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(54) **A CUTTING TOOL AND A METHOD FOR PLANTS GRAFTING**

SCHNEIDWERKZEUG UND VERFAHREN FÜR PFLANZENPFROPFUNG

OUTIL DE COUPE ET PROCÉDÉ DE GREFFAGE SUR VÉGÉTAUX

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Description

Field of the Invention

[0001] The present invention concerns the field of cutting tools, in particular a grafting tool for use in agriculture, horticulture or plant nursery. In particular the invention concerns a disposable cutting tool that is provided with a safety system for preventing the reuse of the blade on several plants.

State of the art

[0002] As it is known, grafting is an agronomic practice that consists of joining two plants by using the root part of a first plant called "rootstock", and the aerial part of a second plant called "scion", so as to obtain a single entity, which constitutes the grafted plant. This grafted plant has all the productive characteristics of the scion, for example in terms of the type and quality of the fruit, but at the same time it also has the characteristics of the root apparatus of the rootstock, firstly the resistance to different soil diseases.

[0003] While grafting has been widely used for centuries in arboriculture, it has been used a lot less in horticulture. However, recently, there has been an exponential increase in grafted horticulture plants, especially due to the spreading of "IPM" (Integrated Pest Management) systems, which are becoming increasingly more common and that have the purpose of minimizing the use of chemical products for eliminating both animal and vegetable pathogens through the use of alternative measures. A plant that has been suitably grafted is indeed naturally resistant to soil diseases, therefore the amount of chemical pesticide treatments necessary for producing healthier and more productive plants is certainly much less than a cultivation in which the same plants have not been grafted.

[0004] In particular, among horticulture plants, the tomato is the plant that over the last years recorded the highest increase of grafting so as to overcome the impossibility of using some specific chemical products that were conventionally used for treating the soil, due to new stricter standards concerning the cultivation of tomatoes.

[0005] Grafted tomato plants are produced in specialised nurseries before being transplanted in a field, according to a production cycle that can be summarised as follows:

- the rootstock, a wild tomato hybrid, and the scion, the tomato that is desired to be grown, are sown and cultivated in alveolar containers;
- the scion and rootstock are cut by means of blades by a worker;
- the aerial part of the scion and the root part of the rootstock are joined, generally through suitable silicone clips, and the plant obtained is kept at controlled temperature and humidity so as to make the tissues heal and join the lymphatic vessels;
- the grafted plant is cultivated in a nursery until a suitable growth stage has been reached and is then transplanted in a field.

[0006] Unfortunately the tomato seed, both of the scion and of the rootstock, can be a carrier of very harmful bacterial diseases; the cutting of the plants through grafting, one after the other in the alveolar containers, can spread the disease if this is carried out with a same blade, leading to the production of sick plants that, once transplanted in the field, could create enormous problems. Some of these bacterial diseases, moreover, do not create phenomena that are visible on the plant when cultivating in the nursery, but develop only later in a field, thus causing even greater damage since many resources were already been spent in order to reach the last cultivation phase.

[0007] In order to limit the spreading of diseases due to grafting cutting it is necessary to use a different blade for each plant, but it is practically impossible to verify whether or not this is indeed being done by the workers.

[0008] It is therefore still strongly desired, in particular in the field of horticulture, to have a safe grafting procedure, that offers the guarantee of not spreading diseases amongst plants of the same cultivation, due to carrying out the grafting of many plants with the same blade.

[0009] The UK patent application GB 2 140 718 describes a disposable cutting tool.

Summary of the invention

[0010] The Applicant has now devised a new cutting tool for plants grafting, in particular horticulture plants, more specifically tomato plants, provided with a particular configuration that makes it possible to implement a grafting procedure that is safe and effective, and especially to avoid the spreading of diseases from one plant to another.

[0011] Subject of the present invention is therefore a disposable cutting tool for plants grafting comprising a body provided with an edge having at least a cutting portion, said body being removably connected to an end of a rod.

[0012] A further subject of the invention is a method for plants grafting comprising a step of cutting the plants portions to be grafted with a disposable cutting tool comprising a body provided with an edge having at least a cutting portion, said body being removably connected to an end of a rod, said cutting step being followed by a step in which said rod is separated from said body having a cutting edge, and located in the proximity of the grafted plant, while said body having a cutting edge, already used for grafting, is thrown away.

[0013] As explained in greater detail in the rest of the description, the tool and the method subject of the invention make it possible to overcome the drawbacks highlighted above of current grafting procedures, by providing

the means for an effective and at the same time safe grafting, thanks to the use of a tool with a cutting edge the use of which is inevitably restricted to a single plant, thus avoiding the spreading of bacterial diseases from one plant to another through the use of a same blade.

[0014] Such results are achieved with the tool according to the present invention, whose essential characteristics are defined by the first of the attached claims, whereas further important characteristics are defined in the following dependent claims.

Brief description of the drawings

[0015] The characteristics and the advantages of the tool according to the present invention shall become clearer from the following description of an embodiment thereof, given as an example and not for limiting purposes, with reference to the attached drawings in which:

- figures 1a and 1b schematically show the tool of the invention, in a perspective view from above and from below, respectively.

Detailed description of the invention

[0016] With reference to the above said figure, the present invention lies in the particular configuration of the present tool 1, in which a body 2 is removably connected to a substantially cylindrical rod 3, through its end 31, the other end 32 of the rod being free.

[0017] At least a portion 21 of the edge of the body 2 is a cutting portion, or it is in any case provided with a blade that is suitable for cutting plants for grafting them. Such a cutting edge can be smooth, undulated or jagged. Preferably, according to the invention, two distinct cutting portions of the edge of the body 2 are present, one intended for cutting the scion and the other the rootstock. According to a particularly preferred embodiment of the invention, illustrated in figures 1 a and 1 b, the body 2 has a substantially rectangular flat shape, with the two major lateral edges in the form of smooth cutting edge respectively for cutting the scion and the rootstock to be grafted to one another so as to create the new grafted plant; again with reference to the figures the minor edge, opposite to the rod, can be in the form of a jagged cutting edge.

[0018] According to a particular embodiment of the invention, the end 31 of the rod 3 is connected to the body 2 with which it forms a single body in plastic material that is obtained by extrusion, and the removable connection is achieved by means of a pre-breaking cut. This particular embodiment allows the worker to carry out the separation between the body with the cutting edges and the rod in an extremely simple and quick manner. As illustrated in figure 1b, the body 2 has a rear surface 22 that is substantially flat, whereas the front surface has at least a bevelled edge so as to form the cutting edge for cutting the plant to be grafted.

[0019] Alternative embodiments of the invention, like for example the one represented in figures 1a and 1b, can on the other hand foresee the rod 3 being connected to the body 2 through snap-fitting of the rod in an appropriate housing 4 obtained in the body 2 in a central position on the non-cutting edge, so that the rod can be easily gripped by the worker who must carry out the grafting leaving the cutting edges free on the body 2 for cutting the plant. Once the two portions of the plant have been cut and grafted, the rod 3 is removed from the housing 4 or they are in any case separated from the body 2 with the cutting edges, which is thrown away. The rod 3, thus separated from the body 2, is inserted in the ground adjacent to the plant that has just been grafted, thus acting as a signal for the worker that the grafting procedure has finished. The rod 3 can moreover be placed so as to also carry out a support stake function for the grafted plant during the following steps of rooting and cultivation in a vase before it is transferred for the final phase of cultivation in the field.

[0020] It is evident that, thanks to the present grafting procedure with the tool described above, plants that have already been grafted but do not have a rod must be eliminated from the cultivation since it is highly probable that they have been grafted with a blade that has already been used for another plant. On the other hand, plants that have already been grafted and have a rod inserted in the adjacent ground will offer greater guarantee of having been cut with a blade that was not previously used.

[0021] The present invention thus provides a solution that is effective for the technical problems outlined above, related to the usual grafting procedure with conventional tools, by providing a tool that is technically very simple to use and to make, also having low costs, which makes it possible to actuate a grafting procedure that is extremely safer than those carried out today with known tools, preventing in particular diseases from being spread from one plant to another.

[0022] The tool according to the invention can be made in different materials as long as they are suitable for the use described above, and in particular it is made in extrudable plastic material. In the present tool there can be a variety of shapes of the body 2 provided with cutting edges so long as it is suitable for the use as a blade for cutting plants, whereas the rod 3 has an elongated shape, for example substantially cylindrical, suitable for being gripped by a worker while cutting with the body having cutting edges, and for its subsequent use as a tutor for the grafted plant.

[0023] The present invention has been described so far with reference to its preferred embodiments. It should be understood that there can be other embodiments that belong to the same inventive core, all covered in the scope of protection of the following claims.

Claims

1. A disposable cutting tool for plants grafting comprising a body (2) provided with an edge having at least a cutting portion (21), said body (2) being removably connected to an end (31) of a rod (3).

2. The tool according to claim 1, wherein said edge of the body (2) has two distinct cutting portions intended for cutting respectively a scion and a rootstock to be joined to form the grafted plant.

3. The tool according to claim 1, wherein said body (2) has a substantially rectangular flat shape, with the two major lateral edges in the form of smooth cutting edge, and the lower edge opposite to said end (31) of the rod (3) in the form of a jagged cutting edge.

4. The tool according to any one of claims 1-3, wherein said end (31) of the rod (3) is connected to the body (2) with which it forms a single body in plastic material obtained by extrusion, and the removable connection is achieved by means of a pre-breaking cut.

5. The tool according to any one of claims 1-3, wherein said end (31) of the rod (3) is connected to said body (2) by snap-fit joint of said end (31) in an appropriate housing (4) obtained in said body (2) in the vicinity of an edge non-cutting portion of said body (2).

6. A method for plants grafting comprising a step of cutting the plants portions to be grafted with a disposable cutting tool comprising a body (2) provided with an edge having at least a cutting portion (21), said body being removably connected to an end (31) of a rod (3), said cutting step being followed by a step in which said rod (3) is separated from said body (2) having a cutting edge, and located in the proximity of the grafted plant, while said body (2) having a cutting edge, already used for grafting, is thrown away.

7. The method according to claim 6, wherein said rod (3) after separation from said body (2) is placed so as to support the grafted plant.

8. The method according to claim 6, wherein said cutting step is conducted by cutting a scion and a rootstock to be joined to form the grafted plant with two distinct cutting portions present on said edge of the body (2) of a same disposable tool.

Patentansprüche

1. Einweg-Schneidwerkzeug zur Pflanzenpfropfung, enthaltend einen Körper (2), der mit einem Rand versehen ist, der wenigstens einen Schneidbereich (21) hat, wobei der Körper (2) lösbar mit einem Ende (31) eines Stabes (3) verbunden ist.

2. Werkzeug nach Anspruch 1, wobei der Rand des Körpers (2) zwei unterschiedliche Schneidbereiche hat, die zu Schneiden eines Sprosses bzw. eines Wurzelstockes vorgesehen sind, die verbunden werden sollen, um die aufgepfropfte Pflanze zu bilden.

3. Werkzeug nach Anspruch 1, wobei der Körper (2) eine im Wesentlichen rechtwinklige flache Form hat, mit den zwei seitlichen Haupträndern in der Form eines glatten Schneidrandes und dem unteren Rand entgegengesetzt zu dem Ende (31) des Stabes (3) in der Form eines gezackten Schneidrandes.

4. Werkzeug nach einem der Ansprüche 1 bis 3, wobei das Ende (31) des Stabes (3) mit dem Körper (2) verbunden ist, mit dem es ein einteiliger Körper aus Kunststoffmaterial ist, der durch Extrusion erhalten wurde, und die lösbare Verbindung mittels eines Sollbruch-Schnittes erzielt wird.

5. Werkzeug nach einem der Ansprüche 1 bis 3, wobei das Ende (31) des Stabes (3) mit dem Körper (2) durch eine Schnappverbindung des Endes (31) in einem geeigneten Gehäuse (4) verbunden ist, das in dem Körper (2) in der Nähe eines nicht schneidenden Bereiches des Körpers (2) erhalten wird.

6. Verfahren zur Pflanzenpfropfung, enthaltend einen Schritt des Scheidens der Pflanzenteile, die gepfropft werden sollen, mit einem Einweg-Schneidwerkzeug, das einen Körper (2) enthält, der mit einem Rand versehen ist, der wenigstens einen Schneidbereich (21) hat, wobei der Körper (2) lösbar mit einem Ende (31) eines Stabes (3) verbunden ist, wobei auf den Schneidschritt ein Schritt folgt, in dem der Stab (3) von dem Körper (2) getrennt wird, der einen Schneidrand hat, und in der Nähe der Pflanze angeordnet wird, während der einen Schneidrand aufweisende Körper (2), der bereits zum Aufpfropfen verwendet wurde, weggeworfen wird.

7. Verfahren nach Anspruch 6, wobei der Stab (3) nach dem Trennen von dem Körper (2) so platziert wird, dass er die aufgepfropfte Pflanze unterstützt.

8. Verfahren nach Anspruch 6, wobei der Schneidschritt ausgeführt wird durch Schneiden eines Sprosses und eines Wurzelstockes, die verbunden werden sollen, um die aufgepfropfte Pflanze zu bilden, mit zwei unterschiedlichen Schneidbereichen, die an dem Rand des Körpers (2) ein und desselben Einweg-Werkzeuges vorhanden sind.

Revendications

1. Un outil de coupe à usage unique pour le greffage de plantes comprenant un corps (2) pourvu d'un bord ayant au moins une portion coupante (21), ledit corps (2) étant relié de manière amovible à une extrémité (31) d'une barre (3).

2. L'outil selon la revendication 1, dans lequel ledit bord du corps (2) comporte deux portions coupantes distinctes destinées à couper respectivement un greffon et un porte-greffe à assembler pour former la plante greffée.

3. L'outil selon la revendication 1, dans lequel ledit corps (2) a une forme sensiblement plate et rectangulaire, avec les deux bords latéraux les plus grands présentant la forme d'un bord de coupe lisse, et le bord inférieur opposé à ladite extrémité (31) de la barre (3) présentant la forme d'un bord de coupe en dents de scie.

4. L'outil selon l'une quelconque des revendications 1-3, dans lequel ladite extrémité (31) de la barre (3) est reliée au corps (2) avec lequel elle forme une seule pièce en matière plastique obtenue par extrusion, et la connexion amovible est réalisée au moyen d'une découpe à points de rupture.

5. L'outil selon l'une quelconque des revendications 1-3, dans lequel ladite extrémité (31) de la barre (3) est reliée au dit corps (2) par une articulation à encliquetage de ladite extrémité (31) dans un logement approprié (4) réalisé dans ledit corps (2) à proximité d'une portion de bord non coupante du dit corps (2).

6. Procédé pour le greffage de plantes, comprenant une étape consistant à couper les portions de plantes à greffer avec un outil de coupe à usage unique comprenant un corps (2) pourvu d'un bord ayant au moins une portion coupante (21), ledit corps étant relié de manière amovible à une extrémité (31) d'une barre (3), ladite étape de coupe étant suivie d'une étape dans laquelle ladite barre (3) est séparée du dit corps (2) ayant un bord de coupe, et positionnée à proximité de la plante greffée, tandis que ledit corps (2) ayant un bord de coupe, déjà utilisé pour le greffage, est jeté.

7. Le procédé selon la revendication 6, dans lequel ladite barre (3) après séparation du dit corps (2) est placée de manière à tuteurer la plante greffée.

8. Le procédé selon la revendication 6, dans lequel ladite étape de coupe consiste à couper un greffon et un porte-greffe à assembler pour former la plante greffée avec deux portions de coupe distinctes présentes sur ledit bord du corps (2) d'un même outil à usage unique.

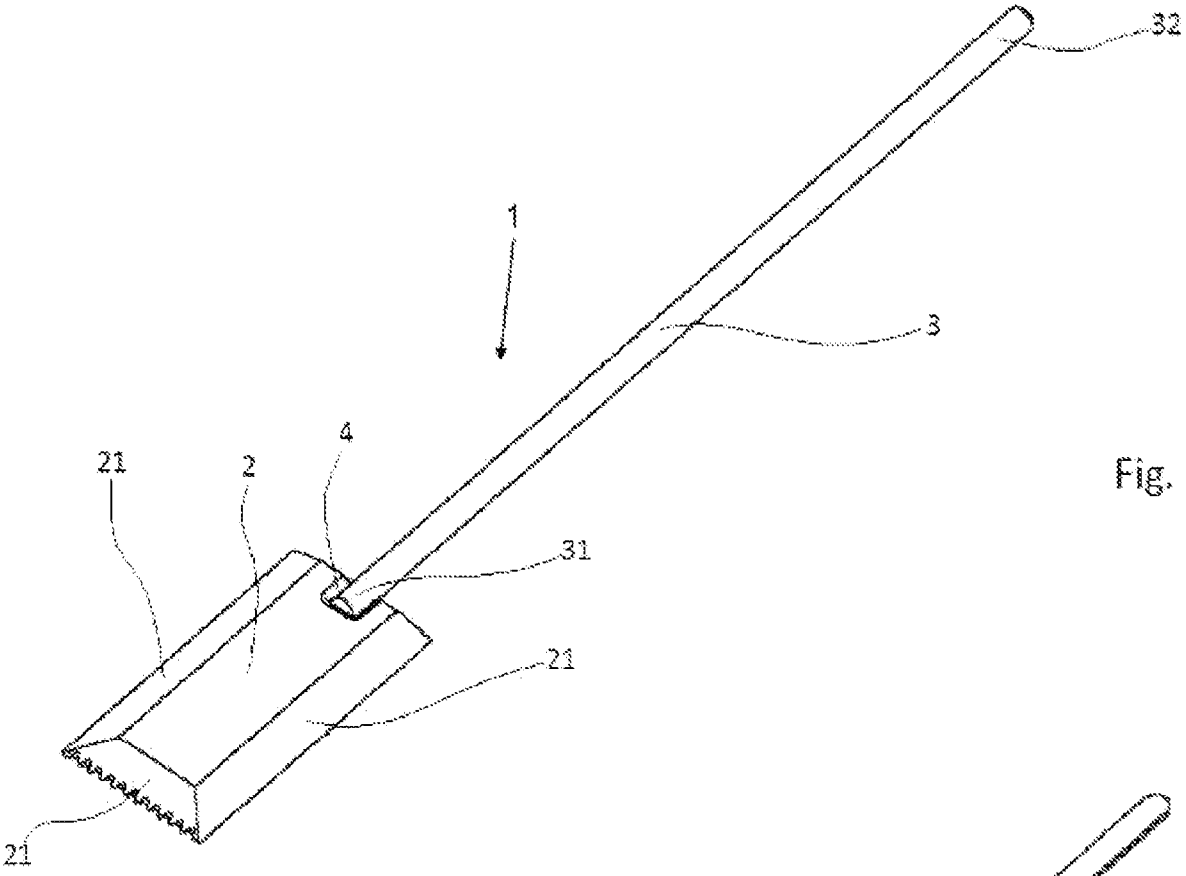

Fig. 1a

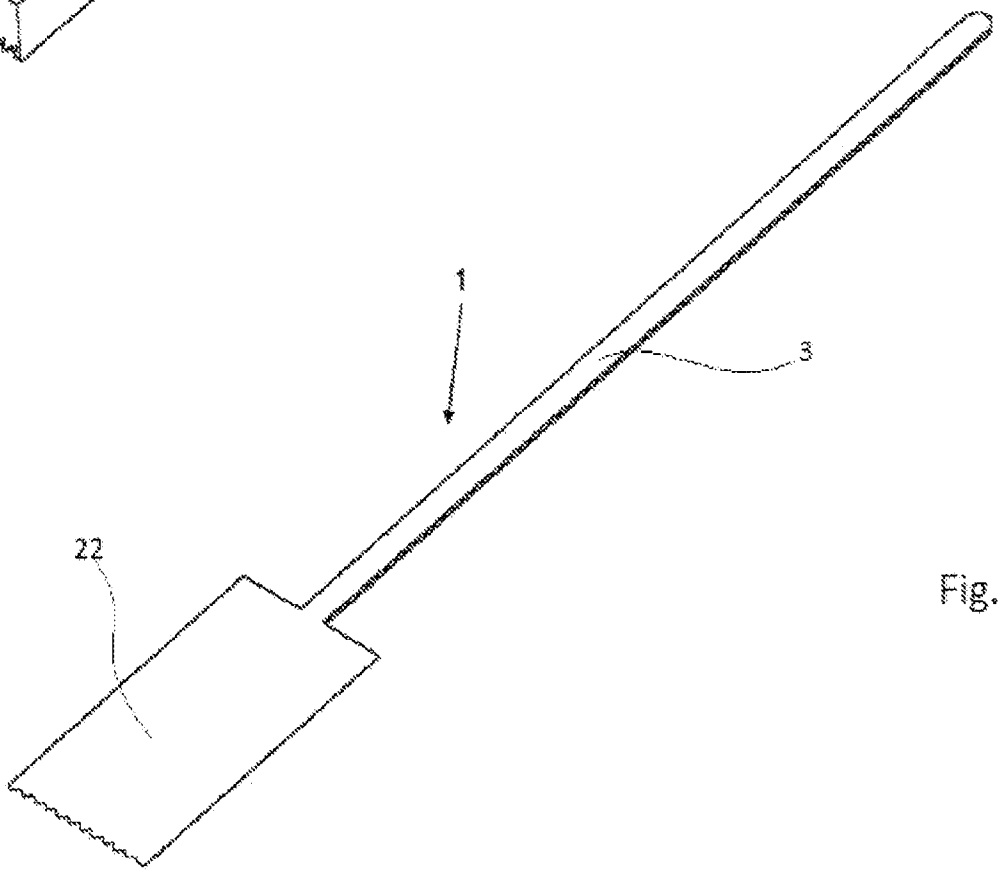

Fig. 1b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- GB 2140718 A **[0009]**

Vágószerszám és eljárás növényoltásra

Szabadalmi igénypontok

1. Egyszer használatos vágószerszám növényoltásra, amely tartalmaz egy testet (2), amely legalább egy vágóéllel (21) rendelkező éllel van ellátva, ahol a test (2) eltávolíthatóan van egy rúd (3) egyik végéhez (31) kapcsolva.

2. Az 1. igénypont szerinti szerszám, ahol a test (2) élének két különálló vágórésze van, amely vágórészek hajtás, illetve gyökértörzs vágására valók, amelyek összekapcsolva a beoltott növényt alkotják.

3. Az 1. igénypont szerinti szerszám, ahol a testnek (2) lényegében téglalap alakú lapos formája van, ahol a test (2) sima vágóélként kiképzett két oldalsó főéllel, valamint a rúd (3) végével (31) szemben recézett vágóélként kiképzett alsó éllel rendelkezik.

4. Az 1-3. igénypontok bármelyike szerinti szerszám, ahol a rúd (3) vége (31) a testtel (2) van összekötve, amellyel együtt egyetlen, sajtolással készült műanyag testet képez, és az eltávolítható kapcsolódás egy előre kialakított gyengítő bemetszés által van megvalósítva.

5. Az 1-3. igénypontok bármelyike szerinti szerszám, ahol a rúd (3) vége (31) a végnek (31), a test (2) egy nem vágó résszel rendelkező élének a közelében a testben (2) kialakított, megfelelő fészekbe (4) történő bepattintásával van összekötve a testtel (2).

6. Eljárás növényoltásra, amely eljárás során a növényrészeket oltás céljából egy olyan, egyszer használatos vágószerszámmal vágunk le, amely tartalmaz legalább egy vágórésszel (21) rendelkező éllel ellátott testet (2), ahol a test eltávolíthatóan van egy rúd (3) egyik végéhez (31) kapcsolva, és a vágást követő lépés során a rudat (3) a vágóéllel rendelkező testről (2) leválasztjuk, és a beoltott növény közelében helyezzük el, miközben a már oltásra használt vágóéllel ellátott testet (2) kidobjuk.

7. A 6. igénypont szerinti eljárás, ahol a rúd (3) a testtől (2) való leválasztást követően úgy van elhelyezve, hogy a beoltott növényt támassza.

8. A 6. igénypont szerinti eljárás, ahol a vágólépést úgy hajtjuk végre, hogy ugyanazon, egyszer használatos szerszám testének (2) az élén lévő két, különálló vágórésszel hajtást, illetve gyökértörzset vágunk le, amelyek összekapcsolva a beoltott növényt alkotják.