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(54) **A method of supplying fibrous material to the feed mechanism of an opening and cleaning machine and a device for carrying out the method**

(57) The invention relates to a method of supplying fibrous material to the feed mechanism of an opening and cleaning machine. The fibrous material is supplied in a fibre layer consisting of at least one longitudinal formation unreeling from the circumference of the winding of said longitudinal formation.

The invention also relates to a device for supplying

fibrous material to the feed mechanism of the opening and cleaning machine. In front of the feed mechanism of the opening and cleaning machine there is situated a feeder (1) of the longitudinal formation connected with the feed mechanism of the opening and cleaning machine by means of a conveyor (2) of flat material. The feeder (1) of the longitudinal formation comprises two unreeling rollers (10) at least one of which is driven.

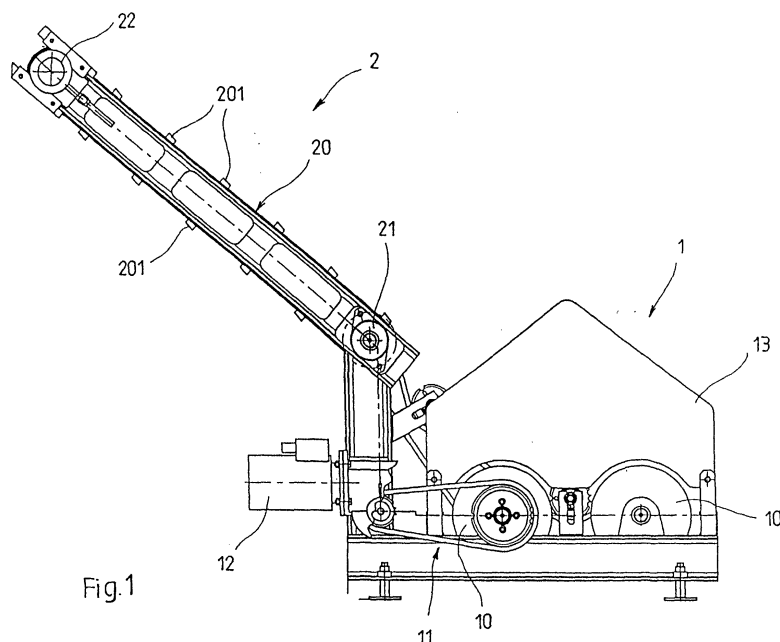


Fig.1

Description

Technical field

[0001] The invention relates to a method of supplying fibrous material to the feed mechanism of an opening and cleaning machine.

[0002] The invention relates also to a device for carrying out the method.

Background art

[0003] It is known to supply fibrous material to the feed mechanism of an opening and cleaning machine in the form of locks.

[0004] The drawback of this method consists in that it is difficult to obtain uniform supply of the fibrous material to the feed mechanism of the opening and cleaning machine since the locks are put on the supply device in a haphazard way. Another drawback of this arrangement consists in the practical impossibility of long-term production of highly homogeneous fibre mixtures by simultaneous processing of fibres of mutually different kinds or colours.

[0005] The invention aims at removing or at least minimizing the drawbacks of the state of art.

Principle of the invention

[0006] The goal of the invention has been achieved by the method of supplying fibrous material to the feed mechanism of an opening and cleaning machine whose principle consists in that the fibrous material is supplied in a fibre layer consisting of at least one longitudinal formation unreeling from the circumference of the winding of said longitudinal formation.

[0007] In this way, the supply of fibrous material to the feed mechanism of an opening and cleaning machine is simplified and rendered more uniform, because the preparation of the windings of longitudinal formations can be done by a well elaborated and accessible technique.

[0008] For reasons of production, it is advantageous if the longitudinal formation is made as a fibre sheet or as a sliver because the preparation of the fibre sheet or sliver is a largely used technique and both the fibre sheet and the sliver are constant in volume and their use ensures a stable fibre supply to the feed mechanism of the opening and cleaning machine.

[0009] The fibre layer consists preferably of at least two longitudinal formations supplied at the same speed.

[0010] The advantage of this arrangement consists in the possibility of supplying to the feed mechanism a fibre volume superior to that contained in a single longitudinal formation. Another advantage consists in the possibility of simultaneously supplying to the feed mechanism fibrous materials of mutually different kind and colour, the mutual relation between all components of the resulting

fibre mixture depending only on the specific weight of each longitudinal formation being unreeling.

[0011] In another preferred embodiment, the fibre layer consists of at least two longitudinal formations out of which at least one is supplied at a speed different from the supply speed of the other(s).

[0012] This embodiment, as well, is advantageous in that it permits to supply to the feed mechanism of the opening and cleaning machine a volume of fibrous material superior to that contained in a single longitudinal formation. Another advantage consists in the possibility of simultaneously supplying to the feed mechanism fibrous materials of mutually different kind and colour, the mutual relation between all components of the resulting fibre mixture depending both on the specific weight of each longitudinal formation being unreeling and on the mutual unreeling speeds of the longitudinal formations involved which permits better to adjust the composition of the resulting fibre mixture after the opening and cleaning machine.

[0013] Preferably, the supply speed of the longitudinal formation is adjustable which permits to extend the processing technique in relation to the quality, volume, weight, degree of impurities contained in, and length, of the fibres.

[0014] In one advantageous embodiment, at least one of the longitudinal formations is made of a material different from that of the other longitudinal formations, and the opening and cleaning machine creates a homogeneous fibre mixture out of them.

[0015] In another preferred embodiment, at least one of the longitudinal formations is different in colour from the other longitudinal formations, and the opening and cleaning machine creates a homogeneous multi-colour fibre mixture out of them.

[0016] Each of these two embodiments permits simply and efficiently to create homogeneous fibre mixtures.

[0017] The principle of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine consists in that it contains a feeder of the longitudinal formation situated in front of the feed mechanism of the opening and cleaning machine and connected with the feed mechanism of the opening and cleaning machine by means of a conveyor of flat material, the feeder of the longitudinal formation containing two unreeling rollers out of which at least one is driven.

[0018] This device is simply and fully functional.

[0019] Throughout its width, the feeder of the longitudinal formation is preferably fitted with at least one partition situated over the unreeling rollers transversely to the unreeling rollers.

[0020] The partition permits to separate from each other the adjacent windings of the longitudinal formations so as to avoid their mutual interaction such as mutual getting caught of one in the other during the unreeling of the longitudinal formations.

[0021] To permit a separate drive of each winding of

the longitudinal formation at mutually different speeds, the driven unreeling roller of the feeder of longitudinal formation is lengthwise separated into segments, each separately driven, and the space over each segment of the driven unreeling roller is separated by a partition from the neighbouring space over the neighbouring segment of the driven unreeling roller.

[0022] The conveyor of flat material is preferably made as a belt conveyor.

[0023] The belt conveyor is a simple, efficient, and reliable device.

[0024] To simplify the drive system of the device supplying fibrous material to the feed mechanism of the opening and cleaning machine, the driven unreeling roller is coupled with the drive, and the conveyor of flat material is in drive connection with the unreeling roller.

[0025] This arrangement is simple and efficient.

[0026] In another preferred embodiment, the driven unreeling roller is coupled with the drive, and the conveyor of flat material is coupled with a separate drive.

[0027] This arrangement permits separately to adjust the speed of each of the sections of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine.

[0028] To improve the transmission of the driving force on the winding of the longitudinal formation being unreeled, it is advantageous if the other one of the pair of the unreeling rollers is in drive connection with the driven unreeling roller.

[0029] To permit the regulation of the activity of the whole device intended to supply fibrous material to the feed mechanism of the opening and cleaning machine, in particular in relation to the parameters of the fibre layer supplied to the feed mechanism of the opening and cleaning machine, each of the drives of the device intended to supply fibrous material to the feed mechanism of the opening and cleaning machine is coupled with a control device.

Description of the drawings

[0030] The invention is schematically shown in the drawings in which Fig. 1 is a lateral view of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine, Fig. 2 is an axonometric view of the device shown in Fig. 1, Fig. 3 is a detailed axonometric view of the remote side of the device shown in Fig. 2, and Fig. 4 is a plan view of the device shown in Fig. 1

Examples of embodiment of the invention

[0031] The device for supplying fibrous material to the feed mechanism of the opening and cleaning machine ensures the supply to the opening and cleaning machine of fibrous material in the form of a fibre layer made as at least one longitudinal formation, for instance as a fibre sheet or a sliver.

[0032] The device for supplying fibrous material to the feed mechanism of the opening and cleaning machine comprises a feeder **1** of longitudinal formation which is by means of a conveyor **2** of flat material coupled with the feed mechanism of the opening and cleaning machine.

[0033] The method of supplying fibrous material to the feed mechanism of the opening and cleaning machine consists in that the longitudinal formation or, as the case may be, a number of fibrous materials differing from each other in material or in colour, is continuously unreeled from the winding(s) of the longitudinal formation (s). The fibre layer is in process of formation on the conveyor **2** of flat material or of the longitudinal formations. Thus, the fibre layer can consist of a number of independent longitudinal formations situated next to each other, each of which is situated in an independent winding. The opening and cleaning machine transforms the fibre layer supplied to the feed mechanism of the opening and cleaning machine into a homogeneous fibre mixture. If the fibre layer supplied to the feed mechanism of the opening and cleaning machine consists of at least two simultaneously supplied longitudinal formations out of which at least one is made of fibres of a different kind including a different colour, the opening and cleaning machine transforms the fibre layer a fibre mixture homogeneous in material and/or colour.

[0034] The feeder **1** of the longitudinal formation comprises a pair of parallel unreeling rollers **10** out of which at least one is in a suitable way coupled with a drive serving to drive the unreeling of the longitudinal formations from the windings seated on the unreeling rollers **10**, the longitudinal formations in the feeder **1** being unreeled by rolling on the two unreeling rollers **10**. In the example of embodiment shown in the figure, the coupling of the unreeling rollers **10** with the drive is carried out by means of a chain transmission **11** connecting the front unreeling roller **10**, considered in the direction from the conveyor **2** of the flat material, with an electric motor **12**.

[0035] If the fibre layer to be supplied to the feed mechanism of the opening and cleaning machine consists of a number of longitudinal formation windings situated next to each other on the unreeling rollers **10** it is advantageous to separate the windings from each other by partitions **13** so as to avoid undesired mutual interaction between them consisting in the catching of the fibres of one winding in the fibres of its neighbouring winding. The partitions **13** consist of flat formations oriented across the unreeling rollers **10** and separating from each other the unreeling sections of the windings as shown in Figs. 2 and 3. The partitions **13** are suitably mounted on the frame of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine. To permit each longitudinal formation winding to be unreeled at a speed independent from the unreeling speed of the other windings the unreeling rollers can be lengthwise divided into individual segments

with a width corresponding to the width of each winding to be unreeling and adapted to rotate at speeds different from each other. To ensure the unreeling of each winding with its respective desired speed, each segment of at least one unreeling roller 10 is coupled with a drive; for instance, each segment is fitted with a drive of its own, and each of the segments of the other unreeling roller 10 is freely rotatable for instance on a common shaft.

[0036] To permit the control of the drive of the unreeling rollers 10 and/or of their segments, the drive of the unreeling rollers 10 is coupled with a suitable control device.

[0037] Situated in front of the front one of the pair of the unreeling rollers 10 is the conveyor 2 of flat material on which the fibre layer made by the unreeling of the longitudinal formation from the winding situated in the feeder 1 of the longitudinal formation is transported to the feed mechanism of the opening and cleaning machine. In the shown example of embodiment, the conveyor 2 of flat material is made as a belt conveyor with an endless conveyor belt 20 engaged on a first and a second end shaft 21, 22 which are fitted with guide wheels 210, 220 on whose circumference the conveyor belt 20 rolls. The first end shaft 21 is coupled with a drive, the second end shaft 22 is freely rotatable. In the example of embodiment shown in Fig. 3, the first end shaft 21 is connected by means of a second chain transmission 23 with the driven unreeling roller 10 of the feeder 1 of the longitudinal formation. In this example of embodiment, the transmission is improved by a third chain transmission 14 connecting with each other the two unreeling rollers 10 of the feeder 1 of longitudinal formation so that both unreeling rollers 10 are driven. In a not shown example of embodiment, the drive of the conveyor 2 of flat material is separated from the drive of the unreeling rollers 10 and can be coupled with a suitable control device. The drive of the unreeling rollers 10 and of the conveyor 2 of flat material can consist of a common control device. For easier control of the whole equipment, the control device of the individual drives of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine can be coupled with the control device of the opening and cleaning machine.

[0038] On the outer side along its width, the conveyor belt 20 is fitted with transverse arms 201 which prevent the longitudinal formations being transported from sliding on the slanting plane of the conveyor belt 20 of the conveyor 2 of flat material and thus facilitate the feeding of longitudinal formations on the slanting plane of the conveyor belt 20 of the conveyor 2 of flat material even in case of steep slope conveyor belts 20.

[0039] A system of auxiliary belts 202 situated spaced apart along the width of the conveyor belt 20 of the conveyor 2 of flat material as shown in Fig. 4 protects the conveyor belt 20 from getting deflected.

[0040] The device operates as follows:

One or more than one winding of longitudinal formation, each resting on both unreeling rollers 10, is inserted into the feeder 1 of the longitudinal formation. The end of each winding is laid on the conveyor belt 20 of the conveyor 2 of flat material. The driven unreeling roller 10 of the feeder of longitudinal formation begins to rotate thus starting the reeling of the longitudinal formation on the pair of the unreeling rollers 10. At the same time, the conveyor belt 20 of the conveyor 2 of flat material begins to move and due to this each longitudinal formation being unreeling from the windings is continuously deposited on the conveyor belt 20 and transported by it to the feed mechanism of the opening and cleaning machine. If the individual longitudinal formations shall be unreeling from their windings at mutually different speeds, for instance for producing homogeneous fibre mixtures of predetermined parameters (such as the proportion of each fibre type in the whole of the fibre mixture), the above mentioned divided unreeling roller 10 whose each segment can be independently driven at a speed different from the speeds of the other segments of the unreeling roller 10 is applied. To permit the formation of fibre mixtures whose composition changes in time in accordance with the parameters required, the drive of the unreeling roller 10 is variable or changeable which increases the processing technology in relation to the quality, volume, degree of impurities contained in, and fibre length, of the fibrous material supplied. The speeds of the motion of the individual parts of the device for supplying fibrous material to the feed mechanism of the opening and cleaning machine, and in particular the mutual relations between said speeds, are either fixed beforehand or are variably controllable by means of the above mentioned control device.

Industrial utilizability

[0041] The invention can be used in the preparation of fibrous material for further processing and for the production of fibre mixtures having required parameters of fibres of various types and colours.

List of reference characters

[0042]

1	feeder of longitudinal formation
10	unreeling roller
11	chain transmission
12	electric motor
13	partition
14	third chain transmission
2	conveyor of flat material
20	conveyor belt
201	transverse arm of conveyor belt

- 202 auxiliary belt of conveyor belt
- 21 first end shaft
- 210 guide wheel on first end shaft
- 22 second end shaft
- 220 guide wheel on second end shaft
- 23 second chain transmission

Claims

1. A method of supplying fibrous material to the feed mechanism of an opening and cleaning machine, **characterized by** that the fibrous material is supplied in a fibre layer consisting of at least one longitudinal formation unreeling from the circumference of the winding of said longitudinal formation.
2. A method as claimed in Claim 1, **characterized by** that the longitudinal formation is made as a fibre sheet.
3. A method as claimed in Claim 1, **characterized by** that the longitudinal formation is made as a sliver.
4. A method as claimed in any of Claims 1 to 3, **characterized by** that the fibre layer consists of at least two longitudinal formations supplied at the same speed.
5. A method as claimed in any of Claims 1 to 3, **characterized by** that the fibre layer consists of at least two longitudinal formations out of which the supply speed of at least one of them is different from the supply speed of the other(s).
6. A method as claimed in any of Claims 4 and 5, **characterized by** that the supply speed of the longitudinal formation is changeable.
7. A method as claimed in any of Claims 4 to 6, **characterized by** that at least one of the longitudinal formations is made of material different from the material of the others and that the opening and cleaning machine produces a homogeneous fibre mixture.
8. A method as claimed in any of Claims 4 to 7, **characterized by** that at least one of the longitudinal formations is different in colour and that the opening and cleaning machine produces a homogeneous fibre mixture.
9. A device as claimed in Claims 1 to 8, **characterized by** that it contains a feeder (1) of the longitudinal formation situated in front of the feed mechanism of the opening and cleaning machine and connected with the feed mechanism of the opening and cleaning machine by means of a conveyor (2) of flat ma-

terial, the feeder (1) of the longitudinal formation containing two unreeling rollers (10) out of which at least one is driven.

- 5 10. A device as claimed in Claim 9, **characterized by** that the feeder (1) of the longitudinal formation is throughout its width fitted with at least one partition (13) situated over the unreeling rollers (10) transversely to the unreeling rollers (10).
- 10 11. A device as claimed in any of Claims 9 and 10, **characterized by** that the driven unreeling roller (10) of the feeder (1) of longitudinal formation is lengthwise divided into segments, each separately driven, and that the space over each segment of the driven unreeling roller (10) is separated by a partition (13) from the neighbouring space over the neighbouring segment of the driven unreeling roller (10).
- 15 12. A device as claimed in any of Claims 9 to 11, **characterized by** that the conveyor (2) of flat material is preferably made as a belt conveyor.
- 20 13. A device as claimed in any of Claims 9 to 12, **characterized by** that the driven unreeling roller (10) is coupled with the drive, and that the conveyor (2) of flat material is in drive connection with the driven unreeling roller (10).
- 25 14. A device as claimed in any of Claims 9 to 12, **characterized by** that the driven unreeling roller (10) is coupled with the drive and that the conveyor (2) of flat material is coupled with a separate drive.
- 30 15. A device as claimed in any of Claims 13 and 14, **characterized by** that the other one of the pair of the unreeling rollers (10) is in drive connection with the driven unreeling roller (10).
- 35 16. A device as claimed in any of Claims 13 and 14, **characterized by** that each of the drives of the device intended to supply fibrous material to the feed mechanism of the opening and cleaning machine is coupled with a control device.
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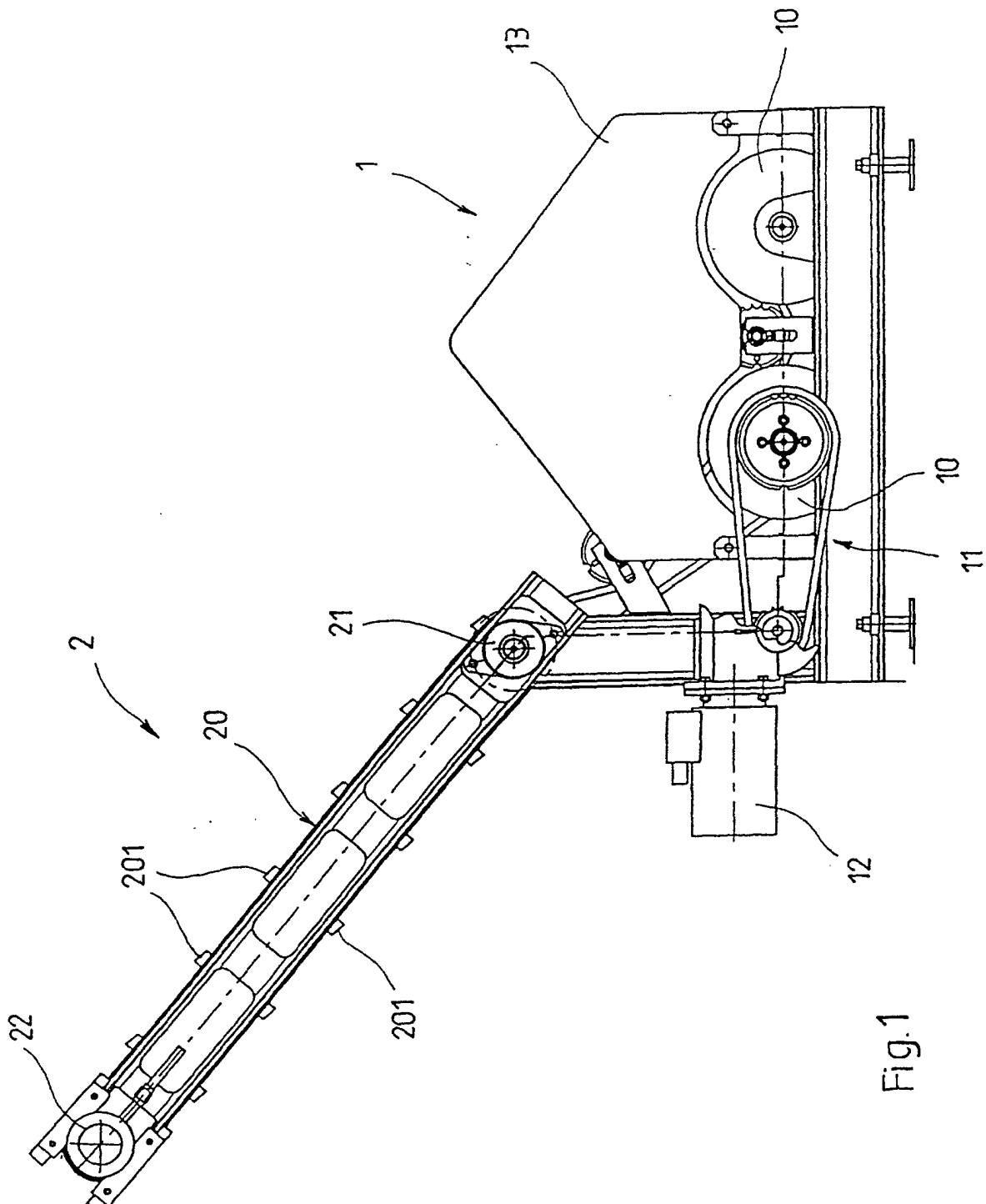


Fig.1

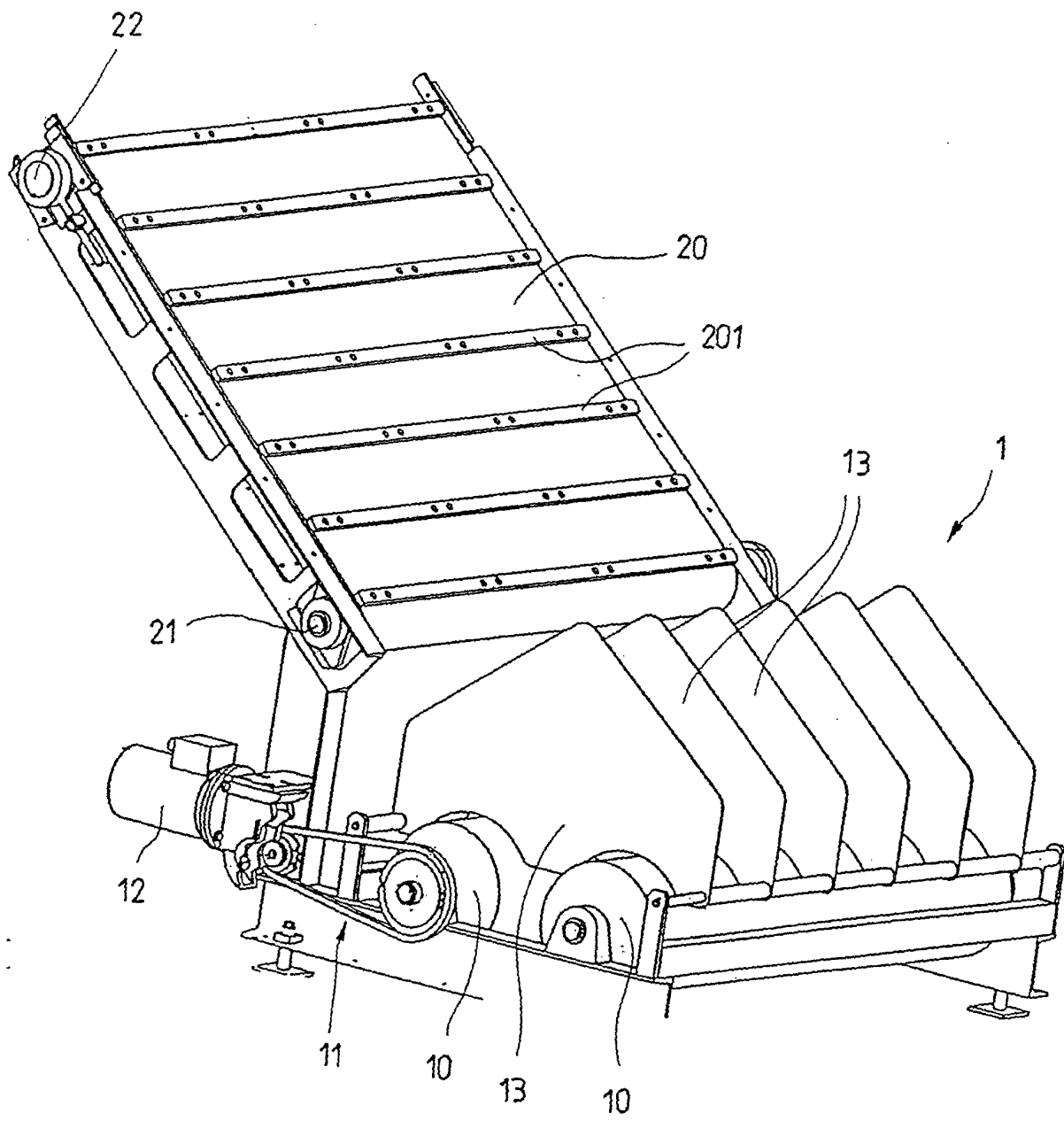


Fig. 2

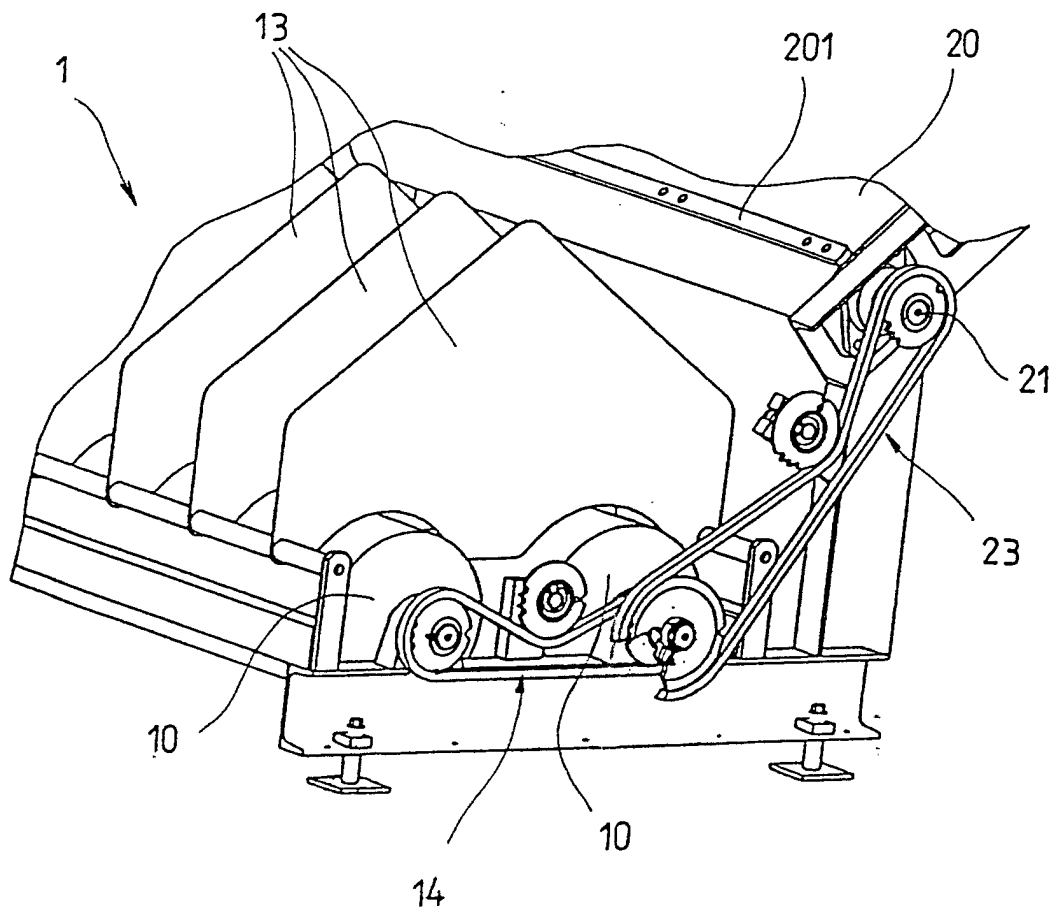


Fig.3

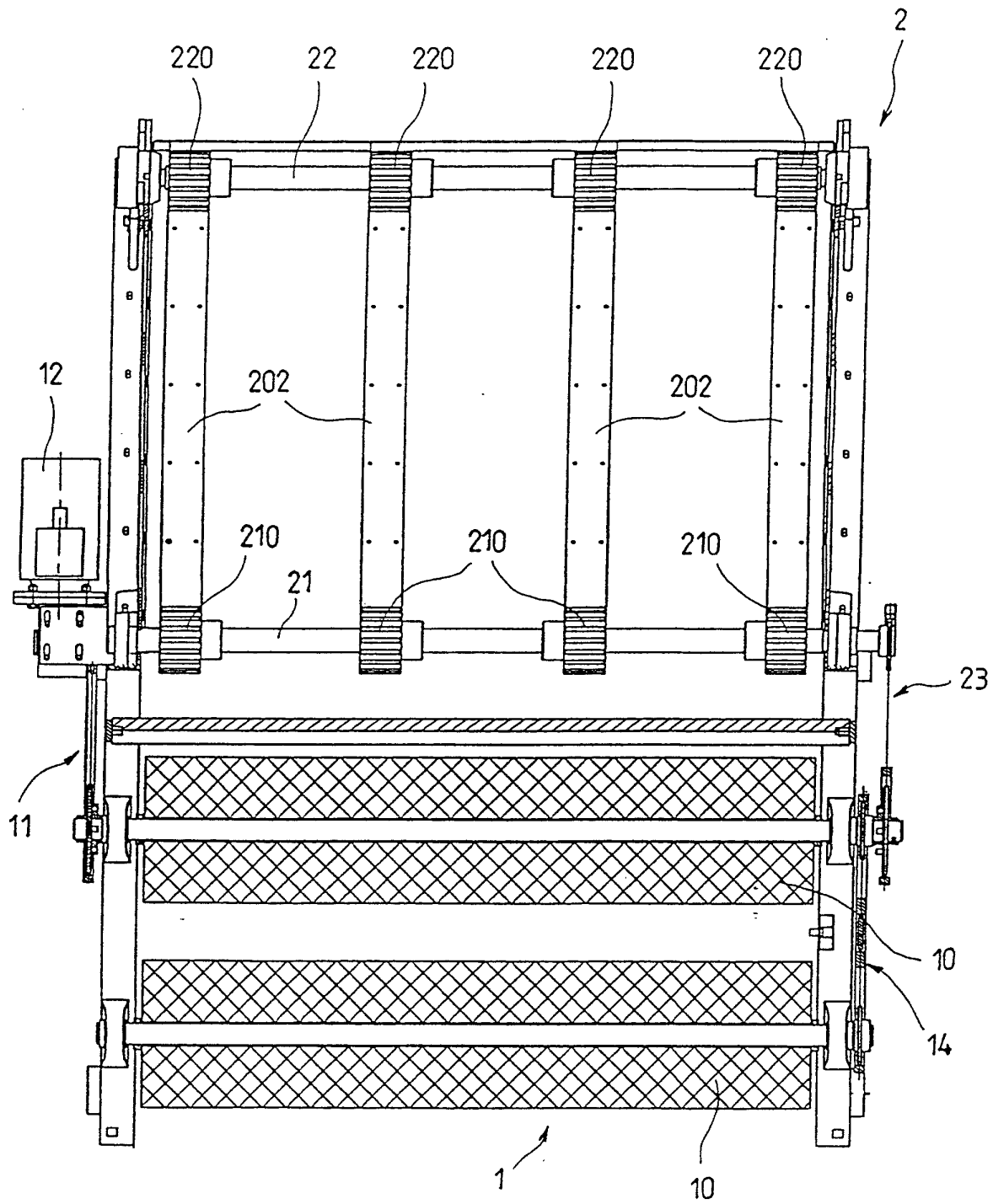


Fig.4



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 12 0303

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 December 2001	Examiner D'Souza, J
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
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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