Nov. 2, 1954 W. J. ANTTONEN 2,693,206

CHAIN SAW WITH OUTBOARD END IDLER PULLEY

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FIG. 1.

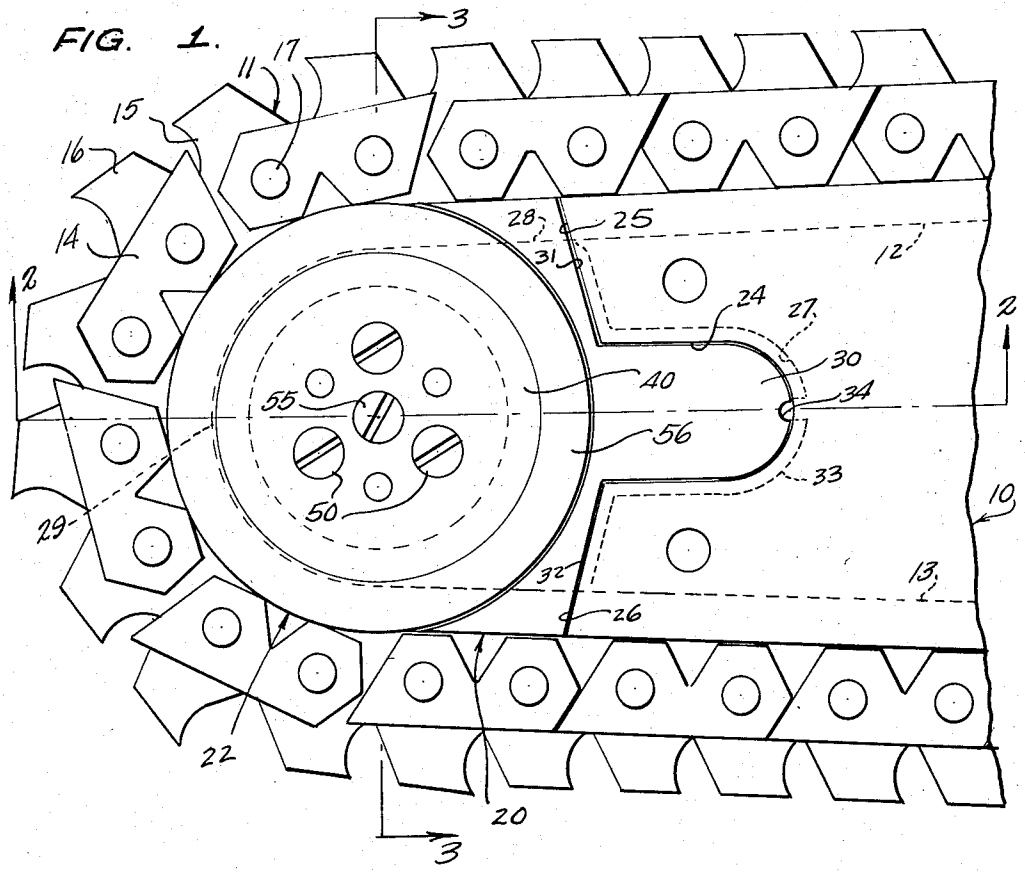
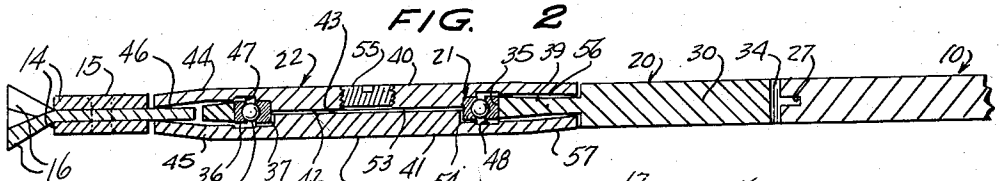


FIG. 2



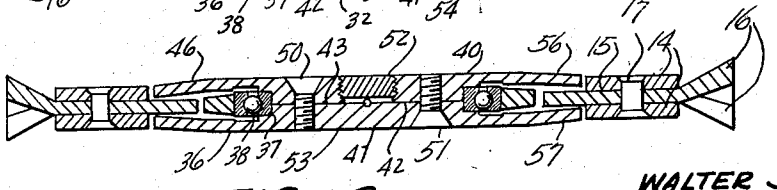


FIG. 3.

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CHAIN SAW WITH OUTBOARD END IDLER PULLEY

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2 Claims. (Cl. 143—32)

This invention relates to power driven, portable chain saws and more particularly to a chain saw having an idler chain pulley mounted in an antifriction bearing at the outer or outboard end of the chain guide bar thereof.

It is among the objects of the invention to provide an improved portable chain saw having a friction reducing chain pulley assembly mounted on the outboard end of the chain guide bar of the saw; in which the pulley assembly is detachably mounted on the bar and can be removed when desired; in which the idler pulley is mounted on an antifriction ball or roller bearing to substantially eliminate the friction incident to the passage of the chain around the outboard end of the chain guide bar; in which the idler chain pulley has a thickness substantially the same as the thickness of the guide bar, so that the idler pulley will pass freely through a kerf cut by the chain in a tree or log; in which the idler pulley assembly can be mounted on an existing chain saw with only minor modification of the existing saw construction; and in which the idler pulley assembly is simple and durable in construction, economical to manufacture, and effective and efficient in operation.

Other objects and advantages will become apparent from a consideration of the following description and the appended claims in conjunction with the accompanying drawing wherein:

Figure 1 is a side elevational view of the outboard end portion of a portable chain saw equipped with an idler pulley assembly illustrative of the invention;

Figure 2 is a fragmentary cross sectional view on the line 2—2 of Figure 1; and

Figure 3 is a transverse cross sectional view on the line 3—3 of Figure 1.

With continued reference to the drawing, the numeral **10** generally indicates the chain guide bar of the saw and the numeral **11** generally indicates the saw chain.

The guide bar **10** is a flat plate of suitable material, such as tempered steel, of elongated shape and having its longitudinal edges slightly curved convexly and longitudinally extending slots, as indicated at **12** and **13**, extending longitudinally of the corresponding side edges of the bar medially of the thickness of the latter.

The chain **11** comprises a plurality of links **14** and **15** of which the links **15** are provided with cutting teeth **16** projecting outwardly from the side of the chain remote from the bar **10** and with extensions on the side of the chain adjacent the bar slidably received in the grooves **12** and **13** to guide the chain along the guide bar. The links **14** pivotally interconnect the adjacent links **15** by means of pivot pins **17** extending through registering apertures in the links **14** and **15**.

In the usual construction, the bar **10** is provided at its outboard end with an arcuately rounded edge around which the grooves **12** and **13** continue and meet, and the chain **11** is driven around this arcuately rounded outboard end of the guide bar. Because of the sharp bending of the chain around the outboard end of the guide bar and the tension forces applied to the chain to perform the cutting operation of the saw, a large amount of mechanical friction and a consequently large amount of heat is generated at the outboard end of the guide bar and this causes rapid wear of the bar and the chain, as well as overheating of these elements.

As power operated, portable chain saws of the character indicated above are well known to the art, and the specific construction of the saw constitutes no part

of the present invention, except in the combination thereof with the idler pulley assembly presently to be described, a more detailed illustration and description of the chain saw is considered unnecessary for purposes of the present disclosure.

The idler pulley assembly of the present invention includes a pulley supporting plate or bracket, generally indicated at **20**, detachably mounted on the guide bar **10** at the outboard end of the latter, an annular antifriction bearing, generally indicated at **21**, mounted in the bracket **20**, and an idler pulley, generally indicated at **22**, is journaled in the bearing **21** and receives the portion of the chain **11** extending around the outboard end of the guide bar **10** to guide the chain around the end of the guide bar.

The guide bar **10** is cut off at its outboard end at a location such that the portion cut off has a length along the guide bar slightly greater than the width of the guide bar along a line extending perpendicular to the longitudinal center line of the guide bar to the center of curvature of the arcuately rounded outboard end of the bar and is provided with a notch **24** which is symmetrically disposed relative to the longitudinal center line of the bar and provided with an arcuately curved inner end. The end portions of the guide bar at the respectively opposite sides of the notch **24**, as indicated at **25** and **26**, are substantially straight and are inclined slightly outwardly from the opposite sides of the notch **24** to the corresponding side edges of the guide bar. The guide bar is provided with a groove **27** which extends around the notch **24** and along the end portions **25** and **26** of the guide bar from the corresponding sides of the notch **24** to the chain guide grooves **12** and **13** and this groove **27** is disposed medially of the thickness of the bar **10**.

The bracket **20** may be formed from a plate of tempered steel having a thickness substantially equal to the thickness of the bar **10** and includes a body portion **28** having one end arcuately curved, as indicated at **29**, and having on its other end a lug **30** which fits into the notch **24**. At each side of the lug **30** the end portions **31** and **32** of the bracket fit against the corresponding end portions **25** and **26** of the bar **10** and a tongue **33** extends around the lug **30** and along the end portions **31** and **32** of the bracket and fits in the groove **27** in the corresponding end of the bar **10** to firmly secure the bracket to the bar. The fit between the tongue **33** and groove **27** is preferably so close that the bracket will be retained on the bar without the use of other fasteners, and a notch **34** is provided in the lug **30** at the distal end thereof for the insertion of a tool, such as a punch, for forcing the lug outwardly of the notch **24** to separate the bracket **20** from the bar **10**, the notch **34** also extending through the tongue **33** on the bracket.

The bracket **20** is provided with a circular opening **35** preferably having the same center as the center of curvature of the outer end **29** of the bracket and the outer race **36** of the antifriction bearing **21** is fitted closely into the opening **35** in the bracket **20**. The bearing is preferably sweated into the bracket **20** by first heating the bracket, then placing the outer race **36** of the bearing in the opening **35** in the bracket and then allowing the bracket to cool and contract around the outer race of the bearing. The bearing has an inner race **37** disposed within the outer race **36** and separated therefrom by the antifriction ball or roller element **38** disposed between the outer and inner races of the antifriction bearing.

An annular portion **39** of the bracket **20** extending around the opening **35** is recessed at both sides of the bracket to provide an annular bracket portion of reduced thickness in which the bearing **21** is mounted.

The pulley **22** consists of two circular discs **40** and **41** of suitable material, such as tempered steel, each having a thickness substantially one-half the thickness of the bracket plate **20**. Each of these discs is provided in one side thereof with an annular recess which provides hub portions **42** and **43** which are concentric with the corresponding discs and fit into the inner race **37** of the bearing **21**, these hub portions having peripheral surfaces disposed perpendicular to the faces of the discs and constituting annular shoulders which firmly engage the inner

surface of the inner race 37 of the bearing. The recessed annular portions 44 and 45 of the discs are disposed at respectively opposite sides of the recessed annular portion 39 of the bracket 20 and out of engagement with the recessed annular portion of the bracket. The space between the recessed annular portions 44 and 45 of the discs 40 and 41 provides a groove in continuation of the grooves 12 and 13 receiving the guide lugs or projections 46 of the chain 11.

The discs 40 and 41 are also provided with shallow annular grooves 47 and 48 within the recessed annular portions thereof closely surrounding the hub portions 42 and 43 which grooves provide clearance over the space between the inner and outer races of the bearing 21 and over the outer race 36 of the bearing.

The two discs 40 and 41 are secured together by screws extending through the hub portions 42 and 43 thereof, there being six screws, three of which, as indicated at 50, extend through apertures in the disc 40 and are threaded into tapped holes in the disc 41, and the other three of which, as indicated at 51, extend through apertures in the disc 41 and are threaded into tapped holes in the disc 40, as illustrated in Figure 3. The three screws in each of these groups are spaced outwardly from the center of the pulley and are spaced apart at substantially equal angular intervals around the center of the pulley, as illustrated in Figure 1.

The disc 40 is provided with a centrally located, screw threaded opening 52 and a passage 53 disposed between the contacting faces of the hub portions of the discs 40 and 41 extends from the opening 52 to the inner race 37 of the bearing 21 and through passages 54 which extend past the inner race of the bearing to the antifriction elements 38 for supplying lubricant from the opening 52 to the antifriction elements of the bearing. A screw plug 55 is threaded into opening 52 to maintain this opening closed, except at those times at which the plug is removed for the application of lubricant to the idler pulley assembly.

The pulley 22 is slightly beveled on both sides around its outer edge, as indicated at 56 and 57, to facilitate passing the pulley into or out of a kerf cut in a work piece by the saw chain 11.

As the pulley 22 constituted by the discs 40 and 41 has a thickness substantially the same as the thickness of the chain guide bar 10 and somewhat less than the set of the chain teeth 16, the presence of the idler pulley does not interfere in any way with the movement of the outboard end of the saw blade through a saw kerf cut into a work piece and, at the same time, the idler pulley guides the chain around the outboard end of the guide bar substantially without mechanical friction.

While means have been shown for lubricating the antifriction bearing 21, it is to be understood that a bearing with sealed in lubricant may be used, if desired, in which case the lubricating arrangement may be omitted.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are, therefore, intended to be embraced therein.

What is claimed is:

1. In a portable chain saw including a chain guide bar having an outboard end, and a cutting chain extending around the outboard end of said guide bar, an idler pulley assembly mounted on said guide bar at the outboard end of the latter for guiding said chain around the outboard end of said guide bar, said assembly comprising a bracket plate having a centrally disposed lug projecting from one end thereof and end portions extending outwardly from the respectively opposite sides of said lug at the proximal end of the latter, said guide bar being cut off at its outboard end to receive said bracket and provided with a notch disposed medially of the width thereof receiving said lug, tongue and groove means extending across said one end of said bracket and around said lug maintaining said bracket in operative position on said bar, said bracket having a thickness substantially equal to the thickness of said bar and having a circular opening therein surrounded by an annular bracket portion of reduced thickness, an antifriction bearing having an outer race secured in the opening in said bracket, an inner race disposed within said outer race and antifriction elements disposed between said races, and an idler pulley including mutually opposed circular discs having concentric hub portions received in the inner race of said bearing and spaced apart outer annular portions of reduced thickness surrounding said hub portions and receiving the annular bracket portion of reduced thickness therebetween, and means releasably securing said discs together in mutually concentric and face to face relationship, said guide bar having chain guiding grooves extending one along each side edge of said bar and the space between the outer annular portions of said pulley discs continuing said chain guiding grooves around the outer side of said pulley.

2. In a portable chain saw including a chain guide bar having an outboard end, and a cutting chain extending around the outboard end of said guide bar, an idler pulley assembly mounted on said guide bar at the outboard end of the latter for guiding said chain around the outboard end of said guide bar, said assembly comprising a bracket plate having a centrally disposed lug projecting from one end thereof and end portions extending outwardly from the respectively opposite sides of said lug at the proximal end of the latter, said guide bar being cut off at its outboard end to receive said bracket and provided with a notch disposed medially of the width thereof receiving said lug, tongue and groove means extending across said one end of said bracket and around said lug maintaining said bracket in operative position on said bar, said bracket having a thickness substantially equal to the thickness of said bar and having a circular opening therein surrounded by an annular bracket portion of reduced thickness, an antifriction bearing having an outer race secured in the opening in said bracket, an inner race disposed within said outer race and antifriction elements disposed between said races, and an idler pulley including mutually opposed circular discs having concentric hub portions received in the inner race of said bearing and spaced apart outer annular portions of reduced thickness surrounding said hub portions and receiving the annular bracket portion of reduced thickness therebetween, and means releasably securing said discs together in mutually concentric and face to face relationship, said guide bar having chain guiding grooves extending one along each side edge of said bar and the space between the outer annular portions of said pulley discs continuing said chain guiding grooves around the outer side of said pulley, one of said discs having a lubricant receiving opening therein and said pulley having a lubricant channel extending from said lubricant receiving opening to said antifriction bearing, and a closure plug threaded into said lubricant receiving opening.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,316,997	Smith	Apr. 20, 1943
2,432,567	Forrest	Dec. 16, 1947
2,532,981	Wolfe	Dec. 5, 1950