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(54) **Shelf unit on movable base with improved actuation**

(57) A shelf unit on a movable base with improved actuation, comprising a framework provided with wheels for the movement of the shelf unit (1), the particularity of which is the fact that it comprises actuation means (7-12) which are arranged externally with respect to the useful loading space of the shelf unit (1), are rigidly fixed to the mutually opposite outer walls of the shorter sides of the framework and run from one shorter side to the other of the framework, below a first usable shelf of the shelf unit (1).

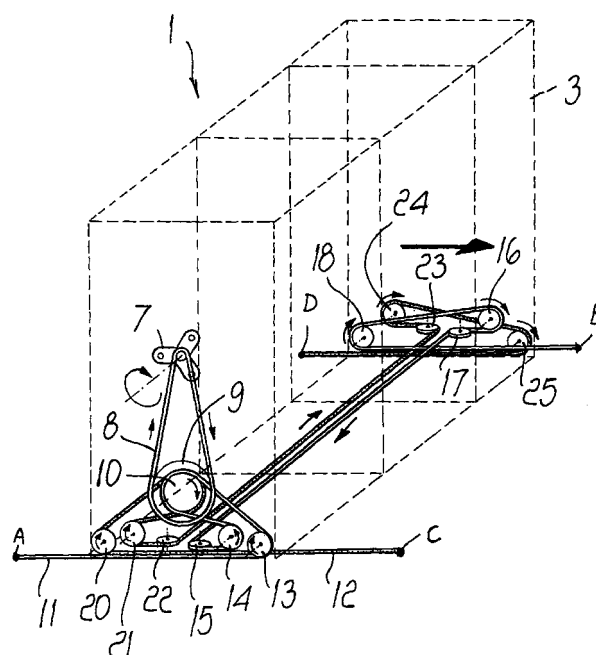


Fig. 2

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Description

[0001] The present invention relates to a shelf unit on a movable base with improved actuation.

[0002] It is known that shelf units on movable bases, actuated manually or by means of a motor, allowing to organize efficiently the space reserved for the filing of documents and the like, are currently widely used.

[0003] Said shelf units on movable bases are generally constituted by a plurality of modular elements which can be arranged side by side and slide, by means of carriages or wheels, on tracks provided on the floor of the room in which the shelf units are accommodated and therefore allow the user to access the required shelf unit by actuating it along said tracks.

[0004] The advantage of said shelf units consists in that it is substantially possible to double the utilization of spaces in offices for filing purposes and it is further possible to utilize the space available vertically.

[0005] Said movable shelf units are generally provided so that one shelf unit is adjacent to the other, accordingly reducing space occupation, since in any case one usually needs to access one shelf unit at a time and therefore it is not necessary to leave spaces between the shelf units, because space is instead provided in each instance by means of the translatory motion of the shelf units along the tracks.

[0006] Conventional shelf units on movable bases, however, suffer drawbacks.

[0007] First of all, the movable base is generally actuated through a transmission shaft which is connected by means of a pinion and a chain to actuation means which are generally constituted by a handwheel (in the case of manual actuation) or by an electric motor (in the case of motorized actuation); wheels are further connected to said transmission shaft, again by means of a rack and a pinion, and receive their motion from said transmission shaft.

[0008] Another solution provides for the direct transmission of the motion to the wheels, all or only some of which can be driving wheels.

[0009] The fact of providing the transmission shaft so that it is accommodated inside the base of the shelf unit entails the drawback that said base must in any case have minimum dimensions which allow to accommodate the transmission shaft in addition to the wheels.

[0010] This leads to the fact that the first usable shelf of the unit is at a certain height from the ground indeed because of the presence of the base.

[0011] Furthermore, this fact limits the loading of the shelf unit in a vertical direction, since part of the useful space is occupied by the base.

[0012] The cost of the base is also a significant factor in the overall cost of the shelf unit.

[0013] The aim of the present invention is to provide a shelf unit on a movable base with improved actuation which can be provided so as to eliminate the base that is present in conventional types of shelf unit.

[0014] Within the scope of this aim, an object of the present invention is to provide a shelf unit on a movable base with improved actuation, in which the first usable shelf is at a lower height than the first shelves of conventional shelf units.

[0015] Another object of the present invention is to provide a shelf unit on a movable base with improved actuation which allows greater vertical utilization in terms of loading, for an equal height of the shelf unit, with respect to conventional shelf units.

[0016] Another object of the present invention is to provide a shelf unit on a movable base with improved actuation in which all the wheels turn freely.

[0017] Another object of the present invention is to provide a shelf unit on a movable base with improved actuation in which said actuation can be equally manual or motorized.

[0018] Another object of the present invention is to provide a shelf unit on a movable base with improved actuation which is highly reliable, relatively easy to manufacture and at competitive costs.

[0019] This aim, these objects and others which will become apparent hereinafter are achieved by a shelf unit on a movable base with improved actuation, comprising a framework provided with wheels for the movement of said shelf unit, characterized in that it comprises actuation means which are arranged externally with respect to the useful loading space of said shelf unit, said actuation means being rigidly fixed to the mutually opposite outer walls of the shorter sides of the framework and running from one shorter side to the other of said framework, below a first usable shelf of said shelf unit.

[0020] Further characteristics and advantages of the invention will become apparent from the following detailed description of a preferred embodiment of the shelf unit according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic perspective view of the shelf unit according to the invention, illustrating the location of the wheels; and

Figure 2 is a schematic perspective view of the actuation device of the shelf unit according to the invention.

[0021] With reference to the above figures, the shelf unit according to the invention, generally designated by the reference numeral 1, comprises a supporting framework which is constituted by a plurality of vertical posts 2 which constitute a frame for the shelf unit and to which the side walls 3 of the shelf unit and the shelves, not shown in the figures, are furthermore bolted.

[0022] The posts 2 are arranged along the shorter side of the shelf unit and are connected one another by a transverse element 4 which internally accommodates at least two wheels for the translatory motion of the shelf

unit along suitable tracks or rails provided at the floor on which the shelf unit stands.

[0023] The transverse element 4 is a box-like body inside which the wheels 5 are arranged longitudinally and are pivoted thereto.

[0024] In this manner, the wheels are arranged so that they occupy substantially no useful space inside the posts 2, i.e., in the position in which the shelves of the shelf unit are installed.

[0025] The posts 2 arranged along the shorter sides of the shelf unit are further connected by means of cross-members 6 which contribute to the formation of the framework of the shelf unit.

[0026] The rotation axis of the wheels is therefore parallel to the longer side of the shelf unit, i.e., to the cross-members 6.

[0027] The device for actuating the shelf unit, which allows to eliminate the transmission shaft of conventional shelf units and therefore to fully eliminate the base, is now described with reference to Figure 2.

[0028] In detail, Figure 2 is a view of an actuation device of the manual type, but the illustrated configuration can also be perfectly adapted to motorized actuation, in which case instead of a handwheel 7, shown in Figure 2, there is an electric motor.

[0029] The actuation device provides for a first actuation element 8 which is constituted by a chain which connects the handwheel 7 to a pinion 9 which supports a pinion 10 coaxial thereto and having a smaller diameter.

[0030] The chain 8 therefore transmits the motion from the handwheel 7 to the pinions 9 and 10.

[0031] There are also second and third actuation elements, designated by the reference numerals 11 and 12 respectively. A plurality of guiding wheels are provided at the lateral surface of the shelf unit 1 and specifically at the shorter side of said shelf unit.

[0032] Said wheels are mounted in a staggered arrangement, as described in detail hereinafter.

[0033] In particular, for the actuation element 11, which is advantageously provided by means of a first traction chain, there are three wheels, designated by the reference numerals 13, 14 and 15, at one side of the shelf unit, and wheels 16, 17 and 18 provided at the opposite side.

[0034] The chain 11 runs around said two sets of three wheels.

[0035] The wheels 13 and 14 are arranged so that their rotation axis is parallel to the longer side of the shelf unit, while the wheel 15 is arranged so that its rotation axis is parallel to the posts 2 of the shelf unit.

[0036] On the opposite side, the wheels 16 and 18 are arranged so that their rotation axis is parallel to the longer side of the shelf unit and the wheel 17 is arranged so that its rotation axis is parallel to the posts 2.

[0037] In practice, the chain 11 is fixed to the floor at one end designated by A, then winds around the wheel

13 and around the pinion 10, is guided around the wheel 14 and the wheel 15, and then crosses longitudinally the shelf unit 1 and reaches the opposite end, where it winds around the wheel 17, the wheel 16, the wheel 18 and is then fixed to the floor in the point designated by B.

[0038] The chain 11 is therefore fixed to the floor in two points A and B which are arranged diagonally with respect to the longitudinal extension of the shelf unit.

[0039] Likewise, the second actuation element 12, also conveniently constituted by a second traction chain, is fixed to the floor at a point C and then wind around two further three-wheel sets which are also arranged on the two opposite sides of the shelf unit.

[0040] In particular, there are provided wheels 20, 21 and 22 at one side of the shelf unit and wheels 23, 24 and 25.

[0041] The chain 12 then winds around the wheel 20, is guided around the pinion 10, returns around the wheel 21, winds around the wheel 22 and is then guided at the side of the shelf unit, where it winds around the wheel 23, the wheel 24, the wheel 25 and is then fixed to the floor at the point D.

[0042] Like the two previous three-wheel sets, the wheels for the chain 12, owing to the position of the wheels 20, 21 and 24, 25, have a rotation axis which is parallel to the longer side of the shelf unit, while the wheels 22 and 23 have a rotation axis which is parallel to the posts 2 of the shelf unit, like the wheels 15 and 17 described earlier.

[0043] In practice, for each chain there are, for each side of the shelf unit, two wheels which allow the connection of the chain between the point that is fixed to the floor and the pinion actuated by the handwheel 7, and two wheels which allow to guide the chain from one side of the shelf unit to the other.

[0044] The wheels 13, 14 and 15 are respectively axially offset with respect to the corresponding wheels 20, 21 and 22 for the chain 12, so as to allow the chains to pass without hindrance.

[0045] This is provided in a similar fashion for the wheels of the opposite side.

[0046] The above described configuration is the optimum configuration for moving the shelf unit.

[0047] However, it is possible to provide a simpler configuration and still achieve adequate movement. In practice, it is sufficient to provide, in addition to the actuation chain 8, at least one other chain whose ends are fixed to the floor but on the same side of the shelf unit.

[0048] In this case it is sufficient to provide, in addition to the pinion 10, at least one other wheel around which the chain winds.

[0049] In practice, again with reference to the numerals used in Figure 2, the chain 11 would wind, from the fixed point A, around the wheel 13, wind around the pinion 10 and then be guided toward the floor again, at a fixed point.

[0050] In this way it is possible to move the shelf unit

by using a single actuation chain arranged on a single side of said shelf unit.

[0051] The use of a second chain, again arranged on a single side of the shelf unit, allows to produce movement in the opposite direction more easily, since the use of a single chain would require push operation in one direction instead of pulling operation, with consequent movement difficulties.

[0052] Finally, the use of two actuation chains 11 and 12, as described earlier, both guided at the opposite side of the shelf unit, allows to achieve a more balanced movement of said shelf unit without forcing the use of additional centering wheels.

[0053] In practice, with reference to Figure 2, the operation of the shelf unit according to the present invention is as follows.

[0054] The rotation of the handwheel 7 to the right, i.e., clockwise, as shown in the figure, entails a movement of the shelf unit to the right also, taking up the chain 11 on the side of the fixed point B and releasing said chain at the fixed point A.

[0055] The situation is reversed for the chain 12.

[0056] Accordingly, a balanced movement of the shelf unit 1 occurs. The wheels 5 slide on tracks or rails 25 which have a slot 26 for containing said wheels.

[0057] The wheels instead slide freely on a flat track 27 at the side that lies opposite to the wheels that slide in the slot 26. If instead the longer side of the shelf has considerable dimensions, it is possible to provide a similar track 25 with a similar slot 26 also for the wheels 5 arranged at the opposite side with respect to the wheels that run in the slot 26, so as to keep the shelf unit more guided during its movement.

[0058] The shelf unit thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept. Thus, for example, said chains can be replaced with a plastics or metal belt or in any case by any other element suitable to apply traction. All the details may be replaced with other technically equivalent elements.

[0059] In practice, the materials employed, so long as they are compatible with the specific use, as well as the dimensions, may be any according to requirements and to the state of the art.

[0060] The disclosures in Italian Patent Application No. MI98A001986 from which this application claims priority are incorporated herein by reference.

[0061] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A shelf unit on a movable base with improved actu-

ation, comprising a framework (2, 6) provided with wheels (5) for the movement of said shelf unit, characterized in that it comprises actuation means (7, 8, 9, 10, 11, 12) which are arranged externally with respect to the useful loading space of said shelf unit (1), said actuation means (8, 11, 12) being rigidly fixed to the mutually opposite outer walls of the shorter sides of the framework (2, 6) and running from one shorter side to the other of said framework, below a first usable shelf of said shelf unit (1).

2. The shelf unit according to claim 1, characterized in that said wheels are freely rotating wheels (5) and are accommodated in two mutually opposite box-like elements (4) which are part of the side walls of the shorter side of said shelf unit (1).
3. The shelf unit according to claim 1, characterized in that said actuation means (7, 8, 9, 10, 11, 12) provide for an actuation handwheel (7) which is connected to a first pinion (9) which coaxially supports a second pinion (10), at least one traction element (8, 11, 12) and a guiding wheel (13÷18, 20÷25) being provided for the actuation of said shelf unit (1), said at least one traction element (11, 12) being fixed to the floor at its two ends (A, B, C, D).
4. The shelf unit according to claim 3, characterized in that said second pinion (10) and said at least one wheel (13÷18, 20÷25) are pivoted to the outer lateral surface of the wall of the shorter side of said shelf unit (1).
5. The shelf unit according to one or more of the preceding claims, characterized in that said at least one traction element (11, 12) is constituted by a first traction chain (11) which is guided at the side of said shelf unit (1) that lies opposite the side on which said first pinion (9) is provided, the free end (A) of said chain being fixed to the floor in the opposite position with respect to the floor fixing point of the other end (B) of the chain (11).
6. The shelf unit according to one or more of the preceding claims, characterized in that said chain (11) is guided to the opposite side of said shelf unit at the base of said shelf unit (1).
7. The shelf unit according to one or more of the preceding claims, characterized in that it comprises a second traction chain (12) which is fixed to the floor at its ends (C, D), said second chain (12) forming a path which is similar to the path of said first chain (11), from one shorter side of said shelf unit (1) to the other.
8. The shelf unit according to one or more of the preceding claims, characterized in that it comprises, for

each traction chain (11, 12), an additional pair of guiding wheels (13÷18, 20÷25) for guiding around said second pinion (10) and for subsequent guiding to the opposite side of the shelf unit (1).

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9. The shelf unit according to one or more of the preceding claims, characterized in that said second chain (12) has one end (C) which is fixed to the floor at one side of the shelf unit (1) and another end (D) which is fixed to the floor at the opposite side of the shelf unit (1). 10
10. The shelf unit according to one or more of the preceding claims, characterized in that it provides for motorized actuation means for the actuation of said pinion (9) and of said second pinion (10). 15

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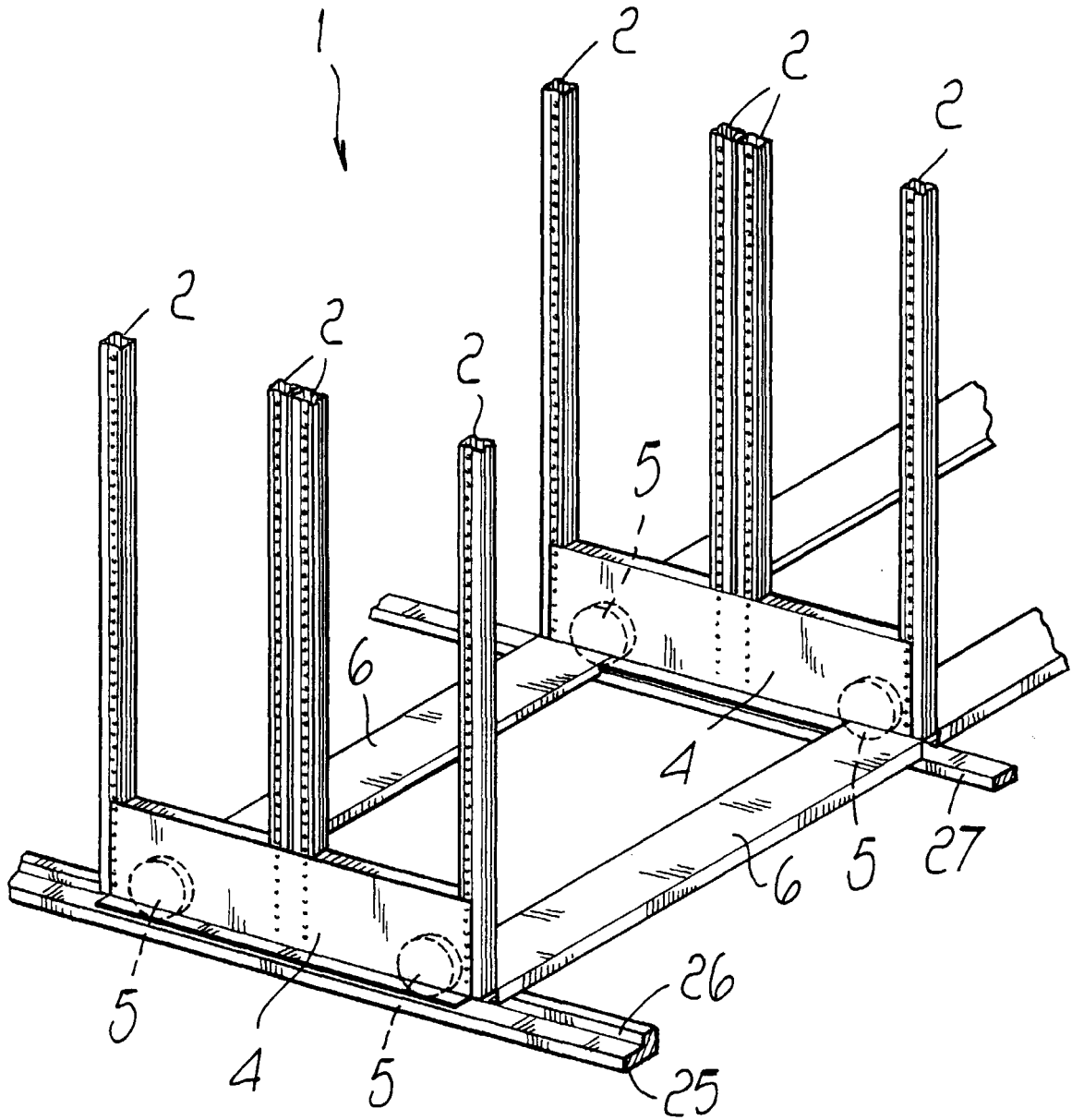


Fig. 1

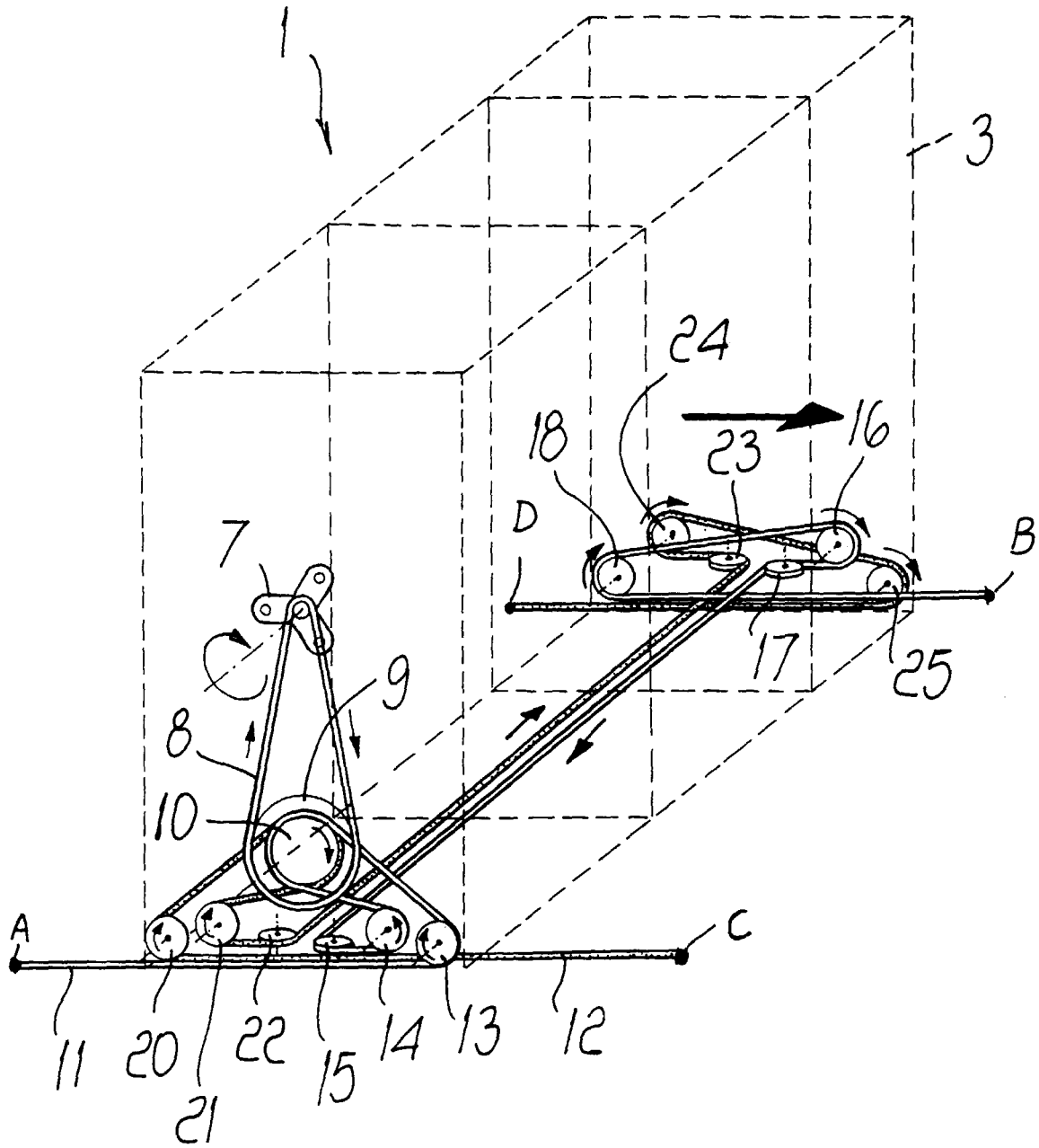


Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 99 11 6807

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)
A	DE 10 79 296 B (STEINICKE) * column 3, last paragraph - column 5, paragraph 3; figure 1 * ---	1	A47B53/02
A	DE 94 17 022 U (POHLSCHRÖDER GMBH & CO.) 15 December 1994 (1994-12-15) * claim 1; figures 1,3 * ---	1-3	
A	CH 580 524 A (FORSTER FOCO AG) 15 October 1976 (1976-10-15) * column 1, paragraph 3 - paragraph 4; figure 2 * * column 2, paragraph 3 * ---	1,5	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47B
Place of search THE HAGUE		Date of completion of the search 22 December 1999	Examiner Jones, C
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 99 11 6807

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22-12-1999

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