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(71) Applicant: **Effe 3 TI Srl**
13045 Gattinara (Vercelli) (IT)

(72) Inventor: **Franchino, Stefano**
13045 Gattinara (Vercelli) (IT)

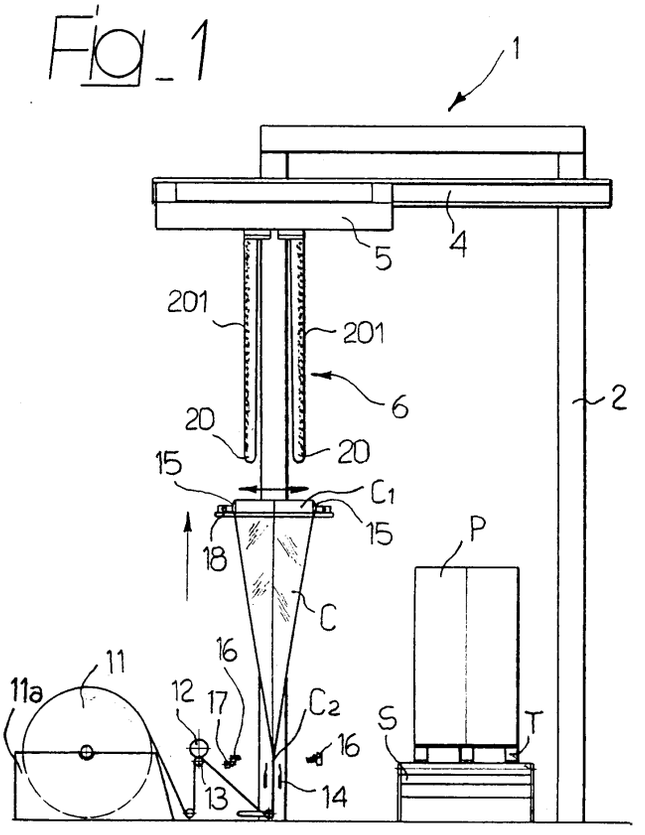
(74) Representative: **Bosotti, Luciano et al**
Buzzi, Notaro & Antonielli d'Oulx
Corso Fiume 6
10133 Torino (IT)

(54) Method and machine for applying a hood to a product

(57) Products (P) such as stacks of pallettized articles are packaged using hoods (C) of a film material, preferably of the shrinkable type. Hoods (C) formed in a forming station (3) provided in the lower portion of the machine are picked-up by means of a pick-up structure (6) which expand them by arranging the respective bottom portion (C2) abutting against the product (P) to be packaged. The hood so expanded is subsequently advanced over the product (P) thereby causing, due to the bottom portion (C2) abutting against the product (P) itself, the hood to become gradually turned inside-out hood and applied onto the product (P) itself.

The machine is adapted for use also in applying hoods having an open tubular structure.

Fig_1



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Description

[0001] The present invention relates to packaging techniques and concerns, in a first aspect, a method for packaging products, such as products arranged on a pallet, by means of a film material, preferably of an extendible type.

[0002] In a further aspect, the invention relates to a machine adapted for use in carrying out the captioned method, while preserving, however, the possibility of carrying out packaging methods of a traditional type.

[0003] The invention has been developed by paying specific attention to the possible use in those techniques providing for a hood or bag formed from a spool of extendible film being used for packaging palletized and non-palletized products of different nature, volume, characteristics with a view of stabilizing the load, or connecting it in a firm manner to the pallet in order to increase the stability thereof during displacement and while being stocked and transported. All this by further protecting the product against dust and the surrounding environment.

[0004] At present certain machines exist (usually referred to as "stretch hooders") which are adapted for using, for the purposes indicated in the foregoing, an extendible tubular film taken from a spool located at the floor level. In a machine of this type, produced in various versions under the common designation HSA by the company Maschinenfabrik Möllers GmbH u. Co. of Beckum (Germany), the film is unwound vertically over the whole height of the machine. Then a return roller directs the film in a horizontal direction to be advanced downwardly through two motor-driven unwinding rollers, in vertical alignment with the product to be packaged. In the upper part of the machine, in addition to the unwinding assembly for the film and the welding/cutting assembly which forms the individual hoods starting from the film, a system is provided for opening the hood intended to be used for the packaging operation. Specifically, the hood is taken by a set of mobile heads having associated therewith a horizontal opening mechanism as well as a mechanism for collecting and folding the hood over its length, while ensuring that the hood is expanded, by stretching the film, in such a way as to be adapted to be placed around the products being packed. The captioned mobile heads are mounted on a carrier which is subsequently lowered in order to gradually apply the hood onto the product by extending it over the product.

[0005] This kind of solutions are intrinsecally complex. Automatically folding and stretching the hood may be critical in terms of reliability: for instance, it is difficult to keep to film aligned and centered with respect to the unwinding axis without giving rise to swerving or the formation of wrinkles, which quite often require the intervention of an operator in order to re-arrange the film.

[0006] Other problems are related to the space requirements of the machine overall, the efficiency of the operating cycle and the reduced flexibility in dealing with possible variations (which may be significant) of the size of the products being packaged.

[0007] If shrinkable films are used, additional problems may arise related to the fact that, in order to obtain an effective degree of shrinking of the film, an abrupt heating of the hood located on packaged product is required, which makes it necessary to use high power heating sources, such as gas or electrical resistance sources, etc. In addition to giving rise to a considerable absorption of energy and to a possible adverse impact on the environment (the machines in question and the respective heat sources are usually located in working areas where operators are present), resorting to heat sources in order to obtain shrinking of the film may cause the film to become overheated, with risks of fire, possibly in unattended stockage areas.

[0008] The object of the present invention is to overcome the drawbacks outlined above in order to take advantage of the elastic characteristics, both vertical and horizontal, of the extendible film used for packaging. All this by reducing the cost of packaging, while also dispensing with the use of ovens and other heating sources.

[0009] According to present invention, that object is achieved by means of a method and machine having the features called for specifically in the following claims.

[0010] The invention will now be described, by way of non-limiting example only, with reference to the annexed drawings, wherein:

- figure 1 is a first side elevational view of a machine according to the invention,
- figure 2 is a side elevational view of one of the elements of the machine of figure 1, shown on a enlarged scale,
- figure 3 is a plan view of the machine of figure 1,
- figures 4 to 8 are further side elevational views substantially similar to figure 1 showing, in a virtual time sequence, various subsequent operating phases of the machine according to the invention, and
- figures 9 and 10 show schematically, according to criteria substantially similar to those of figures 1 to 8, operation of a possible alternative embodiment of a machine according to the invention.

[0011] In the examplary embodiments shown herein, the machine of the invention is indicated 1 overall. In both alternative embodiments shown herein it includes a scaffolding or framework 2 preferably comprised of a robust metallic frame having, still preferably, a general bridge-like structure which enables it to be arranged above a support and/or transportation structure S (of a known'type) onto which the products P to be packed are subsequently positioned.

[0012] In the exemplary embodiment shown-herein - which, it is recalled, is to be taken as such - products P are comprised of stacks of individual elements arranged on a pallet T.

[0013] The nature and characteristics of the articles in question may vary extensively: for example, one may have to do with bags or boxes being stacked, containers of various nature, etc. Nor is it necessary for the products P to be arranged in a stack: one may have to do with single articles such as house appliances (refrigerators, washing machines, dishwashers, etc.).

[0014] One may have to do, indifferently, with products of small or large sizes: in that respect, the flexibility of the machine of the invention is complete.

[0015] Nor is it in any way necessary for the products to be arranged on a pallet T.

[0016] Structure S may be of any kind: for example, one may have to do with a conveyor, for instance of the motor-driven type, gradually advancing products P under frame 2: alternatively one may simply have to do with a rest plane. Also, the presence of structure S is, per se not mandatory, in that the machine 1 of the invention may, at least in principle, operate also on products P resting directly on the ground.

[0017] Adjacent scaffolding or framework 2, preferably in the lower portion thereof, at least one station 3 is provided for dispensing the film material F to be used for packaging.

[0018] Framework 2 carries, in a generally upper portion thereof, a guide structure 4 including for instance two horizontal rails adapted to be displaced vertically with respect to framework 2 (see for instance figures 5 to 8) under the action of respective motor means, not shown but of a known type (for instance, fluid-actuated jacks). A carriage 5 is arranged for movement along rails 4 (also in this case, under the action of motor means not specifically shown in the drawings, but of a known type) carrying at its underside at least one pick-up structure 6 to be described in greater detail in the following.

[0019] In the embodiment of figures 1 to 8, carriage 5 is arranged to reciprocate with respect to rails 4 in order to selectively carry structure 6 in positions vertically aligned with the output end of station 3 and products P, respectively.

[0020] In the alternative embodiment of figures 9 and 10, two structures 6 are provided carried by a carousel-like structure 60. In this case the arrangement is such that, by causing the carousel-like structure to rotate about a vertical axis X60, pick-up structures 6 rotate around axis X60. When one of the structures 6 is located above the output of station 3, the other structure 6 is vertically aligned with a product P and the possibility of rotation of structure 60 (in turn actuated by motor means not specifically shown, but of a known type) enables the two structures 6 to exchange their positions.

[0021] Even if the embodiment shown provides for a single station 3 to be used, the solution of the invention lends itself to the possibility of using, in association with a single framework 2 (onto which one or two pick-up structures 6 are mounted), two or more stations 3 for dispensing films F of different sizes. This solution (not specifically shown, but certainly included within the scope of the present invention) allows the machine of the invention to be provided with the possibility of operating in a fast sequence on products P having respective dimensions which may also significantly differ.

[0022] As better shown in figure 2, the or each station 3 includes, in the operating condition, a spool 11 of an extendible film F mounted on a shaft adapted for free rotation onto two supports lla. One usually has to do with a plastics material film having a tubular structure with or without bellows. A brake system is provided for absorbing the rotational inertia of spool 11 as a film F is unwound. A motor-driven roller 12 and an idle counter roller 13 unwind film F from spool 1. A clamp 14 holds the free end of film F slightly protruding above the zone of intervention of a pick-up arrangement including, in the embodiment shown, two groups of clamps or suckers 14 adapted for acting on the opposed surfaces of film F at opposed, complementary positions in order to cause opening thereof.

[0023] Reference numeral 16 indicates two opposed elements of a welding assembly adapted to act on film F in order to close the tubular structure thereof at selectively determined positions. A cutting member (such as a motor-driven blade 17) selectively acts on the zones welded by causing the film F to be segmented with the ensuing formation of hood- or bag-like elements C in sequence.

[0024] Finally, reference 18 denotes a support structure for clamps or suckers 15 arranged for a general lifting and lowering movement with respect to framework 2, further enabling reciprocating motion of pick-up formations 15.

[0025] The preceding description does not expressly mention those members provided for controlling movement of various elements such as roller 12, clamp 14, suckers 15, welding and cutting members 16, 17, structure 18, etc. The respective description and representation were omitted herein as is the case for the detailed description of other element included in station 3 (relay rollers, pulling rollers or "jockey", rollers etc.) in order to avoid making this description unnecessarily lengthy. In any case, one has to do with elements which are known per se, thus making it unnecessary for them to be described herein in a specific manner, also in view of the fact that they are not significant for understanding and carrying out the invention.

[0026] The or each pick-up structure 6 is substantially comprised of an assembly of arm-like elements 20 (see first of all the plan view of figure 3), extending parallel or at least substantially parallel to one another, thereby jointly defining the vertical edges of a notional parallelepiped cage. All this with the possibility, realized by means of motor means (not specifically shown, but of a known type, also for similarly uses) of selectively varying the dimensions and the plan shape of the cage whose edges are defined by elements 20.

[0027] In general terms, elements 20 can be selectively arranged:

- in a closed or contracted position (shown in figures 1, 4, and 5, as well as in the left-hand portions of figures 9 and 10), and
- in an expanded or opened-up position (shown in figures 6, 7, 8 as well as in the right-hand portions of figures 9 and 10).

[0028] The dimensions taken up by the notional cage defined by elements 20 in the contracted and in the expanded positions, respectively, may furthermore be selectively varied (by acting - also in this case in a known manner - on the motor elements associated with elements 20) in order to meet specific operational needs.

[0029] In practice, the contracted position is chosen in such a way that, in these conditions, elements 20 can penetrate into a hood C just formed (according to the criteria better shown and described in the following) in station 3.

[0030] Conversely, the expanded position is determined in a such a way that, in these conditions, elements 20 can descend from above onto a product P and apply thereon the captioned hood C.

[0031] The solution shown herein provides for the use of four elements 20 located at the notional edges of a regular prism with a parallelogram section. The number of elements 20 and the respective locations may however be different. Specifically, it is possible to use a number of elements 20 less than four (for instance equal to three) or more than four (for instance, five or more elements 20).

[0032] Also, one may also consider an arrangement such that, when passing from the contracted position to the expanded position, not just the size, but also the shape of the notional cage defined by elements 20 is changed.

[0033] For instance, one can devise an arrangement such that, in the contracted position, four elements 20 are active defining a square cage while in the expanded position a different number of elements 20 come into play (for instance, by activating another previously inactive element 20) in order to give the captioned cage (and the film hood C applied on products P) a different shape, such as for instance a pentagonal shape, when this is required depending on the shape of products P.

[0034] Figure 1 shows how, from a starting position corresponding to that shown in figure 2, a hood of a film material F having a general bag-like shape can be formed in station 3 starting from film F.

[0035] For this purpose, pick-up formations (such as clamp or suckers) 15 are moved against the opposed sides of the free end of film F protruding above clamp 14 in such way as to draw and pull it upwarly as a result of the lifting movement of the motor-driven structure 18 onto which pick-up formations 15 are mounted .

[0036] In the meantime, formations 15 are caused to open up.

[0037] The general result thus obtained is shown in figure 4, that is the formation of a hood C having mouth portion C1 which is expanded and a bottom portion C2 which is kept tight. By subsequently actuating the welding and cutting unit 16, 17, bottom portion C2 is closed and separated from the remaining portion of the film which thereby forms a new free end held by clamp 14.

[0038] At this point (for the time been one refers to the solution shown in figures 1 and 3 to 8), rail assembly 4 carrying carriage 5 is lowered in order to cause pick-up unit 6, and specifically elements 20 thereof, to penetrate into hood C. As shown in figure 5, hood C is thereby opened up, by giving thereto an overall shape corresponding to the shape of the cage defined by elements 20 in the contracted position. Due to structure 4 being subsequently moved again upwardly and carriage 5 moved above product P, hood C carried by structure 6 is aligned vertically with the product P itself.

[0039] As better shown in figure 6, in a coordinated manner with the captioned lifting and translational movement, structure 6 is expanded, so that elements 20 cause hood C to extend thereby stretching the film comprising the hood.

[0040] In a preferred, yet not mandatory manner, openings 201 are provided at the outer surfaces of elements 20 in communication with inner cavities of the respective elements 20. These cavities are in turn connected, through conduits not specifically shown, to a sub-atmospheric pressure source (in practice a so-called vacuum source) including, for instance, a pneumatic compressor 202.

[0041] For reasons which will become clear in the following, source 202 is preferably provided with respective control means, e.g. a pneumatic distributor assembly 203, enabling to make it selectively invertible, i.e. adapted for alternatively operating both as a source of a sub-atmospheric pressure and as a source of super-atmospheric pressure.

[0042] In operation as a sub-atmospheric pressure source, compressor 202 (which, to advantage, is also used to provide sub-atmospheric pressure to suckers of groups 15) gives rise, within elements 20, to a sub-atmospheric pressure level such as to induce, through openings 201, a pressure difference or gradient acting to hold hood C onto structure 6 during the pick-up movement from station 3 thus avoiding undesired downward sliding thereof, particularly when structure 6 is still in the contracted position.

[0043] Once the position shown in figure 6 as reached, structure 4 is moved downwardly again in such a manner that hood C is gradually applied onto the product P due to a general extroversion mechanism, i.e. by turning it inside-out.

[0044] More precisely, that mechanism is carried out by bringing the bottom portion C2 of hood C adjacent the upper portion of product P and then by moving elements 20 (kept expanded, in order not to interfere with product P) downwardly in such a way that the captioned bottom portion C2 abuts against the upper portion of product P. Due to the gradual downward movement (fig-

ures 7 and 8), hood C slides along elements 20, by becoming turned inside-out until the final position is reached where mouth portion C1, pushed downwardly by elements 20, is located at the bottom of product P, usually extending under pallet P. This latter is possibly lifted with respect to structure S (through lifting means L, of a known type) just to make sure that mouth portion C1 of hood or bag C may extend under pallet P (this latter solution being preferred, even thought not mandatory). The captioned extroversion mechanism causes the surface or face of film which initially was located at the exterior of the hood C as formed in station 3 to be applied against product P, i.e. being located at the inner surface of the hood in the final packaging arrangement.

[0045] The captioned mechanism of application (as shown particularly in figure 7 and 8) effectively exploits the elasticity characteristics of film F, which is therefore allowed to return to its initial size as the expanding action of elements 20 is discontinued.

[0046] Turning the hood inside-out does not leave on the outside any pockets due to the bellows of the film F. It will also be appreciated that the mechanism described permits hood C to be formed at a station 3 located in a generally lower portion of framework 2, thereby avoiding the presence of bulky elements or systems above products P.

[0047] Preferably, during the application phase shown in figures 7 and 8, compressor 202 is again used, as is the case when hoods C are picked-up from station 3, to vary the coupling relationship between elements 20 and hood C. However, while during pick-up of hoods C, compressor 202 is actuated in such a way to reinforce the captioned coupling relationship, in order to prevent hood from sliding downwardly along elements 20, in this case, compressor 202 is operated in an exactly opposite manner. As hood C is being applied onto a respective product P, compressor 202 is actuated, for instance by acting on element 203, in such a way as to cause the inner spaces of elements 20 to be at a super-atmospheric pressure. In this way, air tends to flow out of elements 20 through holes 201 thus creating, between elements 20 and the portions of hood C still engaged by element 20 themselves, a fluid layer adapted to reduce friction between the opposed surfaces, that is facilitating sliding movement of the film with respect to element 20, thereby rendering less strong the coupling relationship between hood C and pick-up formation 6.

[0048] Once the application operation is completed, the product P just packaged is lowered again onto support structure S to be removed from the machine as a new product P to be packaged is brought to a packaging position under machine 1. Pick-up structure 6 is returned to the contracted position and moved back above station 3 (position shown in figure 1) in order to proceed with picking-up a new hood C realised as explained in the foregoing. Figures 7 and 8 also make it possible to understand that a new hood C can be formed simultaneously while a previously formed hood C is being applied: the advantages in terms of speed and effectiveness in carrying out the packaging cycle are evident, especially insofar as the possibility of reaching high production rates (also of the order of hundredths items/hour) is concerned.

[0049] Further advantages in that respect may be achieved by resorting to the alternative embodiment shown figures 9 and 10.

[0050] Essentially, the alternative embodiment reproduces the features of the machine shown in figure 1 to 8, but for two pick-up structures 6 as disclosed in the foregoing being provided on carousel-like structure 60 in such way to exchange their roles in picking-up hoods C in station 3, on the one hand, and applying hoods C onto products P, on the other hand.

[0051] The advantage of this solution is due to a single lowering stroke (see for instance figure 10) enabling:

- structure 6 located above station 3 to pick-up a new hood C just formed, and
- the other structure to apply the hood C previously picked-up onto a respective product P.

[0052] Once this lowering stroke is completed, structures 6 can be moved upwardly again and carousel-like structure 60 is rotated about its vertical axis X60, so as to bring, as a result of a single rotation movement:

- the structure 6 which has just applied a hood C onto a respective product P, above station 3, and
- the other structure 6, which has just picked-up a new hood C, above a respective new product P onto which this last-mentioned hood will then be applied.

[0053] Resorting to this solution makes it possible to further increase the efficiency of the machine, by attaining operating rates on the order, for instance, of about 250 items/hour. It is evident that the solution described may be extended to the provision of a still larger number of pick-up units 6 arranged on a carousel-like structure or, in any case, a structure enabling them to substitute with one another at the various operating stations of the machine. This applies primarily when a plurality of stations 3 are provided for forming hoods C.

[0054] Even though the exemplary embodiments shown refer to a solution where bottom portions C2 of hoods or bags C are completely closed, the invention lends itself to be used also without arriving to a complete closure of bottom portions C2. All this without having to necessarily dispense with the extroversion application mechanism described in the foregoing.

[0055] Furthermore, the machine structure just described, lends itself to be used also for carrying out packaging operations which provide for product P to be only laterally wound, for instance with a small extension (for instance of 10 cm) at the upper, and possibly at the lower portion. This solution enables a good stabilization of the product or pre-packaging, without achieving full protec-

tion with respect to the environment, with the economic advantage of sparing that portion of film comprising the upper portion of protecting hood.

[0056] According to the prior art, these packaging solutions are realized by resorting to so called winders or winding packers adapted for winding the film in a spiral-like arrangement around the products or by using twin-spool lateral winders with vertical axes by using a heat-shrinkable film.

[0057] Without any modification being required, the machine described with reference to figures 1 to 10, enables also this kind of packaging to be realized (i.e. without resorting to hoods intended to be applied onto product P by being turned inside-out).

[0058] In this case, it is enough to inhibit the welding function (elements 16) of bottom portion C2 of each bags, thereby causing hood C to exhibit, in the place of a closed tubular shape, such as the bag-like structure described in the foregoing, an open tubular structure, thereby taking the form of simple tubular sheath adapted to be taken by means of pick-up unit 6 to be subsequently expanded and then fitted from outside onto product P without being turned inside-out.

[0059] In this case, retaining elements (such as clamps or pincers, not shown, but self-evident in their nature) must be provided in order to keep the tubular film extended as unit 6 is lifted with respect to the product P just packaged, thereby ensuring that the packaging is properly retained onto product P and not' pulled upwardly again.

[0060] It will be further appreciated that in all possible embodiments and variants of use considered in the foregoing, hood C is expanded and applied onto the product P by avoiding, at least in a substantially manner, the formation of plies or wrinkles deriving from the hood having been folded. In addition thereto, shrinking of hood C may be obtained by exclusively taking advantage of the elastic characteristics of the film becoming stretched as the elements 20 of pick-up unit 6 are opened-up, thereby dispensing with the need of resorting to heat sources, with the disadvantages referred to the introductory portion of the description.

[0061] As is well known in the art, the co-ordinated motion of the various elements comprising the machine shown in figures 1 to 10 is obtained under the control of a processing unit such as a so-called PLC, an acronym for Programmable Logic Controller. The respective criteria of use and programming, once the desired actuation functions are defined, fall within the design ability of the person skilled in the art.

[0062] Naturally, the principle of the invention being unchanged, the details of construction and the embodiments may be widely varied with respect to what has been described and shown purely by way of example, without departing from the scope of the present invention as defined by the following claims.

Claims

1. A method for applying onto a product (P) a hood (C) of a film material including a mouth portion (C1) and a bottom portion (C2), characterised in that it includes the steps of:

   - arranging the hood (C) with said bottom portion (C2) adjacent the product (P), and
   - advancing the hood (C) over the product by causing, due to said bottom portion (C2) abutting against the product (P) itself, the hood (C) to be gradually turned inside-out, the hood (C) being thus applied onto the product (P).

2. The method of claim 1, characterised in that it includes the step of expanding (6) the hood (C) to give it dimensions enabling application thereof onto the product.

3. The method of claim 2, characterised in that it includes the steps of:

   - taking said hood (C) by means of a pick-up structure (6) positioned in at least one contracted position, whereby said pick-up structure (6) is adapted to penetrate into said hood starting from said mouth portion (C1), and
   - bringing said pick-up structure (6), once caused to penetrate into the hood (C), to at least one expanded position, thus expanding the hood (C).

4. The method of claim 3, characterised in that it includes the step of providing said pick-up structure (6) with a plurality of elements (20) jointly defining a notional cage having respective different sizes when in said at least one contracted position and said at least one expanded position.

5. The method of any of the preceding claims, characterised in that said hood (C) is expanded and caused to advance over the product by substantially avoiding the formation of wrinkles or plies.

6. The method of any of the preceding claims, characterised in that said hood (C) is comprised of a shrinkable film material (F).

7. The method of claim 6, characterised in that said film material (F) is shrinkable in the substantial absence of heat being applied.

8. The method of claim 2 and any of claims 6 or 7, characterised in that said film (F) is of an extendible material adapted to exhibit elasticity as a result of the hood (C) being expanded.

9. The method of any of preceding claims, characterised in that said hood (C) is formed starting from said film material (F) simultaneously or substantially simultaneously with another, previosly formed hood (C) being applied onto a respective product (P).

10. The method of any of the preceding claims, characterised in that it includes the step of providing a pick-up structure (6) for taking said hood (C) and the step of selectively varying the coupling relationship between said pick-up structure (6) and said hood (C) during at least one of the steps of said hood (C) being taken by said pick-up structure (6) and the hood being advanced over the product (P).

11. The method of claim 10, characterised in that it includes the step of conveying pressurised gas in correspondence with at least one interaction zone (20, 210) of said hood (C) with said pick-up structure (6).

12. A machine for packaging products (P) with hoods (C) of a film material, characterised in that it includes:

- a forming station (3) for forming, starting from said film material (F), a hood (C) of a tubular shape,
- a pick-up structure (6) arranged to co-operate with said hoods (C) in at least one contracted position, wherein the pick-up structure (6) is adapted to penetrate into said hoods (C), and at least one expanded position, wherein said structure is adapted to expand the hood (C) into which it has penetrated in order to give thereto dimensions enabling application onto the product (P) to be packaged,
- motion means to impart to said pick-up structure (6) a relative movement with respect to said product (P) so as to bring said pick-up structure (6) in said at least one expanded position to apply onto a respective product (6) a hood (C) kept expanded by the pick-up structure (6).

13. The machine of claim 12, characterised in that said forming station (3) includes means (16, 17) for forming a respective bottom part (C2) of said hoods (C), and in that said pick-up structure (6) is adapted to arrange said hoods (C) with said bottom part (C2) adjacent the product to be packaged and to subsequently advance the hood (C) over the product (P) by causing, due to said bottom part (C2) abutting against the product (P) itself, the hood (C) to be gradually turned inside-out and applied onto the product (P).

14. The machine of claim 12, characterised in that said forming station (3) is arranged for realizing said hoods (C) with an open tubular shape and in that said pick-up structure (6) is arranged for applying said hoods kept expanded onto respective products (P) due to a relative overall advancing movement without the hood being turned inside-out.

15. The machine of claim 14, characterised in that it includes means retaining the hood (C) applied onto the product (P) while said pick-up structure (6) becomes disengaged from the hood (C) itself.

16. The machine of any of claims 12 to 15, characterised in that said pick-up structure (6) includes a plurality of elements (20) jointly defining a notional cage whose size can be selectively varied in said at least one contracted position and said at least one expanded position.

17. The machine of claim 16, characterised in that said elements (20) are substantially comprised of arm-like elements extending at least substantially parallel among them.

18. The machine of any of previous claims 12 to 17, characterised in that said pick-up structure (6) has associated therewith means (201, 202, 203) for selectively varying the co-operation relationship of said pick-up structure (6) and said hood (C).

19. The machine of claim 18, characterised in that said means (201, 202, 203) for varying the co-operation relationship are adapted for actuation in at least one operating condition wherein they reinforce the retaining action of said hoods (C) by said pick-up structure (6).

20. The machine of claim 18, characterised in that said means (201, 202, 203) for varying the co-operation relationship are adapted for actuation in at least one operating condition wherein they reduce the retaining action of said hoods (C) by said pick-up structure (6).

21. The machine of claim 18, characterised in that said means (201, 202, 203) for varying the co-operation relationship are selectively actuatable in at least one first and at least one second operating conditions wherein they reinforce and reduce the retaining action of said hoods (C) by said pick-up structure (6), respectively.

22. The machine of any of claims 18 to 21, characterised in that said' means (201, 202, 203) for varying the co-operation relationship include a pressurised gas source (202) as well as flow channels (201) for said gas provided in said pick-up structure (6) in order to apply a pressure gradient to the film (F) comprising the hood (C) held by said pick-up structure

(6).

23. The machine of any of claims 12 to 22, characterised in that said forming station (3) is located in generally lower portion of the machine.

24. The machine of any of claims 12 to 23, characterised in that said forming station (3) includes:

- a dispensing source (11) of a film material (F) with a tubular structure,
- opening means (15) for selectively opening the film structure,
- segmentation means (16, 17) in order to produce, starting from said film material (F), subsequent segments each defining a respective one of said hoods (C).

25. The machine of claim 24, characterised in that said segmentation means include a welding unit (16) adapted for forming, in each of said hoods (C), an at least partly closed bottom portion (C2).

26. The machine of any of claims 12 to 25, characterised in that it includes at least two of said pick-up structures (6) adapted to co-operate simultaneously or substantially simultaneously with one of said hoods (C) formed in said forming station (3) and with another hood (C) previously formed and being applied onto a respective product (P), respectively.

27. The machine of claim 26, characterised in that said at least two pick-up structures (6) are arranged on a carousel-like structure (60) adapted for selectively and alternatively transferring said at least two pick-up formations (6) between said forming station (3) and a position for applying said hoods (C) onto respective products (P).

28. The machine of any of claims, 12 to 27, characterised in that it includes a plurality of said forming stations (3) for realizing hoods (C) of respectively different sizes.

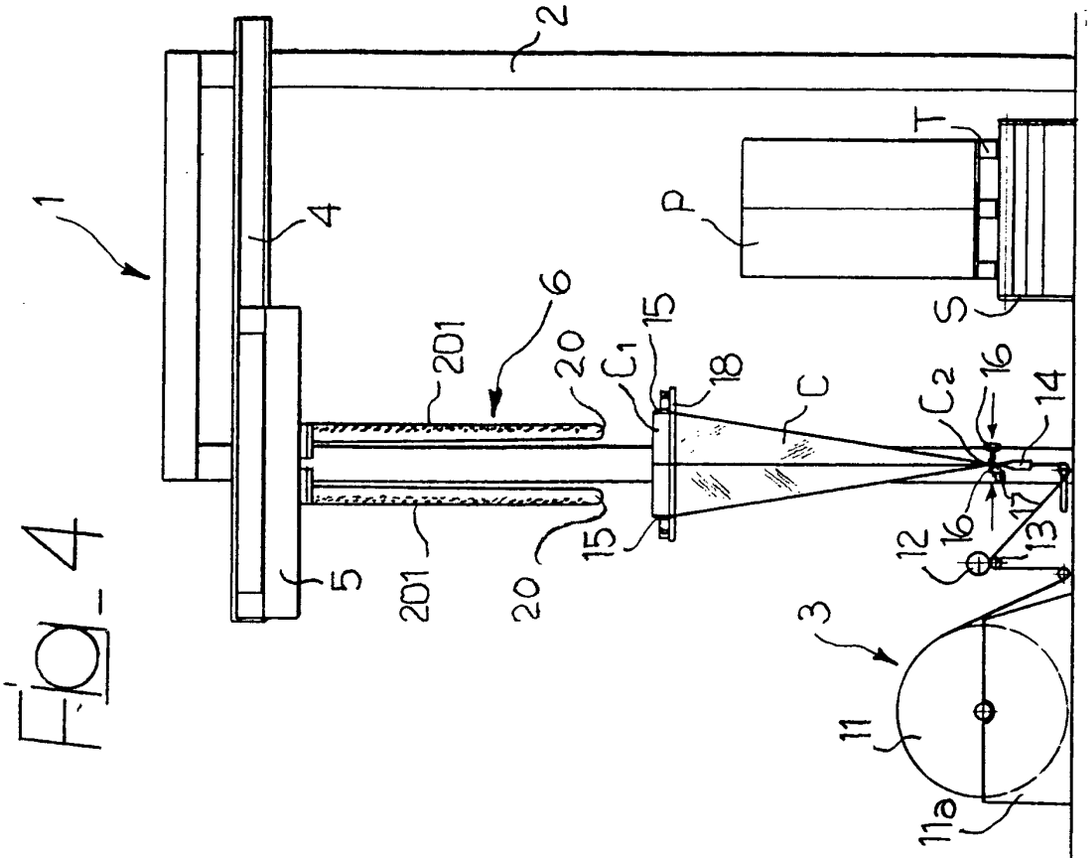
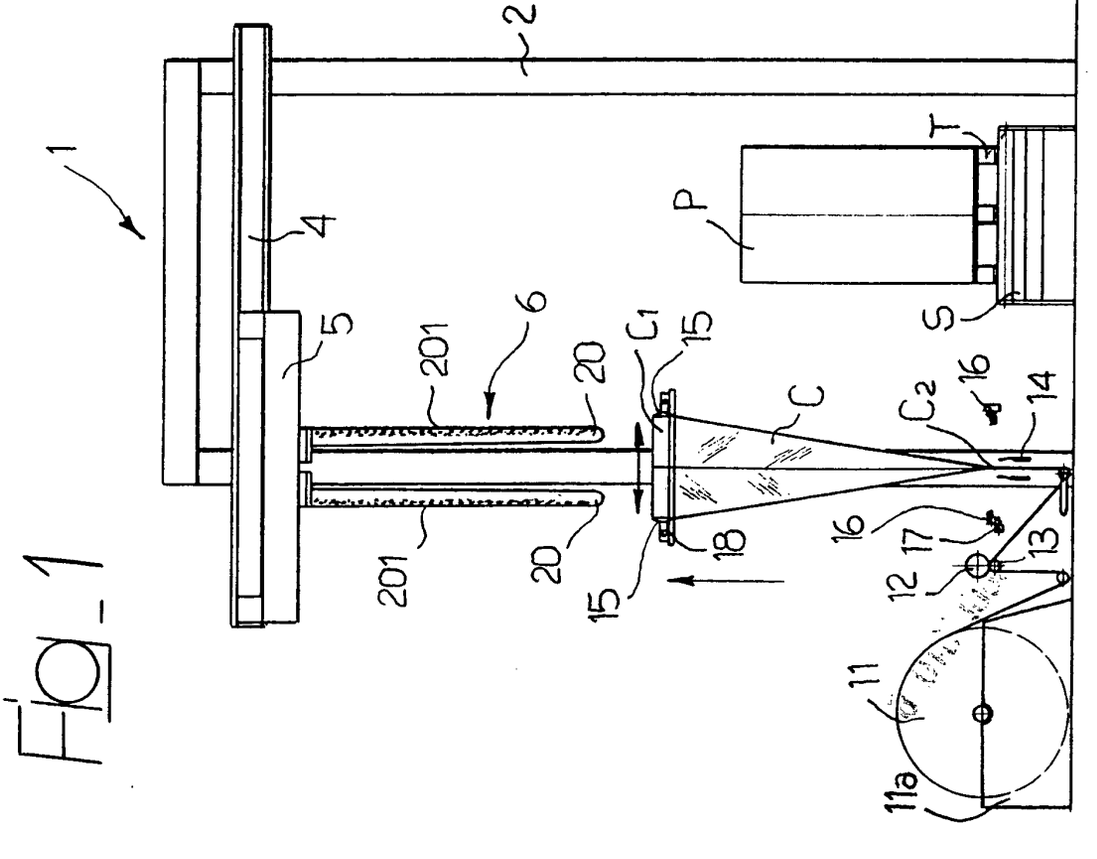

1
2
4
5
6
201
20
15
C1
18
C
C2
16
14
17
13
12
3
11
11a
P
T
S

FIG_4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2
4
5
6
201
20
15
C1
18
C
C2
16
14
17
13
12
11
11a
P
T
S

FIG_1

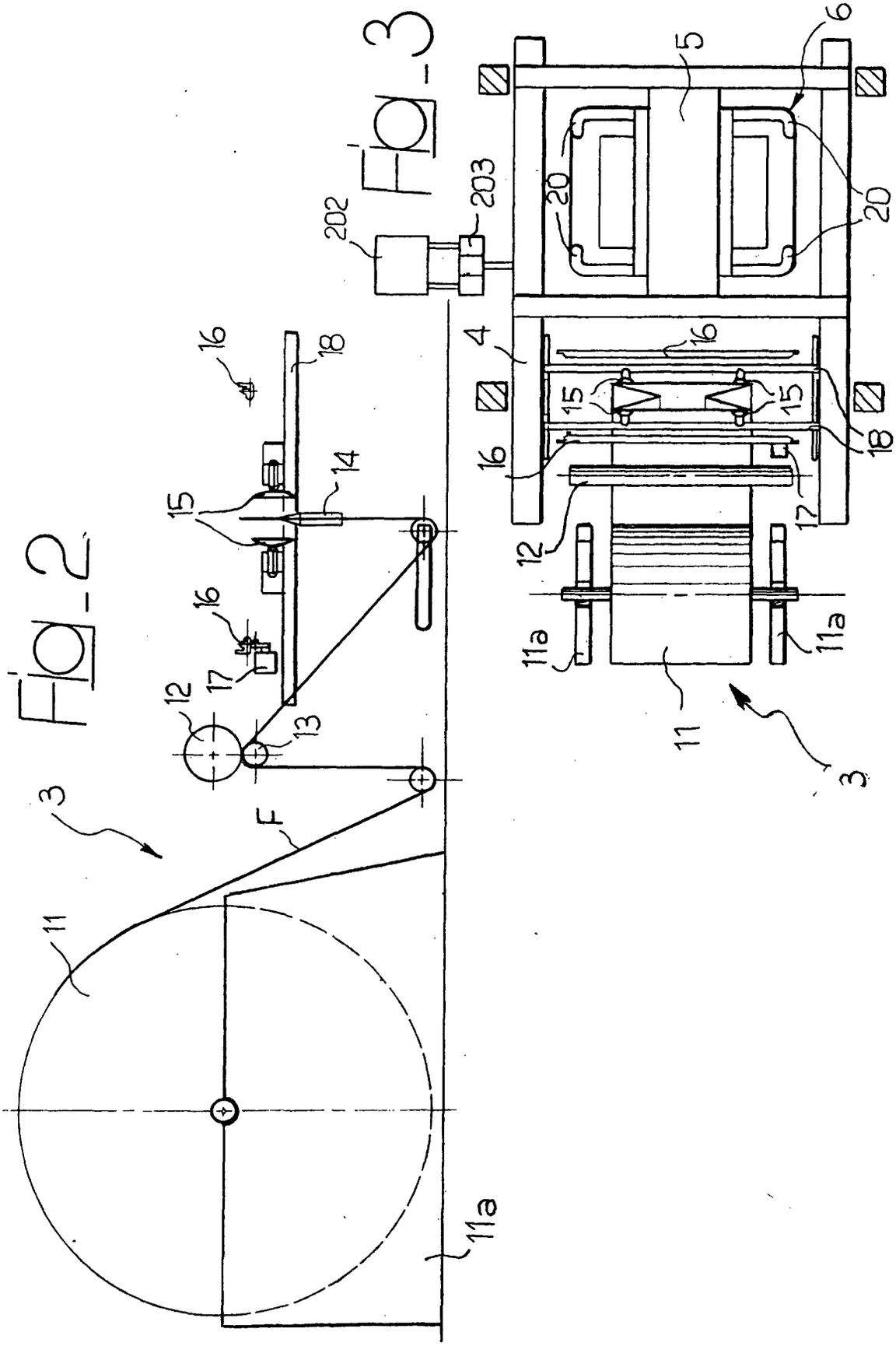
Fig_2
Fig_3
3
11
11a
F
12
13
14
15
16
17
18
202
203
4
5
6
20

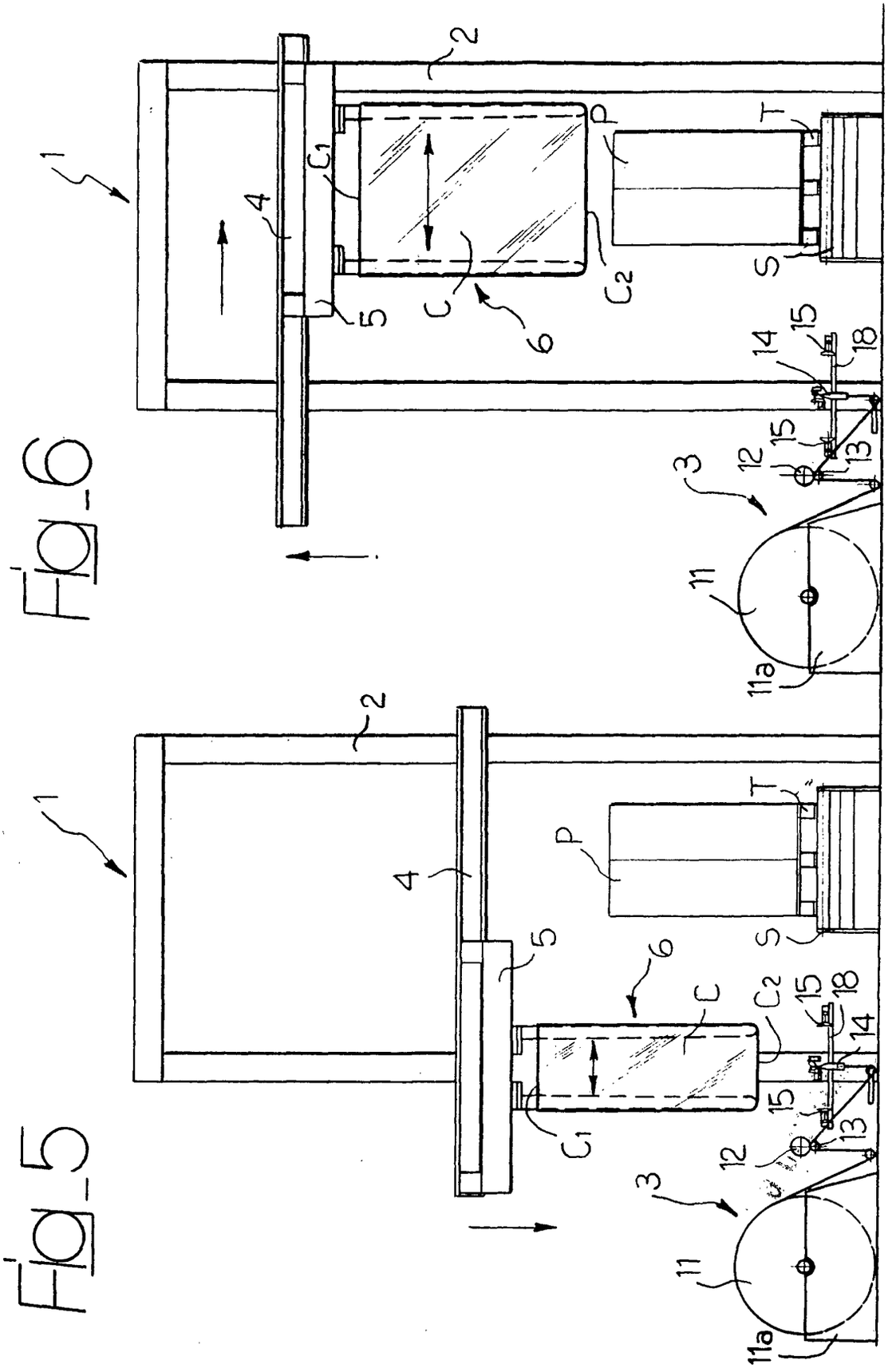
1
2
4
5
6
C
C1
C2
P
T
S
3
11
11a
12
13
14
15
18

Fig_6

1
2
4
5
6
C
C1
C2
P
T
S
3
11
11a
12
13
14
15
18

Fig_5

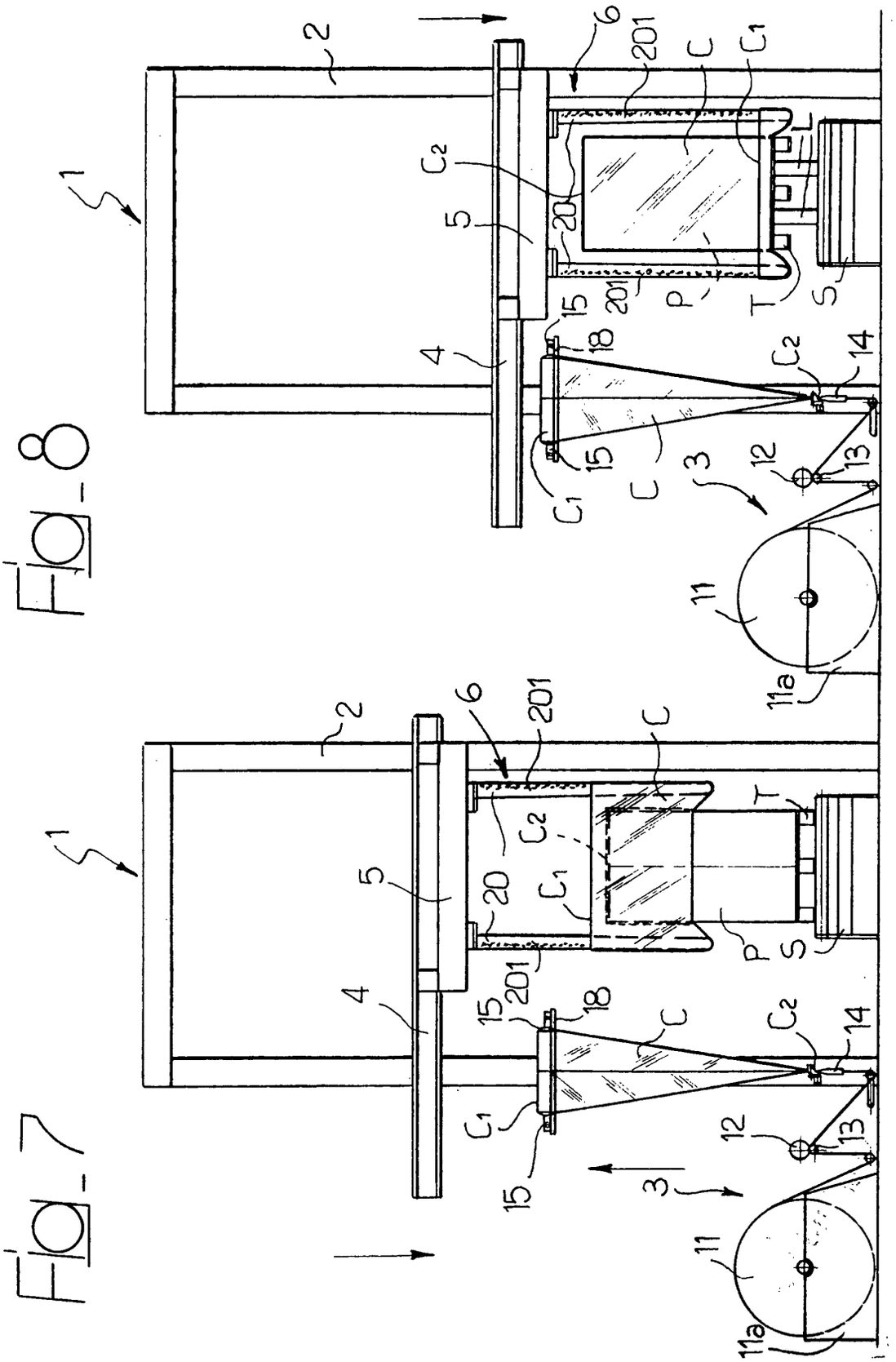

FIG_8

FIG_7

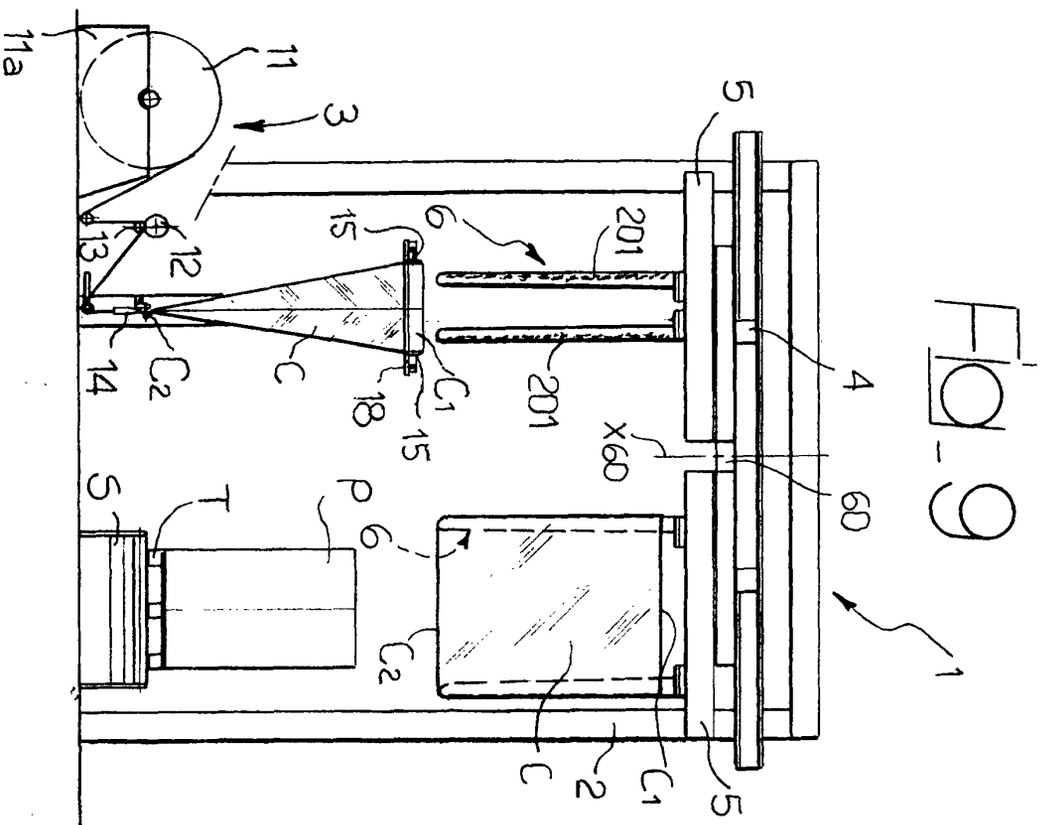
11a
11
3
5
15
6
201
13
12
14
C2
C
18
C1
15
201
4
x60
60
S
T
P
6
C2
C
C1
2
5
1

Fig-9

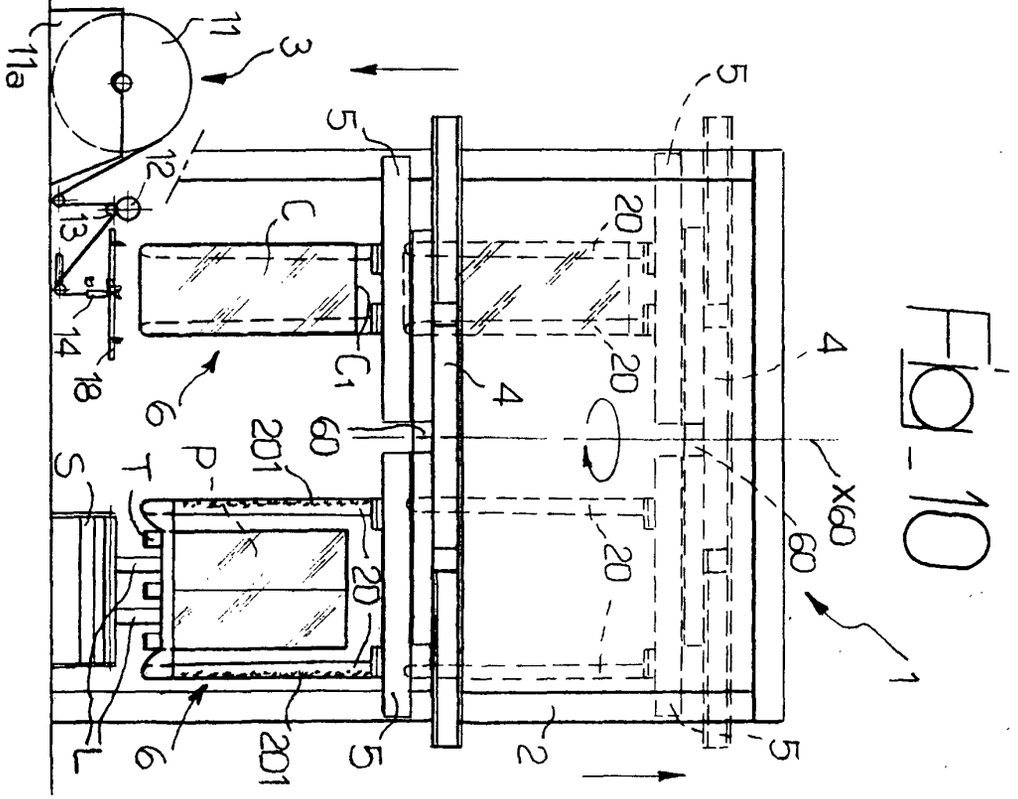
11a
11
3
5
5
12
13
C
20
14
18
C1
4
6
20
60
201
P
T
S
x60
60
20
20
L
6
201
5
2
5
1

Fig-10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 99 83 0767

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Y	* figures 6,7 *	10,13, 16,17	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 May 2000	Claeys, H

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