(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 320 467 A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **88830526.5**

(22) Date of filing: **09.12.88**

(51) Int. Cl.4: **B 65 H 54/84**
B 65 B 13/20

(30) Priority: **11.12.87 IT 957087**

(43) Date of publication of application:
14.06.89 Bulletin 89/24

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR LI LU NL SE

(71) Applicant: **GUALCHIERANI SYSTEM s.a.s. di Sergio Gualchierani & C.**
Viale della Repubblica 141
I-50047 Prato Firenze (IT)

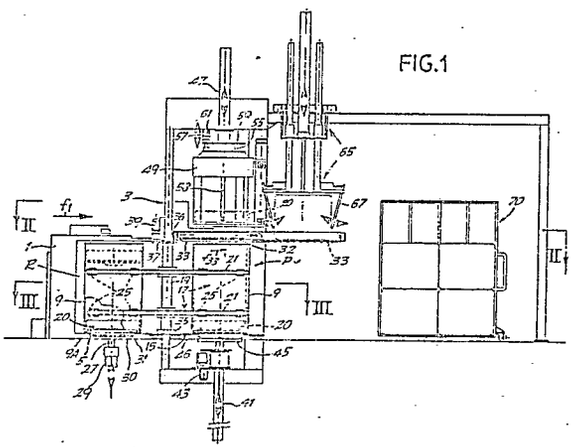
(72) Inventor: **Gualchierani, Sergio**
Via Fossi No.10
I-50047 Prato, Firenze (IT)

(74) Representative: **Mannucci, Gianfranco, Dott.-Ing.**
Ufficio Tecnico Ing. A. Mannucci Via della Scala 4
I-50123 Firenze (IT)

(54) **Automatic plant for forming, pressing and handling coiled packages of textile sliver or rove and the like.**

(57) The plant comprises in combination: a filling station (R) in which said sliver is collected in a first container or vessel (9, 20); a pressing station (P) in which the sliver collected in a second container or vessel (9, 20) is pressed by a press (3), drawn from said container and bound by a binder (50) to form a bump or package; means (33, 64) for drawing the bumps from the pressing station (P) and placeing it under a gripping, lifting and transferring device (65) which places said bound material in a carriage (70); and further means (17) for cyclically and mutually exchanging the positions of the container or vessel (9, 20) in the pressing station and of the container or vessel (9, 20) in the pressing station upon completion of a filling phase and of a pressing and binding phase, respectively.

FIG.1



EP 0 320 467 A1

Description

AUTOMATIC PLANT FOR FORMING, PRESSING AND HANDLING COILED PACKAGES OF TEXTILE SLIVER OR ROVE AND THE LIKE

The invention relates to an automatic plant for forming, pressing, binding and handling coiled packages, i.e. bumps of sliver of combed fibres or the like, delivered by a coiler of a sliver delivering machine.

The object of the invention is a plant of the above mentioned type, which automatically carries out all the operations needed for forming, pressing and bindinga bump starting from a sliver according to a suitably programmed cycle, and which has reduced overall dimensions.

These and other advantages which will be evident to the skilled in the art from the following description are obtained with a plant according to the invention, which comprises in combination: a filling station in which said sliver is collected in a first container or vessel; a pressing station in which the sliver collected in a second container or vessel is pressed by a press, drawn from said container and bound by a binder to form a bump or package; means for drawing the bumps from the pressing station and placeing it under a gripping, lifting and transferring device which places said bound material in a carriage; and further means for cyclically and mutually exchanging the positions of the container or vessel in the pressing station and of the container or vessel in the pressing station upon completion of a filling phase and of a pressing and binding phase, respectively.

In a particular embodiment, said first and said second container or vessel may have a bottomless cylindrical wall and a base which is upwardly and downwardly movable inside said cylindrical walls. In this case,in said filling station means are provided for lifting said base of said container before the filling of the container and progressively lowering it during the filling phase, thus obtaining a regular conformation of the sliver coils inside the container. In the pressing station means are provided for lifting and lowering said base towards and away from an upper plate of said press.

In a possible embodiment of the invention, said means for cyclically and mutually exchanging the positions of the container in the pressing station and of the container in the filling station comprise at least two pairs of arms laterally engaging said two containers, said arms rotating around a vertical axis positioned between said filling and said pressing position. In order to ease the displacement of the containers form the filling to the pressing station planar surfaces can be provided on which said containers are made to slide during their displacement from the filling to the pressing position and vice-versa.

In a further development of the invention, said means for cyclically and mutually exchanging the position of the container in the pressing station and of the container in the filling station comprise a first set of means for handling containers of smaller diameter and a second set of means for handling containers of larger diameters. said first and said second set of means being offset. With this disposition the plant may be alternatively used for handling bumps of larger and smaller diameter respectively. According to the dimension of the bumps to be handled. it is sufficient to line up with the filling and pressing station alternatively the first or the second set of means for handling the containers, each set of means being suitable for handling containers having a diameter comprised in a predetermined range of diameters.

In a further embodiment, said means for cyclically and mutually exchanging the container in the pressing station and the container in the filling station may comprise at least four pairs of arms, the first two pairs being adapted for engaging containers having smaller diameter, and the second two pairs being adapted for engaging containers having larger diameter.

In a particular embodiment of the present invention, the means for drawing the bumps from the pressing station can comprise support means able to keep said bump in a lifted position, and a flat gate member which is horizontally movable under the lifted bump. Said support means dispose said bump on said flat gate member when the latter is positioned under said bump, and the displacement of said flat gate member outside the pressing station operates the withdrawal of the pressed and tied bump.

In order to perform diametral as well as non diametral bindings, the binder and the counter-frame thereof are able to perform movements towards and away from said upper plate and said base. Further, said bases and said upper plate may be replaceable.

In order to grip and handle bumps having different diameters and differently bound, said gripping, lifting and transferring device comprises a first gripping member provided with jaws for the engagement of the external surface of the bumps, and a second gripping member provided with a mandrel having expansion jaws for engaging the internal surface of the central hole of the bumps. Said two gripping members can be alternatively used, depending on the type of bumps being processed.

Further advantageous features of the present invention are set out in the dependent claims.

The invention will be better understood by following the description and the attached drawing, which shows a practical, non-limitative exemplification of the same invention. In the drawing:

Fig. 1 shows a side view of the plant according to the invention, predisposed to form, press and tie bumps of larger diameter;

Figs. 2 and 3 show respective cross sections along lines II-II and III-III of Fig. 1;

Fig. 4 shows a side view similar to Fig. 1, but relative to the plant predisposed to form, press and tie bumps of smaller diameter;

Figs. 5 and 6 show respective cross sections

along lines V-V and VI-VI of Fig. 4;

Fig. 7 shows diagrammatically an apparatus for the replacement of the binding plate when shifting from bumps of larger diameter to bumps of smaller diameter; and

Figs. 8A, 8B and 8C show phases of transfer of bumps of small diameter from a box to a carriage.

As shown in the attached drawing, the plant according to the invention allows the phases for the preparation of bumps, i.e. of coils of pressed and fastened textile sliver or rove having different diameters, to be performed in a fully automated way and according to a precise program up to the placement thereof inside suitable carriages or containers. A so-called "integral" machine for the preparation of the textile sliver, generally indicated by 1, (or other equivalent machine such as those named "intersecting") delivers said sliver through a coiler into vessels, i.e. containers having bottomless cylindrical walls 9. Within each wall 9 a base 20 is provided, resting on a lower edge 9A of the wall 9 and able to slide for the lifting and a gradual lowering during filling. The textile sliver or ribbon delivered by the machine is placed in a known manner in the form of coils on the base 20 which rotates and lowers progressively forming superimposed layers of coils until the filling of the cylinder defined by wall 9 is completed. The lowering of the rotating base 20 is controlled by a meter counter installed on the machine 1, said meter counter also determining the cutting of the sliver when the filling is completed.

Characteristically, in tile plant according to the invention, provision is made for using two so-called "vessels" or containers formed by walls 9, equal one to the other, which are subsequently and alternatively used for providing a coordinated succession of operations until the above mentioned arrangement of pressed and bound "bumps" (or coils of sliver) orderly disposed within stacking carriages or containers at the exit of the plant is obtained.

The operation next to the filling is the transfer of the "vessel" 9, 20 below the press 3 (to be described later), performed through the above mentioned exchange operation. As shown in Figs. 1 and 2, a smooth plate 5 having approximately the shape of an irregular pentagon (in the drawing), with the major side 5M turned towards the press, projects horizontally from machine i above the floor level. Said major side has a recess 7 for ambracing a first (11) of three columns 11, 12 and 13 of press 3, a hollow shaft 19 being able to rotate around column 11. Also press 3 is provided with an underlying rectangular, smoothed, horizontal plate 15 at the same level of plate 5 and with a major side practically matching side 5M of plate 5 so as to form a single sliding plane for the vessels 9, 20.

The above mentioned alternation of a vessel 9, 20 - the filling of which as been completed - from position R below the coiler of machine 1 to position P below press 3, takes place through a "rototranslation", which causes the exchange of a full vessel with the vessel that was under the press and has been already emptied out. said rototranslation being operated by a device 17 consisting of two pairs of parallel and opposite arms. More precisely, from the hollow shaft 19 project two superimposed pairs of equal and opposite arms 23, at each end of which a horizontal longitudinal arm 21 is fixed, orthogonal to arm 23, from which it is divided into two equal and opposite parts. A 180° rotation of shaft 19 causes said device to rotate through 180°, thus determining the exchange of said vessels or containers, which move in the direction of arrow f9 (or in opposite direction) and are supported by the suitably smoothed plates 5, 15. Walls 9 are provided at the bottom with suitable nylon skids (not shown) to facilitate said sliding. The pairs of arms 21, which are disposed at suitable heights, embrace the cylindrical outer part of walls 9, which walls are engaged thereto, in order to result properly positioned, both during the filling and under the press, through internal and external wheels 25 having vertical axis and idly supported inside the arms 21.

As shown in particular in Figs. 3 to 6, in order to put the plant in condition to prepare bumps of diameter smaller than the one considered (i.e. the one of cylindrical walls 9 without fixed bottom), pairs of arms 121, orthogonal to arms 21 and disposed at the same level of the latter, equidistant from the axis of shaft 19, are connected to the hollow shaft 19. The pairs of arms 121. inside which idle wheels 125 having vertical axis are supported, form equal and opposite parts of a further device 117, solid with device 17, intended to cause (with an outphasing of 90° from the start of rotation of shaft 19, obtained by acting on programming means) the alternation of "vessels" 109, 120 used for the formation of bumps having smaller diameter than containers 9, 20. Substantially, the plant in question is provided for forming, pressing and binding bumps of two different diameters selected among those having an external diameter in the range of 1000, 800, 700, 600, 500, 400 mm, which obviously require vessels like those indicated by 9, 20 or by 109, 120, having different internal diameters. In the example of the drawing, vessels 109, 120 may be those for forming bumps with a diameter of 400 mm, while vessels 9, 20 may be those for the bumps with a diameter of 800 mm. Of course, the production of bumps of a given diameter will be carried out separately, as for each diameter the plant shall be differently equipped and predisposed. For example, the devices 17 and 117 shall be dimensioned for a given set of diameters, reference being made to the larger diameter of each set: The device 17 will be used for bumps with diameters of 800 and 700 mm, while the device 117 will be used for diameters of 600 and 400 mm, and both the devices will be predisposed for the vessels of larger diameter. For the smaller diameter(s), suitable adaptations will have to be made each time, e.g. increasing the projection of the supports of wheels 25 (or 125) inside the arms 21 (or 121). It will be also necessary to consider that bumps of minor diameters require different binding procedures with respect to those of major diameter; moreover, the bumps having minor diameters are generally provided with a hole in the middle so that a different lifting member may be necessary at the exit of the press, and their piling up may take place

according to different procedures.

For the filling of vessel 9, 20 located under the coiler of the machine 1, the base 20 must be able to rotate continuously as it lowers from a position of maximum height, at which the filling begins, down to the lowest position, where it comes into contact with edge 9A, in which the filling is completed. The rotation of base 20 is obtained simply by friction operated by a discoidal plate 30 fixed on the top of a rod 27 of a cylinder-piston system 29, said rod (or the end portion thereof) being driven into rotation by suitable means (not shown). The plate 30 has a diameter smaller than that of the mobile base 20 with which it comes into contact passing through a hole 31 predisposed on the plate 5, said hole also having a diameter smaller than that of base 20 and also smaller than the internal diameter of edge 9A. In this way it is ensured that the lower edges of walls 9 (or the skids which they are provided with) are always in contact with plates 5 and 15 during their movement on said plates during the container exchange which takes place when the plate 30 has completely moved down as far as its upper surface is flush with the upper surface of plate 5.

When filling vessels of small internal diameter, like those indicated by 109, 120, the coiler of the machine 1 (or the upper portion of said machine bearing the coiler) must be moved forward in the direction of arrow f1 so that its delivery will take place in the vicinity of the internal wall (on the side of machine 1) of the vessel having minor diameter. The coiler of the machine 1 will provide as usual for the distribution by suitable adjustments according to the diameter of the containers.

As in the case of the vessels having larger diameter, also during the filling of a vessel 109, 120 of small diameter, the base 120 must be able to rotate continuously while gradually lowering down to the point of resting onto the lower edge 198A of walls 109, i.e. when the position of maximum filling is reached. With the vessel 109, 120 in the suitably forward position shown in Fig. 6, i.e. below the coiler of machine 1, the rotation of base 120 is obtained by plain friction operated by the same discoidal plate 30 which, when the plant is predisposed for the filling of the vessels 9, 20 of large diameter, is intended to rotate base 20.

When a vessel 9, 20 - or a vessel of small diameter 109, 120 - is completely filled with textile sliver or rove, its relatively soft content projects from the upper edge of the vessel; the filled vessel thereby is made to pass (while performing the above mentioned "rototranslation" for the exchange with the empty vessel which was under the press) below a mobile gate 33 which is at a level slightly above the upper edge of the moving vessels and can be provided with flare edges for causing the lowering of the textile material partially projecting above the filled vessel. The displacements in horizontal direction of the gate 33 sliding on suitable guides, are achieved by a pair of side cylinder-piston systems 32. As above mentioned and as shown in Figs. 2 and 3. the press 3 is of three-column type (although it may be provided with 4 columns if suitably modified); this eases the rototranslation motion of the vessels as they are exchanged by means of rotation around the column 11. The hollow shaft 19 is supported in the bottom part by a suitable guide and thrust bearing 35 and, in the upper part, by a further support 36 in the vicinity of the gear 37 by which it is driven into rotation through a motor reducer or geared motor 39. The geared motor 39 is controlled by suitable programming means in order to rotate the device 17 and thereby the device 117.

The pressing of a bump of large diameter formed inside a vessel 9, 20 that has been transferred to the position P by the device 17 will now be described.

Press 3 has a cylinder-piston system 41 in its lower part, with a motor reducer 43 solid with the frame of the press and able to rotate the rod of the cylinder-piston system 41 and a plate 45 provided for contacting the base 20 for the lifting thereof within and along the wall of a vessel 9, 20 up to the position P. In the upper part of the press 3, a second cylinder-piston system 47 is provided for moving vertically the upper plate 49 of the press in both directions. By this disposition, it is possible to press the material held within the wall 9 at position P; this is achieved, after gate 33 is moved in the direction of arrow f33 until the internal space between the columns of the press is completely free, by causing the lowering down of plate 40 until its lower surface comes almost into contact with the upper edge of wall 9 and causing, by means of system 41, the lifting of plate 45 and thus of base 20 in order to press the material within wall 9. When the material has been pressed, the two cylinder-piston systems 41 and 47 are driven to lift the plates 45 and 49 up to the position illustrated in Fig. 1, in which the base 20, depicted with dotted lines, is at a position well above the one taken up by the upper surface of gate 33 when this is inserted inside the press 3, while plate 49 is in the position of relative lowering (following the already occurred re-lifting of the two plates with the bump pressed therebetween) depicted with solid lines in Fig. 1.

On the horizontal crossbars of an auxiliary frame fixed to the columns 12 and 13 of press 3, a binding machine 50 of known type is placed, able to perform, especially in an automatic way, the fastening of the bump pressed between the two plates. For the binding, a number of channels are provided on base 20 and on the lower surface of plate 49, while the binder 50 comprises also a U-shaped guide 51 and a counter-frame 53 with a similar relatively solid guide for the ribbon-like element, such as a plastic band, used for the binding. The binder 50 and the elements linked thereto are so predisposed as to carry out a plurality of successive mostly diametral ties. For the bumps of large diameter the ties in a number of 3 or 4 go all through the center, while for the bumps of smaller diameter, such as those for the successive dyeing requiring a free central hole, the ties in number of 4 pass almost tangent to the hole according to coordinates X, Y (see Figs. 2 and 5). Between one binding and the next, the motor reducer 43 is driven for orientating base 20 and plate 40 each time in a different way, so as to match the relevant channels with the binder members. This matching of the channels must be carried out with

the outmost precision in order to avoid jamming of the binder. It is thus essential that the angular displacements of base 20 and plate 49 be equal. The displacement of base 20 cannot differ from the rotation imposed on plate 45, as the latter has pins 46 which fit into corresponding holes formed in the lower surface of base 20 due to an initial rotation prior to the pressing. On the other hand, plate 49 rotates as it is dragged along by the friction with the pressed material, so that its angular displacement may slightly differ from that of base 20, owing to the limited slidings, in its friction-operated rotation. The plate 49 is able to rotate idly with respect to its hub 55 which, instead, is angularly fixed. In order to overcome the small differences between the rotation of plate 40 and that of base 20, a pneumatic positioning member 57 is fixed to a flange 59 projecting from hub 55 which is solid thereto. The positioning member 57 comprises a cylinder-piston system 61 whose rod has a frustoconical end oriented towards plate 49, able to fit into suitable frustoconical seats, circumferentially disposed at predetermined angular positions on the upper face of plate 49. At the end of each angular displacement of base 20, performed prior to the binding operation, the positioner 57 is actuated so that the frustoconical end of the relevant rod, by entering the seat of plate 49 which has been brought into alignment with said rod following the drag-operated rotation of plate 40, causes that small additional rotation necessary to have the channel for the binder of plate 49 exactly superimposed to the corresponding channel of base 20.

Upon completion of the binding, the tied-up and pressed bump must be withdrawn from below the press to allow a further pressing and binding cycle of another bump, formed in the meantime inside wall 9 at position R, to be performed. Such withdrawal operation is performed by gate 33 which is placed under the press again, moving in the direction opposite to arrow f33. To allow this displacement, base 20 - which supported the pressed bump during the binding - must be able to move inside wall 9 again and lower as far as the bottom thereof. In order to prevent the bound and pressed bump from following the base 20 on the lowering thereof, radial supporting members 64 (Fig. 2) are made to intervene, each comprising a cylinder-piston system whose rod is made to protrude in centripetal direction so as to penetrate between the coils of the pressed bump thereby preventing its lowering. When gate 33 has been positioned below the bump supported in this way, rods of supporting members 64 move back so as to let the bump rest down onto the upper surface of gate 33. Subsequently, said gate moves again in the direction of arrow f33 up to positioning the bump below a gripping, lifting, transferring and lowering device 65.

As it is evident, in the pressing and binding operations it is necessary to take into consideration the different diameters of the bumps that may be formed inside vessels 9, 20 or 109, 120 especially the ones having a diameter smaller than that considered in the preceding description relevant to the pressing and binding of bumps of large diameter, this also in relationship to the leatures and destinations of the bumps of smaller diameter.

These pressing and binding operations of bumps of smaller diamter, although being fully similar to those for the bumps of larger diameters, require certain adaptations and replacements that will be now described in relationship to a vessel 109, 120 of relatively small diameter which is supposed to be filled and transferred to the pressing position P by means of device 117. In the considered phase, it is necessary that the diameter of plate 45, intended to push the base 120 for the lifting and the pressing, be chosen suitably small to fit within the lower edge 109A of the cylindrical walls 109. Also plate 49 of the press will have to be replaced, or anyway adapted, not on account of the diameter, as the pressing takes place when said plate is positioned almost in contact with the upper edge of wall 109, but on account of the binding channels. As it is evident from the foregoing, the binding is carried out by binder 50, after the bump - which has been pressed internally to the wall 109 between the base 120 pushed by plate 45 and plate 49 -has been lifted up to a position well above the one taken up by the upper surface of gate 33, when this is fitted inside press 3. This lifting of the already pressed bump takes place by means of the cylinder-piston systems 41 and 47 which cause the simultaneous lifting of plates 45 and 49 which thus run an identical travel, with the bump placed between plate 49 and base 120.

Since, as previously mentioned, the bumps of small diameter have a central hole which, as will be seen later on, can also be used for the gripping, it is preferred to use non-diametral bindings. Consequently, the base 120 shall have a set of channels (generally four) two by two in parallel relationship with respective orthogonal diameters, symmetrical one to the other at an intermediate distance between the centre of the plate and the periphery thereof. Also plate 49 - which in the case of the pressing of a bump of large diameter has angularly equidistan diametral channels -shall have accordingly a set of channels traced in the form of orthogonal chords like that of base 120. It is thus suitable that plate 49, instead of being provided with slots of its own, be either replaceable or constructed so that its down-turned face, against which the pressing is performed, be suitably completed - through a doweling system or other - with a discoidal plate having a diameter corresponding to that of vessels 9, 20 or 100, 120 being used, said plate presenting downwardly the channels for performing one binding at a time either diametral channels, or channels disposed according to four chords equidistant from the centre and two by two orthogonally one to the other. Fig. 7 shows schematically a simple equipment 86 for the application below the plate 49 of a discoidal plate 49′ with diametral channels, or of another plate 49″ having smaller diameter with channels disposed according to orthogonal chords, as well as for the exchange of said plates.

For bumps having small diameter, and in order to perform bindings according to chords spaced from the centre, also binder 50 must be able to move closer to the bump in the centripetal direction of

double arrow fA (Fig. 5) and perform lateral displacements in the two directions of arrow fL. Thus a binding with cross strappings is obtained, like those shown in Fig. 5, in which a set of tied up bumps are placed in a stacking case or carriage 170. Also in the case of the binding with cross orthogonal strappings, as above described, precise rotations of both base 120 and plate 49 are necessary; to ensure that the rotations (taking place by friction) of the latter are as desired, the positioning member 57 is made to operate according to the program predefined for the bump of small diameter under formation.

After the bump of small diameter has been pressed and bound, gate 33 must be brought again under the press by moving it in the direction opposite to arrow f33, but before that, base 120 moves again inside wall 109 and then lower down until it reaches the bottom thereof. Also in this case, in order to prevent the pressed and tied bump from following the base 120 on its lowering, the intervention by the supporting members 64 is caused, each of which comprises a cylinder-piston system whose rod is moved in centripetal direction, and whose run towards the bump and inside the coils of the bump to be sustained must be sufficiently long and adjusted according to the diameter of the bump. On this stage, bumps of larger or smaller diameter, that the plant is able to prepare, can be supported by a predetermined relatively prolonged run of the rods of members 64. By withdrawal of the rods of members 64, the released bump is then made to rest on the upper already re-entered surface of gate 33; on a successive stage, gate 33 is moved again in the direction of arrow f33 as far as positioning the bump outside of the press so that it can be picked up (Fig. 4).

Referring now to the picking up of a bump drawn out from the press and supported by gate 33, Fig. 1 iilustrates the already mentioned device 65 which has pneumatically operated gripping jaws 67 of known type for seizeing from the outside the pressed bumps of larger diameter having diametral fastenings. Device 65 includes also means for lifting the bump to the necessary extent and transferring it above the carriage 70 wherein it is placed by lowering and then piled up, the carriage being predisposed (in the example of the drawing) so as to receive two side-by-side piles. Fig. 4 shows a device 165 for the gripping, transferring and lowering of the bumps having small diameter and a central hole, the device 165 being provided with a mandrel 167 which, by entering the internal hole of the bump, causes the gripping thereof owing to the expansion in radial direction of the jaws of said device. The device 165 picks up the bump of small diameter by means of mandrel 167 in order to place it, through a lifting, translation and lowering, into a box 200 shown in top view in Fig. 5, in which the said bumps are placed so as to form a layer and spaced apart by spacers 172 (six bumps two by two in side-by-side relationship in the example of the drawing). Outside the plant, the group of said bumps of small diameter will be then picked up as a whole (by a suitable multigrip device 201) from the case 200 to be introduced into carriage 170 and form more piles of bumps disposed in superimposed layers.

Obviously, the plant in question will comprise - mounted on a same carriage 69 and separately operable - both the gripping device 65 for the gripping from the outside of bumps of larger diameter, and the gripping device 165 for the expansion-operated gripping from the inside of bumps of smaller diameter, as well as the multigrip device 201 for layers of small bumps - individually shown in Figs. 1, 4, 8A, 8B and 8C -and, according to the diameter of the bumps to be processed, the plant will be programmed to utilize one or the other of devices 65, 165 or 201 by causing them to perform displacements in horizontal and vertical directions.

As it is evident from the foregoing, the plant according to the invention makes up a system by which the bumps formed by the feeding of sliver from the machine 1 are automatically and subsequently pressed, bound, transferred and stacked with a multiseat carriage according to a suitably programmed cycle which breaks off only on the stopping of the sliver delivery. Such plant has particularly reduced overall dimensions, is equipped with all the necessary members for its functioning and, connected with a suitable programming device, is able to operate automatically without requiring the intervention of an operator except for the replacement of the carriage within which the piling up of bumps takes place, once said carriage is completely filled.

Claims

1. Automatic plant for forming, pressing, binding and handling coiled packages, i.e. bumps of sliver of combed fibres or the like, delivered by a coiler of a sliver delivering machine, characterized in that it comprises in combination: a filling station (R) in which said sliver is collected in a first container or vessel (9, 20; 109, 120); a pressing station (P) in which the sliver collected in a second container or vessel (9, 20; 109, 120) is pressed by a press (3), drawn from said container and bound by a binder (50) to form a bump or package; means (33, 64) for drawing the bumps from the pressing station (P) and placeing it under a gripping, lifting and transferring device (65; 165) which places said bound material in a carriage 70, 170); and further means (17, 117) for cyclically and mutually exchanging the positions of the container or vessel (9, 20; 109, 120) in the pressing station and of the container or vessel (9, 20; 109, 120) in the pressing station upon completion of a filling phase and of a pressing and binding phase, respectively.

2. Plant according to claim 1, characterized in that: said first and said second container or vessel (9, 20; 109, 120) have a bottomless cylindrical wall (9; 109) and a base (20; 120) which is upwardly and downwardly movable

inside said cylindrical walls; that in said filling station means (29, 30) are provided for lifting said base (20; 120) of said container (9, 20; 109, 120) before the filling of the container and progressively lowering it during the filling phase; and that in said pressing station means (41, 45) are provided for lifting and lowering said base (20; 120) towards and away from an upper plate (49) of said press (3).

3. Plant according to claim 2, characterized in that means (43, 46) are provided to operate an angular displacement of said means (41, 45) for lifting said base (20; 120) towards said upper plate (49).

4. Plant according to claim 1, characterized in that said means (17) for cyclically and mutually exchanging the positions of the container (9, 20; 109, 120) in the pressing station (P) and of the container (9, 20; 109, 120) in the filling station (R) comprise at least two pairs of arms (21) laterally engaging said two containers, said arms rotating around a vertical axis positioned between said filling and said pressing position.

5. Plant according to claim 4, characterized in that planar surfaces (5, 15) are provided on which said containers are made to slide during their displacement from the filling to the pressing position and vice-versa.

6. Plant according to the preceding claims, characterized in that said means (17; 117) for cyclically and mutually exchanging the position of the container (9, 20; 109, 120) in the pressing station (P) and of the container (9, 20; 109, 120) in the filling station (R) comprise a first set of means (117) for handling containers of smaller diameter and a second set of means (17) for handling containers of larger diameters, said first and said second set of means (17, 117) being offset.

7. Plant according to claim 6, characterized in that said means (17) for cyclically and mutually exchanging the container in the pressing station (P) and the container in the filling station (R) comprise at least four pairs of arms (21, 121), the first two pairs (121) being adapted for engaging containers (109) having smaller diameter, and the second two pairs (21) being adapted for engaging containers (9) having larger diameter.

8. Plant according to the preceding claims, characterized in that each horizontal arm (21, 121) of said means (17; 117) for cyclically and mutually exchange the positions of said containers are provided with idle wheels (25, 125) engaging the outer surfaces of said containers (9, 20; 109, 120).

9. Plant according to claim 1, characterized in that said means (33, 64) for drawing the bumps from the pressing station comprise support means (64) able to keep said bump in a lifted position, and a flat gate member (33) which is horizontally movable under the lifted bump, said support means (64) disposing said bump on said flat gate member (33) when the latter is positioned under said bump, and the displacement of said flat gate member (33) outside the pressing station operating the withdrawal of the pressed and tied bump.

10. Plant according to claims 1 and 9, characterized in that said gripping, lifting and transferring device (65; 165) moves over said flat gate member (33) when the latter is placed outside the pressing station.

11. Plant according to the preceding claims, characterized in that said bases (20; 120) of said containers (9, 20; 100, 120) and said upper plate (49) of said press (3) are provided with channels for the passage of the binding strips during the binding phase of the bump.

12. Plant according to the preceding claims, characterized in that the upper plate (40) of said press (3) is idly supported by a hub (55), and that a positioning member (57) is provided for exactly positioning said upper plate (40) with respect to said binder (50) before binding of the bump.

13. Plant according to claim 11, characterized in that said channels are diametrally disposed and cross each other in the center of said upper plate (49) and of said base (20; 120).

14. Plant according to claim 11, characterized in that said channels are disposed along pairs of parallel chords.

15. Plant according to claim 13 or 14, characterized in that the binder (50) and the counterframe (53) thereof are able to perform movements towards and away from said upper plate (49) and said base (20; 120).

16. Plant according to the preceding claims, characterized in that said bases (20; 120) and said upper plate (49) are replaceable.

17. Plant according to the preceding claims, characterized in that said gripping, lifting and transferring device comprises a first gripping member (65) provided with jaws (67) for the engagement of the external surface of the bumps, and a second gripping member (165) provided with a mandrel (167) having expansion jaws for engaging the internal surface of the central hole of the bumps, said two gripping members being alternatively used, depending on the type of bumps being processed.

FIG.1

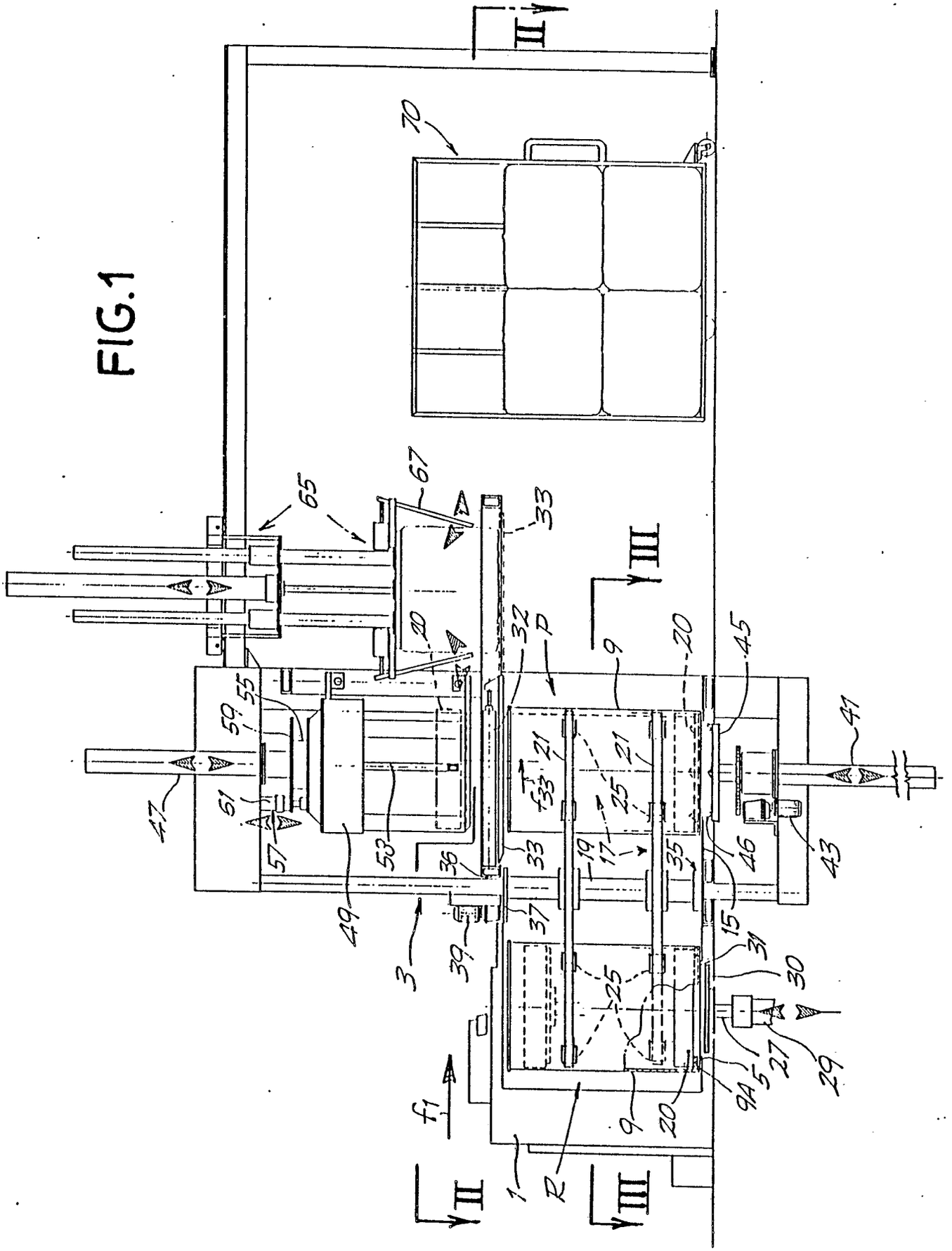
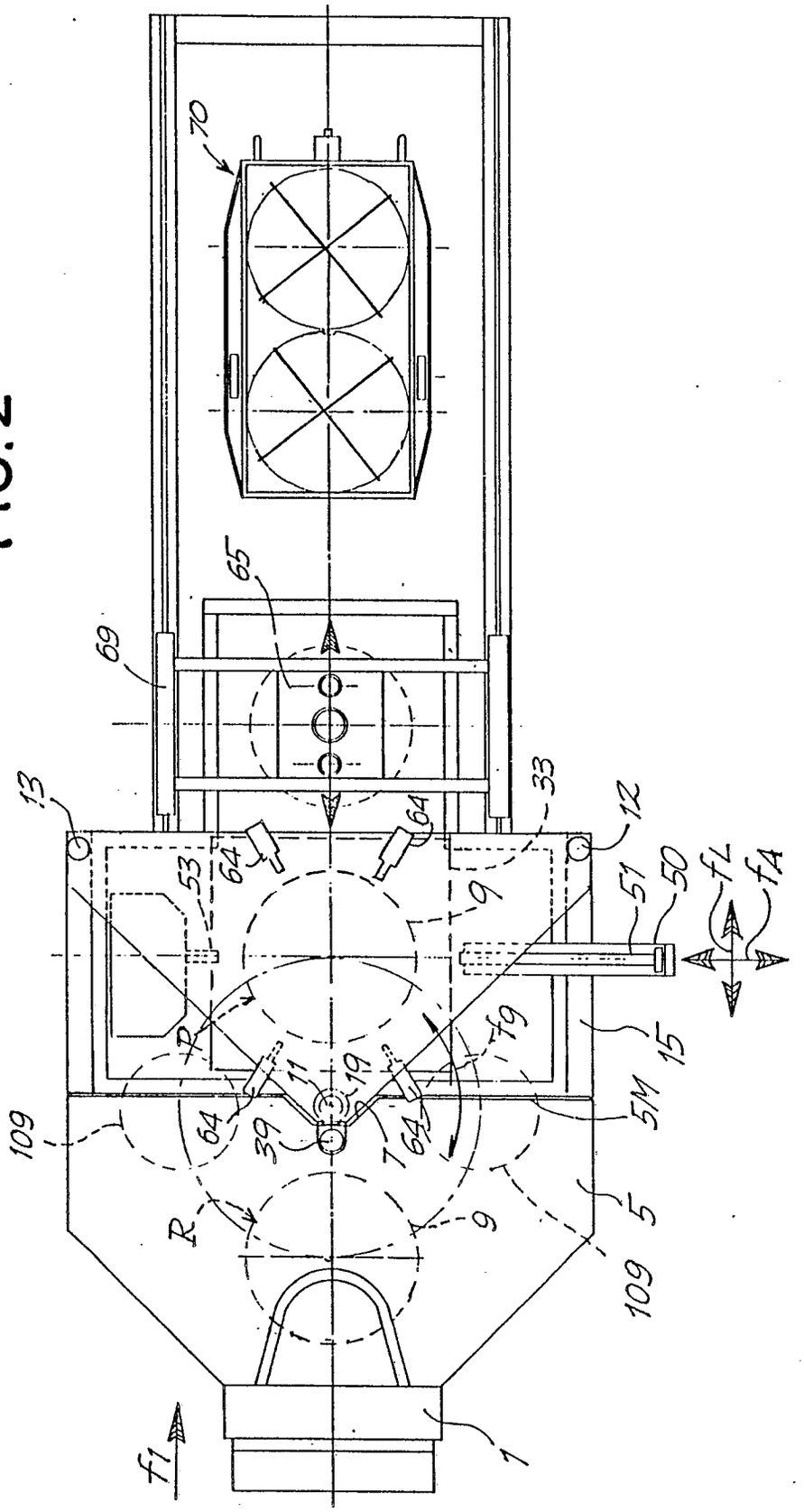

II
III
70
65
67
33
10
32
D
9
20
45
41
59
55
21
25
17
19
35
46
43
47
61
57
53
36
49
37
39
3
15
31
30
27
29
94
F1
1
R

FIG.2



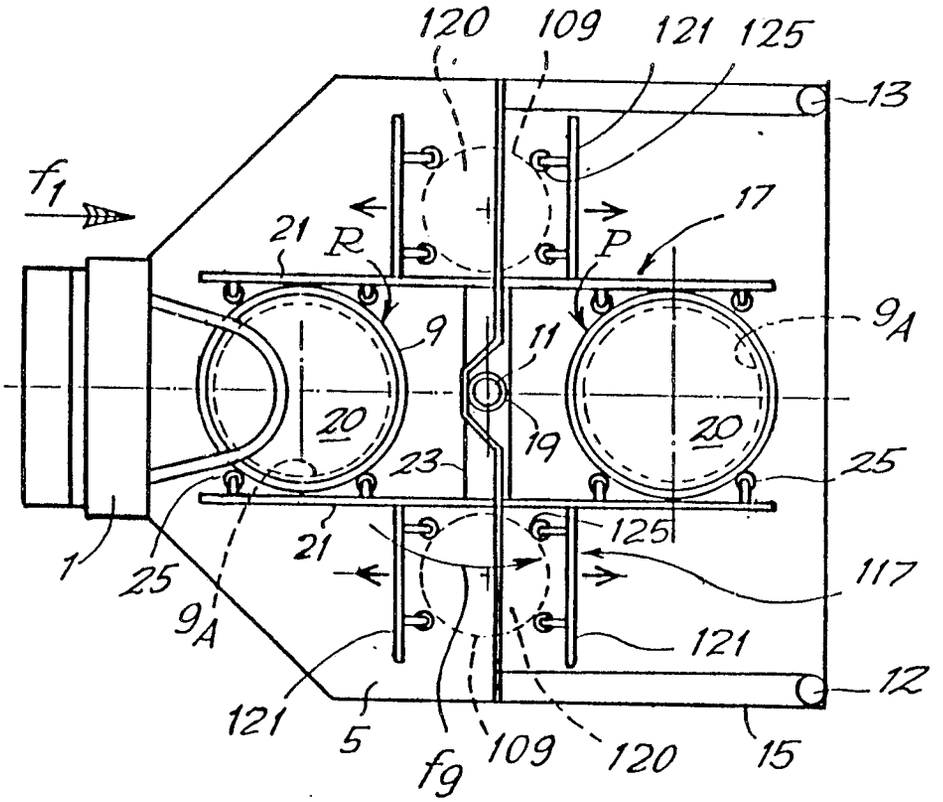

120
109
121
125
13
f_1
21
R
P
17
9
11
9_A
20
19
20
23
25
125
21
117
1
25
9_A
121
121
5
f_9
109
120
15
12

FIG.3

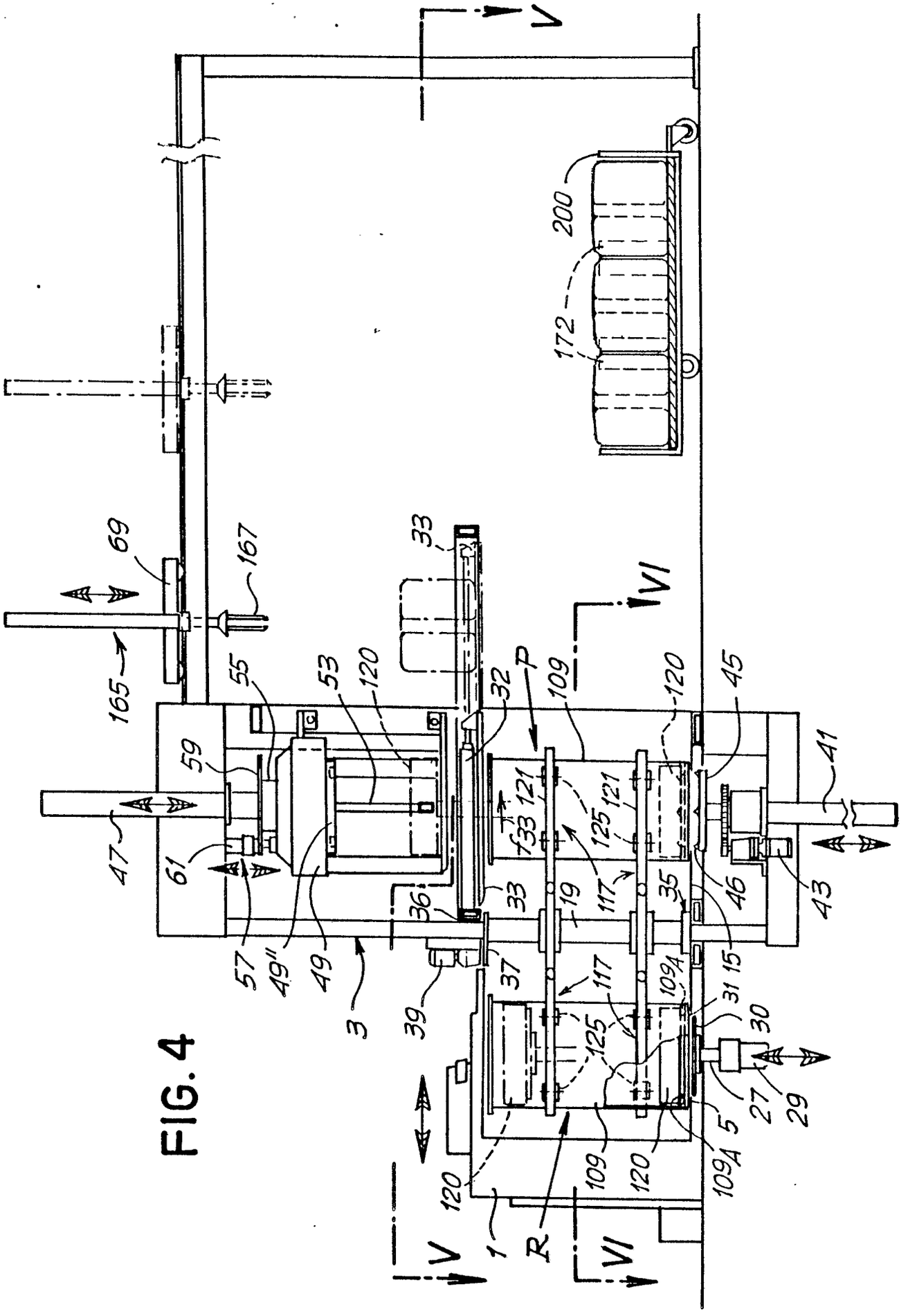

V
200
172
69
167
165
55
53
120
33
VI
32
P
109
120
45
59
41
47
61
121
125
121
133
117
35
46
43
36
33
19
57
49''
49
3
39
37
109A
31
15
30
125
117
27
29
5
120
109
120
109A
1
R
V
VI

FIG. 4

FIG. 5

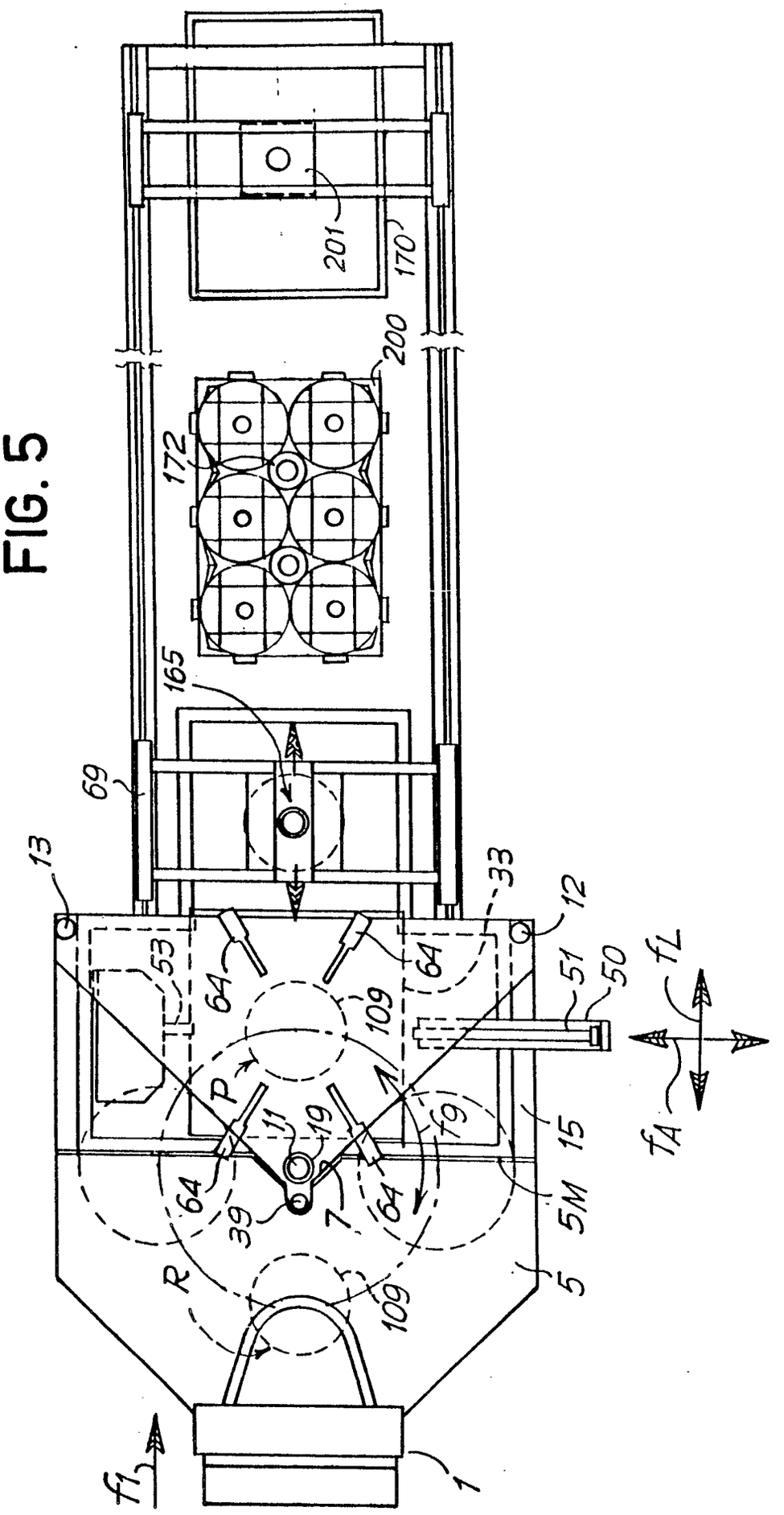
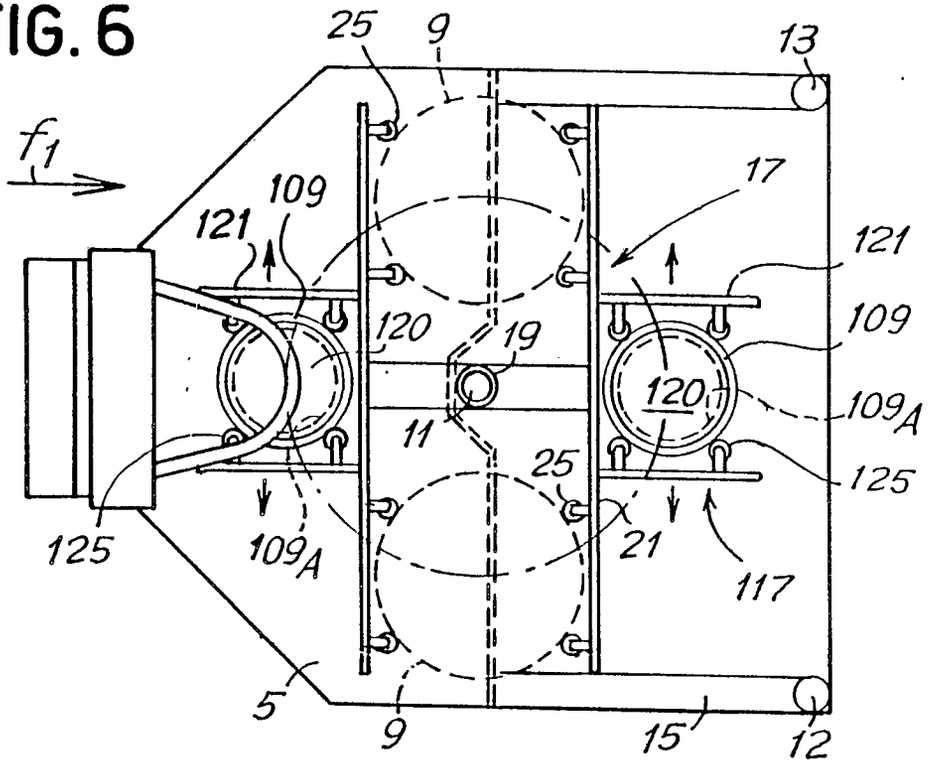

201
170
200
172
165
69
13
33
12
53
64
64
51
50
109
P
11
19
79
15
64
39
7
64
5M
5
R
109
1
f1
fL
fA

FIG. 6


25
9
13
f1
17
109
121
121
120
19
109
120
109A
11
25
125
125
109A
21
117
5
9
15
12

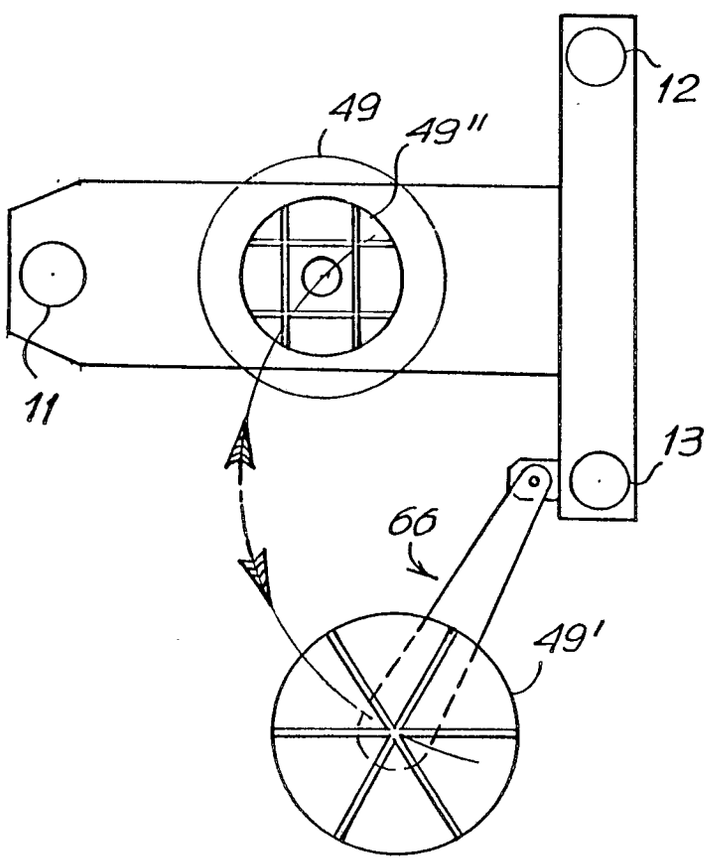

12
49
49''
11
13
66
49'

FIG. 7

Fig.8A

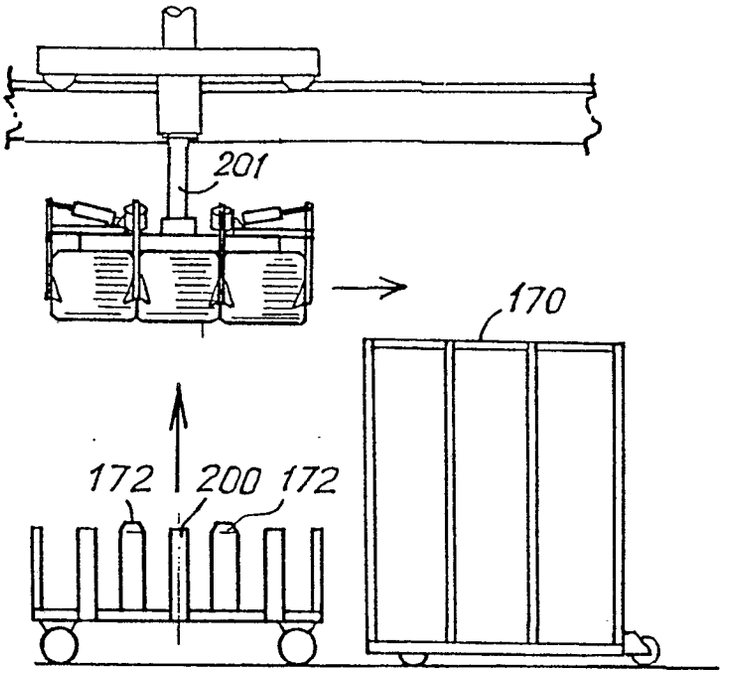


Fig.8B

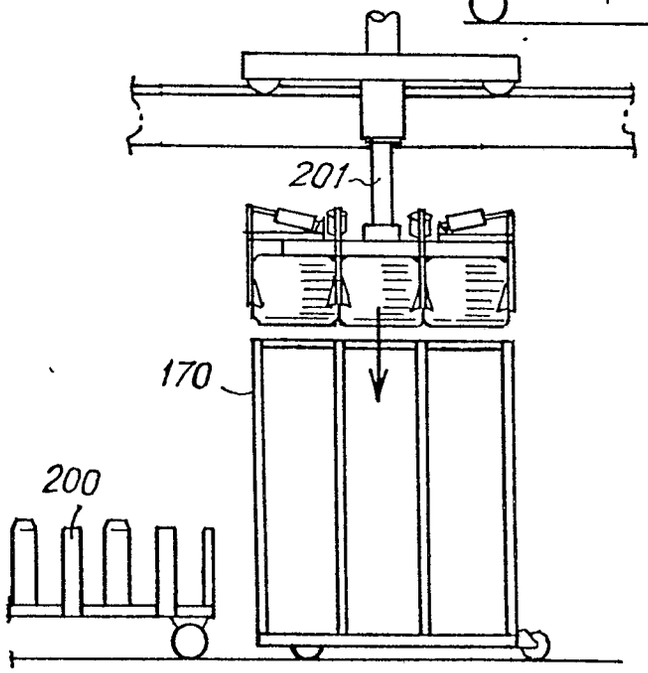
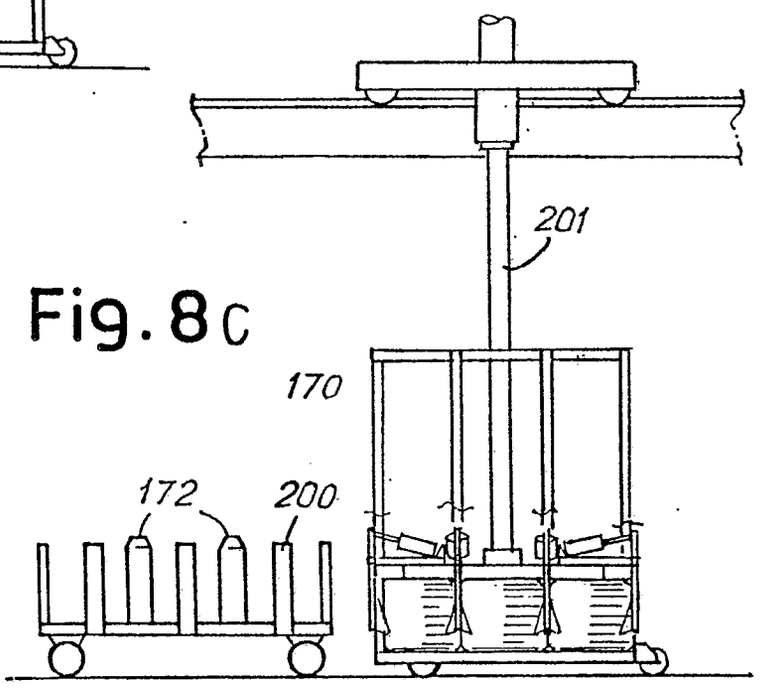


Fig.8C



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 88 83 0526

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	FR-A-2540476 (N SCHLUMBERGER & CIE) * page 5, line 10 - page 6, line 7 *	1,2,3, 11-15	B65H54/84 B65B13/20
A		4,9	
X	EP-A-133422 (GUALCHIERANI & C. S.P.A.) * claims 1-8; figures 1-3 *	1,2,3, 11-15	
A		9,10,17	
P,X	EP-A-277099 (GUALCHIERANI SYSTEM) * the whole document *	1-17	
A	FR-A-2529872 (N SCHLUMBERGER & CIE) * claim 1; figures 1-3 *	1,4,8	
A	FR-A-2223292 (TEMATEX S.P.A.) * claim 1; figures 1, 2 *	1,4,8	
A	GB-A-1166650 (SOCIETE ANONYME FILATURE SAINT LIEVIN) * page 1, line 72 - page 2, line 40 *	1,2,3, 11-16	
A	FR-A-1552706 (TAYLOR WORDSWORTH & CO. LTD) * page 2, left-hand column, line 19 - page 3, left-hand column, line 53 *	1,2, 11-15	TECHNICAL FIELDS SEARCHED (Int. Cl.4) B65H B65B B30B
A	EP-A-194233 (GUALCHIERANI & C. S.P.A.) * the whole document *	9,10,17	
A	US-A-2707806 (R C WILKIE)		
A	FR-A-2345382 (TORAY INDUSTRIES, INC.)		
A	DE-A-2428730 (BATTELLE INSTITUT E.V.)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08 MARCH 1989	D HULSTER E.W.F.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)