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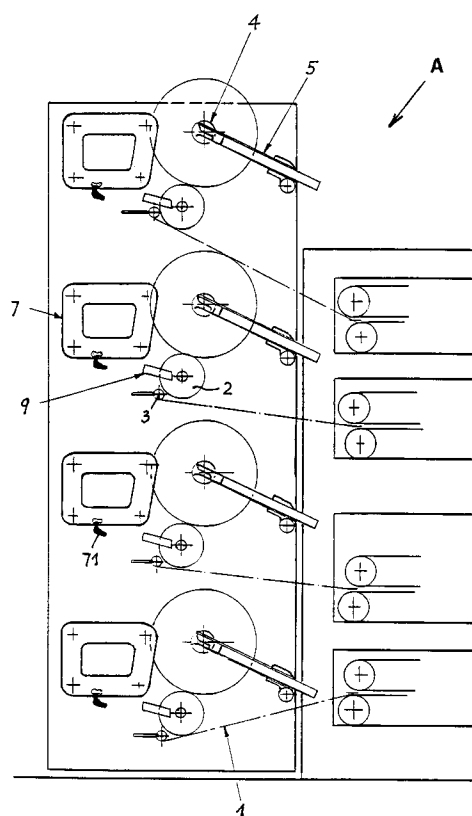
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I-20123 Milano (IT)(54) **Device for automatically doffing the hollow lap rollers from a framing of a condenser card.**

(57) A device for automatically doffing the hollow lap rollers comprises, for each hollow lap roller, a driving movable means (5, 5A, 5B, 5C, 5D) for supporting and ejecting the hollow lap roller (4) already loaded with the roving (1); a doffing element (7) with a closed loop path, provided with doffing hook elements (71); a locating element (9) for locating the empty hollow lap rollers and supplied by sliding guides (90); auxiliary means (150) for ejecting air blows in order to aid a proper starting of the winding of the new hollow lap rollers to be filled-in as well as auxiliary means (6) adapted to press, at the start of a new winding step, the empty hollow lap roller on the hollow lap roller cylinder (2) in order to safely trigger the winding thereof. The device is adapted to speed-up the doffing operation, and allows to save labour and time.

**Fig.1****EP 0 683 254 A1**

BACKGROUND OF THE INVENTION

The present invention relates to a device for automatically doffing the hollow lap rollers from a framing of a condenser card, said condenser card constituting the end portion of a complex apparatus located in a card room.

As is known, immediately upstream of the framing of a condenser card assembly there is conventionally provided a so-called "splitting" element which operates to split the carded fibre web into a plurality of rovings, so as to provide the latter with a slight consistence by means of a crocking or rubbing operation. A plurality of rovings are wound on the individual hollow lap rollers which are rotatively driven by a hollow lap roller cylinder. The number of hollow lap rollers on each of the superimposed levels or planes of hollow lap rollers can vary, while the number of superimposed planes used at present is either 4 or 6.

As the hollow lap rollers on which the rovings are wound achieve a set diameter, there is performed a "doffing" step and this operation, performed with the apparatus in an operation condition, requires from the operator a working time which, depending on the hollow lap roller number, can vary from 8 to 10 minutes.

In order to understand the work which is at present performed and to clearly define the field of the invention, it is considered useful to resume hereinbelow the sequence of steps which are required for doffing full hollow lap rollers and replace them with empty hollow lap rollers to be filled-in.

Such an operating sequence, in particular, comprises the following operating steps:

- locating, immediately before the doffing operation proper, the empty hollow lap rollers on suitable supporting elements, where the hollow lap roller rotate in an empty condition, so as to contact the surface of the hollow lap roller cylinder, without winding rovings thereon;
- removing the full hollow lap rollers by taking up them one by one manually, at the surface thereof free of rovings, i.e. at the two end portions of said hollow lap rollers;
- locating the full hollow lap rollers on suitable carriages used for bringing the hollow lap rollers to the spinning shop. Alternatively, the hollow lap rollers can be engaged on an inner transport chain provided with engagement hook elements;
- collecting manually all of the rovings related to a single hollow lap roller and breaking said rovings;
- introducing an empty hollow lap roller by manually pushing it to its working position;

- casting the roving assembly on each individual hollow lap roller by manually aiding the winding of said rovings.

SUMMARY OF THE INVENTION

The aim of the present invention is to provide such a device which is adapted to automatically perform:

the above disclosed full hollow lap roller doffing operation, which at present requires a great amount of time and labour;

an automatic locating of the full hollow lap rollers on a transport carriage or other like means as well as an immediate loading of the empty hollow lap rollers, so as to provide a great economic advantage since there is not necessary to provide an operator for performing the doffing step and there being moreover obtained an advantageous evenness of the hollow lap roller filling-in operation, with a great reduction of the spinning waste.

According to a preferred embodiment of the invention, each hollow lap roller being filled-in is supported and guided at the two end portions thereof by two swinging or hunting arms. These arms are each provided, at the end of the supporting rod included in said swinging arm, with a recess for receiving the pin of the hollow lap roller, the rod of each swinging arm being associated with an ejecting element provided with a rack adapted to be longitudinally displaced, with a slipping contact, within a slot formed in the wall of said rod.

The end of said ejecting or expeller element abuts against the pins of the hollow lap roller, so as to allow the latter, at a set time, to be removed from the rod receiving recesses of said swinging arms. The hollow lap roller filled-in by rovings is successively taken up by a doffing element with a closed loop path provided with gripping hook elements which are driven in a substantially quadrangular path in order to raise a full hollow lap roller by depositing it on the cradles of a transport carriage. Said hook elements, as they continue their movement, will push ahead, with a slight braking action, a subsequent empty hollow lap roller by causing the latter to slide on guides at the end of which a locating element will deposit the empty hollow lap roller in said swinging arm rod recesses, at a filling-in position.

Since the disclosed device carries out in a full automatic manner the above operation, and since it is not necessary to provide an operator for binding the roving end portions, i.e. for starting the entrainment of the roving ends on a new hollow lap roller, there is moreover provided means, at the sides of each hollow lap roller, for ejecting a pressurized air blow, which are intermittently driven to push said

roving ends toward the center of the hollow lap roller where the rovings are clamped between the driving hollow lap roller cylinder and the hollow lap roller to be filled-in, the latter being forcibly held in contact with said hollow lap roller cylinder by means of a permanent magnet drawing the hollow lap roller supporting swinging rods so as to press said hollow lap roller, for a limited time period, against the hollow lap roller cylinder.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will become more apparent hereinafter from the following disclosure of a preferred embodiment thereof, with reference to the accompanying exemplary and not limitative drawings, where:

Figure 1 is a schematic side elevation view illustrating a hollow lap roller assembly provided with an automatic doffing device according to the invention;

Figure 2 is an enlarged scale side elevation view illustrating, for a single hollow lap roller, the several elements included in the automatic doffing device according to the invention, in a filled-in hollow lap roller condition, immediately before the starting of the doffing operation;

Figures 3 to 9 illustrate sequential operating conditions of the device in the full operating cycle starting from the doffing of a full hollow lap roller (Figure 2) to the loading and the start of the fill-in operation of a new empty hollow lap roller;

Figures 10A and 10B are respectively a longitudinal section view and a cross-section view taken along the line B-B, showing the full hollow lap roller supporting and ejecting assembly;

Figures 11A and 11B are respectively a top plan view and a front elevation view illustrating the empty hollow lap roller locating assembly;

Figure 12 schematically illustrates the closed loop doffing element, provided with hook elements for unloading or doffing a full hollow lap roller and supplying an empty hollow lap roller;

Figure 13 is a longitudinal elevation view illustrating means for preventing an undesired winding of the rovings on the pins of the new hollow lap rollers upon doffing the filled-in or full hollow lap rollers;

Figures 14A and 14B are side elevation views illustrating, at two positions thereof, the means for aiding the starting binding operation for binding the rovings on the empty hollow lap rollers;

Figure 15 schematically illustrates the operating timed starting and stopping sequence of the several elements during a full working cycle of the automatic doffing of the hollow lap rollers; and

Figures 16, A and B, 17, 18, A and B and 19A and B show possible modified embodiments of the hollow lap roller supporting and ejecting element.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figure 1 schematically illustrates a hollow lap roller assembly A, which is herein extended on four planes, in which each hollow lap roller 4 of each plane is provided with a device according to the invention. For each hollow lap roller, a plurality of rovings 1, coming from a carded web splitting element (not shown), are supplied onto the hollow lap roller cylinder 2 through a driving rod 3 provided with separating curved elements 31 to be wound on the hollow lap roller 4 of which the hollow lap roller cylinder 2 constitutes a rotary driving element. The return rod or bar 3, in particular, (see Figure 13), is reciprocated correspondingly to the pitch between two subsequent curved elements 31 in order to provide and even distribution of each roving to a plurality of adjoining rolls the number of which corresponds to the number of the rovings.

In Figure 2, which represents and enlarged detail of Figure 1, the main element assemblies included in the device according to the invention comprise, for each hollow lap roller:

a pair of driving and supporting movable means 5 each comprising, in a mutually associated relationship, a supporting rod 51 and an ejector element 52 for ejecting a full hollow lap roller 4;

a pair of doffing elements 7, provided with a closed loop path, and including gripping hook elements 71 which, in the following disclosure, will be indicated at 71a, b, c, d, exclusively for indicating the positions thereof;

a pair of locating elements 9 for locating the empty hollow lap rollers 4' to be filled-in, which are operatively connected to sliding guides 90 for driving said empty hollow lap rollers 4'.

In order to better understand the operation of the automatic doffing device, Figures 3 to 9 illustrate, by a sequence, the several steps of the operation cycle starting from the ejection of a full hollow lap roller 4 (Figures 3 to 8) and with the simultaneous supplying of an empty hollow lap roller 4' (Figures 5 to 8) and further supplying of a further empty hollow lap roller 4'' (Figures 8A and 9).

In this operating step sequence, Figure 3, to be compared with Figure 2, illustrates the movement of the ejecting element 52 of the driving movable means 5, which in this preferred embodiment will be called swinging arm. The movement of the ejecting element 52 is controlled by a pinion 53.

Said ejecting element will advance and impact against the pins 41 of the filled-in hollow lap roller 4, so as to cause the latter to fall on the pair of hook elements 71 of the closed loop doffing element 7, coming in their path about said element 7 according to the movement direction indicated by the arrow S.

In Figure 4, the hook elements 71 arranged at the position 71b support the full hollow lap roller 4 and start the deposition path on a carriage or truck 100, as it will become more apparent hereinafter, whereas the swinging arm 5, from which the full hollow lap roller 4 has been removed, will fall under the weight thereof, on the hollow lap roller cylinder 2 which is ready for receiving an empty hollow lap roller 4'; the ejecting element 52 is still, at this point, fully forwardly pushed.

In Figure 5, the full hollow lap roller 4 continues its path toward the depositing carriage; in this step, the ejecting element 52 is withdrawn by the pinion 53 so as to disengage the slot 56 for housing the pin 41 of the empty hollow lap roller 4'. The roving 1 is entrained between the full hollow lap roller 4, on a side, and, on the other side, between the empty hollow lap roller 4' and the hollow lap roller cylinder 2.

In Figure 6, the full hollow lap roller 4 is arranged on the end portion of the top horizontal span of the closed loop doffing element 7 and is caused to stop; the roving 1, supplied by the cylinder 2, is brought to a loosened condition.

In Figure 7, the arm 91 of the empty hollow lap roller locating element 9, by rotating through about 90°, causes an empty hollow lap roller 4' to engage by the pins 41' thereof, in the slot 56 of the swinging arm 5. This movement will break the roving 1 the end portion 11 of which will begin to wind on the new hollow lap roller 4', as is shown in the subsequent Figure 8.

In Figures 8 and 8A, the arm 91 of the locating element 9 has been recovered to the rest position thereof, in order to receive another empty hollow lap roller 4'', which will be located by the operator after having removed the carriage 100 supplied with full hollow lap rollers. In the meanwhile, the hollow lap roller 4' is filled-in.

Figure 9 illustrates the step in which the hook element 71 recovers its movement, after having doffed the full hollow lap roller 4 on the carriage 100 and after having pushed another subsequent empty hollow lap roller 4'' on the arm 91 of the locating element 9, by stopping at the position 71a whereas the hollow lap roller 4' will be continuously filled-in.

In Figure 9 there is again shown the operating cycle, started in Figure 2, which is continuously repeated.

There will be hereinafter illustrated the constructional details of the device according to the invention, and, in this disclosure, for each assembly of main elements 5, 7, 9 which are symmetrically arranged in pairs on the sides of each hollow lap roller, exclusively a single element thereof will be illustrated for simplicity.

With reference to Figures 10A and 10B, each pair of swinging arms 5 comprises a rod 51, a rear end 510 of which is clamped between a pair of bearings 512 engaged in bushings 513 which are longitudinally locked by nuts 554 and middle spacers 555. The rod 51, and, accordingly, the overall swinging arm 5, can therefore swing freely on a shaft 55 mounted on a bearing 551 in turn supported by a fixed support 552.

The front end 511 of the rod 51 which supports the hollow lap roller 4, is beveled in order to facilitate the locating of the pin 41 of the hollow lap roller, and is provided with an open slot 56 a wall of which is formed by an insert of a resilient foil 561 which allows said slot to be resiliently fitted to said pin 41 of the hollow lap roller 4.

Slidably contacting the rod 51 there is provided the ejecting element 52 which, in its rearmost position, has the front end 520 thereof arranged near the bottom of the slot 56 of the rod 51, whereas the rear end 521 is provided with a rack 522 and meshing with a pinion 53 rigidly formed on one of the bushings 513 torsionally connected to the shaft 55 by a key 532.

The ejecting element 52 slides by its side ribs 523 in a slot 514 of the rod 51 of the swinging arm 5 and is connected and held adherent to the rod 51 by a guide pin 515 which can slide in a slot 524 of the ejecting element 52.

As shown in Figures 11A and 11B, the empty hollow lap roller locating element 9, is arranged in the gaps between two subsequent segments 2' and 2'' of the hollow lap roller cylinder 2.

Each of the arms 91 and 91' of said locating element serves for the adjoining hollow lap roller, the other necessary symmetrical arm being arranged in the subsequent gap between two adjoining hollow lap rollers.

Each arm 91, 91' is connected to a disc 92 provided with teeth and which can independently turn on bearings 93 keyed on the shaft 22 of the hollow lap roller cylinder 2. Each tooth arrangement of the disc 92 meshes with a pinion 94 in turn keyed on a shaft 95 parallel to the shaft 22 of the hollow lap roller cylinder 2. Accordingly, the shaft 95 will form the drive element of the arms 91 of the locating element 9, provided for loading the empty hollow lap roller at a set time, as it will be disclosed hereinafter. The gear assembly 92, 94 is preferably protected within a casing (not shown).

Figure 12 schematically illustrates the closed loop doffing element 7, for doffing the full hollow lap rollers and supplying the empty hollow lap rollers. This doffing element comprises a conventional link chain 72, closed on itself, at a zone of which is restrained a hook element 71. The chain extends according to a substantially quadrangular path being entrained on four toothed transmission pinions 74 of which only one is a driving pinion, the latter being driven by a shaft coupled to an electric motor receiving time distributed pulses, as it will become more apparent hereinafter.

During the movement thereof, each pair of hook elements 71 of the doffing element 7 (see Figures 8A and 9) will impact against the pins 41" of a new empty hollow lap roller 4" supplied after the doffing of a preceding full hollow lap roller and will push said empty hollow lap roller toward swingable arms 91 of the locating element 9, so as to cause said hollow lap roller to slide, in a slightly braked manner, by known means, on substantially horizontal guides 90 (position 71A of Figure 9).

In addition to the illustrated and disclosed operating cycle, there has been also solved the problem, caused by lack of the manual operator which is now replaced by automatic operations, and related to a proper starting of the "binding" of the ends of the rovings on a new empty hollow lap roller after having doffed the yarn filled hollow lap roller.

Since there is involved a very small weight material, in order to prevent the ends 11 of the broken rovings from winding on the pivot pins 41 of the hollow lap rollers 4, pressurized air blowing nozzles 150 have been provided, as shown in Figure 13, said nozzles being suitably oriented and controlled, and being arranged at the gaps between two subsequent hollow lap rollers 2 and 2' and conveying the rovings, driven between the curved elements 31, toward the center of the hollow lap roller so as to prevent the rovings from accumulating on the pivot pins 41.

With reference to Figures 14A and 14B there is moreover provided a permanent magnet 6, supported by a base 61 which can be vertically adjusted by a slot 611 and which will draw the swinging arm 5 as said arm, after having fallen under its weight on the cylinder 2, is supplied with a new empty hollow lap roller 4'. This magnet (Figure 14A) operates to press the swinging arm 5, and together it the empty hollow lap roller, against the cylinder 2 for a set time allowing the winding of the rovings to be safely started, and, then, as shown in Figure 14B, the magnet will be switched-off for removing the swinging arm and the winding operation of the hollow lap roller being performed in a regular manner.

From the operating standpoint, the working cycle, starting from the doffing of a full hollow lap roller, is controlled by suitable controls derived from the main electric driving or controlling unit of the device according to the invention.

In this preferred embodiment, the repetitive operating cycle is started by a doffing disc D1 provided with microcontacts, a full revolution of which will be controlled by a timer T1 calibrated on a desired full filling-in of a hollow lap roller.

This disc will further control other discs D2 and D3 respectively provided for loading the hollow lap rollers as performed by the locating element 9 and for actuating the ejecting element 52 of the swing-arm 5.

By way of an example, in the operating diagram of Figure 15 in which the discs have been shown at the letter D, the contacts at C and the timers at T, there have been shown the operating steps of the device.

According to the illustrated sequence, the starting of the operating cycle begins from the disc D1 with the contact C10 which drives the disc D3 and starts a timer T1 and a timer T2. The disc D3 will cause the full hollow lap roller to be ejected (shaft 55, pinion 53, ejecting element 52), whereas the timer T1 will drive or actuate the doffing element 7 which will cause the hook element 71 to be driven from the position 71a (Figure 9) to the position 71b (Figure 4) in order to receive the hollow lap roller being ejected through the disc D3. Owing to the provision of a contact C11, the hook element 71 will stop at the position 71c (Figure 6).

In the meanwhile, the timer T2 will actuate the disc D2 for loading an empty hollow lap roller 4' (arms 91) and starting the air blows or jets 150. The disc D3, in turn, will cause, by a contact C30, the ejecting element 51 to be withdrawn, and then another contact C31 will stop said disc D3.

Upon starting the winding operation of the new hollow lap roller, the disc D2, by a contact C20, will perform movements opposite to the preceding movements by shutting off the air jets and causing the arms 91 of the locating element 9 to be returned to their rest position. Another contact C21 will cause the disc D2 to stop.

The disc D2, by the contact C20, will also actuate again the disc D1 which, in turn, by a contact C2, will drive the doffing device 7 so as to cause the hook element 71 to stop at the position 71d (Figures 8 and 8A) and will moreover start a timer T3 for a pause period in which an operator will remove the carriage 100 with the full hollow lap rollers and will supply new empty hollow lap rollers 4" to the inlet of the sliding guides 90.

After a pause set by the timer T3, the disc D1 will be actuated again, so as to displace the doffing device in order to cause the hook element 71 to be

driven from the position 71d to the starting position 71a (see respectively Figures 8A and 9) thereby causing a new empty hollow lap rollers 4" to be displaced on the guides 90 and bring it on the arms of the locating element 9 in order to start a new operating cycle.

Within the scope of the invention, the element for ejecting the full hollow lap roller can be made in different embodiments.

For example, a modified embodiment is that shown in Figures 16A and B, which specifically relates to the above illustrated and shown swinging arm 5.

In this modified embodiment, the function of the guide movable means 5A is halved by an ejecting element 52a sliding on a rod 54 which exclusively operates as a guide of the ejecting element, whereas the support of the hollow lap roller 4 is provided by a rod 51a adjoining the ejecting element 52a.

Another possible modified embodiment is shown in Figure 17, in which from the movable guide means 5B there has been omitted the ejecting element 52, since in this embodiment the above illustrated rod 51 will also operate as an ejecting element. In this case, the rod 51 of the preferred embodiment will operate as a connecting rod-crank assembly, since it will comprise two segments 51b and 51b' pivoted on a shaft 55b. The rod 51b-51b' can be brought to the position represented by a dashed line by holding the hollow lap roller 4, as shown in the figure, in a position on the right of the vertical V of the hollow lap roller cylinder 2, its full extension being obtained by causing the shaft 55b to anti-clockwise rotate through an angle of about 90°, to the position in which the two segments 51b and 51b' will be substantially aligned. This position has been shown in the drawing by blackened bars.

A third possible modified embodiment has been shown in Figures 18A and 18B and it provides for the use of a known arrangement of the guide movable means 5C in which the hollow lap roller 4 is practically only supported by the pivot pins 41 thereof on a rod 51c rightwardly slanted in the drawing, and will move up along the rod 51c during the continued filling-in of said hollow lap roller by the roving 1. In this case, the rod 51c supporting and guiding the hollow lap roller has a L-shape, in which the bottom leg 515 can be caused to anticlockwise turn (Figure 18B) in order to urge the full hollow lap roller beyond the vertical line V of the cylinder 2 so as to bring it to the doffing position thereof.

Yet another modified embodiment 5D of the guide movable means is shown in Figures 19A and 19B and is analogous to the case of Figures 18A and 18B in which the bearing rod 51d is merely

caused to translate so as to provide, as it clear appears from the drawing, the same effect.

The above and other variations can be made by those skilled in the art without departing from the scope of the invention.

Claims

1. A device for automatically doffing hollow lap rollers from a framing of a condenser card (A) constituted by a plurality of hollow lap rollers arranged on several planes, in which hollow lap roller assembly a plurality of rovings (1), preliminarily separated by a carded web splitting element, are wound on each individual hollow lap roller rotatively driven by a hollow lap roller cylinder (2), characterized in that said device comprises, for each hollow lap roller (4):

- a movable means (5. 5A, 5B, 5C. 5D) for supporting and guiding the hollow lap roller (4) during the filling-in thereof and for doffing said hollow lap roller as it has been filled-in by said roving (1);
- a doffing element (7) for doffing the filled-in hollow lap roller, having a closed loop path, and provided with doffing hook elements (71);
- a locating element (9) for locating the empty hollow lap rollers (4, 4', 4" ...) comprising two swinging arms (91) which can be angularly oriented about the shaft (22) of the hollow lap rollers cylinder (2), and on which are arranged said empty hollow lap rollers which are driven, in a braked manner, along sliding guides (90), from the hook elements (71) of said doffing element (7);
- means (150) for applying intermittent pressurized air blows to the free ends (11) of the rovings (1) in order to prevent said rovings from accumulating and winding on the pivot pins (41) of the hollow lap rollers (4) at the start of each filling cycle of new hollow lap rollers;
- auxiliary urging means pressing said movable guide means against the hollow lap roller cylinder (2) as said movable guide means has been supplied with a new hollow lap roller to be filled.

2. A device according to Claim 1, characterized in that the full hollow lap roller doffing element (7) comprises a closed loop chain (72) including articulated links meshing on four transmission toothed pinions (74), of which only one is a driving pinion, connected to an electric motor controlled by electric pulses at the set operating cycle steps, on a link of said chain being

fixed the hook element (71) for doffing the full hollow lap rollers, which also operates, at the substantially horizontal bottom path of said chain closed loop, as an urging element for urging the empty hollow lap rollers toward the orientable arms (91) of the locating element (9).

3. A device according to Claims 1 and 2, characterized in that the locating element (9) comprises arms (91, 91') respectively fixed on toothed discs (92) which can freely rotate on the shaft (22) of the hollow lap roller cylinder (2), said toothed discs (92) being driven by pinions (94) keyed on a shaft (95) parallel to said shaft (22) and driven by a time controlled motor, immediately after the doffing of the hollow lap roller (4) filled-in by the roving (1) and after the withdrawal of the ejecting element (52) to the rest position thereof. 10 15 20
4. A device according to Claim 3, characterized in that the gear assembly of the locating element (9), comprising the toothed discs (92) and related pinions (94), is preferably enclosed in a protecting casing. 25
5. A device according to Claims 1 to 4, characterized in that the means (150) for controllably applying pressurized air blows are arranged in the gaps between two adjoining hollow lap rollers in order to urge the ends (11) of the roving (1) beam which begin to be wound on an empty hollow lap roller toward the centre of said hollow lap rollers in order to prevent said rovings from undesirably winding on the pivot pins (41) of said hollow lap rollers (4). 30 35
6. A device according to Claims 1 to 5, characterized in that for each hollow lap roller, the supporting and guiding movable means (5) is constituted (Figure 2) by a pair of swinging arms each of which is formed, in association, by a supporting rod (51) and an ejecting element (52) of the hollow lap roller (4) in which said ejecting element can be longitudinally displaced with respect to the rod (51) in a longitudinal slot (514) formed in said rod (51). 40 45
7. A device according to Claims 1 to 5, characterized in that, for each hollow lap roller, the supporting and guide movable means (5A) is constituted (Figure 16A) by a rod (51a) which separately operates as a support and a guide of the hollow lap roller (4), and by an ejecting element (52a) arranged parallel to said rod (51a) near said rod and movable within a guide element (54) therefor, in which is formed a 50 55

longitudinal slot for allowing said ejecting element (52a) to be controllably driven.

8. A device according to Claim 6, characterized in that the rod (51) supporting the movable guide means (5) is adapted to freely swing on a shaft (55) mounted on a bearing (551) supported by a fixed support (552), the rear end (510) of said rod (51) being clamped between a pair of bearings (512) engaged in bushings (513) which are longitudinally locked to said shaft (55).
9. A device according to Claim 7, characterized in that the independent rod (51a) supporting the movable guide means (5A) is freely swinging on a shaft (55) mounted on a bearing (551) supported by a fixed support (552), the rear end (510) of said rod (51a) being clamped between a pair of bearings (512) engaged within bushings (513) which are longitudinally locked to said shaft (55).
10. A device according to Claim 8 or 9, characterized in that the ejecting element (52, 52a) comprises a rod which, at the rear end (521) thereof, opposite to the end (520), provided for impacting against the pivot pin (41) of the hollow lap roller (4) for ejecting said roving filled-in hollow lap roller, is provided with a rack (522) meshing with a pinion (53), rigid with one of the bushings (513) torsionally fixed by a key (532) on the shaft (55) which drives said pinion (53) in order to cause said ejecting element (52, 52a) to advance or withdraw.
11. A device according to Claim 10, characterized in that the ejecting element (52, 52a) is held slidably adhering to the rod (51) of the swinging arm (5) or of the guide element (54) by a pin (515) the stem of which is engaged in a slot (524) formed in the body of said ejecting element, said slot having a length substantially equal to the stroke of said ejecting element.
12. A device according to one or more of Claims 6 to 11, characterized in that the means for urging the guide movable means comprise each a magnet (6) arranged at the bottom at the rod (51) of each swinging arm (5) or of the rod (51a) supporting the movable means (5a) to attract said rods (51, 51a) in order to press the periphery of each new empty hollow lap roller (4', 4'' ...), respectively supported by the rod (51) of said swinging arm (5), or by the rod (51a) of the movable guide means (5A) on the hollow lap roller cylinder (2), to assure a safe starting of the winding of the free end (11) of

the roving (1) on the new hollow lap roller.

- 13.** A device according to Claims 1 to 5, characterized in that the movable guide means (5B) is constituted (Figure 17) by an articulated rod 5 formed by two segments (51b, 51b') operating as a connecting rod-crank assembly, in which the free end of the segment (51b') is torsionally coupled to a shaft (55b) the rotation of which is effective to decrease or increase 10 the overall length of the articulated rod (51b, 51b') so as to cause the hollow lap roller (4) to be respectively held in a filling-in position, on a side of the vertical plane (V) passing through the centre of the hollow lap roller cylinder (2), 15 or in a doffing position of the roving (1) filled-in hollow lap roller on the other side of said vertical plane (V).
- 14.** A device according to Claims 1 to 5, wherein 20 the movable guide means (5C) is constituted (Figure 8) by a slanted rod (51c) of L-shape, the bottom leg (515) of which can be caused to turn in order to urge the roving (1) filled-in hollow lap roller (4) beyond the vertical plane 25 (V) passing through the centre of the hollow lap roller cylinder (2) so as to arrive at the doffing position of said hollow lap roller (4).
- 15.** A device according to Claims 1 to 5, wherein 30 the guide means (5D) is constituted (Figure 19) by a slanted rod (51d) which is caused to translate in order to urge the roving (1) filled-in hollow lap roller (4) beyond the vertical plane (V) passing through the centre of the hollow 35 lap roller cylinder (2) to arrive at the doffing position of said hollow lap roller (4).

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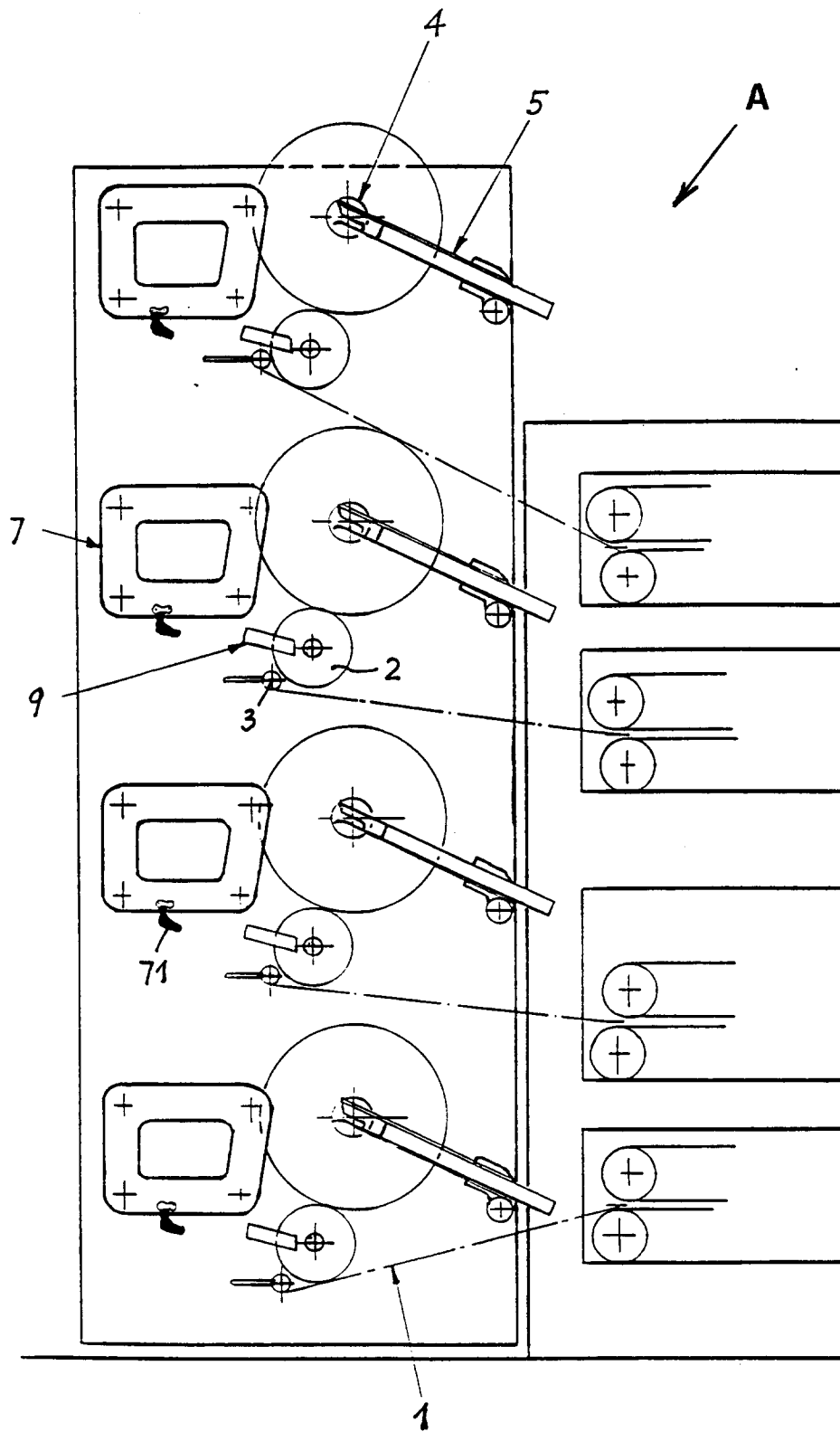


Fig.1

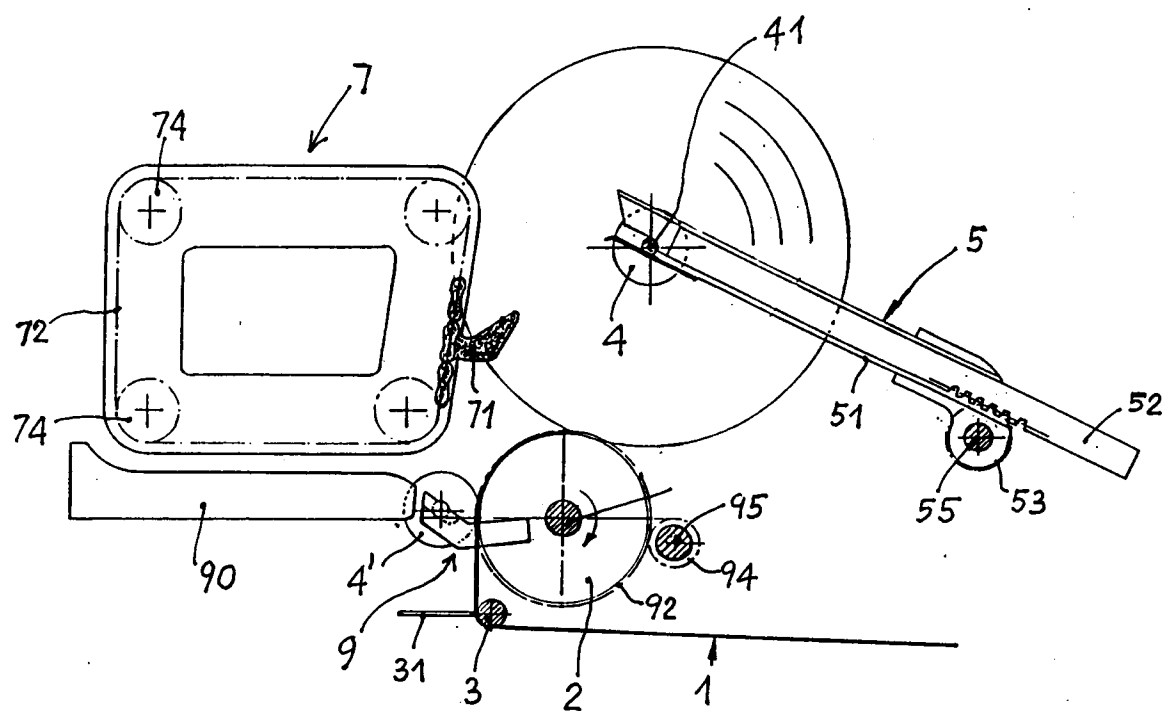


Fig. 2

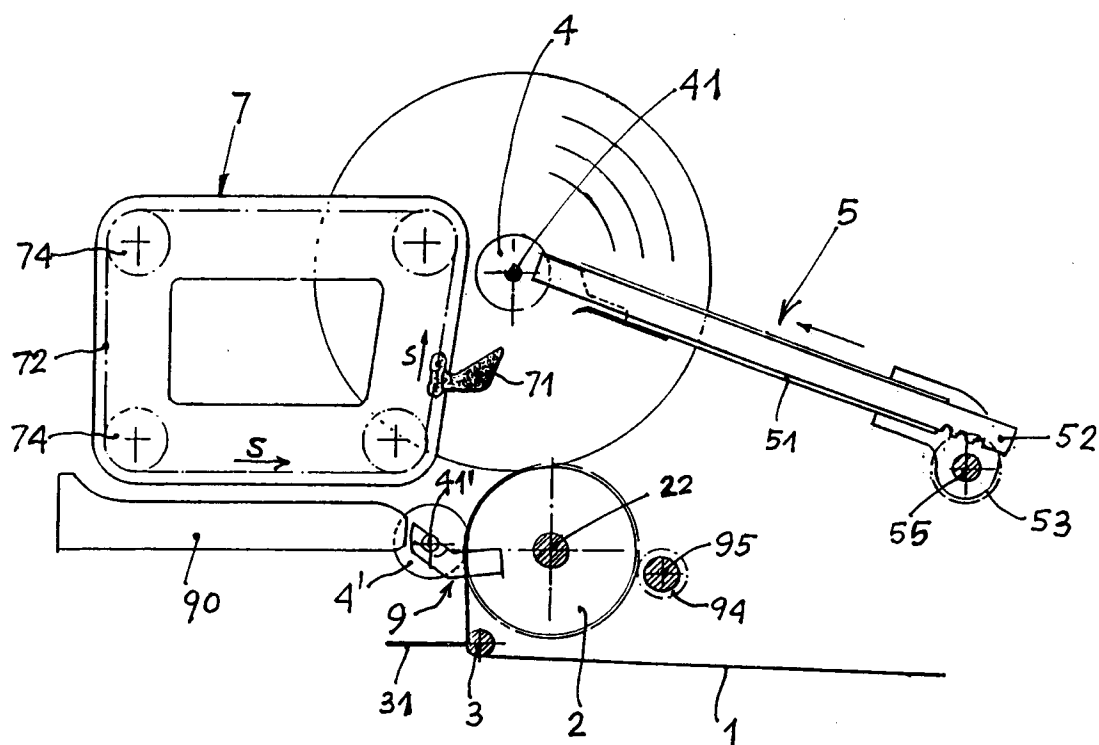


Fig. 3

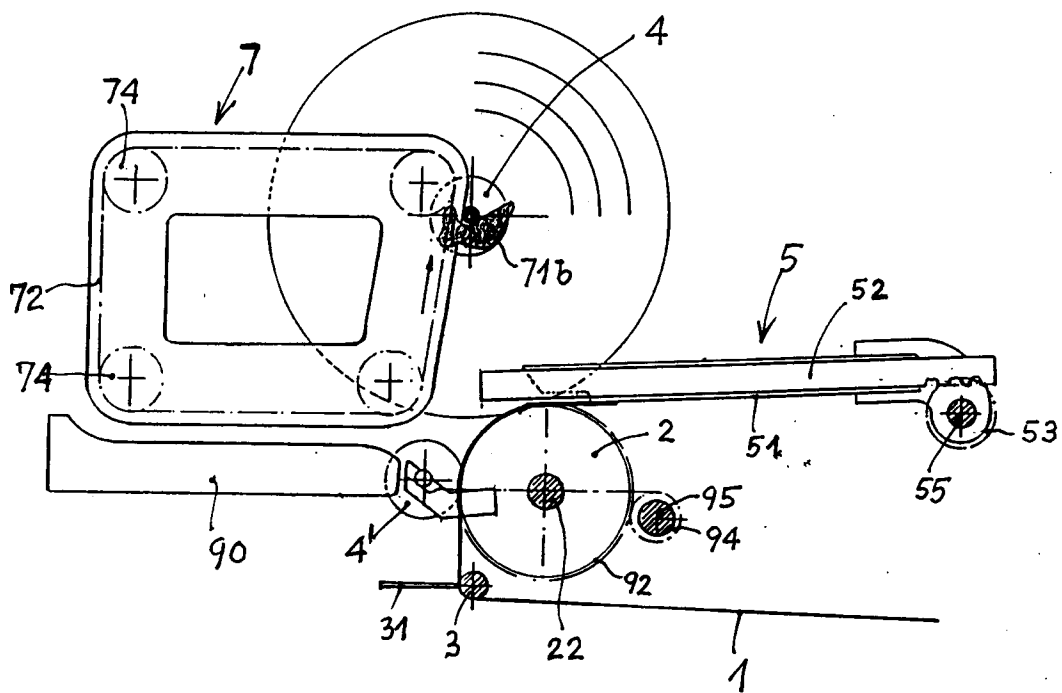


Fig. 4

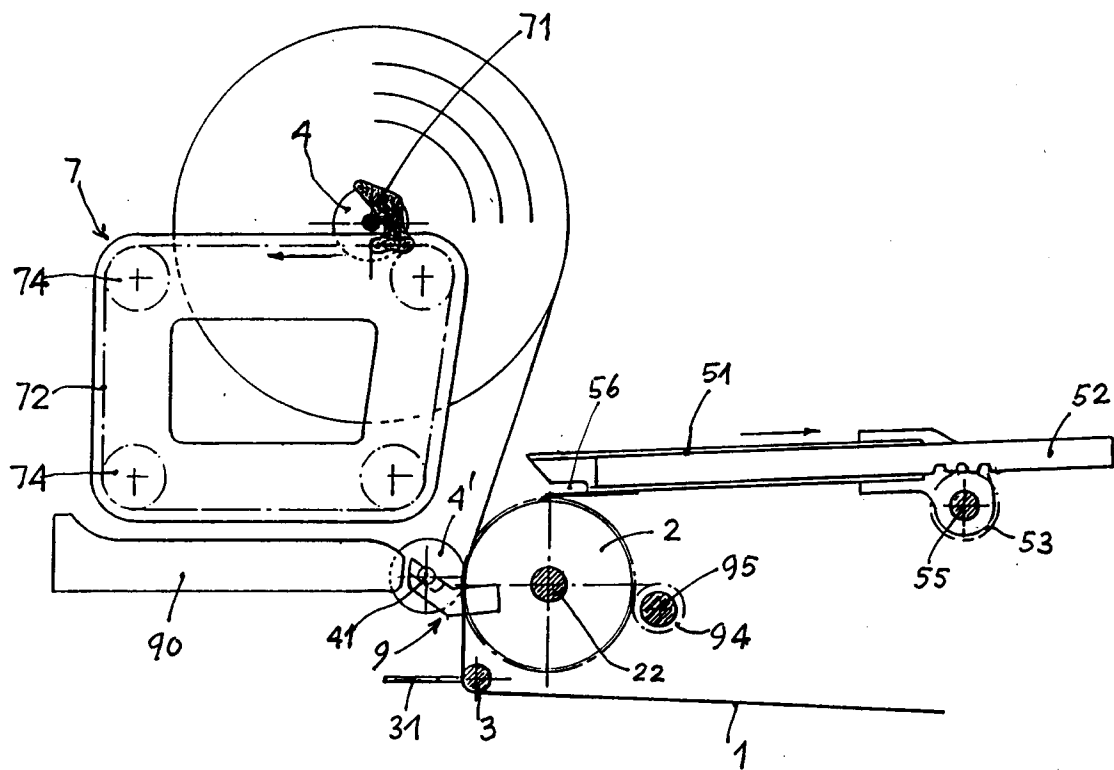


Fig. 5

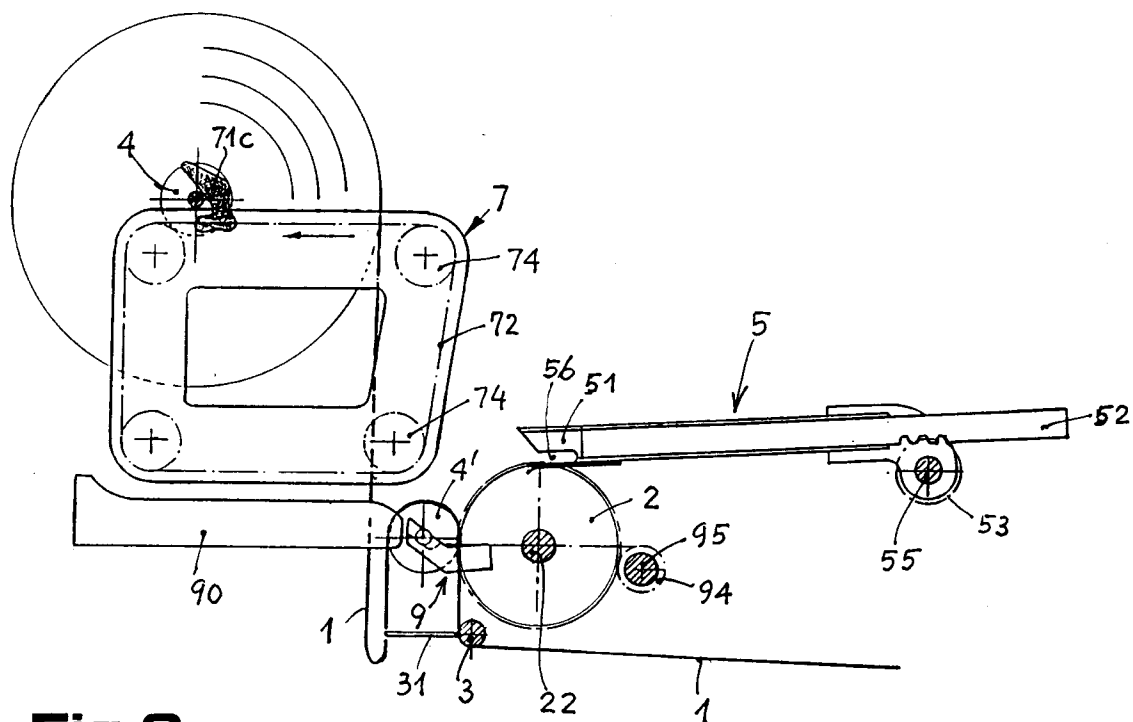


Fig. 6

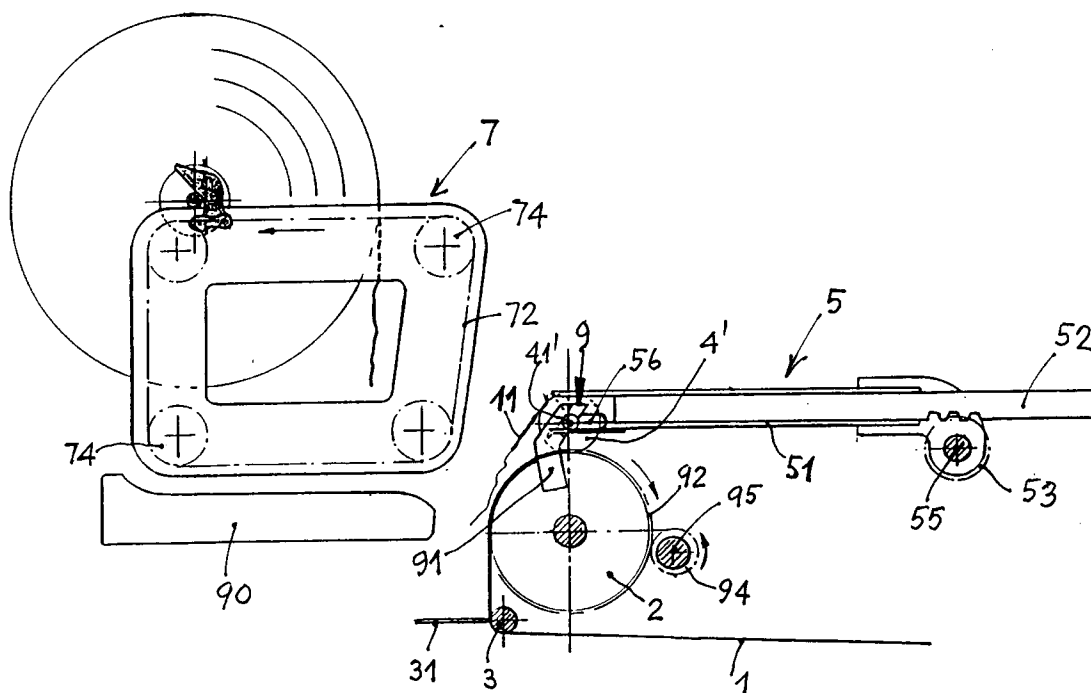


Fig. 7

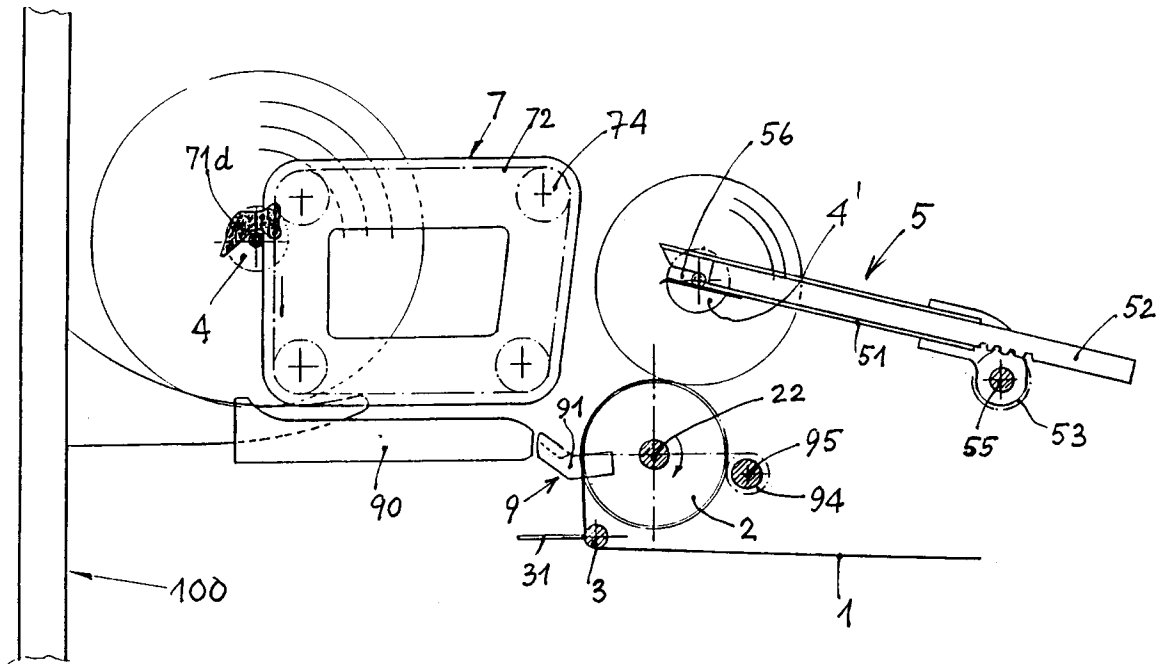


Fig. 8

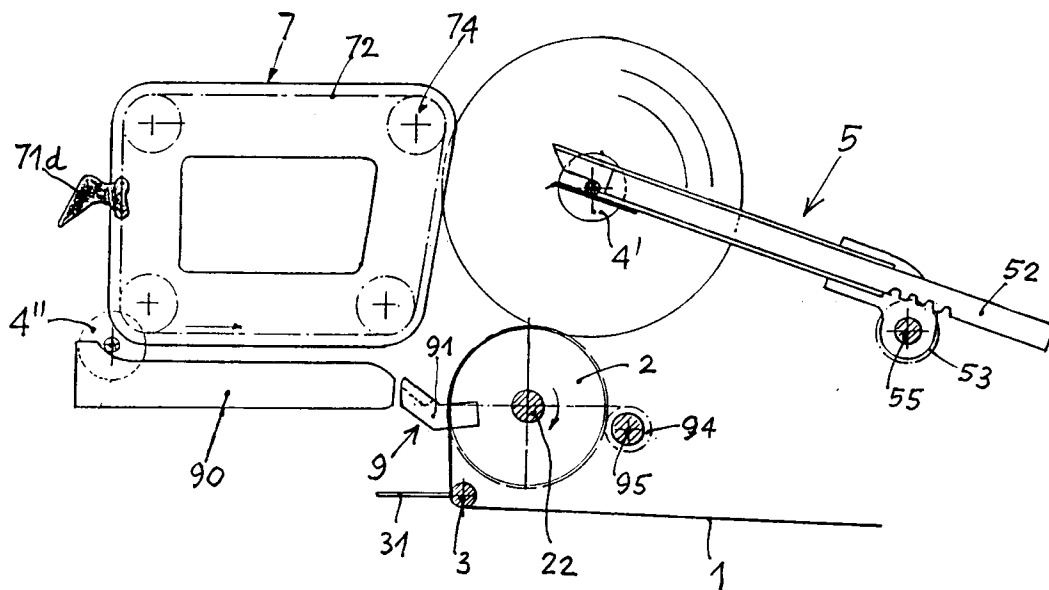


Fig. 8 A

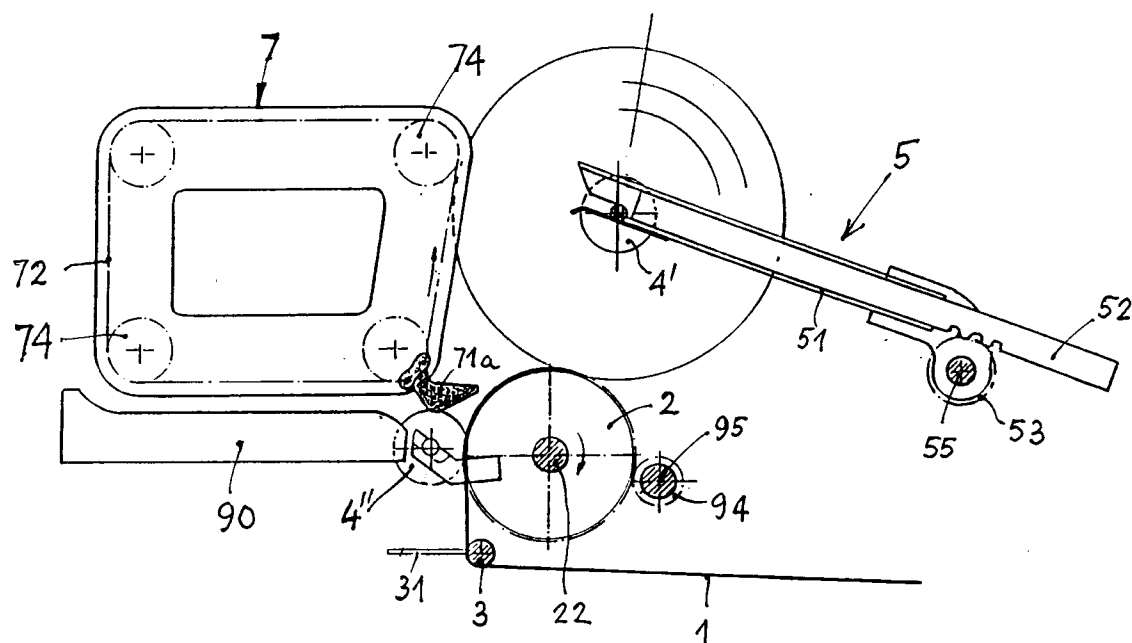


Fig. 9

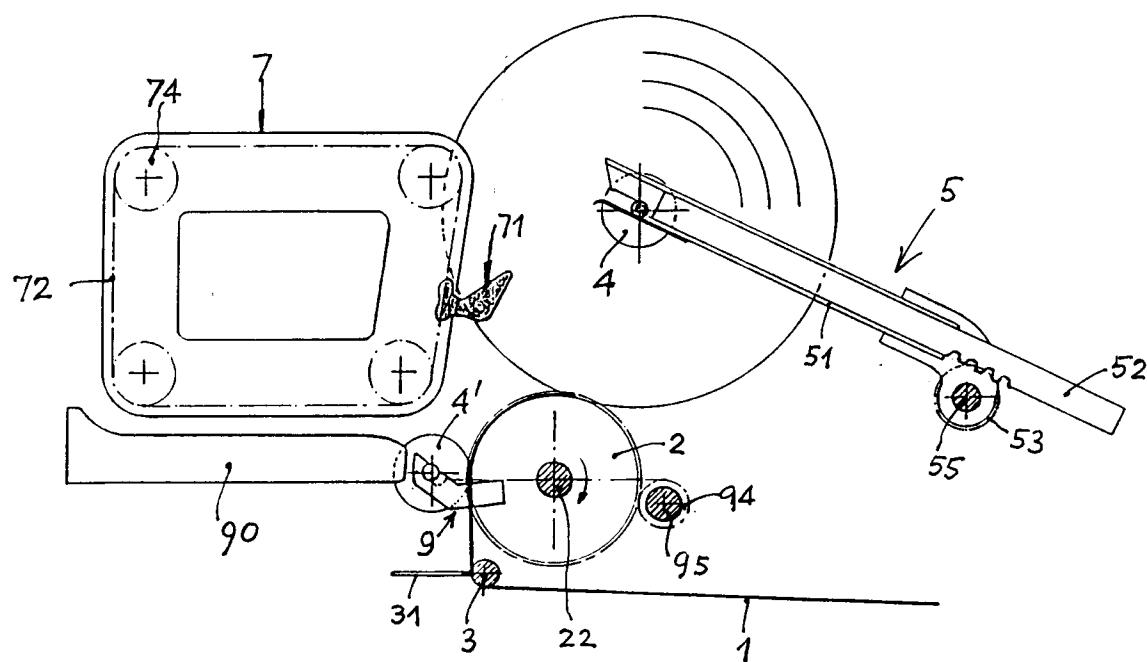


Fig. 12

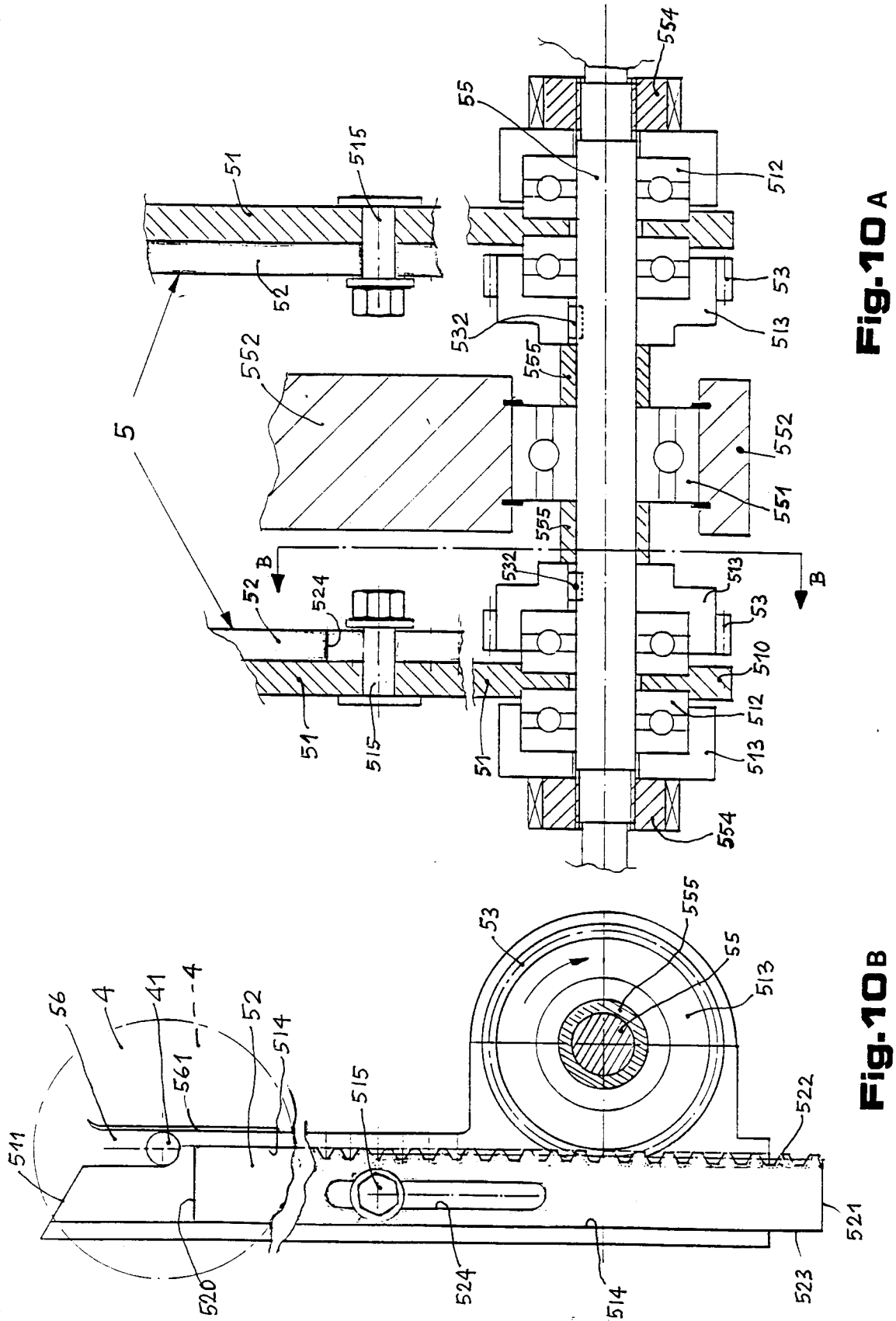


Fig. 10 A

Fig. 10 B

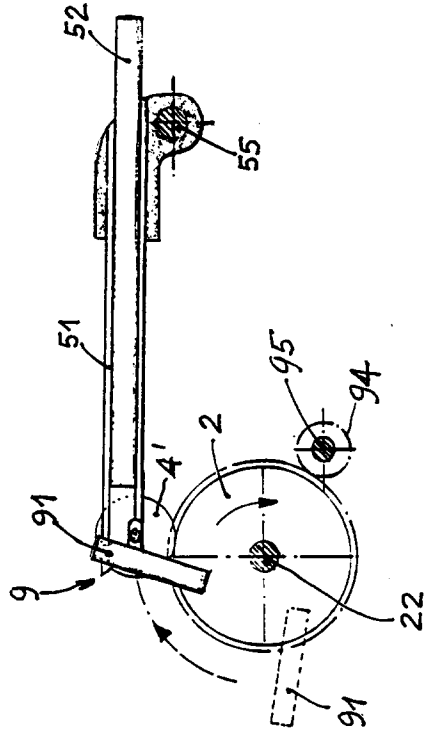


Fig. 11B

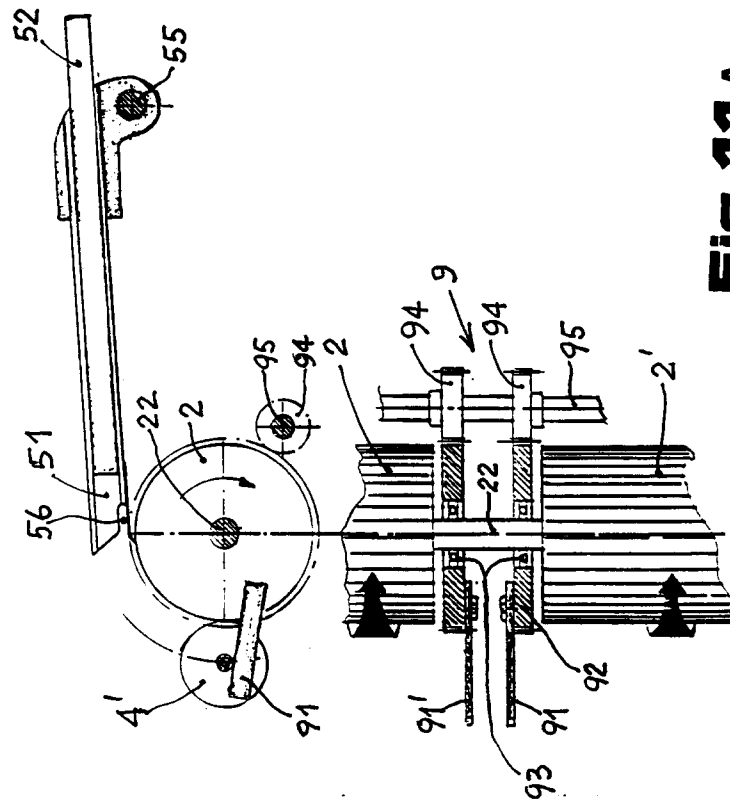


Fig. 11A

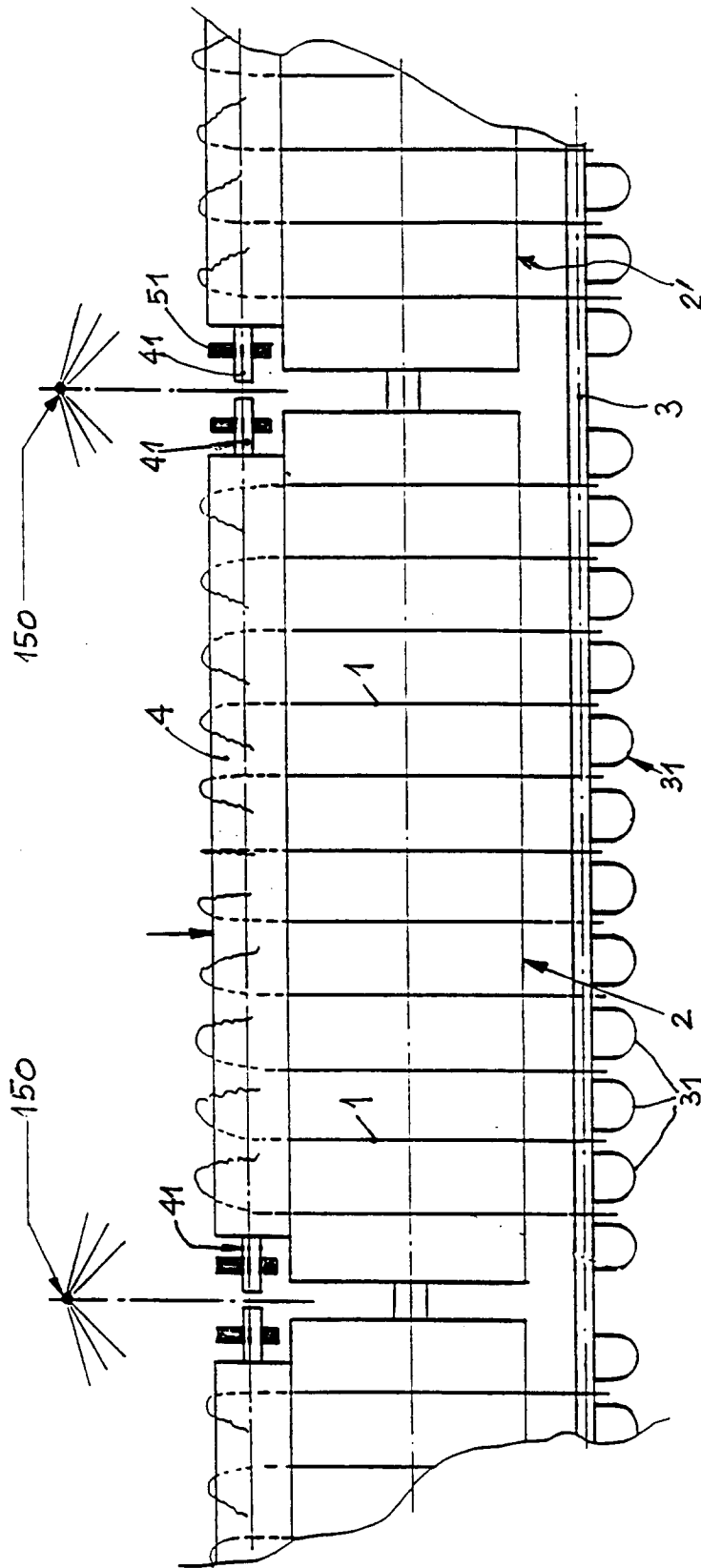


Fig. 13

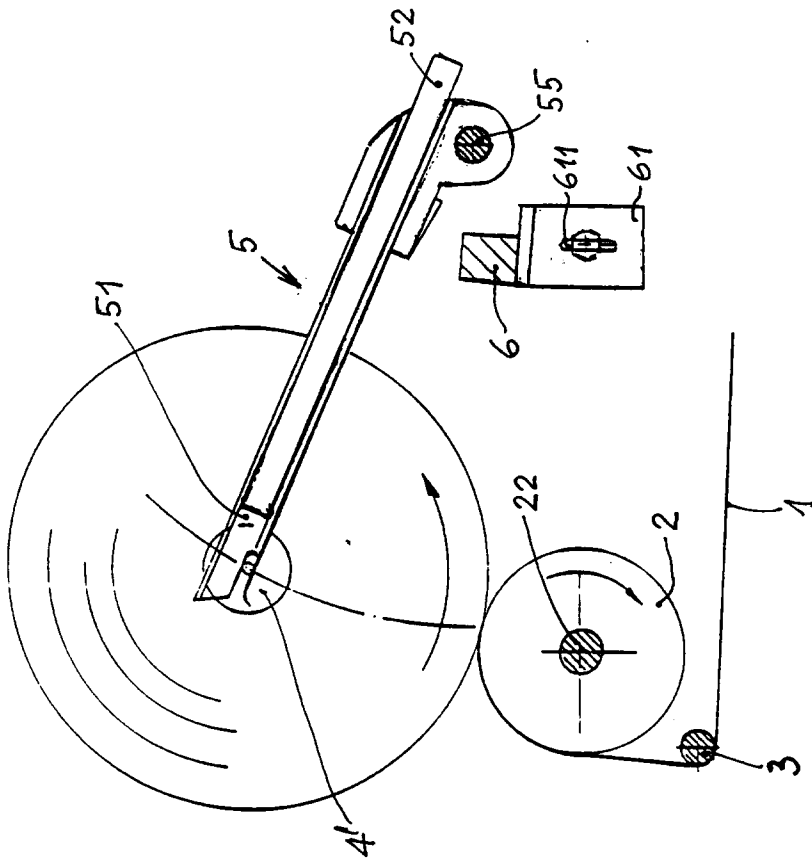


Fig. 14 B

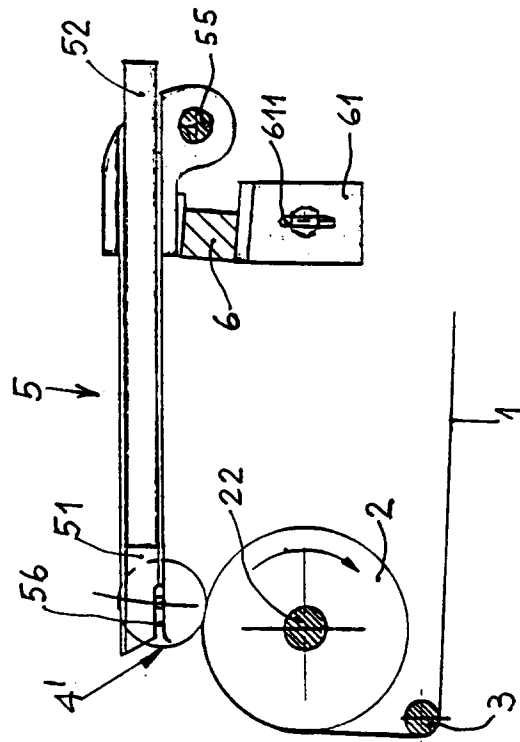


Fig. 14 A

D1 (doffing)		D2 (positioning the empty hollow lap rollers)			D3 (ejection of the full hollow lap rollers)		
	C10	D3, T1, T2					
T1		7 (71a, 71b)				(D3)	(55, 53, 51) →
	C11	7 (stop in 7c)			T2		C30 (55, 53, 51) ←
				C20			C31 (stop D3)
	C12	7 (stop in 7d), T3					
T3		pause			T3		pause
withdrawing of the carriage 100 - supply of empty hollow lap rollers at 90							
T3		7 (71d, 71a)					
	C10	(new cycle)					

Fig. 15

Fig. 16 A

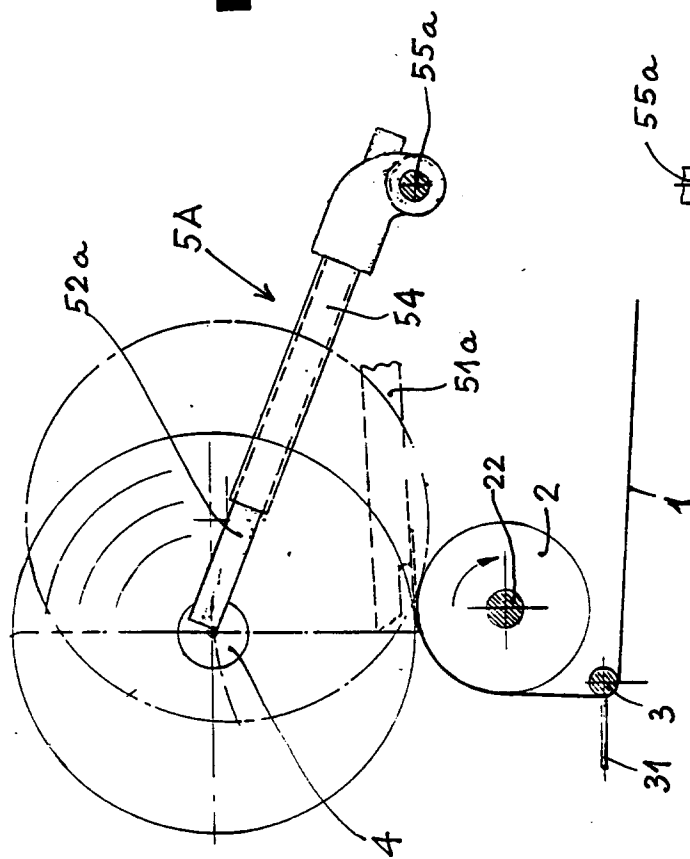
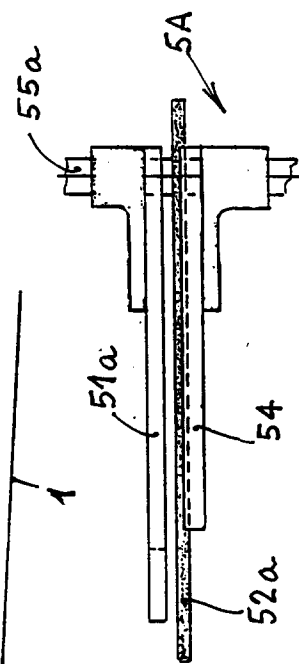
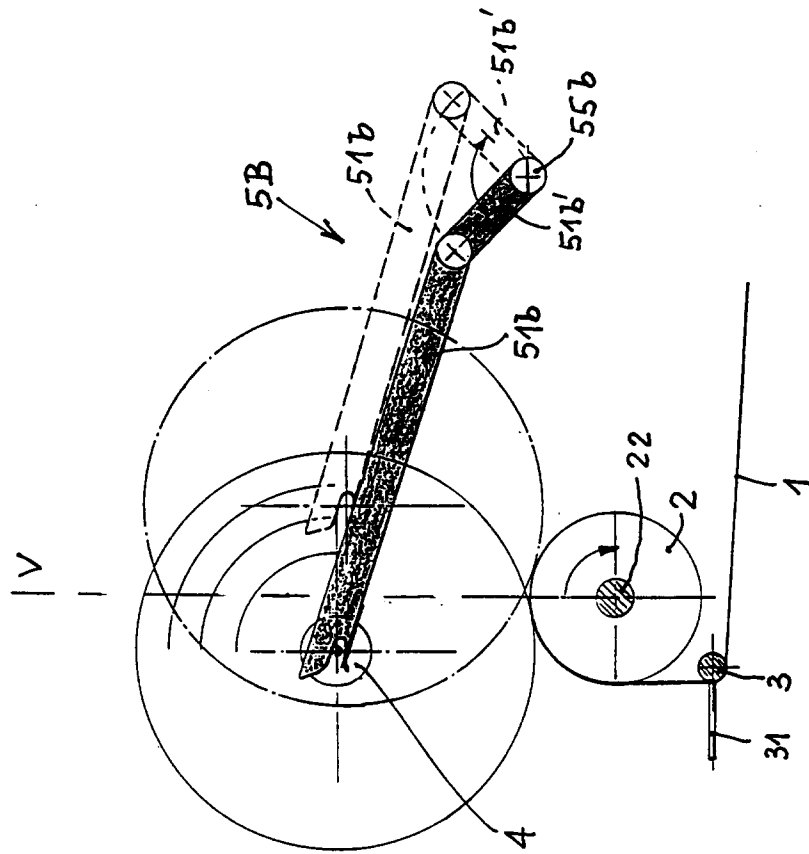


Fig. 16 B





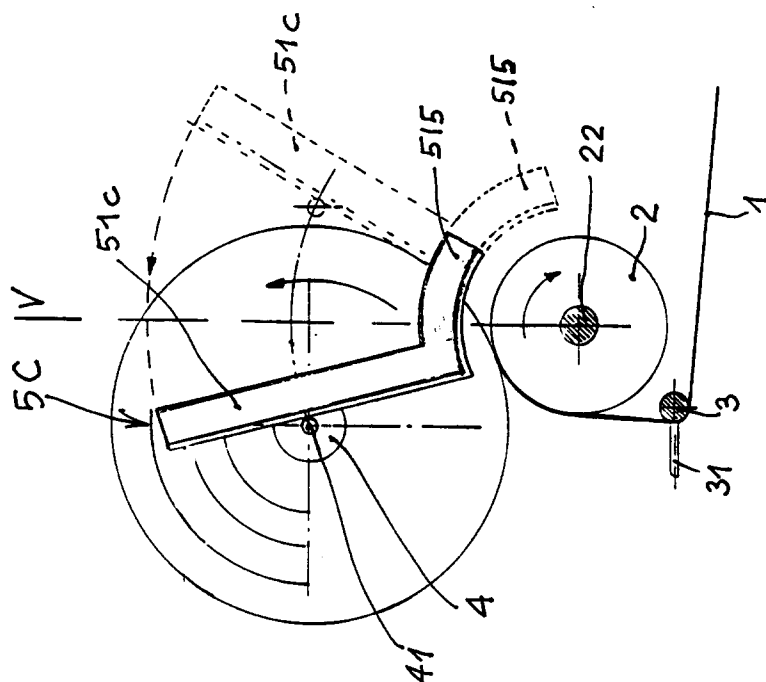


Fig. 18 B

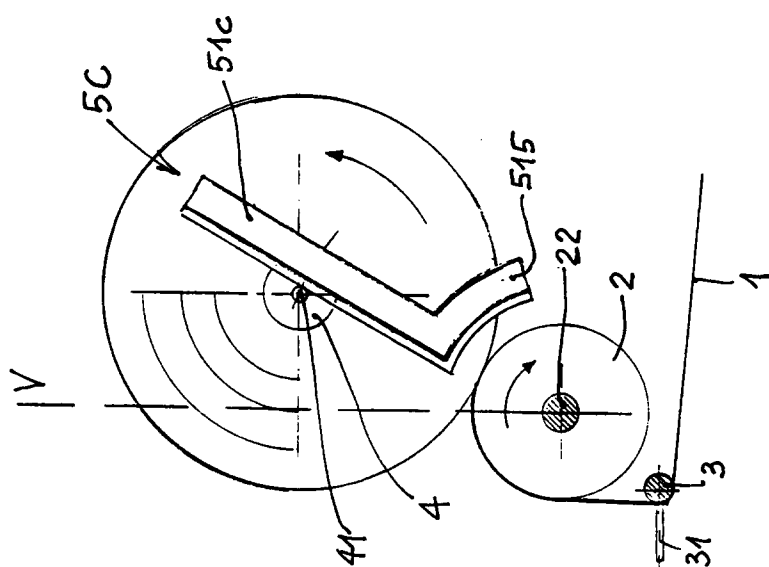


Fig. 18 A

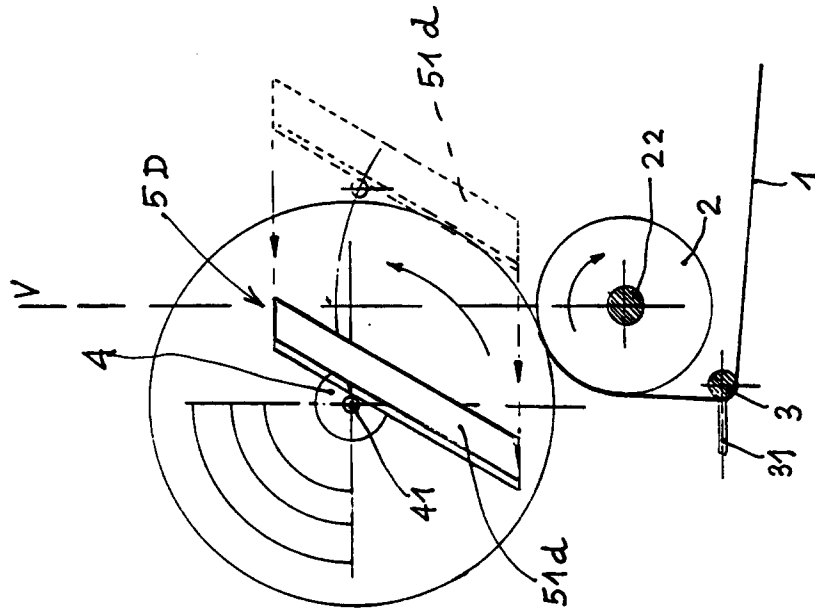


Fig. 19 B

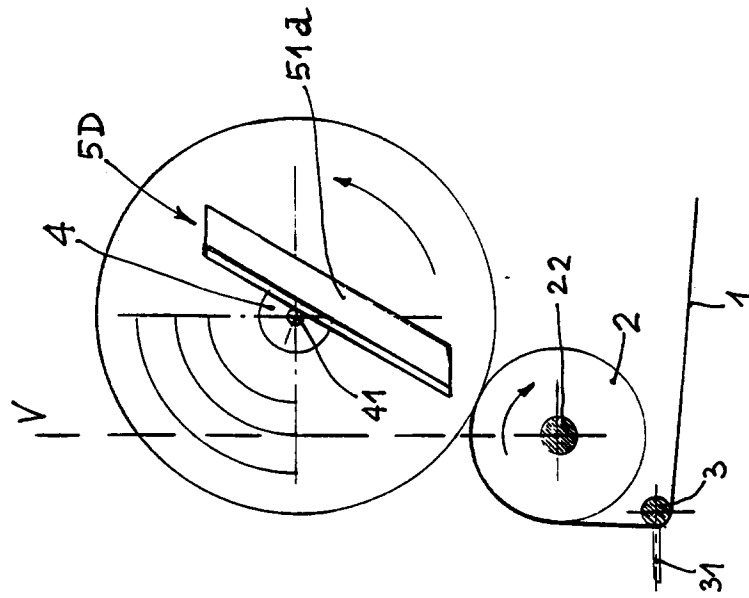


Fig. 19 A



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 95 10 1571

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
P,Y	EP-A-0 607 945 (FAGGIO,E.) * column 9, line 35 - column 13, line 48; claims 1,7; figures 3,5,7,8 *	1	D01G15/62 D01G27/04
A	---	6,7,15	
Y	DE-B-11 66 668 (COMPAGNIE DE SAINT-GOBAIN) * column 3, line 35 - column 4, line 9; claims 4,5; figure 1 *	1	
A	---	5	
A	US-A-2 037 348 (STEIN,M.) * the whole document *	1	
A	---		
A	GB-A-1 171 003 (TOYO BOSEKI KK ET AL) * the whole document *	1,2,6,9	

			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			D01G
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 August 1995	Examiner Munzer, E
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			