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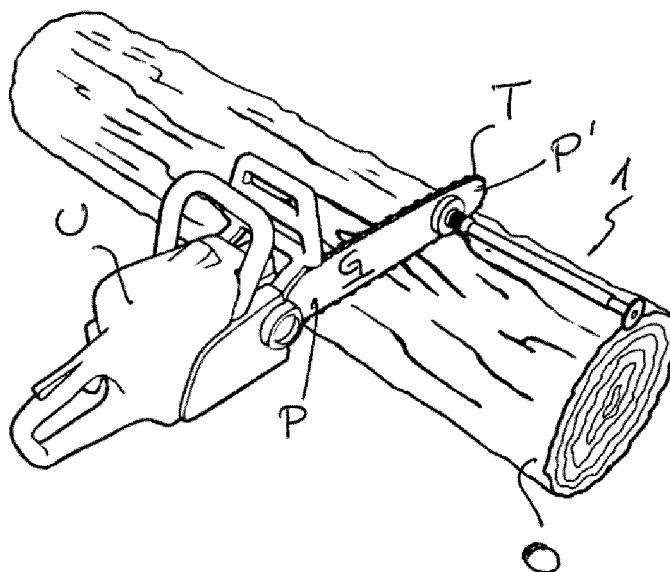
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(54) MEASUREMENT DEVICE FOR PORTABLE CUTTING TOOLS

(57) A measurement device for portable cutting tools (U) such as chain saws or similar apparatus, having a cutting member (T) for cutting an object (O) and a stationary guide (G) designed to support the cutting member (T); the device comprise a support base (2) adapted to be positioned on the stationary guide (G) of the tool (U) in the proximity of the cutting member (T); means (3) for removably connecting the support base (2) to the stationary guide (G) of the tool (U), a substantially cylindrical straight rod-like member (14) with a first end (15) oper-

atively connected to the support base (2) and a second free end (16) opposite thereto, wherein the rod-like member (14) has a preset length (L_2) to define a specific cutting length. Vibration damping means (38) are provided between the support base (2) and the first end (15) of the rod-like member (14), which are adapted to reduce propagation of the vibrations that act on the rod-like member (14) to the support base (2) for improved handling of the tool (U) by a user.

**FIG. 1****EP 3 088 147 A1**

Description

Background of the invention

[0001] The present invention concerns the field of cutting tools and more particularly the field of portable tools for cutting various materials, e.g. wood, metal or plastic, and particularly relates to a measurement device for use with such tools.

Description of the Prior Art

[0002] Cutting tools are commonly used to reduce large-sized products into smaller pieces.

[0003] Products must be often cut on site, using relatively small tools that can be easily carried by the operator to the working site.

[0004] By way of example only, this class of tools includes circular saws, chain saws, electric blades or other similar devices specially designed for cutting wood, plastic, metal or other composite materials.

[0005] The operator that uses these tools is often confronted with the need to cut a large piece into multiple smaller pieces of the same size.

[0006] It will be clear for everyone that cutting to constant sizes is rather simple when tools are stationary, i. e. when they have their own support base or are stably anchored to a workbench, but it is quite difficult when it is carried out on site using a portable tool.

[0007] Nevertheless, referring to a particular tool, such as a chain saw, an attempt to solve this problem has been made by providing a measurement devices that are designed to be removably applied to the rigid guide of the chain.

[0008] Patent US 7,861,416 discloses a measurement device for a chain saw which consists of a resilient rod having one end fitted with a powerful magnet and a stud that is designed to be introduced into a hole formed in the chain guide bar.

[0009] The rod extends perpendicular to the cutting plane and has a disk on the other end, indicating the right measured length of the cut to the operator.

[0010] Furthermore, the rod may be formed of one piece, to thereby define a fixed cutting length, or may be composed of two sliding rods, allowing the cutting length to be adjusted from minimum to maximum preset values.

[0011] The rod is fixed to the chain saw by a pin, which is nevertheless an obstacle to the use of this device as it requires a corresponding receiving bore to be formed in the chain guide.

[0012] Furthermore, with this connection the rod will be rigidly connected to the chain saw, and this will affect ease of handling of the tool because, even when the rod is made of a resilient material, it cannot effectively absorb the shock of impacts with the material to be cut.

[0013] Therefore, the device as disclosed in the aforementioned US patent is apparently not easy to use and is very rigid, which will be an obstacle to handling of the

tool.

[0014] It should be further noted that the measurement device with the adjustable rod is configured to only be able to change the cutting length by discrete multiples of a base value, typically 2", and does not allow continuous adjustments.

[0015] Due to the above, the above discussed device is found to be poorly practical and versatile in use.

[0016] In light of these apparent limits of the prior art, it would be desirable to provide an adjustment device that can be very easily applied to the tool, without requiring the latter to feature particular arrangements therefor, that absorbs almost all the vibrations generated during cutting, that is simple and inexpensive and affords very easy handling of the tool by the user.

Summary of the invention

[0017] The present invention is based on the problem of providing a measurement device that can obviate the aforementioned prior art drawbacks and has the features as discussed hereinabove.

[0018] Also, there is disclosed herein a measurement device that can be easily assembled and may be installed in a cutting tool without requiring special skills on the part of the user.

[0019] A non-incidental object fulfilled by the present invention is to provide a sturdy and handleable measurement device, that can be used under any possible work conditions, due to its high stability and shock-absorbing capacity.

[0020] A similar problem has been solved, according to the invention, by a measurement device for portable cutting tools as defined in claim 1.

[0021] Further embodiments of the present invention will be provided in accordance with the dependent claims.

Brief description of the drawings

[0022] Additional features and advantages of the present invention will become apparent through one embodiment of a measurement device for portable cutting tools that is preferred but shall be intended without limitation. It will be illustrated with the help of the following drawings annexed hereto:

Figures 1 and 2 show a perspective view of a particular cutting tool with the inventive object applied thereto;

Figure 3 is a perspective view of the measurement device as claimed in the present application;

Figure 4 is a side view of the device of Figure 2;

Figure 5 is a cross-section side view of the device of Figure 4;

Figure 6 is an exploded side view of the device of Figure 5;

Figure 7 is a perspective view of the device of Figure 2, installed on a portable cutting tool, showing its

versatile use.

Description of the preferred embodiments

[0023] While the following specification relates to a first embodiment of the invention, as shown in the accompanying figures, this shall not be construed as limiting, as the device of the invention can be provided in a form other than that disclosed herein, and still fall within the scope defined by the main independent claim.

[0024] The measurement device, which is referenced **1** in the drawings, can be applied to a variety of cutting tools **U**, e.g. an electric blade or a wheel cutter, but it will be preferably installed on a chain saw, as schematically shown in the drawings of Figure 1.

[0025] It shall be noted that the measurement device **1** can be applied to the tool **U** if the latter is equipped with both a cutting member **T** designed to cut the object **O**, and a stationary guide **G**, which is generally fixed to a handle **I** and is adapted to support the cutting tool **T**.

[0026] In a chain saw, the cutting member **T** is a chain that slides on an elongate guide **G** defined by a thin flat metal plate **P** having a rounded end **P'**.

[0027] The measurement device **1** comprises a support base **2** that is adapted to be positioned on the stationary guide **G**, i.e. a flat plate, in an area proximate to the cutting tool **T**.

[0028] The support base **2** may be preferably applied to the flat plate **P** in correspondence of the rounded end **P'**.

[0029] Generally, the base **2** is made of metal and has a circular shape, as it is formed by turning. For example, the diameter **D₁** of the base **2** may range from 60mm to 30mm, and is preferably a diameter of about 40mm.

[0030] Means **3** are also provided for removably connecting the support base **2** to the stationary guide **G**.

[0031] As more clearly described hereinafter, these connecting means **3** may comprise at least one screw or threaded pin, or alternatively a plurality of magnets **4** designed to be attached to the metal plate **P** whose attractive force is sufficient to keep the support base **2** in stable contact therewith.

[0032] Firstly, as best shown in Figures 5 and 6, the support base **2** may consist of a disk-shaped first end portion **5** having a flat, circular outer surface **6**.

[0033] This first disk-shaped portion **5** may further have an inner surface **7** opposite and parallel to the outer surface **6**. Nevertheless, the base **2** also comprises an annular second end portion **8** with a cylindrical inner wall **9**, as most clearly shown in Figures 5 and 6, having a transverse end edge **10** which contacts or is more precisely joined to the inner surface **7** of the disk-shaped first end portion **5**.

[0034] On the other side, an open transverse end edge **11** is provided such that an annular cavity **12** is obtained by joining the two portions, the cavity **12** being delimited by the cylindrical inner wall **9** of the second portion **8** and the circular inner wall **7** of the first portion **5**.

[0035] A cylindrical pin **13** having a predetermined di-

ameter, typically about 6mm, may extend from the center of the cavity **12** and particularly from the circular inner surface **7**, and project out of the open edge **11** of the second end portion **8** of the base **2** to fit into a corresponding hole formed in the guide element **G** of the tool **U**.

[0036] The cylindrical pin **13** is provided as an option, although in the particular device as described herein it is shown in Figures 3 to 6 because, while its presence assists application of the device **1** to the tool **U**, it can be only used if the stationary guide **G** of the latter has been formed with a through hole.

[0037] If the base **2** has the pin **13**, then the connecting means **3** may comprise threads formed on the pin itself, so that the entire device **1** may be removably fastened to the tool **U** by a nut that will be screwed down against the face **F'** of the stationary guide **G** opposite to the face that contacts the base **2**.

[0038] Nevertheless, as an alternative to the threaded pin, the connecting means **3** may be of magnetic type and comprise at least one magnet **4** accommodated in the cavity **12** and projecting out of it to interact with the metal face **F** of the metal guide **G**.

[0039] For example, as shown in Figures 3 and 6, four cylindrical neodymium magnets may be used, each having a diameter **D₂** of about 14mm and a depth of about 5mm.

[0040] The cavity **12** will obviously have a depth **p** that is smaller than the length **L₁** of the magnets **4**, i.e. smaller than 5mm and typically of about 3mm.

[0041] A substantially cylindrical straight rod-like member **14** is also provided, having a first end **15** operably connected to the support base **2** and a second free end **16** opposite thereto.

[0042] As more clearly shown in the figures, the rod-like member **14** may have a preset length **L₂** selected to define a given cutting length.

[0043] In order to assist the operator during cutting, the free end of the rod may be joined to a washer or a disk **17**, as shown in figures 1 to 5, which has a very small thickness **s**, so that it may partially fit into a recess formed by the cutting tool **T** on the object **O** during a previous scribing step performed by the operator.

[0044] In a particularly advantageous aspect, the length **L₂** of the rod-like member **14** may be adjusted within a range from predetermined minimum to maximum values.

[0045] In order to do this, as shown in Figures 4 to 6, the rod-like member **14** will comprise a first tubular rod **18** stably connected to the support base **2**. Therefore, the end of the first rod **18** connected to the base **2** will define the first end **15** of the rod-like member **14**.

[0046] The first rod **18** may be a section of a metal tube having an outside diameter **D₃** ranging from 8mm to 20mm, although a tubular section with an outside diameter of 12mm and a hole of 10mm may be preferably used.

[0047] The length **L₃** of the first rod **18** may be obviously selected as desired, but for practical use it does not ex-

ceed 200mm and is often of about 170mm.

[0048] An end opening **19** is provided at the end of the first rod **18**, for a second tubular rod **20** to be slidably introduced therein.

[0049] Therefore, the latter will have one end **21** designed to be introduced into the first rod **18** and an opposite end that will coincide with the second free end **16** of the rod-like member **14** and will be joined to the washer or disk **17**.

[0050] The second rod **20** may also be a section of a tubular section having an outside diameter D_4 of about 10mm and a length L_4 of about 150mm.

[0051] Therefore, the second rod **20** will slide within the first rod **18** to adjust the position of the second free end **16** within the corresponding range from minimum to maximum values which, considering the above mentioned dimensions, may be of about 170mm and 320mm.

[0052] Nevertheless, in order to maintain a fixed cutting length during use, the device **1** will use appropriate selective locking means **22**, for blocking the second rod **20** relative to the first rod **18**.

[0053] As clearly shown in the cross-section view of Figure 5 and the exploded view of Figure 6, the second rod **20** may have a transverse wall **24** and an inwardly tapered outer surface **25** in the end portion **23** that is designed to be introduced into the first rod **18**.

[0054] The end portion **23** may be also formed with a blind hole **26** that ends before the transverse wall **24**.

[0055] The entire end portion **23** may be either integrally formed on the second rod **20**, as schematically shown in Figure 5, or consist of a suitably shaped plug **27** adapted to be fitted into or applied to the end **21** of the second rod **20** that is designed to be slidably introduced into the first rod **18**, as shown in Figure 6.

[0056] A threaded pin **28** is also provided, which is designed to be screwed down and locked in the blind hole **26** of the end portion **23** to form one piece with the second rod **20**.

[0057] By way of example, the tapered surface **25** of the end portion **23** may have a length of about 5 mm, whereas the threaded pin **28** may be as long as 15 mm and have a diameter of 5 mm and M5 threads, these features will match those of the blind hole **26**.

[0058] As clearly shown in Figures 5 and 6, the locking means **22** comprise a cylindrical body **29** which is adapted for tight fitting in the first rod **18** and is made of a metal or plastic material.

[0059] This cylindrical body **29** has a threaded through hole **30** formed therein, for the end portion **31** of the pin **28** that axially projects out of the end portion **23** of the second rod **20** to be screwed in and out of it.

[0060] It should be noted that the pin **28** will be screwed in and out of the through hole **30** of the body **29** when the user imparts a clockwise or anticlockwise rotation to the second rod **20** about its axis **X**.

[0061] The body **29** also has a front portion **32** that faces the end portion **23** of the second rod **20** and has a plurality of radial cuts **33** formed therein, only sketched

in the perspective view of Figure 6, which will inevitably divide this portion **33** of the cylindrical body **29** into respective distinct and angularly contiguous circular sectors **34**.

[0062] Therefore, as the threaded pin **28** is screwed into the central hole **30** of the body **29**, the tapered surface **25** will move toward and contact the front portion **32** of the body **29**.

[0063] Namely, the tip **35** of the tapered surface **25** will fit into the through hole **30** of the body **29** and interact with the inner surface **36** of the hole **30** to outwardly expand all the circular sectors **34** along corresponding radial directions, thereby ensuring a firm hold thereof against the inner surface **37** of the first rod **18**.

[0064] Such firm hold will safely block the second rod **20** relative to the first rod **18** in the axial direction **X**.

[0065] It will be appreciated that, as the threaded pin **28** is unscrewed, the tapered surface **25** will move away from the through hole **30** and all the circular sectors will be retracted **34**, such that they will no longer exert a firm hold on the inner surface **37** of the first rod **18** and the second rod **20** will be free to slide relative to the first rod **18**.

[0066] As compared with prior art measurement devices, the present invention is characterized in that it has vibration damping means **38** interposed between the support base **2** and the first end **15** of the rod-like member **14** or, more precisely, between the support base **2** and the first end **15** of the first rod **18**, as clearly shown in Figures 2 to 7.

[0067] It will be appreciated that the addition of the vibration damping means **38** can damp the propagation of vibrations generated on the rod-like member **14**, e.g. due to shocks exerted thereon by the object **O** being cut or other elements that may be found in the work environment.

[0068] Such damping only allows a small amount of the vibrations imparted by the rod-like member **14** to reach the support base **2**, and actually improves handling of the tool **U** by its user.

[0069] An effective implementation of the damping means **38** consists in the use of a spring **39** having one end **40** stably connected to the support base **2**, and an opposite end **41** stably connected to the first end **15** of the rod-like member **14** or, in other words, stably connected to the first tubular rod **18**.

[0070] Such spring **39** may be formed with steel music wire, e.g. having a diameter of 3mm, and as many turns as to be about 20mm long.

[0071] The outside diameter D_5 of the spring **39** may be of about 15mm, to thereby define a helical spring with an elastic constant approximately ranging from 10 kg/mm to 20 kg/mm.

[0072] Figure 7 schematically shows the function of such damping means **38**, as the presence of the spring **39** allows the rod-like element **14** to oscillate about the center axis **X'** of the device in all directions.

[0073] The device of the present invention may be im-

plemented through any change or variant that may fall within the scope defined in the annexed claims, and all the above discussed elements may be replaced by equivalents, made of the same or a different material and possibly in a form other than that described herein, provided it falls within the disclosed scope.

Claims

1. A measurement device for portable cutting tools (U) such as chainsaws or similar apparatus, wherein the cutting tool (U) has a cutting member (T) adapted to cut an object (O) and a stationary guide (G) adapted to support the cutting member (T), wherein the device comprises:

- a support base (2) adapted to be positioned on the stationary guide (G) of the tool (U) close to the cutting member (T);
- means (3) for removably connecting said support base (2) to the stationary guide (G) of the tool (U);
- a rod-like member (14) substantially cylindrical and rectilinear with a first end (15) operatively connected to said support base (2) and a second free end (16), said rod-like member (14) having a preset length (L_2) to define a predetermined cutting length;

characterized by comprising damping means (38) interposed between said support base (2) and said first end (15) of said rod-like member (14), said damping means (38) being adapted to reduce the propagation of the vibrations of said rod-like member (14) to said support base (2) to increase the handling of the tool (U) by a user.

2. Device as claimed in claim 1, **characterized in that** said damping means (38) comprise a spring (39) having an end (40) stably connected to said support base (2), and an opposite end (41) stably connected to said first end (15) of said rod-like member (14).
3. Device as claimed in claim 1, **characterized in that** said support base (2) has a substantially disk-like first end portion (5) provided of a substantially planar circular outer surface (6) to which is connected the correspondent end (40) of said spring (39), and an inner surface (7) opposite with respect said outer surface (6) and substantially parallel thereof.
4. Device as claimed in claim 3, **characterized in that** said support base (2) comprises a substantially annular second end portion (8) with a cylindrical inner wall (9) having an end edge (10) joined to said inner surface (7) of said first end portion (5), and an open end edge (11) to define an annular cavity (12) de-

limited by said cylindrical wall (9) of said second end portion (8) and said inner surface (7) of said first end portion (5).

5. Device as claimed in claim 1, wherein the stationary guide (G) is made in a metallic material, **characterized in that** said connecting means (2) are of the magnetic type and comprise at least one magnet (4) housed into said cavity (12) and projected from said open end edge (11) to interact with the metal face (F) of the guide (G) of the tool (U).
6. Device as claimed in claim 1, **characterized in that** said preset length (L_2) of said rod-like member (14) is variable between a minimum predetermined value and a maximum predetermined value.
7. Device as claimed in claim 6, **characterized in that** said rod-like member (14) comprises a first tubular rod (18) stably connected to said support base (12) and having an opening end (19) to allow insertion of a second tubular rod (20) provided with said second free end (16), said second rod (20) being slidably movable into said first rod (18) to adjust the position of said second free end (16) between said minimum and maximum values.
8. Device as claimed in claim 7, **characterized by** comprising means (22) for selectively locking said second rod (20) with respect said first rod (18).
9. Device as claimed in claim 8, **characterized in that** said second rod (20) has an end portion (23) adapted to be inserted into said end opening (19) of said first rod (18), said end portion (23) having a transversal wall (24) with a peripheral outer surface (25) tapered inwardly and a blind threaded hole (26) for allowing screwing of a correspondent threaded pin (28).
10. Device as claimed in claim 9, **characterized in that** said locking means (22) comprise a cylindrical body (29) adapted to be inserted into said first tubular rod (18) and having a threaded through hole (30) to allow screwing of said threaded pin (28) upon rotation of said second rod (20) around its extension axes (X), said cylindrical body (29) having a front portion (32) faced to said end portion (23) of said second rod (20) on which are formed a plurality of radial cuts (33) to form respective circular sectors (34) distinct to each other, said tapered outer surface (25) being adapted to interact with said front portion (32) upon screwing of said pin (28) to promote the outwardly selective expansion of said circular sectors (34) and forming a seal against the inner surface (37) of said first rod (18) for blocking said second rod (20) with respect said first rod (18).

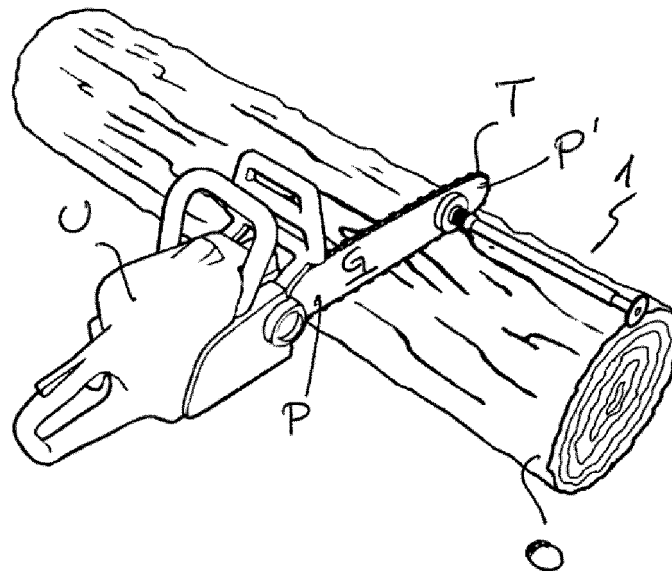


FIG. 1

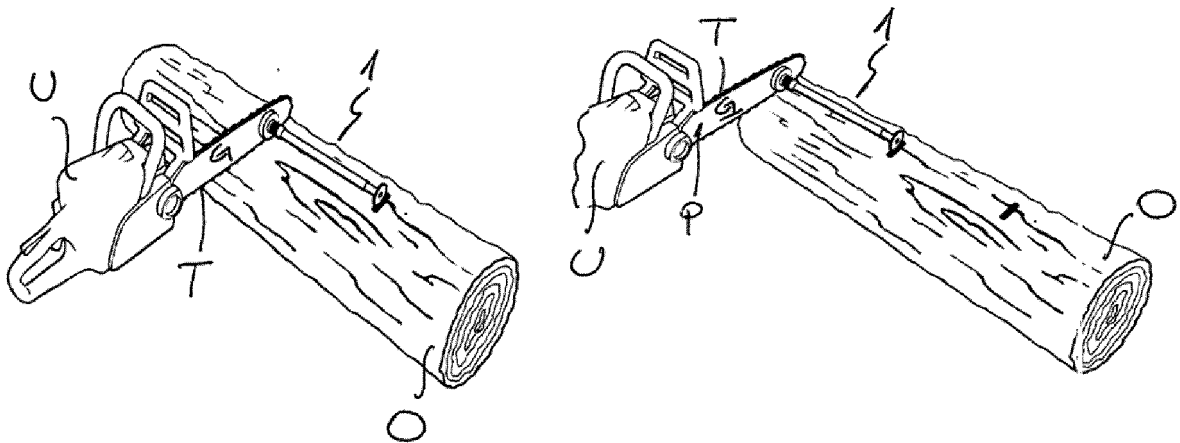


FIG. 2

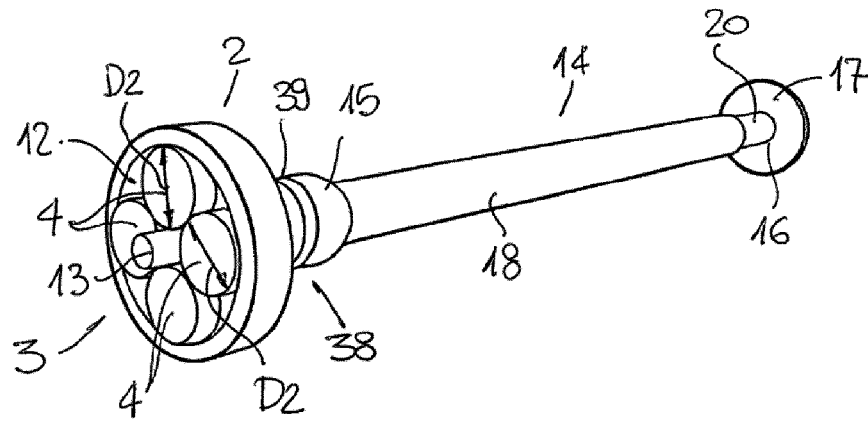


FIG. 3

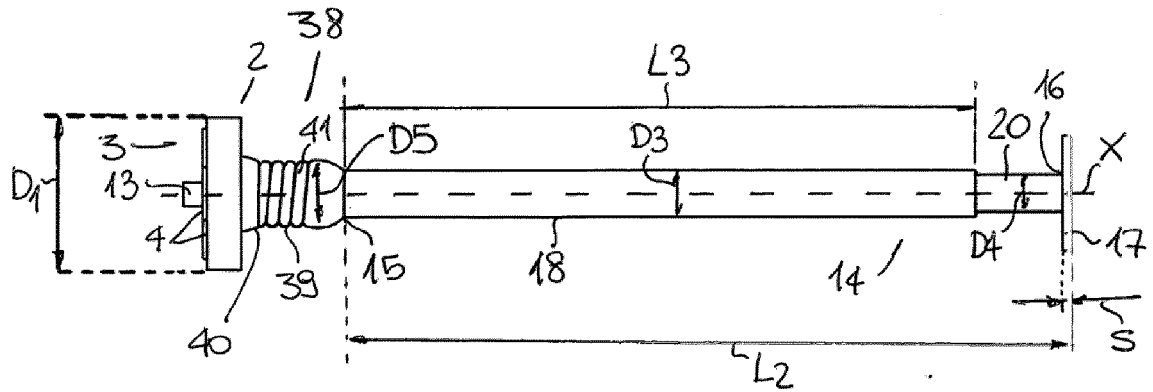


FIG. 4

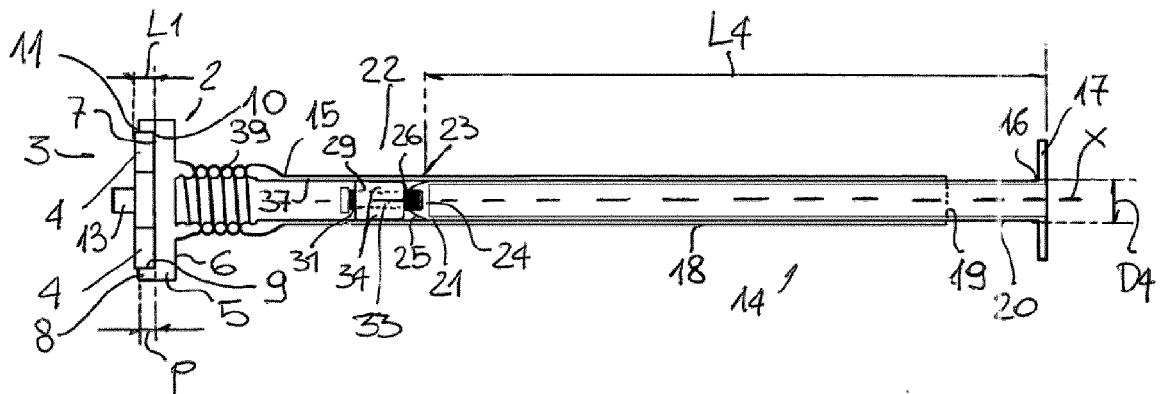


FIG. 5

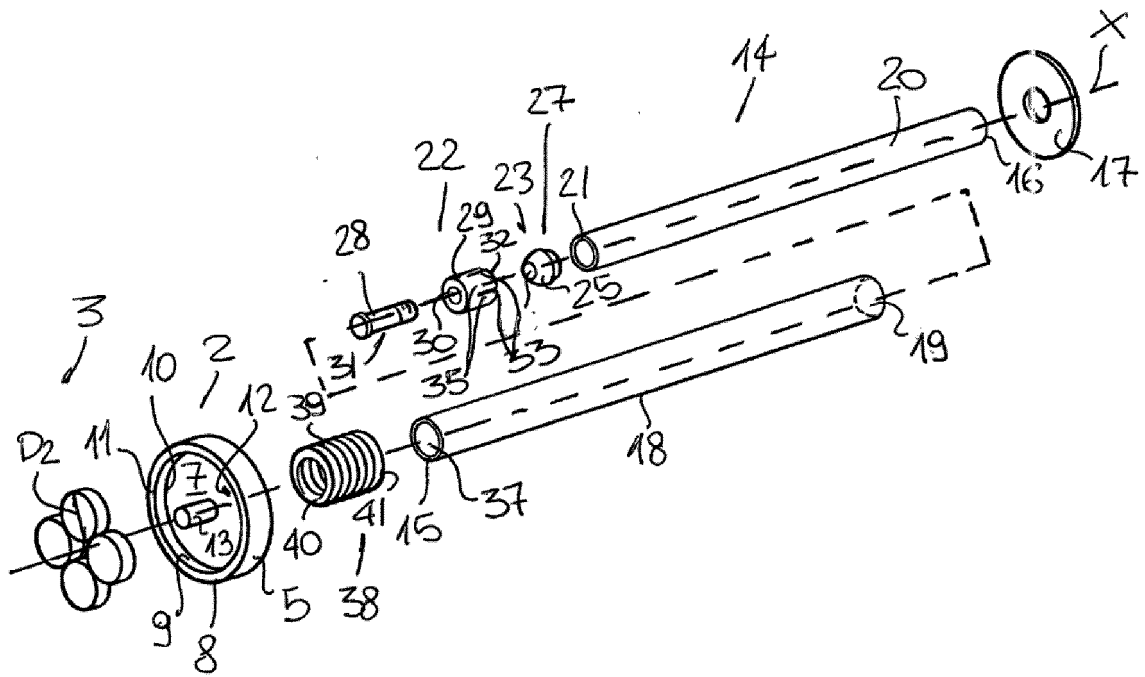


FIG. 6

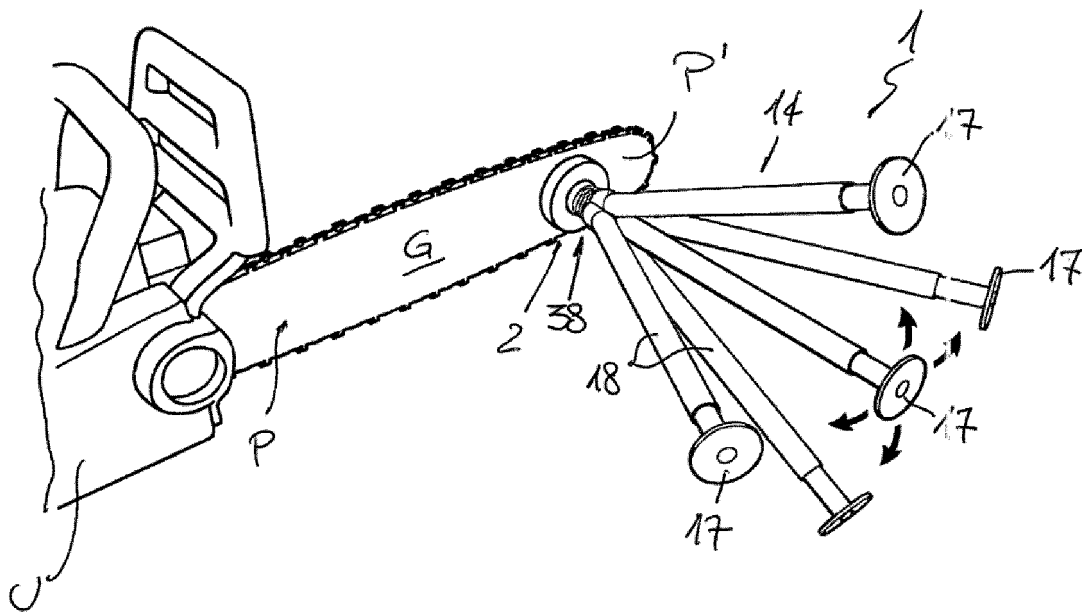


FIG. 7



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Place of search The Hague		Date of completion of the search 17 August 2016	Examiner Chariot, David
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