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(54) **Method and device for wrapping a bouquet**

(57) The invention relates to a method for packing bunches of flowers (43), comprising of providing a supply of sleeves (3) of foil material, opening a sleeve (3), placing a bunch of flowers (43) in the opened sleeve (3) and discharging the bunch of flowers (43) packed into the sleeve (3). According to the invention the sleeve (3) is engaged before the sleeve (3) is opened.

The invention also relates to an apparatus (1) for packing bunches of flowers (43), comprising a frame (4), a holder (2) for a supply of sleeves (3) of foil material, opening means (17,18,32) for opening the sleeve (3) and discharge means (49) for packed bunches of flowers (43). According to the invention the opening means (17,18,32) comprise at least one engaging means for a sleeve (3).

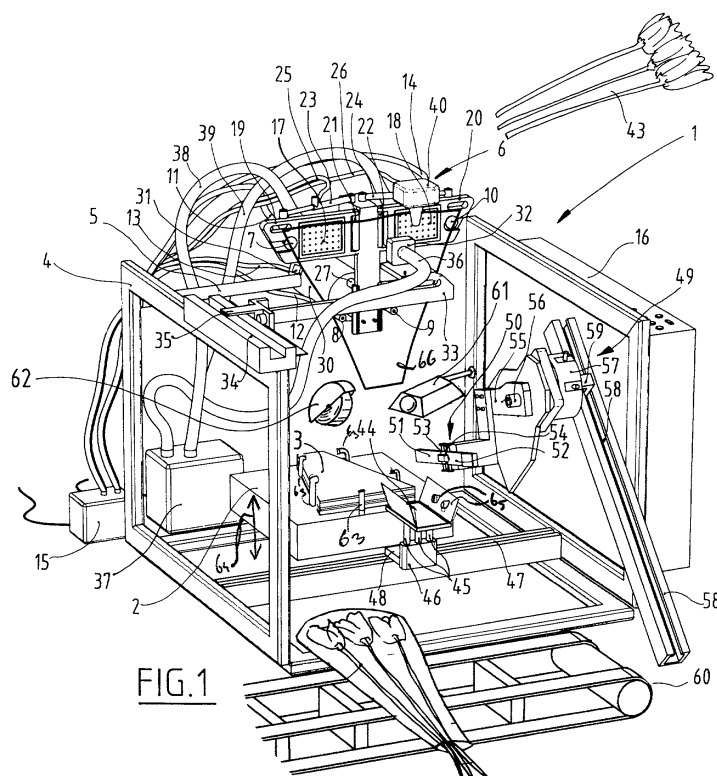


FIG.1

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Description

[0001] The invention relates to a method for packing bunches of flowers, comprising of providing a store of sleeves of foil material, opening a single sleeve into a funnel shape, placing a bunch of flowers in the opened sleeve, and discharging the bunch packed into the sleeve. The invention also relates to an apparatus for packing bunches of flowers. The invention also relates to a method and an apparatus for providing sleeved bunches of flowers.

[0002] Such a packing method is known from NL 9002555. A lying stack of sleeves is provided here, wherein a sleeve is blown open with air from a blow nozzle. A bunch of flowers is placed with an arm into the opened sleeve, wherein the arm is moved through the whole sleeve.

[0003] A drawback to the known method is that opening of the sleeve is not ensured.

[0004] The invention has for its object to provide a packing method of the type specified in the preamble wherein this drawback is alleviated.

[0005] This object is achieved in a packing method according to the invention in that a sleeve is engaged prior to opening. It is hereby possible to open a sleeve and use it as packing for a bunch of flowers.

[0006] In the preferred embodiment a folded sleeve is engaged on two sides. It hereby becomes possible to pull the two sides of the sleeve away from each other.

[0007] In a further preferred embodiment the sleeve is engaged close to the wide outer end. The sleeve is hereby opened such that air can flow into the sleeve. The sleeves are formed such that both sides of a folded sleeve lie on each other with substantially no air therebetween. An airflow is used to separate the two sides.

[0008] An airflow is preferably also applied to the outer end of the opened sleeve. Both sides of the whole sleeve can hereby be released from each other.

[0009] A supply of sleeves is preferably provided in the form of a lying stack of loose sleeves. A single sleeve can hereby be engaged without excessive forces being necessary for this purpose in order to separate the single sleeve from the rest of the stack.

[0010] The sleeve is preferably engaged and carried to an upright position. It hereby becomes possible to arrange a bunch of flowers from above into the larger opening of the funnel-shaped sleeve. The sleeve is rotated from a horizontal position to a vertical position.

[0011] In a further preferred embodiment the lying stack of loose sleeves is replenished. This enables continuous production.

[0012] The sleeve is preferably filled in an upright position. Use can hereby be made of the force of gravity, whereby a bunch is placed in the sleeve. No engaging means is then required for placing the bunch. Precise positioning of the bunch before it is placed on or in the sleeve is hereby no longer necessary.

[0013] The presence of a bunch of flowers in the

sleeve is preferably detected. The different steps for handling of the packing can hereby be detected. The discharge of the sleeved bunch depends on the presence of a bunch.

[0014] The invention likewise relates to and provides an apparatus for packing bunches of flowers comprising a holder for a supply of sleeves of foil material, opening means for opening the sleeve into a funnel form and discharge means for packed bunches of flowers.

[0015] Such an apparatus is known from NL 9002555. The drawback of the known machine is that opening of the sleeve is not ensured. The invention is characterized by opening means which comprise at least one engaging means for a sleeve. A sleeve is hereby engaged and opened.

[0016] The apparatus for packing bunches of flowers preferably comprises pick-up means which pick up a sleeve from the supply. Filling of the sleeves can hereby take place at a location at a distance from the supply location. This prevents an error during filling resulting in a disruption of the supply.

[0017] The opening means preferably comprise at least two engaging means. A sleeve is hereby engaged on two sides. The engaging means can move away from each other, whereby the sleeve is opened.

[0018] The apparatus for packing bunches of flowers preferably comprises a holder for a lying stack of loose sleeves. A supply of funnel-shaped sleeves is preferably supported. The funnel-shaped sleeves lie loosely in a stack on a holder. One sleeve at a time is hereby engaged.

[0019] A clamping means is preferably arranged to hold the supply of loose sleeves in its place. Shifting of the sleeves is hereby prevented. The clamping means is for instance a connection to the narrow end of the sleeves or a means which presses the sleeves onto each other.

[0020] In the preferred embodiment the opening means comprise at least two engaging members which can engage close to the peripheral edge of a sleeve on the end of the funnel shape with the larger periphery, and which are movable away from each other. This movement causes the funnel shape to open on a top side, the larger peripheral side.

[0021] According to an advantageous measure the engaging members can be embodied as suction members. This provides an engaging means at low cost.

[0022] In addition, a blowing means is preferably placed above the suction members, so that the usually adhering sleeve is fully opened. The air pulse blows the sleeve open from the top to the bottom.

[0023] The engaging members are preferably embodied movably so that they can adjust to the round shape of the peripheral edge of the sleeve. Picking-up of the sleeve preferably takes place from a flat stack. The peripheral edge of the opening is preferably round. The engaging members preferably adjust thereto.

[0024] The pick-up means preferably comprise at

least one vacuum pump and at least one suction member. The suction members are embodied such that one loose sleeve is picked up from a stack of sleeves.

[0025] Different engaging members are preferably arranged for picking up and for opening. The method and strength of engagement can hereby be apportioned in favourable manner in accordance with the function of the engaging means. A low force is necessary for engaging and picking up the sleeve. More force is usually required for engaging and opening.

[0026] The moment of engagement of the respective engaging means preferably differs. The sleeve is first engaged from the supply by the pick-up means. The sleeve is then opened, wherein the opening means are switched on.

[0027] Pick-up means preferably comprise bellows suction cups. A sleeve can hereby be engaged locally. The bellows suction cups are connected to a vacuum pump. The vacuum pump sucks through the bellows suction cup and causes it to engage on the sleeve. In the free state the bellows protrudes slightly out of the suction cup. When the suction member engages on a loose sleeve, the bellows is pressed together so that the sleeve is picked up from the stack of sleeves close to that point of engagement. An air space is thus created between one engaged sleeve and the stack of sleeves.

[0028] The opening means preferably comprise large surface area suction members. The sleeve can hereby be engaged over a large area, whereby it is possible to work with more force.

[0029] According to a favourable measure of the invention the stack of sleeves is placed on a holder. This holder is height-adjustable. It is thus possible to correct for the height loss due to one sleeve at a time being removed the stack of sleeves. The pick-up means are placed in each case in the same position in relation to the uppermost sleeve of the stack of sleeves. The height-adjustable holder provides for height correction of the uppermost sleeve of the supply.

[0030] In a particularly efficient embodiment a detection means, for instance a photocell, is arranged which detects the position of the sleeve to be engaged and coacts with the height-adjustable holder such that the position of the sleeve to be engaged always corresponds with the determined engaging position.

[0031] The apparatus according to the invention is preferably embodied with a sticker means, for instance a rotating cylinder with a roll of stickers. The sticker means is adapted such that before the sleeve is engaged by the pick-up means a sticker is placed on the sleeve to be engaged. The sticker means can be embodied in known manner.

[0032] According to a further favourable development the apparatus also comprises engaging means which engage a bunch of flowers and place it in the opened sleeve. In this way the placing of the bunch in the sleeve is embodied in precise manner.

[0033] Providing particular advantage are the dis-

charge means which are formed by a movable engaging means which engages and discharges a packed bunch of flowers. The packed bunch can be placed for instance on a conveyor belt.

[0034] A bunch of flowers placed in the sleeve is preferably supported on the underside. The support is movable between two positions, a first position wherein the support supports the bunch and a second position wherein the support is situated at a distance therefrom. The support is situated in the first position from the moment immediately before placing of the bunch in the opened sleeve to the moment immediately after the discharge means have engaged the bunch. When the support is situated at a distance, the discharge means begin with the discharge movement.

[0035] The invention also relates to a discharge system for bunches of flowers in a sleeve. A sleeve filled with a bunch is discharged to a conveyor belt. The invention is characterized by engaging the bunch of flowers and moving the sleeved bunch to the conveyor belt and placing of the bunch on the conveyor belt.

[0036] An engaging means preferably engages on the stalks of the bunch.

[0037] The sleeve is preferably filled in a standing position and the engaging member rotates the sleeved bunch to a lying position. Packed, individualized and sleeved bunches of flowers are hereby provided.

[0038] Other embodiments of the discharge system are described above or will become apparent with reference to the annexed drawings.

[0039] The invention will be further elucidated in the following description with reference to the annexed figures.

[0040] Figure 1 is a perspective view of the apparatus for packing bunches of flowers according to the invention.

[0041] Figures 2A-C show different positions of the apparatus for packing bunches of flowers according to figure 1.

[0042] Figure 1 shows apparatus 1 for packing bunches of flowers. The holder 2 carries a stack of loose sleeves 3 which can be engaged from above. Holder 2 can move up and downward as according to arrow 64. The stack of sleeves is surrounded by a number of pins 63. Holder 2 is a drawer which is easily exchangeable. When the stack of sleeves is used up, a new drawer with a stack of sleeves can replace the empty drawer. The drawer can also be embodied without pins 63. In another embodiment the sleeves 3 can be torn off on the narrow open side from a stack.

[0043] Arm 5 is mounted on frame 4. Connected pivotally to arm 5 is pivotable frame 6 with the pick-up means and a part of the opening means. In this embodiment the pick-up means are formed by four suction members 7, 8, 9 and 10 mounted on a cross-shaped part of pivotable frame 6. Suction members 7-10 are each connected via a hose 11-14 to a controllable vacuum pump 15. Suction members 7-10 are embodied as

bellows suction cups. The bellows protrudes slightly beyond the suction cups which are connected to vacuum pump 15. The suction of vacuum pump 15 is controlled by a control device 16. This control device 16 in this way controls the moments at which suction members 7-10 can apply suction.

[0044] Pivotal frame 6 also comprises large surface area suction members 17 and 18. This is a surface with a plurality of suction nozzles. Suction members 17 and 18 are part of the opening means which open a loose sleeve 66. Suction member 7 and suction member 17 respectively suction member 18 and suction member 10 are mounted on pivotal arm 19 respectively 20. Pivotal arms 19, 20 are connected to the pivotal frame 6 with hinges 21 respectively 22, as well as pneumatic cylinders 23 and 24. The pneumatic cylinders are controlled via hoses 25, 26 by control device 16. Arms 19 and 20 can pivot about hinges 21 and 22.

[0045] Suction members 17, 18 are likewise controlled by control device 16. These suction members 17, 18 will only be set into operation after the sleeve 66 is picked up from stack 3 by the pick-up means formed by suction members 7-10.

[0046] The cross-shaped part with the six suction members 7-10, 17 and 18 is connected by means of three piston shafts 27-29 to pneumatic cylinder 30. The cross-shaped part and pneumatic cylinder 30 form the pivotal frame 6. Pneumatic cylinder 30 is mounted pivotally on arm 5. A pivoting means 31 controls the pivoting movement of pivotal frame 6. Pivoting means 31 is controlled by control device 16. The same is the case for pneumatic cylinder 30.

[0047] The opening means are formed by suction members 17 and 18 and suction member 32. This latter is arranged on an arm 33 which is moved in controlled manner over a guide track 34. Drive means 35 provides the driving and is controlled by control device 16. As shown in figure 1, arm 33 and suction member 32 can move in controlled manner to the front and rear along a guide track 34. In its rearmost position suction member 32 is situated close to or against the cross-shaped part of pivotal frame 6. Suction member 32 is connected via hose 36 to compressor 37. This is the same compressor as the one connected to hoses 38 and 39 which are connected to suction members 17 and 18. This compressor is also controlled by control device 16.

[0048] A blowing means 40 is arranged above pivotal frame 6 and above arm 33 with suction member 32. The blowing means is oriented with the nozzle downward in the direction of the inside of the opened sleeve 66 which is situated between suction members 17, 18 and 32. Blowing means 40 sends an additional air pulse into the opened sleeve in order to ensure that sleeve 66 is fully opened, not only on the top side but also on the underside of the funnel shape.

[0049] Opening means 17, 18 and 32 engage on the larger peripheral edge of funnel-shaped sleeve 66. In the opened position the sleeve 66 is able to receive a

bunch of flowers 43 therein. Bunch 43 of random composition is arranged in funnel-shaped sleeve 66 with the, in this case, flowers upward. The stalk ends protrude through the opening on the underside of funnel-shaped sleeve 66.

[0050] The bunch can be placed by hand in the opened sleeve. It is possible to use a torsional conveyor belt. Individualized bunches are herein carried from a horizontal position on a conveyor belt to a vertical position. The bunch is then engaged in this vertical position, for instance on the stalk by an engaging means, and carried above the opened sleeve. The bunch is then released. Gravity will cause the bunch to drop into the sleeve.

[0051] Bunch of flowers 43 is caught and supported on the underside by support 44. Support 44 is connected via three piston shafts 45 to a second pneumatic cylinder 46. Cylinder 46 is controlled by control device 16 and moves over a second guide track 47 transversely of the first guide track 34. Present for the movement over guide track 47 is a drive means 48 controlled by control device 16. In its extreme position to the left, as according to figure 1, support 44 is situated directly under funnel-shaped sleeve 66. Support 44 is situated in this position at the moment immediately before arranging of a bunch 43 in sleeve 66. Immediately after the moment that bunch 43 is engaged by discharge means 49, support 44 moves over guide track 47 to the extreme position on the right, just after support 44 is first moved downward by pneumatic cylinder 46 via piston shafts 45. In this extreme position to the right on guide track 47, support 44 is situated outside the reach of the movement space of bunch 43 and discharge means 49.

[0052] Support 44 is provided with detection means 65. These detection means are likewise coupled to control device 16. Only when the presence of a bunch of flowers, in particular the stalks of a bunch, is detected will the sleeved bunch be discharged.

[0053] Discharge means 49 is assembled inter alia from engaging means 50 which consists of two engaging arms 51, 52 which are pivotable on a respective hinge 53, 54 and which can engage clampingly on or close to the end of the stalk of a bunch of flowers 43 situated on support 44. Discharge means 49 also comprises an arm 55 which is connected to a shaft 56. This latter is pivotally connected to a drive means 57, for instance a motor, which is controlled by control device 16 such that shaft 56 is rotatable on its own axis and the whole of engaging means 50 and arm 55 is thereby pivotable. The whole can be moved over a guide track 58 by means of a motor 59 controlled by control device 16 in a manner such that an engaged bunch is discharged and placed on a conveyor belt 60.

[0054] Detection means 61, embodied as photocell, is also mounted on frame 4 for localizing the upper sleeve of the stack of sleeves 3. It is connected to control device 16 so that the position of holder 2 can be adjusted such that the position of the sleeve for engaging, the

uppermost one of the stack of sleeves, corresponds with the determined engaging position.

[0055] Sticker means 62 is mounted on frame 4. It is situated at a position such that a sticker can be arranged on the uppermost sleeve of the stack of loose sleeves 3 carried by holder 2. The drawer 2 is displaceable for this purpose as according to arrow 64, and stack 3 can be brought into contact with the sticker means.

[0056] Figures 2A-C show different positions of the apparatus on the basis of which the method for packing a bunch of flowers will be elucidated. The reference numerals which will be used are the same as in figure 1. The whole method is controlled by control device 16.

[0057] Figure 2A shows the starting position of apparatus 1 for packing bunches of flowers according to the invention. A stack of loose sleeves 3 is situated on holder 2.

[0058] The uppermost sleeve of the stack of loose sleeves 3 is provided by sticker means 62 with a sticker. Sticker means 62 is placed such that it does not lie in the path of movement of pivotable frame 6. The sticker means is embodied in the usual manner.

[0059] The pick-up means formed by suction members 7-10, embodied as bellows suction cups, mounted on pivotable frame 6 are oriented with the nozzle downward. Pivoting means 31 has pivoted pivotable frame 6 90° relative to figure 1. The pick-up means will engage on the uppermost loose sleeve of the stack of loose sleeves 3. The cross-shaped part of pivotable frame 6 is moved downward as according to arrow 70, wherein piston shafts 27-29 become longer through the action of pneumatic cylinder 30. The cross-shaped part is then situated directly above or against the uppermost sleeve of the stack of loose sleeves 3.

[0060] Detection means 61, embodied as photocell, detects the position of the uppermost sleeve of the stack of loose sleeves 3. When the sleeve is not situated at the determined position and detection means 61 detects this, a signal is transmitted to control device 16 which then corrects the position of holder 2 such that the determined position is assumed by the uppermost sleeve of the stack of sleeves 3. Holder 2 can move as according to arrow 70.

[0061] The pick-up means engage the loose sleeve. Suction members 7 and 10, embodied as bellows suction cups, engage on the uppermost sleeve of the stack of loose sleeves 3. When the loose sleeve 66 is engaged by suction members 7 and 10, the bellows will be contracted by the action of the vacuum, whereby loose sleeve 66 is picked up from the stack of sleeves 3. On one side of the sleeve with the larger peripheral edge there is created an air opening between the uppermost loose sleeve 66 and the stack of sleeves 3. Sleeve 66 is now separated from the stack of sleeves 3. The cross-shaped part is then moved upward as according to arrow 70 through the action of pneumatic cylinder 30.

[0062] Support 44 is simultaneously moved over guide track 47 to below the position where the bunch 43

will be arranged. Support 44 moves in the direction of arrow 71 along guide track 47. Piston shafts 45 and second pneumatic cylinder 46 are situated in the lowest position, whereby support 44 is also situated in the lowest position.

[0063] Discharge means 49 will move along guide track 58 as according to arrow 72. Drive means 59 provides this movement.

[0064] Figure 2B shows apparatus 1 for packing bunches of flowers in a second position. Pivotable frame 6 is rotated 90° as according to arrow 73. The cross-shaped part with the suction members is situated in a vertical position. This is also the case for sleeve 66. This latter is still engaged by suction members 7-10. Suction members 7-10 will also pick up sleeve 66.

[0065] Suction member 32 will move forward as according to arrow 74 to a position close to or against sleeve 66. Suction member 32 will pick up sleeve 66.

[0066] Discharge means 49 is situated in the position shown, wherein it is moved to one side of guide track 58. Drive means 57 pivot the whole of engaging means 50 and arms 51, 52 as according to arrow 75.

[0067] Figure 2B otherwise shows a loose drawer 67 with a supply of sleeves 68 which can be placed at the location of drawer 2.

[0068] Figure 2C shows the opened sleeve 66 already filled with a bunch and engaged by discharge means 49.

[0069] Support 44 is moved upward as according to arrow 76 by means of piston shafts 45 and second pneumatic cylinder 46. Support 44 is moved upward such that a bunch 43 is received at the correct position in sleeve 66 when the end of the bunch rests on support 44.

[0070] Suction member 32 is moved to the rear over guide track 34 and engages on or close to the peripheral edge of the sleeve. The opening means made up of suction members 17, 18 and 32 pull the larger peripheral edge of the sleeve open.

[0071] Simultaneously with the movement of suction member 32, pivotable arms 19 and 20 move as according to arrows 78 respectively 79. They herein pivot inward in accordance with the shape of the peripheral edge of sleeve 66. This movement is brought about by pneumatic cylinders 23 respectively 24.

[0072] The opened but still not filled sleeve 66 is then fully opened by means of an air pulse generated by blowing means 40 in the direction of arrow 80. The air pulse provides full opening, also of the end with the smaller peripheral edge, of funnel-shaped sleeve 66.

[0073] Bunch 43 is then arranged as according to arrow 81, for instance by a motorized engaging means or a conveyor belt from which the bunch falls. The bunch drops downward through funnel-shaped sleeve 66 and its stalks eventually find support on support 44.

[0074] As soon as the bunch has come to rest on support 44, this is detected by detecting means 65. Control device 16 actuates engaging arms 51 and 52 which will engage on the stalk end of bunch 43, as indicated by arrows 82 and 83.

[0075] Discharge means 49 engages on bunch 43 received in sleeve 66 and will discharge the bunch to conveyor belt 60. This is carried out by a pivoting movement as according to arrow 84 about axis 56 simultaneously with a carrying-away movement as according to arrow 85 over guide track 58. Immediately after arms 51 and 52 engage on the ends of bunch 43, the support 44 is also moved downward as according to arrow 76 and moved away over guide track 34 as according to arrow 86. In this position support 44 does not lie in the movement space of bunch 43 and sleeve 66. Discharge means 49 ends in the position as shown in figure 2A. Bunch 43 finishes up on the conveyor belt 60 as in figure 2A.

[0076] Figure 3 shows a detail of a second embodiment of an apparatus for packing bunches of flowers according to the invention. Shown is an embodiment wherein the opened end of a sleeve 66 is shown in a position as according to figure 2C. The upper edge of sleeve 66 is protected by two plates 87,88 which are pivotally connected to the frame. Plate 87 can pivot as according to arrow 89. The plate protects the edge of the sleeve and enlarges the funnel shape of the sleeve. Plate 88 is pivotable as according to arrow 90 and connected to the pivotable part 6, and fulfills the same function. The plates are mounted in usual manner.

Claims

1. Method for packing bunches of flowers, comprising of providing a supply of sleeves of foil material, opening a sleeve into a funnel shape, placing a bunch of flowers in the opened sleeve and discharging the bunch packed into the sleeve, **characterized by** engaging the sleeve prior to opening.
2. Method as claimed in claim 1, **characterized in that** a folded sleeve is engaged on two sides.
3. Method as claimed in claim 1 or 2, **characterized in that** the sleeve is engaged close to the wide open end.
4. Method as claimed in any of the claims 1-3, **characterized by** applying an airflow directed in the direction of the wide end of the sleeve.
5. Method as claimed in any of the claims 1-4, **characterized by** providing a supply of sleeves in the form of a lying stack of loose sleeves.
6. Method as claimed in any of the claims 1-5, **characterized by** picking up a sleeve from a lying stack and carrying the sleeve to a vertical position.
7. Apparatus for packing bunches of flowers, comprising a frame, a holder for a supply of sleeves of foil material, opening means for opening the sleeve and discharge means for packed bunches of flowers, **characterized in that** the opening means comprise at least one engaging means for a sleeve.
8. Apparatus for packing bunches of flowers as claimed in claim 7, **characterized in that** the apparatus for packing bunches of flowers comprises pick-up means which pick up a sleeve from the supply.
9. Apparatus for packing bunches of flowers as claimed in claim 7 or 8, **characterized in that** the opening means comprise at least two engaging means.
10. Apparatus for packing bunches of flowers as claimed in any of the claims 7-9, **characterized in that** the supply of sleeves is formed by a lying stack of loose sleeves.
11. Apparatus for packing bunches of flowers as claimed in any of the claims 7-10, **characterized in that** the opening means can engage on two sides of a folded sleeve.
12. Apparatus for packing bunches of flowers as claimed in claim 11, **characterized in that** the opening means are movable away from each other and that the opening means comprise a blowing means which is directed at the space between the opening means movable away from each other.
13. Apparatus for packing bunches of flowers as claimed in any of the claims 7-12, **characterized in that** the holder for a supply of sleeves is connected movably to the frame.
14. Apparatus for packing bunches of flowers as claimed in any of the claims 7-13, **characterized in that** at least one of the opening means comprises a suction member and that the opening means also comprise a vacuum pump.
15. Apparatus for packing bunches of flowers as claimed in any of the claims 7-14, **characterized in that** at least two opening means are movable through an angle.
16. Discharge device for bunches of flowers in a sleeve, comprising discharge means for carrying a sleeved bunch of flowers to a conveyor belt, **characterized in that** engaging means engage the bunch of flowers and the engaging means are connected movably to a frame, wherein the engaging means can carry the sleeved bunch to the conveyor belt.
17. Discharge device as claimed in claim 16, wherein

the engaging means can engage on the stalk of a bunch of flowers.

- 18.** Discharge device as claimed in claim 16 or 17, wherein engaging means can engage the bunch of flowers sleeved in a substantially vertical position and rotate it so that the sleeved bunch can be placed on the conveyor belt in a substantially horizontal position.

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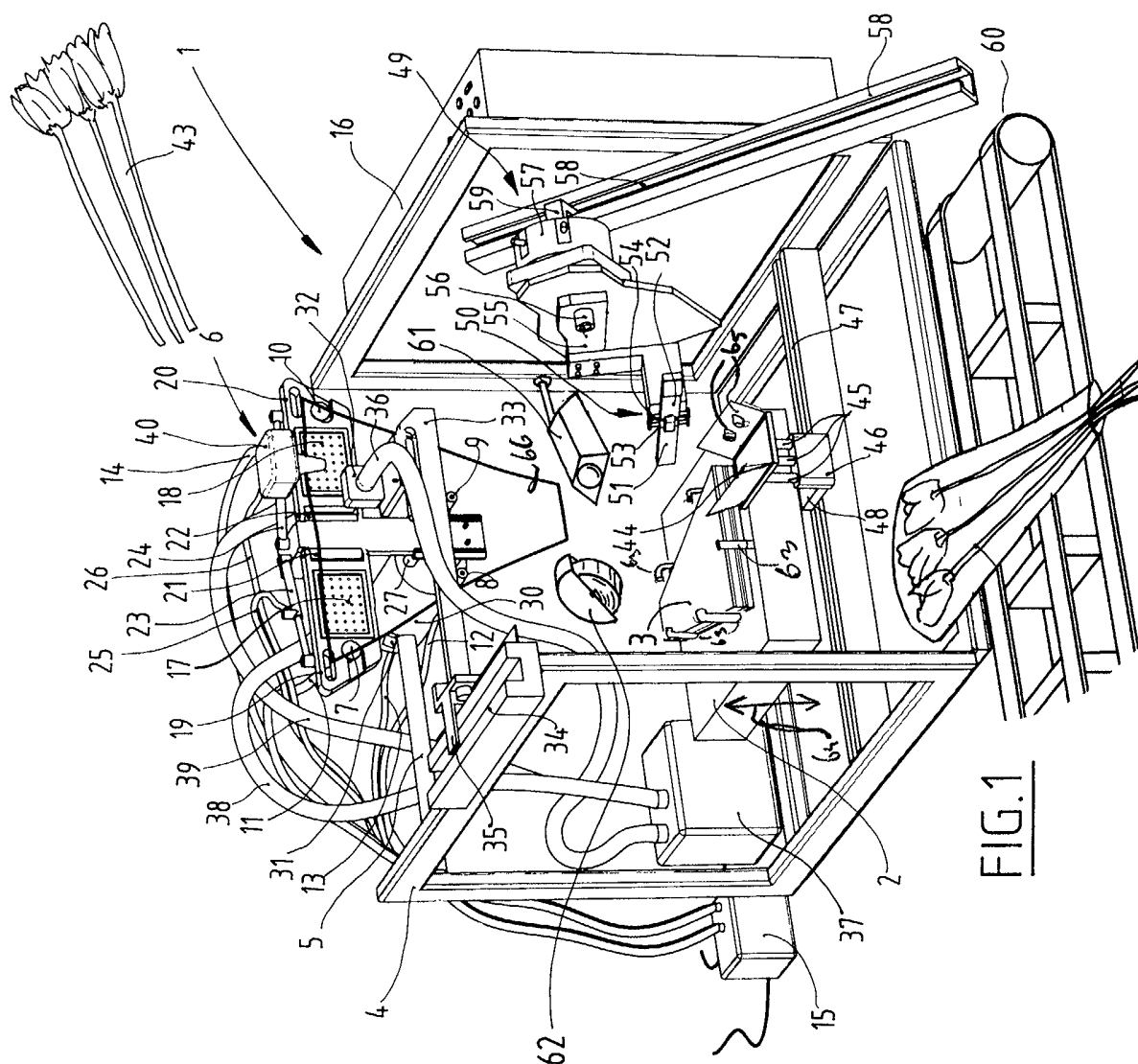
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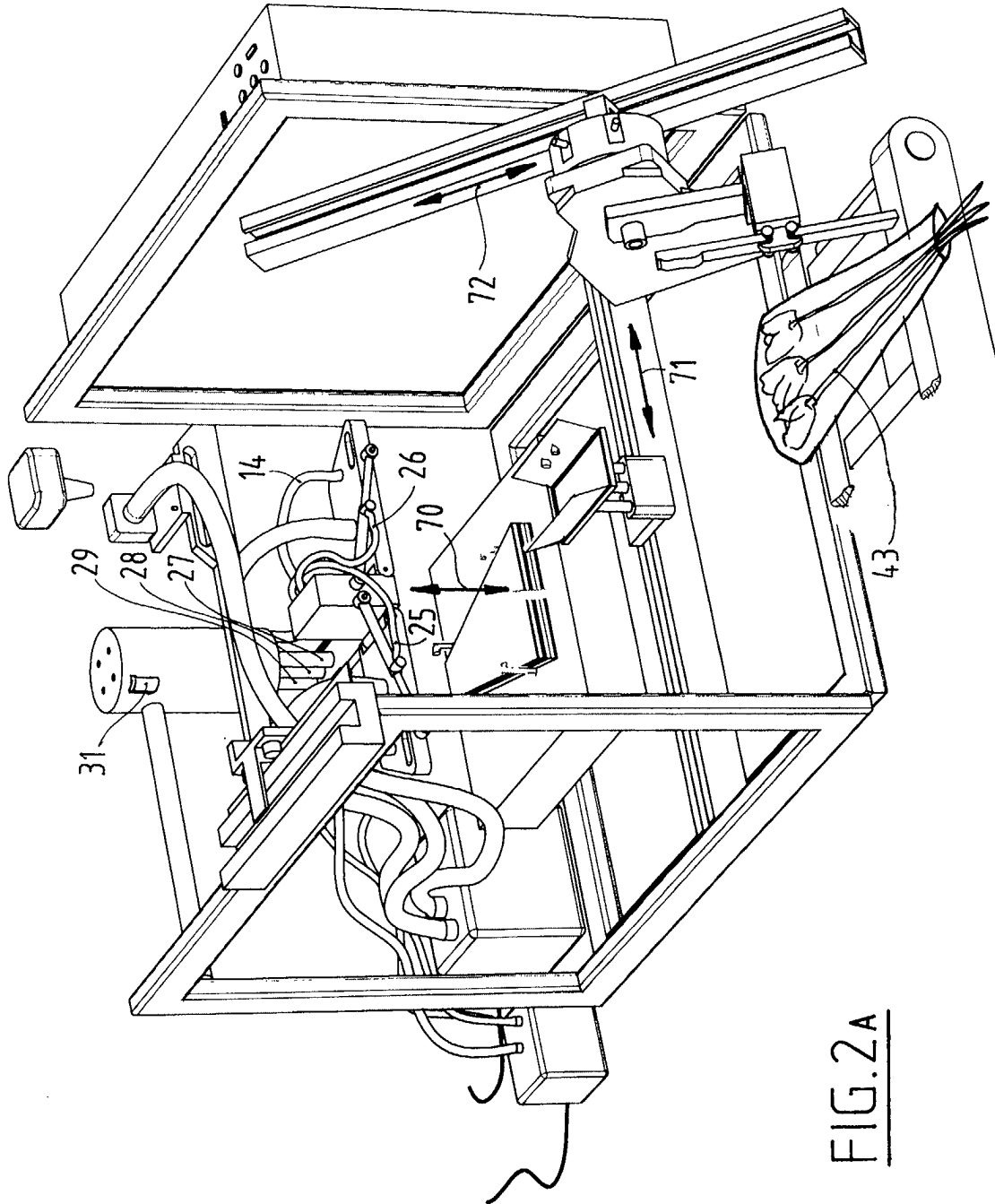
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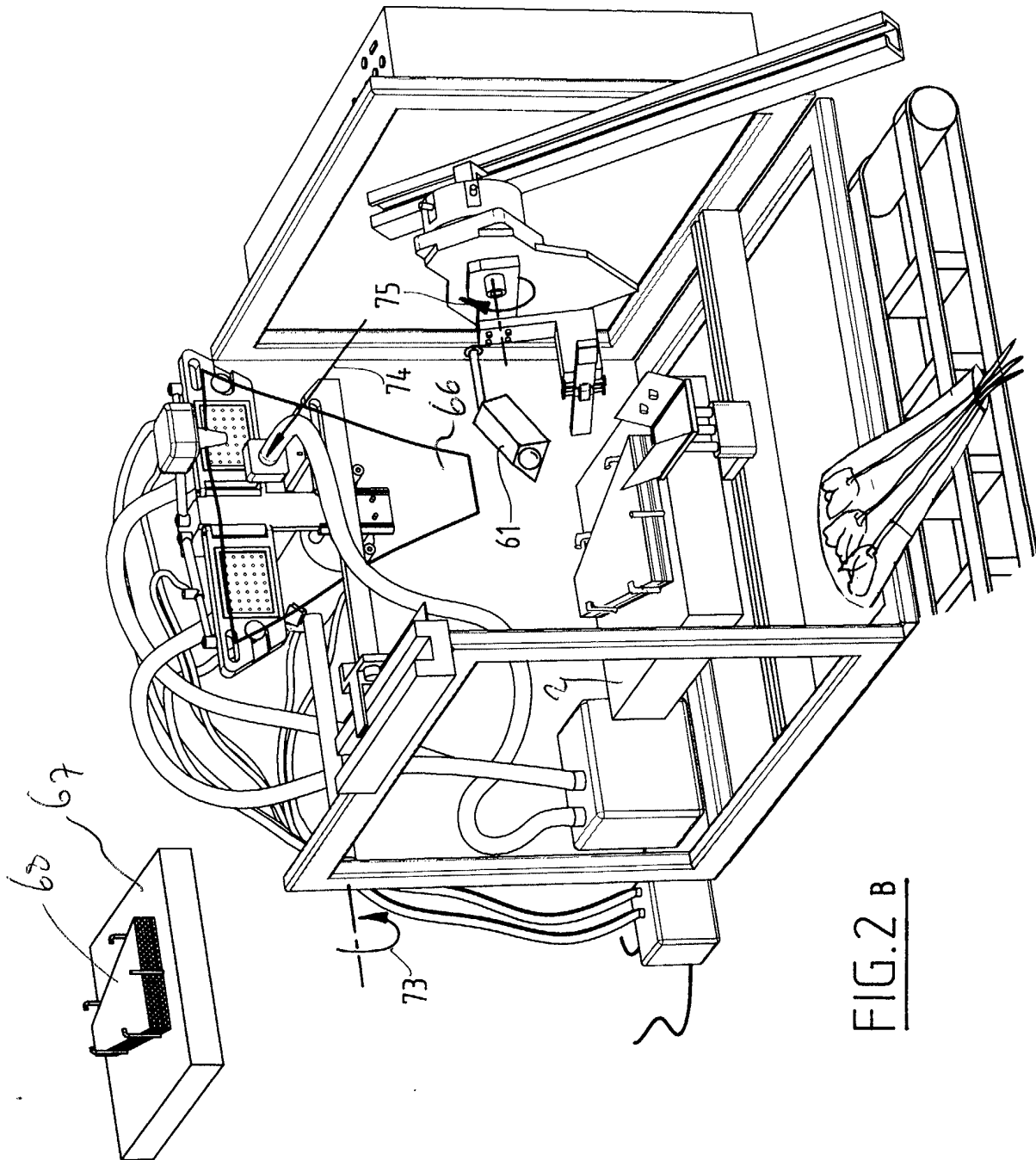


FIG. 2 B

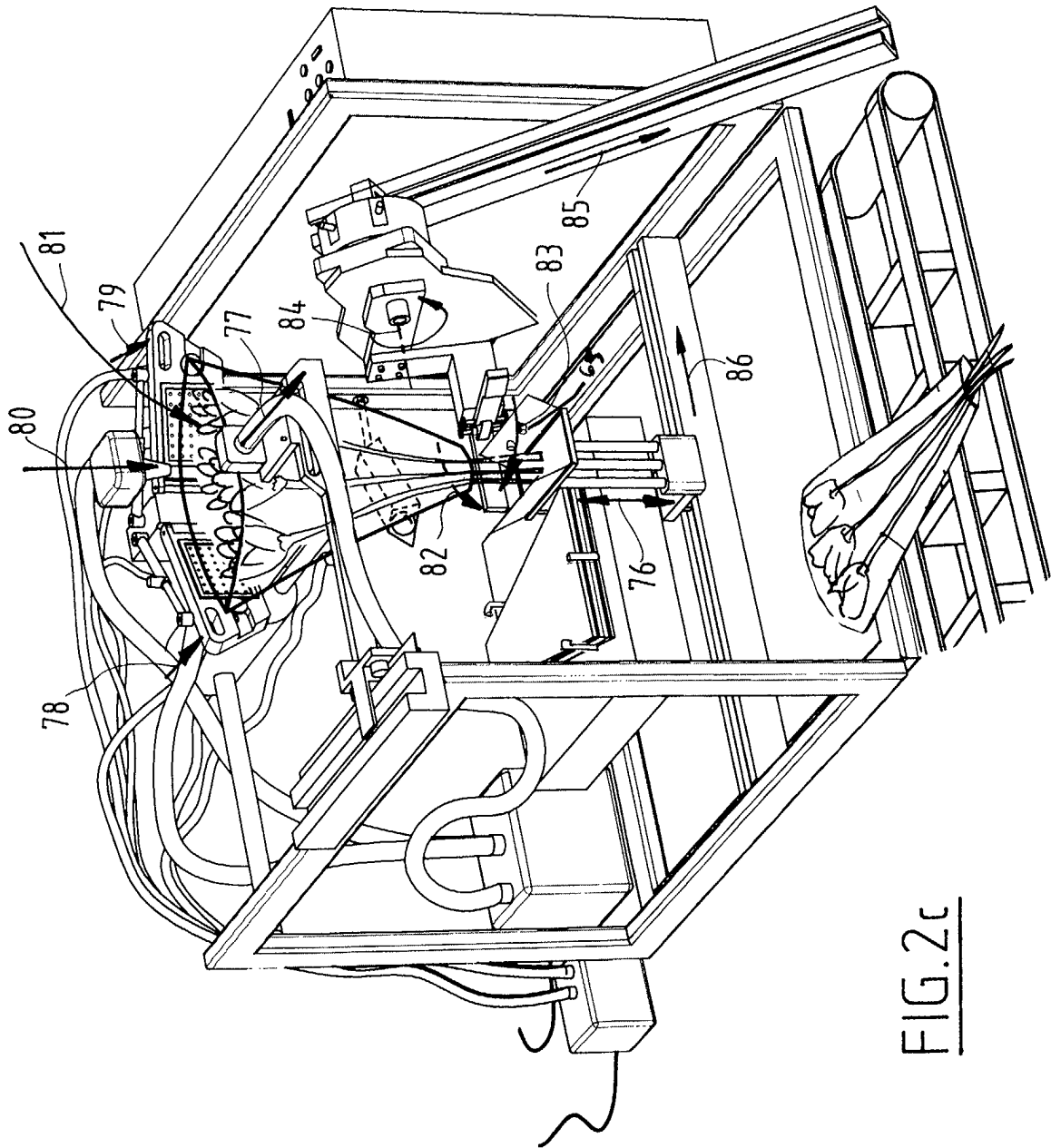


FIG. 2c

