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(54) Assembly of a loading means and a strip stacker

(57) Assembly of a loading means (3) and a strip stacker (2). The loading means comprises a horizontal loading surface (4). The strip stacker comprises a depositing mechanism with a depositing end for depositing an unvulcanized rubber strip (5) on the loading surface. The assembly comprises means for variably adjusting the distance between the depositing end and the loading surface. The distance is minimally adjustable at zero.

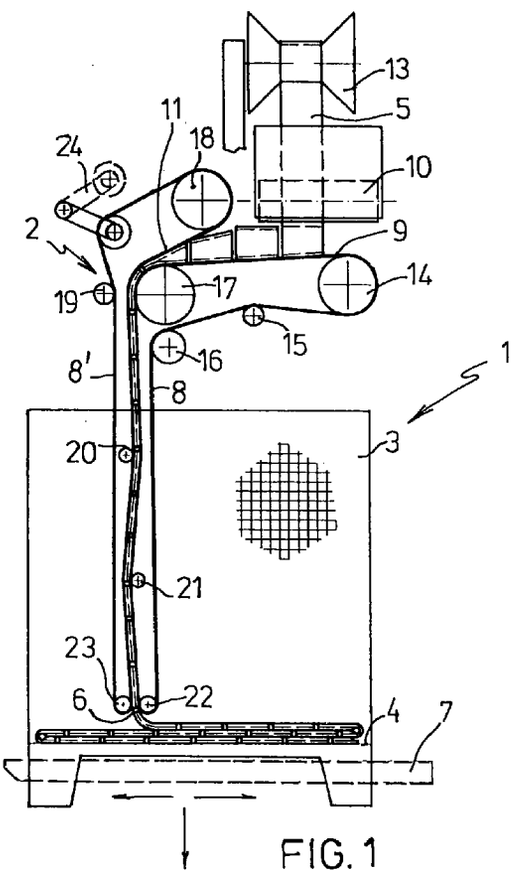

FIG. 1

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Description

The invention relates to an assembly of a loading means with a horizontal loading surface and a strip stacker for depositing an unvulcanized rubber strip on the loading surface, said strip stacker comprising a depositing mechanism with a depositing end.

The invention further relates to a strip stacker for use in such an assembly.

In the rubber processing industry, for instance in the manufacture of car tyres, rubber material is generally manufactured at one location and worked into a final product at a different location. Therefore, the rubber material is to be transported from one location to the other. This takes place by for instance working the rubber material into a rubber strip, and to stack this rubber strip on a pallet by means of a strip stacker with a depositing mechanism. In the majority of cases, the pallet is a box pallet with a horizontal loading surface, on the circumference of which vertical partitions have been placed. The loading surface is reciprocated in two directions relative to the depositing end of the depositing mechanism to stack the rubber strip on the box pallet. In most cases, the depositing end is formed by a roller over which the rubber strip rolls or an exit opening of a funnel-shaped member. After transportation, the rubber strip is removed from the box pallet for further processing by being pulled off. Practice has shown, however, that with this known assembly of loading means and strip stacker, the fill factor or loading factor of a box pallet is not optimum. Moreover, removing the rubber strip from the box pallet or from the pallet creates problems since the stacked rubber strip can become tangled. This hampers a far-reaching automatic, mechanical processing of the rubber strip.

It is an object of the present invention to provide an assembly of a loading means and a strip stacker in which the stacking of the rubber strip on the loading surface is compact, in other words a high fill factor or loading factor is obtained, and in which the formation of knots in the stacked rubber strip is prevented.

For this purpose, an assembly of the type mentioned in the preamble is characterized according to the invention in that the assembly is provided with means for variably adjusting the distance between the depositing end and the loading surface, the distance being adjustable down to zero. The invention is based on the insight that the above-mentioned problems with the known assembly are caused because the distance between the depositing end and the loading surface is at least equal to the height of the partitions of the box pallet, which is standardized. This distance was considered necessary to prevent mechanical interference between the depositing end and the partitions. Even when a pallet without partitions was used, this distance was maintained because the assembly did not offer any possibilities of varying this distance. As a consequence of the distance, the rubber strip will fall unchecked from the depositing end onto the loading surface, in other words the rubber strip is not led between the depositing end and the loading surface. This unchecked depositing results in a stacking of the rubber strip which is not optimum and knots can occur in the stacked rubber strip. On the other hand, by rendering, according to the invention, the distance between the depositing end and the loading surface adjustable, wherein this distance is minimally zero, a controlled and guided depositing is possible. This allows for an optimum stacking to be obtained, that is to say an optimum fill or loading factor, without knots being formed.

When the means comprise a lifting member for the loading means, the adjusting of the distance between the depositing end and the loading surface can easily be realized.

An embodiment of an assembly according to the invention is characterized in that the depositing mechanism comprises a pair of conveying means for vertically conveying a rubber strip between the conveying means to the depositing end. It is thus possible, even with box pallets having raised partitions, to realize a guiding of the rubber strip up to the loading surface without undesirable mechanical interference between depositing mechanism and loading means.

When one conveying means of the pair of conveying means comprises a part which is placed at a distance of and is substantially parallel to the loading surface, the rubber strip to be deposited can be placed on this part, so that the rubber strip can be conveyed towards and between the two conveying means in a controlled and guided fashion, which contributes to the ultimately controlled and guided deposition of the rubber strip on the loading surface.

An embodiment of an assembly according to the invention is characterized in that the depositing mechanism comprises drive means which are reciprocable over the part of the one conveying means, transverse to the direction of movement thereof, to place the rubber strip on the part in a zigzag fashion. Since the rubber strip to be deposited is unvulcanized, and is generally 5°C to 10°C warmer than the ambient temperature, the rubber strip is somewhat plastic, that is to say deformations which have been applied will remain present in the rubber strip for a certain period of time. A zigzag rubber strip on the part of the conveyor belt can therefore also be placed on the loading surface in a zigzag fashion, which contributes to a compact and quick stacking.

The depositing mechanism preferably comprises means for flattening the loops which have been caused during the placement of the rubber strip in a zigzag fashion.

When the conveying means are conveyor belts, an optimum contact surface is realized between conveyor belts and rubber strip during vertical conveyance of the rubber strip, as a consequence of which a good support of the rubber strip is obtained and sagging thereof is prevented.

Because the rubber strip leaves the depositing end in a zigzag fashion, during the depositing of the rubber strip on the loading surface the depositing end need only be reciprocated in one direction, as a consequence of which the means for providing this movement may be of a simple construction.

According to the invention, a strip stacker with depositing mechanism for use in an assembly according to the invention is also provided, said strip stacker allowing a compact and controlled stacking of a rubber strip on a loading means.

An embodiment of an assembly and strip stacker according to the invention will now be described by way of example by means of the drawing. The following is shown in the drawing:

figure 1: a schematic side view of an assembly according to the invention, and
figure 2: a schematic front view of the assembly of figure 1.

Figure 1 shows a schematic side view of an assembly 1 for depositing a rubber strip 5 according to the invention. The assembly 1 comprises a loading means 3 and a strip stacker 2. The loading means 3 is provided with a horizontal loading surface 4, and can for instance be a pallet, a box pallet with raised partitions or any other loading means. In the shown embodiment, the loading means 3 is a box pallet. The strip stacker 2 comprises a depositing mechanism for the rubber strip 5 provided with a depositing end 6.

The rubber strip 5, which is unvulcanized and which, since it is generally stacked immediately after having been manufactured, is about 5°C to 10°C warmer than its surroundings, is supplied to drive means over a roller 13, which drive means are formed in this embodiment by two drive rollers 10, 10' (figure 2). The drive means are reciprocable over an adjustable distance above an almost horizontal part 9 of a conveyor belt 8. The rubber strip 5 is conveyed between the drive means 10, 10' and is placed on the part 9 in a zigzag fashion by the reciprocating movement of the drive means. Because the rubber strip 5 is placed on the part 9 in a zigzag fashion, loops 12 are formed in the rubber strip 5.

Due to the movement of the conveyor belt 8, the rubber strip 5 which has been placed in a zigzag fashion is conveyed from the part 9 to the almost vertically running part of the conveyor belt 8. The speed of the conveyor belt and of the reciprocating movement is herein geared to one another. Near the transition from the horizontal to the vertical part of the conveyor belt 8, a second conveyor belt 8' is placed at a distance from the conveyor belt 8. The distance between the two conveyor belts 8, 8' decreases towards the vertical part of the conveyor belts such that, one the one hand, the loops 12 of the rubber strip 5 are flattened and, on the other hand, the rubber strip 5 is clamped shift-free between the conveyor belts 8, 8' during the vertical displacement. The zigzag shape 26 of the rubber strip is hereby maintained (figure 2). The conveyor belts 8, 8' are preferably driven jointly by one drive 25.

By means of a lifting member 7, the loading surface 4 of the loading means 3 is placed up to a certain distance from the depositing end 6. When the rubber strip 5 reaches the depositing end 6, the loading surface 4 carried by the lifting member 7 is horizontally reciprocated in one direction so that the rubber strip 5 is deposited on the loading surface. When reversing the direction of movement of the loading surface 4, the distance between the depositing end 6 and the layer of rubber strip deposited on the loading surface is each time set to obtain a controlled and guided stacking of the rubber strip. For this purpose, the lifting member 7 is each time moved downwards. When the stacked rubber strip has reached the desired height, the strip stacker is switched off and the rubber strip is cut off.

Thus, the rubber strip is stacked in a compact and controlled manner, so that removing the rubber strip once again from the loading means can take place without any problems, for instance without knots being formed.

The assembly of loading means and strip stacker can be provided with sensors detecting the position of the rubber strip and the loading means, wherein the movements of the loading means and the speeds of the conveyor belts can be controlled independently from this detected position.

In the embodiment described above, adjusting the distance between depositing end and loading surface is realized by vertically shifting the loading surface. It will be clear, however, that the depositing end can also be shifted vertically for this purpose, or the depositing end and the loading surface together. Apart from that, the reciprocating movement required for depositing the rubber strip on the loading surface rather than a horizontal movement of the loading surface can be realized by a reciprocating or swivelling movement of the depositing end.

The pair of conveyor means 8, 8' used in the embodiment described above is formed by conveyor belts in order to obtain an optimum contact surface with the rubber strip, so that the rubber strip is well clamped between the conveyor belts during the vertical conveyance of the rubber strip. The conveyor belt 8 is driven by means of conveyor rollers 14, 15, 16, 17, 21 and 22, which are also mutually positioned such, that a desired tension of the conveyor belt 8 is obtained. Conveyor belt 8' is driven by means of conveyor rollers 18, 19, 20 and 23, wherein the desired tension of the conveyor belt 8' is obtained by a tensioning device 24. Both conveyor belts 8, 8' are preferably driven by a common drive motor 25 which engages one of the drive rollers of each conveyor belt. Apart from the use of conveyor belts, the use of roller, grate or chain conveyance of the rubber strip is also possible.

Flattening the loops of the rubber strip placed in a zigzag fashion can, apart from a suitable positioning of the conveyor means, also be carried out by a separate flattening means.

Claims

1. Assembly of a loading means with a horizontal loading surface and a strip stacker for depositing an unvulcanized rubber strip on the loading surface, said strip stacker comprising a depositing mechanism with a depositing end,

characterized in that the assembly is provided with means for variably adjusting the distance between the depositing end and the loading surface, the distance being adjustable down to zero.

2. Assembly according to claim 1, **characterized in that** the means comprise a lifting member for the loading means.

3. Assembly according to claim 2, **characterized in that** the depositing mechanism comprises a pair of conveying means for vertically conveying a rubber strip between the conveying means to the depositing end.

4. Assembly according to claim 3, **characterized in that** one conveying means of the pair of conveying means comprises a part which is placed at a distance of and substantially parallel to the loading surface.

5. Assembly according to claim 4, **characterized in that** the depositing mechanism comprises drive means which are reciprocable over the part of the one conveying means, transverse to the direction of movement thereof, to place the rubber strip on the part in a zigzag fashion.

6. Assembly according to claim 5, **characterized in that** the depositing mechanism comprises means for flattening the loops of the rubber strip placed in a zigzag fashion.

7. Assembly according to any one of the claims 3 to 6, **characterized in that** the conveying means are conveyor belts.

8. Assembly according to claim 5, 6 or 7, **characterized in that** the assembly is provided with means for reciprocating the depositing end in one direction relative to the loading surface.

9. Strip stacker with depositing mechanism for use in an assembly according to claim 3, 4, 5, 6 or 7.

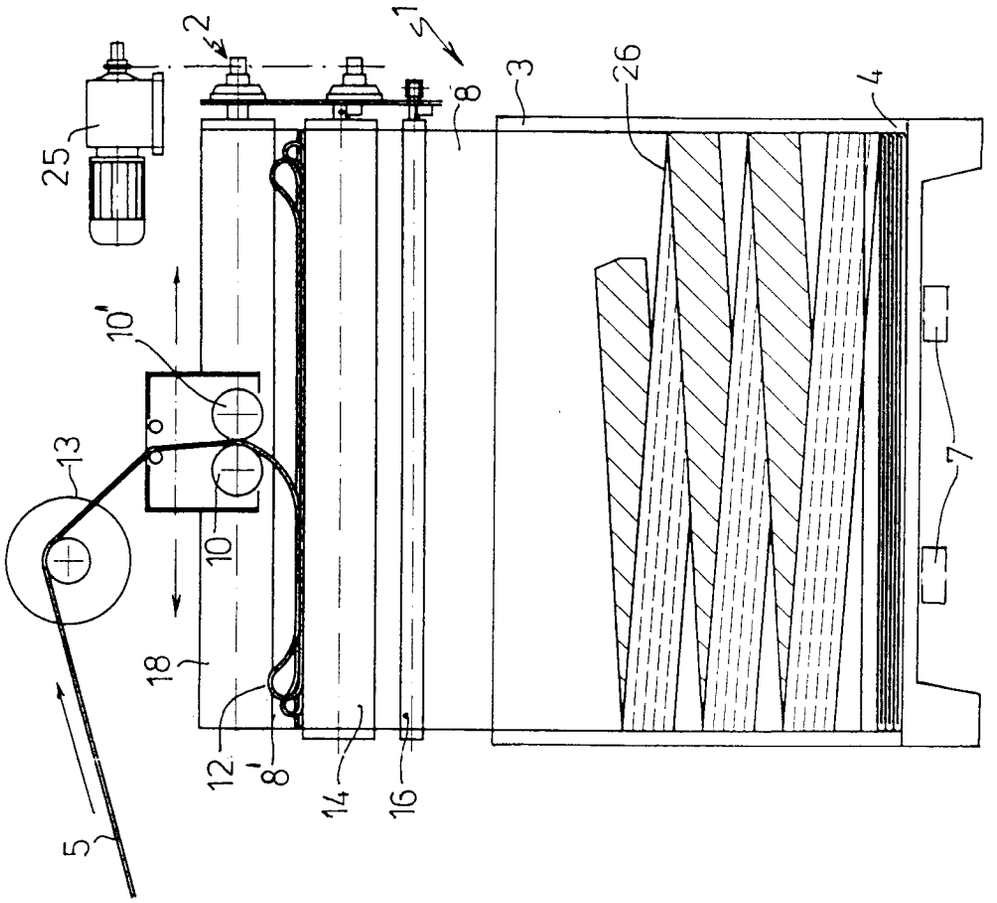
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FIG.2

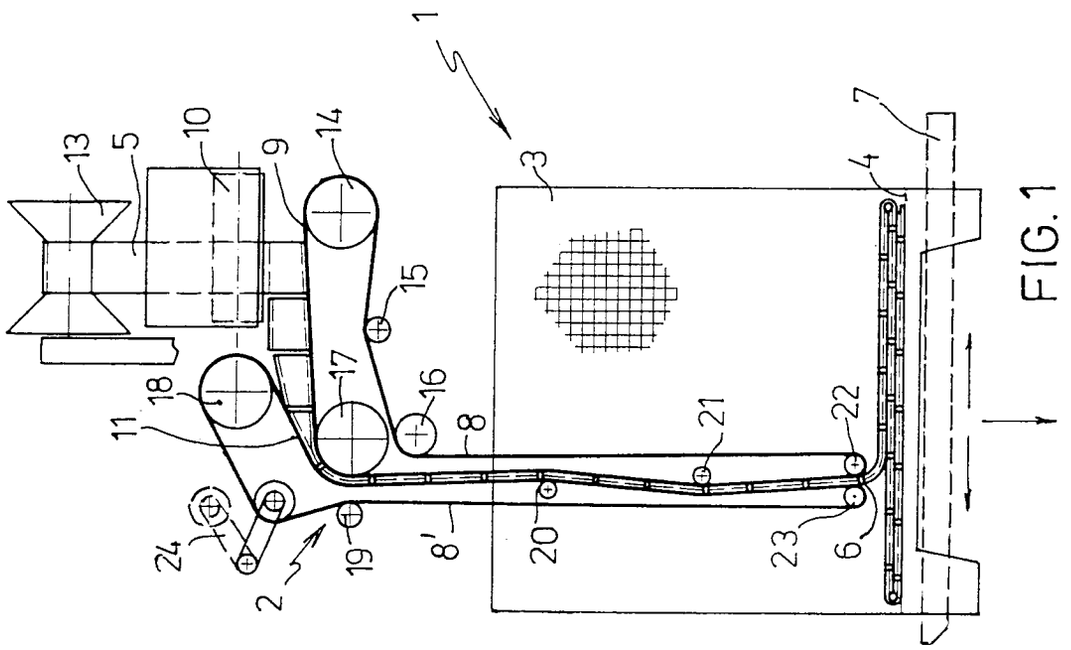
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FIG.1

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EUROPEAN SEARCH REPORT

Application Number
EP 95 20 1498

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)
X	DE-A-34 44 897 (BAYER) * page 8, line 22 - page 10, line 4; figure 2 *	1-3,7-9	B65B63/04
Y		4	

Y	US-A-4 716 706 (MINIGRIP) * column 2, line 41 - column 3, line 48; figures 1,4,6,8 *	4	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 October 1995	Claeys, H

CATEGORY OF CITED DOCUMENTS

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