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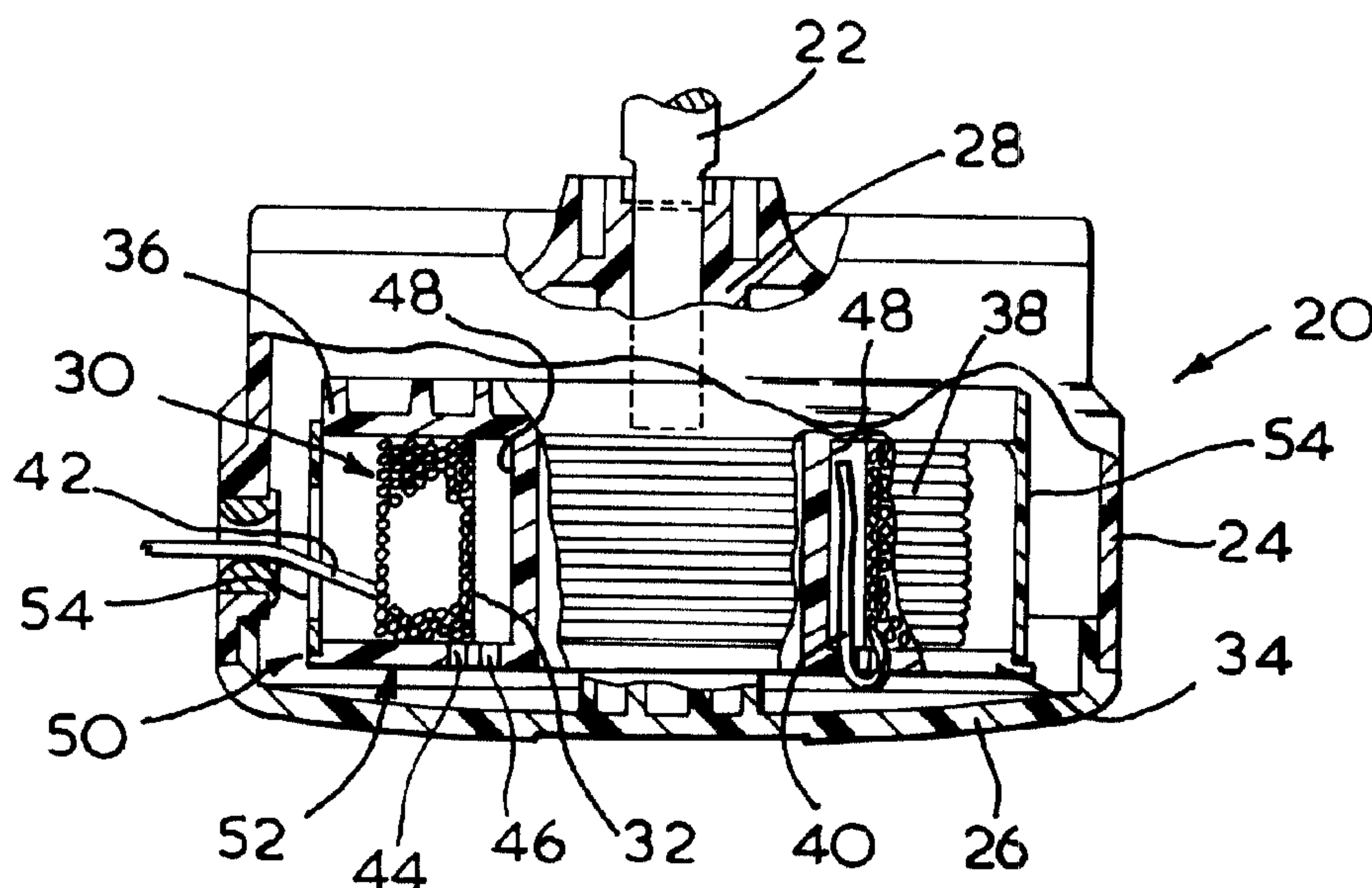
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(54) Titre : AMELIORATIONS APPORTEES AUX DEBROUSSAILLEUSE ROTATIVE

(54) Title: IMPROVEMENTS IN OR RELATING TO VEGETATION CUTTERS



(57) Abrégé/Abstract:

A spool (30) for a rotary cutter, such as a lawn mower edger or trimmer of the type using a flexible line (38) as a cutting member, comprises a core portion (32) and at least two flange portions (34), (36) spaced apart on the core portion (32) for supporting at least one coil of flexible line (38). At least one coiled line member (38) is disposed about the core portion (32) and has a first end (40) secured to the spool (30) and a second end (42) adapted to extend from the coiled line (38) to provide a length of line (12) for cutting. At least one of the flange portions (34) is provided with two apertures (44), (46), through which the line (38) can be threaded, at least one (44) of these apertures being in communication radially with the outside (50) of the flange (34) so that the line (38) can enter the aperture from a position radially exterior of the flange (34), and the line (38) is coiled with said first end (40) threaded through aperture (46) from the outside (52) of the spool (30) in a direction substantially parallel to the axis (A) of the spool (30), so that the end (40) is retained close to the core portion (32) of the spool (30), and then threaded through the communicating aperture (44) in the direction (X) of winding of the line (38). The aperture (44) which is in communication radially with the outside (50) of the flange (34) is preferably L-shaped.



ABSTRACT

A spool (30) for a rotary cutter, such as a lawn mower edger
5 or trimmer of the type using a flexible line (38) as a cutting
member, comprises a core portion (32) and at least two flange
portions (34), (36) spaced apart on the core portion (32) for
supporting at least one coil of flexible line (38). At least one
coiled line member (38) is disposed about the core portion (32)
10 and has a first end (40) secured to the spool (30) and a second
end (42) adapted to extend from the coiled line (38) to provide a
length of line (12) for cutting. At least one of the flange
portions (34) is provided with two apertures (44), (46), through
which the line (38) can be threaded, at least one (44) of these
15 apertures being in communication radially with the outside (50) of
the flange (34) so that the line (38) can enter the aperture from
a position radially exterior of the flange (34), and the line (38)
is coiled with said first end (40) threaded through aperture (46)
from the outside (52) of the spool (30) in a direction
20 substantially parallel to the axis (A) of the spool (30), so that
the end (40) is retained close to the core portion (32) of the
spool (30), and then threaded through the communicating aperture
(44) in the direction (X) of winding of the line (38).

25 The aperture (44 which is in communication radially with the
outside (50) of the flange (34) is preferably L-shaped.

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Title of the InventionImprovements in or relating to Vegetation Cutters5 **BACKGROUND TO THE INVENTION**

This invention relates to vegetation cutters and has particular reference to cutters that cut by means of a filament or strip that is rotated rapidly about an axis that may be either substantially vertical or substantially horizontal, depending upon
10 the application.

In most filament cutters, the cutting filament or strip is stored on a spool or reel from which a cutting length extends. During use, wear on the cutting length shortens that length, and
15 it is then necessary to withdraw filament or strip from the spool to make up the cutting length to its working value. The filament cutter is supplied with a reel or spool on which a supply of filament or strip is stored.

20 In general, when the supply of filament or strip on a reel or spool is exhausted, the empty reel or spool is removed and a replacement reel or spool, with a new supply of filament or strip already loaded is fitted. This is a simple operation, which is carried out by the operator of the vegetation cutter. The
25 replacement reels or spools are readily available from the usual retail sources, including for example, retailers of the vegetation cutter itself.

The cutting filament or strip is a flexible, generally
30 non-metallic filament or strip, in particular a light weight plastic filament or strip, having a relatively small diameter, which is adapted to cut or trim grass or other lightweight vegetation with reasonable effectiveness, and which is unlikely to cause significant injury to persons or animals struck by the
35 flailing filament or strip.

During manufacture of the reel or spool with the supply of cutting filament or strip wound on it, the cutting filament or strip has to be wound onto the empty reel or spool, either manually or automatically. As the winding of a length of cutting 5 filament or strip is commenced, it is necessary for the free end of the filament or strip to be secured, at least temporarily, to the reel or spool before the winding operation can be commenced.

As the filament cutter is used, and the supply of filament or 10 strip becomes exhausted, a relatively short length of filament is eventually left on the spool. If the end of this short length, which is of course the free end referred to in the preceding paragraph, is not secured to the spool, then there is a danger that a length of filament or strip, which might be of a similar 15 length to the cutting length, or may be even longer, may fly off from the cutter head, giving the risk of injury to the operator.

A number of proposals have been made to provide a means of securing the filament or strip to the reel or spool for winding, 20 but none of these is entirely satisfactory. It has been proposed, to locate the free end of the thermoplastic line in an aperture in the spool wall, and optionally to deform the free end by heating, so that it is retained within the spool. This method has the disadvantages firstly that it requires the provision of a heating 25 element at the winding station, and also may lead to environmental and safety issues associated with the heating of plastics materials and secondly that the final section of line is not retained on exhaustion. In GB 1,576,172 it was proposed to thread the cutting line through an aperture in the spool wall and then to 30 secure it by knotting, which involves an inconvenient mechanical operation; an alternative proposal in the same specification suggests that the line can be embedded in the spool wall, but no details are given of this proposal.

It has also been proposed to provide two closed apertures in one flange of the spool and to feed the end of the line through each of these apertures prior to commencing winding. While effective, this proposal has the disadvantage that the initial feeding of the line into the apertures prior to winding must be carried out in the opposite sense to the winding, and therefore constitutes an additional operation in the winding process, adding to the manufacturing costs.

10 UK Patent No. 1,582,568 discloses a filament cutter in which the filament is stored on a disk having a series of apertures circumferentially therearound, with a length of filament fixed to the disk and having a terminal length thereof extending from one of said apertures as a cutting length of the filament. Successive
15 apertures define intermediate portions of filament which themselves become terminal lengths as the line is consumed.

BRIEF SUMMARY OF THE INVENTION

It is an object of the present invention to provide a spool
20 for a vegetation cutter in which the above disadvantages are reduced or substantially obviated. It is a further object of the present invention to provide a method of winding such a spool, and a vegetation cutter comprising such a spool.

25 The present invention provides a spool for a rotary cutter, such as a lawn mower, edger or trimmer of the type using a flexible line as a cutting member, which spool comprises a core portion and at least two flange portions spaced apart on the core portion for supporting at least one coil of flexible line ,
30 and at least one coiled line member disposed about the core portion and having a first end secured to the spool and a second end adapted to extend from the coiled line to provide a length of line for cutting, wherein at least one of the flange portions is provided with at least two apertures, through which the line can
35 be threaded, at least one of these apertures being in

communication radially with the outside of the flange so that the line can enter said communicating aperture from a position radially exterior of the flange, and the line is coiled with said first end threaded through said aperture
5 from the outside of the spool in a direction substantially parallel to the axis of the spool, so that the end is retained close to the core portion of the spool, and then threaded through said communicating aperture in the direction of winding of the line.

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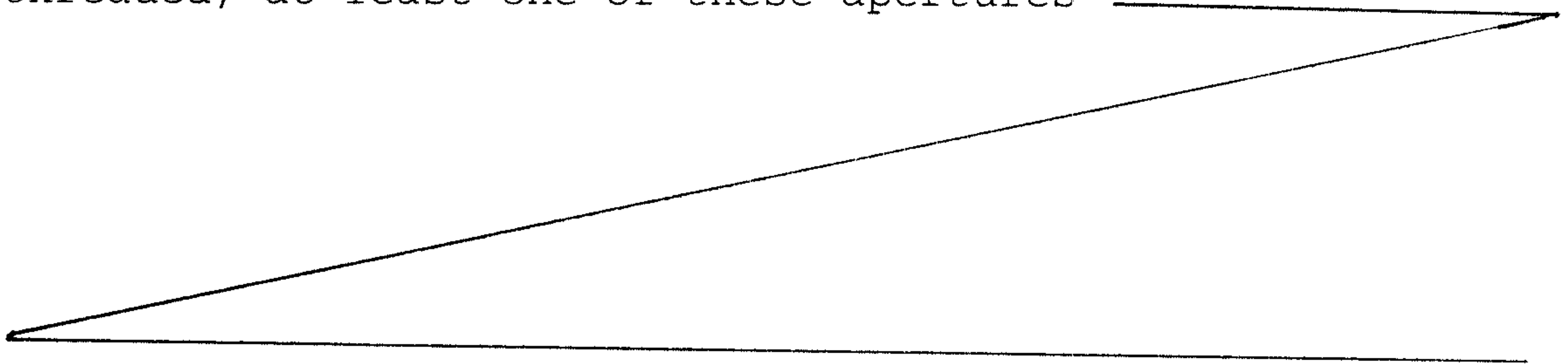
The invention further provides a rotary cutter, such as a lawn mower edger or trimmer of the type using a flexible line as a cutting member, which comprises a spool which comprises a core portion and at least two flange
15 portions spaced apart on the core portion for supporting at least one coil of flexible line, and at least one coiled line member disposed about the core portion and having a first end secured to the spool and a second end adapted to extend from the coiled line to provide a length of line for
20 cutting, wherein at least one of the flange portions is provided with at least two apertures through which the line can be threaded, at least one of these apertures being in communication radially with the outside of the flange so that the line can enter said communicating aperture from a
25 position radially exterior of the flange, and the line is coiled with said first end threaded through said other aperture from the outside of the spool in a direction substantially parallel to the axis of the spool, so that the end is retained close to the core portion of the spool,
30 and then threaded through said communicating aperture in the direction of winding of the line.

The invention further provided a rotary cutter for

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cutting vegetation, of the type using a flexible line stored on a spool as a cutting member, wherein the spool comprises a core portion and at least two flange portions, spaced apart on the core portion for supporting at least one coil of flexible line, and at least one coiled line member disposed about the core portion and having a first end secured to the spool and a second end adapted to extend from the coiled line to provide a length of line for cutting, wherein at least one of the flange portions is provided with two apertures through which the line can be threaded, at least one of the two apertures being in communication radially with the outside of the flange so that the line can enter the aperture from a position radially exterior of the flange and the line is coiled with the first end threaded through aperture from the outside of the spool in a direction substantially parallel to the axis of the spool so that the first end is retained close to the core portion of the spool, and then threaded through the communicating aperture in the direction of winding of the line.

The invention further provides a method of winding line on a spool wherein the spool comprises a core portion and at least two flange portions spaced apart on the core portion for supporting at least one coil of flexible line, wherein at least one of the flange portions is provided with at least two apertures, through which the line can be threaded, at least one of these apertures



being in communication radially with the outside of the flange and a first end of the line is threaded through said other aperture from the outside of the spool in a direction substantially parallel to the axis of the spool, so that said end is retained
5 close to the core portion of the spool, the line is then threaded through said communicating aperture in the direction of winding of the line and the line is then wound on the spool.

In a preferred embodiment of a spool according to the
10 invention, the aperture which is in communication with the outside of the flange is substantially L-shaped, with the base of the "L" extending approximately at right angles to the radius of the spool, in the direction in which the line is to be wound on the spool

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Where the aperture is of the preferred L-shaped configuration, this has the further advantage that this indicates to the operator of the spool winding equipment, the direction in which the line is to be wound.

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BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of a spool according to the invention will now be further described with reference to the accompanying drawings, in which

25 Figure 1 is a general view of a string trimmer;

Figure 2 is a section of a spool assembly;

Figure 3 is a plan view of an embodiment a spool according to the invention and;

Figure 4 is a schematic view of the spool of Figure 3 showing
30 the direction of winding of the cutting filament at the start of the winding operation.

DETAILED DESCRIPTION

Referring to Figure 1, there is shown an apparatus according
35 to the invention for cutting vegetation. The apparatus comprises

a grass trimmer (1) which has a lower housing (2) connected by a shaft (4) to a handle assembly (6). The handle assembly (6) provides a switch (8) for selectively or supplying electrical power to an electric motor (not shown) carried within the housing (2). For two-handed operation of the trimmer, a secondary handle (10) is mounted on the shaft (4). The lower housing (2) carries a cutting head (not shown), rotatable about an axis passing through the housing (2) and the cutting line (12) extends into a cutting plane which is substantially perpendicular to the axis of rotation of the lead.

In Figure 2, there is shown [in section] a cutting head (20) which is mounted on an output shaft (22) of the motor. A spool housing (24) with removable housing cover (26) is mounted for rotation with the output shaft (22) and comprises a hub portion (28). A spool assembly (30), which is shown in more detail in Figure 3, is releasably mounted on the hub portion (28) and comprises a core portion (32) and first and second flange portions (34), (36) spaced apart on the core portion (32). A coiled line member (38) is disposed about the core portion (32) and has a first end (40) secured to the spool (30) and a second end (42) which extends from the coiled line (38) to provide a length of line (12) for cutting. Two apertures (44), (46) through which the line (38) can be threaded are provided in the flange portion (34). The L-shaped aperture (44) is in communication radially with the outside (50) of the flange (34) so that the line (38) can enter the aperture (44) from a position radially exterior of the flange (34). The aperture (46) is in communication with an axial groove (48) formed in the core portion (32) of the spool. The line (38) is coiled with said first end (40) threaded through said aperture (46) from the outside (52) of the spool (30) in a direction substantially parallel to the axis (A) of the spool (30), so that the end (40) is retained within the axial groove (48) of the core portion (32) of the spool (30). The line (38) extends within the groove (48) so that the free end (40) is close to the second

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flange portion (36). The line (38) is then threaded through the communicating aperture (44) in the direction (X) of winding of the line (38). A resilient sleeve (54) is provided to prevent the filament or strip from uncoiling from the spool.

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Claims:-

1 A spool for a rotary cutter, such as a lawn mower edger or
trimmer of the type using a flexible line as a cutting member,
5 which spool comprises a core portion and at least two flange
portions spaced apart on said core portion for supporting at
least one coil of flexible line, and at least one coiled line
member disposed about said core portion and having a first end
secured to said spool and a second end adapted to extend from
10 said coiled line to provide a length of line for cutting, wherein
at least one of the flange portions is provided with two
apertures, through which said line can be threaded, at least one
of the two apertures being in communication radially with the
outside of said flange so that said line can enter said aperture
15 from a position radially exterior of said flange, and said line
is coiled with said first end threaded through aperture from the
outside of said spool in a direction substantially parallel to
the axis of said spool, so that said first end is retained close
to said core portion of said spool, and then threaded through the
20 communicating aperture in the direction of winding of said line.

2 A spool according to claim 1 wherein said aperture is in
communication with an axial groove formed in said core portion of
said spool.

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3 A spool according to Claim 1 or Claim 2 wherein said
aperture which is in communication radially with the outside of
said flange is L-shaped.

30 4 A rotary cutter for cutting vegetation, of the type using a
flexible line stored on a spool as a cutting member, wherein said
spool comprises a core portion and at least two flange portions,
spaced apart on said core portion for supporting at least one coil
of flexible line, and at least one coiled line member disposed
35 about said core portion and having a first end secured to said

spool and a second end adapted to extend from said coiled line to provide a length of line for cutting, wherein at least one of the flange portions is provided with two apertures through which said line can be threaded, at least one of said two apertures being in communication radially with the outside of said flange so that said line can enter said aperture from a position radially exterior of said flange and said line is coiled with said first end threaded through aperture from the outside of said spool in a direction substantially parallel to the axis of said spool so that said first end is retained close to said core portion of said spool, and then threaded through the communicating aperture in the direction of winding of said line.

5 A method of winding line on a spool wherein said spool comprises a core portion and at least two flange portions spaced apart on said core portion for supporting at least one coil of flexible line, wherein at least one of said flange portions is provided with two apertures, through which said line can be threaded, at least one of said two apertures being in communication radially with the outside of the flange and a first end of said line is threaded through said aperture from the outside of said spool in a direction substantially parallel to the axis of said spool, so that said first end is retained close to said core portion of said spool, said line is then threaded through said communicating aperture in the direction of winding of said line and said line is then wound on said spool.

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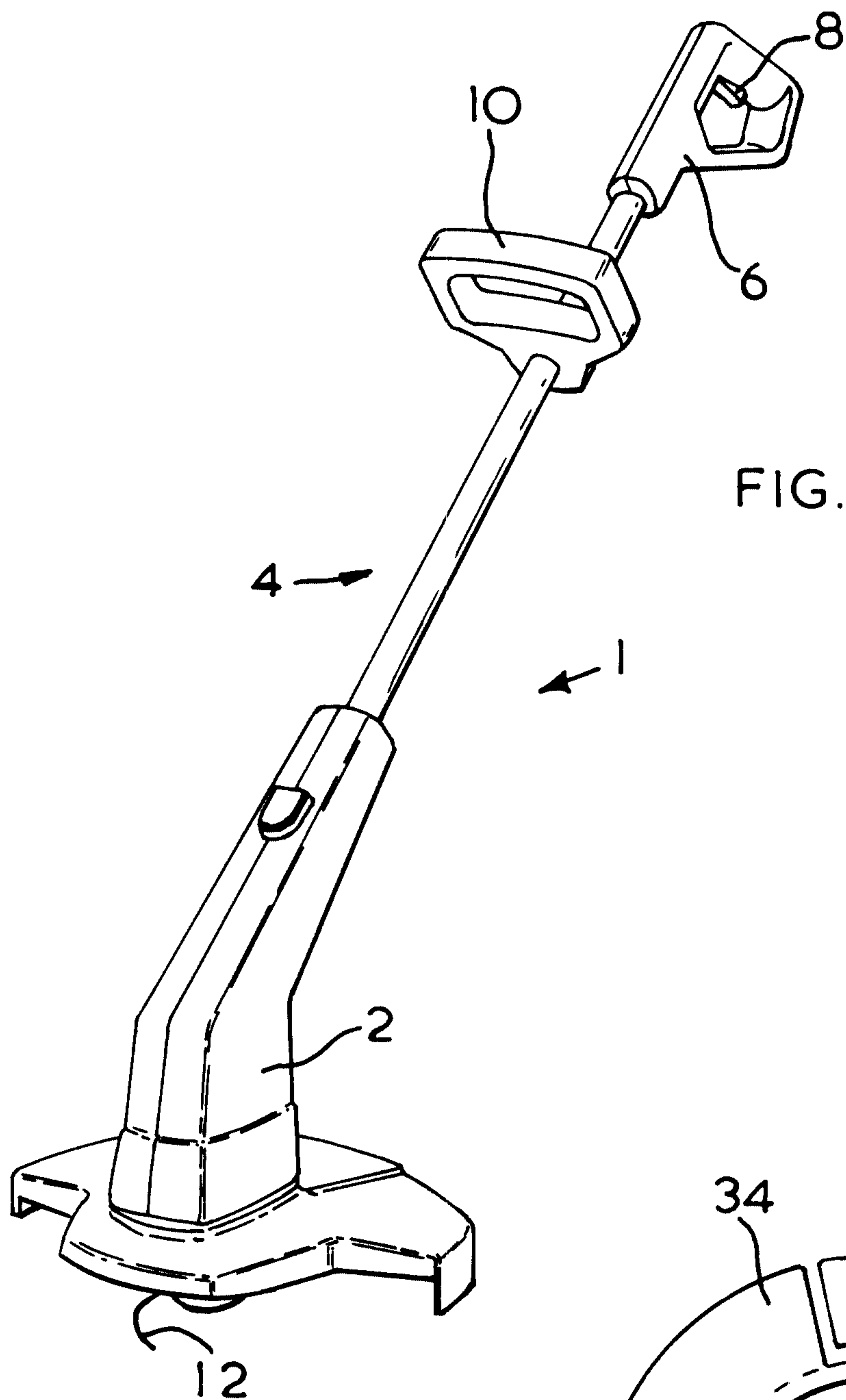


FIG. 1

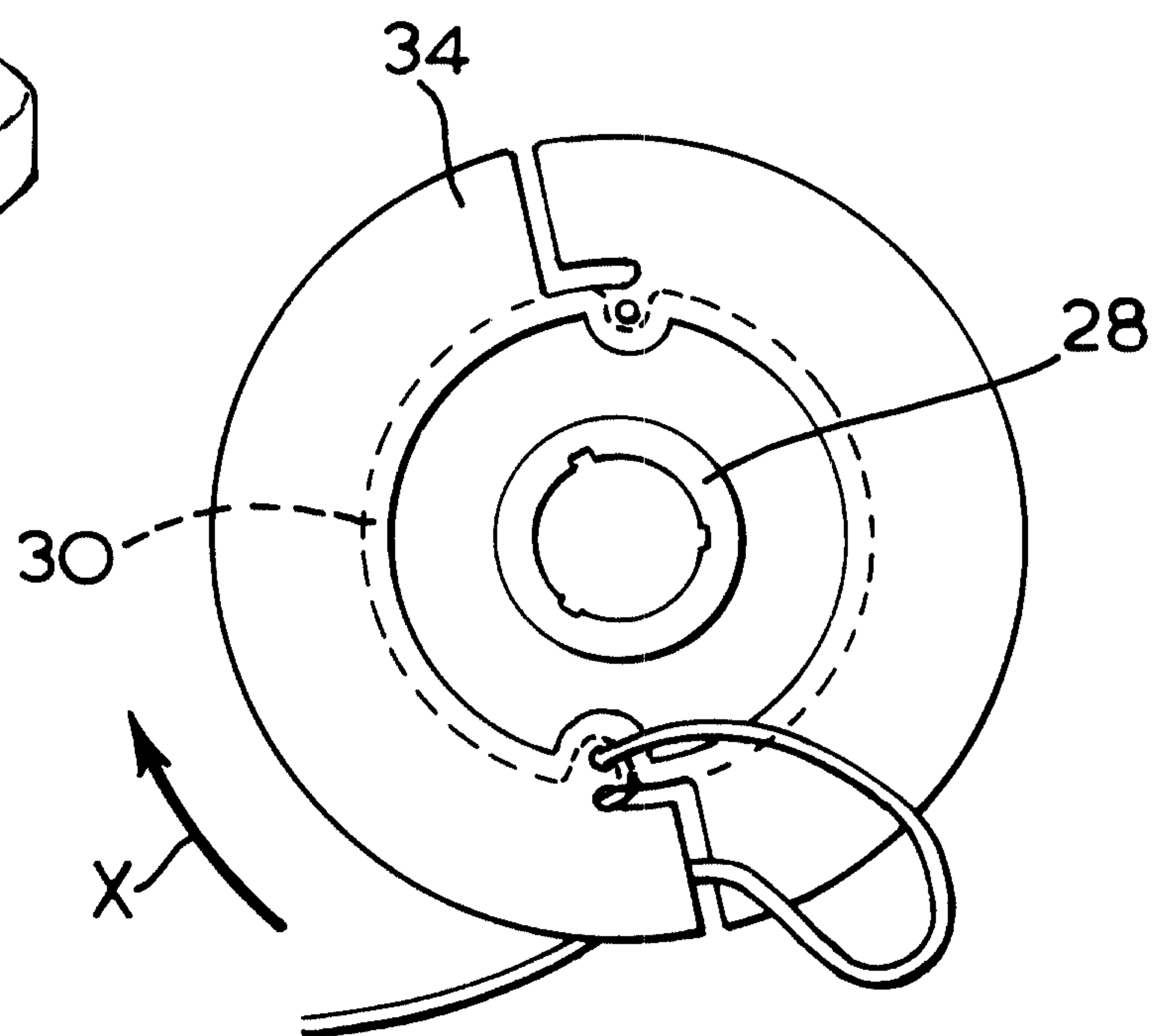


FIG. 4

Sim: H. Bunnell

Sam^l H. Burnell

