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(54) Unit for applying opening devices to packages of pourable food products

(57) A unit (1) for applying opening devices (2) to respective packages (3) of pourable food products, the unit having a first conveying device (8) for feeding the packages (3) successively to an application station (13) along a first path (P1); a second conveying device (21) for feeding the opening devices (2) successively to the application station (13) along a second path (P2); and a sensor (53) for determining the presence of the open-

ing devices at a detecting station (60) located along the second path (P2); and wherein a control unit (59) controls the first conveying device (8) in response to a signal generated by the sensor (53) to prevent supply of a package (3) to the application station (13) in response to a value of the signal indicating the absence of a corresponding opening device (2) at the detecting station (60).

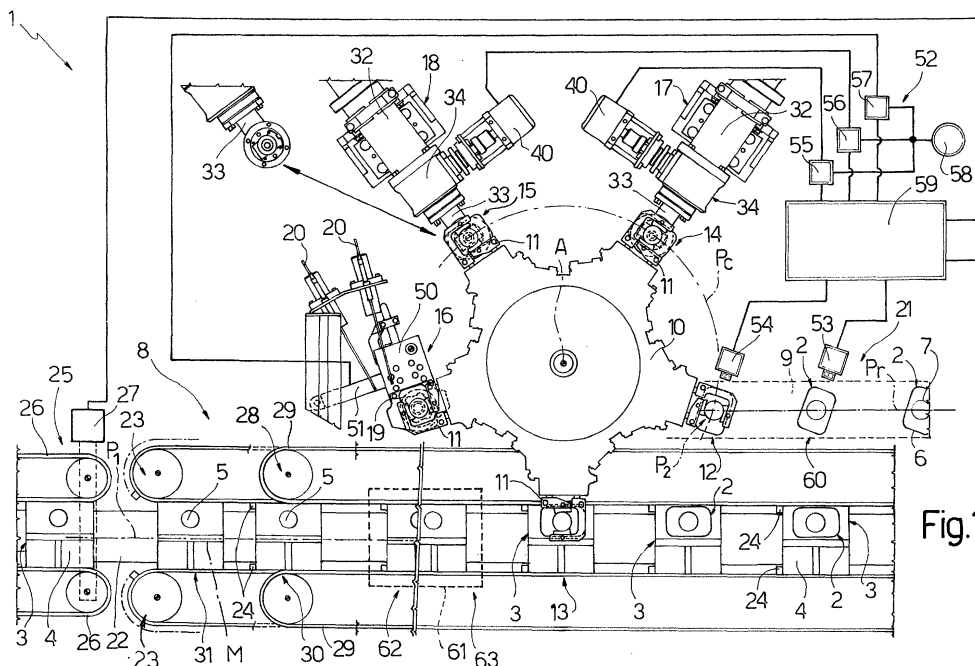


Fig.1

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## Description

**[0001]** The present invention relates to a unit for applying opening devices to packages of pourable food products.

**[0002]** As is known, many pourable food products, such as fruit juice, UHT (ultra-high-temperature-treated) milk, wine, tomato sauce, etc., are sold in packages made of sterilized packaging material.

**[0003]** A typical example of this type of package is the parallelepiped-shaped package for liquid or pourable food products known as Tetra Brik Aseptic (registered trademark), which is made by folding and sealing a web of laminated packaging material. The packaging material has a multilayer structure comprising a layer of fibrous material, e.g. paper, covered on both sides with layers of heat-seal plastic material, e.g. polyethylene, and, in the case of aseptic packages for long-storage products, such as UHT milk, also comprises a layer of oxygen-barrier material, defined, for example, by aluminium foil, which is superimposed on a layer of heat-seal plastic material, and is in turn covered with another layer of heat-seal plastic material eventually defining the inner face of the package contacting the food product.

**[0004]** As is known, such packages are produced on fully automatic packaging machines, on which a continuous tube is formed from the web-fed packaging material; the web of packaging material is sterilized on the packaging machine itself, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution, which, once sterilization is completed, is removed, e.g. vapourized by heating, from the surfaces of the packaging material; and the web of packaging material so sterilized is kept in a closed, sterile environment, and is folded and sealed longitudinally to form a vertical tube.

**[0005]** The tube is filled with the sterilized or sterile-processed food product, and is sealed and cut along equally spaced transverse sections to form pillow packs, which are then folded mechanically to form the finished, e.g. substantially parallelepiped-shaped, packages.

**[0006]** Alternatively, the packaging material may be cut into blanks, which are folded on forming spindles into packages, which are then filled with the food product and sealed. One example of the this type of package is the so-called "gable-top" package known by the trade name Tetra Rex (registered trademark).

**[0007]** Once formed, packages of the above type may undergo further operations, such as application of a closable opening device.

**[0008]** The most commonly marketed opening devices comprise a frame defining an opening and fitted about a pierceable or removable portion on the top wall of the package; and a cap hinged or screwed to the frame, and which is removable to open the package. Alternatively, other, e.g. slidable, opening devices are also known to be used.

**[0009]** The pierceable portion of the package may be defined, for example, by a so-called "prelaminated"

hole, i.e. a hole formed in the fibrous layer of the packaging material before it is covered with the barrier layer, which thus remains whole and closes the hole to ensure airtight, aseptic sealing, while at the same time being pierced easily.

**[0010]** The opening devices described are normally heat sealed or glued directly to the packages by applicator units, which also perform a number of preliminary steps, such as localized heating or application of adhesive.

**[0011]** EP-A-1 228 967, for example, describes an applicator unit substantially comprising a continuously-rotating carousel conveyor for conveying the packages from a loading station to an unloading station via a number of work stations and paths comprising, in particular, a feed station for feeding the opening devices onto the carousel conveyor, and where the opening devices are picked up by respective grippers fitted to the carousel conveyor itself; a number of processing stations for heating the opening devices; and an application station for applying the opening devices to respective packages.

**[0012]** In known applicator units of the type briefly described above, an opening device may fail to be supplied to the feed station or to be picked up by the relative gripper. So, to prevent overheating of the empty gripper exposed directly to the heaters in the absence of the opening device, known units are provided with a sensor for detecting the presence of the opening devices; and deflecting devices for intercepting the heat produced by the heaters in response to a sensor-generated signal indicating a missing opening device.

**[0013]** A major drawback resulting from failure to apply the opening device to a package lies in the package, filled with the product and of considerable value by being at the end of the production cycle, having to be rejected.

**[0014]** It is an object of the present invention to provide a unit for applying opening devices to packages of pourable food products, designed to eliminate the aforementioned drawbacks.

**[0015]** According to the present invention, there is provided an applicator unit as claimed in Claim 1.

**[0016]** A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic plan view of a unit, in accordance with the present invention, for applying opening devices to packages of pourable food products;

Figure 2 shows a section along line II-II of a valve of the Figure 1 unit;

Figure 3 shows a section along line III-III in Figure 2 of the valve in the open position;

Figure 4 shows a section along line III-III in Figure 2 of the valve in the closed position;

Figure 5 shows a larger-scale schematic plan view of a detail of the Figure 1 unit.

**[0017]** Number 1 in Figure 1 indicates as a whole a unit for applying opening devices 2 to packages 3 of pourable food products.

**[0018]** Packages 3 are produced on a packaging unit (not shown) from a web of sheet packaging material comprising a layer of paper material covered on both sides with layers of heat-seal plastic material, e.g. polyethylene; and a layer of barrier material, such as aluminium, located inwards with respect to the layer of paper material, and in turn covered internally by another layer of plastic material.

**[0019]** Each package 3, which is parallelepiped-shaped in the example shown, has, on a top wall 4, a pierceable portion 5 conveniently defined by a so-called "prelaminated" hole, i.e. a hole formed in the fibrous layer of the packaging material before the fibrous layer is covered with the barrier layer, which closes the hole to ensure airtight, aseptic sealing, while at the same time being easily pierceable.

**[0020]** Opening devices 2 are made of thermoplastic material, and each comprise in known manner a frame 6, which is heat sealed about pierceable portion 5 on wall 4 of a respective package 3, and defines a pour opening (not shown); and a cap 7 or cover screwed or hinged to the frame to close said opening. Opening devices 2 conveniently comprise known means, not shown, for piercing or removing pierceable portion 5 of package 3 to unseal the package.

**[0021]** Unit 1 comprises a first conveying device defined by a linear step conveyor 8 for feeding a succession of packages 3 along a preferably straight path P1; a second linear step conveyor 9 for feeding a succession of opening devices 2 along a straight path Pr parallel to and in the opposite direction to path P1 in the example shown; and a step-operated carousel conveyor 10, which rotates about a vertical axis A, has a number of grippers 11 for gripping opening devices 2, and feeds opening devices 2 from a pickup station 12 coincident with one of the stop stations of second conveyor 9, to an application station 13 for applying opening devices 2 to respective packages 3, and which is coincident with one of the stop stations of first conveyor 8.

**[0022]** More specifically, carousel conveyor 10 feeds opening devices 2 along a circular path Pc through a number of intermediate processing stations 14, 15, 16, where opening devices 2 are stopped and heated to partly melt the material. More specifically, stations 14 and 15 have respective hot-air heating devices 17, 18 for generating and directing respective hot-air jets underneath opening devices 2 at respective stations 14, 15; and station 16 has a hydrogen burner 19, which generates a microflame for locally melting the thermoplastic material of opening device 2. Two electrodes 20 are also provided close to station 16 to ignite the microflame.

**[0023]** Second conveyor 9 and carousel conveyor 10 together define a second conveying device 21 for feeding opening devices 2 to application station 13 along a mixed second path P2 defined by paths Pr and Pc.

**[0024]** First conveyor 8 comprises a conveyor belt 22 defining a continuously-moving supporting surface for packages 3; and lateral belt feed devices 23 cooperating with respective opposite sides of packages 3. More specifically, the two feed devices 23 are step-operated, are symmetrical with respect to a vertical plane M containing path P1, and are fitted with respective numbers of vertical feed bars 24 equally spaced by a distance d defining the spacing of packages 3 on first conveyor 8.

**[0025]** Conveyor 8 also comprises a known input synchronizing device 25 comprising two lateral brake belts 26 located on opposite sides of conveyor belt 22 and symmetrical with respect to plane M. Belts 26 are controlled by a motor 27, and interact with the incoming packages 3 fed randomly along conveyor belt 22 to arrest them when motor 27 is off, and to release them one by one along path P1 when motor 27 is turned on.

**[0026]** Conveyor 8 also comprises a clamping device 28 defined by two step-operated belts 29 synchronized with feed devices 23 and cooperating frictionally with respective sides of packages 3 as of a station 30 of conveyor 8 downstream from a pickup station 31 where the packages are picked up by feed devices 23, as described in detail later on.

**[0027]** Heating devices 17, 18 each comprise an electric heater 32 generating hot air at a given temperature, e.g. 650°, in known manner; a nozzle 33 facing respective processing station 14, 15 of carousel conveyor 10; and a two-position, three-way rotary valve 34 interposed between heater 32 and nozzle 33 to connect heater 32 selectively to the nozzle and an exhaust.

**[0028]** Each rotary valve 34 (Figures 2 to 4) comprises a casing 35 defining a cylindrical inner chamber 36; a rotary slide 37 defined by a rod 38 and by a head 39 rotating in airtight manner inside chamber 36; and a rotary pneumatic actuator 40 for activating slide 37. Casing 35 has two coaxial radial openings 41, 42 connected to heater 32 and nozzle 33 respectively; and an axial exhaust opening 43 opposite pneumatic actuator 40 and communicating with the outside.

**[0029]** Head 39 of slide 37 comprises a diametrical through hole 44 alignable with openings 41, 42 in casing 35, and a lateral milled portion 45 facing in a direction perpendicular to the axis of hole 44, and is movable by pneumatic actuator 40 between an open position wherein hole 44 is coaxial with openings 41, 42 and so connects heater 32 to nozzle 33, and an exhaust position wherein milled portion 45 connects opening 41 to exhaust opening 43, and opening 42 is closed hermetically by head 39.

**[0030]** Pneumatic actuator 40 is conveniently detached from casing 35 of valve 34 by a number of spacers 46 and a finned body 47 in series with spacers 46, to minimize heat transmission from chamber 36 to pneumatic actuator 40. For the same reason, rod 38 of rotary slide 37 is connected to an output member 48 of pneumatic actuator 40 by a prismatic joint 49 preventing direct contact between output member 48 and rod 38.

**[0031]** Burner 19 (Figure 5) is fitted to a support 50 hinged to a fixed structure of unit 1 about a vertical axis B, and which is movable, under control of a pneumatic cylinder 51, between a first position wherein burner 19 is located beneath gripper 11 at station 16, and a second position wherein burner 19 is far enough away for the microflame to have no harmful effect on gripper 11, and wherein the two electrodes 20 are operated when necessary to ignite the microflame.

**[0032]** Finally, unit 1 is equipped with a control system 52 comprising a sensor 53 for determining the presence of an opening device 2 at a given station along conveyor 9; a sensor 54 at pickup station 12, to determine opening devices 2 are actually picked up by respective grippers 11; and a number of solenoid valves 55, 56, 57 connected to a compressed-air source 58, and which respectively control pneumatic actuators 40 at stations 14 and 15 and pneumatic cylinder 51, to control the position of rotary valves 34 and burner 19. Control system 52 also comprises a control unit 59, which receives signals from sensors 53, 54, and generates control signals for controlling solenoid valves 55, 56, 57 and motor 27.

**[0033]** Sensor 53 determines the presence of an opening device 2 at a station 60, of second conveying device 21 of conveyor 9, located upstream from application station 13 by a number N2 of steps, measured along path P2 of opening devices 2, at least equal to, and preferably greater than, the number N1 of steps, measured along path P1 of packages 3, between the output of synchronizing device 25 and application station 13.

**[0034]** Two technical requirements determine the number N1 of steps.

**[0035]** Firstly, a definite position of packages 3 with respect to feed devices 23 must be ensured, in which each package contacts and is fed forward by two bars 24, and is clamped in this position by belts 29. This position calls for at least the two stations 30, 31.

**[0036]** Secondly, the top wall 4 of each package 3 must be preheated by a heater 61 located over at least two stations 62, 63 downstream from station 30 and upstream from application station 13.

**[0037]** In the example shown, in which N1 equals four, station 60 is conveniently located along conveyor 9 one step upstream from pickup station 12, i.e. a total of five steps (N2 =5) upstream from application station 13 along path P2.

**[0038]** Operation of unit 1 will be described with reference to the processing cycle of one package 3 and relative opening device 2, the operations described obviously being repeated cyclically at each step.

**[0039]** Opening device 2 is fed in steps along path P2 defined partly by path Pr on conveyor 9, and partly by path Pc on carousel conveyor 10.

**[0040]** At station 60, sensor 53 performs the presence detecting function at a cycle step conveniently indicated "step 0".

**[0041]** If present, the opening device 2 is located at

step 1 at the next station along conveyor 9 defining pickup station 12, is picked up by a gripper 11, and sensor 54 determines the actual presence of opening device 2 on relative gripper 11.

5 **[0042]** At the same time, control unit 59 starts motor 27 of synchronizing device 25 to release and feed the package 3 corresponding to the detected opening device 2 along belt 22 to feed devices 23. The package is released within a time window calculated so that, given the travelling speed of belt 22, the package is positioned between two successive pairs of bars 24 at station 31.

10 **[0043]** At step 2, opening device 2 is fed by carousel conveyor 10 to processing station 14, where pneumatic actuator 40 keeps valve 34 in the open position, so that nozzle 33 is supplied with hot air generated by heater 32.

15 **[0044]** At the same time, feed devices 23 move forward one step. The difference between the travelling speed of feed devices 23 and that of belt 22 must be such as to ensure an incoming pair of bars 24 contacts and pushes package 3 to station 30, where belts 29 clamp the package with respect to feed devices 23 to maintain the definite position defined by contact with bars 24.

20 **[0045]** At step 3, opening device 2 is fed to processing station 15, where pneumatic actuator 40 keeps valve 34 in the open position, so that nozzle 33 is supplied with hot air generated by heater 32; and, at the same time, package 3 is fed to station 62 beneath heater 61.

25 **[0046]** At step 4, opening device 2 is fed to processing station 16, where pneumatic cylinder 51 keeps support 50 in the first position with burner 19 beneath opening device 2 carried by gripper 11; and, at the same time, package 3 is fed to station 63 beneath heater 61.

30 **[0047]** At step 5, opening device 2 and package 3 are both fed to application station 13, where opening device 2 is applied to package 3.

35 **[0048]** Package 3 then continues along conveyor 8 to an output (not shown) of unit 1.

40 **[0049]** The cycle described above applies to the normal operating condition in which opening device 2 is supplied and picked up correctly.

45 **[0050]** Conversely, in the event no opening device 2 is detected by sensor 53 at step 0, control unit 59 disables motor 27 at step 1, so that package 3 is not fed along conveyor 8, and, at step 5, gripper 11 is empty and there is no corresponding package 3.

50 **[0051]** In the event no opening device 2 is detected by sensor 54 at step 1 - that is, the opening device 2 is missing on conveyor 9 or has not been picked up by gripper 11 - control unit 59 performs the following operations:

at step 2, solenoid valve 55 is switched, so that valve 34 at first processing station 14 switches to exhaust to prevent hot air from being directed onto the empty gripper 11;

at step 3, solenoid valve 56 is switched, so that

valve 34 at second processing station 15 switches to exhaust to prevent hot air from being directed on to the empty gripper 11;

at step 4, solenoid valve 57 is switched, so that pneumatic cylinder 51 at processing station 16 moves support 50 into the second position to prevent exposure of the empty gripper 11 to the micro-flame produced by burner 19.

**[0052]** The advantages of unit 1 according to the present invention will be clear from the foregoing description.

**[0053]** First and foremost is the economic advantage of no longer rejecting packages 3 in the event of failure by conveyor 9 to supply respective opening devices 2.

**[0054]** Secondly, by detecting the presence of opening devices at station 12, grippers 11 are protected against heaters 32 and burner 19, thus increasing their working life and so reducing the maintenance cost of unit 1.

**[0055]** Clearly, changes may be made to unit 1 as described and illustrated herein without, however, departing from the scope of the present invention as defined in the accompanying Claims.

**[0056]** In particular, path P2 may be of any shape, e.g. totally linear or totally circular; and second conveying device 21 may be of any type. In particular, conveyor 9 or carousel conveyor 10 or both may be replaced by continuous conveyors or even robotized arms.

**[0057]** Similarly, path P1 and conveyor 8 may also be other than as described.

**[0058]** Intermediate processing stations 14, 15, 16 may differ in number and function, e.g. may be replaced by a gluing station, in the event opening devices 2 are applied to packages 3 using adhesive.

**[0059]** Sensor 53 may be located anywhere upstream from application station 13, provided the opening device detecting function is performed sufficiently in advance to prevent package 3 from being fed to application station 13.

**[0060]** Sensor 54 may also be eliminated, if there is no need to determine pickup by grippers 11; in which case, control unit 59 may also use the sensor 53 signal to control pneumatic valves 55, 56, 57.

## Claims

1. A unit (1) for applying opening devices (2) to respective packages (3) of pourable food products, the unit comprising:

a first conveying device (8) for feeding the packages (3) successively to an application station (13) along a first path (P1);

a second conveying device (21) for feeding the opening devices (2) successively to said application station (13) along a second path (P2);

and

sensor means (53, 54) for determining the presence of said opening devices (2) along said second path (P2);

**characterized by** comprising control means (52) for controlling said first conveying device (8) in response to at least one signal generated by said sensor means (53), and for preventing supply of a package (3) to said application station (13) in response to a value of said signal indicating the absence of a corresponding opening device (2).

2. A unit (1) as claimed in Claim 1, **characterized by** comprising processing means (17, 18, 19) for processing said opening devices (2) and located at at least one processing station (14, 15, 16) through which said second path (P2) extends; said sensor means (53, 54) being located upstream from said processing station (14, 15, 16); and said control means (52) comprising disabling means (34, 51) for disabling said processing means (17, 18, 19) in response to said signal generated by said sensor means (54).

3. A unit (1) as claimed in Claim 1 or 2, **characterized in that** said second conveying device (21) comprises a linear step conveyor (9); and a carousel conveyor (10) having a number of gripping members (11) for feeding said opening devices (2) between a pickup station (12) on said linear step conveyor and said application station (13) via said processing station (14, 15, 16).

4. A unit (1) as claimed in Claim 3, **characterized in that** said sensor means (53, 54) comprise a first sensor (53) located at a station (60) of said linear step conveyor (9) upstream from the pickup station (12); and a second sensor (54) located at said pickup station (12) and for determining actual pickup of said opening devices (2) by said gripping members (11).

5. A unit (1) as claimed in Claim 4, **characterized in that** said control means (52) comprise first control means (27) for controlling said first conveying device (8) in response to said first sensor (53).

6. A unit (1) as claimed in Claim 4 or 5, **characterized in that** said control means (52) comprise second control means (59; 55, 56, 57) for controlling said disabling means (34, 51) in response to said second sensor (54).

7. A unit (1) as claimed in any one of Claims 2 to 6, **characterized in that** said processing means (17, 18, 19) comprise at least one air heater (32), and at least one nozzle (33) connected to said air heater

(32) and located at said processing station (14, 15).

8. A unit (1) as claimed in Claim 7, **characterized in that** said disabling means (34, 51) comprise at least one valve (34) interposed between said air heater (32) and said nozzle (33), and movable between an open position connecting said air heater (32) to said nozzle (33), and an exhaust position. 5
9. A unit (1) as claimed in any one of Claims 2 to 8, **characterized in that** said processing means (17, 18, 19) comprise at least one flame burner (19) fitted to a support (50) movable between a first position wherein said burner (19) is located beneath the gripping member (11) at said processing station (16), and a second position wherein said burner (19) is moved away from said gripping member (11). 10  
15
10. A unit (1) as claimed in Claim 9, **characterized in that** said disabling means (34, 51) comprise an actuator (51) for moving said support (50) between said first position and said second position. 20
11. A unit (1) as claimed in any one of the foregoing Claims, **characterized in that** said first conveying device (8) comprises step feed means (23) for feeding said packages (3) to said application station (13). 25
12. A unit (1) as claimed in Claim 11, **characterized in that** said first conveying device (8) comprises a continuous conveyor (22) for supplying said packages (3) continuously; and a synchronizing device (25) for selectively enabling supply of said packages (3) on said continuous conveyor (22) to said step feed means (23). 30  
35
13. A unit (1) as claimed in Claim 12, **characterized in that** said control means (52) for controlling said first conveying device (8) in response to said sensor means (53, 54) comprise an actuator (27) for activating said synchronizing device (25). 40
14. A unit (1) as claimed in Claim 13, **characterized in that** said synchronizing device (25) is defined by two brake belts (26) cooperating with opposite sides of said packages (3); said actuator being defined by a motor (27) activating said brake belts (26). 45
15. A unit (1) as claimed in Claims 12 to 14, **characterized in that** said first conveying device (8) comprises a clamping device (28) defined by two belts (29) step-operated synchronously with said step feed means (23) and cooperating frictionally with respective sides of the packages (3) to ensure a definite position of said packages (3) with respect to said step feed means (23). 50  
55
16. A unit (1) as claimed in one of Claims 12 to 15, **characterized in that** said step feed means (23) comprise two lateral belt feed devices (23) cooperating with opposite sides of said packages (3), and having respective numbers of vertical feed bars (24) equally spaced by a distance (d) defining the spacing of the packages (3) on the first conveying device (8).

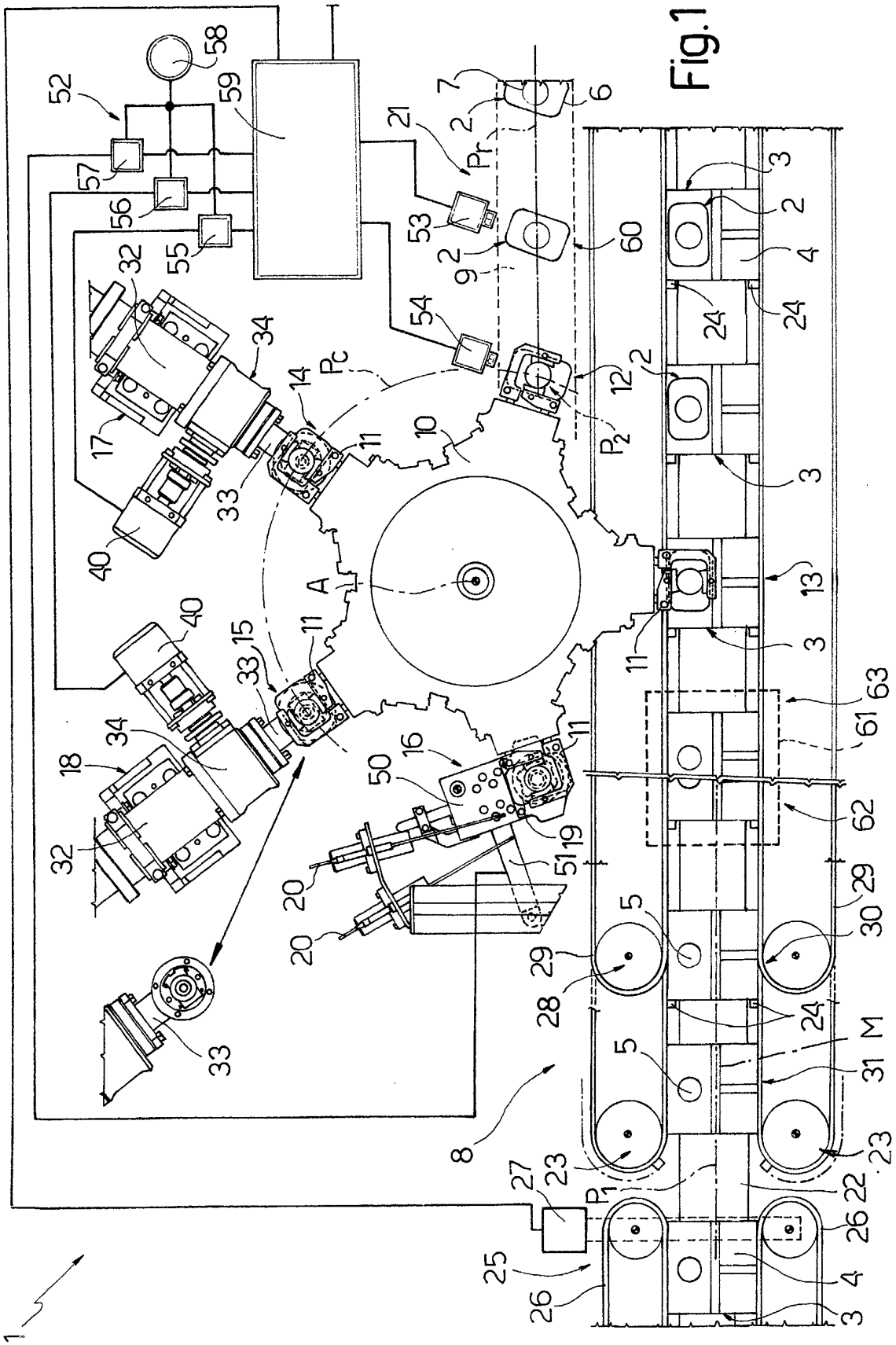


Fig. 1

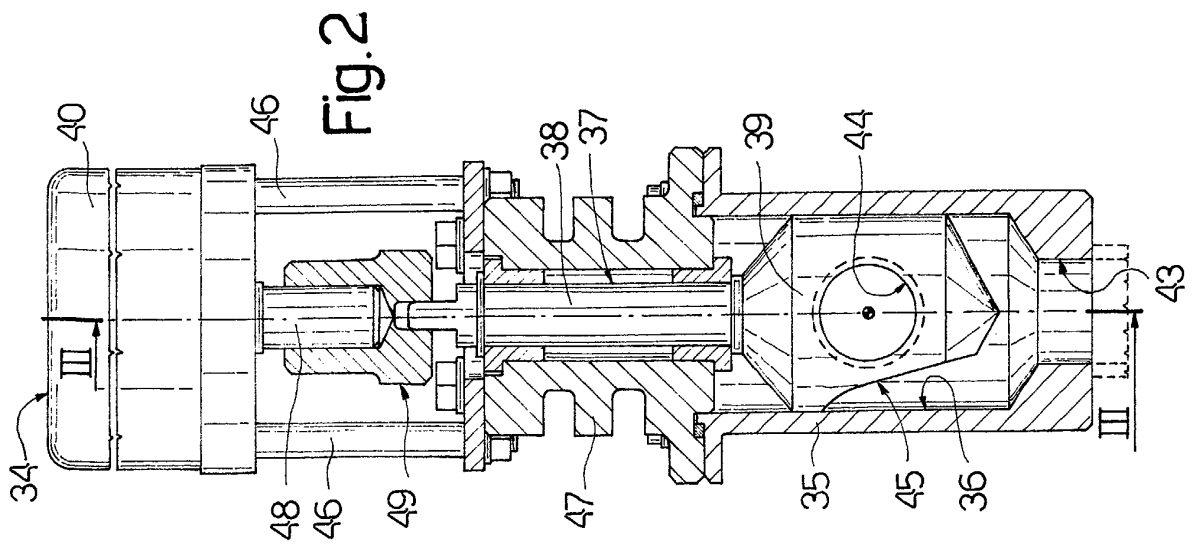
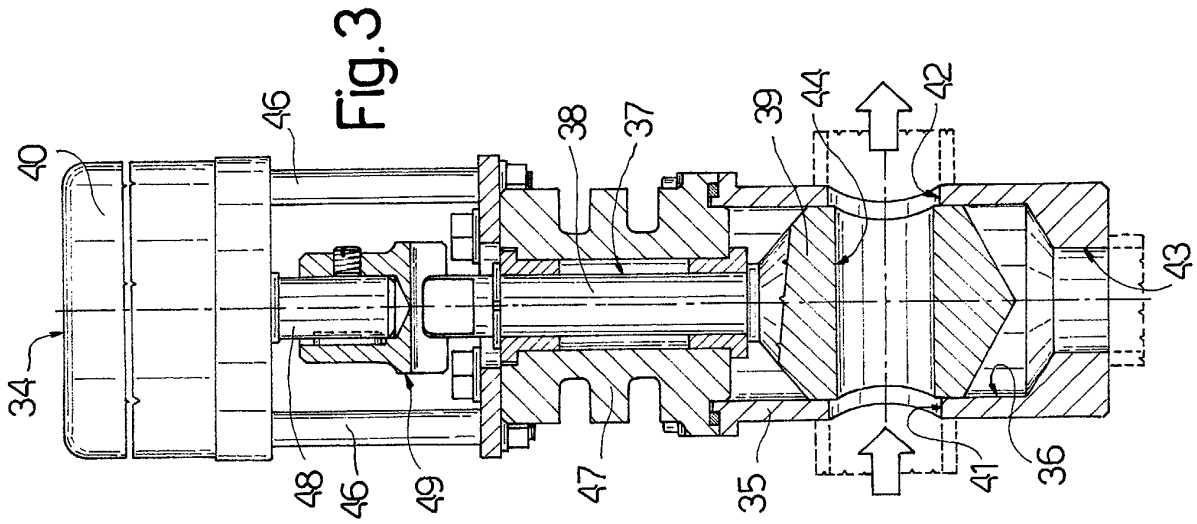
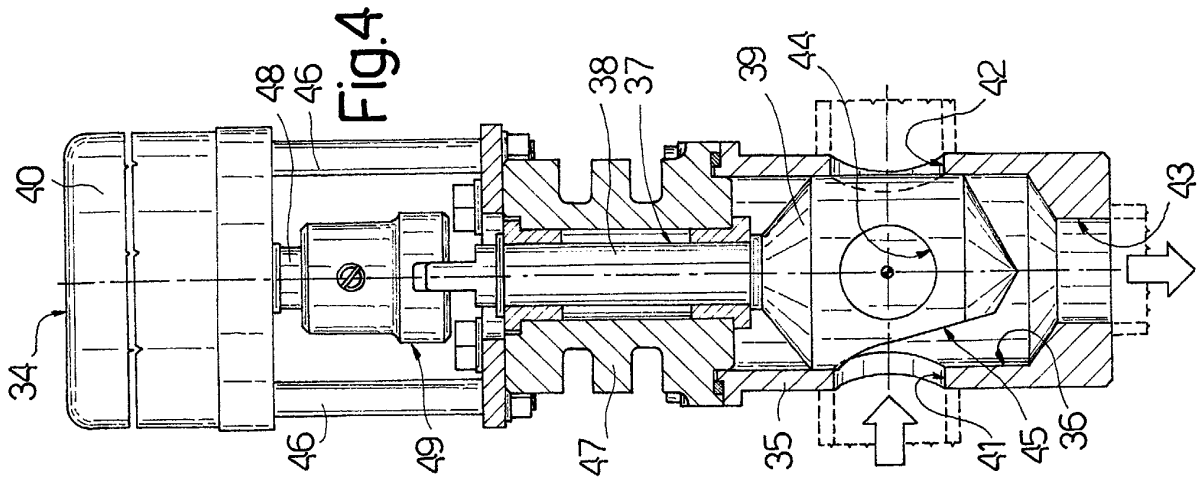
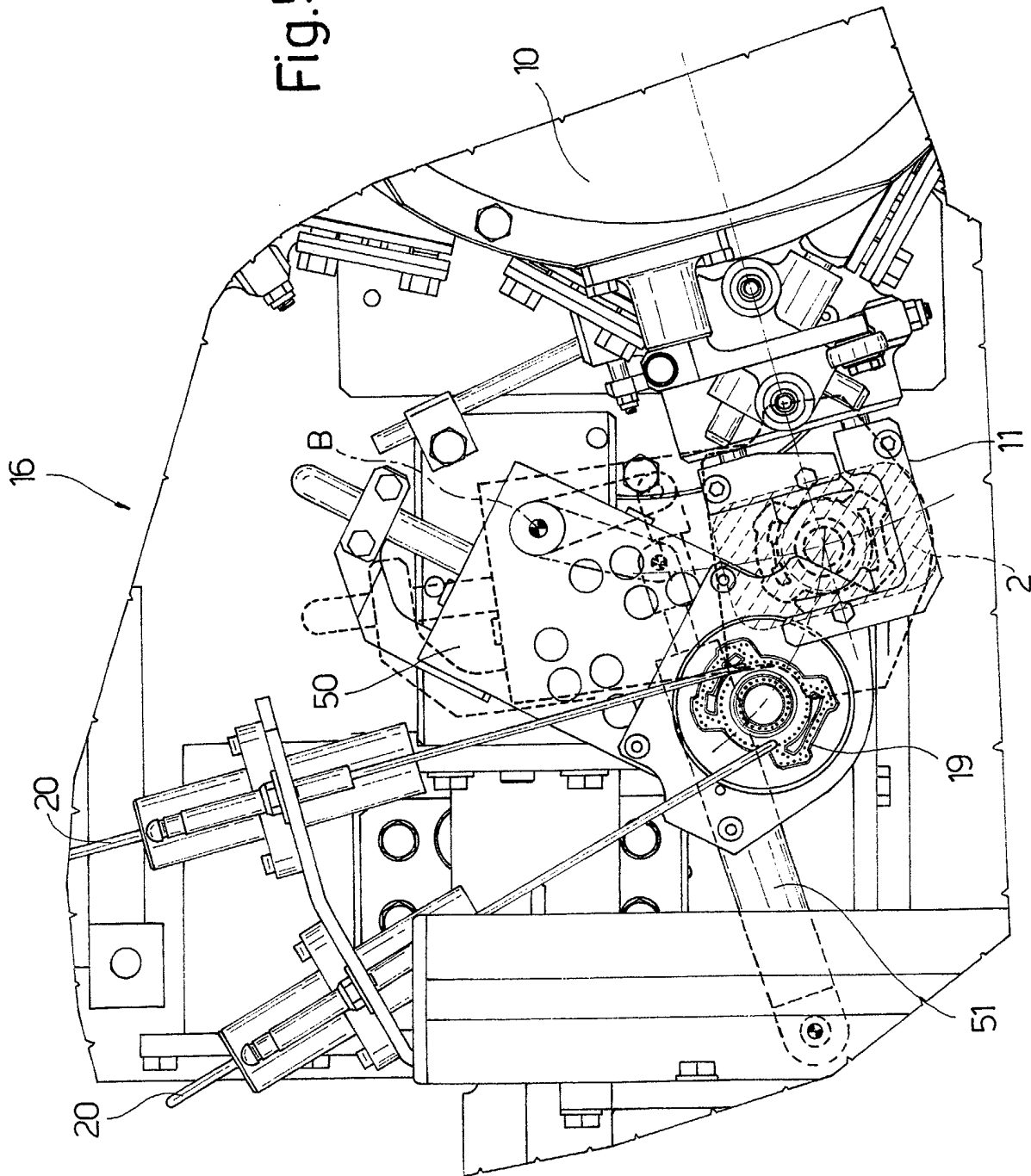


Fig.5





European Patent  
Office

EUROPEAN SEARCH REPORT

Application Number  
EP 03 00 7126

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.7)
X	US 5 484 374 A (WORRELL A S ET AL) 16 January 1996 (1996-01-16) * column 5, line 66 - column 10, line 39 * * column 15, line 25 - column 19, line 36 * * figure 22 *	1,11	B65B61/18 B31B1/84 B31B1/74 B65B57/04 B65G47/84
Y	---	2-10	
D,Y	EP 1 228 967 A (TETRA LAVAL HOLDINGS & FINANCE) 7 August 2002 (2002-08-07) * the whole document *	2,7-10	
Y	EP 0 519 400 A (GD SPA) 23 December 1992 (1992-12-23) * column 2, line 35 - column 4, line 54 * * figures 1,2 *	3-6	
A	US 4 507 168 A (KONAKA YUKIO) 26 March 1985 (1985-03-26) * abstract; figure 3 *	3-6	
A	PATENT ABSTRACTS OF JAPAN vol. 2000, no. 08, 6 October 2000 (2000-10-06) & JP 2000 150209 A (NITTO KOGYO CO LTD), 30 May 2000 (2000-05-30) * abstract *	3-6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65B B31B B65G
<del>The present search report has been drawn up for all claims</del>			
Place of search <b>MUNICH</b>		Date of completion of the search <b>31 October 2003</b>	Examiner <b>Farizon, P</b>
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 03.02 (P04C01)

**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:  
1-11
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1,2,7-11

Processing means for processing opening devices

2. Claims: 3-6

Carousel conveyor for opening devices

3. Claims: 12-16

Selectively enabled supply means for packages conveyor

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

EP 03 00 7126

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  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-10-2003

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