Sept. 22, 1942. A. N. BLUM 2,296,240

CHAIN SAW

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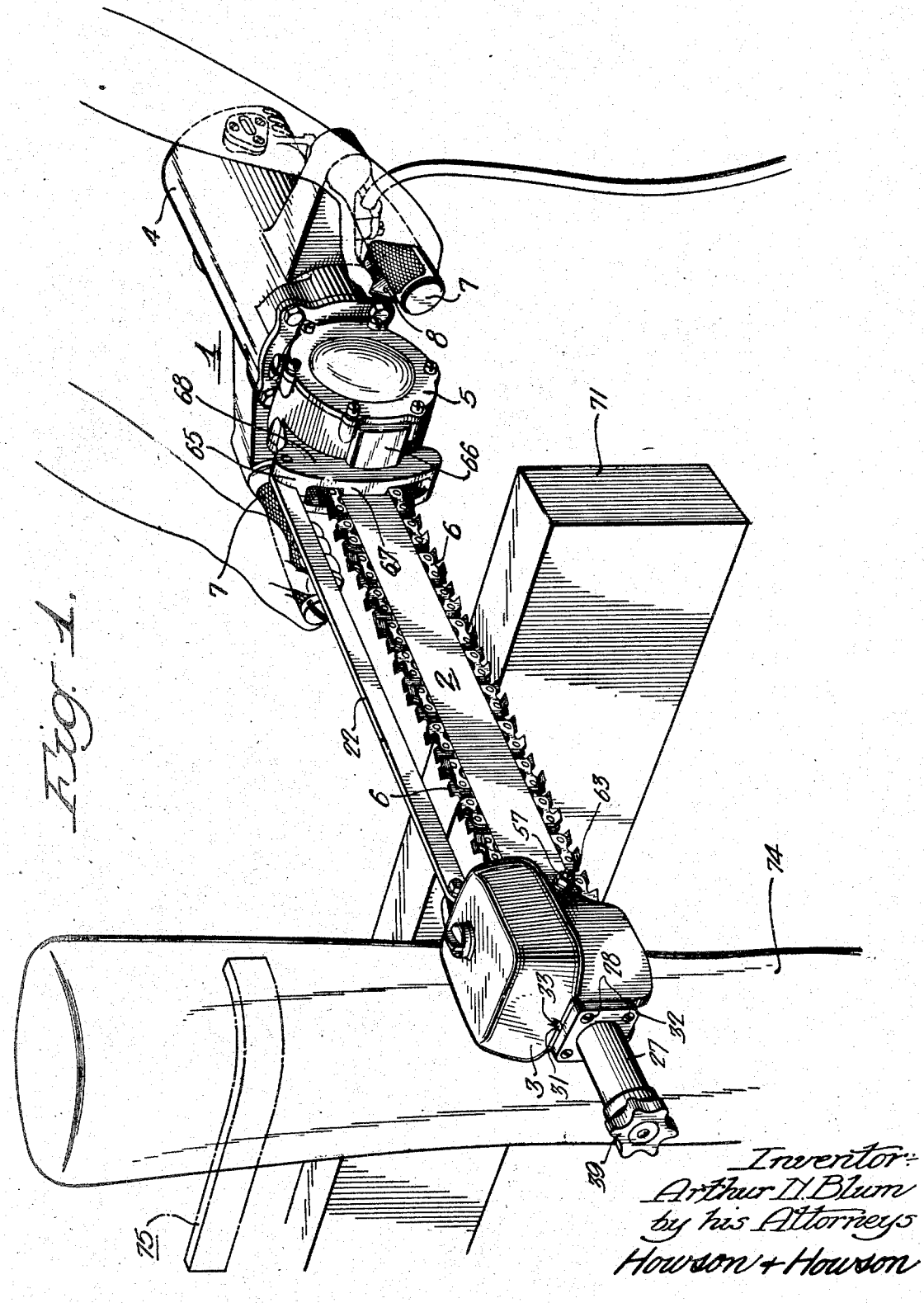

Fig. 1.

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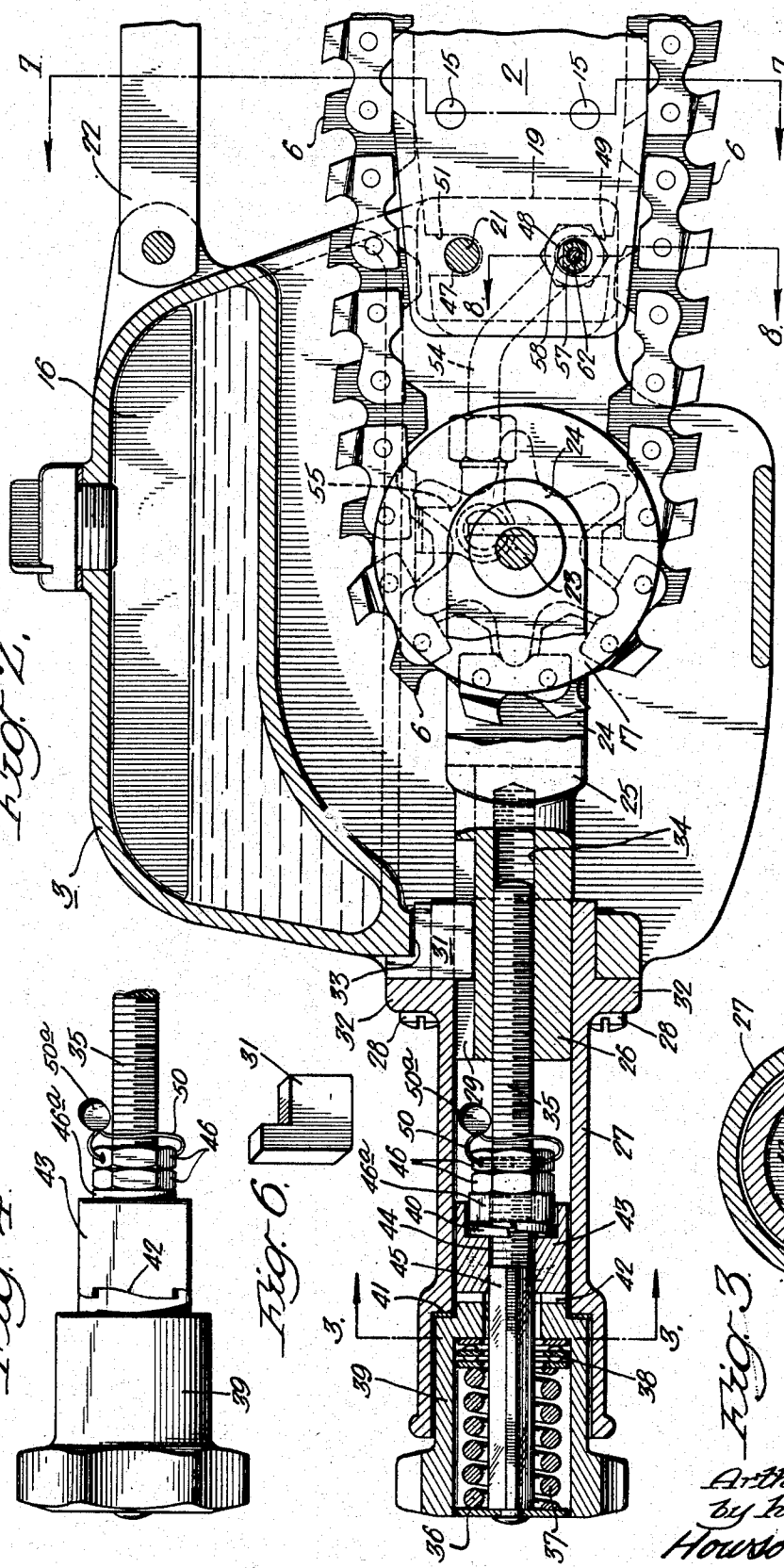

Fig. 2.

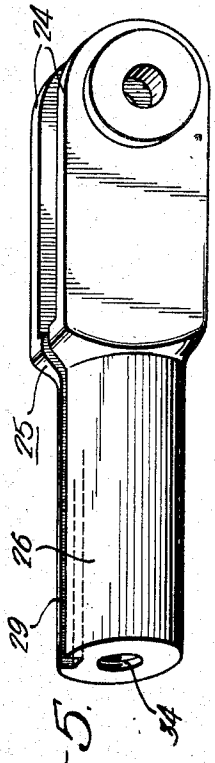

Fig. 5.

Fig. 4.

Fig. 6.

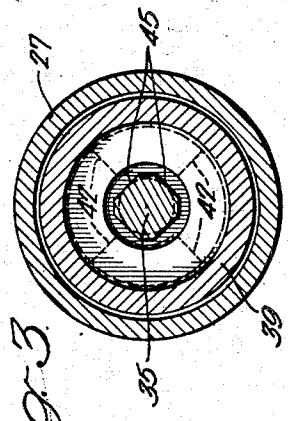

Fig. 3.

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Fig. 7.

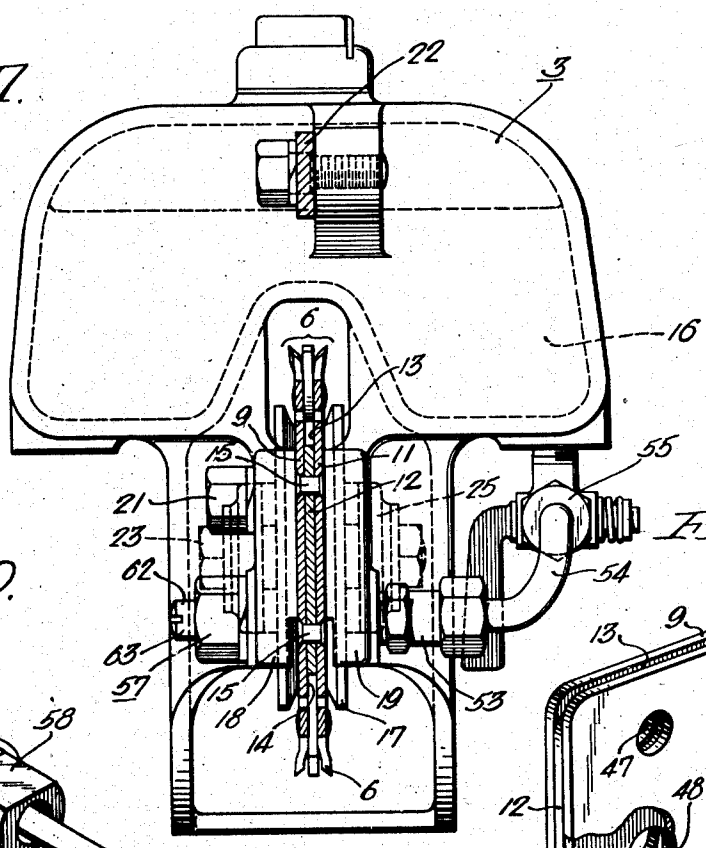


Fig. 9.

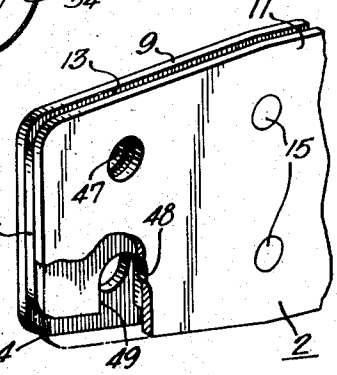


Fig. 10.

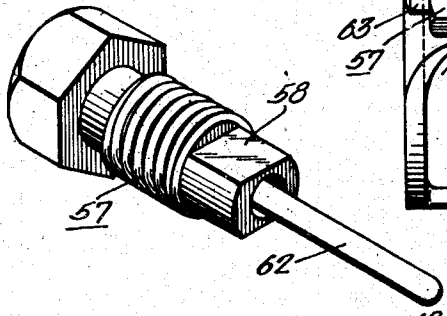
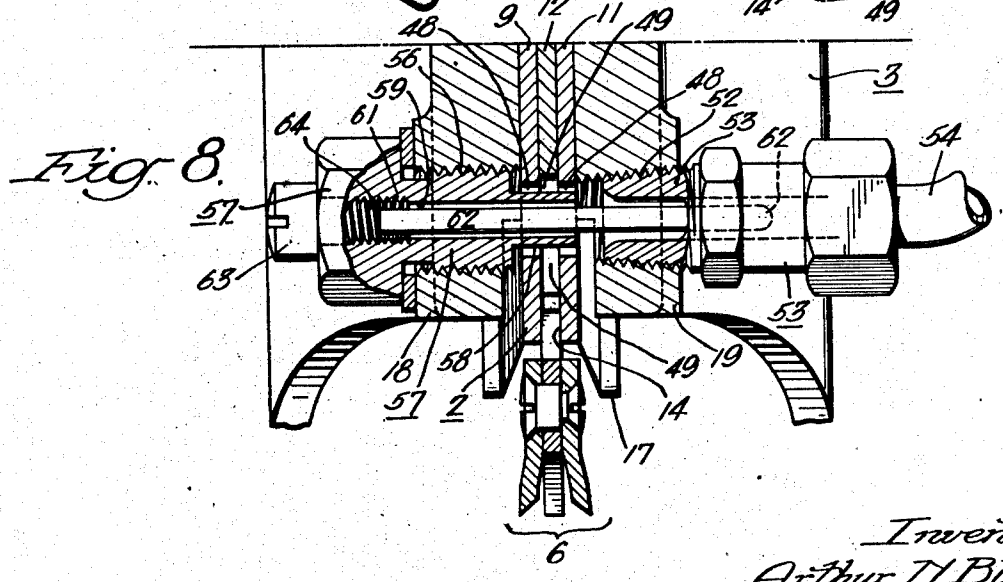


Fig. 8.



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CHAIN SAW

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Fig. 11.

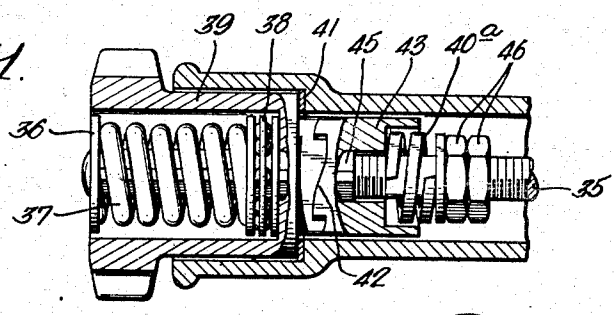


Fig. 12.

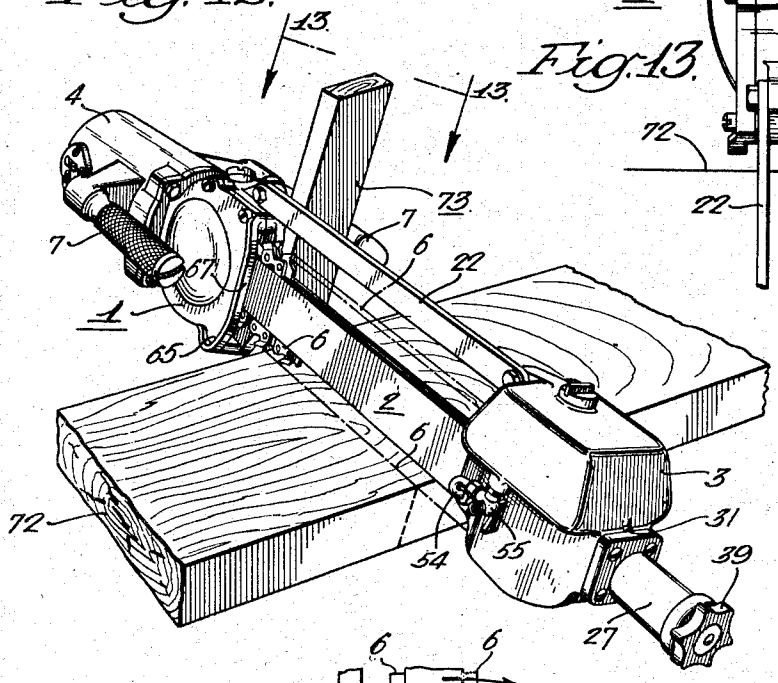


Fig. 13.

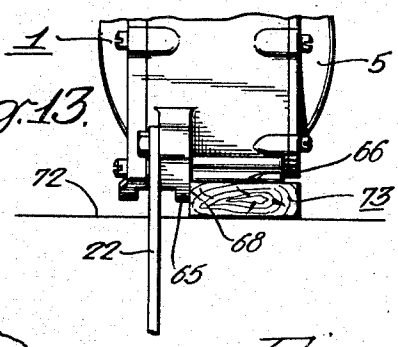


Fig. 14.

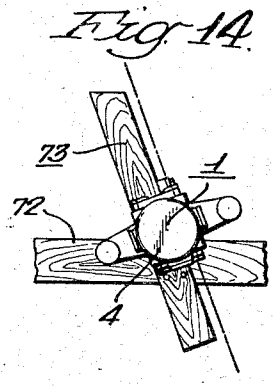
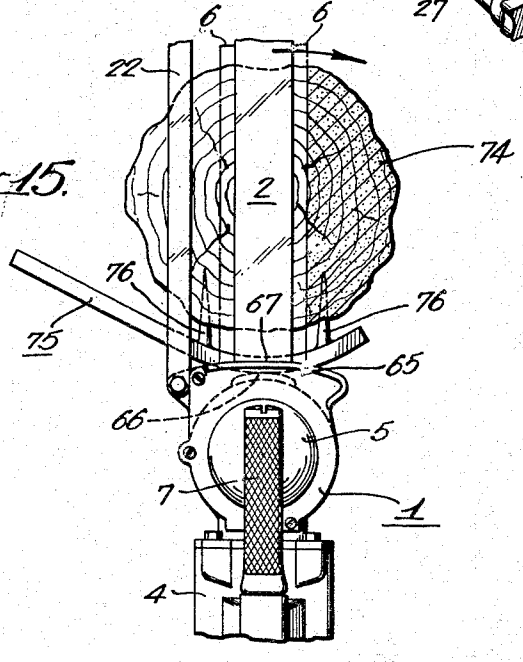


Fig. 15.



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Patented Sept. 22, 1942

2,296,240

UNITED STATES PATENT OFFICE

2,296,240

CHAIN SAW

Arthur N. Blum, Philadelphia, Pa.

Application November 14, 1939, Serial No. 304,401

15 Claims. (Cl. 143—32)

This invention relates to improvements in chain saws.

One object of the invention is to provide a novel semi-automatic adjustment means for accurately tensioning the saw chain.

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

The invention further resides in certain novel structural details and arrangements hereinafter described and illustrated in the attached drawings, wherein:

Figure 1 is a view in perspective of a saw made in accordance with my invention;

Fig. 2 is an enlarged fragmentary sectional view showing details of the chain-adjustment and lubricating means;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a fragmentary view illustrating an element of the tension-adjusting means;

Figs. 5 and 6 are detached views in perspective of elements of the tensioning device;

Fig. 7 is a sectional view on the line 7—7, Fig. 2;

Fig. 8 is a sectional view on the line 8—8, Fig. 2;

Fig. 9 is a fragmentary view in perspective showing a detail of the lubricating device;

Fig. 10 is a view in perspective of one of the elements of the lubricating device;

Fig. 11 is a fragmentary sectional view illustrating a modification within the scope of the invention;

Fig. 12 is a view in perspective showing a method of guiding the saw in a framing cut;

Fig. 13 is a fragmentary view taken from the position indicated as 13—13 in Fig. 12;

Fig. 14 is a reduced elevational view from the handle end of the saw in Fig. 12, and

Fig. 15 is a plan view illustrating a means for supporting and guiding the saw in a transverse cut.

With reference to Fig. 1, a saw made in accordance with my invention comprises a base frame 1, a guide rail 2 which is supported at one end in the base frame, and a strain head 3 which is supported at the outer end of the rail 2. The main frame 1 comprises in the present instance a housing 4 for an electric motor, and a gear case 5 which also houses the driving sprocket for the toothed chain 6. The base frame also comprises two handles 7, 7 by means of which the operator supports and manipulates the saw in well known manner, and one of the handles carries an electric switch device 8 for controlling the electric motor which is connected through the gearing with the chain sprocket.

The rail 2 consists of two side plates 9 and 11, see Figs. 7, 8 and 9, and an intervening filler plate 12, the filler plate being of lesser breadth than the two side plates 9 and 11 so as to provide at top and bottom of the rail longitudinal grooves 13 and 14 within which the toothed chain 6 is guided in well known manner and as shown in Figs. 7 and 8. The plates 9, 11 and 12 are secured together in the present instance by means of rivets 15 shown in Figs. 2 and 7. Except in certain details hereinafter described, the rail 2 constitutes no part of the present invention.

The strain head 3, shown in Figs. 2 and 7, is formed to provide at the top a reservoir 16 for lubricating oil, and at the bottom a housing for an adjustable guide roll 17 for the chain 6, the said roll preferably taking the form of a sprocket as shown. The outer end of the rail 2 fits into a slot between the two side portions 18 and 19 of the head and is clamped solidly therebetween by means of a screw 21 which passes through the rail 2, as shown in Fig. 2. The head is further held in fixed position with respect to the rail 2 by means of dowel plug 51, hereinafter described, and also a tie rod 22 which extends above and parallel to the guide rail 2 and is secured at its opposite ends to the base frame 1 and to the strain head 3, as shown in Fig. 1. The primary function of the rod 22, however, is to act as a guard for the upper run of the saw chain 6, and as a safety device in event of breakage of the chain in operation.

The sprocket 17 is journaled on a shaft 23 between the bifurcations 24, 24 of a member 25 which is mounted for sliding adjustment in the head 3. The member 25, see Fig. 5, has a cylindrical extremity 26 which is slidably fitted into the cylindrical interior of a tubular member 27 which is secured by screws 28 to the outer end of the head 3. The extension 26 of the member 25 is provided with a longitudinal slot or keyway 29, and this slot receives a feather 31 which, as shown in Fig. 2, is clamped between the body of the head 3 and the flange 32 of the member 27. The body of the head 3 is slotted at 33 in accurate alignment with the slot between the side members 18 and 19 of the head wherein, as previously described, the end of the guide plate 2 is clamped, and the feather 31 is accurately fitted to this slot 33. That portion of the feather 31 which occupies the keyway 29 of the member 25 is therefore necessarily in accurate alignment with the rail 2 and establishes a similarly accurately aligned relation between the sprocket 17 and the said rail.

The cylindrical portion 26 of the member 25 is provided with an axially extending threaded bore 34 which in assembly and as shown in Fig. 2 receives the correspondingly threaded end of an adjusting rod 35. This rod extends outwardly through the cylindrical member 27 and has at its outer end a washer 36 which forms a seat for a coiled spring 37. The inner end of the spring 37 seats against a thrust bearing 38 in the bottom of a recessed sleeve member 39, this member 39 being supported in a countersunk recess in the outer end of the member 27, and being pressed by the spring 37 against the shoulder 41 in the bottom of said recess. The inner end of the sleeve member 39 has a ratchet connection, as shown at 42 in Fig. 4, with a collar 43 of externally cylindrical form which occupies the interior of the member 27 and which, with the member 39, is free to turn in the latter. This collar 43 is provided with a rectangular bore 44 which receives the correspondingly rectangularly formed outer end portion 45 of the adjusting rod 35 so that it turns with the latter but is free to be displaced longitudinally to it.

As previously stated, the outer end of the collar 43 has a ratchet engagement with the sleeve 39. Behind the collar 43, the adjusting rod 35 carries a pair of stop nuts 46 and a sleeve 46*a*, said sleeve forming a seat for a split washer 40 which bears also against the end of the collar 43. The washer 40, acting as a spring, exerts pressure to force the said collar resiliently against the opposed ratchet face of the sleeve 39, and performs the added function of a lock washer precluding loosening and displacement of the stop nuts 46 on the adjusting rod. Obviously, the washer 40 can, without functional change, be substituted by a spring 40*a*, as illustrated in Fig. 11. The washer 40 or spring 40*a* constitutes an important functional element of the device as hereinafter more fully set forth.

When the sleeve 39, which is formed at its outer end with a hand-grip, as illustrated, is turned in a counterclockwise direction, as viewed in Fig. 1, the teeth of the ratchet device 42 function to positively interlock the sleeve with the collar 43, with the result that the rod 35 is backed away in the threaded bore 34 of the member 25, thereby relieving the tension on the chain 6. To increase the tension on the chain, the sleeve 39 is turned in the opposite or clockwise direction; and in this case, the ratchet 42, by reason of its form, as shown in Fig. 4, will not positively couple the sleeve to the collar 43, the connection between the collar and the sleeve in this case being dependent entirely upon interfriction of the cam-like surfaces of the interengaged teeth of the ratchet 42 as regulated by the pressure of the spring 37 and secondarily of the washer 40. As the rod 35 advances into the member 26, the tension on the chain 6 increases, and when this tension reaches a predetermined point the teeth of the sleeve 39 will slip on the opposing teeth of the collar 43 so that in effect the sleeve will become uncoupled from the adjusting rod 35 and is no longer effective to turn the rod in that direction. It is apparent that the actual amount of tension in the spring 37, which will always exceed that of the spring or washer 40, the latter being only intended to keep the two mating parts of the ratchet in constant positive engagement, may be regulated by adjustment of the collar 43 on the rod 35 through the medium of the nuts 46, so that the spring 37 may be set to afford an exact amount of tension in the chain 6 beyond which the ratchet 42 will slip or in absence of spring washer 40 be entirely disengaged, as described above, to prevent any further tightening of the adjusting rod 35.

It will be noted that in the aforedescribed construction, the adjusting screw assembly is made to constitute a self-contained unit which may be removed intact from the saw structure. In the operation of the saw, it is important that this unit be maintained securely in position so as to preclude backing out of the adjusting screw, since any material release or loosening of the tension under which the toothed chain is held in operation will result inevitably in rupture of the chain. It is a primary function of the spring or washer 40 to aid in maintaining the adjusting rod or screw in position and to prevent any movement of this screw due to oscillations during cutting which might modify the tension of the toothed chain.

It will be noted that in assembly and aside from the normal frictional contact between the interengaged threads of the adjusting rod 35 and the member 26, the sole factor precluding rotary movement in the housing of the adjusting rod and of the adjusting rod assembly as a whole is the frictional engagement between the sleeve 39 and the shoulder 41 of the casing against which the sleeve is pressed by action of the spring 37. In the normal operation of the saw a considerable longitudinal vibration is set up in the member 25 and in the adjusting screw 35, and it is apparent that in the absence of the washer 40 or spring 40*a* at the back of the collar 43, this vibration would have a tendency both to unseat the sleeve 39 from the shoulder 41 and to permit the collar 43 to retract from its normal frictional engagement with the said sleeve 39. Any unseating of the sleeve 39 or loss of solid frictional contact between the sleeve and the shoulder 41 would obviously permit the adjusting rod assembly to turn, with consequent loss of tension in the toothed chain and eventual breakage of the latter. Release of the solid frictional engagement between the collar 43 and the sleeve 39 would permit angular movement of the adjusting rod 35 with the same result. By insertion of resilient means between the lock nuts 46 and the collar 43, it is apparent that there may be a movement of the adjusting rod 35 to the left, as viewed in Fig. 2, without unseating the sleeve 39 from the shoulder 41, the relative movement between the adjusting rod and the collar 43 being taken up by compression of the resilient means. It will be apparent also that any movement of the adjusting rod in the opposite direction will not result in a release of the normal engagement between the collar 43 and the sleeve 39, the resilient means in this instance functioning by expansion to maintain the collar 43 in its normal position of engagement with the sleeve 39. Also the sharp edges of the washer 40 preclude any relative movement between the collars 43 and 46*a* and help to maintain the various elements of the assembly in their proper relative positions angularly of the adjusting rod 35. It is important, therefore, that the nuts 46 be so placed that the washer 40 or other resilient means shall not under normal conditions be pressed entirely flat between the collars 43 and 46*a*, and that it shall normally be under partial compression. If a spring is used, as shown in Fig. 11, in lieu of the resilient lock washer, the terminal ends of the spring should preferably present to the surfaces against which

they seat the sharp locking edges which are characteristic of resilient washers of the type shown in Fig. 2.

Another desirable characteristic of the construction described above resides in the fact that after the lock nuts **46** have been set in proper position upon the adjusting rod **35** to afford the required tension in the toothed chain and to establish the elements of the adjusting rod assembly in their proper relative positions as described above, there need be no further adjustment of the lock nuts under normal conditions, and they may, therefore, be established in this position by tamper-proof means, such, for example, as by means of a wire **50** passed through apertures in one or both of the nuts and through the adjusting rod **35**, the ends of the wires being secured, for example, by a detachable lead seal **50***a* of well known type. This will preclude tampering with the device or any maladjustment of the parts which might adversely affect operation of the saw as a whole. Readjustment of the parts, however, may be made by any authorized and qualified individual after the seal is broken and the wire withdrawn.

In the operation of the saw, a considerable longitudinal vibration is set up in the member **25** and adjusting rod **35**. This vibration, if uncontrolled, has a tendency to separate the elements of the ratchet device described above, to loosen the nuts **46** on the adjusting rod, and to turn the said rod itself in the threaded bore **34** of the member **25**, with consequent maladjustment of the parts and modification of the normal chain tension. The washer or spring **40** affords the necessary control of this vibration. It insures continuous firm contact between the elements of the ratchet device; exerts continuous pressure, through the sleeve **46***a*, upon the nuts **46** and prevents loosening and displacement of the nuts on the adjusting rod; and, with the spring **37**, maintains the rod in the normal adjusted position with respect to the bore **34** in which the rod is threaded.

By reason of the tracking of the chain **6** in the rail **2** as previously described, it is essential, in order to reduce frictional wear to a minimum, to provide for adequate lubrication between the chain and the rail. As previously described, the outer end of the rail is secured in the tensioning head by means of the screw **21** which passes through an opening **47** in the rail. The rail is provided with a corresponding opening **48** which is placed directly opposite to the opening **47**, and the openings **47** and **48** are symmetrical with respect to the longitudinal center line of the rail **2** for a purpose hereinafter described. The filler plate **12** is recessed from its lower edge, as indicated at **49**, Fig. 9, in registration with the openings **48** in the side plates **9** and **11**, and a corresponding recess **51** is provided at the upper edge of the filler plate **12** for registration with the side plate openings **47**, as indicated in broken lines in Fig. 2. The side member **19** of the tensioning head **3** is provided with a threaded opening **52** in registration with the opening **48** in the rail, and into this opening **52** is threaded the terminal fitting **53** of a duct **54**, which extends, as illustrated in Fig. 7, to the reservoir chamber **16** of the tensioning head. Also as shown in Fig. 7, the duct **54** is provided with a suitable valve **55**, so that the flow of lubricant from the chamber **16** through the duct **54** may be regulated as required. A threaded port **56** is also provided in the side member **18** in registration with the opening **48** of the guide rail, and this opening receives a threaded dowel plug **57** of the form shown in Figs. 8 and 10, this plug having at its inner end a flattened extension **58**, which in assembly and as shown in Fig. 8 projects through the opening **48** in the rail **2** and in conjunction with bolt **21** fixes securely the guide rail to the tensioning head. The flattened sides, or equivalent, in the extension **58**, as shown in Fig. 8, afford a certain amount of clearance between the extension and the peripheral edges of the holes **48** in the outer plates **9** and **11** of the rail **2**. The dowel plug **57** is provided with an axial bore **59**, the outer end of which is threaded, as indicated at **61**, in Fig. 8. Projecting into the bore **59** is a rod **62**, and this rod projects beyond the end of the plug **57** and into the terminal fitting **53** previously referred to. The rod **62** has a head **63**, and immediately adjoining the head a threaded portion **64** which fits the threads **61** of the bore **59**. When oil is allowed to pass through the duct **54**, it comes in contact with the outer end of the rod **62** and follows the surface of the rod to the end of the plug **57**. From this point, it passes through the flattened portions of the extremity **58** of the plug, and thus obtains access to the space **49** between the side plates **9** and **11**. From this space the oil passes into the recess **49**, and therefrom into the slot **14**, wherein it contacts with the portions of the saw chain which travel in the slot and provides for a thorough lubrication of the contacting surfaces of the saw chain and the guide rail **2**. The passage of the lubricant to the chain slot is continuous and extends to the entire length of the track and of the guide rail.

The symmetrical location of the holes **47** and **48** in the rail **2** permits the position of the rail in the frame as a whole to be reversed. In this reversal, the clamping screw **21** passes through the hole **48**, and the hole **47** then becomes the lubricating aperture, functioning with the lubricating elements as described above. It is preferable also that the means for securing the rail **2** in the head frame **1** correspond to the means for securing the rail in the tensioning head so that the position of the rail in the assembly may be reversed from end to end. The advantage of this device resides in the fact that in the use of the saw, the wear is not uniform in the rail, but occurs in certain localized areas, and the ability to install the rail in assembly in the various positions described provides for a longer useful life of this element.

As shown in Fig. 1, the base or head frame **1** is provided at its inner or forward end with an extension **65** and an adjoining boss **66**. The extension **65** is provided with bosses for attachment of the inner end of the rail **2** and of the guard rod **22**, and contains also the openings or passages which admit the toothed chain **6** to the interior of the gear case **5**. Preferably the forward face **67** of the extension **65** lies at right angles to the plane of the rail **2** and of the chain **6**, and the side face **68** of the extension in parallel relation to this plane. Similarly the forward face of the boss **66** will preferably occupy a position at right angles to the face **68** of the extension **65**. In making a simple cut such, for example, as in removing the end of the beam **71** shown in Fig. 1, the face **67** of the extension **65** may be brought to bear against the side of the beam so as to hold the saw securely against the thrust imposed by the action of the cutting teeth upon the wood.

In other types of cut, the extension **65** and face **67** may also function to support the saw in

the desired position with respect to the work. In Figs. 12 to 14, for example, I have illustrated a framing cut wherein a timber 72 is cut at an acute angle to the plane of its surface. Where accuracy is required in a cut of this character, a templet 73 may be employed in the form of a board which may be secured to the side of the timber 72 in line with the direction of the desired cut. With the boss 66 abutting the face of the templet 73 and the adjoining surface 68 of the extension 65 abutting the end of the timber as shown in Fig. 13, the saw may be accurately guided on the templet in making the angular cut. In similar manner, the saw may be supported and guided in making a transverse cut, such, for example, as in removing the upper end of the pile 74 shown in Fig. 1. For this purpose, as shown in Fig. 15, a suitably formed metal guide 75 may be secured by means of attached spikes 76 to the side of the pile. In this case, the forward face of the boss 66 bears against the outer side face of the guide bar 75, and the face 68 of the extension 65 rests upon the upper edge of the side guide bar and keeps the cutting chain at a safe distance from the metal guide bar 75, the said bar thus acting as a supporting and guiding medium for the saw without injury to the cutting chain.

I claim:

1. In a chain saw, the combination with an endless toothed chain, of a support for said chain including relatively spaced rotary elements, and means for relatively adjusting said elements to tension the chain, said adjusting means comprising an adjusting element, a manual actuator for said adjusting element, a friction clutch operatively connecting said actuator with the adjusting element, a single resilient means exerting pressure tending to engage said clutch and operative to resiliently tension the said chain, and means for regulating the effective pressure of said resilient means.

2. In a chain saw, the combination with a toothed chain, of a pair of rotary elements supporting said chain, and take-up means operatively associated with one of said elements for tensioning said chain, said take-up means comprising a threaded take-up element, a manual actuator, and means for frictionally coupling said actuator with the said take-up element, said coupling means including a resilient element exerting resilient pressure to tension the said chain.

3. In a chain saw, the combination with a toothed chain, of a pair of rotary elements supporting said chain, and take-up means operatively associated with one of said sprockets for tensioning said chain, said take-up means comprising a threaded take-up element, a manual actuator, and means for frictionally coupling said actuator with said take-up element for operating said element in the direction to tension the chain, and for positively coupling said actuator with said take-up element for operating the element in the opposite direction to relieve said tension, said coupling means including a friction-regulating resilient element operative through said take-up element to resiliently tension the chain.

4. In a chain saw, the combination with a toothed chain, of a pair of rotary elements supporting said chain, and take-up means operatively associated with one of said elements for tensioning said chain, said take-up means comprising a threaded take-up element, a manual actuator, ratchet means for coupling the actuator to said take-up element, said ratchet affording a friction coupling for operating the element in the direction to tension the chain, and a positive coupling for operating the element in the opposite direction to relieve said tension, and a spring interposed between the take-up element and the actuator, said spring regulating the effective friction in said coupling and being operative through said take-up element to resiliently tension the chain.

5. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element adjustably supported in the frame, a threaded adjusting element for said bearing, a manual actuator for said adjusting element seating against said frame, a spring confined between said actuator and the adjusting element and operative through the latter to resiliently tension the chain, and friction means regulated by said spring for coupling said actuator to the said adjusting element.

6. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a manual actuator, a spring interposed between the actuator and said adjusting element and exerting pressure to frictionally couple said actuator to said element, and means affording a thrust bearing for said actuator on the frame whereby manipulation of said adjusting element through the actuator may operate through said spring to resiliently tension said chain.

7. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a manual actuator seating upon the frame, a friction clutch for operatively connecting the said actuator with the adjusting element, and a spring confined under pressure between said actuator and the adjusting element and operative both to resiliently tension the chain and to frictionally bind said actuator through said clutch to the adjusting element.

8. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, and means on said adjusting element and movable therewith for frictional engagement with said sleeve under pressure of said spring whereby rotation of the

sleeve is transmitted frictionally to the adjusting element.

9. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, a collar on said adjusting element and movable therewith, said collar having ratchet engagement with said sleeve and being held by the said spring in said engagement, and said ratchet being arranged so that rotation of said sleeve in a direction to tighten said adjusting element is transmitted frictionally to the latter through said collar, and rotation of the sleeve in the opposite direction is transmitted positively to said adjusting element.

10. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, means operatively connected with said adjusting element and initially held by said spring in frictional engagement with said sleeve for transmitting rotation of the sleeve to the adjusting element, and supplementary resilient means independent of said spring for maintaining positive engagement of said transmitting means with the sleeve.

11. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, a collar carried by and movable longitudinally of said adjusting element for frictional engagement with said sleeve, means for limiting the movement of said collar longitudinally of the adjusting element whereby said spring is operative initially to engage the collar with the sleeve, means for preventing relative rotation of said collar and the adjusting element whereby rotation of the sleeve may be transmitted through the collar to said element, and supplementary resilient means for maintaining the collar in frictional engagement with the sleeve.

12. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, a collar carried by and movable longitudinally of said adjusting element for frictional engagement with said sleeve, means for preventing relative rotation of said collar and the adjusting element whereby rotation of the sleeve may be transmitted through the collar to said element, a stop nut on said adjusting element, limiting the longitudinal movement of the collar on the adjusting element whereby said spring is operative initially to engage the collar with the sleeve, and a spring interposed between the said nut and the collar and exerting pressure to retain the collar in frictional engagement with the sleeve.

13. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting element having threaded connection with said bearing, a sleeve embracing said adjusting element and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting element and exerting pressure upon the sleeve to hold it to its seat and upon the said element in a direction to tension the chain, a collar carried by and movable longitudinally of said adjusting element for frictional engagement with said sleeve, means for preventing relative rotation of said collar and the adjusting element whereby rotation of the sleeve may be transmitted through the collar to said element, a stop member on said adjusting element, limiting the movement of the collar longitudinally of the adjusting element whereby said spring is effective initially to hold the collar in engagement with the sleeve, and resilient locking means engaging said collar and held by said stop member under partial compression, said resilient locking means exerting pressure to maintain the collar in frictional engagement with the sleeve while permitting relative movement of said adjusting element in the longitudinal direction with respect to said sleeve and collar.

14. In a chain saw, a toothed chain, a pair of rotary elements supporting said chain, a supporting framework for said chain and elements, and means for adjusting one of said elements in the frame for tensioning said chain, said adjusting means comprising a bearing for said element slidably supported in the frame, an adjusting screw having threaded connection with said bearing, a sleeve embracing said adjusting screw and seating in the frame, a spring confined under pressure between the said sleeve and the adjusting screw and exerting pressure upon the sleeve to hold it to its seat and upon the said screw in a direction to tension the chain, a collar carried by and movable longitudinally of said adjusting screw for frictional engagement with said sleeve, means for preventing relative rotation of said

collar and the adjusting screw whereby rotation of the sleeve may be transmitted through the collar to the screw, a stop nut on the screw limiting the movement of the collar longitudinally of the adjusting element whereby said spring is effective initially to hold the collar in engagement with the sleeve, and a resilient lock washer held by said nut in a state of partial compression against said collar whereby said washer may function as a spring to maintain the collar in frictional engagement with the sleeve while permitting longitudinal movement of said screw with respect both to the collar and the sleeve.

15. In a chain saw, the combination with a toothed chain, of a pair of rotary elements supporting said chain, a base member comprising a mounting for one of said elements, a guide plate for said chain secured at one end to said member, a tensioning head having a slot for receiving the other end of said guide plate and means for securing the plate in the slot, a bearing for the other of said elements slidably mounted in the tensioning head, said head having a second slot in accurate alignment with the slot first named, a key in said second slot coactive with the said bearing for maintaining the associated element in accurate alignment with the said guide plate, and means for adjusting said bearing in the head to tension the said chain.

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