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(54) **A retractable covering system**

(57) A retractable coverage system is defined by at least one coverage element (9) fastened to at least two carriages (12a), each of which is mounted inside a rela-

tive shaped guide (8) having at least one curvilinear segment (7), and is movable along the guide (8) driven by a relative motor (31) mounted on the carriage (12a) inside said guide (8).

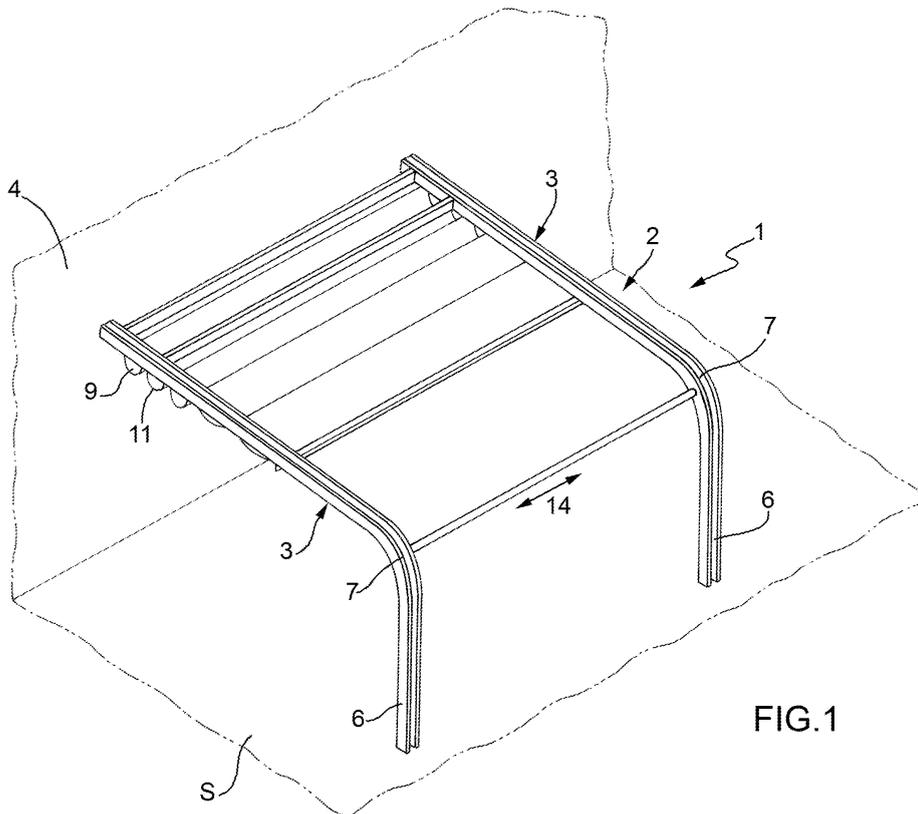


FIG.1

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Description

[0001] The present invention relates to a retractable coverage system.

[0002] In particular, the present invention relates to a retractable coverage system of the type comprising a supporting frame provided with at least two vertical upright members parallel to one another, which extend upwards from the ground, and are fixed to a supporting wall by means of respective cross members which extend between the free upper ends of the relative upright members and the supporting wall; and a cover sheet, which extends between the two cross members, and is fastened to a plurality of carriages, which are mounted inside each cross member, and define part of an actuating device for moving the cover sheet between a work position and a rest position.

[0003] In general, the actuating device further comprises two toothed transmission belts, each of which extends inside a relative cross member, is fastened to one of the carriages housed in the relative cross member, and is looped around a pair of pulleys, which are coaxial with respect to the corresponding pulleys of the other toothed transmission belt, and are mounted so as to rotate about respective longitudinal axes driven by an electric motor that is fixed to said supporting frame.

[0004] The known retractable coverage systems of the type described above have some drawbacks mainly deriving from the fact that, due to the reduced internal dimensions of the cross members, the toothed transmission belts, although thoroughly tried and tested, can only be installed inside straight cross members which considerably limits the possible configurations of such retractable coverage systems.

[0005] Moreover, since said actuating device is unable to move the carriages along the relative cross members as well as along the corresponding upright members, the known retractable coverage systems of the type described above have the added drawback of requiring an additional cover sheet and an additional actuating device identical to those described above, which must be fitted to close the space delimited between the two upright members, thus making such retractable coverage systems relatively complex and expensive.

[0006] It is an object of the present invention to provide a retractable coverage system that overcomes the drawbacks described above and that is simple and inexpensive to produce.

[0007] According to the present invention there is provided a retractable coverage system as claimed in claims 1 to 12.

[0008] The present invention can also be used advantageously in a retractable wall used, for example, to divide and/or to shut-off areas of a room.

[0009] According to the present invention there is provided a retractable wall as claimed in claim 13.

[0010] The present invention will now be described with reference to the accompanying drawings, illustrating

a non-limiting embodiment thereof, in which:

figure 1 is a schematic perspective view, with parts removed for the sake of clarity, of a preferred embodiment of the retractable coverage system according to the present invention;

figure 2 is a schematic side view, with parts removed for the sake of clarity, of the retractable coverage system of figure 1;

figure 3 is a schematic side view, with cross-sections of parts and parts removed for the sake of clarity, of a detail of figures 1 and 2;

figure 4 is a cross-section along the line IV-IV of figure 3;

figure 5 is an exploded perspective view of a detail of figures 3 and 4;

figure 6 is a schematic cross-section of the detail of figure 5; and

figure 7 is a side view of a detail of figures 5 and 6.

[0011] With reference to figures 1 and 2, designated as a whole by number 1 is a retractable coverage system to provide protection against the sun and rain comprising a supporting frame 2 which, in turn, comprises, in this example, two metal sections 3 parallel to one another, which extend between the ground S and a substantially vertical supporting wall, are fixed to the ground S and to the wall 4, have a substantially U-shaped cross-section with the concavity facing downwards, and each of which comprises two respective lower longitudinal edges 5 (figure 4) which are folded inwards so as to be coplanar with respect to each other.

[0012] Each section 3 is also shaped, comprises a substantially vertical lower segment 6 that protrudes upwards from the ground S and an upper and at least partially curvilinear segment which extends between the segment 6 and the wall 4, and internally defines a guide 8 (figure 4).

[0013] The coverage system 1 further comprises, in this example, a cover sheet 9, which extends between the two sections 3, has an upper edge 10 fixed to the wall 4, and is limited by two lateral edges 11, each of which is fixed to a relative string of carriages 12, which are housed inside a relative guide 8, and define, with the carriages 12 of the other guide 8, an actuating device 13 for moving the sheet 9 between a work condition (not illustrated), in which the sheet 9 is pulled out along the sections 3, and a rest position (figure 2), in which the sheet 9 is gathered at the top in proximity to said wall 4.

[0014] Each string of carriages 12 comprises a first carriage 12 (hereinafter designated by 12a), which is fixed to a free end of the relative edge 11, and is aligned with the carriage 12a of the other guide 8 in a horizontal direction 14 transversal to the sections 3, and a plurality of intermediate carriages 12 (hereinafter designated by 12b), which are arranged between the wall 4 and the carriage 12a, and each of which is aligned with a corresponding carriage 12b of the other guide 8 in direction 14.

[0015] According to that illustrated in figures 3 and 4, each carriage 12a, 12b comprises a supporting body 15; a first set of four wheels 16, which cooperate two by two with the lower edges 5 of the relative guide 8, are coaxial two by two with respect to one another, and are mounted so as to rotate, with respect to the body 15, about respective longitudinal axes 17 parallel to the direction 14; and a second set of four wheels 18, which cooperate with a surface 19 of the relative guide 8 parallel and opposite to the relative edges 5, and are mounted so as to rotate about respective longitudinal axes 20 parallel to one another and to direction 14.

[0016] The wheels 18 are mounted on respective supports (not illustrated), which are slidingly coupled to the body 15 by means of the interposition of relative damping springs (not illustrated) so as to move, with respect to the body 15, in a straight line in a direction 21 orthogonal to the edges 5 and to the surface 19, and allow the carriage 12a, 12b to couple without clearance with the relative segment 6 and with any straight portions of the relative segment 7, and to correctly follow the curvilinear portions of said relative segment 7.

[0017] Each carriage 12a further supports a toothed wheel 22, which has a longitudinal axis 23 parallel to the direction 14, protrudes upwards from the body 15 to couple with a toothed belt 24 fixed along the surface 19 of the relative guide 8, and is axially limited by two flat surfaces 25, 26 (figures 5 and 7) substantially orthogonal to the axis 23, and the surface 25 of which faces the body 15.

[0018] With reference to figures 5 and 7, the wheel 22 has a cavity 27 obtained in the surface 26 coaxially with respect to the axis 23, is provided with two radial slits 28 arranged opposite one another obtained in the surface 25, and is slidingly fixed to a drive shaft 29, which extends through the wheel 22 coaxial with respect to the axis 23, is pivotally coupled to the body 15 so as to rotate, with respect to the body 15, about the axis 23, and is provided with two radial coupling pins 30 which protrude radially outwards from the shaft 29.

[0019] According to that illustrated in figures 3 and 4, the shaft 29 is made to rotate about the axis 23 by an electric motor 31, which is fixed to the body 15 inside the relative guide 8, is interconnected to and phased with the motor 31 of the other carriage 12a by means of an electronic control unit (not illustrated), and is powered by means of a power supply device 32 with sliding electrical contacts comprising a pair of guides 33 made of a conductive material fixed along the surface 19 and a pair of electrical contacts 34 which are also made of a conductive material borne by the carriage 12a.

[0020] The contacts 34 are mounted on a plate 35 which is slidingly coupled to the body 15 so as to move, with respect to the body 15, in the direction 21 between an extracted work position, in which the contacts 34 protrude from the body 15 in the direction 21 so as to come into contact with the relative guides 33, and a retracted rest position, in which the contacts 34 do not engage said relative guides 33.

[0021] The motor 31 has an output shaft (not illustrated) defined by a worm screw, which extends transversely with respect to the directions 14 and 21, and is coupled to a worm wheel (not illustrated) obtained on one end of the shaft 29.

[0022] According to that illustrated in figures 5 and 6, the wheel 22 is moved to, and normally maintained in, a locking position, in which the pins 30 engage the relative slits 28 to angularly lock the wheel 22 to the shaft 29, by a spring 36, which is housed in the cavity 27 coaxially to the axis 23, and is held inside the cavity 27 by a plate 37, which is mounted orthogonally to the axis 23 to close the cavity 27, and is axially locked to the shaft 29 by means of a lock screw 38 screwed into the shaft 29 parallel to said axis 23.

[0023] In the event of an interruption in the electric power supply or a motor 31 malfunction, the wheel 22 is moved from its locking position to a release position, in which the slits 28 disengage the pins 30 to allow the wheel 22 to become uncoupled from the shaft 29 and so that the carriage 12a can slide along the guide 8, by a releasing member 39, which is substantially fork shaped, is inserted manually between the body 15 and the wheel 22 through the two edges 5 of the guide 8 and through two holes 40 obtained in the body 15 parallel to the direction 21, and is turned (in a clockwise direction in figure 6) to move the wheel 22 in the direction 14 against the action of the spring 36.

[0024] Therefore, thanks to the actuating device 13, it is possible to produce undulated coverage systems 1, each section 3 can be produced as a single piece, and the sheet 9 can be moved between the ground S and the wall 4.

[0025] According to an alternative embodiment that is not illustrated, the cover sheet 9 is eliminated and replaced with a plurality of coverage panels, equal in number to the number of carriages 12a, 12b mounted inside a guide 8, and which extend between the two sections 3, and are borne one by the two carriages 12a and each of the others by a relative pair of corresponding carriages 12b. Each panel is provided with a pair of fastening tabs, which are arranged on opposite sides of the panel, and one of which enables said panel to couple with the adjacent panel when the panels are moved into their work position and the other when the panels are moved into their rest position, in which the panels are arranged one on top of the other.

[0026] According to a further alternative embodiment that is not illustrated, the present invention is used to particular advantage in a retractable wall used, for example, to divide and/or shut-off areas of a room. The retractable wall comprises at least one shaped guide, which is fixed to a floor or to a ceiling of the room, and has at least one curvilinear segment; at least one panel extending in a substantially vertical containing plane; and an actuating device for moving the panel along the guide and comprising at least one motor powered carriage identical to the carriages 12a.

[0027] According to a third alternative embodiment that is not illustrated, the two sections 3 are substantially U-shaped with the concavity facing downwards and are fastened to the ground S in correspondence with both of the free ends.

[0028] According to a fourth alternative embodiment that is not illustrated, the coverage system 1 comprises a first substantially circular guide fastened to the ground S or to the top of a supporting post structure; a carriage 12 mounted inside the first guide; and a cover sheet, which has a lower edge that is movable along the first guide, an upper edge engaged in a second guide arranged on top of the first guide, a first transverse edge anchored to the supporting structure, and a second transverse edge fixed to the carriage 12 so as to allow the carriage 12 to move the sheet from and towards a coverage work position, in which the sheet has a substantially truncated cone shape.

[0029] According to a fifth alternative embodiment that is not illustrated, the two sections 3 are straight.

[0030] Since each carriage 12 is provided with the relative motor 31, the coverage system 1 is relatively simple and quick to install and does not require external actuating motors to be mounted on the sections 3.

Claims

1. A retractable coverage system comprising a supporting frame (2) provided with a pair of guides (8) parallel to each other and fixed to at least one supporting wall (4, S); at least one coverage element (9) extending between the two guides (8); and an actuating device (13) for moving the coverage element (9) along the guides (8) between a work position and a rest position, the actuating device (13) comprising at least one first carriage (12a) mounted inside each guide (8) and fastened to the coverage element (9), and actuator means (31) for moving said first carriages (12a) along the corresponding guides (8); and **characterized in that** each guide (8) is a shaped guide comprising at least one first curvilinear segment (7); the actuator means (31) comprising, for each first carriage (12a), a motor (31) mounted on said first carriage (12a) inside the corresponding guide (8).
2. A retractable coverage system according to claim 1, wherein each guide (8) is further fixed to the ground (S).
3. A retractable coverage system according to claim 2, wherein each guide (8) further comprises a second substantially rectilinear segment (6) extending upwards from the ground (S).
4. A retractable coverage system according to any one of the preceding claims, wherein each first carriage (12a) is provided with at least one drive wheel (22) mounted to rotate, driven by the corresponding motor (31), about a longitudinal axis (23) thereof transversal to the corresponding guide (8) so as to feed the first carriage (12a) along said corresponding guide (8).
5. A retractable coverage system according to claim 4, wherein each first carriage (12a) further comprises first and second coupling means (28, 29, 30) connected to the drive wheel (22) and to the output shaft, respectively, and reciprocally movable between a coupling position, in which the first and second coupling means (28, 29, 30) are coupled in an angularly fixed manner, and a releasing position, in which the first and second coupling means (28, 29, 30) are coupled to each other in a pivoting manner.
6. A retractable coverage system according to claim 5, wherein each first carriage (12a) further comprises first thrust means (36) for moving and normally keeping the first and second coupling means (28, 29, 30) in their coupling position and second thrust means (39) for moving the first and second coupling means (28, 29, 30) to their releasing position against the action of the first thrust means (36).
7. A retractable coverage system according to any one of the claims from 4 to 6, wherein each drive wheel (22) is a toothed drive wheel; the actuating device (13) further comprising a toothed belt (24) mounted inside each guide (8) and coupled to the corresponding drive wheel (22).
8. A retractable coverage system according to any one of the preceding claims, wherein each motor (31) is an electric motor; power supply means (32) being mounted along the corresponding guide (8) to electrically supply said motor (31).
9. A retractable coverage system according to any one of the preceding claims, wherein the actuating device (13) further comprises, for each guide (8), at least one respective second carriage (12b) fastened to the coverage element (9) and movable along the corresponding guide (8) under the action of the coverage element (9) and/or of the corresponding first carriage (12a).
10. A retractable coverage system according to claim 9, wherein the coverage element (9) comprises a sheet (9) fixed to said first and second carriages (12a, 12b).
11. A retractable coverage system according to claim 9, wherein the coverage element (9) comprises a plurality of coverage panels, one of which is fixed to the two first carriages (12a) and each of the others is fixed to a corresponding pair of reciprocally corre-

sponding second carriages (12b).

12. A retractable coverage system according to any one of the claims from 9 to 11, wherein each said first and second carriage (12a, 12b) is provided with a respective plurality of rolling members (16, 18) suitable for coupling the carriage (12a, 12b) to the corresponding guide (8) without clearance. 5
13. A retractable wall comprising a supporting frame provided with at least one guide; at least one panel extending in a substantially vertical containing plane; and an actuating device for moving the panel along the guide, the actuating device comprising a carriage fastened to the panel and mounted inside the guide, and actuator means for moving the carriage along said guide; and **characterized in that** the guide is a shaped guide comprising at least one curvilinear segment; the actuator means comprising a motor mounted on the carriage inside the guide. 10
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14. A retractable coverage system comprising a supporting frame (2) provided with a guide extending in a substantially horizontal containing plane; at least one coverage element extending above the guide; and an actuating device (13) for moving the coverage element along said guide between a work position and a rest position, the actuating device (13) comprising at least one carriage (12) mounted inside the guide and fastened to the coverage element, and actuator means (31) for moving the carriage (12) along said guide; and **characterized in that** the guide is a shaped guide, preferably a circular guide, comprising at least one curvilinear segment; the actuator means (31) comprising, for each carriage (12), a motor (31) mounted on said carriage (12) inside said guide; the coverage element, in its work position, having a substantially truncated cone shape. 25
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15. A retractable coverage system comprising a supporting frame (2) provided with a pair of guides (8) parallel to one another fixed to at least one supporting wall (4, S); at least one coverage element (9) extending between the two guides (8); and an actuating device (13) for moving the coverage element (9) along the guides (8) between a work position and a rest position, the actuating device (13) comprising at least a first carriage (12a) mounted inside each guide (8) and fastened to the coverage element (9), and actuator means (31) for moving said first carriages (12a) along the corresponding guides (8); and **characterized in that** each guide (8) is a rectilinear guide; the actuator means (31) comprising, for each first carriage (12a), a motor (31) mounted on said first carriage (12a) inside the relative guide (8). 40
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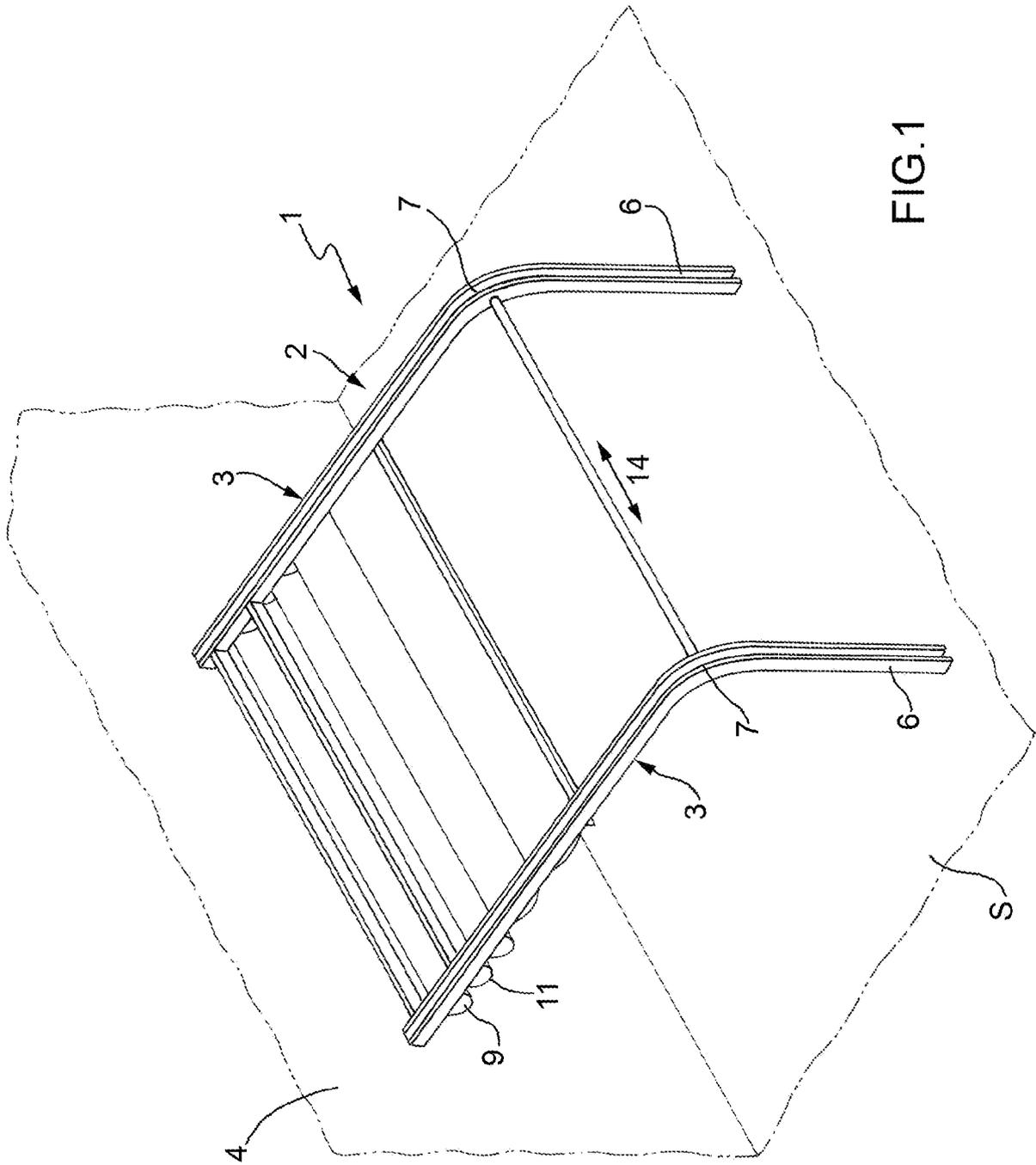


FIG.1

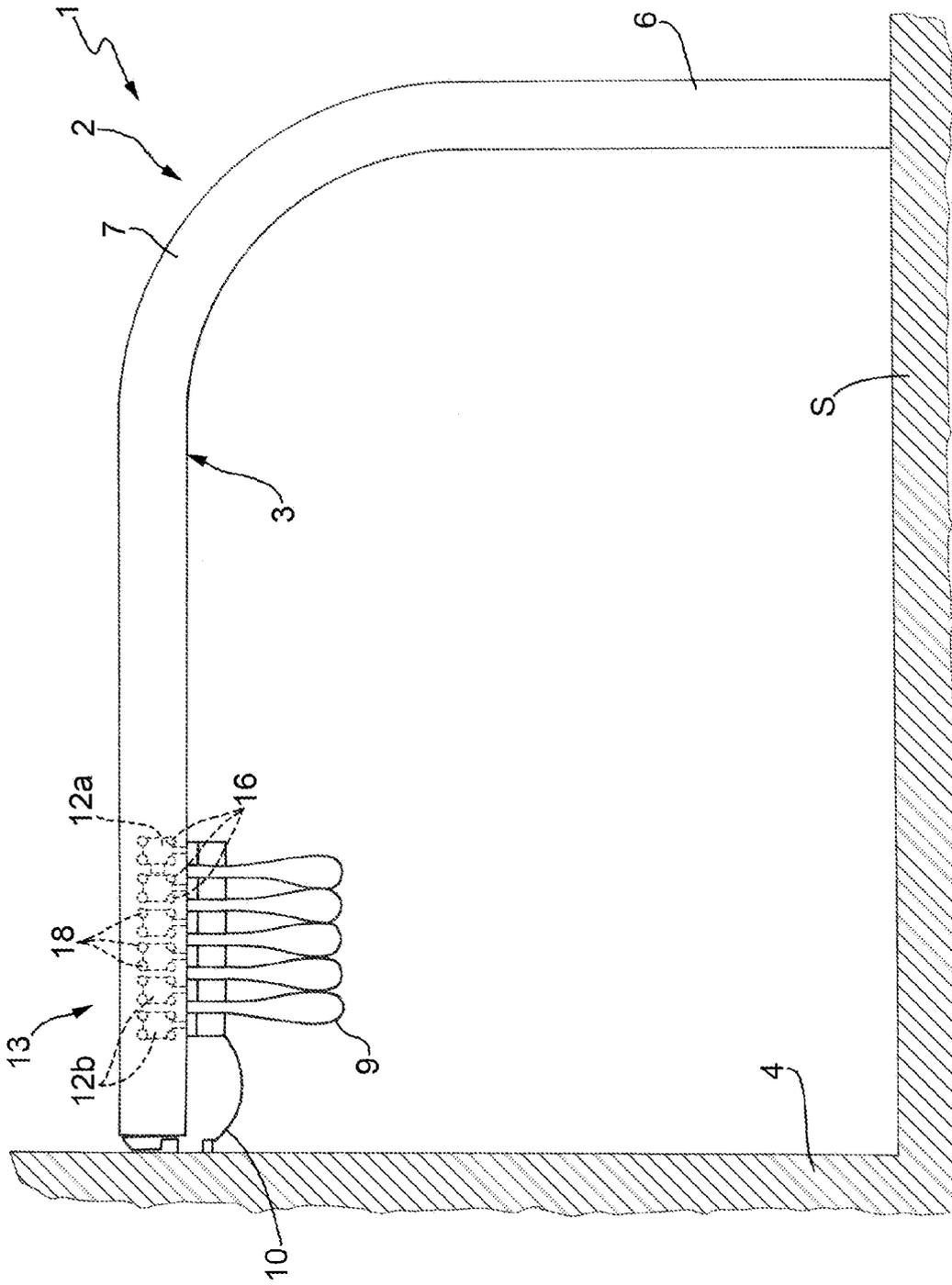


FIG.2

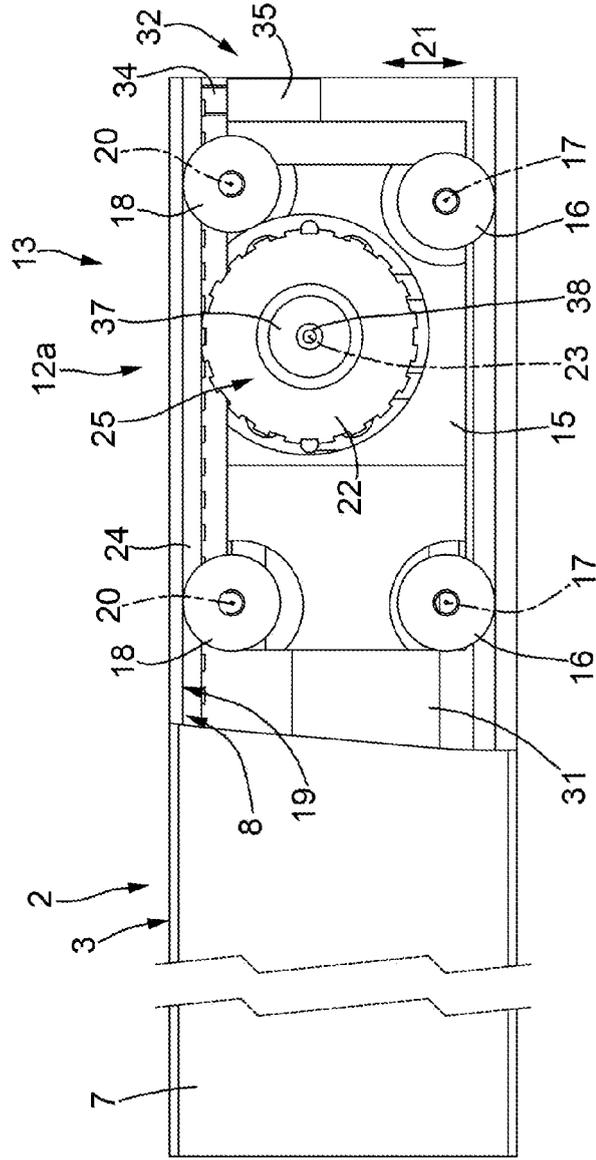


FIG.3

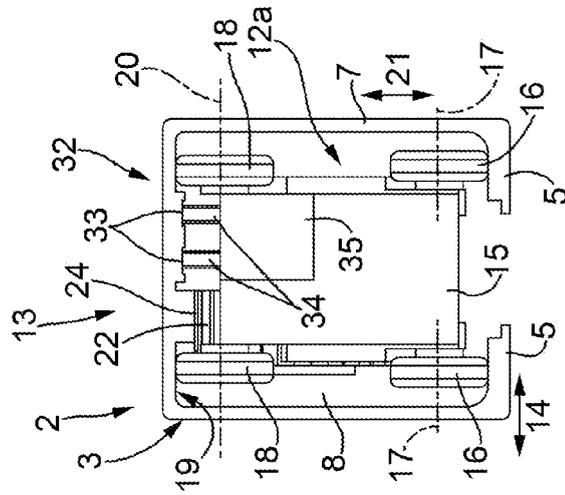


FIG.4

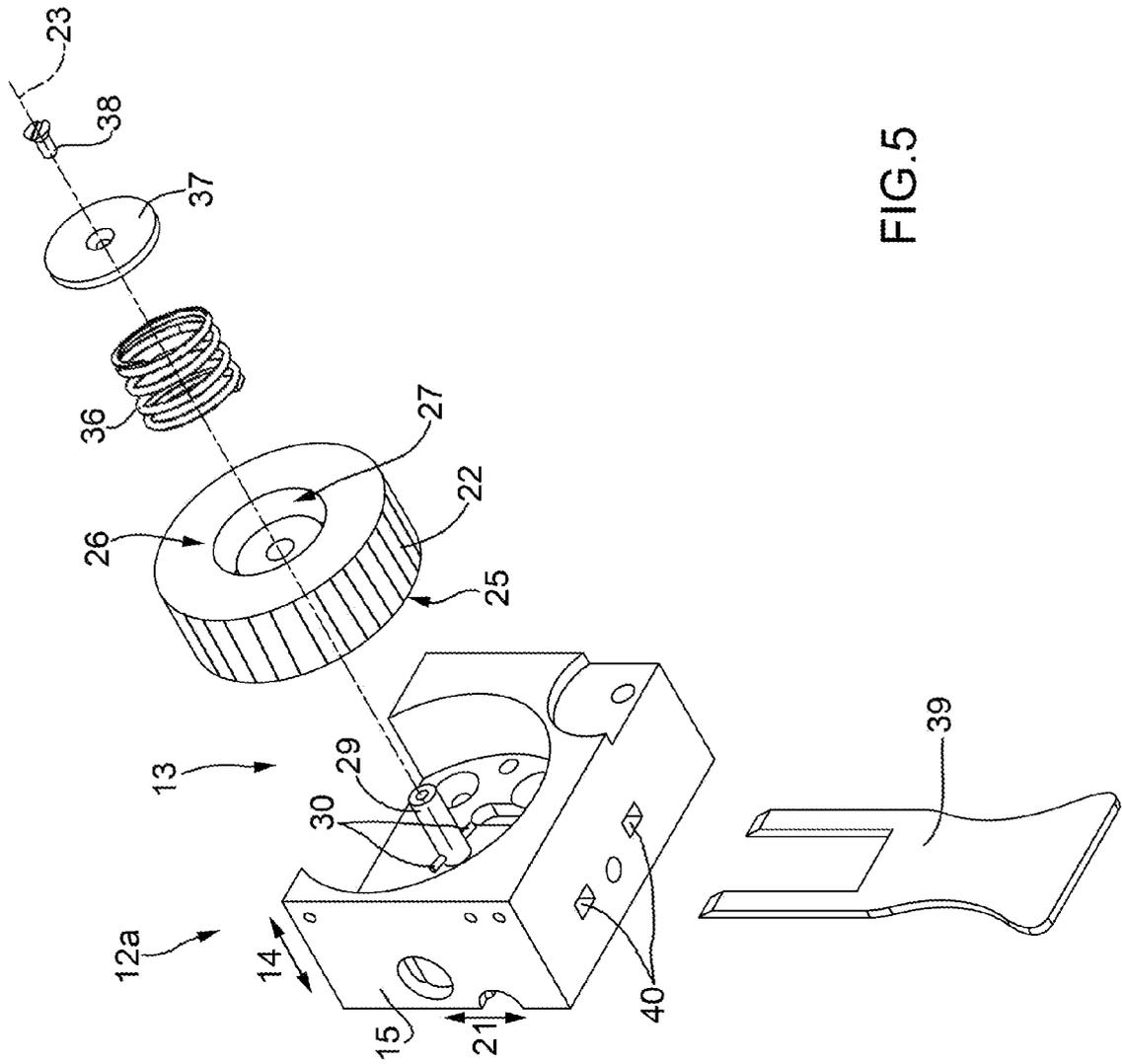


FIG.5

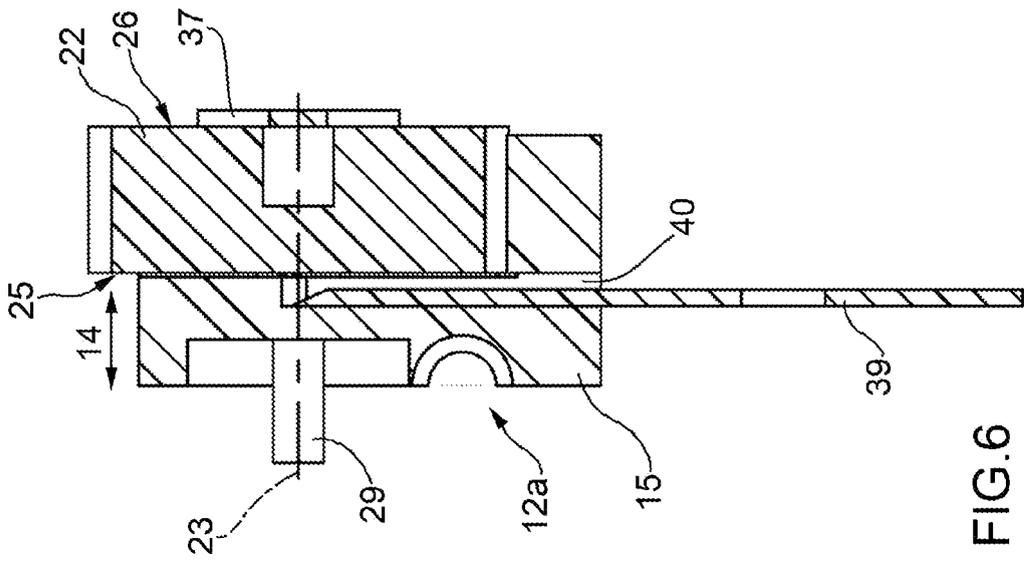


FIG. 6

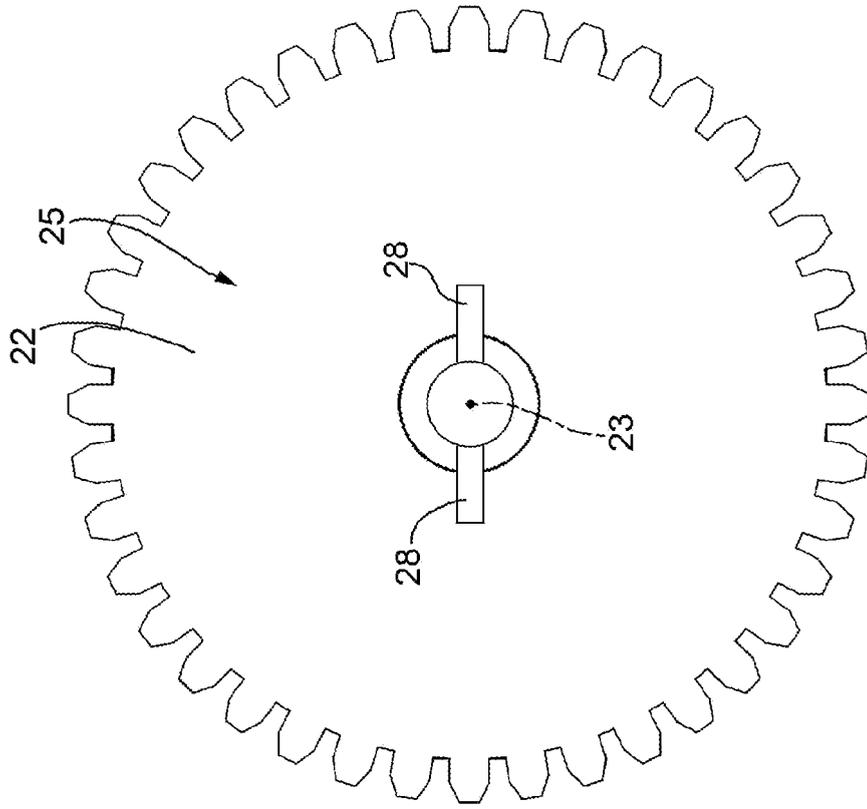


FIG. 7