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Gottlieb

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[54] **OILER APPARATUS FOR POWER TOOLS**

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[52] **U.S. Cl.** ..... **184/15 A**, 222/191, 222/192, 83/169

[51] **Int. Cl.** **F16n 7/14**

[58] **Field of Search** ... 30/181–187, 123.3, 381–387; 83/169; 222/191, 192; 184/15

[56] **References Cited**

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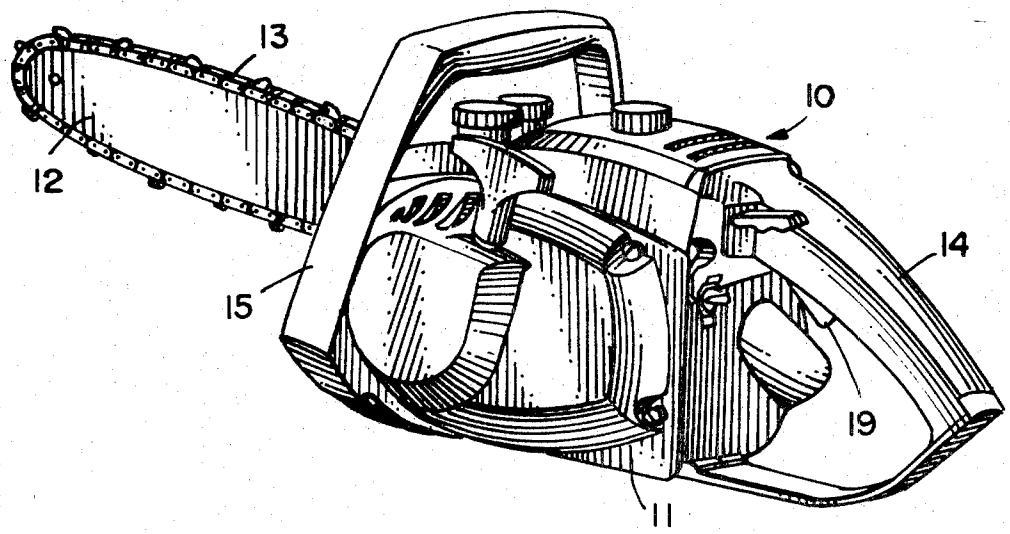
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Primary Examiner—Samuel F. Coleman
Assistant Examiner—H. Grant Skaggs, Jr.
Attorney—Dawson, Tilton, Fallon & Lungmus

[57] **ABSTRACT**

An oiler apparatus for power tools automatically supplies oil to the moving parts of the tool when the tool is actuated and may be manually operated to supply oil when desired. The oiler apparatus includes a plunger reciprocably mounted within a casing having inlet and outlet means for supplying oil to the casing and for conducting oil from the casing to the parts to be oiled. Linkage means extends from the plunger to adjacent the throttle trigger or other actuating means for operating the tool. The linkage means is engaged by the trigger when the trigger is pulled to operate the tool whereby the linkage and the plunger are moved to pump oil through the outlet means of the casing. A manual actuator which is also engageable with the linkage means is mounted adjacent the trigger, and the linkage and the plunger can be moved by the manual actuator independently of the trigger.

7 Claims, 8 Drawing Figures



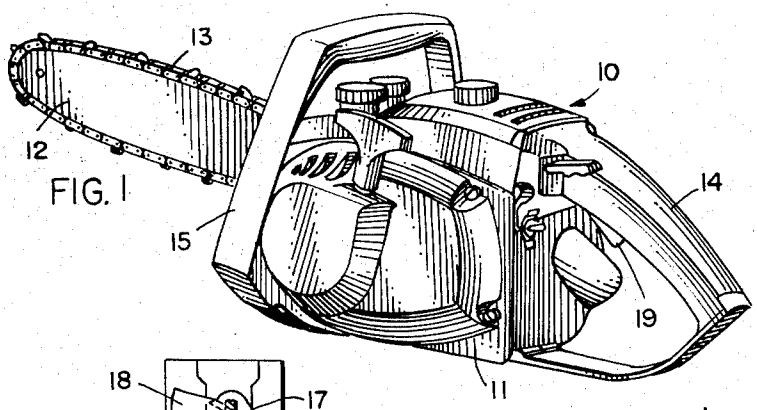


FIG. 1

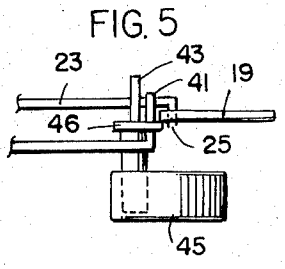


FIG. 5

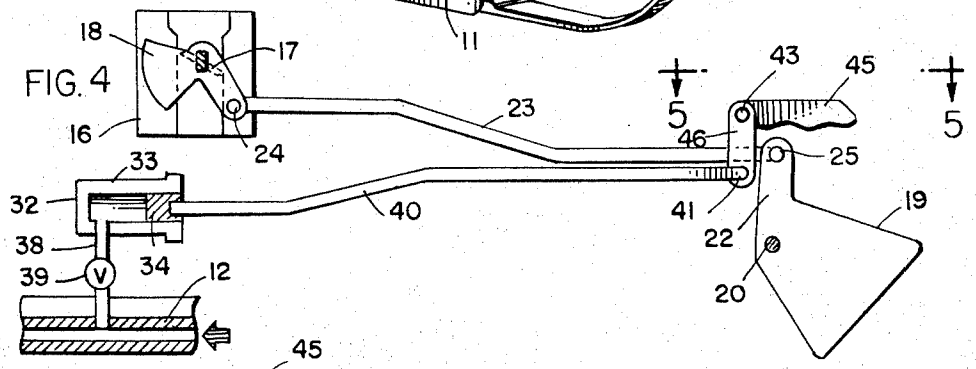


FIG. 4

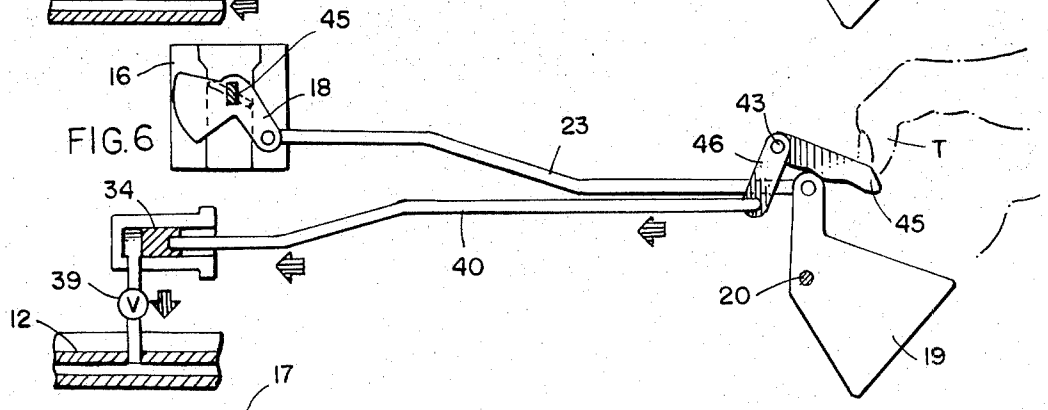


FIG. 6

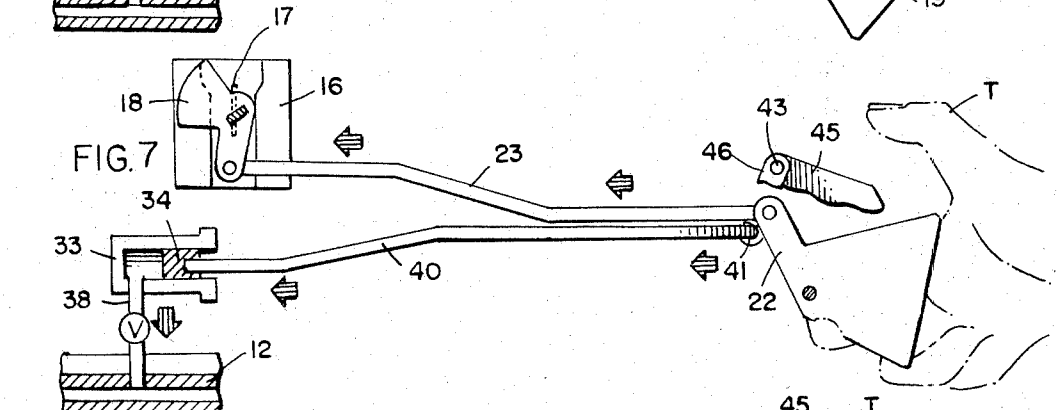


FIG. 7

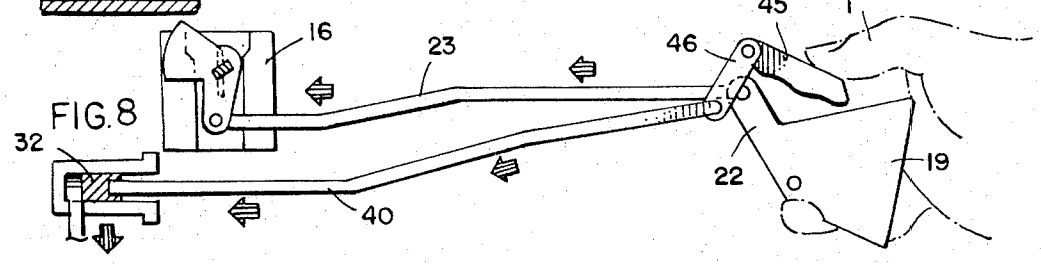


FIG. 8

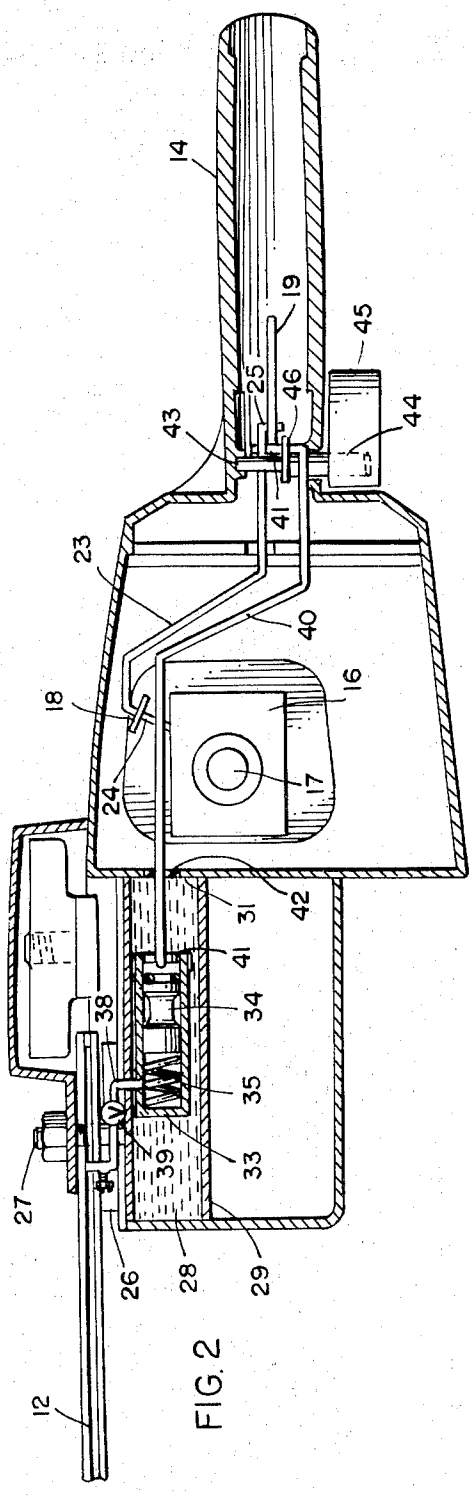

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FIG. 2

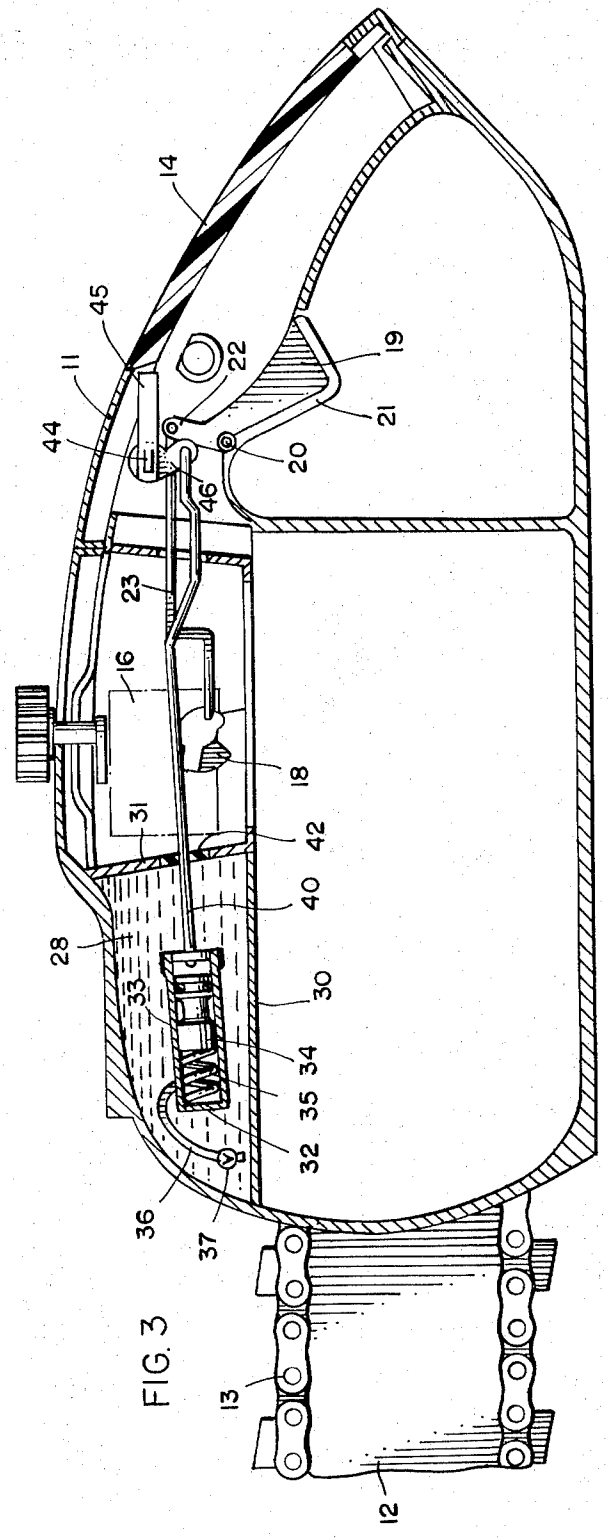

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FIG. 3

OILER APPARATUS FOR POWER TOOLS

BACKGROUND

This invention relates to an oiling apparatus for power tools. The apparatus finds particular utility in chain saws and will be described in conjunction therewith, although it will be understood by those skilled in the art that the oiling apparatus may be used with other power tools.

Chain saws conventionally include an endless saw chain which rides on the guiding surfaces of an elongated guide bar and power means, such as an internal combustion engine, which is operatively connected to the saw chain, as by a sprocket wheel, to drive the saw chain around the guide bar at high speed. Because of the high speed movement of the saw chain over the guiding surfaces of the guide bar, it is important to provide lubrication for the chain and the guide bar.

In the past lubrication has generally been provided by a manually operated oiler which includes an oil pump having a manually operated plunger. When lubrication was required, the plunger was manually operated to pump oil to the guide bar to lubricate the guiding surfaces of the guide bar and the chain. However, operators of chain saws frequently forget or simply neglect to operate the oiler, or do not operate the oiler often enough to provide sufficient lubrication under extreme working conditions. In any of these situations damage to the chain saw can result.

SUMMARY

The invention provides an oiling apparatus which is automatically operated whenever the throttle of the engine is operated to increase the speed of the saw chain and which can also be operated manually when desired to supply additional oil while maintaining full throttle operation or to supply oil when the engine is idling. The oiling apparatus includes a pump having a reciprocable plunger and linkage which extends from the plunger to a position adjacent the trigger which operates the throttle. The end portion of the linkage extends parallel to the axis of rotation of the trigger, and when the trigger is rotated to increase the speed of the saw chain, the trigger engages the linkage and moves the plunger to pump oil to the guide bar and chain. A manually operable bell crank means is rotatably mounted adjacent the trigger and is connected to the end portion of the linkage. The bell crank can be rotated to move the linkage and the plunger independently of the trigger when the saw chain is moving either at idling speed or at cutting speed.

DESCRIPTION OF THE DRAWING

The invention will be explained in conjunction with an illustrative embodiment shown in the accompanying drawing, in which:

FIG. 1 is a perspective view of a chain saw equipped with the invention;

FIG. 2 is a fragmentary top sectional view of the chain saw with portions thereof omitted for purposes of clarity;

FIG. 3 is a fragmentary sectional view taken along the lines 3—3 of FIG. 2;

FIGS. 4–8 are diagrammatic views illustrating the operation of the oiling apparatus. FIG. 4 illustrates the relationship between the throttle trigger and the oiling apparatus when the chain saw is idling; FIG. 5 is a fragmentary top view of FIG. 4; FIG. 6 is a view illustrating manual operation of the oiling apparatus when the engine is idling; FIG. 7 is a view illustrating automatic operation of the oiling apparatus; and FIG. 8 is a view illustrating manual operation of the oiling apparatus when the engine is operating at cutting speed.

DESCRIPTION OF SPECIFIC EMBODIMENT

Referring now to FIG. 1, the numeral 10 designates generally a chain saw which includes a housing 11, a guide bar 12, and an endless saw chain 13 which is trained over the guide bar for movement along the guiding surfaces thereof. The housing includes a right hand or rear handle 14 and a left hand or forward handle 15. The chain saw is conventional and need not be explained in detail.

The saw chain is driven by a sprocket wheel which is rotated by an internal combustion engine (not shown) mounted within the housing 11. Alternatively, an electric motor could be used to drive the saw chain. Fuel is fed to the engine by a conventional carburetor 16 (shown in solid outline in FIG. 2 and in phantom in FIG. 3) which includes a throttle or shutter plate 17 and a crank 18 for rotating the shutter plate.

The shutter plate is controlled by a throttle trigger 19 which is pivotally or rotatably mounted within the housing by a pin 20. The throttle trigger includes a finger portion 21 which extends from the handle 14 and actuating portion 22 which extends upwardly from the pin 20. The trigger is connected to the throttle crank 18 by conventional linkage 23 which has a first end portion 24 which extends through an opening in the crank 18 and a second end portion 25 which extends through an opening in the upper portion 22 of the trigger. The end portion 24 extends generally parallel to the axis of rotation of the crank 18 and is rotatably received by the opening in the crank, and the end portion 25 extends generally parallel to the mounting pin 20 of the trigger and is rotatably received by the opening in the trigger.

As can be seen best in FIG. 2, the rear end of the guide bar 12 is secured to the chain saw housing by means of a guide bar support pad 26 and a bolt 27. An oil tank or reservoir 28 is formed within the forward portion of the housing adjacent the rear end of the guide bar by side, bottom and rear walls 29, 30, and 31, and an oil pump 32 is mounted within the tank. The pump 32 includes an outer cylinder or casing 33 which is secured to the inside of the housing and a plunger or piston 34 which is reciprocably received within the casing. A helical coil spring 35 is positioned in the casing forwardly of the plunger for biasing the plunger toward the rear of the chain saw.

Oil is supplied to the casing 33 by means of an oil inlet line 36 which extends from the oil reservoir to the wall of the casing and which includes a check valve 37 which permits oil to flow into the casing but prevents outflow. An oil outlet line 38 communicates with the interior of the casing 33 and extends through the guide bar support pad 27 to the guide bar. A check valve 39 is positioned in the oil outlet line for permitting oil to flow from the casing to the guide bar but for preventing backflow.

The plunger can be moved forwardly against the bias of the return spring 36 by linkage 40 which extends through an opening in the end cap 41 of the casing. The forward end of the linkage 40 is somewhat rounded and

is received in correspondingly shaped recess in the rear end of the plunger **34**, and the linkage extends rearwardly through the rear wall of the oil tank and alongside the carburetor **16**. The linkage terminates in an end portion **41** which extends generally parallel to the trigger pin **20** and the end portion **25** of the throttle linkage **23**. If desired, the plunger linkage **40** can be provided in two parts for ease of assembly which are joined by a connector. The linkage passes through a suitable sealing member mounted in the rear wall **31** of the oil reservoir, such as rubber washer **42**, which prevents oil leakage.

A pivot pin **43** is rotatably mounted in the rear handle portion of the housing and extends outwardly from the left side of the handle and terminates in a flattened end portion **44**. An oiler lever **45** provided with a recess which is shaped to non-rotatably receive the end portion **44** of the pivot pin is mounted on the end portion of the pin and extends alongside the handle. A crank or lever **46** is non-rotatably mounted on the pivot pin **43** within the housing, and the end portion **41** of the oiler linkage extends through an opening in the crank **46**.

The operation of the oiler apparatus will be explained with reference to FIGS. **4–8**. FIG. **4** diagrammatically illustrates the throttle and oiler portions of the chain saw when the chain saw is in the idle position and the saw chain is revolving around the guide bar relatively slowly. The shutter plate **17** is in its idle position within the throat of the carburetor **16**, and the throttle crank **18** is connected to the shutter plate by pin **45** to cause rotation of the throttle plate as the crank rotates. The actuating portion **22** of the trigger **19** is spaced slightly rearwardly of the end portion **41** of the oiler linkage, and the oil pump plunger **34** is maintained in its rearward position by the return spring **35** (not shown in FIG. **4**). In this position, no oil is being pumped to the guide bar.

If it is desired to lubricate the guide bar and the saw chain when the saw chain is running at idle speed, the oiler lever **45** is depressed by the thumb T of the right hand of the operator as indicated in FIG. **6**. The lever **45** and the crank **46** are both fixed to the pivot **43** and thereby act as first and second lever portions of a bell crank, i.e., as the lever **45** is depressed, the crank **46** rotates in the same direction to move the oiler linkage **40** forwardly. Forward movement of the oiler linkage moves the plunger **34** forwardly within the casing **33** and pumps oil through the oil outlet line **38** to the guide bar. Since the oiler lever and the oiler linkage is mounted independently of the throttle trigger and throttle linkage, the guide bar can be lubricated without changing the position of the shutter plate of the carburetor.

When it is desired to use the chain saw for cutting, the speed of the saw chain is increased by pulling the lower portion of the throttle trigger as shown in FIG. **7**. The actuating portion **22** of the trigger is thereby caused to rotate forwardly or clockwise as viewed in FIG. **7** to move the throttle linkage **23**, the throttle crank **18** and the shutter plate **17** to increase the amount of fuel supplied to the engine. Forward movement of the actuating portion **22** of the trigger also brings the actuating portion into engagement with the end portion **41** of the oiler linkage and pushes the oiler linkage forwardly to move the oil pump plunger and pump oil to the guide bar. Forward movement of the oiler linkage is permitted by rotation of the crank **46** and the oiler lever **45** even though the oiler lever is not depressed. The guide bar and chain are therefore automatically lubricated each time the throttle trigger is pulled.

When the chain saw is being operated at cutting speed for a sustained period of time, for example, when cutting through a relatively large log, it may be desirable to lubricate the guide bar and the chain without decreasing the speed of the chain. The length of the casing **33** of the oil pump is such that when the throttle trigger has been pulled to move the shutter plate to the full throttle position shown in FIG. **7**, the plunger has been moved forwardly only to an intermediate position within the casing. The plunger can therefore be moved forwardly an additional distance to pump oil to the guide bar by manually depressing the oiler lever **45** with the thumb to further rotate the bell crank means and push the oiler linkage forwardly. Since the oiler lever is located alongside the handle **14**, the oiler lever can be depressed with the thumb while the index finger maintains the trigger in the full throttle position. When the oiler lever is released, the return spring returns the plunger and the oiler linkage to the position illustrated in FIG. **7**, and the suction provided by the rearward movement of the plunger draws oil into the casing from the oil reservoir through the check valve **37**. The oiler can then again be operated manually to lubricate the guide bar when desired without releasing the trigger.

When the trigger is released, conventional return means associated with the trigger or the carburetor returns the trigger and the throttle linkage to the position illustrated in FIG. **4**, and the return spring **35** returns the plunger and the oiler linkage to the position illustrated in FIG. **4**. As the plunger is returned, oil is pulled into the casing from the oil reservoir.

From the foregoing it is seen that the oiler apparatus is operated automatically whenever the chain saw throttle is operated, and the guide bar and chain will be lubricated to prevent damage even if the operator forgets or neglects to operate the oiler manually. The oiler apparatus can be operated manually independently of the throttle when the chain saw is being operated at either idle speed or cutting speed.

Although I have described a piston-type pump, it will be apparent that other types of pumps can be used. The oiler linkage would then be operatively connected to the movable pumping member. Further, the apparatus could be used with other power tools which have a moving work part that requires lubrication such as a drill, bank saw, and the like.

While in the foregoing specification, a detailed description of a specific embodiment of the invention was set forth for the purpose of illustration, it is to be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In a chain saw having a housing, an elongated guide bar mounted on the housing and extending therefrom, an endless saw chain trained around the guide bar, power means within the housing for moving the saw chain around the guide bar, and trigger means movably mounted on the housing for actuating the power means, an improved chain oiling apparatus comprising a casing, inlet means for supplying oil to the casing, outlet means for supplying oil from the casing to the guide bar, plunger means within the casing and

being movable toward the outlet means to force oil from the casing through the outlet means, linkage means for moving the plunger within the casing extending from the plunger and having an end portion adjacent the trigger, bell crank means rotatably mounted on the housing and providing a first lever portion extending from the housing and a second lever portion within the housing, rotation of the first lever portion causing rotation of the second lever portion, the end portion of the linkage means being connected to the second lever portion for movement therewith whereby the plunger means may be moved toward the outlet means of the casing by rotating the first lever portion of the bell crank means, the trigger means being engageable with the end portion of the linkage means when the trigger means is moved to actuate the power means to move the linkage means so that the plunger is moved toward the outlet means and oil is forced by the plunger means through the outlet means to the guide bar.

2. The apparatus of claim 1 in which the end portion of the linkage means extends generally parallel to the axis of rotation of the bell crank means, the trigger means being rotatable about an axis extending generally parallel to the axis of rotation of the bell crank means and including an actuating portion engageable with the end portion of the linkage means when the trigger means is rotated to actuate the power means.

3. In a chain saw having a housing, an elongated guide bar mounted on the housing and extending therefrom, an endless saw chain trained around the guide bar, power means within the housing for moving the saw chain around the guide bar, and trigger means movably mounted on the housing for actuating the power means, an improved chain oiling apparatus comprising a casing, inlet means for supplying oil to the casing, outlet means for supplying oil from the casing to the guide bar, plunger means within the casing and being movable toward the outlet means to force oil from the casing through the outlet means, linkage means for moving the plunger within the casing extending from the plunger and having an end portion adjacent the trigger, the trigger means being engageable with the end portion of the linkage means when the trigger means is moved to actuate the power means to move the linkage means so that the plunger means is moved toward the outlet means and oil is forced by the plunger means through the outlet means to the guide bar.

4. The apparatus of claim 3 including linkage-moving means movably mounted on the housing adjacent the end portion of the linkage means, the linkage-moving means being engageable with the linkage means whereby the linkage means can be moved to move the plunger means toward the outlet means independently of movement of the trigger means.

5. The apparatus of claim 3 including a lever rotatably mounted on the housing adjacent the end portion of the linkage means, rotation of the lever causing movement of the linkage means to move the plunger means toward the outlet means independently of movement of the trigger means.

6. An oiling apparatus for a power tool having a movable work part, power means for moving the work part and movable control means operatively associated with the power means for varying the speed of the work piece comprising an oil pump having a casing and a plunger movably mounted within the casing, the casing being provided with oil inlet means and oil outlet means, movement of the plunger toward the oil outlet means forcing oil from the casing through the outlet means, linkage means extending from the plunger to adjacent the control means, the linkage means being movable by the control means when the control means is moved to increase the speed of the work part to move the plunger toward the oil outlet means and force oil through the oil outlet means.

7. The apparatus of claim 6 including linkage-moving means mounted on the power tool adjacent the control means for moving the linkage means independently of the control means.

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