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(54) **METHOD AND APPARATUS FOR PACKAGING PRODUCTS IN TUBULAR NET**

VERFAHREN UND VORRICHTUNG ZUM VERPACKEN VON PRODUKTEN IN
SCHLAUCHFÖRMIGEN NETZEN

PROCÉDÉ ET APPAREIL POUR EMBALLER DES PRODUITS DANS UN FILET TUBULAIRE

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Description

Technical Field

[0001] The present invention regards a method for packaging products in a tubular net wrapping, in particular for packaging punnets of fruit and vegetable products and the like, as well as an apparatus for carrying out such a method.

Background Art

[0002] Packaging of fruit and vegetable products in punnets contained inside a tubular net wrapping has been known for a while. More particularly, such packages are generally made of a punnet for containing the products, made of plastic material, contained inside a tubular net wrapping which is closed, at the opposite ends, through clipping with respective metal clips; often such metal clips also tighten the opposite ends of a thin strip of plasticized paper designed to serve as handle for transporting the package. Usually with the punnet is associated a label made of paper or similar material, containing the data suitable to identify the product put on sale. Also such a label is maintained by one of the cited metal clips.

[0003] To realize the cited packages, so-called netting automatic machines have been known; such machines provide to introduce single punnets, filled with a predetermined quantity of products, inside the tubular net, closed beforehand through clipping downstream of the tract engaged by the punnet, and to close and cut the aforesaid tract of tubular net upstream of the same punnet. The tubular net unwinds on the external surface of a pipe which also serves as a feeding way for the punnets to package. At the end of such feeding pipe, the punnet to be packaged hits the tract of tubular net closed downstream, and is moved forward, together with such tract of tubular net, until it goes beyond a clipping device which accomplishes the cited closing upstream of the punnets. With the clipping device are associated suitable cutting means which provide to cut the tubular net, for shaping the wrapping. Practically, the cutting of the tubular net occurs in an intermediate position between two different metal clips simultaneously applied by the clipping device, so as to prearrange the tubular net for packaging the successive punnet. A netting machine of this type is illustrated in European patent application no. EP 123 655.

[0004] The described solution, although still widely used, does not fully satisfy the exigencies of the users. In fact the so realized package turns out to be insufficiently ecologic and determines sensible problems for the disposal, in particular where the sorting of waste is required. On this matter, it is to be observed that the presence of metal parts, such as clips, is generally not appreciated by the consumers, further to representing an additional cost for the producers. Furthermore in the complete package three different typologies of materials are present, that is the plastic material of the punnet and

of the tubular net, the metallic material of the clips and the plasticized paper or similar material of the label and of the small strip that serves as an handle, with a consequent multiplication of the collection and recycling costs of such various materials.

[0005] European patent application no. EP 0 677 449 discloses a package for horticultural fruit products comprising a net bag provided with a narrow strip of synthetic material, representing the handle, arranged at a definite spacing from a net bag body and extending longitudinally with respect to the net bag body, welded at its ends to the ends of the net bag. At such ends, pieces of plastics material strip are connected to the bag and to the strip acting as the handle by the same welds.

[0006] Document US 4,537,006 discloses an automatic apparatus for enshrouding fruit and vegetable containers in a net wrapping comprising a station for feeding the containers that is provided with suitable conveyors and a net carrying pipe placed downstream of such conveyors. The apparatus comprises a subsequent station in which each container is enshrouded in a net arranged downstream of the net carrying pipe, and a station for fixing reinforcing strips to the container, as well as a station for labelling the containers.

Disclosure

[0007] The task of the present invention is that of solving the aforementioned problems, devising a method that allows to perform the packaging of products in a tubular net wrapping, in particular providing a package which is relatively cheap and easy to recycle.

[0008] Within such task, it is a further scope of the present invention that of providing an apparatus that enables to realize in an optimal way the aforesaid method for packaging products in a tubular net wrapping.

[0009] Another object of the invention is that of providing an apparatus for packaging products in a tubular net wrapping able to ensure a high production rate.

[0010] A further scope of the invention is that of providing an apparatus for packaging products in a tubular net wrapping of simple structural and functional conception, equipped with a certainly reliable functioning and of versatile use, as well as relatively economic cost.

[0011] The above mentioned scopes are attained, according to the present invention, by the method for packaging punnets of fruit and vegetable products in a tubular net wrapping according to claim 1.

[0012] According to the present invention, the method for packaging punnets of fruit and vegetable products in a tubular net wrapping provides for performing the closing through welding of the ends of a tract of tubular net inside which is introduced the product to be packaged.

[0013] The method provides for attaching to said ends of the tract of tubular net, at the closing areas obtained through welding, the ends of at least one strip of thermoplastic material, extended longitudinally with respect to the same tract of tubular net.

[0014] The present invention also concerns the apparatus for packaging products II in a tubular net wrapping according to claim 5.

Description of Drawings

[0015] Details of the invention shall be more apparent from the detailed description of a preferred embodiment of the method for packaging products in a tubular net wrapping, according to the invention, illustrated for indicative purposes in the attached drawings, wherein:

figure 1 shows a perspective view of the apparatus in hand for packaging products in a tubular net wrapping;
figure 2 shows, in the same perspective view, an enlarged portion of an operating area of the apparatus;
figure 3 shows a perspective view from a different angle of such an operating area;
figures 4 and 5 respectively show a lateral view and a plan view of the apparatus;
figure 6 shows a perspective view of an operating member of the apparatus, with removed parts;
figure 6a shows an enlarged detail thereof;
figures 7 and 8 show the same operating member in various operating steps;
figures 9, 10, 11, 12 and 13 respectively show a lateral view of the aforesaid operating area of the apparatus in successive steps of the method in hand;
figure 14 shows a schematic perspective view of a package realized according to the method in hand.

Best Mode

[0016] With particular reference to such figures, the apparatus for packaging products in an extruded tubular net wrapping is indicated in its entirety with 1. In the illustrated case, the products to be packaged consist of punnets 2 of fruit and vegetable products and the like. The punnet is made of plastic material, for example polypropylene or similar materials.

[0017] The apparatus 1 has, above a base 10, a tubular member 11 arranged with horizontal axis. On the external surface of the tubular member 11, in use, a tubular net 21 made of plastic material, for example polyethylene or similar materials, unwinds.

[0018] The tubular member 11 is longitudinally crossed at its own inside, in a known way, by a conveyor belt 12 suitable to perform the feed of the products 2 to be packaged. The conveyor belt 12 is wound at the opposite ends on a couple of wheels 13, respectively driving and driven, which are supported rotatable by a framework 14 constrained to the base 10 of the apparatus. The framework 14 also supports, at the opposite ends, the tubular member 11. The conveyor belt 12 is operated by a suitable electric motor member 15.

[0019] Downstream of the tubular member 11, accord-

ing to the feed direction of the products 2, are arranged further conveyor means 16 suitable to receive the products 2 to be packaged exiting from the same tubular member 11. Such conveyor means 16 are suitably constituted by a further conveyor belt which is wound on wheels 17 suitably motorized; preferably the active branch of such conveyor belt 16 is separated in two consecutive tracts of variable length, such that to a lengthening of one corresponds a shortening of the other, and vice versa. Such active branch of the conveyor belt 16 is substantially overlapped to the conveyor belt 12 for feeding the products 2, in order to facilitate the advancement of the same products 2.

[0020] Above the conveyor means 16 is placed a closing and cutting device 30 for the tubular net 21, to perform the separation of the single packages 20. The closing device 30 comprises a frame 31 which is mobile with alternated motion in direction longitudinal to the tubular member 11, and which carries suitable sealing means and cutting means suitable to operate the closing and the separation of the aforesaid packages 20, in suitable step relation with the feed of the products 2 which, exiting from the tubular member 11, are introduced inside the tubular net 21.

[0021] More precisely, the frame 31 comprises a couple of posts 32 placed side by side which extend from a trolley 33 provided with opposite couples of sliding blocks 34; the sliding blocks 34 are mounted sliding on a guide rail 35 fixed on the base 10. The frame 31 is actuated in alternated motion by suitable actuator members, for example an electric motor member acting through a transmission member 36 or alternatively actuator means of the pneumatic type, or again a linear electric motor and the like.

[0022] The frame 31 carries mobile, on a vertical plane transverse to the longitudinal axis of the apparatus, a first unit 40 and a second unit 50 for closing the tubular net 21, respectively upper and lower, mounted sliding through respective sliding blocks 41, 51 on guide means 37 associated with the posts 32 (see in particular fig. 6). The closing units 40, 50 are preferably mobile relative to each other, with an alternated motion of reciprocal approaching and departing, upon control of respective actuator members 42, 52 for example of pneumatic type or by means of a crank gear driven by an electric motor preferably of the brushless type. It is obviously possible to provide that the aforesaid relative motion is determined by the driving of one only of the closing units 40, 50, for example the upper closing unit 40.

[0023] The upper closing unit 40 provides a couple of blades 43 placed beside at a suitable distance from each other and constrained at the opposite sides to the aforesaid sliding blocks 41; for greater clarity, only one of the blades 43 is represented in figures 6, 7 and 8. The blades 43 are suitable to act substantially as a guillotine to operate the closing of the tubular net 21, as better specified in the following. To such an end, the blades 43 have at the lower part thereof an analogous shaped profile 43a

with opposite tracts converging upwards, so as to act as a draft for collecting the tubular net 21 at a central zone 43b of the same profile. The central zone 43b of the lower profile of the blades 43 shapes a flat bottom cavity of suitable width.

[0024] Between the blades 43, a sealing member 44 preferably of the thermal type is vertically mobile; obviously it is possible to provide the use of sealing means of a different type, for example ultrasonic or with electric impulses. The sealing member 44 is actuated by a couple of actuator members 45, for example pneumatic, carried by a crossbar 46 fixed between the blades 43.

[0025] The lower closing unit 50 has a couple of blades 53 placed beside at a suitable distance from each other and constrained at the opposite sides to the aforesaid sliding blocks 51. The blades 53 are suitable to cooperate with the opposite blades 43 of the upper closing unit 40 to perform the closing of the tubular net 21. To this aim, the blades 53 have at the upper part an analogous shaped profile 53a with opposite tracts converging downwards, so as to act as a draft for collecting the tubular net 21 at a central zone 53b of the same profile, having a width substantially corresponding to the central zone 43b of the profile of the upper blades 43. Such central zone 53b shapes the housing seat for an abutment member 54 suitable to abut, in suitable step relation, the aforesaid upper blades 43 and the sealing member 44.

[0026] It is to be observed that the lower blades 53 are more approached to each other with respect to the upper blades 43, in such a way as to enable the reciprocal joint in the step of approaching of the closing units 40, 50.

[0027] More particularly, the sealing member 44 carries on a median plane a cutting member 47 suitable to perform the cutting of the tubular net 21, for separating the single packages 20. The cutting member 47 penetrates during the cutting step in a corresponding groove 57 practiced on the upper surface of the abutment member 54 (fig. 6a). Suitably it is possible to provide that the abutment member 54 is provided, on the upper surface, with a washer of elastic material, of the type of the silicone rubber, suitable to absorb the pressure of the cutting member 47. A washer of this type can be in any case preferably provided to compensate possible misalignments and to increase the grip of the net.

[0028] The abutment member 54 is preferably made of aluminium or similar materials and has on the upper surface a series of holes 55 in communication, through respective internal channels, with suitable pneumatic means for sending a flow of cooling air (see again fig. 6a). Obviously the cited washer of elastic material has a corresponding series of holes.

[0029] To the closing device 30 are also fed a first ribbon 22 and a second ribbon 23 of thermoplastic material, respectively upper and lower, extending longitudinally with respect to the tubular net 21 outside the tubular member 11. The ribbons 22, 23 of thermoplastic material unwind from respective reels 24, 25 associated with the structure of the apparatus by means of suitable support

means, for simplicity not represented. Usefully are provided tensioner means, known per se and not represented in the drawings, suitable to maintain the tension of the ribbons 22, 23 constant during the displacement steps.

5 Practically, the ribbons 22, 23 of thermoplastic material are fed to the sealing area defined between the sealing member 44 and the abutment member 54 at sides diametrically opposed with respect to the tubular net 21 brought in the same sealing area.

10 **[0030]** The method for packaging products in a tubular net wrapping turns out to be easy to understand from the preceding description.

[0031] The products to be packaged, consisting of punnets 2 of fruit and vegetable products, are fed in ordered sequence, suitably distanced from each other, along the channel defined by the tubular member 11. At the outlet of the tubular member 11, a single product 2 to be packaged is transferred by inertia inside the tract of tubular net 21 protruding, in a known way, from the front part of the tubular member 11 (fig. 9). The front end of such a tract of tubular net 21 turns out to have been previously closed through welding, according to the modality specified thereafter. The product 2 to be packaged is moved forward inside said tract of tubular net 21 until it reaches said front end closed through welding.

[0032] To the aforesaid front end of the tract of tubular net 21 are also attached, at the sealing area, the ends of the ribbons 22, 23 of thermoplastic material, respectively upper and lower, that unwind from the respective reels 24, 25. Practically, the ribbons 22, 23 of thermoplastic material extend longitudinally to the tubular net, in positions diametrically opposed with respect to such tubular net.

[0033] Suitably the presence of the product 2 to be packaged on the conveyor belt 16 is detected by suitable sensor means, not represented, arranged at the outlet opening of the tubular member 11. Instead the following product 2 is stopped inside the same tubular member 11.

[0034] Then is operated the displacement of the closing device 30 at a first operating station arranged close to the aforesaid outlet opening of the tubular member 11, wherein the closing of the tubular net 21 is realized upstream of the product (fig. 10). More in detail, the closing device 30 is mobile alternatively between said closing station and a second operating station, suitably distanced from the tubular member 11, wherein is released the product packaged in the tubular net wrapping, indicated with 20 for greater clarity.

[0035] In the closing station, is firstly actuated the reciprocal approaching of the blades 43, 53 of the closing units 40, 50, respectively upper and lower, associated with the closing device 30 (see in particular fig. 7). The blades 43, 53 act substantially as a guillotine to perform the closing of the tubular net 21, upstream of the product 2 (fig. 11). Practically the tubular net 21 is obstructed by the opposite shaped profiles 43a, 53a of the blades 43, 53, until being tighten at the central zone 43b, 53b of the aforesaid shaped profiles of the blades 43, 53. In partic-

ular, during such closing step the central zone 43b of the upper blades 43 is brought abutting against the abutment member 54 associated with the lower blades 53.

[0036] In suitable step relation, is then operated the actuation of the sealing member 44 and the shifting of the closing device 30 towards the release station, as well as the advancing in the same direction of the product 2 inserted into the tubular net 21 on the conveyor belt 16 (fig. 12); in particular the product 2 and the closing device 30 move with the same linear speed, so as to determine between them a null relative speed. It is to be noted that the closing device 30 draws the tubular net 21 and the ribbons 22, 23 of thermoplastic material that are tightened between the blades 43, 53 of the closing units 40, 50. Such a drawing action determines the extraction of the tubular net 21 from the tubular member 11 and the unwinding of the ribbons 22, 23 from the relative reels 24, 25.

[0037] The sealing member 44 comes in abutment of the underneath abutment member 54 and performs the welding of the portion of the tubular net 21 and of the ribbons 22, 23 of thermoplastic material tightened between the blades 43, 53 of the closing device 30 (fig. 8). In the same time the cutting member 47 associated with the sealing member 44 performs the cutting of the same tubular net 21 and of the ribbons 22, 23 of thermoplastic material, according to a cutting line transverse to the tubular net 21 and to the ribbons 22, 23 of thermoplastic material and substantially median to the aforesaid sealed portion.

[0038] When the welding is completed, during the cited shifting step of the closing device 30 from the closing station to the release station, the displacement of the sealing member 44 into the lifted disengagement position is actuated, maintaining closed the blades 43, 53 which tighten the sealed portion of the tubular net 21 and of the ribbons 22, 23 of thermoplastic material (see again fig. 7). In the meantime is operated the sending of a flow of cooling air from the holes 55 present on the upper surface of the abutment member 54, in a way as to accelerate the cooling of the welded area. In such a way a better seal of the package is achieved.

[0039] When the closing device 30 reaches the release station, the movement of reciprocal departing of the closing units 40, 50 is actuated, so as to free the sealed portion of the tubular net 21 and of the ribbons 22, 23 of thermoplastic material from the tightening of the blades 43, 53 (fig. 13). In such a way the wrapping results completed and the packaged product 20 can be conveyed to the outlet of the apparatus.

[0040] At this point the return of the closing device 30 at the closing station is operated, to perform a new cycle for packaging a successive product 2, in the meantime prearranged inside the tubular net 21, as previously described.

[0041] The method and the apparatus in hand attain the scope of performing in an optimal manner the packaging of products in a tubular net wrapping, in particular

providing a package of relatively economic cost, highly functional and easy to recycle.

[0042] Such a result is obtained essentially thanks to the inventive idea of performing the closing of the tubular net wrapping through welding. This allows to avoid the presence of metal parts, such as the usual clips commonly used in the prior art. Moreover the closing through welding warrants an efficient seal and prevents the opening of the product contained inside the punnet.

[0043] A characteristic of the present invention is that of associating with the wrapping, in the sealing step, at least one ribbon of thermoplastic material and preferably a couple of ribbons 22, 23 of thermoplastic material, which extend shaping an arc respectively above and underneath the wrapping, that is one in the upper part and the other in the bottom of the punnet, being fixed to the respective ends at the sealed portions 26 which close the tubular net wrapping at the opposite ends; nevertheless, according to the typology of product, it is possible to provide the use only of the upper ribbon or only of the lower ribbon. Such ribbons of thermoplastic material can be advantageously used for printing thereon the data suitable to identify the product put on sale. In particular the upper ribbon, which can be used also as handle of the package, can carry the general data of the producer, while on the lower ribbon can be printed the specific data of the product, such as for example the weight and the like, as well as the necessary bar code. It is to observe that the position of the bar code at the bottom of the package facilitates the reading thereof on conventional scanners, avoiding the operators to turn the punnet upside down.

[0044] It is to be noted that the width of the ribbons offers a wide surface for printing the aforementioned data. The apparatus is suitably provided with a print device, known per se, suitable in particular to carry out in line the printing of the lower ribbon; obviously if the application of only an upper ribbon is provided, the aforementioned data of the product will be printed by the print device on such upper ribbon.

[0045] In such a way the necessity of providing the package with a paper label carrying the aforementioned identifying data is overcome. Practically then the package does not require the use of materials different from the plastic material of which the punnet, the tubular net and the upper and lower ribbons are realized, in particular metal material and paper. Being realized with a single material, the package turns out to be entirely recyclable and does not require sorting during the disposal. The package can therefore be easily disposed also where the waste sorting is required.

[0046] The so realized package further has a low production cost, by virtue of the used materials, with respect to the traditional packages.

[0047] Another characteristic of the invention consists in the fact that the welded portion has a relatively wide width, extended in a direction transverse to the longitudinal axis of the tubular net 21 and corresponding to the

width of the upper and lower ribbons associated with the package. Such width can for example be provided at 40 mm or anyway comprised in a range of such an order of magnitude. It is to be noted that such a width is determined by the dimensions of the space defined by the central zone 43b, 53b of the shaped profiles of the blades 43, 53 between which is tightened, in a flattened form, the portion of tubular net 21 in sealing step. The wide sealing zone enables to make the sealing easier and faster, in particular reducing the time of action of the sealing member 44.

[0048] It is to be pointed out the fact that the successive cooling step, through flow of air, allows to complete in a faster time the sealing cycle, at the advantage of the productivity.

[0049] Practically the welding, the cutting and the cooling of the tubular net are realized in suitable time succession during the transfer step of the closing device 30 from the closing station to the release station. This allows to reach a high productive speed.

[0050] The apparatus described for indicative purpose is susceptible of numerous modifications and variants according to the various exigencies.

[0051] In practice, the embodiment of the invention, the materials used, as well as the shape and dimensions, may vary depending on the requirements.

Claims

1. Method for packaging punnets of fruit and vegetable products in a tubular net wrapping, comprising the steps of:

- a. closing by means of welding a front end of a tract of tubular net (21);
- b. attaching to said front end of said tract of tubular net (21), at the zone of closing by means of welding, at least one ribbon (22) of thermoplastic material, extending longitudinally with respect to the said tract of tubular net (21);
- c. feeding the punnet (2) of fruit and vegetable products to be packaged inside said tract of tubular net (21), until it reaches said front end of the tract of tubular net (21) closed by means of welding;
- d. prearranging closing means (40, 50) at a closing station placed at the rear part of said punnet (2) fed inside said tract of tubular net (21), said closing means (40, 50) comprising a first closing unit (40) and a second closing unit (50), respectively upper and lower, mobile relative to each other, with an alternated motion of reciprocal approach and departing, on a plane transverse to the longitudinal axis of said tubular net (21), said first closing unit (40) and second closing unit (50) respectively comprising a couple of blades (43, 53) placed beside, suitable to act as a guillotine

to tighten said portion of tubular net (21);

e. operating said closing means (40, 50) to tighten said tract of tubular net (21) and said ribbon (22) of thermoplastic material in a position rear to said punnet (2);

f. performing the displacement in the same direction of said punnet (2) fed inside said tract of tubular net (21) and of said closing means (40, 50) tightening said tract of tubular net (21) and said ribbon (22) of thermoplastic material, from said closing station to a release station for the packaged punnet (20);

g. performing, during said displacement step, the welding of said tract of tubular net (21) and of said ribbon (22) of thermoplastic material tightened by said closing means (40, 50);

h. in the meantime, performing the cut of said tract of tubular net (21) and of said ribbon (22) of thermoplastic material at the rear welding zone to separate said packaged punnet (20);

i. during said displacement step, performing the displacement of a sealing member (44) of the said closing means (40, 50) into a lifted disengagement position, maintaining closed said blades (43, 53) of the said closing means (40, 50), said sealing member (44) being mobile on said first closing unit (40), upon control of actuator means (45), between a non operating position and an active position wherein the sealing member is brought in abutment of an abutment member (54) associated with said second closing unit (50);

j. performing the reciprocal departing of the said closing means (40, 50) so as to free the sealed portion of the said tubular net (21) and of the said ribbon (22) from the tightening of said blades (43, 53).

2. Method according to claim 1, **characterized in that** it provides for attaching to said tract of tubular net (21) an upper ribbon (22) and a lower ribbon (23) of thermoplastic material, extending longitudinally with respect to the said tract of tubular net (21) in diametrically opposed positions.

3. Method according to claim 1 or 2, **characterized in that** it provides for performing, during said step of simultaneous displacement of said punnet (2) fed inside said tract of tubular net (21) and of said closing means (40, 50), the cooling of said rear sealing zone.

4. Method according to claim 1 or 3, **characterized in that** it provides for tightening between said closing means (40, 50) a widened portion of tubular net (21), extending in a direction transverse to the longitudinal axis of the same tubular net (21), having a width corresponding substantially to the width of said ribbon (22) of thermoplastic material.

5. Apparatus for packaging punnets of fruit and vegetable products in a tubular net wrapping, comprising a tubular member (11) arranged with horizontal axis on the external surface of which a tubular net (21) unwinds; feed means (12) for the punnet (2) to be packaged along said tubular member (11), to introduce the same punnet (2) inside a tract of said tubular net (21) protruding at the front of said tubular member (11) and previously closed at the front end; a closing and cutting device (30) for said tubular net (21) arranged at the front part of said tubular member (11) and operating to tighten said tract of tubular net (21) at the back of said punnet (2) introduced in the same tubular net (21), **characterized in that** said closing and cutting device (30) is provided with closing means (40, 50) operable to tighten a portion of said tract of tubular net (21), at the back of said punnet (2) introduced in the said tubular net (21), said closing means (40, 50) being operable to be displaced in the same direction of said punnet (2), and carrying welding means (44) to perform, during said displacement step, the welding of said portion of tubular net (21) tightened between said closing means (40, 50), said closing means (40, 50) comprising a first closing unit (40) and a second closing unit (50), respectively upper and lower, mobile relative to each other, with an alternated motion of reciprocal approach and departing, on a plane transverse to the longitudinal axis of said tubular net (21); said first closing unit (40) and second closing unit (50) respectively comprising a couple of blades (43, 53) placed beside, suitable to act as a guillotine to tighten said portion of tubular net (21); said sealing means (44) comprising a sealing member which is mobile on said first closing unit (40), upon control of actuator means (45), between a non-operating position and an active position wherein the sealing member is brought in abutment of an abutment member (54) associated with said second closing unit (50), said sealing member (44) being operable to be displaced in the said non-operating position maintaining closed the said blades (43, 53); said apparatus comprising means (24) for feeding at least one ribbon (22) of thermoplastic material, extending longitudinally with respect to the said tract of tubular net (21) in order to be tightened to said portion of tubular net (21) by said closing means (40, 50) and attached thereto by means of sealing by said sealing means (44).
6. Apparatus according to claim 5 or 6, **characterized in that** said closing and cutting device (30) is mobile with alternated motion between a first operating station arranged approached to said tubular member (11), wherein is performed the closing of said tubular net (21) upstream of said punnet (2) introduced in the same tubular net (21), and a second operating station, distanced from the same tubular member (11), wherein is performed the release of the pack-

aged punnet (20) in the tubular net wrapping.

7. Apparatus according to claim 5, **characterized in that** said blades (43, 53) have a shaped profile (43a, 53a) with converging tracts in order to act as draft for collecting said portion of tubular net (21) at a central zone (43b, 53b) of the same profile, at least the central zone (43b) of said profile of the upper blades (43) shaping a flat bottom cavity suitable to receive said portion of tubular net (21) during the tightening step.
8. Apparatus according to claim 5, **characterized in that** said abutment member (54) is suitable to abut said blades (43) of the first closing unit (40) in order to tighten said portion of tubular net (21).
9. Apparatus according to claim 5, **characterized in that** said abutment member (54) has on the upper surface a series of holes (55) in communication with means for sending a flow of cooling air following the sealing of said portion of tubular net (21).

Patentansprüche

1. Verfahren zum Verpacken von Schalen mit Obst- oder Gemüseprodukten in einer röhrenförmigen Netzhüllung, folgende Schritte umfassend:
- Verschließen mittels Verschweißen eines vorderen Endes eines Strangs röhrenförmigen Netzes (21),
 - Anbringen mindestens eines Bandes (22) aus Thermoplastmaterial, das sich längs in Bezug auf den Strang röhrenförmigen Netzes (21) erstreckt, am vorderen Ende des Strangs röhrenförmigen Netzes (21) an der Zone des Verschließens mittels Verschweißen,
 - Zuführen der zu verpackenden Schale (2) mit Obst- oder Gemüseprodukten in den Strang röhrenförmigen Netzes (21), bis sie das vordere Ende des Strangs röhrenförmigen Netzes (21), der mittels Verschweißen verschlossen ist, erreicht,
 - Vorabanordnen von Verschlussmitteln (40, 50) an einer am hinteren Teil der in den Strang röhrenförmigen Netzes (21) geführten Schale (2) angeordneten Verschlussstation, wobei die Verschlussmittel (40, 50) eine erste Verschlusseinheit (40) und eine zweite Verschlusseinheit (50) - eine obere beziehungsweise eine untere - umfassen, die zueinander mit einer abwechselnden Bewegung der Annäherung aneinander und Entfernung voneinander in einer zur Längsachse des röhrenförmigen Netzes (21) quer verlaufenden Ebene beweglich sind, wobei die erste Verschlusseinheit (40) und die zweite

- Verschlusseinheit (50) jeweils ein Paar von daneben angeordneten Blättern (43, 53) umfassen, die dafür geeignet sind, als Schlagmesser zu wirken, um den Abschnitt röhrenförmigen Netzes (21) straffzuziehen,
- e. Betätigen der Verschlussmittel (40, 50), um den Strang röhrenförmigen Netzes (21) und das Band (22) aus Thermoplastmaterial in einer Position hinter der Schale (2) straffzuziehen,
- f. Ausführen der Verlagerung der in den Strang röhrenförmigen Netzes (21) zugeführten Schale (2) und der Verschlussmittel (40, 50), die den Strang röhrenförmigen Netzes (21) und das Band (22) aus Thermoplastmaterial straffziehen, in die gleiche Richtung von der Verschlussstation zu einer Freigabestation für die verpackte Schale (20),
- g. Ausführen des Verschweißens des Strangs röhrenförmigen Netzes (21) und des Bandes (22) aus Thermoplastmaterial, die durch die Verschlussmittel (40, 50) straffgezogen sind, während des Verlagerungsschrittes,
- h. zwischenzeitlich Ausführen des Schnitts des Strangs röhrenförmigen Netzes (21) und des Bandes (22) aus Thermoplastmaterial an der hinteren Schweißzone, um die verpackte Schale (20) abzutrennen,
- i. Ausführen der Verlagerung eines Versiegelungselements (44) der Verschlussmittel (40, 50), während des Verlagerungsschritts, in eine angehobene Nichteingriffsposition, wobei die Blätter (43, 53) der Verschlussmittel (40, 50) geschlossen gehalten werden, wobei das Versiegelungselement (44) an der ersten Verschlusseinheit (40) nach Steuerung durch Stellgliedmittel (45) zwischen einer Nichtbetriebsposition und einer aktiven Position beweglich ist, in der das Versiegelungselement zum Anliegen an ein zur zweiten Verschlusseinheit (50) gehörendes Anlageflächenelement (54) gebracht wird,
- j. Ausführen des Voneinander-Entfernens der Verschlussmittel (40, 50), so dass der versiegelte Abschnitt des röhrenförmigen Netzes (21) und des Bandes (22) aus der Straffung durch die Blätter (43, 53) freigegeben werden.
2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** es das Anbringen eines oberen Bandes (22) und eines unteren Bandes (23) aus Thermoplastmaterial, die sich längs in Bezug auf den Strang röhrenförmigen Netzes (21) in diametral gegenüberliegende Positionen erstrecken, an dem Strang röhrenförmigen Netzes (21) vorsieht.
 3. Verfahren nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** es das Ausführen des Kühlens der hinteren Versiegelungszone während des Schritts der gleichzeitigen Verlagerung der in den

Strang röhrenförmigen Netzes (21) geführten Schale (2) und der Verschlussmittel (40, 50) vorsieht.

4. Verfahren nach Anspruch 1 oder 3, **dadurch gekennzeichnet, dass** es das Straffziehen eines aufgeweiteten Abschnitts röhrenförmigen Netzes (21), der sich in eine zur Längsachse dieses röhrenförmigen Netzes (21) quer verlaufende Richtung erstreckt und eine Breite aufweist, die im Wesentlichen der Breite des Bandes (22) aus Thermoplastmaterial entspricht, zwischen den Verschlussmitteln (40, 50) vorsieht.
5. Vorrichtung zum Verpacken von Schalen mit Obst- oder Gemüseprodukten in einer röhrenförmigen Netzhüllung, umfassend ein mit horizontaler Achse angeordnetes röhrenförmiges Element (11), auf dessen Außenoberfläche sich ein röhrenförmiges Netz (21) abwickelt, Zuführungsmittel (12) für die zu verpackende Schale (2) entlang des röhrenförmigen Elements (11), um die Schale (2) in einen Strang röhrenförmigen Netzes (21) zuzuführen, der an der Vorderseite des röhrenförmigen Elements (11) hervorsteht und vorher am vorderen Ende verschlossen wurde, eine Verschluss- und Schneideinrichtung (30) für das röhrenförmige Netz (21), die am vorderen Teil des röhrenförmigen Elements (11) angeordnet ist und dazu dient, den Strang röhrenförmigen Netzes (21) an der Rückseite der in das röhrenförmige Netz (21) eingeführten Schale (2) straffzuziehen, **dadurch gekennzeichnet, dass** die Verschluss- und Schneideinrichtung (30) mit Verschlussmitteln (40, 50) versehen ist, die so betätigt werden können, dass sie einen Abschnitt des Strangs röhrenförmigen Netzes (21) an der Rückseite der in das röhrenförmige Netz (21) eingeführten Schale (2) straffziehen, wobei die Verschlussmittel (40, 50) so betätigt werden können, dass sie in die gleiche Richtung wie die Schale (2) verlagert werden, und Schweißmittel (44) tragen, um während des Verlagerungsschritts das Verschweißen des zwischen den Verschlussmitteln (40, 50) straffgezogenen Abschnitts röhrenförmigen Netzes (21) auszuführen, wobei die Verschlussmittel (40, 50) eine erste Verschlusseinheit (40) und eine zweite Verschlusseinheit (50), eine obere beziehungsweise eine untere - umfassen, die zueinander mit einer abwechselnden Bewegung der Annäherung aneinander und Entfernung voneinander in einer zur Längsachse des röhrenförmigen Netzes (21) quer verlaufenden Ebene beweglich sind, wobei die erste Verschlusseinheit (40) und die zweite Verschlusseinheit (50) jeweils ein Paar von daneben angeordneten Blättern (43, 53) umfassen, die dafür geeignet sind, als Schlagmesser zu wirken, um den Abschnitt röhrenförmigen Netzes (21) straffzuziehen, wobei die Versiegelungsmittel (44) ein Versiegelungselement umfassen, das an der ersten Verschlusseinheit

(40) nach Steuerung durch Stellgliedmittel (45) zwischen einer Nichtbetriebsposition und einer aktiven Position beweglich ist, in der das Versiegelungselement zum Anliegen an ein zur zweiten Verschlusseinheit (50) gehörendes Anlageflächenelement (54) gebracht wird, wobei das Versiegelungselement (44) so betätigt werden kann, dass in die Nichtbetriebsposition verlagert wird, wobei die Blätter (43, 53) geschlossen gehalten werden, wobei die Vorrichtung Mittel (24) zum Zuführen mindestens eines Bandes (22) aus Thermoplastmaterial umfasst, das sich längs in Bezug auf den Strang röhrenförmigen Netzes (21) erstreckt, um durch die Verschlussmittel (40, 50) an dem Abschnitt röhrenförmigen Netzes (21) straffgezogen und durch die Versiegelungsmittel (44) daran angebracht zu werden.

6. Vorrichtung nach Anspruch 5 oder 6, **dadurch gekennzeichnet, dass** die Verschluss- und Schneideinrichtung (30) mit abwechselnder Bewegung zwischen einer ersten Betriebsstation, die an das röhrenförmige Element (11) angenähert angeordnet ist und in der das Verschließen des röhrenförmigen Netzes (21) stromaufwärts der in das röhrenförmige Netz (21) eingeführten Schale (2) ausgeführt wird, und einer zweiten Betriebsstation, die vom röhrenförmigen Element (11) beabstandet ist und in der das Freigeben der in die röhrenförmige Netzhülle verpackten Schale (20) ausgeführt wird.
7. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** die Blätter (43, 53) ein Formprofil (43a, 53a) mit aufeinander zulaufenden Teilen aufweisen, um als Zugmittel zum Einholen des Abschnitts röhrenförmigen Netzes (21) an einer zentralen Zone (43b, 53b) dieses Profils zu wirken, wobei zumindest die zentrale Zone (43b) des Profils der oberen Blätter (43) einen Hohlraum mit flachem Boden bildet, der geeignet ist, den Abschnitt röhrenförmigen Netzes (21) während des Straffziehschritts aufzunehmen.
8. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** das Anlageflächenelement (54) dafür geeignet ist, an den Blättern (43) der ersten Verschlusseinheit (40) anzuliegen, um den Abschnitt röhrenförmigen Netzes (21) straffzuziehen.
9. Vorrichtung nach Anspruch 5, **dadurch gekennzeichnet, dass** das Anlageflächenelement (54) auf der Oberseite eine Reihe von Löchern (55) in Verbindung mit Mitteln zum Senden eines Stroms von Kühlungsluft nach dem Versiegeln des Abschnitts röhrenförmigen Netzes (21) aufweist.

Revendications

1. Procédé pour l'emballage de barquettes de fruits et légumes dans une enveloppe de filet tubulaire, comprenant les étapes consistant à
 - a. fermer par soudure une extrémité avant d'un tronçon de filet tubulaire (21) ;
 - b. unir à ladite extrémité avant dudit tronçon de filet tubulaire (21), en correspondance de la zone de fermeture par soudure, au moins une bande (22) de matériau thermoplastique, s'étendant longitudinalement à ce même tronçon de filet tubulaire (21) ;
 - c. alimenter la barquette (2) de fruits et légumes à conditionner à l'intérieur dudit tronçon de filet tubulaire (21), jusque contre ladite extrémité avant du tronçon de filet tubulaire (21) fermé par soudure ;
 - d. prédisposer des moyens de fermeture (40, 50) en correspondance d'une station de fermeture placée à l'arrière de ladite barquette (2) alimentée à l'intérieur dudit tronçon de filet tubulaire (21) ; lesdits moyens de fermeture (40, 50) comprenant un premier groupe de fermeture (40) et un deuxième groupe de fermeture (50), respectivement supérieur et inférieur, mobiles l'un par rapport à l'autre, avec un mouvement alternatif de rapprochement et d'éloignement réciproque, sur un plan transversal à l'axe longitudinal dudit filet tubulaire (21), lesdits premier groupe de fermeture (40) et deuxième groupe de fermeture (50) comprenant respectivement une paire de lames (43, 53) côte à côte, adaptées pour agir comme une guillotine pour serrer ladite portion de filet tubulaire (21) ;
 - e. actionner lesdits moyens de fermeture (40, 50) pour serrer ledit tronçon de filet tubulaire (21) et ladite bande (22) de matériau thermoplastique dans une position à l'arrière de ladite barquette (2) ;
 - f. effectuer le déplacement concordant dudit produit (2) alimenté à l'intérieur dudit tronçon de filet tubulaire (21) et desdits moyens de fermeture (40, 50) serrant ledit tronçon de filet tubulaire (21) et ladite bande (22) de matériau thermoplastique, de ladite station de fermeture à une station de relâchement de la barquette conditionnée (20) ;
 - g. effectuer, durant ladite étape de déplacement, la soudure dudit tronçon de filet tubulaire (21) et de ladite bande (22) de matériau thermoplastique serrés par lesdits moyens de fermeture (40, 50) ;
 - h. effectuer dans un même temps la coupe dudit tronçon de filet tubulaire (21) et de ladite bande (22) de matériau thermoplastique en correspondance de la zone de soudure arrière pour sépa-

- rer ladite barquette conditionnée (20) ;
- i. durant ladite étape de déplacement, effectuer le déplacement d'un organe de soudage (44) desdits moyens de fermeture (40, 50) dans une position relevée de désengagement, en maintenant fermées lesdites lames (43, 53) desdits moyens de fermeture (40, 50), ledit organe de soudage (44) étant mobile sur ledit premier groupe de fermeture (40), sur commande de moyens actionneurs (45), entre une position non fonctionnelle et une position active dans laquelle l'organe de soudage est amené en contraste contre un organe de butée (54) associé audit deuxième groupe de fermeture (50) ;
- j. effectuer l'éloignement réciproque desdits moyens de fermeture (40, 50) de manière à libérer la portion soudée dudit filet tubulaire (21) et de ladite bande (22) de la prise desdites lames (43, 53).
2. Procédé selon la revendication 1, **caractérisé en ce qu'il** prévoit d'unir audit tronçon de filet tubulaire (21) une bande supérieure (22) et une bande inférieure (23) de matériau thermoplastique, s'étendant longitudinalement à ce même tronçon de filet tubulaire (21) dans des positions diamétralement opposées.
 3. Procédé selon la revendication 1 ou 2, **caractérisé en ce qu'il** prévoit d'effectuer, durant l'étape de déplacement concordant de ladite barquette (2) alimentée à l'intérieur dudit tronçon de filet tubulaire (21) et desdits moyens de fermeture (40, 50), le refroidissement de ladite zone de soudure arrière.
 4. Procédé selon la revendication 1 ou 3, **caractérisé en ce qu'il** prévoit de serrer entre lesdits moyens de fermeture (40, 50) une portion élargie de filet tubulaire (21), étendue en direction transversale à l'axe longitudinal de ce même filet tubulaire (21), de grandeur correspondant sensiblement à la largeur de ladite bande (22) de matériau thermoplastique.
 5. Equipement pour l'emballage de barquettes de fruits et légumes dans une enveloppe de filet tubulaire, comprenant un organe tubulaire (11) disposé avec l'axe horizontal sur la surface extérieure duquel se déroule un filet tubulaire (21) ; des moyens d'alimentation (12) de la barquette (2) à conditionner le long dudit organe tubulaire (11), pour introduire cette même barquette (2) à l'intérieur d'un tronçon dudit filet tubulaire (21) dépassant vers l'avant dudit organe tubulaire (11) et précédemment fermé à l'extrémité avant ; un dispositif (30) de fermeture et de coupe dudit filet tubulaire (21) disposé à l'avant dudit organe tubulaire (11) et fonctionnel pour serrer ledit tronçon de filet tubulaire (21) à l'arrière de ladite barquette (2) introduite dans ce même filet tubulaire (21), **caractérisé en ce que** ledit dispositif (30) de fermeture et de coupe est équipé de moyens de fermeture (40, 50) pouvant être actionnés pour serrer une portion dudit tronçon de filet tubulaire (21), à l'arrière de ladite barquette (2) introduite dans ce même filet tubulaire (21), lesdits moyens de fermeture (40, 50) pouvant être actionnés pour être déplacés dans la même direction que ladite barquette (2), et portant des moyens de soudage (44) pour exécuter, durant ladite phase de déplacement, la soudure de ladite portion de filet tubulaire (21) serrée entre lesdits moyens de fermeture (40, 50), lesdits moyens de fermeture (40, 50) comprenant un premier groupe de fermeture (40) et un deuxième groupe de fermeture (50), respectivement supérieur et inférieur, mobiles l'un par rapport à l'autre, avec un mouvement alternatif de rapprochement et d'éloignement réciproque, sur un plan transversal à l'axe longitudinal dudit filet tubulaire (21) ; lesdits premier groupe de fermeture (40) et deuxième groupe de fermeture (50) comprenant respectivement une paire de lames (43, 53) côte à côte, adaptées pour agir comme une guillotine pour serrer ladite portion de filet tubulaire (21) ; lesdits moyens de soudage (44) comprenant un organe de soudage qui est mobile sur ledit premier groupe (40) de fermeture, sur commande des moyens actionneurs (45), entre une position non fonctionnelle et une position active dans laquelle l'organe de soudage est amené en contraste contre un organe de butée (54) associé audit deuxième groupe de fermeture (50) ; ledit organe de soudage (44) pouvant être actionné pour être déplacé dans ladite position non fonctionnelle en maintenant lesdites lames (43, 53) fermées ; ledit équipement comprenant des moyens (24) d'alimentation d'au moins une bande (22) de matériau thermoplastique, s'étendant longitudinalement à ce même tronçon de filet tubulaire (21) pour être serrée à ladite portion de filet tubulaire (21) par lesdits moyens de fermeture (40, 50) et unie à celle-ci par soudure par lesdits moyens de soudage (44).
 6. Equipement selon la revendication 5 ou 6, **caractérisé en ce que** ledit dispositif (30) de fermeture et de coupe est mobile avec un mouvement alternatif entre une première station fonctionnelle disposée rapprochée dudit organe tubulaire (11), dans laquelle est réalisée la fermeture dudit filet tubulaire (21) en amont dudit produit (2) introduit dans ce même filet tubulaire (21), et une deuxième station fonctionnelle, éloignée de ce même organe tubulaire (11), dans laquelle est effectué le relâchement du produit conditionné (20) dans l'enveloppe de filet tubulaire.
 7. Equipement selon la revendication 5, **caractérisé en ce que** lesdites lames (43, 53) présentent un profil modelé (43a, 53a) avec des tronçons convergents pour servir d'amorce pour la collecte de ladite portion de filet tubulaire (21) en correspondance d'une zone

centrale (43b, 53b) de ce même profil, au moins la zone centrale (43b) dudit profil des lames (43) supérieures réalisant une cavité à fond plat adaptée pour accueillir ladite portion de filet tubulaire (21) en phase de serrage.

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8. Equipement selon la revendication 5, **caractérisé en ce que** ledit organe de butée (54) est adapté à venir en butée contre lesdites lames (43) du premier groupe (40) de fermeture pour serrer ladite portion de filet tubulaire (21).

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9. Equipement selon la revendication 5, **caractérisé en ce que** ledit organe de butée (54) présente sur la surface supérieure une série de trous (55) en communication avec des moyens de refoulement d'un flux d'air de refroidissement à la suite de la soudure de ladite portion de filet tubulaire (21).

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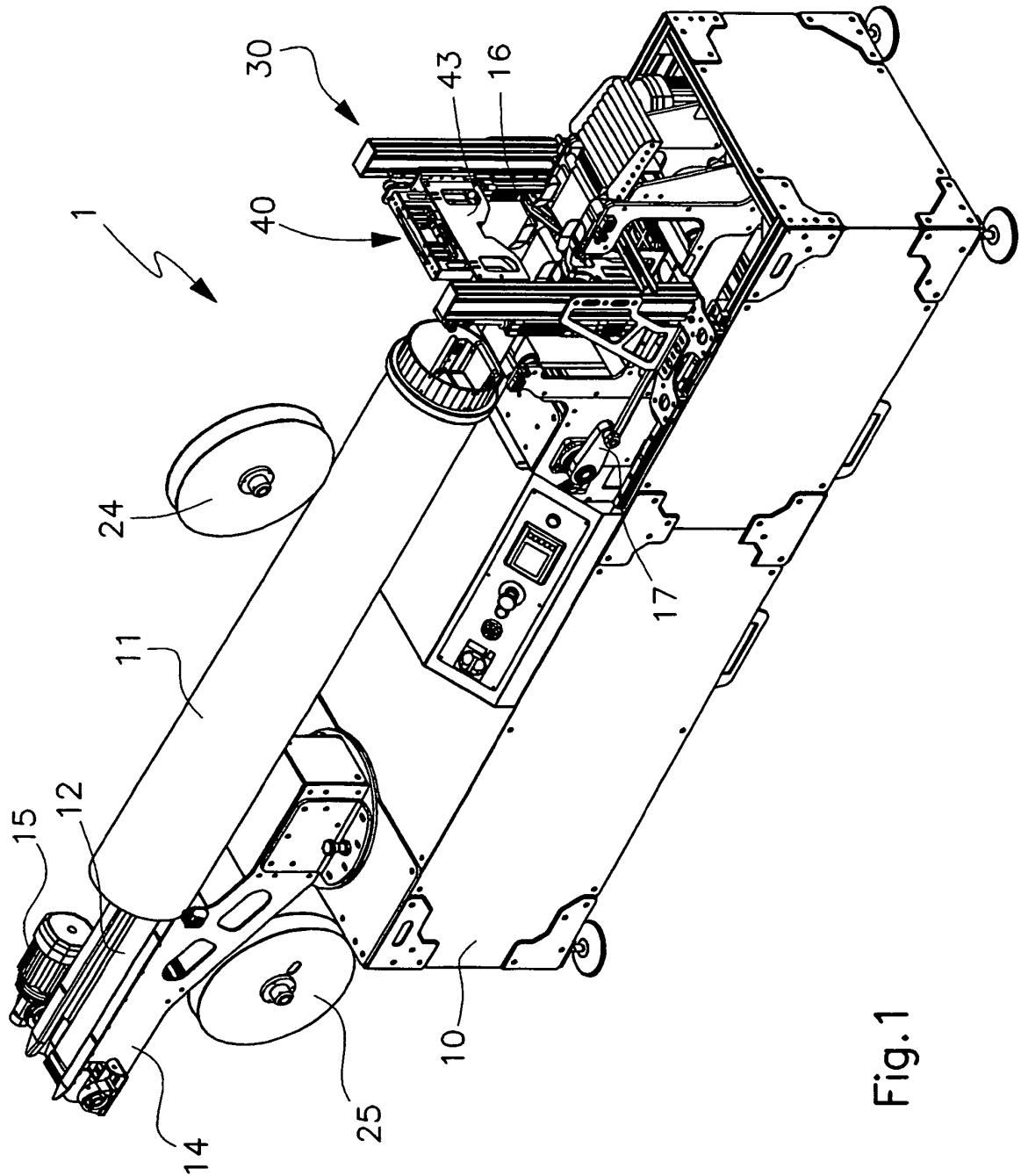


Fig. 1

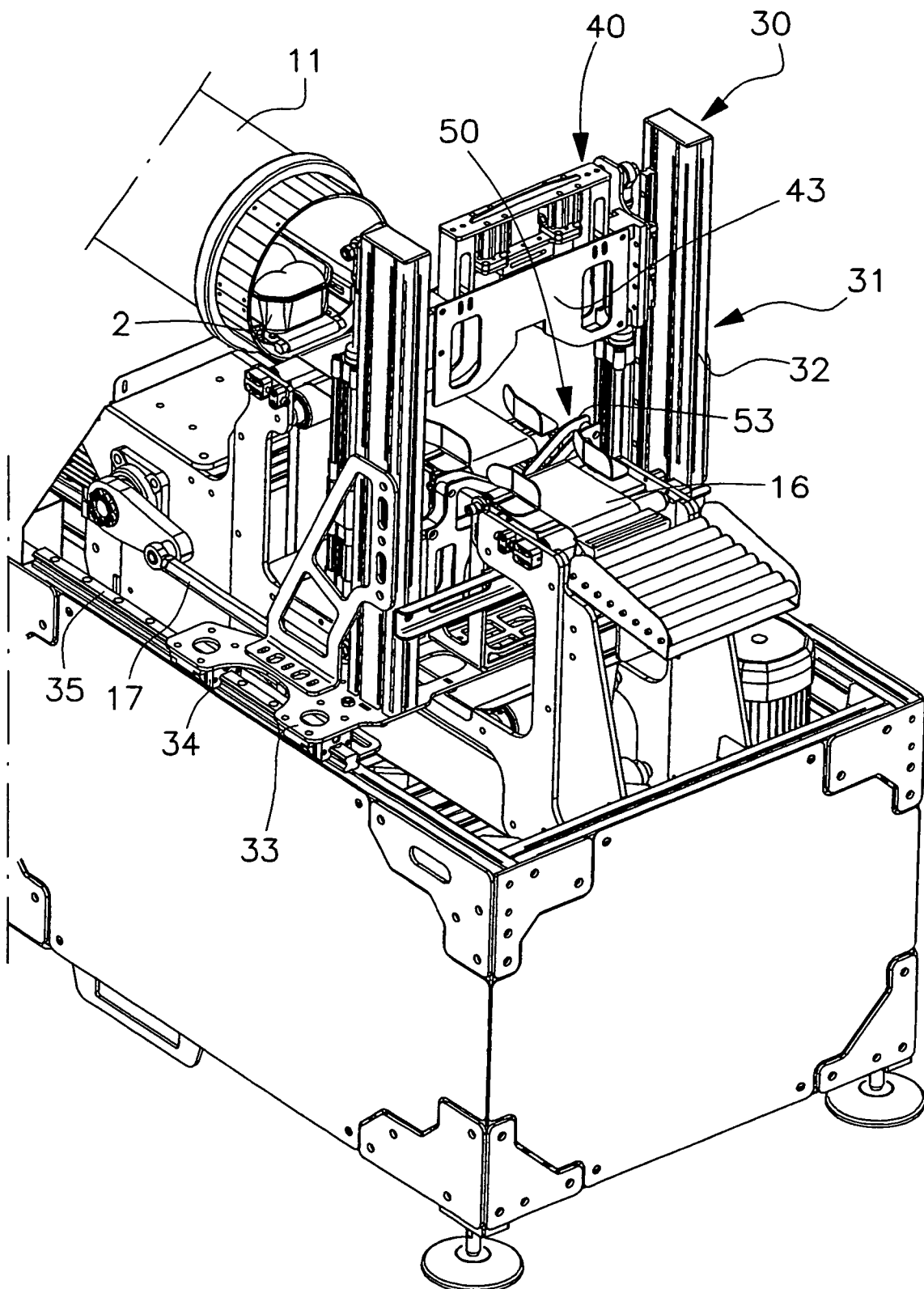


Fig.2

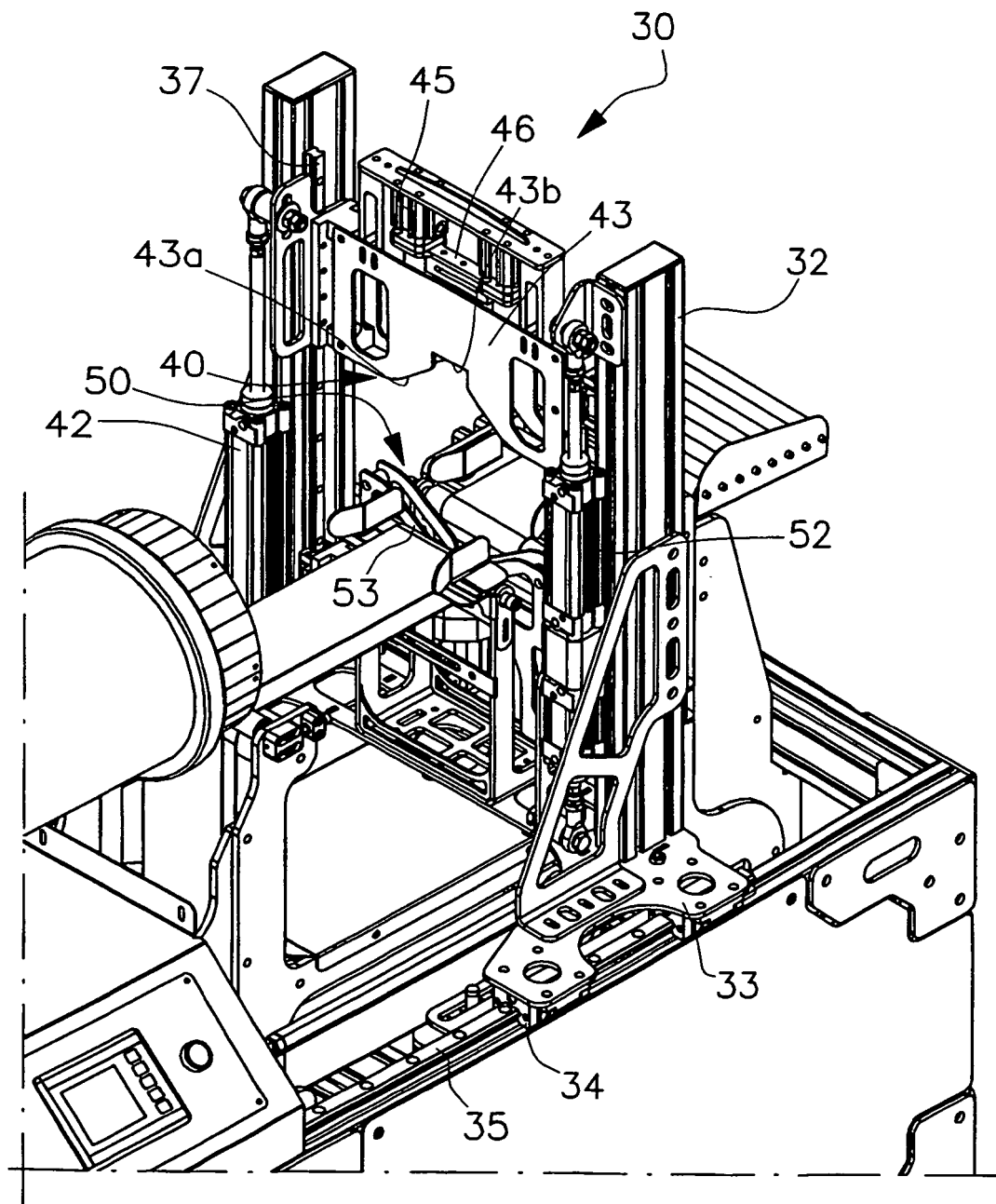


Fig.3

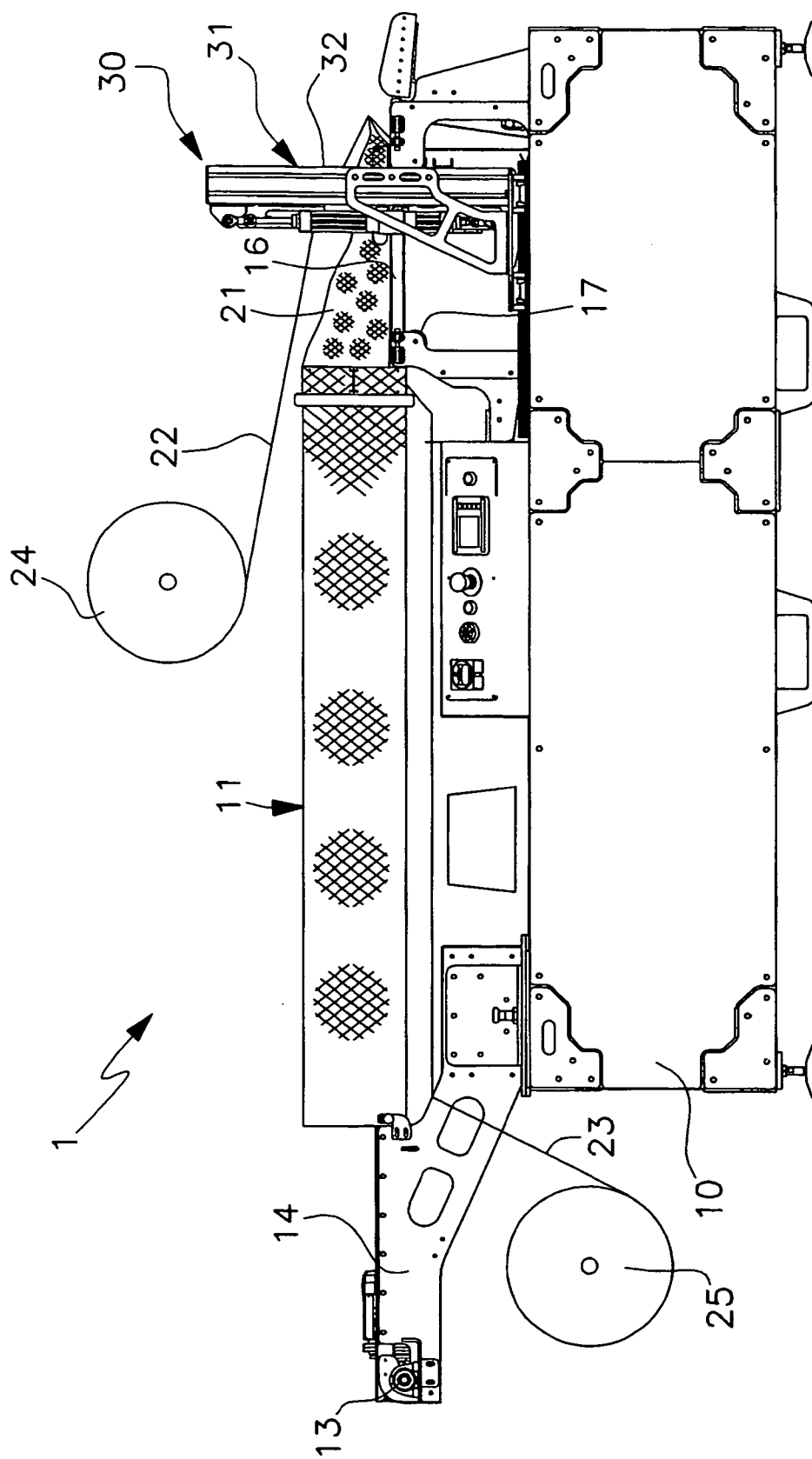


Fig.4

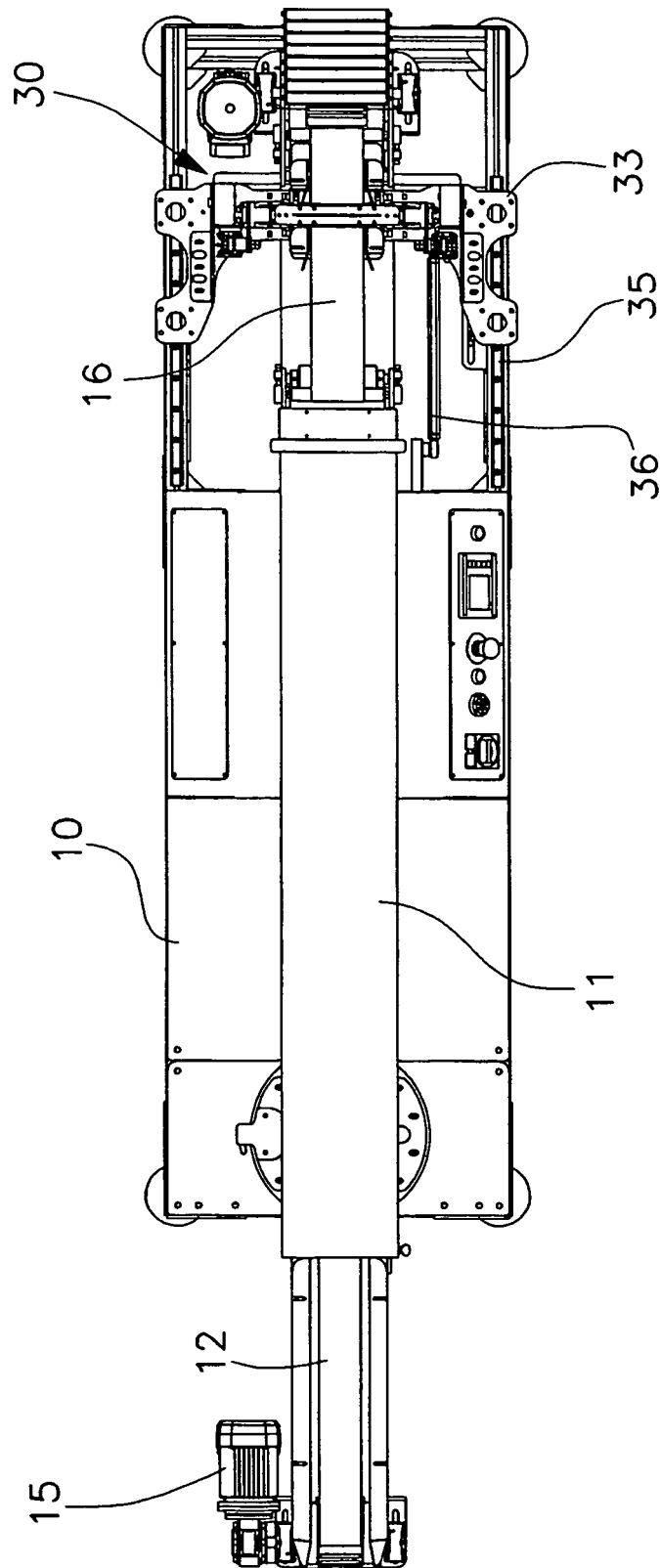


Fig.5

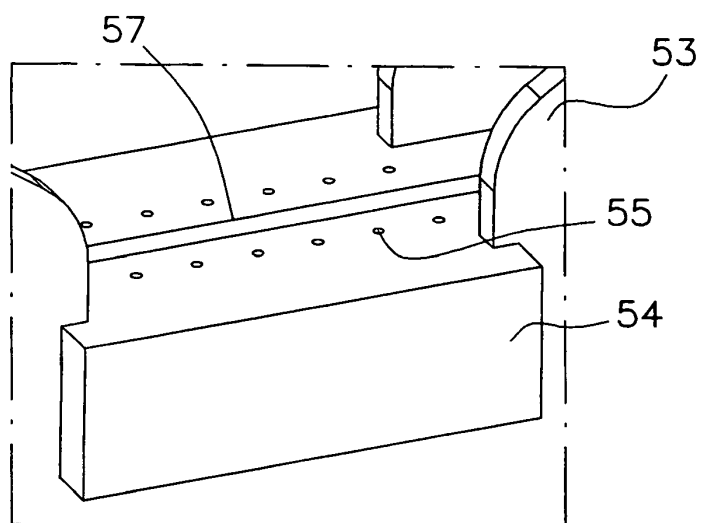


Fig. 6a

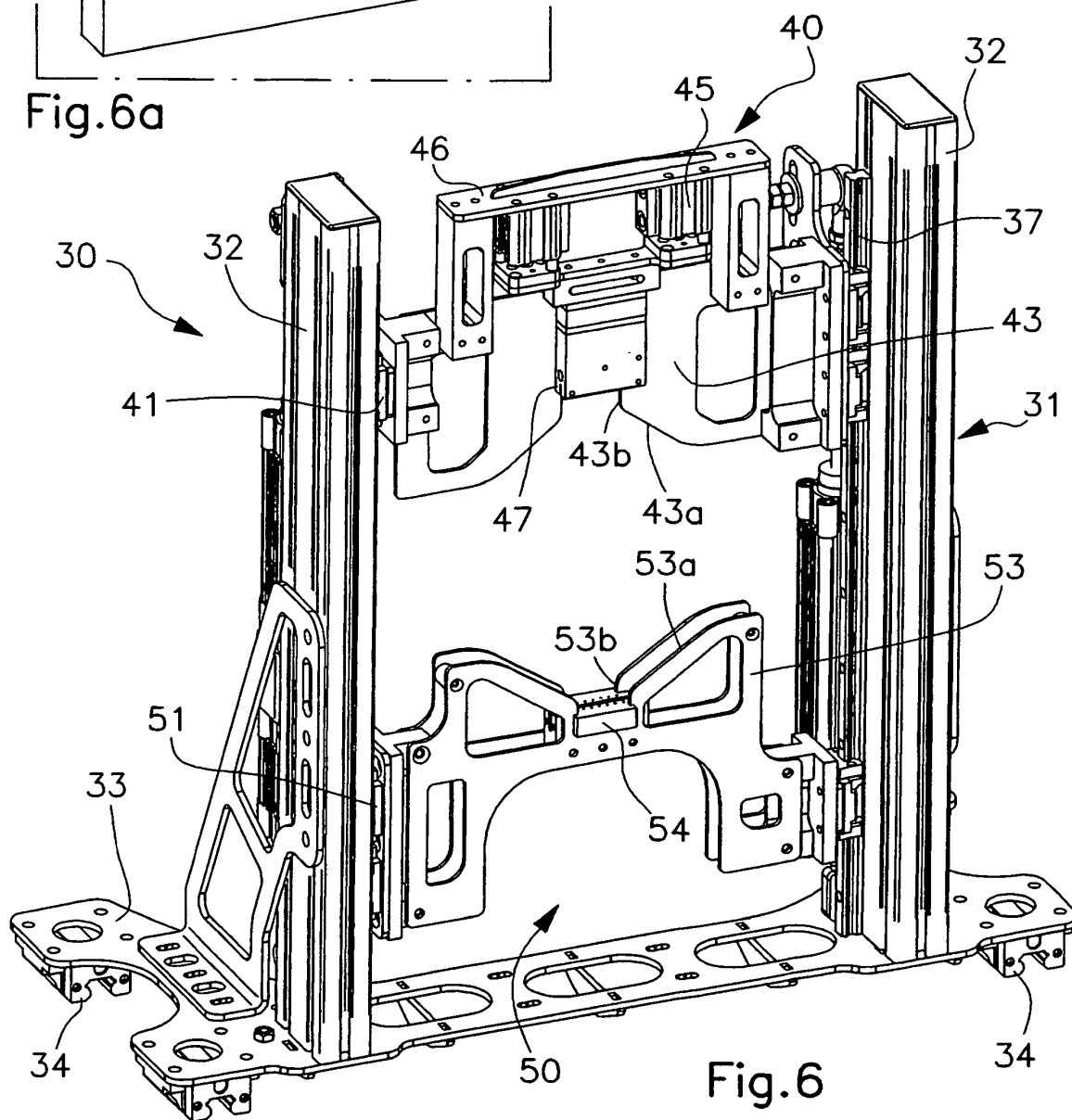
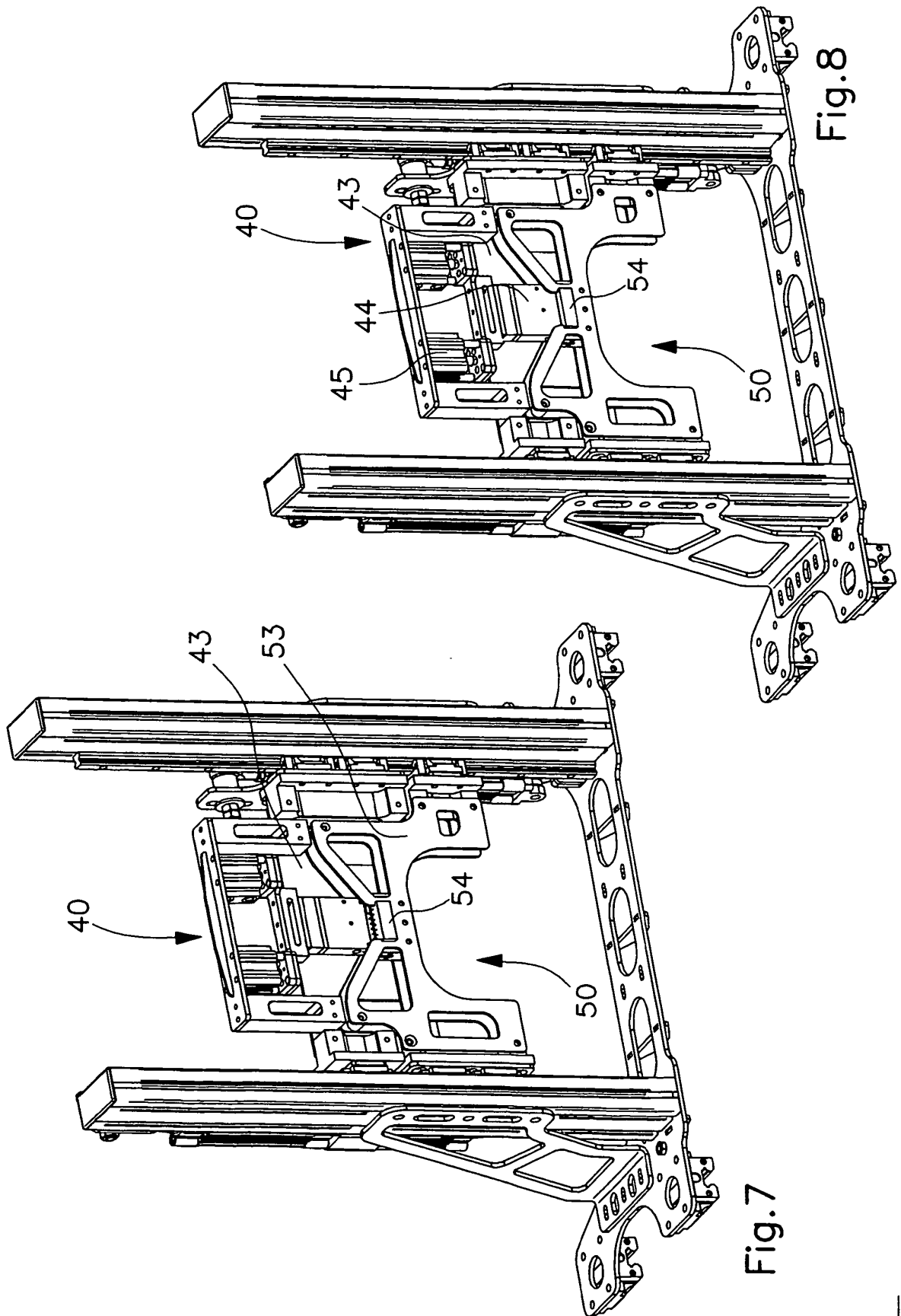


Fig. 6



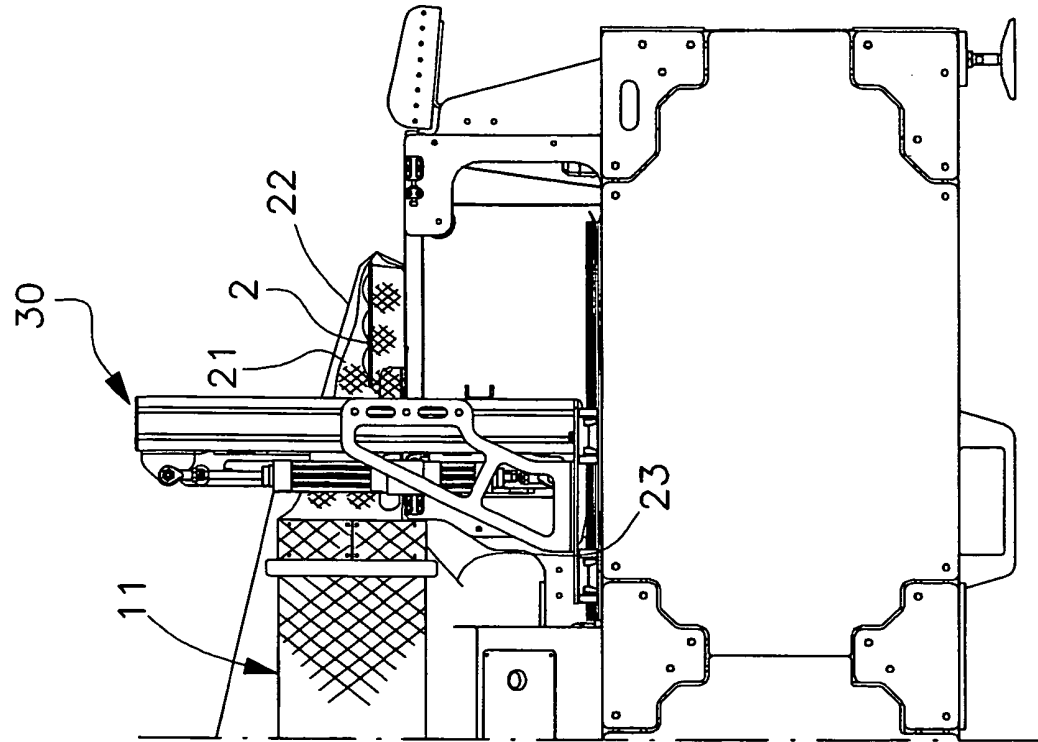


Fig. 9

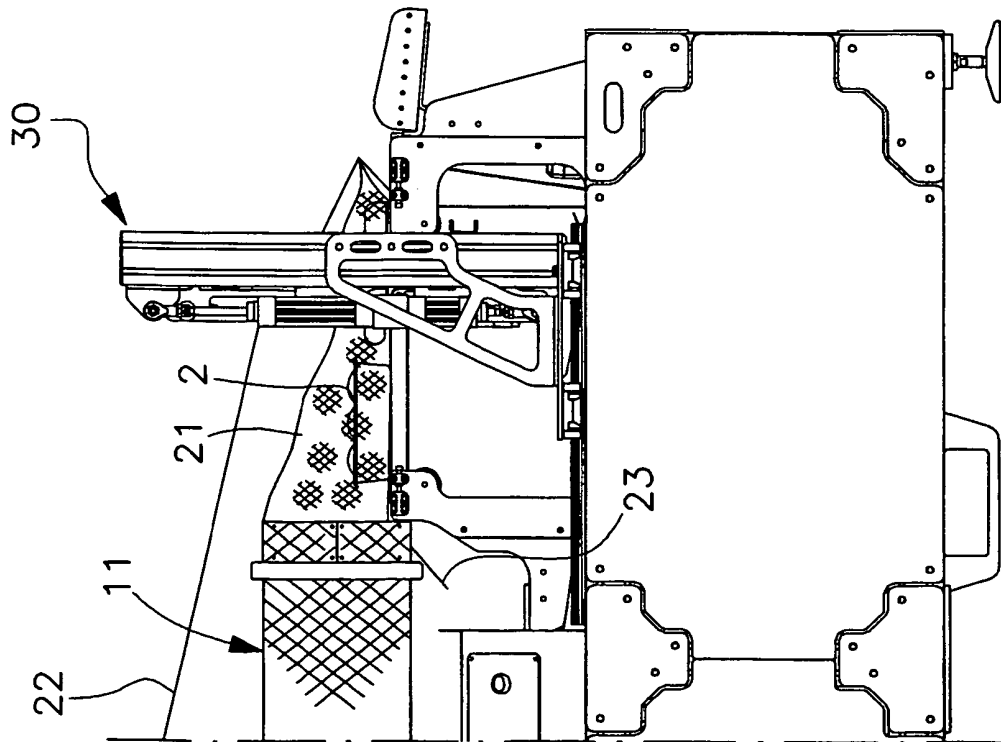


Fig. 10

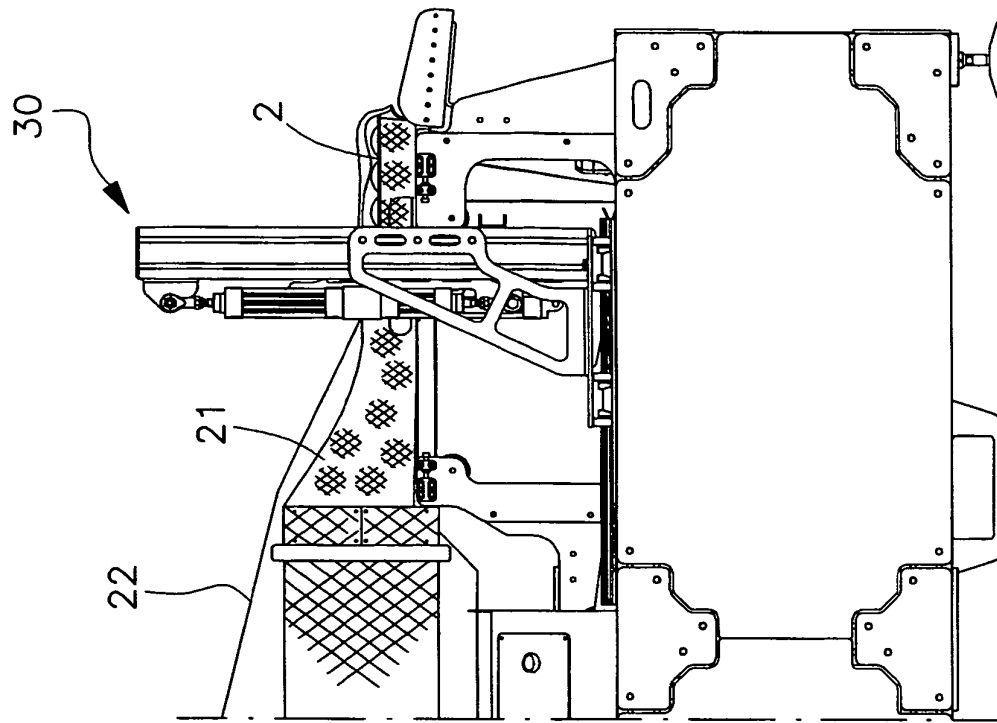


Fig.12

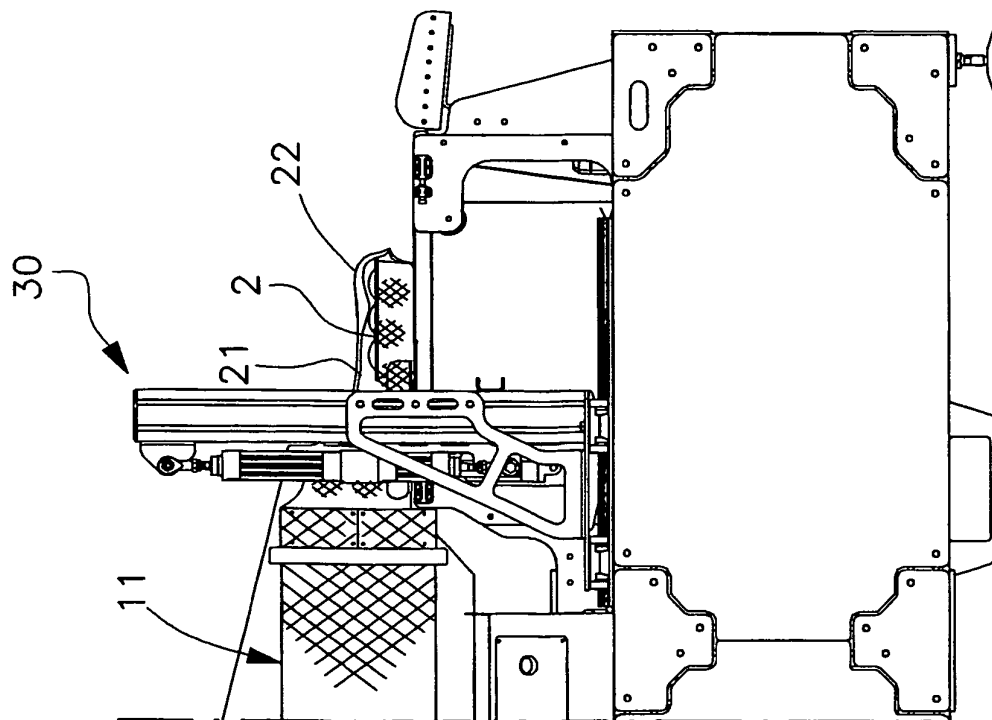
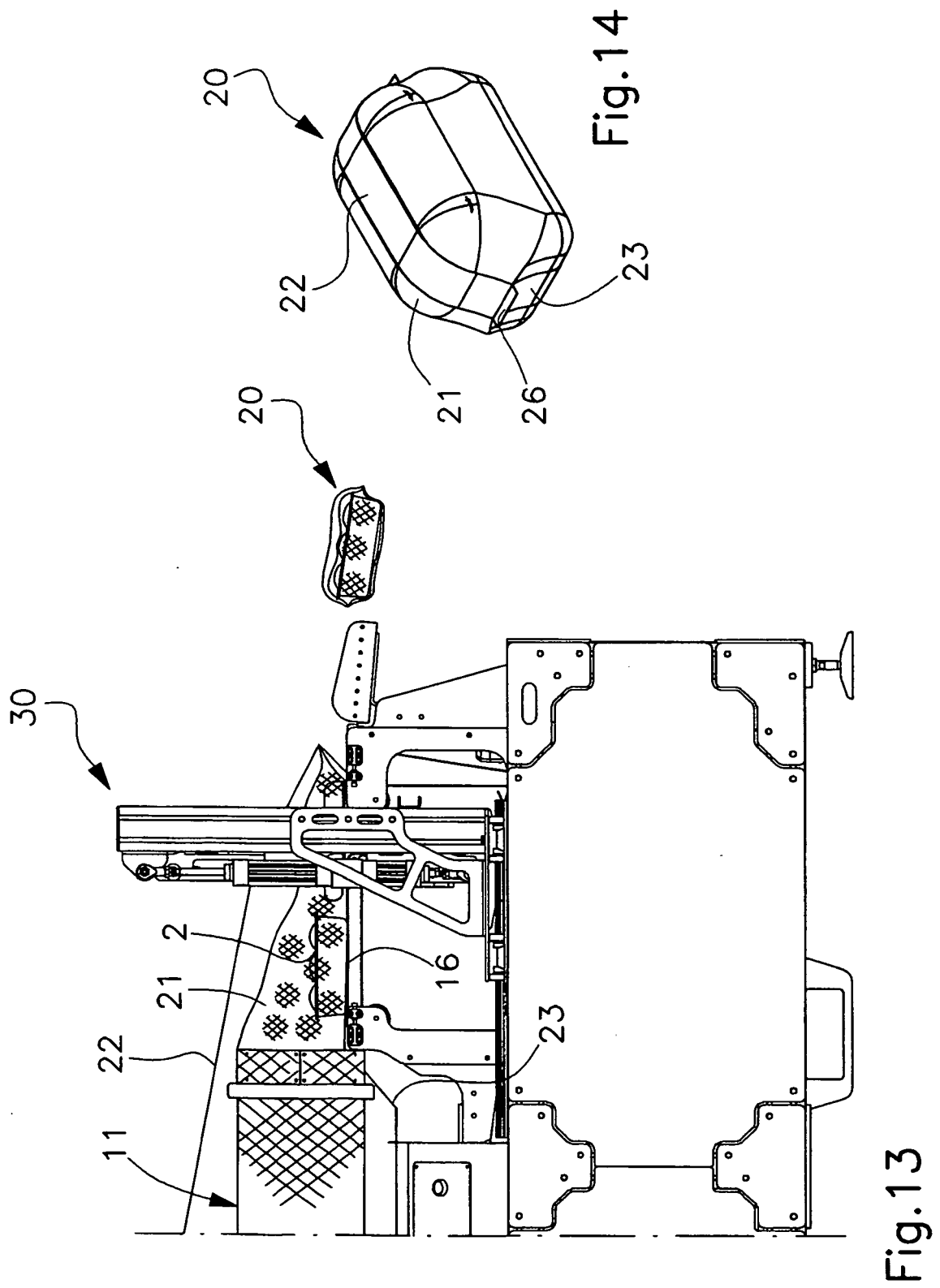


Fig.11



REFERENCES CITED IN THE DESCRIPTION

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