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(54) **PACKAGING APPARATUS**

(57) The present invention relates to a packaging machine for surrounding a packaging tray with a stretchable film.

The packaging machine comprises a packaging station for wrapping packaging trays with a film and a table consisting of multiple lift posts attached to a bottom plate. The table is for supporting a packaging tray to be wrapped. At least one lift post consists of a fixed member attached at one side to the bottom plate and further consists of a support head at the other side. The support head is attached to the fixed member by a flexible connection bendable in each direction in a plane orthogonal to the lift post.

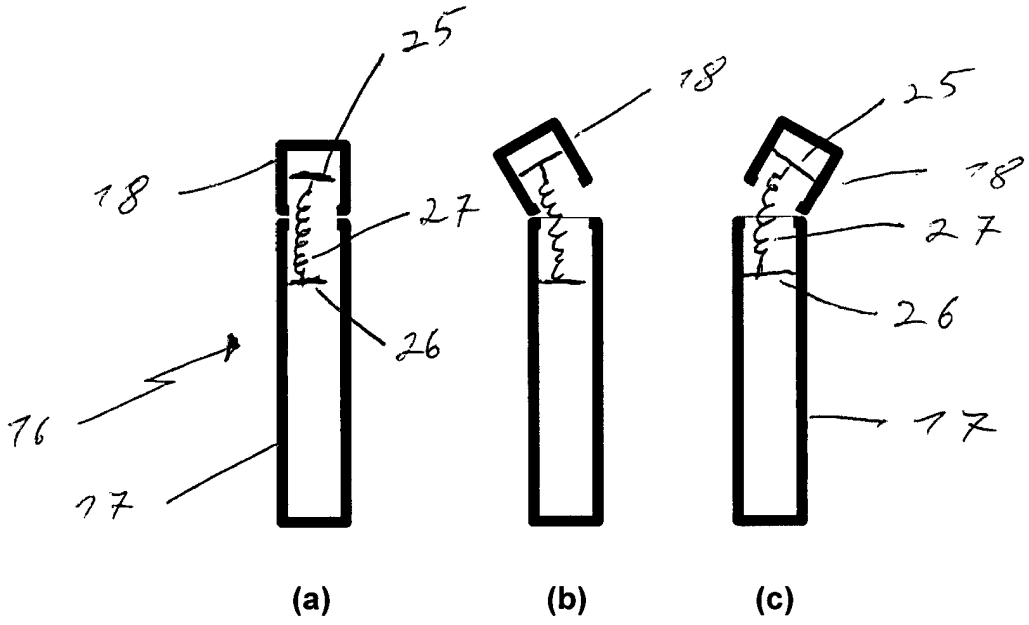

Fig. 2

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a packaging machine for wrapping packaging trays including e.g. fresh food with a stretchable film.

BACKGROUND OF THE INVENTION

[0002] The section introduces aspects that may be helpful in facilitating a better understanding of the invention. Accordingly, the statements of this section are to be read in this light and are not to be understood as admission about what is in the prior art.

[0003] In today's packaging machines, a stretchable film is pulled off a roll and a packaging tray including products for sale, e.g. fresh food, is wrapped around by the stretchable film. Usually, the packaging tray is carried by a table and the film is applied from the top to the packaging tray. This is done by moving the packaging tray in the direction of the film or moving the film in the direction of the packaging tray. Then, the film is wrapped around the packaging tray at all four sides and the edges of the film are located at the bottom side of the packaging tray. Optionally, the film is sealed on the bottom side of the packaging tray. Optionally, the film is stretched before being wrapped around the packaging tray.

[0004] Such a system is e.g. disclosed in US patent US5,855,106. For carrying the packaging tray, a table is proposed consisting of lift posts. The lift posts include heads which need to be moved away when wrapping the film around the packaging tray. There is a need to be cautious how the lift posts are installed such that the heads are moveable in the right direction. In case there is an obstacle in the moving direction of the head, the wrapping process may be disturbed.

SUMMARY OF THE INVENTION

[0005] It is an object of the invention to enhance the above described system, to ease its installation and to enhance its reliability.

[0006] The present invention concerns a packaging machine. The packaging machine comprises a packaging station for wrapping packaging trays with a stretchable film. Exemplarily, the packaging trays are supermarket food trays or supermarket food plates formed of plastic as known from food packaging. The packaging machine further comprises a table consisting of multiple lift posts attached to a bottom plate. The table is for supporting a packaging tray to be wrapped. This means the packaging tray is lying on the table. At least one of the lift posts consists of a fixed member which is attached to the bottom plate at one side. Thus the fixed members are standing on the bottom plate. Further, the lift posts consist of a support head. The support head is attached at one side to the fixed member. Attached within this context means that the support head and the fixed member are neighboring each other and the support head forms a spatial extension of the fixed member. According to one embodiment, the fixed member has at one end a plane side and the support head has at one end a plane side. The plane side of the fixed member and the plane side of the support head are located side by side and fit to each other. A force is applied forcing the fixed member and the support head together, thus building the lift post. The support head is attached to the fixed member by a flexible connection bendable in each direction in a plane orthogonal to the lift post. In other words, the support head is attached to the fixed member but is bendable in a random direction in the plane orthogonal to the lift post if a lateral force is applied to the support head.

[0007] Within the meaning of the invention, the table is formed of multiple lift posts which form a horizontal plane. A packaging tray is laying on the support heads of the lift posts forming the table. The apparatus as described above has the advantage that the support head may be moved in a random direction in the plane orthogonal to the lift posts, depending from which side a lateral force is applied to the support head. In other words, if a force is applied to the support head from the left, the support head moves to the right and vice versa. If a force is applied to the support head from behind, the support head moves to the front and vice versa. Thus, movement of the support head in a plane orthogonal to the lift post is possible independent form the orientation of the lift post. This is advantageous as the lift posts are replaceable in order to replace destroyed lift posts and in order to change the size of the table to different packaging tray sizes. In known systems, if some lift posts are replaced in order to change the size of the table, care needs to be taken that the orientation of the lift posts is correct and the support heads are moveable in the direction given by a folding member when wrapping the film around the packaging tray. Depending on the position of the support head in the table, this direction varies. According to the invention, the support heads are moveable in a random direction and there is no need to take special care about their orientation. A further advantage of the apparatus according to the invention is that if an obstacle hinders the support head to move in its predetermined direction, it is possible that the support head is bent to the side in order not to be blocked by the obstacle.

[0008] According to one embodiment, the flexible connection bendable in each direction in a plane orthogonal to the lift post is realized by a spring. The spring is for forcing the plane side of the fixed member and the plane side of the support head against each other. This has the advantage that the support head is forced automatically in its original position, after the lateral force to the support head is released. There is no need for a separate mechanism for moving the support head back in its original position.

[0009] According to one embodiment, the support head comprises a first holding member for holding one

end of a spring and the fixed member comprises a second holding member for holding the other end of a spring.

[0010] According to one embodiment, the first holding member and the second holding member are oriented in a way that the spring is located alongside a common axis of the fixed member and the support head.

[0011] According to one embodiment, the flexible connection bendable in each direction in a plane orthogonal to the lift post is realized by a flexible rod formed of flexible plastic.

[0012] According to one embodiment, at least some lift posts are attachable and detachable to the bottom plate by fastening and unfastening a screw.

[0013] According to one embodiment, at least some lift posts are attachable and detachable to the bottom plate by a snapping mechanism.

[0014] According to one embodiment, at least one column of lift posts is attachable and detachable at the same time by attaching or detaching a lift post holder to or from the bottom plate. According to one embodiment, the packaging machine further comprises at least one first side folder for wrapping a film at a first side below the packaging tray by moving a first wrapping member carrying a part of the film from the first side below the packaging tray. The first wrapping member bends down the support heads carrying the packaging tray at the first side in the moving direction of the first wrapping member.

[0015] According to one embodiment, the packaging machine further comprises at least one second side folder for wrapping a film at a second side below the packaging tray by moving a second wrapping member carrying a part of the film from the second side below the packaging tray. The second wrapping member bends down the support heads carrying the packaging tray at the second side in the moving direction of the second wrapping member.

[0016] According to one embodiment, the packaging machine further comprises at least one back folder for wrapping a film at the back side below the packaging tray by moving a third wrapping member carrying a part of the film from the back side below the packaging tray. The third wrapping member bends down the support heads carrying the packaging tray at the back side in the moving direction of the third wrapping member.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Some embodiments of apparatus and methods in accordance with embodiments of the present invention are now described, by way of examples only, and which reference to the accompanying drawings, in which:

Fig. 1 schematically depicts a packaging machine according to the invention

Fig. 2 schematically depicts a lift post according to a first embodiment of the invention

Fig. 3 schematically depicts a lift post according to a second embodiment of the invention

Fig. 4 schematically depicts a table consisting of multiple lift posts

Fig. 5 schematically depicts a table consisting of multiple lift posts according the invention and a side folder wrapping a film below a packaging tray

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0018] The description and drawings merely illustrate the principles of the invention. It will thus be appreciated that those skilled in the art will be able to devise various arrangements that, although not explicitly described or shown herein, embody the principles of the invention and are included within its spirit and scope. Furthermore, all examples recited herein are principally intended expressly to be only for pedagogical purposes to aid the reader in understanding the principles of the invention and the concepts contributed by the inventors to furthering the art, and are to be construed as being without limitation to such specifically recited examples and conditions. Moreover, all statements herein reciting principles, aspects and embodiments of the invention, as well as specific examples thereof, are intended to encompass equivalents thereof.

[0019] Fig. 1 shows a packaging machine 10 according to the invention. A stretchable film 12 for being wrapped around a packaging tray 15 is supplied from a film roll 11. The stretchable film 12 is cut by a cutter 13 at an adequate length in order to provide an element of the stretchable film 12 of adequate size to be wrapped around the packaging tray 15. This part of the stretchable film 12 is secured in a film holder 14. The film holder 14 is schematically depicted in Fig. 1 and comprises holding means for holding the front and rear edges of the part of the stretchable film 12. According to one embodiment, the film holder 14 is further for stretching the stretchable film 12. The packaging tray 15 is provided on a table. The table consists of multiple rows of lift posts 16. A lift post 16 comprises a fixed member 17 and a support head 18. The lift posts 16 are attached to a bottom plate 19 in order to provide the table. The table is to be understood as a plane which is provided by multiple support heads 18 on which the packaging tray 15 is laying. The bottom plate 19 is moveable in vertical direction by a lifer 20 in order to move the packaging tray 15 laying on the support heads 18 in the direction of the stretchable film 12 kept between the film holder 14. This movement is indicated in Fig. 1 by the arrows. If the lifter 20 is extended, the packaging tray 15 is lifted to a position above the film holder 14. This means, by moving the table by the lifter, the packaging tray 15 is moved in the direction of the stretchable film 12 and pushes the stretchable film 12 in upwards direction until the stretchable film 12 covers the

upper side of the packaging tray 15. The lower side of the packaging tray 15 is also located above the film holder 12. A first side folder 21 is provided to wrap one end of the stretchable film 12 around one side of the packaging tray 15 such that the end of the stretchable film 12 is folded to the lower side of the packaging tray 15. Therefore, the first side folder 21 moves from a first side below the packaging tray 15 carrying the end of the stretchable film 12. A second side folder 23 is provided to wrap the other end of the stretchable film 12 around a second side of the packaging tray 15 such that the end of the stretchable film 12 is folded to the lower side of the packaging tray 15. Therefore, the second side folder 23 moves from a second side below the packaging tray 15 carrying the end of the stretchable film 12. A back folder 22 is provided to wrap around the back side of the stretchable film 12 at the back side of the packaging tray 15 such that the end of the stretchable film 12 is folded to the lower side of the packaging tray from behind. If the packaging tray 15 leaves the table, the front part of the stretchable film 12 is folded around the packaging tray 15 from the front side by a separate mechanism (not illustrated). Applying the first and second side folders 21, 23, the back folder 22 and the front folding mechanism results in a packaging tray 15 completely wrapped around with the stretchable film 12. The edges of the stretchable film 12 meet each other below the packaging tray 15. The stretchable film 12 is then sealed below the packaging tray 15 on a sealing station (not illustrated) in order to produce a film covered packaging tray 15 e.g. for packaging fresh food. For applying the first and second side folder 21, 23 and the back folder, the support heads 18 need to be flexible and movable. The first and second side folder 21, 23 and the back folder 22 bend away at least some support heads 18 when moving below the packaging tray 15 for placing the edges of the stretchable film 12 at their predetermined positions.

[0020] Fig. 2 schematically depicts a lift post 16 according to a first embodiment of the invention. The lift post consists at least of a fixed member 17 and a support head 18. Multiple lift posts 16 arranged in a matrix like manner form a table in a packaging machine 10 for carrying a packaging tray 15 as described above. In Fig. 2 (a), the lift post 16 is depicted in its initial position. The fixed member 17 and the support head 18 forming the lift post 16 have their longitudinal axis in the same direction. The support head 18 comprises a first holding member 25 for holding one end of a spring 27. The fixed member comprises a second holding member 26 for holding the other end of a spring 27. The fixed member 17 and the support head 18 include cavities wherein the spring 27 is located. The fixed member 17 and the support head 18 are forced together by the spring, such that the upper side of the fixed member 17 and the lower side of the support member 17 are pressed against each other. In one embodiment, the fixed member 17 is a tube like cylinder. In one embodiment, the first and second holding members 25, 26 are holes in the walls of the fixed member 17 and the support head 18, respectively, wherein the ends of the spring 27 are fixed with a screw. In one embodiment, a protrusion is provided within the fixed member 17 and the support head 18 for fixing the spring 27.

[0021] Fig. 2 (b) depicts the lift post 16 if a force is applied from the right side as it is the case if a side folder touches the support head 18 from the right side. The support head 18 is bent to the left. The fixed member 17 stays in its original upright position. The spring 27 is stressed and forces the support head 17 in the direction of the fixed member 17. If the force from the right side is released, e.g. because the side folder moves away, the spring 27 stresses the support head 18 back in its original position as depicted in Fig. 2(a). Fig. 2 (c) illustrates the position of the support head 18 if a lateral force is applied from the left side. The support head 18 is bent to the right and the fixed member 17 stays in its original upright position. If the force from the left side is released, e.g. because the side folder moves away, the spring 27 stresses the support head 18 back in its original position as depicted in Fig. 2 (a). Fig. 2 (b) and (c) exemplarily illustrate the position of the support head 18 if a force is applied from a specific side. It is understood that the support head 18 may be pushed away in each direction in the plane orthogonal to the lift post 16 depending on the side from which a force is applied. In a packaging machine according to Fig. 1, the support heads 18 are pushed away by the side folders 21, 23 or back folder 22 and are forced back in their upright positions by the springs 27. In case there is an obstacle hindering a support head 18 to be pushed in the direction of the movement of the side folders 21, 23 or back folder 22, the spring 27 enables the support head 18 to flexible retreat in a direction where no obstacle is present.

[0022] Fig. 3 schematically depicts a lift post 16 according to a second embodiment of the invention. The lift post consists at least of a fixed member 17 and a support head 18. Multiple lift posts 16 arranged in a matrix like manner form a table in a packaging machine 10 for carrying a packaging tray 15 as described above. In Fig. 3 (a), the lift post 16 is depicted in its initial position. The fixed member 17 and the support head 18 forming the lift post 16 have a longitudinal axis in the same direction. The spring 27 as described in the first embodiment above is replaced by a flexible plastic object, e.g. a flexible rod 31. The flexible rod 31 has similar effects as described above on the movement of the support member 18 if a force is applied from the side, e.g. by a side folder 21, 23 or a back folder 22. The flexible rod 31 is fixed in the support head 18 by a first holding member 25 and in the fixed member 17 by a second holding member 26. In one embodiment, the first and second holding members 25, 26 are bolts or screws sticking in the wall of the support member 18 and the fixed member 17, respectively, and tightening the flexible rod 31 within the support member 18 and fixed member 17, respectively.

[0023] Fig. 4 discloses a top view on the table for carrying a packaging tray 15. The table consists of multiple

lift posts 16 as described above which are arranged in a matrix like manner. In Fig. 4, the support heads 18 are in their original position. Thus, in the top view on the lift posts 16, the upper side of the support heads 18 is depicted. The lift posts 16 are attached to the bottom plate 19. As an example only, the left and right columns of lift posts 16 are attached to a lift post holder 42. By detaching the lift post holder 42 from the bottom plate 19, a whole column of lift posts 16, e.g. the whole left column of lift posts 16 or the whole right column of lift posts 16 is detachable or attachable at once to easily reconfigure the packaging apparatus 10. The inner area 41 of the bottom plate 19 comprises lift posts 16 which are attachable and detachable separately. The lift posts 16 are either attached to the bottom plate 19 by a screw sticking out from the bottom plate and the lift post 16 having a threaded inner hole to be screwed on the screw. Alternatively, an inner hole of the lift post 16 is put on a bold and is fixed by a screw from the side driving through the wall of the lift post 16. Alternatively, the lift post is attached to the bottom plate 19 by a clipping mechanism. The lift post 16 is attachable to the lift post holder 42 in the same way.

[0024] Fig. 5 schematically depicts a table consisting of multiple lift posts 16 according the invention. By way of example only, three columns of four lift posts 16 are attached to the bottom plate 19. The lift posts 16 in the second and third columns are in their original position because no force is applied from the side to the support heads 18 of these lift posts 16. The corresponding springs 27 are in their original positions forcing the support heads 18 in an upright position. A folder 21, 22, 23, e.g. a side folder or a back folder, is illustrated indicating that the support heads 18 of the left columns of lift posts 16 experience a lateral force from the left side. For sake of simplicity, the folder 21, 22, 23 is not depicted in detail but is illustrated as a black bar and does not touch the support heads 18 in the figure. A person skilled in the art understands that the folder 21, 22, 23 is for carrying the stretchable film 12 to be wrapped around the packaging tray 15 and for wrapping the stretchable film 12 below the packaging tray 15 and that the support heads 18 are bended away when the folder 21, 22, 23 in fact touches them. When the folder 21, 22, 23 removes after wrapping the stretchable film 12 below the packaging tray 15, the support heads 18 of the left columns of lift posts 16 remove to their original position by the force applied by the corresponding springs 27. The folder 21, 22, 23 does not need to remove the support heads 18. Fig. 5 illustrates the table using lift posts 16 according to one embodiment including a spring for forcing the support heads 18 in their original position. A person skilled in the art understands that the same effect is realized using the lift posts 16 according to the embodiment using flexible plastic rods 31 for forcing the support heads back in their original position.

Claims

1. A packaging machine comprising:

   - a packaging station for wrapping packaging trays with a stretchable film,
   - a table consisting of multiple lift posts attached to a bottom plate, the table is for supporting a packaging tray to be wrapped,
   wherein
   at least one lift post consists of a fixed member attached at one side to the bottom plate and further consists of a support head at the other side,
   characterized in that
   the support head is attached to the fixed member by a flexible connection bendable in each direction in a plane orthogonal to the lift post.

2. A packaging machine according to claim 1, wherein the flexible connection bendable in each direction in a plane orthogonal to the lift post is realized by a spring.

3. A packaging machine according to claim 1, wherein the flexible connection bendable in each direction in a plane orthogonal to the lift post is realized by a flexible rod formed of flexible plastic.

4. A packaging machine according to one of claims 1 to 3,
   wherein at least some lift posts are attachable and detachable to the bottom plate by fastening and unfastening a screw.

5. A packaging machine according to one of claims 1 to 3, wherein at least some lift posts are attachable and detachable to the bottom plate by a snapping mechanism.

6. A packaging machine according to one of claims 1 to 3, wherein at least one column of lift posts is attachable and detachable at the same time by attaching or detaching a lift post holder to or from the bottom plate.

7. A packaging machine according to one of claims 1 to 6, wherein the packaging machine further comprises at least one first side folder for wrapping a film at a first side below the packaging tray by moving a first wrapping member carrying a part of the film from the first side below the packaging tray, the first wrapping member bending down the support heads carrying the packaging tray at the first side in the moving direction of the first wrapping member.

8. A packaging machine according to one of claims 1 to 7, wherein the packaging machine further comprises at least one second side folder for wrapping

a film at a second side below the packaging tray by moving a second wrapping member carrying a part of the film from the second side below the packaging tray, the second wrapping member bending down the support heads carrying the packaging tray at the second side in the moving direction of the second wrapping member.

9. A packaging machine according to one of claims 1 to 8, wherein the packaging machine further comprises at least one back folder for wrapping a film at the back side below the packaging tray by moving a third wrapping member carrying a part of the film from the back side below the packaging tray, the third wrapping member bending down the support heads carrying the packaging tray at the back side in the moving direction of the third wrapping member.

10. A lift post consisting of a fixed member and a support head attached at one side to the fixed member, **characterized in that** the support head comprises a first holding member for holding one end of a spring and the fixed member comprises a second holding member for holding the other end of a spring.

11. A lift post according to claim 10, wherein the first holding member and the second holding member are oriented in a way that the spring is located alongside a common axis of the fixed member and the support head.

12. A lift post according to claim 10 or 11, wherein the fixed member has one end a plane side and the support head has at one end a plane side, the two plane sides are located side by side in the lift post and the spring is for forcing the plane sides against each other.

13. A packaging machine according to one of claims 1 to 9,
wherein the at least one lift post is a lift post according to one of claims 10 to 12.

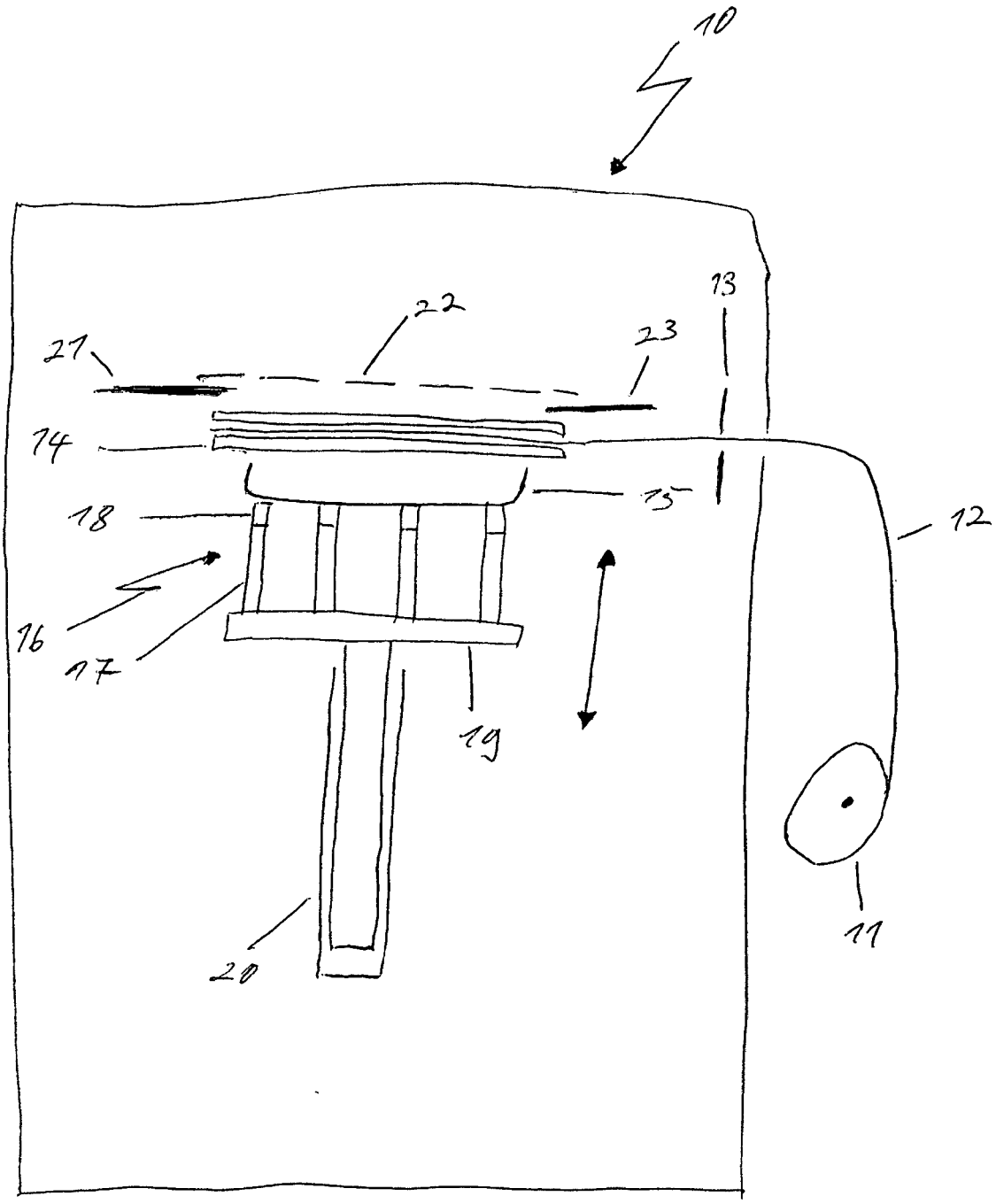

Fig. 1

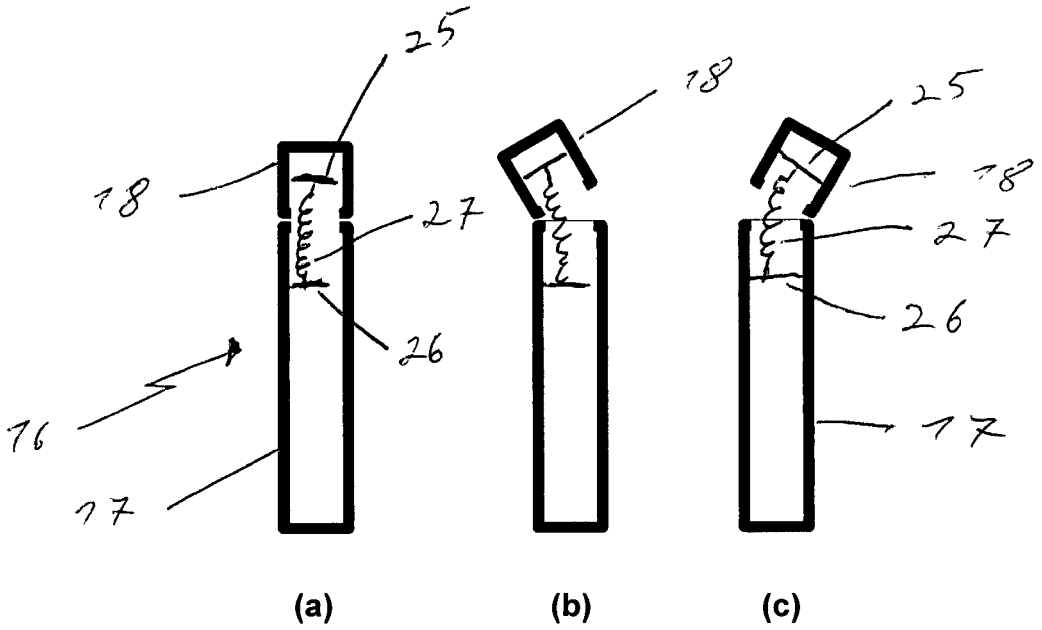
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Fig. 2

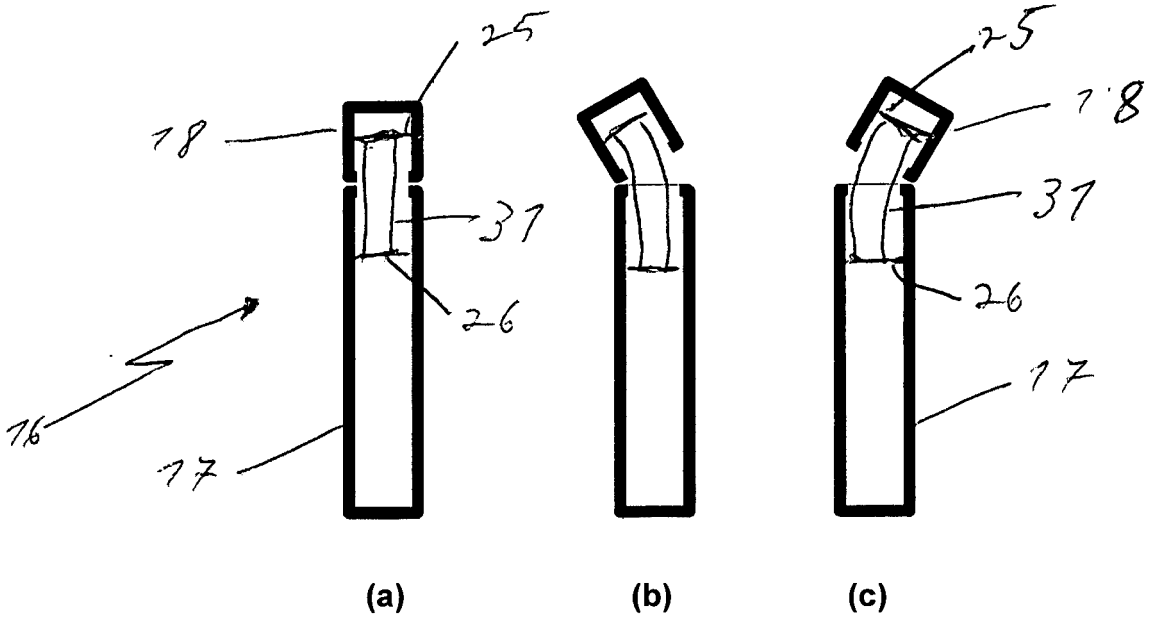
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Fig. 3

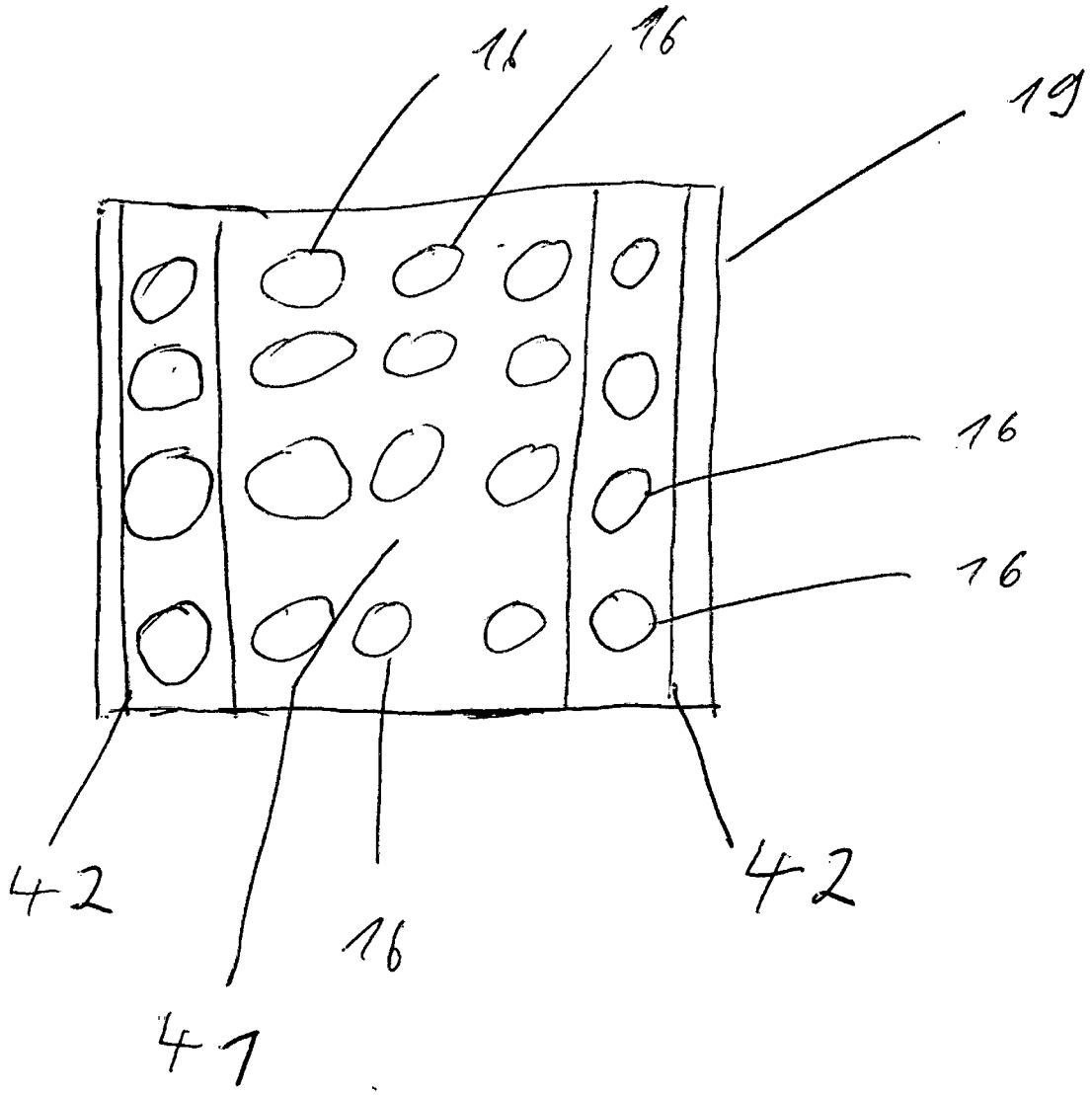

Fig. 4

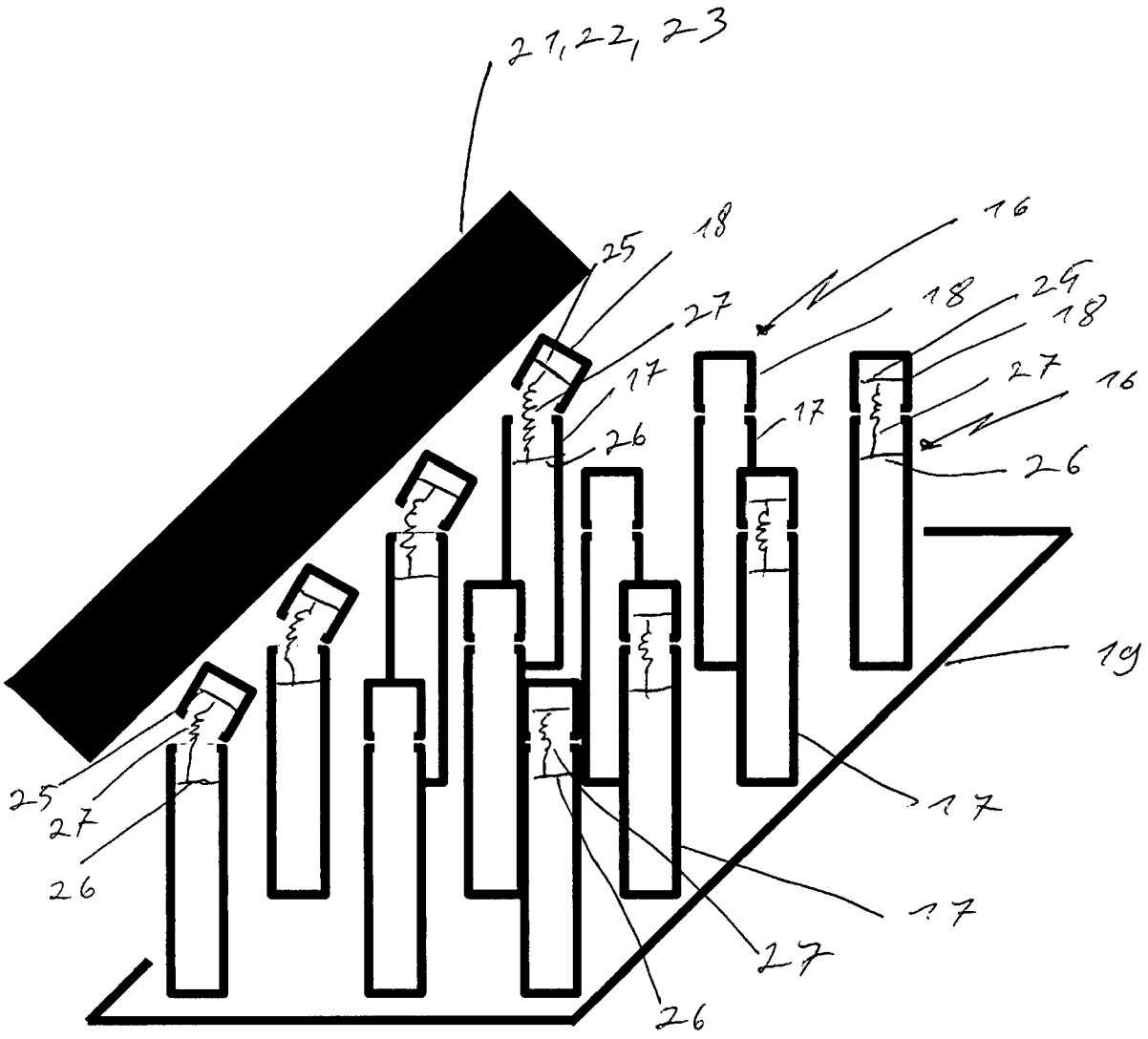

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 15 00 1617

DOCUMENTS CONSIDERED TO BE RELEVANT

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	30 September 2015	Yazici, Baris

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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