



(11) **EP 1 880 945 B9**

(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**

(15) Correction information:
Corrected version no 1 (W1 B1)
Corrections, see
Claims EN 1

(51) Int Cl.:
B65B 11/58 (2006.01) **B65B 11/02** (2006.01)
B65B 13/04 (2006.01)

(48) Corrigendum issued on:
26.08.2009 Bulletin 2009/35

(45) Date of publication and mention
of the grant of the patent:
25.02.2009 Bulletin 2009/09

(21) Application number: **06425501.1**

(22) Date of filing: **20.07.2006**

(54) **System for wrapping loads**

System zum Umwickeln von Ladungen

Système pour envelopper des charges

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI
SK TR

(43) Date of publication of application:
23.01.2008 Bulletin 2008/04

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Description

[0001] This invention refers to a system for wrapping loads, in particular palletised loads that consist of one or more products distributed more or less evenly on a pallet so it can be handled and transported practically and easily.

[0002] As is common knowledge, palletised loads are normally covered with a stabilising covering that immobilises them on the pallet so they can then be transported without risk of falling or tipping over.

[0003] To make such a stabilising covering the usual way is to tightly wrap the sides of the load and pallet with a plastic covering film that is unwound from a reel of film.

[0004] Either automatic or semi automatic systems are normally used for such wrapping.

[0005] One very widely used wrapping system uses a machine to move a wrapping head equipped with a reel of covering film.

[0006] The moving machine is normally composed of a jointed robot arm that, to wind the covering film around the load to wrap, operates the wrapping head with a lifting and rotating motion around the load to wrap which substantially stays still.

[0007] Alternatively, the moving machine works by moving the wrapping head vertically, simultaneously winding the covering film around the palletised load that turns on a rotating platform.

[0008] It is also common practice to equip traditional type systems with an automatic wrapping head change unit that deposits the head in a store when the reel of covering film is finished and collects a new head ready to use.

[0009] When parking them in the store, the wrapping heads are usually placed on an external frame fitted with pins on which the wrapping head is hung waiting to be used.

[0010] For the moving machine to collect them, the wrapping heads are fitted with special coupling means that consist of a circular plate with radial hollows that can be engaged by a mobile wedge system mounted on the robot arm and operated by one or more pneumatic cylinders, also mounted on the robot arm.

[0011] Once the wrapping head is associated to the robot arm, it is connected to an electrical joint and to a pneumatic feeding joint that lets it work in the palletised load wrapping phase.

[0012] These traditional wrapping systems do have a few drawbacks involving the automatic change unit which they are equipped with.

[0013] As a matter of fact the use of the mobile wedge system significantly complicates both the structure and the functionality of the moving machines.

[0014] In fact, the moveability of the wedges must be inconveniently guaranteed by means of a complex electronic system that manages and controls operation of the pneumatic cylinders and of the compressed air unit that feeds them.

[0015] Neither must we neglect the fact that the automatic change unit, as it is made, is rather cumbersome and costly.

[0016] The main aim of this invention is to devise a system for wrapping loads that will solve the above mentioned problems of the known technology, while making it possible to change the wrapping heads practically and easily in a simple, rational and economical way.

[0017] The purposes listed above are all reached with this system for wrappings loads comprising at least one moving machine of at least one wrapping head equipped with at least one reel of film for covering the load, said wrapping head comprising first removable coupling means to an external supporting frame for parking the head in a store and second removable coupling means to said moving machine, characterised by the fact that said second coupling means comprise at least one substantially vertical fastening element associated to at least one between said wrapping head and said moving machine and at least one reference element associated to the other between said wrapping head and said moving machine and which can be coupled to said fastening element along a mutual and substantially vertical direction of engagement and disengagement.

[0018] Further characteristics and advantages of this invention will appear even more evident from the detailed description of a preferred, but not exclusive, form of embodiment of a system for wrapping loads, illustrated by way of non limiting example in the accompanying drawings, wherein:

figure 1 is an axonometric view of a portion of the system according to the invention during the wrapping head change phase;

figure 2 is an axonometric view, from another angle, of the system of figure 1;

figure 3 is an axonometric view of the external frame for supporting the wrapping head in the store contemplated by the system according to the invention; figure 4 is an exploded view of the plate for connecting the wrapping head to the moving machine of the system according to the invention;

figure 5 is an elevated side view of a portion of the moving machine and plate for connecting the wrapping head before mutual coupling;

figure 6 is an elevated side view of the portion of the moving machine and connecting plate of figure 5 in coupling configuration.

[0019] With special reference to such figures, a system for wrapping loads, of the palletised type or the like, has been generally designated by reference numeral 1.

[0020] The system 1 comprises a moving machine 2 for one wrapping head 3 fitted with a reel 4 of film for covering a load; the load is not illustrated in the figures.

[0021] Advantageously, the moving machine 2 is composed of a jointed robot arm, of which only the free end is shown in the figures, used to grip the wrapping head 3.

[0022] In detail, the wrapping head 3 comprises a boxed body 5 that contains the means to rotate the reel 4, to prestretch the covering film and to wrap it around the load, all of types already known.

[0023] The boxed body 5 has a front part which, when used, faces the load to wrap, and a rear part that is fitted with first removable coupling means 6 to an external supporting frame 7 for parking the wrapping head 3 in the store.

[0024] The first removable coupling means 6, in particular, consist of four vertical axis sleeves 8 which are distributed at the back of the wrapping head 3 and which are able to engage, substantially without play or interference, the same number of vertical pegs 9 arranged on the external frame 7.

[0025] The external frame 7 consists of a beamed structure defining a stand 10 on the floor from which two uprights 11 project upwards, each supporting a pair of vertical pegs 9.

[0026] The external frame 7 also comprises means for detecting 12 the wrapping head 3 in the store.

[0027] The means for detecting 12 are made up of, for example, a feeler element 13 mounted in a turnable way at the base of one of the uprights 11; when the wrapping head 3 is placed on the external frame 7, the feeler element 13 is pushed downwards contrasting a return spring and activating an electronic transducer 14 to which it is associated.

[0028] Usefully the wrapping head 3 is equipped with second removable coupling means 15 to the moving machine 2.

[0029] The second removable coupling means 15 comprise a plurality of fastening elements 16 substantially extending in a vertical direction from the robot arm 2, and a plurality of reference elements 17 associated to the wrapping head 3 which can be coupled to the fastening elements 16 along a mutual and substantially vertical direction of engagement and disengagement.

[0030] The fastening elements 16 and reference elements 17 are integrally and rigidly associated to the moving machine 2 and wrapping head 3 respectively.

[0031] In particular, the fastening elements 16 consist of four vertical pins mounted on the same number of associated brackets 18 where the four vertices of a square plate 19 are.

[0032] In turn, the plate 19 is associated vertically to the free end of the robot arm 2.

[0033] The reference elements 17 consist of four blocks with corresponding vertical slots 20 that house the same number of anti-wear bushes 21, made in a polymer material, for the insertion without play and interference of the pins 16.

[0034] The blocks 17 are mounted on the four vertices of a sheet 22 associated vertically to the rear portion of the boxed body 5.

[0035] According to the particular form of embodiment of the invention illustrated in the figures, the pins 16 are mounted on the moving machine 2 so they project up-

wards and can be inserted from the bottom into the blocks 17 associated to the wrapping head 3 and, in use, sustain the weight of the wrapping head 3.

[0036] Alternative forms of embodiment of this invention are not excluded where, instead, the fastening elements 16 are associated to the wrapping head 3 projecting downwards and, in use, are hung inside the blocks 17 mounted on the free end of the robot arm 2; note that in this case too, coupling between the pins 16 and the blocks 17 and the consequent collection of the wrapping head 3 are done by raising the robot arm 2 from the floor upwards.

[0037] The second removable coupling means 15 also comprise holding means 23 that prevent the pins 16 and blocks 17 from sliding once they are connected together.

[0038] Such holding means consist of a bar associated to the moving machine 2 sliding along a direction transversal to the pins 16 and plate 19.

[0039] In detail, the bar 23 is housed inside a tubular section 24 extending orthogonally from the plate 19 and from where it can be extracted to be inserted in a corresponding through hole 25 made roughly in the middle of the sheet 22.

[0040] Usefully, pneumatic connection means and electronic connection means are contemplated, that can be inserted between the wrapping head 3 and the moving machine 2, their purpose being to feed the means housed inside the boxed body 5 with compressed air and electricity to operate the wrapping head 3.

[0041] In detail, the pneumatic connection means comprise an first joint 26 projecting from the sheet 22 above the hole 25 and facing down, and a second joint 27 associated to the plate 19 and facing up.

[0042] The two joints 26 and 27, in effect, can be coupled one against the other when the wrapping head 3 is mounted on the moving machine 2.

[0043] The above mentioned electronic connection means consist of a first electronic port 28, mounted so it projects from the sheet 22 on a supporting and protection column 29 positioned by the side of the hole 25, and a second electronic port 30, associated to the plate 19 and which, when the wrapping head 3 is being mounted on the moving machine 2, can be electrically connected to the first electronic port 28.

[0044] The operation of this invention is the following.

[0045] When the wrapping head 3 is left in the store, it rests on the external frame 7 by coupling the sleeves 8 with the vertical pegs 9.

[0046] To mount the wrapping head 3 on the moving machine 2, the plate 19 is brought up to the sheet 22 so the pins 16 are below the blocks 17, perfectly aligned with the vertical slots 20.

[0047] The free end of the robot arm 2 is now lifted so the pins 16 can be introduced into the vertical slots 20 and the wrapping head 3 is positioned against the robot arm 2.

[0048] Note that when aligning the pins 16 and the vertical slots 20, joints 26 and 27 are one under the other

and coupled together when the robot arm 2 is raised.

[0049] The same happens also for the reciprocal connection of the electronic ports 28 and 30.

[0050] Moreover at the end of assembly the tubular section 24 is perfectly aligned with the hole 25; when the bar 23 comes out of the tubular section 24 and fits into the hole 25, it prevents the pins 16 from coming out of the blocks 17, making it possible to stabilise the join between the wrapping head 3 and the free end of the robot arm 2.

[0051] It has in fact been ascertained how the described invention achieves the set purposes.

[0052] The invention thus conceived is susceptible of numerous modifications and variations, all of which falling within the scope of the inventive concept.

[0053] Furthermore all the details can be replaced with others that are technically equivalent.

[0054] In practice, the materials used, as well as the shapes and dimensions, may be any according to requirements without because of this moving outside the protection scope of the following claims.

Claims

1. System (1) for wrappings loads comprising at least one moving machine (2) of at least one wrapping head (3) equipped with at least one reel (4) of film for covering the load, said wrapping head (3) comprising first removable coupling means (6) to an external supporting frame (7) for parking the head (3) in a store and second removable coupling means (15) to said moving machine (2), **characterised by** the fact that said second coupling means (15) comprise at least one substantially vertical fastening element (16, 17) associated to at least one between said wrapping head (3) and said moving machine (2) and at least one reference element (16, 17) associated to the other between said wrapping head (3) and said moving machine (2) and which can be coupled to said fastening element along a mutual and substantially vertical direction of engagement and disengagement.
2. System (1) according to claim 1, **characterized by** the fact that said fastening element (16, 17) and said reference element (16, 17) are rigidly associated to at least one between said wrapping head (3) and said moving machine (2).
3. System (1) according to one or more of the preceding claims, **characterized by** the fact that said fastening element is a substantially vertical pin (16).
4. System (1) according to one or more of the preceding claims, **characterized by** the fact that said reference element comprises a block (17) fitted with a slot (20) for the insertion of said fastening element (16).

5. System (1) according to one or more of the preceding claims, **characterized by** the fact that said fastening element (16) is associated to said moving machine (2) projecting upwards.
6. System (1) according to one or more of the preceding claims, **characterized by** the fact that said fastening element (16) is associated to said wrapping head (3) projecting downwards.
7. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise at least one substantially vertical plate (19, 22) which is associated to at least one between said wrapping head (3) and said moving machine (2) and which supports said fastening element (16, 17).
8. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise at least one substantially vertical sheet (19, 22) to which said reference element (16, 17) is associated.
9. System (1) according to one or more of the preceding claims, **characterized by** the fact that at least one between said plate (19, 22) and said sheet (19, 22) is substantially quadrangular,
10. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise a plurality of said fastening elements (16, 17) and said reference elements (16, 17).
11. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise four of said fastening elements (16, 17) associated by the four vertices of said plate (19, 22).
12. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise four of said reference elements (16, 17) associated by the four vertices of said sheet (19, 22).
13. System (1) according to one or more of the preceding claims, **characterized by** the fact that said second removable coupling means (15) comprise holding means able to prevent said fastening element (16, 17) and said reference element (16, 17) from sliding.
14. System (1) according to one or more of the preceding claims, **characterized by** the fact that said holding means comprise at least one bar associated to said moving machine (2) sliding along a direction transversal to said fastening elements (16, 17) and which

can be inserted in a corresponding hole made on said wrapping head (3).

15. System (1) according to one or more of the preceding claims, **characterized by** the fact that said through hole is made on said sheet. 5
16. System (1) according to one or more of the preceding claims, **characterized by** the fact that it comprises pneumatic connection means which can be inserted between said wrapping head (3) and said moving machine (2). 10
17. System (1) according to one or more of the preceding claims, **characterized by** the fact that said pneumatic connection means comprise at least a first joint associated to said wrapping head (3) and facing down, and at least a second joint associated to said moving machine (2), facing up and which can be coupled to said first joint. 15 20
18. System (1) according to one or more of the preceding claims, **characterized by** the fact that it comprises electronic connection means which can be inserted between said wrapping head (3) and said moving machine (2). 25
19. System (1) according to one or more of the preceding claims, **characterized by** the fact that said electronic connection means comprise a first electronic port associated to said sheet and a second electronic port associated to said plate and which can be electrically connected to said first electronic port. 30
20. System (1) according to one or more of the preceding claims, **characterized by** the fact that said first electronic port is mounted so it projects from said sheet on at least one supporting and protection column. 35
21. System (1) according to one or more of the preceding claims, **characterized by** the fact that said external frame comprises means for detecting said wrapping head (3). 40
22. System (1) according to one or more of the preceding claims, **characterized by** the fact that said means for detecting comprise at least one feeler element associated to an electronic transducer 45

Patentansprüche

1. System (1) zum Umwickeln von Landungen, mit mindestens eine Bewegungsvorrichtung (2) zumindest eines Packkopfs (3), der mit mindestens einer Folienrolle (4) zum Einwickeln der Landung ausgestattet ist, wobei der Packkopf (3) erste lösbare Verbindungsmittel (6) mit einem externen Tragrahmen (7) 55

zur stationären Aufnahme des Packkopfes (3) in einem Speicher und zweite lösbare Verbindungsmittel (15) mit der Bewegungsvorrichtung (2) aufweist, **dadurch gekennzeichnet, dass** die zweiten Verbindungsmittel (15) zumindest ein im Wesentlichen vertikales Befestigungselement (16, 17), das zumindest entweder dem Packkopf (3) oder der Bewegungsvorrichtung (2) zugeordnet ist, und zumindest ein Referenzelement (16, 17), das jeweils der Bewegungsvorrichtung (2) oder dem Packkopf (3) zugeordnet ist, aufweisen, und die mit dem Befestigungselement längs einer gemeinsamen und im Wesentlichen vertikalen Richtung, in welche der Verbindungsvorgang und der Lösevorgang erfolgen, verbunden werden können.

2. System (1) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** das Befestigungselement (16, 17) und das Referenzelement (16, 17) starr mit zumindest dem Packkopf (3) oder der Bewegungsvorrichtung (2) verbunden sind.
3. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Befestigungselement als ein im wesentlichen vertikaler Bolzen (16) ausgebildet ist.
4. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Referenzelement eine Halterung (17) aufweist, die mit einer Aussparung (20) zum Einsetzen des Befestigungselements (16) versehen ist.
5. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Befestigungselement (16) mit der Bewegungsvorrichtung (2) verbunden ist, die aufwärts ragt.
6. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Befestigungselement (16) mit dem Packkopf (3) verbunden ist, der abwärts ragt.
7. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) zumindest eine im Wesentlichen vertikale Platte (19, 22) aufweise, die zumindest mit dem Packkopf (3) oder der Bewegungsvorrichtung (2) verbunden ist und die das Befestigungselement (16, 17) trägt. 50

8. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) zumindest eine im Wesentlichen vertikale Blechplatte (19, 22) aufweisen, mit der das Referenzelement (16, 17) verbunden ist.

9. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** zumindest die Platte (19, 22) oder die Blechplatte (19, 22) eine im Wesentlichen rechteckige Form aufweist. 5
10. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) eine Mehrzahl an Befestigungselementen (16, 17) und Referenzelementen (16, 17) aufweisen. 10
11. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) vier der Befestigungselemente (16, 17), die mit den vier Eckbereichen der Platte (19, 22) verbunden sind, aufweisen. 15
12. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) vier der Befestigungselemente (16, 17), die mit den vier Eckbereichen der Blechplatte (19, 22) verbunden sind, aufweisen. 20
13. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die zweiten lösbaren Verbindungsmittel (15) Haltemittel aufweisen, die es ermöglichen, eine Schiebebewegung zwischen dem Befestigungselement (16, 17) und dem Referenzelement (16, 17) zu verhindern. 30
14. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Haltemittel zumindest eine Stange umfassen, die mit der Bewegungsvorrichtung (2) verbunden ist und sich längs einer Richtung quer zu den Befestigungselementen (16, 17) schieben lässt und in eine entsprechende Öffnung, die am Packkopf geschaffen wurde, eingeführt werden kann. 40
15. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die durchgängige Ausnehmung in der Blechplatte eingearbeitet ist. 45
16. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es pneumatische Verbindungsmittel aufweist, die zwischen dem Packkopf (3) und der Bewegungsvorrichtung (2) eingefügt werden können. 50
17. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die pneumatischen Verbindungsmittel zumindest eine erste Verbindungsstelle, die mit dem Packkopf (3) verbunden ist und nach unten ragt, und mindestens eine zweite Verbindungsstelle, die mit der Bewegungsvorrichtung (2) verbunden ist, die nach oben ragt und die mit der ersten Verbindungsstelle verbindbar ist, aufweisen. 5
18. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es elektronische Verbindungsmittel aufweist, die zwischen dem Packkopf (3) und der beweglichen Vorrichtung (2) eingefügt werden können. 10
19. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die elektronischen Verbindungsmittel einen ersten elektronischen Anschluss, der mit der Blechplatte verbunden ist, und einen zweiten elektronischen Anschluss, der mit der Platte verbunden ist und der elektrisch an den ersten elektronischen Anschluss angeschlossen werden kann, aufweisen. 15
20. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der erste elektronische Anschluss derart befestigt ist, dass er von der Blechplatte in zumindest eine Trag- und Schutzsäule ragt. 25
21. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der externe Rahmen Mittel zur Erfassung des Packkopfes (3) aufweist. 30
22. System (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Mittel zur Erfassung zumindest ein Fühlerelement aufweisen, das an einen elektronischen Messwandler angeschlossen ist. 35
- Revendications** 40
1. Système (1) d'emballage de charges comprenant au moins une machine de déplacement (2) d'au moins une tête d'emballage (3) équipée d'au moins une bobine (4) de film destiné à recouvrir la charge, ladite tête d'emballage (3) comprenant des premiers moyens amovibles (6) de couplage avec un cadre de support extérieur (7) pour ranger la tête (3) dans un magasin et des deuxièmes moyens amovibles (15) de couplage avec ladite machine de déplacement (2), **caractérisé par le fait que** lesdits deuxièmes moyens de couplage (15) comprennent au moins un élément de fixation sensiblement vertical (16, 17) associé à au moins l'une d'entre ladite tête d'emballage (3) et ladite machine de déplacement (2), et au moins un élément de référence (16, 17) associé à l'autre d'entre ladite tête d'emballage (3) et ladite machine de déplacement (2) et qui peut être 55

couplé audit élément de fixation le long d'une direction mutuelle et sensiblement verticale d'accouplement et de désaccouplement.

2. Système (1) selon la revendication 1, **caractérisé par le fait que** ledit élément de fixation (16, 17) et ledit élément de référence (16, 17) sont associés de manière rigide au moins l'une d'entre ladite tête d'emballage (3) et ladite machine de déplacement (2). 5
3. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit élément de fixation est une broche sensiblement verticale (16). 10
4. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit élément de référence comprend un bloc (17) pourvu d'une fente (20) pour l'insertion dudit élément de fixation (16). 15 20
5. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit élément de fixation (16) est associé à ladite machine de déplacement (2) en saillie vers le haut. 25
6. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit élément de fixation (16) est associé à ladite tête d'emballage (3) en saillie vers le bas. 30
7. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent au moins une plaque sensiblement verticale (19, 22) qui est associée à au moins l'une d'entre ladite tête d'emballage (3) et ladite machine de déplacement (2) et qui supporte ledit élément de fixation (16, 17). 35 40
8. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent au moins une feuille sensiblement verticale (19, 22) à laquelle est associé ledit élément de référence (16, 17). 45
9. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait qu'**au moins l'une d'entre ladite plaque (19, 22) et ladite feuille (19, 22) est sensiblement rectangulaire. 50
10. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent une pluralité desdits éléments de fixation (16, 17) et desdits éléments de référence (16, 55

17).

11. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent quatre desdits éléments de fixation (16, 17) associés par les quatre sommets de ladite plaque (19, 22).
12. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent quatre desdits éléments de référence (16, 17) associés par les quatre sommets de ladite feuille (19, 22). 15
13. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits deuxièmes moyens de couplage amovibles (15) comprennent des moyens de retenue aptes à empêcher ledit élément de fixation (16, 17) et ledit élément de référence (16, 17) de glisser.
14. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits moyens de retenue comprennent au moins une barre associée à ladite machine de déplacement (2), coulissant dans une direction transversale auxdits éléments de fixation (16, 17) et qui peut être insérée dans un trou correspondant ménagé sur ladite tête d'emballage (3).
15. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit trou traversant est pratiqué sur ladite feuille.
16. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait qu'**il comprend des moyens de liaison pneumatique qui peuvent être insérés entre ladite tête d'emballage (3) et ladite machine de déplacement (2).
17. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits moyens de liaison pneumatique comprennent au moins un premier joint associé à ladite tête d'emballage (3) et orienté vers le bas, et au moins un deuxièmes joint associé à ladite machine de déplacement (2), orienté vers le haut, et qui peut être couplé audit premier joint.
18. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait qu'**il comprend des moyens de liaison électronique qui peuvent être insérés entre ladite tête d'emballage (3) et ladite machine de déplacement (2).
19. Système (1) selon l'une ou plusieurs des revendica-

tions précédentes, **caractérisé par le fait que** ladite liaison électronique comprend un premier port électronique associé à ladite feuille et un deuxième port électronique associé à ladite plaque et qui peut être raccordé Électriquement audit premier port électronique. 5

20. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit premier port électronique est monté de manière à faire saillie de ladite feuille sur au moins une colonne de support et de protection. 10

21. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** ledit cadre extérieur comprend des moyens pour détecter ladite tête d'emballage (3). 15

22. Système (1) selon l'une ou plusieurs des revendications précédentes, **caractérisé par le fait que** lesdits moyens de détection comprennent au moins un élément palpeur associé à un transducteur électronique. 20

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Fig. 1

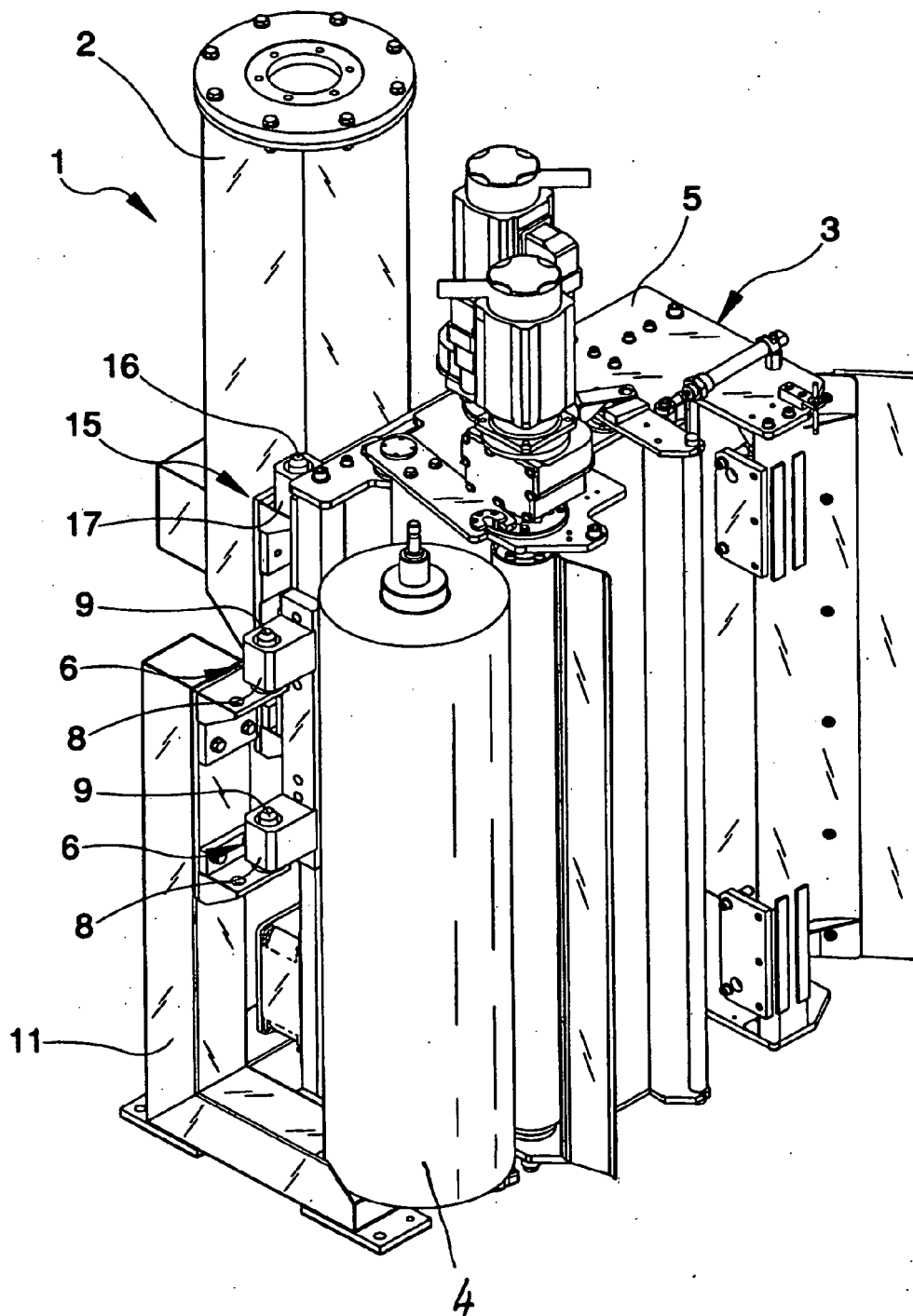


Fig. 2

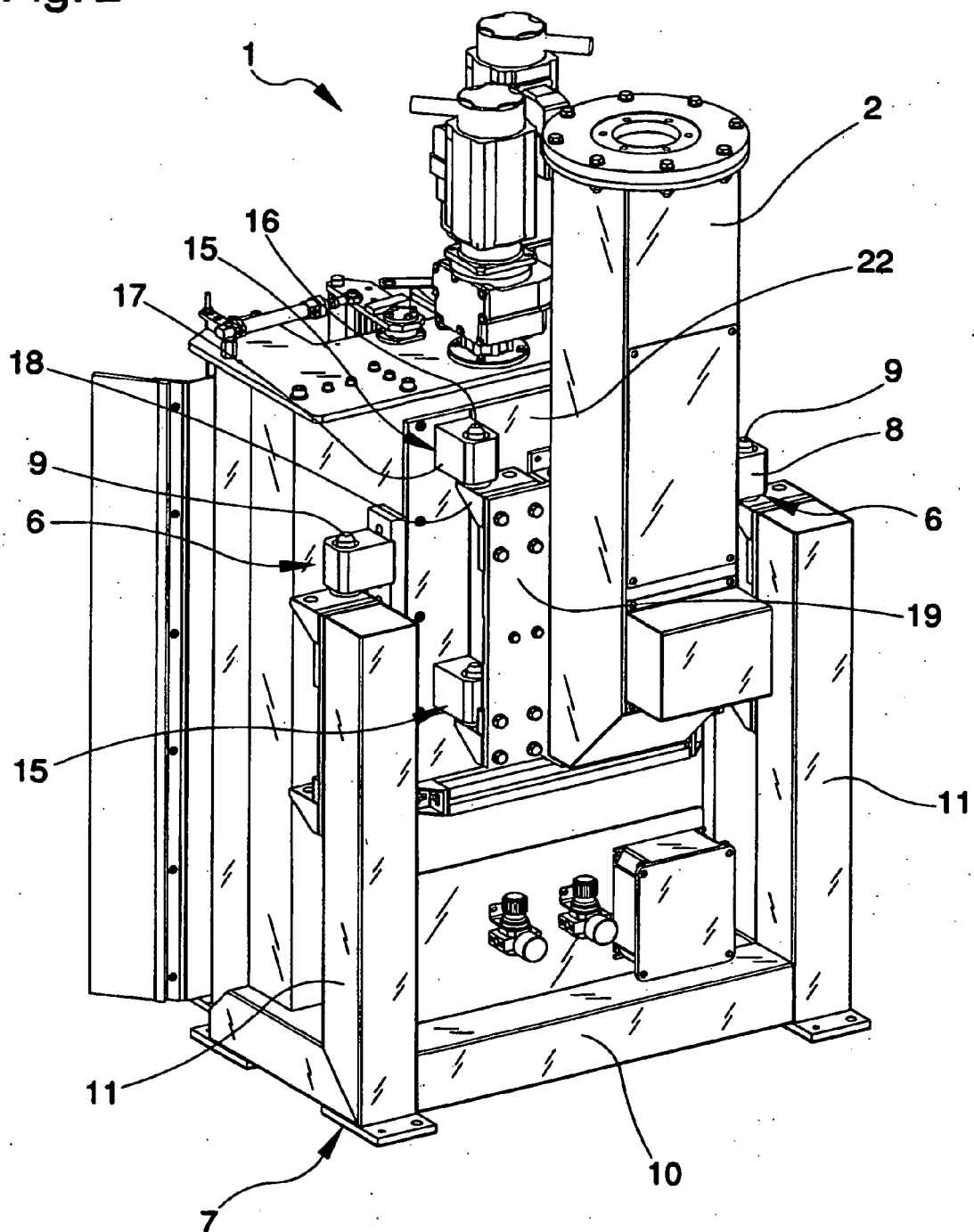


Fig. 4

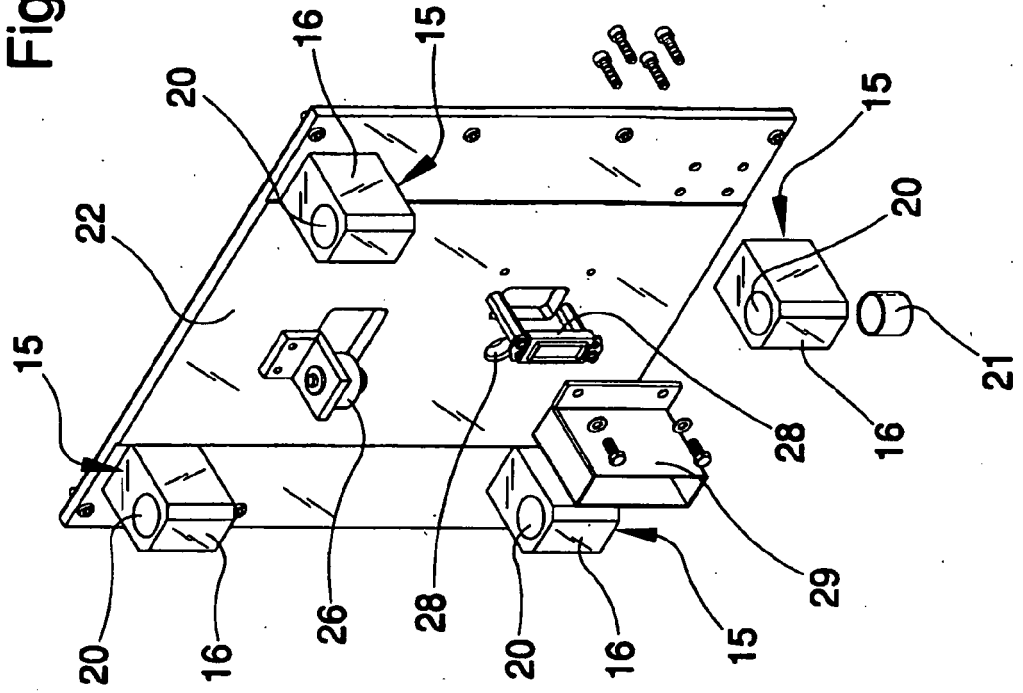


Fig. 3

