Sept. 14, 1954 D. J. SMITH 2,688,989

LUBRICATING DEVICE FOR CHAIN SAWS

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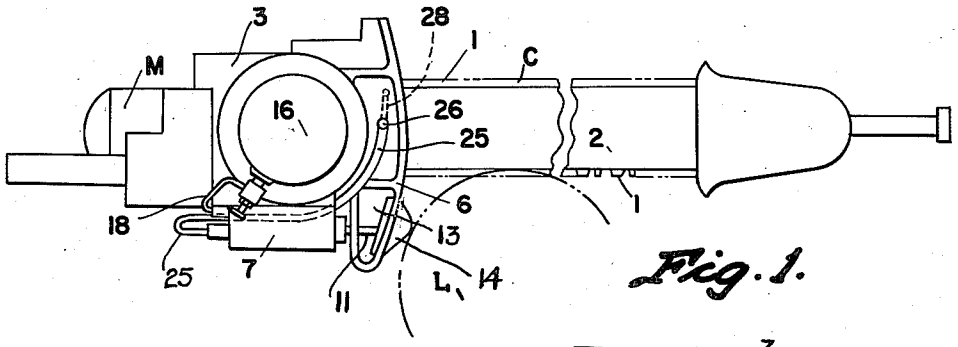


Fig. 1.

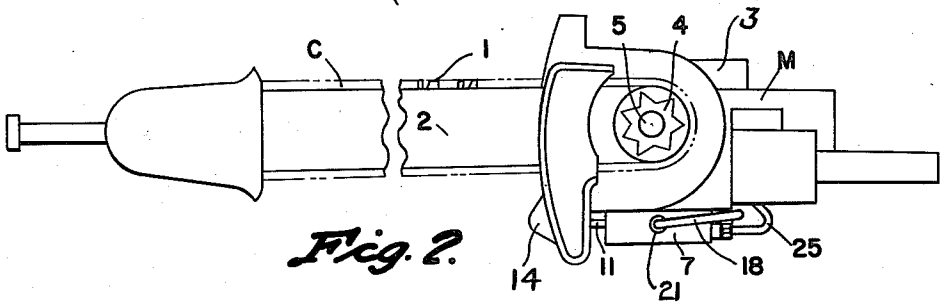


Fig. 2.

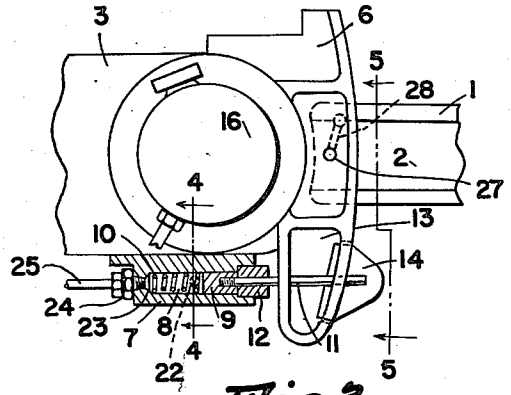


Fig. 3.

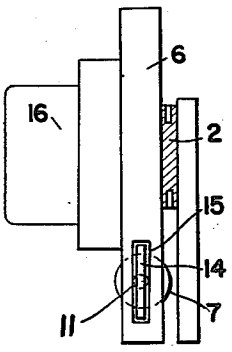


Fig. 5.

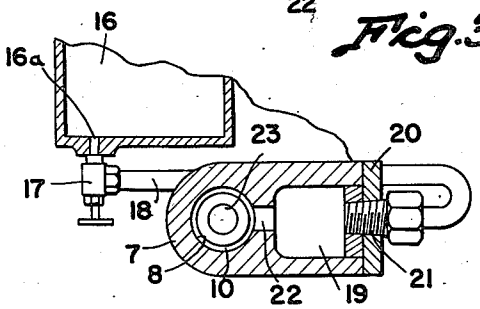


Fig. 4.

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LUBRICATING DEVICE FOR CHAIN SAWS

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4 Claims. (Cl. 143—32)

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The present invention relates to power-driven chain saws of the type in which a chain composed of pivotally connected cutting links is driven around a cutter bar by a motor, such as an internal combustion engine, or a motor receiving its energy from a source of fluid pressure, or electrical power.

The object of the present invention is to provide a lubricating device for a chain saw of the above indicated type that will insure the delivery of a supply of lubricant to the links of the chain saw, every time that the saw is engaged with a log, or other piece of work, preparatory to making a cut therein. Briefly stated, the invention resides in providing the flame of a chain saw with a lubricant supply and a reciprocating pump, operable by an external plunger slidably mounted on the saw frame in such a position as to be engaged by the surface of a log when the frame and log are forced together by the pull of the moving teeth of the chain saw, at the beginning of a cut. As a result, a considerable quantity of lubricant is forced under pressure by the pump piston through a conduit leading to the chain saw at a point adjacent to where it passes around the motor driven sprocket.

The above and other advantageous features of the present invention will hereinafter more fully appear from the following description, considered in connection with the accompanying drawings, in which,

Fig. 1 is a view in side elevation of a power-driven chain saw provided with a lubricating device incorporating the present invention.

Fig. 2 is a view in elevation of the opposite side of the saw shown in Fig. 1.

Fig. 3 is a fragmentary view partially in side elevation, and partially in section, showing the lubricating device of Fig. 1 on an enlarged scale.

Fig. 4 is a vertical sectional view along the line 4—4 of Fig. 3, looking in the direction of the arrows.

Fig. 5 is a view in vertical section along the line 5—5 of Fig. 3, looking in the direction of the arrows.

Referring first to Fig. 1, the invention is shown for purposes of illustration as being embodied in a power-driven chain saw in which the chain C consists of cutting links 1 pivotally connected together, and supported for sliding movement

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around the edge of a rigid cutter bar 2. The inner end of the bar 2 is mounted on a frame 3 and the chain C is driven by means of a sprocket 4 mounted on a shaft 5, see Fig. 2, which shaft is driven from a suitable motor M, so that the chain C rides around the outside of the bar 2, with the cutter links 1 on the underside of the chain moving towards the right.

One side of the frame 3 provides a projecting bumper 6 facing in the direction of the cutter bar 2, the purpose of the bumper 6 being to engage the log, or other work, which is to be cut by the underside of the moving chain, as viewed in Fig. 1. The outline of a log L is indicated in dot and dash lines in Fig. 1, and it is obvious that as the cutter links 1 of the chain C enter the upper surface of the log to make a cut, the direction of movement of the chain is such as to press the log L against the bumper 6 at the very start of the cutting operation. In other words, the cutting action of the chain C will always tend to draw together the bumper 6 and the surface of the log below the zone of cutting, and this relative movement between the saw frame and the work being cut, is depended upon to operate the lubricating device which constitutes the present invention.

Referring now to Figs. 3 and 4, a portion of the frame 3 and the bumper 6 is shown on an enlarged scale, and it will be seen that the lower portion of the frame is provided with a cylinder 7 which is shown in section. The cylinder 7 provides a bore 8 within which a piston 9 is movable, with a spring 10 tending to yieldingly maintain the piston 9 at the right-hand end of the cylinder 7. A rod 11 is connected to the piston 9 and extends through a suitable packing ring 12 into an opening 13, provided in the lower portion of the bumper 6.

The outer end of the piston rod 11 carries a shoe 14, which as best shown in Fig. 5 extends through a slot 15 provided in the front face of the bumper 6. The shoe 14 is freely movable in the slot 15, and the pressure of the spring 10 on the piston 9 is such as to normally maintain the shoe 14 with its major portion projecting beyond the face of the bumper 6. Therefore, it will be apparent from a consideration of Fig. 1 that whenever the cutter links 1 of the chain C engage the log L, at the start of a cut, the pull of

the moving chain will engage the end of the shoe 14 with the surface of the log, as a result of which the shoe will be forced inwardly through the bumper slot 15 to move the piston 9 to the left against the pressure of the spring 10.

For the purpose of supplying the cylinder 7 with lubricant, such as oil, a tank 16 is mounted on one side of the frame 3 above the cylinder 7. The bottom of the tank 16 provides an opening 16a for receiving a valve 17, from which extends a pipe 18. As best shown in Fig. 4, the pipe 18 passes behind the end of cylinder 7 and is bent around so as to enter an oil storage reservoir 19 forming part of the pump cylinder 7. This reservoir 19 is closed by a plate 20 extending along one side of the cylinder 7, and pipe 18 is received in a fitting 21 provided by the plate 20. The reservoir 19 is in continuous communication with the bore 8 of the cylinder 7 through a port 22.

As best shown in Fig. 3, the port 22 enters the cylinder bore 8 at a point just beyond the left-hand end of the piston 9 when the latter occupies its normal position, in which the shoe 14 is yieldingly held beyond the face of the bumper 6 by the pressure of the spring 10. Therefore, when the valve 17 is open, oil from the tank 16 can flow freely through the pipe 18 into the reservoir 19 from which it enters the cylinder bore 8 through the port 22. As a result, the cylinder bore 8 is kept filled with oil in readiness for a pumping operation as long as the shoe 14 remains in the full line position of Fig. 3.

The end of the cylinder 7 opposite to the piston 9 provides a discharge port 23 for receiving a fitting 24 from which a pipe 25 leads to a second fitting 26 extending through an opening 27 provided in the bumper 6. This opening 27 extends through to the cutter bar 2 and is in communication with a passage 28 leading to the edge of the cutter bar 2 around which the chain C passes. The passage 28 is indicated in dotted lines in Fig. 1, from which it will be apparent that oil delivered under pressure to the pipe 25 from the pump cylinder 7 will be conducted directly to the cutter bar 2 at a point where the chain C travels after leaving the driving sprocket 4.

From the foregoing description of the construction of the pump and the arrangement of the pipe connections between the oil tank 16, the cylinder bore 8 and the cutter bar 2, it will be apparent that inward movement of the shoe 14, as a result of its forceable engagement with the surface of a log L, will cause the piston 9 to move inwardly against the spring 10 and thereby force the oil in the bore 8 under pressure through the pipe 25 to where it will lubricate the cutter links 1 of the saw chain C. Since the shoe 14 is forced inwardly at the very start of a cut in the log by the chain saw, the resulting operation of the pump will insure that the chain will be thoroughly lubricated as the cutting progresses. Furthermore, upon each withdrawal of the cutter bar 2 from the log in preparation for a new cut, the spring 10 will again force the piston 9 to the right, as viewed in Fig. 3, and thereby again project the shoe 14 beyond the face of the bumper 6. Whenever this occurs, oil from the reservoir 19 is free to enter the cylinder bore 8 through the port 22 in response to the suction created by the movement of piston 9, so that the bore is full of oil in readiness for delivery to the cutter bar 2 through the pipe 25 when the shoe 14 is again pressed into the bumper 6, upon engagement with the surface of the log L.

From the foregoing, it is apparent that by the present invention there is provided an improved lubricating device for power-driven chain saws that is characterized by its simplicity of construction and effectiveness in operation. As a result of providing a pump that is operable only in response to engagement with a log at the beginning of a cut, the consumption of oil is reduced to a minimum. This is an important factor in woods operations, wherein the intermittent use of the saw for actual cutting requires running of the driving motor for considerable periods when it is disconnected from the chain saw. During such periods, the pump of the present arrangement is not operating, which would not be the case were the pump to be driven from the motor. While the reservoir 19 contains sufficient oil to supply the cylinder bore 8 at all times, there is no delivery of oil by the pump until the saw is actually engaged with the work; consequently the oil consumption of the pump is determined by the number of cutting operations performed by the saw, over any given period.

I claim:

1. A chain saw and lubricating device therefore comprising in combination, a frame, a chain saw movable with respect to said frame, a bumper on said frame for engaging a piece of work, while being cut by said saw, a supply of lubricant carried by said frame, a pump mounted on said frame, and connections between said lubricant supply, pump and chain saw, said pump having an operating plunger extending through said bumper and terminating in a shoe projecting beyond the work-engaging face of said bumper for engagement by the work, whereby to deliver lubricant under pressure from said supply to said saw.

2. A chain saw and lubricating device therefor comprising in combination, a frame, a cutter bar extending from said frame, a chain saw driven around said cutter bar by a motor on said frame, with said cutter bar providing a passage leading to said saw, a bumper on said frame for engaging a piece of work being cut by said saw, a lubricant tank on said frame, a pump mounted on said frame below said tank, connections between said tank, pump, and cutter bar passage, and a plunger extending from said pump through said bumper carrying a shoe at its outer end which projects beyond the bumper for engagement by a piece of work, to thereby operate said plunger and cause said pump to deliver lubricant under pressure to said cutter bar passage.

3. A chain saw and lubricating device therefor comprising in combination, a frame, a cutter bar extending from said frame, a chain saw driven around said cutter bar by a motor on said frame, a bumper on said frame for engaging a piece of work being cut by said saw, a lubricant tank on said frame, a pump mounted on said frame below said tank, connections between said tank, pump, and cutter bar, a plunger extending from said pump through said bumper, and a spring acting on said plunger for yieldingly maintaining the outer end of said plunger beyond the work-engaging face of said bumper, for engagement by a piece of work at the start of a cut therein by said saw, to thereby operate said pump.

4. A chain saw and lubricating device therefor comprising in combination, a frame, a chain

saw slidably mounted with respect to said frame, a bumper on said frame for engaging a piece of work while being cut by said saw, a supply of lubricant carried by said frame, a cylinder mounted on said frame with its axis parallel to the direction of movement of said saw as it engages the work, connections between said lubricant supply, cylinder and saw, a piston movable in said cylinder and having an extension movable in said bumper, and a spring operable on said piston for yieldingly maintaining the outer end of the piston extension beyond the work-engaging face of said bumper with said cylinder full of lubricant, whereby engagement of the piston extension by a piece of work at the start of

a cut therein by said saw serves to displace said piston and deliver lubricant to said saw through one of said connections.

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