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(54) **Device for cutting branches and the like**

(57) A device (1) for cutting branches and the like, comprising an annular cutting chain (2), a shaped slideway (3) cooperating with the chain (2) and a motor (9) for sliding the chain (2) along the slideway (3) so as to give it a cutting motion, wherein, in operation, a effective

portion (20) of the chain (2) is into contact with the piece to be cut in order to perform the cutting, and wherein the slideway (3) has, at the effective portion (20) of the chain, a recess (6), the overall arrangement being such that at said recess (6) the slideway (3) is not into contact with the effective portion (20) of the chain (2) (Figure 1).

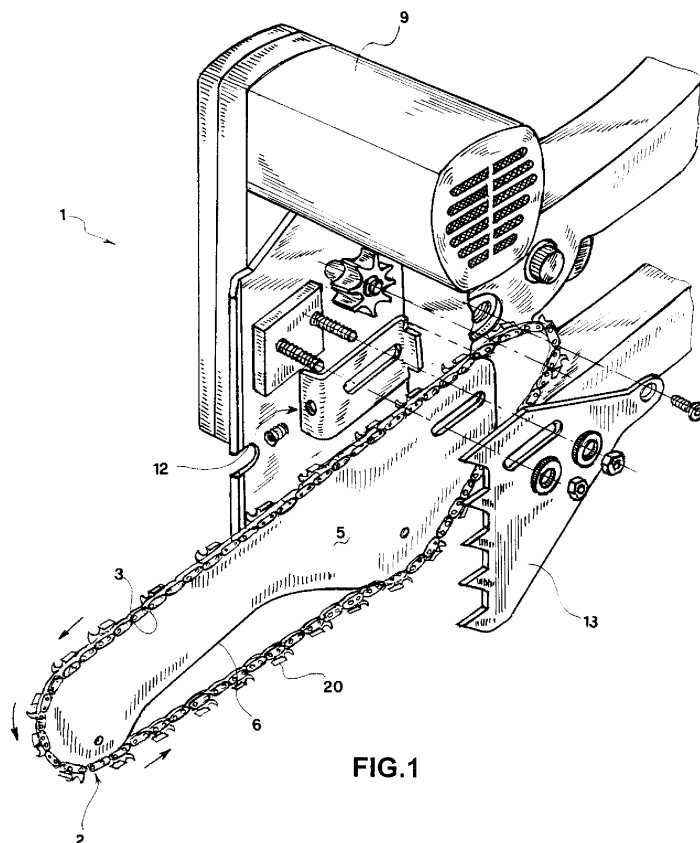


FIG.1

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Description

[0001] The present invention relates to a device for cutting branches and the like. In particular, it relates to a cutting device of a kind comprising an annular and substantially flexible cutting tool, a guide for said tool and driving means for giving a cutting motion to the tool itself along said guide.

[0002] Devices for cutting branches and the like — often used for pruning — based on a chain-type annular cutting device are known in the art. Such devices comprise a track for guiding the cutting chain, said track typically having an ellipsoidal development, and a motor for producing a translatory motion of the chain itself along said track.

[0003] Such cutting devices of the known art entail several drawbacks. The main drawback lies in that during the cutting elevated friction is generated between track and chain at the interface between the latter and the piece to be cut. This is due both to the presence of cutting debris and possibly of resins released by the piece to be cut, which slip in between the track and the tool, and to the fact that the pressure exerted on the piece to cut it induces a closer contact between the tool and the track, thereby increasing the constraining reaction forces therebetween.

[0004] Due to the above, the motion of the cutting tool is often hampered or even blocked.

[0005] Moreover, to overcome said increased friction it is necessary to have motors presenting an elevated power, or anyhow a power markedly higher than that strictly required to produce the desired cutting. This, among other things, limits the opportunity of using electric motors powered by portable power sources. Moreover, always due to the elevated powers demanded to the motor, the device, weights being equal, exhibits a limited autonomy of operation. Vice versa, the device exhibits an elevated weight when a satisfactory autonomy of operation is to be attained.

[0006] Hence, the technical problem underlying the present invention is to provide a device for cutting allowing overcoming the drawbacks mentioned above with reference to the known art.

[0007] Such a problem is solved by a device for cutting according to claim 1.

[0008] According to the same inventive concept, the present invention further relates to a cutting kit according to claim 22.

[0009] Preferred features of the present invention are present in the dependent claims.

[0010] The present invention provides several relevant advantages. The main advantage lies in that the absence of contact between the tool portion performing the cutting and the guide of the tool itself prevents any friction between said components, and prevents as well cutting debris, sawings, resins and the like from clogging them up.

[0011] Accordingly, there is no risk of the cutting tool

motion being hampered or blocked, nor of the cutting increasing the contact forces between tool and guide.

[0012] All this makes it possible to use motors of a power markedly lower with respect to the known art.

[0013] Other advantages, features and the operation steps of the present invention will be made apparent in the following detailed description of some embodiments thereof, given by way of a non-limiting example. Reference will be made to the figures of the annexed drawings, wherein:

Figure 1 shows an exploded view of a first embodiment of the device for cutting according to the present embodiment;

Figure 2 shows a perspective view of the device of Figure 1 in an assembled condition thereof;

Figure 3 shows a perspective view of a cutting kit comprising the device of Figure 1;

Figure 4 shows an exploded view of a detail of the device of Figure 1;

Figure 5 shows a perspective view of the detail of Figure 4;

Figure 6 shows a front view of the detail of Figure 4; and

Figure 7 shows a perspective view of another embodiment of the device for cutting according to the present embodiment.

[0014] Initially referring to Figures 1 and 2, a device for cutting branches and the like according to the invention is generally indicated by 1.

[0015] In the present embodiment, the device 1 is an electric saw for the cutting of trees and the like.

[0016] The device 1 comprises a substantially flexible elongate cutting tool 2, having an annular development, which in the present embodiment is a conventional cutting chain.

[0017] Moreover, as it is better visible in Figures 4 to 6, the device 1 comprises a guide 3 shaped according to closed-path, cooperating with the chain 2 in order to guide the cutting motion of the latter. The sense of the cutting motion of the chain 2 onto the guide 3 is indicated by arrows in Figure 6.

[0018] Always referring to Figures 4 to 6, in the present embodiment the guide 3 is an annular track, it also indicated by 3, developing along an elongate path and onto which the chain 2 extends. The track 3 is obtained at a peripheral edge 4 of a substantially flat guide body 5.

[0019] According to the invention, the track 3 has, at a bottom portion thereof, a recess 6 having a substantially loop-shaped contour, and in particular a substantially sinuous contour, having rounded corners.

[0020] The device 1 also comprises means 12, schematically depicted in Figure 1, for tensioning the chain 2 onto the track 3. Said means 12 is of a conventional type, and therefore will not be described in further detail.

[0021] Always referring to Figures 4 to 6, in corre-

spondence of the track 3 the device 1 comprises means for dragging the chain 2, said means being housed within the guide body 5. In the present embodiment the means for dragging is in form of a first and a second sprocket, 7 and 8, respectively, each mounted on a res-

[0022] In particular, the first sprocket 7 is arranged at a rear mouth of the recess 6, and precisely downstream of the latter with respect to the sense of the cutting motion of the chain 2 onto the track 3. Such an arrangement fosters an effective dragging of the chain 2, as it will be detailed hereinafter.

[0023] The second sprocket 8 is instead arranged at the foremost portion of the guide body 5.

[0024] The mounting on bearings of the sprockets 7 and 8 improves the dragging of the chain 2.

[0025] Further referring to Figures 1 and 2, the device 1 further comprises means for driving the chain 2, apt to slide the latter along the track 3, so as to give it a substantially translatory cutting motion.

[0026] In the present embodiment, the means for driving comprises an electric motor 9 that drives the chain 2 by interposition of conventional transmission means.

[0027] The motor 9 is powered by means of a battery, e.g. of a rechargeable type. The latter may easily be housed within a bag or pouch M carried or worn-on by the operator, as it is shown in Figure 3.

[0028] The motor 9 can be operated by means of a pushbutton or of an equivalent conventional system.

[0029] Of course, in an alternative embodiment the device could provide powering means different from that of the hereto-considered embodiment, e.g., an explosion engine. In fact, the latter is more suitable in case the device of the invention consists of an electric saw or the like.

[0030] The device 1 also comprises a protecting cover 11 for covering the chain 2 when the device itself is not in operation; for simplicity's sake, said protection has been depicted solely in Figure 2.

[0031] In the present embodiment, the cover 11 consists of a sleeve opened lengthwise to receive the chain 2. Such a sleeve 11 is rotatably connected, and in particular hinged, onto the chassis of the device 1. Thus, it does not require a separate carrying and can easily be inserted on and taken out of the chain 2.

[0032] Moreover, the device 1 comprises a system for lubricating the chain 2 and a side means 13 resting on the piece to be cut, commonly called 'lug', of a conventional type and therefore not described in further detail.

[0033] The operation modes of the device 1 will hereinafter be illustrated with reference to all of the hereto-introduced figures.

[0034] When the operator operates the motor 9, the chain 2 is induced to slide onto the track 3, following an annular path about the latter.

[0035] In operation, the cutting of the piece is performed by an effective portion 20 of the chain 2 (enclosed within a dashed line in Figure 2) into contact with

the piece itself. According to the invention, such effective portion 20 extends at the recess 6 of the track 3, and therefore it is not into contact with the latter. In particular, as it is shown in Figure 6, in operation the effective portion 20 is substantially spaced apart from said track 3, exhibiting a maximal distance therefrom that is indicated by a reference height 203.

[0036] It will be understood that the fact that the effective portion 20 of the chain 2 is not into contact with the guide 3 does not penalize the efficiency and the effectiveness of the cutting, also by virtue of the arrangement of the dragging sprocket 7 immediately downstream of the recess 6. In particular, the cutting action could determine a slight bending of the effective portion 20 of the chain toward the track 3, without however determining, by virtue of said substantial distance 203, a contact between the two components. On the other hand, such bending of the portion 20 of the chain toward the wall of the recess 6 induces a moving away from the track 3 of a portion 21 of the chain opposite to the effective portion 20. Evidently, this further reduces the overall friction between slideway 3 and chain 2.

[0037] Referring now to Figure 7, according to another embodiment of the invention the device for cutting comprises a side means 130, resting on the piece to be cut, which is different from that of the first embodiment described with reference to the preceding figures.

[0038] In particular, the means 130 comprises a substantially vertical smooth chute-like edge 132 and a sprocket 131 arranged therebelow. The sprocket 131 rotates idle, e.g. above a needle bearing, and it is equipped with teeth apt to engage the piece to be cut, and in particular apt to break into the branch bark. The idle sprocket 131, by inserting the rotating teeth in the branch bark, annuls vibrations and side shifting of the cutting device, moreover easing the descent of the cutting chain into the cut jointly with the smooth bank 132 completing the detachment of the branch.

[0039] The smooth edge 132 may also be replaced by plural idle sprockets aligned thereamong.

[0040] Moreover, the sprocket or sprockets 131 may be replaced by any other suitable rotating element.

[0041] Lastly, it will be understood that the invention may be provided in form of a kit comprising the device 1, the means 9 for driving, the battery and the bag or pouch M schematically shown in Figure 3.

[0042] The present invention has hereto been described with reference to preferred embodiments thereof. It is understood that there could be other embodiments afferent to the same inventive kernel, all falling within the protective scope of the claims set forth hereinafter.

Claims

1. A device (1) for cutting branches and the like, comprising:

- a substantially flexible elongate cutting tool (2);
- guide (3) shaped according to a closed-path, onto which said cutting tool (2) extends; and
- driving means (9) for driving said cutting tool (2), apt to slide the latter onto said guide (3) so as to provide it with a cutting motion,

wherein, in operation, an effective portion (20) of said tool (2) is in contact with the piece to be cut in order to perform the cutting,

characterised in that

said guide (3) has, at said effective tool portion (20), a recess (6), the overall arrangement being such that at said recess (6) said guide (3) is not in contact with said effective portion (20) of the cutting tool (2).

2. The device (1) according to claim 1, wherein the overall arrangement is such that at said recess (6) said guide (3) is substantially spaced apart from said effective portion (20) of the cutting tool (2).

3. The device (1) according to claim 1 or 2, wherein said cutting tool is an annular cutting chain (2).

4. The device (1) according to any one of the preceding claims, wherein said recess (6) of said guide (3) has a substantially loop-shaped contour.

5. The device (1) according to the preceding claim, wherein said recess (6) has a substantially sinuous contour, having rounded comers.

6. The device (1) according to any one of the preceding claims, wherein said guide comprises a track (3).

7. The device (1) according to any one of the preceding claims, comprising a shaped body (5) the peripheral edge of which implements said guide (3).

8. The device (1) according to any one of the preceding claims, comprising means (7, 8) for dragging said cutting tool (2), arranged at said guide (3).

9. The device (1) according to the preceding claim, wherein said means for dragging comprises a dragging element (7, 8) mounted onto a respective bearing.

10. The device (1) according to claim 8 or 9, wherein said means for dragging comprises a dragging element (7) arranged at a mouth of said recess (6).

11. The device (1) according to any one of claims 8 to 10, wherein said means for dragging comprises a dragging element (7) arranged downstream of said recess (6) with respect to the sense of the cutting motion of said tool (2) onto said guide (3).

12. The device (1) according to any one of claims 8 to 11, wherein said means for dragging comprises at least one guide sprocket (7, 8).

13. The device (1) according to any one of the preceding claims, wherein said means for driving comprises an electric motor (9).

14. The device (1) according to any one of the claims 1 to 12, wherein said means (9) for driving comprises an explosion engine.

15. The device (1) according to any one of the preceding claims, comprising a protecting cover (11) for covering said cutting tool (2).

16. The device (1) according to the preceding claim, wherein said protecting cover (11) is rotatably connected to the chassis of the device itself.

17. The device (1) according to claim 15 or 16, wherein said protecting cover comprises a sleeve element (11) lengthwise opened to receive said cutting tool (2).

18. The device (1) according to any one of the preceding claims, comprising a resting means (130) resting on the piece to be cut, in its turn comprising a rotating element (131) equipped with teeth apt to engage the piece to be cut.

19. The device (1) according to the preceding claim, wherein said rotating element is an idle element (131).

20. The device (1) according to claim 18 or 19, wherein said resting means (130) comprises a plurality of rotating elements (131), each equipped with teeth apt to engage the piece to be cut.

21. The device (1) according to the preceding claim, wherein the rotating elements (131) of said plurality are arranged aligned thereamong.

22. A cutting kit for branches and the like, comprising a device for cutting (1) according to any one of the preceding claims, a battery for powering said means (9) for driving said device (1) and a bag or pouch (M) for housing said battery.

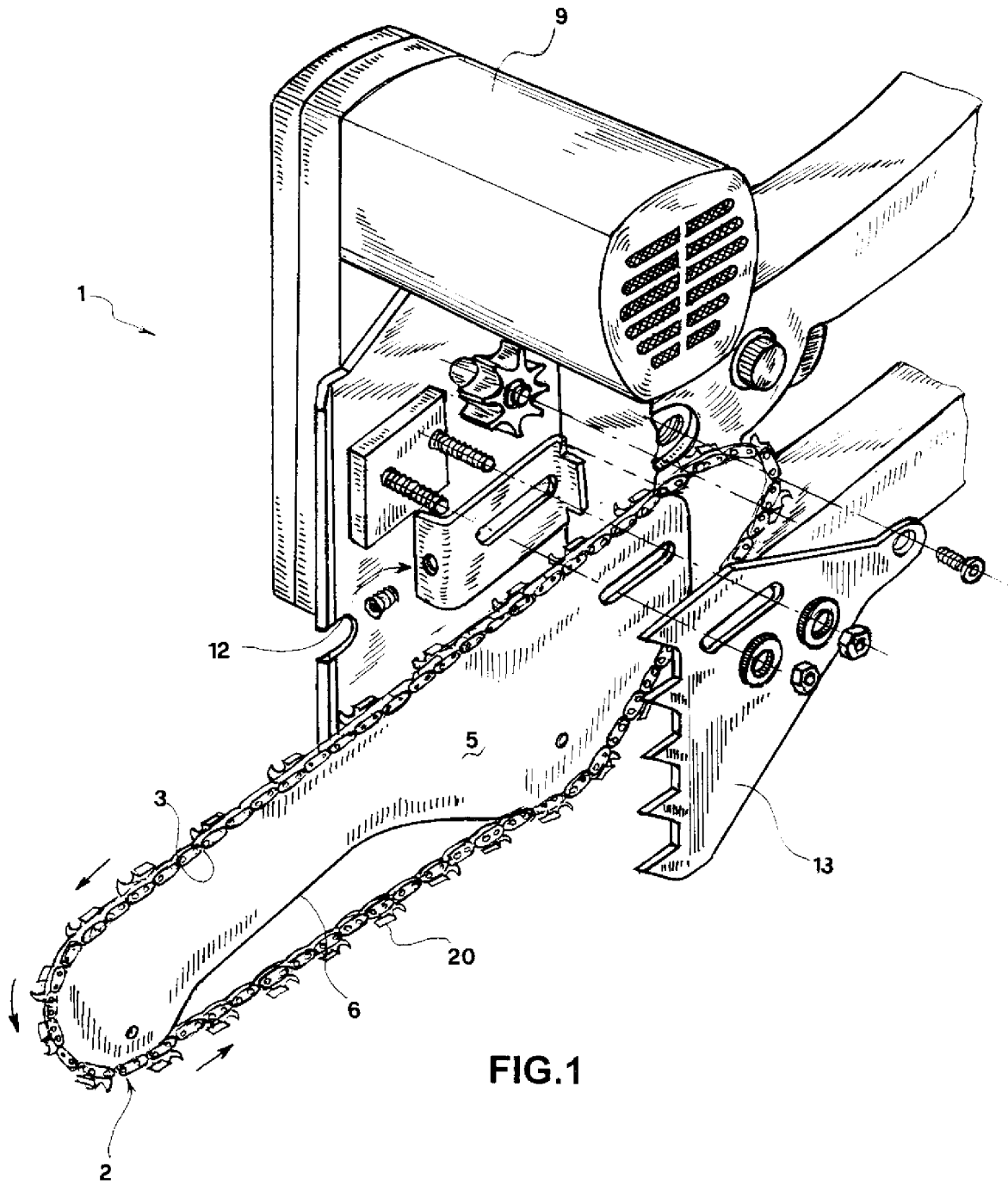
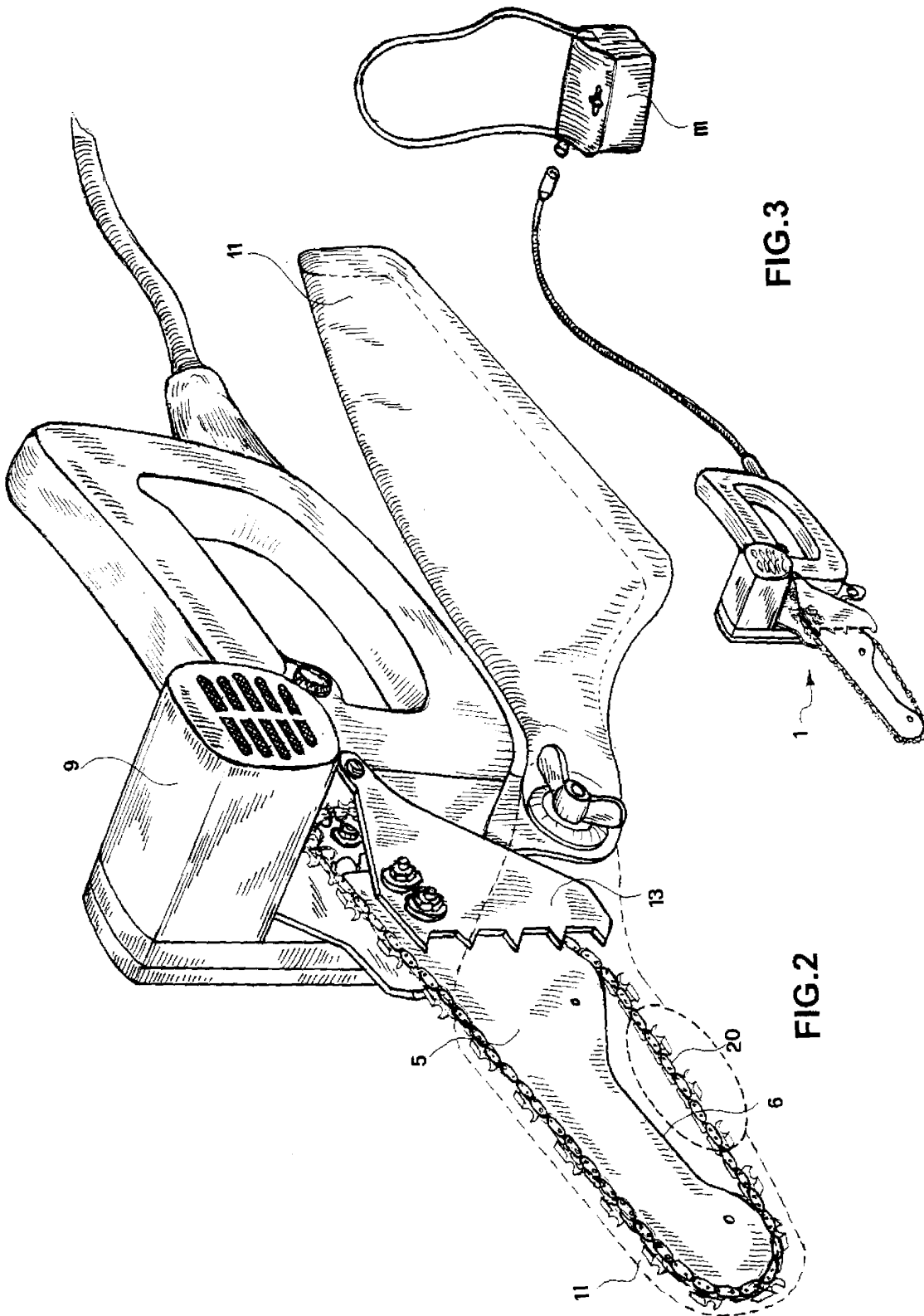


FIG.1



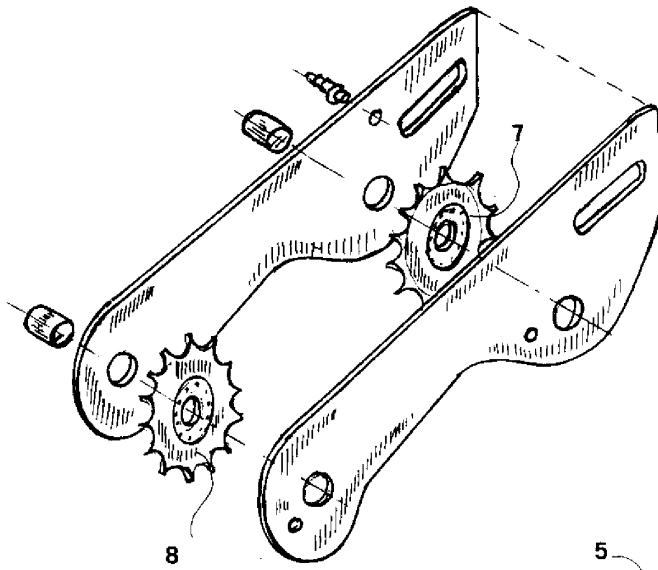


FIG. 4

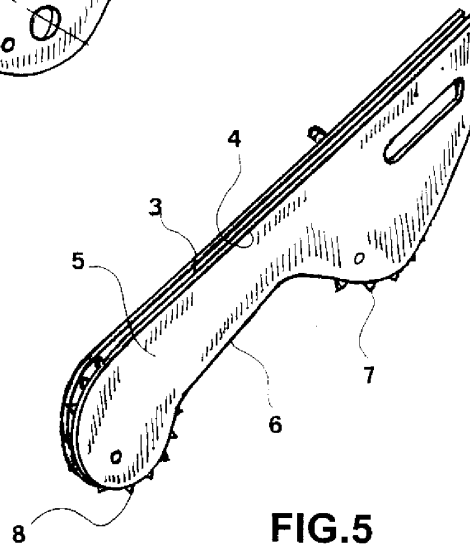


FIG. 5

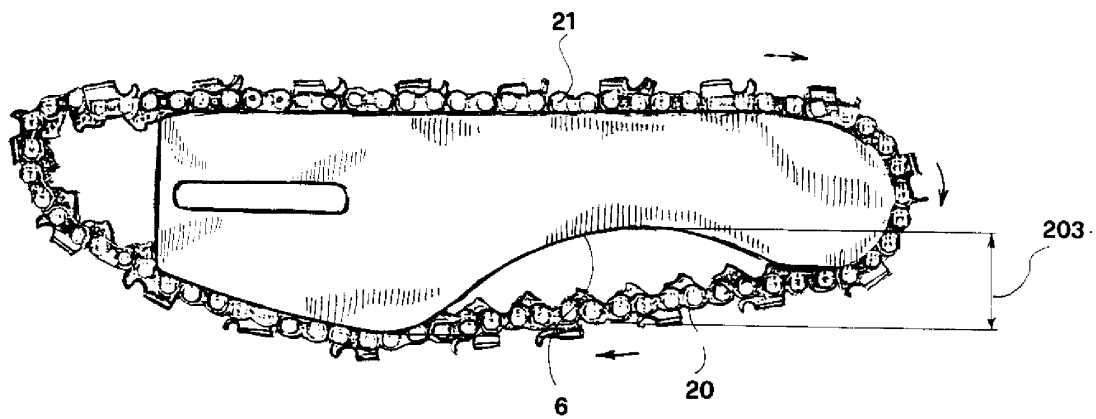


FIG. 6

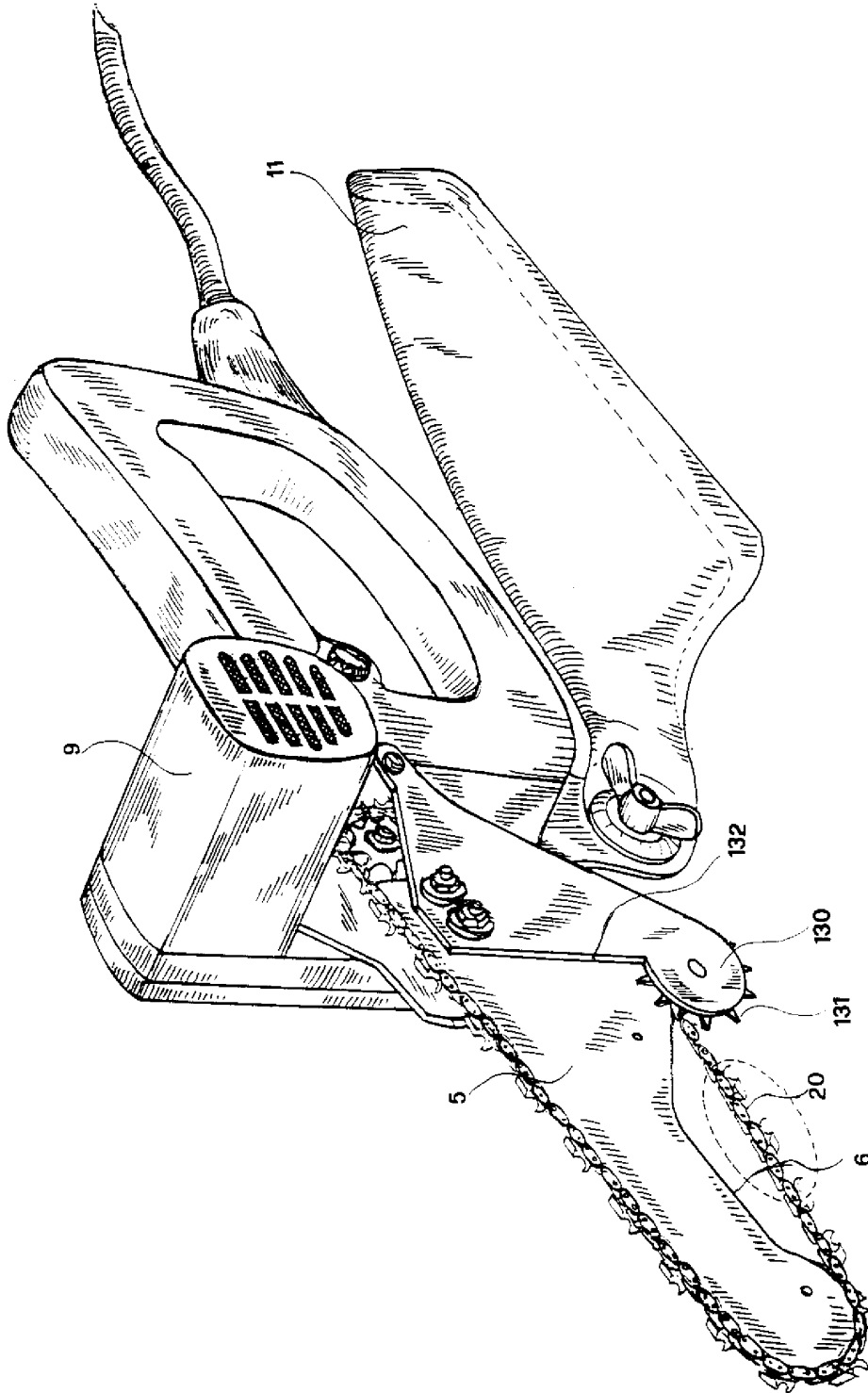


FIG.7