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(54) **HOODING MACHINE WITH FILM STORAGE DEVICE**

(57) A hooding machine (10) comprises a store (11) for feeding a strip of film (12) to be wound onto a package which is arranged in a packaging area (16). The machine comprises a positioning device (16) for positioning the strip of film on the package and a storage device (17) which is arranged between the store (11) and the positioning device (16) so as to accumulate a length of film.

The storage device (17) has two rollers (21, 22), arranged on opposite sides of the strip of film, and a motorized support (23) which supports the rollers and moves so as to cause the rollers to perform an arc-like movement about an intermediate axis so as to divert the film between the rollers and accumulate the length of film inside the storage device. An operating method is also described.

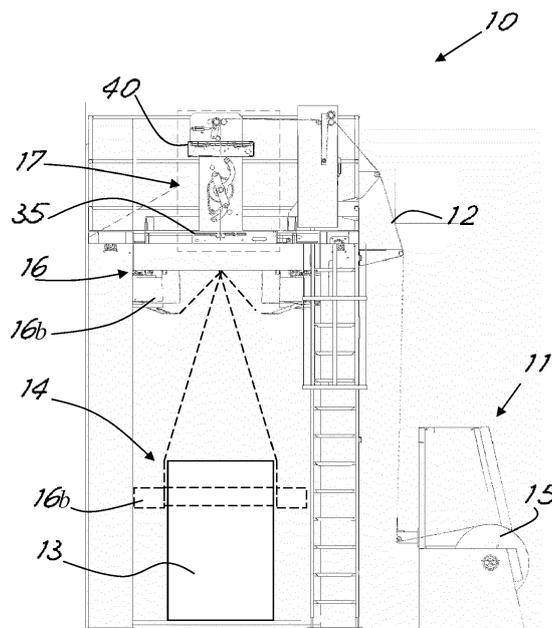


Fig. 1

Description

[0001] The present invention relates to a hooding machine with film storage device.

[0002] Hooding machines which comprise a store which supplies a strip of plastic film which is arranged by the machine on a package in a packaging area are known. For example, the strip of film may be in the form of a tube of film or be folded and welded so as to form a tube of film which may be cut transversely and arranged in the manner of a hood on the package, being fitting over it from above. The tube fitted onto the package may also be heat-shrunk if need be.

[0003] For reasons essentially relating to the operating speed of the machine, it may be useful for the portion of film which is to be positioned on the package to be prepared and accumulated in a storage device above the packaging zone, so as to avoid during the packaging operations having to rapidly retrieve the film from the supply store. In fact, usually the supply store comprises a large reel of film, which develops a considerable inertia during unwinding of the film, while the device for positioning the film on the package may operate at a relatively high speed.

[0004] Known storage devices generally comprise one or more storage rollers which move in a linear manner away from each other with the film which is folded so to form loops between them. Once the right amount of film has been accumulated, the rollers may be rapidly moved close together so as to allow fast travel of the film towards the positioning device. The linear movement mechanism of the rollers is however relatively complex, costly and delicate. It must moreover be perfectly synchronized with the positioning device so as to prevent excessive tensioning of the film during its passage from the storage device to the positioning device. The complexity of the known mechanisms, however, is not suitable for easy and effective synchronization. Other known devices, for example with a plurality of storage rollers distributed along rotating chains, are even more complex and difficult to synchronize.

[0005] The general object of the present invention is to overcome the drawbacks of the prior art by providing a packaging machine which has a simple and effective storage device.

[0006] In view of this object the idea which has occurred according to the invention is to provide a hooding machine comprising a store for feeding a strip of film to be wound onto a package which is arranged in a packaging area of the machine, the machine further comprising a positioning device for positioning the strip of film on the package and a storage device arranged between the store and the positioning device so as to accumulate a length of film, characterized in that the storage device comprises: a path for passage of the strip of film through the storage device between an input and an output of the storage device; two movable rollers arranged on opposite sides of the strip of film along said path, each movable

roll having a central rotation axis which is arranged transverse to the direction of movement of the strip of film along said path and which is parallel to the surface of the film along said path; a support which supports the movable rollers and which is driven to move the movable rollers along an arc around an intermediate axis which is situated in between and parallel to the movable rollers, so as to move them from a rest position to a storage position, crossing from opposite directions said path for passage of the strip of film through the storage device so as to divert the strip of film between the movable rollers and accumulate the length of film in the storage device.

[0007] Still according to the invention, the idea which has occurred is to implement using the aforementioned machine a method for packaging a package with a length of film and comprising the steps of feeding a length of film from the supply store to the output of the storage device; keeping the front end of the length of film downstream of the storage device; actuating the storage device so as to move the movable rollers from the rest position to the storage position, while continuing to feed the length of film from the supply store so as to accumulate the length of film in the storage device; actuating a device for cross-cutting the strip of film upstream of the movable rollers so as to separate the accumulated length of film; actuating the positioning device so as to position the length of film on the package in the packaging area while the movable rollers are moved back from the storage position to the rest position so as to release the accumulated length of film to the positioning device.

[0008] In order to illustrate more cleanly the innovative principles of the present invention and its advantages compared to the prior art, below a preferred embodiment applying these principles will be described with reference to the attached drawings. In these drawings:

- Figure 1 shows a schematic side elevation view of a packaging machine provided according to the invention;
- Figure 2 shows a schematic view, on a larger scale, of a storage device of the machine according to Figure 1;
- Figures 3 and 4 show schematic views of the storage device according to Figure 2 in different operating positions.

[0009] With reference to the figures, Figure 1 shows a hooding machine provided according to the invention and indicated by generally by 10.

[0010] This machine 10 comprises a store 11 which feeds a strip of film 12 to be wound onto a package 13 which is arranged in a packaging area 14 of the machine.

[0011] The store 11 is of the type known per se and may comprise for example a reel of film 15 and means for unrolling the film from the reel (which are not shown or described in detail since they may be easily imagined by the person skilled in the art), these for example comprising transmission rollers and electric motors for rotat-

ing the reel and/or pulling the film.

[0012] The strip of film must be supplied to a device 16 for positioning the strip of film on the package. The strip of film may be advantageously in the form of a flattened tube of film or be folded and welded longitudinally to form a tube of film.

[0013] With a strip of tubular-shaped film the positioning device 16 may advantageously comprise a frame 16b for opening the strip of tubular film and fitting from above the strip of tubular film onto the package in the packaging area. The folding and welding of the strip of film may also advantageously be performed directly in the positioning device or immediately upstream thereof, in a manner which is known per se and may therefore be easily imagined by the person skilled in the art.

[0014] For example, the frame 16b (also of the type known per se and therefore not described or shown here in detail) may have a rectangular shape and may slide vertically so as to engage around the package transporting the film with it, which may be formed and then opened as a tubular hood by the said positioning device, so as to fit over the package as schematically shown in broken lines in Figure 1.

[0015] As is known to the person skilled in the art, the film may also be of the heat-shrinkable type so as to be able to be heat-shrunk onto the package by means of heating devices (for example with electrical resistances and fans for blowing hot air) which are arranged on the positioning device or provided in a downstream heat-shrinking station to which the package is sent after being packaged with the film.

[0016] The machine 10 also comprises a storage device 17 which is arranged between the store 11 and the positioning device 16 so as to be able to accumulate a length of film before it is positioned on the package. Advantageously the storage device is arranged above the storage area and the positioning device. The film may thus be lowered vertically from above and engage inside the positioning device, be gripped by the latter and be positioned over the package with a vertical movement.

[0017] Figure 2 shows in greater detail the storage device 17 provided according to the present invention.

[0018] This storage device 17 comprises a path 18 for passage of the strip of film through it from an input 19 to an output 20.

[0019] Preferably the output 20 may be arranged vertically below the input 19 such that the film may easily pass from the input to the output hanging vertically, without the need for complex guiding systems, and be then taken up by the underlying positioning device.

[0020] The storage device 17 comprises at least two movable rollers 21 and 22 which are arranged on opposite sides of the strip of film along the path 18, as can be clearly seen in Figure 2. The rollers may be sufficiently long to cover the whole width of the strip of film.

[0021] The central axis (advantageously of free rotation) of each movable roller 21, 22 is arranged transverse to the direction of movement of the strip of film along the

path 18 parallel to the surface of the film along this path.

[0022] These movable rollers 21, 22 are supported by means of a support 23 which is motorized so as to cause the rollers to perform an arc-like movement around an axis 24 which is situated in between the rollers and parallel thereto.

[0023] As can be clearly seen from a comparison of Figures 2, 3 and 4, owing to this movement around the axis 24, the rollers may move from a non-operative or rest position (Figure 2) to a storage position (Figures 3 and/or 4) crossing from opposite directions the path 18 for passage of the strip of film through the storage device. The rollers 21, 22 thus divert the strip of film between them and accumulate a length of film inside the storage device.

[0024] The support 23 of the rollers may be realized in various ways, for example as rotating discs centered on the axis 24 and supporting one or both ends of the rollers, or as arc-like guides along which the two opposite ends of the said rollers are made to travel, etc.

[0025] Advantageously the support 23 for the movable rollers may comprise rotating support arms 25, 26 which are connected between one or both the ends of each movable roller and a motorized shaft 27 coaxial with said intermediate axis 24. For each roller, a single arm may be provided at only one end of the roller or, preferably, for greater strength of the support, one arm may be provided at each end of the roller.

[0026] The arms may also not be straight (for example curved, as shown in the figures).

[0027] The motorized shaft 27 may be connected to an actuator 28 (for example an electric motor or a linear actuator) via a kinematic connection 29, for example a belt or chain connection with suitable pulleys and toothed wheels. As will become clear from the description below, the actuator will be advantageously designed or controlled so as to cause the movable rollers 21 and 22 to follow only an arc of predefined amplitude between the rest position and the accumulation and return position.

[0028] Preferably, the storage device 17 may also comprise two fixed rollers 30 and 31 which are parallel to the movable rollers and situated in opposite positions relative to the intermediate axis 24 and on opposite sides of the strip of film along the path 18. As can be seen in Figure 2, preferably each fixed roller is close to a corresponding movable roller, but on the opposite face of the strip 12. Moreover, each fixed roller is situated preferably at a distance from the axis 24 which is smaller than the distance of the movable rollers from this axis 24.

[0029] The fixed rollers may also be sufficiently long to cover the whole width of the strip of film. The fixed rollers are moreover also advantageously freely rotatable about their central axis.

[0030] As can be clearly seen from a comparison of Figures 2, 3 and 4, owing to the presence of the fixed rollers, the strip of film may be further diverted between the movable rollers during the said arc-like movement of the movable rollers from the rest position to the storage

position. The amount of film accumulated is thus increased without the need for an excessive distance between the movable rollers and the axis 24.

[0031] Advantageously, in any case, the length of the film accumulated between the input and the output of the storage device may be provided so that it is substantially equal to the length of the film needed to perform packaging of a package, as will become clear from the description below.

[0032] As can be seen in the figures, the fixed rollers 31 may also be supported by support arms 32, 33 connected between one or both the ends of each fixed roller and a fixed spindle or shaft 34 coaxial with the axis 24. Their angular position about the axis 34 may thus be easily adjusted.

[0033] Downstream of the movable rollers (preferably immediately underneath the output 20) there is a motorized device 35 for controlling the travel of the strip of film out from the output 20 of the storage device.

[0034] This device 35 comprises advantageously at least one pair of motorized rollers 36, 37 which are movable controllably along guides 38, 39 so as to move towards or away from each other and allow a front end section of the strip 12 to pass freely or be gripped between them and pulled downwards so as to be fed to the positioning device 16.

[0035] Upstream of the movable rollers (preferably close to or at the input 19) there is a device 40 known per se for transversely cutting the strip of film. This cutting device 40 may advantageously comprise a pair of blades 41, 42 movable controllably along guides 43, 44 towards or away from each other and so as to allow respectively the free passage of the strip of film or the transverse cutting of this strip of film. One of the two blades may also be simply replaced by a stop surface. Moreover, only one blade may also move towards the other one, or vice versa). In the case where the strip of film already has a tubular form, the transverse cutting device may also comprise known welding means for closing the top part of the accumulated film, so as to form a hood closed at the top, to be fitted onto the package.

[0036] After a portion of the strip of film has been accumulated in the storage device, the positioning device may rapidly position the portion of the strip of film on the package while the movable rollers return from the storage position back to the rest position for releasing the previously accumulated strip.

[0037] The machine described may operate in various ways depending on the sequence of operations which is preferred or is useful for a specific purpose.

[0038] Advantageously, a method for packaging a package with a length of film using a machine according to the invention may be the following.

[0039] Firstly a length of film is fed from the supply store 11 to the output 20 of the storage device and the front end of the length of film downstream of the storage device is retained in order to prevent it from returning when the storage device is operated.

[0040] The front end of the strip section may be retained by the device 35 which moves the two rollers together in order to grip the strip, as shown in Figure 2.

[0041] After this, the storage device 17 may be operated so as to displace the movable rollers from the rest position to the storage position, while continuing to feed the length of film from the supply store so as to accumulate it in the storage device (Figures 3 and 4).

[0042] Once the accumulation step has been completed it is possible to actuate the device 40 for cutting and, if necessary, transversely welding the strip of film so as to separate the section of accumulated film. The section of accumulated film has substantially a length the same as that necessary for packaging the package in the packaging area. The length of the accumulated film may be adjusted within certain limits for example by adjusting the degree of rotation of the movable rollers about the axis 24 and/or the position of the fixed rollers.

[0043] The accumulated strip may then be fed to the positioning device, for example by operating the motorized rollers 36, 37, while the movable rollers are moved back from the storage position to the rest position in order to release to the positioning device the length of film which has been previously accumulated. The positioning device may be simultaneously actuated so as to position the length of film on the package present in the packaging area and heat-shrink it if necessary.

[0044] The cycle may then be repeated from the beginning in order to package a new package, with renewed feeding of the strip of film inside the storage device, and so on.

[0045] At this point it is clear how the objects of the invention have been achieved. Owing to the device according to the invention, the accumulating operation is performed in a precise, fast and reliable manner and the machine may perform very short packaging cycles, while also making advantageous use of the cutting, welding, hooding downtime, etc.

[0046] Obviously, the description above of embodiments applying the innovative principles of the present invention is provided by way of example of these innovative principles and must therefore not be regarded as limiting the scope of the rights claimed herein.

[0047] For example, the structure, size and proportions of the machine and its parts may vary depending on the specific practical requirements and the packaging methods chosen, as may be now easily imagined by the person skilled in the art. Although the machine according to the invention has been defined here as a "hooding machine", the system for positioning the film on the package may be different, for example the film may be wound around the package. The machine may also be provided with known means (for example a belt or roller conveyor) for transporting the packages towards and out of the packaging area.

Claims

1. A hooding machine (10) comprising a store (11) for feeding a strip of film (12) to be wound onto a package which is arranged in a packaging area (14) of the machine, the machine further comprising a positioning device (16) for positioning the strip of film on the package and a storage device (17) arranged between the store (11) and the positioning device (16) so as to accumulate a length of film, **characterized in that** the storage device (17) comprises:
 - a path (18) for passage of the strip of film through the storage device between an input (19) and an output (20) of the storage device;
 - two movable rollers (21, 22) arranged on opposite sides of the strip of film along said path (18), each movable roll having a central rotation axis which is arranged transverse to the direction of movement of the strip of film along said path and which is parallel to the surface of the film along said path;
 - a support (23) which supports the movable rollers (21, 22) and which is driven to move the movable rollers (21, 22) along an arc around an intermediate axis (24) which is situated in between and parallel to the movable rollers, so as to move them from a rest position to a storage position, crossing from opposite directions said path (18) for passage of the strip of film through the storage device so as to divert the strip of film between the movable rollers (21, 22) and accumulate the length of film in the storage device.

2. A hooding machine according to claim 1, **characterized in that** the storage device (17) comprises two fixed rollers (30,31) which are parallel to the movable rollers (21, 22) and in opposite positions with respect to said intermediate axis (24) and on opposite sides of the strip of film along said path (18), so as to further divert the strip of film between the movable rollers (21, 22) around the intermediate axis (24) during said arc-like movement of the movable rollers (21, 22) from the rest position to the storage position.

3. A hooding machine according to claim 1, **characterized in that** the support (23) for the movable rollers (21, 22) comprises rotating support arms (25, 26) which are connected between one or both ends of each movable roller and a motorized shaft (27) which is coaxial with said intermediate axis (24).

4. A hooding machine according to claim 2, **characterized in that** the fixed rollers (30, 31) are supported by support arms (32, 33) connected between one or both ends of each fixed roller and a fixed axis (34) coaxial with said intermediate axis (24).

5. A hooding machine according to claim 3, **characterized in that** the motorized shaft (27) is connected to an actuator (28) via a kinematic belt or chain connection (29).

6. A hooding machine as claimed in claim 1, **characterized in that**, downstream of the movable rollers (21, 22), there is a motorized device (35) for controlling the travel of the strip of film out from the output (20) of the storage device.

7. A hooding machine according to claim 1, **characterized in that**, upstream of the movable rollers (21, 22), there is a device (40) for transversely cutting and optionally welding the strip of film.

8. A hooding machine according to claim 1, **characterized in that**, when the movable rollers (21, 22) are in the rest position, said path (18) of the film between the input (19) and the output (20) of the storage device is vertical.

9. A hooding machine according to claim 1, **characterized in that** the strip of film is a strip of tubular film or a tubular film strip is formed from it and the positioning device (16) comprises a frame (16b) for fitting from above the strip of tubular film onto the package in the packaging area (14) during a movement of the movable rollers (21, 22) back from the storage position to the rest position.

10. A method for packaging a package with a length of film by means of a machine (10) according to any one of the preceding claims, comprising the steps of:
 - feeding a length of film from the supply store (11) to the output (20) of the storage device (17);
 - keeping the front end of the length of film downstream of the storage device;
 - actuating the storage device so as to move the movable rollers (21, 22) from the rest position to the storage position, while continuing to feed the length of film from the supply store (11) so as to accumulate the length of film in the storage device (17);
 - actuating a device (40) for cross-cutting the strip of film upstream of the movable rollers (21, 22) so as to separate the accumulated length of film;
 - actuating the positioning device (16) so as to position the length of film on the package in the packaging area while the movable rollers (21, 22) are moved back from the storage position to the rest position so as to release the accumulated length of film to the positioning device (16).

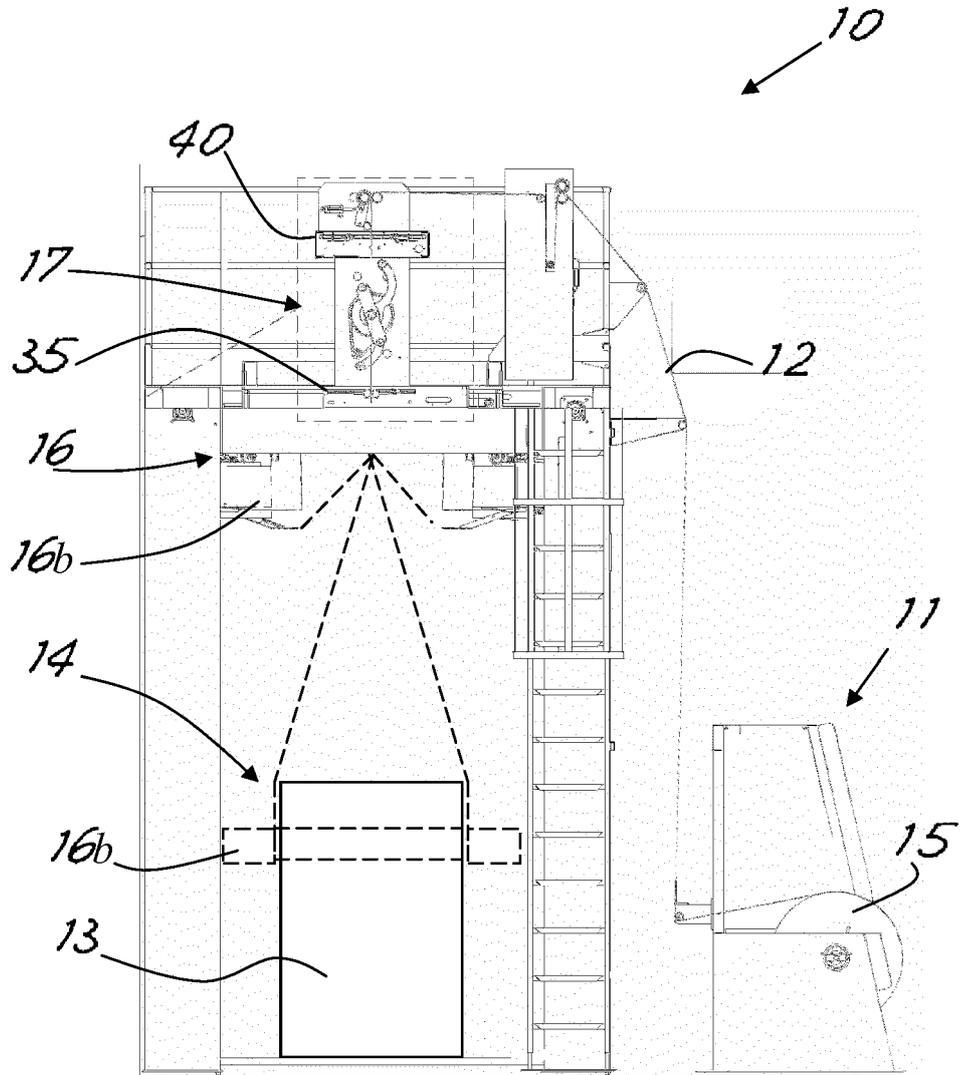


Fig. 1

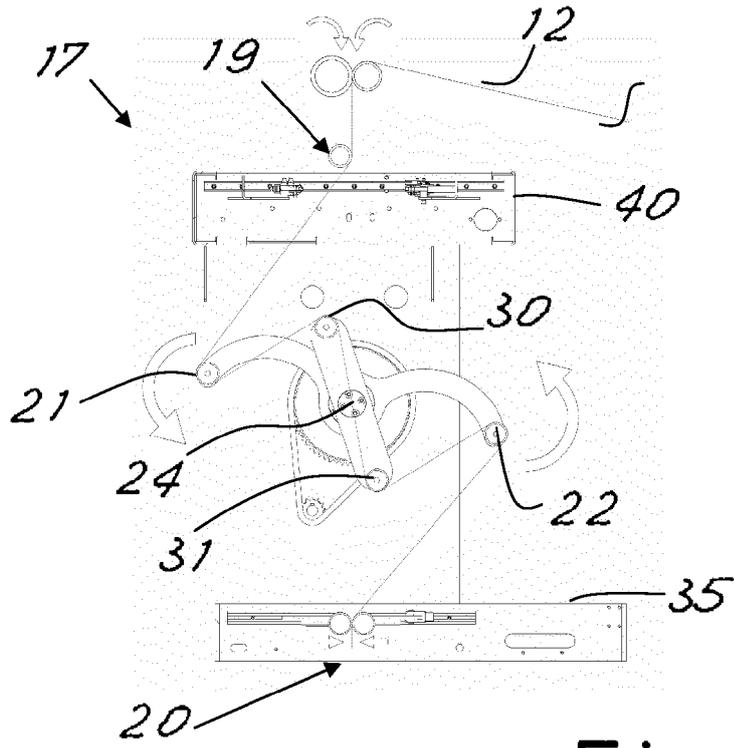


Fig. 3

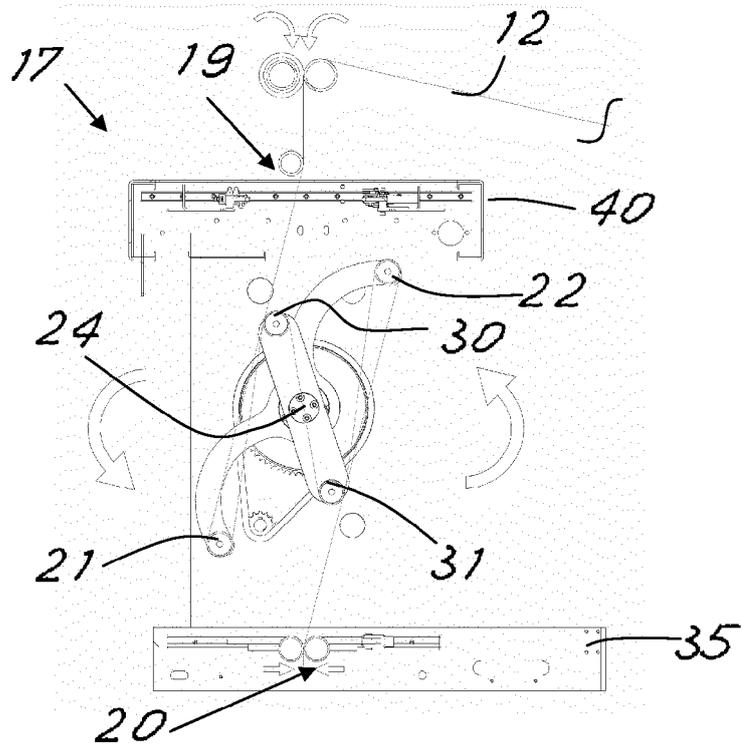


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 18 19 2661

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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 (IPC)
Y	WO 2015/140310 A1 (RH MONTAGETECHNIK APS [DK]) 24 September 2015 (2015-09-24) * page 10, line 32 - page 11, line 13; figures 1-3 *	1-10	INV. B65B9/13 B65B41/16
Y	JP S49 3077 B1 (TOSHIBA MACHINE CO., LTD) 24 January 1974 (1974-01-24) * figure 1 *	1-10	ADD. B65B61/06 B65B9/14
Y	EP 0 999 134 A2 (KLOCKNER BARTELT INC [US]) 10 May 2000 (2000-05-10) * paragraphs [0052] - [0054]; figures 1, 5 *	1-10	
Y	WO 2016/087169 A1 (GEA FOOD SOLUTIONS GERMANY GMBH [DE]) 9 June 2016 (2016-06-09) * page 9 - page 10; figures 3-4 *	1-10	
A	EP 3 009 384 A2 (ALTOPACK SPA [IT]) 20 April 2016 (2016-04-20) * paragraphs [0012] - [0020]; figures 5-6 *	1-10	TECHNICAL FIELDS SEARCHED (IPC) B65B
A	FR 2 667 053 A1 (BOURGEOIS MARCEL) 27 March 1992 (1992-03-27) * the whole document *	1-10	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 September 2018	Examiner Cardoso, Victor
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 18 19 2661

5

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2015140310 A1	24-09-2015	DK 3119680 T3 EP 3119680 A1 WO 2015140310 A1	20-08-2018 25-01-2017 24-09-2015
JP S493077 B1	24-01-1974	NONE	
EP 0999134 A2	10-05-2000	EP 0999134 A2 US 6247293 B1 US 2001009090 A1 US 2001010142 A1	10-05-2000 19-06-2001 26-07-2001 02-08-2001
WO 2016087169 A1	09-06-2016	BR 112017011887 A2 CN 107000860 A EP 3227190 A1 US 2017327257 A1 WO 2016087169 A1	09-01-2018 01-08-2017 11-10-2017 16-11-2017 09-06-2016
EP 3009384 A2	20-04-2016	BR 102015022498 A2 EP 3009384 A2	15-03-2016 20-04-2016
FR 2667053 A1	27-03-1992	NONE	

EPO FORM P0459

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