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(54) **A coplanar sliding wing door construction, particularly for wardrobes and the like**

(57) A coplanar sliding wing door construction, particularly for wardrobes and the like, characterized in that said construction comprises at least two wing elements (2), which, in a closed position thereof, are coplanar with respect to one another and close an inner space of a said wardrobe or the like, said wing elements (2) being supported by a supporting and handling device which extends substantially through an overall width of said inner space of said wardrobe, and comprising a base plate (5) which, at a top thereof, defines said inner space or ward-

robe; each said wing element (2) being supported by a supporting bracket (7), which is slidingly coupled to said base plate (5), to longitudinally slide along said base plate (5); said supporting bracket (7) being coupled to said base plate (5) by a single coupling carriage assembly (10) sliding on rail elements (12,13) made rigid with said base plate (5); said supporting bracket (7) being rigidly coupled to said sliding carriage (10) by a swinging coupling (14) fixed to a cross slider assembly (15) and through an end small carriage (21).

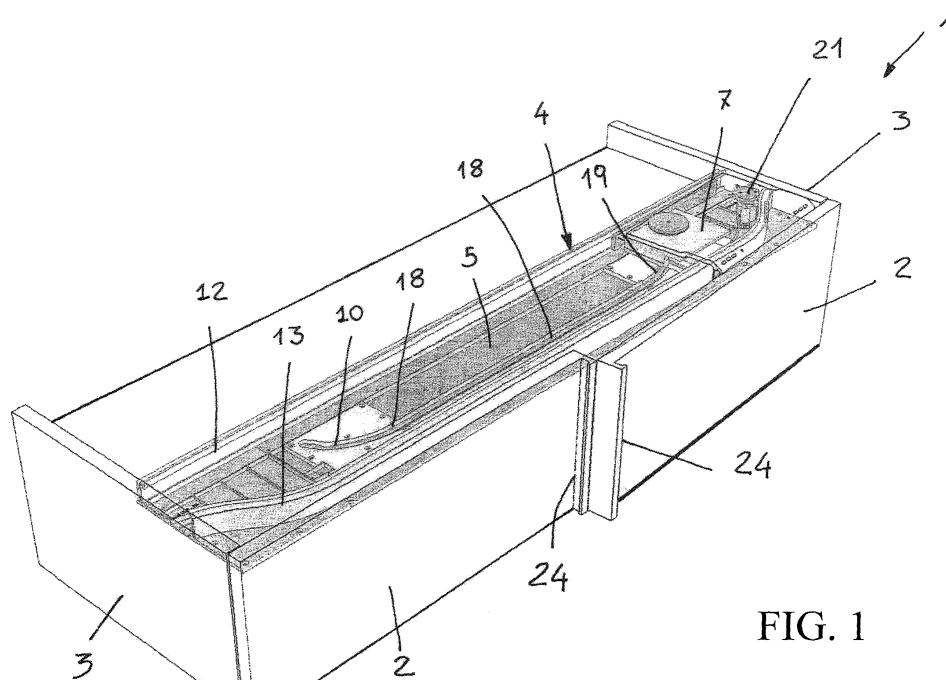


FIG. 1

Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a coplanar sliding wing door construction particularly for wardrobes and the like.

[0002] As is known, horizontally sliding wing elements are conventionally used for making furniture pieces and, in general, for closing spaces or other environments, as it is desired to not hinder an opening region by pivot pin wing elements.

[0003] Conventional prior sliding wings are clamped at the top thereof to a rail assembly extending along the top edge portion of the furniture piece and therealong a plurality of wheel elements coupled to the wing by a coupling bracket or the like element are caused to slide.

[0004] At the bottom portion thereof, the wing comprises a further bottom bracket or shoe element which supports respective bottom rolling wheels designed for sliding along a bottom rail, thereby supporting and guiding the wing itself.

[0005] The wing supporting rails extend parallel to one another and, accordingly, prior wings are not coplanar, which is disadvantageous from an aesthetic standpoint.

[0006] Accordingly, systems have been designed for making prior wings coplanar in a closed position thereof, but, however, as they are driven to their open position are brought to an overlapping relationship.

[0007] The wing coplanarity is achieved in the prior art by using complex wing guiding and supporting systems including a plurality of brackets sliding in contoured rails.

[0008] On the other hand, the above mentioned supporting and guiding systems are, as stated, very complex from a mechanical standpoint and, moreover, their size is rather large, thereby resulting in a high making cost and a less operation reliability, in a prolonged driving operation.

[0009] The above mentioned large size represents moreover another problem since it reduces the inner space of the wardrobe, while greatly limiting the mounting patterns in small space environments.

SUMMARY OF THE INVENTION

[0010] Accordingly, the aim of the present invention is to provide a coplanar sliding wing door construction, particularly for wardrobes and the like, which has a very small size and a very simple and reliable construction.

[0011] Within the scope of the above mentioned aim, a main object of the invention is to provide such a coplanar sliding wing door construction comprising a small number of component elements and which can be assembled and installed in a quick and simple manner.

[0012] Yet another object of the present invention is to provide such a coplanar sliding wing door construction which may also be installed in restricted spaced, while allowing the sliding wings to be mounted in a flush relationship with the room environment.

relationship with the room environment.

[0013] Yet another object of the present invention is to provide such a coplanar sliding wing door construction which, owing to its specifically designed structural features, is very reliable and safe in operation.

[0014] According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a coplanar sliding wing door construction, particularly for wardrobes and the like, characterized in that said construction comprises at least two wing elements which, in a closing position thereof, are coplanar to one another and close an inner space of a said wardrobe.

[0015] Said wing elements are supported by a supporting and handling device which extends substantially through an overall width of said inner space or wardrobe, and comprises a base plate which, at a top thereof, defines said inner space or wardrobe.

[0016] Each said wing elements is supported by a supporting bracket which is slidably coupled to said base plate, to longitudinally slide along said base plate.

[0017] Said supporting bracket is coupled to said base plate by a single coupling carriage assembly sliding on rail elements made rigid with said base plate, said supporting bracket being rigidly coupled to said sliding carriage by a swinging coupling fixed to a cross slider assembly and through an end small carriage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Further characteristics and advantages of the present invention will become more apparent hereinafter from the following detailed disclosure of a preferred, though not exclusive, embodiment of the invention, which is illustrated, by way of an indicative, but not limitative, example in the accompanying drawings, where:

Figure 1 is a partial perspective view of a coplanar sliding wing door construction, according to the present invention;

Figure 2 is a top plan view showing the inventive coplanar sliding wing door construction in a starting opening step for opening a wing element thereof;

Figure 3 is a view similar to figure 2 showing another step for opening a sliding wing element;

Figure 4 is a further view similar to figure 3 showing the sliding wing element in an open position thereof; Figure 5 is a cross-sectioned side elevation view showing a detail of a driving mechanism with the sliding wing element being in a closed position thereof;

Figure 6 is a view similar to figure 5, but showing the driving mechanism with the wing element being arranged in an opening or opened position thereof;

Figure 7 is a perspective view showing the driving mechanism at a wing element opened position; and Figure 8 is a further perspective view of the above

driving mechanism with the sliding wing element being shown in a closed or closing position thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] With reference to the number references of the above mentioned figures, the coplanar sliding wing door construction, according to the present invention, generally indicated by the reference number 1, comprises at least two wing elements, generally indicated by the reference number 2 which, in a closed or closing position thereof are arranged with a coplanar relationship to close a space of a wardrobe or the like defined by sidewalls 3.

[0020] The wing elements 2 are supported by a driving and supporting device, generally indicated by the reference number 4, which extends substantially through the overall width of the wardrobe or space, and comprises a base plate 5, made rigid with a top horizontal panel 6 delimiting at the top said wardrobe or space.

[0021] Each said wing element 2 is supported by a single supporting bracket 7, which is slidably coupled to the base plate 5 so as to longitudinally slide along the latter to bring therewith the wing element while performing the opening and closing movements of said wardrobe or inner space.

[0022] As shown, said supporting bracket 7 has a substantially L-shape, as seen laterally, and comprises a vertical portion 8 coupled to the wing element 2 and a horizontal portion 9 bearing on said base plate 5.

[0023] The wing element 2 is clamped to the vertical portion 8 by an adjustable clamping system 30, allowing to adjust the wing element height and driving translating movement, with respect to said supporting bracket, by operating from the bottom, for example by a driving element 31, for example as shown in figure 6.

[0024] The adjustable coupling or clamping system, which, as stated, can be adjusted from the bottom, allows the inventive construction to be also mounted or assembled in a flush mounting arrangement with respect to the ceiling.

[0025] As shown, the supporting bracket 7 is coupled to said plate base by a coupling carriage 10, including a plurality of coupling carriage wheels 11, preferably four coupling carriage wheels arranged in two pairs.

[0026] Each said wheel pair slides in a respect rail assembly, a rear rail 12 and a front rail 13 being made rigid or integral with said base plate 5.

[0027] The supporting bracket 7 being made rigid or integral with said carriage 10 by a swinging coupling 14 clamped to a cross slider assembly 15.

[0028] Said winging coupling 14 allows said supporting bracket 7 to horizontally swing with respect to said carriage 10, thereby allowing said wing element 2 to be cross-wise displaced.

[0029] Said cross slider assembly 15 allows said supporting bracket 7 to perform a cross-wise movement, thereby allowing the wing element associated with said

supporting bracket 7 to also perform a cross-wise movement, as counter-biased by a pair of coil springs 16.

[0030] Said cross slider assembly 15 comprises a guide roller 17, sliding in a first longitudinal contoured guide 18 formed in said base plate 5.

[0031] Said first contoured guide 18 extends substantially parallel to the front rail 13, with an exception of the two end portions 19 thereof which are inward curved.

[0032] A second contoured guide 20 extends between the first contoured guide 18 and the front rail 13.

[0033] Said front rail 13 and second contoured guide 20 are substantially parallel through an overall extension thereof and form, at the end portions thereof, an inner curved portion, at an endmost position with respect to said curved portion 19 of said first contoured guide 18.

[0034] An end small carriage 21, clamped or coupled by a pin to said supporting bracket 7, comprises a pair of small guide rollers 22 sliding in the second contoured guide 20 and a pair of wheels 23 sliding in the front rail 13.

[0035] The above disclosed construction operates as follows.

[0036] In a closed or closing position thereof, the wing elements 2 are coplanar and the respective supporting brackets are arranged at their two end positions.

[0037] Figure 2 shows an end position of the supporting bracket 7 of the left wing element, which is arranged in a tightly closed position, whereas the right wing element is shown at an opening starting condition thereof in which a user, by operating the gripping element 24, has drawn or pulled the right wing element 2 to open the latter, by overcoming the counterbiasing force of the spring elements 16 of the cross slider 15.

[0038] By continuously applying a pulling force, the user will displace to the left the right wing element 2 so as to cause the latter to overlap the front of the left wing element, as shown in figure 3, so as to slide to achieve the full opening position, shown in figure 4.

[0039] By referring again to the opening starting step or operation, as the user drives the wing element 2 to him/her, then said wing element 2 will start a swinging movement centered on the small end carriage 21, as permitted by the cross displacement of the cross-slider 15 and swinging or oscillating coupling 14.

[0040] Immediately after having performed the first swinging movement, the wing element is longitudinally driven owing to the contoured configurations of the contoured guides 18 and 20 which respectively guide the cross slider 15 and small end carriage 21, the wing element weight being supported by the carriage 10 which slides along the above mentioned sliding rails 12 and 13 by the wheels 11.

[0041] The wing element closure movement is substantially identical to the opening movement thereof and, as the wing element arrives at its closing position, the springs 16 will operate thereon to hold it at its closing position.

[0042] The supporting and handling device has a modular construction or structure including a central portion,

comprising rectilinear and parallel sectors of the rails and contoured guides, and two end portions comprising the curved sectors of said contoured guides 18 and 20 and front rail 13.

[0043] Said end portions may have a standard size, whereas said central portion has a size depending on an overall size of the opening of said inner space or wardrobe to be closed by said sliding wing elements.

[0044] It has been found that the invention fully achieves the intended aim and objects.

[0045] In fact, the invention has provided a coplanar sliding wing door construction, in which a sliding wing movement is fully guided by a supporting and driving or handling system which extends on the top of the wardrobe, without hindering the latter.

[0046] The small size of said handling or driving and supporting system and the specifically designed clamping or connecting system for coupling the sliding wings allow to also assemble the subject construction in a flush relationship with the ceiling.

[0047] In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

Claims

1. A coplanar sliding wing door construction, particularly for wardrobes, **characterized in that** said construction comprises at least two wing elements, which, in a closed position thereof, are coplanar with respect to one another and close an inner space of a said wardrobe, said wing elements being supported by a supporting and handling device which extends substantially through an overall width of said inner space of said wardrobe, and comprising a base plate which, at a top thereof, defines said inner space or wardrobe, each said wing element being supported by a supporting bracket, which is slidably coupled to said base plate, to longitudinally slide along said base plate, said supporting bracket being coupled to said base plate by a single coupling carriage assembly sliding on rail elements made rigid with said base plate, said supporting bracket being rigidly coupled to said sliding carriage by a swinging coupling fixed to a cross slider assembly and through an end small carriage.
2. A coplanar sliding wing door construction, according to claim 1, **characterized in that** said base plate is made rigid or integral with a top horizontal panel defining at a top thereof said space or wardrobe.
3. A coplanar sliding wing door construction, according to claim 1, **characterized in that** said supporting bracket has, as seen laterally, a substantially L-shape, and including a vertical bracket portion fixed to a said wing element and a horizontal bracket por-

tion bearing on said base plate; said wing element being fixed to said vertical portion by an adjustable clamping system allowing to adjust a height and displacement movement of said wing element with respect to said supporting bracket, by operating from the bottom, so as to allow said construction to be also mounted on a ceiling with a flush mounting arrangement.

4. A coplanar sliding wing door construction, according to claim 1, **characterized in that** said supporting bracket is coupled to said base plate by a coupling carriage including a plurality of coupling carriage wheels, preferably four coupling carriage wheels arranged in two pairs, each said wheel pair sliding in a respective rail assembly, a rear rail and a front rail being made rigid or integral with said base plate.
5. A coplanar sliding wing door construction, according to claim 1, **characterized in that** said supporting bracket is made rigid or integral with said carriage by a swinging coupling clamped to a cross slider assembly, said swinging coupling allowing said supporting bracket to horizontally swing with respect to said carriage, thereby allowing said wing element to be cross-wise displaced, said cross slider assembly allowing said supporting bracket to perform a cross-wise movement, to in turn allow the wing element associated with said supporting bracket to also perform a cross-wise movement, as counter-biased by counter-biasing resilient means.
6. A coplanar sliding wing door construction, according to one or more of the preceding claims, **characterized in that** said cross slider assembly comprises a guide roller sliding in a first longitudinal contoured guide formed in said base plate, said first contoured guide extending substantially parallel to the front rail, with an exception of the two end portions thereof which are inward curved.
7. A coplanar sliding wing door construction, according to one or more of the preceding claims, **characterized in that** a second contoured guide extends between said first contoured guide and front rail, said front rail and second contoured guide being substantially parallel through an overall extension thereof and forming, at the end portions, an inward curved portion, at an endmost position with respect to said curved portion of said first contoured guide.
8. A coplanar sliding wing door construction, according to one or more of the preceding claims, **characterized in that** said end small carriage, clamped by a clamping pivot element to said supporting bracket, comprises a pair of guide rollers, sliding in said second contoured guide, and a pair of sliding wheels sliding in the front rail.

9. A coplanar sliding wing door construction, according to one or more of the preceding claims, **characterized in that** said supporting and handling device has a modular structure including a central portion, comprising rectilinear and parallel sectors of the rails and contoured guides, and two end portions comprising the curved sectors of said contoured guides and front rail. 5
10. A coplanar sliding wing door construction, according to one or more of the preceding claims, **characterized in that** said end portions have a standard size, whereas said central portion has a size depending on an overall size of the opening of said inner space or wardrobe to be closed by said sliding wing elements. 10 15

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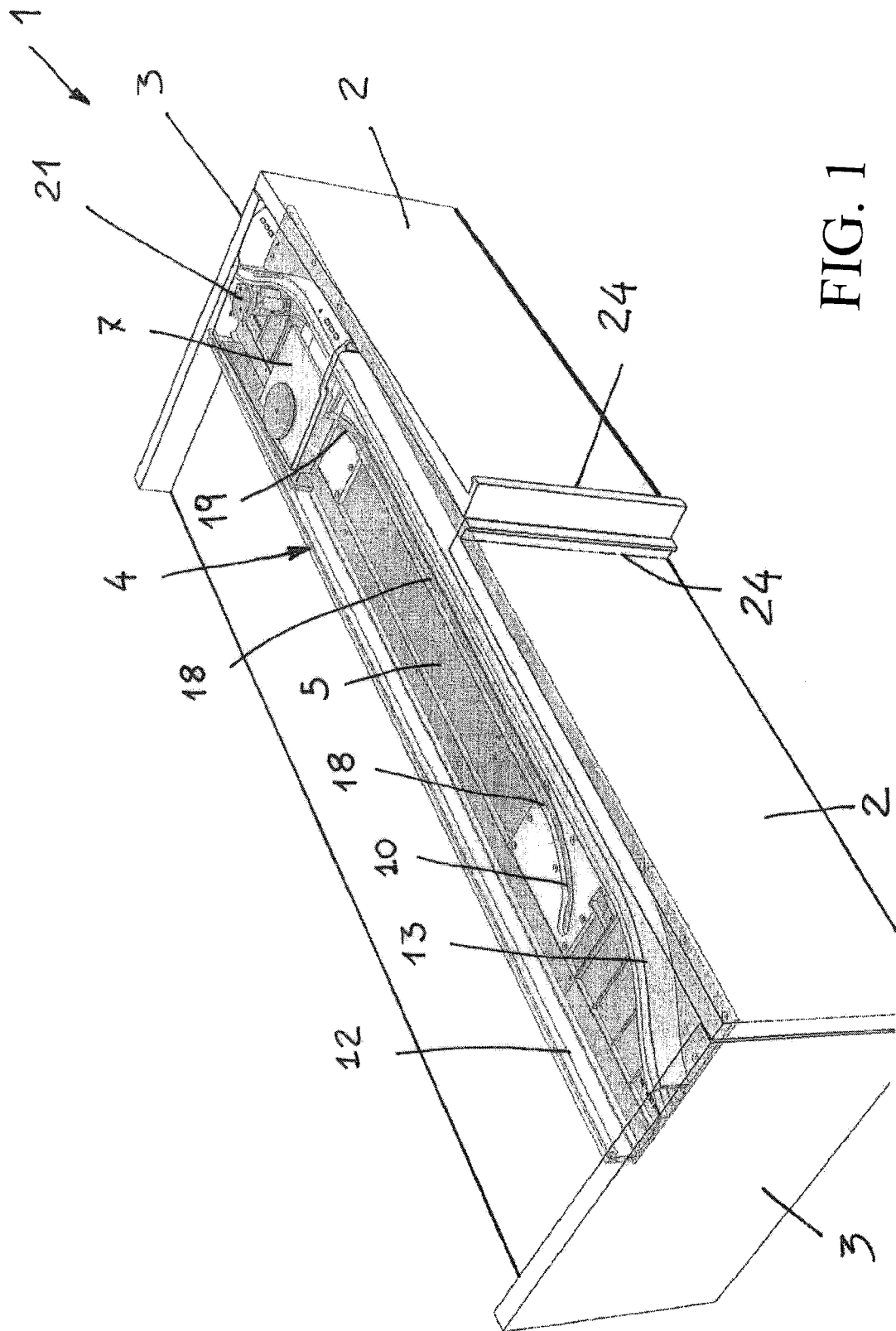


FIG. 1

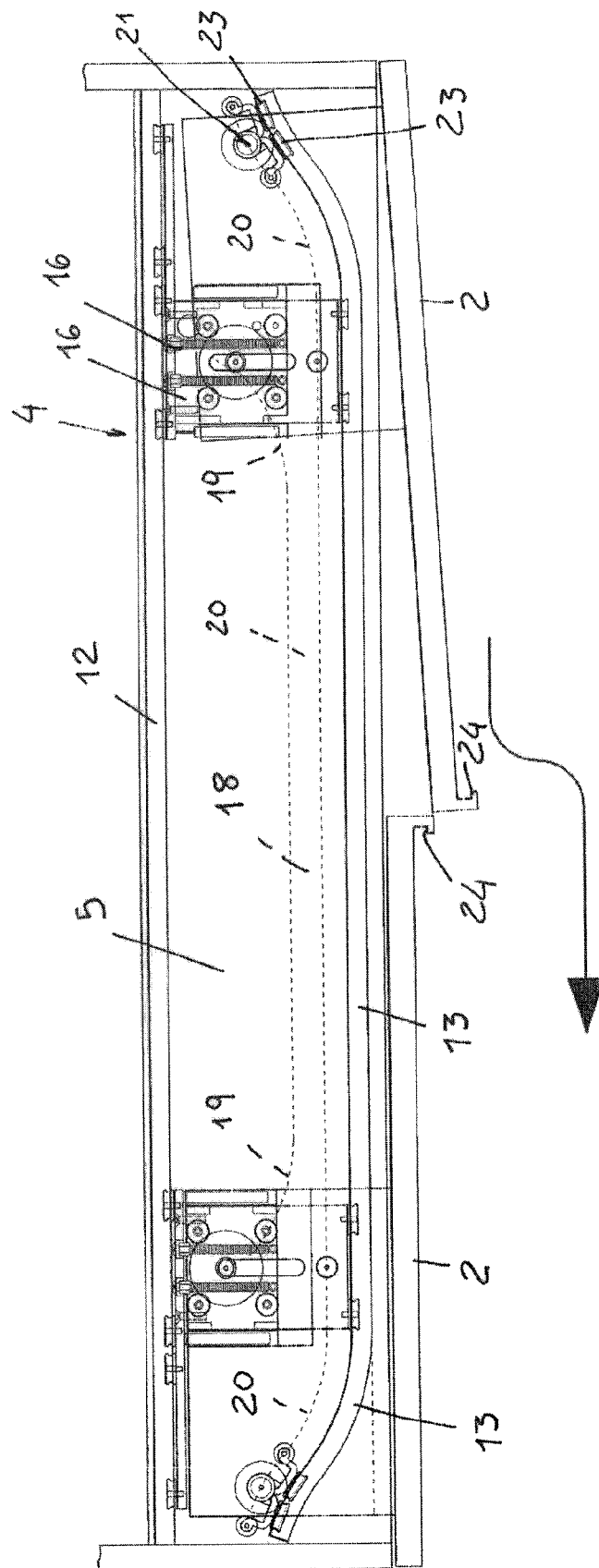


FIG. 2

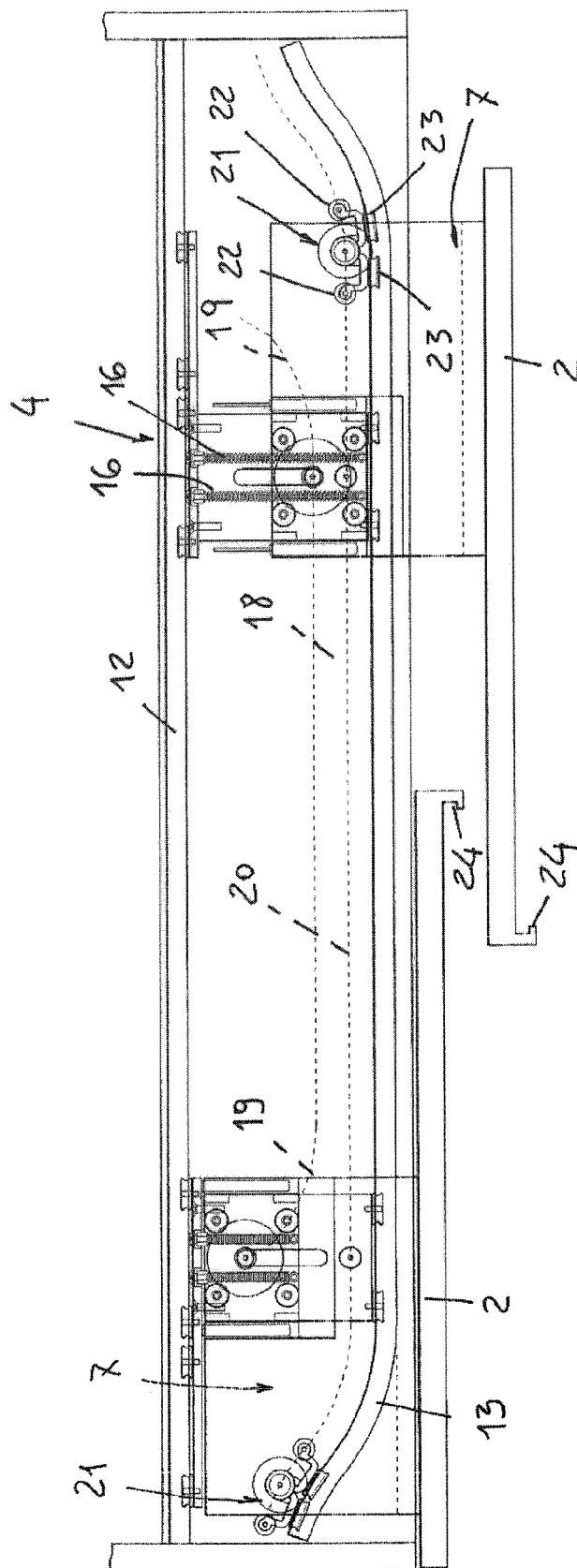


FIG. 3

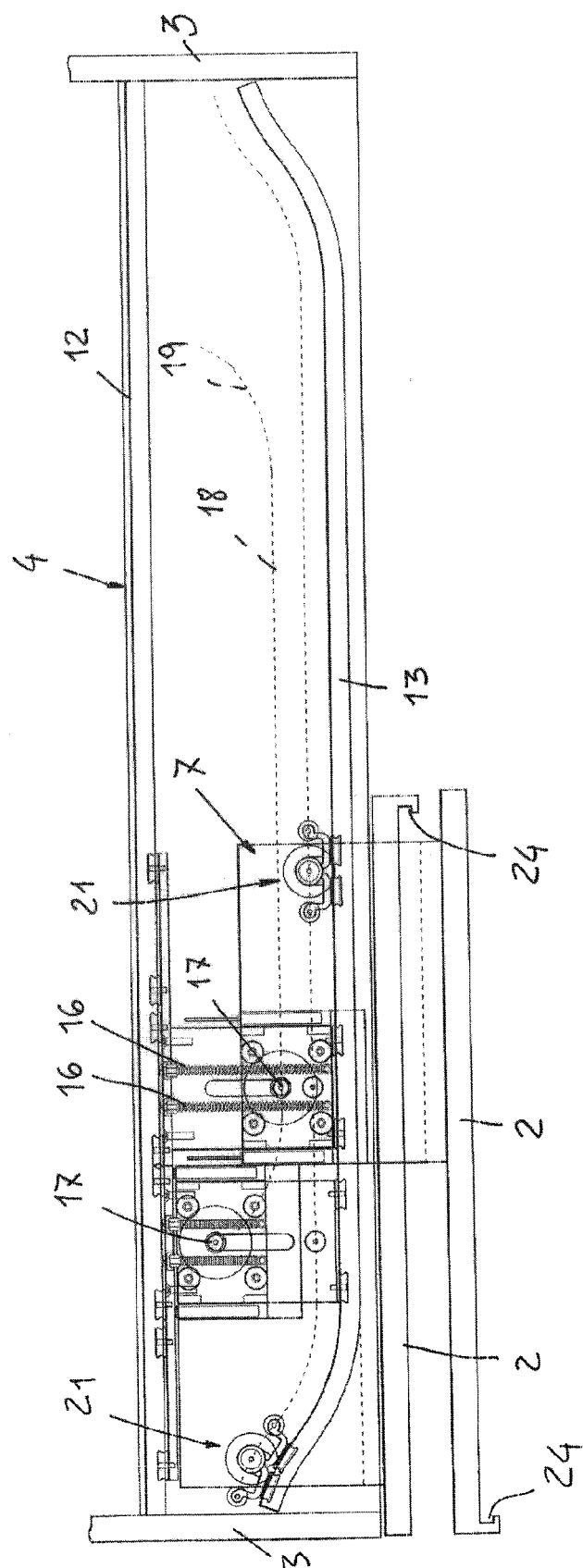


FIG. 4

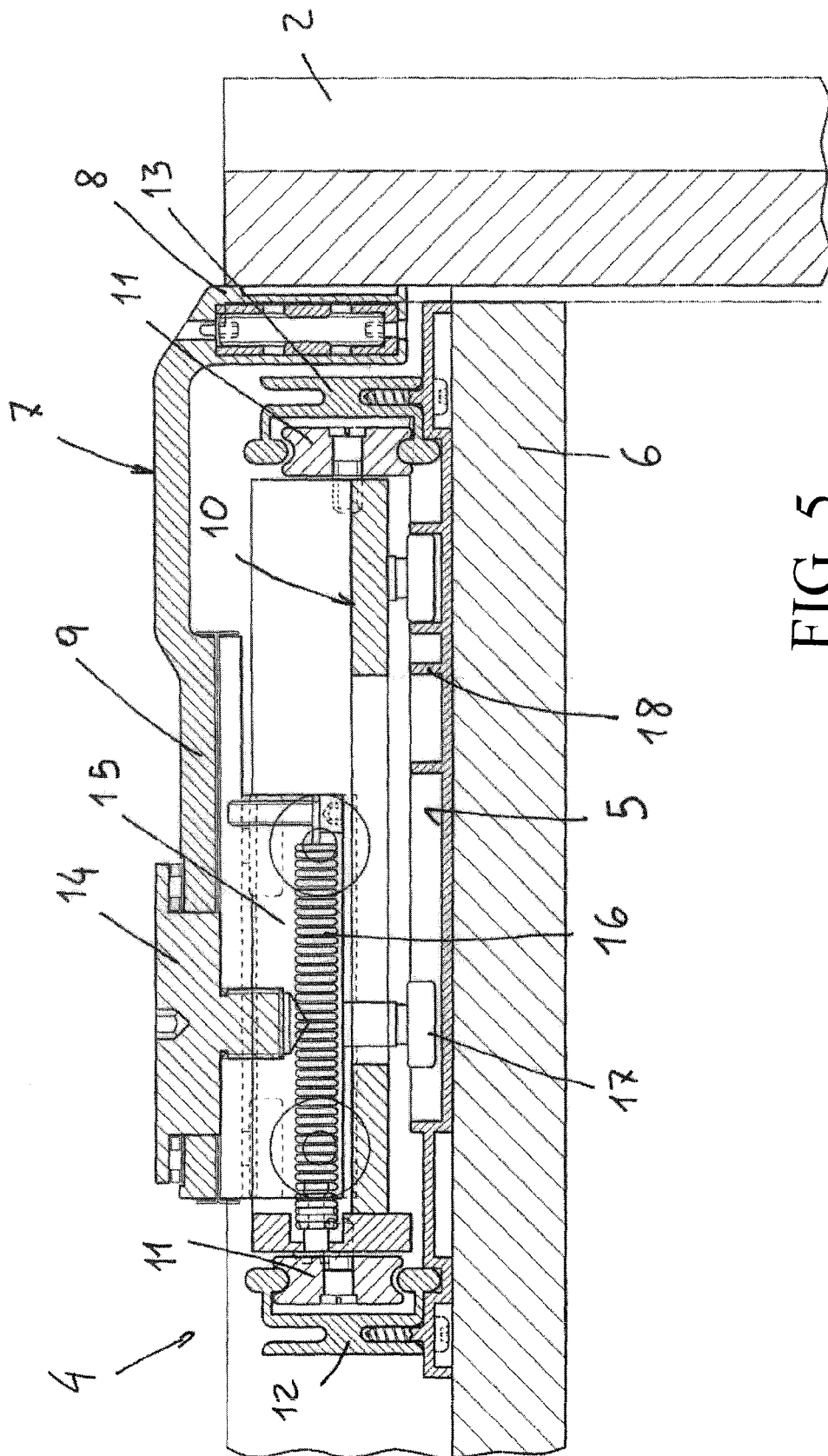


FIG. 5

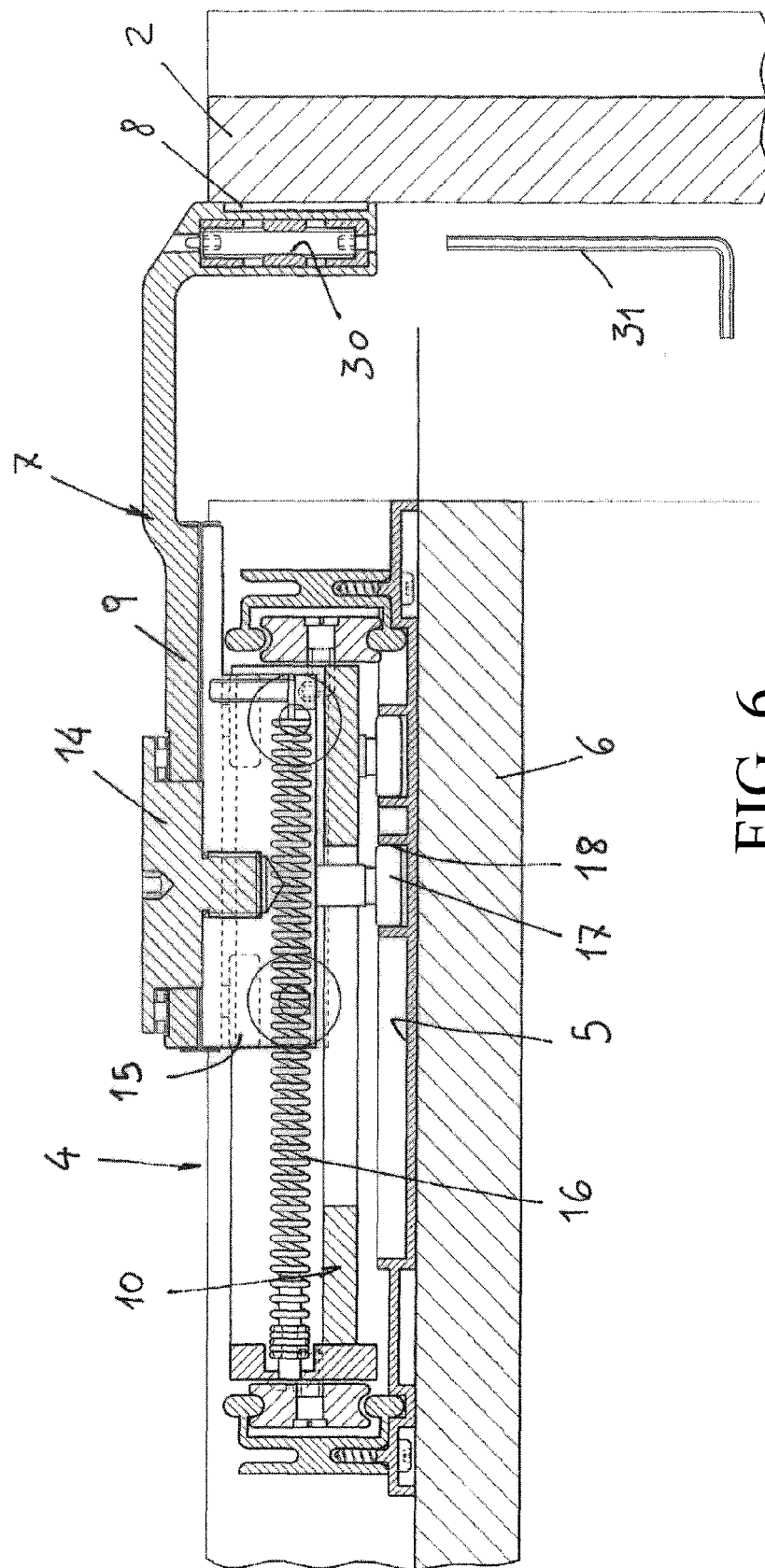


FIG. 6

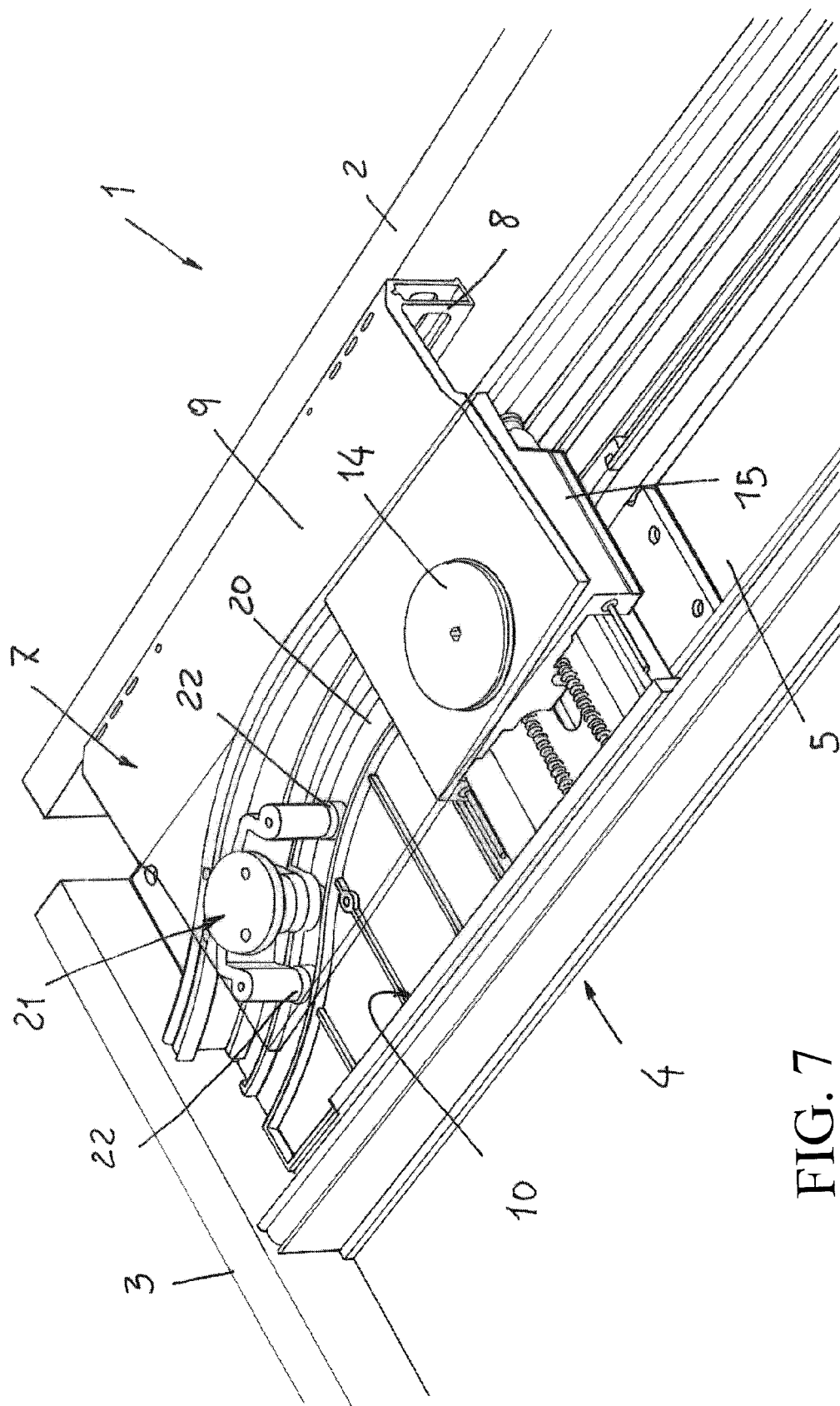


FIG. 7

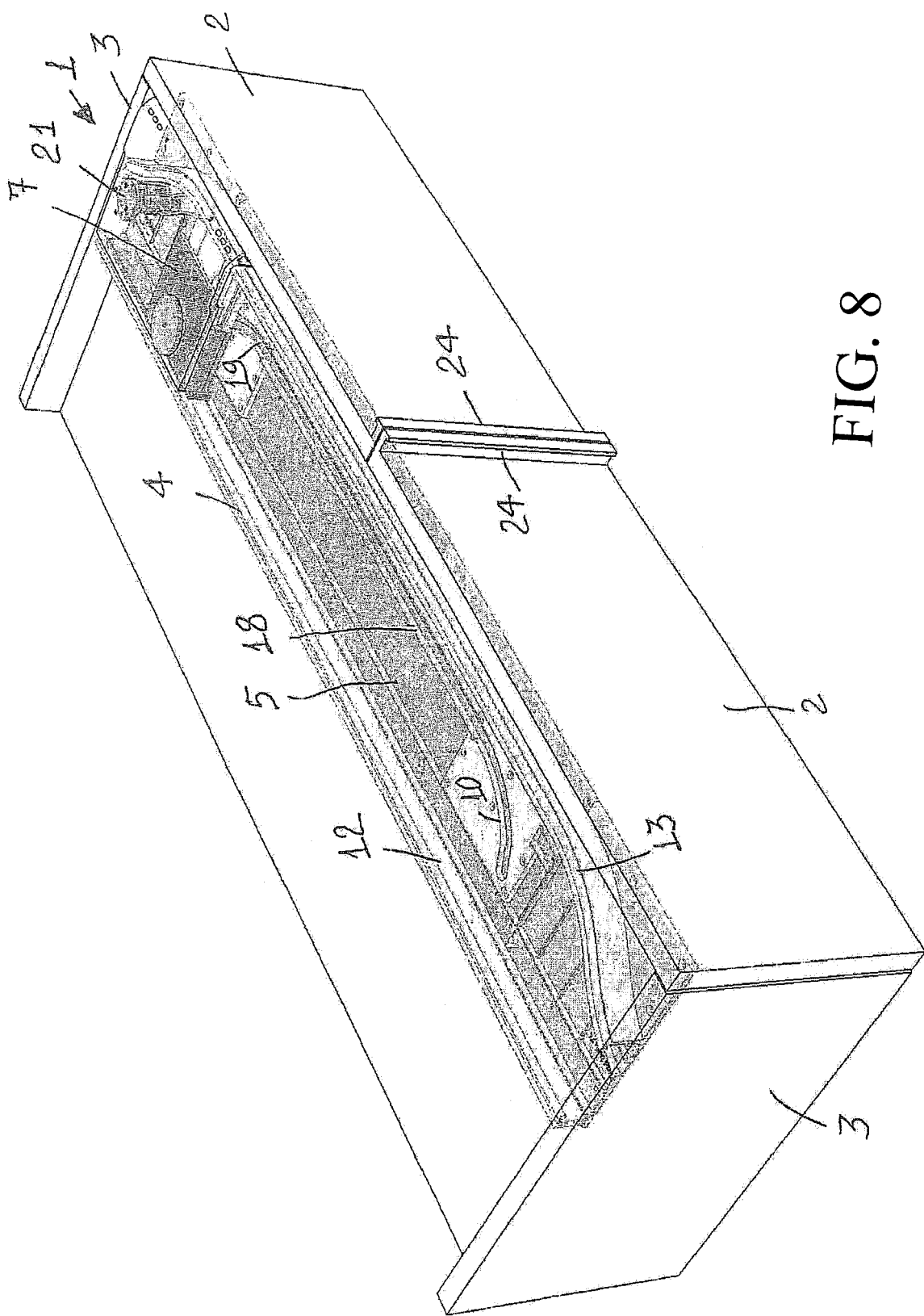


FIG. 8



EUROPEAN SEARCH REPORT

Application Number
EP 10 15 7689

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	WO 2009/003670 A (BORTOLUZZI MOBILI SRL [IT]; BORTOLUZZI GUIDO [IT]) 8 January 2009 (2009-01-08)	1,2,4-8	INV. E05D15/10
Y	* figures 11,12,15,17 * * page 5, line 1 - page 6, line 4 * * page 10, line 3 - page 11, line 9 * * page 14, column 7 - page 15, column 4 *	3,9,10	
Y	US 2 999 267 A (STERLING JOHN G ET AL) 12 September 1961 (1961-09-12) * figures 2,4 * * column 1, lines 53-63 * * column 4, lines 14-23 * * column 5, lines 5-20 *	3	
Y	EP 1 195 492 A (WAIBEL WALTER [DE]) 10 April 2002 (2002-04-10) * column 2, lines 22-26,46-50 *	9,10	
A	WO 2004/090274 A (BORTOLUZZI MOBILI SPA [IT]; BORTOLUZZI GUIDO [IT]) 21 October 2004 (2004-10-21) * figures 2,9,19,20 *	1,2,4-8	TECHNICAL FIELDS SEARCHED (IPC) E05D
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 29 April 2010	Examiner Klemke, Beate
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 (03.82) (P04C01)

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

EP 10 15 7689

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