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

(11) EP 1 122 714 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.08.2001 Bulletin 2001/32

(51) Int Cl.[7]: **G10D 7/12**, G10D 11/00

(21) Application number: **01830061.6**

(22) Date of filing: **31.01.2001**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **03.02.2000 IT VR000009**

(71) Applicant: **Tononi, Guido**
38068 Rovereto (TN) (IT)

(72) Inventor: **Tononi, Guido**
38068 Rovereto (TN) (IT)

(74) Representative: **Baldi, Claudio**
Piazza Ghislieri, 3
60035 Jesi (Ancona) (IT)

(54) Portable air musical instrument provided with keyboard

(57) Portable air musical instrument (1) provided with keyboard (40), comprising a resonance box (5) with ventilation openings (47) and at least one portion (6) with keyboard configuration (40), a compartment (15) for the accumulation of pressurised air inside the resonance box (5) that communicates with it by means of cells (18) provided with at least one inlet (19) intersected by a vibrant reed (20) and at least one outlet (21) for the passage of pressurised air to the resonance box (5) and a sequence of keys (40) cinematically connected by means of a small arm to a pad (45) designed to open or close an air outlet. The instrument is also provided with adduction means of pressurised air to the accumulation compartment (15) that can be connected to at least one external source of pressurised air to cause the vibration of one or more reeds at a time, each of them generating a different musical note when the corresponding key is pressed.

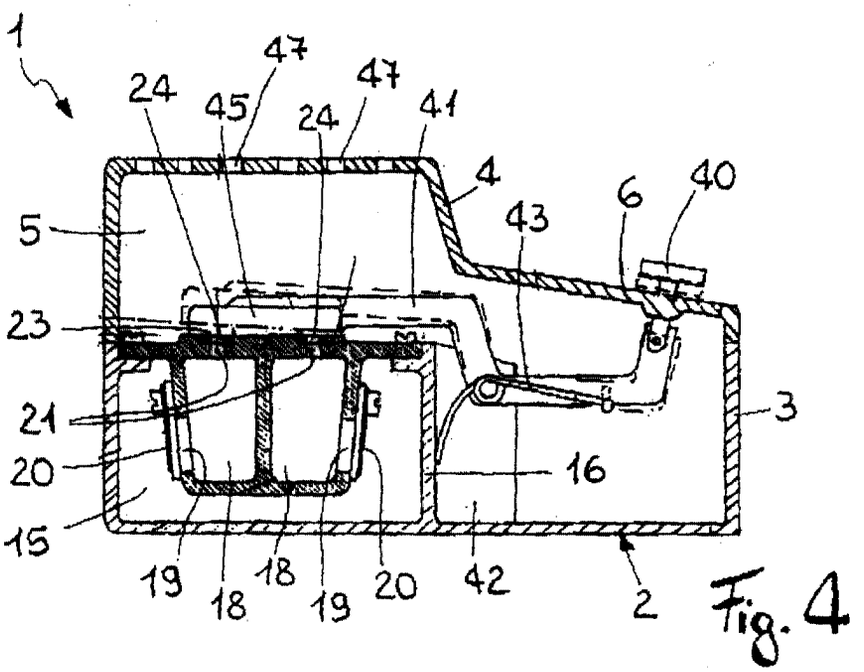


Fig. 4

EP 1 122 714 A2

Description

[0001] The present invention relates to a portable air musical instrument provided with keyboard.

[0002] The accordion is the most commonly used among the portable air musical instrument provided with keyboard.

[0003] The typical notes of the accordion are generated by the vibration of a series of reeds with different seizes and shapes, caused by a flow of pressurised air that intercepts them according to a sequence determined by the musician by means of multiple external keys.

[0004] The accordion keys are distributed in two lateral sections separated by a bellows and divided into melody keys and accompaniment keys.

[0005] The bellows delimits a variable volume, whose expansion results in the aspiration of air from the outside and whose reduction determines the compression of the air accumulated inside it so as to generate and maintain the flow of pressurised air constant, channelling it in suitable cells in order to intercept the reeds and cause their vibration.

[0006] The accordion is held on the two sides, with one hand that reaches the keyboard for the composition of the melody and the other hand that reaches the keyboard for the accompaniment. The musician continuously changes the volume of the bellows in order to maintain the pressurised air flow constant and guarantee the uniformity and continuity of the sound. To do this, the musician alternatively moves close and away the two lateral portions, thus causing the extension and the reduction of the bellows, respectively.

[0007] To play the accordion, the musician uses his hands independently, one hand to create the melody and the other hand to create the accompaniment and at the same time co-ordinates the movements of his arms to operate the bellows and make the instrument play.

[0008] The main purpose of the present invention is to provide for a portable air musical instrument that can be connected to an external source of pressurised air so that the volume is constant, resulting in more comfortable use.

[0009] Another purpose of the present invention is to provide for a wind instrument.

[0010] Another purpose of the present invention is to provide for a musical instrument with handle that can be comfortably played with one hand.

[0011] Finally, another purpose of the present invention is to provide for a musical instrument capable of creating a melody, with the typical sound of the accordion, mixed with tonalities that can be reproduced with wind instruments, such as the harmonica.

[0012] The above purposes are obtained by means of a portable air musical instrument with keyboard, comprising a box-shaped body including a portion configured as resonance box with ventilation openings and a portion configured as keyboard, a compartment for the accumulation of pressurised air inside the resonance box that communicates with it by means of multiple cells provided with at least an inlet intercepted by a reed that vibrates due to the passage of pressurised air from the air accumulation compartment to the cell and at least one outlet for the passage of pressurised air from the cell to the resonance box and a sequence of external keys located in the portion with keyboard configuration and cinematically connected by means of a small arm elastically hinged in the resonance box to a pad designed to open or close the outlet for pressurised air, characterised by the fact that it comprises adduction means of pressurised air towards the accumulation compartment that can be connected to at least one external source of pressurised air to cause the vibration of one or more reeds at a time, each of them generating a different musical note when the corresponding key is pressed.

[0013] The adduction means advantageously comprise a tubular duct provided with an opening for the musician's lips at one end.

[0014] The adduction means suitably include at least one adjustment valve for the pressurised air flow in order to intercept the air flow and a register device capable of controlling from the outside the opening and closing of the adjustment valve in order to modulate the sound emitted by the musician.

[0015] The description of the present invention continues with reference to the enclosed drawings whereby:

Figure 1 is a plan of the musical instrument according to the present invention;
Figure 2 is a front elevation of the musical instrument of Fig. 1;
Figure 3 is a lateral elevation of the musical instrument of Fig. 1;
Figure 4 is an enlarged section of the musical instrument according to the plane IV-IV of Fig. 1;
Figure 5 is an enlarged section of the musical instrument according to the plane V-V of Fig. 1;
Figure 6 is a partially sectioned top view of a portion of the musical instrument of Fig. 1;
Figure 7 is a perspective of a portion of the internal components of the instrument shown in Fig. 1.

[0016] With reference to the above figures, the musical instrument (1) according to the present invention comprises a box-shaped body (2) made up of a base (3) and a cover (4) delimiting a portion (5) shown in Figs. 4 and 5 that acts as resonance box and a portion (6) with keyboard configuration.

[0017] As shown in Figs. 1, 2 and 3, the instrument (1) can be provided with a curved tubular duct (7) that connects a suitable source of pressurised air to the body (2). When the musician blows into the instrument (1), the tubular duct (7) connected with an attachment (9) to the base (3) of the body (2) at one end (8) features an opening (10) at the free end, where the musician puts

his lips to play the instrument. As shown in Fig. 3, the tubular duct (7) is preferably composed of three sections (12, 13 and 14) connected and placed in such a way that the opening (10) delimiting the free end of the section (14) can be easily reached by the musician's mouth, while comfortably holding the instrument (1).

[0018] The end (8) of the tubular duct (7) ends inside the body (2) in the accumulation compartment (15) of pressurised air, as shown in Figs. 4 and 5, partially delimited by the base (3), by an internal vertical separator (16) and by a sequence of cells (18) that can be aligned and arranged in two rows along the entire length of the instrument (1).

[0019] Each cell (18) is provided with a pressurised air inlet (19), through which it communicates with the accumulation compartment (15), intercepted by a vibrant reed (20) of suitable shape and size according to the desired note. Each opening (19) of the cell (18) is combined with a different (20) reed in order to obtain a relatively wide selection of sounds.

[0020] As shown in Fig. 4, each cell (18) features a pressurised air outlet (21), which allows the air previously accumulated in the cells (18) to move towards the portion (5) of the body (2), which acts as resonance box of the instrument (1) diffusing and amplifying the vibrations generated by the reeds (20).

[0021] Being located next to a cell (18), the outlets (21) are preferably aligned and arranged in two rows. The outlets (21) in the same row can be simultaneously opened and/or closed by means of a selector register (22) of sound timbre, as shown in Figs. 5, 6 and 7, which includes a cursor (23) provided with through holes (24) placed at a distance (P) equal to the distance between two adjacent outlets (21). The holes (24) allow for intercepting the outlets (21) of the cells (18) to be used when playing the instrument (1).

[0022] The cursors (23) are designed to make short rectilinear travels as shown in Fig. 7 with the arrows X, being forced to slide into two parallel guides (25a and 25b) delimited by a central portion (26) and two lateral portions (27 and 28) in relief with respect to a reference plane (33).

[0023] The movement of the cursors (23) may be actuated from the outside of the body (2) by means of a knob (29) that can be manually moved inside a groove (30), also shown in Figs. 2 and 3, located in the portion (6) with keyboard configuration in front position in order to move the cursor (23) by means of a lever system.

[0024] The lever system is composed of a small arm (31), with one end joined to the knob (29) and the other end hinged to the upper part (32) of a C-shaped crank (34) that turns around a fixed pin (35). The lower element (36) of the crank (34) features a groove (37) inside which a pin (38) fixed to one end of each cursor (23) slides. By means of the small arm (31), the movement of the knob (29) inside the groove (30) causes the angular travel of the crank (34) around the fixed pin (35), which, being hinged to the pin (38) by means of the groove (37), imposes a predefined rectilinear movement to the cursor (23). The grooves (30), the cursors (23) and the lever system that moves them are preferably dimensioned in such a way that, when the knob (29) is positioned on one end of the groove (30), the through holes (24) of the cursor (23) are placed over the outlets (21) of the cells (18), and in a way that, when the knob (29) is positioned on the opposite end of the groove (30) the cursor (23) closes the outlets (21) thus preventing the passage of air from the cells (18) to the sound-box (5).

[0025] Apart from deciding whether to use one and/or the other row of cells (18), the instrument (1) allows for opening or closing the outlets (21) that correspond to the cells (18) used by means of a keyboard (39) provided with keys (40), whose number is half of the number of the cells (18). As shown in Fig. 4, thanks to the curved arm (41) centrally hinged to an internal vertical separator (42) inside the body (2) and elastically loaded with a return spring (43), each key (40), which is hinged at one end of the curved arm (41), controls a pad (45) fixed at the opposite end of the curved arm (41) and designed to cover or uncover two outlets (21) of two corresponding cells (18) simultaneously.

[0026] Fig. 4 shows the pad (45) in two different positions. The continuous line shows the key (40) in raised position with the pad (45) that closes the outlets (21), while the dotted line shows the key (40) pressed downwards with the pad (45) in raised position in order to free the outlets (21).

[0027] To play the instrument (19), the musician blows pressurised air through the tubular duct (7) to fill the accumulation compartment (15). No air passes through the cells (18) if the keys (40) are not pressed and therefore no sound is emitted. Once the registers (22) have been set and the cells (18) to be used have been selected, the musician presses one of the keys (40) to allow for the passage of air from the accumulation compartment (15) to the sound-box (5) passing through the usable cells (18). The pressurised air flow that goes through the usable cells (18) causes the vibration of the reeds (20) that intercept the inlets (19) generating a predefined sound that propagates towards the sound-box (5) where it is amplified. The pressurised air flow finally exits through the multiple through holes (47) located on the cover (4) of the body (2), through which the pressurised air introduced into the tubular duct (7) is ejected, diffusing sound outside.

[0028] The present invention can be subject to numerous modifications and variants within the protection defined by the following claims.

[0029] Materials as well as sizes can vary according to the specific requirements.

Claims

1. Portable air musical instrument provided with key-

board comprising a box-shaped body that features at least a portion configured as resonance box with ventilation openings and at least a portion with keyboard configuration, a compartment for the accumulation of pressurised air inside the resonance box that communicates with it by means of multiple cells provided with at least one inlet intersected by a vibrant reed for the passage of pressurised air from the accumulation compartment to the cell and at least one outlet for the passage of pressurised air from the cell to the resonance box and a sequence of external keys located in the keyboard portion and cinematically connected by means of a small arm elastically hinged in the resonance box to a pad designed to open or close a pressurised air outlet, characterised by the fact that it comprises adduction means of pressurised air towards the accumulation compartment that can be connected to at least one external source of pressurised air to cause the vibration of one or more reeds at a time, each of them generating a different musical note when the corresponding key is pressed.

2. Instrument according to claim 1, characterised by the fact that the adduction means comprise a tubular duct provided with an opening for the musician's lips at one end.

3. Instrument according to claim 1, characterised by the fact that the tubular duct is provided with an airtight attachment that allows for connection to a source of compressed air.

4. Instrument according to claim 3, characterised by the fact that the adduction means comprise at least one adjustment valve for the pressurised air flow in order to intercept the air flow and a register device capable of controlling from the outside the opening and closing of the adjustment valve in order to modulate the sound emitted by the musician.

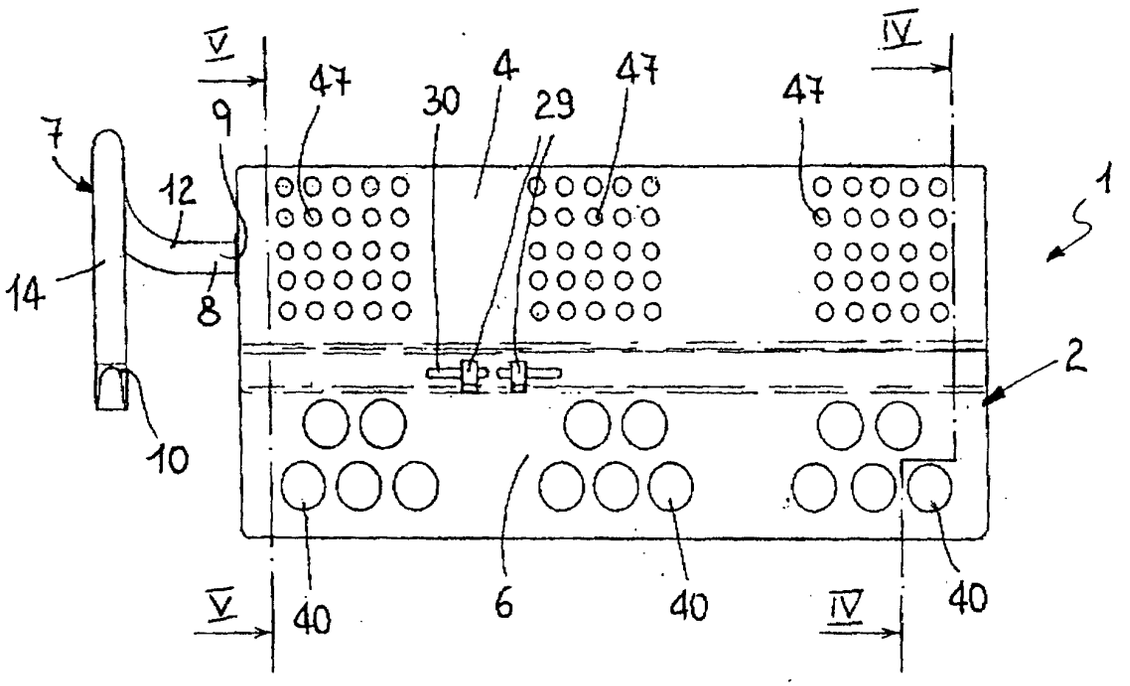
5. Instrument according to any of the previous claims, characterised by the fact that it comprises at least a register used to select the timbre of the sound emitted by the instrument, composed of a multiple lever transmission system and at least one cursor designed to include and/or exclude one or more cells at a time through the opening and/or closing of the outlets, distributed according to a preferred arrangement, in order to allow and/or prevent the passage of pressurised air from the cell to the portion with resonance box configuration.

6. Instrument according to claim 5, characterised by the fact that each cursor is provided with through holes distributed according to the preferred arrangement of the outlets and can be moved between a working position in which each through hole is located over the outlet to make the cells usable to generate the corresponding timbre and a rest position in which the cursor closes the outlets to make the cells unusable.

7. Instrument according to any of the previous claims, characterised by the fact that the cells are located at least in one row and that the preferred distribution of the air outlets of pressurised air from cells belonging to the same row provides for the alignment of the outlets that corresponds to the alignment of the through holes, so that each cell belonging to the same row can be simultaneously intercepted or covered by the corresponding through hole of the cursor.

8. Instrument according to claim 7, characterised by the fact that the cells are located on two parallel rows and the pressurised air outlets are also located on two parallel rows, so that each pad can intercept up to two through holes at a time during use.

Fig. 1



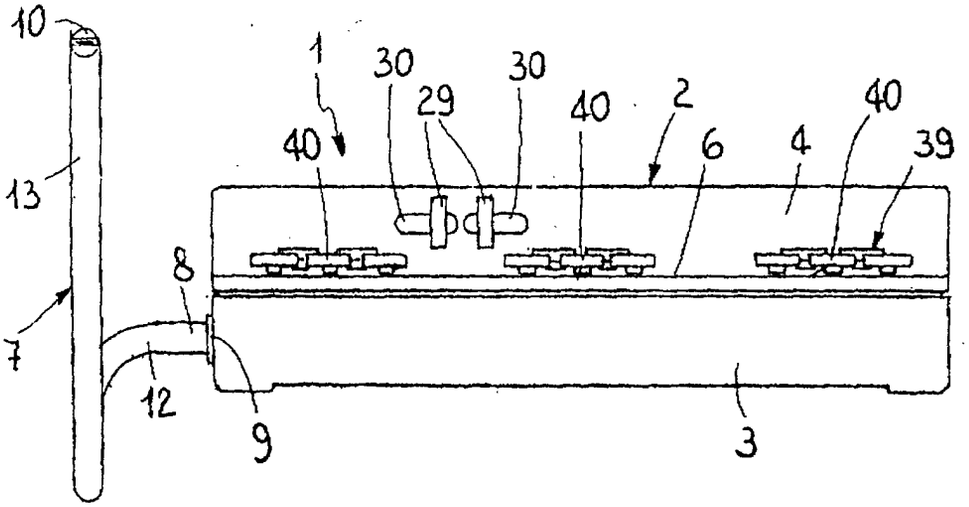

10
13
7
8
12
9
1
30
29
30
40
40
2
6
4
40
39
3

Fig. 2

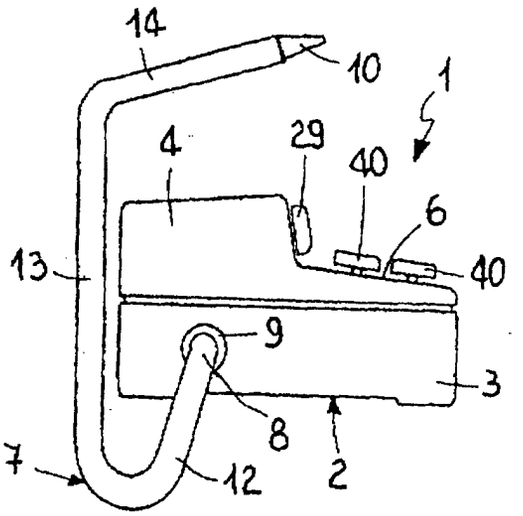

14
10
1
4
29
40
6
40
13
9
3
8
7
12
2

Fig. 3

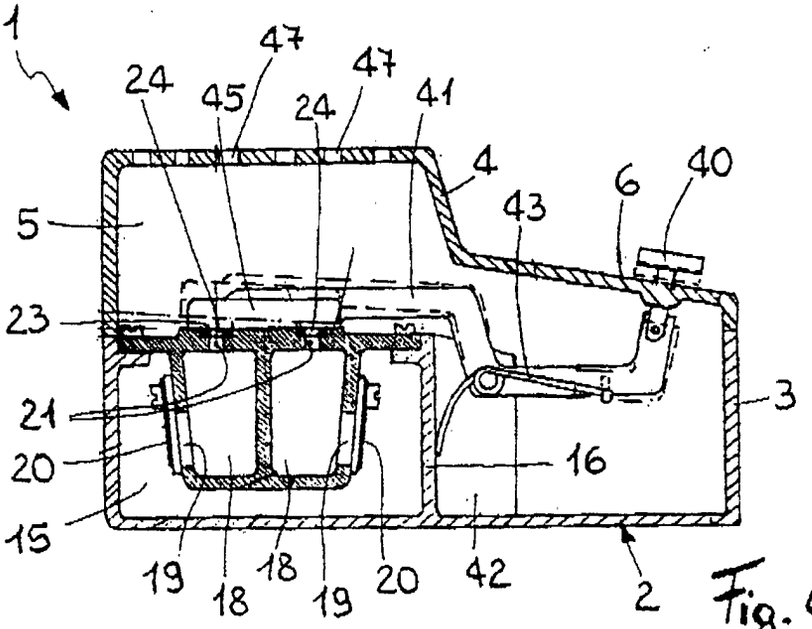

1
47
24
45
47
24
41
4
6
40
43
5
23
3
21
20
16
15
19
18
18
19
20
42
2

Fig. 4

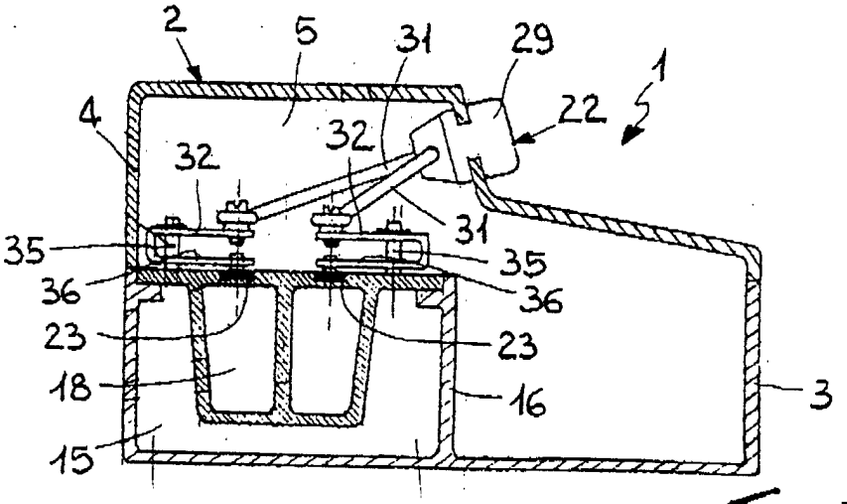

2
5
31
29
1
4
22
32
32
31
35
35
36
36
23
23
18
16
3
15

Fig. 5

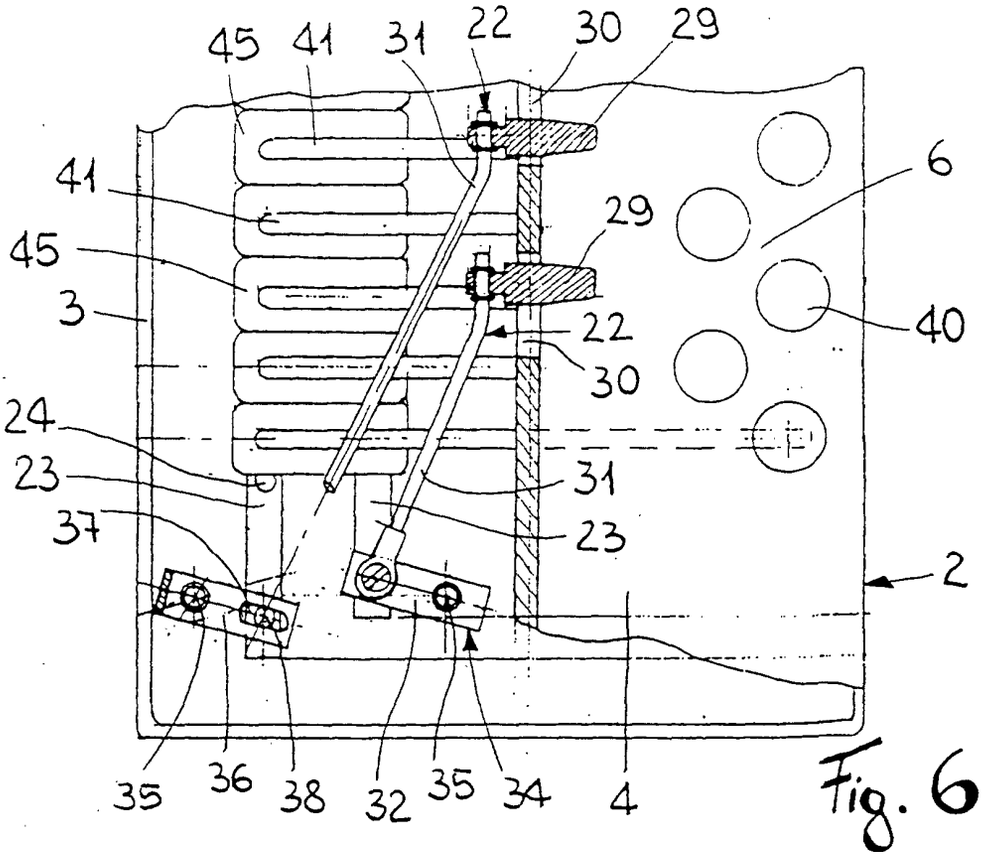

45
41
31
22
30
29
41
45
3
24
23
37
6
29
40
22
30
31
23
2
35
36
38
32
35
34
4

Fig. 6

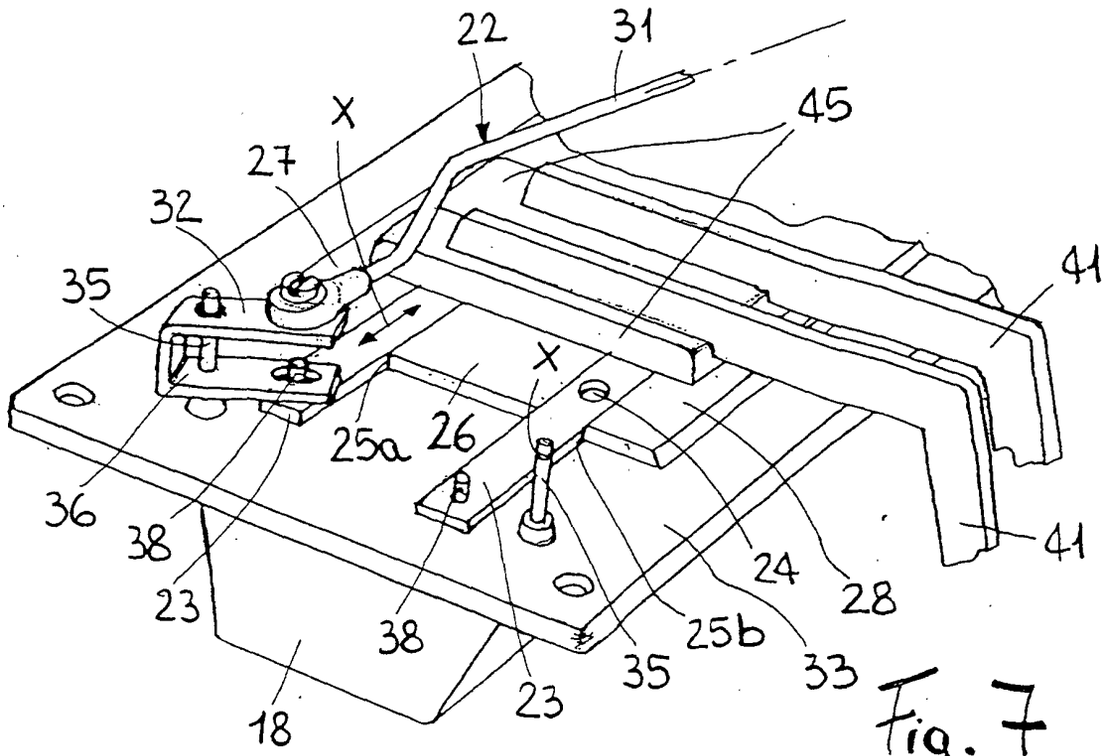

22
31
X
27
45
32
35
41
X
25a
26
36
38
23
24
28
41
38
25b
35
33
23
18

Fig. 7