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

(11) **EP 1 795 447 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.06.2007 Bulletin 2007/24

(51) Int Cl.:
B65B 51/30 *(2006.01)* ***B65B 9/20*** *(2006.01)*

(21) Application number: **05425878.5**

(22) Date of filing: **12.12.2005**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(71) Applicant: **Tetra Laval Holdings & Finance SA**
1009 Pully (CH)

(72) Inventors:
- **Baccilieri, Alessandro**
  44012 Bondeno (IT)
- **Mattioli, Giorgio**
  41100 Modena (IT)
- **Orsini, Ivan**
  41043 Formigine (IT)
- **Poppi, Marco**
  41100 Modena (IT)
- **Spinelli, Luca**
  41100 Modena (IT)

(74) Representative: **D'Angelo, Fabio et al**
Studio Torta S.r.l.
Via Viotti, 9
10121 Torino (IT)

(54) Packaging unit for producing sealed packages of pourable food products from a tube of packaging material

(57) There is described a unit (1, 1') for producing sealed packages of a pourable food product from a tube (2) of packaging material; the unit (1) has two forming members (20) movable cyclically between a first position, in which they cooperate with the tube (2) to control the volume of the packages being formed, and a second position, in which they are detached from the tube (2); the forming members (20) are pushed by elastic force to perform an operating stroke from one of the first and second positions to the other of the first and second positions; and the unit (1, 1') has retaining means (25, 25'), which cooperate with the forming members (20) during the operating stroke to oppose the elastic force and reduce dynamic stress at the end of the operating stroke.

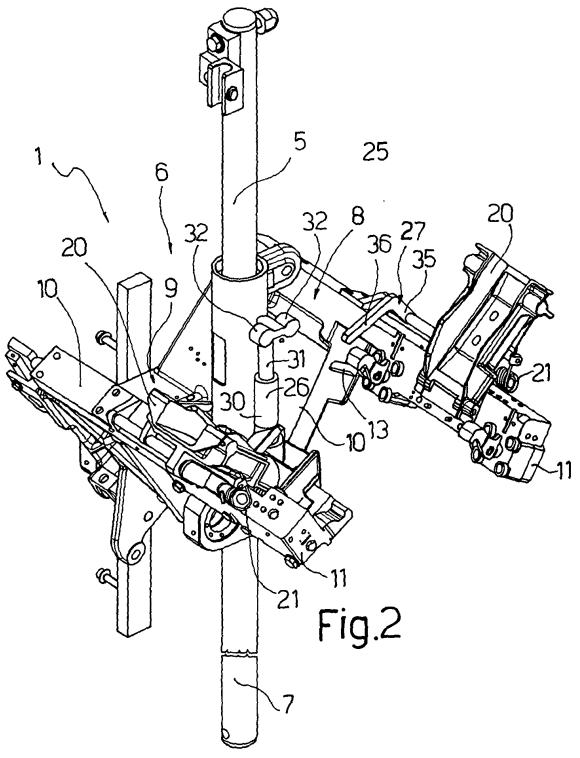


Fig.2

EP 1 795 447 A1

Description

[0001] The present invention relates to a packaging unit for producing sealed packages of pourable food products from a tube of packaging material.

[0002] Many pourable food products, such as fruit juice, pasteurized or 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 laminated strip packaging material. The laminated packaging material comprises layers of fibrous material, e.g. paper, covered on both sides with thermoplastic material, e.g. polyethylene. In the case of packages for long-storage products (such as UHT milk), the side of the packaging material eventually contacting the food product also has a layer of barrier material, e.g. aluminium foil, which in turn is covered with a layer of thermoplastic material.

[0004] As is known, packages of this sort 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, e.g. by applying a chemical sterilizing agent, such as a hydrogen peroxide solution; and, once sterilizing is completed, the sterilizing agent is removed, e.g. vaporized by heating, from the surfaces of the packaging material.

[0005] The sterilized web of packaging material is maintained in a closed, sterile environment, and is folded into a cylinder and sealed longitudinally to form a tube.

[0006] The tube is fed in a vertical direction parallel to its axis, and is filled continuously with the sterilized or sterile-processed food product.

[0007] The packaging unit interacts with the tube to heat seal equally spaced cross sections of the tube and form pillow packs connected to the tube by transverse sealing bands.

[0008] More specifically, the unit comprises two forming assemblies movable along respective guides and which interact cyclically and successively with the tube to heat seal the packaging material of the tube.

[0009] Each forming assembly comprises a slide movable back and forth along the respective guide; and two jaws hinged at the bottom to the respective slide, and movable between a closed position, in which they cooperate with the tube to heat seal it, and an open position, in which they are detached from the tube.

[0010] More specifically, the jaws of each forming assembly are moved between said open and closed positions by respective cams.

[0011] The forming assemblies operate a half-period out of phase : one forming assembly moves up, with its jaws open, while the other forming assembly moves down, with its jaws closed, to avoid collision and interference between the assemblies.

[0012] The jaws of each forming assembly are fitted with respective sealing members cooperating on opposite sides with the tube, and defined, for example, by a heating member, and by a member made of elastomeric material and for providing mechanical support to grip the tube with the necessary pressure.

[0013] Each forming assembly also comprises a pair of forming members in the form of half-shells, which are hinged to the respective jaws and interact mutually to fold the tube between two consecutive sealed sections and define the volume of the package being formed.

[0014] Each pair of forming members is movable cyclically between an open configuration, in which the forming members are detached from the tube, and a closed configuration, in which the forming members contact the tube.

[0015] More specifically, the forming members may be spring-loaded elastically into the open configuration, and have respective rollers which cooperate with relative cams designed to close the forming members about the tube when the relative forming assembly is in a predetermined position.

[0016] Though of excellent performance in general, packaging units of the type described above still leave room for further improvement.

[0017] In particular, at certain travelling speeds of the forming assemblies, the forming members reaching the open position produces shock, which dynamically stresses the packaging unit, and which can only be reduced - by appropriately adjusting the stiffness of the springs and the mass of the moving parts - at a given travelling speed of the slide, thus limiting output and flexibility of the packaging unit.

[0018] It is an object of the present invention to provide a packaging unit for producing sealed packages of pourable food products from a tube of packaging material, designed to eliminate the aforementioned drawback typically associated with known units.

[0019] According to the present invention, there is provided a packaging unit for producing sealed packages of a pourable food product from a tube of packaging material; the unit comprising two forming members movable cyclically between a first position, in which they cooperate with said tube to control the volume of the packages being formed, and a second position, in which they are detached from said tube; said forming members being pushed by elastic force to perform an operating stroke from one of said first and second positions to the other of said first and second positions; and the unit being characterized by comprising retaining means, which cooperate with said forming members during said operating stroke to oppose said elastic force and reduce dynamic stress at the end of said operating stroke.

[0020] 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 front view of a packaging unit in

accordance with the teachings of the present invention;

Figure 2 shows a view in perspective, with parts removed for clarity, of the Figure 1 unit in a first operating position;

Figures 3 to 6 show the Figure 1 and 2 unit in different operating positions;

Figure 7 shows a view in perspective of a further embodiment of the Figure 1 unit.

[0021] With reference to the accompanying drawings, number 1 indicates as a whole a packaging unit for producing sealed packages (not shown) of a pourable food product, such as pasteurized milk or fruit juice, from a tube 2 of sheet packaging material.

[0022] The packaging material has a multilayer structure (not shown), and comprises a layer of fibrous material, normally paper, covered on both sides with respective layers of heat-seal plastic material, e.g. polyethylene. In the case of aseptic packages for long-storage products, such as UHT milk, the packaging material also comprises a layer of oxygen-barrier material, e.g. 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.

[0023] Tube 2 is formed in known manner by longitudinally folding and sealing a web 3 of heat-seal sheet material, is filled by a feed pipe 4 with the sterilized or sterile-processed food product for packaging, and is fed in known manner, not shown, along a vertical path defined by an axis A.

[0024] Unit 1 interacts with tube 2 to heat seal equally spaced cross sections of the tube and form a number of pillow packs connected to the tube by transverse sealing bands.

[0025] Unit 1 also comprises, in known manner, two forming assemblies 6, 6', which move vertically along respective vertical cylindrical guides 5, 5' located symmetrically with respect to axis A, and interact cyclically with tube 2 to grip equally spaced cross sections of the tube, and to heat seal tube 2 at cross sections of the tube extending perpendicular to axis A.

[0026] More specifically, assemblies 6, 6' move along guides 5, 5' from a bottom dead-centre position to a top dead-centre position, and vice versa, in an upward and downward movement respectively.

[0027] Since assemblies 6 and 6' are known and identical, only one (assembly 6) is described herein; and identical or corresponding parts of assemblies 6, 6' are indicated in the accompanying drawings using the same reference numbers.

[0028] With reference to Figures 2 to 6, assembly 6 substantially comprises a slide 7 running along respective guide 5; and two jaws 8, 9 - defined, in the example shown, by respective L-shaped plates - hinged at the bottom to slide 7 about respective axes B, C, which, in use, are horizontal and perpendicular to axis A. Jaws 8, 9 are located on opposite sides of tube 2, and are movable, about respective axes B, C, between a closed position (Figure 4), in which they grip tube 2, and an open position (Figure 6), in which they are detached from tube 2.

[0029] More specifically, each jaw 8, 9 comprises a substantially quadrangular base portion 10 hinged at its bottom end to a bottom portion of slide 7; and an arm 11, which interacts with tube 2, is fixed to a top end of portion 10, and extends perpendicular to axis A.

[0030] Jaws 8, 9 are fitted at portions 10 with motion transmission members 12 for rotating jaws 8, 9 in opposite directions and by equal angles about respective axes B, C.

[0031] Assembly 6 also comprises a first retaining member 14 fitted integrally to portion 10 of one of the jaws (8); a second retaining member 13 hinged to portion 10 of the other jaw (9) about an axis D parallel to axes B, C; and a hydraulic cylinder 15 (shown only partly) for gripping retaining members 13, 14 firmly in an engaged position corresponding to the closed position of jaws 8, 9 on tube 2.

[0032] Jaws 8, 9 therefore perform a linear vertical movement by virtue of the movement of slide 7 along guide 5, and an opening and closing movement with respect to tube 2 of packaging material by rotating about respective axes B, C, by which they are hinged to slide 7. The opening and closing movement is superimposed on the vertical, back and forth linear movement of slide 7.

[0033] Said vertical movement and said opening and closing movement are controlled respectively by a first and second known cam actuating device, which are not shown, by not being essential to a clear understanding of the present invention.

[0034] Assemblies 6, 6' operate a half-period out of phase : assembly 6 moves up, with jaws 8, 9 open, at the same time as assembly 6' moves down, so that arms 11 of assembly 6' pass between, and so avoid interfering with, arms 11 of assembly 6.

[0035] Assembly 6 also comprises a sealing device - known and not shown in the drawings - to heat seal each cross section of tube 2 of packaging material gripped between relative jaws 8, 9.

[0036] The sealing device comprises a heating member fitted to arm 11 of jaw 8 and interacting with tube 2 by means of two active surfaces; and two pressure pads fitted to arm 11 of jaw 9 and cooperating with respective active surfaces of the heating member to grip and heat seal tube 2.

[0037] Assembly 6 also comprises two forming half-shells 20 facing each other, hinged to respective jaws 8, 9, and movable between an open position (Figure 6), into which they are pushed by respective coil springs 21, and a closed position (Figure 4), in which they mate to define a space defining the shape and volume of the package being formed between half-shells 20. More specifically, half-shells 20 are hinged to relative arms 11 of relative jaws 8, 9 about respective axes E, F parallel to axes B, C.

[0038] More specifically, as assembly 6 moves up and down, half-shells 20 perform a work cycle comprising a closing stroke (Figure 3), in which half-shells 20 move towards tube 2 from the open position to the closed position; a volume-control stroke (Figure 4), in which half-shells 20 cooperate with tube 2; an opening stroke (Figure 5) produced by springs 21, and in which half-shells 20 withdraw from tube 2 from the closed position to the open position; and a return stroke (Figure 6), in which half-shells 20 are detached from tube 2 by springs 21.

[0039] Unit 1 advantageously comprises a retaining assembly 25, which cooperates with half-shells 20 to oppose the action of springs 21 and induce closing and opening of half-shells 20.

[0040] More specifically, retaining assembly 25 comprises, for each pair of jaws 8, 9, a respective variable-length actuator 26 fixed to relative slide 7 and extendable/contractable parallel to axis A; and a respective pair of levers 27 fixed to relative half-shells 20 and which interact with actuator 26 to produce the closing stroke of half-shells 20 and to oppose the action of springs 21 during the opening stroke of half-shells 20.

[0041] Actuator 26 comprises a sleeve 30 fixed to slide 7; and a piston 31 sliding, parallel to axis A, inside sleeve 30. More specifically, piston 31 terminates, at the opposite end to sleeve 30, with two spherical members 32 located on opposite sides of piston 31 and each for pushing a respective lever 27 to close half-shells 20.

[0042] Each lever 27 is substantially L-shaped, and comprises a first portion 35 fixed to a respective half-shell 20 at relative axis E, F; and a free second portion 36 which cooperates in sliding manner with a relative member 32. More specifically, each portion 36 is pushed by relative member 32 during the closing stroke, and pushes relative member 32, by virtue of relative spring 21, during the opening stroke.

[0043] Actuator 26 is controllable in various ways to reduce dynamic stress at the end of the opening stroke, as a function of the travelling speed of assemblies 6, 6' and the stiffness of springs 21.

[0044] In actual use, tube 2, filled with the liquid food product by pipe 4, is fed along path A, and assemblies 6, 6', operating a half-period out of phase, move up and down respective guides 5.

[0045] More specifically, as assemblies 6, 6' move up and down, jaws 8, 9 interact with the cams to move between the closed position (Figure 4), in which they heat seal cross sections of tube 2, and the open position (Figure 6), in which they are detached from tube 2.

[0046] More specifically, assembly 6 moves up, with jaws 8, 9 open, at the same time as assembly 6' moves down, with jaws 8, 9 closed, so that arms 11 of assembly 6' pass between, and so avoid interfering with, arms 11 of assembly 6.

[0047] As assemblies 6, 6' operate, half-shells 20 perform their work cycle, under the control of springs 21 and retaining assembly 25.

[0048] More specifically, retaining assembly 25 moves half-shells 20 through the closing stroke (Figure 3), holds them in contact with tube 2 through the volume-control stroke (Figure 4), and then opposes the action of springs 21 during the opening stroke (Figure 5) to reduce the dynamic stress associated with half-shells 20 reaching the open position (Figure 6).

[0049] As assemblies 6, 6' move up, actuator 26 is in the fully extended configuration along axis A, i.e. piston 31 is fully extracted from sleeve 30.

[0050] During the closing stroke (Figure 3), piston 31 of actuator 26 slides inside sleeve 30 to contract actuator 26 and bring members 32 into contact with respective portions 36 of relative levers 27. Each member 32 then slides along the surface of respective portion 36 to rotate levers 27 in opposite directions and so close half-shells 20 about tube 2 (Figure 4). Contraction of actuator 26 also shortens springs 21.

[0051] Once half-shells 20 are closed about tube 2, the sealing device is activated, and half-shells 20 control the volume and shape of the package being formed.

[0052] Once sealing is completed, jaws 8, 9 begin opening by rotating about respective axes B, C, while actuator 26 is kept in the fully contracted position (Figure 5). The parting of jaws 8, 9 withdraws half-shells 20 from members 32 of actuator 26, and causes levers 27 to slide against members 32, so that the action of springs 21 is counteracted by levers 27 interacting with members 32 of actuator 26.

[0053] Once the open position is reached (Figure 6), levers 27 and members 32 are detached.

[0054] At this point, actuator 26 is restored to the fully extended configuration along axis A.

[0055] By appropriately calibrating springs 21 and appropriately operating actuator 26, the return stroke can be controlled over a wide range of travelling speeds of assemblies 6, 6', to prevent sudden opening of half-shells 20 from dynamically stressing unit 1.

[0056] With reference to Figure 7, number 1' indicates as a whole a packaging unit in accordance with a different embodiment of the present invention. Unit 1' is similar to unit 1, and is described below only insofar as it differs from unit 1, and using the same reference numbers, where possible, for corresponding or equivalent parts of units 1 and 1'.

[0057] More specifically, unit 1' differs from unit 1 by comprising two fixed, facing cams 40, each of which cooperates with two rollers 41, carried by each half-shell 20, to produce, in opposition to springs 21, the closing stroke of half-shells 20 towards tube 2 when assemblies 6, 6' are in predetermined positions along respective guides 5.

[0058] Cams 40 are so positioned that, when assemblies 6, 6' are in predetermined positions along respective guides 5, rollers 41 are detached from cams 40, and springs 21 produce the opening stroke of half-shells 20.

[0059] To reduce dynamic stress and shock produced by each pair of half-shells 20 reaching the open position, unit 1' comprises a retaining assembly 25', which coop-

erates with half-shells 20 to oppose the action of springs 21.

[0060] More specifically, retaining assembly 25' comprises two cams 42 carried by respective forming assemblies 6, 6'; and two tappet assemblies 43 (only one shown in Figure 7), each carried by a relative forming assembly 6, 6' and cooperating with a relative cam 42.

[0061] More specifically, tappet assembly 43 on one (6) of forming assemblies 6, 6' cooperates with cam 42 on the other (6') of forming assemblies 6, 6', and vice versa.

[0062] More specifically, each cam 42 is fixed to a relative slide 7 to move, integrally with respective forming assembly 6, 6', along respective guide 5, and defines, on its outer edge, on opposite sides of relative guide 5, two curved surfaces 44 connected to each other, perpendicularly to the extension direction of guides 5, by a cross member 45.

[0063] Each tappet assembly 43 comprises two rollers 46 (only one shown in Figure 7), each of which projects from a relative half-shell 20 of respective assembly 6, 6' and cooperates in rolling manner with a respective surface 44 to oppose the action of springs 21 as half-shells 20 open.

[0064] Operation of unit 1' differs from that of unit 1 by the closing stroke of half-shells 20 being produced by each cam 40 interacting with relative roller 41, and by the fact that, during the closing stroke, retaining assembly 25' does not interact with half-shells 20.

[0065] The advantages of unit 1, 1' according to the present invention will be clear from the foregoing description.

[0066] In particular, unit 1, 1' provides, over a wide range of travelling speeds of assemblies 6, 6' along respective guides 5, for reducing the dynamic stress associated with half-shells 20 reaching the open position.

[0067] This is achieved by retaining assembly 25, 25' cooperating with each half-shell 20 to counteract the action of springs 21 and so reduce the opening force exerted by springs 21 on half-shells 20, to reduce the dynamic stress produced by the half-shells reaching the open position.

[0068] Unit 1 employs a retaining assembly 25 which may be operated electronically, with no need for cams, thus improving the flexibility of unit 1, by enabling reproduction of various operating movements of actuator 26 using the same number of component parts, and so enabling obvious saving in terms of the operating cost of unit 1. In addition, retaining assembly 25 may easily be feedback-controlled for more accurate, reproducible operation of actuator 26.

[0069] Clearly, changes may be made to unit 1, 1' as described herein without, however, departing from the scope of the accompanying Claims.

[0070] In particular, half-shells 20 may be loaded by springs 21 into the closed position, and retaining assembly 25, 25' may counteract springs 21 during the closing stroke to reduce dynamic stress caused by half-shells 20 reaching the closed position.

Claims

1. A packaging unit (1, 1') for producing sealed packages of a pourable food product from a tube (2) of packaging material; said unit comprising :

   two forming members (20) movable cyclically between a first position, in which they cooperate with said tube (2) to control the volume of said packages being formed, and a second position, in which they are detached from said tube (2); said forming members (20) being pushed by elastic force to perform an operating stroke from one of said first and second positions to the other of said first and second positions;
   and being **characterized by** comprising retaining means (25, 25'), which cooperate with said forming members (20) during said operating stroke to oppose said elastic force and reduce dynamic stress at the end of said operating stroke.

2. A unit as claimed in Claim 1, **characterized by** comprising at least two jaws (8, 9) for gripping and sealing said tube (2) of packaging material at a number of equally spaced cross sections, and each of which supports a respective said forming member (20) to control the volume of the said package being formed between each two consecutive said cross sections.

3. A unit as claimed in Claim 2, **characterized in that** each said jaw (8, 9) is hinged to a common supporting body (7); and **in that** each said forming member (20) is hinged to a respective said jaw (8, 9).

4. A unit as claimed in Claim 3, **characterized in that** said retaining means (25, 25') comprise a first member (26, 42) carried by said supporting body (7); and at least two second members (27, 46) carried by respective forming members (20) and each cooperating with said first member (26, 42) to reduce the elastic thrust exerted by said forming members (20) during said operating stroke.

5. A unit as claimed in Claim 4, **characterized in that** distinct portions (32, 44) of said first member (26, 42) cooperate with said second members (27, 46).

6. A unit as claimed in Claim 4 or 5, **characterized in that** said first and said second member (26, 42; 27, 46) cooperate in relative sliding manner.

7. A unit as claimed in any one of Claims 4 to 6, **characterized in that** said first member (26) is a variable-length actuator, which cooperates with said second

members (27) to reduce said elastic force on the respective forming members (20) during said operating stroke, and to cause said forming members (20) to perform a stroke opposite said operating stroke.

8. A unit as claimed in any one of Claims 4 to 6, **characterized in that** said first member (42) is a cam (42), and each said second member (46) is a roller (46).

9. A unit as claimed in Claim 8, **characterized by** comprising two pairs of said jaws (8, 9) located on opposite sides of said tube (2) and interacting alternately with said tube (2); and two pairs of said forming members (20) carried by the respective said jaws (8, 9); and in that each cam (42) is connected operatively to a jaw (8) in a first pair of said jaws (8, 9), and said roller (46) is connected operatively to a forming member (20) of a second pair of said jaws (8, 9).

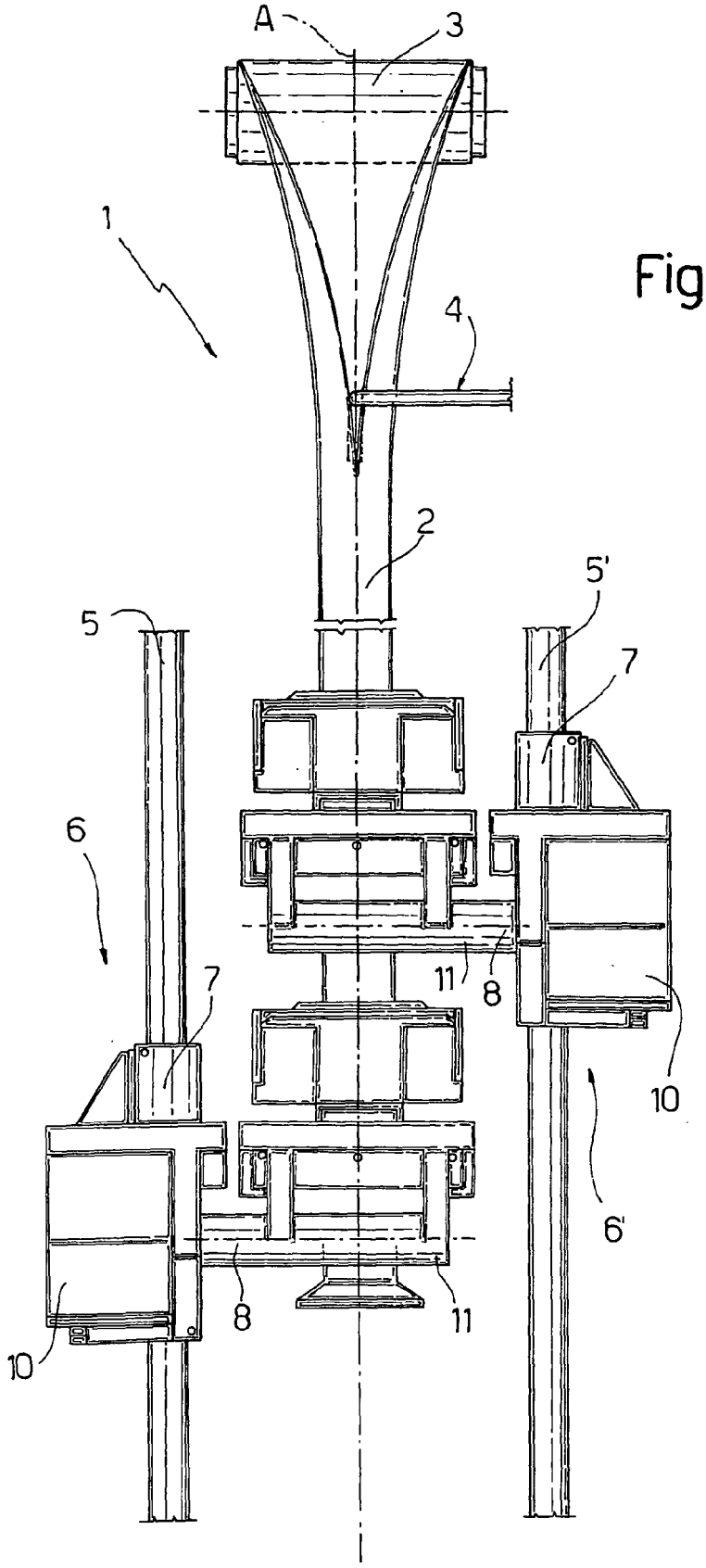


Fig.1

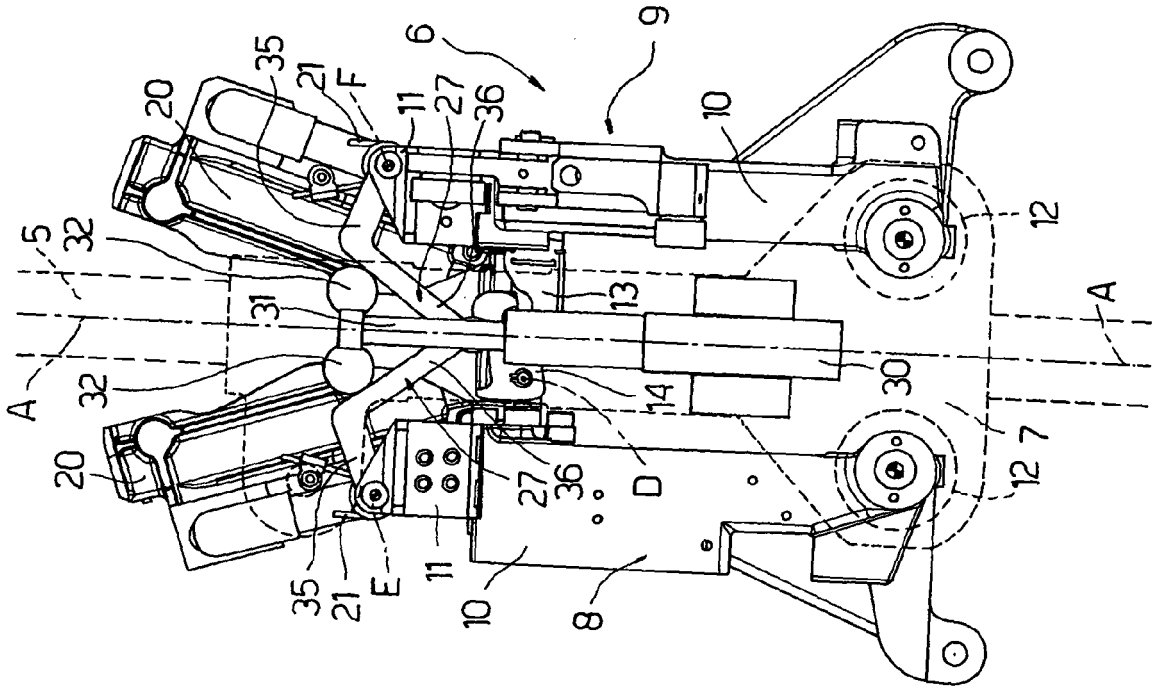

6
9
35
21
F
20
11
27
36
10
12
5
32
31
13
A
A
32
30
14
20
27
36
D
12
7
35
21
E
11
10
8

Fig.3

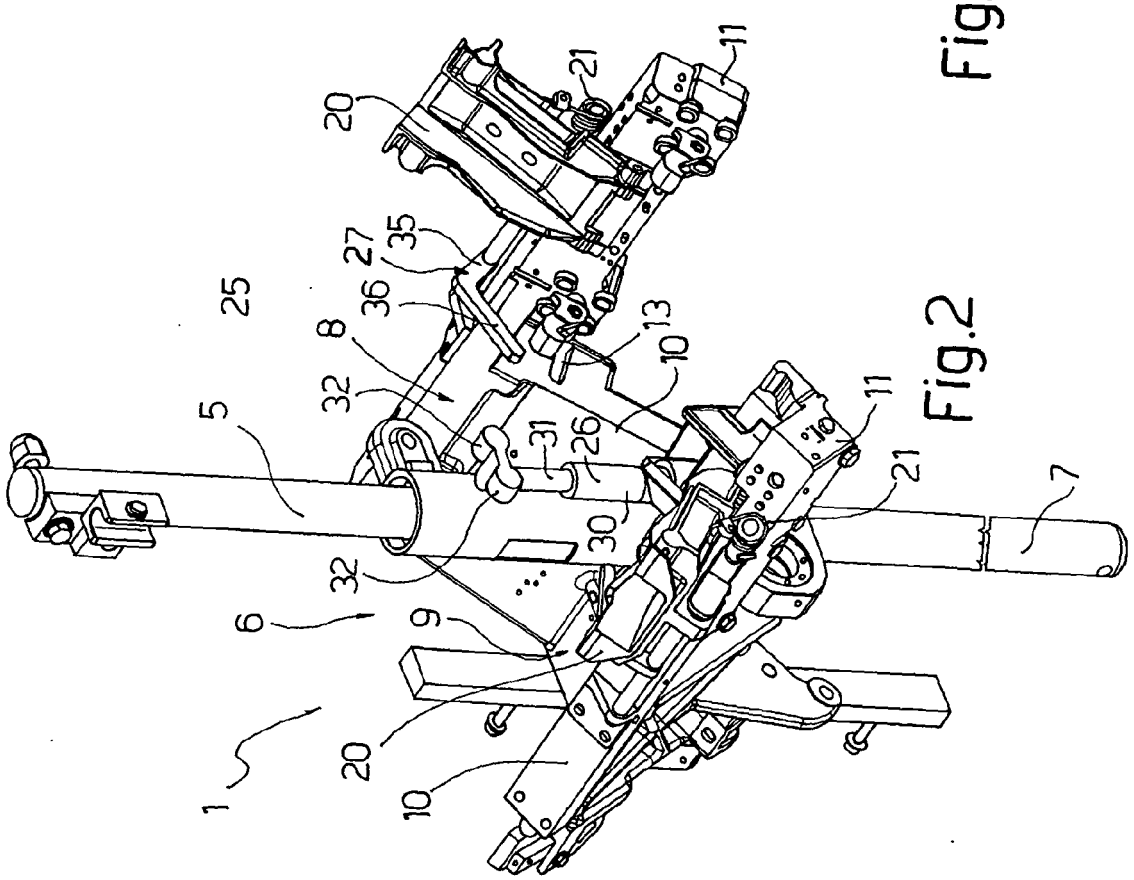

11
21
20
27
35
25
36
8
13
10
32
5
31
26
11
10
21
7
30
32
6
9
1
20
10

Fig.2

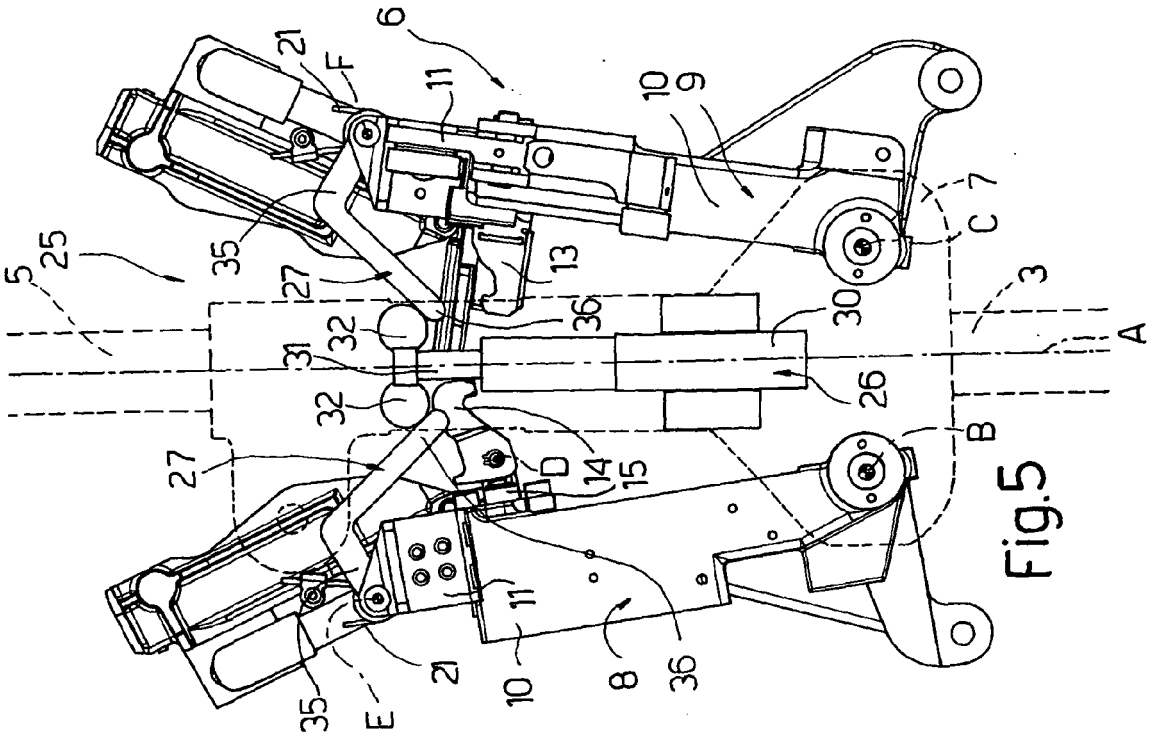

6
21
F
11
10
9
C
7
5
25
35
27
13
36
30
3
A
31
32
26
B
14
15
D
11
21
10
8
36
E
35

Fig.5

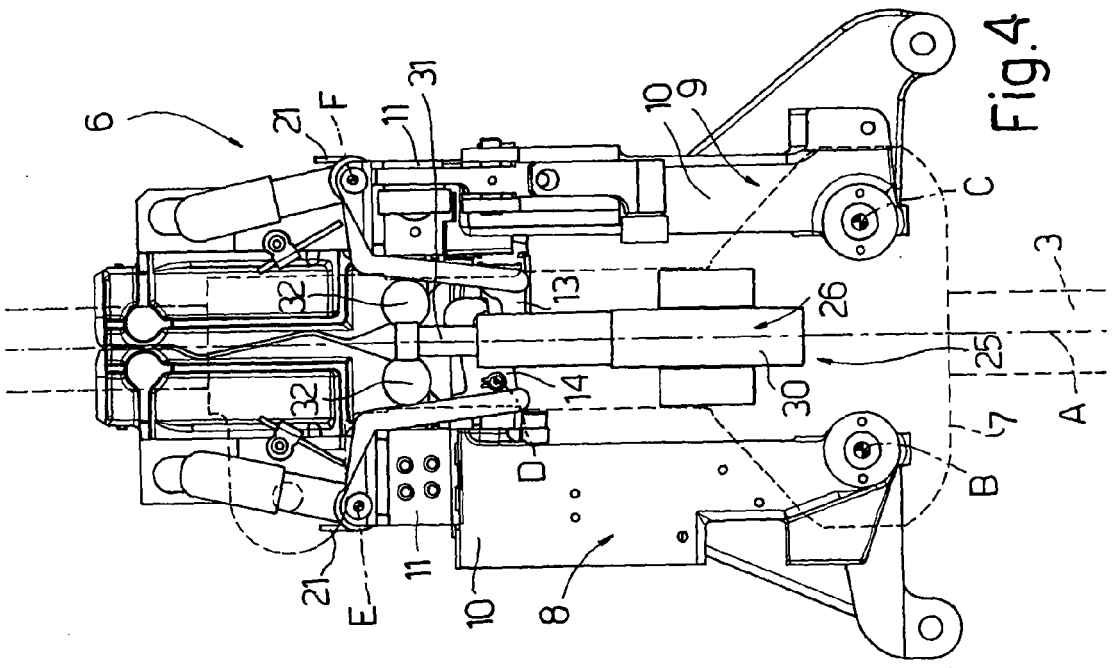
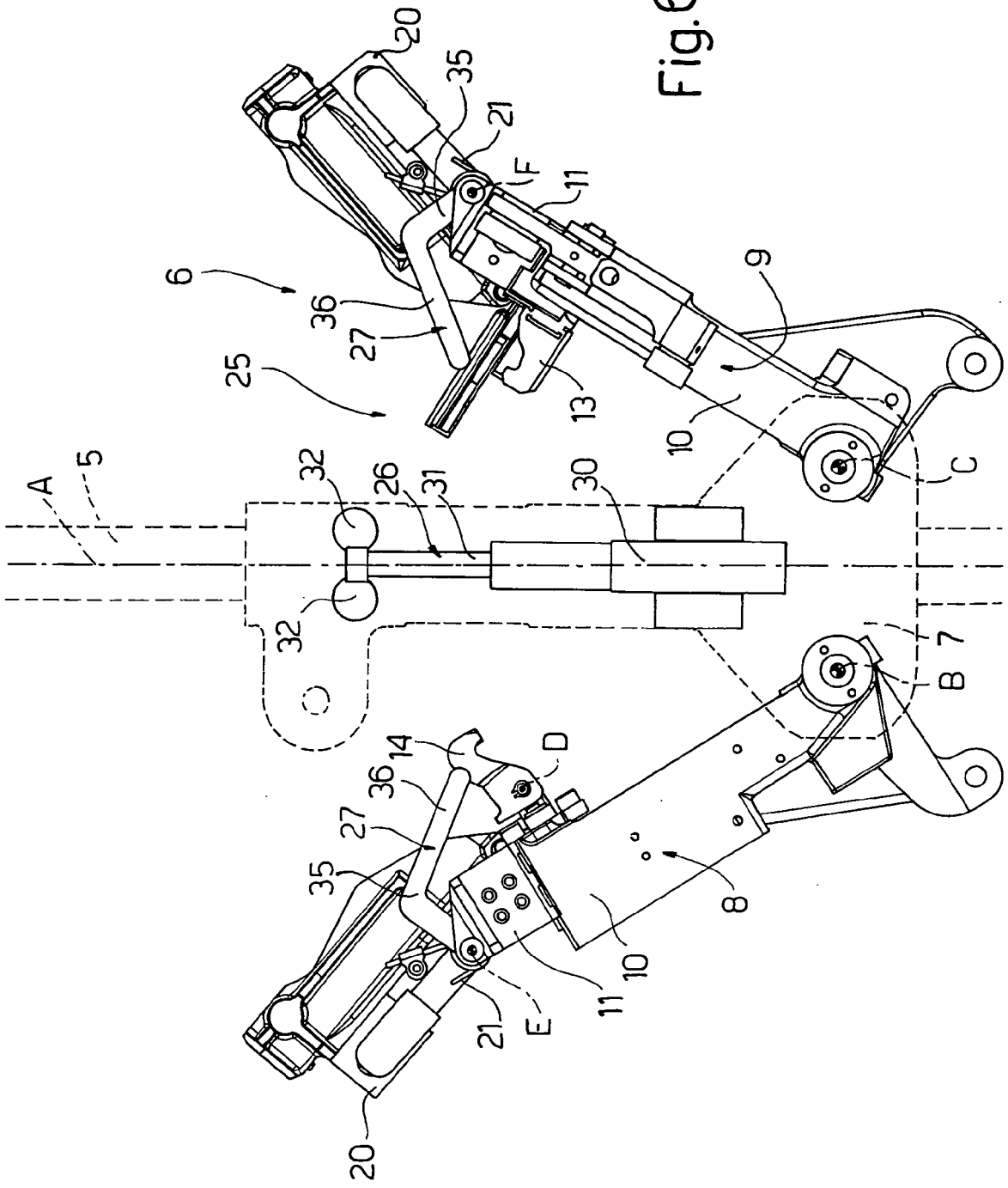

6
21
F
11
31
10
9
C
3
32
13
26
25
A
32
14
30
7
B
D
11
21
10
8
E

Fig.4

Fig.6


20
35
21
F
11
6
36
27
25
13
9
10
C
A
5
32
26
31
30
32
B
7
14
D
36
27
35
8
10
11
21
E
20

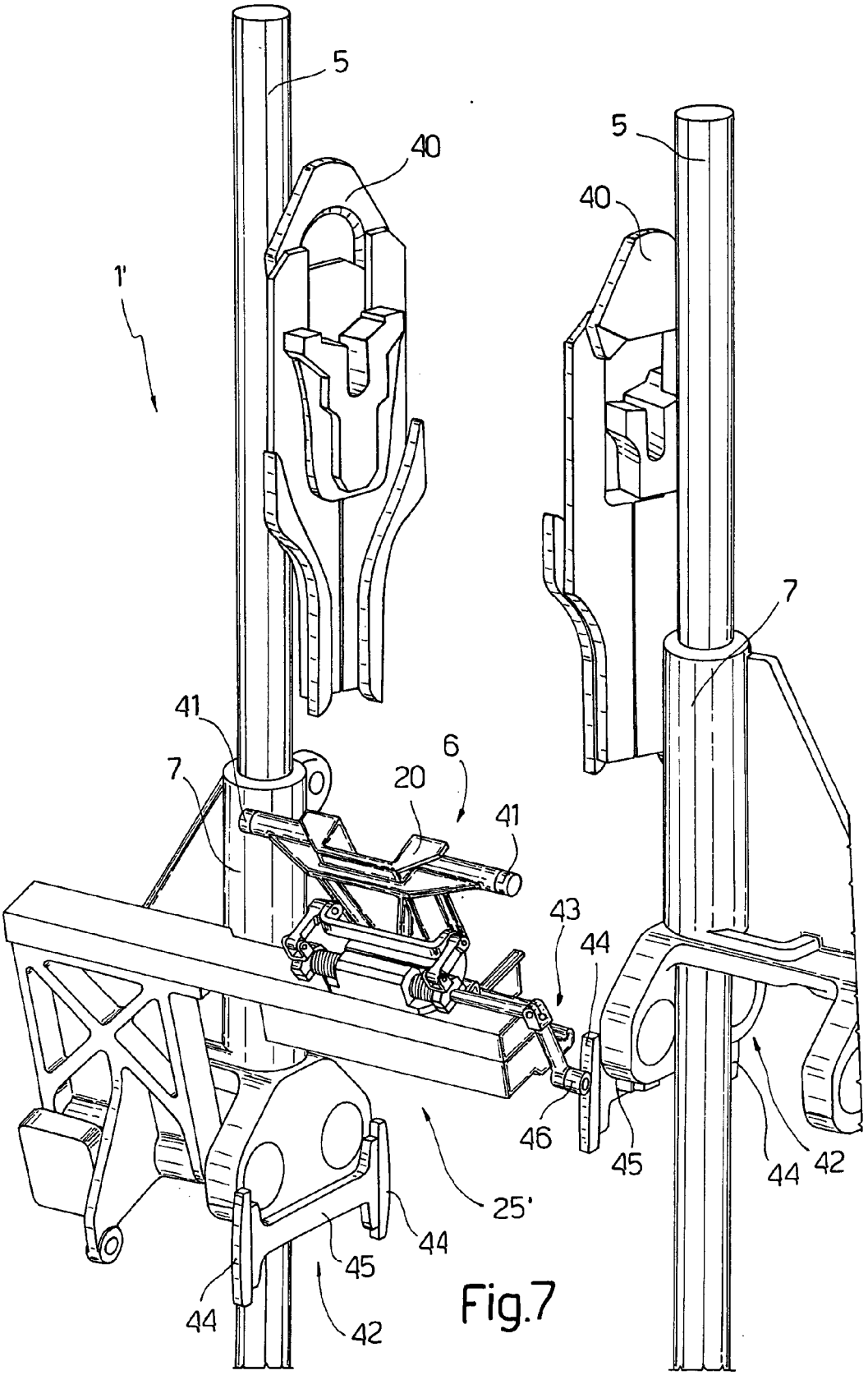


Fig.7

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5878

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	EP 1 101 700 A (TETRA LAVAL HOLDINGS & FINANCE S.A) 23 May 2001 (2001-05-23) * the whole document *	1-6	INV. B65B51/30 B65B9/20
X	EP 1 526 074 A (TETRA LAVAL HOLDINGS & FINANCE S.A) 27 April 2005 (2005-04-27) * abstract; figures 2,6,7 *	1	
X	US 4 580 392 A (LAGERSTEDT ET AL) 8 April 1986 (1986-04-08) * abstract; figures 4a,4b *	1	
A	EP 0 887 263 A (TETRA LAVAL HOLDINGS & FINANCE SA) 30 December 1998 (1998-12-30) * abstract; figure 3 *		
A	EP 0 992 431 A (TETRA LAVAL HOLDINGS & FINANCE SA) 12 April 2000 (2000-04-12) * figure 3 *		
			TECHNICAL FIELDS SEARCHED (IPC) B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 May 2006	Ungureanu, M

CATEGORY OF CITED DOCUMENTS

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

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

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 42 5878

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.

18-05-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1101700 A	23-05-2001	AT 265961 T	15-05-2004
		CN 1309059 A	22-08-2001
		DE 69917039 D1	09-06-2004
		DE 69917039 T2	12-05-2005
		DK 1101700 T3	26-07-2004
		ES 2217730 T3	01-11-2004
		HK 1039598 A1	25-11-2005
		JP 2001192006 A	17-07-2001
		PL 343718 A1	21-05-2001
		PT 1101700 T	31-08-2004
		US 6543205 B1	08-04-2003
EP 1526074 A	27-04-2005	WO 2005039983 A1	06-05-2005
US 4580392 A	08-04-1986	AU 555396 B2	25-09-1986
		AU 1345583 A	20-10-1983
		AU 576963 B2	08-09-1988
		AU 5855986 A	16-10-1986
		DE 3376640 D1	23-06-1988
		DE 3381227 D1	29-03-1990
		EP 0091712 A2	19-10-1983
		EP 0228362 A1	08-07-1987
		ES 8500164 A1	01-01-1985
		ES 8504598 A1	16-07-1985
		JP 6013325 B	23-02-1994
		JP 58193206 A	10-11-1983
		JP 6345014 A	20-12-1994
		JP 6321208 A	22-11-1994
		JP 7049283 B	31-05-1995
		JP 6298208 A	25-10-1994
		JP 6298209 A	25-10-1994
		JP 7049284 B	31-05-1995
		JP 6298210 A	25-10-1994
		JP 7049285 B	31-05-1995
		JP 2015450 C	02-02-1996
		JP 5032207 A	09-02-1993
		JP 7041883 B	10-05-1995
		SE 454584 B	16-05-1988
		SE 8202302 A	14-10-1983
		SU 1422989 A3	07-09-1988
EP 0887263 A	30-12-1998	AT 282551 T	15-12-2004
		BR 9802277 A	13-10-1999
		CN 1203876 A	06-01-1999
		DE 69731618 D1	23-12-2004
		DE 69731618 T2	01-12-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 42 5878

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.

18-05-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0887263 A		ES 2231851 T3	16-05-2005
		HK 1017648 A1	30-04-2004
		HU 9801469 A2	28-06-1999
		ID 20484 A	31-12-1998
		JP 11070906 A	16-03-1999
		RU 2138428 C1	27-09-1999
		TW 386972 B	11-04-2000
		US 6035615 A	14-03-2000
EP 0992431 A	12-04-2000	AT 317796 T	15-03-2006
		AU 6335099 A	26-04-2000
		BR 9914334 A	26-06-2001
		CN 1322177 A	14-11-2001
		WO 0020279 A1	13-04-2000
		HU 0103737 A2	28-02-2002
		ID 28152 A	10-05-2001
		JP 2002526344 T	20-08-2002
		TR 200100968 T2	23-07-2001
		UA 72474 C2	15-03-2005
		US 6877295 B1	12-04-2005

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82