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(71) Applicants:
- **Soremartec S.A.**
  2632 Findel (LU)
  Designated Contracting States:
  AL AT BE BG CH CY CZ DK EE ES FI FR GB GR HR HU IE IS LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
- **Ferrero S.p.A.**
  12051 Alba (Cuneo) (IT)
  Designated Contracting States:
  IT
- **Ferrero Offene Handelsgesellschaft m.b.H.**
  35260 Stadtallendorf (DE)
  Designated Contracting States:
  DE

(72) Inventor: **Canuto, Franco**
12050 Racca di Guarene (Cuneo) (IT)

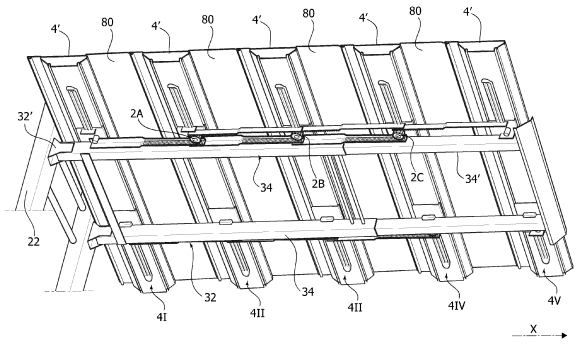
(74) Representative: **Frontoni, Stefano**
c/o Buzzi, Notaro & Antonielli d'Oulx S.r.l.
Via Maria Vittoria, 18
10123 Torino (IT)

(54) Display unit with pinion-and-rack mechanism

(57) A shelf for multi-shelf display units, of the type comprising an extendable resting surface (S) for articles to be displayed,
the shelf comprising:
- a frame (32) provided with means for connection of the shelf to a supporting structure of said display unit; and
- a series of supporting elements (4I-4V) set in succession and together defining said extendable surface (S), wherein said elements are mounted on said frame so as to be mobile with respect to one another in a direction of extension (X) of said surface.

The shelf comprises means for guiding the movement of said supporting elements, which enable simple and continuous adjustment of the length of the aforesaid extendable surface (S).

FIG. 4



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Description

Field of the invention

[0001] The present invention relates to a shelf for multi-shelf display units, of the type comprising an extendable resting surface for the articles to be displayed, the shelf comprising:

- a frame provided with means for connection of the shelf to a supporting structure of the display unit;
- a series of supporting elements set in succession and together defining said extendable surface, said elements being mounted on said frame so as to be mobile with respect to one another in a direction of extension of said surface; and
- means for guiding the movement of said supporting elements.

[0002] A shelf of the type referred to above is, for example, described in the international patent application No. WO 2006/120468 A1.

Object and summary of the invention

[0003] The object of the present invention is to improve the above type of shelf known in the art, rendering it more functional as regards its modality of extension/reduction, and maintaining in any case a structure that is as a whole simple and of contained cost.

[0004] The above object is achieved via a shelf having the characteristics recalled in Claim 1.

[0005] The claims form an integral part of the technical teaching provided herein in relation to the invention.

Brief description of the drawings

[0006] The invention will now be described purely by way of non-limiting example with reference to the annexed representations wherein:

- Figure 1 is a perspective view of a display unit comprising a plurality of shelves of the type described herein;
- Figure 2 is an axonometric view from beneath of a shelf of the type described herein;
- Figure 3 is an axonometric view from beneath of a shelf of the type described herein, mounted on the display unit, in a reduced condition thereof;
- Figure 4 is an axonometric view from beneath of the shelf of Figure 3 in extended condition thereof;
- Figures 5A-5E illustrate detailed views of guide elements of the shelf described herein;
- Figure 6 is an exploded view of a set of components of the shelf described herein;
- Figure 7 is a detailed side view of the shelf described herein;
- Figures 8A-8C illustrate different configurations of the guide means provided in the shelf described herein; and
- Figures 9A-9C represent the diagrams of speed of the guide means of Figures 8A-8C.

Detailed description of the invention

[0007] In the following description, the various specific details are illustrated aimed at an in-depth understanding of the embodiments. The embodiments may be provided without one or more specific details, or with other methods, components, materials, etc. In other cases, known structures, materials, or operations have not been described in detail so that various aspects of the embodiments will not be obscured.

[0008] The references used are merely for convenience and hence do not define the sphere of protection of the embodiments.

[0009] Illustrated in Figure 1 is a display unit 20 provided with a vertical structure 22 resting on the ground and designed to support a series of shelves 10 set on top of one another. The shelves 10 are produced according to the teachings of the present invention.

[0010] With reference to Figures 2 to 4, each shelf 10 has a frame 32 equipped with fixing means 32' for connecting the shelf to the structure 22 of the display unit. The above means will not be described in detail herein for simplicity of treatment but may in any case be of any type known in the art (for example, connection plates and bolts). Mounted on the frame 32 are a series of supporting elements 4I-4V, which together define a resting surface S for the articles to be displayed. Preferably, the elements 4I-4V have respective top sides 4' defining as a whole the resting surface S, which all lie substantially in one and the same plane.

[0011] With reference to Figure 1, on the surface S of the shelf 10 in the condition where it is mounted on the structure 22 there may be identified a first direction X, in which the depth or extension of the resting surface S may be identified, and a second direction Y, orthogonal to the first direction X, in which the width of said surface may be identified. The supporting elements 4I-4V are mounted on the frame 32 so as to be mobile with respect to one another in order to enable adjustment of one of the dimensions of the surface S. In various embodiments, as in the one illustrated, the elements 4I-4V are mobile with respect to one another in the direction X for regulating the depth of the resting surface S. It is in any case possible to envisage alternative embodiments in which the supporting elements 4I-4V are instead mobile in the direction Y for regulating the width of the shelf.

[0012] The shelf 10 described herein comprises guide means designed to enable the sliding movement of the elements 4I-4V on the frame 32.

[0013] As will be seen in detail, in the shelf described herein, the guide means are configured for determining a movement of the series of supporting elements 4I-4V such that the distance between all the elements is varied

simultaneously, in a constant condition where the elements remain equally spaced apart from one another. This modality of movement guarantees a simple and continuous regulation of the depth of the shelf. Moreover, whatever the extension of the shelf, the resting surface S is always defined by a homogeneous distribution of the supporting elements.

[0014] The guide means in question will be described hereinafter. They comprise a kinematic chain for transmission of motion characterized by a given diagram of the speed of the elements making up the chain.

[0015] Figures 8A, 8B and 8C illustrate some possible configurations of the above means, which differ from one another only as regards the number of "stages" comprised in the kinematic chain.

[0016] The guide means in question comprise:

- a first wheel 2A that can turn freely about an axis of rotation 2^{I};
- a first profile 4, extending in a direction parallel to the direction X, i.e., in the direction of extension of the shelf, and prearranged for coupling with the wheel 2A; and
- a second profile 6, which extends in a direction parallel to the direction X and is also prearranged for coupling with the wheel 2A,

wherein said wheel is in rolling coupling with both of the profiles 4 and 6, respectively, at opposite sides thereof with respect to the axis of rotation 2^{I}.

[0017] With reference to the embodiment of Figure 8A, the guide means illustrated therein, in addition to the characteristics referred to above, moreover comprise:

- a second wheel 2B that can turn freely about an axis of rotation 2^{II} fixed with respect to the second profile 6 and parallel to the axis 2^{I};
- a third profile 8, extending in a direction parallel to the direction X, and fixed with respect to the axis of rotation 2^{I} of the first wheel 2A, said third profile being prearranged for coupling with the second wheel 2B; and
- a fourth profile 12, extending in a direction parallel to the direction X, the fourth profile being prearranged for coupling with the second wheel 2B,

wherein the second wheel 2B is in rolling coupling with both of the profiles 8 and 12, respectively, at opposite sides thereof with respect to the axis of rotation 2^{II}.

[0018] In various embodiments, as in the one illustrated, the wheels 2A and 2B both have one and the same diameter. Moreover, in various embodiments, as in the one illustrated, the axes of rotation 2^{I}, 2^{II} lie in one and the same plane parallel to the direction of extension of the shelf. In various preferred embodiments, as in the one illustrated, the second and fourth profiles 6, 12 lie on one and the same ideal straight line parallel to the aforesaid plane of the axes of rotation, whereas the first and third profiles 4, 8 lie on another ideal straight line parallel to the above plane, and, with respect to the latter, opposite to the straight line of the profiles 6 and 12. In various embodiments, the profiles 4, 6, 8, 12 all have one and the same length.

[0019] The kinematic chain described above is such as to determine concatenated movements of the different elements that make it up, according to the diagram of the speed illustrated in Figure 9A. This diagram represents also the centres of instantaneous rotation (C.I.R.) of the wheels 2A and 2B and the straight line along which these centres are arranged.

[0020] With reference to the above diagram, it may be noted that the various elements of the chain have speeds different from one another. In particular, the difference between the speed of the fourth profile 12 and the linear speed of the second wheel 2B (i.e., of the second profile 6) is equal to the difference between the latter speed and the linear speed of the first wheel 2A (i.e., of the third profile 8). In operation of the chain, the relative position between the various elements - to be understood as distance between respective given points of the elements - consequently varies in a homogeneous way along the entire chain, i.e., the variation of the relative position between the fourth profile 12 and the second wheel 2B (i.e., the second profile 6) is equal to the variation of the relative position between the second wheel 2B (i.e., the second profile 6) and the first wheel 2A (i.e., the third profile 8). It follows that points equally spaced apart, mobile with respect to one another, belonging to the kinematic chain - for example, points belonging, respectively, to the fourth profile 12, the second wheel 2B (i.e., second profile 6), and the first wheel 2A (i.e., the third profile 8) - at the end of operation will be set at a greater or lesser distance from one another and will continue to be equally spaced apart, whatever the degree of movement of the kinematic chain. In this connection, see the two images of Figure 8A, representing, respectively, the guide means in a compact condition thereof (see Figure 8A at the top) and in an extended condition thereof (see Figure 8A at the bottom), from which it may be noted how the various elements of the above means remain equally spaced apart from one another in both of the conditions illustrated.

[0021] Figure 8B illustrates a further embodiment of the guide means, which, in addition to the elements described with reference to Figure 8A, comprise:

- a third wheel 2C that can turn freely about an axis of rotation 2^{III} fixed with respect to the fourth profile 12 and parallel to the axis 2^{II};
- a fifth profile 14, extending in a direction parallel to the direction of extension X, and fixed with respect to the axis of rotation 2^{II} of the second wheel 2B, the fifth profile 14 being prearranged for coupling with the third wheel 2C; and
- a sixth profile 16, extending in a direction parallel to the direction X, said sixth profile being prearranged for coupling with the third wheel 2C, wherein the third

wheel 2C is in rolling coupling with both of the profiles 14, 16, at opposite sides thereof with respect to the axis of rotation 2^{III}.

[0022] Figure 9B illustrates the diagram of the speed of the elements making up the kinematic chain described above. Said diagram represents also the centres of instantaneous rotation (C.I.R.) of the wheels 2A, 2B and 2C and the straight line along which said centres are arranged. In a way similar to what has been described with reference to the embodiment of Figure 8A, it may be noted that the speed of the various elements of the chain are different from one another, and in particular that:

- the difference between the linear speed of the third wheel 2C (i.e., of the fourth profile 12) and the linear speed of the second wheel 2B (i.e., of the second and fifth profiles 6, 14) is equal to the difference between the linear speed of the second wheel 2B (i.e., of the second and fifth profiles) and the linear speed of the first wheel 2A (i.e., of the third profile 8); and
- the difference between the speed of the sixth profile 16 and the linear speed of the third wheel 2C (i.e., of the fourth profile 12) is equal to the difference between the linear speed of the third wheel 2C (i.e., of the fourth profile 12) and the linear speed of the second wheel 2B (i.e., of the second and fifth profiles 6, 14). In operation of the kinematic chain, the relative positions between the various elements consequently vary in a homogeneous way throughout the chain; i.e., the variation of the distance between the third wheel 2C (i.e., the fourth profile 12) and the second wheel 2B (i.e., the second and fifth profiles 6, 14) is equal to the variation of the distance between the second wheel 2B (i.e., the second and fifth profiles 6, 14) and the first wheel 2A (i.e., the third profile 8) and to the variation of the relative position between the sixth profile 16 and the third wheel 2C (i.e., the fourth profile 12). The guide means of Figure 8B hence have the same properties and functions as those of Figure 8A.

[0023] In various embodiments, as in the one illustrated, the wheels 2A, 2B, 2C all have one and the same diameter. Moreover, in various embodiments, as in the one illustrated, the axes of rotation 2^{I}, 2^{II}, 2^{III} lie in one and the same plane parallel to the direction of extension of the shelf. In various preferred embodiments, as in the one illustrated, the second, fourth, and sixth profiles 6, 12, 16 lie on one and the same ideal straight line parallel to the aforesaid plane of the axes of rotation, whereas the first, third, and fifth profiles 4, 8, 14 lie on another ideal straight line parallel to the aforesaid plane, and, with respect to the latter, opposite to the straight line of the profiles 6, 12 and 16. In various embodiments, the profiles 4, 6, 8, 12, 14, and 16 all have one and the same length.

[0024] In general, in the kinematic chains of the two embodiments illustrated above it is possible to identify individual "stages", which are defined by each wheel and the two respective profiles that engage it, and the connections between the individual "stages", which are configured so as to render the axis of the wheel of the previous stage fixed with respect to the profile on which the wheel of the next stage advances, and to render the profile that runs on the wheel of the previous stage fixed with respect to the axis of the wheel of the next stage.

[0025] Within each individual "stage" there is an increase of speed between the wheel and the profile that runs thereon, which is due to the rolling coupling between the wheel and the profile. This increase is of one and the same value for all the stages in so far as their respective wheels are all of one and the same diameter. The speed of the wheel of the first stage has then a value equal precisely to the increase of speed generated within the individual stages.

[0026] Moreover, thanks to the type of connection referred to above, the "stages" are concatenated; i.e., the increase of speed within each individual stage is also transmitted to the stage that follows, and so forth up to the last stage so that the speed at output from the individual stage is the result of the sum of all the increases of speed generated in the previous stages, plus the speed of the first wheel.

[0027] It follows, as has already been seen above with reference to Figures 8A and 8B, that operation of the kinematic chain generates one and the same increase of speed that is repeated always equal to itself from each element of the chain to the next, throughout chain and hence one and the same variation of relative position and/or distance between the various elements that make it up.

[0028] In the shelf described herein, the supporting elements 4I-4V are associated to the guide means in question so as to exploit the properties thereof referred to above.

[0029] In particular, in various embodiments, the supporting elements 4I-4V are connected so as to be arranged equally spaced apart to the various elements making up the kinematic chain of the guide means. From what has been said above, in the operation of these means the supporting elements 4I-4V are thus subjected to a simultaneous movement of mutual recession or approach, in any case remaining always equally spaced apart from one another. This movement generates as a whole extension or reduction of the surface of the shelf.

[0030] The guide means in question can be reproduced with any desired number of "stages", according to the type of shelf for which they are designed or to the number of mutually mobile supporting elements that it presents. Figure 8C illustrates guide means having a kinematic chain with just one stage, for example for a shelf formed by three supporting elements. Figure 9c illustrates the diagram of the speed thereof.

[0031] There now follows a detailed description of the shelf according to the embodiment illustrated in Figures

2 to 7 in order to illustrate an example of how the supporting elements 4I-4V can be associated to the guide means described above. It should be noted that the shelf in question has guide means that reproduce the configuration illustrated in Figure 8B. In any case, it is clear that the teachings appearing in what follows may be reproduced for any other configuration of the guide means, for example the ones illustrated in Figures 8A and 8C.

[0032] The shelf 10 illustrated in Figures 2 to 7 has a total number of five supporting elements, from 4I to 4V, mounted in mutual succession and mobile with respect to one another on the frame 32 of the shelf. The frame 32 comprises a telescopic guide 34 (see Figures 3 and 4), the fixed part of which is prearranged for being connected via the fixing means 32' of the frame to the vertical structure of the display unit, whereas the mobile part 34' is connected to the last supporting element 4V. In various preferred embodiments, as in the one illustrated, the frame comprises two telescopic guides 34 set parallel.

[0033] In various embodiments, as in the one illustrated in the figures, the supporting elements 4I-4V of the example of embodiment of Figures 2 to 7 are made as elongated tubular elements, the longitudinal direction of which is oriented, in the condition where the various elements are mounted, in a direction transverse with respect to the principal direction of extension of the shelf. With reference to Figure 7, the elements 4I-4V each have a top side 4', which defines the resting surface S of the shelf, and a bottom side forming the base 4", which is associated to the guide means.

[0034] The guide means comprise a first guide element 52 (see Figure 5A), which is fixed to the fixed part of the telescopic guide and on which there is in turn fixed the first supporting element 4I of the shelf. Provided on the first guide element is the first profile 4, which extends towards the last supporting element 4V.

[0035] The guide means comprise a second guide element 54 (see Figure 5B), fixed on which is the second supporting element 4II and mounted on which in a freely rotatable way is the first wheel 2A. Likewise provided on the second guide element 54 is the third profile 8, which extends, with respect to the first wheel 2A, towards the last supporting element 4V.

[0036] The guide means moreover comprise a third guide element 56 (see Figure 5C), fixed on which is the third supporting element 4III and mounted on which in a freely rotatable way is the second wheel 2B. Likewise provided on the third guide element 56 are the second profile 6 and the fifth profile 14, which extend on opposite sides with respect to the second wheel 2B, the second profile 6 towards the first supporting element 4I, the fifth profile 14 towards the last supporting element 4V. The guide means further comprise a fourth guide element 58 (see Figure 5D), fixed on which is the fourth supporting element 4IV and mounted on which in a freely rotatable way is the third wheel 2C. Provided on the guide element 58 is the fourth profile 12, which extends, with respect to the third wheel, towards the first supporting element 4I.

[0037] Finally, the guide means comprise a fifth guide element 62 (see Figure 5E), fixed on which is the fifth supporting element 4V, and provided on which is the sixth profile 16. The fifth guide element is anchored to the mobile part of the telescopic guide 34.

[0038] In various embodiments, as in the one illustrated in Figures 5A to 5E, each of the guide elements 52, 54, 56, 58 and 62 is preferably made of a single body, for example of polymeric material, on which it is possible to identify a respective attachment portion 52A, 54A, 56A, 58A, 62a, for fixing, for example via slotting (see in this connection, Figure 7), the guide element to the respective supporting element, and an arm 52B, 54B, 56B, 58B, 62B, defined on which is the respective profile for engagement of one of the wheels 2A, 2B and 2C. In various embodiments, the attachment portion of the guide elements that carry the wheels 2A, 2B, 2C envisages a perforated and internally threaded pin (see the pin 56' of Figure 6, which represents the guide element 56) mounted on which in a freely rotatable way is the single wheel, by means of a screw 57 that engages the threaded hole of the pin itself. In various embodiments, as in the one illustrated in Figures 5A to 5E, the arms 52B, 54B, 56B, 58B and 62B each have a respective substantially step-like portion 52B', 54B', 56B', 58B', 62B', designed to set the arm itself at a distance from the straight line common to the engagement profiles, in the stretch between the profile and the attachment portion, in order to determine, in this stretch, a space for receiving the arm of the adjacent guide element and thus enable a superposition of the arms.

[0039] The guide elements 52, 54, 56, 58 and 62 are set with respect to one another so as to reproduce the kinematic chain illustrated in Figure 8B. In particular, the various guide elements are set with respect to one another so that the first wheel 2A is in rolling coupling with the first and second profiles 4, 6, the second wheel 2B is in rolling coupling with the third and fourth profiles 8, 12, while the third wheel 2C is in rolling coupling with the fifth and sixth profiles 14, 16. The reader is referred to the description of Figures 8 and 9 for the details.

[0040] Figures 3 and 4 illustrate the supporting elements 4I-4V and the guide elements 52-62 associated to them, respectively, in a reduced condition and in an extended condition of the shelf. Passage from the reduced condition to the extended condition is obtained by simply pulling the mobile structure of the frame 32, to which the supporting element 4V is anchored, or else by pulling the supporting element 4V directly, this entailing, as a result of the action of the guide elements 52-62, one and the same simultaneous distancing between each supporting element and the next, and hence total extension of the shelf.

[0041] In various embodiments, as in the one illustrated (see in this connection, Figure 7), present between each supporting element and the next is a preferably rigid strip or band 80, which covers at the top the space between the two elements in order to define globally a con-

tinuous resting surface S. In various preferred embodiments, this band is carried by one of the two elements, which is thus slidable with respect to the other, and moreover has a length that is greater than the distance between the individual supporting elements in the condition of maximum extension of the shelf. In this way, the surface S is continuous whatever the degree of extension of the shelf. In various preferred embodiments, the band 80 is slotted with an edge thereof within a longitudinal end groove of one of the two supporting elements and is, instead, set resting with its opposite edge on the surface 4' of the other supporting element (see in this connection, the example of Figure 7).

[0042] As an alternative to the bands 80, to provide a continuous resting surface S it is also possible to envisage a web that unrolls on the shelf according to the extension of the latter. In various embodiments, the surface S can present, instead, discontinuous, i.e., defined by just the sides 4' of the supporting elements.

[0043] As has been seen above, the supporting elements of the shelf are associated to the guide means described herein so as to exploit the kinematic properties thereof to provide a simple and continuous adjustment of the depth of the shelf. In the embodiments that have been illustrated, the guide means envisage a number of elements equal to the number of supporting elements that as a whole constitute the shelf. However, according to the type of application, it is also possible to envisage embodiments where the number of the guide elements differs from that of the supporting elements; for example, the guide elements are more numerous than the supporting elements, to provide, for example, configurations where the supporting elements are connected to non-consecutive guide elements in the kinematic chain or else configurations where the first guide element and/or the last guide element are/is without the supporting elements.

[0044] Finally, it should be noted that, in the example of embodiment of Figures 2 to 7, the wheels and the profiles prearranged for coupling therewith have respective toothed portions designed to mesh with one another. However, as an alternative it is possible to envisage any type of mated profiles that are able to guarantee a coupling between the various elements that is suited for the purposes that have been indicated. In various preferred embodiments, the guide means are provided with technopolymers in order to limit both the weight and the cost of the overall structure of the shelf. It is clear that the choice of the constructional materials is not binding in relation to the functional and structural characteristics of the shelves described herein.

[0045] The teachings provided in the present description may advantageously be reproduced also for other applications. In particular, the present invention also regards an extendable structure comprising:

- a supporting frame;
- a series of elements set in succession and mounted on said frame so as to be mobile with respect to one another in a direction of extension of said structure; and
- means for guiding the movement of said elements; wherein said guide means have a kinematic chain of transmission of the motion comprising:
- at least one wheel that can turn about an axis of rotation;
- a first profile extending in a direction parallel to said direction of extension, prearranged for coupling with said wheel; and
- a second profile extending in a direction parallel to said direction of extension, prearranged for coupling with said wheel;

wherein said wheel is in rolling coupling with said first and second profiles at opposite sides thereof with respect to said axis of rotation, and

wherein said elements are connected, respectively, to said axis of at least said first wheel and to said profiles, so that operation of said kinematic chain causes approach or distancing of said elements, keeping said elements equally spaced apart from one another.

[0046] In various embodiments, the guide means of the extendable structure have one or more of the characteristics described above with reference to Figures 2 to 9, and/or of the characteristics recalled in one or more of the ensuing claims.

[0047] The extendable structure referred to above can advantageously be integrated in any machine, system, or construction.

[0048] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to what has been illustrated herein purely by way of non-limiting example, without thereby departing from the scope of the invention, as defined by the annexed claims.

Claims

1. A shelf for multi-shelf display units, of the type comprising an extendable resting surface (S) for the articles to be displayed,
the shelf comprising:

- a frame (32) provided with means (32') for connection of the shelf to a supporting structure of said display unit;
- a series of supporting elements (4I-4V) set in succession and together defining said extendable surface, wherein said elements are mounted on said frame so as to be mobile with respect to one another in a direction of extension (X) of said surface; and
- means for guiding the movement of said supporting elements;

said shelf being **characterized in that**:

said guide means present a kinematic chain for transmission of motion that comprises:

- at least one wheel (2A, 2B, 2C) that can turn about an axis of rotation (2^{I}, 2^{II}, 2^{III});
- a first profile (4) extending in a direction parallel to said direction of extension, prearranged for coupling with said wheel; and
- a second profile (6) extending in a direction parallel to said direction of extension, prearranged for coupling with said wheel;

wherein said wheel (2A) is in rolling coupling with said first and second profiles (4, 6) at its opposite sides with respect to said axis (2^{I}), and
wherein said supporting elements (4I-4V) are connected, respectively, to said axis of said at least one wheel and to said profiles so that a pulling action exerted on said series of supporting elements (4I-4V) in a condition where they are set close to one another causes distancing of said supporting elements, keeping said elements equally spaced apart from one another.

2. The shelf according to Claim 1, wherein said wheel is a first wheel (2A) that can turn about a first axis (2^{I}), said shelf comprising:

- a second wheel (2B) that can turn about a second axis of rotation (2^{II}) parallel to said first axis and is fixed with respect to said second profile (6);
- a third profile (8) extending in a direction parallel to said direction of extension (X) and fixed with respect to said first axis of said first wheel, said third profile being prearranged for coupling with said second wheel (2B); and
- a fourth profile (12) extending in a direction parallel to said direction of extension (X), said fourth profile being prearranged for coupling with said second wheel,

wherein said second wheel (2B) is in rolling coupling with said third and fourth profiles (8, 12) at its opposite sides with respect to said second axis (2^{II}).

3. The shelf according to Claim 2, comprising:

- a third wheel (2C) that can turn about a third axis of rotation (2^{III}) parallel to said first axis (2^{I}) and is fixed with respect to said fourth profile (12);
- a fifth profile (14) extending in a direction parallel to said direction of extension (X) and fixed with respect to said second axis (2^{II}) of said second wheel, said fifth profile being prearranged for coupling with said third wheel (2C); and
- a sixth profile (16) extending in a direction parallel to said direction of extension (X), said sixth profile being prearranged for coupling with said third wheel (2C),

wherein said third wheel is in rolling coupling with said fifth and sixth profiles (14, 16) at its opposite sides with respect to said third axis (2^{III}).

4. The shelf according to any one of Claim 2 or Claim 3, wherein said wheels (2A, 2B, 2C) are all of the same diameter.

5. The shelf according to any one of Claims 2 to 4, wherein said axes of rotation (2^{I}, 2^{II}, 2^{III}) lie in one and the same plane parallel to the direction of extension of the shelf.

6. The shelf according to Claim 5, wherein said second and fourth profiles (6, 12) lie on one and the same ideal straight line parallel to said plane, and wherein said first and third profiles (4, 8) lie on one and the same ideal straight line parallel to said plane and, with respect to said plane, opposite to said straight line of said second and fourth profiles (6, 12).

7. The shelf according to Claim 5, wherein said second, fourth, and sixth profiles (6, 12, 16) lie on one and the same ideal straight line parallel to said plane, and wherein said first, third, and fifth profiles (4, 8, 14) lie on one and the same ideal straight line parallel to said plane and, with respect to said plane, opposite to said straight line of said second, fourth, and sixth profiles (6, 12, 16).

8. The shelf according to any one of the preceding claims, wherein said profiles (4, 6, 8, 12, 14, 16) have substantially one and the same length.

9. The shelf according to any one of the preceding claims, wherein said frame comprises at least one telescopic guide (34), the fixed part of which is prearranged for being fixed, via said connection means, to said supporting structure of the display unit, whilst the mobile part (34") is connected to the last of said series of supporting elements (4I-4V).

10. The shelf according to any one of the preceding claims, wherein present between each supporting element and the next is a band (80), preferably rigid, which covers at the top the space between the two elements in order to define globally a continuous resting surface (S).

11. The shelf according to Claim 10, wherein said band (80) is carried by one of the two elements, being slidable with respect to the other, and moreover has

a length that is greater than the distance obtained between the individual supporting elements in the condition of maximum extension of the shelf.

12. The shelf according to any one of the preceding claims, wherein said at least one wheel is a gear, and said profiles have corresponding toothed portions for rolling coupling with said wheel.

FIG. 1

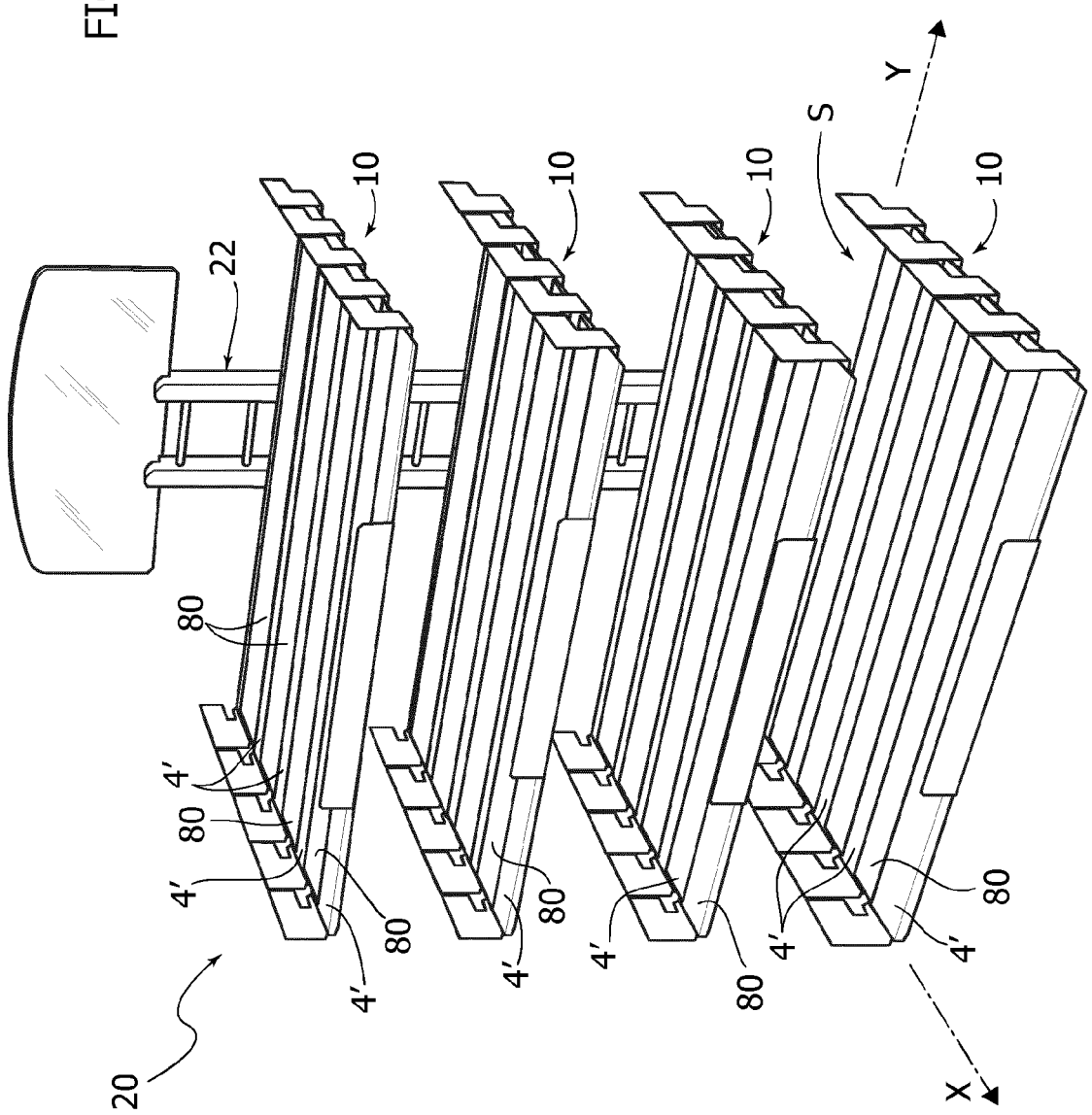


FIG. 2

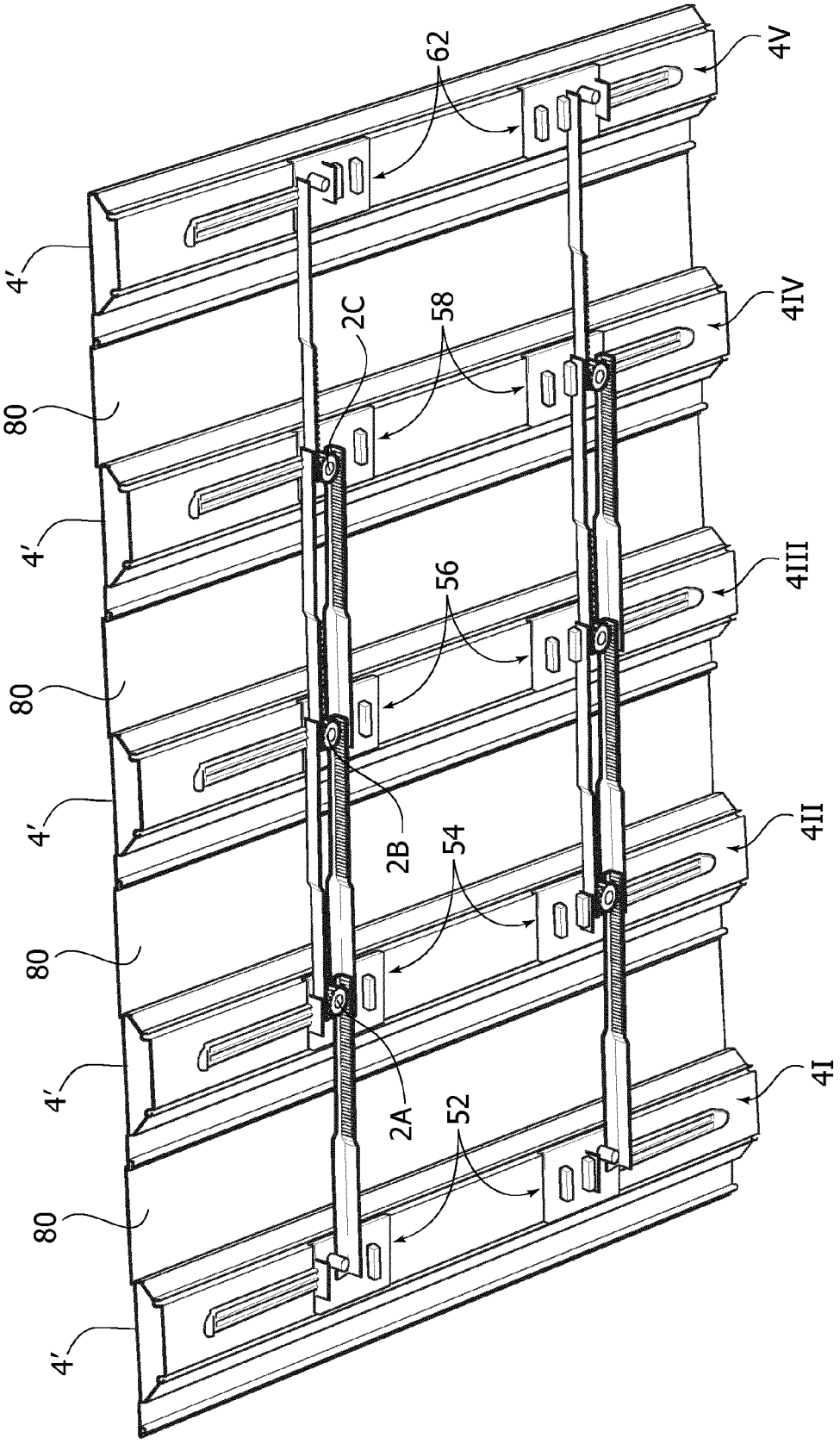


FIG. 3

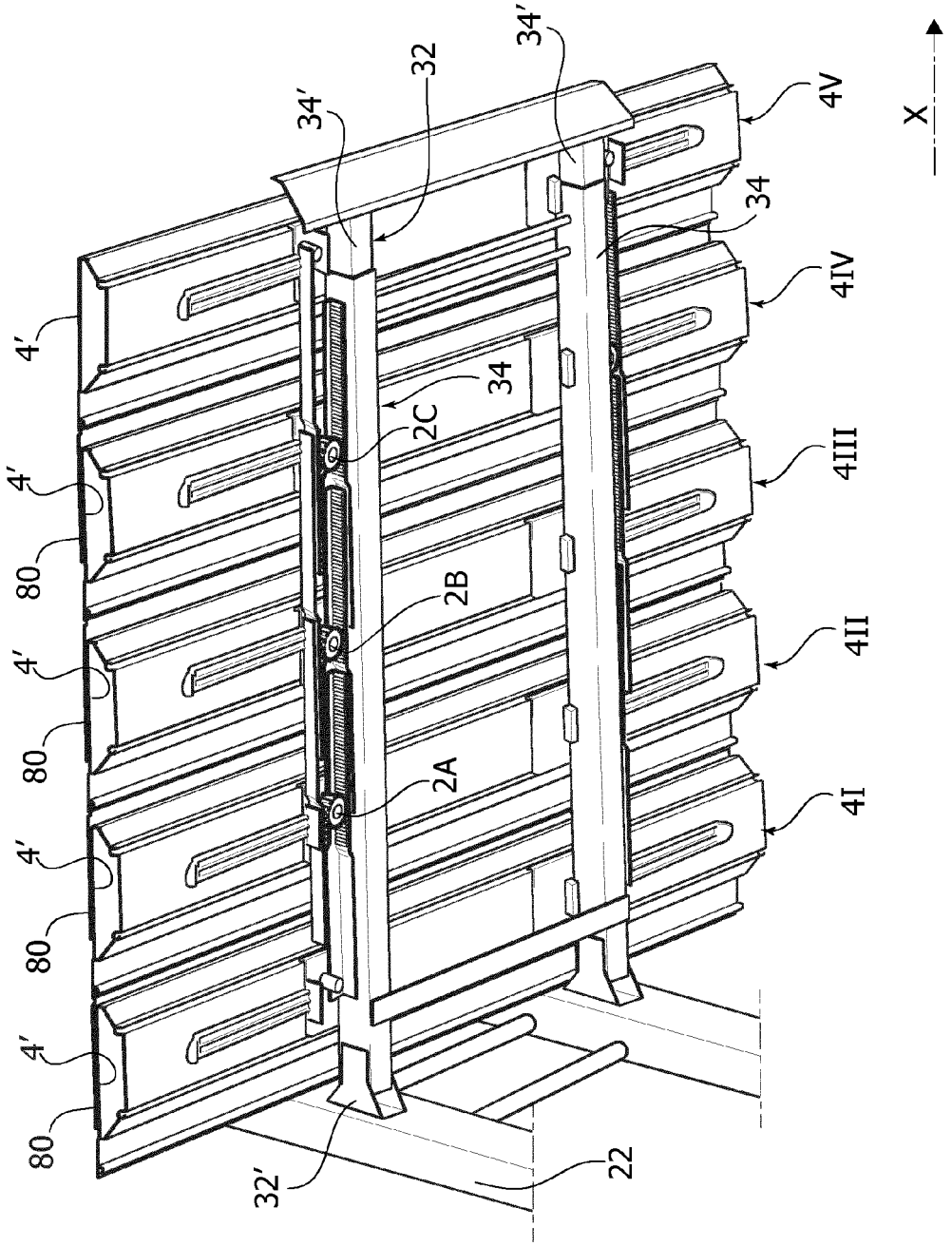


FIG. 4

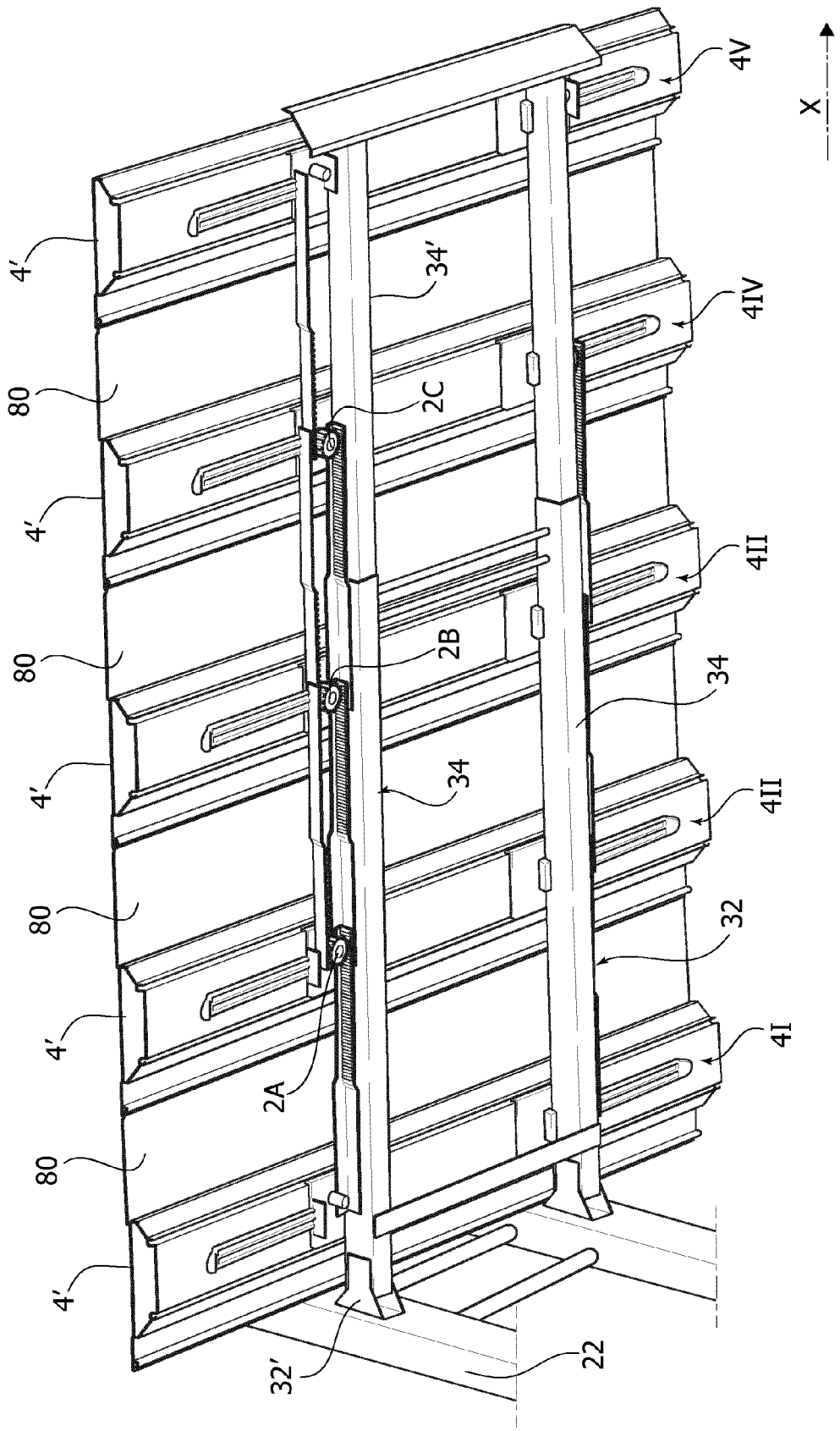


FIG. 5A

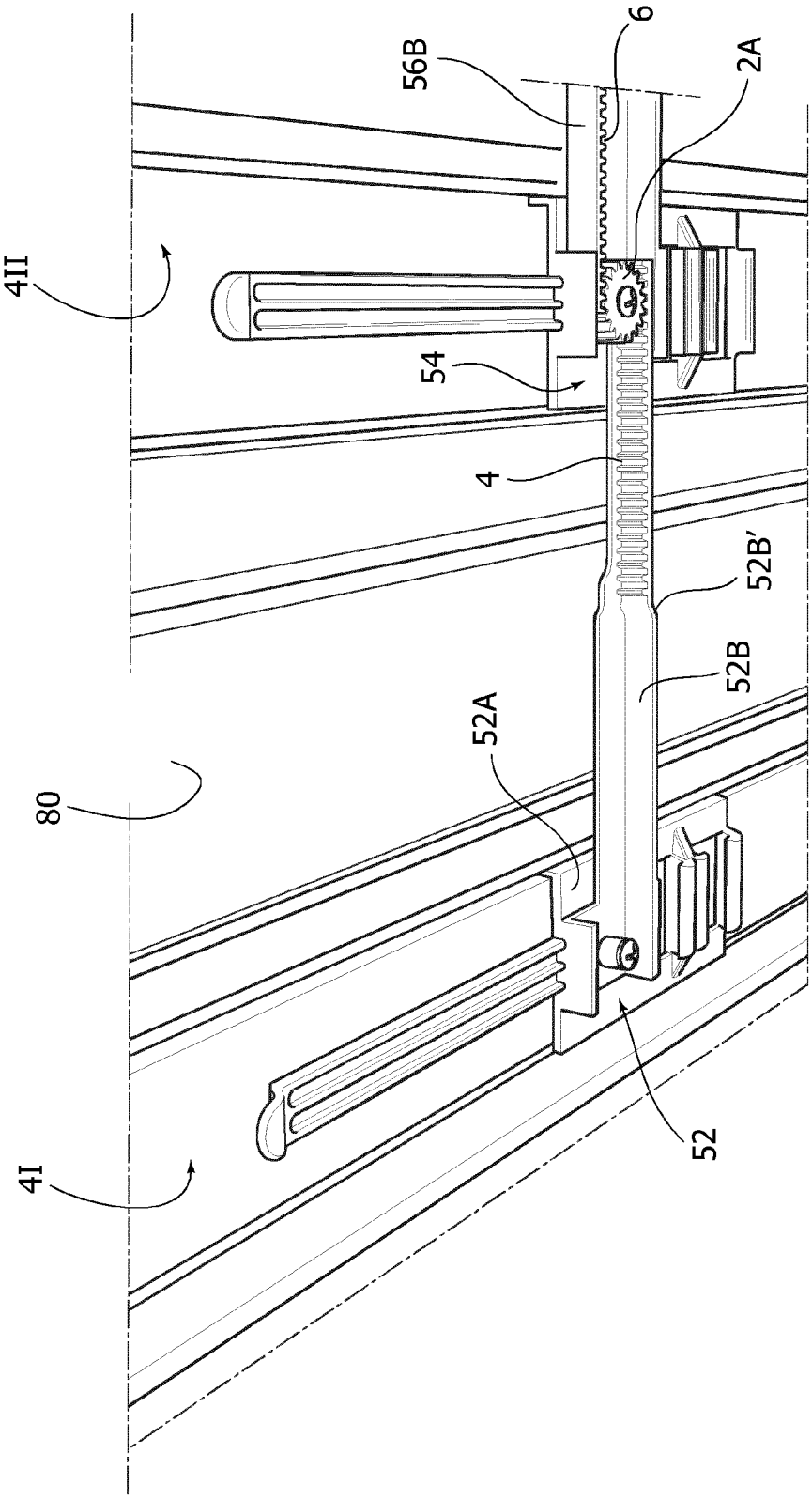


FIG. 5B

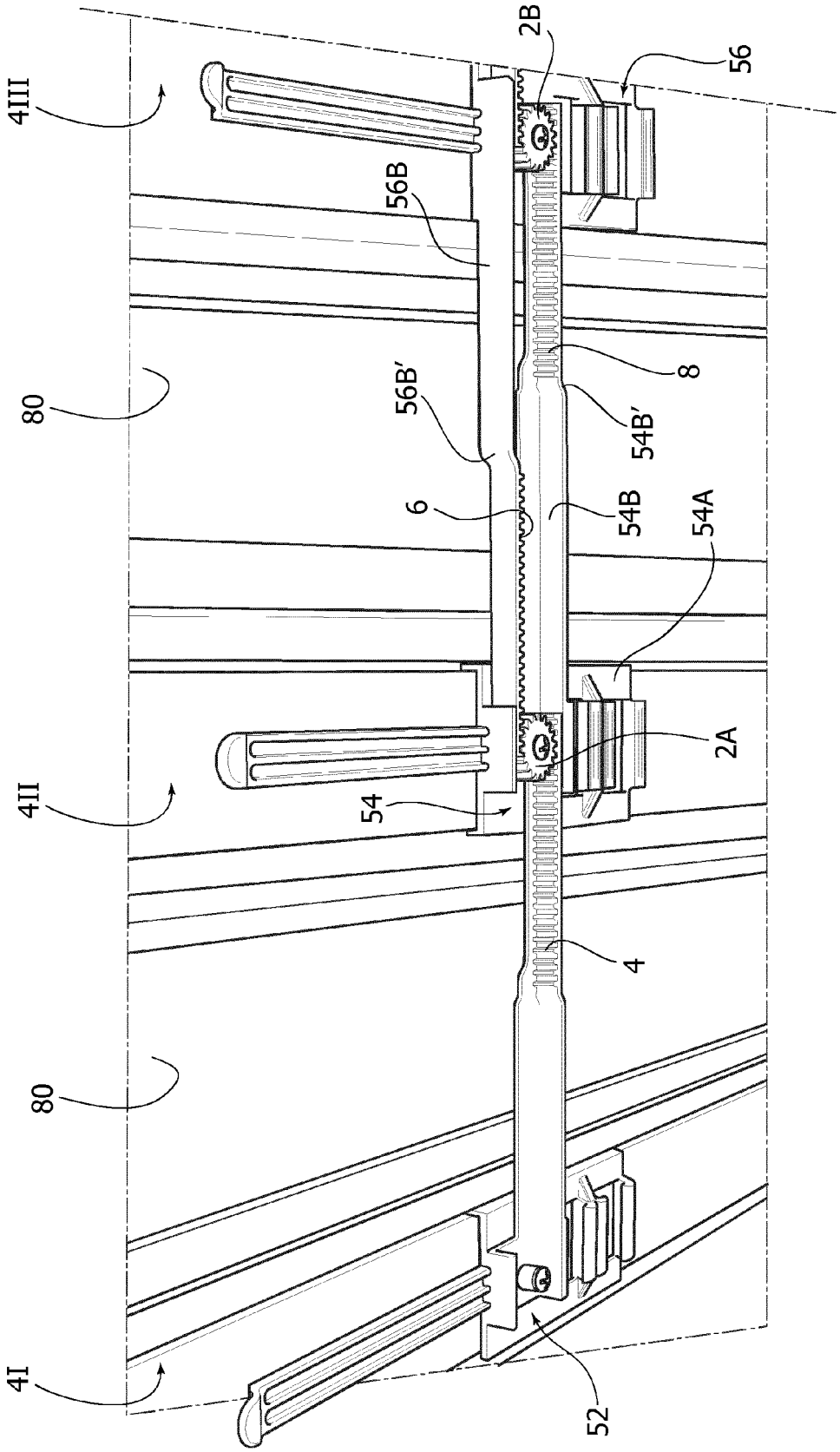


FIG. 5C

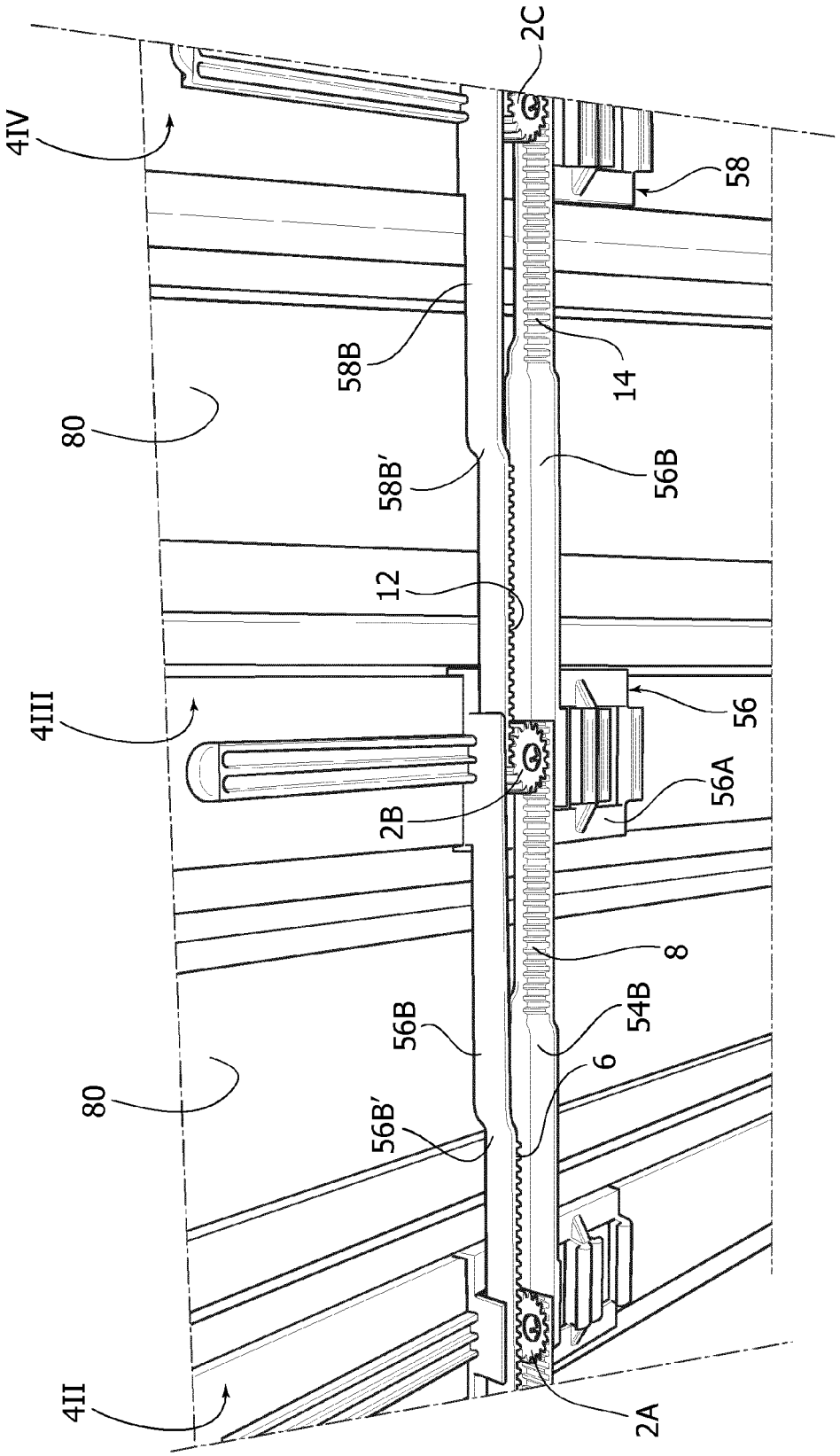

2C
4IV
58
58B
14
80
58B'
56B
12
4III
56
56A
2B
8
54B
56B
6
80
56B'
4II
2A

FIG. 5D

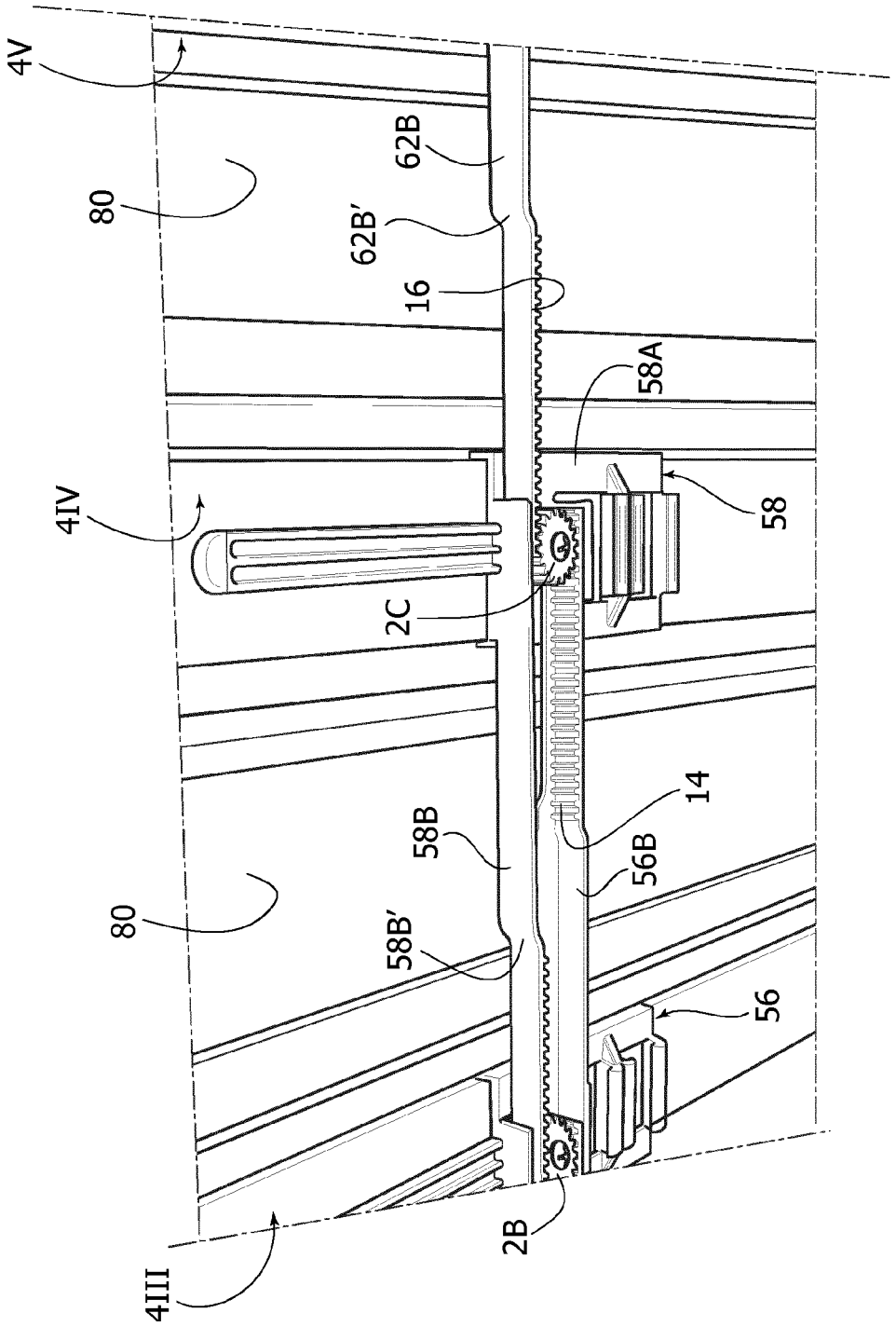


FIG. 5E

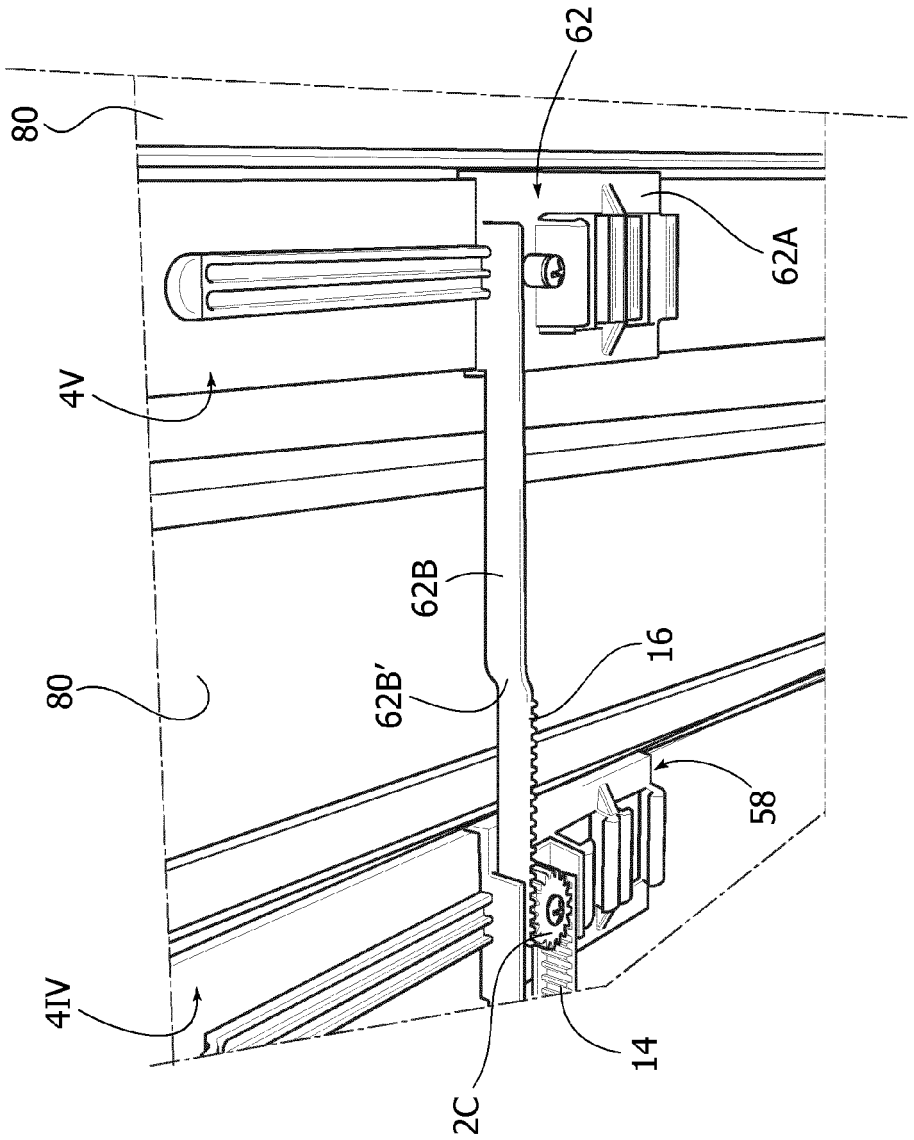


FIG. 6

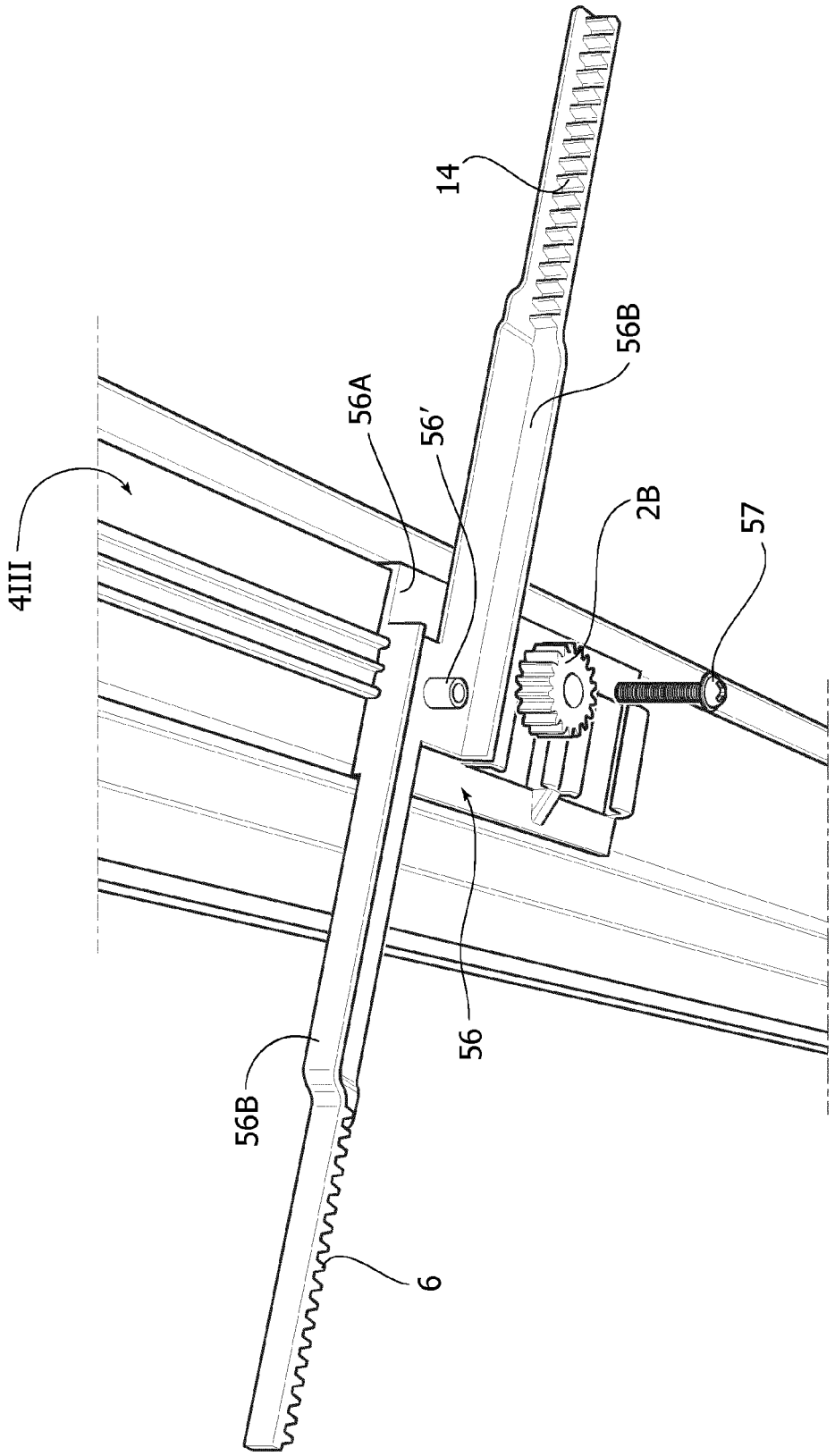
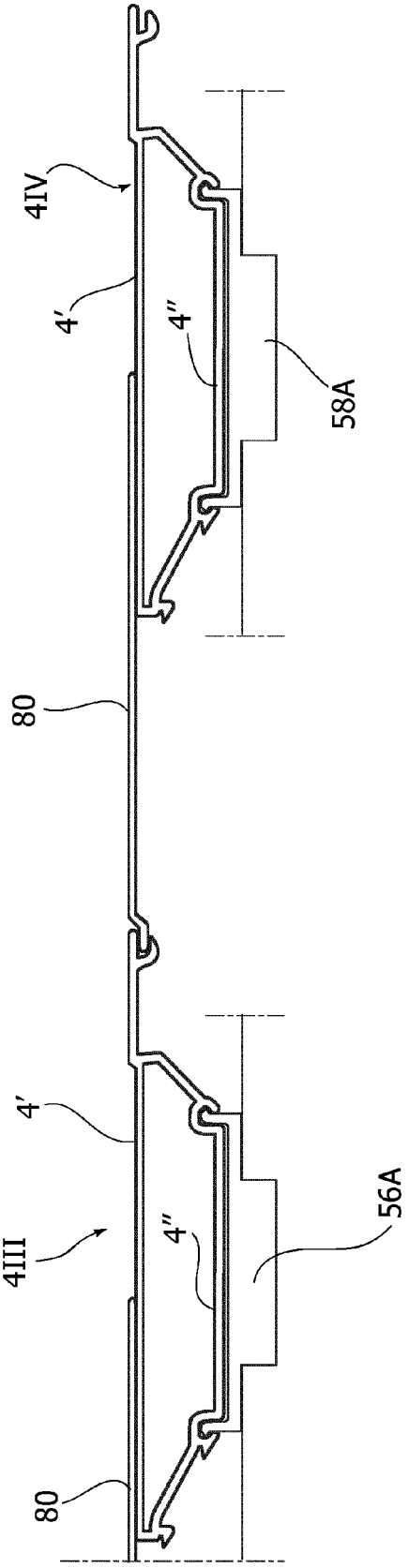


FIG. 7



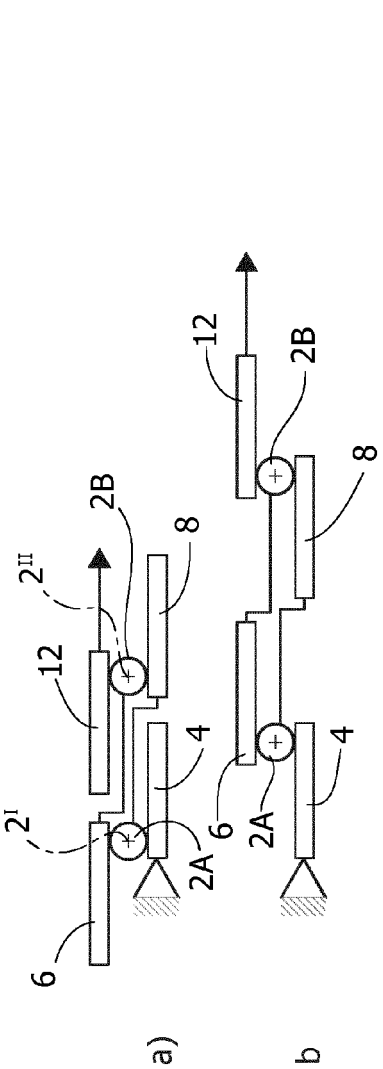


FIG. 8A

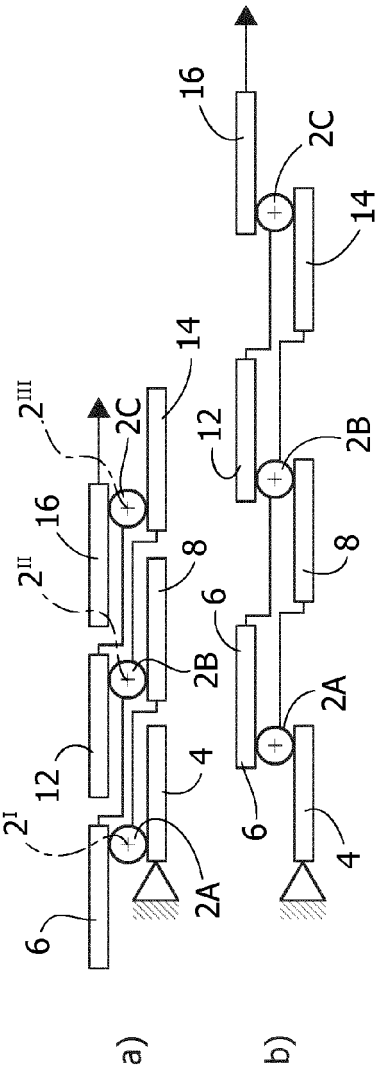


FIG. 8B

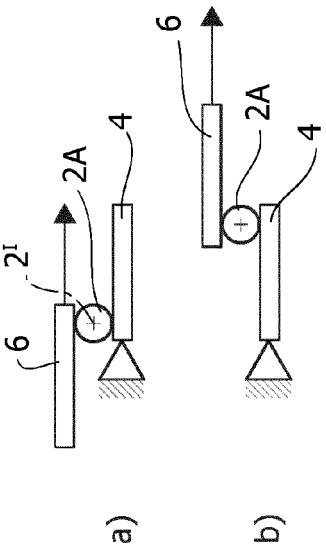


FIG. 8C

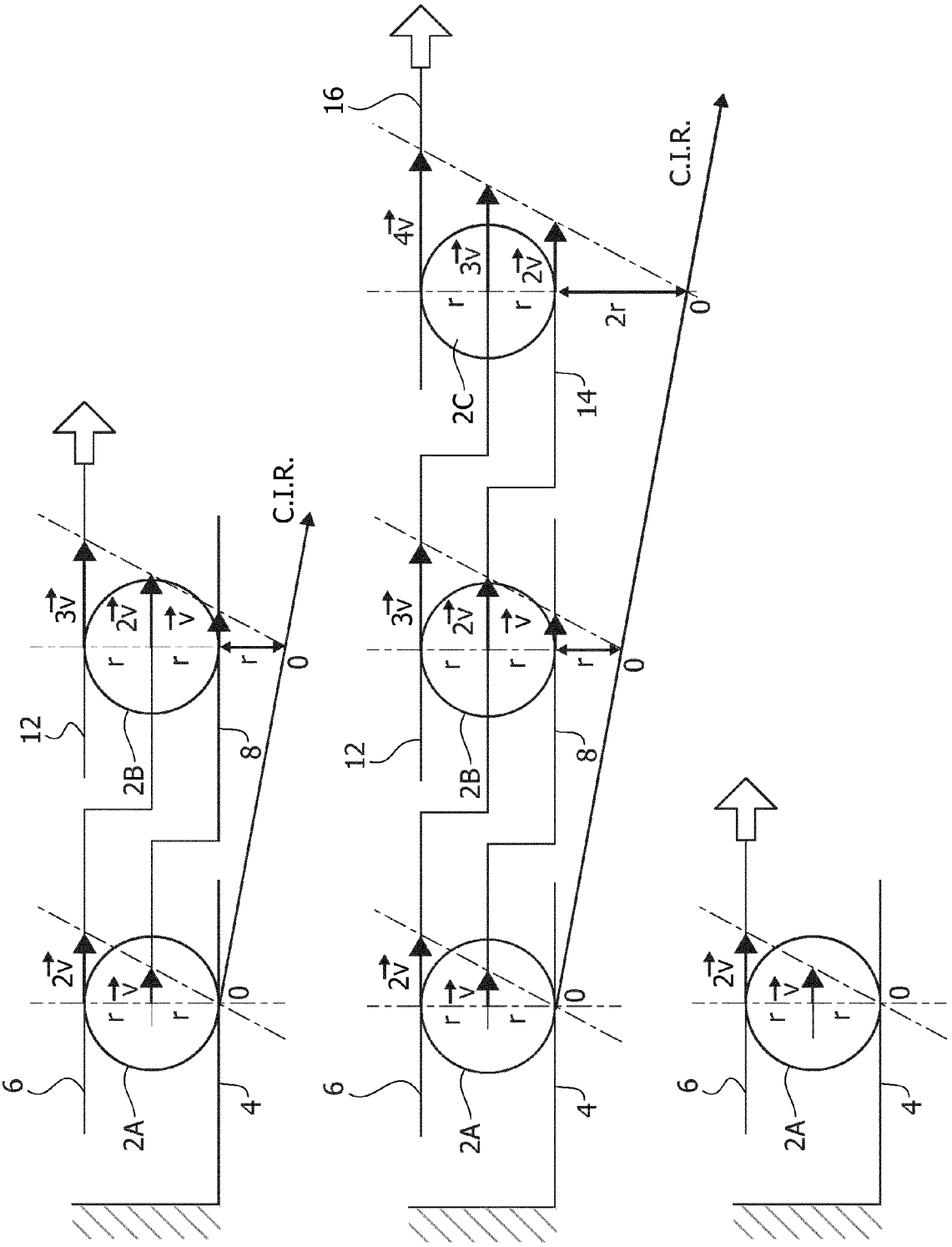


FIG. 9A

FIG. 9B

FIG. 9C

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EUROPEAN SEARCH REPORT

Application Number
EP 13 18 7945

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2006/120468 A1 (CADBURY SCHWEPPES PLC) 16 November 2006 (2006-11-16) * abstract; figures 1-5 * -----	1	INV. A47B45/00
A	DE 17 81 008 B (FREIMUTH JOACHIM) 31 May 1972 (1972-05-31) * figures 3,4 * -----	1	
A	WO 2011/069956 A1 (FOURNIER STEPHANE) 16 June 2011 (2011-06-16) * abstract; figures 1,3 * -----	1	
			TECHNICAL FIELDS SEARCHED (IPC) A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 November 2013	Tempels, Marco

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1

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11-11-2013

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