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(54) **A machine for packaging pallets**

Maschine zum Verpacken von Paletten

Machine d'emballage de palettes

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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 device 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] Examples of prior art devices, which suffer of the above drawbacks, are known from documents DE3600589, US2002/170270, DE1927356, EP1818261.

[0010] 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. This object is achieved by a machine according to claim 1. 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 comprises gripping units (51), predisposed to grip the section of tubular film at one end and to collect the section of tubular film in a sleeve around hooking elements (52) and to fit the section of film onto a pile of articles;
 wherein 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);
 wherein the cutting and welding device (4) is maintained fixed in a specific vertical position with respect to the frame (2), during normal functioning of the machine;
 wherein the cutting and welding device (4) may be lowered down to a level accessible from the ground for operators, on occasion of maintenance operations;
 and wherein during normal functioning of the machine, the gripping units (51) are lowered, fitting the tubular film (F) onto the pile of articles;

wherein 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.

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).

Patentansprüche

1. Maschine zum Verpacken von Paletten, umfassend: einen Rahmen (2); eine Zufuhrvorrichtung (3), die ausgelegt ist, um einen Abschnitt einer schlauchförmigen Folie aus einem Lager (M) zu entfernen; eine Schneid- und Schweißvorrichtung (4), die ausgelegt ist, um an einem bestimmten Abschnitt der schlauchförmigen Folie zu schneiden und zu schweißen; eine Positionierungsvorrichtung (5), die vertikal verfahrbar ist und Greifeinheiten (51) umfasst,

- die ausgelegt sind, um den Abschnitt der schlauchförmigen Folie an einem Ende zu greifen und den Abschnitt der schlauchförmigen Folie in einer Hülle rund um Hakenelemente (52) zu sammeln und den Folienabschnitt auf einem Stapel von Artikeln aufzubringen,
- wobei die Schneid- und Schweißvorrichtung (4) vertikal verfahrbar ist, während die Zufuhrvorrichtung (3) an einer fixen Position in einem oberen Bereich des Rahmens (2) über der Schneid- und Schweißvorrichtung (4) und der Positionierungsvorrichtung (5) angeordnet ist,
- wobei die Schneid- und Schweißvorrichtung (4) während des Normalbetriebs der Maschine fix in einer spezifischen vertikalen Position zum Rahmen (2) beibehalten wird, wobei die Schneid- und Schweißvorrichtung (4) nach unten auf ein Niveau gesenkt werden kann, das für Instandhaltungsarbeiten für Arbeitskräfte vom Boden aus zugänglich ist, und wobei die Greifeinheiten (51) während des Normalbetriebs der Maschine gesenkt werden und die schlauchförmige Folie (F) auf dem Artikelstapel aufbringen,
- wobei der Stapel, nachdem die Anordnung der schlauchförmigen Folie (F) auf dem Artikelstapel fertiggestellt wurde, ausgestoßen und durch einen neuen, zu bedeckenden Stapel ersetzt wird und die Greifeinheiten (51) in ihre Ausgangsposition zurückfahren.
2. Maschine nach Anspruch 1, wobei die Zufuhrvorrichtung (3) ein Paar Walzen (31, 32) umfasst, von denen mindestens eine motorbetrieben ist, ausgelegt, um einen Abschnitt der schlauchförmigen Folie zwischen ihnen zu greifen.
 3. Maschine nach Anspruch 1, wobei die Schneid- und Schweißvorrichtung (4) ein Paar Bearbeitungselemente (41, 42) umfasst, von denen mindestens eins auf eine Schmelztemperatur der schlauchförmigen Folie erhitzt werden kann, die zwischen einer Betriebsposition, in der sie nebeneinander angeordnet sind, um einen Abschnitt der schlauchförmigen Folie zu greifen, und einer Freigabeposition, in der sie voneinander beabstandet sind, verfahrbar sind.
 4. Maschine nach Anspruch 1, wobei die Positionierungsvorrichtung (5) vier Greifeinheiten (51) umfasst, die im Wesentlichen an den Scheiteln eines Vierecks angeordnet sind, von denen eine jede auf einer horizontalen Ebene entlang zwei senkrechter Achsen (X, Y) verfahrbar ist.
 5. Maschine nach Anspruch 4, wobei eine jede Greifeinheit umfasst: ein Hakenelement (52), ausgelegt, um mindestens teilweise in die schlauchförmige Folie unter einer Unterkante der schlauchförmigen Folie eingefügt zu werden und die schlauchförmige Folie auseinanderzuziehen; eine motorbetriebene Walze (53), die ausgelegt ist, um sich dem Hakenelement (52) zu nähern und die schlauchförmige Folie auf dem Hakenelement (52) zu greifen.
 6. Maschine nach Anspruch 5, wobei die motorbetriebene Walze (53) mit einer Halterung (54) assoziiert ist, in der Lage, sich um eine vertikale Achse zwischen einer untätigen Position, in der die Walze vom Hakenelement (52) beabstandet ist, und einer Betriebsposition, in der die motorbetriebene Walze (53) neben dem Hakenelement (52) angeordnet ist, zu drehen.

Revendications

1. Machine d'emballage de palettes, comprenant un châssis (2) ;
un dispositif d'alimentation (3) prédisposé pour retirer une section de film tubulaire d'un magasin (M) ;
un dispositif de découpe et de soudage (4), prédisposé pour couper et souder en correspondance d'une section déterminée du film tubulaire ;
un dispositif de positionnement (5), mobile verticalement, comprenant des unités de préhension (51) prédisposées pour saisir la section de film tubulaire à une extrémité et pour recueillir la section de film tubulaire dans un manchon autour d'éléments d'accrochage (52) et pour ajuster la section de film sur une pile d'articles ;
dans laquelle le dispositif de découpe et de soudage (4) est mobile verticalement, tandis que le dispositif d'alimentation (3) est disposé dans une position fixe dans une zone supérieure du châssis (2) au-dessus du dispositif de découpe et de soudage (4) et du dispositif de positionnement (5) ;
dans laquelle le dispositif de découpe et de soudage (4) est maintenu fixe dans une position verticale spécifique par rapport au châssis (2) lors du fonctionnement normal de la machine ; dans laquelle le dispositif de découpe et de soudage (4) peut être abaissé à un niveau accessible depuis le sol pour des opérateurs, à l'occasion d'opérations de maintenance ;
et dans laquelle lors du fonctionnement normal de la machine, les unités de préhension (51) sont abaissées, en ajustant le film tubulaire (F) sur la pile d'articles ;
dans laquelle lorsque la disposition du film tubulaire (F) sur la pile d'articles est terminée, ladite pile est évacuée et remplacée par une nouvelle pile d'articles à recouvrir et les unités de préhension (51) retournent dans la position initiale.
2. Machine selon la revendication 1, dans laquelle le dispositif d'alimentation (3) comprend une paire de rouleaux (31, 32), dont au moins un est motorisé, prédisposés pour saisir une section de film tubulaire

entre eux.

3. Machine selon la revendication 1, dans laquelle le dispositif de découpe et de soudage (4) comprend une paire d'éléments fonctionnels (41, 42), dont au moins un peut être chauffé à une température de fusion du film tubulaire, étant mobiles entre une position fonctionnelle, dans laquelle ils sont situés l'un à côté de l'autre pour saisir une section de film tubulaire, et une position de relâchement, dans laquelle ils sont éloignés l'un de l'autre. 5
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4. Machine selon la revendication 1, dans laquelle le dispositif de positionnement (5) comprend quatre unités de préhension (51) disposées substantiellement aux sommets d'un quadrilatère, chacune étant mobile sur un plan horizontal le long de deux axes perpendiculaires (X, Y). 15
5. Machine selon la revendication 4, dans laquelle chaque unité de préhension comprend : un élément d'accrochage (52), prédisposé pour être inséré au moins partiellement dans le film tubulaire en dessous d'un bord inférieur dudit film tubulaire et pour tirer en extension le film tubulaire ; un rouleau motorisé (53), prédisposé pour approcher l'élément de préhension (52) et pour saisir le film tubulaire sur l'élément d'accrochage (52). 20
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6. Machine selon la revendication 5, dans laquelle le rouleau motorisé (53) est associé à un support (54) pouvant tourner autour d'un axe vertical entre une position inactive, dans laquelle le rouleau est éloigné de l'élément d'accrochage (52), et une position fonctionnelle, dans laquelle le rouleau motorisé (53) est situé à côté de l'élément d'accrochage (52). 30
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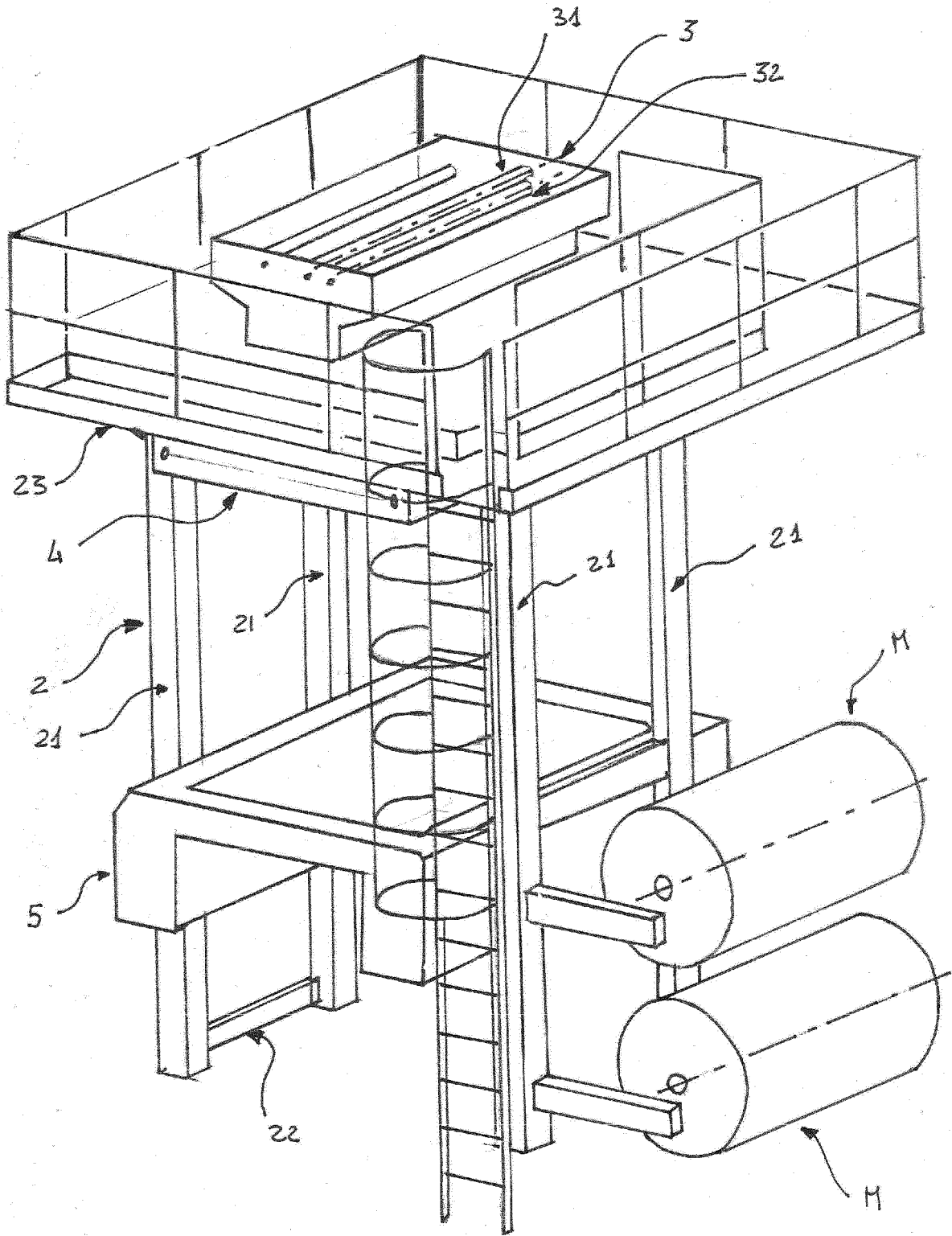


Fig. 1

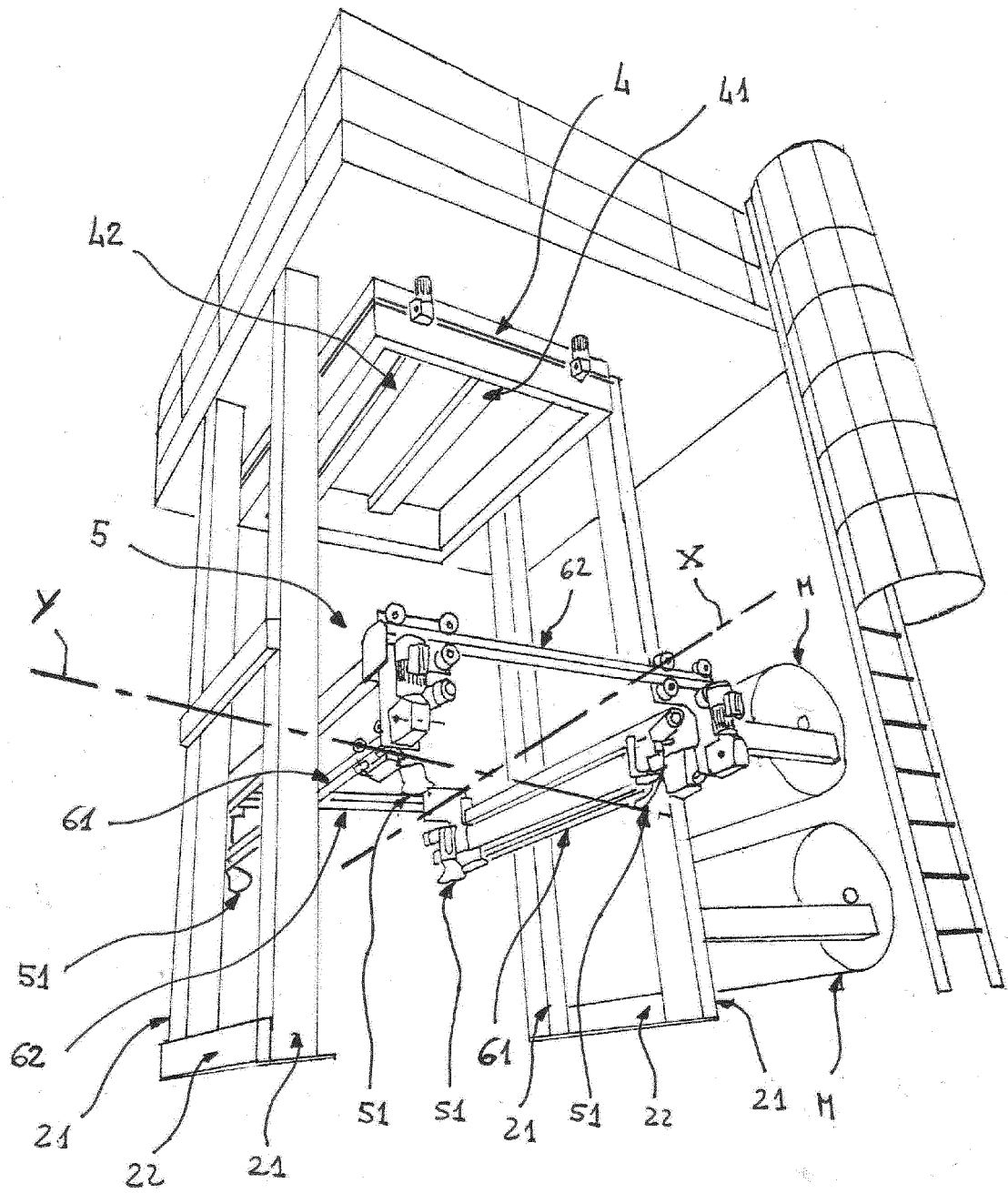


Fig. 2

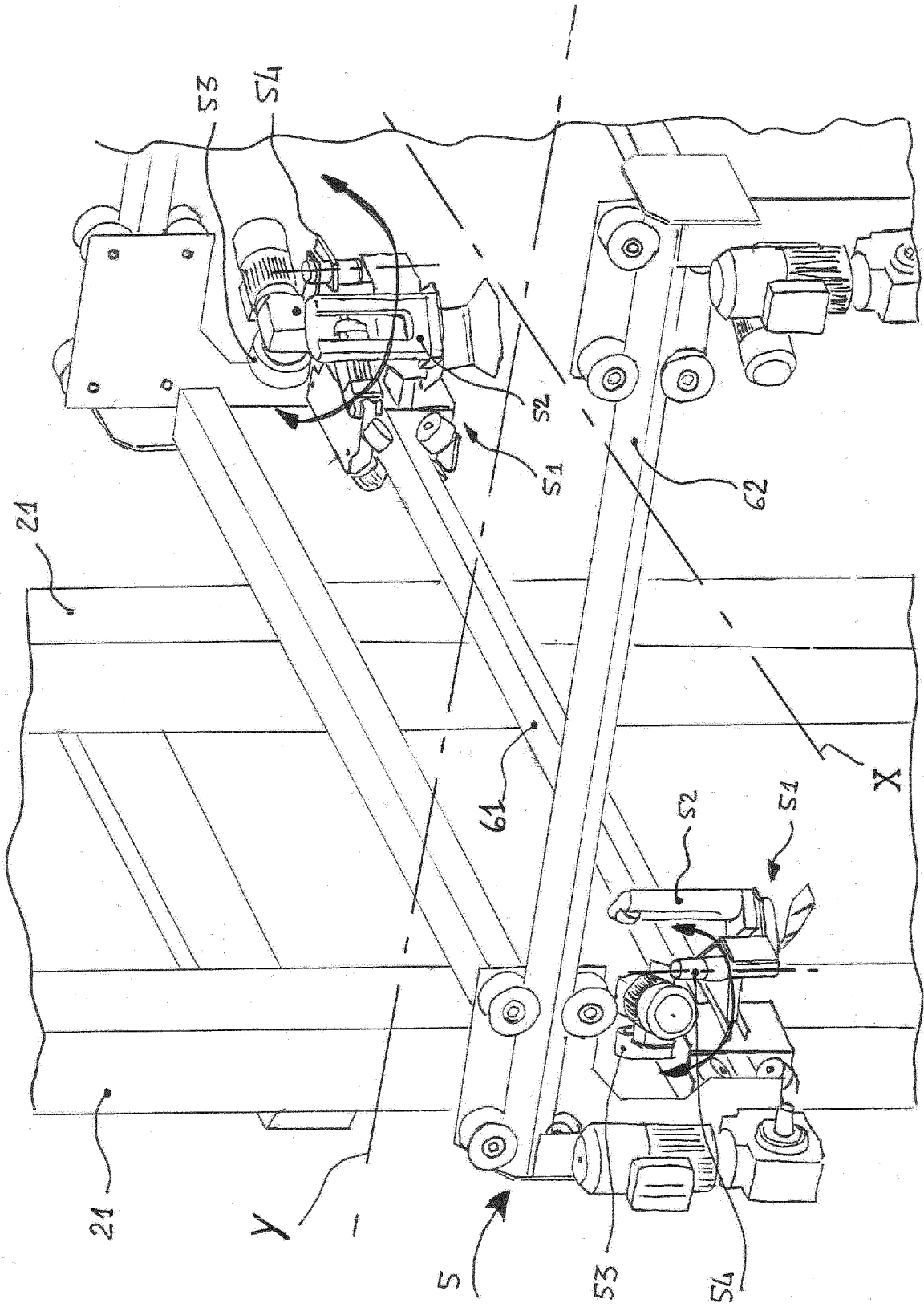


Fig. 3

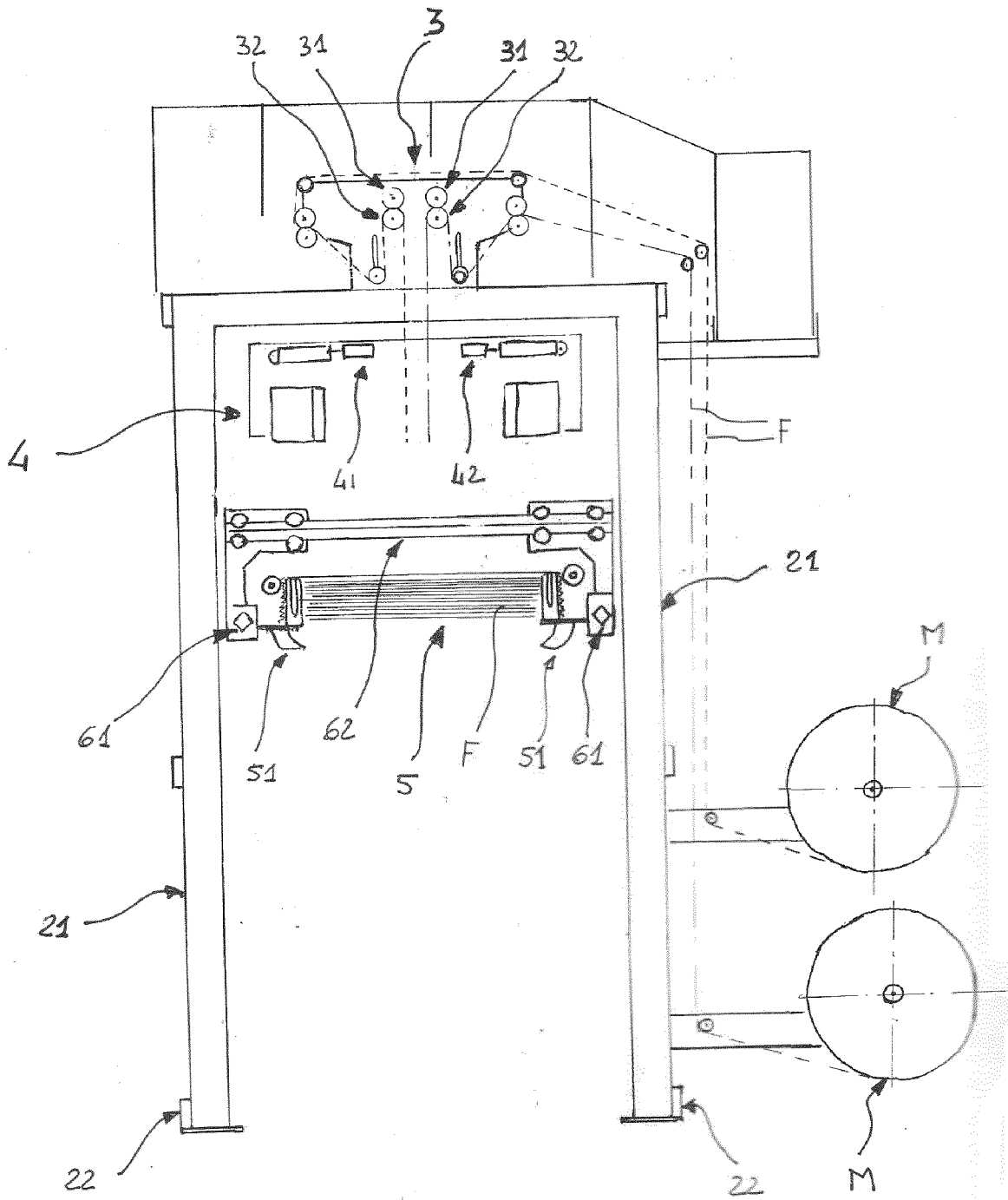


Fig. 4

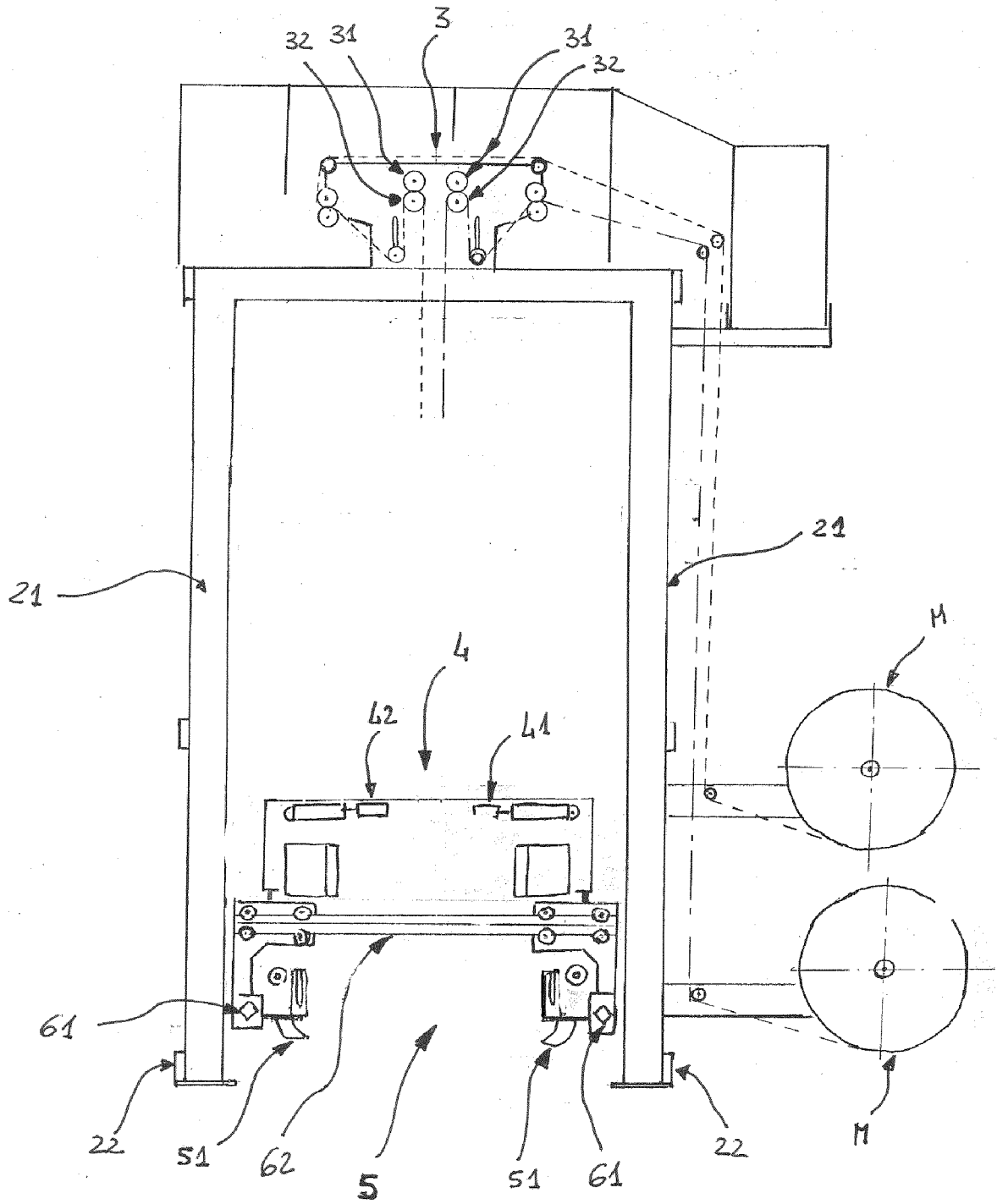


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

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- EP 1818261 A [0009]

RAKLAPCSOMAGOLÓ GÉP

SZABADALMI IGÉNYPONTOK

1. Raklapcsomagoló gép, amely magában foglal:

egy tartóvázat (2);

egy ellátó eszközt (3), amely arra szolgál, hogy egy tárolóról (M) eltávolítson egy szakasz tömlőfóliát;

egy vágó és hegesztő eszközt (4), amely arra szolgál, hogy a tömlőfólia egy meghatározott szakaszánál vágást és hegesztést végezzen;

egy függőlegesen mozgó pozicionáló eszközt (5), amely megfogó egységeket (51) foglal magában, amelyek arra szolgálnak, hogy a tömlőfólia szakaszát az egyik végén megfogják, a tömlőfólia szakaszát hüvelyben kampós elemek (52) köré gyűjtsék, és a tömlőfólia szakaszát egymásra rakott árucikkekre illesszék;

a vágó és hegesztő eszköz (4) függőlegesen mozog, míg az ellátó eszköz (3) a tartóváz (2) felső zónájában, a vágó és hegesztő eszköz (4), valamint a pozicionáló eszköz (5) felett rögzített helyzetben van elhelyezve;

amely vágó és hegesztő eszköz (4) a gép üzemszerű működése alatt a tartóvázhhoz (2) képest meghatározott függőleges helyzetben van rögzítve;

továbbá amely vágó és hegesztő eszköz (4) leereszthető egy olyan szintre, amely a karbantartási műveletek során a kezelők számára a talajról hozzáférhető; és

a gép üzemszerű működése alatt a tömlőfóliát (F) az egymásra rakott árucikkekre illesztő megfogó egységek (51) le vannak eresztve;

miután befejeződött a tömlőfóliának (F) az egymásra rakott árucikkekkel való elhelyezése, az egymásra rakott árucikkek eltávolításra kerülnek, helyükbe új befedendő árucikkek kerülnek, és a megfogó egységek (51) visszatérnek kiindulási helyzetükbe.

2. Az 1. igénypont szerinti gép, amelyben az ellátó eszköz (3) magában foglal egy pár hengert (31, 32), amelyek közül legalább az egyiket motor hajtja, amely hengerek arra szolgálnak, hogy a tömlőfólia egy szakaszát maguk között megfogják.

3. Az 1. igénypont szerinti gép, amelyben a vágó és hegesztő eszköz (4) magában foglal egy pár kezelőelemet (41, 42), amelyek közül legalább az egyik felmelegíthető a tömlőfólia olvadáspontjára, és amely kezelőelemek a következő helyzetek között mozognak: egy működési helyzet, amelyben egymás mellett vannak, hogy megfogják a tömlőfólia egy szakaszát, és egy szétvált helyzet, amelyben bizonyos távolságra vannak egymástól.

4. Az 1. igénypont szerinti gép, amelyben a pozicionáló eszköz (5) négy megfogó



egységet (51) foglal magában, amelyek alapjában véve egy négyszög csúcsain helyezkednek el, és amelyek mindegyike egy vízszintes síkban mozog, amely két merőleges tengely (X, Y) mentén terjed ki.

5. A 4. igénypont szerinti gép, amelyben mindegyik megfogó egység magában foglal:

egy kampóelemet (52), amely arra szolgál, hogy legalább részben be legyen helyezve a tömlőfóliába a tömlőfólia alsó szélé alatt, és széthúzza a tömlőfóliát;

egy motorral hajtott hengert (53), amely arra szolgál, hogy közeledjen a kampóelem (52) felé, és megfogja a kampóelemen (52) lévő tömlőfóliát.

6. Az 5. igénypont szerinti gép, amelyben a motorral hajtott hengerhez (53) tartozik egy tartóelem (54), amely egy függőleges tengely körül a következő helyzetek között tud forogni: egy inaktív helyzet, amelyben bizonyos távolságra van a kampóelemtől (52), és egy működési helyzet, amelyben a motorral hajtott henger (53) a kampóelem (52) mellett van.