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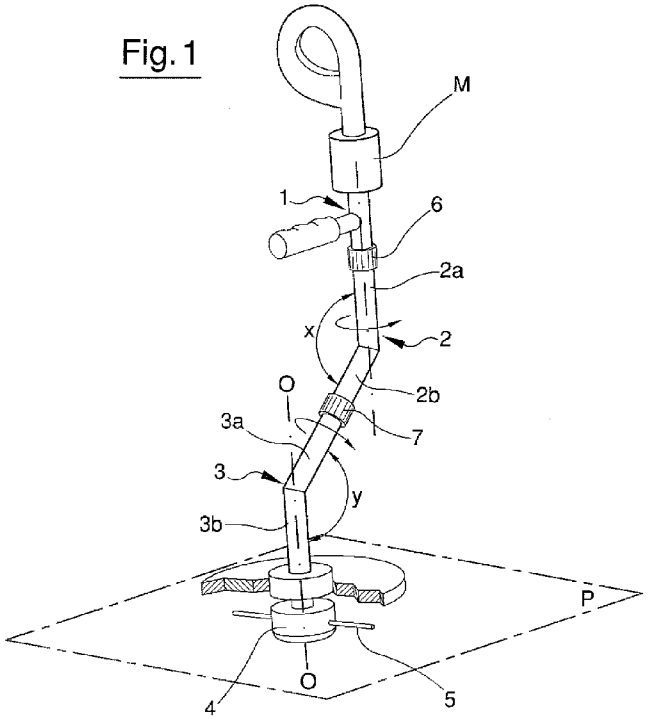
(54) **Title**: AN IMPROVED EDGE-TRIMMER WITH A DOUBLE-JOINTED EXTENSIBLE HANDLE

Fig. 1



(57) **Abstract**: An edge-trimmer for trimming grass, leaves, shrubs and small trunked plants, comprising a cutting tool, a shaft connected at one of ends thereof to the cutting tool for supporting and moving the tool, a grip which is solidly-constrained to an opposite end of the shaft in order to enable an operator to use the trimmer and a motor (M) connected to the shaft for activating the cutting tool (3). The shaft comprises an upper portion (1) which is solidly constrained to the grip and an intermediate portion (2) which is bent by an angle into two sections which meet at a vertex, and a final portion (3), bent by an angle, also in two sections meeting at a vertex. A first section (2a) of the intermediate portion (2) is connected to the upper portion (1), coaxially and freely rotating with respect thereto, a second section (2b) of the intermediate portion (2) is connected to a first section (3a) of the final portion (3), coaxially and freely rotating with respect thereto, while an opposite end of the second final section (3b) is connected to the cutting tool (5). The connection between the cutting tool (5) and the end of the second final section (2b) exhibits a fixed inclination, preferably of 90°.

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Description

An Improved Edge-Trimmer with a Double-jointed Extensible Handle.

Technical Field

The invention relates to an edge-trimmer, i.e. a type of tool widely used by those working in the area of maintaining green spaces in parks and gardens, and more precisely, the invention relates to an edge-trimmer of a portable and motorised type, constituted by a tool which is carried and completely projectingly supported by the operator, being a tool without wheels or another type of support for the weight of the tool.

The tool is provided with an orientable cutting head which can be arranged in a plurality of differently-inclined planes with respect to a single reference plane, generally a plane which is horizontal to the ground.

Background Art

Tools of this type available on the market are many and varied, but thanks to their particular mode of use all of them are provided with a substantially common structure.

In particular they comprise an elongate rod provided at an end thereof with a grip so that they can be handled and manoeuvred by the operator, and a cutting tool located at the opposite end. The cutting tool comprises a rotating head supporting a blade which rotates in an inclined plane, generally having a variable angle with respect to the axis of the end of the rod on which the blade is mounted; alternatively the cutting tool comprises a spool of a wire element, generally nylon or another similar material, which is set in rotation by the rotating head. By effect of the speed of rotation and the centrifugal force applied to the end of the wire, the wire behaves as an effective cutting blade against the vegetation (grass, bushes,

slim shrubs, etc.) that it encounters during the movement of the trimmer. When the end of the wire breaks due to wear following prolonged use, the spool dispenses the necessary quantity of wire to restore the tool to functionality.

The rotation head is set in movement by a motor which can be of the electric type or can be an internal combustion engine, or any other convenient type; the motor can be arranged on the end of the rod where the rotating head is mounted; indeed in these cases the rotating head is often the motor itself, or it can be mounted in proximity of the grip, transmitting its rotation movement to the rotation head via a transmission device, for example a string or mechanical joints.

An indispensable condition is that the tool must be light in order to guarantee its manoeuvrability.

During working, the cutting plane must take on various positions with respect to the horizontal plane on which the operator moves, in order to be able to cut flat on a meadow, variously on inclined grassy edges, vertically or even upturned on hedges, and has to perform tidying operations around lawns or on tree trunks and the like.

Notwithstanding the above, a particularly delicate and unsatisfactory aspect of the known tools relates to the possibility of varying the inclination of the cutting plane with respect to the axis of the shaft of the grip. The possibility of the varying the inclination of the rotation axis of the rotating head with respect to the axis of the shaft requires coupling devices between the shaft and the rotating head which are heavy and complex, such as to negatively influence the weight of the tool and the facility of manoeuvring thereof, as well as significantly limiting the possibilities of orientating the cutting plane connected to the rotating head axis.

US patent n° 6,324,764 attempted to resolve the problem with a two-piece shaft, one straight shaft connected to the grip and bearing the motor of the tool, and another bent shaft having an end which is coaxial and connected rotatably to the free end of the first piece, the opposite end being provided with a variable-inclination joint connected to the rotating head and thus to the cutting tool.

This solution too has however not advantageously solved the problem; in particular it has left practically untouched the difficulties connected to the presence of a connecting joint between the rotating head and the end of the variable-inclination support shaft.

The applicant has found that the above-mentioned problems might be resolved with a structurally-improved edge-trimmer, lighter, more easily manoeuvrable with less physical exertion and more versatile inasmuch as it is provided with a greater number of cutting planes with respect to known tools of the same type.

In its more general aspect, the present invention relates to a trimmer provided with a cutting tool which is fixed with respect to the axis of the end of the support shaft.

In a special aspect, the invention relates to a trimmer as described in the first claim.

Disclosure of Invention

The invention will more clearly emerge from the following description and with the aid of the accompanying figure of the drawing, which is provided exclusively by way of non-limiting example, as other realisations are however possible, in respect of and in the ambit of the definition of the trimmer according to the claims that follow.

Figure 1 is a schematic view of the trimmer of the invention in a preferred embodiment thereof, which has been shown to be very convenient for trimming grass, leaves, shrubs and small trunked plants, whatever the inclination of the lie plane on which they grow with respect to the

horizontal plane of the terrain, and on which the trimming is to be performed.

Substantially, the trimmer comprises a support shaft connected at an end thereof to a cutting tool, and at the other end thereof to a grip for enabling use of the trimmer by an operator. A motor mounted on the shaft produces the activating of the cutting tool. The shaft is an elongate element having three portions 1, 2 and 3 connected to one another in a way which will be described herein below. The upper portion 1 is connected to an intermediate portion 2 comprising two sections 2a and 2b which are inclined with respect to one another and meet at a vertex which defines the angle x of reciprocal inclination. The extent of the angle x is preferably comprised between 30° and 70°.

According to the invention, the first section 2a of the intermediate portion is connected to the upper portion 1, coaxially and rotatably with respect to the upper portion through an angle of 360°; the free rotation of the first section 2a with respect to the upper portion 1 can be blocked in any position by means of any device from among those commonly known to experts in the field, for example a threaded ferrule 6, but preferably comprises at least two predetermined blocking positions with respect to the upper portion 1 arranged preferably at 180° to one another. For a greater number of predetermined blocking positions the angular spacing between the positions is advantageously varied in equal angles or in different angles.

The intermediate portion 2 is connected to a final portion 3 comprising two sections 3a and 3b which are reciprocally inclined and which meet at a vertex defining the angle y of reciprocal inclination. The extent of the angle is preferably comprised between 30° and 70°.

With the invention, the first section 3a of the final portion is connected to the second section 2b of the intermediate portion 2 coaxially and rotatably

with respect thereto; the free rotation of section 3a with respect to section 2b of the intermediate portion 2 can be blocked in any position by means of any device from among the many known to technical experts in the field, for example a threaded ferrule 7, but preferably comprises at least four blocking positions with respect to section 2b, preferably arranged at 90° to one another. For a different number of blocking positions the angular spacing between the positions is advantageously stepped either equally or variously. The displacement between the various angular positions of section 2a with respect to portion 1 and section 3a with respect to section 2b is preferably done by unblocking the blocking device and manually rotating one section with respect to another. In a different embodiment of the invention the displacement between the various angular positions is performed automatically or semi-automatically.

The free end of the final portion, i.e. of section 3b, is connected to the cutting tool by means of a suitable rotating head 4.

In a preferred embodiment of the invention the upper, intermediate and final portions of the shaft are tubular elements connected to one another telescopically. The material constituting the tubular elements is chosen from among the materials which contemporaneously offer high mechanical resistance and great lightness, for example aluminium or carbon fibre.

The cutting plane p exhibits a fixed inclination with respect to the axis O-O of the end of the section 3b; preferably the inclination is of 90°, i.e. the cutting plane p is perpendicular to the end of section 3b.

The cutting tool 5 is selected according to the type of service the trimmer is prevalently intended for, according to the total weight of the trimmer and its total cost. It can be a rotating blade but is preferably a wire tool.

The activating motor M of the tool is preferably selected from between an internal combustion engine, for example a 35cc motor and preferably not

above 50cc, which gives the trimmer the maximum level of freedom of movement, or an electric motor, for example one having between 50 and 100 Watts of power, which however has the constraint of needing a supply cable for connecting the motor to the electrical source.

The motor M for activating the cutting tool, whichever type of motor is chosen, is preferably mounted on the upper portion 1 of the shaft in proximity of the grip and is connected to the cutting head via a wire transmission which can rotate the cutting tool in either direction.

The invention provides many and important advantages.

The trimmer is light, easy to handle and very versatile: in particular the fixed angle between the rotating head driving the cutting tool and section 3b, as well as the ability of the rotating head to rotate in either direction (clockwise and anticlockwise), obviates the need for a kinematic coupling between the two elements, which would be very complex and therefore heavy and more subject to damage and faults.

The double-jointed shaft realised with the connections 1-2a and 2b-3a means that the cutting plane can be arranged in a plurality of different positions with respect to the operator's work position; in particular, with the trimmer of the invention, the operator can remain stationary with respect to the terrain, having first chosen the most ergonomic and least tiring position, and can cut on eight different planes which are differently inclined with respect to one another. The passage from one work position into another is easily done in great safety for the operator, by temporarily stopping the rotation of the cutting tool and rotating, either manually or automatically, a sectionof the shaft with respect to an adjacent section.

The use of a wire transmission between the motor and the rotating head of the cutting tool makes the trimmer light, simple and reliable.

In the present description not all the possible structural and dimensional alternatives to the described embodiments of the invention have been illustrated: it is not necessary to expand overly in the constructional details of the system of the invention as any technical expert, following the instructions given here, will have no difficulty in designing the most advantageous technical solution, selecting suitable materials and sizes therefor.

These variations are however all comprised within the ambit of protection of the present invention, as the alternative embodiments mentioned are easily derivable from the description made herein above, each embodiment being adapted to the use or result to which it will be put

Claims.

1). An edge-trimmer for trimming grass, leaves, shrubs and small trunked plants, comprising a cutting tool, a shaft connected at one of ends thereof to the cutting tool for supporting and moving the tool, a grip which is solidly constrained to an opposite end of the shaft in order to enable an operator to use the trimmer and a motor connected to the shaft for activating the cutting tool, the shaft comprising an upper portion which is solidly constrained to the grip and an intermediate portion which is bent by an angle into two sections which meet at a vertex, characterised in that a first section of the intermediate portion is connected to the upper portion, coaxially and freely rotating with respect thereto, a second section of the intermediate portion is connected to a final portion which is bent at an angle, an end of which final portion is connected to the second section of the intermediate portion, coaxially and freely rotating with respect thereto, an opposite end of the final portion being connected to the cutting tool.

2). The trimmer of claim 1, characterised in that the upper portion, the intermediate portion and the final portion of the shaft are tubular elements telescopically connected to one another.

3). The trimmer of claim 1, characterised in that the intermediate portion comprises two predetermined blocking positions with respect to the upper portion, which blocking positions are located at a step of 180° from one another.

4). The trimmer of claim 1, characterised in that the angle (x) between the first section and the second section of the intermediate portion is comprised between 30° and 70°.

5). The trimmer of claim 1, characterised in that the final portion comprises four predetermined blocking positions with respect to the intermediate portion, which blocking positions are located at steps of 90° from one another.

6). The trimmer of claim 1, characterised in that the angle (y) between the first section and the second section of the final portion is comprised between 30° and 70°.

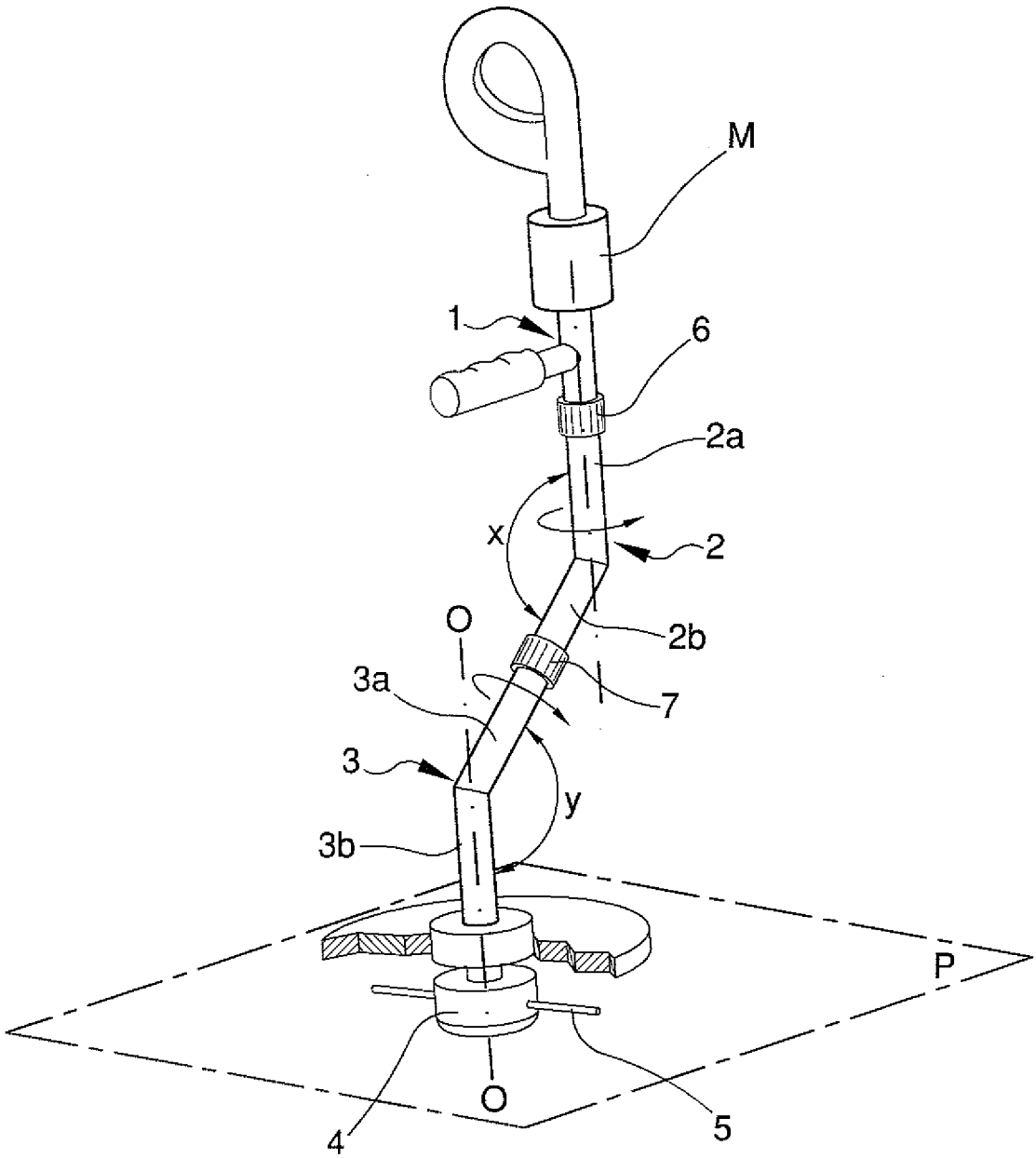
7). The trimmer of claim 1, characterised in that the cutting tool is selected from between wire-cutting tools and rotating-blade tools.

8). The trimmer of claim 1, characterised in that the cutting tool is a rotating-blade tool.

9). The trimmer of claim 1, characterised in that the activating motor of the cutting tool is located in proximity of the grip.

10). The trimmer of claims 3 and 5, characterised in that the blocking positions are set and fixed in mode which is selected from among manual, semi-automatic and automatic.

Fig. 1



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/052611

A. CLASSIFICATION OF SUBJECT MATTER
INV. A01G3/06

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)
A01G A01D

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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6 324 764 B1 (WATKINS STEVEN B [US]) 4 December 2001 (2001-12-04) cited in the application column 3, line 52 - column 4, line 48; figures	1-10
A	US 2004/231166 A1 (WILKINSON SEAN D [CA] ET AL) 25 November 2004 (2004-11-25) paragraphs [0048] - [0057]; figure 2	1-10
A	US 2 062 820 A (PIERCE ORBRA C) 1 December 1936 (1936-12-01) page 1, line 39 - page 2, line 2; figures	1-10

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
22 October 2009	03/11/2009

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2009/052611

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6324764 B1	04-12-2001	NONE	
US 2004231166 A1	25-11-2004	NONE	
US 2062820 A	01-12-1936	NONE	