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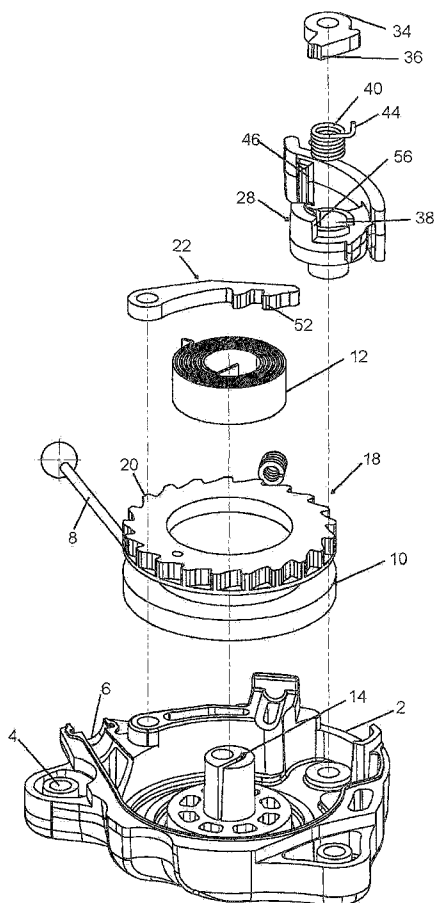
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[Continued on next page]

(54) Title: TENSIONING AND LOCKING DEVICE, IN PARTICULAR FOR SNOW CHAINS

(57) Abstract: A tensioning and locking device, in particular for snow chains, characterised by comprising: - a casing (2) housing a spool (10) about which a traction cable is wound, - elastic means (12) preloadable as a result of withdrawing the cable (8) from the casing (2), - a ring gear (18) coaxially rigid with said spool (10), - a first retention pawl (22, 52) which removably engages said ring gear (18) and which, when engaged, enables the spool to rotate in a first direction but prevents its rotation in a second direction opposite to the preceding, - a second retention pawl (34, 36) which removably engages said ring gear (18) and which, when engaged, enables the spool to rotate in the second direction but prevents its rotation in the first direction, - an intermediate member (28) operable by the user, and acting simultaneously on said first retention pawl (22, 52) and on said second retention pawl such that when the first retention pawl is engaged with the ring gear the second retention pawl is disengaged therefrom and vice versa.



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TENSIONING AND LOCKING DEVICE, IN PARTICULAR FOR SNOW CHAINS

The present invention relates to a tensioning and locking device, in particular for snow chains.

5 Known tensioning and locking devices for snow chains are fixed at two points, namely at one end of the outer chain and at one end of a transverse chain, and are provided with a flexible traction cable wound about a spool and elastically engaging the other end of the outer chain.

 These devices are generally provided with levers and pushers which, depending on their position, enable the cable to be pulled to connect the two ends of the chain together, prevent its further exit to ensure chain tensioning, and lock this tensioning configuration.

 However these known devices present certain drawbacks, and in particular:

- 15 - danger during use as there is nothing to prevent elastic return of the traction cable by the spring, which can strike the user's hands,
 - laborious and difficult operation.

 An object of the invention is to eliminate these drawbacks by providing a tensioning and locking device which can be operated easily and
20 comfortably.

 Another object of the invention is to provide a device which enables the degree of tensioning to be maintained constant even following settling during vehicle travel.

 These objects are attained according to the invention by a tensioning
25 and locking device, in particular for snow chains as claimed in claim 1.

A preferred embodiment of the present invention is further described hereinafter with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of the device of the invention,

Figure 2 shows in it plan view during extraction of the traction cable, and

5 Figure 3 shows it during retraction of the traction cable.

As can be seen from the figures the tensioning and locking device according to the invention comprises substantially a casing 2 closable by a cap, not shown in the drawings, and provided with two rings 4 to which the end of the transverse chain and the end of the outer chain of snow chains are
10 fixed.

The casing comprises in its lateral surface a slot 6 for passage of a traction cable 8 fixable to the other end of the outer chain.

The traction cable is secured to a spool 10 housed in the casing 2.

A helical spring 12 is inserted into the cylindrical cavity of the spool 10
15 and has its inner end secured to a slot 14 provided in the casing and its other end engaged in a tooth 16 provided on the inner lateral surface of the spool.

With the spool there is associated a ring gear 18 the teeth 20 of which are elastically engaged by a first retention pawl, indicated by 22, pivoted to the casing on a pin 24. The head of the retention pawl 22 engages in a seat
20 26 provided on a rotatable member 28 pivoted on a pin 30 rigid with the casing 2 and provided with an operating lever 32. On the pin 30 there is also pivoted a second retention pawl 34 provided with a tooth 36, the purpose of which will be apparent hereinafter. The second retention pawl 34 is housed in a seat 38 provided in the member 28 and is rigid therewith by virtue of the
25 presence of a spring 40 having one end 42 housed in a seat present in the member itself and acting at its other end 44 on the retention pawl 34.

The device of the invention operates in the following manner:

after fixing the ends of the inner chain and positioning all the transverse chains across the wheel, the lever arm 32 is rotated clockwise (with respect to Figure 2), after elastically disengaging an appendix 46 from a
5 tooth 48 provided on the casing 2 and elastically engaging an appendix 58 with a tooth 60. In this manner the retention pawl 22, the head of which is guided within the seat 26, rotates anticlockwise about the pin 24, against the elastic action of a spring 50, and disengages its teeth 52 from the teeth 20 of the ring gear.

10 While in this configuration the tooth 36 of the retention pawl 34 interferes via its active flank with the teeth 20 of the ring gear 18, but does not hinder clockwise rotation of this latter as it can rock about the pin 32 against the elastic action of the spring 44.

In this manner the cable 8 can be extracted from the casing 2, while
15 simultaneously loading the helical spring 12, to hence engage its end 54 with the other end of the outer chain.

If the user accidentally loses grip on the cable, it is prevented from suddenly winding on the spool by the action of the helical spring, because in this configuration the teeth 20 of the ring gear 18 interfere with the passive
20 flank of the tooth 36 of the second retention pawl 34, to prevent rotation of the spool in the opposite direction to that which enables the traction cable to be extracted. In particular, rotation of the retention pawl 34 is prevented by the contrasting action presented by a shoulder on the member 28, this member being prevented from rotating by bearing against the casing 2.

25 When the end of the traction cable has been engaged with the end of the outer chain, the user firstly disengages the appendix 58 from the tooth 60

then rotates the lever arm 32 in the opposite direction to the preceding (see Figure 3).

As a result of this rotation the lever arm 22 is brought into the configuration in which its teeth 52 engage in the tothing of the ring gear 18.

5 This enables the cable to automatically wind onto the spool 10 which, under the action of the preload of the helical spring 12, rotates freely as the engagement between the passive flanks of the ring gear teeth 20 and of the teeth 52 of the retention pawl 22 enables these to easily pass over each other.

10 It should be noted that when the cable has been drawn into the casing by the amount required to tension the chain, no slackening of this tension is possible as rotation of the spool 10 in the clockwise direction (with respect to Figure 3) is prevented by the engagement between the active flanks of the ring gear and of the retention pawl.

15 From the foregoing it is apparent that the device of the invention presents numerous advantages, and in particular:

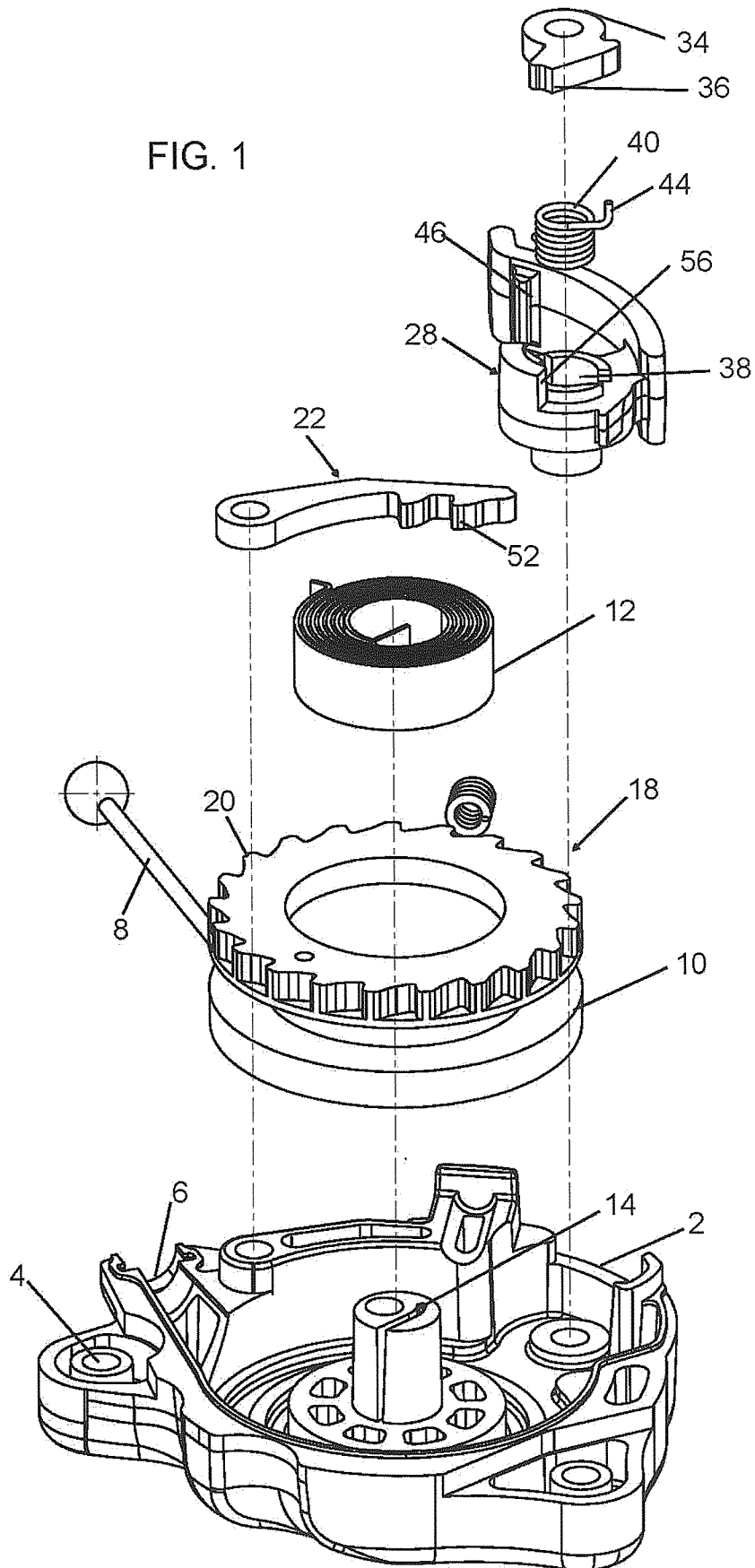
- it can be easily and comfortably activated,
- it maintains the degree of tensioning stable,
- it presents no danger to the user as accidental elastic retraction of the traction cable by the spool is prevented.

C L A I M S

1. A tensioning and locking device, in particular for snow chains, characterised by comprising:
- a casing (2) housing a spool (10) about which a traction cable is wound,
 - 5 - elastic means (12) preloadable as a result of withdrawing the cable (8) from the casing (2),
 - a ring gear (18) coaxially rigid with said spool (10),
 - a first retention pawl (22, 52) which removably engages said ring gear (18) and which, when engaged, enables the spool to rotate in a first direction but
 - 10 prevents its rotation in a second direction opposite to the preceding,
 - a second retention pawl (34, 36) which removably engages said ring gear (18) and which, when engaged, enables the spool to rotate in the second direction but prevents its rotation in the first direction,
 - an intermediate member (28) operable by the user, and acting
 - 15 simultaneously on said first retention pawl (22, 52) and on said second retention pawl such that when the first retention pawl is engaged with the ring gear the second retention pawl is disengaged therefrom and vice versa.
2. A device as claimed in claim 1, characterised in that the first retention
- 20 pawl consists of a lever arm (22) provided with teeth (52) engaging the ring gear (18), the head of the lever arm being housed in a seat provided in said intermediate member.
3. A device as claimed in claim 2, characterised in that said intermediate
- 25 member (28) is provided with elastic means (40) acting on said second retention pawl.

4. A device as claimed in claims 1 and 3, characterised in that said intermediate member (28) consists of a rotatable body (28) provided with an articulation arm (32) pivoted to the casing on a pin (30), on which the second retention pawl (34, 36) and the elastic means (40) are also pivoted.
- 5 5. A device as claimed in claim 1, characterised in that the second retention pawl is housed in a seat (38) provided in said rotatable body.

FIG. 1



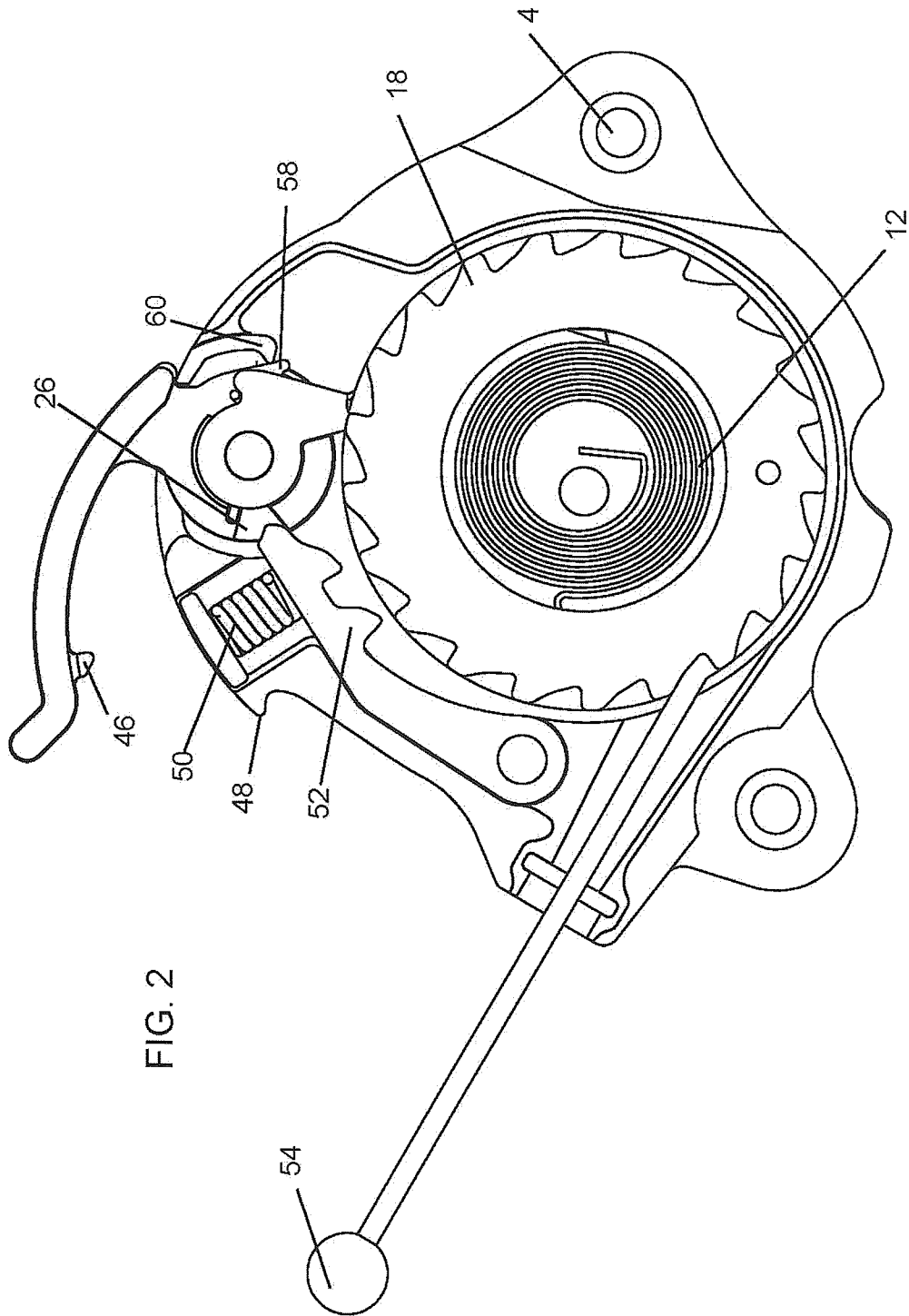
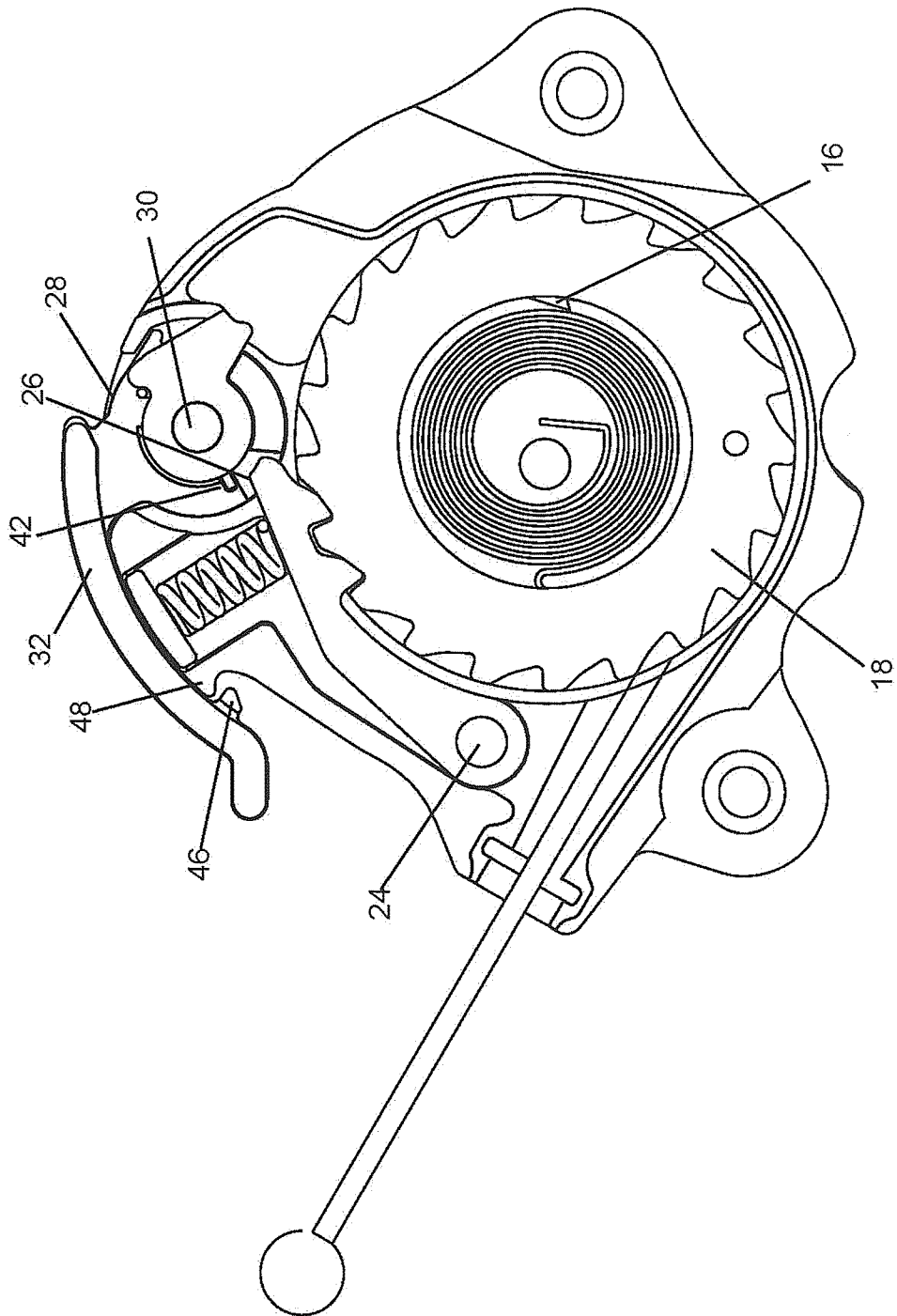


FIG. 2

FIG. 3



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B60C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/102065 A1 (PICHER THOMAS [AT] ET AL) 5 June 2003 (2003-06-05)	1,2,5
A	page 1 - page 2; figures	3
A	WO 2004/022363 A (PEWAG AUSTRIA GMBH [AT]) 18 March 2004 (2004-03-18)	1
A	claims; figures	
A	DE 10 2004 037332 B3 (RUD KETTEN RIEGER & DIETZ [DE]) 25 May 2005 (2005-05-25)	1
A	paragraphs [0014] - [0018]; claims; figures	
A	DE 297 03 911 U1 (WEISSENFELS CONTIWEISS [DE]) 17 April 1997 (1997-04-17)	1
	page 9 - page 11; claims; figures	

Further documents are listed in the continuation of Box C.

See patent family annex.

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- * & * document member of the same patent family

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Information on patent family members

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