United States Patent [19]

Arff

[11] **3,765,088**

[45] **Oct. 16, 1973**

[54] **NOSE ROLLER**

[75] Inventor: **Uwe F. Arff,** Peterborough, Ontario, Canada

[73] Assignee: **Outboard Marine Corporation,** Waukegan, Ill.

[22] Filed: **June 24, 1971**

[21] Appl. No.: **156,364**

[52] **U.S. Cl.** **30/384**

[51] **Int. Cl.** **B27b 17/04**

[58] **Field of Search** ..... 143/32 H, 32 R; 30/381, 384, 383, 385, 386, 387

[56] **References Cited**

UNITED STATES PATENTS

2,693,206	11/1954	Anttonen	143/32 H
3,198,222	8/1965	Bowen	143/32 H
3,602,274	8/1971	Barrett	143/32 H

Primary Examiner—Donald R. Schran

Attorney—Robert E. Clemency et al.

[57] **ABSTRACT**

Disclosed herein is a cutter bar nose roller comprising a tongue adapted to be connected to one end of the cutter bar and including a circular wall defining an aperture, bearing means received in the aperture and engaging the tongue wall, a first side plate including an apertured side portion extending in parallel relation to and on one side of the tongue and a circular flange extending from the side portion into the tongue aperture in radially inwardly spaced relation from the tongue wall and in engagement with the bearing means, and a second side plate including a side portion extending in parallel relation to and on the other side of the tongue, and a circular flange portion extending from said second plate member side portion and into the aperture in the first place member side portion and joined to said first plate member for common rotary movement relative to the tongue.

9 Claims, 6 Drawing Figures

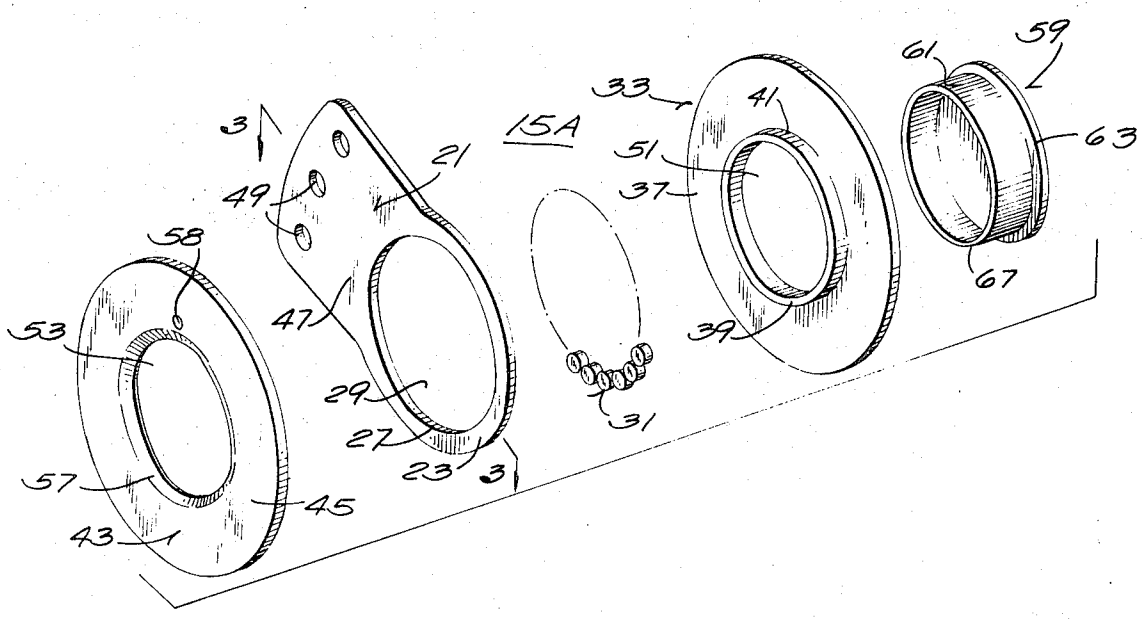


Fig. 1

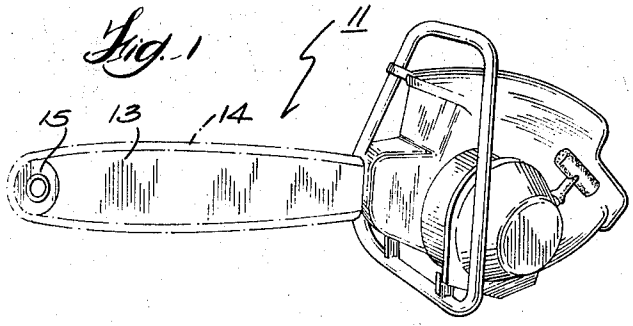


Fig. 2

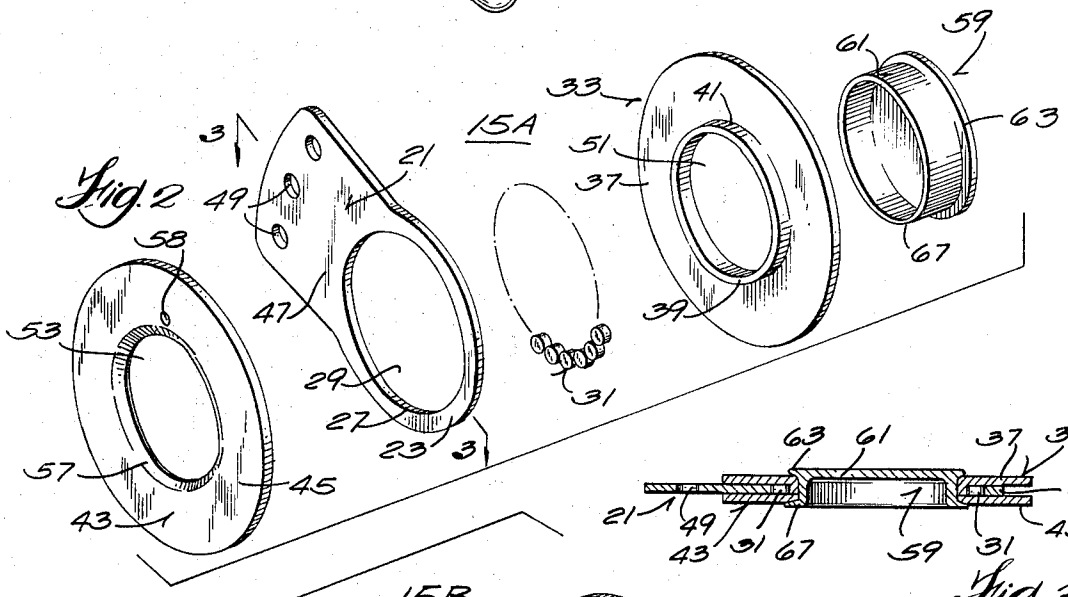


Fig. 3

Fig. 4

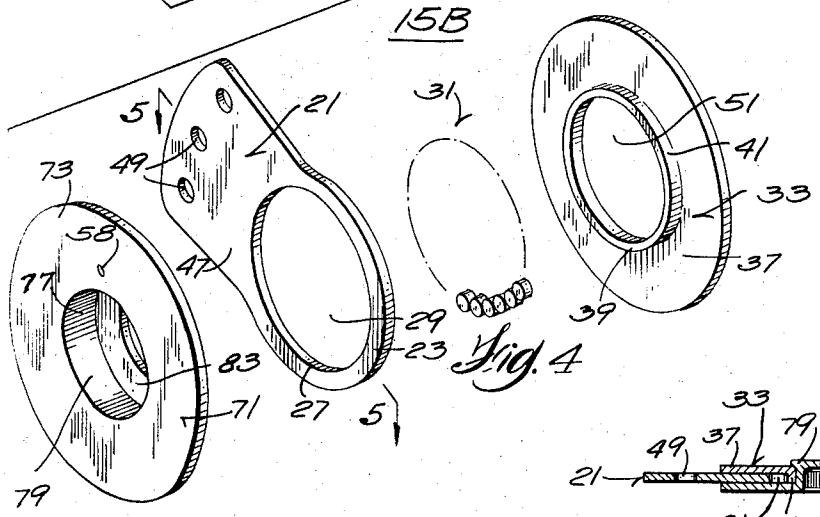


Fig. 5

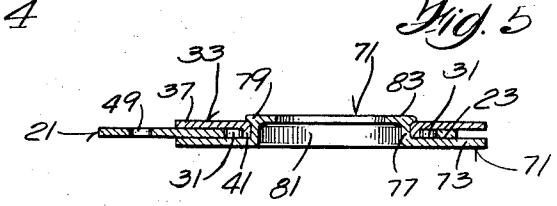
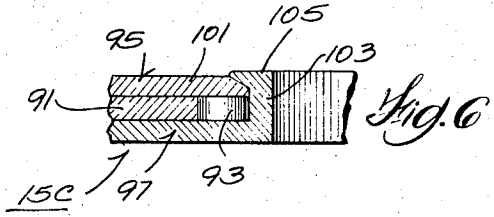


Fig. 6



Inventor
Uwe H. Artt

NOSE ROLLER

BACKGROUND OF THE INVENTION

The invention relates to chain saws and more particularly to devices for minimizing frictional loss when the cutting chain traverses the tip of a cutter bar during chain saw operation. Specifically, the invention relates to cutter bar nose rollers.

Prior cutter bar nose roller constructions are disclosed in the U.S. Bowen III Pat. Nos. 3,198,222 and 3,198,223 issued Aug. 3, 1965, in the Dibbertin U.S. Pat. No. 3,263,715 issued Aug. 2, 1966 and in the U.S. Barrett application Ser. No. 826,172 filed May 20, 1969. The above-identified prior constructions all include a tongue having a circular wall which defines an aperture and forms an outer bearing race, a bearing located in the aperture and engaged against the race, and a roller assembly which provides an outer race for the bearing and which includes a pair of side plates which are unified together and rotatable relative to the tongue.

SUMMARY OF THE INVENTION

The invention provides a nose roller comprising a tongue including a circular wall which defines an aperture and forms an outer race for a suitable bearing provided with an inner race by a circular flange extending inwardly of the tongue aperture from a side plate member. Thus, in accordance with the invention, one member is employed to provide both a side plate and an inner bearing race.

Also in accordance with the invention, the nose roller side plate members are constructed to afford unification therebetween without additional elements. In this regard, one of the side plate members includes a circular flange portion which extends through an aperture in the other side plate member and which, at its outer end, is fixed to the other side plate member to provide an annular area serving to unify and secure together the side plates. Thus, the invention also provides for unification of the side plate members into a roller assembly without additional components.

Also in accordance with the invention, one of the side plate members can be apertured and formed with a circular flange which provides a bearing race while the other side plate member can be provided with a circular flange which is received into the aperture of the first side plate member and secured thereto so as to unify the side plate members.

Alternatively and in accordance with the invention, one of the side plate members can be formed with a circular flange which provides an inner bearing race and which additionally enters into an aperture in the other side plate member and, at its outer end, is deformed into overlying relation to the outer surface of the other side plate member, or otherwise suitably fixed to the other side plate member, to unify the side plate members into a roller assembly.

One of the principal objects of the invention is the provision of a nose roller in which the inner race is provided by a flange on one of the side plate members.

Another of the principal objects of the invention is the provision of a nose roller in which the side plates are fixed together by a circular flange extending from one of the side plates.

Another of the principal objects of the invention is the provision of a nose roller including a circular flange

extending from one of the side plates and through an aperture in the other of the side plates and joined to the other side plate by being deformed into overlying relation to the margin of the aperture in the other side plate.

Still another of the principal objects of the invention is the provision of a nose roller in which a first side plate member is apertured and includes a flange which surrounds the aperture and provides an inner bearing race, together with a second side plate member which includes a circular flange extending telescopically inwardly of the flange on the first plate member and which, at its outer end, is provided with means for retaining the side plate members in assembled relation.

Another of the principal objects of the invention is the provision of a nose roller which is constructed from a minimum number of parts or components.

Another of the principal objects of the invention is the provision of a nose roller which has superior strength and resistance to side plate separation, notwithstanding being constructed of a minimum number of components.

Still another principal object of the invention is the provision of a nose roller which affords superior manufacturing efficiency, which is constructed of a minimum number of parts, and which affords superior strength and resistance to side plate separation.

Another of the principal objects of the invention is the provision of a new and improved nose roller which is relatively economical to manufacture and which will nevertheless provide superior service over a long and useful life.

Still another of the principal objects of the invention is the provision of a nose roller which can be of relatively small size without sacrificing strength and which affords superior resistance to side plate separation.

Other objects and advantages of the invention will become known by reference to the following description and accompanying drawings.

DRAWINGS

FIG. 1 is a perspective view of a chain saw including a nose roller embodying various of the features of the invention.

FIG. 2 is an exploded perspective view of the components of one embodiment of a nose roller embodying various of the features of the invention.

FIG. 3 is a sectional view which is taken in the direction of line 3—3 of FIG. 2 and which illustrates the nose roller constructed from the components shown in FIG. 2.

FIG. 4 is an exploded perspective view of the components of a second embodiment of a nose roller embodying various of the features of the invention.

FIG. 5 is a sectional view which is taken in the direction of line 5—5 of FIG. 4 and which illustrates the nose roller constructed from the components shown in FIG. 4.

FIG. 6 is a fragmentary view of another embodiment of a nose roller embodying various of the features of the invention.

GENERAL DESCRIPTION

Shown in FIG. 1 is a chain saw 11 including a cutter bar 13 which supports a saw chain 14 and is provided with a nose roller 15 in accordance with the invention.

Shown in FIGS. 2 and 3 is a nose roller 15A which can be employed on the cutter bar 13 and which comprises a tongue 21 including an annular portion 23 with a transverse circular wall 27 which defines an aperture 29 and which serves as an outer race for a suitable bearing means 31 located in the aperture 29 and in engagement with the wall 27. The nose roller further includes a first side plate member 33 including a side portion 37 extending in parallel relation to and on one side of the tongue 21 and a flange portion 39 which extends from the side portion 37 and into the tongue aperture 29 and which includes an annular surface 41 engaging the bearing means 31 and serving as an inner race. The nose roller 15A also includes a second side plate member 43 which includes a side portion 45 extending in parallel relation to and on the other side of the tongue 21, together with means fixedly connecting the side plate members 39 and 43 for common rotary movement relative to the tongue 21.

More particularly, the annular portion 23 of the tongue 21 extends from a portion 47 having mounting apertures 49 facilitating assembly of the tongue 21 between the side plates of the chain saw cutter bar 13. In this regard, as is conventional, the tongue 21 is adapted to extend into a recess between the cutter bar side plates and can be secured by rivets or bolts (not shown) which extend through the apertures 49 in the tongue 21.

As can be seen readily from FIG. 2, the respective side portions 37 and 45 of the side plate members 33 and 43 are provided with respective centrally located apertures 51 and 53, and the flange portion 39 of the first side plate member 33 extends from the margin of the aperture 51. In addition, the margin on the outer surface of the second plate member 43 around the aperture can be chamfered as shown at 57. In addition, one of the side plate members can include a lubrication hole 58 which is illustrated as being provided in the side plate member 43.

In the FIGS. 2 and 3 embodiment, the previously mentioned connecting means comprises an element or rivet 59 which includes a tubular or hollow body section 61 which can be solid or hollow, an enlarged head 63 which is located at one end of the body section 61, and which engages the margin on the outer surface of the side portion 37 of the first side plate member 33 around the aperture 51, together with an end portion 67 which is located at the other end of the body section 61 and which, when the nose roller 15A is assembled, is deformed as shown in FIG. 3, into an annular area of engagement with the chamfered margin 57 so as to unify the side plate members 33 and 43 into a roller assembly which is rotatable relative to the tongue 21.

In operation, when the saw chain 14 travels along the cutter bar 13, such movement causes the roller assembly to rotate relative to the tongue 21 and cutter bar 13 thereby reducing frictional losses.

Shown in FIGS. 4 and 5 is another nose roller 15B which includes various components constructed the same as in the nose roller 15A. Such components include the tongue 21, the bearing means 31, and the side plate member 33. As in nose roller 15A shown in the FIGS. 2 and 3 embodiment, the nose roller 15B shown in FIGS. 3 and 4 also includes a second side plate member 71 and means for joining the side plate members 33 and 71.

More particularly in the nose roller 15B shown in FIGS. 4 and 5, the side plate member 71 includes a side portion 73 and the connecting means comprises a circular flange portion 77 which extends from the side portion 73 in radially inwardly telescopic relation to the flange portion 41 of the first side plate member 33. At its outer end, the flange portion 77 includes an end portion 79 (See especially FIG. 5) which is radially outwardly deformable to engage the margin of the outer surface of the side portion 37 of the first side plate member 33 about the aperture 51. If desired, the margin on the outer surface of the first side plate member side portion 37 around the aperture 51 could be chamfered to facilitate fixed connection between the first side plate member 33 and the outer end portion 79 of the flange portion 77 of the second side plate member 71.

In the illustrated construction, the side portion 73 of the second side plate member 71 is apertured at 81 radially inwardly of the flange portion 77 and the second plate member 71 includes a wall 83 which can be apertured as shown and which is peripherally connected to the outer end portion 79 of the flange portion 77. This construction facilitates employment of the tooling which enlarges the outer end portion 79 of the flange portion 77 and also offers increased strength after the deformation which serves to secure together the side plate members 33 and 71 to form an assembly rotatable relative to the tongue 21.

Operation of the embodiments shown in FIGS. 4 and 5 is the same as that shown in FIGS. 2 and 3.

Shown fragmentarily in FIG. 6 is another nose roller 15C which embodies various of the features of the invention. More specifically, the nose roller 15C includes a tongue 91 which is constructed in the same manner as the tongue 21. In addition, the nose roller 15C includes suitable bearing means 93 and two side plate members 95 and 97. The side plate member 95 includes a side portion 101 which is centrally apertured and the side plate member 97 includes a circular flange portion 103 which provides an inner race for the bearing means 93 and which extends through the aperture in the other side plate member 95 and has an outer end portion 105 which is deformed to tightly and securely engage the aperture margin of the outer surface of the side plate member 95. Such margin could be chamfered and, if desired, the circular flange portion 103 could be joined to a wall (not shown) such as the wall 83 illustrated in FIGS. 4 and 5.

As a consequence, the nose roller 15C includes one circular flange which serves both to provide an inner race and to afford connection of the side plate members 33 and 71 into a roller assembly.

Alternatively, if desired, the side plates 33 and 71 could be secured together without deformation of the outer end portion 105 of the circular flange portion 103 by internally threading the circular flange portion 103 and by screwing a bolt (not shown) into the flange portion, which bolt has a head with a sufficient radial extent to provide an annular area of engagement with the aperture margin of the outer surface of the plate member 95.

As a further alternative, the flange portion 103 of the plate member 97 could be internally threaded and could project toward the side plate member 95 without extending through an aperture in the side plate member. Instead, a bolt (not shown) which extends through

an aperture in the side plate member **95** and includes a head engaging the aperture margin, could be threaded internally into the flange portion **103**.

The nose roller **15C** of FIG. **6**, as well as the modifications described above, operates in essentially the same manner as the nose rollers **15A** and **15B** of FIGS. **2** through **5**.

Any suitable bearing means can be employed in any of the embodiments between the race on the tongue and the race on the circular flange portion. Placement of the bearing means and retention in proper placement during assembly is provided by the three-sided annular pocket which results from insertion of the flange portion into the tongue aperture. Subsequent overlying of the other side plate member assures against loss of the bearing means during the assembly operation which secures the side plate members together.

In addition to the other advantages already mentioned, the disclosed constructions afford a high degree of concentricity between the various components and the integral extension of the inner race from one of the side plate members provides excellent heat transfer away from the bearing area, thereby increasing bearing life.

Various of the features of the invention are set forth in the following claims.

What is claimed is:

1. A nose roller for a cutter bar comprising a tongue adapted to be connected to one end of the cutter bar and including a circular wall defining an aperture, bearing means received in said aperture and engaging said tongue wall, a first member including a side plate portion extending in parallel relation to said tongue on one side thereof and including therein a central aperture having a margin in adjacent relation to said one tongue side, a circular flange portion extending from said first member side plate portion aperture margin for a distance at least equal to the thickness of said tongue and projecting into said tongue aperture in radially inwardly spaced relation from said tongue wall and in engagement with said bearing means, a second member including a side plate portion extending in parallel relation to said tongue on the other side thereof, and means fixedly connecting together said first and second members for rotary movement relative to said tongue.

2. A nose roller in accordance with claim **1** wherein said connecting means comprises a flange extending from said second member side plate portion and through said first member aperture, said second member flange portion having an outer portion engaging the outer surface of said first member to prevent disassembly therebetween.

3. A nose roller in accordance with claim **2** wherein said second member further includes an apertured wall extending radially inwardly from said outer end of said second member flange portion.

4. A nose roller in accordance with claim **2** wherein said second member side plate portion includes a central aperture, wherein said second member flange portion extends from the margin of said second member central aperture, and wherein said outer portion of said second member flange portion engages the margin of said first member central aperture.

5. A nose roller in accordance with claim **2** wherein said first and second member flange portions extend in telescopic relation to each other with said first member flange portion being located radially outwardly of said second member flange portion.

6. A nose roller in accordance with claim **1** wherein said second member side plate portion includes therein a central aperture and said connecting means extends through said member apertures and is secured to each of said side plate portions.

7. A nose roller in accordance with claim **1** wherein said second member side plate portion includes therein a central aperture and said connecting means includes an element extending through said member apertures and having enlarged portions at each end exteriorly of said members so as to prevent disassembly therebetween.

8. A nose roller in accordance with claim **7** wherein said second member side plate portion includes on the outer surface thereof, and adjacent to said central aperture, a chamfered surface and wherein said element comprises a rivet having a hollow cylindrical body section, an enlarged head at one end of said body section engaged with said first member side plate portion and a deformed portion at the other end of said body section engaged with said chamfered surface.

9. A nose roller in accordance with claim **1** wherein said second member side plate portion includes a central aperture and wherein said first member flange portion includes an end portion extending in said second plate member aperture, and wherein said connecting means connects said end portion to said second member.

* * * * *