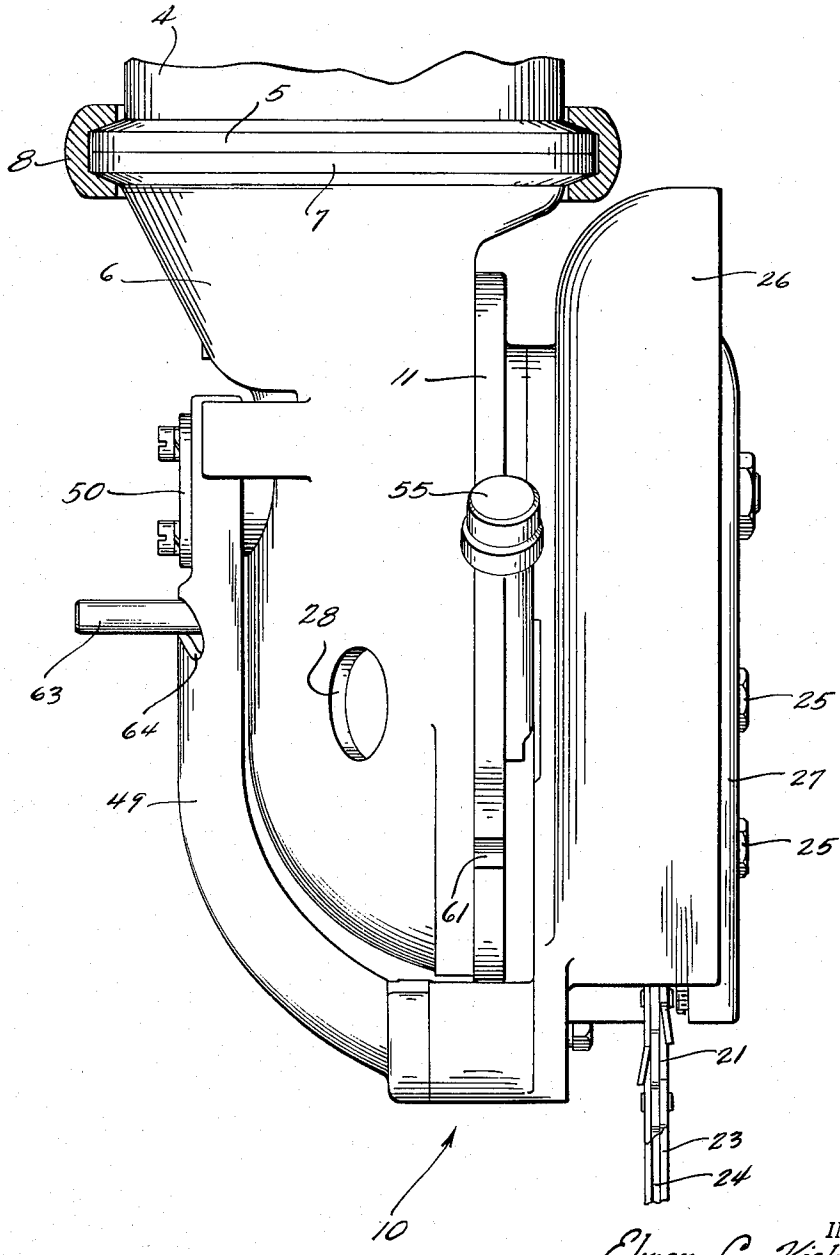
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PORTABLE POWER CHAIN SAW WITH UNIVERSAL ADJUSTMENT OF GUIDE RAIL

Filed July 30, 1952 4 Sheets-Sheet 4

Fig. 6



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PORTABLE POWER CHAIN SAW WITH UNIVERSAL ADJUSTMENT OF GUIDE RAIL

Elmer C. Kiekhaefer, Cedarburg, Wis.

Application July 30, 1952, Serial No. 301,703

3 Claims. (Cl. 143—32)

This invention relates to chain saws and particularly to the transmission case providing the selective indexing of the chain saw guide rail on an axis normal to the rail.

The invention provides for the pivotal support of the guide rail by the transmission case on the axis of the shaft carrying the sprocket driving the chain, positive locking to secure the rail in the selective position, and the lubrication of the chain carried by the guide rail by lubricant supply means carried by the transmission case.

An object of the invention is to provide for the indexing of the guide rail relative to the engine of the chain saw unit to allow angular cuts without inclining the engine driving the chain.

Another object is to provide the indexing of the abutment plate with the guide rail.

Another object is to assure the positive locking of the guide rail in the indexed position selected.

Another object is to provide and assure the lubrication of the saw chain on the guide rail in any indexed position.

These and other objects and advantages of the invention will be set forth more fully in the following description of the embodiment of the invention illustrated in the accompanying drawings.

In the drawings:

Figure 1 is a perspective view of the chain saw unit showing the engine, the transmission case, and the guide rail carrying the saw chain;

Fig. 2 is an enlarged side elevation of the transmission case and guide rail bracket and shows in dotted lines one of the several alternate positions of adjustment of the guide rail provided for by the invention;

Fig. 3 is a view similar to Fig. 2 with parts of the transmission case broken away and sectioned to show the interior thereof and the lubrication supply means;

Fig. 4 is a horizontal transverse section through the transmission case taken on the axis of the sprocket shaft which drives the chain;

Fig. 5 is a fragmentary view showing the oil delivery passage within the guide rail bracket and the discharge nozzle for directing the oil to the chain; and

Fig. 6 is a plan view of the transmission case.

The chain saw unit shown in the drawings includes the engine 1 mounted on the tubular frame 2 which extends beneath the engine and includes the two handles 3 extending rearwardly of the unit.

The forward end of the crankcase 4 of engine 1 is provided with the annular flange 5 and is adapted to receive the opposite end of the member 6 which is formed with the corresponding flange 7. The ring clamp 8 fits over flanges 5 and 7 to join crankcase 4 and member 6. The adjustment of ring clamp 8 by tension means, not shown, provides for the firm and rigid securement of member 6 and crankcase 4 or by loosening of clamp 8 for the selective rotational adjustment of member 6 relative to engine 1 on the axis of the shaft 9 driven by the engine and carried by member 6. The transmission case 10 which includes member 6 and the cover 11 therefor carries the driven shaft 12 adjacent to the forward end of shaft 9 and at right angles thereto.

Member 6 comprises a unitary casting having two adjoining chambers 13 and 14 which open to one side thereof formed with the planiform face 15. Shaft 9 extends into chamber 13 and includes the pinion 16 which meshes with the gear 17 carried by shaft 12 therein. The roller bearing unit 18 seated in the chamber 13 journally supports the inner end of shaft 12 adjacent to shaft 9. The bearing unit 19 supports the opposite end of shaft 12 and is mounted in the hub 20 of cover 11 through which the shaft projects.

The saw chain 21 is trained over the sprocket 22 which is mounted on the outer end of shaft 12 and drives the chain around the guide rail 23 of the unit.

Guide rail 23 comprises a flat blade which is disposed in alignment with the pitch of sprocket 22 and is provided with the groove 24 in its upper and lower edges to receive guiding projections of the chain. The end of guide rail 23 adjacent to sprocket 22 is securely clamped by the bolts 25 between the abutment plate 26 and the sprocket cover 27.

The opening 28 in member 6 is provided with a closure cap, not shown, and allows filling of chamber 14 with a supply of lubricant for the chain.

The lubricant supply system includes the plunger 29 and the cylinder 30 carried by cover 11 within member 6 and adjacent to the eccentric 31 formed by a part of the hub of gear 17. Reciprocation of plunger 29 within cylinder 30 is effected by the collar 32 on eccentric 31 connected to the plunger to operate with rotation of shaft 12.

The flexible fuel pickup tube 33 disposed within chamber 14 is mounted at one end within the wall 34 of member 6 which divides chambers 13 and 14 thereof. Pickup tube 33 communicates with passage 35 formed in wall 34 which extends to and registers with the intake groove 36 of cylinder 30. The similar annular groove 37 is adapted to receive the oil under pressure from within cylinder 30 and communicates through an opening registering therewith with the valve passage 38 formed in cover plate 11 for delivery to plate 26 as will be described.

The abutment plate 26 is provided with the large bore 40 at one end thereof by which the plate is pivotally mounted on the outer periphery of hub 20 of cover 11. Plate 26 extends generally parallel to the cover 27 and projects forwardly of the transmission case. The flanged washer 41 secured to the end of hub 20 holds bearing 19 within the hub and plate 26 on the outer periphery of the hub. The guide block 42 is secured to plate 26 by bolt 43 within slot 44 of plate 26 and carries the threaded adjustment screw 45. By loosening bolts 25, guide rail 23 is released for lengthwise adjustment relative to sprocket 22 to effect tightening or loosening of chain 21 thereon. The threaded lug 46 on adjustment screw 45 engages guide rail 23 in the forward end of slot 48 thereof to adjust the guide rail forwardly by turning screw 46.

The side arm bracket 49 is pivotally mounted at one end on the trunnion 50 formed integrally with member 6 of transmission case 10 oppositely of hub 20 and on the axis thereof and the axis of shaft 12.

Bracket 49 extends from trunnion 50 forwardly of transmission case 10 and is secured to abutment plate 26 by the bolts 51 forwardly of the transmission case and adjacent to guide rail 23 to form a rigid structure therewith which is adapted to be pivotally moved on the axis of shaft 12.

According to the invention, lubrication of chain 21 with the operation of the unit is provided for by reciprocation of plunger 29, as described, which effects the delivery of oil from cylinder 30 to the passage 38 formed within cover 11. The valve seat 52 threaded within passage 38 is provided with a central bore adapted to be opened or closed by the adjustment of threaded valve needle 53 carried by the bushing 54 which closes the upper end of passage 38. The knob 55 on the upper end of valve needle 53 provides for the selective adjustment of the opening or closing of valve seat 52 and the delivery of oil from passage 38 to passage 56 which extends to hub 20 and communicates with the annular

groove 57 within the bore 40 of plate 26. The passage 58 within plate 26 extends from groove 57 and opens from plate 26 adjacent to chain 21 on the upper part of guide rail 23. The communication of passage 56 and groove 57 provides a supply of lubricant to the chain, as controlled by the adjustment of needle 53, and irrespective of the adjustment of plate 26 and guide rail 23 relative to transmission case 10 on the axis of shaft 12.

Positive locking means securing plate 26 and the guide rail 23 in the desired position is provided for by the bar 59 carried within the hollow forward end of bracket 49 which is provided with the lug 60 selectively engageable with transmission case 10 in one of the series of notches 61 formed in the arcuate, front face of cover 11. Bar 59 is pivotally carried by bracket 49 and is biased by the flat spring 62 to urge lug 60 into engagement with one of the notches 61.

The withdrawal of lug 60 from the respective notch 61 by means of the lever 63 allows abutment plate 26 and guide rail 23 to be adjusted respecting the axis of shaft 12 to dispose the saw chain angularly downwardly or upwardly from or respecting engine 1 to allow operation of the saw in such position with engine 1 disposed in its normal horizontal position of operation. The abutment plate 26 rotates with the adjustment of the guide rail and is in fixed relation to guide rail 23, so as to engage the work in whichever position is selected for the guide rail. The lower end of plate 26 extends downwardly to approximately the level of frame 2 extending beneath engine 1 whereby the saw is adapted to be placed upon lake ice for cutting the ice.

The outer end of lever 63 projects through the arcuate slot 64 in bracket 49 at the rear thereof and extends within or beneath the bracket to the front of the transmission case. The forward end of lever 63 is fixed to bar 59 whereby manipulation of the lever moves bar 59 and lug 60 thereof out of engagement with the particular notch 61. Lever 63 extends from the forward end of the transmission case and rearwardly to slot 64 adjacent to bearing trunnion 51 whereby the length of lever 63 as provided allows the use of a particularly heavy spring 62 to secure bar 59 in the notch. Lever 63, excepting that portion projecting from slot 64 for manipulation, is disposed between transmission case 10 and bracket 49 so as to be generally shielded by the latter against accidental displacement as by a limb of a tree.

The chain saw unit is made more flexible in its operation by reason of the adjustment of the guide rail as provided and the construction of the transmission case as described involves only a nominal additional weight.

Various embodiments of the invention may be employed within the scope of the following claims.

I claim:

1. In a chain saw unit, an engine, a transmission case secured to said engine, a shaft rotatably supported within said transmission case and driven by the engine, a chamber formed within said transmission case to contain a supply of lubricant, pressure supply means operated by said shaft and having inlet means to receive lubricant from said chamber for discharge under pressure, a passage from said pressure means opening from said transmission case adjacent to said shaft, an abutment plate including a bracket fixed thereto and together pivotally secured respectively to said transmission case on one side thereof concentrically of the projecting end of said shaft and on the other side of said transmission case for relative pivotal adjustment on the axis of said shaft, said abutment plate having rotational bearing means supporting said plate on said transmission case and overlying the opening of said passage, an annular groove formed in said bearing means to register with said opening of said last-named passage in any of said positions of adjustment, a guide rail carried by said abutment plate for angular adjustment therewith, a saw chain carried by said guide rail, a sprocket mounted on said shaft and carrying said chain to drive the latter around said rail, and a discharge passage within said abutment plate and communicating with said annular passage to provide for delivery of lubricant to said chain in any of said positions of adjustment, said abutment plate and bracket being joined to provide a rigid structure protecting said transmission case.

2. In a chain saw unit, an engine, a transmission case secured to said engine, a shaft rotatably supported within said transmission case and driven by the engine, a chamber formed within said transmission case to contain a supply of lubricant, pressure supply means operated by said shaft and having inlet means to receive lubricant from said chamber for discharge under pressure, a separate abutment plate, said case having a bearing for pivotally supporting said plate on one side thereof and concentrically of the projecting end of said shaft for relative pivotal adjustment on the axis of said shaft, a passage from said pressure means having an outlet opening in said bearing means, said plate having a corresponding bearing means overlying the opening of said passage and an annular groove formed in said bearing means to register with said opening of said last-named passage in any of said positions of adjustment, a guide rail carried by said abutment plate for angular adjustment therewith, a saw chain carried by said guide rail, a sprocket mounted on said shaft and carrying said chain to drive the latter around said rail, and a discharge passage within said abutment plate and communicating with said annular passage to provide for delivery of lubricant to said chain in any of said positions of adjustment.

3. In a chain saw unit, a guide rail, an engine, a transmission case secured to said engine, a chain sprocket rotatably carried at one side of and by said transmission case and driven by said engine, bearing supports on opposite sides of said transmission case concentrically of the rotational axis of said sprocket, a plate having a bracket member rigidly secured thereto at the forward end thereof and providing an abutment forwardly of said transmission case for engaging the work, said plate adjustably carrying said guide rail in direct alignment with said sprocket at the fixed end of said guide rail extending forwardly of the unit adjacent to the abutment means provided by said plate, said plate and bracket being mounted on said bearing means at corresponding opposite sides of said transmission case independently of said sprocket for the rotational adjustment thereof and said guide rail with respect to said sprocket, latch means carried by said plate and bracket adjacent to the forward end of said transmission case and therebetween, said transmission case having a series of notches to receive selectively said latch means and secure said plate and bracket and guide rail supported thereby in the selected position of adjustment, and a lever connected to said latch means and extending beneath said bracket from the forward end of said transmission so as to be shielded thereby against accidental displacement and having a projecting handle disposed relatively rearwardly and movable upwardly to release said latch means, said projecting handle being located on the opposite side of said case and remote from said sprocket and the chain carried thereby in all positions of said adjustment.

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