DEGRADABLE PLASTIC GRASS CUTTER

BACKGROUND OF THE INVENTION

The present invention relates to a degradable plastic grass cutter and a grass cutter assembly for use therewith.

To the present time, grass cutters, which term for the purposes of this specification also including edge trimmers and the like, are typically constructed to have a high speed rotating disk on which metal blades or nylon fishing line is mounted. In the latter type, the nylon fishing line may be in the form of a reel or may be in the form of discrete lengths which are inserted into slots on the disk and typically knotted at one end to keep them in place in the slots.

As is well known, in use the rotating disk is driven, typically by a petrol or electric motor, and the metal blades or the nylon fishing line slice through the grass to cut it or cut along the edge of a lawn or the like, when used as an edge cutter. Frequently an adjustment may be possible to enable the angle of the rotating disk to be adjusted. A problem with the use of nylon fishing line has been found to be that the nylon, due to friction, will be worn off into a powdery residue or particles which is not able to be absorbed by the soil or grass and results in pollution or contamination. The residue or particles will result in a long lasting suffocation of the grass so that where this is present, the grass will not grow or its growth will be affected so that bald or poor growth grass patches will appear. This, of course, results in the need to replace the contaminated soil with fresh fertile soil to enable the grass to be re-established.

It has been found that single nylon strings may only last some 2-5 minutes in use, depending on the quality of the nylon and the type of grass, so that apart from the pollution or contamination problem, there is also a need for regular replacement of the nylon strings.

OBJECTS OF THE INVENTION

It is an object of one embodiment of the invention to provide a grass cutter of a degradable plastics material which will avoid or at least obviate the above problems or which at least will provide the public with a useful choice.

It is an object of a further embodiment of the invention to provide a grass cutter assembly utilising a grass cutter as mentioned in the paragraph immediately above.

Further objects of the invention in its various embodiments will become apparent from the following description.

SUMMARY OF THE INVENTION

According to one aspect of the present invention, a grass cutter is formed from a specially formulated polymer including an additive which will disintegrate the polymer when removed from the grass cutter as a residue or in particles.

According to a further aspect of the present invention, a grass cutter assembly includes a rotatable disk with at least one grass cutter in the form of a string of a degradable plastics material.

Further aspects of this invention which should be considered in all its novel aspects will become apparent from the following description given by way of example of possible embodiments thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1: shows diagramatically a cross sectional view of a grass cutter assembly according to one possible embodiment in the invention;

FIGURE 2: shows diagramatically an enlarged cross sectional view of part of the grass cutter of Figure 1.

FIGURES 3

(a) & (b): show front and side views of a grass cutter according to one possible embodiment of the invention.

BRIEF DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to the accompanying drawings, one embodiment of the present invention shows a grass cutter assembly, referenced generally by arrow 1, including a disk 2 suitably of metal or plastics which in use will be rotated at high speed, possibly of the order of 5,000-6,000 RPM. The angle of inclination of the disk 2 may be adjustable either by angular adjustment of the shaft (not shown) on which the disk 2 may be mounted or by the angular adjustment of the disk 2 relative to the shaft. It is envisaged that embodiments of the invention may not in fact utilise a shaft but could, for example, have a direct or geared drive.

In the embodiment shown in Figure 1, the disk 2 has mounted thereon, diagonally opposite, a pair of cutters 3, shown enlarged in Figures 3, which in this embodiment are shown as being in the form of strings of specified length having an enlarged portion 4, which may fit into a slot 5 in the disk 2 and an end enlarged portion 6. In this embodiment, the enlarged portion 4 may be able to move slightly within the slot 5. The enlarged portion 6 may be of any shape or size to retain the cutter in the disk 2 in use.

It has been found in testing that the enlarged portion 4, as well as providing a firm fitting in the slot 5 in the disk 2, allows elongation of the cutter 3 when it is subjected to heat produced by friction due to the high speed rotation of the disk 2. This elongation can avoid snapping of the cutter 3 and allows it to be used for a much greater time, possibly 15 minutes or more, compared with currently available cutters.

Particularly as shown particularly in Figure 3(b), the cutter 3 has a substantially rectangular or square cross section 7, so as to provide top and bottom edges 8 and 9 which will facilitate the efficient cutting of grass, including when the grass is wet, enabling grass to be cut in the rain, if necessary. In previous cutter assemblies using nylon strings, these have typically been round or oval in cross section which has not facilitated the cutting of wet grass which will tend to slip away from the nylon string as it passes it. The rectangular or square cross section 7 will, it is believed, also facilitate the cutting of different types of grass, even carpet grass with its

sharp edges. Additionally, the square or rectangular cross section may also facilitate the trimming of grass at its edges or between obstacles. Due to the more efficient cutting using a square or rectangular cross section, a lower speed of rotation of the disk 2 may also be possible so as to reduce the power usage. However, in alternative embodiments the cutter could be of alternative cross sections such as oval or round.

Referring particularly to Figure 2, the enlarged rounded portion 6 of the cutter 3 is shown fitting on an inside edge of the disk 2 so as to avoid the troublesome and time consuming need of tying a knot as has been necessary in the past with nylon strings. The enlarged portion 4 is also shown fitting snugly within the slot 5 of the disk 2 so as to prevent or at least minimise bending of the string 3. In nylon string cutters, it was found that they tended to snap from their knotted ends or slip off the rotating disk if not tied properly.

Although a pair of diametrically opposite cutter strings 3 are shown in Figure 1, this is, of course, by way of example only. In an alternative embodiment, it is envisaged that the cutter material may be formed into a reel, for example, so that an appropriate length of it can be pulled out as it is used. In a further alternative the strings 3 may be in pre-set lengths which the user may then cut or the lengths may be standard pre-cut lengths in which the user may tie the appropriate knots.

As mentioned previously, one major problem with the use of nylon fishing line is its contamination of the ground by nylon powder and particles.

The present invention, however, provides a plastics material which is degradable by oxidation and photodegradation, so that any powder or particles which are left on the grass readily disintegrate so as to not provide any ongoing contamination which would interfere with grass growth.

In a preferred embodiment of the invention, the plastics material comprises polyethylene to which is added a proprietary additive such as a PDQ-H additive manufactured by Willow Ridge Plastics, Inc., Kentucky, USA. Preferably that additive may be utilised with a specially formulated polyethylene such as an injection moulded or extruded G 215 combined with G 812 low density polyethylene available under the trade mark COSMOTHENE having a density respectively of 0.920 or 0.917g/cm3, a tensile strength at break of 160 or 100kg/cm2, an elongation of 650% or 550% and a flexural

modulus of 2000 or 1800kg/cm2. Preferably the proportion of G 215 and G 812 in the polymer may be 80%:20% by weight.

The grade of polymer such as polyethylene, polypropylene or other suitable polymer will be such as to provide a durability of sufficient length when used as a grass cutter in a particular environment, including the type of grass being cut. The polymer must, of course, be capable of being degradable by the use of an effective amount of a suitable additive.

The type and amount of additive used with the polyethylene will be such as to provide the disintegration by oxidation and photodegradation within a suitable time.

The added durability of the cutter 3 also enable all types of grass to be cut including weeds and the use of a pair of cutters 3 as in one preferred embodiment of the invention provides an efficient cutting operation.

Although this invention has been described by way of example and with reference to possible embodiments thereof, it is to be understood that modifications or improvements may be made thereto without departing from the scope of the invention as defined in the appended claims.

CLAIMS:

1. A grass cutter which is formed from a polymer characterised in that the polymer is a specially formulated polymer which includes an additive, which will disintegrate the polymer when removed from the grass cutter as a residue or in particles.

2. A grass cutter as claimed in Claim 1, characterised in that said polymer is a combination of polyethylenes.

3. A grass cutter as claimed in Claim 2, characterised in that the combination is 80%:20% of G 215 and G 812 grade polyethylenes.

4. A grass cutter as claimed in Claim 3, characterised in that said material is formed into a string of a required or pre-set length.

5. A grass cutter as claimed in Claim 4, characterised in that said string is of a discrete length and is adapted in use to be fitted into or on a rotating disk.

6. A grass cutter as claimed in Claim 5, characterised in that said string is of a substantially rectangular or square cross section.

7. A grass cutter as claimed in Claim 5, characterised in that said string is of a substantially triangular cross section.

8. A grass cutter as claimed in Claim 5, characterised in that said string is of a substantially polygonal cross section.

9. A grass cutter as claimed in Claim 5, characterised in that said string is of a substantially oval or round cross section.

10. A grass cutter as claimed in Claim 4, characterised in that said string includes an enlarged portion adapted to fit within a slot in said disk in use.

11. A grass cutter as claimed in Claim 10 characterised in that said enlarged portion is adapted to allow the elongation of the string as it is heated.

12. A grass cutter as claimed in Claim 11, characterised in that said string further includes adjacent said enlarged portion, a further enlarged portion adapted to, in use, fit against an inner edge of said disk.

13. A grass cutter assembly having a rotatable disk characterised in that it includes at least one grass cutter in the form of a string of a degradable plastics material.

14. A grass cutter substantially as herein described with reference to the accompanying drawings.

15. A grass cutter assembly substantially as herein described with reference to the accompanying drawings.