June 29, 1948. A. W. MALL 2,444,138

ADJUSTABLE TENSION CHAIN SAW MACHINE

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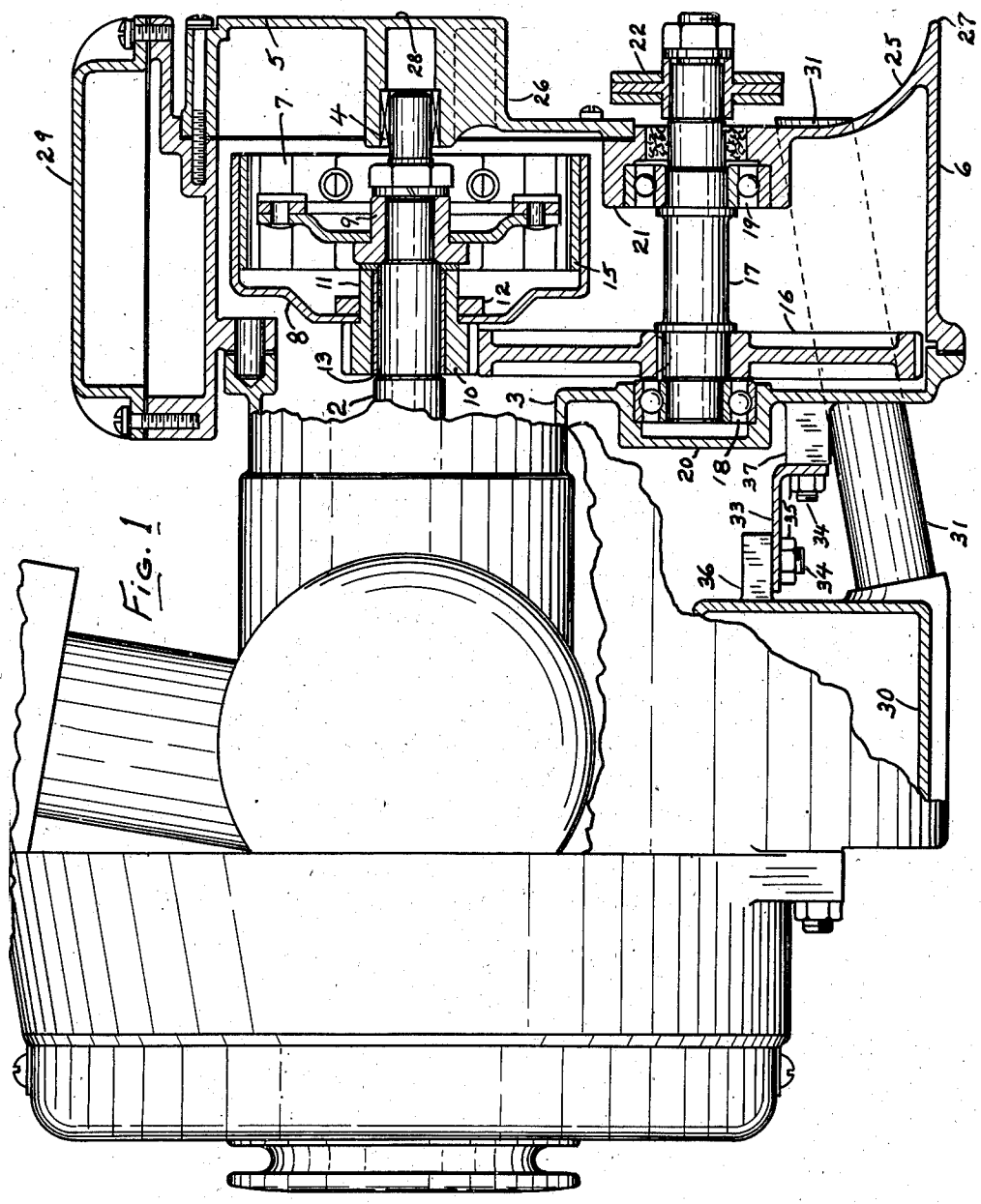


Fig. 1

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Fig. 2

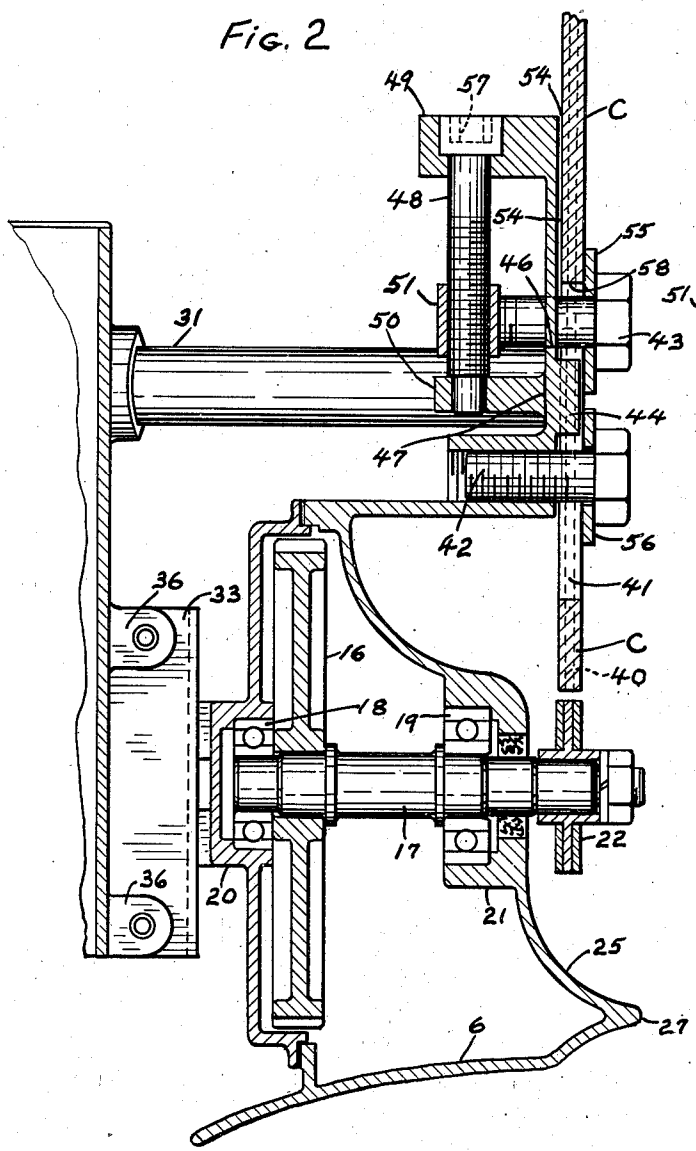


Fig. 5

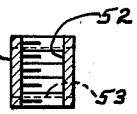
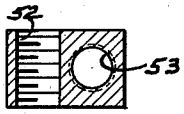


Fig. 6



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Fig. 3

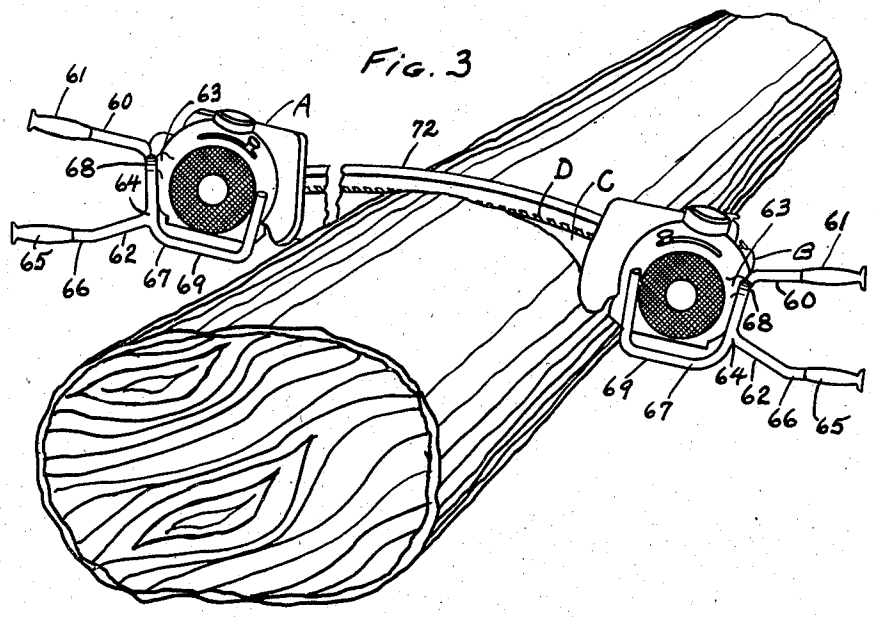
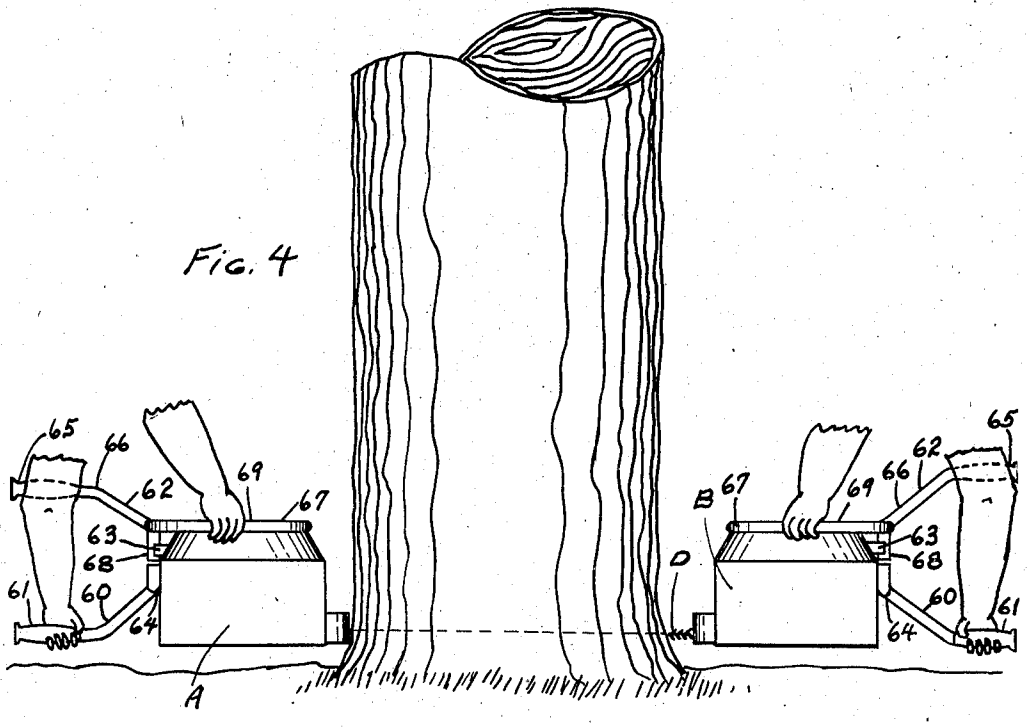


Fig. 4



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ADJUSTABLE TENSION CHAIN SAW MACHINE

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2 Claims. (Cl. 143—32)

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My invention relates to chain saw machines of the type which are used primarily for felling and bucking trees and has as its general objective the provision of an improved sawing machine.

My invention also relates to an improved method of felling and bucking trees.

One object of my invention is to provide a chain saw machine having two engines to drive the cutting chain.

Another object of my invention is to provide a simple device for adjusting the tension of the cutting chain and for maintaining constant chain tension as adjusted.

Another object of my invention is to provide novel means for lubricating the chain.

A further object of my invention is to provide a compact arrangement of the mechanical parts and castings supporting same so as to reduce the over-all weight of the sawing machine and so as to better withstand the constant pounding action to which these sawing machines are subjected when cutting a tree.

A still further object of my invention is to provide a new method of felling and bucking trees which method is accomplished largely through improved mechanical features of my sawing machine.

Other objects and advantages will become apparent upon reading the following specification and upon examination of the drawings in which:

Fig. 1 is an end view of one of the engines shown partly in section;

Fig. 2 is a fragmentary top view in section of the engine shown in Fig. 1;

Fig. 3 is a perspective view of my sawing machine as it is used when bucking a fallen tree;

Fig. 4 is a perspective view of my sawing machine as it is used to fell a standing tree;

Fig. 5 is a detail top view in section of the sleeve device into which the chain tension adjustment screw is threaded; and

Fig. 6 is a detail side view in section of the device shown in Fig. 5.

In general my chain saw machine comprises two internal combustion engines A and B mounted at either end of a chain guiding plate C about which the cutting chain D is trained.

Referring to Fig. 1 I have shown one of the engines which is preferably a two cylinder, two stroke engine. The engine shaft 2 extends outwardly from the engine housing 3 and the outer end of said engine shaft is journaled in a sleeve bearing 4 which is pressed into cover housing 5. An intermediate housing 6 is interposed between engine housing 3 and cover housing 5.

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Toward the outer end of engine shaft 2 I have provided a centrifugal type of automatic clutch comprised of a driving member 7 and a driven member 8. The driving member 7 is rigidly secured to engine shaft 2 through the medium of sleeve 9 so as to be rotatable at all times with the engine shaft.

A pinion 10 is provided with a shank portion 11 on which the driven clutch member 8 is mounted. Driven clutch member 8 is rigidly secured to pinion 10 by nut 12 so as to be rotatable therewith. A sleeve bearing 13 is pressed into pinion 10 so as to be rigid therewith. Driven clutch member 8 is thus rotatably mounted on engine shaft 2. When the engine shaft 2 reaches a predetermined speed of rotation, the centrifugally actuated driving clutch member engages the clutch lining 15 of driven clutch member 8 and imparts rotation thereto. A speed reducing spur gear 16 meshes with pinion 10 to impart rotation to sprocket shaft 17. The sprocket shaft 17 is supported at each end by anti-friction bearings 18 and 19 respectively. A bearing retainer cup 20 is formed in the wall of engine housing 3 and a second bearing retainer 21 is formed in the wall of housing 6. At the free end of sprocket shaft 17 a driving sprocket 22 is mounted preferably by being splined thereto. The sprocket 22 drives the cutting chain D. It is significant to note that the exterior wall of housing 6 is provided with an outwardly extending wall portion 25 which in conjunction with the underneath wall 26 of cover 5 forms a protective covering for the cutting chain for safety purposes. It is to be also noted that the plane defined by the outermost tip of wall 25, said tip being designated 27, and the outer surface 28 of cover 5 is closely adjacent the plane in which the sprocket 22 lies, thus when a tree is being felled, the cutting chain can be lowered to within an inch or so of the ground thereby leaving little or no tree stump after the tree has been felled. Fig. 4 illustrates how close the cutting chain is to the ground when felling a tree.

Secured to the upper end of housing 6 is another housing 29 which forms the upper part of the fuel tank. The fuel tank is filled with gasoline and, as is customary in two cycle engines, the lubricating oil for the pistons and cylinders is mixed in with the gasoline. The exhaust gases from the cylinders travel into the exhaust chamber 30. The exhaust gases are partly made up of the lubricating oil in an atomized state and one feature of my invention is to utilize these exhaust gases for lubricating the cutting chain, thereby

eliminating the necessity of a separate lubricating system for the cutting chain. I have provided a tubular pipe 31 which extends outwardly from the exhaust chamber and terminates adjacent the cutting chain. The exhaust gases are thus expelled from the exhaust chamber 30 through pipe 31 from which they are projected directly onto the cutting chain.

The lubricant carried by the exhaust gases thus lubricates the cutting chain and at the same time the exhaust gases also serve to blow saw dust away from the cutting chain.

Rigidity between the exhaust chamber 30 and housing 3 is obtained by means of an angle iron 33 being secured therebetween by means of bolts and nuts 34 and 35 fastened to bosses 36 and 37.

One significant feature of my invention is the compactness of my engine and its associated driving parts. By locating the driving pinion 10 rearwardly of the automatic clutch assembly, I have made it possible to locate the driving sprocket inwardly relative to the engine thus reducing the overall length of the engine and associated parts. This provides a more rugged construction which is better able to withstand the pounding action to which these chain saw machines are now subjected.

Referring to Fig. 2 I have shown a novel means for adjusting the tension of the cutting chain and for maintaining the tension as adjusted. The cutting chain is trained about the sprocket 22 and the chain guiding plate C, said chain having tongue portions (not shown) which ride in the slot 40 (shown in dotted lines) in guide plate C. The guide plate C is longitudinally movable relative to its supporting housing 6, the extent of such movement being determined by the length of slot 41 in guide plate C. The slot 41 is just wide enough to accommodate the shanks of locking bolts 42 and 43 and the boss 44 which is integral with housing 6 and extends into slot 41 to guide the movement of guide plate C relative to housing 6, assuring rectilinear movement thereof.

It is significant to note that the apparent walls in housing 6 as indicated by lines at 46 and 47 in Fig. 2 are for the purpose of indicating a different sectional plane of the chain tension adjustment screw 48 and its supporting bosses 49 and 50 which are integral with housing 6 and which are located in a plane slightly above the plane defined by the cross sectioning in the remainder of the drawing of Fig. 2. The adjusting screw 48 is rotatably mounted in bosses 49 and 50 and extends through sleeve member 51 by screw thread engagement. The sleeve member 51 has a threaded bore 52 which receives the adjusting screw 48 and also has a threaded bore 53 which receives locking bolt 43 as shown in Fig. 6.

It is significant to note that housing 6 is provided with a rib 54 which rides against guide plate C. On the side of the guide plate C opposite the rib a pair of washers 55 and 56 provide ample clamping surface for guide plate C relative to bolts 42 and 43 as well as serving the function of lock washers.

When it is desired to tighten the cutting chain, the bolts 42 and 43 are first loosened. Then an Allen wrench is inserted into the socket 57 of screw 48 and screw 48 is turned causing sleeve member 52 and bolt 43 to move outwardly away from sprocket 22. When bolt 43 reaches the end of slot 41 in guide plate C, it engages wall 58 at the end of slot 41 and causes the guide plate C to move outwardly away from sprocket 22 thereby tightening the cutting chain. As soon as the desired chain tension is obtained by turning screw 48, then bolts 42 and 43 are tightened against the guide plate C, securely clamping said guide plate in the desired position of adjustment relative to sprocket 22.

Referring to Fig. 3 I have shown my twin-engine chain saw machine as it is used in bucking a fallen tree and in Fig. 4 as it is used in felling a standing tree. Heretofore it has been necessary in using a gasoline engine driven chain saw machine, to rotate the cutting chain and its guide plate relative to the engine in order to fell a tree, the reason being that the gasoline engine has to be maintained in an upright position in order to operate. In my engines I use a diaphragm type of carburetor which permits the gasoline engine to be tilted in any position, forward or backward or on either side, and as a result of this, my new method of felling and bucking trees is achieved.

My method of felling and bucking a tree with a gasoline engine driven chain saw consists of a series of continuous steps forming a continuous operation, uninterrupted by adjustments to the sawing machine. It is significant, first, to note the handle arrangement which I have provided for my machine as my method of felling and bucking trees is partly dependent upon this particular type of handle arrangement.

One handle member 60 is secured to the central region of the engine and extends angularly downwardly and then outwardly away from the engine, terminating with a hand gripping portion 61. Viewing Fig. 4 it is to be noted that the hand gripping portion 61 lies in a plane which is approximately common with the plane defined by the chain guide plate C and the cutting chain D. A second handle member 62 is secured to a boss 63 on the engine. Handle member 62 is preferably formed of two sections which may be welded together at 64. One portion 66 of handle member 62 extends angularly upwardly and then outwardly away from the engine, terminating in a hand gripping portion 65. The handle portion 66 forms a mate for handle member 60 and the plane defined by these two handle members is at right angles to the plane defined by the guide plate C and cutting chain D. Thus when bucking a fallen tree, as viewed in Fig. 8, the operator grasps hand gripping portions 61 and 65. The spacing of these handle members 60 and 66 permits balancing the saw to assure that the cutting chain progresses through the log in a vertical direction and in a straight line cut.

Handle member 62 is provided with a second section 67 which is substantially U-shaped and which has a downwardly depending tongue 68 which is secured to boss 63. This U-shaped section 67 embraces the upper end of the engine and has a hand gripping portion 69. Thus when felling a tree, hand gripping portions 61 and 69 are grasped by the operator. Viewing Fig. 3 it will be noted that hand gripping portion 61 is located on the opposite side of the engine from handle 69 and viewing Fig. 4 it will be noted that it is located at the under side of the engine whereas handle 69 is located at the upper side of the engine. Thus the machine is well balanced in the operator's grasp while felling a tree.

It is significant to note that when felling a tree, the operator grasps handle 69 with one hand, the other hand being used to grasp handle 61 and

handle 65 rests against the back side of the arm, thereby giving the operator a tri-cornered balancing condition, which is desirable when felling a tree.

The continuous method of felling and bucking a tree comprises the steps of grasping handles 61 and 69 with handle 65 resting against the back side of the arm which carries handle 61. An operator is at each end of the saw, the cutting chain being urged against the tree while the cutting chain progresses through the tree. As soon as the saw has progressed sufficiently far through the tree trunk, so that the guard bar 72 is within the tree trunk, it may or may not be necessary to drive wedges into the kerf to prevent pinching while the saw continues cutting through the tree. When the tree begins to fall, the operators may retract the sawing machine from the tree while still grasping handles 61 and 69. Then, while still grasping handles 61, the sawing machine is turned a quarter of a turn until the cutting chain and guide plate are in a vertical position as viewed in Fig. 3.

The operator's grip on handle 69 is released and handle 65 is then grasped. Then the operators carry the sawing machine along, one on either side of the fallen tree, until the desired location for the first bucking cut is reached. The cutting chain is then permitted to come into contact with the tree and cuts through the log, the weight of the engines being sufficient to urge the cutting chain through the tree. Thus it can be seen that my method of felling and then bucking a tree consists of a series of continuous steps which are uninterrupted due to the fact that it is not necessary to stop and make adjustments to the sawing machine during the steps of felling and bucking a tree.

Having thus described my invention, what I claim is:

1. A chain saw machine comprising a power unit, a chain guiding member extending therefrom, a support member associated with the power unit, a sprocket shaft carried by the support member, a sprocket on the sprocket shaft, a cutting chain trained about the sprocket and

chain guiding member, a slot in said chain guiding member, a pair of bolts extending through the slot, one of said bolts being threaded into the support member, an adjustment screw carried by the support member and being at right angles to the other two bolts, a sleeve member threaded onto the adjustment screw, the second of said bolts having screw-threaded engagement with the sleeve member whereby upon turning the adjustment screw, the second bolt moves relative thereto.

2. A chain saw machine as described in claim 1 wherein a boss on the support member extends into the slot in the chain guiding member.

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