



(11) **EP 3 319 878 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:

29.04.2020 Bulletin 2020/18

(21) Application number: **16736628.5**

(22) Date of filing: **04.07.2016**

(51) Int Cl.:

B65B 9/20 (2012.01)	B65B 51/30 (2006.01)
B65B 35/40 (2006.01)	B65B 51/28 (2006.01)
B65B 59/00 (2006.01)	B65B 25/14 (2006.01)
B65B 61/02 (2006.01)	B65B 61/10 (2006.01)
B65B 61/14 (2006.01)	B65B 61/28 (2006.01)
B65B 63/02 (2006.01)	

(86) International application number:

PCT/IB2016/054007

(87) International publication number:

WO 2017/009737 (19.01.2017 Gazette 2017/03)

(54) **WRAPPING MACHINE FOR SINGLE OR GROUPED AND/OR STACKED PRODUCTS, IN PACKS OF THERMOPLASTIC MATERIAL OBTAINED FROM FILM UNWOUND FROM A REEL AND RELATED OPERATING METHOD**

UMWICKLUNGSMASCHINE FÜR EINZELNE ODER GRUPPIERTE UND/ODER GESTAPELTE PRODUKTE IN PACKUNGEN AUS THERMOPLASTISCHEM MATERIAL AUS EINER VON EINER SPULE ABGEWICKELTEN FOLIE UND ENTSPRECHENDES BETRIEBSVERFAHREN

MACHINE D'EMBALLAGE POUR UN PRODUIT UNIQUE OU DES PRODUITS GROUPÉS ET/OU EMPILÉS, DANS DES PAQUETS DE MATÉRIAU THERMOPLASTIQUE OBTENU À PARTIR D'UN FILM DÉROULÉ À PARTIR D'UN ROULEAU ET PROCÉDÉ DE FONCTIONNEMENT ASSOCIÉ

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **10.07.2015 IT UB20152063**

(43) Date of publication of application:

16.05.2018 Bulletin 2018/20

(73) Proprietor: **CPS Company S.R.L.**

40033 Casalecchio di Reno (IT)

(72) Inventors:

- **CASSOLI, Stefano**
40033 Casalecchio di Reno (Province of Bologna)
(IT)

- **CASSOLI, Marco**

40033 Casalecchio di Reno (Province of Bologna)
(IT)

- **CASSOLI, Paolo**

40033 Casalecchio di Reno (Province of Bologna)
(IT)

(74) Representative: **Porsia, Attilio**

Via Caffaro 3/2

16124 Genova (IT)

(56) References cited:

EP-A2- 1 157 930	WO-A1-02/053457
GB-A- 2 266 509	GB-A- 2 312 199
JP-A- 2002 193 203	JP-A- 2012 131 513
JP-U- 3 111 669	US-A- 4 679 379
US-A- 4 715 166	

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description

[0001] The invention relates to a machine for wrapping single or grouped and/or stacked products, particularly paper or nonwoven products, for sanitary or other uses, in packs of thermoplastic material obtained from a film unwound from a reel and concerns the operating method of this machine.

[0002] It should be noted that the terms "upstream" and "downstream" used hereinafter relate to the direction of feed of the packs.

[0003] As state of the art closest to the invention, filed in the international class B65B63/02, the patent US 4 679 379, filed in 1983 by the same inventor of the present patent application, is cited. This document describes a packaging machine equipped with a horizontal hollow mandrel, of the type in the shape of a sailor neck tie, to one end of which there is fed a continuous sheet or film of thermoplastic material, unwound from a reel, which proceeding towards the opposite end of the mandrel, is formed in a tube with overlapping and heat-sealing of its longitudinal edges and that, upon delivery from the same mandrel, is closed transversely by a transverse static assembly that, on command, carries out a prior gusseting operation on the opposite sides of the same tubular wrapping and that on the gusseted portion of the same tube carries out two transverse heat seals and an intermediate cut, to close the trailing end of the pack filled and formed in the previous cycle, to close the leading end of the future pack to be formed and to separate the completed pack from the one being formed. Upstream of the tube-forming mandrel of the packaging film there is provided a loading station of the products to be packaged, for example toilet rolls, absorbent paper for kitchen or other uses, packs of napkins or hand towels, also in nonwoven, where these products are grouped together and/or stacked to form a bundle that is preferably subjected to slight pressure in transverse direction and that after this step has a cross section of a shape and width slightly less than the internal cross section of said hollow mandrel on the outside of which said tubular wrapping slides, gusseted and closed at the leading end. In correct phase, a pusher is activated to eject the bundle from said loading station, slide it along said hollow mandrel and, at the exit thereof, push it against the closed leading end of the tubular wrapping, causing this wrapping to advance and, while it exits from the hollow mandrel, become engaged by the bundle, which due to the previous slight transverse compression to which it was subjected in said loading station and due to its elastic memory, expands slightly and closely engages the portion of tubular package ejected from the mandrel and which with this is supported by conveyor means below. The pusher ends its active movement downstream of the mandrel and slightly downstream of the transverse heat-sealing and cutting assembly, which is in open position, after which the same pusher reverses its movement and returns to the cycle start position, to free the loading station and allow repetition of a new operating cycle.

In sequence, the lateral gusseting means of the portion of tubular wrapping positioned between the trailing end of the bagged bundle and the discharge mouth of the tube-forming mandrel are activated, followed by activation of the transverse heat-sealing and cutting assembly, which carries out closing of the trailing end of the filled pack, which closes the leading end of the pack being formed and still to be filled, after which said assembly opens slightly to release the heat seals and allow action thereon of optional blower cooling means positioned on the same assembly, which in sequence opens fully to allow repetition of a new operating cycle, while the pack produced is moved away by the conveyor that supports it. When a new operating cycle is repeated, said transverse heat-sealing and cutting assembly must be fully open to allow the tubular pack to advance pushed by the product inserted therein by the pusher that carries out its active operating movement. To prevent the heat seal of the leading end of the tubular pack being filled from yielding under the thrust of the product in the bagging step and therefore prevent the pack from tearing and bursting, also due to the air that is compressed by the product when it advances in the tubular pack closed longitudinally and at the leading end, in the current state of the art it is possible to act as follows:

- a) to ensure effective cooling of the heat seal of the leading end of the tubular pack, the idle times between one operating cycle and the next are extended;
- b) the product is inserted into the tubular pack being formed and closed at the leading end, at slow speed, to allow the air that remains trapped in the front part of the pack to escape by passing between product and pack. Just as the previous solution, this solution unavoidably limits the operating speed and consequently the productivity of prior art packaging machines.

[0004] The invention intends to overcome these and other limits of the prior art, to produce reliable packaging machines with high hourly production rates, with the idea of a solution according to the appended claim 1) and to the subsequent dependent claims 2, 3 and 5, for which the transverse heat-sealing and cutting assembly is provided with pressers at least upstream of the heat-sealing means, so as to firmly clamp the film before, during and after the step of carrying out the transverse heat seals. In combination with said pressers, the same transverse heat-sealing and cutting assembly is movable in the pack forming direction, first closed and moving away from said tube-forming mandrel and then open and in the opposite direction, to return to the cycle start position for repetition of a subsequent operating cycle. The tubular pack can now advance along the tube-forming mandrel drawn by the new double transverse heat-sealing and cutting assembly with pressers, as a result of which it is possible:

1. to produce strong and efficient heat seals, with the times required to ensure proper implementation thereof, as these heat seals are carried out in the forming and filling step of each subsequent tubular pack, while the transverse heat-sealing and cutting assembly is closed and moves away from the mandrel;

2. while the new tubular pack advances drawn by the transverse heat-sealing and cutting assembly with pressers, which has heat sealed the leading end of the new pack, has closed the trailing end of the pack of the previous cycle and is accompanying this latter to be unloaded, the same new pack can be filled rapidly by said pusher, as the presser downstream of this transverse heat-sealing and cutting assembly mechanically isolates the transverse heat seal of the leading end carried out on the new pack, so that this transverse heat seal is not stressed by insertion of the product into the new tubular pack and by thrust of the air trapped in the same pack and positioned in front of the product, also because in this step it is possible for the pusher to insert the product into the new pack with a relative speed that allows slow and progressive backward discharge of the air that is compressed upstream of the product;

3. during its movement away from the tube-forming mandrel, the transverse heat-sealing and cutting assembly has all the time required to carry out its main transverse heat-sealing and cutting operations and, in the last part of the same movement, it also has time to open the heat sealers slightly and allow action of the means for natural or forced cooling of the transverse heat seals carried out, while the film upstream and downstream is held by the pressers at all times to prevent even minimum stress on the same transverse heat seals;

4. the return movement to the cycle start position of the transverse heat-sealing and cutting assembly, after it has been opened, overlaps the return movement at the same speed of the pusher for bagging the product and, after this return step, a pack filled and ready for closing of the trailing end is already positioned downstream of the transverse heat-sealing and cutting assembly.

[0005] It is evident how with the new solution according to the invention, packaging machines that are more reliable and faster than those of the prior art can be produced.

[0006] Further characteristics of the invention, and the advantages deriving therefrom, will be more apparent from the following description of a preferred embodiment thereof, illustrated purely by way of non-limiting example in the figures of the eight accompanying drawings, wherein:

- Figs. 1 and 2 are respectively side elevation and top plan views of a packaging machine according to the

invention;

- Figs. 3 and 4 are respectively a side and front view, with parts in section, of one of the side panels of the moving transverse heat-sealing and cutting assembly of the packaging machine;
- Figs. 5, 5a and 5b are cross sectional views of the transverse heat-sealing and cutting assembly in the solution useful for producing packs with incorporated handle, the same assembly being illustrated respectively in the open position, in the closed position and in the semi-open or semi-closed position, with the transverse heat-sealing and cutting means open and with the outer pressers still closed on the packs downstream and upstream;
- Fig. 6 is a perspective view of a pack with handle that can be obtained with the transverse heat-sealing and cutting assembly of Fig. 5;
- Fig. 7 illustrates, in open position and in a cross sectional view, the transverse heat-sealing and cutting assembly according to a variant of embodiment useful for producing a pack with symmetrical heat seals of the leading and trailing ends, without the handle of Fig. 6;
- Fig. 8 illustrates a perspective view of a pack without a handle that can be produced with the transverse heat-sealing and cutting assembly of Fig. 7;
- Fig. 9 illustrates a schematic plan view of the means for prior lateral gusseting of the portion of tubular wrapping that is cyclically engaged by the double transverse heat-sealing and cutting assembly;
- Fig. 10 illustrates a side view, enlarged and with parts in section, of the variable gap area of the conveyor associated with the transverse heat-sealing and cutting assembly, to support the packs in the subsequent steps of the operating cycle in which the same packs pass cyclically through this gap in which the opposite bars of the transverse heat-sealing and cutting assembly operate;
- Figs. 11 to 16 illustrate schematic side views of the main components of the packaging machine according to the invention, in some subsequent and significant steps of the operating cycle of these components.

- 45 **[0007]** From Figs. 1 and 2 it can be seen how the packaging machine comprises as intermediate component an axially hollow mandrel 1 in the shape of a sailor neck tie with a rectangular or square cross section, adjustable when the format of the pack to be produced changes, positioned horizontally with its longitudinal axis, equipped on the left when viewing the figures with an open end 101 from which the film 102 coming from a reel below 2 enters and which by guide means typical of mandrels in the shape of a sailor neck tie is made to adopt a tubular shape, to move longitudinally along the same mandrel 1 towards the outlet 201 thereof, with mutual overlapping of the longitudinal flaps of the same film and with continuous and mutual heat-sealing of these by a

heat-sealing device of known type 3, so that the same film exits from the outlet 201 of the mandrel 1 in the form of a sack and with a cross section of a size slightly larger than the inner cross section of the same mandrel 1 that externally guides and supports said sack of film and that with its inner lateral surface is instead destined to guide the product to be packaged. Upstream of the mandrel 1 there is provided the known loading station 4 in which means, also known, form a bundle of grouped and/or stacked products, coming from at least any one feed line, not shown as not necessary in order to understand the invention. The loading station 4 is also adjustable when the format of the packs to be produced changes and can advantageously be characterised by subjecting the bundle of paper product to an adequate transverse compression, so that when the same bundle is ejected longitudinally from the loading station 4, it can easily enter the hollow mandrel 1 and can slide along it still in a condition of adequate transverse compression.

[0008] In Fig. 1, the dot and dash line 5 indicates the ideal horizontal plane on which the bottom of the bundle and the packs produced by the packaging machine in question move. Upstream of the loading station 4 there is provided the pusher 6 supported by the front end of a horizontal rod 106, whose longitudinal axis is parallel to the common longitudinal axis of the aforesaid stations 1 and 4 and that extends to the left when viewing Figs. 1 and 2. At the end next to the pusher 6, the rod 106 is guided longitudinally by rolling means 7 supported by a base plate 8 in the form of a portal, on which there is also mounted a gear motor assembly 9, on the vertical output shaft of which there is press fitted a toothed pulley 10 that cooperates with a toothed belt 11 guided on a pair of idle pulleys 12 and parallel to the pulley 10, also supported by the portal 8, so as to carry the same toothed belt 11 in a path parallel to the rod 106 and to be able to be fixed thereto with the opposite ends, so as to form the equivalent of a rack fixed longitudinally to the rod 106 and meshing with the pinion 10, so that by rotating the motion unit in one or other direction, it is possible to operate the pusher 6 in the useful movement for transfer of the bundle formed in the loading station 4 along the tube-forming mandrel 1 and downstream thereof and of the transverse heat-sealing and cutting assembly (see below), for insertion of the same bundle into the tubular pack produced by the same mandrel 1 and by the longitudinal heat-sealing device 3, with a movement indicated with A in Figs. 1 and 2. The assembly 9 is equipped with an electric motor that not only can rotate in two directions but also with electronic speed control, to allow operation of the pusher 6 with a varied motion, with correct acceleration and deceleration ramps (see below).

[0009] Downstream of the mandrel 1, at a short distance from the outlet 201 thereof, there is provided the innovative assembly 13 that carries out the double transverse heat seal and the intermediate cut on the pack and that, according to the invention, after closing on the vertical plane, is operated first with a horizontal movement

away from the same mandrel 1, to accompany the pack in the transverse heat-sealing and cutting step and then, after opening on the vertical plane, is translated horizontally in the opposite direction to the preceding one, to return to the initial starting position illustrated with a continuous line in Figs. 1 and 2, for repetition of a new operating cycle, carrying out reciprocating movement B, the length or range of which will be correlated to the length of the packs to produce and will therefore be variable (see below).

[0010] In order to perform said horizontal translation movement B, as also illustrated in the details of Figs. 3 and 4, the assembly 13 is mounted on a carriage 14 that by means of lateral recirculating ball slides 15, slides on pairs of rectilinear and horizontal guides 115 fixed longitudinally on the inner faces of the side panels of the portion of base plate 116 of the packaging machine that extends downstream of the one 16 (fig. 2) that supports the stations 1, 4 and 6 described previously. Parallel to the pairs of guides 115, between these and parallel thereto, the inner side panels of the base plate 106 support toothed belts 17 closed in a loop and guided on respective end pulleys 18, one pair of which is interconnected by a transverse shaft 19, in turn connected by means of a positive motion transmission 20 to a motion assembly 21 with electric motor that rotates in two directions and preferably of the type with electronic speed and phase control. The two side panels of the carriage 14, which can be carried in the rectilinear reciprocating movement of the aforesaid range B by the motion assembly 20, are fixed to the upper branch of the two toothed belts 17 with clamps 22 (fig. 3).

[0011] The assembly 13 comprises two elements 113' and 113" parallel to and opposite each other, positioned on a common ideal vertical plane, transverse to the longitudinal direction of the ideal plane 5 of advance of the packs, the lower 113" of which is positioned under this plane 5 at the start of each cycle, while the upper element 113' is raised and at a distance from the plane 5 that allows the packs cyclically exiting from the mandrel 1 to pass below without interference. In the active operating step, the elements 113', 113" are moved towards each other with a self-centring movement on the common ideal vertical plane, so as to meet approximately at half the height of the packs to be closed. To allow the machine to produce packs of different height, the position in height of the support and guide means of said elements 113' and 113" can be adjusted simultaneously, without adjusting the related distance at rest. For this purpose, as illustrated in Figs. 3 and 4, the support means of said elements 113' and 113" are mounted on respective vertical slides 23 positioned inside the side panels of the carriage 14 that support these slides with guide means 24. Each slide 23 is equipped with an protruding intermediate appendage 123, with a lead screw 125 that cooperates with a vertical screw 25, in turn connected, with the interposition of a safety coupling 26, to a three-way bevel gearbox 27, the vertical way of which acts on the screw 25,

while one of the horizontal ways connects the screw 25 of a slide to that of the slide of the opposite side, which will be served by a two-way bevel gearbox, while the third horizontal way of the gearbox 27 is connected to a motion assembly 28 with electric motor that rotates in two directions and preferably of the type with electronic speed and phase control, to allow the automatic or semi-automatic adjustment of the position in height of the transverse heat-sealing and cutting assembly 13.

[0012] Fixed to the inner sides of the aforesaid vertical slides 23 with supports 29 and 30 that respectively support them by the lower end and by an intermediate area, are vertical guide rods 31, with a round section, sliding on which, with the interposition of recirculating ball bearings, are sleeves 32 and 33, the lower of which 32 slides between said supports 29, 30 and supports the end of the lower transverse heat-sealing and cutting element 113", while the upper sleeves 33 slide above the supports 30 of the respective rods 31 and support the ends of the upper transverse heat-sealing and cutting element 113'. In Figs. 3 and 4 it can also be seen that the sleeves 32 and 33 of each rod 31 are fixed by means of respective clamps 132, 133 to the opposite branches of toothed belts 34 guided on a pulley 35 supported adjustably by the upper end of each rod 31 and on a toothed pulley 36 supported by the lower end of each vertical slide 23 and the same lower pulleys 26 are connected to each other by a synchronizer shaft 37, which by means of a positive motion transmission 38 is connected to a motion assembly 39 with electric motor that rotates in two directions and preferably of the type with electronic speed and phase control. The opposed elements 113' and 113" of the transverse heat-sealing and cutting assembly 13 receive the movements for the opening and closing steps from this motion assembly, with the necessary acceleration and deceleration ramps, as indicated below.

[0013] From Figs. 1 and 2 and 10 to 12, it can be seen that the same ideal vertical plane on which the elements 113' and 113" of the transverse heat-sealing and cutting assembly 13 move, is provided with the transverse opening or gap 40 of the upper branch of a conveyor 41, which with the same upper branch moves in the direction of the arrow 42 and lies on the horizontal operating plane 5 to support the packs during exit from the mandrel 1, during their movement away from it, while transverse heat-sealing of the trailing and leading ends and the intermediate cut is carried out dynamically on the same packs (see below). When the elements 113', 113" of the assembly 13 are in the open position at rest and have to carry out the return movement to be arranged upstream of the new pack that has been unloaded from the mandrel 1 (see below), it must be possible to substantially close said transverse gap 40, to allow this new pack to pass over it. For this purpose, the upper branch of the conveyor 41 is guided on a roller 43 positioned at the outlet of the mandrel 1 and supported rotatably by the side panel of the base plate 116 of the packaging machine, together with the end roller 143. The lower branch of the conveyor

41 is instead guided on idle rollers 44, on at least one dancer roller 44' and on a toothed pulley 45 press fitted onto the slow output shaft of a motion assembly 46. A short distance from the upper roller 43, the upper branch of the conveyor 41 is guided on a roller 47 parallel to and positioned at the same height as the roller 43 and is then guided on three lower rollers 48, 49 and 50, also parallel to one another, idle and parallel to the roller 47, and which with this take the same upper branch of the conveyor 41 to form said gap 40 in which the lower element 113" of the transverse heat-sealing and cutting assembly 13, in its lowered rest position, can be positioned and through which the same element 113" can, on command, be raised to cooperate with the upper element 113'. The rollers 47 to 50 are supported rotatably by the carriage 14 and move therewith. The roller 50 is positioned at a lower height than the roller 47, so that two idle rollers 51 and 52, positioned respectively downstream and upstream of the same roller 50, and the latter of which is at the same height as the roller 47, can be placed above the same roller 50. Passing over the rollers 50, 51 and 52, the conveyor belt 41 takes a zigzag path. The rollers 51 and 52 are mounted rotating on a small secondary carriage 53 that is mounted on the main carriage 14 and is able to carry out thereon, on command, a controlled horizontal movement that can take the same rollers 51 and 52 from the moved back position of Fig. 11, in which the gap 40 is substantially closed and the pack can pass easily over the rollers 47 and 52, to the extended position of Fig. 12 in which the gap 49 is open to allow freedom of movement on the vertical of the lower element 113" of the transverse heat-sealing and cutting assembly 13.

[0014] From the details of Fig. 10 it can be seen that the rollers 51, 52 are mounted transversely on the opposite ends of a said secondary carriage 53, equipped laterally with horizontal and longitudinal guides 153 sliding on slides 54 fixed on the top of a cross member 55, in turn fixed with the its ends to the side panels of the main carriage 14. The cross member 55 supports, rotatably and in a cantilever fashion, a pair of screws 56 parallel to each other and to the guides 54 and lead screws 156, integral with appendages 253 of the secondary carriage 53, cooperate with these screws 56. The two screws 56, only one of which is visible in Fig. 10, are operated by means of a positive motion transmission 57 by a motion assembly 58 flanged to the cross member 55 and operated by an electric motor that rotates in two directions and optionally also with electronic phase control.

[0015] In Fig. 10, the secondary carriage 53 with the rollers 51 and 52 is illustrated with a continuous line in the extended position that closes the gap 40, while it is illustrated with a dashed line in the moved back position that opens the same gap 40. The same figure clearly shows how the rollers 51 and 52 carry out movements D of equal range and such that when the roller 52 moves back to the left, when viewing Fig. 10, and causes a double shortening D of the upper part of the conveyor 41, the lower roller 51 also moves to the left and causes a

double lengthening D of the lower part of the same conveyor 41, so that the movements of the secondary carriage 53 do not modify the longitudinal tension of the same conveyor 41 and do not modify its movement.

[0016] From Figs. 1, 2 and 9 it can be seen that opposed folders 59, 59' are provided at the side of the conveyor 41 and at the transverse heat-sealing and cutting assembly 13, which prior to operation of the same assembly 13 act on the sides of the portion of tubular pack exiting from the mandrel 1, which is not engaged by the product to be packaged (see below) and that is to be engaged by the same assembly 13, to produce recessed lateral gusseting on the same portion of pack, which are useful to prevent the heat sealed area from protruding laterally from the pack and to ensure that the same area closely wraps the end of the packaged products. The folders 59, 59' can be mounted adjustably on respective slides 60, 60' sliding on guides 61, 61' constrained to the fixed frame 116 of the packaging machine, the same slides 60, 60' being operated by respective fluid pressure piston cylinder assemblies 62, 62' or by other suitable linear reciprocating motion actuators.

[0017] With reference to Figs. 5, 5a and 5b, the composition of the means that form the elements 113' and 113" of the double transverse heat-sealing and intermediate cutting assembly 13 is now described. In Fig. 5 the elements 113' and 113" are illustrated in the step of movement towards each other and that, with a greater distance between the same elements, is equivalent to the rest position of the same elements 113', 113" of the assembly 13. The transverse heat-sealing and cutting assembly, which is now described with reference to Fig. 5, is able to produce a pack C1 as shown in Fig. 6, closed longitudinally by the heat seal SL formed by the heat-sealing device 3 shown in Figs. 1 and 2, equipped at the ends with the portions F recessed and gusseted by the folders 59, 59' of Fig. 9, closed at the leading end by a transverse heat seal ST1, closed at the trailing end by a transverse heat seal ST2 and equipped with a flattened and gusseted portion M of the same pack, also closed longitudinally by the heat seal SL, which is closed on the free edge B2 by fusion of the material obtained from the separation with a hot cut between subsequent packs, and which is equipped with a C-shaped intermediate cut G, useful to be able to use the same portion M of pack as a handle for carrying the same pack C1. At the transverse leading end seal ST1, the pack C1 has a small protruding appendage of the same pack, the front edge B1 of which, parallel to ST1, is closed by fusion of the material obtained from the separation with a hot cut between subsequent packs.

[0018] The assembly 13 must be able to carry out simultaneously, on the portion of tubular pack on which it is pressed transversely, the parallel heat seals ST2 for the pack already filled and to be closed at the trailing end, the parallel heat seal ST1 for the following pack still to be filled with product, the intermediate cut that produces the edges B2, B1 and the mutual separation of the packs

and to carry out punching to form the opening G acting as handle.

[0019] From Fig. 5 it can be seen that the upper element 113' of the assembly 13 is equipped at least upstream, but preferably both upstream and downstream, with pressers 63, 63', which with their lower edge with rounded profile, both project downwards with respect to the lower operating surface of the same element 113', and which can move back towards this operating surface, in opposition to the action of counter springs 64, 64'. On the lower operating surface of the element 113', in a position vertically and horizontally moved back from the pressers 63, 63' and arranged coplanar with each other, there are provided the heat sealing devices 65 and 66 for carrying out the heat seals ST1 and ST2 of Fig. 6, and the hot cutting means 67 for separating the packs from one another and for forming the fused edges B1 and B2 of the same pack of Fig. 6. In the intermediate part of the lower operating surface of the element 113' there are provided two small spring operated pressers 68, 68', the lower and suitably rounded edge of which projects slightly downwards from the ideal plane that contains the heat sealing devices 65, 66 and, in a position moved back from these intermediate pressers 68, 68', there is provided a punching unit 69 for forming the cut G on the handle M of the pack C1 of Fig. 6. The whole assembly 113' is supported by the support part 70 positioned above connected to the sleeves 33 shown in Figs. 3 and 4, with the interposition of spring and compensation means 71, common in the transverse heat sealing and cutting means in question.

[0020] The lower element 113" of the assembly 13 as shown in Fig. 3 comprises, with arrangement on a common ideal horizontal plane, counter means 163, 163' opposite the pressers 63, 63', counter-heat sealing devices 165, 166 opposite the heat sealing devices 65, 66, a counter means 167 for the cutting means 67, counter means 168, 168' for the intermediate pressers 68, 68' and a punch 169 for the upper punching unit 69. The pressers 63, 63' and the respective counter means 163, 163' are produced or machined so as to have a high coefficient of friction in contact with the film that forms the packs and that exits from the tube-forming mandrel 1.

[0021] Moving the elements 113' and 113" of the transverse heat-sealing and cutting assembly 13 towards each other in parallel, as shown in Fig. 5, with self-centring movement on the common ideal vertical plane, the outer pressers 63, 163 and 63', 163', as shown in Fig. 5b, act first, firmly clamping in transverse direction the interposed tubular pack, not illustrated, and then, continuing the movement towards each other, the same elements 113', 113" reach the condition of Fig. 5a, useful for producing on the pack C1 said heat seals ST1, ST2, the intermediate cut B1-B2, with action in correct phase of the intermediate pressers 68, 168, 68', 168', which firmly retain the portion of pack that is provided with the cut G by the elements of the punching unit and punch 69, 169. After said transverse heat sealing and cutting

operations have taken place, the elements 113', 113" of the assembly 13 are taken temporarily to a partially open condition, as shown in Fig. 5b, with raising of the heat sealers 65, 66 and of the cutting means 67 by the respective lower counter means 165, 166, 167, to allow rapid natural or forced cooling of the heat seals and of the transverse cut carried out, while the pack remains clamped between the outer pressers and counter pressers 63, 163 and 63', 163' so that it can be drawn further by the assembly 13, as indicated below.

[0022] If the machine is to produce packs C2 as shown in Fig. 8, without a handle, but equipped only with the transverse leading and trailing end heat seals ST1 and ST2 with the fused edges B1 and B2, resulting from the hot cutting operation of the pack, at a short distance therefrom, the transverse heat sealing and cutting assembly 13 will be simplified as shown in Fig. 7, with the upper element 113' equipped only with the outer pressers 63, 63', the heat sealers 65, 66 and the hot cutting means 67, while the lower element 113" will carry the counter means 163, 163', 165, 166, 167 for the aforesaid operating means positioned above.

[0023] In Fig. 1, the numeral 72 indicates a processor programmable through a unit 73, and to which all the electric motors of the aforesaid motion assemblies are connected, to allow automatic and safe operation of the packaging machine, as is now described with reference to Figs. 11 to 16.

[0024] Fig. 11 illustrates the transverse heat sealing and cutting assembly 13, which previously carried out heat sealing of the trailing end of the finished pack C1, heat sealing of the leading end of the new pack C1' and the intermediate transverse cut to separate from the new pack C1' the pack C1, which is moved away by the upper branch of the conveyor 41 that moves in the direction 42 to be unloaded, also to maintain the subsequent pack C1' exiting from the mandrel 1 lying longitudinally as a result of the pull exerted previously by the same assembly 13 in the previous movement to the right, when viewing Fig. 11, as the same new pack C1' has in correct phase been filled by the pusher 6, which in correct phase moves back as indicated with the dashed line. The elements 113', 113" of the assembly 13 are spaced from each other or open, with the lower element 113" inside the gap 40 and with the upper element 113' in raised position so as not to interfere with the new pack C1'. The gap 40 is in this phase closed to prevent interference when passing below the same new pack C1' and is arranged upstream of this pack C1'.

[0025] In the subsequent step illustrated in Fig. 12, the secondary carriage 53 moves to the right and opens the gap 40 to free the ideal vertical plane on which the elements 113', 113" of the transverse heat-sealing and cutting assembly 13 move. After the static folders 59, 59' of Fig. 9 have acted laterally on the portion of tubular wrapping 102' between the outlet of the mandrel 1 and the product P inserted in the new pack C1', to equip this portion of wrapping with lateral recessed gussets, ac-

cording to the prior art, the elements 113' and 113" of the assembly 13 are commanded to carry out a self-centring closing movement which closes them immediately downstream of the product P packaged in C1' and at half the height of this same pack, in the fully closed condition shown in Fig. 5a or in the partially closed condition shown in Fig. 5 or in Fig. 5b. In correct phase with total or partial closing of the elements 113', 113", the lateral folders 59, 59' are moved back to the rest position and, in sequence, the main carriage 14 that carries the assembly 13 is translated to the left. If the elements 113', 113" of the assembly 13 are not fully closed, as shown in Fig. 5 or Fig. 5b, the initially slow movement of the same assembly 13 away from the mandrel 1 and the resistance created by the tube of film 102 that impacts the tube-forming mandrel 1, can cause the pack C1' to move close to the assembly 13 to allow an adequately tight wrapping to be formed also in longitudinal direction. In sequence, the elements 113', 113" of the assembly 13 are closed as shown in Fig. 5a so as to firmly clamp the trailing end of the pack C1' and to carry out thereon the transverse heat seal ST2 of Fig. 6, the separation with hot cut (forming of the closed edges B2 and B1 and their separation) from the subsequent pack C1" exiting from the mandrel 1 that the assembly 13 starts to draw and to carry out the cold cut G to equip the same pack C1' with the carrying handle M.

[0026] While the assembly 13 moves to the right, as illustrated in Fig. 14, the pusher 6 inserts the product P to be packaged into the future pack C1", in which the same product expands transversely due to the previous transverse compression to which it was subjected in the loading station 4 shown in Figs. 1 and 2 and the insertion speed of the same product in the wrapper of C1" can be such that the air trapped in this pack and positioned upstream of the product P being packaged, escapes slowly downstream, without damaging the same pack C1", which is nonetheless firmly retained by the presser upstream 63, 163 of the assembly 13, this latter which is taken in correct phase to the condition shown in Fig. 5b to allow rapid cooling of the heat seals carried out by the same assembly 13.

[0027] From Fig. 14 it is thus evident that while the assembly 13 dynamically carries out its operations of double transverse heat-sealing and cutting it has been designated with, at the same time a new pack already filled with the product P to be packaged is formed downstream of this assembly (see starting condition of Fig. 11).

[0028] In sequence, as illustrated in Fig. 15, when the carriage 14 reaches or is about to reach the end of its movement to the right, the elements 113', 113" of the assembly 13 open, with the lower element 113" that returns into the open gap 40 and with the upper element 113' that is arranged at a greater height than that of the upper part of the pack C1".

[0029] As illustrated in Fig. 16, in close sequence to the preceding step, the secondary carriage 53 is moved to the left to close the gap 40 and then the main carriage also translates to the left to return to the cycle start po-

sition shown in Fig. 1, without the slightest interference with the bottom of the new pack C1", which is maintained lying flat by the active movement 42 of the conveyor 41. The pusher 6 is, or has already been, moved back in correct phase to repeat a new operating cycle. The return movement to the start of the cycle by the assembly 13 in open position can take place very rapidly, further increasing the productivity of the packaging machine.

[0030] It is understood that the description refers to a preferred embodiment of the invention, to which numerous variants and modifications can be made, all without departing from the guiding principle of the invention, which scope is defined by the appended claims.

[0031] In the claims, the references indicated in brackets are purely indicative and do not limit the scope of protection of these claims.

Claims

1. A wrapping machine for wrapping individual or grouped and/or stacked products, in packs of thermoplastic material, said machine comprising:

- a heat-sealing device (3),
- a transverse heat-sealing and cutting assembly (13) for carrying out double transverse heat seal and intermediate cut on the packs of thermoplastic material,
- folders (59, 59') provided at the transverse heat-sealing and cutting assembly (13),
- a hollow horizontal mandrel (1) to the loading end (101) of which there is fed a continuous film of thermoplastic material (102), unwound from a reel (2), which proceeding towards the unloading end (201) of this mandrel, is formed in a tube with overlapping and mutual heat-sealing of its longitudinal edges by the heat-sealing device (3) and which exits from the same mandrel (1) in the form of a tubular wrapping (102'), which is closed transversely by the transverse heat-sealing and cutting assembly (13) positioned downstream of the same mandrel (1) and which, on the portion of the tubular wrapping previously gusseted by the folders (59, 59'), carries out two transverse heat seals (ST1, ST2) and an intermediate cut (B1, B2), filled and formed in the previous cycle, to close the leading end of the following pack (C1") and to separate the completed pack (C1') from the one being formed (C1"), the machine comprises upstream of said mandrel (1) and aligned longitudinally therewith,
- a loading station (4) of the products (P) to be packaged, grouped and/or stacked and compressed in transverse direction and the machine further comprises upstream of said station (4) and aligned longitudinally therewith
- a pusher (6) that, on command, transfers the

product or products (P) from the loading station (4) into the tubular pack produced by said mandrel (1), passing through this latter for the whole of its length and beyond,

characterised in that said transverse heat-sealing and cutting assembly (13) comprises parallel and opposed elements (113', 113") for carrying out the double transverse heat seal by means of heat-sealing devices (65, 66) and the intermediate cut with cutting means (67), said elements (113, 113') being equipped upstream of said heat-sealing devices (65, 66) with respective pressers (63, 63') and counterpressers (163, 163') to firmly clamp in transverse direction the portion of gusseted wrapping (102') on which the transverse heat-sealing and cutting assembly (13), on command, is closed, the machine further comprises a main carriage (14), the transverse heat-sealing and cutting assembly (13) being mounted on the main carriage (14) with horizontal movement operated by motion means to be able in correct phase to be moved away from the tube-forming mandrel (1) to follow the completed pack during heat sealing of the trailing end and to extract from the mandrel (1) a new portion of tubular wrapping (102') into which in correct phase said pusher (6) inserts a product (P) to form said subsequent pack (C1"), there being provided means such that said main carriage (14) is returned rapidly to the initial position moved towards the mandrel (1), to be arranged downstream of the new pack (C1") already filled and to be closed at the trailing end, the machine further comprising a motorized conveyor (41) to support the packs being formed downstream of said mandrel (1) and an upper branch of this conveyor (41) being guided on parallel rollers (47, 48, 49, 50) supported rotatably by said main carriage (14) and being guided in a zigzag path on further rollers (51, 52) supported by a secondary carriage (53) mounted on the main carriage (14) and sliding horizontally on command on the main carriage (14), all so as to form at said transverse heat-sealing and intermediate cutting assembly (13) a gap (40) inside which the lower element (113") of said assembly (13) is normally housed and this gap (40) being opened by the movement in one direction of said secondary carriage (53), to allow freedom of action of this lower element (113") and the same gap (40), when engaged by said lower element (113"), being closed by the movement of said secondary carriage (53) in the opposite direction, so that said conveyor (41) correctly supports the packs being formed during the return movement of said main carriage (14).

2. The wrapping machine according to claim 1), wherein the main carriage (14) that carries said transverse heat-sealing and cutting assembly (13), is equipped laterally with slides (15) that slide on pairs of recti-

linear and horizontal guides (115) fixed longitudinally to the side panels of the portion of base plate (116) of the same machine and these side panels also support, parallel to said pairs of guides (115), toothed belts (17) closed in a loop and guided on respective end pulleys (18), a pair of which is interconnected by a transverse shaft (19) in turn connected to a motion assembly (20, 21) with electric motor that rotates in two directions and of the type with electronic speed and phase control, the two side panels of the main carriage (14) being connected to a branch of said two toothed belts (17) by means of clamps (22), to receive therefrom the necessary rectilinear reciprocating movement with the necessary acceleration and deceleration ramps.

3. The wrapping machine according to claim 1), wherein the support means of the two parallel and opposed elements (113', 113'') that form said transverse heat-sealing and cutting assembly (13), are mounted on respective vertical slides (23) positioned inside the side panels of the main carriage (14) that support said slides (23) with guide means (24), each slide (23) being equipped with a protruding intermediate appendage (123), with a lead screw (125) that cooperates with a vertical screw (25), in turn connected to a three-way bevel gearbox (27), the vertical way of which acts on said screw (25), while one of the horizontal ways connects the same screw (25) of a slide (23) to that of the slide (23) of the opposite side, which will be served by a two-way bevel gearbox, while the third horizontal way of said gearbox (27) is connected to a motion assembly (28) with electric motor that rotates in two directions and preferably of the type with electronic speed and phase control, to allow the automatic or semi-automatic adjustment of the position in height of the transverse heat-sealing and cutting assembly (13) when the height of the packs to be produced varies.

4. The wrapping machine according to claim 3), wherein fixed to the inner sides of said vertical slides (23) with supports (29, 30) that respectively support them by the lower end and by an intermediate area, are vertical guide rods (31), with a round section, sliding on which, with the interposition of recirculating ball bearings, are sleeves (32, 33) the lower of which (32) slides between said supports (29, 30) and supports the end of the lower transverse heat-sealing and cutting element (113''), while the upper sleeves (33) slide above the upper supports (30) of the respective rods (31) and support the ends of the upper transverse heat-sealing and cutting element (113'), the sleeves (32, 33) of each said rod (31) being fixed by means of respective clamps (132, 133) to the opposite branches of toothed belts (34) guided on a pulley (35) supported adjustably by the upper end of each rod (31) and on a toothed pulley (36) supported by

the lower end of each said vertical slide (23) and the same lower pulleys (26) are connected to each other by a synchronizer shaft (37), in turn connected to a motion assembly (38, 39) with electric motor that rotates in two directions and preferably of the type with electronic speed and phase control, which transmits to the opposed elements (113', 113'') of the transverse heat-sealing and cutting assembly (13) the movements for total or partial closing or total or partial opening, with the necessary acceleration and deceleration ramps.

5. The wrapping machine according to claim 1), wherein the pressers (63, 63') positioned upstream and downstream of the heat-sealing devices (65, 66) of the upper element (113') of the transverse heat-sealing and cutting assembly (13), are stressed in downward extension by respective counter springs (64, 64') so that when they are at rest, the lower edges with rounded profile of the same pressers are suitably spaced from each other by the lower operating surface of the same upper element (113'), while the lower element (113'') of the same assembly (13) comprises with arrangement on a common horizontal ideal plane, counter means (163, 163') opposite said upper pressers (63, 63') which, similarly to these counter means (163, 163') are produced or machined so as to have a high coefficient of friction in contact with the tubular wrapping (102') of film that forms the packs and that exits from said tube-forming mandrel (1), all so that, also in combination with the action of said counter springs (64, 64'), said wrapping of film (102') is able to be firmly clamped between these pressers (63, 63') and the respective counter means (163, 163) both when said elements (113', 113'') are thrust against each other to carry out the two transverse heat seals and the intermediate cut for which they are responsible, and when these elements (113', 113'') are close to each other but with the transverse heat-sealing and intermediate cutting means (65, 66, 67) raised by the respective counter means (165, 166, 167), to free and cool the heat sealed and cut portions of wrapping.

6. The wrapping machine according to claim 2), wherein said secondary carriage (53) that supports the zig-zag guide rollers (51, 52) of the upper branch of the conveyor (41), is equipped laterally with horizontal and longitudinal guides (153) sliding on slides (54) fixed on the top of a cross member (55), in turn fixed with its ends to the side panels of the main carriage (14), this cross member (55) supporting rotatably and in a cantilever fashion, a pair of screws (56) parallel to each other and to said guides (54) and these screws (56) cooperate with respective lead screws (156), integral with appendages (253) of the secondary carriage (53) and these screws (56) being operated by a motion assembly (57, 58) flanged to said

cross member (55) and operated by an electric motor that rotates in two directions and optionally also of the type with electronic phase control.

7. A method for wrapping single or grouped and/or stacked products (P), in packs of thermoplastic material obtained from film unwound from a reel, with a machine according to the preceding claims 1 to 6, with a transverse heat-sealing and cutting assembly (13) equipped with pressers and counter pressers (63, 163, 63', 163') upstream and downstream of the transverse heat-sealing and cutting means (65, 165, 67, 167, 66, 166), to be able to firmly clamp the tubular pack of film during the step of carrying out the transverse heat seals and in which the same transverse heat-sealing and cutting assembly (13) is movable in the pack forming direction, first closed and moving away from the tube-forming mandrel (1) and then open and in the opposite direction, to return to the cycle start position for repetition of a subsequent operating cycle, all so that advance of the tubular wrapping (102') along the tube-forming mandrel (1) can take place drawn by the same transverse heat-sealing and cutting assembly (13) with pressers, **characterised in that** with this assembly (13) it is possible to carry out in the forming and filling step of each subsequent tubular pack (C1, C1', C1" etc.), while the transverse heat-sealing and cutting assembly (13) is closed and moves away from the mandrel (1) and also **characterised in that** the return movement to the cycle start position of the transverse heat-sealing and cutting assembly (13), after it has been opened, overlaps the return movement at the same speed of the pusher (6) for bagging the product and, after this return step, a pack (C1") filled and ready for closing of the trailing end is already positioned downstream of the transverse heat-sealing and cutting assembly (13).

8. The method according to claim 7), **characterised in that** while the new tubular pack (C1') advances and is drawn by the transverse heat-sealing and cutting assembly (13) with pressers (63, 163, 63', 163'), which heat seals the leading end of this new pack, closes the trailing end of the pack (C1) of the previous cycle and is accompanying this latter to be unloaded, the same new pack (C1') can be filled rapidly by the designated pusher (6), as the presser (63, 163) downstream of this transverse heat-sealing and cutting assembly (13), mechanically isolates the transverse heat seal of the leading end (ST1) carried out on the new pack, so that this transverse heat seal (ST1) is not stressed by insertion of the product (P) into the new tubular pack (C1') and by thrust of the air trapped in the same new pack (C1') and positioned in front of the product (P), also as in this step it is possible for the pusher to insert the product (P) into the new pack with a relative speed that allows

slow and progressive backward discharge of the air that is compressed upstream of the same product (P) and against the leading end of the new pack (C1').

9. The method according to the preceding claims, wherein during the active movement away from the tube-forming mandrel (1), the transverse heat-sealing and cutting assembly (13) is given all the time required to carry out its main heat sealing and cutting operations and, in the last part of the same active movement, to open the heat sealers and the cutting means slightly to free the transverse heat seals (ST1, ST2) and allow action of the means for natural or forced cooling of these heat seals, while the wrapping of the packs upstream and downstream is held at all times by the pressers (63, 163, 63', 163'), which prevent even minimum stress on said transverse heat seals (ST1, ST2).

10. The method according to the preceding claims, **characterised in that** in the initial step of its operating cycle, the transverse heat-sealing and cutting assembly (13) can be closed only partially on the gusseted tubular wrapping (102') and in this partially closed condition can be moved slowly away from the tube-forming mandrel (1) so as to move towards the pack downstream (C1') and compress it longitudinally, after which the same assembly (13) is fully closed and increases its speed of movement to carry out the double transverse heat sealing and intermediate cutting steps for which it is responsible.

Patentansprüche

1. Eine Umwicklungsmaschine für einzelne oder gruppierte und/oder gestapelte Produkte in Packungen aus thermoplastischem Material, wobei die genannte Maschine jeweils Folgendes umfasst:
 - Eine Maschine zum Heißsiegeln (3),
 - Eine Querheißsiegel- und Schneideeinheit (13) zur Ausführung von doppelter Querheißsiegelung und Zwischenschnitten an den Packungen aus thermoplastischem Material,
 - Faltvorrichtungen (59, 59'), die an der Querheißsiegel- und Schneideeinheit (13) vorgesehen sind,
 - Eine hohle horizontale Spindel (1), zu deren Ladeende (101) eine durchgehende Folie aus thermoplastischem Material (102) zugeführt wird, welche von einer Spule (2) abgewickelt wird, die jeweils in Richtung des entsprechenden Entladeendes (201) dieser Spindel vorgeschoben wird, wird in einer Röhre mit überlappender und beidseitiger Heißsiegelung ihrer Längskanten durch die Heißsiegelvorrichtung (3) gebildet, und die aus derselben Spindel (1)

in Form einer röhrenförmigen Umwicklung (102') austritt, welche durch die quer verlaufende Heißsiegelungs- und Schneideeinheit (13) quer verschlossen wird, die stromabwärts von der selben Spindel angeordnet ist und die, an dem Abschnitt der röhrenförmigen Umwicklung, welche zuvor durch entsprechende Faltvorrichtungen (59, 59') eckversteift worden ist, zwei quer verlaufende Heißsiegelungen (ST1, ST2) und einen Zwischenschnitt (B1, B2) durchführt, die im vorausgegangenen Arbeitsgang jeweils gefüllt und geformt worden waren, um das vordere Ende der folgenden Packung (C1'') zu schließen und die fertiggestellte Packung (C1') jeweils von der in der Formung begriffenen (C1') zu trennen, wobei die Maschine stromaufwärts der genannten Spindel (1) und längs damit ausgerichtet

- eine Ladestation (4) der zu verpackenden, zu gruppierenden und/oder zu stapelnden und in Querrichtung zu komprimierenden Produkte (P) umfasst, und die Maschine desweiteren stromaufwärts von der genannten Station (4) und längs damit ausgerichtet jeweils Folgendes umfasst:

- Eine Schubvorrichtung (6), die auf Befehl das Produkt beziehungsweise die Produkte (P) von der Ladestation (4) in die röhrenförmige Packung überführt, die von der genannten Spindel (1) hergestellt wird, indem sie über ihre gesamte Länge durch diese letztere hindurch und darüber hinaus geführt wird,

dadurch gekennzeichnet, dass die genannte Querheißsiegel- und Schneideeinheit (13) jeweils parallele und gegenüberliegende Elemente (113', 113'') zur Durchführung der doppelten Quer-Heißsiegelung durch die Heißsiegelvorrichtungen (65, 66) und den Zwischenschnitt mit den entsprechenden Schneideelementen (67) umfasst, wobei die genannten Elemente (113, 113') stromaufwärts der genannten Heißsiegelvorrichtungen (65, 66) jeweils mit entsprechenden Press- (63, 63') und Gegendruckvorrichtungen (163, 163') ausgerüstet sind, um den jeweiligen Abschnitt der eckversteiften Verpackung (102') quer festzuklemmen, auf dem die Querheißsiegel- und Schneideeinheit (13) auf Befehl geschlossen wird, wobei die Maschine desweiteren einen Hauptschlitten (14) umfasst und die Heißsiegel- und Schneideeinheit (13) jeweils an dem Hauptschlitten (14) mit horizontaler Bewegung montiert ist, die durch entsprechende Bewegungselemente betrieben wird, um in der richtigen Phase von der röhrenbildenden Spindel (1) wegbewegt werden zu können und der fertiggestellten Packung während der Heißsiegelung des hinteren Endes zu folgen und einen neuen Abschnitt der röhrenförmigen Umwicklung

(102'') aus der Spindel zu ziehen, in die in der richtigen Phase die genannte Schubvorrichtung (6) ein Produkt (P) zur Formung der darauf folgenden Packung (C1'') einsetzt, wobei jeweils Elemente vorgesehen sind, die so beschaffen sind, dass der genannte Hauptschlitten (14) schnell zu der zur Spindel bewegten Ausgangsstellung zurückgeführt wird, um stromabwärts der neuen, bereits gefüllten Packung (C1'') angeordnet und am hinteren Ende geschlossen zu werden, wobei die Maschine desweiteren eine motorisierte Förderanlage (41) umfasst, um die Packungen zu halten, die jeweils stromabwärts von der genannten Spindel (1) gebildet werden, und eine obere Abzweigung dieser Förderanlage (41) über parallele Rollen (47, 48, 49, 50) geführt wird, welche drehbar von dem genannten Schlitten (14) getragen werden und wobei die Abzweigung in Zickzackbahn über weitere Rollen (51, 52) geführt wird, die durch einen Nebenschlitten (53) gehalten werden, welcher an dem Hauptschlitten (14) montiert ist und horizontal auf Befehl über den Hauptschlitten (14) gleitet, so dass an der genannten Querheißsiegel- und Zwischenschniteinheit (13) eine entsprechende Aussparung (40) entsteht, in der das untere Element (113'') der genannten Einheit (13) normalerweise untergebracht ist, und diese Aussparung (40) durch die Bewegung in eine Richtung des genannten Nebenschlittens (53) geöffnet wird, um die Bewegungsfreiheit dieses unteren Elements (113'') zu gestatten, und dieselbe Aussparung (40), wenn sie durch das genannte untere Element (113'') eingerückt wird, durch die Bewegung des genannten Nebenschlittens (53) in der entgegengesetzten Richtung geschlossen wird, so dass die genannte Förderanlage (41) die Packungen richtig hält, welche jeweils während des Rücklaufs des genannten Hauptschlittens (14) geformt werden.

2. Die Umwicklungsmaschine gemäß Anspruch 1, wobei der Hauptschlitten (14), welcher die genannte Querheißsiegel- und Schneideeinheit (13) trägt, seitlich mit Gleitbahnen (15) ausgerüstet ist, die jeweils über Paare geradliniger und horizontaler Führungen (115) gleiten, welche längs an den Seitenplatten des Abschnitts der Grundplatte (116) derselben Maschine befestigt sind und diese Seitenplatten ebenfalls, jeweils parallel zu den genannten Führungspaaren (115), gezahnte Riemen (17) halten, die in einer Schleife geschlossen sind und über entsprechende Endriemenscheiben (18) geführt werden, von denen ein Paar jeweils durch eine Querwelle (19) miteinander verbunden ist, welche wiederum mit einer Bewegungseinheit (20, 21) mit einem Elektromotor verbunden ist, der sich in zwei Richtungen dreht und des Typs mit elektronischer Geschwindigkeits- und

Phasensteuerung ist, wobei die beiden Seitenplatten des Hauptschlittens (14) mit Hilfe entsprechender Klemmen (22) jeweils mit einer Abzweigung der genannten zwei gezahnten Riemen (17) verbunden sind, um davon die notwendige geradlinige Wechselbewegung mit den nötigen Beschleunigungs- und Verzögerungsrampen zu beziehen.

3. Die Umwicklungsmaschine gemäß Anspruch 1, wobei die Halteelemente der beiden parallelen und gegenüberliegenden Elemente (113', 113''), welche die genannte Querheißiegel- und Schneideeinheit (13) bilden, jeweils auf entsprechende senkrechte Gleitbahnen (23) montiert sind, die innen in den Seitenplatten des Hauptschlittens (14) angeordnet sind und die die genannten Gleitbahnen (23) mit Führungselementen (24) halten, wobei jede Gleitbahn (23) mit einem entsprechenden vorstehenden Zwischenfortsatz (123) ausgerüstet ist, mit einer Leitspindel (125), die mit einer vertikalen Schraube (25) kooperiert, welche wiederum mit einem Dreizeh-Kegelradgetriebe (27) verbunden ist, dessen senkrechter Weg auf die genannte Schraube (25) wirkt, während einer der waagerechten Wege dieselbe Schraube (25) einer Gleitbahn (23) mit der der Gleitbahn (23) der gegenüberliegenden Seite verbindet, die durch ein Zweizeh-Kegelradgetriebe bedient wird, während der dritte waagerechte Weg des genannten Kegelradgetriebes (27) jeweils mit einer Bewegungseinheit (28) mit Elektromotor verbunden ist, welcher sich in zwei Richtungen dreht und vorzugsweise des Typs mit elektronischer und Phasensteuerung ist, um die automatische oder halbautomatische Höhenverstellung der Querheißiegel- und Schneideeinheit (13) immer dann zu gestatten, wenn die Höhe der herzustellenden Packungen sich ändert.
4. Die Umwicklungsmaschine gemäß Anspruch 3, wobei senkrechte Führungsstangen (31) an den inneren Seiten der genannten senkrechten Gleitbahnen (23) mit Haltern (29, 30), welche sie jeweils über das untere Ende und einen Zwischenbereich halten, befestigt sind, mit einem runden Abschnitt, über den durch dazwischen angeordnete Kugelumlauflager entsprechende Buchsen (32, 33) gleiten, deren untere (32) jeweils zwischen den genannten Halterungen (29, 30) gleitet und das Ende des unteren Querheißiegel- und Schneideelements (113'') hält, während die oberen Buchsen (33) über die oberen Halterungen (30) der entsprechenden Stangen (31) gleiten und die Enden des oberen Querheißiegel- und Schneideelements (113') halten, wobei die Buchsen (32, 33) von jeder der genannten Stangen (31) mit Hilfe entsprechender Klemmen (132, 133) jeweils an den gegenüberliegenden Abzweigungen gezahnter Riemen (34) befestigt sind, welche über eine Riemenscheibe (35) geleitet werden, die einstellbar

durch das obere Ende jeder Stange (31) gehalten wird sowie über eine gezahnte Riemenscheibe (36), die durch das untere Ende jeder genannten senkrechten Gleitbahn (23) gehalten wird und dieselben unteren Riemenscheiben (26) miteinander durch eine Synchronwelle (37) verbunden sind, welche wiederum mit einer Bewegungseinheit (38, 39) mit Elektromotor verbunden ist, der sich in zwei Richtungen dreht und vorzugsweise des Typs mit elektronischer Geschwindigkeits- und Phasensteuerung ist, welcher die Bewegungen auf die gegenüberliegenden Elemente (113', 113'') der Querheißiegelungs- und Schneideelemente (13) für die vollständige oder teilweise Schließung beziehungsweise die vollständige oder teilweise Öffnung überträgt, und zwar jeweils mit den entsprechenden notwendigen Beschleunigungs- und Verzögerungsrampen.

5. Die Umwicklungsmaschine gemäß Anspruch 1, wobei die Pressvorrichtungen (63, 63'), welche sich jeweils stromauf- und abwärts der Heißiegelvorrichtungen (65, 66) des oberen Elements (113') der Querheißiegel- und Schneideeinheit (13) befinden, durch entsprechende Gegenfedern (64, 64') nach unten gespannt werden, so dass, wenn sie sich in Ruhestellung befinden, die unteren Kanten mit abgerundetem Profil derselben Pressvorrichtungen jeweils durch die untere Betriebsfläche des oberen Elements (113') voneinander zweckmässig entfernt werden, während das untere Element (113') derselben Einheit (13), per Anordnung auf einer gemeinsamen horizontalen, idealen Fläche, Gegenelemente (163, 163') gegenüber den genannten oberen Pressvorrichtungen (63, 63') umfasst, welche, in ähnlicher Weise wie diese Gegenelemente (163, 163'), so hergestellt oder maschinell bearbeitet werden, dass sie einen hohen Reibungskoeffizienten im Kontakt mit der röhrenförmigen Umwicklung (102') der Folie aufweisen, die die Packungen formt und die von der genannten, die Röhren formenden Spindel (1) ausgeht, so dass die genannte Folienumwicklung, auch zusammen mit der Wirkung der genannten Gegenfedern (64, 64'), jeweils zwischen diesen beiden Pressvorrichtungen (63, 63') und den entsprechenden Gegenelementen (163, 163') festgeklemmt werden kann, wenn die genannten Elemente (113', 113'') gegeneinander geschoben werden, um die zwei Querheißiegel und den Zwischenschnitt durchzuführen, für die sie verantwortlich sind, und wenn diese Elemente (113', 113'') sich nah aneinander befinden, aber bei durch die entsprechenden Gegenelemente (165, 166, 167) angehobenen Querheißiegel- und Zwischenschnittelementen (65, 66, 67), um die heißversiegelten und geschnittenen Umwicklungsabschnitte freizugeben und abzukühlen.
6. Die Umwicklungsmaschine gemäß Anspruch 2, wo-

- bei der genannte Nebenschlitten (53), welcher die Zickzackrollenführungen (51, 52) der oberen Abzweigung der Förderanlage (41) hält, seitlich jeweils mit entsprechenden Horizontal- und Längsführungen (153) ausgerüstet ist, die über Gleitbahnen (54) gleiten, die oben an einem entsprechenden Querstreber (55) befestigt sind, welcher wiederum mit seinen Enden jeweils an den Seitenplatten des Hauptschlittens (14) befestigt ist, wobei dieser Querstreber (55) drehbar und freitragend ein Paar sich parallel zueinander und zu den genannten Führungen (54) verhaltender Schrauben (56) hält und diese Schrauben (56) jeweils mit entsprechenden Leitspindeln (156) kooperieren, welche aus einem Stück mit entsprechenden Fortsätzen (253) des Nebenschlittens (53) sind, und diese Schrauben (56) jeweils durch eine Bewegungseinheit (57, 58) betätigt werden, die an den genannten Querstreber (55) geflanscht ist und durch einen Elektromotor angetrieben werden, der sich in zwei Richtungen dreht und wahlweise ebenfalls des Typs mit elektronischer Phasensteuerung ist.
7. Ein Verfahren zur Umwicklung von einzelnen oder gruppierten und/oder gestapelten Produkten (P) in Packungen aus thermoplastischem Material aus einer von einer Spule abgewickelten Folie, mit einer Maschine gemäß den vorausgegangenen Ansprüchen von 1 bis 6, mit einer Querheißsiegel- und Schneideeinheit (13), welche jeweils mit entsprechenden Press- und Gegenpressvorrichtungen (63, 163, 63', 163') stromauf- und -abwärts der Querheißsiegel- und Schneideeinheiten (65, 165, 67, 167, 66, 166) ausgerüstet ist, um die röhrenförmige Folienpackung während des Schritts der Durchführung der Querheißsiegel festklemmen zu können, und wobei diese selbe Querheißsiegel- und Schneideeinheit (13) in die die Packung formende Richtung bewegt werden kann, und zwar zunächst geschlossen und sich von der Röhren formenden Spindel (1) entfernend, und dann offen und in der entgegengesetzten Richtung, um zu der Zyklusstartstellung zur Wiederholung eines darauffolgenden Arbeitsgangs zurückzukehren, so dass die Vorwärtsbewegung der röhrenförmigen Umwicklung (102') entlang der die Röhren formenden Spindel (1) stattfinden kann, gezogen durch dieselbe Querheißsiegel- und Schneideeinheit (13) mit Pressvorrichtungen, **dadurch gekennzeichnet, dass** es mit dieser Einheit (13) möglich ist, den Form- und Füllschritt jeder aufeinander folgenden Röhrenpackung (C1, C1', C1'' usw.) durchzuführen, während die Querheißsiegel- und Schneideeinheit (13) geschlossen ist und sich von der Spindel (1) wegbewegt, sowie ebenfalls **dadurch gekennzeichnet, dass** die Rücklaufbewegung zur Zyklusstartposition der Querheißsiegel- und Schneideeinheit (13) nach ihrer Öffnung die Rücklaufbewegung mit der gleichen Geschwindigkeit der Pressvorrichtung zur Absackung des Produkts überlagert, und eine Packung (C1'') nach diesem Rücklaufschrift, gefüllt und bereit zur Schließung des hinteren Endes, bereits stromabwärts von der Querheißsiegel- und Schneideeinheit (13) angeordnet wird.
8. Ein Verfahren gemäß Anspruch 7, **dadurch gekennzeichnet, dass** während die neue röhrenförmige Packung (C1') sich vorwärts bewegt und durch die Querheißsiegel- und Schneideeinheit (13) mit Pressvorrichtungen (63, 163, 63', 163') gezogen wird, welche das vordere Ende dieser neuen Packung heißversiegelt, das hintere Ende der Packung (C1) des vorausgegangenen Arbeitsgangs verschließt und diese letztere zur Entladung begleitet, die neue Packung (C1') schnell durch die dafür vorgesehenen Drücker (6) gefüllt werden kann, während die Pressvorrichtung (63, 163') stromabwärts von dieser Querheißsiegel- und Schneideeinheit (13) das Querheißsiegel des vorderen Endes (ST1) mechanisch isoliert, das an der neuen Packung vorgenommen wurde, so dass dieses Querheißsiegel (ST1) nicht durch den Einsatz des Produkts (P) in die neue röhrenförmige Packung (C1') und durch die Schubkraft der in derselben neuen Packung (C1') eingeschlossenen Luft belastet und vor dem Produkt (P) positioniert wird, und zwar auch, weil es dem Drücker in diesem Schritt ermöglicht wird, das Produkt (P) mit einer solchen Geschwindigkeit in die neue Packung einzusetzen, welche eine langsame und progressive rückwärtige Entladung der Luft gestattet, die stromaufwärts desselben Produktes (P) jeweils zusammen- und gegen das vordere Ende der neuen Packung (C1') gedrückt wird.
9. Das Verfahren gemäß den vorausgegangenen Ansprüchen, wobei während der aktiven Bewegung weg von der die Röhre formenden Spindel (1) der Querheißsiegel- und Schneideeinheit (13) alle Zeit gelassen wird, die sie benötigt, um ihren Hauptsiegel- und Schneidearbeitsgang durchzuführen, und im letzten Teil derselben aktiven Bewegung die Heißsiegel- und Schneideelemente leicht zu öffnen, um die Querheißsiegel (ST1, ST2) freizugeben und den Betrieb der Elemente für die natürliche oder Zwangskühlung dieser Heißsiegel zu gestatten, während die Umwicklung der Packungen stromauf- und -abwärts jederzeit durch die Pressvorrichtungen (63, 163, 63', 163') beibehalten wird, die auch die geringste Anspannung an den genannten Querheißsiegeln (ST1, ST2) verhindern.
10. Das Verfahren gemäß den vorausgegangenen Ansprüchen, **dadurch gekennzeichnet, dass** die Querheißsiegel- und Schneideeinheit (13) in dem anfänglichen Schritt des Betriebszyklus an der eckversteiften röhrenförmigen Umwicklung (102') nur

teilweise geschlossen und in diesem teilweise geschlossenen Zustand langsam von der die Röhre formenden Spindel (1) wegbewegt werden kann, so dass die Packung jeweils stromabwärts (C1') bewegt und längs komprimiert wird, wonach diese selbe Einheit (13) ganz geschlossen wird und ihre Bewegungsgeschwindigkeit entsprechend erhöht, um die doppelten Querheißsiegelungs- und Zwischenschnittschritte durchführen zu können, für die sie verantwortlich ist.

Revendications

1. Machine d'emballage pour emballer des produits individuels ou groupés et/ou empilés, dans des paquets de matériau thermoplastique, ladite machine comprenant :

- un dispositif de thermosoudage (3),
- un ensemble de coupe et de thermosoudage transversal (13) pour effectuer un double thermosoudage transversal et une coupe intermédiaire sur les paquets de matériau thermoplastique,
- des plieurs (59, 59') disposés sur l'ensemble de coupe et de thermosoudage transversal (13),
- un mandrin horizontal creux (1) à l'extrémité de chargement (101) duquel est alimenté un film continu de matériau thermoplastique (102), déroulé à partir d'un rouleau (2), qui en procédant vers l'extrémité de déchargement (201) de ce mandrin, est formé en un tube avec chevauchement et thermosoudage mutuel de ses bords longitudinaux par le dispositif de thermosoudage (3) et qui sort du même mandrin (1) sous la forme d'un emballage tubulaire (102'), qui est fermé transversalement par l'ensemble de coupe et de thermosoudage transversal (13) positionné en aval du même mandrin (1) et qui, sur la portion de l'emballage tubulaire précédemment pliée en soufflet par les plieurs (59, 59'), effectue deux thermosoudages transversaux (ST1, ST2) et une coupe intermédiaire (B1, B2), rempli et formé dans le cycle précédent, pour fermer l'extrémité avant du paquet suivant (C1'') et pour séparer le paquet complété (C1') de celui qui est en train d'être formé (C1''), la machine comprend en amont dudit mandrin (1) et alignée longitudinalement avec celui-ci,
- une station de chargement (4) des produits (P) à emballer, groupés et/ou empilés et comprimés dans la direction transversale et la machine comprend en outre en amont de ladite station (4) et aligné longitudinalement avec celui-ci
- un dispositif de poussée (6) qui, sur commande, transfère le produit ou les produits (P) de la station de chargement (4) dans le paquet tubu-

laire produit par ledit mandrin (1), passant à travers ce dernier sur toute sa longueur et au-delà,

caractérisé en ce que ledit ensemble de coupe et de thermosoudage transversal (13) comprend des éléments parallèles et opposés (113', 113'') pour effectuer le double thermosoudage transversal au moyen de dispositifs de thermosoudage (65, 66) et la coupe intermédiaire avec des moyens de coupe (67), lesdits éléments (113, 113') étant équipés en amont desdits dispositifs de thermosoudage (65, 66) avec des presses respectives (63, 63') et des presses antagonistes (163, 163') pour pincer fermement dans la direction transversale la portion d'emballage pliée en soufflet (102') sur lequel l'ensemble de coupe et de thermosoudage transversal (13), sur commande, est fermé, la machine comprend en outre un chariot principal (14), l'ensemble de coupe et de thermosoudage transversal (13) étant monté sur le chariot principal (14) avec un mouvement horizontal actionné par des moyens de déplacement pour être susceptible en phase correcte d'être écarté du mandrin formant le tube (1) pour suivre le paquet complété pendant le thermosoudage de l'extrémité arrière et pour extraire du mandrin (1) une nouvelle portion d'emballage tubulaire (102') dans lequel en phase correcte ledit dispositif de poussée (6) insert un produit (P) pour former ledit paquet ultérieur (C1''), des moyens de manière étant fourni à ce que ledit chariot principal (14) soit rapidement ramené à la position initiale déplacé vers le mandrin (1), pour être arrangé en aval du nouvel paquet (C1'') déjà rempli et à fermer à l'extrémité arrière, la machine comprenant en outre un convoyeur motorisé (41) pour supporter les paquets étant formés en aval dudit mandrin (1) et une branche supérieure de ce convoyeur (41) étant guidée sur des rouleaux parallèles (47, 48, 49, 50) supportés en rotation par ledit chariot principal (14) et étant guidée en un trajet en zigzag sur des rouleaux ultérieurs (51, 52) supportés par un chariot secondaire (53) monté sur le chariot principal (14) et coulissant horizontalement sur commande sur le chariot principal (14), tout cela pour former sur l'ensemble de coupe intermédiaire et de thermosoudage transversal (13) un espace (40) à l'intérieur duquel l'élément inférieur (113'') dudit ensemble (13) est normalement logé et cet espace (40) étant ouvert par le mouvement dans une direction dudit chariot secondaire (53), pour permettre la liberté d'action de cet élément inférieur (113'') et le même espace (40), quand engagé par ledit élément inférieur (113''), étant fermé par le mouvement dudit chariot secondaire (53) dans la direction opposée, de manière à ce que ledit convoyeur (41) supporte correctement les paquets étant formés pendant le mouvement de retour dudit chariot principal (14).

2. Machine d'emballage selon la revendication 1, où le

chariot principal (14) qui transporte ledit ensemble de coupe et de thermosoudage transversal (13), est équipé latéralement avec des coulisseaux (15) qui coulisent sur des paires de glissières horizontales et rectilignes (115) fixées longitudinalement aux panneaux latéraux de la portion de la plaque de base (116) de la même machine et ces panneaux latéraux supportent également, parallèles auxdites paires de glissières (115), des courroies dentées (17) fermées dans une boucle et guidées sur des poulies terminales respectives (18), une paire desquelles est interconnectée par un arbre transversal (19) lui-même relié à un ensemble de mouvement (20, 21) avec un moteur électrique qui tourne dans deux directions et du type avec un contrôle de vitesse et de phase électronique, les deux panneaux latéraux du chariot principal (14) étant reliés à une branche des deux dites courroies dentées (17) au moyen de pinces (22), pour recevoir de ces dernières le mouvement de va-et-vient rectiligne nécessaire avec les rampes d'accélération et de décélération nécessaires.

3. Machine d'emballage selon la revendication 1, où les moyens de support des deux éléments parallèles et opposés (113', 113'') qui forment ledit ensemble de coupe et de thermosoudage transversal (13), sont montés sur des coulisseaux verticaux respectifs (23) positionnés dans les panneaux latéraux du chariot principal (14) qui supportent lesdits coulisseaux (23) avec des moyens de guidage (24), chaque coulisseau (23) étant équipé avec une appendice en saillie intermédiaire (123), avec une vis-mère (125) qui coopère avec une vis verticale (25), elle-même reliée à une boîte d'engrenages coniques à trois voies (27), la voie verticale de cette dernière agit sur ladite vis (25), tandis que une des voies horizontales relie la même vis (25) d'un coulisseau (23) à celle du coulisseau (23) du côté opposé, qui sera servie par une boîte d'engrenages coniques à deux voies, tandis que la troisième voie horizontale de ladite boîte d'engrenages (27) est reliée à un ensemble de mouvement (28) avec un moteur électrique qui tourne dans deux directions et de préférence du type avec un contrôle de vitesse et de phase électronique, pour permettre le réglage automatique ou semi-automatique de la position en hauteur de l'ensemble de coupe et de thermosoudage transversal (13) quand la hauteur des paquets à fabriquer varie.

4. Machine d'emballage selon la revendication 3, où fixés aux côtés internes desdits coulisseaux verticaux (23) avec des supports (29, 30) qui les supportent respectivement par l'extrémité inférieure et par une aire intermédiaire, sont des tiges de guidage verticales (31), avec une section circulaire, coulisant sur lesquelles, avec l'interposition de roulements à billes de recirculation, sont des manchons (32, 33), desquelles le manchon inférieur (32) cou-

lisce entre lesdits supports (29, 30) et supporte l'extrémité de l'élément de coupe et de thermosoudage transversal inférieur (113''), tandis que les manchons supérieurs (33) coulisent au-dessus des supports supérieurs (30) des tiges respectives (31) et supportent les extrémités de l'élément de coupe et de thermosoudage transversal supérieur (113'), les manchons (32, 33) de chaque dite tige (31) étant fixés au moyens de pinces respectives (132, 133) aux branches opposées des courroies dentées (34) guidées sur une poulie (35) supportée de manière réglable par l'extrémité supérieure de chaque dite tige (31) et sur une poulie dentée (36) supportée par l'extrémité inférieure de chaque dits coulisseaux verticaux (23) et les mêmes poulies inférieures (26) sont reliées les unes aux autres par un arbre de synchronisation (37), lui-même relié à un ensemble de mouvement (38, 39) avec un moteur électrique qui tourne dans deux directions et de préférence du type avec un contrôle de vitesse et de phase électronique, qui transmet aux éléments opposés (113', 113'') de l'ensemble de coupe et de thermosoudage transversal (13) les mouvements pour une fermeture totale ou partielle ou une ouverture totale ou partielle, avec les rampes d'accélération et de décélération nécessaires.

5. Machine d'emballage selon la revendication 1, où les presses (63, 63') positionnées en amont et en aval des dispositifs de thermosoudage (65, 66) de l'élément supérieur (113') de l'ensemble de coupe et de thermosoudage transversal (13), sont sollicités en extension vers le bas par des ressorts antagonistes respectifs (64, 64') de manière à ce que quand ils sont au repos, les bords inférieurs avec un profil circulaire des mêmes presses sont suffisamment espacés les uns des autres par la surface de fonctionnement inférieure du même élément supérieur (113'), tandis que l'élément inférieur (113'') du même ensemble (13) comprend avec un agencement sur un plan idéal horizontal commun, des moyens antagonistes (163, 163') opposés aux presses supérieures (63, 63') qui, de la même manière de ces moyens antagonistes (163, 163') sont fabriqués ou usinés de manière à ce qu'ils ont un fort coefficient de friction au contact de l'emballage tubulaire (102') du film qui forme les paquets et qui sort dudit mandrin formant le tube (1), tout cela pour que, également en combinaison avec l'action desdits ressorts antagonistes (64, 64'), ledit emballage de film (102') est susceptible d'être pincé fermement entre ces presses (63, 63') et les moyens antagonistes respectifs (163, 163') soit quand lesdits éléments (113, 113') sont poussés les uns contre les autres pour effectuer les deux thermosoudages transversaux et la coupe intermédiaire pour quoi ils sont responsables, soit quand ces éléments (113', 113'') sont proches les uns des autres mais avec les moyens de coupe in-

termédiaire et le thermosoudage transversal (65, 66, 67) soulevés par les moyens antagonistes respectifs (165, 166, 167), pour libérer et refroidir les portions thermosoudées et coupées d'emballage.

6. Machine d'emballage selon la revendication 2, où ledit chariot secondaire (53) qui supporte les rouleaux de guidage en zigzag (51, 52) de la branche supérieure du convoyeur (41), est équipé latéralement avec des glissières horizontales et longitudinales (153) couissant sur des coulisseaux (54) fixés sur la partie haute d'un élément transversal (55), lui-même fixé avec ses extrémités aux panneaux latéraux du chariot principal (14), cet élément transversal (55) supportant de manière rotative et dans un porte à faux, une paire de vis (56) parallèles les unes aux autres et aux dites glissières (54) et ces vis (56) coopèrent avec des vis-mère respectives (156), solidaires des appendices (253) du chariot secondaire (53) et ses vis (56) étant actionnées par un ensemble de mouvement (57, 58) bridé audit élément transversal (55) et actionné par un moteur électrique qui tourne dans deux directions et facultativement également du type avec un contrôle de phase électronique.
7. Procédé pour emballer des produits individuels ou groupés et/ou empilés (P), dans des paquets de matériau thermoplastique obtenu à partir d'un film déroulé à partir d'un rouleau, avec une machine selon les précédentes revendications de 1 à 6, avec un ensemble de coupe et de thermosoudage transversal (13) équipé avec des presses et des presses antagonistes (63, 163, 63', 163') en amont et en aval des moyens de coupe et de thermosoudage transversal (65, 165, 67, 167, 66, 166), pour être capable de pincer fermement le paquet tubulaire de film pendant l'étape de réalisation des thermosoudages transversaux et dans lequel le même ensemble de coupe et de thermosoudage transversal (13) est déplaçable dans la direction de formation de paquet, premièrement fermé et écarté du mandrin formant le tube (1) et puis ouvert et dans la direction opposée, pour revenir à la position de départ du cycle pour répétition d'un cycle de fonctionnement ultérieur, tout cela pour que l'avancement de l'emballage tubulaire (102') le long du mandrin formant le tube (1) puisse avoir lieu poussé par le même ensemble de coupe et de thermosoudage transversal (13) avec des presses, **caractérisé en ce qu'**avec cet ensemble (13) il est possible d'effectuer pendant les étapes de formation et remplissage de chaque paquet tubulaire ultérieur (C1, C1', C1" etc.), tandis que l'ensemble de coupe et de thermosoudage transversal (13) est fermé et s'écarte du mandrin (1) et également **caractérisé en ce que** le mouvement de retour à la position de départ de cycle de l'ensemble de coupe et de thermosoudage transversal (13), après

son ouverture, chevauche le mouvement de retour à la même vitesse du dispositif de poussée (6) pour ensacher le produit et, après cette étape de retour, un paquet (C1") rempli et prêt pour la fermeture de l'extrémité arrière est déjà positionné en aval de l'ensemble de coupe et de thermosoudage transversal (13).

8. Procédé selon la revendication 7, **caractérisé en ce que** pendant que le nouveau paquet tubulaire (C1') avance et est poussé par l'ensemble de coupe et de thermosoudage transversal (13) avec des presses (63, 163, 63', 163'), qui thermosoude l'extrémité avant de ce nouveau paquet, ferme l'extrémité arrière du paquet (C1) du cycle précédent et accompagne ce dernier pour être déchargé, le même nouveau paquet (C1') peut être rempli rapidement par le dispositif de poussée indiqué (6), comme la presse (63, 163) en aval de cet ensemble de coupe et de thermosoudage transversal (13), isole mécaniquement le thermosoudage transversal de l'extrémité avant (ST1) effectué sur le nouveau paquet, de manière à ce que ce thermosoudage transversal (ST1) n'est pas sollicité par l'insertion du produit (P) dans le nouveau paquet tubulaire (C1') et par la poussée de l'air emprisonné dans le même nouveau paquet (C1') et positionné face au produit (P), de même dans cette étape étant possible pour le dispositif de poussée d'insérer le produit (P) dans le nouveau paquet avec une vitesse relative qui permet un déchargement vers l'arrière lent et progressif de l'air qui est comprimé en amont du même produit (P) et contre l'extrémité avant du nouveau paquet (C1').
9. Procédé selon les revendications précédentes, où pendant l'écartement actif du mandrin formant le tube (1), l'ensemble de coupe et de thermosoudage transversal (13) dispose de tout le temps nécessaire pour effectuer ses opérations principales de coupe et de thermosoudage et, dans la dernière partie du même mouvement actif, pour ouvrir légèrement les thermosoudeuses et les moyens de coupe pour libérer les thermosoudages transversaux (ST1, ST2) et permettre l'action des moyens pour le refroidissement naturel ou forcé de ces thermosoudages, tandis que l'emballage des paquets en amont et en aval est maintenu à tout moment par les presses (63, 163, 63', 163'), ce qui évite même un minimum de sollicitation sur lesdits thermosoudages transversaux (ST1, ST2).
10. Procédé selon les revendications précédentes, **caractérisé en ce que** pendant l'étape initiale de son cycle de fonctionnement, l'ensemble de coupe et de thermosoudage transversal (13) peut être fermé seulement en partie sur l'emballage tubulaire plié en soufflet (102') et dans cette condition partiellement fermée il peut être écarté lentement du mandrin for-

mant le tube (1) de manière à se déplacer vers le paquet en aval (C1') et le comprime longitudinalement, après quoi le même ensemble (13) est complètement fermé et augmente sa vitesse de mouvement pour effectuer les étapes de coupe intermédiaire et de double thermosoudage transversal dont il est responsable.

10

15

20

25

30

35

40

45

50

55

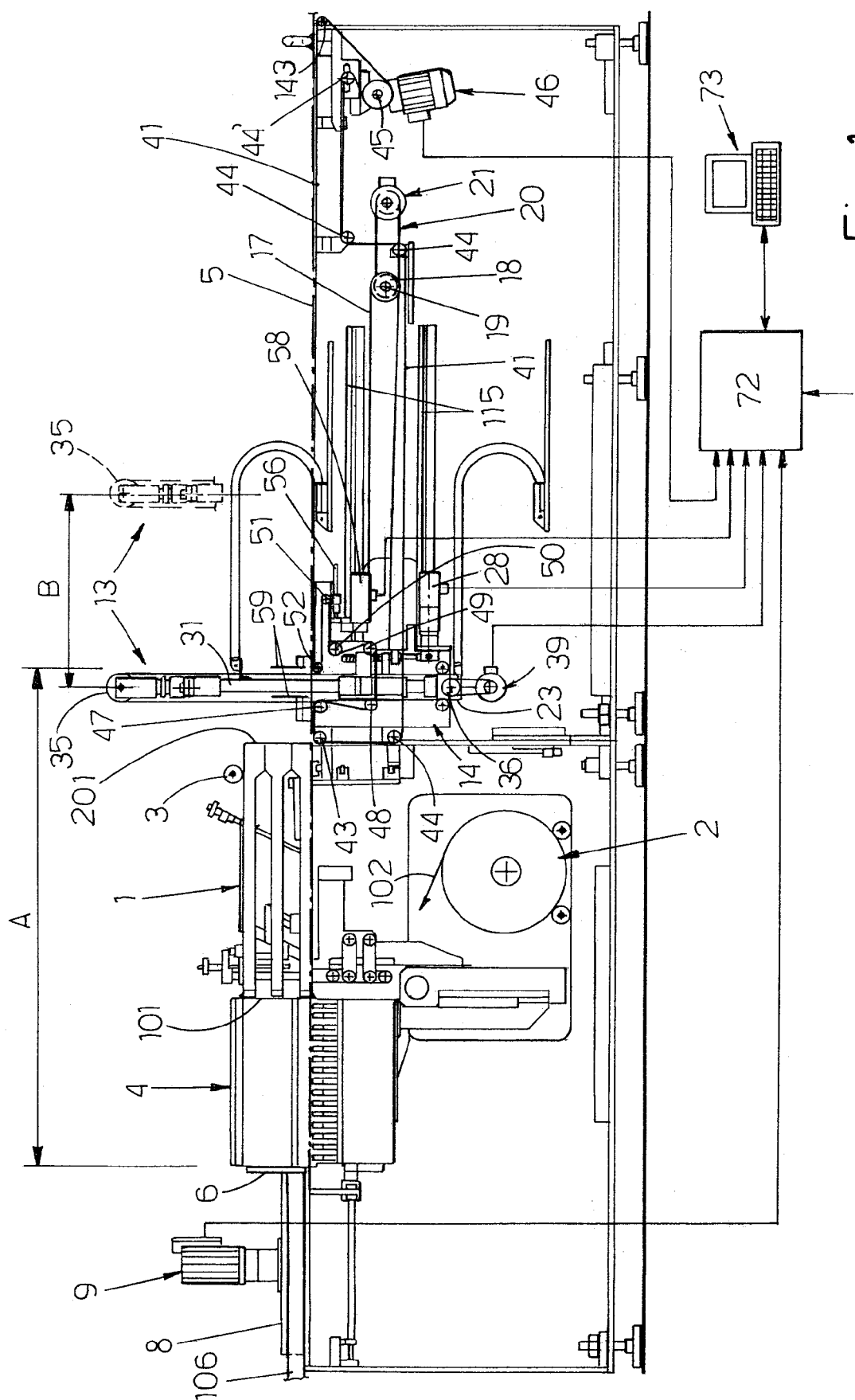
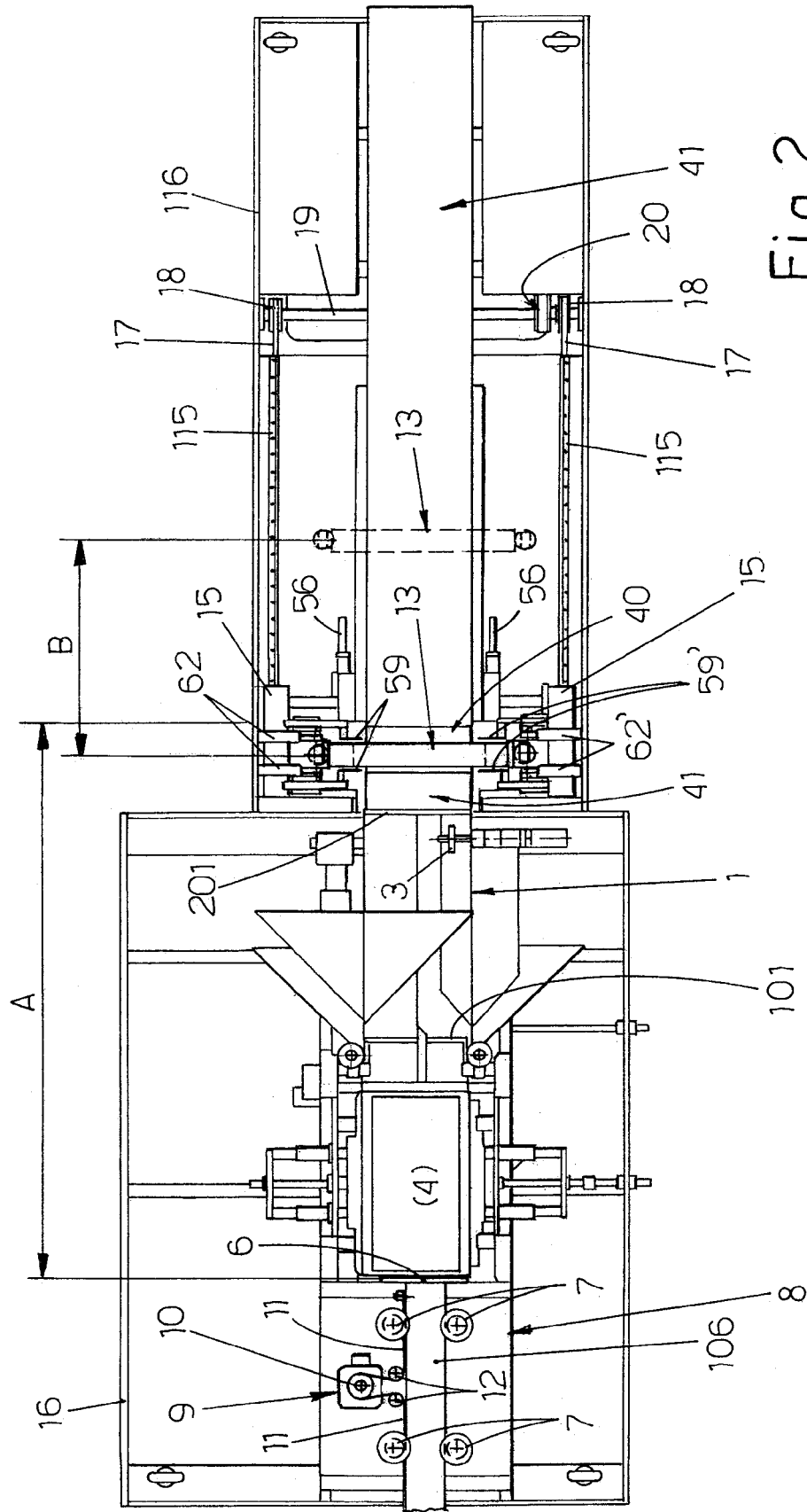
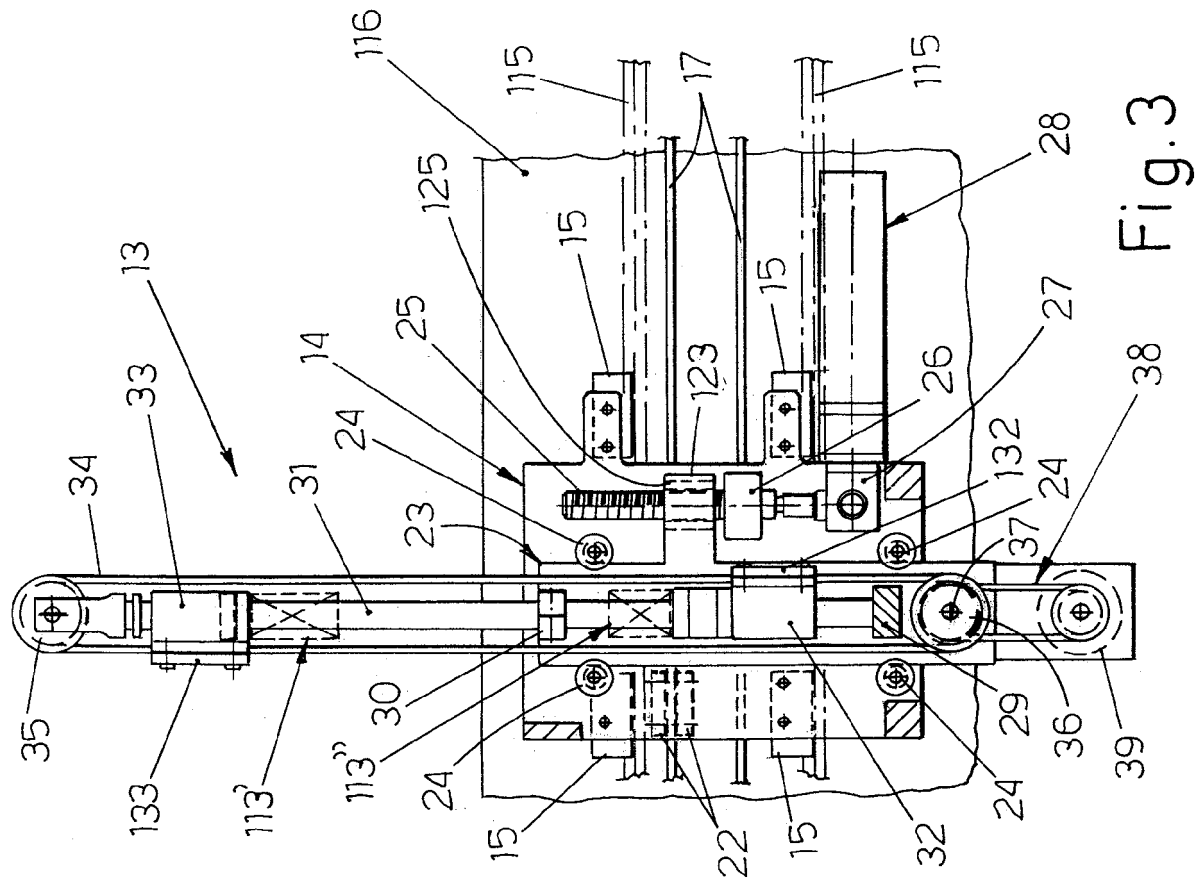
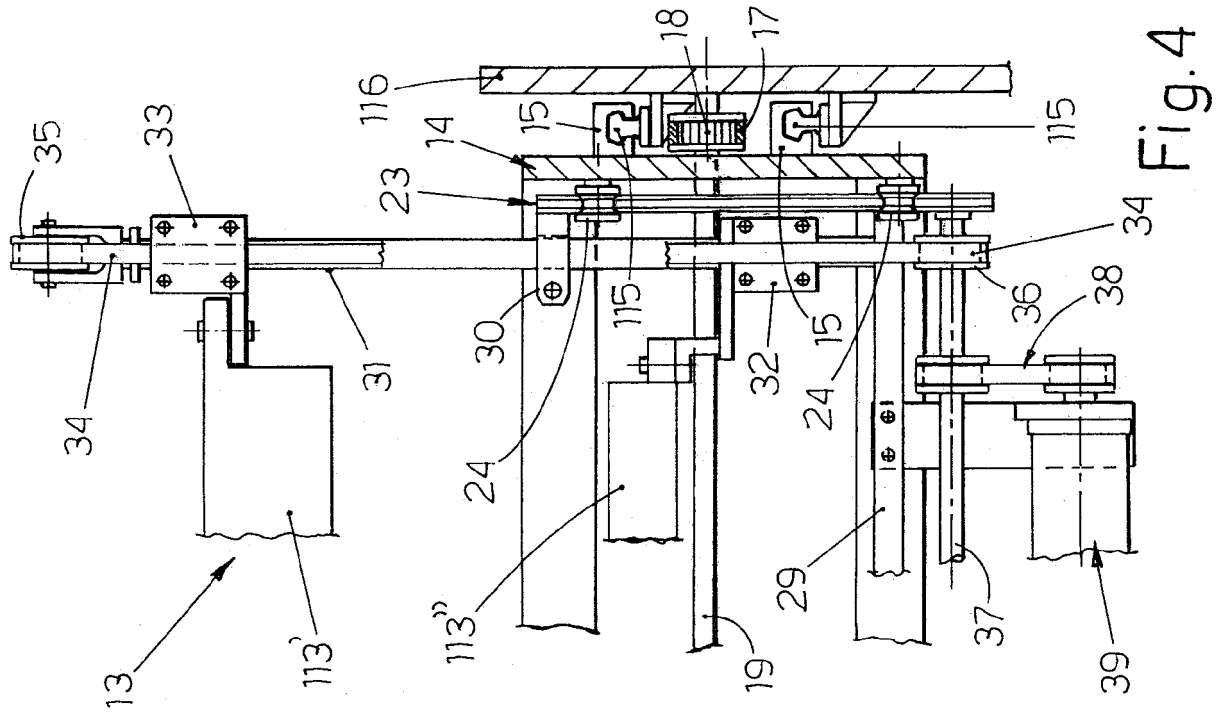


Fig.1





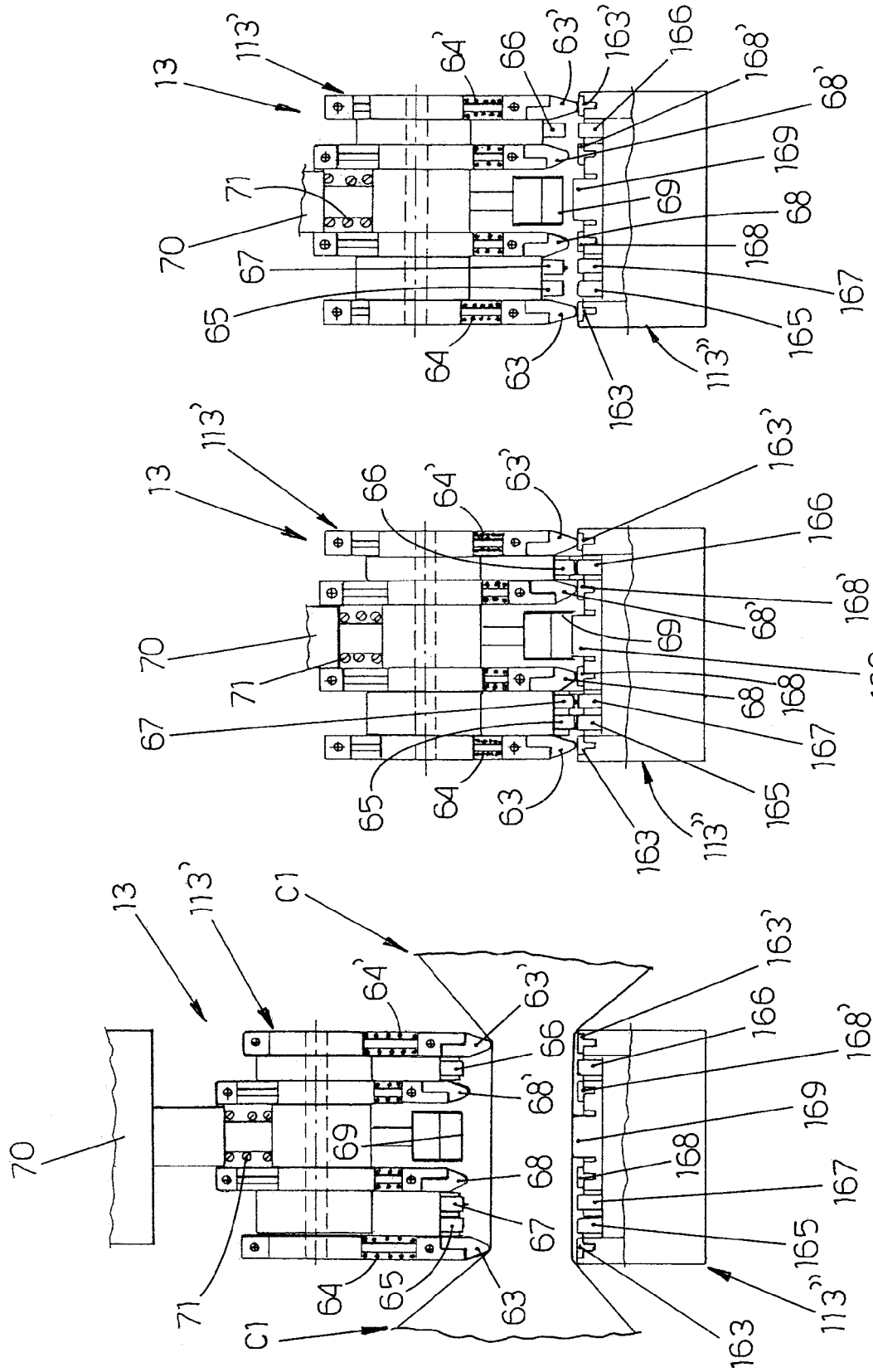
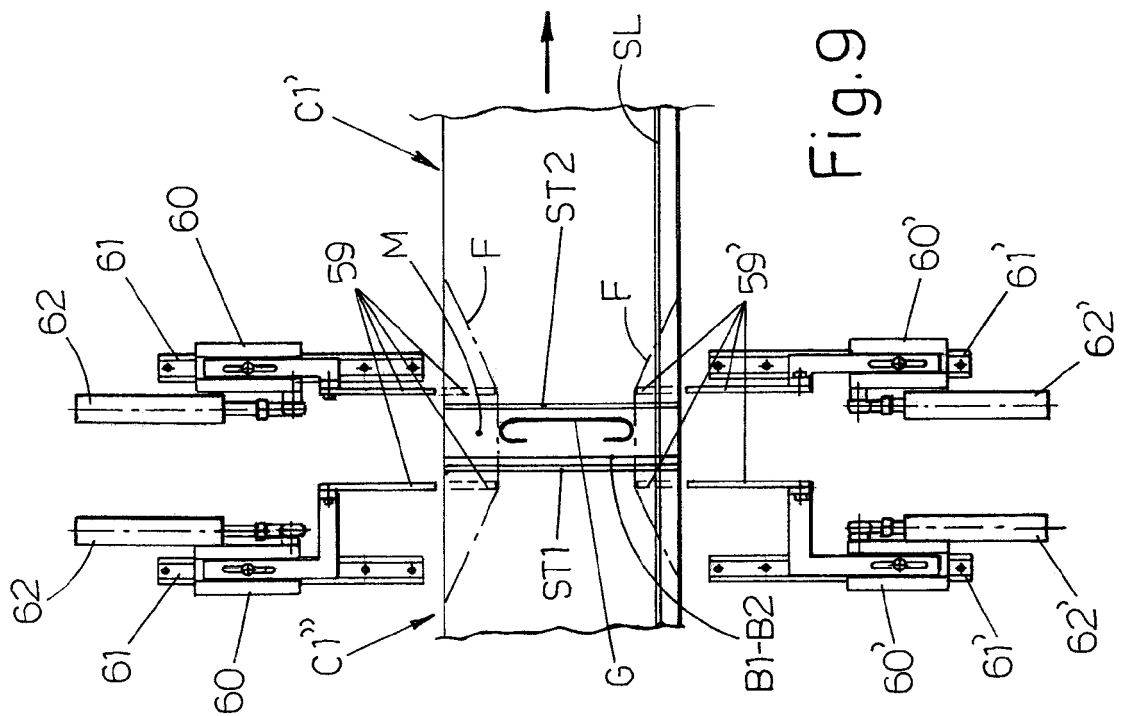
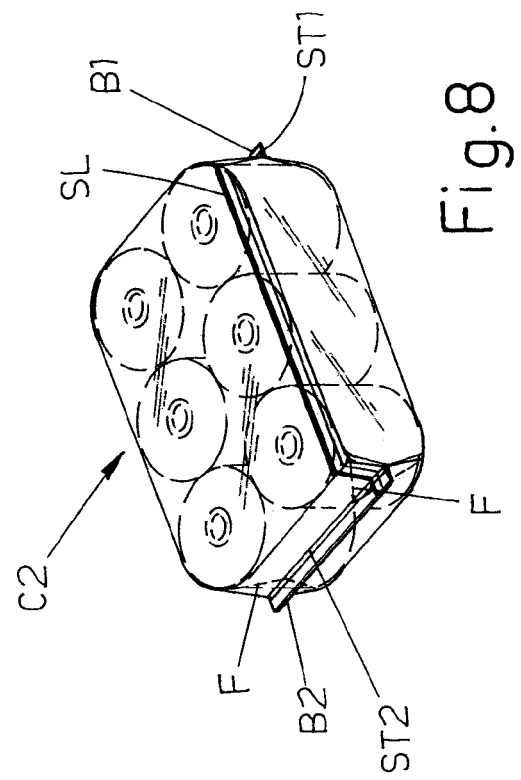
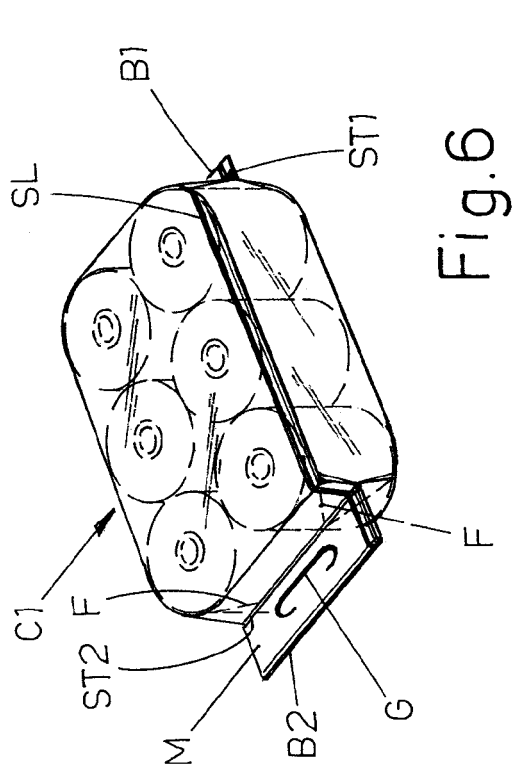
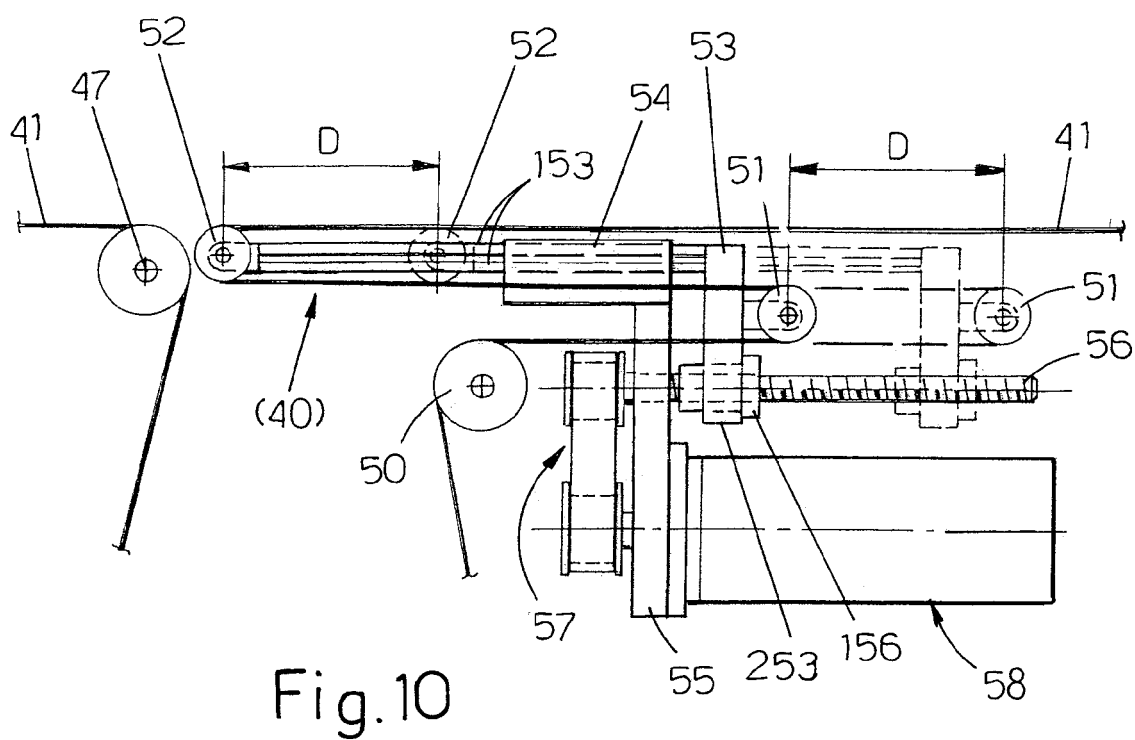
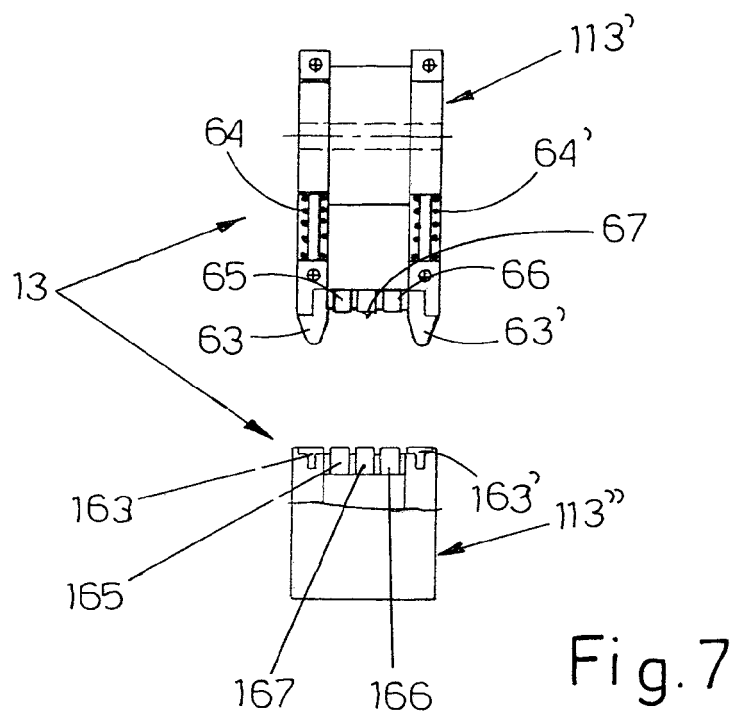


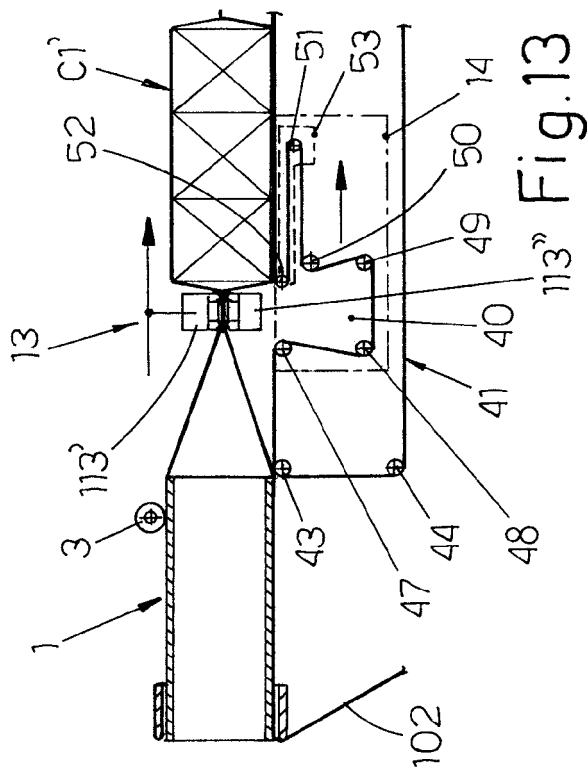
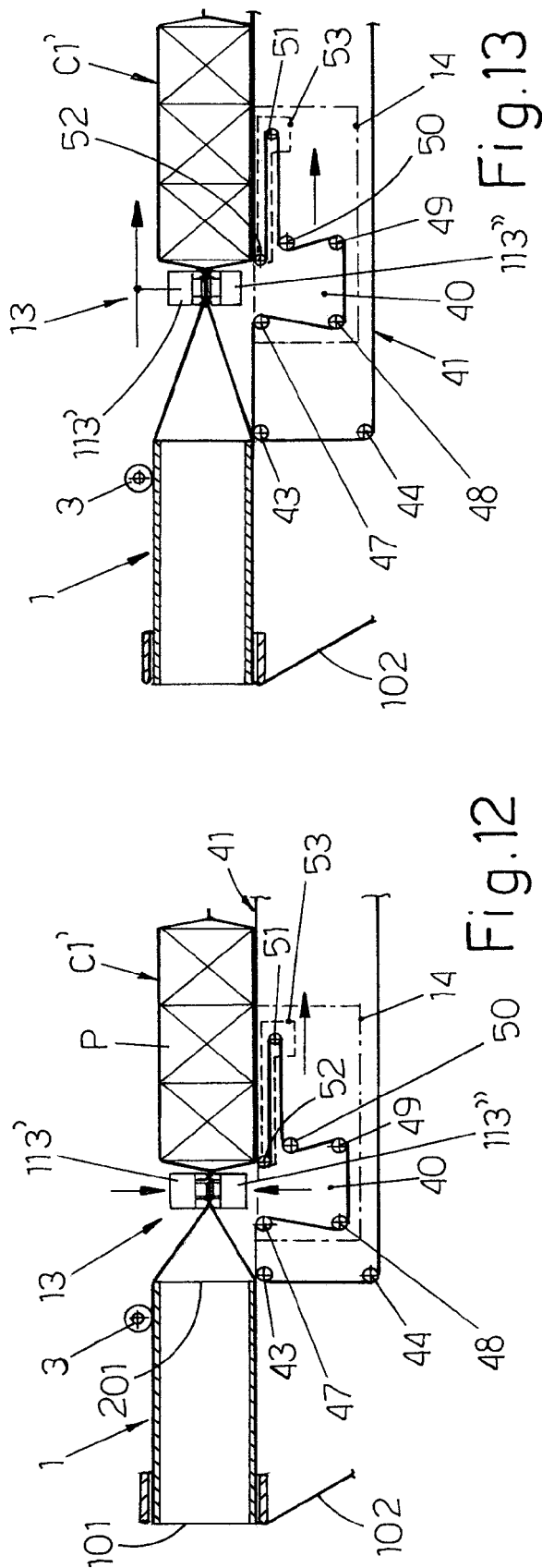
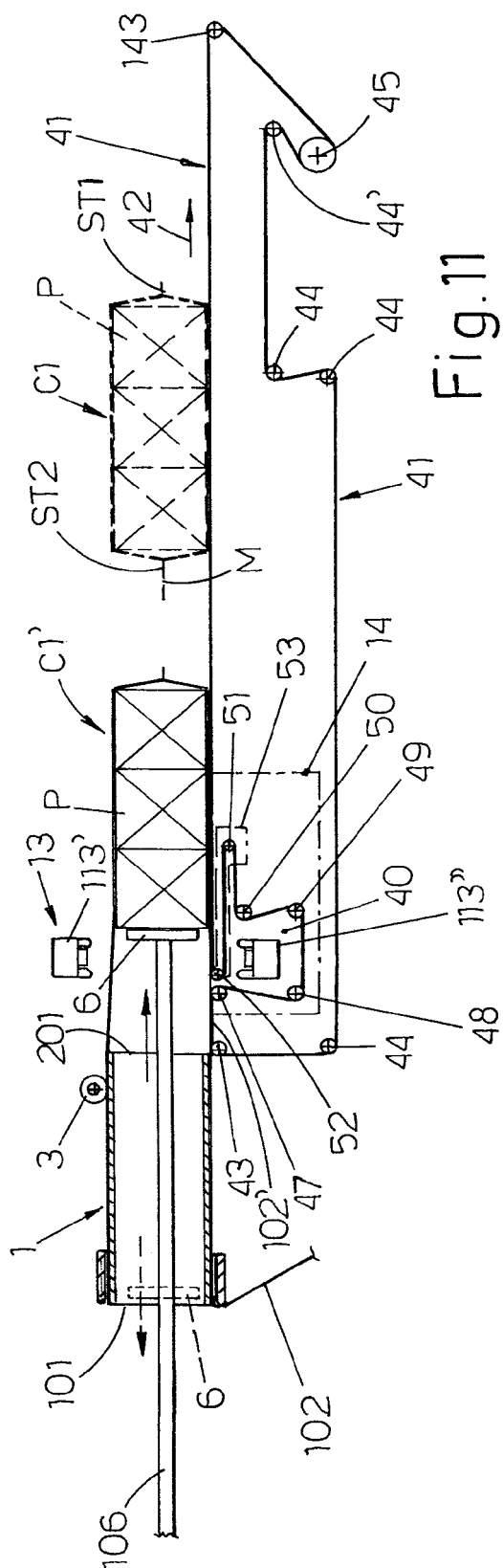
Fig. 5b

Fig. 5a

Fig. 5







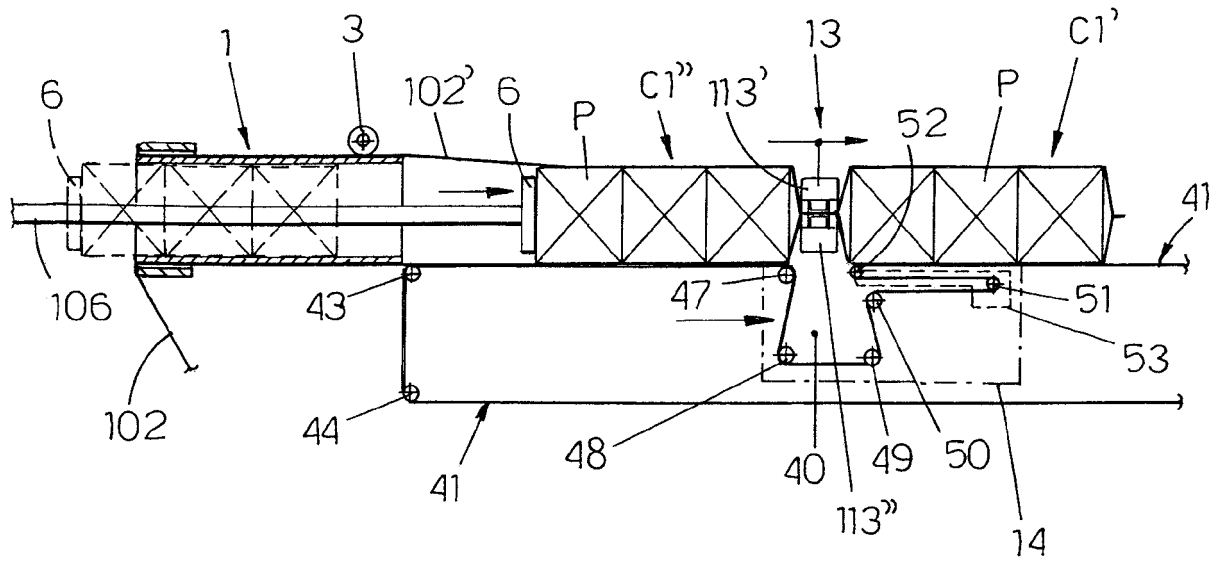


Fig.14

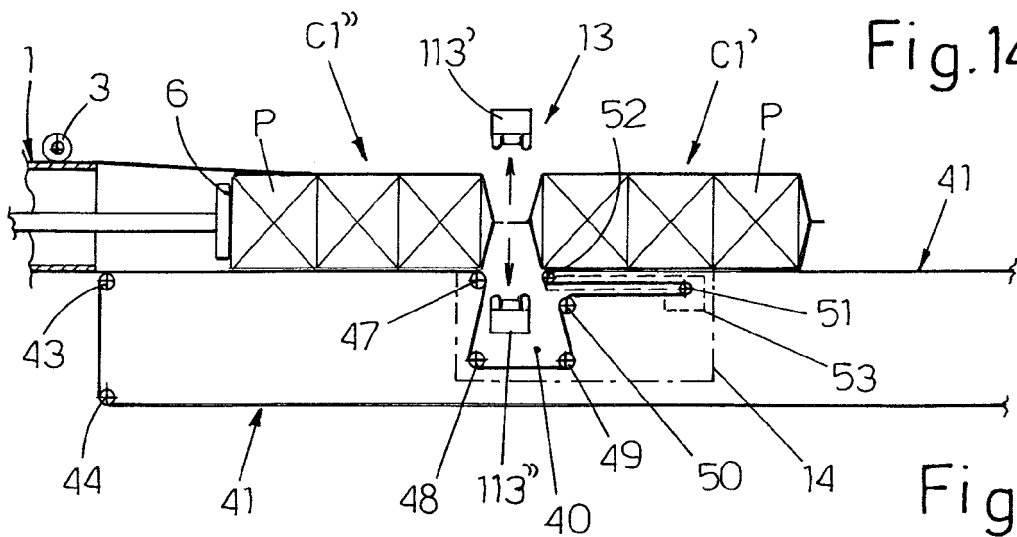


Fig.15

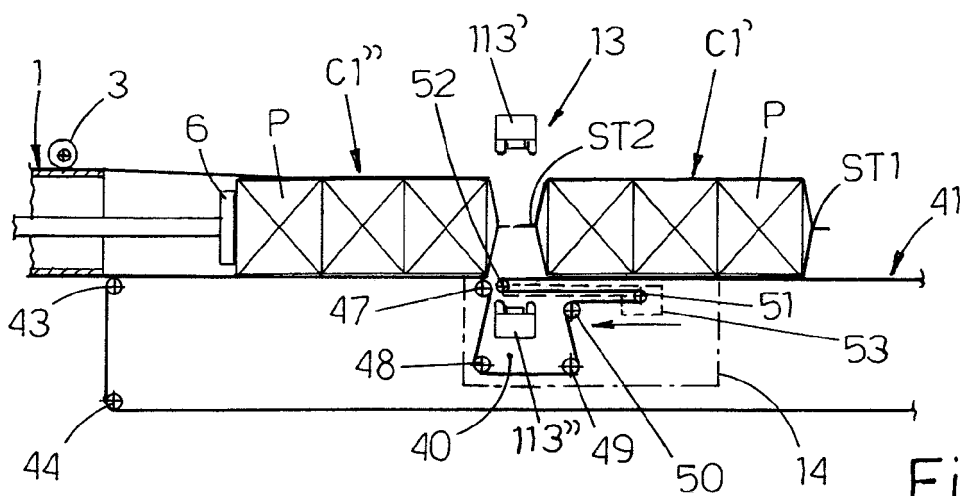


Fig.16

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4679379 A [0003]