

[54] **GEAR SUPPORT FOR A HEDGE TRIMMER**

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[58] Field of Search 30/216, 220, 221, 222, 30/223, 224, 215, 218; 56/17.6, 236

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Primary Examiner—Al Lawrence Smith

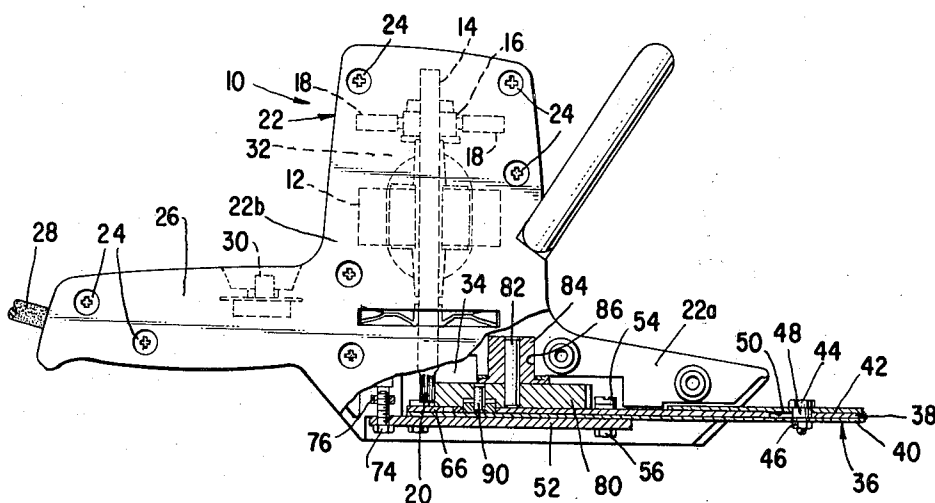
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[57] **ABSTRACT**

A gear support for a hedge trimmer having a housing with a motor chamber and a gear chamber therein. A motor is mounted in the motor chamber of the housing with a vertically disposed armature shaft having a drive pinion formed at the lower end thereof which extends into the gear chamber portion. A reduction gear is carried by a stub shaft mounted in the gear chamber, and drives a cutting blade through an eccentric member. The reduction gear is disposed in superposition to the cutting blade and has its forward end continuously supported by the cutting blade. A support plate is mounted in the gear chamber portion of the housing to continuously support the rearward end of the reduction gear.

7 Claims, 6 Drawing Figures



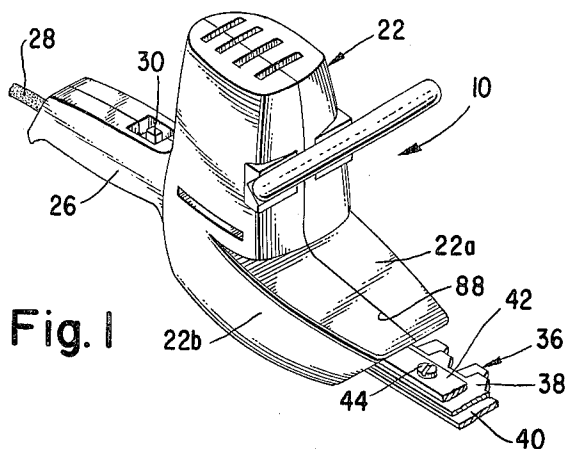


Fig. 1

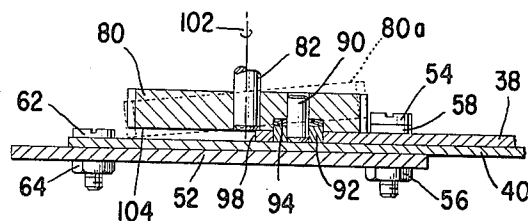


Fig. 5

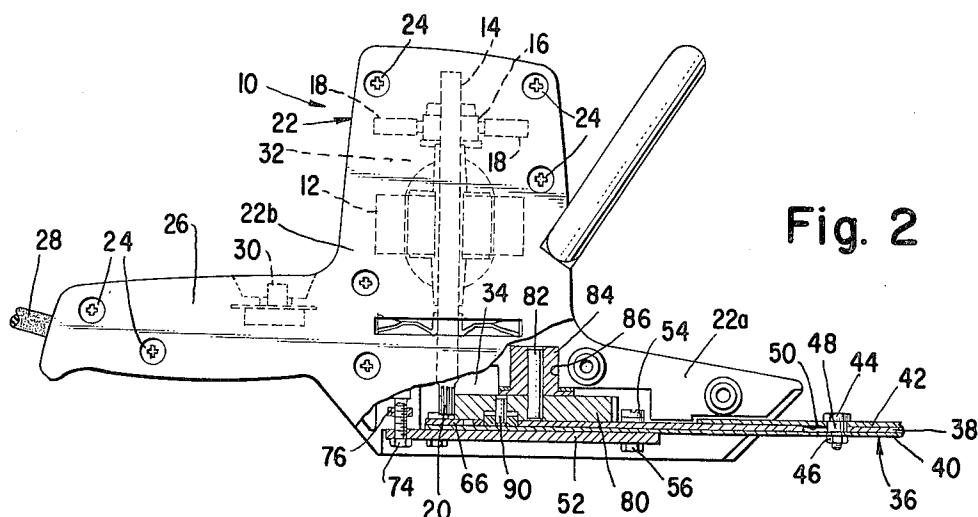


Fig. 2

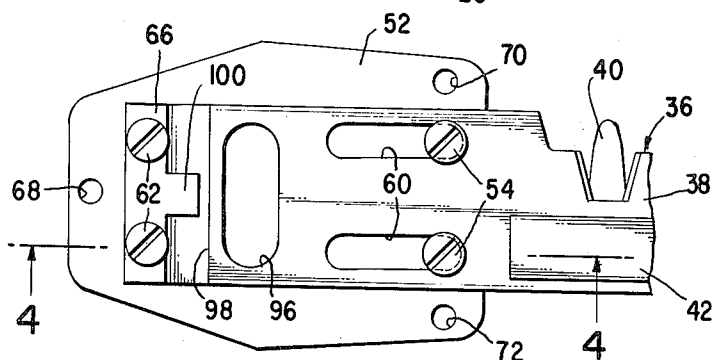


Fig. 3

Fig. 4

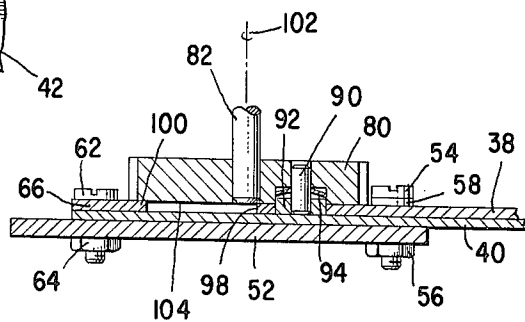
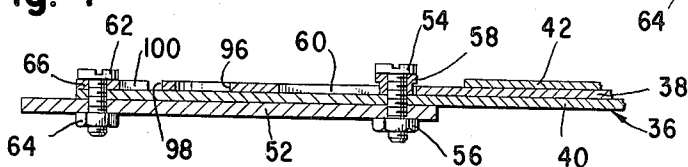


Fig. 6

GEAR SUPPORT FOR A HEDGE TRIMMER

BACKGROUND OF THE INVENTION

In the prior art, the drive assembly of a certain type of hedge trimmer was mounted in such a way as to require a longer cutting blade in that the eccentric was connected further forwardly of the end of the cutting blade, whereby both the forward and rearward end of the reduction gear was supported by the cutting blade regardless of its relative position. Alternatively, the reduction gear of the prior art could be mounted on a shaft having both ends supported within the housing whether or not the cutting blade supported the reduction gear. The use of an intermediate drive connection to the cutting blade required that such cutting blade be longer, while a through shaft supported at both ends, created assembly, disassembly and drive connection problems.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide an improved gear support for a hedge trimmer which overcomes the prior art disadvantages; which is simple, economical and reliable; which has a reduction gear mounted on a stub shaft in cantilevered fashion; which uses a support plate mounted in the housing to support one end of the reduction gear; which uses a support plate mounted on a stationary comb of the blade assembly; which has the drive pinion disposed in superposition to the support plate; which uses a support plate lying in the same plane as the cutting blade; and which has the reduction gear supported on one end by the cutting blade and on the other end by the support plate.

Other objects and advantages will be apparent from the following description of one embodiment of the invention and the novel features will be particularly pointed out hereinafter in the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention is illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of a hedge trimmer embodying the present invention.

FIG. 2 is a side elevational view, partly in section, of the hedge trimmer embodying the present invention.

FIG. 3 is a top plan view of the cutting blade assembly, including the support plate of the present invention.

FIG. 4 is a side elevational view taken along line 4—4 of FIG. 3.

FIG. 5 is a diagrammatic representation of the reduction gear without the support plate and showing in the dotted line representation therein, the cocking of the reduction gear.

FIG. 6 is a side elevational view of the present invention wherein the reduction gear has the rearward end supported by the support plate.

DESCRIPTION OF THE INVENTION

A hedge trimmer 10 is shown in FIGS. 1 and 2 embodying the present invention. The hedge trimmer 10 includes an electric motor 12 having an armature shaft 14, which carries a commutator 16, engaged by a brush assembly 18. The armature shaft 14 is journaled by a pair of spaced bearings (not shown), and has a drive pinion 20 formed at its lower end. The hedge trimmer

10 has a housing 22 having housing halves 22a and 22b, suitably connected to each other as by screw means 24 so as to form what is commonly termed a clamshell housing. The housing 22 has an integrally formed pistol-group handle 26 which receives an electric cord 28, that in turn is connected to an on-off switch 30 in circuit with the motor 12 in the usual manner. The housing 22 has a motor chamber 32 in which the motor 12 is mounted, and a gear chamber 34 formed below, into which the pinion 20 extends.

The hedge trimmer 10 includes a cutting blade assembly 36 including a reciprocally-driven cutting blade 38, sandwiched between a stationary comb 40 and a stationary guide bar 42 held in assembled position by a plurality of connecting means, one of which is shown in FIGS. 1 and 2 as being a screw 44, a nut 46 and an intermediate spacer 48, connected to each other, with the spacer extending through a longitudinal slot 50 to permit the cutting blade 38 to be freely reciprocated. The cutting blade 38 and stationary comb 40 extend into the gear chamber 34 and are interconnected to a chamber cover 52 as illustrated in FIGS. 3 and 4 by means of a pair of screws 54 and nuts 56 with an intermediate shoulder spacer 58 disposed in the slot 60 of the cutting blade 38 to permit the same to be reciprocated. The rear end of the stationary comb is connected to the cover by a pair of screws 62 and nuts 64 which also carries a T support plate 66 for purposes described hereinafter. As shown in FIGS. 2 and 3, the cover 52 is itself connected to the housing through holes at 68, 70 and 72 by means of a plurality of screws 74 and nuts 76 held captive within said housing, only one of which is shown in FIG. 2. Also, the cover 52 serves to close the open bottom of gear chamber 34.

A single reduction gear 80 is mounted in the gear chamber 34 to be driven by the pinion 20. The reduction gear 80 is affixed to a stub shaft 82 journaled in a nonrotatable bushing 84, illustrated in FIG. 2, entrapped within complementary recesses 86 formed at the joint 88, shown in FIG. 1, of the clamshell housing 22. The stub shaft 82 is substantially parallel with the armature shaft 14, and the reduction gear 80 carries an eccentric pin 90 to which a roller 92 is rotatively disposed and pressed downwardly by a spring washer 94 for positive engagement within a transverse drive slot 96 formed in the cutting blade 38 adjacent the rear end 98 thereof, as shown in FIGS. 2 and 6, to produce the reciprocal motion of the cutting blade 38 upon operation of the motor 12. The location of the eccentric pin 90 and the attached roller 92 determine the limits of reciprocal travel of the cutting blade 38. The furthest rearward travel of the cutting blade 38 is shown in FIGS. 3 and 4 wherein the rear end 98 of the cutting blade 38 comes to rest a short distance from the bottom of the stem 100 of the support plate 66. The furthest forward position of the cutting blade 38 is depicted in FIGS. 5 and 6 and is shown to be forwardly of the center line or axis 102 of the stub shaft 82. The pinion 20 of the armature shaft 14 engages the reduction gear 80 at a point rearwardly, or as viewed in FIG. 2, on the left hand side of the furthest rearward point of travel of the cutting blade 38. The lower surface 104 of the reduction gear 80 contacts the cutting blade 38 so that at least the front portion, or the portion of the reduction gear 80 on the right side of the axis 102, as viewed in FIG. 5, is always in contact with, and supported by the cutting blade 38. However, when the eccentric pin 90

and roller 92, are on the right hand side of the axis 102 in its frontmost position, as shown in FIG. 5, the rear half of the reduction gear 80 on the leftmost side of the axis 102, as viewed in FIG. 5, would be unsupported and would therefore have a tendency to cock as indicated by the dotted line representation 80a of the reduction gear shown in FIG. 5. The FIG. 5 representation has intentionally omitted the support plate 66 to dramatically represent the serious condition which would develop in its absence. The cocking of the reduction gear 80 would cause excessive stress on both the stub shaft 82 and the bushing 84 resulting in premature failure of the housing 22 of excessive wear of the bushing 84 or annoying vibrations during operation of the hedge trimmer 10.

Accordingly, the support plate 66 is affixed atop the rear end of the stationary comb 40 underneath the pinion 20 of the armature shaft 14, to have its stem 100 extend beneath the left side of the reduction gear 80. The cutting blade 38 and the support plate 66 lie in the same planes, since each rest upon the stationary comb 40. The gear chamber 34 is sufficiently lubricated to minimize any friction developing between the lower surface 104 of the reduction gear 80 and the blade and the support plate 66.

It will be understood that various changes in the details, materials, arrangements of parts and operating conditions which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principles and scope of the invention.

Having thus set forth the nature of the invention, what is claimed herein is:

1. A gear support for a hedge trimmer comprising:
 - a. a housing having a motor chamber and a gear chamber,
 - b. a motor having a vertical armature shaft journaled in the motor chamber of the housing,
 - c. a drive pinion formed in the lower end of the armature shaft and extending into the gear chamber,
 - d. a stub shaft journaled at one end in the gear chamber,
 - e. a reduction gear carried by the other end of the

stub shaft and drivingly engaged by the pinion, f. a blade assembly having a cutting blade mounted in the housing,

- g. an eccentric member affixed to the reduction gear to engage and reciprocally drive the cutting blade between a forwardly and backwardly position,
- h. the reduction gear disposed in superposition to the cutting blade whereby when the cutting blade is in its forwardly position, the blade will be forwardly of the stub shaft, and
- i. a support plate mounted in the gear chamber portion of the housing to continuously support the rearward end of the reduction gear, thereby preventing the reduction gear from cocking when the cutting blade is in its forwardly position.

2. The combination claimed in claim 1 wherein:

- a. a stationary comb is included in the blade assembly,
- b. the support plate is mounted on the stationary comb.

3. The combination claimed in claim 2 wherein:

- a. the cutting blade is reciprocally mounted above the stationary comb.

4. The combination claimed in claim 3 wherein:

- a. the pinion and the stub shaft are mounted in the housing in parallel relationship to each other, and
- b. the pinion is disposed in superposition to the support plate.

5. The combination claimed in claim 4 wherein:

- a. the support plate is mounted in the same plane as the cutting blade.

6. The combination claimed in claim 5 wherein:

- a. the support plate is in spaced relationship to the cutting blade and disposed rearwardly thereof.

7. The combination claimed in claim 1 wherein:

- a. the reduction gear is mounted centrally upon the stub shaft with a forward portion and a rearward portion defined on either side of said shaft,
- b. the cutting blade to continuously support the forward portion of the reduction gear, and
- c. the support plate to continuously support the rearward portion of the reduction gear.

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