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(72) Inventors:
• **Bowden, Michael**
Co. Durham, DL5 4XF (GB)
• **Douglas, James Stuart**
County Durham, DL3 9JE (GB)

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(74) Representative: **Pratt, David Martin et al**
Withers & Rogers LLP
Goldings House
2 Hays Lane
London SE1 2HW (GB)

(71) Applicant: **Husqvarna UK Limited**
County Durham, DL5 6UP (GB)

(54) **Chainsaw**

(57) A chainsaw comprises a main body (1), a motor housed within the main body, the motor being drivably connected to a sprocket drive shaft (6), and a guide bar/saw chain assembly (4). The assembly (4) comprises a guide bar (7, 8), a saw chain (12) and a sprocket drive wheel (5). The guide bar has first and second guide bar portions (7, 8) telescopically connected together, and the sprocket drive wheel (5) is associated with the second guide bar portion (8). The saw chain (12) is in drivable

engagement with the sprocket drive wheel (5) and passes around the peripheries of the first and second guide bar portions (7, 8). The sprocket drive wheel (5) is in drivable engagement with the sprocket drive shaft (6). The assembly (4) is movable between a first, non-operative position in which the first and second guide bar portions (7, 8) are positioned so that the saw chain (12) is not tensioned, and a second, operative position in which the first and second guide bar portions are positioned so as to tension the saw chain.

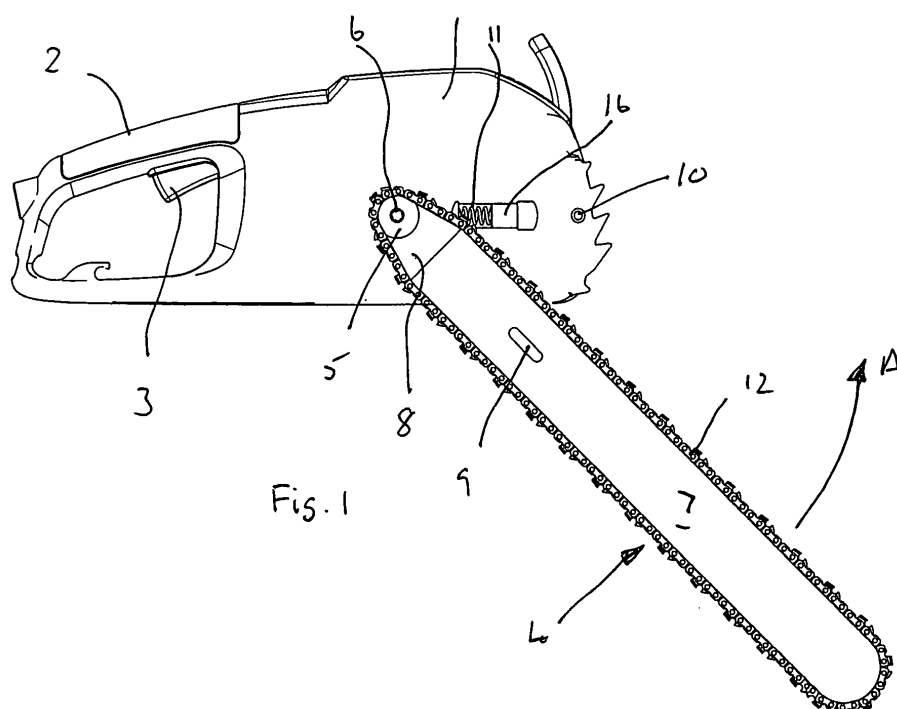


Fig. 1

Description

[0001] This invention relates to a chainsaw, and in particular to a chainsaw sub-assembly comprising a guide bar, a saw chain, a sprocket drive wheel and means for tensioning the saw chain.

[0002] A known chainsaw has a main body provided with one or more handles for holding the chainsaw when in use, and a guide bar/saw chain assembly which is detachably fixed to the main body. The main body houses a prime mover (such as an electric motor) drivably connected to a sprocket drive shaft which drivably engages the saw chain via a sprocket drive wheel fixed to the sprocket drive shaft. The guide bar is an elongate rectangular member having a substantially semicircular free end portion and a guide groove along its outer periphery.

[0003] This chainsaw suffers from a number of disadvantages. In particular, when a customer buys this chainsaw, it is packaged with the main body, the guide bar and the saw chain as separate items, and the customer must assemble these items together. This, in itself, is a tricky operation, even for a skilled user. Unfortunately, a further difficulty exists in that it is extremely important that, once assembled, the chain is correctly tensioned, otherwise there is a risk that the chain escapes from the guide groove in the guide bar which could cause serious injury to the user. It is particularly difficult for the average user to tension the chain correctly. Furthermore, the chain and guide bar are user-replaceable items that wear (the chain tends to become blunt, and the guide bar wears). The chain and guide bar do, therefore, require occasional replacement. These parts will also need to be removed for cleaning and maintenance. The known chainsaw is such that removal and replacement of the guide bar and chain is a difficult operation.

[0004] Finally, as the chain of the known chainsaw elongates during use due to wear between the links, the user must manually re-tension the chain on a regular basis in order to ensure optimum safety and cutting performance. Manual re-tensioning of the chain of the known chainsaw is not easy, and difficult to explain in an instruction manual. In this connection, correct tensioning is a feeling of the tension rather than an explicit indicator.

[0005] An aim of the invention is to provide a chainsaw having a guide bar/saw chain assembly which is such that the saw chain is automatically and correctly tensioned both when the assembly is in an operative position, and when the chain elongates due to wear.

[0006] The present invention provides a chainsaw comprising a main body, a prime mover housed within the main body, the prime mover being driveably connected to a sprocket drive shaft, and a guide bar/saw chain assembly comprising a guide bar, a saw chain and a sprocket drive wheel, the guide bar having first and second guide bar portions telescopically connected together, the sprocket drive wheel being associated with the second guide bar portion, the saw chain being in drivable engagement with the sprocket drive wheel and passing

around the peripheries of the first and second guide bar portions, and the sprocket drive wheel being in drivable engagement with the sprocket drive shaft, wherein the assembly is movable between a first, non-operative position in which the first and second guide bar portions are positioned so that the saw chain is not tensioned, and a second, operative position in which the first and second guide bar portions are positioned so as to tension the saw chain.

[0007] Preferably, the chainsaw further comprises means for holding the assembly to the main body when the assembly is in its second position.

[0008] In a preferred embodiment, the assembly is pivotable between its first and second positions with the sprocket drive shaft defining the pivot axis for this pivotal movement.

[0009] Advantageously, the chainsaw further comprises means for biasing the first and second guide bar portions apart as the assembly is pivoted from its first position to its second position. Preferably, the biasing means is constituted by a spring-biased member associated with the main body and a ramp provided on the first guide bar portion. The biasing means may also constitute means for automatically tensioning the saw chain to compensate for wear, the spring-biased member engaging the ramp to force the first and second guide bar portions further apart to compensate for elongation of the chain resulting from wear.

[0010] Conveniently, the first and second guide bar portions are connected by connection means capable of preventing relative telescopic movement in a direction tending to force the two guide bar portions towards one another. Preferably, the connection means is constituted by interengageable means provided on the first and second guide bar portions, and interengageable ratchets constitute the interengageable means of the first and second guide bar portions.

[0011] Advantageously, the interengageable means are provided by a pair of arms provided on the first guide bar portion and by an elongate, rectangular aperture formed in the second guide bar portion.

[0012] In a preferred embodiment, the prime mover is an electric motor.

[0013] The invention also provides a guide bar/saw chain assembly for a chainsaw, the assembly comprising a guide bar, a saw chain and a sprocket drive wheel, the guide bar having first and second guide bar portions telescopically and movably connected together, the sprocket drive wheel being associated with the second guide bar portion, and the saw chain being in drivable engagement with the sprocket drive wheel and passing around the peripheries of the first and second guide bar portions, wherein the first and second guide bar portions are connected by connection means capable of preventing relative telescopic movement in a direction tending to force the two guide bar portions towards one another.

[0014] In a preferred embodiment, the connection means is constituted by interengageable means provid-

ed on the first and second guide bar portions, and interengageable ratchets constitute the interengageable means of the first and second guide bar portions.

[0015] Preferably, the interengageable means are provided by a pair of arms provided on the first guide bar portion and by an elongate, rectangular aperture formed in the second guide bar portion.

[0016] Advantageously, the sprocket drive wheel is formed with means for drivable engagement with a sprocket drive shaft drivably connected to chainsaw prime mover.

[0017] Preferably, the first guide bar portion is provided with a ramp which is engageable with a spring for biasing the two guide bar portions apart.

[0018] The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:-

Figure 1 is a side elevation of a chainsaw constructed in accordance with the invention, and shows its guide bar/chain assembly in a first, non-operative position;

Figure 2 is a side elevation of the chainsaw of Figure 1, and shows the guide bar/chain assembly in a second, operative position;

Figure 3 is an exploded perspective view of the guide bar of Figures 1 and 2 and an associated part of the main body of the chainsaw;

Figure 4 is an enlarged perspective view of part of the guide bar of Figure 3;

Figure 5 is another exploded perspective view of the guide bar and the associated part of the main body of the chainsaw;

Figure 6 is a perspective view of the guide bar;

Figure 7 is an enlarged side elevation of part of the guide bar/chain assembly, and shows the chain tensioned;

Figure 8 is a view similar of that of Figure 7 but showing the assembly in a position where the chain is not tensioned;

Figure 9 is a side elevation of the guide bar, and shows the opposite side of the guide bar in the position in which the chain would be tensioned; and

Figure 10 is a view similar to that of Figure 9, but showing the guide bar in a position in which the chain would not be tensioned.

[0019] Referring to the drawings, Figure 1 shows the chainsaw having a main body 1 housing an electric motor (not shown). The main body 1 is formed with a handle

portion 2 and a trigger switch 3 for turning the motor on and off. A guide bar/chain assembly 4 is pivotally attached to the main body 1 by engagement of a sprocket drive wheel 5 provided at one end of the assembly 4 with a sprocket drive shaft 6 drivably connected to the motor. The assembly 4 is constituted by a telescopic guide bar, constituted by a main portion 7 and an attachment portion 8 that houses the sprocket drive wheel 5, and a chain 12.

[0020] Figure 1 shows the chainsaw in a first, non-operative position, in which the guide bar/chain assembly 4 is fitted to the main body 1 in a position beneath the main body. In order to prepare the chainsaw for use, the guide bar/chain assembly 4 is pivoted in the direction of the arrow A until it is positioned as shown in Figure 2. In this position, an elongate slot 9 formed in the guide bar main portion 7 is in alignment with a threaded aperture 10 formed in the main body 1. The assembly 4 is then fixed to the main body 1 by a bolt (not shown). As the assembly 4 pivots towards the position shown in Figure 2 it engages a spring 11 to tension the chain, as is described in greater detail below.

[0021] Figure 6 shows the guide bar 7, 8 when separate from the main body 1, this figure not showing the chain 12. It will be appreciated, however, that the chain 12 is already in position over the guide bar 7, 8 when the chainsaw is purchased, thereby forming the assembly 4. When the chainsaw is purchased, therefore, the assembly 4 is separate from the main body 1. This is to be contrasted with known chainsaws, in which the main body, the guide bar and the chain are all packaged separately for subsequent assembly by the purchaser.

[0022] Referring to Figures 3 to 5, the guide bar main portion 7 is constituted by three components 7a, 7b and 7c welded together. The members 7a and 7c are each formed with an elongate aperture 9a, 9b respectively which constitute the elongate slot 9. The member 7b is provided with two axially-extending prongs 13. The attachment portion 8 is constituted by three components 8a, 8b and 8c welded together. The component 8b is provided with an axially-extending slot 14 into which the prongs 13 fit as is described below. The sprocket drive wheel 5 is mounted at the free end of the attachment portion 8 between the two outer components 8a and 8c, for engagement with the chain 12 which extends around the periphery of the guide bar 7, 8 in a peripheral groove (not shown). The sprocket drive wheel 5 is in drivable engagement with the links of the chain 12, and is formed with an internal splined aperture 5a for engagement with corresponding spline 6a provided on the sprocket drive shaft 6. A bearing 15 is positioned between the sprocket drive wheel 5 and the component 8a. The telescopic engagement of the prongs 13 and the slot 14 enables the guide bar portions 7 and 8 to move away from, each other in order to tension the chain 12.

[0023] As shown in Figure 4, the outer surface of each of the prongs 13 is provided with ratchet teeth 13a which are engageable with complementary ratchet teeth 14a formed on the longitudinally-extending inside surface of

the slot 14. The ratchet teeth 13a, 14a prevent the guide bar portions 7 and 8 moving towards each other, so that the chain cannot come out of the peripheral groove.

[0024] Figures 3 and 5 also show part of the main body 1 which is formed with an elongate slot 16 formed with a stop 17 at one end. The stop 17 engages one end of the spring 11, the other end of the spring being located within a hollow end portion of a shuttle 18, the shuttle being slidably mounted in the slot 16. In use, the shuttle is engageable with an inclined ramp 19 formed on the outer surface of the member 7c, in a manner to be described below.

[0025] When a customer purchases the chainsaw, the assembly 4 is packaged separately from the main body 1. The customer can then fit the assembly 4 to the main body 1 by engagement of the splined portion 5a of the sprocket drive wheel 5 with the splined portion 6a of the sprocket drive shaft 6, with the assembly being in the position shown in Figure 1. As the assembly 4 is pivoted in the direction of the arrow A, the shuttle 18 engages the ramp 19, thereby compressing the spring 11 which exerts a resultant force onto the ramp to telescope the two portions 7 and 8 of the guide bar apart, consequently applying the correct tension to the chain 12. Once the assembly 4 is in the position shown in Figure 2, the assembly is clamped to the main body 1 by means of the bolt which passes through the slot 9 and into the threaded aperture 10. Figure 10 shows the guide bar 7, 8 as it is configured when the assembly 4 is positioned on the main body 1 as shown in Figure 1; and Figure 9 shows the guide bar in the configuration when the assembly is clamped in the position shown in Figure 2.

[0026] As previously mentioned, the chain 12 stretches during normal use. In order to compensate for such stretching, the assembly 4 can be unclamped from the main body 1, in which case the spring 11 will force the attachment portion 8 further away from the guide bar main portion 7 to re-tension the chain 12. The ratchet engagement between the prongs 13 and the slot 14 is such as to permit the attachment portion 18 to move away from the guide bar main portion 7, but to prevent those two portions being telescoped together. This ratchet arrangement also ensures that the assembly 4, once assembled in the factory prior to sale, cannot telescope together, thereby preventing the chain 12 from coming off the guide bar 7, 8 prior to assembly by the purchaser.

[0027] It will be apparent that the chainsaw described above has a number of advantages when compared with known chainsaws. In particular, correct tensioning of its chain 12 is automatic on assembly of the chainsaw, and subsequent re-tensioning to compensate for the chain stretching during normal use is also automatic once the clamping of the assembly 4 to the main body 1 is released. Both these tensioning processes can be carried out easily by an unskilled user. Consequently, this chainsaw is considerably safer in use than known chainsaws, as the correct automatic tensioning of the chain 12 prevents the chain from escaping from the guide bar during

normal use.

[0028] It will also be apparent that modifications could be made to the chainsaw described above. For example, the electric motor could be replaced by any suitable prime mover such as a petrol engine.

Claims

1. A chainsaw comprising a main body, a prime mover housed within the main body, the prime mover being drivably connected to a sprocket drive shaft, and a guide bar/saw chain assembly comprising a guide bar, a saw chain and a sprocket drive wheel, the guide bar having first and second guide bar portions telescopically connected together, the sprocket drive wheel being associated with the second guide bar portion, the saw chain being in drivable engagement with the sprocket drive wheel and passing around the peripheries of the first and second guide bar portions, and the sprocket drive wheel being in drivable engagement with the sprocket drive shaft, wherein the assembly is movable between a first, non-operative position in which the first and second guide bar portions are positioned so that the saw chain is not tensioned, and a second, operative position in which the first and second guide bar portions are positioned so as to tension the saw chain.
2. A chainsaw as claimed in claim 1, further comprising means for holding the assembly to the main body when the assembly is in its second position.
3. A chainsaw as claimed in claim 1 or claim 2, wherein the assembly is pivotable between its first and second positions with the sprocket drive shaft defining the pivot axis for this pivotal movement.
4. A chainsaw as claimed in any one of claims 1 to 3, further comprising means for biasing the first and second guide bar portions apart as the assembly is pivoted from its first position to its second position.
5. A chainsaw as claimed in claim 4, wherein the biasing means is constituted by a spring-biased member associated with the main body and a ramp provided on the first guide bar portion.
6. A chainsaw as claimed in claim 5, wherein the biasing means also constitutes means for automatically tensioning the saw chain to compensate for wear, the spring-biased member engaging the ramp to force the first and second guide bar portions further apart to compensate for elongation of the chain resulting from wear.
7. A chainsaw as claimed in any one of claims 1 to 6, wherein the first and second guide bar portions are

connected by connection means capable of preventing relative telescopic movement in a direction tending to force the two guide bar portions towards one another.

8. A chainsaw as claimed in claim 7, wherein the connection means is constituted by interengageable means provided on the first and second guide bar portions.

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9. A chainsaw as claimed in claim 8, wherein interengageable ratchets constitute the interengageable means of the first and second guide bar portions.

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10. A chainsaw as claimed in claim 8 or claim 9, wherein the interengageable means are provided by a pair of arms provided on the first guide bar portion and by an elongate, rectangular aperture formed in the second guide bar portion.

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11. A chainsaw as claimed in any one of claims 1 to 10, wherein the prime mover is an electric motor.

12. A guide bar/saw chain assembly for a chainsaw, the assembly comprising a guide bar, a saw chain and a sprocket drive wheel, the guide bar having first and second guide bar portions telescopically and movably connected together, the sprocket drive wheel being associated with the second guide bar portion, and the saw chain being in drivable engagement with the sprocket drive wheel and passing around the peripheries of the first and second guide bar portions, wherein the first and second guide bar portions are connected by connection means capable of preventing relative telescopic movement in a direction tending to force the two guide bar portions towards one another.

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13. An assembly as claimed in claim 12, wherein the connection means is constituted by interengageable means provided on the first and second guide bar portions.

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14. An assembly as claimed in claim 13, wherein interengageable ratchets constitute the interengageable means of the first and second guide bar portions.

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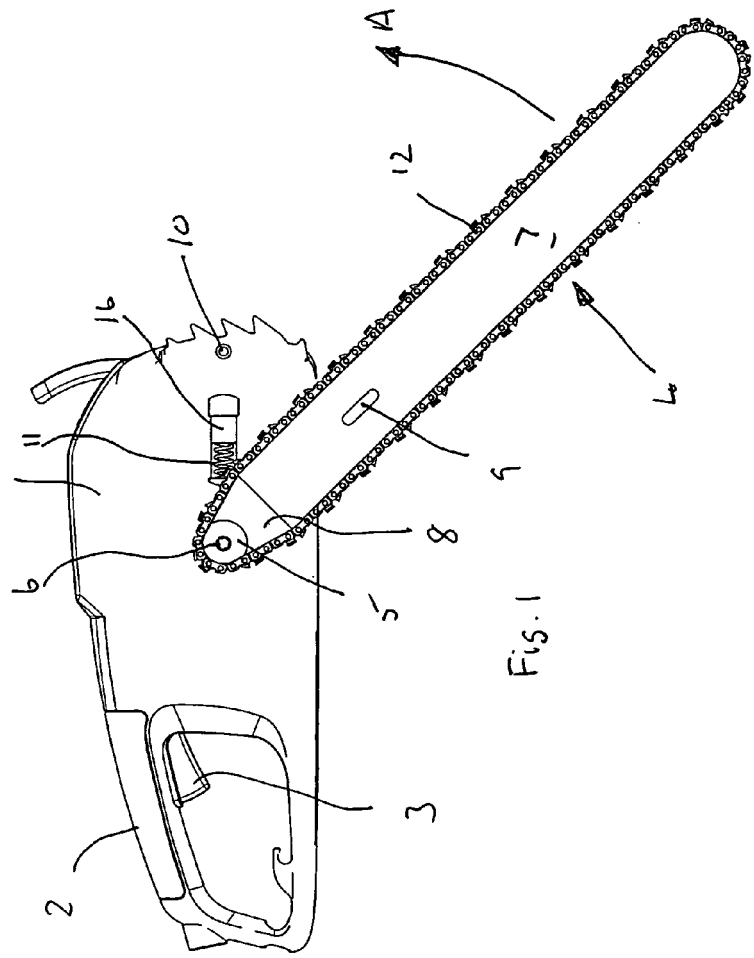
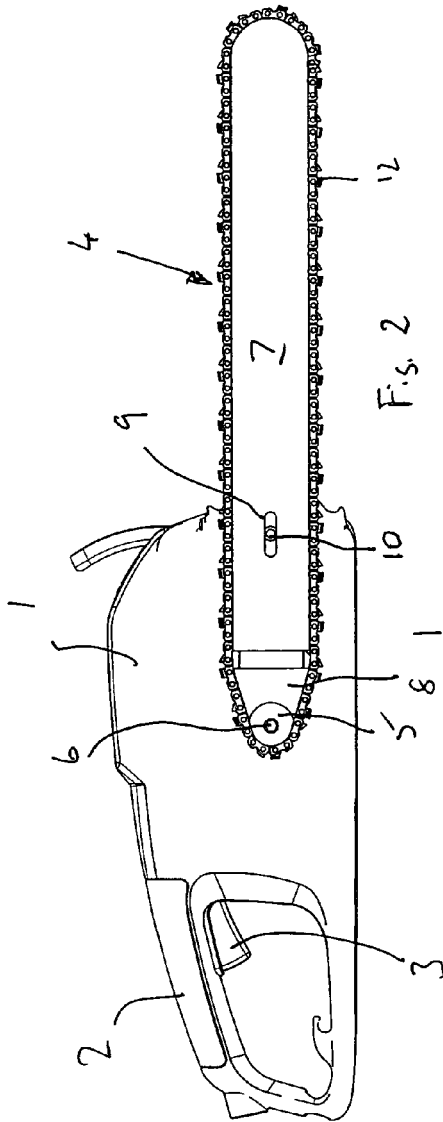
15. An assembly as claimed in claim 13 or claim 14, wherein the interengageable means are provided by a pair of arms provided on the first guide bar portion and by an elongate, rectangular aperture formed in the second guide bar portion.

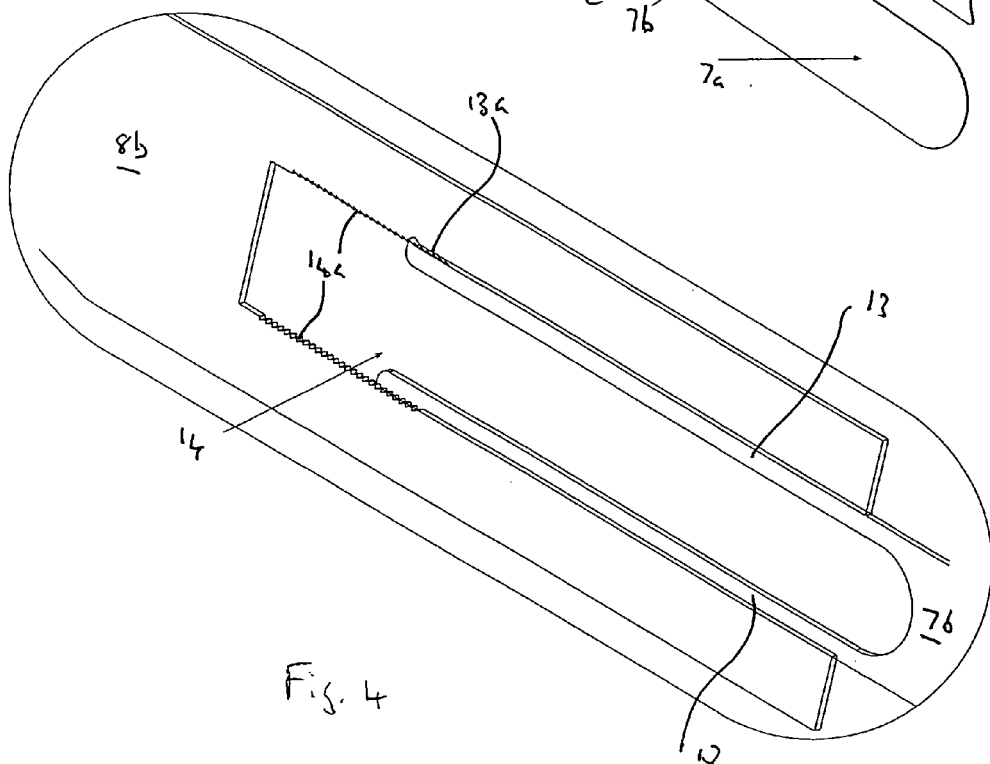
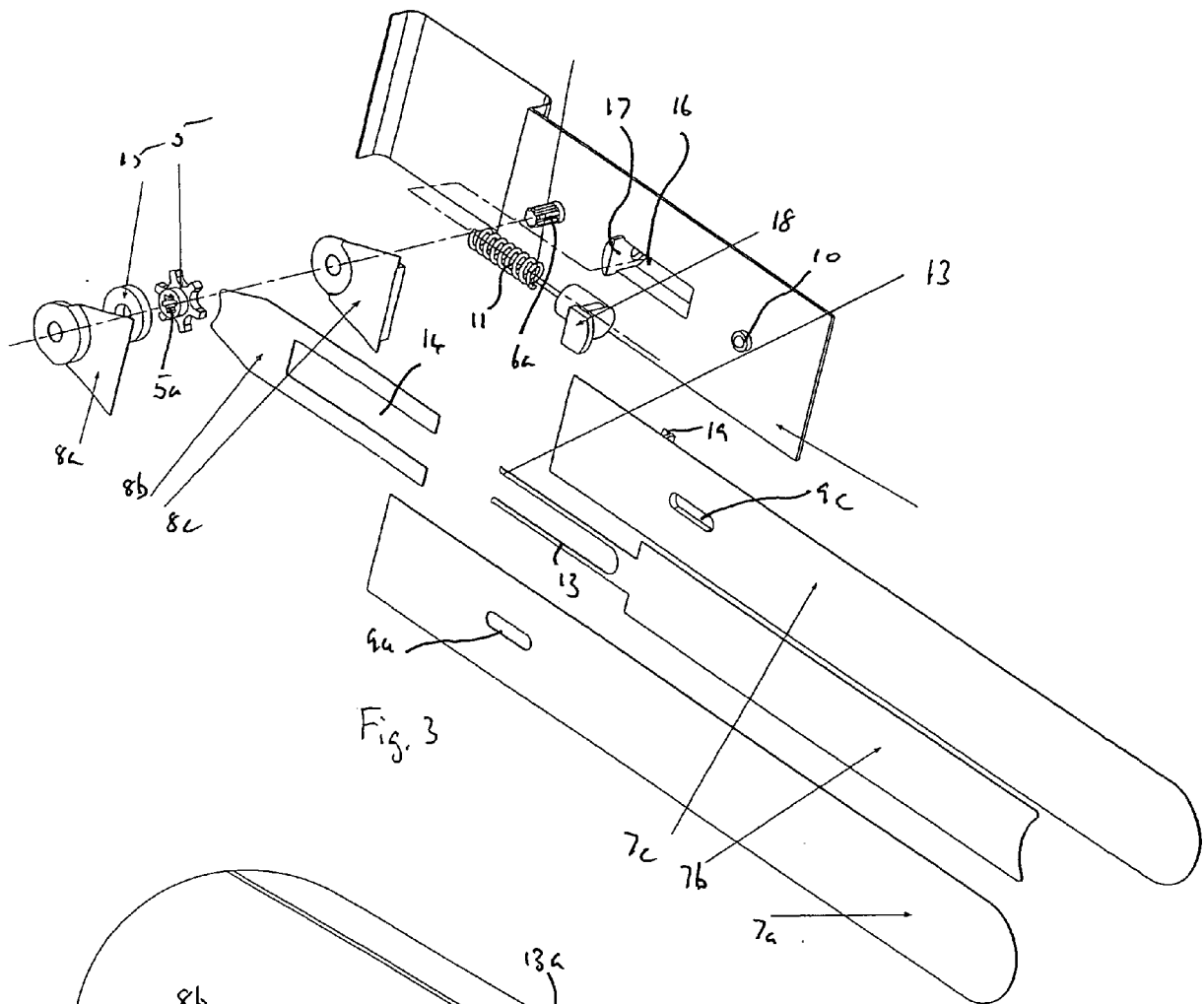
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16. An assembly as claimed in any one of claims 12 to 15, wherein the sprocket drive wheel is formed with means for drivable engagement with a sprocket drive shaft drivably connected to chainsaw prime mover.

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17. An assembly as claimed in any one of claims 12 to 22, wherein the first guide bar portion is provided with a ramp which is engageable with a spring for biasing the two guide bar portions apart.





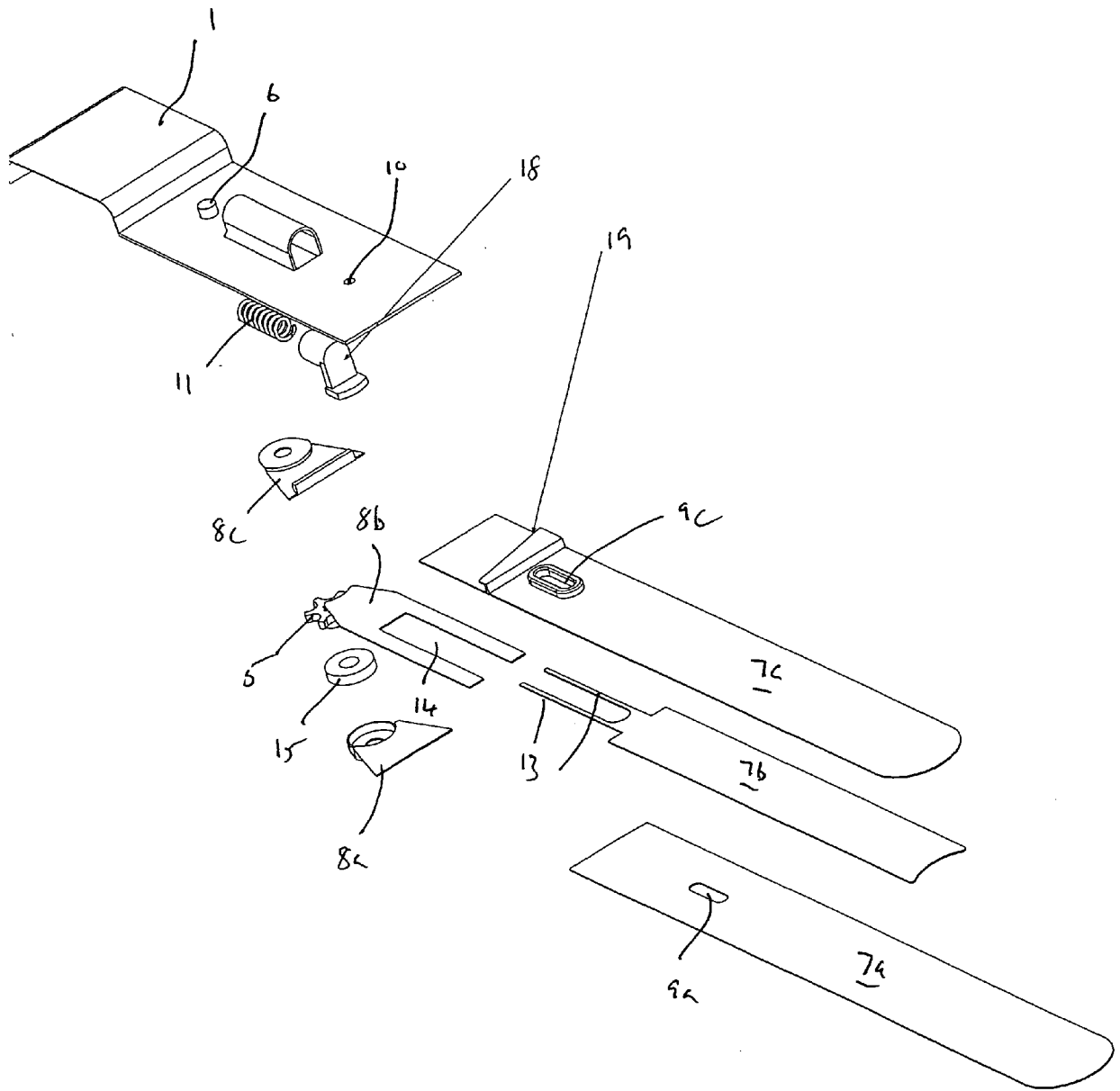


Fig. 5

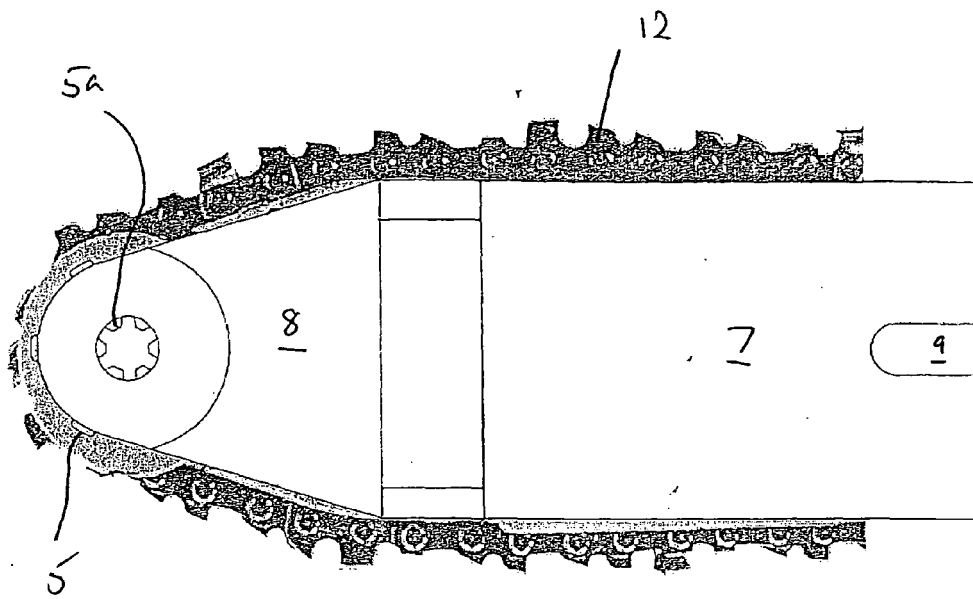


Fig. 7

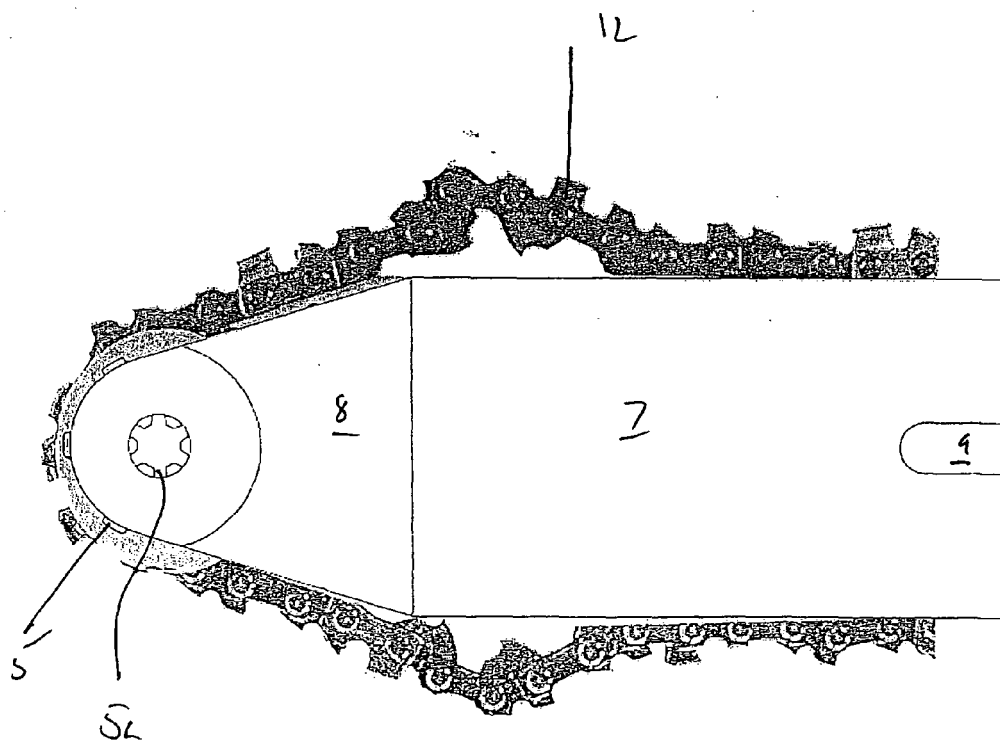


Fig. 8

