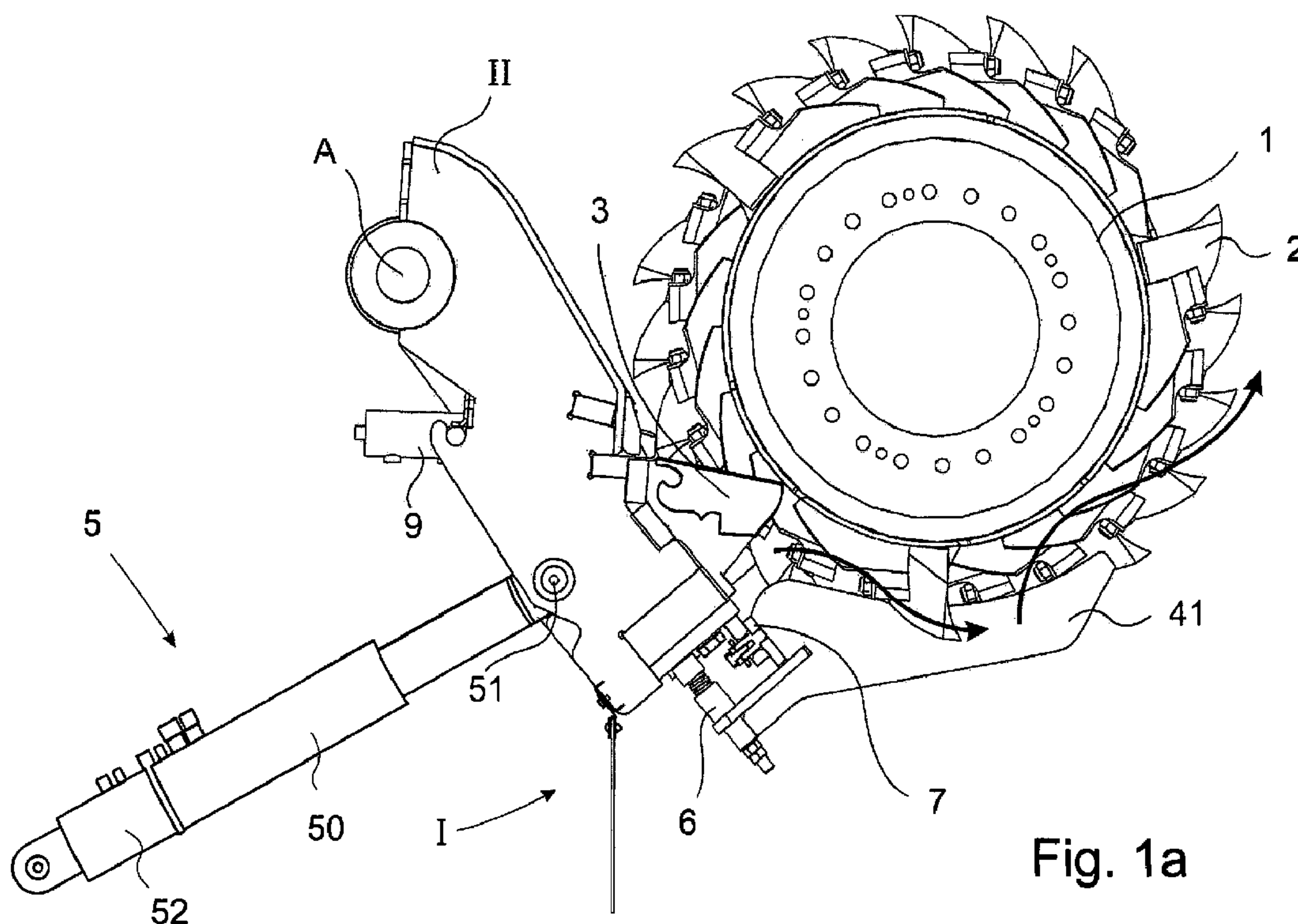




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(54) Titre : DISPOSITIF DE BROYAGE AVEC UN SYSTEME A PEIGNE  
(54) Title: DISINTEGRATING DEVICE WITH A COMB SYSTEM



(57) Abrégé/Abstract:

The invention relates to a disintegrating device comprising a comb system (I), wherein the disintegrating device is formed by at least one disintegrating roller (1), rotatably mounted in a machine frame, with at least one disintegrating tool (2) arranged thereon,



**(57) Abrégé(suite)/Abstract(continued):**

wherein the disintegrating device has at least one counter blade (3) that cooperates with the disintegrating tool (2), and comprising at least one base comb (II) on which the at least one counter blade (3) is arranged, and on which at least one sieve element (41) can be arranged as a component of a sieve device (4), wherein the sieve device (4) at least partially comprises the disintegrating roller (1) in the intended application. The invention is characterised in that the sieve element (41) is spring-mounted on the base comb (II).

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Erklärungen gemäß Regel 4.17:

— Erfindererklärung (Regel 4.17 Ziffer iv)

[Fortsetzung auf der nächsten Seite]

(54) Title: DISINTEGRATING DEVICE COMPRISING A COMB SYSTEM

(54) Bezeichnung : ZERKLEINERUNGSVORRICHTUNG MIT EINEM KAMMSYSTEM

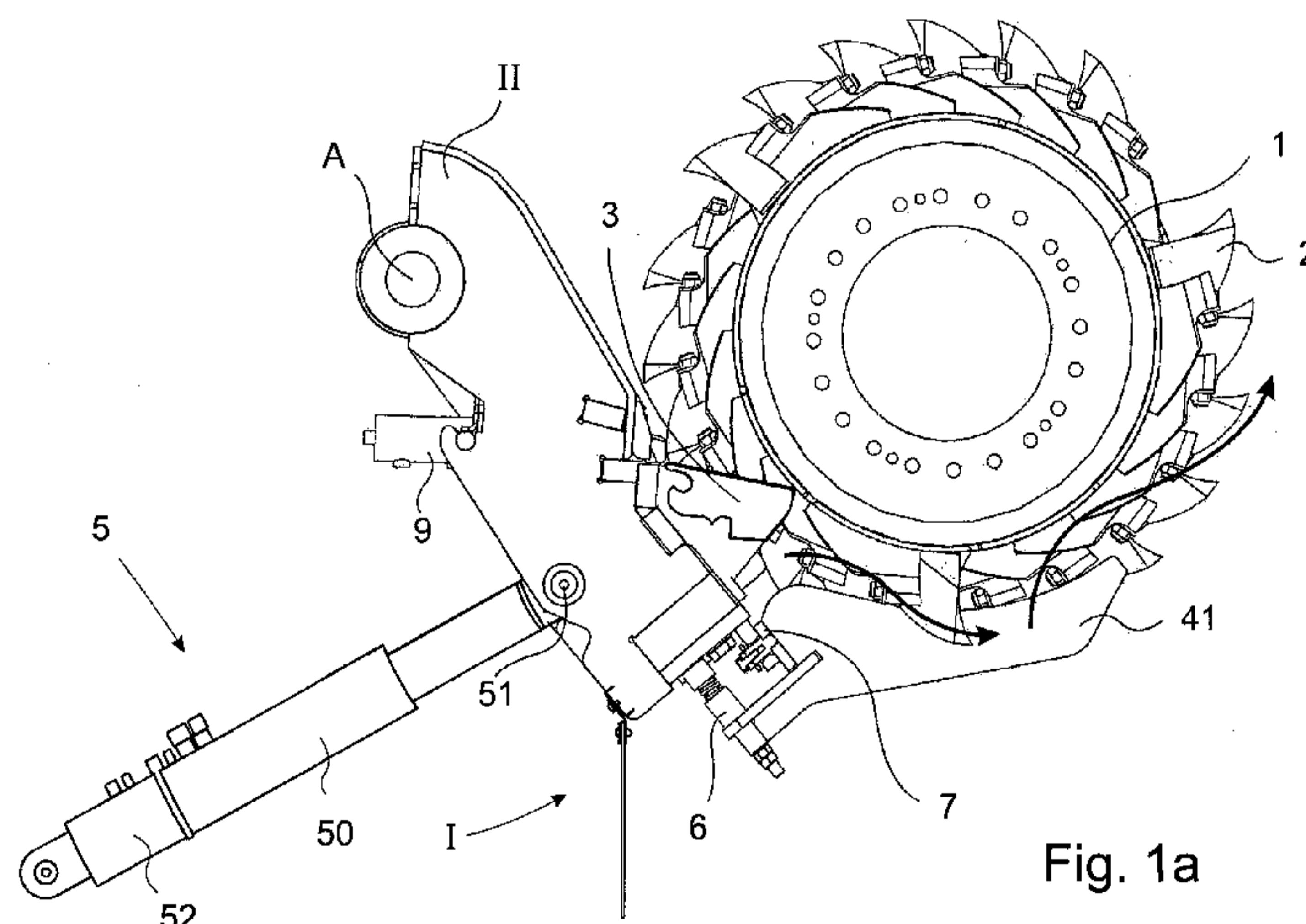


Fig. 1a

(57) Abstract: The invention relates to a disintegrating device comprising a comb system (I), wherein the disintegrating device is formed by at least one disintegrating roller (1), rotatably mounted in a machine frame, with at least one disintegrating tool (2) arranged thereon, wherein the disintegrating device has at least one counter blade (3) that cooperates with the disintegrating tool (2), and comprising at least one base comb (II) on which the at least one counter blade (3) is arranged, and on which at least one sieve element (41) can be arranged as a component of a sieve device (4), wherein the sieve device (4) at least partially comprises the disintegrating roller (1) in the intended application. The invention is characterised in that the sieve element (41) is spring-mounted on the base comb (II).

(57) Zusammenfassung:

[Fortsetzung auf der nächsten Seite]



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## WO 2016/096103 A1

**Veröffentlicht:**

— mit internationalem Recherchenbericht (Artikel 21 Absatz 3)

— vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eingehen (Regel 48 Absatz 2 Buchstabe h)

Die Erfindung betrifft eine Zerkleinerungsvorrichtung mit einem Kammsystem (I), wobei die Zerkleinerungsvorrichtung aus wenigstens einer in einem Maschinengestell drehbar gelagerten Zerkleinerungswalze (1) mit zumindest einem darauf angeordneten Zerkleinerungswerkzeug (2) besteht, wobei die Zerkleinerungsvorrichtung wenigstens eine Gegenschneide (3) aufweist, die mit dem Zerkleinerungswerkzeug (2) zusammenwirkt, mit wenigstens einem Grundkamm (II), an dem die wenigstens eine Gegenschneide (3) angeordnet ist und an dem wenigstens ein Siebelement (41) als Bestandteil einer Siebvorrichtung (4) anordenbar ist, wobei die Siebvorrichtung (4) im bestimmungsgemäßen Einsatz die Zerkleinerungswalze (1) zumindest teilweise umfasst. Die Erfindung zeichnet sich dadurch aus, dass das Siebelement (41) federnd an dem Grundkamm (II) gelagert ist.

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## Disintegrating Device With A Comb System

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### Description

The invention relates to a disintegrating device comprising a comb system, wherein the disintegrating device is formed by at least one disintegrating roller, rotatably mounted in a machine frame, with at least one disintegrating tool arranged thereon, wherein the disintegrating device has at least one counter blade that cooperates with the disintegrating tool, and comprising at least one base comb on which the at least one counter blade is arranged, and on which at least one sieve element can be arranged as a component of the sieve device, wherein the sieve device at least partially encircles the disintegrating roller in the intended application.

Disintegrating devices of this kind are sufficiently known in the state of the art. The known disintegrating devices, however, have the disadvantage that the sieve elements, when used as intended, during disintegrating of material to be disintegrated loaded with solid material or rocks (oversized material) either block or deform or damage the disintegrating roller. The result is that downtime for disintegrating devices of this kind is rather high when mixed material like this has to be disintegrated.

From the citation DE 299 10 772 U1 a disintegrating device has been known comprising stationary, comb-like arranged teeth. This citation describes that the stationary teeth are formed by at least one plate, wherein the plate is supposed to be clamped hydraulically in the centered position to a carrier. A springy support that could prevent the teeth of the disintegrating device from damage or destruction cannot be seen in this citation.

Furthermore, in the citation DE 20 2012 004 469 U1 a disintegrating device with a swiveling sieve basket cassette is described. Also citation US 7,992,812 B2 is known from the state of the art. Here also exist the disadvantages as described in the beginning with reference to the state of the art.

Therefore, it is an object of the invention to suggest a disintegrating device that does not have anymore the before-described disadvantages.

The problem of the invention is solved by a disintegrating device with a comb system, wherein the disintegrating device consists of at least one disintegrating roller rotatably mounted in a machine frame with at least one disintegrating tool arranged thereon, wherein the disintegrating device has at least one counter blade interacting with the disintegrating tool, with at least one base comb on which the at least one counter blade is arranged, and on which at least one sieve element can be arranged as part of a sieve device, wherein the sieve device, when applied as intended, encircles at least partly the disintegrating roller, characterized in that the sieve element is spring-mounted on the base comb. The springy support allows that during

the disintegrating process the sieve elements are able to recede as they can move back because of the springy support when over-sized material enters. This reliably prevents the sieve elements from damage during the intended application. The particular shape of the sieve elements (also denoted limiter comb extension elements) follows the radius of the disintegrating roller so that over-sized material is lead around the disintegrating roller with a slight pre-pressing. Downtime is thus reduced because damage of the sieve elements is avoided, which leads, of course, to an increase of the use of the entire disintegrating device.

A development of the above-described disintegrating device according to the invention is characterized in that a suspension is provided as component of the mount at the base comb where the sieve element is mounted swiveling, preferably in two different directions, for example with horizontal and vertical orientation. In particular the swiveling mount in two different directions has the result that the sieve elements can dodge larger jamming elements not only in vertical direction, but also in horizontal direction. This further reduces the failure susceptibility of the device as the sieve elements can recede vertically as well as horizontally in order to dodge these interfering elements.

A particularly clever modification of the invention suggests that the suspension is a cardanic suspension for the sieve element. This cardanic suspension is particularly suited for the above-described dodging movements in two different directions. In addition a cardanic suspension is particularly little prone to failure, if at all.

The disintegrating device according to the invention is also characterized in that a spring system, consisting of at least one spring, is provided interacting with the suspension and forming the spring mount of the sieve element.

It has proved here to be an advantage when the spring system is provided spaced parallel to the suspension. This creates enough space in the device for arranging the spring.

Furthermore it is advantageous when a pressure spring is provided as spring, and/or the spring is arranged at least partly in a spring sleeve. Of course this reduces the free movement of the spring or the spring mount altogether.

It is another aspect of the disintegrating device according to the invention that at the base comb a preferably replaceable holding device is provided where the suspension, the spring system, and the sieve element are arranged interchangeably. Thus the entire holding device, if necessary even with installed sieve elements, can be dismounted from the base comb and mounted again. Thus entire assemblies can be supplied that may be replaced in an arranged single case. Also for repair reasons differently designed assemblies can be provided. Single suspensions or a single replacement of possibly damaged sieve elements is thus possible.

The disintegrating device according to the invention is characterized according to a development in that the spring system comprises an adjustment device by means of which the preload force of the spring and/or the angle of attack of the sieve element can be set.

Of course it is also provided according to the invention that at the disintegrating device a number of sieve elements is arranged at the holding device, and the sieve elements are provided such that they can be installed or dismantled along with the holding device as common assembly.

Furthermore, it is an advantage when the sieve element as comb extension element follows or is adjusted to the radius of the disintegrating roller.

An advantageous development of the invention suggests that that distance of the sieve element to the disintegrating roller can be set. For example, this allows determining the size for the material to be disintegrated, or to determine how large the material has to be that has to be disintegrated anew.

It has proved to be particularly advantageous when the disintegrating device according to the invention is configured such that a swiveling device is provided by means of which the base comb can be swiveled across an axle. Thus the space between the disintegrating tools and the counter blades can be altered, which is necessary for altering the size of the material to be disintegrated. At the same time, the base comb along with the counter blades and the sieve elements can be moved towards and away from the disintegrating roller. Besides the desired adjustment of distance, this feature of the device can also be used for cleaning the space between the rollers between the teeth if there is too much material adhering. This may happen, for example, when the material is very wet. Of course, this interferes with the disintegrating process altogether what can be eliminated with the above-described feature of the device.

A favorable development of the disintegrating device according to the invention is characterized in that the swiveling device is formed by at least one hydraulic cylinder arranged above a base comb axle and a housing axle in the disintegrating device. The attachment between the two axles and swiveling via the swiveling axle of the base comb leads to the intended option of changing the distance.

Furthermore it has turned out to be an advantage when the swiveling device comprises another hydraulic cylinder setting the distance to the disintegrating roller up to the stop. This avoids reliably that the base comb moves too close to the disintegrating roller.

According to the invention it has been found to be an advantage when a control is provided measuring the distance of the comb system to the disintegrating roller, sets it to a pre-determined distance, and keeps it to this distance, and, if necessary, readjusts it.

The invention also suggests designing the counter blade of the disintegrating device according to the invention preferably as replaceable comb tooth or alternate tooth.

It is another aspect of the invention that a toothed bar is provided where the counter blade is arranged individually or as assembly along with a multitude of counter blades.

It has proved here to be an advantage when between the toothed bar and the counter blade designed as comb tooth a wear plate is provided. If necessary, this can

be replaced when the wear is high. A premature replacement of the entire base comb is thus avoided.

A development of the disintegrating device according to the invention is characterized in that a preferably hydraulic locking system is provided for the counter blade.

Accordingly the invention suggests that the disintegrating device or the comb system comprises at least the base comb, the toothed bar with counter blades or alternate teeth, and the sieve device with the holding device and sieve elements as comb extension elements.

Preferably the sieve device of the disintegrating device according to the invention is designed like a basket. The individual sieve elements form the basket.

Furthermore, the invention suggests that the sieve device can be combined as system component with different disintegrating rollers having different diameters such that different disintegration tasks can be executed with one disintegrating device.

The disintegrating device according to the invention is furthermore characterized in that the position of the disintegrating roller and the sieve device in the device is orientated essentially horizontally, and/or the sieve device encumbers the disintegrating device in the bottom area in the direction of set up.

In the following the invention will be described by means of examples.

In the figures:

- |               |   |
|---------------|---|
| Figs. 1a – 1c | different views of details of the disintegrating device according to the invention,   |
| Fig. 2        | an enlarged representation of the area of the base comb with counter blades and sieve elements of the disintegrating device according to the invention, and |
| Figs. 3a – 3b | further details of the suspension of the comb elements.   |

In the following an embodiment of the disintegrating device according to the invention will be described by means of the figures. It is pointed out that the drawn representation is only an example for a disintegrating device according to the invention which has to be understood by no means as restricting. Identical features in the drawings will be provided with identical reference numbers so that all drawings will be described complexly.

Figures 1a to 3c show side views and three-dimensional presentations of the base comb II provided with sieve elements 41 of the disintegrating device according to the invention. In two of the figures the disintegrating roller 1 is shown with disintegrating tools 2 arranged thereon. The disintegrating roller 1 is arranged in a not shown frame as well as the base comb II with the elements arranged thereon that will be described later on. An arrow and reference number I schematically indicate the comb system

according to the invention. It consists of a base comb II on which the counter blades 3 and the sieve elements 41 of the sieve device 4 are arranged. The base comb II can be swiveled via an axle A. The swiveling movement is executed by a swiveling device 5 formed by a hydraulic cylinder 50 attached in the device via a base comb axle 51 and a housing axle 52. The housing axle is provided here in the not shown frame of the disintegrating device. The sieve elements 41 are attached to a suspension 7, which is part of the mount, to the base comb II. The springy support is reached by the spring system 6 arranged, as well as the suspension 7, at a preferably replaceable holding device 8. Suspension 7 and spring system 6 are provided parallel spaced from each other what has the result that by means of an adjustment device 62 the preload force of the spring 61 as well as the angle of attack  $\alpha$  of the sieve elements 41 can be changed. This is a big advantage as, for example, different material to be disintegrated can be reacted on accordingly, i. e. the angle and, if necessary, the preload force, can be set. Spring 61 is a pressure spring arranged at least partly in a spring sleeve 63. The suspension 7 of the sieve elements 41 is preferably a cardanic suspension. Of course, this is only one of several possible modifications for suspensions that is by no means limiting. The swiveling device 5 comprises another hydraulic cylinder 9, however, that acts in opposite direction of hydraulic cylinder 50. Hydraulic cylinder 9 sets the distance of the base comb II to the disintegrating roller 1 up to the stop. At the base comb II a toothed bar 31 is provided where the counter blades 3 are provided individually or as assembly with a multitude of counter blades 3. Between the toothed bar 31 and the counter blade 3 designed as comb tooth a wear plate 32 is provided that prevents the entire base comb II from being replaced when worn. Only the wear plate is replaced. The counter blades 3 are defined at the base comb by means of a locking device 10, designed preferably also hydraulic.

The invention has been described above by means of an example. However, the invention is not restricted to it. The claims filed now and to be filed later on along with the application are attempted formulations without prejudice for obtaining broader protection.

References in the sub-claims relate to the further design of the matter of the main claim through the characteristics of the respective sub-claim. These are however not to be understood as a waiver of independent subjective protection for the characteristics of the referred sub-claims.

Characteristics only disclosed in the description so far may now, in the course of proceedings, be claimed as being of inventive relevance, for example to distinguish from the state of the art.

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## Disintegrating Device With A Comb System

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### Claims

1. Disintegrating device with a comb system (I), wherein the disintegrating device consists of at least one disintegrating roller (1) mounted rotatably in a machine frame with at least one disintegrating tool (2) arranged thereon, wherein the disintegrating device has at least one counter blade (3) interacting with the disintegrating tool (2), with at least one base comb (II) on which the at least one counter blade (3) is arranged, and at which at least one sieve element (41) can be arranged as component of a sieve device (4), wherein the sieve device (4), when used as intended, encircles the disintegrating roller (1) at least partly, **characterized in that** the sieve element (41) is spring mounted at the base comb (II).
2. Disintegrating device according to claim 1, **characterized in that** a suspension (7) is provided as part of the mount at the base comb (II) where the sieve element (41) is mounted swiveling, preferably swiveling in two different directions, for example in horizontal and vertical orientation.
3. Disintegrating device according to one of the preceding claims, **characterized in that** the suspension (7) is designed as cardanic suspension for the sieve element (41).
4. Disintegrating device according to one of the preceding claims, **characterized in that** a spring system (6) is provided consisting of at least one spring (61) interacting with the suspension (7) and forming the spring support of the sieve element (41).
5. Disintegrating device according to one of the preceding claims, **characterized in that** the spring system (6) is provided parallel spaced to the suspension (7), and/or as spring (61) a pressure spring is provided, and/or the spring (61) is arranged at least partly in a spring sleeve (63).
6. Disintegrating device according to one of the preceding claims, **characterized in that** a preferably replaceable holding device (8) is provided at the base comb (II) where the suspension (7), the spring system (6), and the sieve element (41) are arranged replaceably, wherein the spring system (6)

- comprises in particular an adjustment device (62) by means of which the preload force of the spring (61) and/or the angle of attack ( $\alpha$ ) of the sieve element (41) can be set.
7. Disintegrating device according to one of the preceding claims, **characterized in that** a multitude of sieve elements (41) is arranged at the holding device (8), and the sieve elements (41) along with the holding device (8) are provided such that they can be mounted or dismounted as common assembly, wherein the sieve element (41) preferably as comb extension element follows or is adapted to the radius of the disintegrating roller (1).
  8. Disintegrating device according to one of the preceding claims, **characterized in that** the distance of the sieve element (41) to the disintegrating roller (1) can be set, in particular a swiveling device (5) is provided by means of which the base comb (II) can swivel via an axle (A).
  9. Disintegrating device according to one of the preceding claims, **characterized in that** the swiveling device (5) is formed by at least one hydraulic cylinder (50) arranged via a base comb axle (51) and a housing axle (52) in the disintegrating device, and/or the swiveling device (5) comprises another hydraulic cylinder (9) that sets the distance to the disintegrating roller (1) up to the stop.
  10. Disintegrating device according to one of the preceding claims, **characterized in that** a control is provided measuring the distance of the comb system (I) from the disintegrating roller (1), sets it to a predefined distance, keeps it at this distance, and readjust it, if necessary.
  11. Disintegrating device according to one of the preceding claims, **characterized in that** the counter blade (3) is designed preferably as replaceable comb tooth or alternate tooth, and/or a toothed bar (31) is provided where the counter blade (3) is provided individually or as assembly with a multitude of counter blades (3).
  12. Disintegrating device according to one of the preceding claims, **characterized in that** between the toothed bar (31) and the counter blade (3) designed as comb tooth a wear plate (32) is provided, and/or that a preferably hydraulic locking device (10) is provided for the counter blade (3).
  13. Disintegrating device according to one of the preceding claims, **characterized in that** the comb system (I) comprises at least the base comb (II), the toothed bar (31) along with counter blades (3) or alternate teeth, and the sieve device (4) with the holding device (8) and sieve elements (41) as comb extension elements.
  14. Disintegrating device according to one or more of the preceding claims, **characterized in that** the sieve device (4) is designed basket-like, and single sieve elements (41) form the basket, and/or the sieve device (4) as system component can be combined with different disintegrating rollers (1) having different diameters such that different disintegrating tasks can be performed with one disintegrating device.

15. Disintegrating device according to one or more of the preceding claims, **characterized in that** the position of the disintegrating roller (1) and the sieve device (4) is orientated essentially horizontally in the device, and/or the sieve device (4) encircles the disintegrating roller (1) in the bottom area in installation direction.

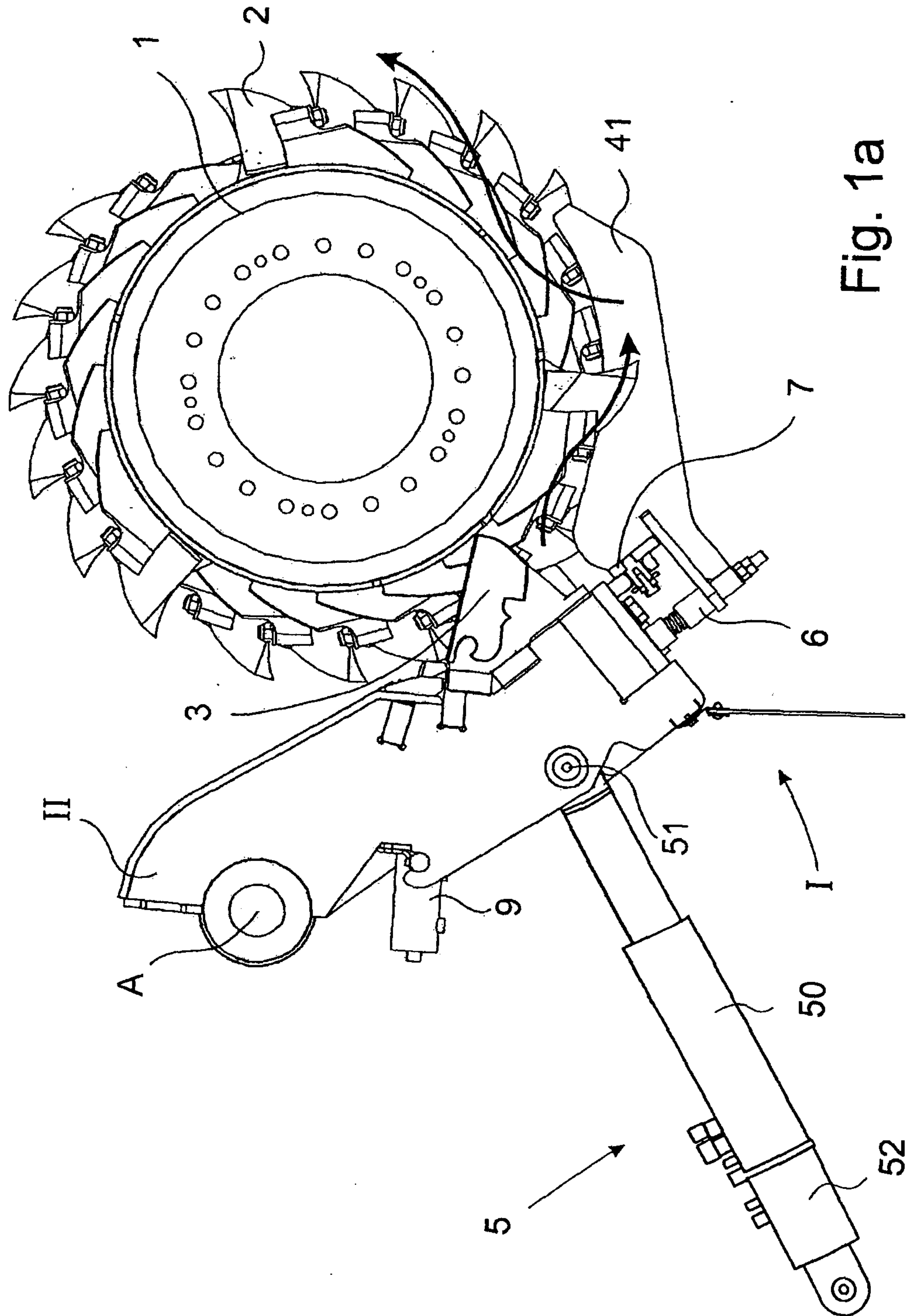


Fig. 1a

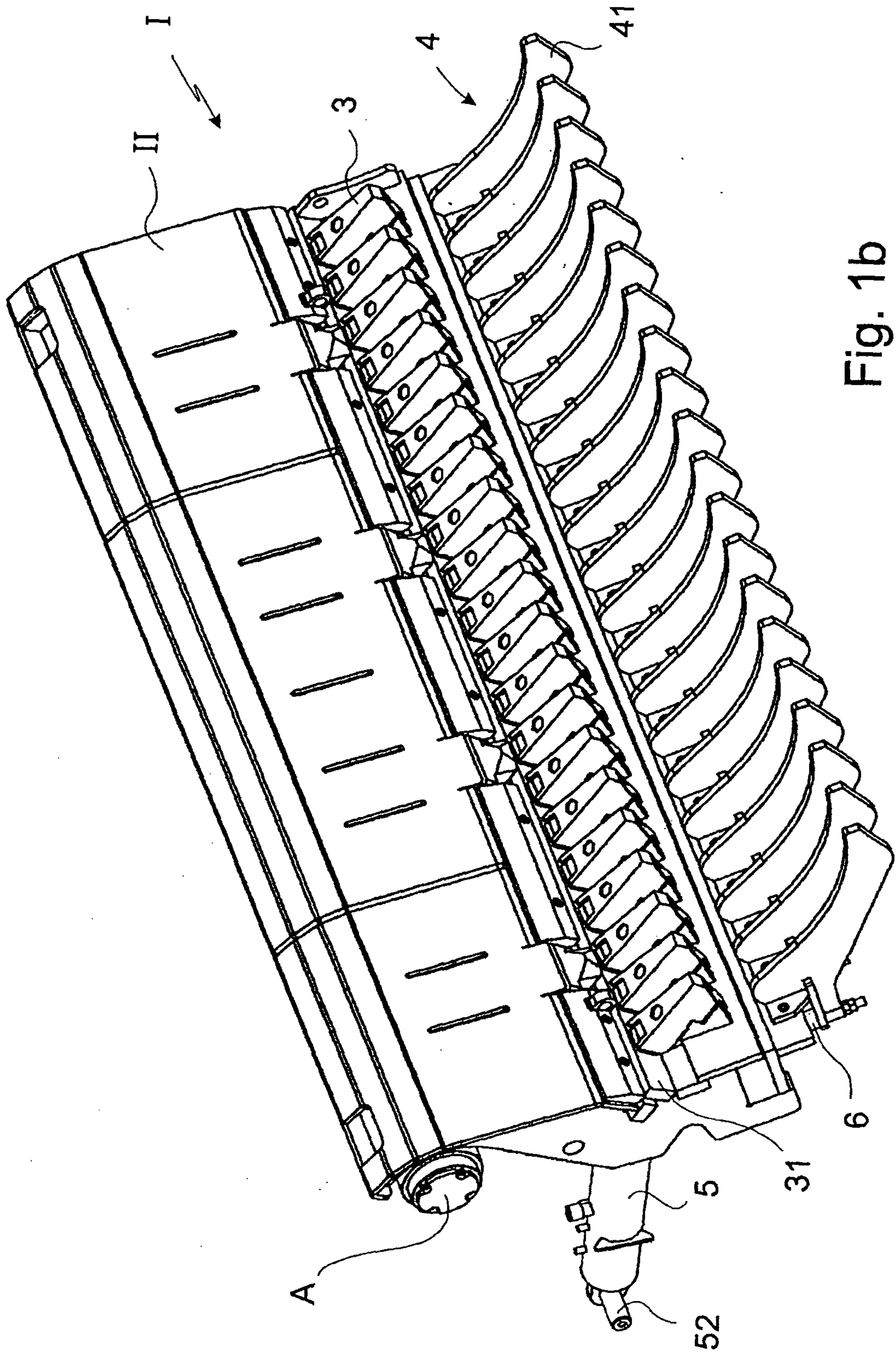


Fig. 1b

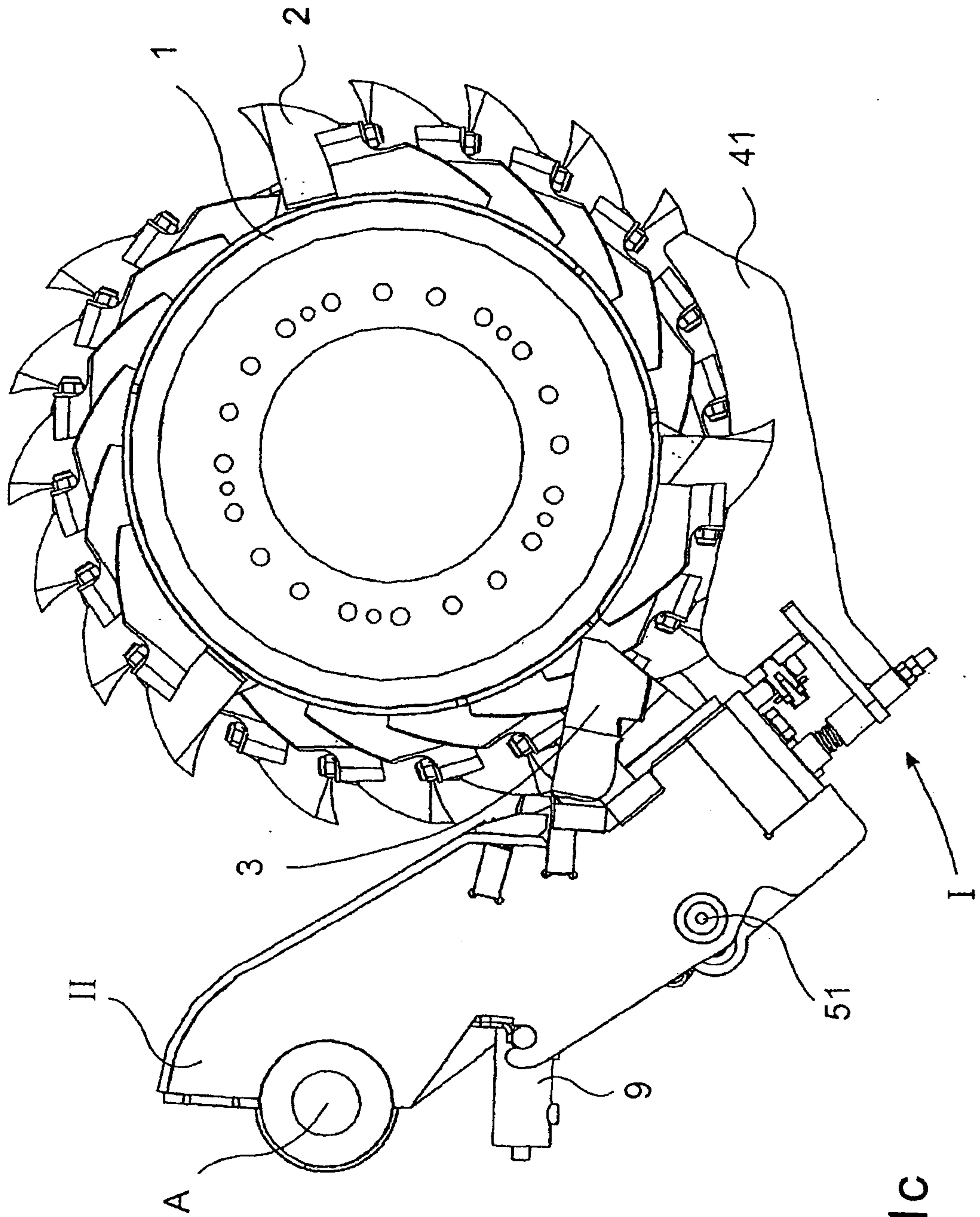
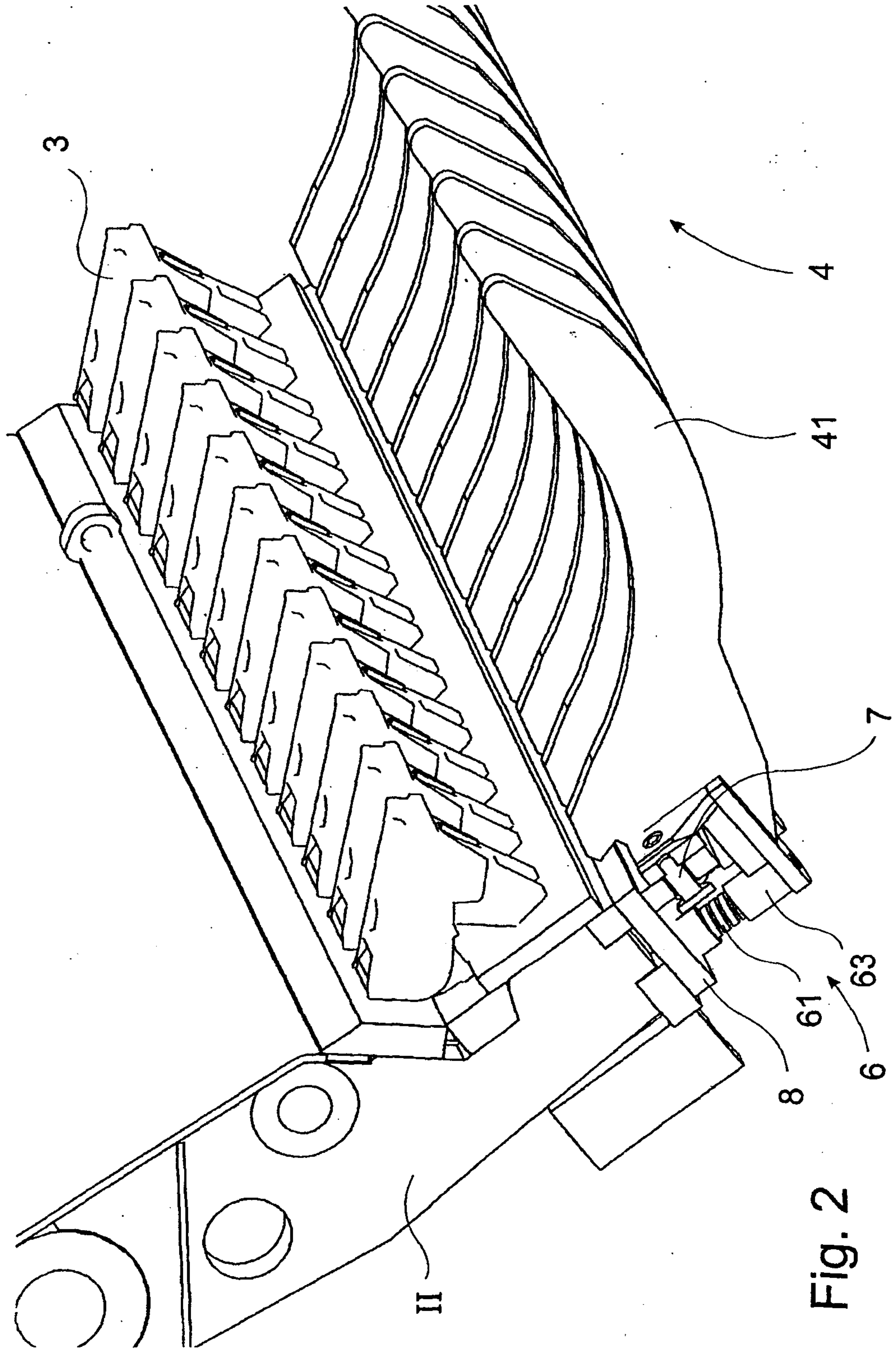


Fig. 1c

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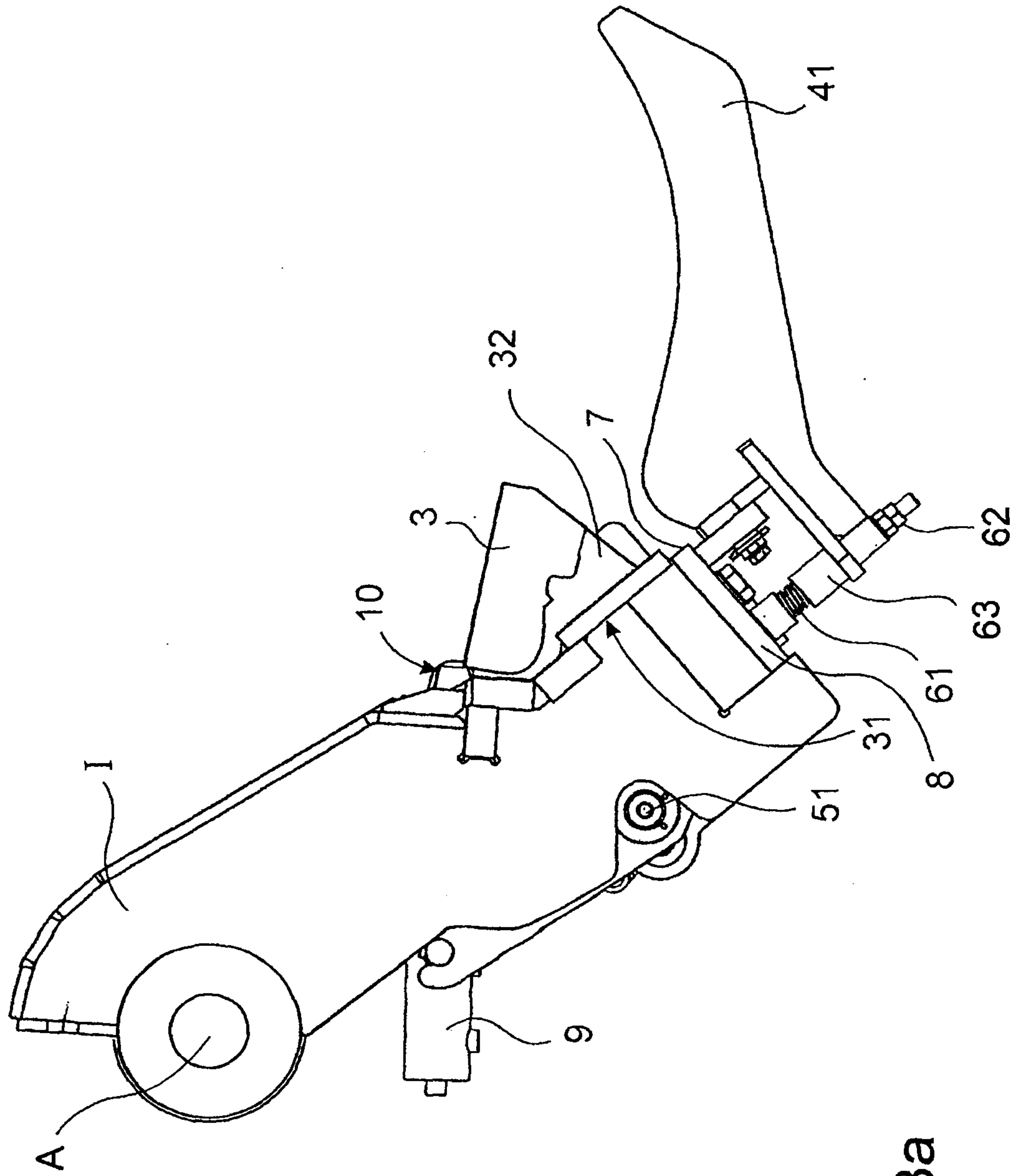


Fig. 3a

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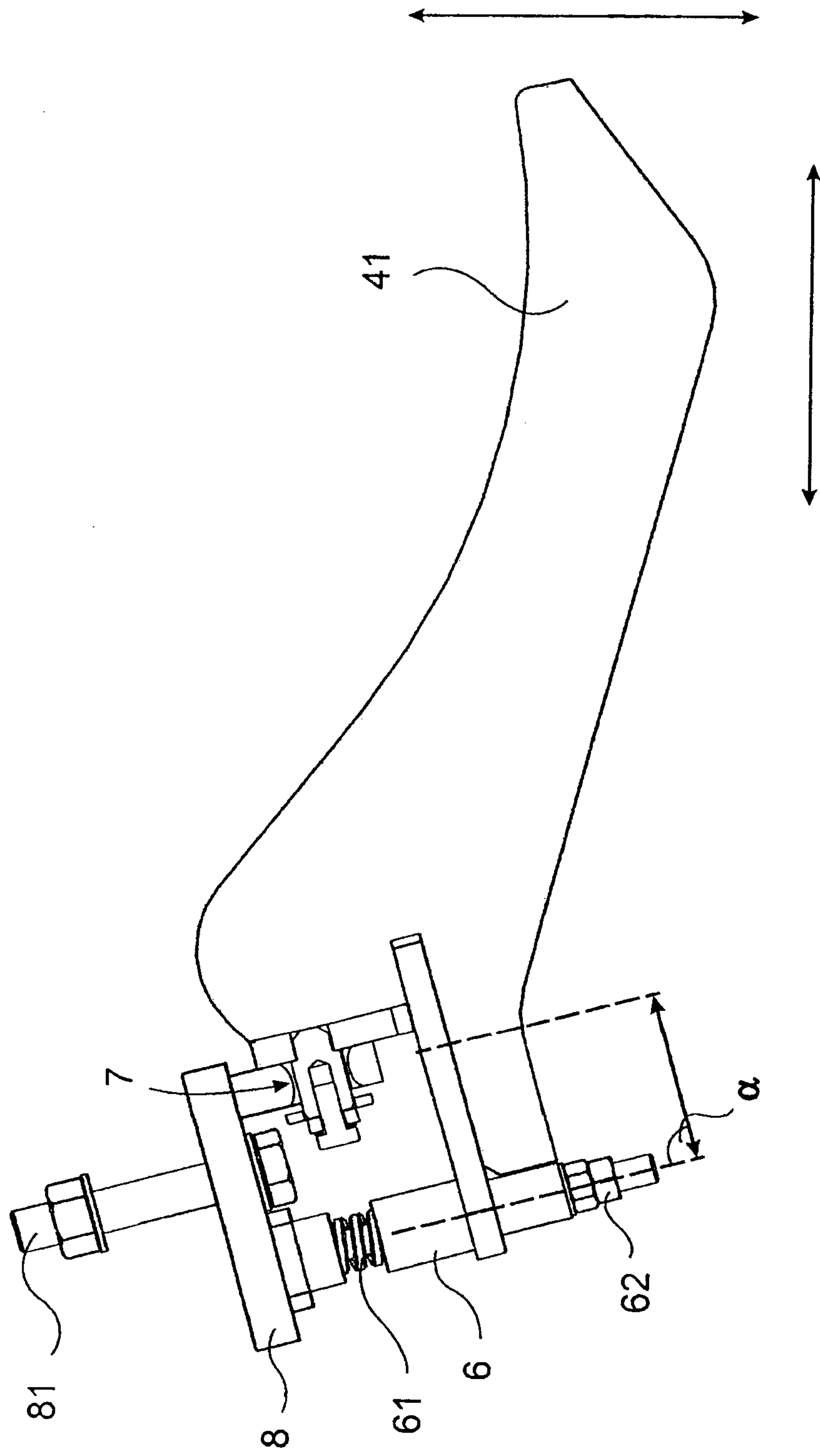


Fig. 3b

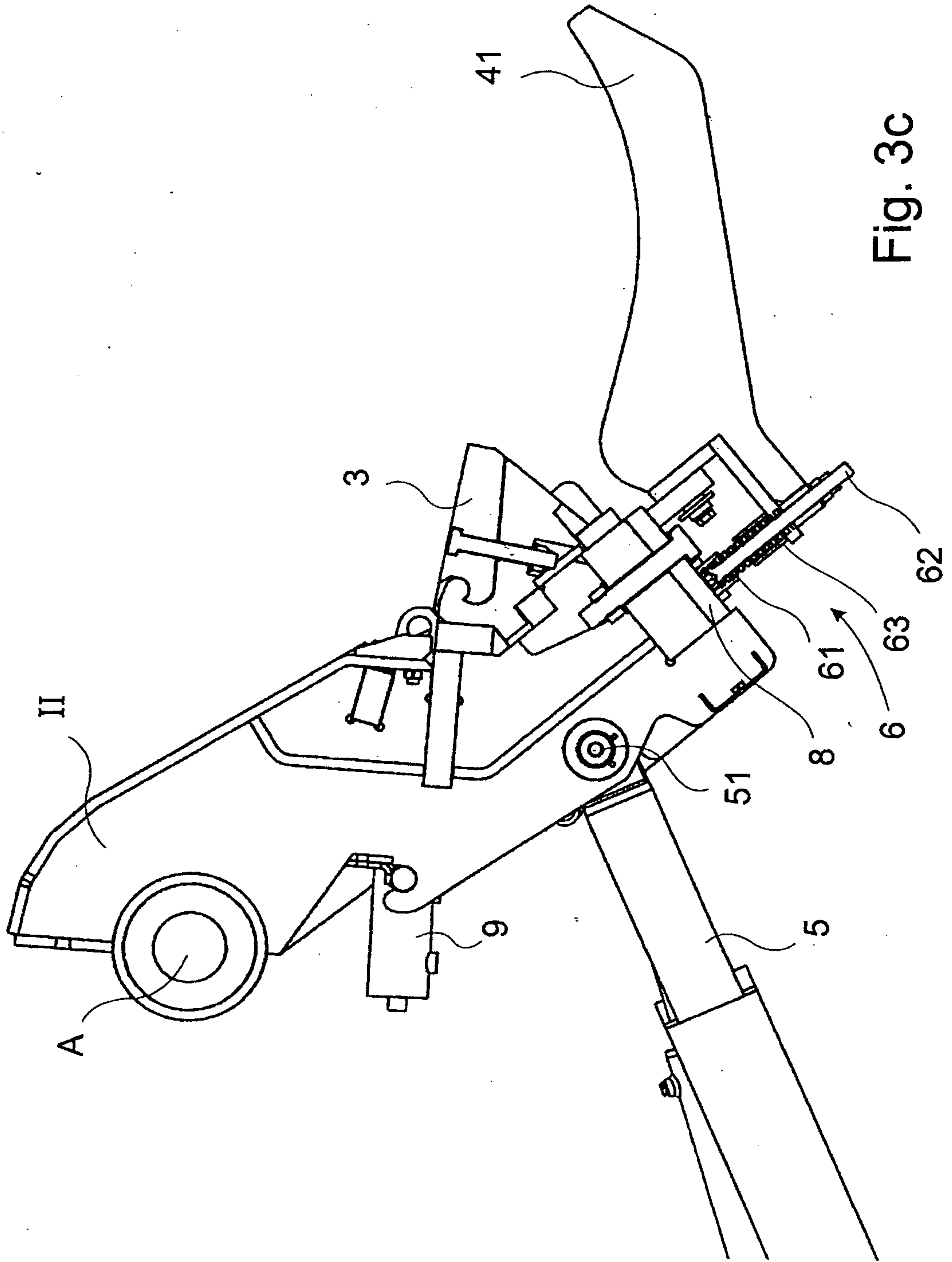


Fig. 3c

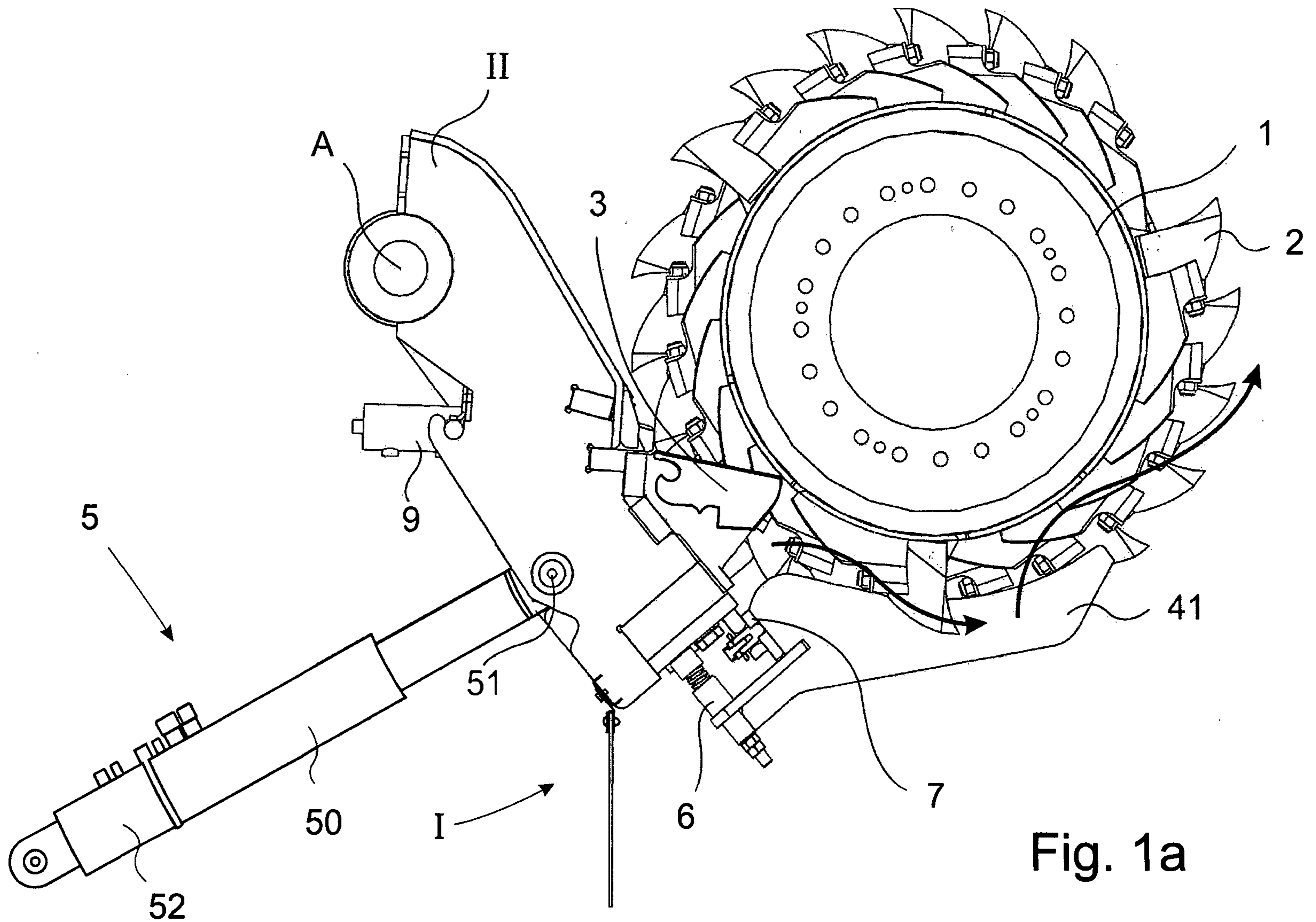


Fig. 1a