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(54) A machine for packaging pallets

(57) A machine for packaging pallets, comprising: a frame (2); a supply device (3), predisposed to remove a section of tubular film from a store (M); a cutting and welding device (4), predisposed to cut and weld at a determined section of the tubular film; a positioning device (5), vertically mobile, which is predisposed to grip the section of tubular film at one end and to fit the section of film onto a pile of articles. The cutting and welding device (4) is vertically mobile, while the supply device (3) is arranged in a fixed position in an upper zone of the frame (2), above the cutting and welding device (4) and the positioning device (5).

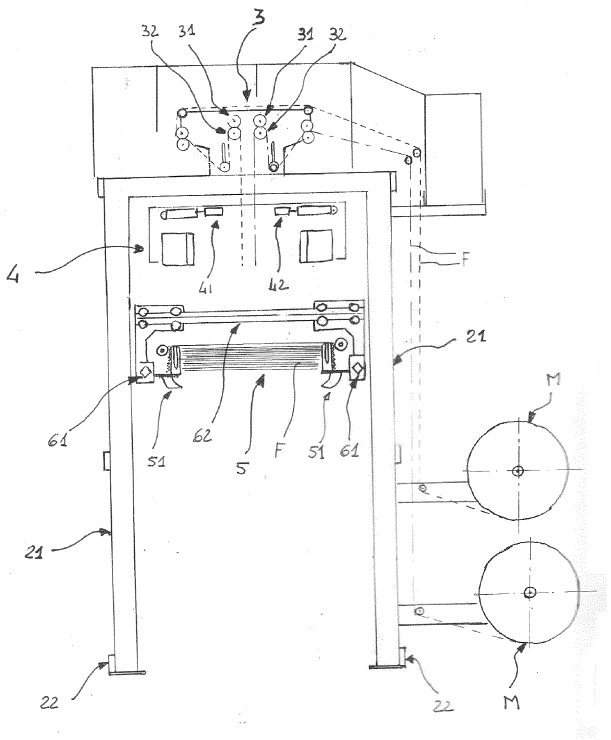

Fig. 4

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Description

[0001] The present invention relates to a machine for packaging pallets.

[0002] In particular, the present invention relates to a machine predisposed to fit a cap of stretchable film onto a pile of articles arranged on a pallet.

[0003] The machines currently available for packaging pallets by means of a cap of stretchable film comprise a frame, with mainly vertical development, with which a device for supplying the film, a device for cutting and welding the film and a devise for positioning the film are associated.

[0004] The film supply device removes a section of tubular stretchable film from a store, typically realised in the form of a wound roll of said film. The section of film is normally removed by unwinding from said store.

[0005] The cutting and welding device, positioned beneath the supply device, is predisposed to cut and weld the film, so as to obtain a cap closed at one end.

[0006] The film positioning device, positioned beneath the cutting and welding device, is predisposed to grip the lower edges of the film cap and to lower said cap, fitting it onto the pile of articles beneath.

[0007] The machines currently available are divided substantially into two types. In a first type of machine, all the operating devices briefly described above are associated with the upper part of the frame, which may reach considerable heights. This makes it necessary to predispose access ladders or walkways at the upper part of the frame so as to allow maintenance operations on said devices. Said access ladders and walkways require appropriate safety measures to be adopted, often obligatory, to prevent accidental falling of operators.

[0008] In a second type of machine, the operating devices briefly described above are provided with the possibility of sliding vertically along the machine frame, being able to lower substantially to ground level to allow performance of maintenance operations on the ground. This requires the use of additional motorised devices with respect to those normally present on the machines, with a consequent increase in the costs and complexity of the machine. Lowering of the supply device also requires adoption of a further film collection device, which must intervene to collect the section of stretched film between the store and the supply device each time the supply device is lowered.

[0009] The object of the present invention is providing a machine for packaging pallets which allows the problems of the currently available machines to be overcome.

[0010] One advantage of the machine according to the present invention is that it heavily limits the need to access the upper part of the frame.

[0011] Another advantage of the machine according to the present invention is that it does not require the addition of further motorised devices with respect to those normally present on machines of this type.

[0012] Further characteristics and advantages of the present invention will become clear from the following detailed description of an embodiment of the invention in question, illustrated by way of non-limiting example in the appended figures, wherein:

- Figure 1 shows a first perspective view of the machine according to the present invention;
- Figure 2 shows a second perspective view of the machine according to the present invention;
- Figure 3 shows an enlargement of a zone of the machine according to the present invention;
- Figure 4 shows a side view of the machine in a first operating configuration;
- Figure 5 shows the machine of Figure 4 in a second operating configuration.

[0013] The machine for packaging pallets according to the present invention comprises a frame (2). Said frame (2) has a mainly vertical development and comprises four vertical uprights (21) joined at the bottom by a base structure (22) and at the top by a head structure (23). The base structure (22) has a resting surface for the articles to be packaged. In the preferred use of the machine, the articles to be packaged are arranged in a pile supported by a pallet.

[0014] The machine also comprises a supply device (3), predisposed to remove a section of tubular film from a store (M). In a preferred embodiment, the supply device (3) comprises a pair of rollers (31,32), of which at least one is motorised. The two rollers (31,32) are predisposed to grip between them a section of tubular film, which is in a flattened configuration in two superimposed layers. Rotation of the rollers (31,32) therefore causes dragging of the film in the same direction of rotation of said rollers. This allows a section of film of a specific length to be removed from the store (M). The length of the section of film removed may be measured in various ways at the disposal of a person skilled in the art. Preferably, the store (M) is in the form of a roller onto which the tubular film is wound in a flattened configuration. In said flattened configuration, the tubular film is substantially arranged in two superimposed layers joined laterally. Figures 4 and 5 show two stores (M) in the form of rollers onto which tubular films (F) of different format are wound, which are used alternatively, depending on the format of the pallet to be covered.

[0015] The machine according to the invention also comprises a cutting and welding device (4), predisposed to cut and weld at a specific section of the tubular film. The function of said cutting and welding device (4) is closing at one end a section of tubular film, so as to give it an overall cap shape. Preferably, the cutting and welding device (4) comprises a pair of operating elements (41,42), of which at least one may be heated to a melting temperature of the tubular film. The two operating elements are mobile between an operating position, in which they are alongside each other to grip a section of the tubular film, and a release position, in which they are

distanced from each other. The two operating elements are controlled by actuators at the disposal of the person skilled in the art. The two operating elements (41,42) are arranged downstream of the supply device (3) and act on the tubular film which is still in the flattened configuration in two superimposed layers. In the operating position, the heat and the action of pressure exerted by the two operating elements (41,42) on the tubular film, which is flattened in two superimposed layers, cause cutting of the tubular film and melting between the two layers.

[0016] A positioning device (5), vertically mobile, is predisposed to grip the section of tubular film at one end and to fit the section of film onto a pile of articles beneath. In a preferred embodiment, the positioning device (5) comprises four gripping units (51), arranged substantially at the vertices of a quadrilateral. Each gripping unit (51) is mobile on a horizontal plane along two perpendicular axes (X,Y). In order to obtain this type of mobility, the gripping units (51) are divided into two opposing pairs. Each pair of gripping units (51) is associated with a respective crossbar (61) parallel to a first horizontal direction (X). The gripping units (51) slide along their own crossbar in a parallel direction to the first horizontal direction (X). The two crossbars (61) are in turn associated with two side members (62) parallel to a second horizontal direction (Y) perpendicular to the first horizontal direction (X). The two crossbars (61) also slide along the side members (62) in a parallel way to the second horizontal direction (Y). Sliding of the gripping units and the two crossbars (61) is obtained by means of actuators at the disposal of the person skilled in the art. The vertical motion of the positioning device (5) is obtained by means of sliding of the side members (62) along the frame (2) of the machine, operated by actuators of a known type.

[0017] Each gripping unit preferably comprises a hooking element (52), predisposed to be inserted at least partially into the tubular film below a lower edge of said tubular film. Said hooking element (52) is preferably in the form of an elongated plate, oriented vertically and shaped so as not to cause damage to the tubular film. The hooking element (52) is predisposed to drag and enlarge the tubular film through the sliding motions of the gripping unit (51) along the horizontal sliding directions (X,Y).

[0018] In particular, the gripping units (51) are initially in a position in which they are close to each other. In this position, they are raised towards the lower edge of the tubular film above them, coming from the supply device (3). Each hooking element (52) is positioned inside the tubular film (F). Subsequently, the gripping units (51) are distanced from each other by sliding, until they reach the vertices of a quadrilateral. By moving away from each other, the hooking elements (52) stretch the lower edge of the tubular film (F) so that it is positioned according to a corresponding quadrangular shape.

[0019] Each gripping unit (51) also comprises a motorised roller (53), predisposed to approach the hooking element (52) and to grip the tubular film on the hooking element (52). Thus, when rotated, the motorised roller (53) collects the tubular film between itself and the hooking element alongside it. The simultaneous action of the four gripping units therefore leads to total collection, along a vertical direction, of the section of tubular film coming from the supply device. The section of tubular film, previously cut by the cutting and welding device (4), is collected in a sleeve around the hooking elements (52), as shown schematically in figure 4. Subsequently, the gripping units (51) are lowered, fitting the tubular film (F) onto the pile of articles. The tubular film extends once again in contact with the pile of articles, progressively unwinding from the hooking elements (52). Once arrangement of the tubular film (F) on the pile of articles is completed, said pile is evacuated and replaced by a new pile of articles to be covered and the gripping units (51) return to the initial position for a new cycle of operations identical to the one described.

[0020] Each motorised roller (53) is associated with a support (54) being able to rotate around a vertical axis between an inactive position, in which the roller is distanced from the hooking element (52), and an operating position, in which the motorised roller (53) is alongside the hooking element (52). During vertical raising of the gripping units (51) which carries the hooking elements (52) to be inserted in the tubular film (F), and during the expanding motion of the gripping units (51), the motorised rollers (53) are in the inactive position. At the end of expansion of the gripping units, the motorised rollers (53) move into the operating position to collect the tubular film.

[0021] Advantageously, the cutting and welding device (4) is vertically mobile along the frame (2). Movement of the cutting and welding device (4) may be obtained by means of actuators specifically dedicated to this purpose, in a known way for the person skilled in the art. In view of the lightness and construction simplicity of the cutting and welding device (4), small and inexpensive sliding means may be used. Alternatively, the vertical movement of the cutting and welding device (4) may be obtained using the positioning device (5), which is provided with the vertical sliding means described above and necessary for its functioning, as a conveying system. In other words, the cutting and welding device (4) may be arranged resting on the positioning device (5) underneath and be moved vertically and integrally with the positioning device. In this case blocking means are provided, not shown as they are known to the person skilled in the art, predisposed to maintain the cutting and welding device (4) fixed in a specific vertical position with respect to the frame (2), during normal functioning of the machine. On occasion of maintenance operations, the cutting and welding device (4) may be lowered, by means of dedicated sliding means or by sliding of the positioning device (5), at a level accessible from the ground for operators.

[0022] In contrast, the supply device (3) is arranged in a fixed position in an upper zone of the frame (2), above the cutting and welding device (4) and the positioning device (5). The supply device (3), in fact, requires extremely infrequent maintenance operations, in view of its

construction simplicity and the simplicity of the operation it is designed to perform. For these infrequent maintenance operations, it is therefore preferable for the operator to go directly to the supply device (3), using a ladder and a walkway which can be predisposed for this purpose, even only temporarily. The use of the fixed supply device (3), in any case, considerably simplifies realisation and functioning of the machine according to the present invention with respect to machines in which the possibility of vertically moving the supply device (3) is also envisaged.

[0023] The machine according to the present invention therefore offers considerable advantages. It allows simplification of maintenance operations on the cutting and welding device (4), which may be lowered to ground level. Simultaneously, the complexity of the machine is not increased excessively, since the supply device (3) is fixed, and all devices needed to allow its vertical movement are therefore absent.

Claims

1. A machine for packaging pallets, comprising: a frame (2); a supply device (3), predisposed to remove a section of tubular film from a store (M); a cutting and welding device (4), predisposed to cut and weld at a determined section of the tubular film; a positioning device (5), vertically mobile, which is predisposed to grip the section of tubular film at one end and to fit the section of film onto a pile of articles; **characterised in that** the cutting and welding device (4) is vertically mobile, while the supply device (3) is arranged in a fixed position in an upper zone of the frame (2), above the cutting and welding device (4) and the positioning device (5).

2. The machine according to claim 1, wherein the supply device (3) comprises a pair of rollers (31, 32), of which at least one is motorised, predisposed to grip a section of tubular film between them.

3. The machine according to claim 1, wherein the cutting and welding device (4) comprises a pair of operating elements (41, 42), of which at least one may be heated to a melting temperature of the tubular film, which are mobile between an operating position, in which they are alongside each other to grip a section of the tubular film, and a release position, in which they are distanced from each other.

4. The machine according to claim 1, wherein the positioning device (5) comprises four gripping units (51), arranged substantially at the vertices of a quadrilateral, each of which is mobile on a horizontal plane along two perpendicular axes (X, Y).

5. The machine according to claim 4, wherein each gripping unit comprises: a hooking element (52), predisposed to be inserted at least partially into the tubular film below a lower edge of said tubular film and to pull in expansion the tubular film; a motorised roller (53), predisposed to approach the hooking element (52) and to grip the tubular film on the hooking element (52).

6. The machine according to claim 5, wherein the motorised roller (53) is associated with a support (54) being able to rotate around a vertical axis between an inactive position, in which the roller is distanced from the hooking element (52), and an operating position, in which the motorised roller (53) is alongside the hooking element (52).

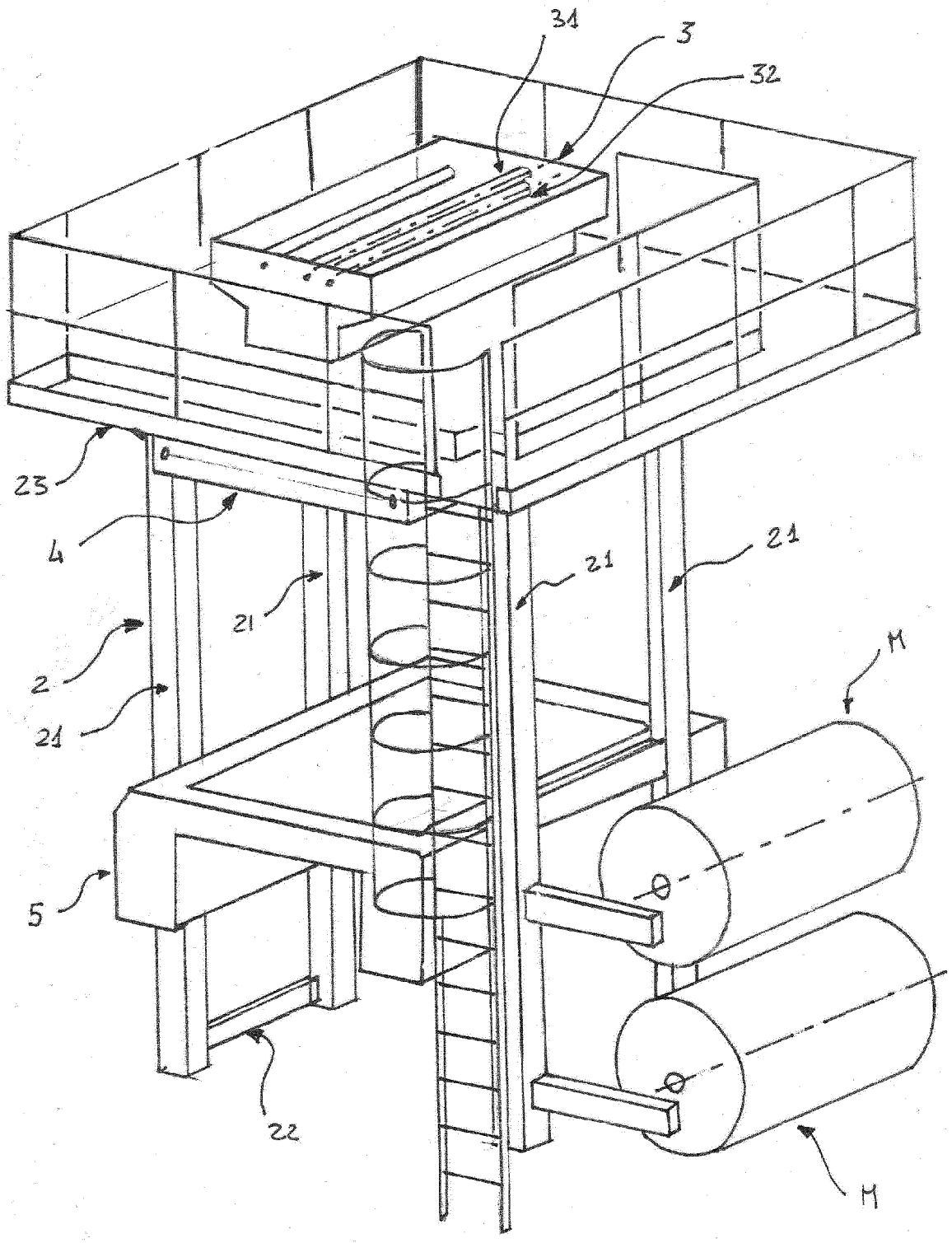

Fig. 1

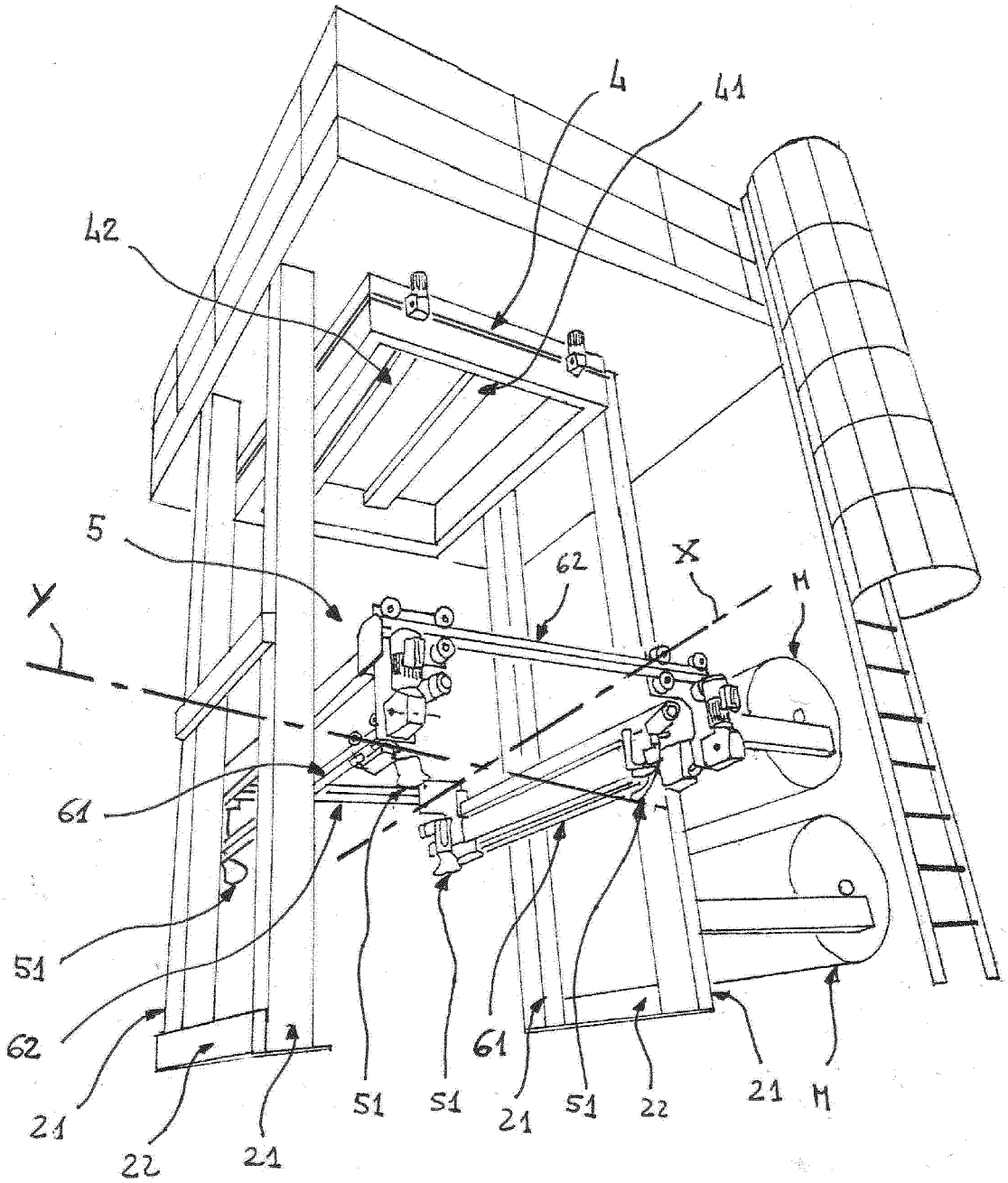

Fig. 2

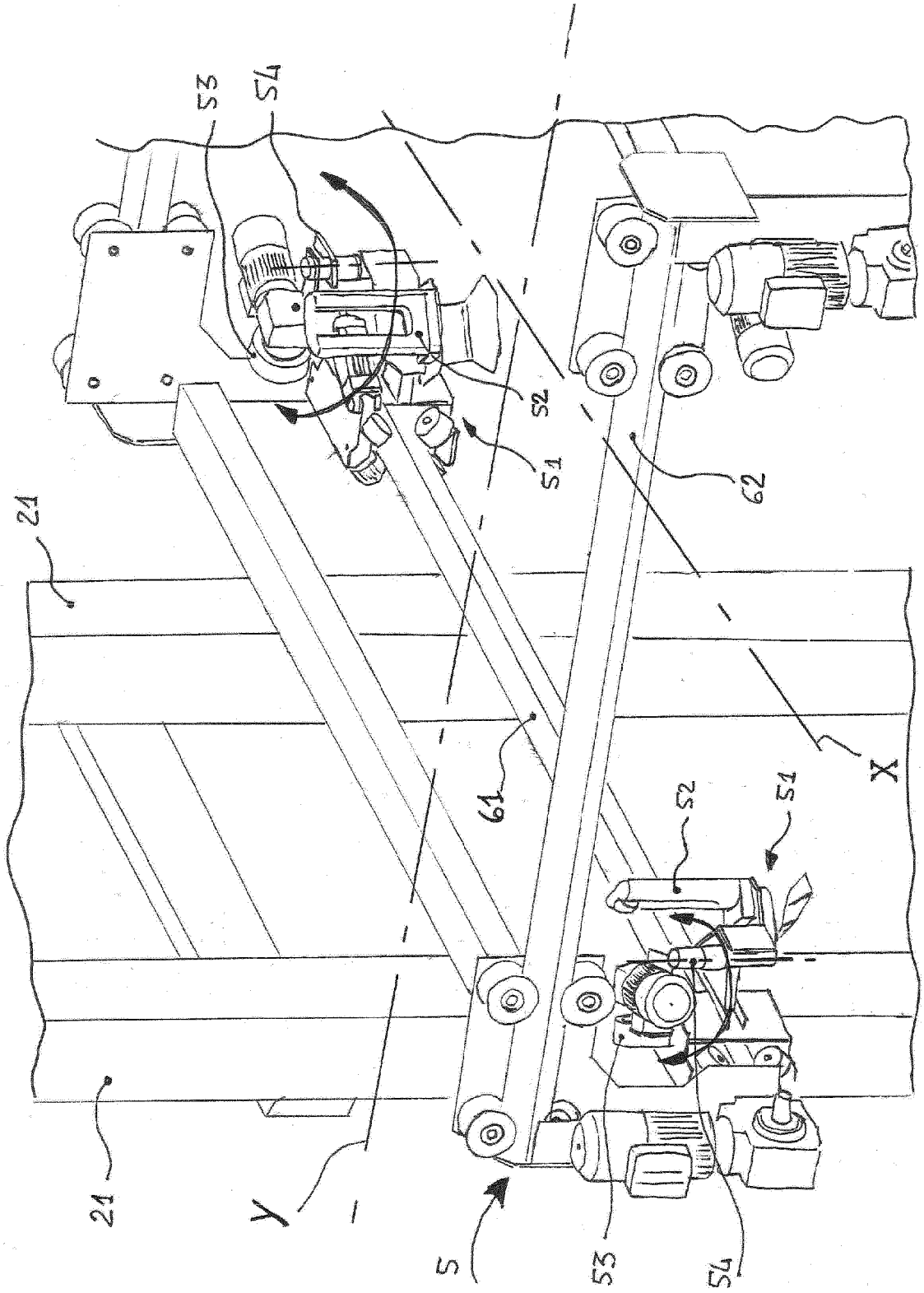

Fig. 3

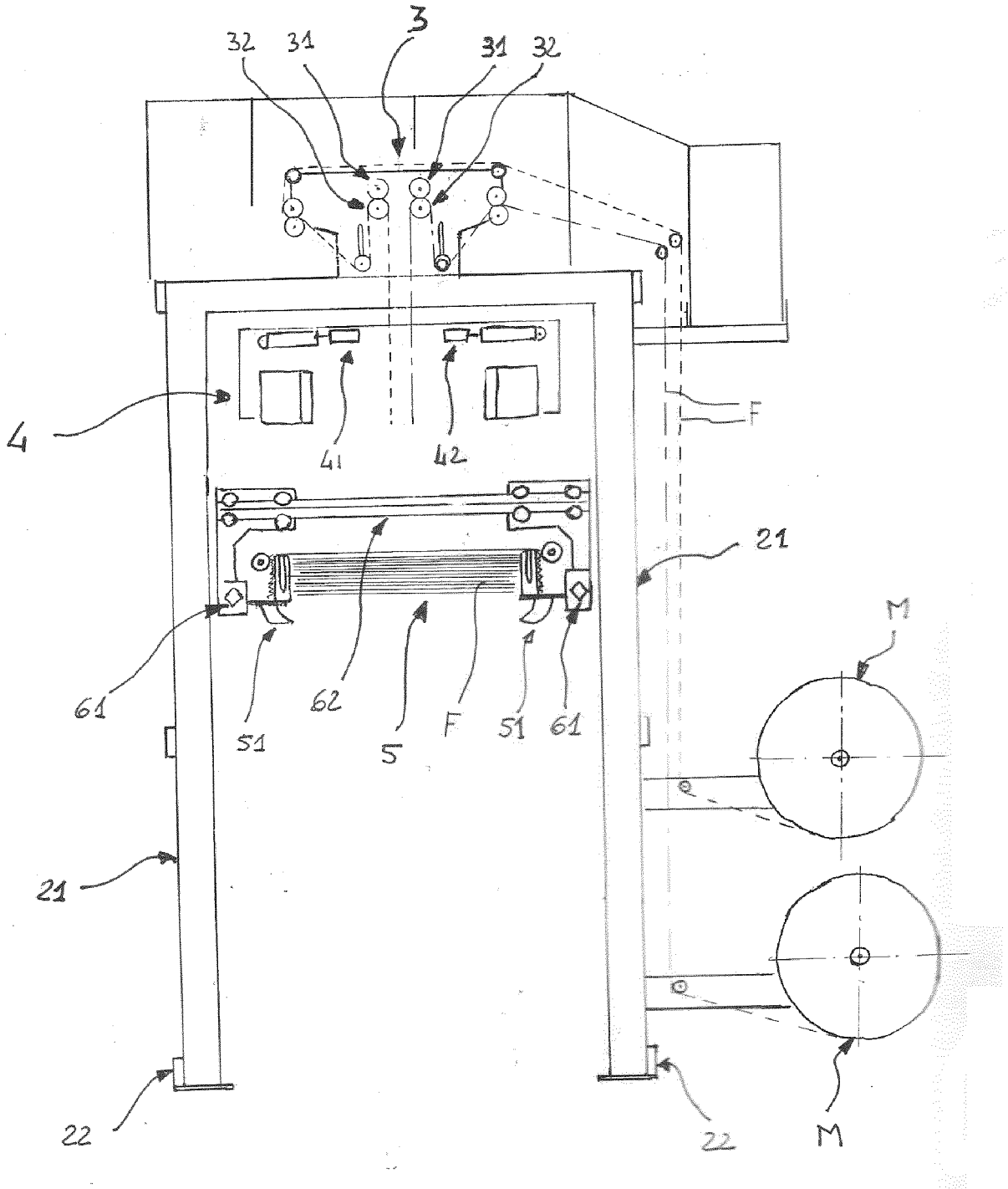

Fig. 4

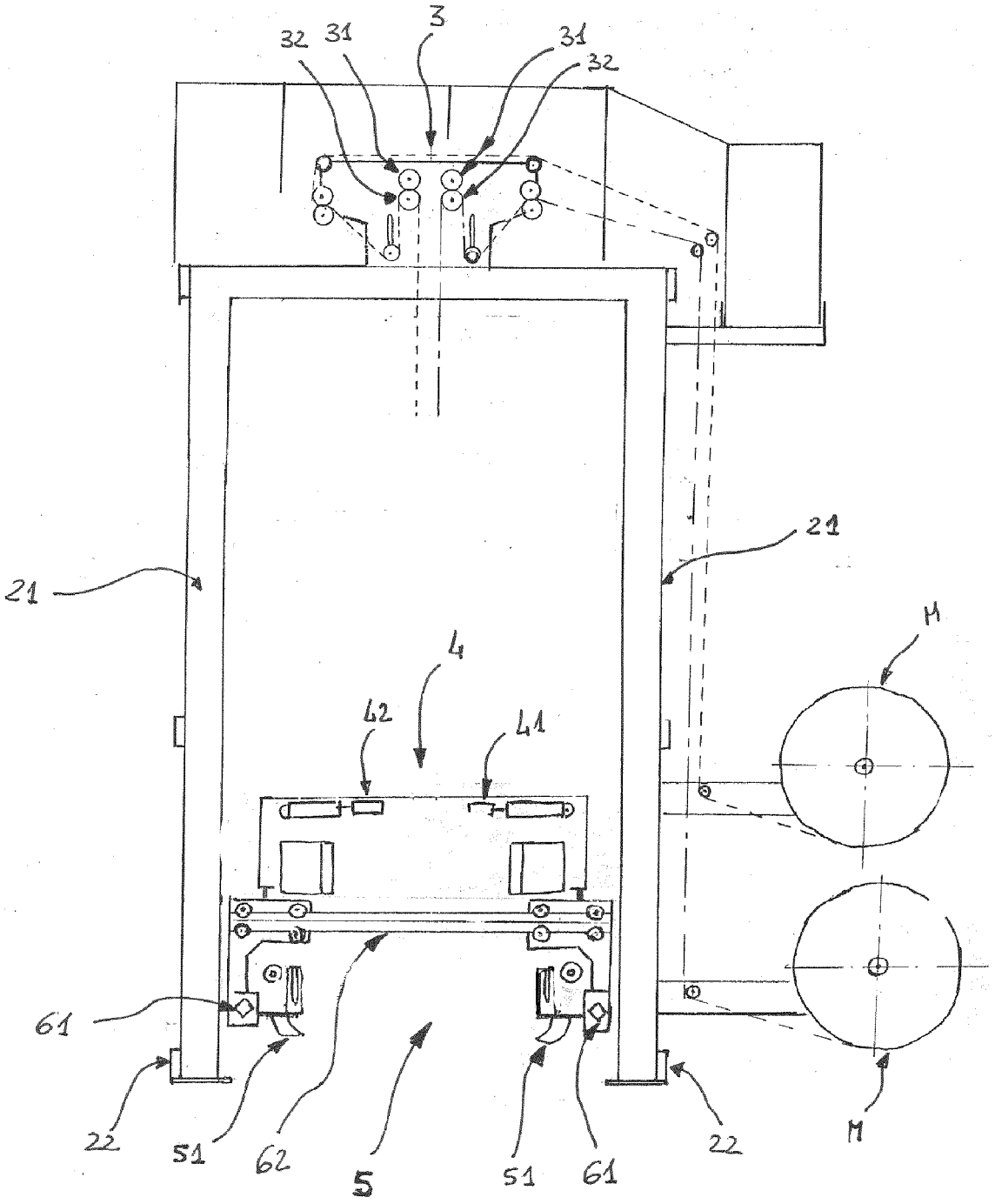

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 14 16 3123

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	19 August 2014	Paetzke, Uwe

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