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(54) **Shredder**

(57) The present invention relates to a shredder (1) for reducing organic material (2) comprising:

- a shredding chamber (3) provided with rotatable cutting means (4) for shredding the organic material (2);
- an introduction funnel (5) having an introduction opening (6) intended for introducing the organic material (2) into the shredding chamber (3);

with said introduction opening (6) being provided in an element (7) which is arranged in the introduction funnel (5) in such a manner that it can be oriented. Providing the introduction opening (6) in an orientable element (7) makes it possible to orient the material (2) to be shredded in a simple and quick manner in the introduction funnel (6), so that the material to be shredded can in each case be introduced under ideal circumstances.

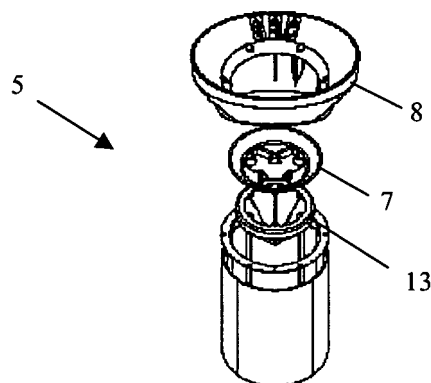


Fig. 4

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Description

[0001] The present invention relates to a shredder for reducing organic material, comprising:

- a shredding chamber provided with rotatable cutting means for shredding the organic material;
- an introduction funnel having an introduction opening intended for introducing the organic material into the shredding chamber, with said introduction opening forming a passage for said organic material.

[0002] The present invention relates in particular to a green waste shredder for shredding garden waste, prunings, flowers, branches, leaves, agricultural crops, foliage, etc.

[0003] Shredders are used for shredding (chopping) pruning waste, such as prunings, branches, leaves, agricultural crops, foliage, etc. originating from nature and landscape management. Various systems are known already which shred the pruning waste by chopping it transversely by means of a chopping knife or grazing knife acting against a counter knife. After shredding, the chips leave the shredding chamber via the discharge side.

[0004] A first known system is the chipper, in which a number of blades are mounted in the plane of a large disc against which the organic material is pressed when it is introduced into an introduction funnel, optionally by introduction rollers, and is chopped off between the blades and a counter-blade.

[0005] A second known system is the plain shredder, in which a number of blades are mounted along a drum wall in the longitudinal direction. The organic material is pushed against the drum wall, resulting in said material being chopped off transversely between the blades and a counter-blade.

[0006] Another common system chops the organic material by means of flails or hammers in the direction of the fibre. These are systems where the rotor is composed of a number of discs from which or between which loosely hanging cutting elements are suspended. These loosely hanging flails or hammers smash the green waste to pieces.

[0007] Another principle which is being used is that of the spocket shredder, in which a roller provided with sharp teeth moves narrowly past an anvil at low rotary speed. The green waste which has been introduced is in this case pulled and clamped and squeezed between the roller and the anvil, with the teeth on the roller pushing through the material and cutting it off against the anvil, thus producing the chips.

[0008] With the abovementioned systems, the introduction of the organic material to be shredded takes place via an upright or oblique introduction funnel with an introduction opening. After the material has been introduced, it is usually automatically pulled further inwards. In order to prevent hands from being able to access the cutting mechanism via the introduction opening, manu-

facturers often reduce the shape and dimensions of the introduction opening as a safety measure in order to prevent a hand from being able to pass through. Since, in addition, the introduction opening is provided with protection means, such as e.g. protective rubber flaps, as a safety measure, the user has to exert a slight pressure (force) on the material to be shredded when introducing the latter in order to push it through the introduction opening. In this case, it is important that the user has a good grip of the material. However, due to the arbitrary and sometimes unwieldy shapes of the material to be shredded, it is not always possible to introduce this material in the ideal (ergonomic) circumstances. Sometimes, it is even necessary to pull the material to be shredded back out of the shredder, to reposition it and re-introduce it into the shredder.

[0009] There are also shredders, as described, inter alia in EP 0,134,378 and FR 2,232,365, by means of which it is possible to adjust the supply of material to the cutting means due to the fact that the passage for the material to be supplied can be reduced or increased in size. However, such devices are not suitable for shredding garden waste, prunings, flowers, branches, leaves, agricultural crops, foliage, etc.

[0010] It is an object of the invention to provide a shredder by means of which it is possible to introduce the material to be shredded under in each case ideal circumstances, irrespective of the shape of this material.

[0011] The object of the invention is achieved by providing a shredder for reducing organic material, comprising:

- a shredding chamber provided with rotatable cutting means for shredding the organic material;
- an introduction funnel having an introduction opening intended for introducing the organic material into the shredding chamber, with said introduction opening forming a passage for said organic material;

with said introduction opening being provided in an element which is arranged in the introduction funnel in such a manner that it can be oriented and with the orientation of said element resulting in the orientation of the passage. Due to the fact that the introduction opening is provided in an element which is arranged in the introduction funnel in such a manner that it can be oriented and/or positioned, it is possible to modify the location of the passage.

[0012] Providing the introduction opening in an orientable element makes it possible to orient the passage for the material to be shredded and thus the material to be shredded in a simple and quick manner in the introduction funnel, so that the material to be shredded can in each case be introduced under ideal circumstances. As a result of the fact that the material to be shredded can in each case be introduced under ideal circumstances, the operating speed will also increase. The orientable element is preferably arranged in the vicinity of the entrance of the introduction funnel. More particularly, said element

is rotatably arranged in the introduction funnel, with the rotation of said element resulting in a rotation of the passage.

[0013] With the shredder according to the present invention, the passage for the organic material is of a fixed size so that in each case the same amount of organic material can be introduced with this shredder.

[0014] In a preferred embodiment of the shredder according to the invention, said element is of disc-shaped design. The shape of the disc-shaped element is obviously round. Other embodiments of said element are also possible, such as for example a spherical element, arranged in the introduction funnel so as to be orientable (rotatable and tiltable) and provided with an introduction opening.

[0015] In a more preferred embodiment of the shredder according to the invention, said element can be rotated both clockwise and anticlockwise.

[0016] According to a particular embodiment of the shredder of the present invention, said element comprises protection means. Said protection means are preferably designed as protective rubber flaps or anti-projection flaps. Since said protection means are connected to said element, they do not obstruct the introduction of the material to be shredded.

[0017] In a more particular embodiment of the shredder according to the invention, the introduction funnel comprises a funnel-shaped guide piece on its introduction side, said element being arranged inside this guide piece. The funnel-shaped guide piece makes it easier to fill the shredder.

[0018] In a preferred embodiment of the shredder according to the invention, the introduction opening has a round and/or slotted and/or quadrangular shape.

[0019] The present invention will now be described in more detail with reference to the following detailed description of a shredder according to the invention. The aim of this description is solely to give an illustrative example and to indicate further advantages and particulars of the present invention, and can therefore by no means be interpreted as a limitation of the area of application of the invention or of the patent rights claimed in the claims.

[0020] In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- *Fig. 1 is a perspective view of the shredder according to the invention;*
- *Fig. 2 (2.1 and 2.2) illustrates the principle of the rotatable element;*
- *Fig. 3 shows a perspective view of the introduction funnel provided with a rotatable element having an introduction opening;*
- *Fig. 4 shows an exploded view of the introduction funnel illustrated in Fig. 3;*
- *Fig. 5 (5.1, 5.2 and 5.3) shows a view of a number of alternative embodiments of the introduction opening.*

[0021] The shredder (1) for reducing, in particular shredding, organic material (2), according to the present invention and as represented in Fig. 1, comprises:

- a shredding chamber (3) provided with rotatable cutting means (4) for shredding the organic material (2);
- an introduction funnel (5) having an introduction opening (6) provided for introducing the organic material (2) into the shredding chamber (3), with said introduction opening forming a passage for said organic material.

[0022] The material to be shredded (2) is supplied via the introduction opening (6) of the introduction funnel (5), the introduction funnel (5) is in communication with the shredding chamber (3) where the supplied material (2) is then shredded by means of the rotatable cutting means (4) to form chips. As soon as the material to be shredded (2) comes into contact with the cutting means (4), this material is automatically pulled in as a result of the rotation of the cutting means (4). In order to, on the one hand, reduce the risk of users (or others) inserting their hand into the introduction opening (6) and, on the other hand, to prevent the risk of chips flying back out, this opening (6) is provided with protective rubber flaps (13). As a result, the user has to exert a certain force on the material to be shredded (2) in order to push the material to be shredded (2) past the protective flaps (13). However, the supplied material which is to be shredded, such as for example branches, sometimes has unwieldy shapes, as a result of which it is not always easy for the user to introduce said material under ideal circumstances. Thus, it may be the case that when the user introduces branches into the known systems with a fixed introduction opening, he/she has to position his/her body in such a manner that he/she is no longer balanced, in an ergonomically comfortable position or in a safe position. In this case, as soon as the introduced branches come into contact with the cutting means, there is a risk of the user falling or being partially pulled along or suffering spraining due to a rebound effect. Other possible risks in this context may be: spraining, a torn muscle or another bodily straining, injuries due to moving into the projection zone of the chips, earlier onset of tiredness or cramps leading to an increased risk of incorrect or unsafe operation.

[0023] In order to prevent this, the introduction opening (6) of the shredder (1) according to the invention is provided with an element (7) which is arranged in the introduction funnel (5) such that it can be oriented. As the introduction opening is provided in an element which is arranged in the introduction funnel such that it can be oriented and/or positioned, it is possible to change the position where the passage is located depending on the supplied organic material. In this case, it should be noted that the size of the passage for the organic material always remains the same with the shredder (1) according to the present invention.

[0024] In the illustrated figures, said element (7) is in

each case rotatably arranged in the introduction funnel (5). However, it is possible to design said element in such a manner that this element (7) is arranged such that it can be oriented three-dimensionally in the introduction funnel. This would, for example, be the case if the element (7) were to be constructed at least partially spherically.

[0025] Providing the introduction opening (6) in an orientable (positionable, rotatable) element (7) makes it possible, as is illustrated in Figs. 2.1 and 2.2, to orient (turn) the material to be shredded during introduction in the introduction opening (6) in a simple and quick manner in order to thus get a better grip on said material (2) and to thus introduce it under ideal circumstances. Being able to introduce the material to be shredded (2) under ideal circumstances in each case also results in an increased operating speed.

[0026] The introduction funnel (5) is of tubular design and comprises a funnel-shaped guide piece (8) on its introduction side. The rotatable element (7) is in the position where the introduction funnel (5) joins the funnel shape (8). The funnel-shaped guide piece (8) facilitates the introduction of the material to be shredded. The protection means, particularly the protective rubber flaps (13), are mounted on the rear of the rotatable element (7), as can be seen in Fig. 4, and are provided, inter alia, in order to stop the chips from flying back out. Since they are also attached to the rotatable element (7), they will also co-rotate with this element (7). The protection means (13) are preferably mounted on the rotatable element (7) in such a manner that they form a conical guide duct in order thus to make the smooth introduction of material to be shredded possible without the rotating movement of the rotatable element (7) being inhibited.

[0027] The introduction opening (6) preferably has a round, slotted or quadrangular shape, but can also be formed, as is clear from Fig. 5, by a combination of two or more of the preceding shapes. Thus, the introduction opening illustrated in Fig. 5.1 is formed by a combination of a slotted and a quadrangular shape.

[0028] The cutting means (4) preferably comprise a rotor (9) which is arranged transversely to the direction of introduction and is composed of a shaft on which at least two adjacent groups of blades are securely mounted on the circumference and which are rotatably arranged for an anvil, with said groups of blades each comprising several fixed cleaving blades which are intended to cleave the waste mainly in the direction of introduction of the waste and comprising at least one chopping blade which is intended to cut up the waste mainly transversely to the direction of introduction of the waste. The rotor (9) rotates in a housing which is referred to as the shredding chamber (3).

[0029] The shredding chamber (3) furthermore has a discharge opening via which the shredded material is discharged. The discharge opening can optionally be closed off by a calibration sieve. If used, the calibration sieve ensures that the material stays inside the shredding

chamber (3), so that it is cut up further to form small particles.

[0030] As mentioned above, the supplied material is shredded in shredding chamber (3) by means of rotatable cutting means (4) in order to form chips which are small enough to pass through the calibration sieve.

[0031] The shredder (1) according to the present invention is furthermore provided with a collecting tray (10) for collecting the shredded material which has been discharged via the discharge opening.

[0032] The capacity of the shredder (1) preferably varies in terms of the diameter of the material to be shredded (2) between 1 cm and 5 cm. However, it is evident that the shredder (1) according to the invention can also be used for shredding material having a smaller (< 1 cm) or slightly larger (> 5 cm) diameter.

[0033] The shredder (1) is preferably driven electrically, and to this end the shredder (1) is provided with a socket which can be closed by means of a cover. It is obvious that other drive means (for example by means of a petrol motor) are also possible.

[0034] In order to be able to readily displace the shredder (1), it is provided with a number of wheels (11), preferably two. The wheels (11) are provided on a folding wheel frame (12). By means of the wheel frame (12), the shredder (1) can be hung on, for example, a wall.

Claims

1. Shredder (1) for reducing organic material (2), comprising:

- a shredding chamber (3) provided with rotatable cutting means (4) for shredding the organic material (2);
- an introduction funnel (5) having an introduction opening (6) intended for introducing the organic material (2) into the shredding chamber (3), with said introduction opening forming a passage for said organic material;

characterized in that said introduction opening (6) is provided in an element (7) which is arranged in the introduction funnel (5) in such a manner that it can be oriented and **in that** the orientation of said element (7) results in the orientation of the passage.

2. Shredder (1) according to Claim 1 **characterized in that** said element (7) is rotatably arranged in the introduction funnel (5) and **in that** the rotation of said element results in a rotation of the passage.

3. Shredder (1) according to Claim 1 or 2, **characterized in that** said element (7) is of disc-shaped design.

4. Shredder (1) according to Claim 2 or 3, **character-**

ized in that said element (7) can be rotated both clockwise and anticlockwise.

5. Shredder (1) according to one of the preceding claims, **characterized in that** said element (7) comprises protection means (13). 5
6. Shredder (1) according to one of the preceding claims, **characterized in that** the introduction funnel (5) comprises a funnel-shaped guide piece (8) on its introduction side, said element (7) being arranged inside this guide piece (8). 10
7. Shredder (1) according to one of the preceding claims, **characterized in that** the introduction opening (6) has a round and/or slotted and/or quadrangular shape. 15

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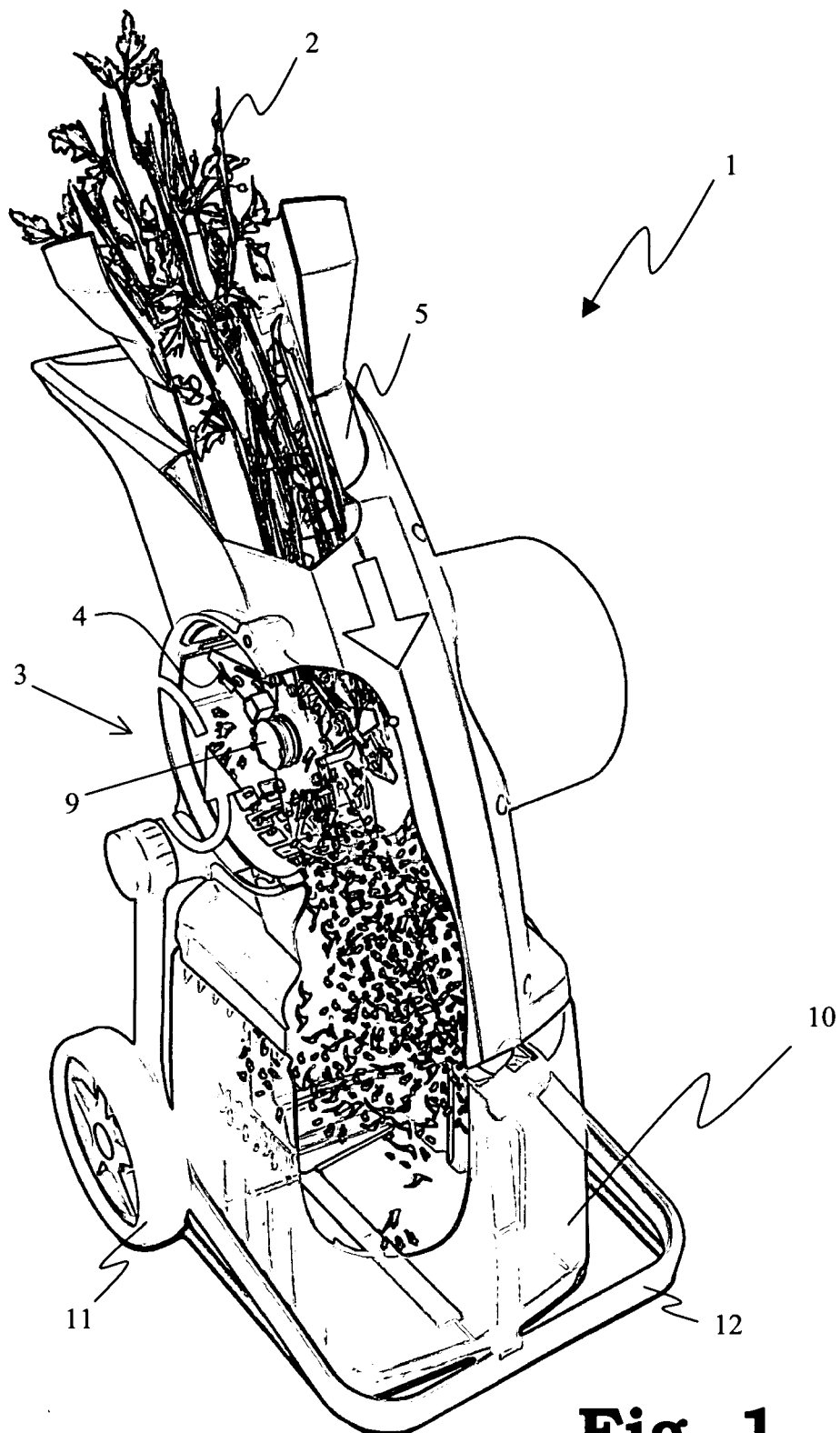


Fig. 1

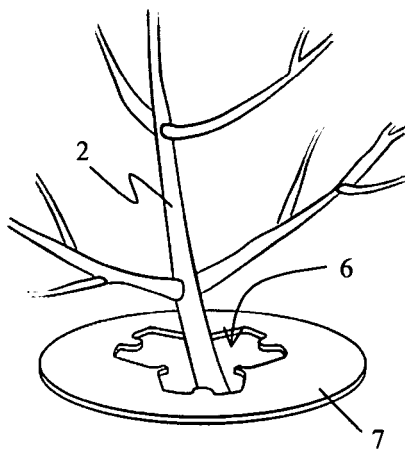


Fig. 2.1

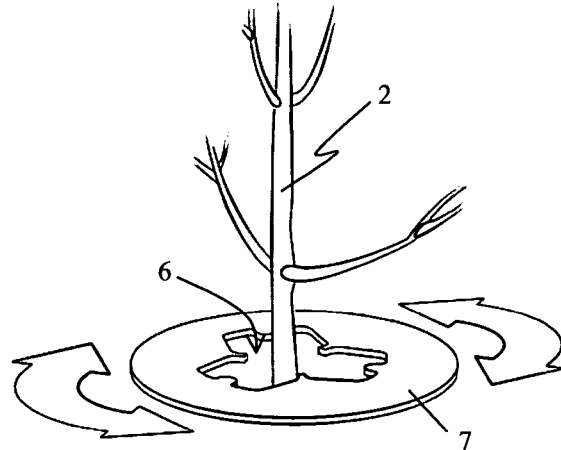


Fig. 2.2

Fig. 2

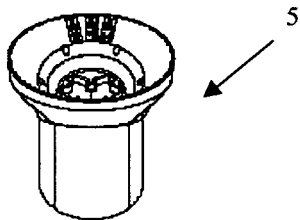


Fig. 3

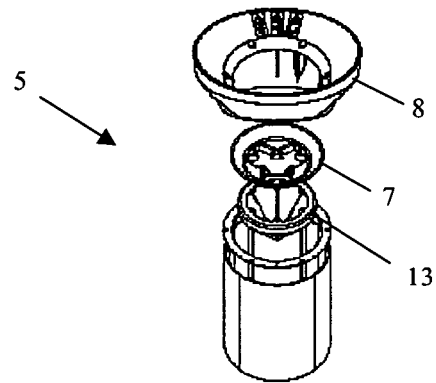


Fig. 4

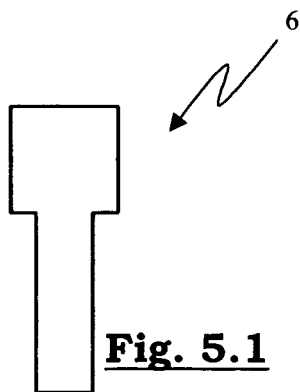


Fig. 5.1

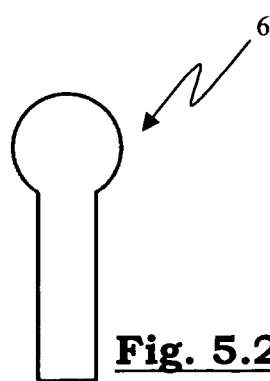


Fig. 5.2

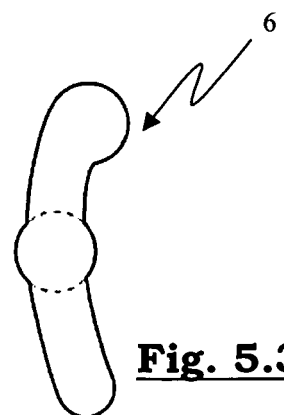


Fig. 5.3

Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 09 17 7506

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			B02C A01G A01F B27L
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 5 February 2010	Examiner Leitner, Josef
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 17 7506

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The members are as contained in the European Patent Office EDP file on
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05-02-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0134378	A1	20-03-1985	NONE
FR 2232365	A1	03-01-1975	NONE
DE 8213479	U1	08-07-1982	NONE
DE 9014541	U1	03-01-1991	NONE

REFERENCES CITED IN THE DESCRIPTION

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- EP 0134378 A [0009]
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