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TECHNICAL FIELD

5 The invention relates to a device for processing foodstuffs.

PRIOR ART

10 From the prior art a large number of disc graters are known, which are sold, for example, either as individual devices or as auxiliary devices for kitchen machines. Normally such disc graters are electrically operated. They have a filling duct for the vegetable to be comminuted, a connecting piece with which the vegetable is pressed into the filling duct, which also serves at the same time as cutting protection and an electric drive for the cutting disc. Depending on the cutting result desired the cutting discs can be accordingly
15 exchanged. At this point the electric grater OPTUS Z1 of the company OPTUS should be mentioned as an example of a large number of electric disc graters. Manually operated devices, which are substantially the same design as those which are electrically operated and have a crank drive are known, for example, from the company Zyliss. A disadvantage of the crank drives is, that frequently the cutting disc can only be driven with low torque
20 and, compared to an electric drive, only substantially lower rotational speeds can be achieved. As a result of that in the case of hard or fibrous cutting material only modest results can be achieved. The cutting material is either taken along by the blade of the cutting disc and is not cut, or the cutting disc is locked.

25 Document GB 2 327 864 A discloses a device for processing foodstuffs having an upper part and a drive capable of being placed onto a lower part, comprising a work unit that by means of the drive is drivable and capable of being set in rotary motion, wherein the drive comprises a drive wheel having an external toothing, and the work unit has a cutting disc.

30 PRESENTATION OF THE INVENTION

The problem addressed by the invention is therefore to make available a manually operated device for processing foodstuffs, which does not have the above- mentioned

disadvantages. According to the present invention a device is made available for this purpose having an upper part, a drive and preferably a lower part with working container and a work unit drivable by means of the drive and capable of being set in rotary motion. The drive is operatively connected to the work unit. The work unit is a cutting disc.

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The drive has, for example, a pull cord roller with a concentric clearance, in which a spring element is disposed so as to lie inside said concentric clearance, wherein the spring element is operatively connected to the pull cord roller. Through the arrangement of the spring element in the concentric clearance of the pull cord roller the overall height of the device can accordingly be reduced and thus the danger of toppling during manual operation of the pull cord can be reduced.

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The spring element, preferably a helical spring, is connected to the pull cord roller in such a manner that during operation of the drive the spring element is pre-tensioned in a first rotating direction – therefore when pulling on the pull chord – and the spring element is relaxed again after release of the pull cord and the pull cord roller thereby rotates in the opposite direction. In a preferred embodiment of the invention the drive is disposed in the upper part of the device. The pull cord roller is measured against a central axis of the device, disposed parallel to and spaced apart from said central axis. The cord of the pull cord roller is provided with a hand grip. The cord exits from the upper part of the device, opposite a foodstuff infeed installation. Preferably said exit point, is disposed in dependence on a geometric shape of the upper part in such a manner that the distance between the central axis A of the device and the exit point is maximum. This arrangement causes a maximum force transmission to the work unit and an improved the cutting effect.

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The device according to the present invention has a drive, which comprises a drive wheel with an external tothing. The work unit has a corresponding internal tothing. The drive wheel is disposed to the work unit in such a manner that the external tothing of the drive wheel engages into the internal tothing of the work unit. The drive drives the drive wheel and through the engagement of the external tothing of the drive wheel into the internal tothing of the work unit, the work unit is set in rotary motion.

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The drive wheel can be driven by any drive. In a preferred embodiment this is a manual drive, for example, a manual drive with a pull cord roller.

5 It is an advantage of said arrangement, for example, that the device gets by with a reduced number of components, since the work unit is moved directly by the drive wheel.

In a preferred embodiment of the invention the work unit is mounted so as to be positionable on at least two bearing elements, wherein the first bearing element is disposed in the centre of the work unit, preferably in a receptacle provided therefor in
10 the work unit.

Preferably, at least one of the two bearing elements is disposed spaced apart from the first bearing element, wherein the distance is defined by a radius of the work unit. At least one of the two bearing elements is applied to the upper part of the device, preferably to
15 the lower side of the upper part. In a preferred embodiment at least one of the two bearing elements is configured so as to be hook-shaped. This makes possible a simple change of the work unit with stable storage at the same time. Most preferred besides the central bearing element two or three peripheral, hook-shaped bearing elements are provided for safe, rotationally movable holding of the work unit. In the case of three
20 peripheral, hook-shaped holding elements these are preferably disposed at 0° , 90° and 180° positions in relation to the periphery of the work unit, for example, of a grating disc. In this way it is ensured that the disc is sufficiently held, supported and guided and it can be introduced without problems from one side into the hook-shaped holding element, or removed from the latter.

25 According to the invention the work unit is a cutting-, friction- or grating disc (referred to hereinafter generally as a cutting disc). The cutting disc is rotated peripherally by a support ring, which has an internal tothing. When the work unit is driven the drive wheel, which has an external tothing engages into the internal tothing of the support ring and
30 in this way drives the cutting disc. The driving force is therefore not as known from the prior art introduced in the centre of the cutting- or grating disc, but rather is transferred from the externally toothed drive wheel to the internal tothing of the cutting disc. The latter rotates the periphery of the cutting disc on the inside. An advantage of this

arrangement lies in the fact that more space is available for the arrangement of the foodstuff infeed installation and the entire radius of the cutting- or grating disc can be provided for the cutting. In addition, sufficient space is made available to provide even more wheels besides the drive wheel for an additional gearing.

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In a preferred embodiment of the invention the cutting disc has a first side having a first cutting blade- or blade assembly, and a second side having a second cutting blade- or blade assembly. The internally toothed support ring is disposed so as to be symmetrical in relation to the cutting disc, wherein the cutting disc represents the symmetry plane. An advantage of said arrangement is that with a cutting disc two different cutting-, friction- and grating products can be produced. The cutting discs according to the present invention are preferably produced from steel sheet with a material thickness of 0.3 to 0.6 mm, preferably 0.4 mm.

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The first and second cutting- or cutting blade assembly is, for example, a variable number of individual cutting knives, blades or cutters, preferably two to six per side, which make it possible to cut cutting material in slices, sticks, Julienne or other shapes. It has proven to be particularly advantageous to produce the slices directly by forming from the disc material. By applying a high pressure the cutting edges are thereby punched or deep-drawn in the desired form from the disc and the actual cutting edge is brought by the material flow into the form, so that a subsequent grinding of the cutting edge is no longer necessary. The discs can, for example, consist of a martensitic chromium steel sheet with a chromium content of 11.5-13.5% of the type AISI 430. The radius integrally formed on the cutting edge is preferably less than 0.2 mm.

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In preferred embodiments a geometric rotation axis of the drive wheel and a geometric rotation axis of the work unit are disposed so as to be mutually axially parallel. The geometric rotation axis of the drive wheel thereby intersects the work unit. This arrangement of the drive wheel to the work unit is compact, saves space and thus brings a high degree of freedom of design in the installation in the upper part of the device.

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Furthermore, in a preferred embodiment of the device according to the present invention a unidirectional coupling is provided, which is specified to lock in a first rotating direction

and thus to transmit the force from the pull cord roller or another primary driven part of the drive to the drive wheel and to set said drive wheel in rotary motion. In a second rotating direction the coupling is in freewheeling mode and decouples the drive wheel from the reverse rotary motion of the pull cord roller or another primary driven part of the drive. An advantage of the unidirectional coupling is that the driving force can be transmitted in the desired rotational direction to the drive wheel and thus the work means can be driven in the working direction. However, when rolling up the pull cord, said pull cord is decoupled from the work means and a braking or jamming of the cord roller is prevented during the cutting, rubbing or grating of the cutting material. The unidirectional coupling can be connected with any type of drive. In a preferred embodiment this is a manual pull cord drive.

In a preferred embodiment of the invention the device for processing foodstuffs has a safety device with a locking element, which is specified for locking the work means in a non-operating state and an unlocking element which is specified for activating the locking element so as to release the blocking mechanism. The locking element, preferably applied to the upper part of the device, engages in a brake means, wherein the brake means is part of the work unit. In a preferred embodiment the work unit has tothing, preferably an external tothing, and the locking element engages in said tothing.

Preferably the unlocking element is a foodstuff infeed installation comprising at least one duct and one pusher, wherein the duct is specified for activating the unlocking element.

In a further preferred embodiment the unlocking element comprises a foodstuff infeed installation with a slide and a cover element operatively connected to the slide, wherein the slide is specified for activating the unlocking element.

The advantage of the safety device is that the locking element locks the work unit and only releases it when the unlocking element activates the locking element. The risk of injury to the user is reduced in this way.

The device according to the present invention can be placed on different lower parts or can be detachably connected to different lower parts. In a preferred embodiment the

lower part is a collecting container. Further embodiments are conceivable, such as, for example, that of a frame, on which the device according to the present invention is placed. The upper part can also alternatively or additionally have positive-locking means on its lower side or peripherally by means of which it can be placed on a pot or a bowl of appropriate size.

BRIEF EXPLANATION OF THE FIGURES

The invention shall be elucidated in detail below by means of embodiments in conjunction with the drawing.

- Fig. 1 shows a preferred embodiment of the device according to the present invention in a sectional view,
- Fig. 2 shows an upper part of a preferred embodiment of the device according to the present invention in a sectional view,
- Fig. 3 shows three different views of a cutting disc (top view (a) on a first side, (b) side view and top view (c) on a second side),
- Fig. 4 shows an embodiment of the device with a safety device according to the present invention having a preferred unlocking element, and
- Fig. 5 shows a preferred design of the cutting device having a further safety device according to the present invention with a further preferred embodiment of an unlocking element.

WAYS TO CARRY OUT THE INVENTION

In Fig. 1 a first preferred embodiment of the device 100 according to the present invention is depicted. The device comprises an upper part 1, which is placed on the lower part 3. The device 100 furthermore has a work unit 4, which represents a cutting disc 8, a foodstuff infeed installation 13 and a drive 2. In a preferred embodiment the drive 2 comprises a pull cord roller 21. In the pull cord roller 21 a clearance 22 is disposed concentric to the rotation axis D, in which a spring element 23, for example, a helical spring 24 is located. The spring element 23 is thereby operatively connected to the pull cord roller 21 in such a manner that when the drive 2 is activated, preferably by manual

pulling, the helical spring 24 is pre-tensioned in a first rotating direction and the helical spring 24 is relaxed in a second rotating direction. The pre-tensioning and relaxation of the helical spring 24 leads to the work unit 4 being set in rotary motion via a drive wheel 61. In this preferred embodiment the pull cord roller 21 is disposed to the drive wheel 61 in such a manner that the rotation axis D of the pull cord roller coincides with a geometric rotation axis D1 of the drive wheel 61. In the preferred embodiment according to Fig. 1 the geometric rotation axis D1 of the drive wheel 61 runs parallel to a geometric rotation axis D2 of the work unit or to a central axis A of the device 100.

10 According to the embodiment of Fig. 1 the drive wheel 61, which has an external tothing 62 is operated by the drive 2. The motion of the drive wheel 61 is not limited to the drive 2. A further possibility (not shown) is the use of a crank drive or of an electric drive. If the drive wheel 61 is set in rotary motion, the external tothing 62 of the drive wheel engages into an internal tothing 63 of the work unit 4 and in this way sets the work unit 4 in rotary motion.

The work unit 4 is preferably mounted so as to be positionable on at least two bearing elements 71, 72. The first bearing element 71, for example, constitutes a fastening means, which is disposed in a receptacle 41 of the work unit 4. The second bearing element 72 is disposed in a preferred embodiment of the invention spaced apart from the first bearing element 71, wherein the distance corresponds to the radius 42 of the work unit 4.

Fig. 2 shows a preferred embodiment of the upper part 1'. The drive 2 is connected via a unidirectional coupling 9 to the drive wheel 61.

25 Fig. 3(a) shows a first side 81 of a cutting disc 8 according to the present invention. On the first side 81 a first cutting blade assembly 81' is located, which is designed, for example, in such a manner that vegetable can be cut into slices. In the preferred embodiment according to Fig. 3(a) the cutting disc is rotated by a support ring 80, which both on the first side 81 as well as on a second side 82 and has an internal tothing 63 (see also Fig. 3(b), Fig. 3(c)). In a preferred embodiment the cutting disc 8 is made from a metal sheet and the support ring 80 from plastic, wherein the cutting disc 8 and the support ring 80 are produced as two separate parts. In a further embodiment the cutting disc 8 and the

support ring 80 are made in one piece from plastic. The blades of the cutting disc form separate inserts made of metal.

5 Fig. 3(b) shows a side view of the cutting disc 8. The cutting disc 8 has a first side 81 with a first cutting blade assembly 81' and a second side 82 with a second cutting blade assembly 82'. The support ring 80 is thereby designed such that the internal tothing 63 runs both on the first side 81 as well as on the second side 82. In a preferred embodiment the cutting disc 8 can be used alternately depending on the desired cutting quality.

10 Fig. 3(c) shows a second side 82 of the cutting disc 8 with a second cutting blade assembly 82' rotated by the support ring 80 having the internal tothing 63.

The first and second cutting blade assembly 81' and 82' shown in Figs. 3(a) to 3(c) shows four cutting knives. The invention is not limited to a cutting blade assembly of four cutting
15 knives. In further preferred embodiments more or fewer than four cutting knives, for example, three can be provided.

Fig. 4 shows a preferred embodiment of a safety device 200 according to the present invention. The safety device comprises an unlocking element 11 and locking element 10.
20 In the preferred embodiment according to Fig. 4 the locking element 10 is designed as a movably mounted hook-shaped element and is disposed on the upper part 1 of the device. In the state depicted in Fig. 4 the safety device is unlocked. The duct 14, which is part of the foodstuff infeed installation 13 constitutes the unlocking element 11. The foodstuff infeed installation 13 comprises the duct 14 and the pusher 15 and represents
25 a separate unit from the upper part 1. In a preferred embodiment of the invention the foodstuff infeed installation 13 can be fitted onto the upper part 1. Without the fitted-on foodstuff infeed installation 13 the locking element engages into the brake means 12 of the work unit 4 and locks the work unit 4. When the duct 14 is fitted onto the upper part 1 of the device 100, the duct 14 unlocks the locking element 10 and the work unit 4 can
30 be set in rotary motion with the aid of the drive 2.

Fig. 5 shows a further preferred embodiment of the safety device 201 in an unlocked state. In this preferred embodiment the foodstuff infeed installation 13' comprises a slide

16 and a cover element 17. The foodstuff infeed installation 13' represents a separate unit from the upper part 1.

5 In a preferred embodiment of the invention the foodstuff infeed installation 13' can be fitted onto the upper part 1'. Without the fitted-on foodstuff infeed installation 13' the locking element 10 engages into the brake means 12 of the work unit 4 and locks the work unit 4. When the slide 16 is fitted onto the upper part 1 of the device 100, the slide 16 unlocks the locking element 10 and the work unit 4 can be set in rotary motion with the aid of the drive 2.

10

List of reference signs

	Device	100
	Upper part	1, 1'
5	Foodstuff infeed installation	13, 13'
	Drive	2
	Pull cord roller	21
	Clearance	22
	Spring element	23
10	Helical spring	24
	Lower part	3
	Work unit	4
	Receptacle	41
	Radius	42
15	Toothings	43
	Central axis	A
	Rotation axis of the pull cord roller	D
	Drive wheel	61
	External toothings	62
20	Internal toothings	63
	First bearing element	71, 71'
	Second bearing element	72, 72'
	Cutting disc	8
	Supporting disc	80
25	First side	81
	Second side	82
	First cutting blade assembly	81'
	Second cutting blade assembly	82'
	Unidirectional coupling	9
30	Locking element	10
	Unlocking element	11
	Break means	12
	Duct	14

	Pusher	15
	Slide	16
	Cover element	17
	Geometric rotation axis of the drive wheel	D1
5	Geometric rotation axis of the work unit	D2
	Safety device	200

Patentkrav

1. Indretning (100) til bearbejdning af fødevarer, med en overdel (1) og et drev (2), der kan anbringes på en underdel (3), omfattende en arbejdsenhed (4) der ved hjælp af drevet (2) kan drives og sættes i roterende bevægelse, hvor drevet 5 omfatter et drivhjul (61) med en ekstern fortanding (62), og arbejdsenheden (4) omfatter en skæreskive (8) med en indvendig fortanding (63), hvor drivhjulet (61) i forhold til arbejdsenheden (4) er indrettet på en sådan måde, at den udvendige fortanding (62) af drivhjulet (61) griber ind i den indvendige fortanding (63) af arbejdsenheden (4), og arbejdsenheden (4), når den aktiverer drevet (2), 10 sættes i roterende bevægelse.

2. Indretning (100) ifølge krav 1, **kendetegnet ved, at** drevet (2), hvilket fortrinsvis er indrettet i overdelen (1), omfatter en snoretrækrulle (21), og snoretrækrullen (21) har et koncentrisk mellemrum (22), i hvilket et 15 fjederelement (23), fortrinsvis en spiralfjeder (24), er indrettet til at ligge inde i det koncentriske mellemrum (22), hvor fjederelementet (23) er virksomt forbundet med snoretrækrullen.

3. Indretning (100) ifølge krav 2, **kendetegnet ved, at** fjederelementet (23) 20 forspændes i en første rotationsretning af snoretrækrullen (21), og fjederelementet (23) afspændes i en anden rotationsretning, og arbejdsenheden (4), ved forspænding og afspænding af fjederelementet (23), sættes i roterende bevægelse.

25 4. Indretning (100) ifølge et af de foregående krav 2 til 3, **kendetegnet ved, at** en midterakse (A) af indretningen og en rotationsakse (D) af snoretrækrullen (21) er indrettet parallelt med hinanden.

5. Indretning (100) ifølge et af de foregående krav, **kendetegnet ved, at** drevet 30 (2) er indrettet modsat en fødevareforsyningsindretning (13).

6. Indretning ifølge et af de foregående krav, **kendetegnet ved, at** arbejdsenheden (4) er placeret positionerbart på mindst to lejeelementer (71; 72), hvor fortrinsvis mindst det andet lejeelement (72) er indrettet på en

underside (11) af overdelen (1).

7. Indretning ifølge krav 6, **kendetegnet ved, at** det første lejeelement (71) er indrettet i midten af arbejdsenheden (4), fortrinsvis i en beholder (41) indrettet
5 dertil i arbejdsenheden (4).

8. Indretning ifølge krav 6, **kendetegnet ved, at** mindst det andet lejeelement (72) er indrettet med afstand fra det første lejeelement (71), hvor afstanden defineres af en radius (42) af arbejdsenheden (4).

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9. Indretning ifølge krav 6, **kendetegnet ved, at** mindst et af de to lejeelementer (71, 72) er indrettet til at være krogformet.

10. Indretning ifølge krav 1, **kendetegnet ved, at** skæreskiven (8) har en
15 bærering (80), der periferisk omgiver skæreskiven (8).

11. Indretning ifølge krav 10, **kendetegnet ved, at** bæreringen (80) omfatter en indvendig fortanding (63).

20 **12.** Indretning ifølge krav 10, **kendetegnet ved, at** bæreringen (80) er indrettet til at være symmetrisk i forhold til skæreskiven (8), hvor skæreskiven (8) repræsenterer symmetriplanet.

13. Indretning ifølge krav 1, **kendetegnet ved, at** skæreskiven (8) har en første
25 side (81) med en første skæreklingeorden (81'), og en anden side (82) med en anden skæreklingeorden (82').

14. Indretning ifølge et af de foregående krav 1, 6 til 13, **kendetegnet ved, at** en geometrisk rotationsakse (D1) af drivhjulet (61) og en geometrisk
30 rotationsakse af arbejdsenheden (D2) er indrettet til at være aksialt parallelle med hinanden.

15. Indretning ifølge et af de foregående krav 1, 6 til 14, **kendetegnet ved, at** den geometriske rotationsakse (D1) af drivhjulet krydser arbejdsenheden (4).

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16. Indretning ifølge et af de foregående krav 1, 6 til 15, **kendetegnet ved** en envejskobling (9), hvilken er indrettet til at sætte drivhjulet (61) i en roterende bevægelse i en første rotationsretning og drivhjulet (61) i friløb i en anden rotationsretning.

5

17. Indretning ifølge krav 1, **kendetegnet ved** et låsningselement (10) fortrinsvis et bevægeligt monteret krogformet element, hvilket i en ikke-drift tilstand er indrettet til at låse arbejdsorganet (4), og med et oplåsningselement (11) hvilket er indrettet til at aktivere låsningselementet (10) for at frigive
10 blokeringsmekanismen, fortrinsvis således at låsningselementet (10) griber ind i et bremseorgan (12), hvor bremseorganet (12) er del af arbejdsenheden (4).

18. Indretning ifølge krav 17, **kendetegnet ved, at** låsningselementet (10) griber ind i et bremseorgan (12), hvor bremseorganet (12) er del af
15 arbejdsenheden (4), hvor bremseorganet (12) fortrinsvis er indrettet som en fortanding (43), fortrinsvis en udvendig fortanding, og låsningselementet (10) griber ind i fortandingen (43).

19. Indretning ifølge krav 17, **kendetegnet ved, at** oplåsningselementet (11)
20 repræsenterer en fødevareforsyningsindretning (13) omfattende en skakt (14) og en skubber (15), hvor skakten (14) og/eller skubberen (15) er indrettet til at aktivere låsningselementet (10).

20. Indretning ifølge krav 17, **kendetegnet ved, at** oplåsningselementet (11) er
25 en fødevareforsyningsindretning (13) omfattende en glider (16) og et dækelement (17) der er virksomt forbundet med glideren (16), hvor glideren (16) er indrettet til at aktivere låsningselementet (11).

Fig. 1

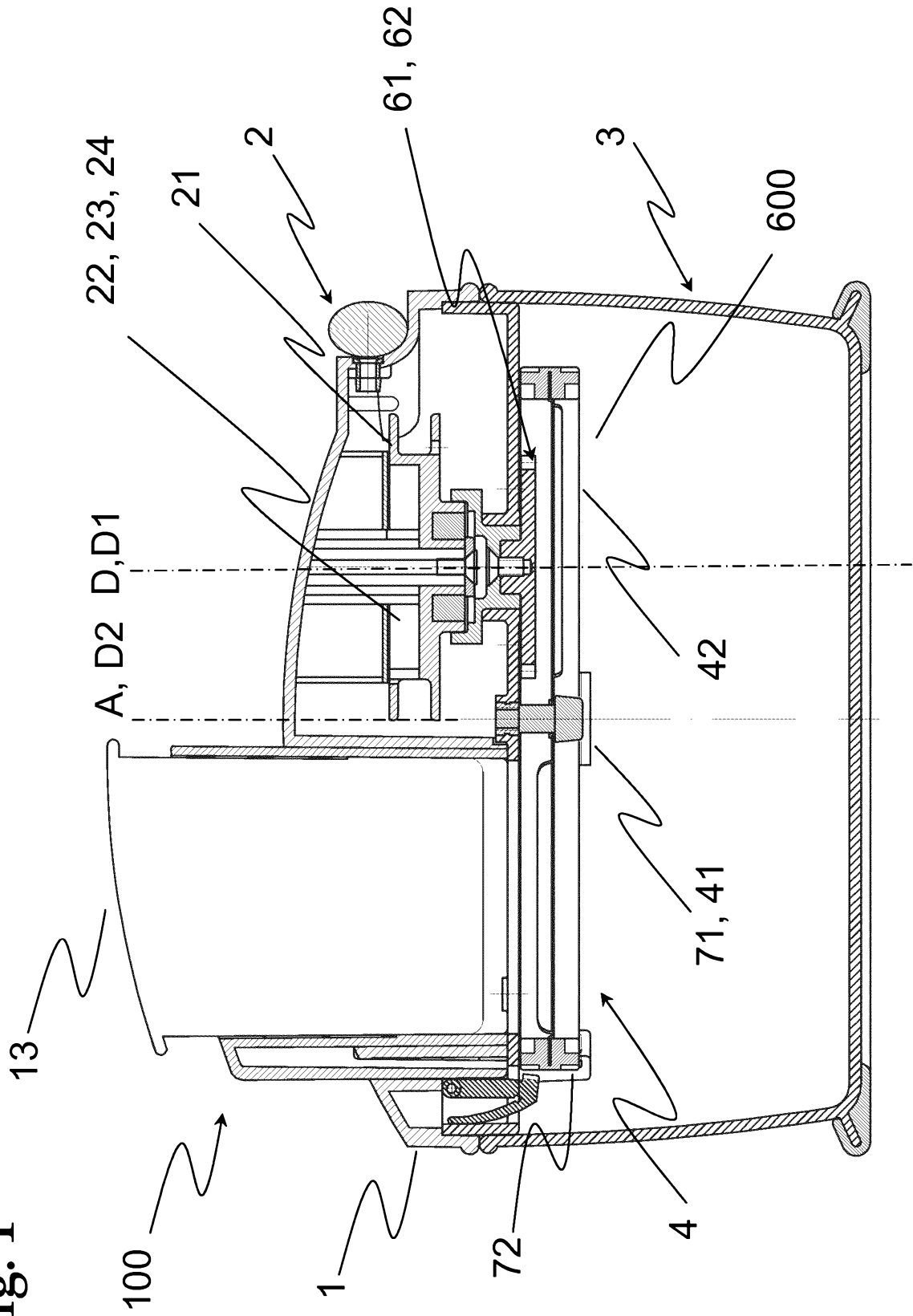


Fig. 2

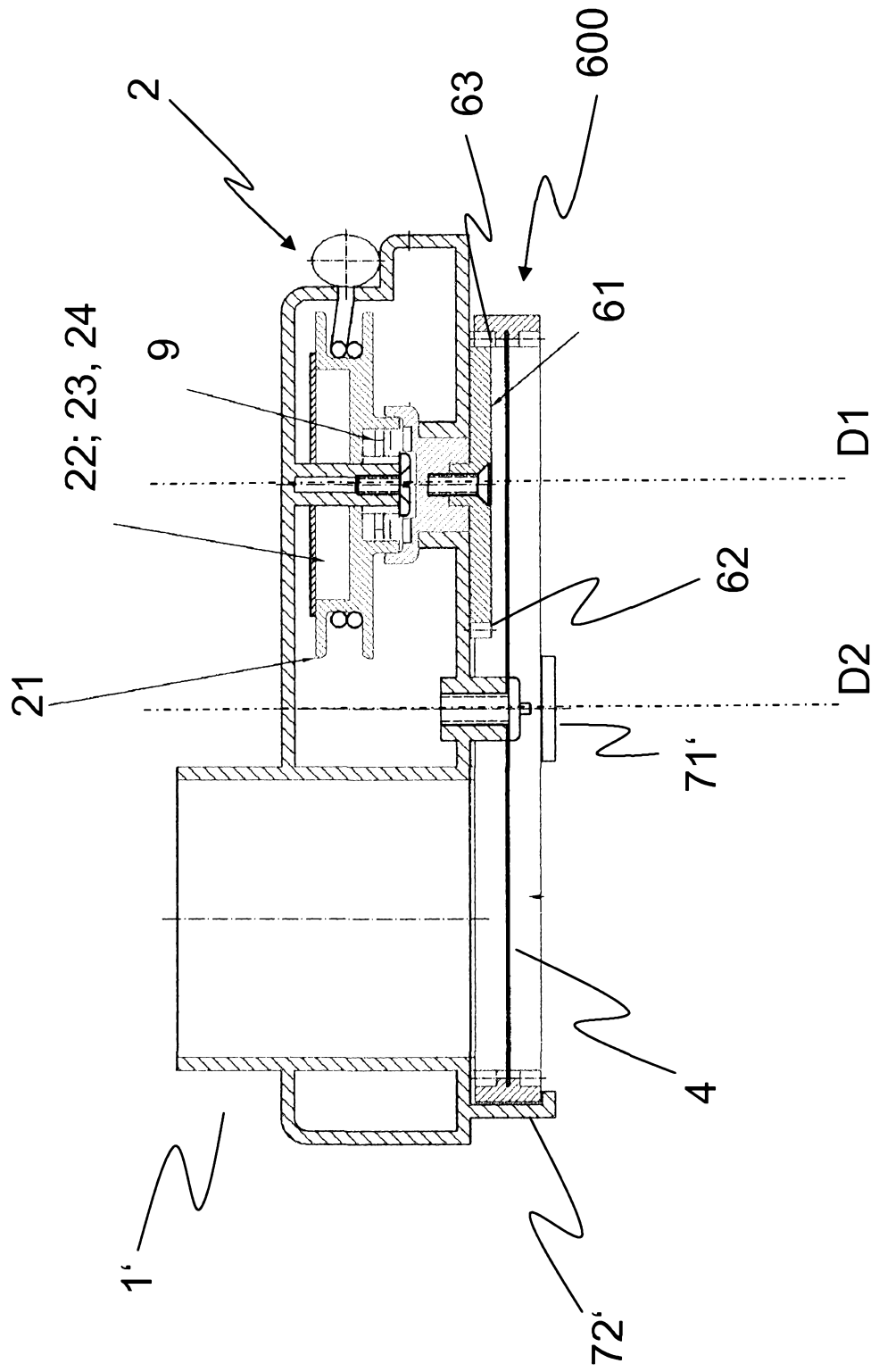
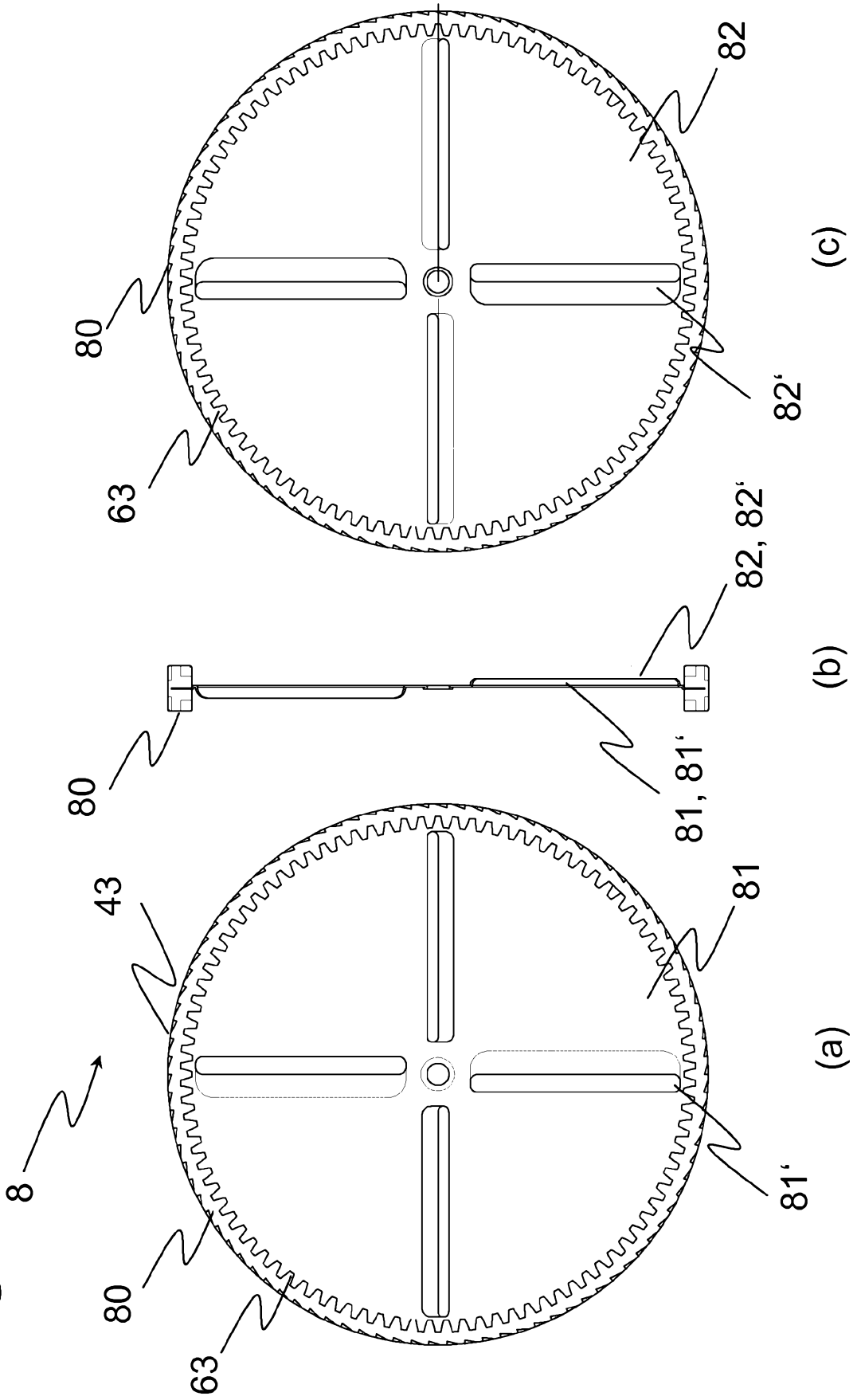


Fig. 3



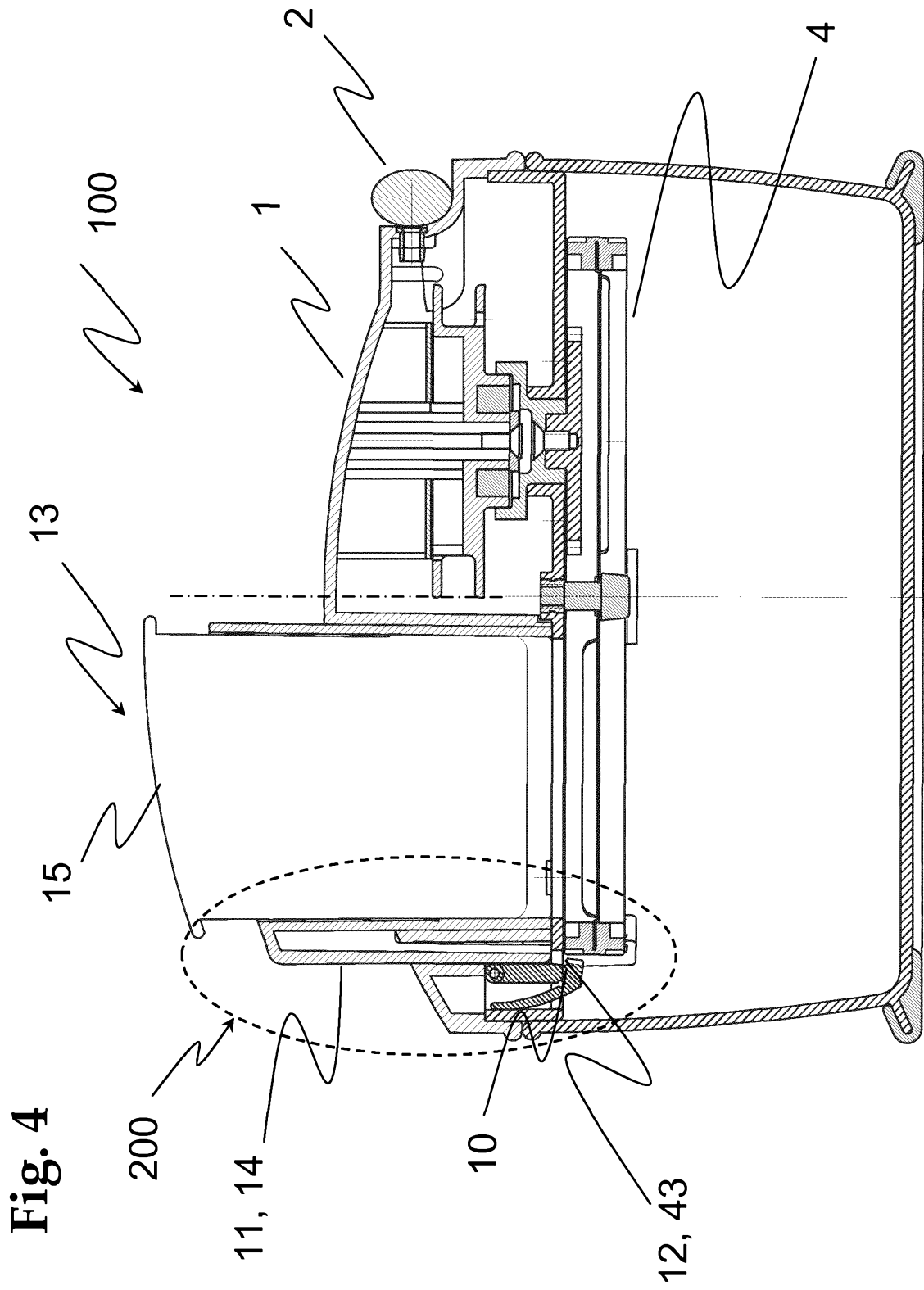


Fig. 5

