

Description

Application field of the invention

[0001] The present invention concerns a machine suitable to handle, to fill and to automatically wrap up permeable or impermeable to air fabric bags with loose, granular or pulverized products or already wrapped up in other paper, plastic or composite material small bags.

[0002] More in detail, the machine of the present invention seizes, in a completely automatic way, by leafing through, one at a time, the fabric bags, already preformed with open mouth and piled on a platform, positions them at the lower mouth of a vertical tube or duct, located under a loading and weighing hopper, in order to fill them with loose, granular or pulverized products, or already wrapped up in other small bags of suitable sizes and material and, after filling them with a product quantity with a desired weight, moves them to a closing device to be then delivered to the storage.

State of the art

[0003] For the automatic filling of loose, granular or pulverized products, machines are known in the art which utilize bags of no permeable to air material and by which the seizing of the bags, to predispose them to the filling, is made with automatic devices by means of depression suction cups.

[0004] This kind of handling with depression suction cups cannot be utilized with permeable to air fabric bags because the sucked air permeates through the bag fabric so jeopardizing its seizing, and, by consequence, all the wrapping up process.

[0005] It may also happen that the depression suction cups seize, from the predisposed bag heap, more than one bag at a time, instead of only one: in this case too the wrapping up process is compromised.

[0006] With the existing machines it is therefore not possible to use permeable to air fabric bags.

[0007] On the other hand, it is possible to remedy the above mentioned inconveniencies utilizing, further than the not permeable to air material bags, also the permeable to air material bags, covering them, in correspondence to the zones of the suction cup application, with layers of suitable material not permeable to air; this method, however, causes some complications in the bag production with a consequent higher cost of the same.

[0008] The machine of the present invention enables to utilize permeable to air fabric bags or impermeable to air fabric bags and does not present the above mentioned draw-backs. It assures furthermore the seizing of only one bag at a time from the predisposed bag heap.

Short description of the invention

[0009] The main characteristic of the machine of the present invention consists in the fact that it makes pos-

sible the use of bags formed by permeable or impermeable to air fabric which are properly seized, one at a time, by pliers, from a platform, on which they are positioned, in horizontal or vertical position, depending on the typology of the material forming the bag, said platform being adjustable both in height and also in useful sizes depending on the bag to be filled sizes. The first bag up on the heap of predisposed bags on the platform is therefore positioned at the same suitable height which may be pre-fixed.

[0010] The machine of the invention is usefully used for wrapping up of all these products which require or take advantage of some air circulation for their correct storage; they can be, e.g., cereal products like rice, wheat, barley, etc.; dry legumes like beans, chickpeas, lentils, peas, broad beans, etc., as well as some confectionery products like chocolate grains, optionally coated, confits, etc.

[0011] Said products are put in bags in weight quantities which may vary from some hectograms to some tens of kilograms. In the last case, and depending also on the packed product apparent specific weight, the bags are more properly sacks. In the following the only word "bags" will be used, meaning by that small bags as well as sacks.

[0012] The bags handled by the machine of the invention are made of permeable or impermeable to air fabric, meaning in the first case, by fabric, any manufactured fabric which enables some permeability to air and, in the second case, any spread or laminated or treated manufactured fabric, i.e., made impermeable to air.

[0013] The kinds of fabric, so defined, may be of different manufacture: knitted fabric, weft and warp yarns interwoven, or other type and made with different material like, e.g. cotton, hemp, jute, wool, etc.

[0014] The machine of the present invention, further than wrapping up bags filled with a weighed quantity of loose, granular or pulverized products, can also use for their filling, bags having small sizes, already wrapped up in a material suitable to its use.

[0015] When in operation, the machine operates on the first upper bag of the bag heap which are horizontally positioned on a platform and, by suitable pliers, which automatically operate, seizes the single upper layer of the first bag, precisely in the central position of the fabric edge in correspondence with its mouth and then automatically lifts it in such a way to open said mouth.

[0016] The correct leafing through from the heap of only one bag at a time and the bag mouth opening are assured by some shakings imparted to the bag by the pliers.

[0017] Suitable pliers consist in a device which assures the seizing of only one bag at a time and operates with an adhesive tape, made adhesive or with glue application or with a particular type of bonding agent directly applied by a metallic small block which touches the upper fabric of the bag to be seized. So made pliers are defined adhesive pliers.

[0018] Successively, two widening arms which, in their

minimum size position, are brought closer and carry, at their ends, four pneumatic cylinders having one portion coming out from each of them, easily enter the open bag mouth. By said portions coming out from the cylinders, they assure the bag inside the mouth, while, at the same time, the widening arms depart one from the other till to adapt to the bag mouth opening, blocking it tightly.

[0019] Said device, after a 90° rotation, positions the bag around the lower end of a vertical tube or duct which forms the continuation of a loading and weighing hopper.

[0020] On said tube or duct two pneumatic cylinders are positioned, which tighten themselves on the tube or duct, blocking the bag, while the four cylinders together with the two widening arms withdraw, so freeing the bag mouth when the filling is completed.

[0021] The loading tube or duct has the characteristic to be provided also with two diametrically opposite rods which, suitably driven by two arms, depart one from the other, so stretching the bag mouth when filled.

[0022] When the bag is filled with the weighed product, the two pneumatic cylinders of the tube or duct, which block the bag to said tube or duct, open and the bag is left to fall on a conveyor belt, while, at the same time, a device provided with pliers keeps outstretched and closed the bag mouth. In these conditions the bag is conveyed, by the conveyor belt, to the bag closing which is implemented by sewing or other similar operations for the bag closing known in the art.

[0023] Should the bag fabric be thermo-adhesive or thermo-made adhesive, the bag closing may be implemented by a heat welding system.

[0024] Should the bag fabric both synthetic and mixed natural -synthetic, its closing may be implemented by an ultrasonic welding system.

[0025] The machine of the present invention can also foresee the bag closing by a quiff. In this case, the use of a system of quiff closing will be sufficient.

[0026] Before the bag closing, if requested, in any case for a more correct wrapping up, a coding label, free or tied to the closing, can be introduced inside the bag, for any closing type.

[0027] Alternatively to the described adhesive pliers, it is possible to utilize, always assuring the seizing of only one bag at a time, a device with needle pliers consisting of two or more needles opposed and inclined as to the horizontal plan where the bag to be seized lies.

[0028] Said needles are located at the lower end of the stems which may be translated along their axis inside their seats so that to make the needle tips to come out. The command of the needle coming out is pneumatic and allows them to pierce into the fabric fibre when the seat containing them is laid on the fabric of the bag to be seized.

[0029] All the drives of the various devices of the invention are moreover automatic with the achievement times to a great extent determined by the requested weight of product to be introduced into the bags, by its apparent specific weight and by the kind of bag fabric.

Detailed description of the invention

[0030] The machine object of the present invention for the automatic wrapping up in bags of permeable or impermeable to air fabric, with loose, granular or pulverized products or already wrapped up in small size and suitable material bags, is now more in detail described with reference to the attached drawings, given only as non limiting examples.

[0031] In the following the machine of the invention is described, which foresees the arrangement of the empty bags in a horizontal heap placed on a horizontal platform.

Figure 1 schematically shows, top view, the machine of the invention;

Figure 2 schematically shows, front view, the portion of the machine of the invention wherein the platform suitable to the bag heap storage and the device, i.e., the pliers, for seizing them, are present;

Figure 3 shows the portion of the machine of Figure 2, cross section, according to the arrows A-A of Figure 2;

Figure 4 schematically shows, front view and in details, the seizing device of a single bag of the machine of the invention, consisting in adhesive pliers;

Figure 5 schematically shows, front view, the device of the machine of the invention on seizing a bag, one at a time, in the position wherein the bag is seized by the device from the side of the open bag mouth; Figure 6 schematically shows, front view, the device of Figure 5 after the bag has been placed and blocked around the loading vertical tube or duct of the product to be wrapped up;

Figure 7 schematically shows the loading vertical tube or duct and the filled fabric bag, front view, with its unhooking devices;

Figure 8 schematically shows, front view and in detail, the seizing device of a single bag of the machine of the invention, consisting in needle pliers to seize the bags in alternative to the device shown in Figure 4;

Figure 9 schematically shows the device of Figure 8, side view.

[0032] In the above Figures are clearly shown: the platform 1 with useful width manually adjustable, according to the fabric bag 9 width, by a slide 2 which, by means of the arms 3, causes the symmetric widening or narrowing of the horizontal bars 4 between them and, by consequence, of the vertical rods 5, which are integral with the bars 4 and may slide in correspondence of suitable slits 6 made in the platform 1, limiting the useful space on which the heap 8 of bags 9 rests; the platform 1 being automatically vertically translated by the motor-reducer 7, coupled to a vertical externally threaded shaft 10, the first upper bag 9 of the bag heap 8 is always at the same predetermined height H during the bag seizing; the seizing device 11 of a single bag 9, specifically indicated in

Figure 4, placed on a suitable structure, including the metallic body 12 provided with the fixing holes 13, on which two bobbins are placed, one of them, 14, of the adhesive tape 15 to be used and the other one, 16, of the used tape 17, at opposite sides in respect to the body 12; the adhesive tape 15 having the adhesive side turned down; the clutch 18, which serves to keep the tape 15 in tension, located at the bobbin 14 center; the pneumatic cylinder 19; the structure with pawl 20; its pin 21; the toothed wheel 22 integral with the bobbin 16 of the used tape 17, being the active portion 23 of the pliers placed under the metallic body 12, said active portion 23 which is measurable activating more or less frequently the pneumatic cylinder 19; some of said elements being obviously replaceable by equivalent other ones: the structure with pawl 20, e.g., can be replaced by a free wheel and the pneumatic cylinder 19 by a suitable engine; the basis sizes of the metallic body 12 being of such an extent to assure an adequate contact surface between the adhesive tape to be used 15, once laed on the upper fabric 24 of the bag 9, and said fabric 24, so as to raise the last one also with vertical shakings to make easier the mouth 25 opening of the bag 9, the vertical movements of the metallic body 12, downwards, in order to hook the upper fabric 24 of the bag 9, and upwards, in order to open the mouth 25 of the bag 9, as well as the vertical shakings, being imparted to the metallic body 12 by a pneumatic cylinder not shown in Figure 4; the rotating cylinder 26 integral with two widening arms 27 which carry at their free ends four pneumatic cylinders 28 suitably spaced out among them and perpendicular to the arms 27 which, in their position of minimum size wherein they are closer, enter the mouth 25 of the bag 9; the four pneumatic cylinders 28 coming out for a portion 29 towards the mouth 25 of the bag 9, seize the bag 9 inside the mouth 25, while the two arms 27 depart one from the other adapting themselves to the mouth 25 opening; the rotating cylinder 26 provided with two widening arms 27, and the relevant pneumatic cylinders 28, which rotates 90° positioning the bag 9 around the loading vertical tube or duct 30, said duct having rectangular, square or even elliptical section; the two pneumatic cylinders 31 which tighten themselves around the tube or duct 30 blocking the bag 9 in the vertical position to implement the filling and widen when the filling is completed; the four pneumatic cylinders 28 placed on the two widening arms 27 which withdraw the portions 29 so freeing the mouth 25 of the bag 9; the vertical loading tube or duct 30, located under a loading and weighing hopper, not shown in the figures, provided with two extension rods 32 driven by two arms 33, which depart one from the other extending the mouth 25 of the bag 9 when the bag is full; the pliers system 34 which keeps stretched and closed the mouth 25 of the bag 9; the conveyor belt 35, adjustable in height, according to the bag 9 sizes, by the vertical translation device 36 coupled with a vertical externally threaded shaft 37, which receives the bag 9, kept in position by the small belts 38, and delivers it to the closing device 39 of the

mouth 25 which may be implemented by sewing or heat welding or by ultrasounds according to the bag fabric nature or by a quiff.

[0033] At the sewing end a pneumatic cylinder pushes the sewing thread inside the small chain cutting device and the bag is so wrapped up.

[0034] Before the bag enters the closing system, a device, not shown in the Figures, inserts a coding label which remains integral with the bag mouth and, in the case of closing by sewing, the same is sewn together with the bag mouth.

[0035] The possibility of inserting the label in the quiff or joining it to suitably pendants in plastic material also exists.

[0036] The above description and the relevant Figures, particularly Figure 4, refer to the machine of the invention wherein the single bag 9 is seized, from the bag heap 8, by the adhesive pliers 11.

[0037] The machine of the invention can also implement the seizing of only one bag at a time by the device 40, alternatively to the above described device 11 with adhesive pliers. In fact it is possible to utilize, always assuring the seizing of only one bag at a time, a device with needle pliers, placed on suitable structure and movable by vertical translation by a suitable pneumatic cylinder, said device 40 being formed by the system 41 of pliers with needles 42 and by the pneumatic cylinder 43, which operates the pliers system 41, which, placed on the upper portion of the pile 8 of bags 9, precisely on the first upper bag 9, implements the seizing of its upper layer 24 by suitable pliers carrying two or more needles 42 opposite and inclined in respect to the resting plan of the bag 9, said needles 42, together with the stems 44, translating inside the seats wherein they are contained, for an extent which depends from the fabric 24 thickness and consistency and from the bag 9 weight, pierce into it implementing the seizing on the central portion of the mouth 25 edge of the bag 9, said needle 42 coming out being predetermined by the knob or screw 45 by which it is regulated.

[0038] The sizes and the material of needles 42, depending from the thickness and consistency of fabric 24 and the weight of the bag 9 to be seized, must be such that they safeguard the integrity of the same needles 42. For the same integrity, their correct moving timing is also important.

[0039] The needles 42 must furthermore pierce into the fabric 24, in the moment they seize the bag, and come out from it, in the moment they release the bag 9, without causing lacerations to it.

[0040] Once seized the bag 9 with the needle pliers of Figures 8 and 9, by penetration of needles 42 into the upper layer 24 of the bag 9, with consequent opening of its mouth, made easier by some vertical shakings, the bag is handled as per the alternative with adhesive pliers 11 and therefore as above described and shown in Figures 5, 6 and 7.

[0041] When the machine of the invention is started

up it is necessary to fix the operation parameters of the automatic devices, greatly depending on the products to be wrapped up and therefore on the product weight to be wrapped up and on its apparent specific weight and bag fabric type and sizes.

[0042] Depending on said characteristics of the bags to be handled, for the adhesive pliers, the adhesive tape 15 type and sizes and its frequency advancing have to be predetermined, taking into account that the active (adhesive) portion 23 of the adhesive tape 15, because of dust and impurities stuck during the operation, must increase, and therefore the pneumatic cylinder 19 intervention must be more frequent during the time in order to suitably renew said adhesive portion 23 of the adhesive tape 15 which runs under the metallic body 12 of the adhesive pliers 11.

[0043] For the needle pliers the type (sizes and material), the number of needle 42 couples and the extent of their coming out in order to pierce into the upper layer fabric 24 of the bag 9, have to be prefixed.

[0044] The described devices, further than automatic, are driven in sequential way from the seizing of the single bag 9, to the filling and its final wrapping up and repetitive for every single bag.

[0045] The sequence times are prefixed and determined by a suitable switchboard depending on the product amounts to be filled and the bags to be utilized.

Claims

1. A machine for the automatic wrap up in bags of permeable or impermeable to air fabric **characterized by** the fact that it consists in a platform (1) on which a surface is bound for the positioning of the heap (8) of bags (9), having sizes that can be varied by means of the vertical poles (5), which slide inside suitable slits (6) made in the platform (1), integral with the horizontal bars (4) connected to the arms (3) of the slide (2), the platform (1) being vertically movable; in the seizing device (11) of the bags (9) made up of the metallic body (12), provided with the fixing holes (13), on which are suitably placed the bobbin (14), from which the adhesive tape (15) unrolls, and, in a position diametrically opposite as regards to the body (12), the bobbin (16), on which the used tape (17) rolls up, being present the clutch (18) axially located with the bobbin (14), of the pneumatic cylinder (19) integral with the pawl (20), in turn engaged with the toothed wheel (22) integral with the bobbin (16); in the rotating cylinder (26), integral with the two widening arms (27), which carry, at their free ends, four pneumatic cylinders (28) which are perpendicular to said arms (27) and are provided, each one, with a portion (29), axially movable; in the loading vertical means (30), selected between a tube and a duct, provided with two pneumatic cylinders (31), tightenable, when necessary, on it; in the stretching

poles (32), integral with the arms (33); in the pliers (34) stretching the mouth (25) of the bag (9); in the vertically movable conveyor belt (35), axially movable, provided with the small belts (38); and in the closing system (39) of the bag (9).

2. A machine for the automatic wrap up in bags of permeable or impermeable to air fabric **characterized by** the fact that it consists in a platform (1) on which a surface is bound for the positioning of the heap (8) of bags (9), having sizes that can be varied by means of the vertical poles (5), which slide inside suitable slits (6) made in the platform (1), integral with the horizontal bars (4) connected to the arms (3) of the slide (2), the platform (1) being vertically movable; in the seizing device (40) of the bags (9) made up of the pneumatic cylinder (43) and of the system (41) of pliers with the housing wherein the stems (44) slide, which carry at their lower end the needles (42), each other opposite and inclined as regards the platform (1), said needles (42) having the possibility to come out from said housing containing them by an extent suitably prefixed by means of the device (45); in the rotating cylinder (26), integral with the two widening arms (27), which carry, at their free ends, four pneumatic cylinders (28) which are perpendicular to said arms (27) and are provided, each one, with a portion (29), axially movable; in the loading vertical means (30), selected between a tube and a duct, provided with two pneumatic cylinders (31), tightenable, when necessary, on it; in the stretching poles (32), integral with the arms (33); in the pliers (34) stretching the mouth (25) of the bag (9); in the vertically movable conveyor belt (35), axially movable, provided with the small belts (38); and in the closing system (39) of the bag (9).

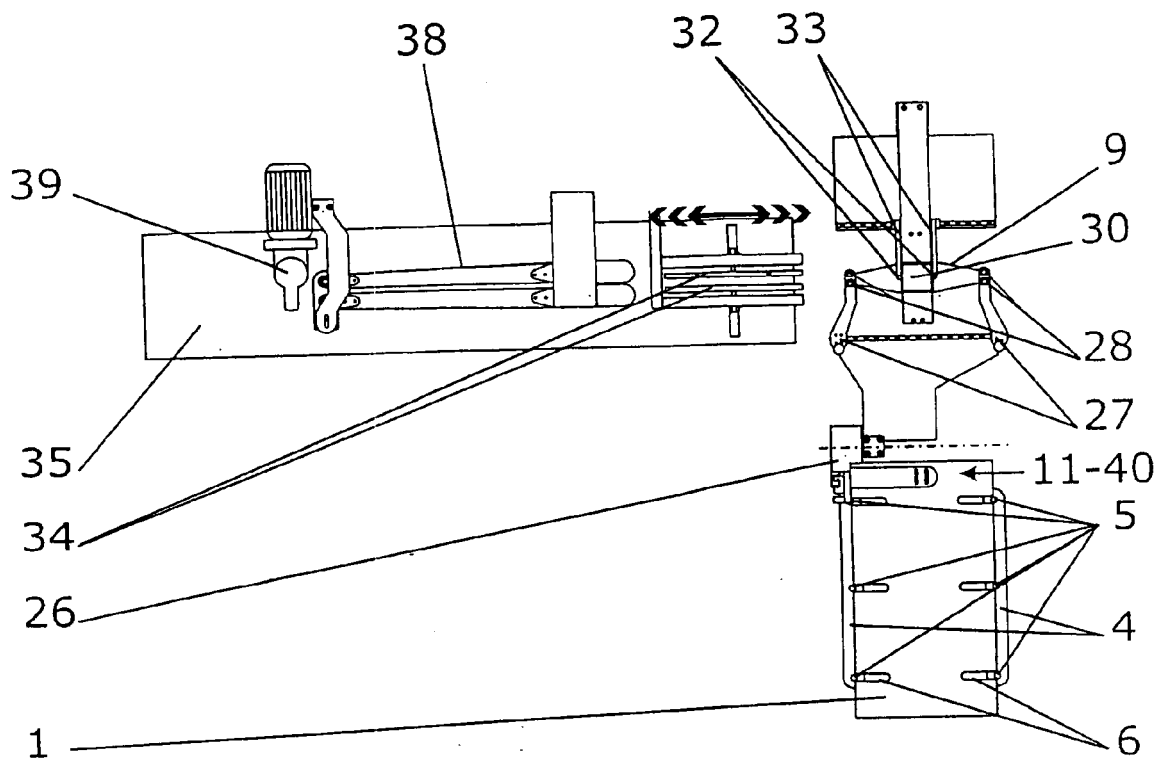


Figure 1

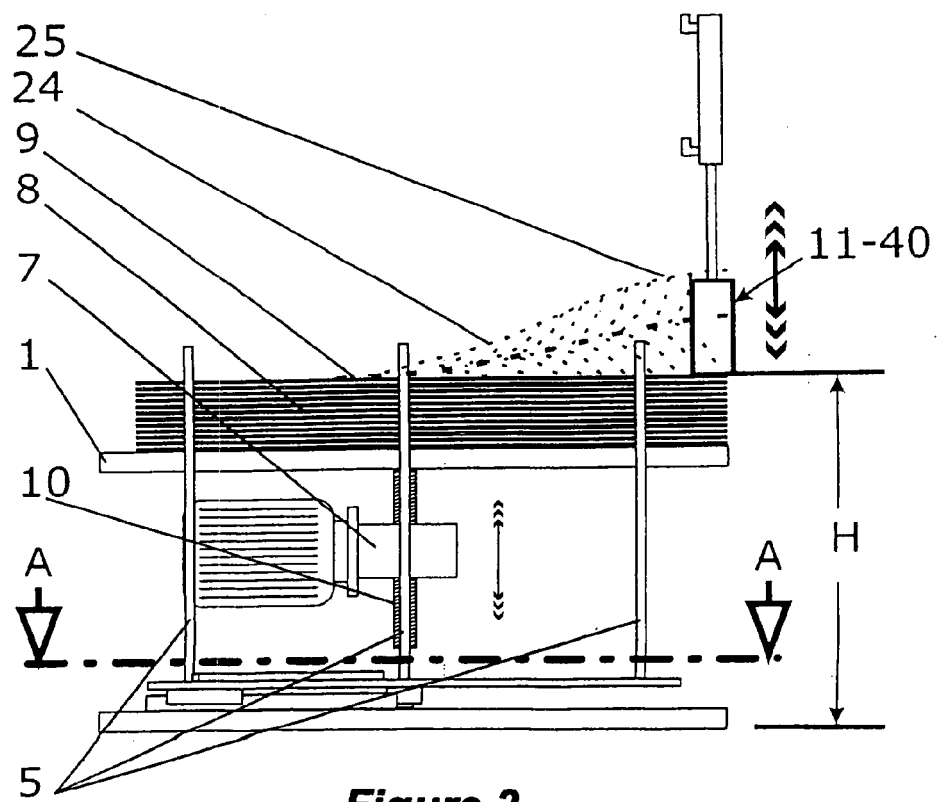


Figure 2

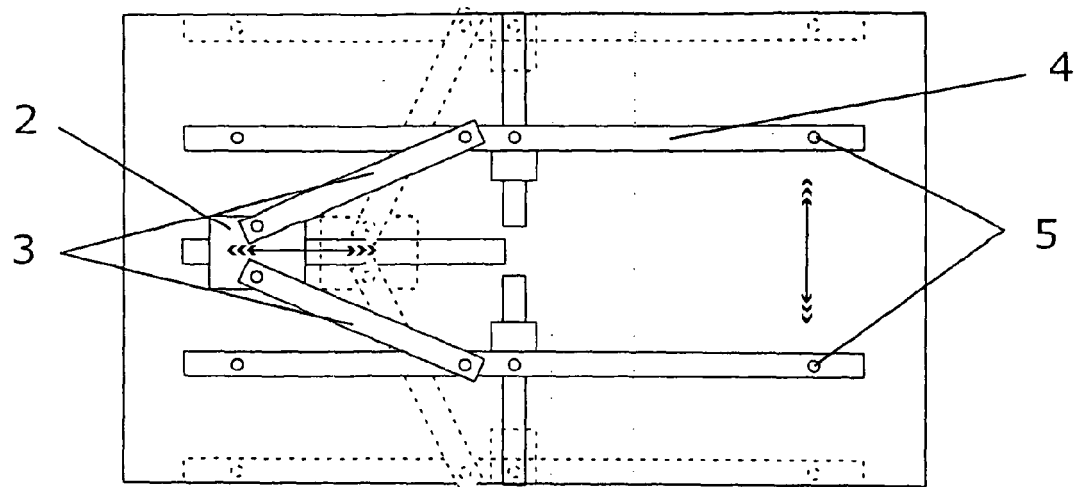


Figure 3

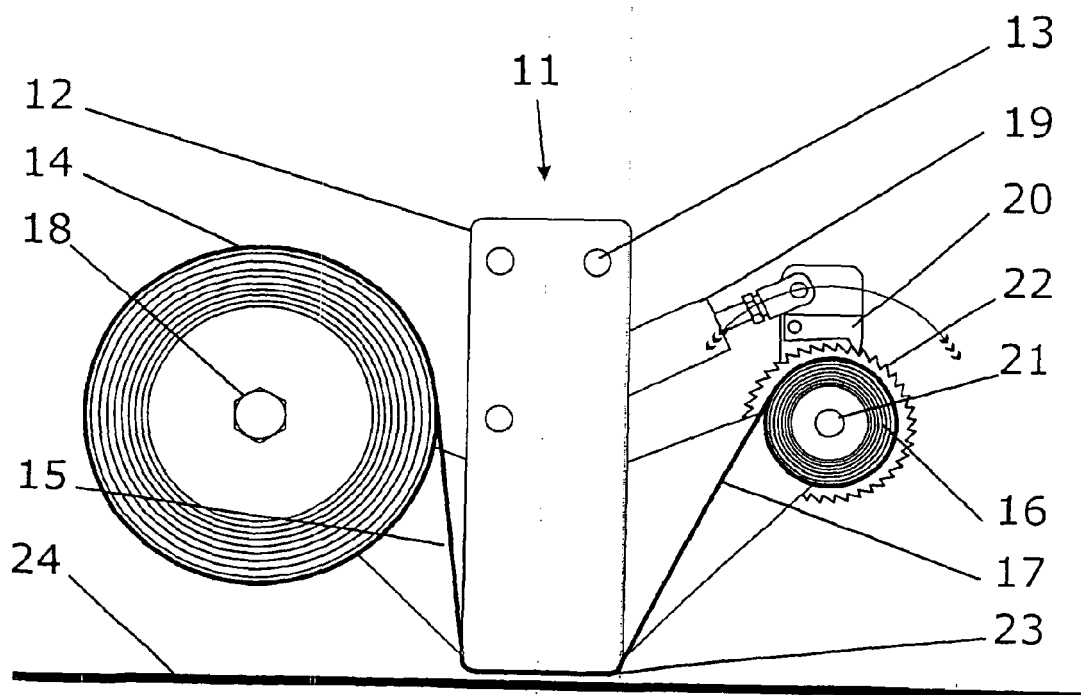


Figure 4

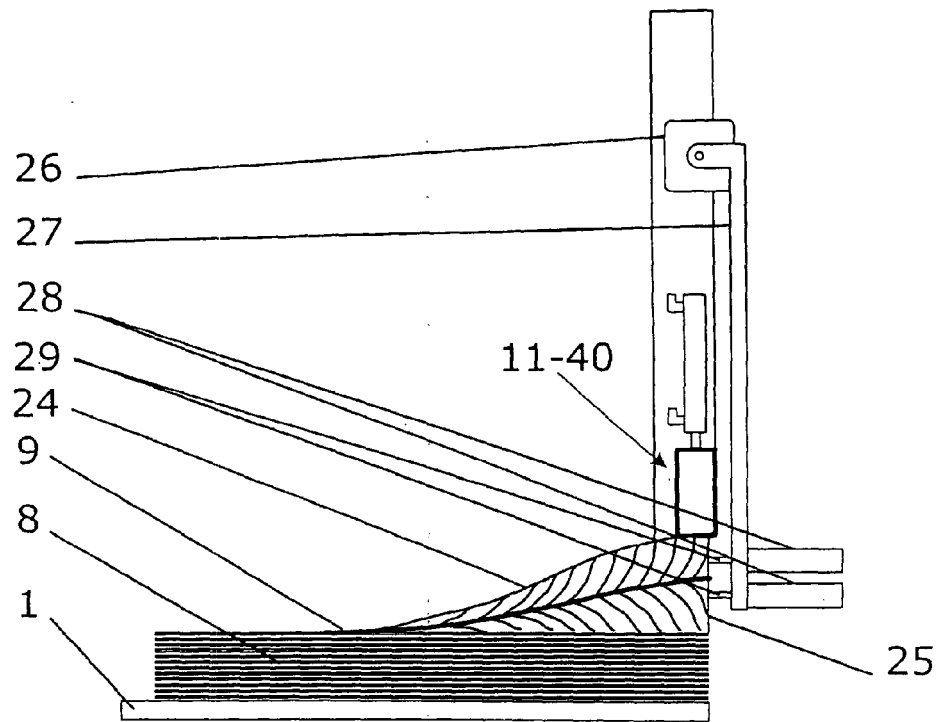


Figure 5

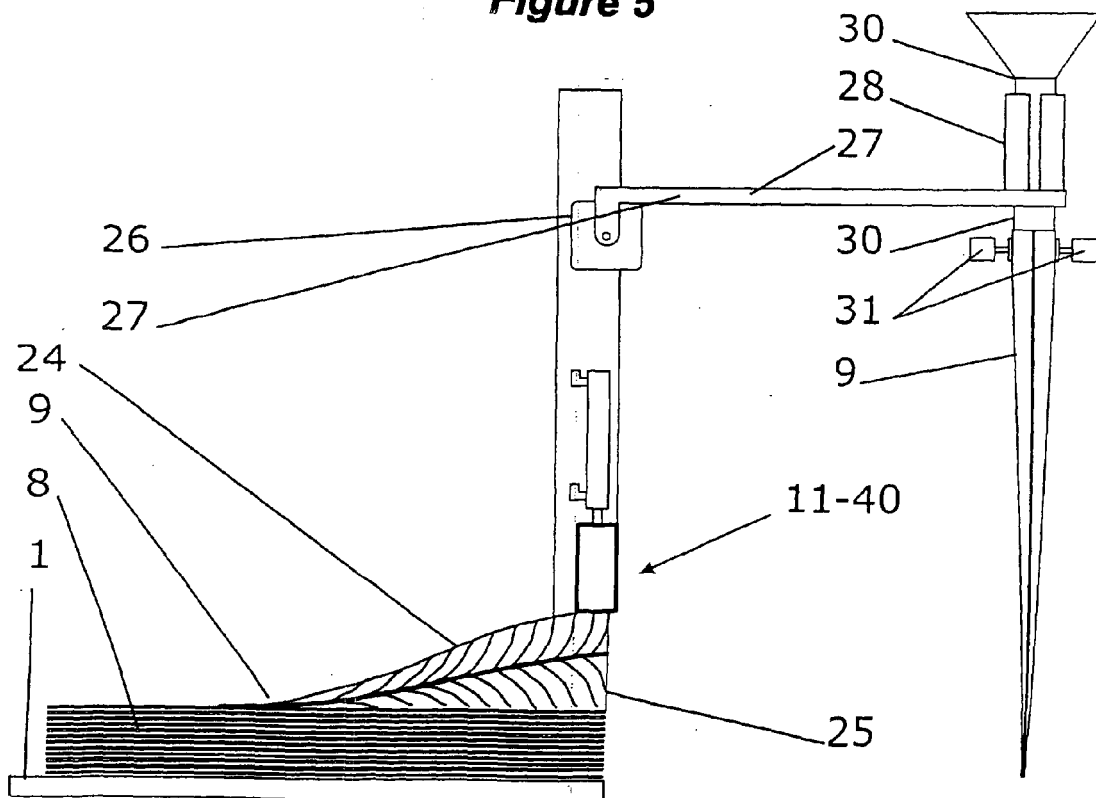
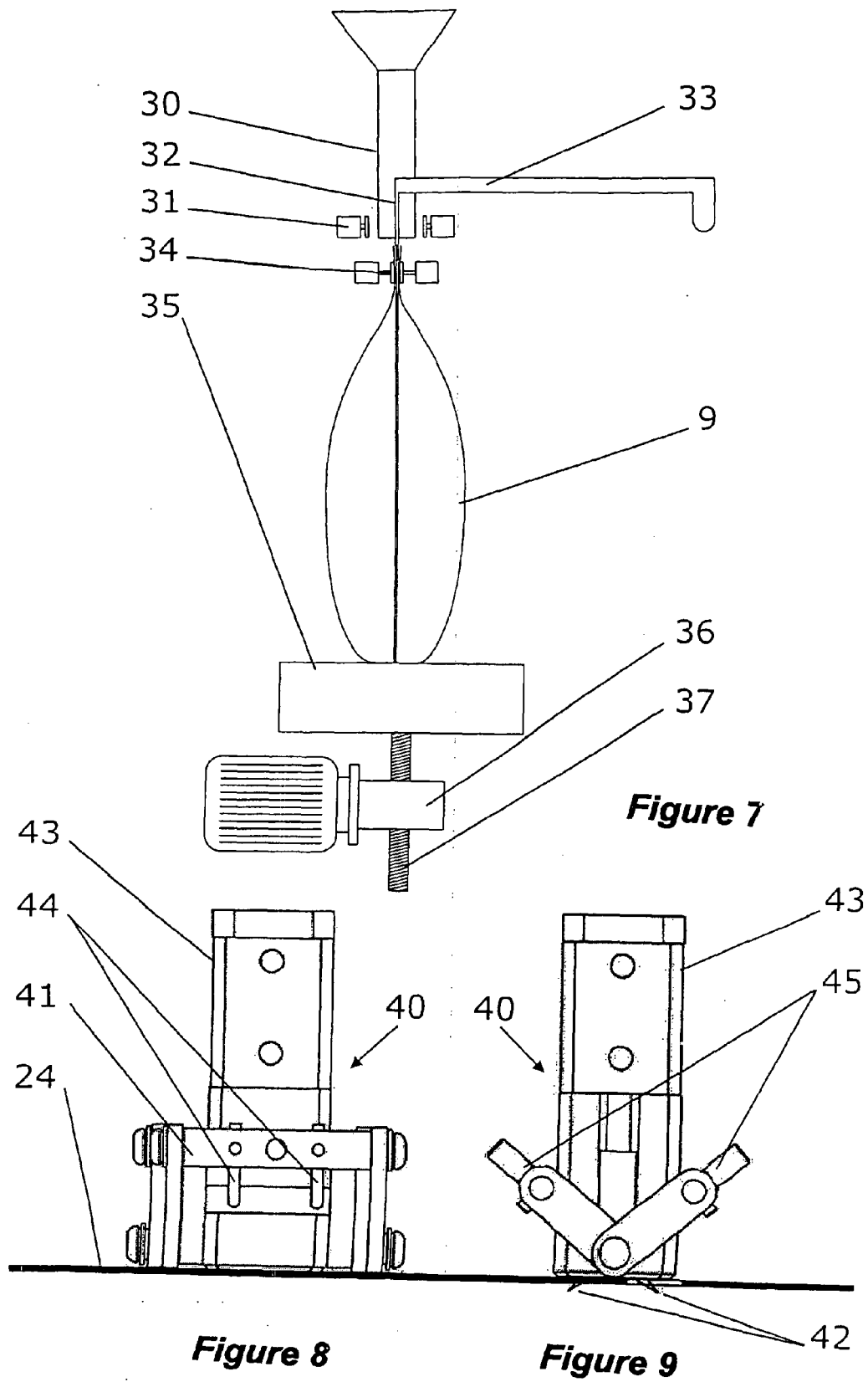


Figure 6





EUROPEAN SEARCH REPORT

Application Number
EP 10 00 1793

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 3 509 689 A (H. PERRIN) 5 May 1970 (1970-05-05) * column 3, line 38 - column 5, line 15; figures *	1	INV. B65B43/14 B65B43/46
A	GB 2 176 165 A (W. GRACE) 17 December 1986 (1986-12-17) * page 1, line 78 - page 2, line 106; figures *	1,2	
A	FR 2 537 947 A1 (MANUFACTURE TOURANGELLE D' INSTRUMENTS DE PESAGE) 22 June 1984 (1984-06-22) * page 4, line 31 - page 6, line 32; figures *	1,2	
A	US 4 516 384 A (N. IMPERIALE) 14 May 1985 (1985-05-14) * column 3, line 38 - column 4, line 39; figures *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 7 June 2010	Examiner Jagusiak, Antony
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	

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 00 1793

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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07-06-2010

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3509689	A	05-05-1970	DE 1561949 A1 21-05-1970
			FR 1503836 A 01-12-1967
			GB 1121415 A 24-07-1968

GB 2176165	A	17-12-1986	NONE

FR 2537947	A1	22-06-1984	NONE

US 4516384	A	14-05-1985	CH 654265 A5 14-02-1986
			DE 3148186 A1 23-09-1982
			DK 509081 A 17-09-1982
			FI 813522 A 17-09-1982
			FR 2501628 A1 17-09-1982
			GB 2094744 A 22-09-1982
			IT 1139927 B 24-09-1986
			JP 57153829 A 22-09-1982
			NL 8105175 A 18-10-1982
