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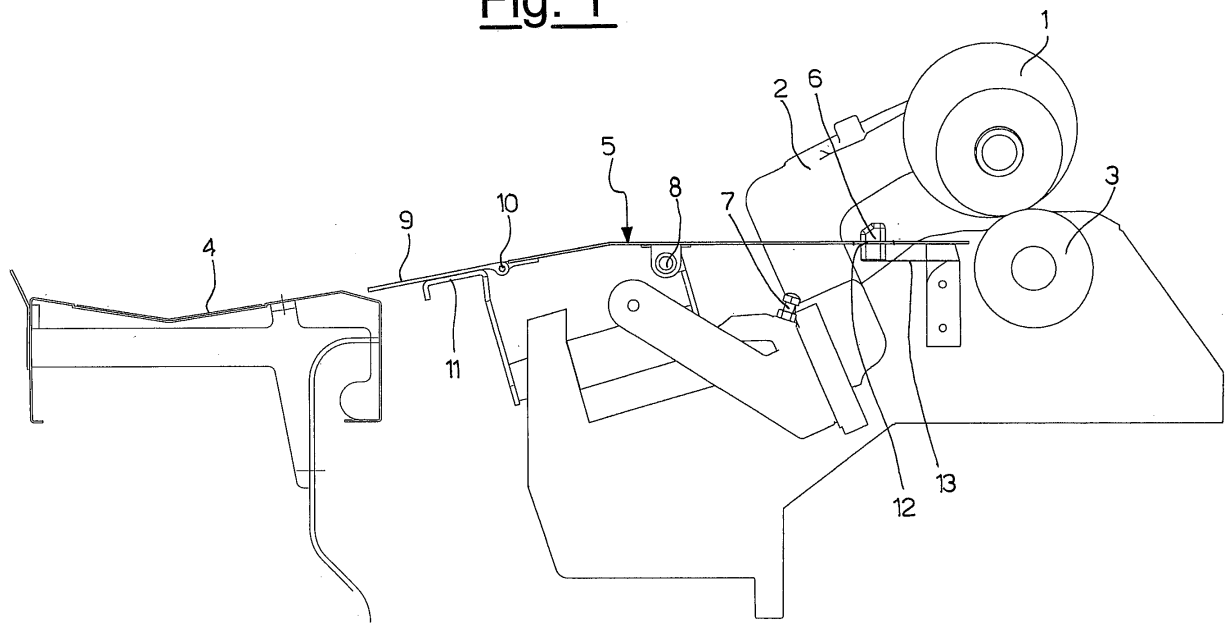
(54) **Device for the automatic doffing of bobbins in a crosswinding machine**

(57) The invention relates to a device for the automatic doffing of bobbins in a crosswinding machine, of the type comprising a rolling chute (5) on which the bobbin is free to roll towards a conveyor belt (4), wherein said rolling chute (5) is hinged around a rotation pin (8), around which it can rotate varying the level difference between its ends, a flap (9) being hinged to the end of said rolling chute (5) facing the conveyor belt (4), whose portion facing the conveyor belt (4) slides on a fixed supporting counter-edge (11).

Fig. 1



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Description

[0001] The present invention relates to a device for the automatic doffing of bobbins in a crosswinding machine and for the substitution of a bobbin which has reached the pre-established dimensions, with a new tube around which the yarn coming from a feeding pirn is wound to form a new bobbin.

[0002] As is known, crosswinding procedures essentially consist of unwinding operations of the yarn from feeding pirns, cleaning the yarn from possible faults and its crosswinding onto tubes, according to forms and dimensions which vary according to the destination of the yarn. If the yarn is destined for feeding highspeed machines, the bobbins are normally cylindrical, or truncated-conical with a low conicity, if, on the contrary, the yarn is destined for feeding low-speed machines, the bobbins are truncated-conical with a higher conicity. The degree of conicity is selected so as to always ensure a correct unwinding of the bobbins during their final use, in the presence of more or less strong centrifugal forces.

[0003] A crosswinding machine allows the contemporaneous crosswinding of a series of bobbins, i.e. it normally comprises a series of devices for the formation of bobbins, so-called crosswinding heads, positioned side by side, and served by at least one common service device, also called trolley, which can run along the whole crosswinding machine, positioning itself in correspondence with each crosswinding head and which effects, in an automated manner, various operations which are cyclically required by each crosswinding head, among which, in particular, the substitution of bobbins which have reached the pre-established dimensions with a new winding tube around which a new bobbin is formed.

[0004] In particular, the doffing operation of a bobbin and its substitution envisages stopping the crosswinding head, cutting the yarn and withholding its end coming from the pirn, removing the bobbin which has reached the pre-established dimensions and substituting it with a new tube to which the yarn end coming from the pirn is fastened to restart the crosswinding. The removed bobbin is sent to a conveyor belt which runs along the crosswinding machine, to receive the completed bobbins coming from the various crosswinding heads.

[0005] Doffing operations of a bobbin require the intervention of the common service device which, in cooperation with the devices already positioned on the crosswinding head, recovers the yarn end coming from the pirn, removes the completed bobbin, positions the new winding tube and arranges the yarn end on the new winding tube.

[0006] The transfer of the bobbin to the conveyor belt is conveniently effected by rolling the bobbin along a tilted surface situated between the formation position of the bobbin and the position of the conveyor belt. In relation to the higher or lower conicity and dimension of the bobbin to be doffed and transferred to the conveyor belt, particular attention should therefore be paid to ensure that the rolling of the bobbins is effected without the risk of going the wrong way or stopping along the course of the conveyor belt, and that the bobbins themselves are deposited on the conveyor belt without any form of impact.

[0007] According to the known art, in particular with reference to European patents EP282105 and EP285186, filed by the same applicant of the present patent application, the rolling is facilitated by dividing the course of the bobbin towards the conveyor belt into several parts, with intermediate stops which prevent the bobbin from gaining speed while rolling and at the same time allowing its position to be adjusted. The division of the bobbin course is obtained by means of levers which can rotate around a rotation axis, between a position in which they intercept the bobbin along its run and a position in which they are lifted and let the bobbin pass. The levers can also be rotated so as to push the bobbin.

[0008] The above solution is extremely effective but it depends on a series of moving organs, each equipped with specific driving means, with the consequent necessity of frequent repair and maintenance stoppages of the moving parts.

[0009] An objective of the present invention is therefore to ensure the correct rolling of the bobbin towards the conveyor belt, by proposing means capable of forming a series of stop and start points of the bobbin in its rolling, and reducing the number of necessary driving elements.

[0010] A further objective of the present invention is to guarantee a greater productivity of the crosswinding machine through a greater operating factor.

[0011] These objectives according to the present invention are achieved by providing a device for the automatic doffing of bobbins in a crosswinding machine as specified in claim 1.

[0012] Further characteristics of the device according to the invention are indicated in the subsequent dependent claims.

[0013] The present invention is now described, for illustrative and non-limiting purposes, according to one of its preferred embodiments, with particular reference to figures 1-5 of the enclosed drawings which schematically show some of the devices of a crosswinding head during a succession of operating phases.

[0014] With reference to the figures, these show in particular a bobbin 1, a supporting arm of the bobbin, commonly called bobbin-holder arm 2, a driving and traversing cylinder 3 (which collaborates with the formation of the bobbin and whose presence and function have nothing to do with the specific object of the present invention), a conveyor belt 4 and a rolling chute 5, for allowing the bobbin 1 to roll by gravity from its formation position, on the bobbin-holder arm 2, to the conveyor belt 4.

[0015] Under operating conditions, figure 1, a yarn (not shown), which is unwound from a pirn (not shown) and after passing through a series of devices whose function is to eliminate faults of the yarn itself, is wound around

the bobbin 1.

[0016] In correspondence with the detection of the formation of the pre-established dimensions of the bobbin 1, or, in any case, in correspondence with a command for changing the bobbin 1, figure 2, the yarn coming from the pirn is cut and the rotation of the bobbin 1 is interrupted. The bobbin-holder arm 2 is induced to release the bobbin 1, which falls onto the rolling chute 5 and is stopped by a stopping element 6, integral with the structure of the crosswinding head, which crosses the surface of the rolling chute 5 in correspondence with an opening 12. In order to prevent the contact between the bobbin 1 and the stopping element 6 from being too brusque, the constraint between the stopping element 6 and the structure of the crosswinding head can conveniently have a certain degree of elasticity, for example by supporting the stopping element 6 with an elastic lamella 13.

[0017] The bobbin-holder arm 2 is lifted and, during its movement, engages the lower surface of the rolling chute 5, by exerting upward pressure on the same, with a counter-edge element 7.

[0018] With reference to figure 3, the rolling chute 5 is hinged on a rotation pin 8, integral with the structure of the crosswinding head, positioned under the rolling chute 5 in a shifted position towards the conveyor belt 4 with respect to the contact point between the rolling chute 5 and the counter-edge element 7 integral with the bobbin-holder arm 2. The pressure exerted by the counter-edge element 7 on the rolling chute 5 therefore causes a rotation of the rolling chute around the rotation pin 8, causing a difference in level between the two ends of the rolling chute 5 itself. When the lifting of the portion of the rolling chute 5 on which the bobbin 1 is situated is such as to exceed the height of the stopping element 6, the bobbin 1 is released and, by force of gravity, begins rolling along the rolling chute 5, in the direction of the conveyor belt 4.

[0019] The end of the rolling chute 5 facing the conveyor belt 4, consists of a flap 9, hinged around a hinge 10 and resting on a supporting counter-edge 11. As a result of the rotation of the rolling chute 5 around the rotation pin 8, its end containing the flap 9 is lowered, the supporting counter-edge 11 forcing the flap 9 to rotate around the hinge 10, forming an angled position with respect to the rolling chute 5. With particular reference to figure 4, this shows how the flap 9 thus forms an obstacle for the movement of the bobbin 1 and between the flap 9 itself and the rolling chute 5, a V-shaped housing and alignment seat is formed for the bobbin 1.

[0020] Subsequently, with reference to figure 5, the bobbin-holder arm 2 is returned to its original position. Consequently, the rolling chute 5 also returns to its original position and the flap 9 rotates around the hinge 10 until it has formed an aligned position with the rolling chute 5. In particular, the position of the flap 9 is determined by the supporting counter-edge 11, which prevents the rotation of the flap 9 around the hinge 10 from continuing beyond the alignment position with the conveyor belt 4.

[0021] In particular, the very weight of the portion of rolling chute 5 facing the formation position of the bobbin 1 is such that, without the pressure exerted by the counter-edge element 7 of the bobbin-holder arm 2, the rolling chute 5 automatically returns to its original position, also in the presence of the bobbin 1 on the end of its portion facing the conveyor belt. As an alternative or in addition to this expedient, means can be provided for facilitating the return of the rolling chute 5 to its original position.

[0022] The portion of rolling chute 5 facing the conveyor belt 4 is preferably slightly tilted towards the conveyor belt with respect to the remaining part, forming a slight difference in level which helps the rolling of the bobbin 1 towards the conveyor belt 4. In particular, as the bobbin 1 begins to roll from a stop position and as the remaining distance to be covered by the bobbin 1 with said rolling movement, is short, the bobbin 1 is prevented from accelerating and gaining an undesired speed; the bobbin 1, on the contrary, is delicately positioned on the conveyor belt 4.

[0023] In order to optimize the use of the device, object of the present invention, with bobbins of the conical type, the rolling chute 5 can be equipped with one or more raised side edges (not shown), in particular on the side of the rolling chute 5 towards which the conicity of the bobbin is facing. This expedient, already used also for devices produced according to the known art, helps to prevent the bobbins from effecting a curvilinear trajectory during their rolling, which would induce them to be in a transversal position with respect to the direction towards the conveyor belt.

[0024] It is evident how, through the solution proposed, the control of the movement rate of the bobbin 1 towards the conveyor belt 4 is entrusted to a single mechanism already equipped with its single drive, thus achieving the pre-established objectives.

[0025] The present invention is described, for illustrative and non-limiting purposes, according to its preferred embodiments, however, variations and/or modifications can obviously be applied by experts in the field, included in the protection scope, as defined in the enclosed claims.

Claims

1. A device for the automatic doffing of bobbins in a crosswinding machine, of the type comprising a rolling chute (5) on which the bobbin is free to roll towards a conveyor belt (4), **characterized in that** said rolling chute (5) is hinged around a rotation pin (8), around which it can rotate varying the level difference between its ends, a flap (9) being hinged to the end of said rolling chute (5) facing the conveyor belt (4), whose portion facing the conveyor belt (4) slides on a fixed supporting counter-edge (11).

2. The device for the automatic doffing of bobbins in a crosswinding machine according to claim 1,

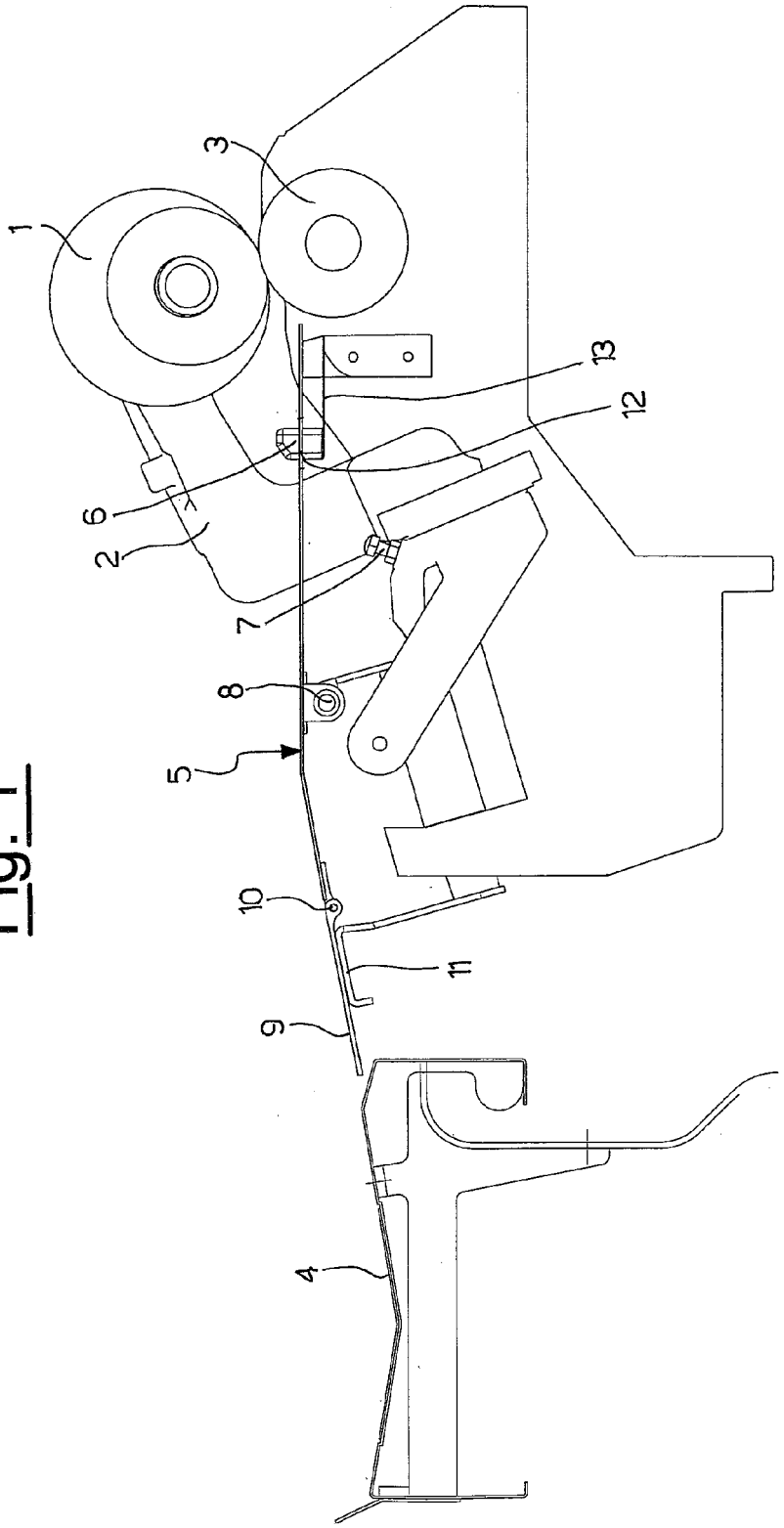
characterized in that the raising of the end of the rolling chute (5) facing the formation position of the bobbin (1) leads to a lowering of its opposite end and the end of the flap (9) hinged thereto, said flap (9) being forced to rotate around the hinge (10) by the constraint consisting of said supporting counter-edge (11), forming an angled position with respect to the rolling chute (5) and together with this forming a depression, in correspondence with the hinge (10).

3. The device for the automatic doffing of bobbins in a crosswinding machine according to claim 1, **characterized in that** the raising of the end of the rolling chute (5) facing the formation position of the bobbin (1) is caused by the direct action of a counter-edge element (7) integral with the bobbin-holder arm (2).

4. The device for the automatic doffing of bobbins in a crosswinding machine according to claim 1, **characterized in that** the return of the end of the rolling chute (5) facing the formation position of the bobbin (1) to the position it occupies during the bobbin formation phases, is caused by the difference in weight between the portions of the rolling chute (5) opposing the rotation pin (8), or by the direct action of a counter-edge element (not shown) integral with the bobbin-holder arm (2) or by recalling means.

5. The device for the automatic doffing of bobbins in a crosswinding machine according to claim 1, **characterized in that** it comprises a stopping element (6), integral with the structure of the crosswinding head, which, when the end of the rolling chute (5) facing the formation position of the bobbin (1) is not sufficiently raised, crosses the surface of the rolling chute (5) in correspondence with an opening.

Fig. 1



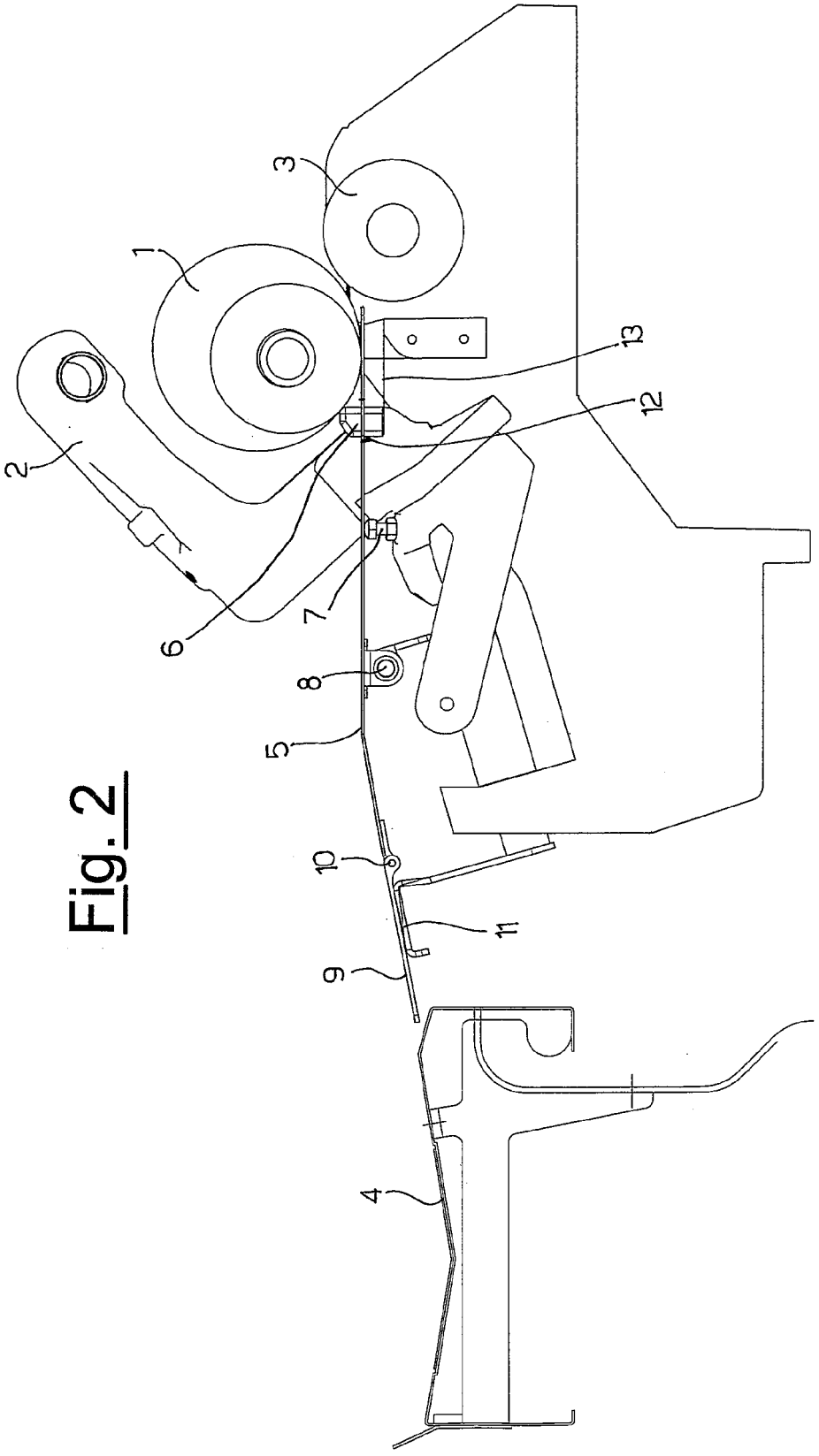


Fig. 2

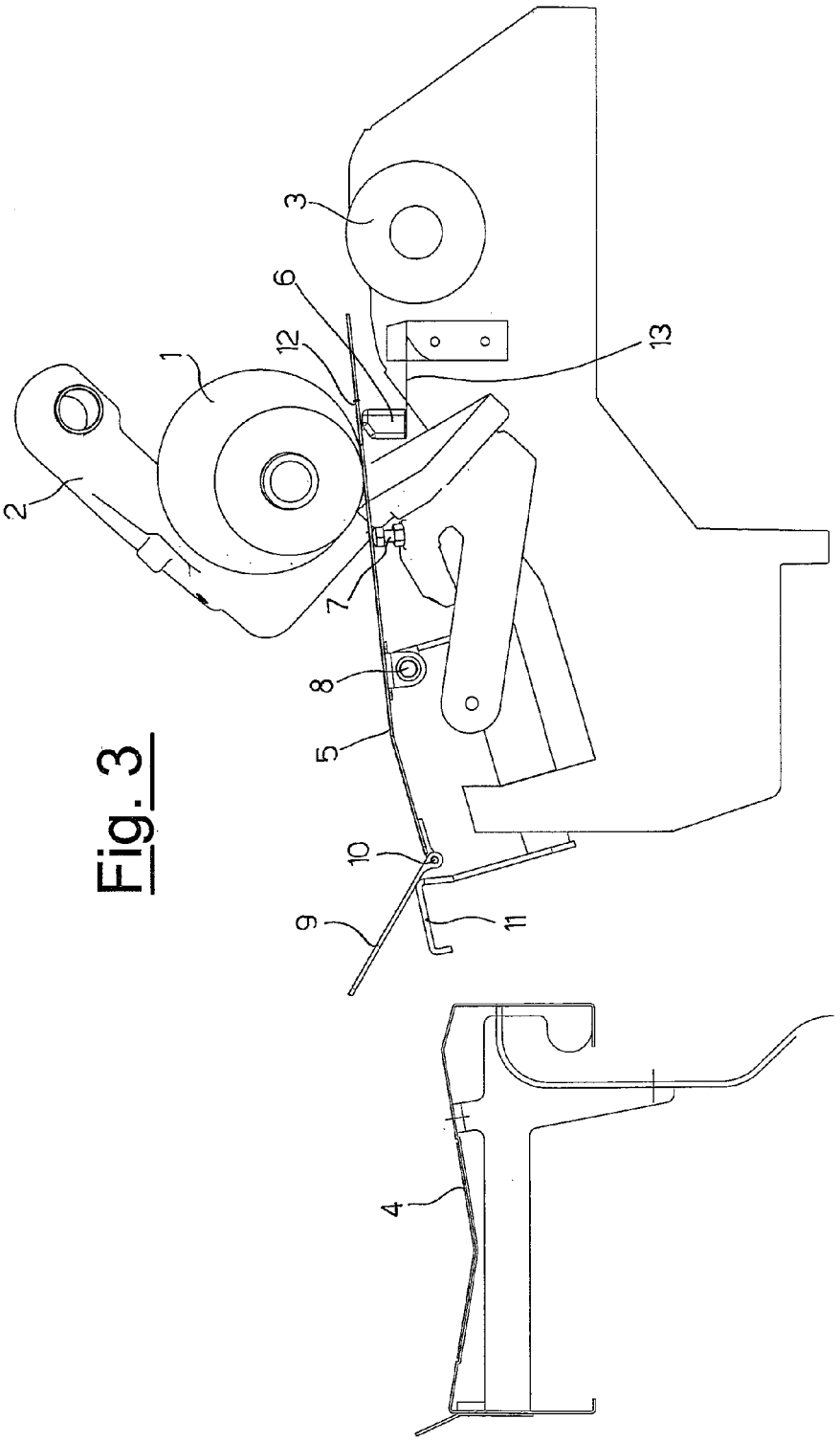


Fig. 3

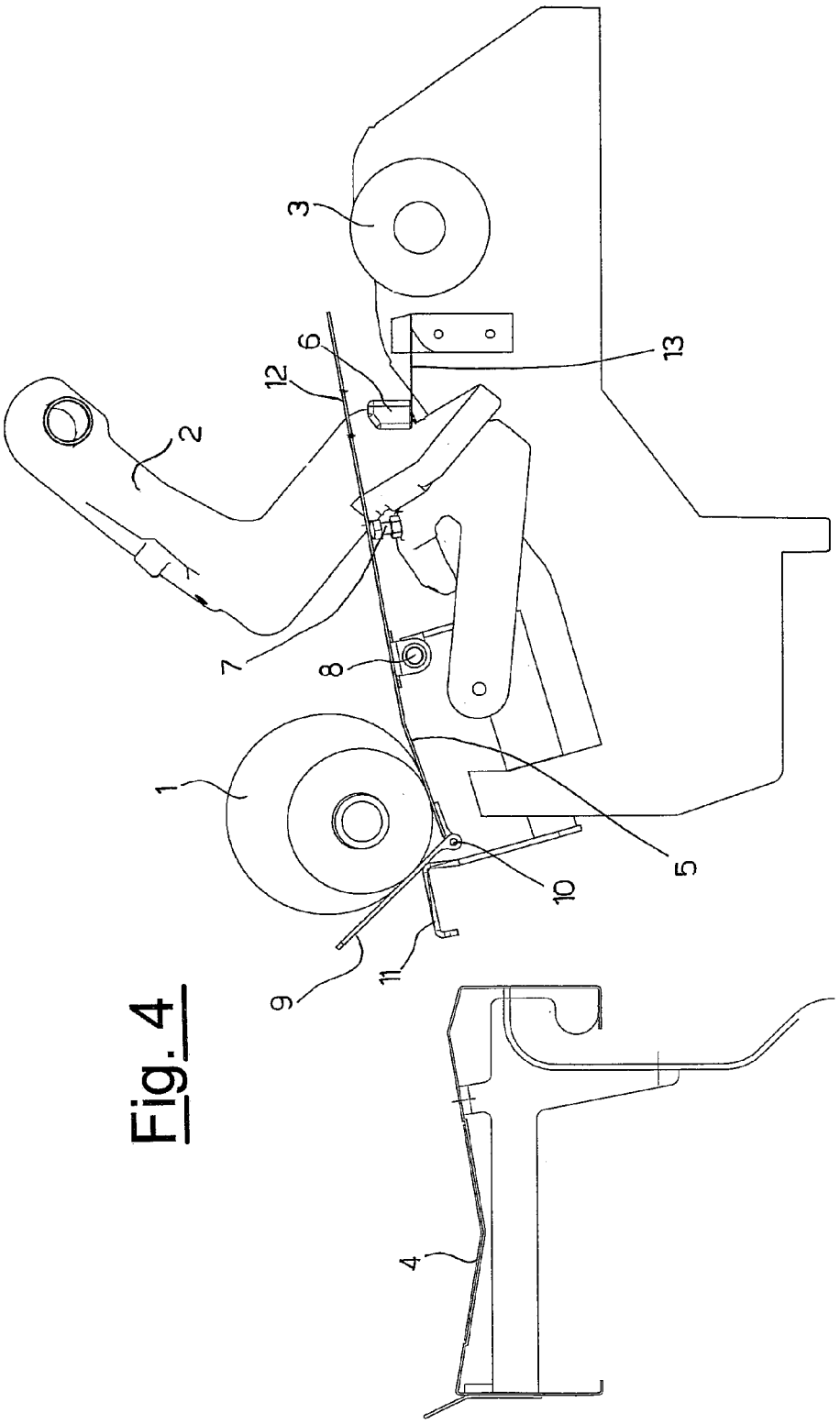


Fig. 4

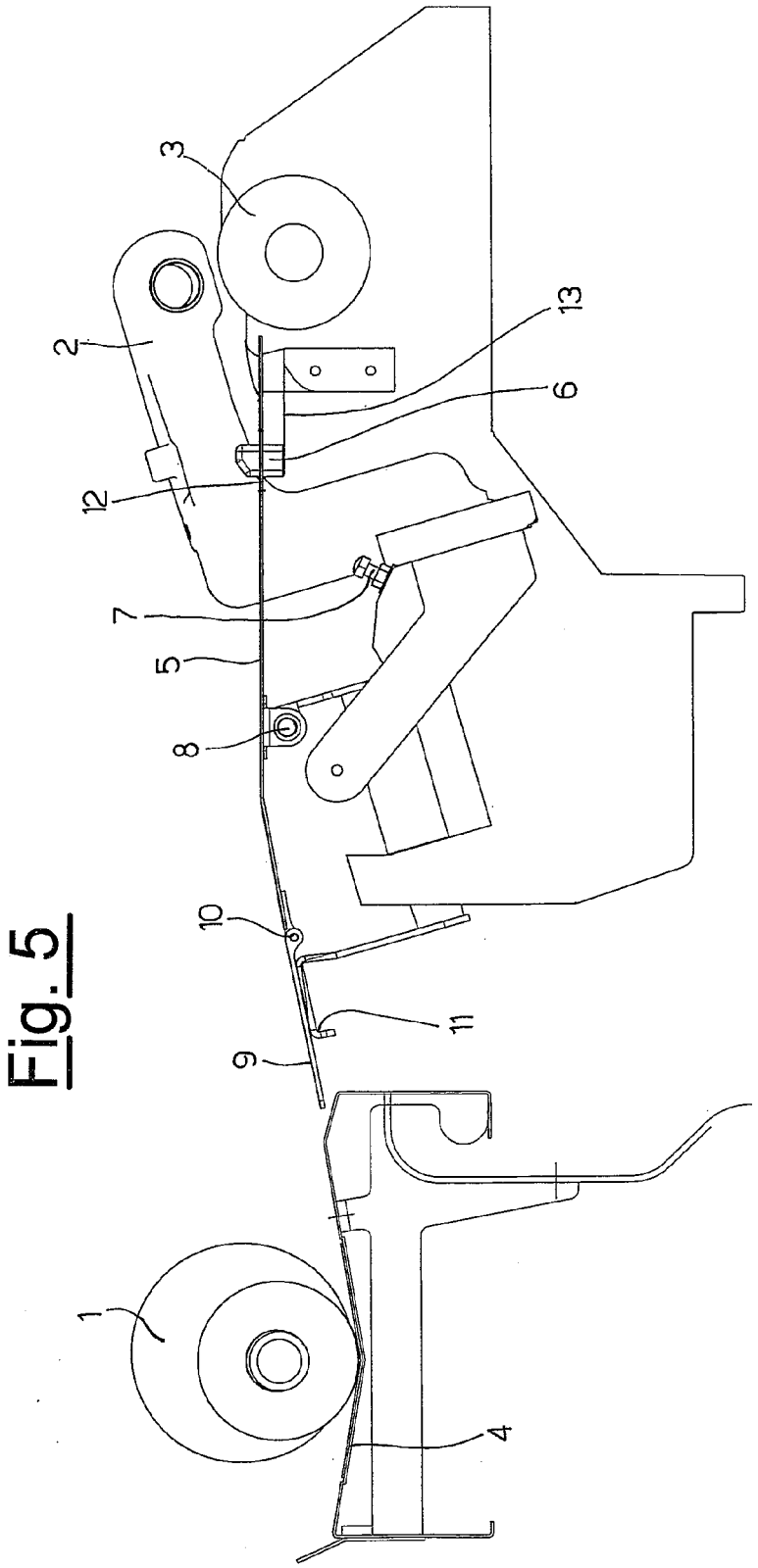


Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 06 11 1731

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 195 20 132 A1 (W. SCHLAFHORST AG & CO, 41061 MOENCHENGLADBACH, DE) 5 December 1996 (1996-12-05) * column 3, lines 12-15; figures 3,5 * * column 3, line 59 - line 67 * * column 5, line 1 - line 15 *	1	INV. B65H67/04
A	DE 38 42 783 A1 (SAURER-ALLMA GMBH, 8960 KEMPTEN, DE) 28 June 1990 (1990-06-28) * column 3, line 37 - line 47; figure 2 *	1	
A	GB 1 443 642 A (TOYODA JIDOSHOKKI SEISAKUSHO KK; DAIWA BOSEKI KK) 21 July 1976 (1976-07-21) * figures 2,8-13 *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B65H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 July 2006	Kising, A

CATEGORY OF CITED DOCUMENTS

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27-07-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19520132 A1	05-12-1996	NONE	
DE 3842783 A1	28-06-1990	FR 2640648 A1	22-06-1990
		IT 1238500 B	18-08-1993
		JP 2259126 A	19-10-1990
		US 4982561 A	08-01-1991
GB 1443642 A	21-07-1976	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 282105 A **[0007]**
- EP 285186 A **[0007]**