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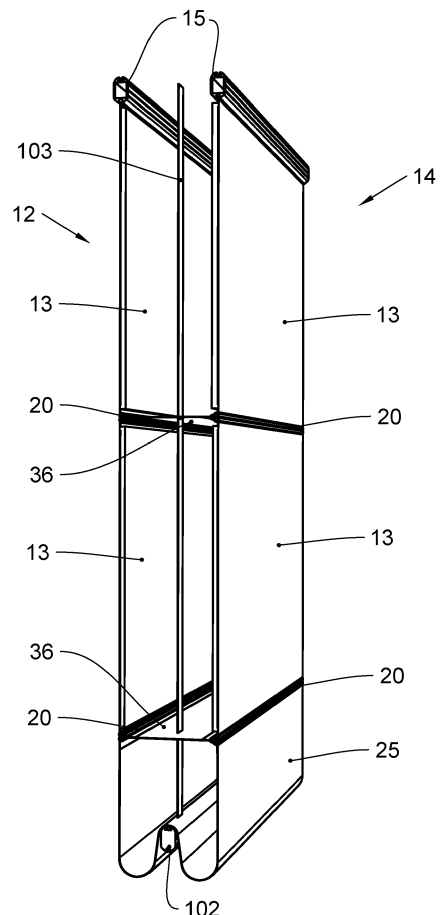
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(54) **PARTITION FOR USE IN AN ACOUSTIC PARTITION SYSTEM, ACOUSTIC PARTITION SYSTEM
COMPRISING SAID PARTITION AND A METHOD FOR ASSEMBLING SAID PARTITION**

(57) The invention relates to a partition (14) for use in halls, such as sports halls, comprising at least one pair of partition screens (12) comprising sound absorbing material, that are interconnected at a predetermined mutual distance by a series of strips (36) of sound insulating material essentially extending over the width of the partition screens.

Each partition screen (12) comprises two or more partition screen parts (13) that are arranged for releasable connection to form the partition screen. A series of strips (36) comprising sound insulating material span the distance between the partition screens (12). The partition further comprises a number of separate connecting elements (20) that are each arranged for releasably connecting two partition screen parts (13) and a strip (36), wherein the connecting elements have a general longitudinal shape and, in the assembled state, essentially extend in lateral direction of the partition screen (12).

Fig. 1



Description

[0001] The present invention relates to a partition for use in an acoustic partition system for sound control in halls, such as sports halls.

[0002] The acoustics in sport halls is known to give rise to complaints from users, especially from people who must work in such halls, such as trainers and teachers. To improve the acoustic characteristics of sports halls it is known to cover the walls, ceiling and floor with panels of sound absorbing material.

[0003] Most sports halls are provided with one or more partition systems to divide the sports hall into smaller sections. Unfortunately, the acoustic characteristics deteriorate significantly, as soon as the partition systems are closed. Particularly, when a middle part of the hall is closed with partition systems at two sides, a considerable reverberation time combined with flutter-echoes is observed in the middle part of the hall.

[0004] More specifically the present invention relates to a partition for use in an acoustic partition system comprising a partition carrier on which the partition is to be mounted and motorized moving means for moving the partition with respect to the partition carrier, wherein the partition comprises at least one pair of partition screens that are arranged at a predetermined mutual distance, wherein each partition screen comprises two or more partition screen parts, that are arranged for releasable connection to form the partition screen, a series of strips comprising sound insulating material that are arranged for releasable connection to the partition screens, such that, in the assembled state, the strips span the distance between the partition screens.

[0005] Such a partition is known from NL2018486 of the same applicant.

[0006] The known partition has a modular structure of acoustic chambers that are formed between the partition screen parts and the strips. The use of different materials for the partition screen parts results in different chambers with different acoustic characteristics, thus providing an instrument for detailed sound control. The modular structure of the partition thus allows for a wide variety of possibilities for composing the optimal acoustic characteristics of the partition system. Advantageously the known partition system can effectively full fill the noise standards for sports halls that are formulated as directives by several institutions, such as NOC NSF and ISA/Kiwa.

[0007] The invention has for its object to provide an improved partition for use in an acoustic partition system, such as the known partition system.

[0008] In order to achieve this object the partition according to the present invention further comprises a number of separate connecting elements that are each arranged for releasably connecting two partition screen parts and a strip, wherein the connecting elements have a general longitudinal shape and, in the assembled state, essentially extend in lateral direction of the partition screen.

[0009] The inventive connecting elements make mounting easier, thereby considerably reducing the mounting time of the partition according to the present invention.

5 **[0010]** Each component of the partition according to the present invention, including the inventive connecting elements, can be separately replaced for maintenance or repair which advantageously is cost saving.

10 **[0011]** All the components of the partition can be pre-fabricated and the partition can be assembled in the sports hall. The assembled partition can then be arranged on a partition carrier to form a completely new partition system. Advantageously the partition according to the invention is suitable for use in other known partition systems. The assembled partition can easily be arranged on an existing partition carrier to replace an existing partition.

15 **[0012]** In a first preferred embodiment of the partition according to the invention the connecting elements comprise a number of rails, each having a channel for receiving one of the outer ends of the partition screen parts or the strip. Advantageously the partition screen parts and/or the strip can be slid into the rails.

20 **[0013]** In a further preferred embodiment each connecting element comprises one or more kador rails having a kador channel for receiving a kador cord that is arranged on one of the partition screen parts or on the strip. Such a kador connection forms a reliable releasable connection. Preferably the kador channel has a general C-shape.

25 **[0014]** According to an elegant further elaboration of the first preferred embodiment one or more of the connecting elements comprises three kador rails that are attached to each other with outward facing channel openings. Preferably the channel openings are oriented at angles of essentially 120 degrees. Due to said preferred connecting elements the partition according to the invention is able to fold up neatly.

30 **[0015]** In a another preferred embodiment one or more of the partition screen parts comprise an inner layer of sound absorbing material and an outer layer of sound insulating material, wherein the outer layer and the inner layer are fixed to each other near outer ends of the partition screen part. Advantageously said preferred embodiment is easy to produce.

35 **[0016]** The outer layer of each partition screen part can be chosen separately and for instance may comprise perforations and/or may be made of reinforced material.

40 **[0017]** According to a practical preferred embodiment the partition according to the invention comprises two upper mounting beams that are to be arranged on the upper ends of the partition screens. Preferably each of the upper mounting beams comprises a channel, preferably a kador channel, for receiving an outer end of the partition screen parts. According to a further elaboration of the practical preferred embodiment the partition comprises one lower mounting beam to which the lower ends of the partition screens are to be connected. Advanta-

geously said practical preferred embodiment of the partition according to the invention is suitable to replace an entire partition of an existing partition system.

[0018] The invention also relates to a partition system comprising a partition according to the invention and a partition carrier on which the partition is to be mounted and motorized moving means for moving the partition with respect to the partition carrier.

[0019] In a preferred embodiment of the partition system the distance between the partition screens enlarges in the direction towards the partition carrier. This can be achieved by enlarging the width of the strips in the direction towards the partition carrier. Thus, room is created for the partition screens to fold up.

[0020] The invention further relates to a method of assembling a partition according to the invention comprising the steps of:

- a) Selecting a first partition screen part with specific acoustic characteristics;
- b) Selecting a second partition screen part with specific acoustic characteristics;
- c) Using a first connecting element to interconnect the second partition screen part to the first partition screen part to form a first partition screen;
- d) Selecting a strip;
- e) Connecting the strip selected in step d) to the first connecting element used in step c);
- f) Selecting a third partition screen part with specific acoustic characteristics;
- g) Selecting a fourth partition screen part with specific acoustic characteristics;
- h) Using a second connecting element to interconnect the fourth partition screen part to the third partition screen part to form a second partition screen;
- i) Connecting the strip selected in step d) to the second connecting element used in step h);
- j) Optionally repeating steps a) through i) with further partition screen parts, connecting elements and strips until the partition is finished.

[0021] The invention will be explained referring to the accompanying drawings in which

Figure 1 schematically shows a preferred embodiment of a partition according to the invention;
 Figure 2 schematically shows a partition system with the partition of figure 1 in cross section;
 Figure 3 schematically shows a part of a partition of figure 2 in more detail;
 Figure 4 schematically shows a detailed section of the partition of figure 3 with exploded parts; and
 Figure 5 schematically shows the partition of figure 1 in pulled up position; and

[0022] The figures 1-5 show a partition system 11 with a partition 14 according to the invention in a preferred embodiment that is intended for use in a sports hall. Fig-

ure 1 schematically shows the preferred embodiment of the partition 14 according to the invention. Figure 2 schematically shows the partition system 11 according to the invention in cross section.

[0023] The partition system 11 comprises a preferred embodiment of a partition 14 provided with a pair of partition screens 12 comprising sound absorbing material. The partition screens 12 are interconnected at a predetermined mutual distance and arranged on a partition carrier 100. The partition carrier 100 is provided with motorized moving means 104 for moving the partition 14 with respect to the partition carrier 100.

[0024] Each partition screen 12 comprises two or more partition screen parts 13, that are arranged for releasable connection to form the partition screen 12.

[0025] The partition 14 further comprises a series of strips 36 that are made of sound insulating material. The strips 36 are spaced apart in height direction of the partition 14. The lateral dimensions of the strips 36 are suitable to span the mutual distance between the partition screens 12. The longitudinal dimensions of the strips 36 preferably are essentially equal to the width of the partition screen parts 13.

In the assembled state of the partition shown in figure 2, the strips 36 span the distance between the partition screens 12 thereby dividing the space between the partitions screens 12 and forming acoustic chambers 10.

[0026] In the preferred embodiment the distance between the partition screens 12 enlarges in height direction of the partition 14. Consequently, the width of the strips 36 enlarges in height direction of the partition 14.

[0027] Figure 3 schematically shows a part of the partition 14 in more detail in cross section. Figure 4 schematically shows a detailed cross section of the partition 14 with exploded parts.

[0028] According to the invention, the partition 14 further comprises a number of separate connecting elements 20 that are each arranged for releasably connecting two partition screen parts 13 and a strip 36. The connecting elements 20 have a general longitudinal shape and, in the assembled state, essentially extend in lateral direction of the partition screens 13.

[0029] The connecting elements comprise a number of rails 21, each having a channel 22 for receiving the outer ends of the partition screen parts 13 and/or the strip 36. In the preferred embodiment shown, each connecting element 20 comprises one or more kador rails 21, each having a kador channel 22 for receiving a kador cord 23 that is arranged on one of the partition screen parts 13 and/or on the strip 36.

[0030] It is noted that in the relevant technical field the word "keder" is sometimes used as an alternative for "kador" and the word "tendon" can also be used as an alternative for "kador cord".

[0031] Preferably the kador channel 22 has a general C-shape cross section. In the preferred embodiment shown, the connecting elements 20 comprises three kador rails 21 that are attached to each other with outward

facing channel openings. Preferably the channel openings are oriented at angles α of essentially 120 degrees.

[0032] In the figures the longitudinal dimensions of the connecting elements 20 are shown to be essentially equal to the width of the partition screen parts 13 and the length of strips 36. However, depending on the width of the partition 11, it may be necessary to arrange a number of connecting elements 20 in line.

[0033] A suitable material for the connecting elements 20 is aluminium.

[0034] Figure 5 schematically shows the partition of figure 1 in pulled up position.

[0035] In the preferred embodiment shown the partition screen parts 13 comprise an outer layer 131 of sound insulating material. The outer layer may be modified to change its acoustic characteristics. One example of such a modification is the presence of perforations. The outer layer may also be modified to a specific use. One example of such a modification is the presence of reinforced material.

[0036] In the context of the present invention sound insulating material has a substantially closed, airtight structure that forms an obstruction for sound waves. An example of a suitable sound insulating material for use in the partition according to the invention is artificial leather.

[0037] In the preferred embodiment shown the partition screen parts 13 comprise an inner layer 132 of sound absorbing material, i.e. a material suitable for absorbing sound waves. An example of a suitable sound absorbing material for use in the partition according to the invention is PE wool.

[0038] The partition carrier 100 comprises a head shaft 101 and motorized moving means 104 to drive the shaft 101 to wind up respectively unwind pull bands 103 running from the head shaft 101 to a bottom mounting beam 102 of the partition 14 through openings present in the strips 36. It is noted that the surface of the strips 36 is substantially closed, apart from said openings.

[0039] In order to arrange the partition 14 according to the invention on the partition carrier 100, the partition 14 is further provided with two upper mounting beams 15. The mounting beams 15 are provided at an underside with a channel 152 suitable for receiving the outer ends of the partition screen parts 13. The channel 152 preferably corresponds to the channel 22 of the connection elements 20 and can receive a kador cord 23 of the partition screen parts 13. The mounting beams 15 are preferably provided at an upper side with a slot 153 for receiving a number of coupling elements. Suitable mounting elements, such as chains 105, can be used to mount the mounting beams 15 to the partition carrier 100 through the coupling elements.

[0040] Preferably an "adapter sheet" 25 is provided to connect the lowest connection elements 20 to the bottom beam 102. The adapter sheet 25 is preferably provided with outer ends that are arranged to cooperate with the connection elements 20. The adapter sheet is used to

adapt the height of the screens 12 of the partition 14 to the dimensions of the location where it is mounted.

[0041] The motorized moving means 104 drive the shaft 101 to wind up respectively unwind the pull bands 103 to pull up respectively let down the partition 14. During pulling up each partition screen part 13 moves upward and folds onto itself. In pulled up position the folded partition screen parts 13 of the partition 14 are arranged adjacently in vertical position under the head shaft 101, as can be seen in figure 5.

[0042] It is noted that a partition 14 can be provided with several types of chambers or modules 10 with different acoustic characteristics can be made based on the information disclosed herein. For instance, perforations can be provided in the outer layer 131 of a partition screen part 12. As another example the materials of the inner layer 132 of a partition screen part 12 can be changed. Optionally the inner layer 132 can be omitted in a partition screen part 12. A tailor-made partition 14 can thus be constructed by a person skilled in the art out of any combination of chambers or modules 10.

[0043] In an alternative preferred embodiment alternative partition screen parts may be used comprising two panels of sound absorbing material with a folding area present between the panels to facilitate folding of each partition screen part. Reference is made to NL2018486 cited above and incorporated herein by reference.

[0044] The outer ends of each partition screen part 2 are arranged for cooperation with the connecting elements 20 according to the present invention.

[0045] The invention is of course not limited to the described and shown preferred embodiment, which is developed for use in sports accommodations or halls, such as gymnasiums, fitness rooms, ice rinks, indoor halls for tennis, squash, climbing et cetera. The partition and system according to the invention is suitable for use as a motorized acoustic screen to divide spaces in any kind of facility or accommodation. Some non-limiting examples of other facilities or accommodations, wherein the partition system according to the invention can be used include factories, industry halls, exhibition halls and stock rooms.

[0046] The invention therefore extends to any embodiment falling within the scope of protection as defined in the claims and as seen in the light of the foregoing description and accompanying drawings.

Claims

1. Partition for use in an acoustic partition system, said partition system comprising a partition carrier on which the partition is to be mounted and motorized moving means for moving the partition with respect to the partition carrier,

wherein the partition comprises at least one pair of partition screens that are to be arranged at a

predetermined mutual distance,
wherein each partition screen comprises two or
more partition screen parts, that are arranged
for releasable connection to form the partition
screen,

a series of strips comprising sound insulating material that are arranged for releasable connection to the partition screens, such that, in the assembled state, the strips span the distance between the partition screens, **characterized in that** the partition further comprises a number of separate connecting elements that are each arranged for releasably connecting two partition screen parts and a strip, wherein the connecting elements have a general longitudinal shape and, in the assembled state, essentially extend in lateral direction of the partition screen.

2. Partition according to claim 1, wherein the connecting elements comprise a number of rails, each having a channel for receiving an outer end of the partition screen parts or the strip. 20
3. Partition according to claim 1 or 2, wherein each connecting element comprises one or more kador rails, each having a kador channel for receiving a kador cord that is arranged on one of the partition screen parts or on the strip. 25
4. Partition according to claim 3, wherein the kador channels have a general C-shape. 30
5. Partition according to claim 3 or 4, wherein one or more of the connecting elements comprises three kador rails that are attached to each other with outward facing channel openings. 35
6. Partition according to claim 5, wherein the channel openings are oriented at angles of essentially 120 degrees. 40
7. Partition according to one or more of the preceding claims, wherein one or more of the partition screen parts comprise an inner layer of sound absorbing material and an outer layer of sound insulating material, wherein the outer layer and the inner layer are fixed to each other near the outer ends of the partition screen part that are to be received in the channels. 45
8. Partition according to claim 7, wherein the outer layer comprises perforations. 50
9. Partition according to claim 7 or 8, wherein the outer layer is made of reinforced material. 55
10. Partition according to one or more of the preceding claims, wherein the partition comprises two upper mounting beams that are to be arranged on the upper

ends of the partition screens.

11. Partition according to claim 11, wherein each of the upper mounting beams comprises a channel, preferably a kador channel, for receiving the outer ends of the partition screen parts. 5
12. Partition according to one or more of the preceding claims, wherein the partition comprises one lower mounting beam to which the lower ends of the partition screens are to be connected. 10
13. Partition system comprising a partition according to one or more of the preceding claims and a partition carrier on which the partition is to be arranged and motorized moving means for moving the partition with respect to the partition carrier. 15
14. Partition system according to claim 13, wherein the distance between the partition screens enlarges in the direction towards the partition carrier. 20
15. Method of assembling a partition according to one or more of the preceding claims 1-12, comprising the steps of:
 - a) Selecting a first partition screen part with specific acoustic characteristics;
 - b) Selecting a second partition screen part with specific acoustic characteristics;
 - c) Using a first connecting element to interconnect the second partition screen part to the first partition screen part to form a first partition screen;
 - d) Selecting a strip;
 - e) Connecting the strip selected in step d) to the first connecting element used in step c);
 - f) Selecting a third partition screen part with specific acoustic characteristics;
 - g) Selecting a fourth partition screen part with specific acoustic characteristics;
 - h) Using a second connecting element to interconnect the fourth partition screen part to the third partition screen part to form a second partition screen;
 - i) Connecting the strip selected in step d) to the second connecting element used in step h);
 - j) Optionally repeating steps a) through i) with further partition screen parts, connecting elements and strips until the partition is finished.

Fig. 1

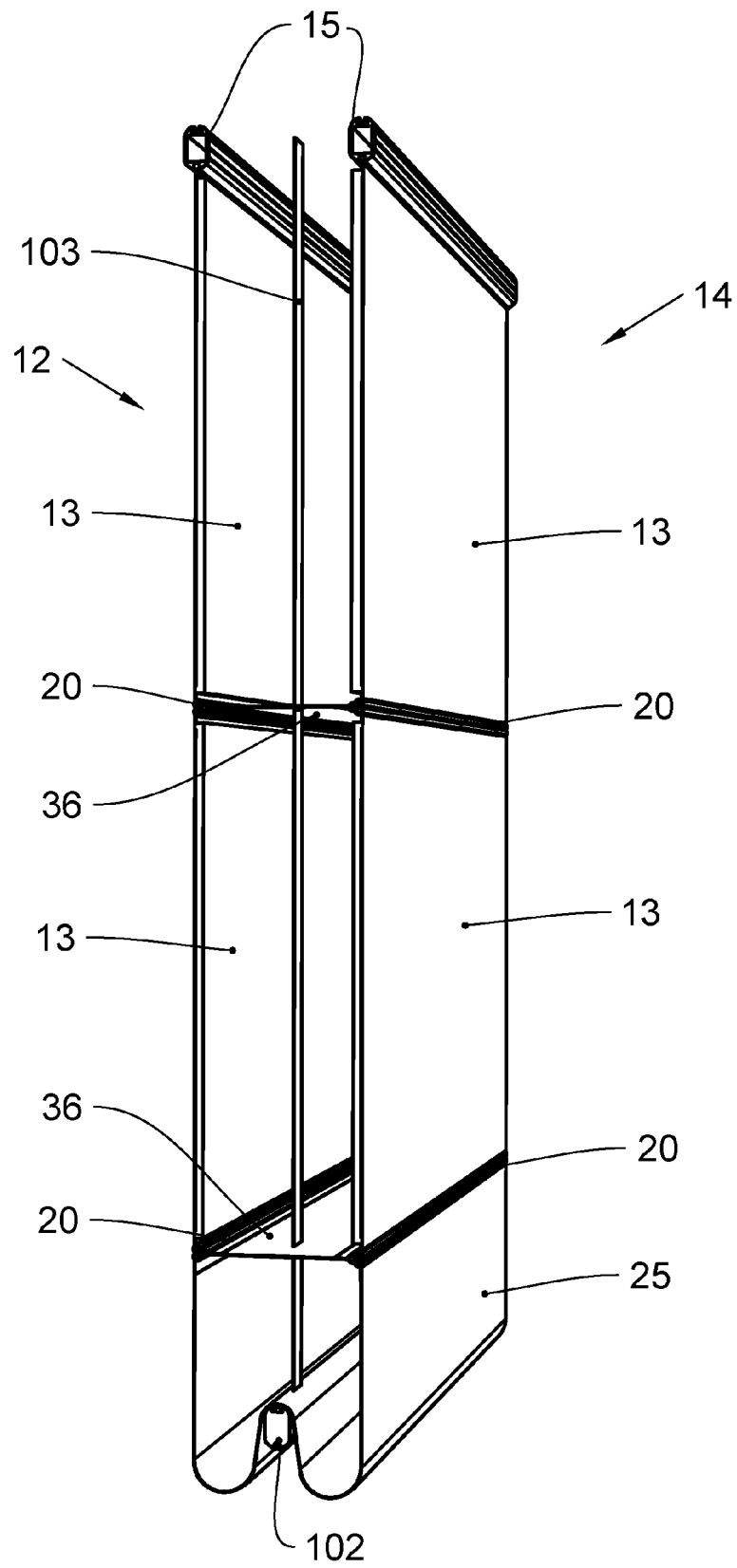


Fig. 2

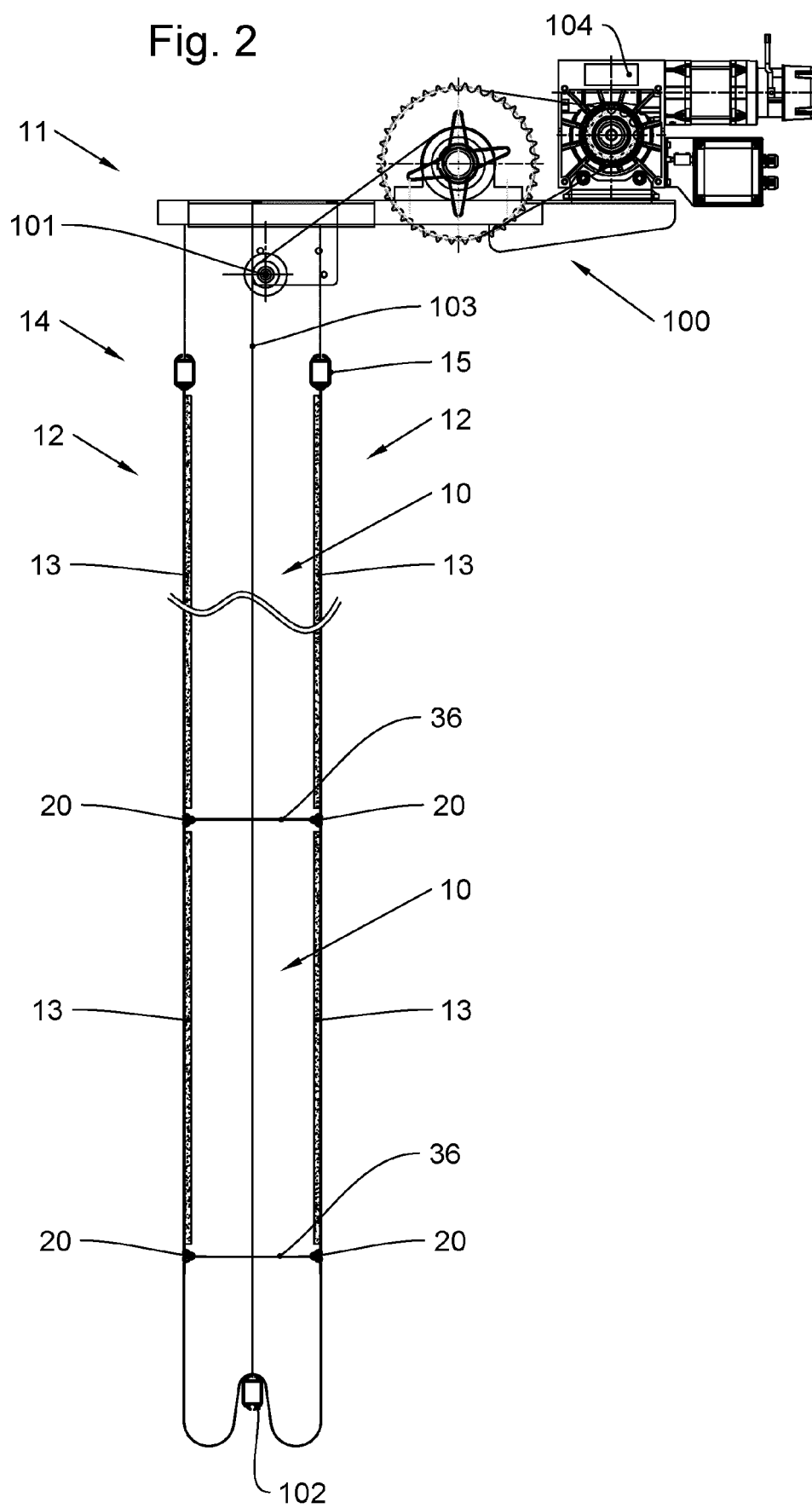


Fig. 3

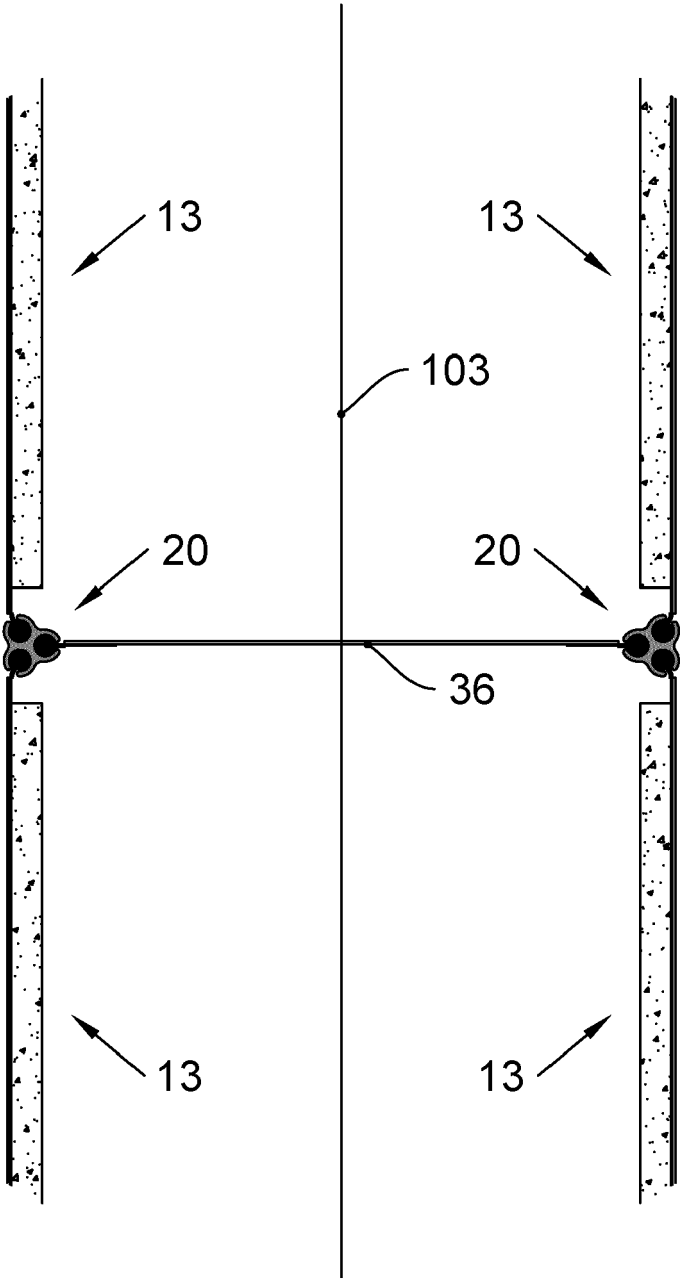


Fig. 4

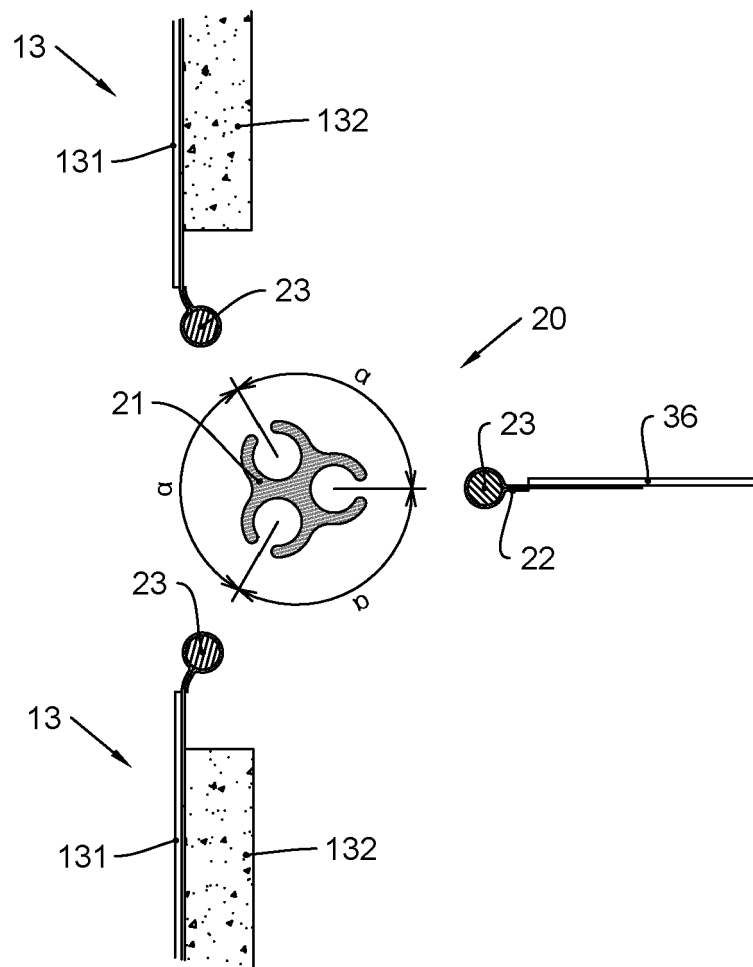
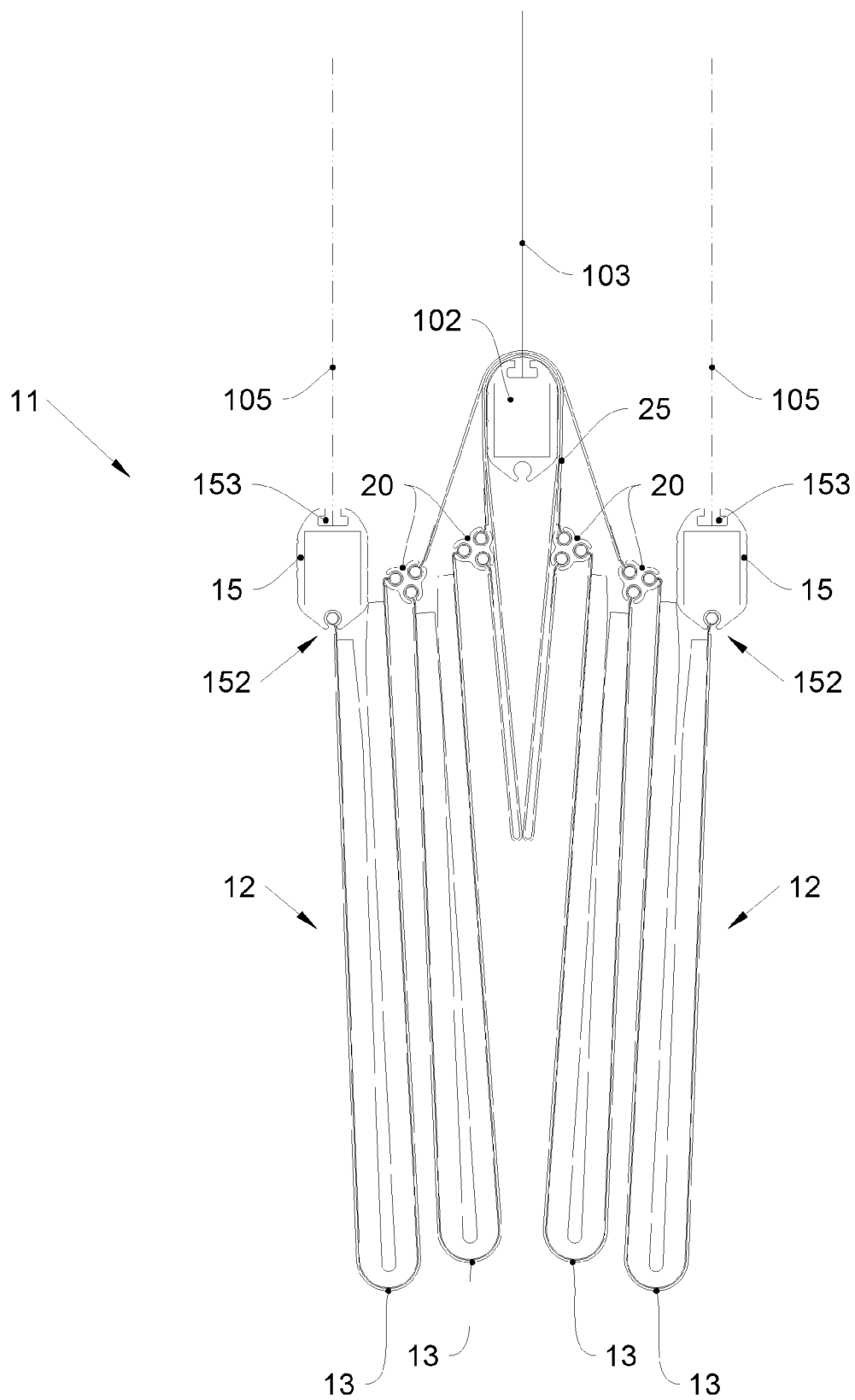


Fig. 5





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 Application Number
 EP 21 16 0091

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 July 2021	Examiner Merz, Wolfgang
CATEGORY OF CITED DOCUMENTS		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	
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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