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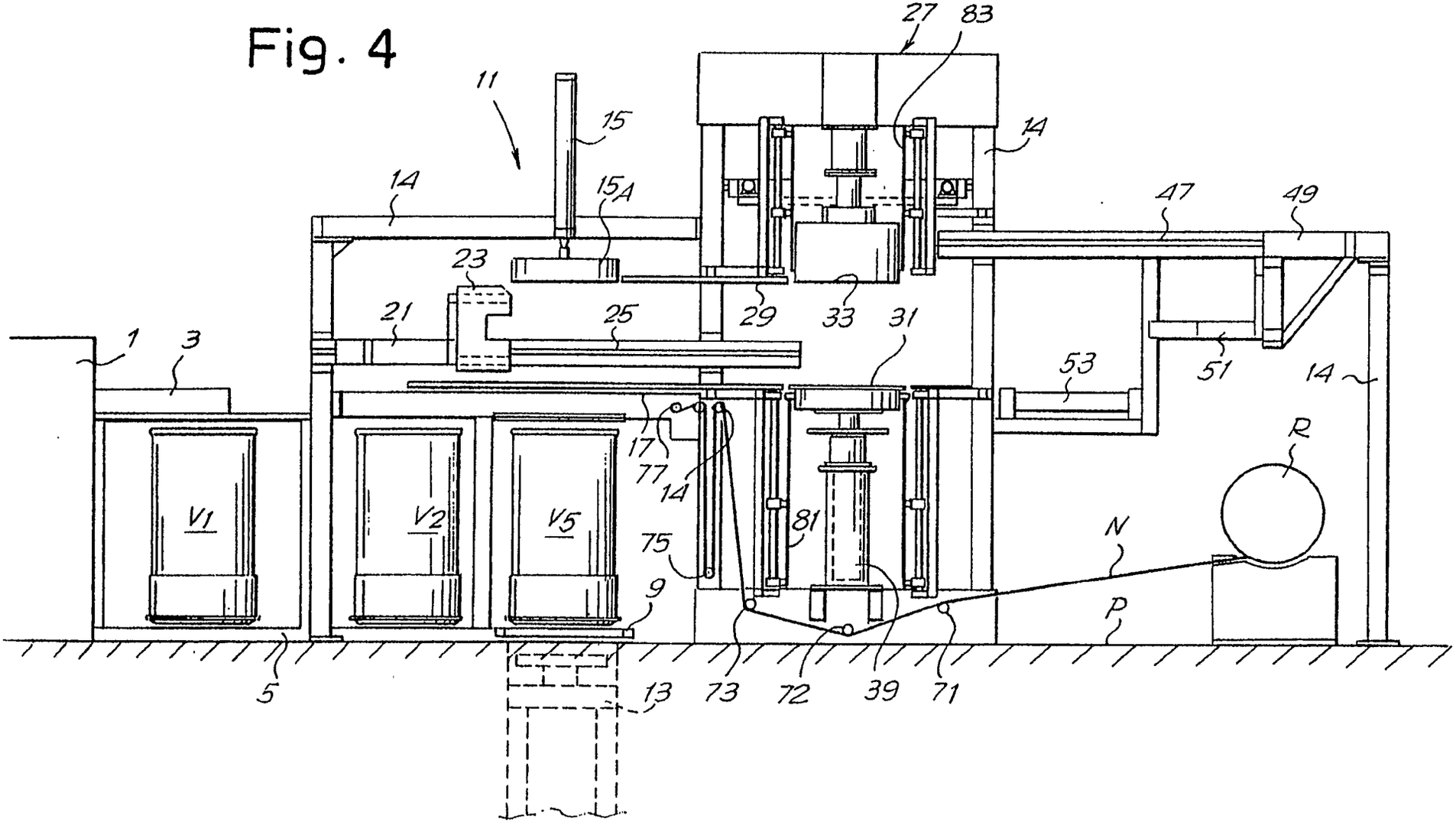
(54) Apparatus for the pressing and packing of bumps.

(57) The apparatus comprises: means (13, 31, 33) for the extraction of the material from the collecting can (V5) and for the pressing of said material; means (35, 37) for the tying of the pressed bump; and means (51, 53, 65) for handling the tied bump. Such an apparatus comprises a first station (11) for the extraction of the material from the can (V5) and a second station (27) for the pressing and tying of the bump; means (21, 23) are also provided for transferring the bump to transfer the material from said first extraction station to said second pressing and tying station.

EP 0 441 753 A1

Fig. 4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APPARATUS FOR THE PRESSING AND PACKING OF BUMPS

The invention relates to an apparatus for the pressing and tying of bumps, comprising means for pressing the bumps taken from a collector can, means for tying the bumps and means for handling the pressed and tied bumps.

An apparatus of this type is described for example in European Patent Application EP-A-0,320,467. This known type of apparatus has certain drawbacks. In the first place it requires pits to be dug in which some parts of the apparatus have to be placed, in particular the pressing members. This means an increase in installation costs and also in maintenance costs. In addition, this apparatus is connected to a machine for producing sliver and accumulating it in cans. This machine, whose coiler dispenses the sliver which arranges itself in the collecting can, is of rather limited output that does not fully utilize that part of the apparatus which is intended for the pressing and packing of the bumps. This is particularly true for large diameter bumps, which are pressed and packed very quickly, while the time required to accumulate it in the collecting can is decidedly long. As a result it is not possible to optimize the use of the apparatus and output is accordingly low.

The invention therefore relates to an apparatus which enables high outputs to be achieved by optimizing the use of the pressing and packing apparatus.

This and other aims, which will become clear to those skilled in the art on reading the text which follows, are achieved with an apparatus of the abovementioned type, comprising a first station for the extraction of the material from the can and a second station for the pressing and tying of the bump, means of transferring the bump being provided to transfer the material from said first extraction station to said second pressing and tying station. In the first station for extraction of the material a partial pre-pressing of the material may also be carried out.

In conventional pressing and packing apparatuses, including that mentioned above, the bumps are pressed and tied and only subsequently wrapped in plastic tape. In the apparatus of EP-A-0,320,467, in particular, one station extracts the coiled sliver from the can, presses it and ties the bump thus obtained. The tied bump is discharged and then, in a subsequent phase, wrapped in plastic tape. The wrapping of the bump with the plastic film when the bump has already been tied up is hampered by the underlying ties sticking out and is never satisfactory. Besides, the enveloping film can easily become torn during subsequent handling of the bump.

A further aim of the invention is therefore to produce an apparatus for pressing and tying bumps of textile material which allows the pressed bump to be optionally wrapped in protective plastic film underneath the ties. This aim is easily achievable with a further improvement of the abovementioned apparatus.

Thus, by providing a station for extraction of the material from the collecting can and a separate and subsequent station for pressing and tying, it is possible to arrange for a said extraction station to be combined with means for arranging a wrapping film around the material extracted from the collecting can. In this way the wrapping of the material takes place before the tying.

In the pressing and tying station further members can be provided to complete the wrapping of the pressed bump in the wrapping film, for example tubular-shaped members positioned with respect to the pressing surfaces in such a way as to encircle the tied bump and swathe it with the wrapping film before the definitive tying takes place.

Further embodiments of the apparatus according to the invention are indicated in the attached claims.

The invention also relates to a method of automatically pressing and packing a bump of textile material or similar product, comprising the phases of : extracting the material from the collecting can, compressing the material and wrapping it in a packing film; and tying the bump of pressed and wrapped material in said packing film. According to the invention, the phases of extraction and wrapping can take place in a first station and the pressing and tying in a subsequent station. It is also possible to arrange for a prepressing of the material to be performed in the first station, so that the material reaches the pressing and tying station already partly pressed.

The invention will be understood better following the description and the attached drawing, which shows a practical non-limiting embodiment of said invention. In the drawing :

Fig 1 shows a diagrammatic plan view of the apparatus according to the invention ;

Fig 2 shows a side view from II-II in Fig 1 ;

Fig 3 shows a cross-section through III-III in Fig 2 ;

Figs 4 and 5 show a side view and cross-section respectively of a modified form of the apparatus according to the invention ;

Fig 6 shows an enlarged detail of Fig 4 ; and

Figs 7 to 11 show successive phases of the operation of the apparatus of Figs 4 to 6.

Referring first to Figs 1 to 3, in the embodiment shown the apparatus is linked to two machines for dispensing roving, diagrammatically indicated by 1 and equipped with coilers 3 for distributing the roving in corresponding cans V1, V2, V3, V4 arranged on rotating platforms 5. In front of the rotating platforms 5 runs a transverse table 7 a certain height off the floor P,

underneath which a shuttle or carriage 9 runs up and down alternately taking can V2 or can V4 from one or other of the rotating platforms 5 and transporting it to a station where the wound roving is extracted from the can, indicated as a whole by 11.

The extraction station 11 is arranged centrally between the two rotating platforms 5 and comprises a pushing member 13 (Fig 2) arranged beneath the level of the floor P, at the point where the carriage 9 comes, bearing its can indicated by V5 in Fig 2, when the material that has been accumulated in it is to be extracted for subsequent pressing and packing. The pushing member 13, which is the only part of the apparatus to be arranged beneath the level of the floor P, consists in the embodiment shown of a cylinder-and-piston system which interacts with a second cylinder-and-piston system 15 carried by the frame 14 of the apparatus, arranged coaxially with and above said pushing member 13 and carrying a disk 15A. Between the two cylinder-and-piston systems 13 and 15 is a horizontal table 17 for the purposes indicated below, having a circular aperture 19 (Fig 1) for the material extracted from the can V5 to be passed through. The extraction station 11 further comprises a carriage 21 equipped with gripping means 23 for laterally grasping the packet of roving material extracted from the can V5 and partly pressed between the cylinder-and-piston systems 13, 15, and transferring said material to the pressing and tying station described below. The carriage 21 moves on horizontal rails 25 running between the extraction station 11 and the subsequent pressing and tying station which is indicated as a whole by 27. The carriage 21 moves between the table 17 and a table 29 parallel to it and above it, the two tables 17, 29 defining a passage for the bump which comes from the extraction station 11 and is directed on to the pressing and tying station 27.

The pressing and tying station 27 comprises a lower pressing surface 31 and an upper pressing surface 33, suitably grooved, in a manner known per se, to enable a tying machine - diagrammatically indicated by 35, 37 in Fig 3 and omitted for the sake of clarity in Fig 2 - to tie the bump as it is held and pressed between said two pressing surfaces. The lower pressing surface 31 is carried by the rod of a cylinder-and-piston actuator 39 connected to a motor reducer 41 (Fig 3) which, via a coupling 43, can make the lower pressing surface 31 rotate about the axis of a cylinder-and-piston actuator 39. The upper pressing surface 33, on the other hand, is mounted idle on the rod of a corresponding cylinder-and-piston actuator 45 so that it can be drawn in rotation by friction with the bump pressed between the two pressing surfaces when the lower pressing surface 31 is made to rotate by the motor reducer 41.

In front of the pressing and tying station 27, on the opposite side with respect to the extraction station 11, are two rails 47 on which a carriage 49 runs with gripping means 51 to take the pressed and tied bump from the pressing and tying station 27 and transport it to a position on a conveyor belt 53 running crosswise with respect to the axis of the apparatus. In Fig 1, B indicates the position in which the pressed and tied bump is deposited on the conveyor belt 53 for subsequent removal from the apparatus in the direction of the arrow f53.

The conveyor belt 53 extends as far as a point underneath means 55 of withdrawing the bumps from the conveyor belt 53. Said means comprises a trolley 57 which is able to move in the directions indicated by the double arrow f57 (Fig 1), parallel to the pressing and tying apparatus along two horizontal guide rails 59 shown in Figs 1 and 3 and omitted from Fig 2 for the sake of clarity in the drawing. On the trolley 57 is a slide 61 which is able to move in the direction of the double arrow f61, transversely with respect to the direction of movement of the trolley 57 itself along running guides 63. The slide 61 carries members 65 for gripping and lifting the bumps from the conveyor 53 and transporting said bumps to unload them onto a plurality of pallets or the like, indicated by 67 in Fig 1. The movements of the trolley 57 and of the slide 61 are programmed so as to fill the pallets 67, which are regularly taken away and replaced.

The apparatus operates as follows.

The cans in positions V2 and V4 are alternately taken from their respective rotating platforms 5 and placed on the shuttle 9 which transports one can at a time into the station 11 and onto the pushing member 13 in the position V5. The disk 15A is lowered toward the upper aperture of the can in position V5 and the pusher 13 and the cylinder-and-piston system 15 then move up to extract the material from the can V5, and bring it over the table 17 through the aperture 19. During the upward movement of the pushing member 13 and disk 15A the reciprocal distance between said members is reduced so that in addition to extracting the material from the can, they also partly compress it. At this point, the carriage 21 advances in the direction of f21 (Figs 1 and 2), laterally grasps the partially pressed material and transports it to the pressing station 27. The transfer takes place with the material being maintained in its partly pressed state between the tables 17, 19 which keep the material from re-expanding before it comes between the upper and lower pressing surfaces 33, 31 of the pressing station 27. At this point the pressing surfaces 31, 33 are moved toward each other to compress the material. Next, the lower pressing surface 31 is made to rotate through predetermined angles in such a way as to enable the tying machine 35, 37 (known per se) to tie the bump around three or four diameters. One it is tied, the upper pressing surface 33 can be removed and the tied bump is taken by the gripping means 51 on the carriage 49 and these deposit said bump on the conveyor belt 53. From here the bump is conveyed to

beneath the withdrawing means 55 and is placed on the corresponding pallet 67.

From the moment the carriage 21 and the gripping means 23 have begun the transfer of the material between the tables 17, 29 towards the pressing and tying station 27, the pushing member 13 can be retracted and the can V5 can be transported back to the corresponding rotating platform 5. The empty shuttle 9 can then be moved on to the other rotating platform 5 to take the next can. In this way only five cans are needed to operate the apparatus, and the apparatus itself is fully utilized since it can simultaneously serve two roving dispensing machines 1. Clearly the number of machines 1 which can be set up in parallel with the extraction station and pressing and tying station can vary, depending on among other things the dimensions of the bumps.

Figs 4 to 11 show an improved embodiment of the apparatus of Figs 1 to 3, which is capable of performing not only the pressing and tying but also, between said two operations, the wrapping of the bumps. Identical or corresponding parts of the two apparatuses of Figs 1-3 and of Figs 4-11 are indicated by the same reference numerals. Figs 7 to 11 show diagrammatically only certain parts of the apparatus in successive working phases in order to clarify its operation.

The modified version of the apparatus of Fig 4 has a roll R of tape of plastic film in which to wrap the bump. The tape of film N is unrolled from the roll R and drawn back by a plurality of rollers 71, 72, 73, 74, 75, 76 (Fig 6) in such a way that the forward end of said tape comes underneath the table 17 in the vicinity of the aperture 19 through which the material extracted from the can V5 is passed. In this position the free edge of the tape N is grasped by the gripping members (not shown in Fig 3 and sketched in at 78 in Figs 7 and 8, and known per se) and drawn in the direction of f78 (Fig 7) so as to be stretched over the mouth of the can V5 which is in position for the material to be extracted. The tape N is then wrapped around the bump that is to be packed in the manner described below in such a way that tying takes place after wrapping. In order that the bump can be wrapped up, in the pressing station 27 there are two tubular members 81, 83 shown in detail in Fig 6 in cross-section through their longitudinal axis, arranged coaxially with the pressing surfaces 31 and 33 respectively. The lower tubular member 81 is guided by means of rings 84 along guide rods 85 running parrallel to the axis of the actuator 39, and can thus move (by means of actuators, not shown) vertically upwards from the position of Fig 6 in the direction of f81. The tubular member 81 also has two diametrically opposed apertures parallel to its axis for the purposes described below, diagrammatically indicated by 87.

The upper tubular member 83 like the lower tubular member 81, is guided by means of rings 89 along guide rods 90 and has two diametrically opposed apertures extending parallel to its axis, diagrammatically indicated by 91.

The tubular members 81, 83 can be made as a single piece or in two parts joined together, for example around a plane passing through the axis. As will be seen more clearly later, they serve to encircle the bump after it has been pressed so as to swathe it with the portion of plastic film in which it becomes wrapped, before it is tied.

Figs 7 to 11 show in highly diagrammatic form the work phases from extraction of the material from the can V5 to the tying of the pressed bump in the pressing station 27. In Fig 7 the can V5 is visible in the extraction station 11 underneath the cylinder-and-piston system 15. The tape N, whose free end is held by the gripping members 78 has been unwound far enough to cover the mouth of the can V5. The disk 15A of the cylinder-and-piston system 15 is lowered towards the can V5. At this point the pushing member 13 pushes up the material contained in the can V5 and the disk 15A is moved up until the material M reaches the position shown in Fig. 8, in which said material becomes partly pressed to a height which fits between the two tables 17 and 29. During this movement the gripping members 78 have kept the free end of the tape N still in such a way that said tape has been partly unwound from the roll R to the point where it is wrapped around the material M as shown in Fig 8. A cutting means, for example a hot wire or a blade, diagrammatically indicated by 95 in Fig 8, is now used to cut the tape N.

When the tape N has been cut, the carriage 21 advances in the direction of f21 (Fig 8) until the gripping means 23 laterally grasp the material M. The further advance of the carriage 21 in the direction of f21 carries the partly pressed material M from the extraction station 11 to the pressing and tying station 27, where the material M assumes the position of Fig 9. During this movement the horizontal tables 17, 29 stop the partly pressed material M from re-expanding and the lower horizontal table 17 also produces a partial wrapping of the tape N around the material M. The pressing surfaces 31, 33 then perform the pressing of the bump B as shown in Fig. 10. In this arrangement, the length of tape N wrapped around the bump in the packing phase is partly wrapped around the packet of roving of the bump, but the edges corresponding to the lateral sides of the tape remain free, protruding perpendicularly to the plane of the figure. To complete the wrapping of the bump, two tubular members 81, 83 are used, which are under the control of corresponding actuators (not shown) are moved in the directions of the arrows f81 and f83 towards each other until one penetrates the other, this partial penetration being possible because of the difference between the internal diameter of the lower tubular member 81 and the external diameter of the upper tubular member 83. The position assumed is shown in Fig 11.

In the position of Fig 11 the pressed and wrapped bump is ready to be tied. For this purpose windows are cut at 87 and 91 in the tubular members 81, 83 as mentioned above, to allow the tying machine 35, 37 to pass through. The tying takes place in the conventional manner by rotating the lower pressing surface 31, which draws the upper tying surface 33 round with it, while the tubular members 81, 83 remain stationary with respect to the frame of the apparatus. When tying is completed the tubular members 81, 83 are removed and the carriage 49 removes the packed bump in the manner described above referring to Figs 1 to 6.

It is understood that the drawing shows only one embodiment, given solely as a practical demonstration of the invention, as the invention may vary in form and arrangements without thereby departing from the scope of the concept which underlies said invention. Any reference numbers appearing in the attached claims are to facilitate the reading of the claims with reference to the description and to the drawing, and do not limit the scope of protection represented by the claims.

Claims

1. An apparatus for the pressing and tying of bumps comprising : means (13, 31, 33) for the extraction of the material from the collecting can (V5) and for the pressing of said material ; means (35, 37) for the tying of the pressed bump ; and means (51, 53, 65) for handling the tied bump, comprising a first station (11) for the extraction of the material from the can (V5) and a second station (27) for the pressing and tying of the bump, means (21, 23) of transferring the bump being provided to transfer the material from said first extraction station to said second pressing and tying station.

2. The apparatus as claimed in claim 1, in which said extraction station (11) comprises an extractor (13) for extracting the material from the can (V5) and a pressing means (15, 15A) to perform a partial pre-compression of the material extracted from the can.

3. The apparatus as claimed in claim 2, in which between the said extraction station (11) and said pressing and tying station (27) retaining and guiding means (17, 29) are arranged which prevent the re-expansion of the material while it is being transferred from the first to the second station.

4. The apparatus as claimed in one or more of claims 1 to 3, in which said means of transferring the bump from the extraction station (11) to the pressing and tying station (27) comprise a carriage (21) with members (23) for gripping the material that is to be transferred.

5. The apparatus as claimed in one or more of claims 1 to 4, in which connected with said pressing and tying station (27) are handling means for taking and transferring the packed bump.

6. The apparatus as claimed in claim 5, in which connected with the pressing and tying station is a conveyor belt (53) on which the pressed and tied bump is deposited for subsequent removal.

7. The apparatus as claimed in one or more of the preceding claims, comprising a shuttle (9) which takes alternately from one or other of at least two rotating can-filling platforms (5), a can filled with the material that is to be pressed and packed and transports it to the pressing unit.

8. The apparatus as claimed in one or more of the preceding claims, in which connected with said extraction station (11) are means (78) for placing a wrapping film (N) around the material (M) extracted from the collecting can (V5).

9. The apparatus as claimed in claim 8, in which said means for placing the wrapping film around the material (M) which is to be packed comprise gripping members (78) which grasp the free end of a rolled tape of film (N) and unwind it to a predetermined length, and members (95) for cutting the unwound tape.

10. The apparatus as claimed in claim 8 or 9, in which members (81, 83) are provided for completing the wrapping of the pressed bump with the wrapping film, in the pressing and tying station (27).

11. The apparatus as claimed in claim 10, in which said members (81, 83) are tubular members arranged coaxially with pressing surfaces (31, 33) of the pressing and tying station, and vertically moveable to assume alternately a retracted position and a position in which they encircle the pressed bump between said two pressing surfaces.

12. The apparatus as claimed in claim 11, in which said tubular members have apertures (87, 91) for the tying machine (35, 37) to pass through.

13. A method for the automatic pressing and wrapping of a bump of textile material or similar product, comprising the phases of : extracting the material from the collecting can ; compressing the material and wrapping it in a packing film ; and tying the bump of pressed and wrapped material in said packing film.

14. The method as claimed in claim 13, in which the phases of extracting the material from the collecting can and of wrapping it in the film take place in a first extraction station (11), and the wrapped material is transferred to a second pressing and tying station (27).

15. The method as claimed in claim 14, in which during the extraction from the collecting can and the wrapping of the material, said material is partly pre-compressed.

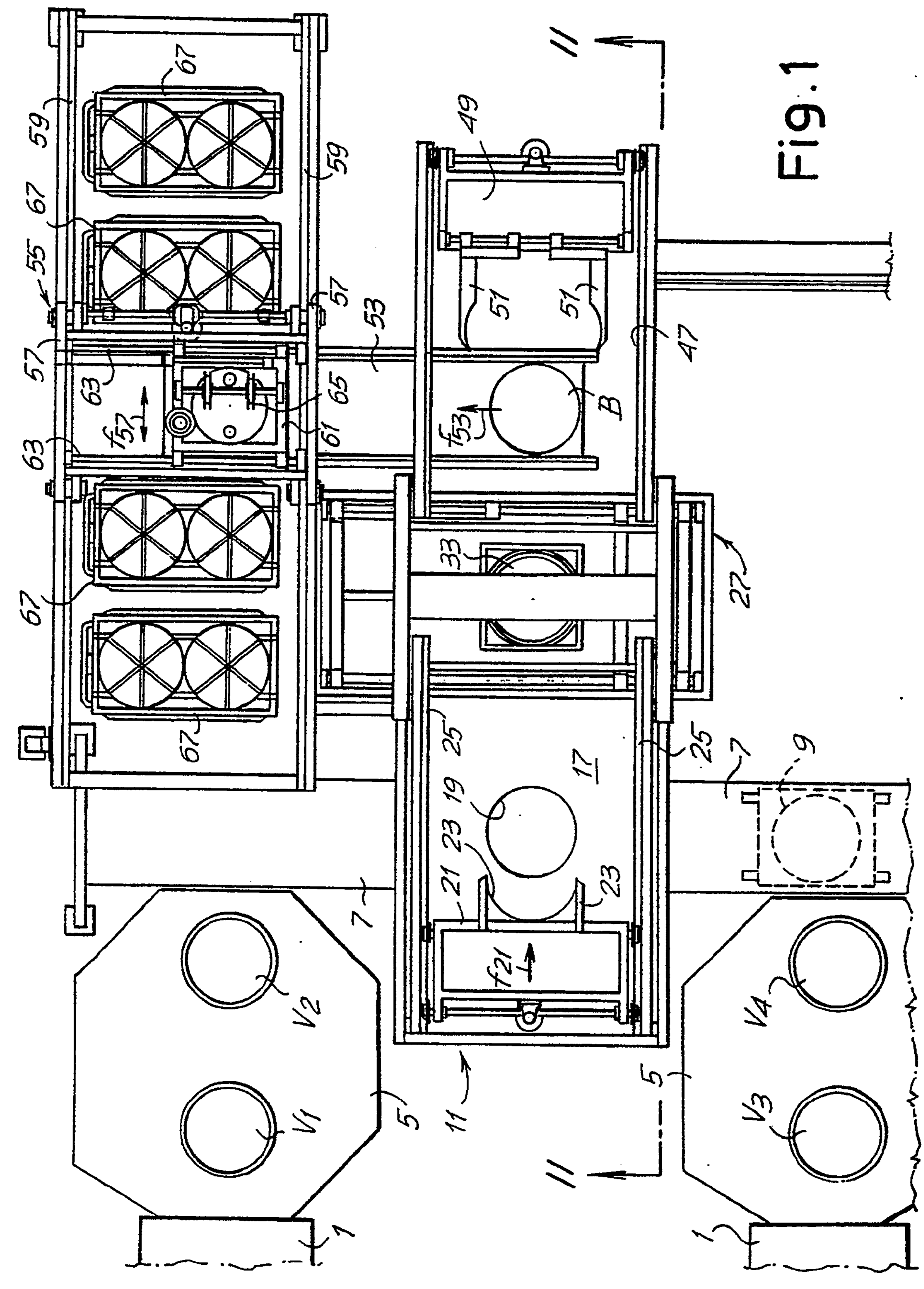
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Fig.1

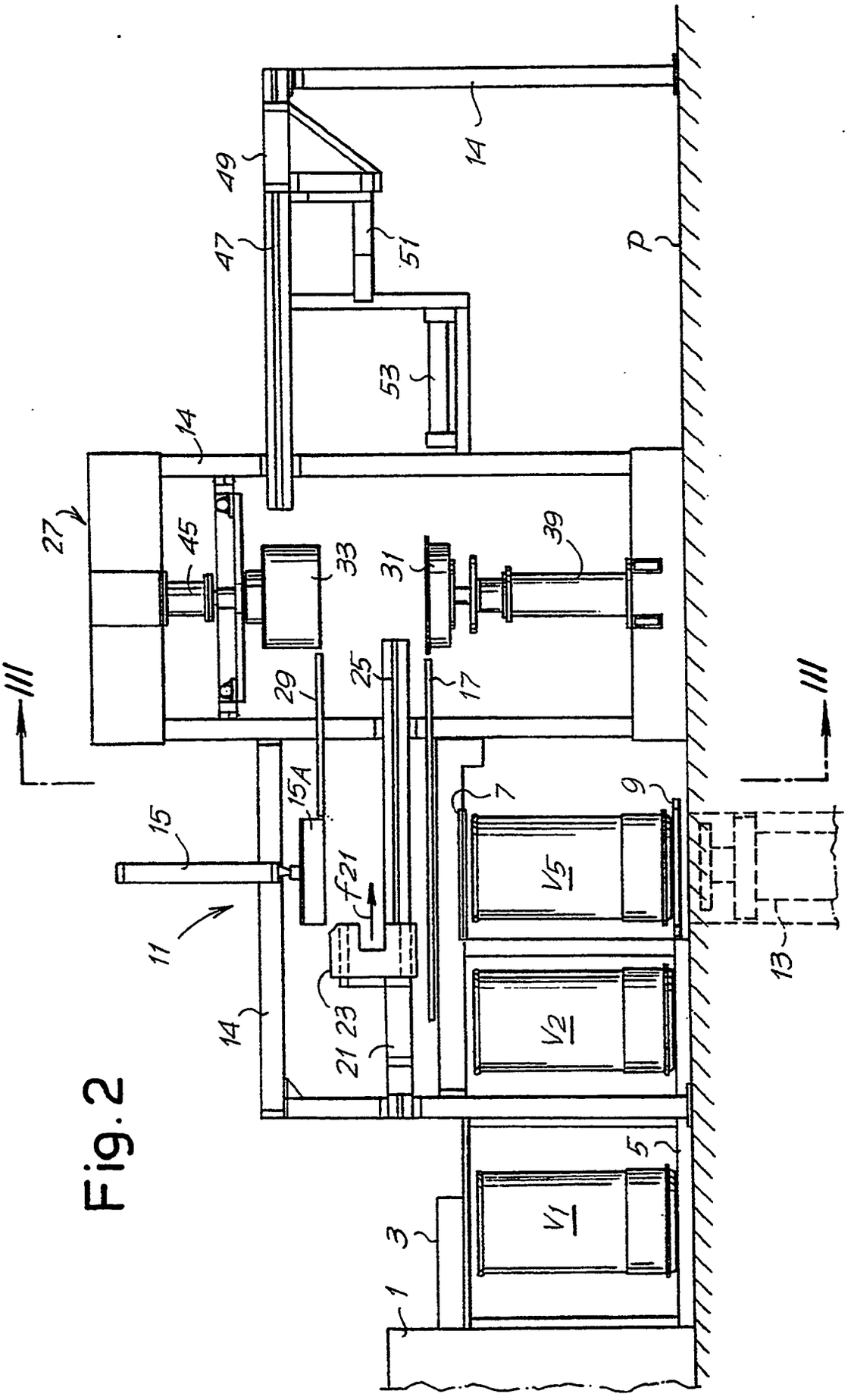
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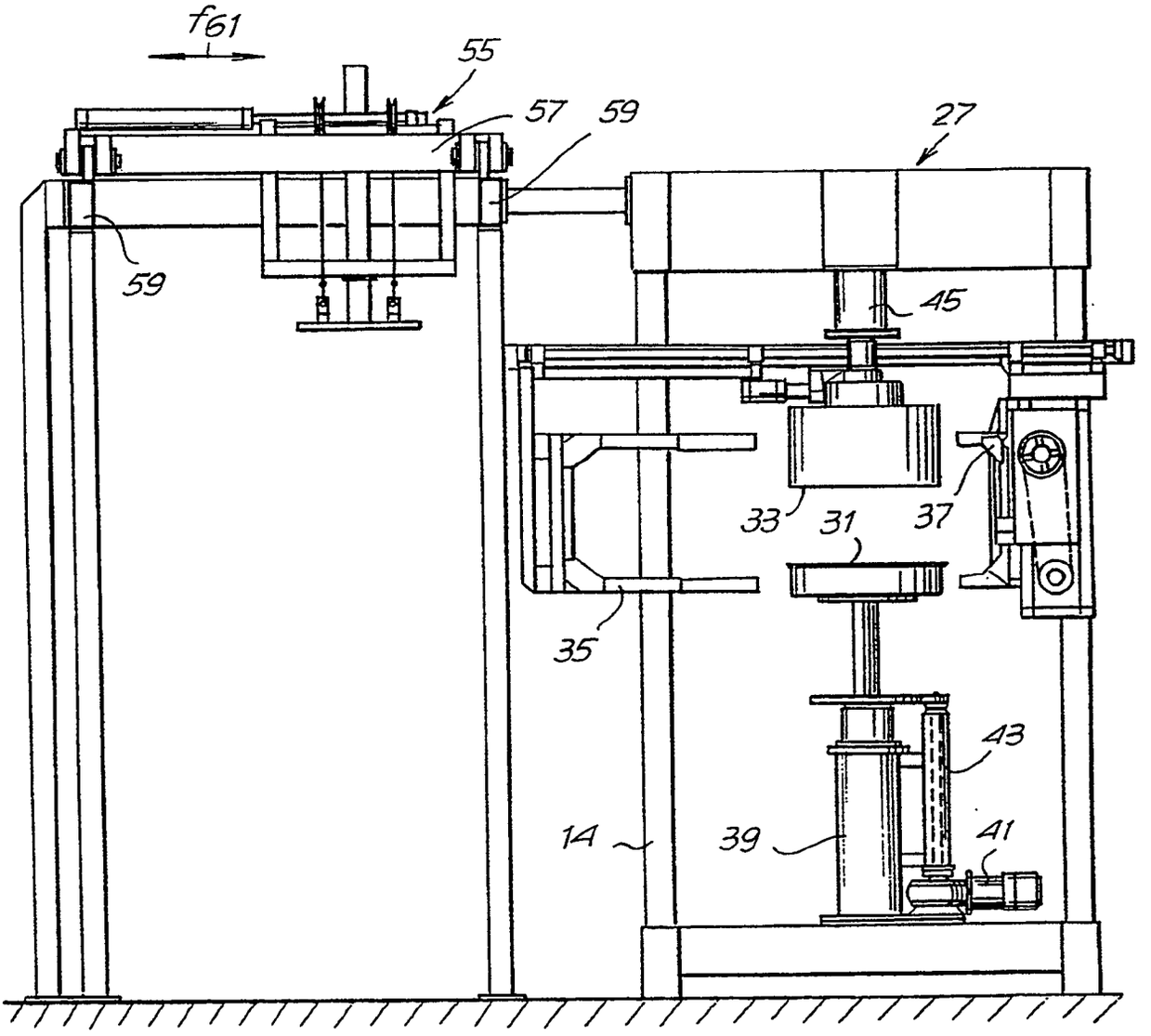
Fig. 2

Fig.3



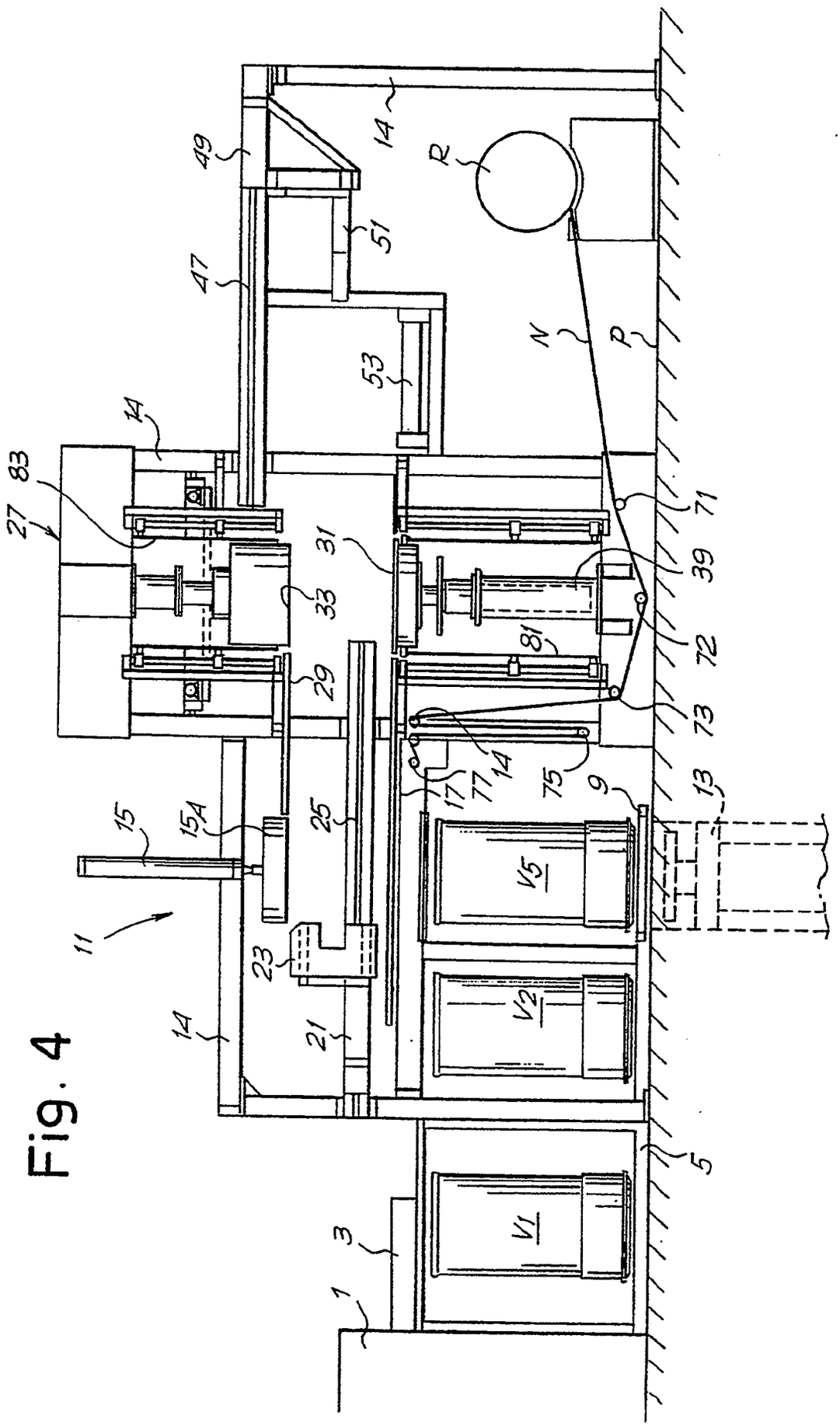

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Fig. 4

Fig. 5

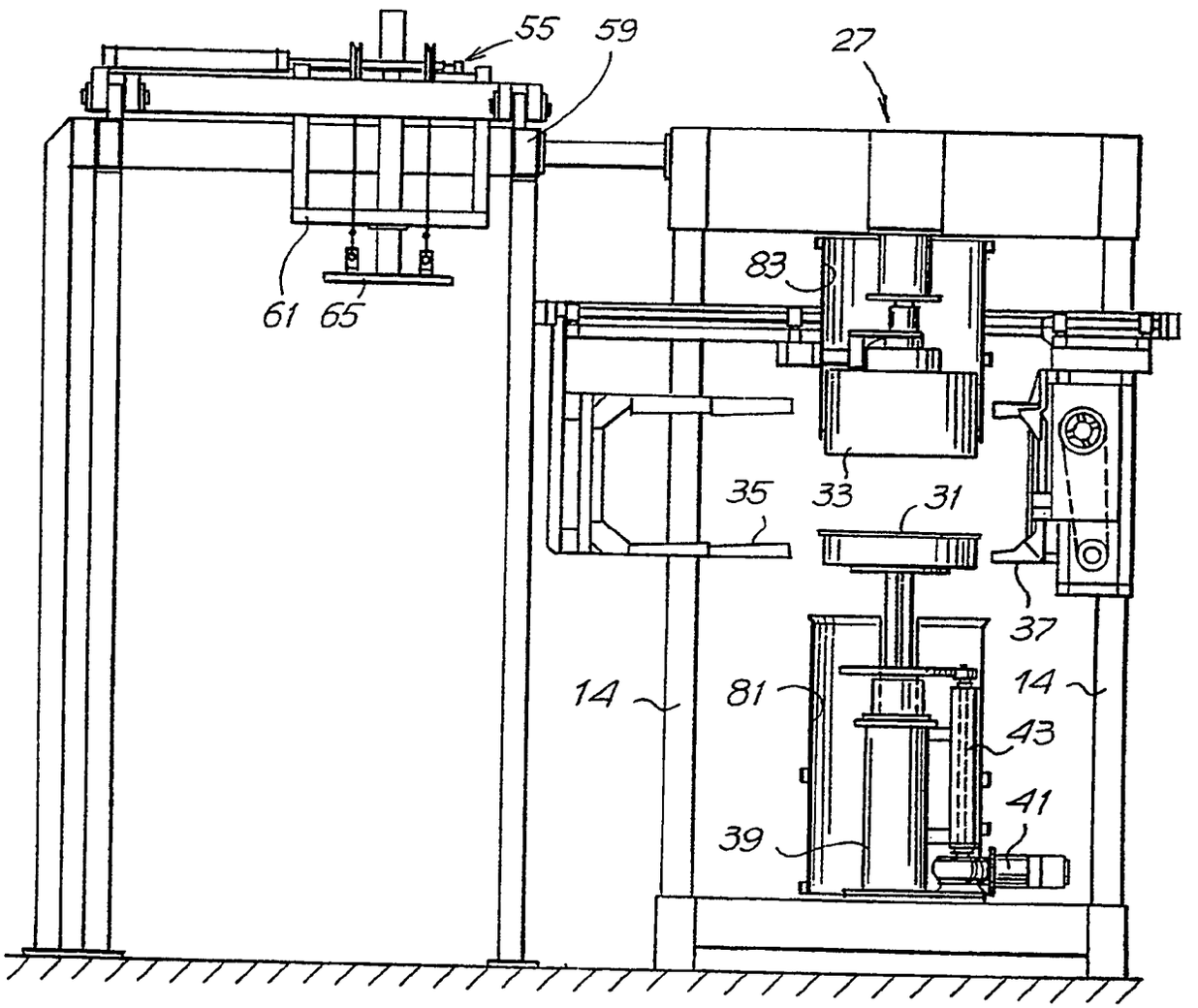

Fig.6

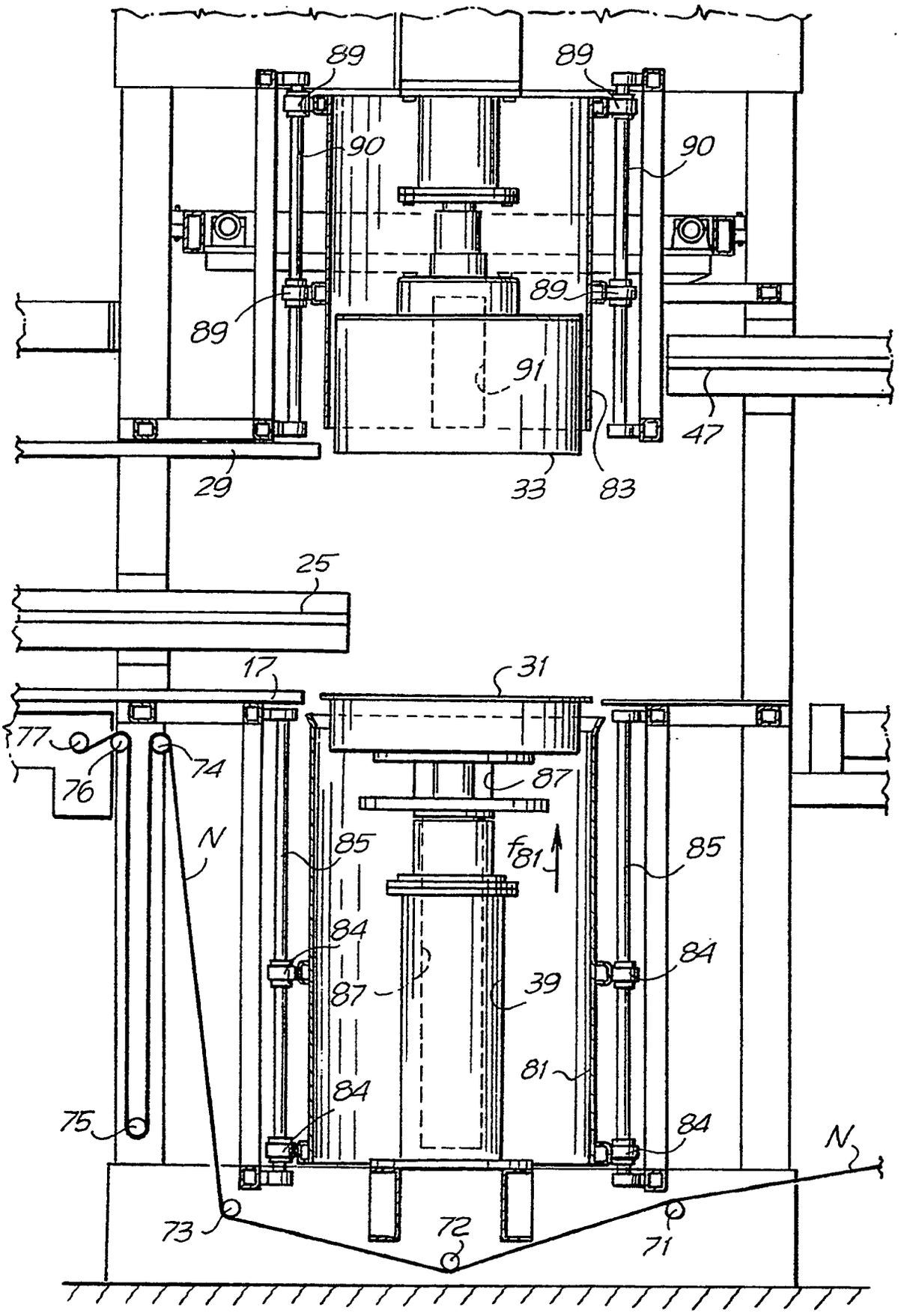
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Fig. 7

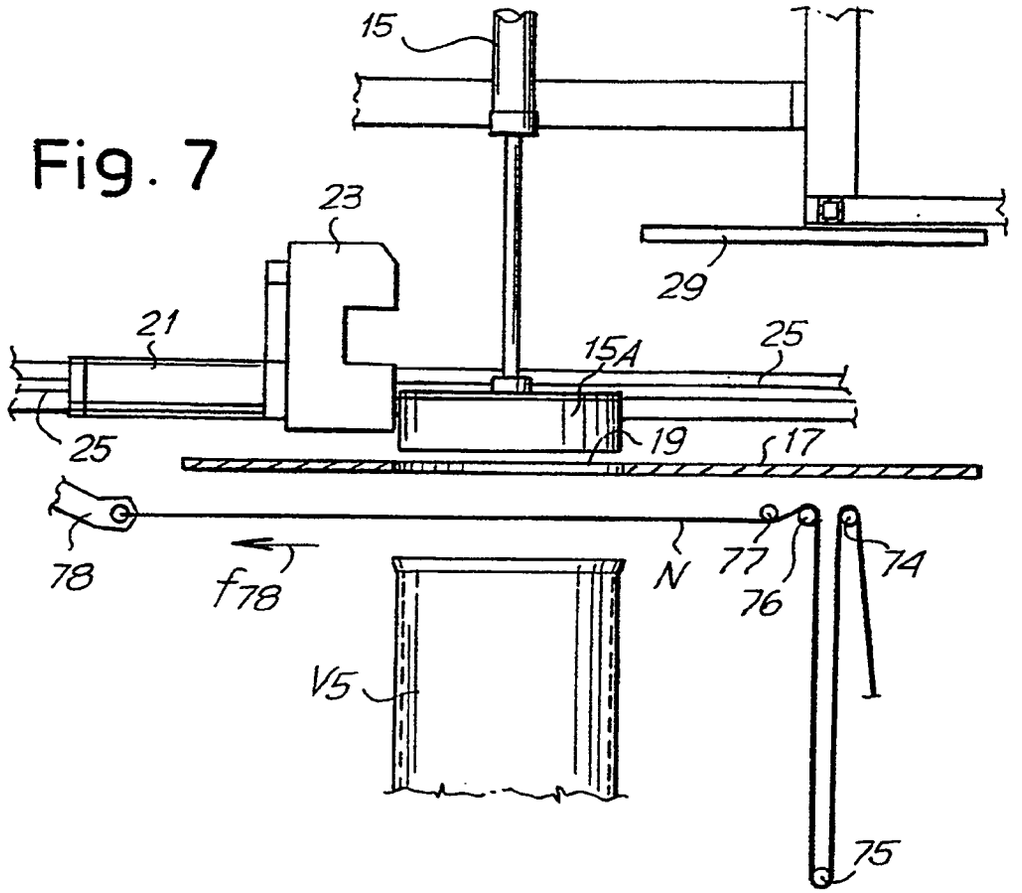
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Fig. 8

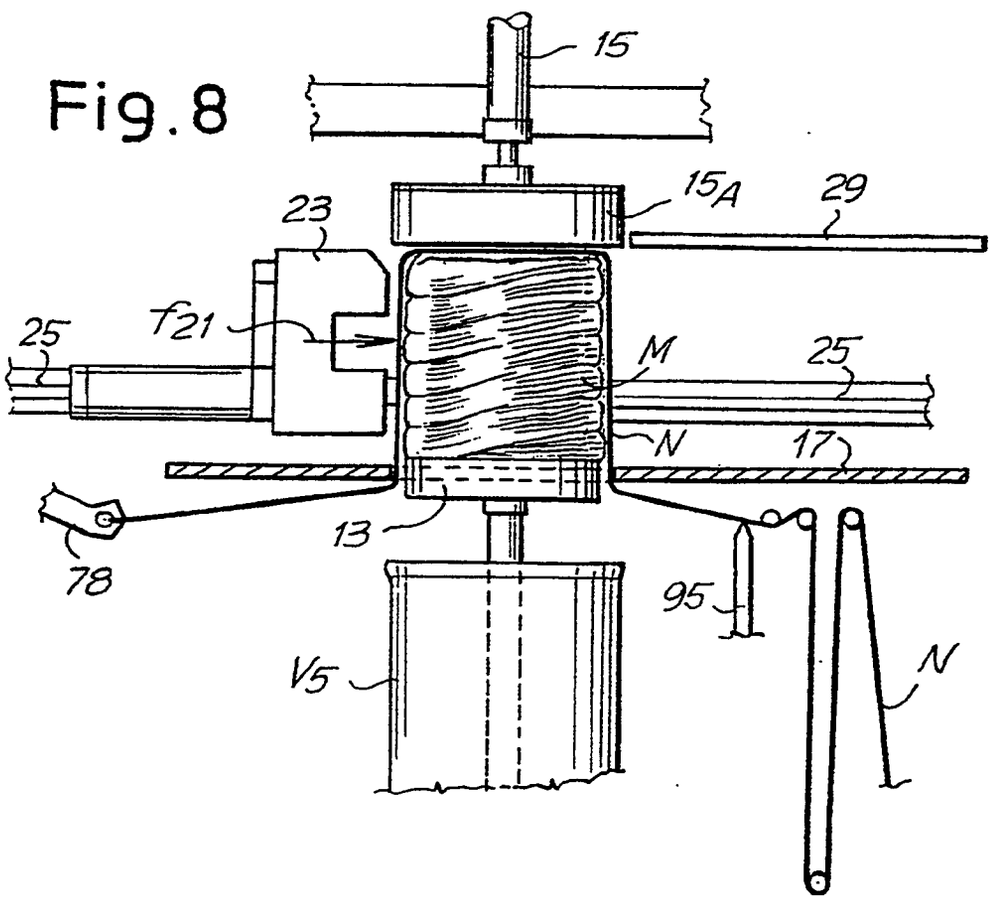
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Fig.9

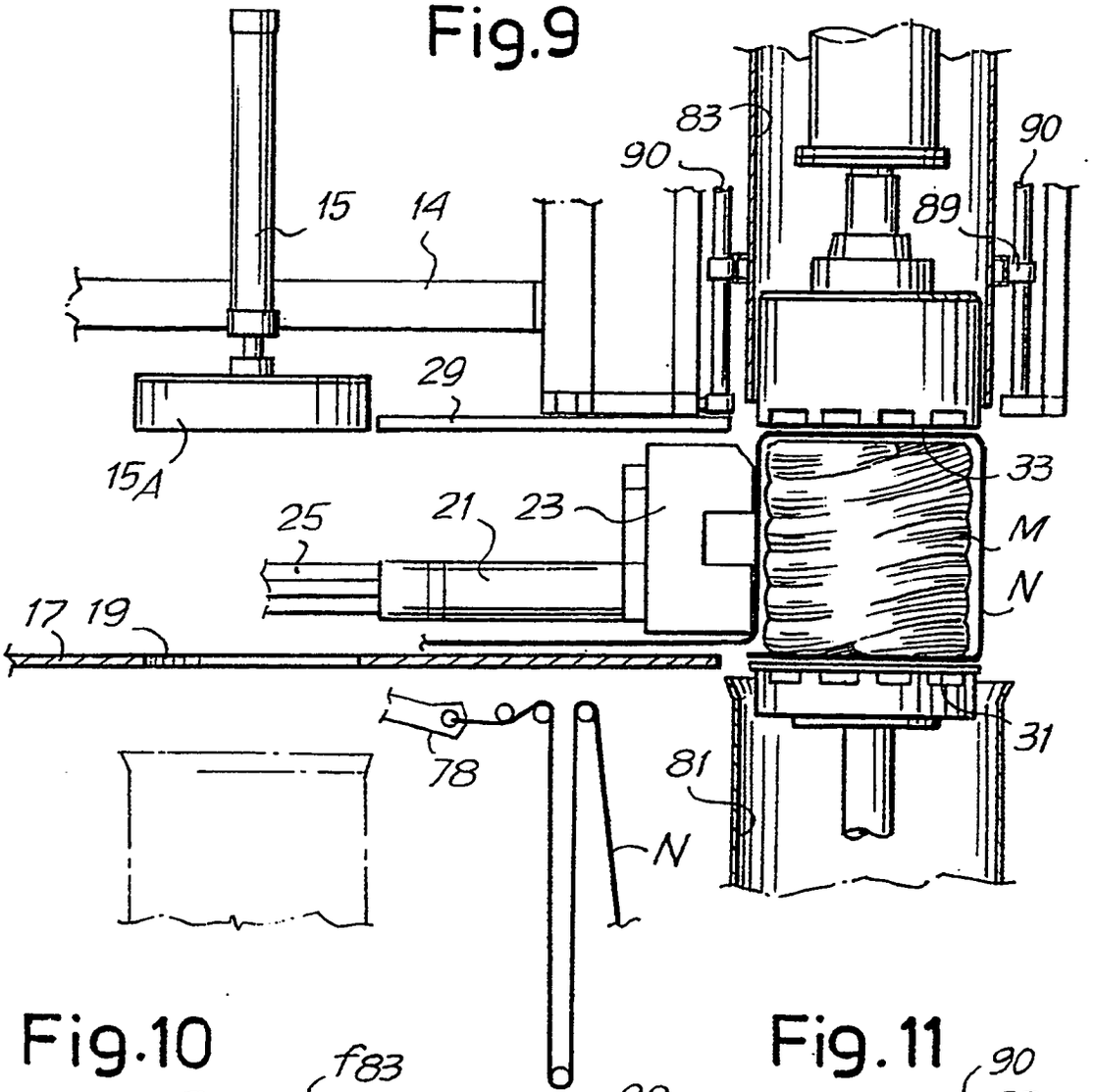


Fig.10

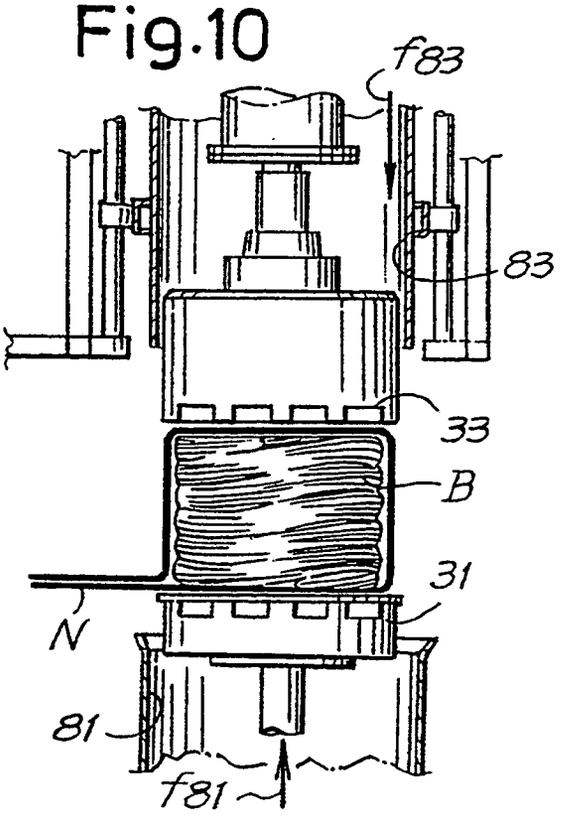
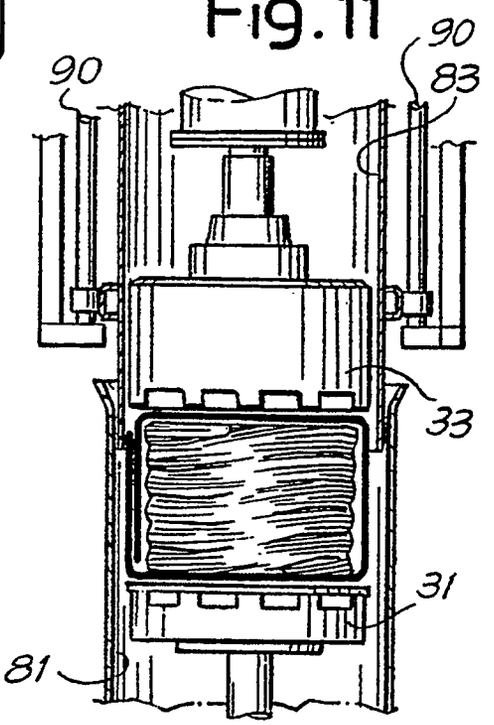


Fig.11



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 91 83 0017

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.5)
X	EP-A-0 014 923 (HOECHST) * Page 16, line 1 - page 17, line 15; page 24, line 26 - page 25, line 30; fig. *	1,2,4,5,13	B 65 B 63/02
Y		6,8,9,10,11,15	
Y	EP-A-0 198 992 (GUALCHIERANI) * Page 8, line 13 - page 9, line 23; figures 1-3 *	1,2,3,4,5,13	
Y	EP-A-0 277 099 (GUALCHIERANI) * Column 9, line 64 - column 11, line 9; fig. *	1,2,3,4,5,13	
Y	FR-A-2 219 064 (JOHNS-MANVILLE) * Page 10, lines 26-31; figure 1 *	6	
Y	US-A-3 962 846 (J. NEITZEL) * Column 2, line 60 - column 4, line 22; column 7, line 15 - column 9, line 42; figures 1-10 *	8,9,10,11,15	TECHNICAL FIELDS SEARCHED (Int. Cl.5) B 65 B B 65 H B 30 B
A	US-A-4 805 383 (R. ALLWEIN) * Column 5, line 36 - column 6, line 44; fig. *	8,9,10,11,15	
A	EP-A-0 132 120 (LUMMUS IND.)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	08-05-1991	JAGUSIAK A.H.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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P : intermediate document

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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)