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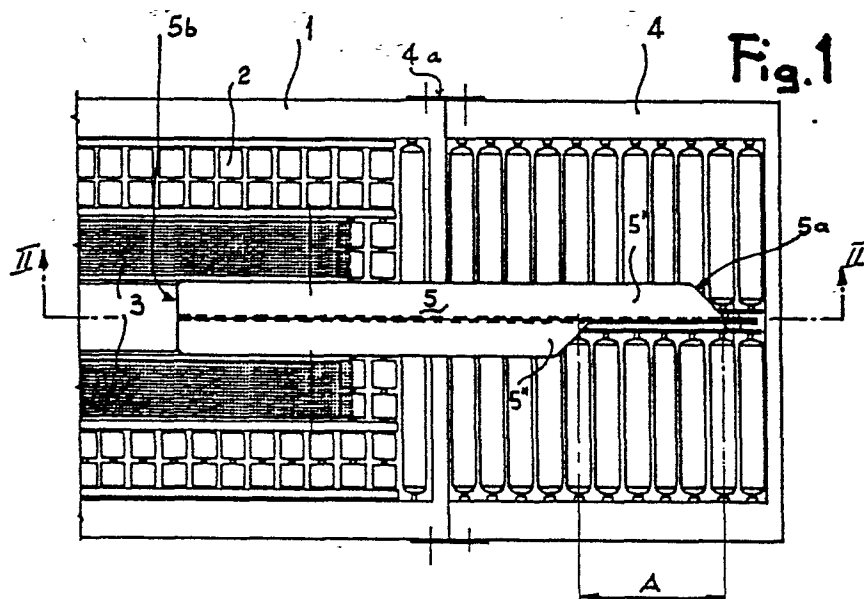
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Device for guiding packaging boxes, in a taping machine and working bed assembly.

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The present invention concerns a packaging taping machine assembly comprising a taping machine (1) with a sliding surface (2) and a conveyor (3, 3a) for conveying the boxes (S) along said surface, and a working bed (4) upstream of the taping machine, as well as means for guiding the boxes along the main longitudinal axis of said machine. The means guiding the boxes consist of a T-shaped slide bar (5), arranged along the longitudinal axis of the machine and having an inlet end (5a) in an intermediate position of the bed (4) and an outlet end (5b) in a position of the taping machine downstream of the starting point of the conveyor (3, 3a), the horizontal branches (5', 5'') of the T lying in close proximity to the sliding surface (2) of the bed and of the taping machine respectively.



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"DEVICE FOR GUIDING PACKAGING BOXES, IN A TAPING MACHINE AND WORKING BED ASSEMBLY"

It is known that in packaging machines, particularly in the so-called taping machines, the boxes to be packaged - usually cardboard boxes - are fed along a horizontal conveyor and carried through a station where an adhesive sealing tape is automatically applied along the junction line of the folded flaps of the box.

For this purpose it is indispensable, when closing the box, to fold first of all the transversal flaps and then, over these, the longitudinal flaps, it being understood that the terms "transversal" and "longitudinal" refer to the main longitudinal axis of advancement of the boxes along the conveyor of the packaging machine. By operating this way, the junction line of the external flaps is correctly aligned with the feeding direction, according to which the adhesive sealing tape is applied.

It is moreover indispensable to move the boxes forward perfectly centered in respect of said longitudinal axis, so that the adhesive tape is correctly applied in alignment with and astride of the two adjacent edges of the folded flaps of said box. To obtain this result, all the known taping machines comprise lateral guiding and centering means for the boxes, positioned symmetrically in respect of said longitudinal axis.

There are known to be different types of lateral guide means. According to a known solution, two guides are provided parallel to the longitudinal axis of the machine and apt to move close and away from said axis, under the control of motor means operated in synchronism with the advancement along the conveyor of the boxes being packaged (see for example US-A-4173105, or US-A-4041675, wherein the motor means consist of a piston). In rest conditions, said guides are spaced apart and, when a box reaches their field of control, they move symmetrically close to the machine axis, so as to bear against the sides of the box and push it in a centred and aligned position.

The guides hold this close position for all the time in which the box is clamped between them and until the closing operation has been completed by applying the adhesive tape.

This known arrangement, though perfectly functional, is however relatively complex and costly, so that its use appears justified only on automatic taping machines forming part of a high production line: for instance, a line in which the boxes are fed already filled and with folded flaps, from a previous machine having a production rhythm of its own.

Another known solution - widely spread especially because it is considerably more economic - consists in using lateral guides in the form of slide bars mounted on articulated parallelograms, which are manually adjustable in position and can be locked in an adjusted position. Their adjustment is carried out once and for all, according to a predetermined size and type of box to be packaged, and the boxes are manually fed towards said slide bars. The inlet ends of said slide bars have an inclined shape, to facilitate introduction of the boxes.

Once the boxes have been introduced between the slide bars, they are automatically aligned and centred, and this centred position is guaranteed all along the conveyor, until the outlet from the unit applying the adhesive sealing tape.

This second solution, which has the advantage of being far simpler and more economic, is adopted both in manual and in semi-automatic machines. In these known machines, a working bed is normally provided upstream of the machine itself; this bed is used to allow the operator to rest the open box thereon and fill it. At the end of the filling

operation, the operator closes the upper flaps of the box and gives it a slight push towards the taping machine. At this moment, the operator makes sure to correctly position the box between the slide bars of the taping machine.

Though this arrangement with lateral slide bars is simple and economic, it however compels the operator to place particular care in positioning the boxes between the slide bars. This however involves a waste of time; besides, as it often happens, there is a risk to damage the box, which may be guided on the conveyor in a non-centred position, thereby hitting the ends of the slide bars.

To prevent this drawback, and at the same time supply the operator with means for retaining the boxes during the filling operation, it has already been proposed to apply to the working bed an additional pair of lateral guides, also parallel to the machine axis, which are moved symmetrically - either automatically or under the operator's control - close to the box, to center the same and hold it on the bed in a centred position.

This arrangement is considered quite efficient, so that it is widely spread on machines of this type; nevertheless, it practically reintroduces on the working bed the same structural complications, and thus the same high manufacturing costs, of the automatic machines mentioned further above. In addition, it does not fully solve the problem of obtaining a perfect transfer of the boxes from the working bed to the taping machine, since in moving from one to the other, and particularly just after having left the guides on the bed, the boxes may accidentally take up an oblique positioning.

A simpler arrangement to hold the boxes on the working bed is that proposed in the US-A-4398381, which provides for a pair of flange members extending upwardly from the longitudinal center axis of a base plate, and then outwardly, so as to make sure that the longitudinal flaps of the box are retained between the base plate and said flange members.

The object of the present invention is to realize a simple system, which can be adopted not only to retain the boxes on the working bed, but also and above all to guide and transfer said boxes from the bed to the taping machine; this system is of very simple conception and very economic construction, but at the same time it guarantees an efficient and safe centred alignment of the boxes in their transfer from the working bed onto the conveyor of the taping machine.

This result is obtained in that the means for guiding the boxes consist of a T-shaped slide bar, arranged along the longitudinal axis of the machine and having an inlet end in an intermediate position of the bed and an outlet end in a position of the taping machine downstream of the starting point of the conveyor, the horizontal branches of the T lying in close proximity to the sliding surface of the bed and of the taping machine respectively.

Further characteristics and advantages of the guide means according to the present invention will anyhow be more evident from the following description of a preferred embodiment thereof, illustrated by way of example on the accompanying drawing, in which:

Fig. 1 is a diagrammatic partial plan view, showing the working bed and the starting end of a taping machine, onto which are applied the guide means according to the invention;

Fig. 2 is a longitudinal sectional view along the line II-II of figure 1; and

Fig. 3 is a cross section view along the line III-III of figure 2, showing successive steps of a box being positioned on the working bed.

As shown, the taping machine comprises, in known manner, a main frame 1, with a roller table 2 along which are moved forward the boxes S to be packaged. The sliding surface houses a conveyor 3, consisting for instance of a pair of dragging belts.

Next to the frame 1 there is positioned the working bed 4, essentially consisting of a frame with a roller table, onto which are placed the open boxes - in the position indicated by S₁ in figures 2 and 3 - to allow the operator to easily fill them. The bed 4 normally has its own support legs and is positioned to the side of the frame 1; however it can be directly fixed to said frame 1 by means of plates 4a and bolts, as shown in figures 1 and 2, this solution being adopted in particular with beds of smaller dimensions.

When boxes S on the bed 4 have been filled, the operator folds and closes the upper flaps thereof. Once this operation has been carried out, the box S is pushed towards the roller table 2, where it is caught by the belt conveyor 3 to be dragged into the position S₂ wherein the adhesive tape is applied. In this position, also an upper belt conveyor 3a is generally provided.

According to the present invention, a slide bar 5 with a T cross section is mounted along the main longitudinal axis of the bed 4. Preferably, said slide bar 5 is formed from bent plate, the central vertical portion of the T being of double plate, while the two horizontal branches of the T are of single plate.

The slide bar 5 has an inlet end 5a, arranged between a starting position and an intermediate position of the bed 4 (as shown). Whereas, the other end 5b, or outlet end of the slide bar 5, extends beyond the bed 4 (see figure 1). In this way, when the bed 4 is to the side of the frame 1, or fixed thereto, the end 5b of the slide bar 5 extends as far as a position of the roller table 2 which is downstream of the starting point of the belt conveyor 3, and preferably also downstream of the starting point of the belt conveyor 3a. It is thus clearly evident that the T-shaped slide bar 5 is positioned astride of the sliding surfaces of the bed 4 and of the taping machine.

Differently from the US-A-4398381 - which provides for a structure comprising a base plate with superposed flanges, acting as bilateral means to retain the boxes stationary on the bed - the slide bar 5 according to the invention holds the flaps of the box only on one side, namely from above, but most of all, it acts as means allowing, both to retain the boxes stationary on the bed, during filling thereof, and to guarantee their safe transfer from the working bed to the taping machine.

As shown in figure 3, the vertical portion of the T of the slide bar 5 is housed into a central axial groove 6, formed both in the bed 4 and in the roller table 2. In this way, the horizontal branches of the T of said sliding bar 5 are in close proximity to the sliding surfaces for the boxes S.

Figure 3 also shows the function of the T-shaped slide bar 5. When the operator places a box S on the bed 4, he first of all folds the lower transversal flaps, positioning them flat on the bottom surface of the box; then, keeping the box in the inclined position S₁, he introduces one of the longitudinal flaps 8 under one of the horizontal branches 5' of the T, pressing the free edge of the flap 8 against the vertical

portion of the T. Finally, he rotates the box anticlockwise in respect of figure 3 (arrow F), carrying also the other flap 8' of the box under the second branch 5'' of the T, in the manner traced by the successive positions S₂, S₃.

To facilitate this second step, the inlet end of the T-shaped slide bar is deprived of the branch 5'', through an initial length A thereof, as clearly shown in figure 1. In this way, while the flap 8 is actually inserted under the branch 5' when the box is first positioned on the bed 4 - and it is held thereunder, the flap 8' is positioned first of all on the roller table of the bed 4, in correspondence of the end of the slide bar 5 deprived of the branch 5'' (zone A), hence without being simultaneously introduced under the branch 5''; said introduction only takes place subsequently, as the operator provides to slightly push forward the box S in the direction of the arrow F' (figure 2).

Furthermore, both branches 5' and 5'' of the slide bar 5 have their edge corresponding to the inlet end, slightly oblique - as shown in figure 1 - to facilitate the above operation of initial introduction, while moving in the direction F'.

The slide bar 5 is preferably pivoted, in correspondence of its inlet end, on the pin 9 which crosses the groove 6; the pivoting is obtained through a vertical slotted hole 10, allowing a certain slack in height of the bar 5, for an automatic adjustment to different thicknesses of the flaps 8, 8'. At the other end, the slide bar 5 is essentially free to oscillate; spring means (not shown) are preferably connected to this outlet end, to impart a downward pull on the bar itself.

It can be easily understood how this simple slide bar 5 guarantees, in a very efficient manner, a perfect guiding of the box S. In fact, the two opposed inner edges of the flaps 8, 8', rest against the vertical portion of the T of the bar 5, thereby making sure that the box is positively centred on the longitudinal axis of the machine. On the other hand, the engagement of the flaps 8, 8', under the branches 5' and 5'', as well as the fact that the bar 5 is pushed downwardly by the aforementioned spring means, guarantees a steady positioning of the box on the roller table and, in particular, on the belt conveyor 3. Finally, the fact that the bar 5 extends beyond the starting point of the belt conveyor 3, and preferably also beyond the starting point of the belt conveyor 3a, guarantees that the box is guided in a centred position - in its transfer from the bed to the taping machine - until it is safely and completely retained by the belt conveyors. In other words, the box S is abandoned by the bar 5 only when it is already clamped the means for applying the adhesive tape, namely, in a position where it can practically no longer be deviated from the correct rectilinear trajectory.

It is anyhow understood that the invention is not limited to the particular embodiment described, but that many modifications can be made thereto, all within reach of an expert in the art and all thus falling within the protection scope of the invention itself.

Claims

1) Packaging taping machine assembly comprising a working bed (4) positioned upstream of said machine, wherein the taping machine (1) comprises a sliding surface (2), a conveyor (3) for conveying the boxes (S) along said sliding surface, as well as means for guiding the boxes along the main longitudinal axis of said machine, and wherein said working bed comprises in turn a sliding surface, as well as means retaining the boxes, characterized in that said means

guiding the boxes and said means retaining the same, consist of a single T-shaped slide bar (5), arranged along the longitudinal axis of the machine and having an inlet end (5a) in an intermediate position of the bed and an outlet end (5b) in a position of the taping machine downstream of the starting point of the conveyor, the horizontal branches of the T lying in close proximity to the sliding surface of the bed and of the taping machine respectively.

2) Taping machine and working bed assembly as in claim 1), wherein the inlet end (5a) of said T-shaped slide bar is pivoted to the bed.

3) Taping machine and working bed assembly as in claim 2), wherein said pivoting is obtained through a vertical slotted hole (10).

4) Taping machine and working bed assembly as in claim 1), the taping machine comprising a lower belt conveyor (3), on level with the sliding surface, and an upper belt conveyor (3a), characterized in that, the outlet end (5b) of said T-shaped slide bar extends as far as a position downstream of the starting point of both said belt conveyors.

5) Taping machine and working bed assembly as in claim 1), wherein spring means are associated to said T-shaped

slide bar, to impart a downward pull on said slide bar.

6) Taping machine and working bed assembly as in claim 5), wherein said spring means are fixed to said slide bar close to its outlet end.

7) Taping machine and working bed assembly as in claim 1), wherein said T-shaped slide bar is formed from bent plate.

8) Taping machine and working bed assembly as in claim 7), wherein the section of said T-shaped slide bar comprises a central vertical portion (5) of double plate and two horizontal branches (5',5'') of single plate.

9) Taping machine and working bed assembly as in claim 1), wherein the branches of the T-shaped slide bar are cut oblique in correspondence of the inlet end of said bar.

10) Taping machine and working bed assembly as in claim 1), wherein the inlet end of the T-shaped slide bar is deprived of one of the branches of the T through an initial length (A) thereof.

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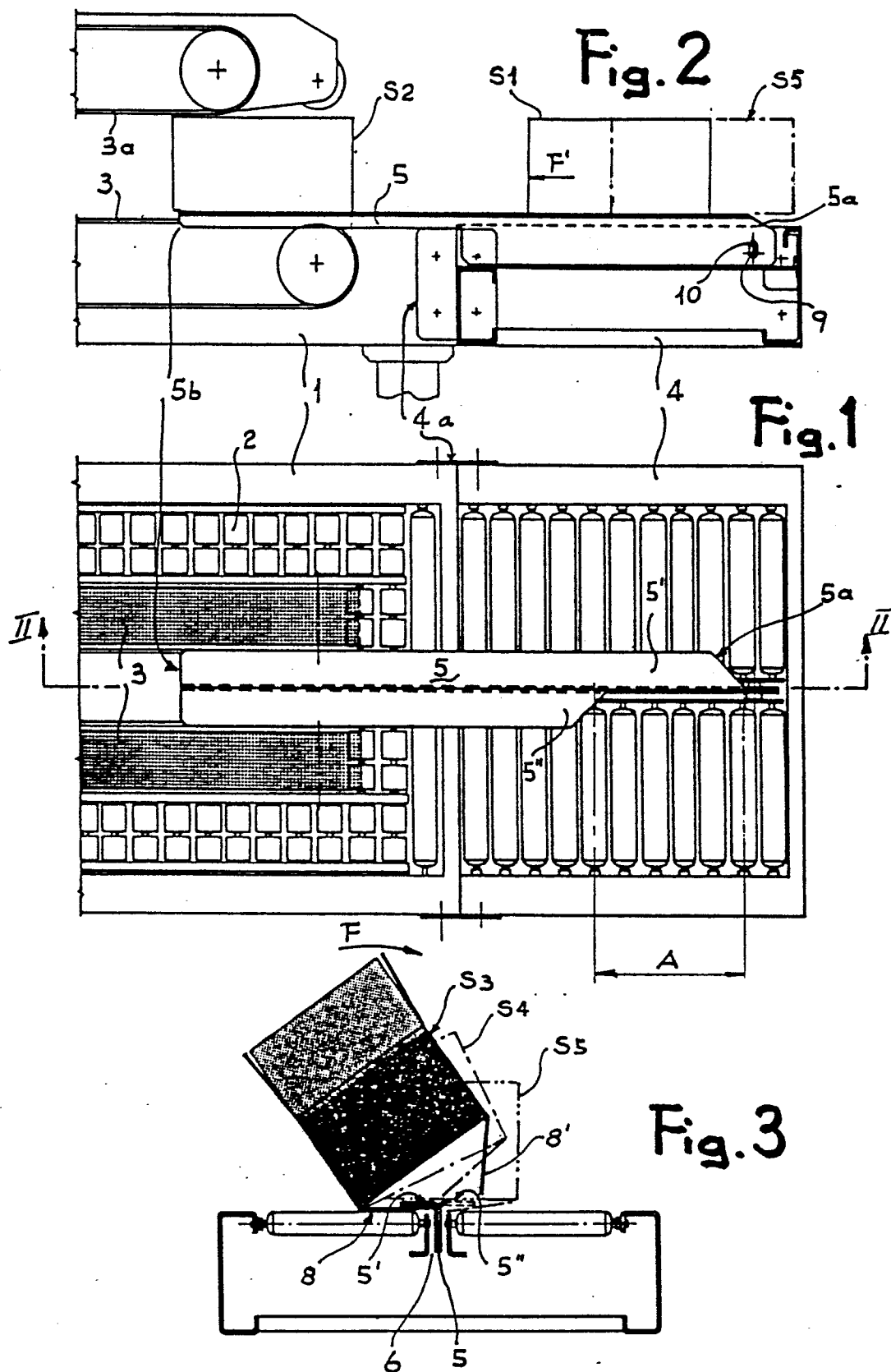
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A,D	US-A-4 398 381 (ULRICH et al.) * Column 1, lines 17-23,32-50; column 2, line 45 - column 3, line 2; figure 1 *	1,7,9	B 65 B 51/06
A,D	--- US-A-4 041 675 (LOVELAND et al.) * Abstract; figures 1,2 *	1,4	
A	--- DE-A-2 651 413 (MARCHETTI) * Pages 7,8; figure 1 *	1,4	
A	--- US-A-2 873 039 (POWEL) * Column 1, lines 50-67; figure 2 * -----	4	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B
Place of search THE HAGUE		Date of completion of the search 14-02-1986	Examiner GRENTZIUS W.
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			