COMMONWEALTH of AUSTRALIA 608937
Patents Act 1952

APPLICATION FOR A STANDARD PATENT

I/We

Maschinenfabrik Rieter AG

of

CH-8406 Winterthur, Winterthur, Switzerland

hereby apply for the grant of a Standard Patent for an invention entitled:

Method of an apparatus for removal of fibre flocks from fibre bales

which is described in the accompanying complete specification.

Details of basic application(s):-

Number	Convention Country	Date
00 400/88-0	Switzerland	4 February 1988

The address for service is care of DAVIES & COLLISON, Patent Attorneys, of 1 Little Collins Street, Melbourne, in the State of Victoria, Commonwealth of Australia.

DATED this EIGHTEENTH day of JANUARY 1989

To: THE COMMISSIONER OF PATENTS

.....
a member of the firm of
DAVIES & COLLISON for
and on behalf of the
applicant(s)

Davies & Collison, Melbourne

APPLICATION ACCEPTED AND AMENDMENTS
ALLOWED 11/1/91

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

DECLARATION IN SUPPORT OF CONVENTION OR NON-CONVENTION APPLICATION FOR A PATENT

In support of the Application made for a patent for an invention

Insert title of invention.

entitled: "Method of an apparatus for removal of fibre flocks from fibre bales".

Insert full name(s) and address(es) of declarant(s) being the applicant(s) or person(s) authorized to sign on behalf of an applicant company.

We ~~I~~ and ~~We~~ Victor Walker, Waldstr. 14, CH-8400 Schaffhausen
Robert Wehrli, Im Lindengarten 1, CH-9242 Oberuzwil
Switzerland.

do solemnly and sincerely declare as follows :-

Cross out whichever of paragraphs 1(a) or 1(b) does not apply

1(a) relates to application made by individual(s)
1(b) relates to application made by company; insert name of applicant company.

1. (a) ~~I am the applicant for the patent~~ ~~We are~~
or (b) ~~I am~~ ~~We are~~ authorized by MASCHINENFABRIK RIETER AG, CH-8406 Winterthur/Switzerland

the applicant..... for the patent to make this declaration on ~~its~~ behalf.

Cross out whichever of paragraphs 2(a) or 2(b) does not apply

2(a) relates to application made by inventor(s)
2(b) relates to application made by company(s) or person(s) who are not inventor(s); insert full name(s) and address(es) of inventors.

2. (a) ~~I am the actual inventor of the invention~~ ~~We are~~
or (b) DANIEL HANSELMANN, Kernstr. 17, 8406 Winterthur/CH
WALTER SCHLEPFER, Stationsstr. 3, 8406 Winterthur/CH
Both of Switzerland.

~~is~~ are the actual inventor...is.... of the invention and the facts upon which the applicant.....
~~is~~ are entitled to make the application are as follows :-

State manner in which applicant(s) derive title from inventor(s)

by virtue of the employment contract of: 01.09.1964 and 07.07.1969 whereby the applicant would, if a patent were granted on an application made by the said actual inventors, be entitled to have the patent assigned to it.

Cross out paragraphs 3 and 4 for non-convention applications. For convention applications, insert basic country(s) followed by date(s) and basic applicant(s).

3. The basic application..... as defined by Section 141 of the Act ~~was~~ were made
in SWITZERLAND ..... on the 04.02.1988.....
by MASCHINENFABRIK RIETER AG.....
in ..... on the .....
by.....
in ..... on the .....
by.....

4. The basic application..... referred to in paragraph 3 of this Declaration ~~was~~ were the first application..... made in a Convention country in respect of the invention the subject of the application.

Insert place and date of signature.

Declared at Winterthur 9th this December day of 1988

Signature of declarant(s) (no attestation required)

Note: Initial all alterations.

.....
Victor Walker Robert Wehrli

DAVIES & COLLISON, MELBOURNE and CANBERRA.

(12) PATENT ABRIDGMENT (11) Document No. AU-B-28627/89
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 608937

(54) Title
METHOD OF AN APPARATUS FOR REMOVAL OF FIBRE FLOCKS FROM FIBRE BALES

International Patent Classification(s)
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444/88	04.02.88	CH SWITZERLAND

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(57) Claim

1. A method of removing fibre flocks from fibre bales arranged in line, by a removal means travelling over the fibre bales and comprising at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, and which for removal of fibre flocks penetrate into the fibre bales with a preset depth of penetration and are driven over the bales, characterised in that the depths of penetration of the rolls differ.

608937

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

COMPLETE SPECIFICATION

NAME & ADDRESS OF APPLICANT:

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COMPLETE SPECIFICATION FOR THE INVENTION ENTITLED:

Method of an apparatus for removal of fibre flocks from fibre bales

The following statement is a full description of this invention, including the best method of performing it known to me/us:-

The invention relates to a method of and apparatus for the removal of fibre flocks from fibre bales, e.g. cotton or man-made fibre bales and the like, disposed in line, by a removal means travelling over the fibre bales.

German patent specification DE-3334222 C2 discloses apparatus comprising a removal means for removing material from fibre bales comprising two rotating removal rolls, in which the removal means is reciprocated over the fibre bale surface for removal of the fibre flocks and, on each passage, penetrates into the fibre bales with a predetermined depth of penetration, to give the removal rolls the opportunity of detaching fibre flocks from the surface, said flocks then being passed to a pneumatic conveying shaft.

It is known from practice that the removal rolls rotate contra-directionally in such double-roll bale openers, the front removal roll as considered in the direction of travel, rotating "co-directionally" with the direction of travel in order to detach fibre flocks from the surface during this co-directional movement. The rear roll, as considered in the direction of travel, correspondingly rotates in the opposite direction and detaches fibre flocks from the same surface by the contra-directional removal system.

It is known, however, that the removal of fibre flocks in the said contra-direction has a poorer opening efficiency in terms of quantity than a roll rotating co-directionally.

Removal means are also known comprising an opener roll whose direction of rotation is reversible so that the opener roll is in each case rotatable co-directionally.

Although the said double-roll arrangement of the prior art gives the opportunity of detaching flocks in the reciprocating movement of the removal means without having to change the direction of rotation of the removal rolls, because the front roll as considered in the direction of travel is always rotating co-directionally, it is practically impossible to increase the flock removal output in comparison with the said single-roll removal means, owing to the poor quantitative efficiency of the contra-directional removal roll.

An improvement of the said flock removal output lies in the possibility of both removal rolls rotating co-directionally in each direction of travel, but this requires giving the rolls the opposite direction of rotation for the return movement or lifting the removal means from the surface so that fibre flocks can be detached only in one direction of travel. In the latter case, however, any increase in output is rather problematic, even with a rapid return travel, since, depending on the length of the bale rows, it is necessary to accept some period of time during which no fibre flocks are removed.

Another means of increasing output is, of course, to increase the roll length correspondingly, using removal means comprising a single roll or two rolls.

A disadvantage of a step of this kind, however, is the wide projection of the removal means on the mobile stand accommodating the same, so that the entire system is subject to a higher mechanical loading.

It is therefore an object of the invention to increase the removal output irrespective of removal roll length.

According to one aspect of the invention there is provided an apparatus for removing fibre flocks from fibre bales arranged in line, comprising a removal means having at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, the removal means being lowerable by a predetermined amount on each fibre-removing passage, in order to obtain a corresponding predetermined depth of penetration of the removal rolls into the bale surface, characterised in that the rolls are arranged so as to be adjustable in respect of their position in such manner that the depths of penetration of the rolls with respect to the surface for removal differ.

According to a further aspect of the invention there is provided an apparatus for removing the flocks from fibre bales arranged in line, comprising a removal means having at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, the removal means being lowerable by a predetermined amount on each fibre-removing passage, in order to obtain a corresponding predetermined depth of penetration of the removal rolls into the bale surface, and the removal means comprise toothed discs which, as considered in the direction of the rotational axis of the removal rolls, are strung together with gaps between the toothed discs and grid bars resting on the surface of the fibre bales during removal of the fibre flocks are provided in the gaps, characterised in that the grid bars are arranged for adjustment in such manner that the depths of penetration of the removal rolls differ.

The invention also provides a method of removing fibre flocks from fibre bales arranged in line, by a removal means travelling over the fibre bales and comprising at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the

direction of travel of the removal means, are disposed consecutively, and which for removal of fibre flocks penetrate into the fibre bales with a preset depth of penetration and are driven over the bales, characterised in that the depths of penetration of the rolls differ.

Advantages of the invention are, on the one hand, that the different depths of penetration of the rolls enable the two rolls to utilize the full removal depth so that in a twin-roll arrangement there is an effective doubling of the removal capacity or, on the other hand, smaller flocks can be removed with a removal capacity equivalent to one roll, since the flock size is, of course, increased with increasing depth of penetration per passage, something which is not always desirable. In other words, for the same depth of penetration, double or multiple output can be obtained with a double or multiple roll arrangement as compared with a single-roll arrangement or alternatively, for a given output, the flock size can be reduced by reducing the depth of penetration.

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Fig. 1 is a semi-diagrammatic elevation of a removal apparatus according to an embodiment of the invention;

Fig. 2 shows the apparatus of Fig. 1 in the opposite direction of travel to that shown in Fig. 1;

Fig. 3 is a likewise diagrammatic elevation of a removal apparatus having removal means according to another embodiment of the invention:

Fig. 4 shows the apparatus of Fig. 3 in the opposite direction of travel to that shown in Fig. 1;

Fig. 5 is a semi-diagrammatic elevation of removal means according to a further embodiment of the invention;

Fig. 6 is a semi-diagrammatic more detailed and enlarged view of the removal means of the removal apparatus shown in Figs. 3 and 4;

Fig. 7 shows the removal apparatus of Figs. 3 and 4 looking in the direction M (Fig. 3) with additional details; and

Figs. 8 to 11 are diagrams showing the performance of the method according to various embodiments of the invention.

An apparatus 1 for removing fibre flocks comprises a stand 2 which travels by means of wheels 3 on rails (not shown) along a row of bales 4 in the direction A in Fig. 1 and in the direction B in Fig. 2. A removal means 5 is disposed on the stand 2 to move up and down on guide rails (not shown) as shown by the arrows C and D.

The removal means 5 comprises two rotating removal rolls 6a and 6b known, for example, from European patent application 0058781. From this patent application it is known that these removal rolls comprise toothed discs strung together with gaps between the discs, and grid bars 7 are provided in the gaps and are either movable as shown in Fig. 5 or stationary as shown in Fig. 6. The fixing of the grid bars will be explained hereinafter.

The removal rolls 6a and 6b are each mounted in a roll carrier 8,9 respectively so as to be rotatable and drivable.

The said roll carriers 8 and 9 respectively are in turn guided for movement up and down in the direction of the arrows C and D in the

removal means 5 by means of guide rails (not shown), the movement being performed by a servomotor drive 10 (Fig. 2). A drive of this kind comprises a geared motor 12 fixed on the removal means by a bracket 11 (Fig. 1) and having a rotational pulse transmitter 13. The output shaft of the geared motor is also a spindle 14 guided in a spindle bush 15. The latter is in turn fixed on the roll carriers 8, 9 respectively. The latter also each comprise a guide plate 16 and 17 (Fig. 2), the guide plates each leading into an outlet duct 18 at the top, looking at the drawings. Suction ducts 19, 20 respectively engage in the outlet ducts with minimum clearance between the respective suction duct and outlet duct 18, in order to generate the negative pressure required in the surroundings of the removal rolls for suction extraction of the fibre flock conveying air. The outlet ducts 18 and the suction ducts 19 and 20 respectively extend at least over the complete length of the removal rolls 6a, 6b respectively, i.e. they cover these removal rolls.

The suction ducts 19 and 20 are connected to a suction pipe 21 which is in turn connected to a negative pressure source (not shown) to produce the said fibre flock conveying air stream. The suction pipe is conical in such manner that its diameter increases towards the negative pressure producer in order to maintain a substantially uniformly extracted quantity of air over the entire length corresponding to the removal rolls. The negative pressure source is known per se from practice and is therefore not explained in detail.

In a variant which is not shown, the removal means 5 could be modified by only the roll carriers 8 and 9 being movable up and down and not the entire removal means. The outlet duct 18 and the suction ducts 19 and 20 respectively would accordingly have to be telescopic in construction and the spindle 14 would have to experience a corresponding lengthening. The removal means 5 as such would be disposed to be stationary in such a variant.

In the case of the latter variant, the grid bars 7 form part of the roll carriers 8, 9 respectively, the grid bars being fixable as shown in Fig. 5 or as shown in Fig. 6.

Figs. 3, 4, 6 and 7 show a variant according to the invention in which like elements have the same references as in Figs. 1 and 2. This variant comprises an apparatus 1.1 for the removal of fibre flocks comprising the stand 2, but with a removal means 30 in which the rotatable and drivable removal rolls 6a, 6b respectively are arranged to be stationary with respect to the removal means.

The removal means 30 is mounted to pivot as a unit by means of a hollow pivot shaft 31 rotating about an axis of rotation 39. The pivot shaft 31 is received in a pivot bearing 40 (Fig. 7) provided in a slide 40. The means of moving the slide 40 up and down are described in European patent application No. 193647.

Grid bars 32 are also secured in the manner shown in Fig. 5 or in the manner shown in Fig. 6.

The removal means 30 is pivoted about the rotational axis 39 by means of a servomotor drive 33 (Fig. 6). This comprises a geared motor 34 fixed pivotally on a sliding element 35 movable up and down with the removal means in the directions of movement C and D. Sliding element 35 is guided by a stationary guide tube 41. For the movements in the said directions the sliding element 35 is driven by a driver 42 fixed on the one hand on the sliding element 35 and on the other hand on the slide 40. The output shaft of the geared motor is also designed as a spindle 36 guided in a spindle bush 37. The latter is in turn pivotally secured on the removal means 30 by a pivot bearing 38.

To guide the air stream conveying the fibre flocks the removal means 30 also comprises an air guide shaft which, in accordance with

its functions, extends over at least the entire length of the removal rolls 6a, 6b respectively and is connected to a suction tube which to generate the said air stream is in turn connected to a negative pressure source (not shown).

As a variant of this, Fig. 5 shows another aspect of the embodiment shown in European patent application No. 0199041, which contains a description of the movement of the grid bars, so that in connection with Fig. 5 only the essential features are repeated, but with new identification. Like elements have the same references as in Fig. 6.

Adjustable grid bars movable relatively to the position of the removal rolls are known from European patent application 0199041, so that the variant shown in Fig. 5 will not be explained in every detail.

The grid bars 32.1 shown in Fig. 5 are secured to longitudinal members 50 which are in turn movable relatively to the removal rolls 6a, 6b respectively by means of a lifting mechanism pivotally secured thereto. The lifting mechanism comprises the geared stopping motors 51 shown in the said European patent application and the screw spindles 52.

The spindles 52 are guided in spindle bushes 53 which are pivotally connected to the longitudinal members 50. As will also be seen from European patent application 0199041, two lifting devices are provided per longitudinal member 50. The geared stopping motors are correspondingly provided with rotational pulse transmitters 54 by means of which the position of the removal grids 32.1 can be preset in a control system (not shown). Control systems of this kind are known per se.

It should also be noted that the removal means 30.1 of Fig. 5 can in the same way be provided with a pivot mechanism as shown in Fig. 6

and in the same way be pivotable about the rotational axis 39, without this being repeated in detail.

Figs. 7 to 10 show different operational variants which can be performed with the apparatus shown hereinbefore.

Fig. 8 shows the possible use of the removal means 30 (Fig. 6) and 30.1 (Fig. 5).

When the removal means 30 is used, the pivot angle $\alpha.1$ of the removal rolls 6a and 6b arising from the pivoting of this removal means has the same value as the pivot angle $\beta.1$ of the grid bars 32. In these conditions, the angle $\alpha.1$ is formed by an imaginary plane 56 abutting the periphery of the removal rolls 6a and 6b, while on the other hand the angle $\beta.1$ is formed by the plane 55 and an imaginary plane 57 containing the bottom surface of the grid bars penetrating the bale surface. The pivot angle $\alpha.1$ is usually so selected that the depth of penetration T.1 of the removal roll 6a is about half the depth of penetration T.2 of the removal roll 6b. The term depth of penetration denotes the extent to which the associated removal roll penetrates with respect to the bale surface in front of the removal means 30. This applies whether the stand moves in the direction A (Fig. 3) or in the direction B. Also, when the removal means 30 is in use the angle α is equal to the angle β.

Fig. 9 shows the same but for the direction of travel B. The remarks in connection with the angles $\alpha.1$ and $\beta.1$ therefore also apply to the angles $\alpha.2$ and $\beta.2$ respectively.

If, in a likewise possible variant, the suspension of the grid bars 32.1 in Fig. 5 is combined with a pivotable removal means, corresponding to the removal means 30 in Fig. 6, it is possible to choose different values for the angles $\alpha.1$, $\alpha.2$ respectively and $\beta.1$, $\beta.2$ respectively (Fig. 8).

The arrows G (Fig. 8) and H (Fig. 9) respectively showing the direction of rotation indicate that, in the case of Fig. 8, the removal rolls having the direction of rotation G and the direction of rotation H in Fig. 9 rotate "co-directionally" with the direction of travel A and B respectively. On the other hand, when the removal rolls 6a and 6b rotate in the directions K and L, the removal roll 6a in the case of Fig. 8 is co-directional and the removal roll 6b is contra-directional, whereas in the example shown in Fig. 9 the removal roll 6b rotates co-directionally and the removal roll 6a contra-directionally. Fig. 10 shows an example with the use of the removal means 30.1, i.e. without the pivoting mechanism, i.e. only with adjustability of the grid bars 32.1, so that the difference in respect of the depth of penetration T.3 between the removal roll 6a and the removal roll 6b is produced by adjustment of the grid bars 32.1 at the angle β.3 for the direction of travel A and the angle β.4 for the direction of travel B. In these conditions the directions of rotation G and H or K and L may be selected.

Fig. 11 shows the use of the removal means 5 according to Figs. 1 and 2, but only for the direction of travel A. The depths of penetration T.1 and T.2 are individually selectable and can be obtained alternately on the return travel B (not shown in Fig. 10) if flocks are removed in both directions of travel.

The arrow B shown in double broken lines and the row of bales 4 shown in broken lines indicate a variant which is possible with all the removal means, namely the removal means 5, 30, 30.1 respectively are lifted away from the bale surface on the return travel and always have the same inclination. In this way, fibre flocks are removed from the bales only in the direction A. This variant may be useful when it is intended always to remove the mixture inside the row of fibre bales from the same side. A fixed inclined position of the removal rolls can also be selected for a variant of this kind.

In addition, the principle of the invention as set forth in this application can be combined with the inventive principle shown in European patent application No. 0193647. The latter application shows that the feed depth of the removal means 5, 30, 30.1 respectively varies per passage with increasing fibre bale density, i.e. it is reduced firstly in order to make the output uniform and secondly to detach the fibre flocks from the fibre bales undamaged.

This means that the depths of penetration T.1, T.2 respectively can also be varied correspondingly with increasing fibre bale density. The apparatus required for this purpose is shown and described in the latter European patent application, so that for the sake of simplicity no further explanation is given in this application.

Finally, it will be understood that the principle of the invention and hence the embodiments illustrated can be performed with three and more removal rolls and that removal means without grid bars can be used.

THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:

1. A method of removing fibre flocks from fibre bales arranged in line, by a removal means travelling over the fibre bales and comprising at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, and which for removal of fibre flocks penetrate into the fibre bales with a preset depth of penetration and are driven over the bales, characterised in that the depths of penetration of the rolls differ.

2. A method according to claim 1, characterised in that the depth of penetration of the rear roll as considered in the direction of travel is greater than that of the front roll.

3. A method according to claims 1 or 2, characterised in that the different depths of penetration are adapted to the bale density.

4. A method according to claims 1, 2 or 3 characterised in that the removal of the fibre flocks is effected by toothed disc removal rolls, the toothed discs being strung together with gaps between the toothed discs and grid bars resting on the surface of the fibre bales are provided in the gaps.

5. A method according to any preceding claim characterised in that the depth of penetration is obtained by different delivery roll feeds.

6. A method according to claim 4, characterised in that the depth of penetration is obtained by means of the position of the grid bars.

7. A method according to claim 6, characterised in

that the depth of penetration is obtained by different delivery roll feeds and by the position of the grid bars.

8. A method according to any of claims 1 to 7, characterised in that the removal rolls have the same directions of rotation.

9. A method according to any of claims 1 to 7, characterised in that the removal rolls have opposite directions of rotation.

10. A method according to claim 8 or 9, characterised in that the first roll as considered in the direction of movement of the removal means rotates "co-directionally" with the direction of movement.

11. An apparatus for removing fibre flocks from fibre bales arranged in line, comprising a removal means having at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, the removal means being lowerable by a predetermined amount on each fibre-removing passage, in order to obtain a corresponding predetermined depth of penetration of the removal rolls into the bale surface, characterised in that the rolls are arranged so as to be adjustable in respect of their position in such manner that the depths of penetration of the rolls with respect to the surface for removal differ.

12. An apparatus according to claim 11, characterised in that the removal means is arranged pivotally and the adjustability of the position of the rolls is obtained by pivoting the removal means a predetermined amount and means are provided for pivoting the removal means.

13. An apparatus according to claim 11, characterised

in that the removal means is divided up into partial removal means per removal roll, said partial removal means being each individually movable up and/or down by a predetermined amount by a corresponding means and the positional adjustability is obtainable by means of the said adjustability of the partial removal means.

14. An apparatus according to claim 11, characterised in that the removal rolls also consist of toothed discs which are strung together with gaps as considered in the direction of the rotational axis of the removal rolls and grid bars resting on the surface of the fibre bales during removal of the fibre flocks are provided in the gaps.

15. An apparatus according to claim 14, characterised in that the grid bars are arranged to be adjustable as to position in the same way as the removal rolls.

16. An apparatus for removing the flocks from fibre bales arranged in line, comprising a removal means having at least two rotating removal rolls which, as considered in the axial direction of the rolls, are disposed side by side and, as considered in the direction of travel of the removal means, are disposed consecutively, the removal means being lowerable by a predetermined amount on each fibre-removing passage, in order to obtain a corresponding predetermined depth of penetration of the removal rolls into the bale surface, and the removal means comprise toothed discs which, as considered in the direction of the rotational axis of the removal rolls, are strung together with gaps between the toothed discs and grid bars resting on the surface of the fibre bales during removal of the fibre flocks are provided in the gaps, characterised in that the grid bars are arranged for adjustment in such manner that the depths of penetration of the removal rolls differ.

17. An apparatus according to any of claims 14, 15 and

16, characterised in that the grid bars are adjustable, on the one hand, in accordance with the positional adjustability of the rolls and, on the other hand, are additionally adjustable by their own means.

18. An apparatus according to any of claims 11 to 17, characterised in that the removal rolls are drivable co-directionally.

19. An apparatus according to any of claims 11 to 17, characterised in that the removal rolls are drivable contra-directionally.

20. An apparatus according to claim 18 or 19, characterised in that the first removal roll as considered in the direction of travel of the removal means, is drivable "co-directionally" with the direction of travel.

21. An apparatus according to any of claims 11 to 20, characterised in that the direction of rotation of the removal rolls is reversible.

22. An apparatus according to any of claims 11 to 21, characterised in that the removal means is liftable from the fibre bales for the return travel.

23. A method or an apparatus for removing fibre flocks from fibre bales substantially as hereinbefore described with reference to the drawings.

24. The steps, features, compositions and compounds disclosed herein or referred to or indicated in the specification and/or claims of this application, individually or collectively, and any and all combinations of any two or more of said steps or features.

DATED this EIGHTEENTH day of JANUARY 1989

Maschinenfabrik Rieter AG

by DAVIES & COLLISON
Patent Attorneys for the applicant(s)

Fig.1

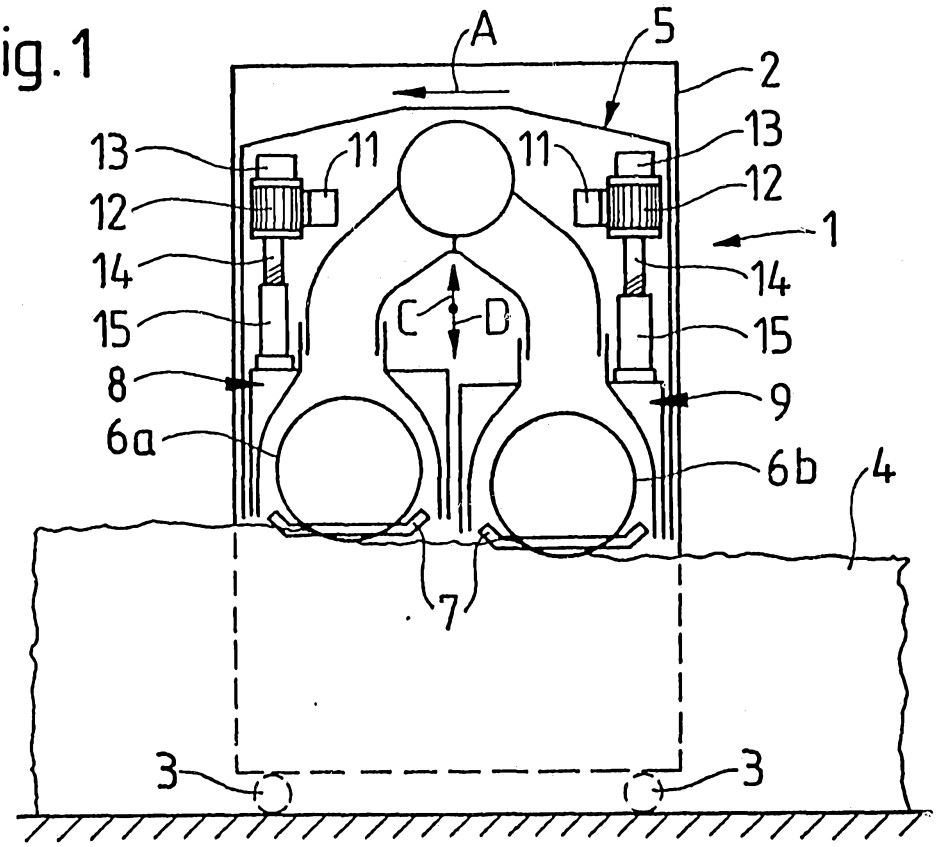
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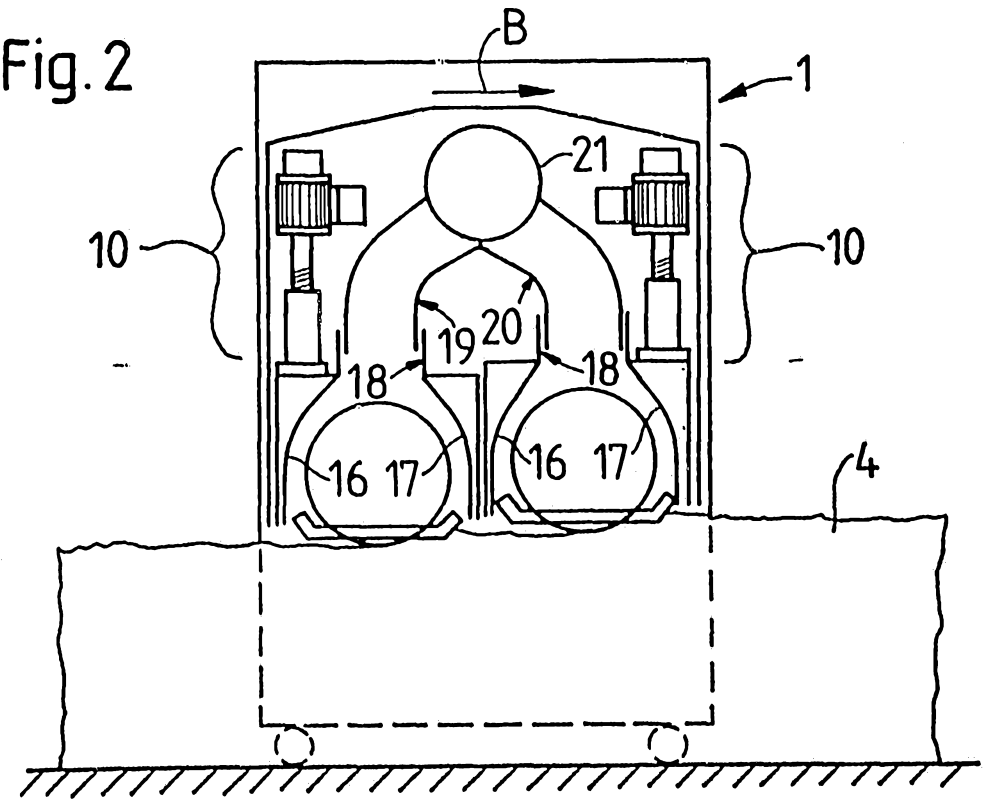
Fig.2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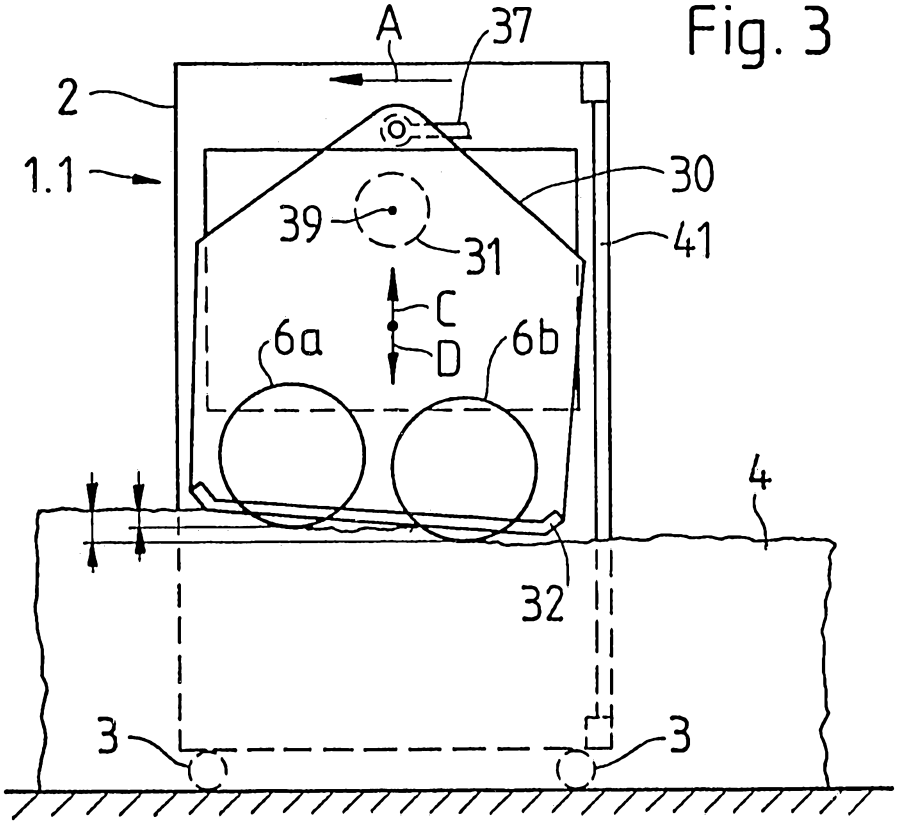

Fig. 3

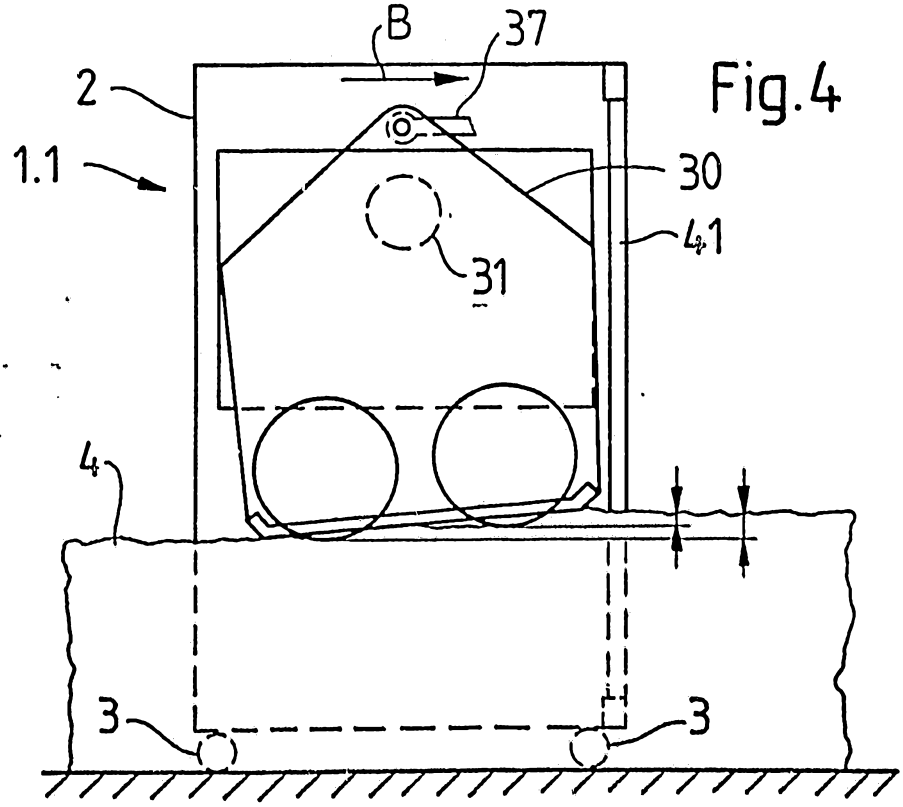

Fig. 4

Fig. 5

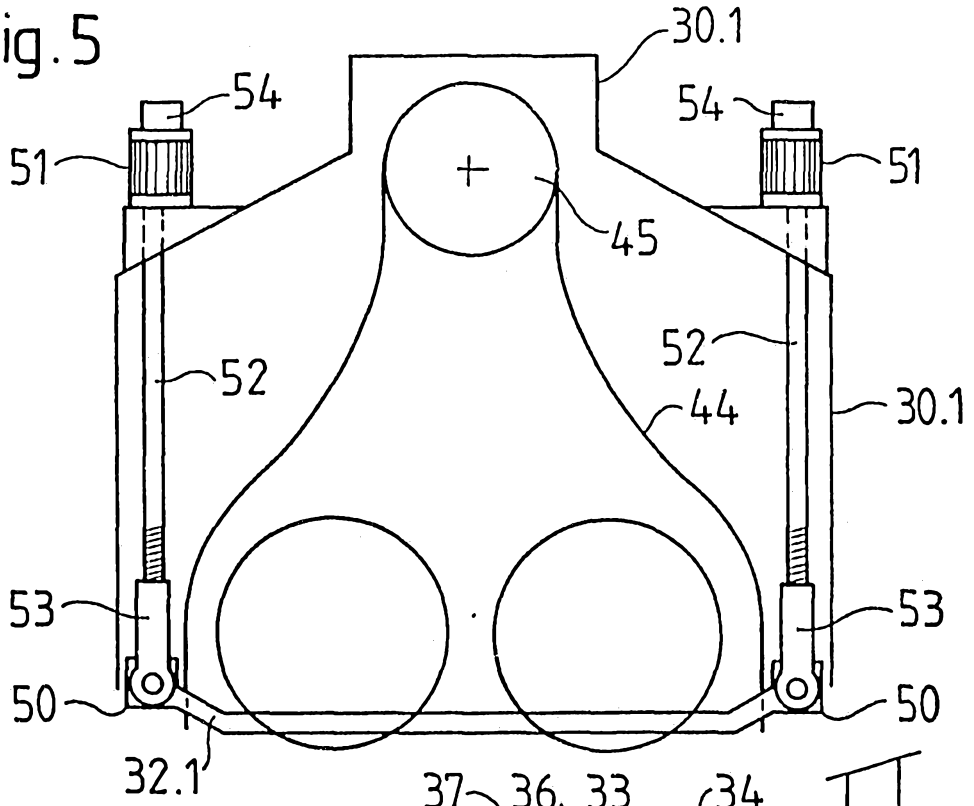
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Fig. 6

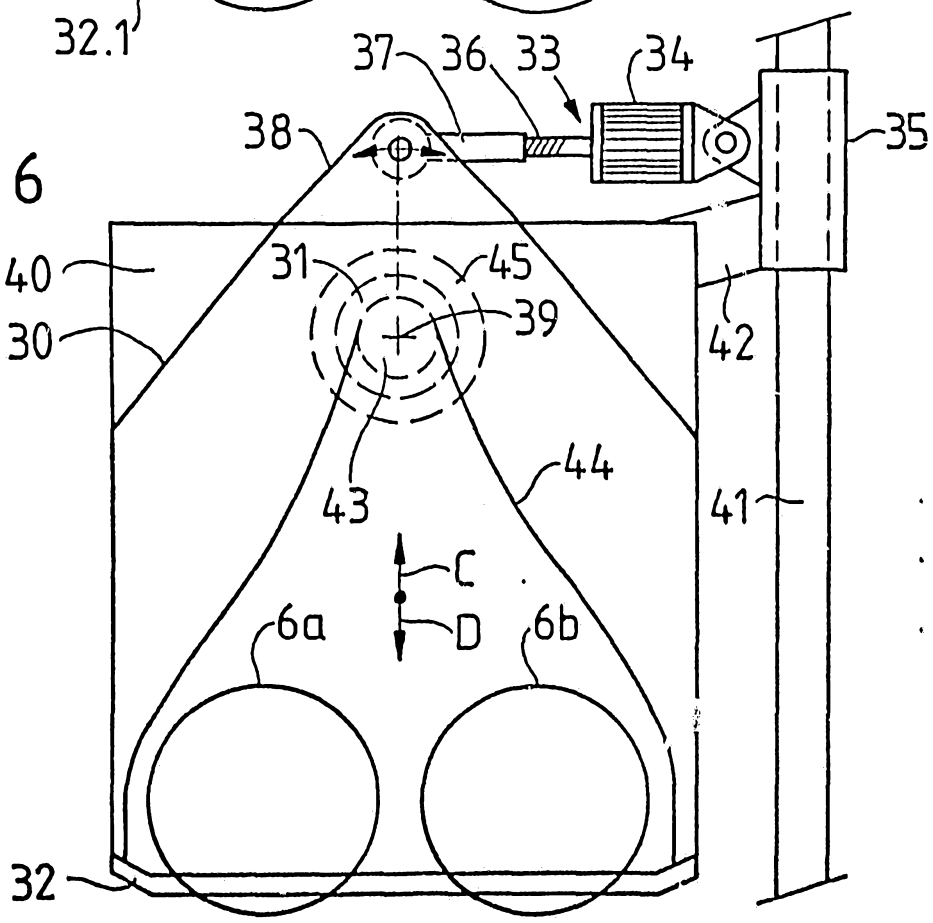
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Fig. 7

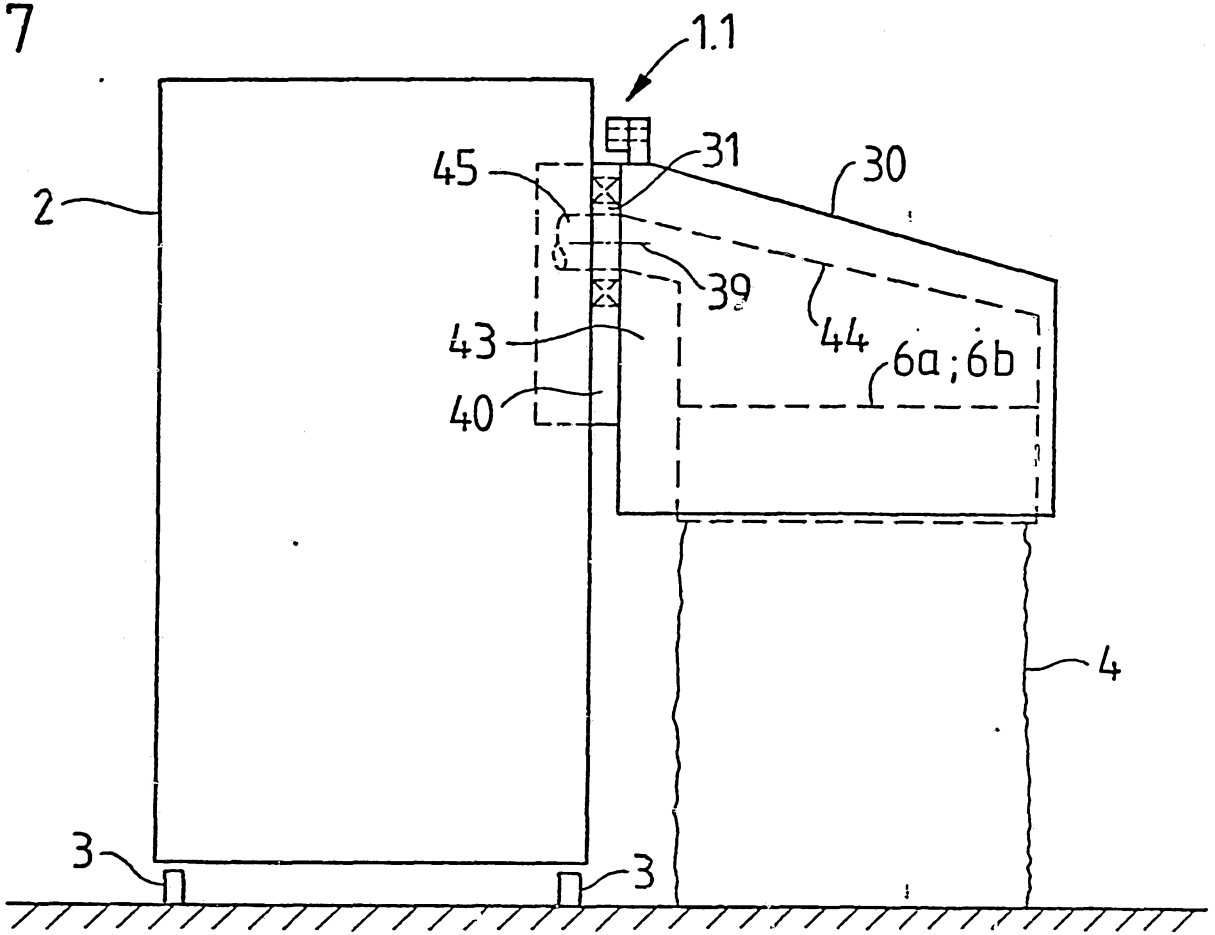

Fig. 8

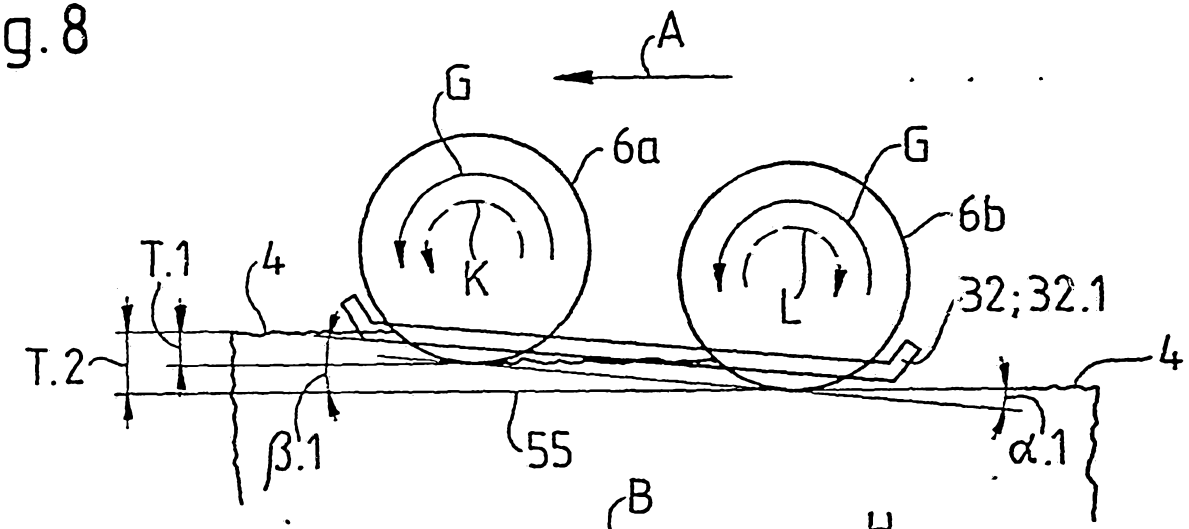

Fig. 9

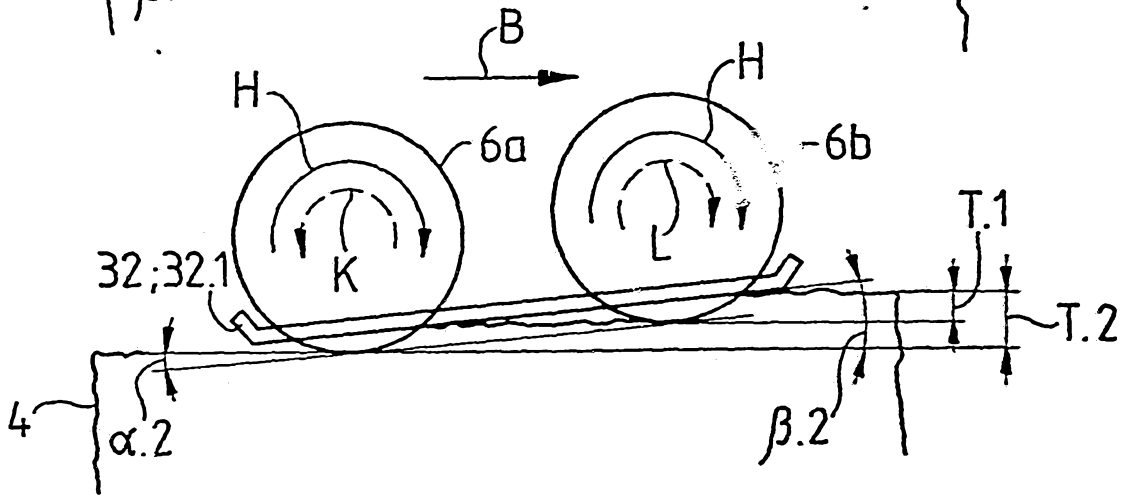

Fig. 10

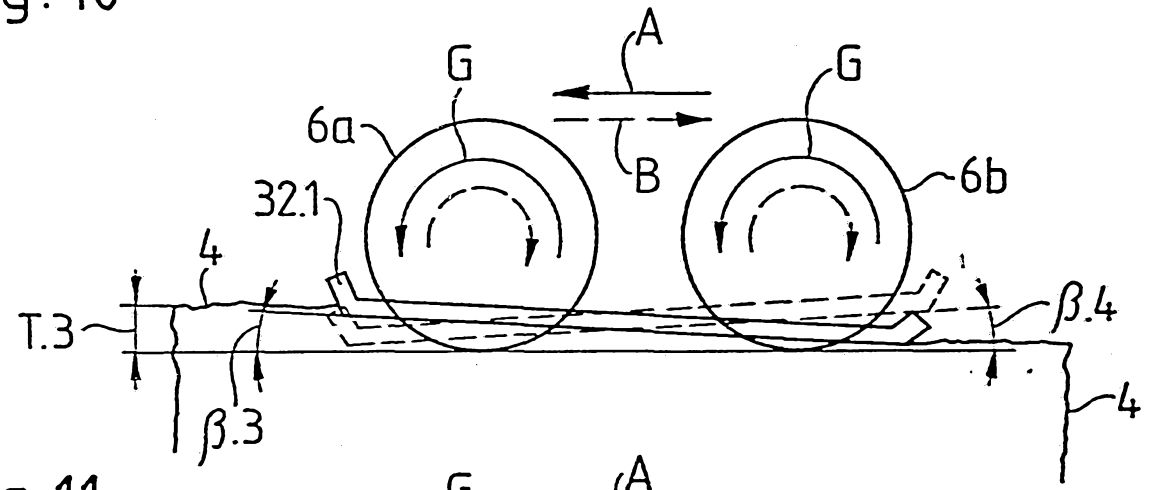

Fig. 11