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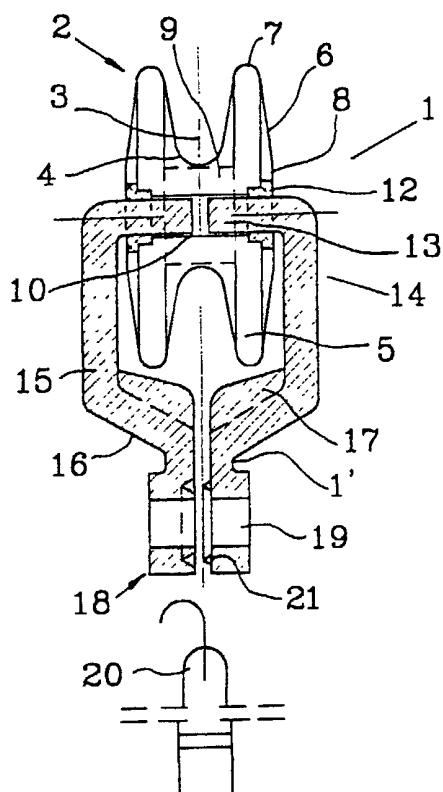
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(57) Abstract: A device for supporting and moving curtains, comprising a support element (1; 27; 38; 49; 90) of the curtain, with rolling elements (2) which are apt to contact, in a rolling manner, the upper external surface of rods (50), which are devoid of longitudinal slide rails. The rolling means form a roller or wheel having a circular groove or a central channel, which conforms to the circular section of the cable or rod. In a different embodiment, the rolling means (2) are rollers having preferably a cambered section (convex section), and are integrated in an annular structure. The rolling means (2), if made of metal, may be laser worked in order to obtain perfectly smooth surfaces.

Description

A DEVICE INTERACTING WITH SUPPORTS AND TRANSLATIONS OF CURTAINS

Technical Field

The present invention relates to a device which interacts with curtain supports and translations thereof, especially designed for domestic use, and to methods for obtaining this device and the resulting formations.

- 5 In this document, by the expressions “a device interacting with supports and translations of curtains”, we mean a system which works according to reciprocity relations in respect of said actions performed on curtains, which may have an ornamental or protective function and may be formed by materials draped and equipped in accordance with their final use.

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Background Art

- According to the present state of the art, hollow metallic rods supporting the so-called “vetrage sticks” by means of re-sewed terminals, are presently well-known and widespread; the said rods are adapted to them but - although effective for
- 15 lowering, supporting, and lifting them again -, they suffer from disadvantages and drawbacks due to humidity conditions, related oxidation giving rise to abrasive surfaces of said rods, and from “wrinkling” hindering the movements of said terminals, and finally, from the effects produced by sliding frictions.

- These forces, as in other known systems, cause damages to metallic ropes and dorsal
- 20 wear of hooks or rings, whereon these means are translated and said “vetrage sticks” are supported.

In order to obviate said drawbacks and effects, and to reduce friction during the movement of the curtain, usually formed by draped single bodies including tails and

located in front of one or more windows which are fixed or may be opened, or in front of other elements, it is also known to utilise apparatus comprising metallic and/or wooden toric rings for supporting said curtain and for displacing them along corresponding rods.

- 5 Said toroidal supports or the like give rise to drawbacks caused by the same sliding frictions, which, although of reduced entity in this case, cause tilting and torsion, such as to render useless said ring shaped supports and to transmit these states and effects to the curtains supported by them. These curtains are moved by appropriate “sticks for curtains” or by means of cords (strings) associated to the aforesaid
- 10 means. The latter have non isolated bodies, and in this way may cause noise in consequence of contacts and collisions between them, and this noise is in turn transmitted by the rods according to asynchronous successions, producing vibrations and resonances which often adversely affect their supports, especially in case of hollow metallic rods.
- 15 In order to solve these problems and to eliminate the further drawbacks due to flexures of said rods, produced by uniformly or non-uniformly distributed loads on metallic or wooden rods, or on metallic ropes, systems have recently been employed to protect plate-like window frames, and which are formed by metallic rods provided with translation tracks whereon a plurality of corresponding sliders are movable, the
- 20 latter being formed by plastic polymers and interconnected by means of cords (strings) used to drag them together with said curtains, the latter being appended on tweezers, and wherein said sliders are subjected singly or together with the other ones, to forces and reactions caused by sliding frictions; said frictions may also be increased by dust particles, during the motion, thereby producing tensions and
- 25 irreparable damages and tears of the strings and/or axial torsion of the rods, their detachments or the detachment of the sliders.

Disclosure of Invention

The main object of the present invention is to solve the above mentioned problems, obviating the disadvantages, damages and drawbacks related to these causes and/or effects.

The results achieved by this kind of device interacting with supports and translations
5 of curtains, especially designed for domestic use, and the structures and formations resulting from practical embodiments thereof, are substantially contained in the following list:

- the translations of the supported curtains, which may be fitted in various ways, are performed by using rolling means and apparatus movable on wooden or metallic
10 rods, or on steel ropes;
- the applied forces are small, and correspond to small energy dissipation resulting from the rolling friction coefficient;
- the tails and drapes appended to said supports, assume stable states and conditions, due to the rolling means, which give rise to vertical positions of the supports;
- 15 - the supports are not influenced by vibrations, resonances, collisions caused by incongruous actions on the aforesaid strings and "sticks for curtains".

The main advantages obtained by the use of said devices and structures, are above all the following:

- any kind of curtain may be moved along said rods, with or without tracks and
20 metallic ropes;
- the supports are not constrained on said rods and are isolated from factors which negatively influence the movements;
- the supports may be driven by mechanical means adapted to small forces produced by the rolling friction;
- 25 - the lower ends are stable with respect to the ground, and are located opposite to the upper terminals removable from said supports, not previously separated from the said rods;
- simple and convenient assembling and reassembling of said curtains supported and

moved according to reciprocity relations by means of said rolling means and devices characterising the so-formed structures which are fully reliable and have reduced costs.

5 Brief description of Drawings

Further features, functions and advantages will result from detailed descriptions of non-limitative preferred practical embodiments - in accordance with the invention -, of an interacting device for the support and the movement of curtains, especially designed for domestic use, the said embodiments being shown in the drawings,

10 which represent, in appropriate scales:

Fig. 1: a device resulting from a first embodiment, in a lateral, partially cross-sectional view;

15 Fig. 2: a cross sectional view of Fig. 1;

Fig. 3: a device according to a second embodiment, in a front view;

Fig. 4: the device of Fig. 3, in a lateral view;

20

Fig. 5: the cross section B-B' in the device shown in Figs. 3 and 4;

Fig. 6: a device according to a third embodiment, in a front view;

25 Fig. 7: the lateral view of the device of Fig. 6;

Fig. 8: a device according to a fourth embodiment, in a front view;

Fig. 9: the device of Fig. 8, in a lateral view;

Fig. 10: a device according to a fifth embodiment, in a front view;

Fig. 11: the cross-section C-C' of the device shown in Fig. 10;

- 5 Fig. 12: a locking means, drawn in cross-section, which in the present example is associated to a component of the device of Figs. 10 and 11;

Fig. 13: a device resulting from a sixth embodiment, in a partially sectioned front view;

10

Fig. 14: the cross-section D-D' of the assembly shown in Fig. 13;

Fig. 15: according to a front view, part of a plurality of connective components included in the device of Figs. 13 and 14.

15

Modes for carrying out the invention

According to the invention, the Figs. 1 to 15 represent devices resulting from embodiments of a structure interacting with supports and movements of curtains, especially for domestic use, comprising support members and means utilised to move
20 and support said curtains along respective rods; said structure being characterised in that said support members have rolling elements incorporated, that is integrated therein, which may roll along rods of corresponding dimensions, said elements being suited to determine vertical states of a plurality of said support members and their reversible sliding motions coaxially to said rods, wherein the said curtains are
25 appended to the ends of the support members, and these ends have positions and inclinations which correspond to the same states of said supporting members, and the wherein these latter members interact in such a way as to protect themselves and the rods from actions and effects produced by stresses and reactions generated during the

motion of said supporting members, which co-operate with said rolling elements, and which are moved by said means.

Advantageously, in order to achieve preferred end positions and/or intermediate positions of the curtains, corresponding to stationary (motionless) states of drapes
5 and tails of the curtain, the said assemblies may be equipped with a locking means, which stops their movements.

Moreover, various materials may be used to form said devices: e.g. treated metal alloys, including light alloys, polymers with or without additives (fillers), polymers with pigments or neutral polymers, may be used to form said support members, the
10 axes, or the rolling elements; the latter could also be made of glass or wood; and finally, also sintered materials could be used for making small rollers or balls.

The said device or structure, according to a first embodiment, is indicated by reference numeral 1, and is designed especially for steel cables (ropes) or small steel rods, or for "vetrage sticks". It comprises a rolling element 2 which usually is
15 manufactured from brass, and which has a recessed portion 3 with a bottom 4 sized so as to correspond to the dimensions of the rod, the said recess being located between opposite parts 5 which are noticeably raised (see Fig. 1)

The parts 5 have sensibly inclined external sides 6 between cambered vertexes 7 and between opposite ends 8 of a region 9; the latter has an orthogonal cavity 10 located
20 internally with respect to said bottom 4 and vertexes 7 (see Fig. 1).

The cavity 10 receives sectors 12, which are sintered when the element 2 is made of plastic polymers, and which serve to isolate from vibrations said means, their supports members, and the plurality of devices 1 during their movements together with the appended curtains, and moreover, in order to dampen the collisions caused
25 by contacts between the so-formed ends 7 (see Fig. 1).

The said cavity 10 receives terminals 13 which are correspondingly shaped and which make part of said device 1, and the latter comprises separate parts 1' with a bifurcation 14 and vertical elements 15 located upwardly with respect to oblique

elements 16 with reinforcements 17, the latter being arranged over the opposite sectors 18, which are coaxial to said device, and are made preferably of plastic polymers with fillers. (see Fig. 1).

Said sectors 18 are provided with holes 19 which engage known sticks 20 for
5 curtains, or strings (cords), in order to move the curtains, and are connected to each other by a connector 21 (see Fig. 1). Said connector 21 has a plurality of sectors 22 between slits 23, having protruding edges 24 conforming to the shape of a recess 25 of a cavity 26, so that, when they are introduced inside the recess, said supporting device 1 will be stable (see Figs. 1,2).

10 According to a second embodiment, a structure which is generally indicated by 27 and which is used together with the aforesaid means, comprises:
an element 2 which usually is formed by plastic polymers and which is formed by similar parts 28, each including zones of said recess 3 and bottom 4, between raised parallel portions 29 having planar vertexes 30 (see Fig. 3).

15 Said parts 28 are connected to each other by said connector 21 in proximity of said bottom 4 (see Figs. 2,3,4).

The element 2 is contained inside a preferably laminar shell 31, which is semi-elliptic and metallic, and has an axis 32, preferably of plastic polymers with fillers, on which said element is rotatable (see Figs. 3 and 5).

20 The axis or pin 32 has a head portion 33 on a shaft 34 with an end 35, wherein the edges 24 are adapted to the shape of a recess 25 located inside the cavity 36 of the body 37 having a corresponding head 33' (see Fig. 5).

A structure according to a third embodiment, which is indicated by 38, and which is also utilised for said means, comprises:

25 the element 2 obtained from a plurality of semi-spherical parts 39 including partial zones of said recess 3 and bottom 4 (see Fig. 6);
wherein, said semi-spheres 39 are associated to said connector 21, and include the respective components of the connector therein (see Figs. 2 and 6);

said element 2 is arranged on an axis 40 whose ends 41 may be removably engaged inside cavities 42 provided on vertical portions 43, the latter being located between arcuated portions 44, 45 of a shell 46 which is preferably rigid and made of brass (see Fig. 6).

- 5 Said element 2 is rotatably mounted on a plurality of sectors 47, usually of sintered brass, with an interposed elastic means 48, such that under a compression force of this elastic means, acting on said ends 41, it is possible to engage or disengage these ends with or from said cavities 42 (see Fig. 6).

According to a fourth embodiment, a structure 49 designed for wooden or hollow

- 10 metallic rods 50, presents:

a shell 51 which is sensibly elastic and normally made of brass, and which is externally convex and associated to said element 2, and comprising asymmetric arcuated portions 52 and 53 located between planar portions 54 (see Fig. 8 and 9); the said element 2 is formed by parts 55 which are connected to each other by said

- 15 connector 21 and has annular sectors 55' made of plastic polymers (see Figs. 2, 8).

The element 2 is arranged on an axis 56 having ends 57 between a plurality of steel-made small rollers 58, which are retained by means of protrusions 59 of said parts 55. The ends 57 are removably retained inside diametrically opposite cavities 60 arranged on said planar zones 54 of said shell 51 (see Fig. 8);

- 20 the shell 51 has edges 56 with sectors 61 made of said elastomers, which serve to isolate the shell 51 included in a plurality of respective structures 49 (see Fig. 9).

According to a fifth embodiment, there is provided an annular structure 62, especially designed for rods 50, and including:

a plurality of separate parts 63, 64, 65 made of said plastic polymers (see Fig. 10);

- 25 wherein, the said parts 63, 64 are mutually connected by a plurality of connectors 21, and are associated to said part 65 forming a single body, and also to an element 66 which is generally laminar and made of brass, and which conforms to the shape of a recess 67', the latter being arranged between sensibly raised edges 68' of said

mutually engageable parts 63, 64 (see Figs. 2,10,11).

Between said parts 63,64 there is provided a plurality of said cylindrical elements 2 including semi-spherical protrusions 67 disposed inside similarly shaped recesses 68 (see Fig. 10).

- 5 Said elements 2 are tangentially in contact with said rods 50 and according to an angle which conforms to the size of the rod itself (see Fig. 10).

In proximity of the apex 69 of said sectors 63, 64, there is provided a plurality of slits 70 which are adapted to the curved ends 71 of said element 66 which is designed to retain these sectors 63, 64 on protrusions 72, the latter being located on the
10 vertexes 73 of a bifurcation 74, on said single (that is integrally formed) body 65 (see fig. 10).

Said wrapping element 66, includes a known intermediate annular member 75 designed for appending a curtain thereon (see Fig. 10).

- Between said slits 70, there is provided a removable means 76 made of said
15 elastomers, for wiping dorsal zones of said rods 50 (see Fig. 11).

Said integrally formed body 65, when used as subsidiary means for obtaining said motionless states of the curtains, comprises inside a cavity 77, a device 78 including a body 79 on a shaft 80 having a head 81, the latter having edges 82 conforming to the shape of a sector 83, made of said elastomers, and adapted to the form of the
20 surface of said rods 50 (see Fig. 12).

An elastic means 84, which in this example forms a spring, is mounted between said head 81 and a planar zone 85, the latter including a bore 86 for allowing the passage of said shaft 80, which has an annular sector 88 and a hole 89 like known means associated to sticks 20 for curtains or to strings for driving the devices (see Fig. 12).

- 25 According to a sixth embodiment, which is also used in combination with said rods 50, the structure 90 comprises:

a shell 91 made of a plurality of parts 92, 92', which include partial zones of a cavity 77 provided for said locking device 78 (see Fig. 13);

wherein, the element 2, which is preferably formed in a single piece of brass, is adapted to the shape of the surface of said rod 50, and has sides 94 with spheres 95 inserted inside corresponding recesses 96 on opposite sides 97 of the so-formed parts 92, 92' (see Figs. 13 and 14).

- 5 Said parts 92, 92', comprising frontal isolating (that is dampening) means 61, are interconnected by means of aforesaid connectors 21 to 26, in positions 93', preferably intermediate with respect to the inner and outer edges 98,99 of this kind of structure 91 (see Fig. 15).

Moreover, the invention also includes embodiments of said structure which

- 10 correspond to functional features which are derivable directly from modifications of the foregoing description of particular embodiments.

Some among the most obvious modifications are the following ones:

the integrally formed body 2 is made of turned wood, with a support member 1 made of a stainless steel wire including ends 13 bent from a bifurcation 14, the latter

- 15 extending from a twined shaft replacing the annular sector 18;

a plurality of said elements 2 arranged on fixed or articulated shell bodies, made of the aforesaid materials;

toroidal elements made of said elastomers, located on the bottom 4 of said assemblies 1, 27, 38;

- 20 these assemblies 1,27,38, with or without toroidal elements, may be adapted to said rods or cables, or to metallic or plastic-made section bars, which are extruded or laminated accordingly;

said shells 31, 46, 51 are obtained from sectors cut from extruded bars, in particular made of light alloys;

- 25 said elements 2, shells 31,46,51,91 and parts 62,63,64,92,93 can be made of pigmented or neutral polymers, glass or crystal, or of treated wood, and can be arranged on axes 40, preferably made of metals;

said support members 1,27,38,49,62,90 can be automatically driven to achieve

automatic movements by employing appropriate means, like toothed belts and/or cables with continuous rings;

the rods 50 may be metallic rotating rods having dorsal surfaces with helical protrusions, and, in case of automatic movements, they could be associated to slave,

- 5 radio-wave controlled apparatus, or to sensors of light intensity, or to sensors for external and/or environmental conditions;

the devices 78, having pads 88, are associated to said support members and to operative means driven, that is controlled, by said electronic and related mechanical means, the latter including as a stop said sector 83;

- 10 the device 78 may be associated with said support members 1,27,38,62,90 and also with conventional members, that is those which engage said metallic or wooden rods 50 or said cables by means of a sliding contact.

Finally, a further possible configuration of a support member 1 for curtains, is shown in Fig. 16, while Fig. 17 shows separately, the cylindrical sustaining element 100

- 15 used for very long rods 50. As may be seen in Fig. 16, the support member 1 may comprise an interrupted bifurcation 14' made of a bent metallic wire with a lower U-shaped supporting portion 18'. This configuration allows the support member 1 to pass over and beyond the cylindrical sustaining element 100 of the rod 50. The shape of the rolling element 2 is – for instance – that corresponding to Fig. 8. The
- 20 cylindrical sustaining element 100 has a recess 101 at its front end, which forms a seat for a long rod 50; in this manner a possible deflection of the rod 50 at an intermediate position between its lateral fixations (not shown) to the wall is reliably prevented. The seat 101 conforms to the shape of the round – section rod 50, and the latter projects outwardly from the seat 101, for more than half of its circumference,
- 25 in such a way that the rolling element 2 is not hindered by the cylindrical sustaining element 2 of the rod 50 during its passage above and beyond it. The base 103 of the sustaining element 100 is connected by screws passing through holes 104 to the wall or the like.

From the above description and drawings it can be seen that these devices, and their practical embodiments, clearly differ from the present state of the art with regard to the problems proposed, and to the objects, the latter being fully achieved.

Any constructive detail which has been described and exemplified, and which is
5 necessary to solve these problems, could be replaced by other technically equivalent means. In the same way, during tests or in practical solutions, according to the proposed embodiments, the materials employed and the shapes and dimensions, will be those suited for the respective requirements.

CLAIMS

1. A device for supporting and displacing curtains, comprising a support member (1; 27; 38; 49; 90) for supporting the curtain, suited for connection to a drive means (20), characterised in that it comprises rolling elements (2) apt to contact, in a rolling manner, the external surface of rods (50) or cables with a substantially circular cross-section, the said rods (50) on which said rolling elements (2) may displace themselves, being devoid of longitudinal guides or rails used to perform said displacement, and said rolling elements (2) comprising for each support member (1; 27; 38; 49; 90) at least a wheel or roller (2) having a circular groove or central circular channel (3), conforming to the circular cross section of said cable or rod (50).

2. A device for supporting and displacing curtains, comprising a support member (62) for supporting the curtain, suited for connection to a drive means, characterised in that it comprises rolling elements (2) apt to contact, in a rolling manner, the external surface of rods (50) with a substantially circular cross-section, the said rods (50) on which said rolling elements (2) may displace themselves, being devoid of longitudinal guides or rails used to perform said displacement, and said rolling elements (2) comprising, for each support member (62), at least two transversally spaced apart rollers (2), having preferably a cambered cross-section, and whose axes enclose an angle ensuring the stability of the curtain and conforming to the rod shape; the said at least two rollers (2) being incorporated in an annular structure which may also be assembled from separate parts (63, 64, 65).

3. A device according to claim 1, characterised in that according to an embodiment especially suited for cables and steel rods, said element (2) has a recess (3) with a bottom (4), located between parts (1') forming said support member (1), which

usually is made of plastic polymers with fillers.

4. A device according to claims 1 and 3, characterised in that it comprises said element (2), which is made of brass or plastic polymers, and has raised portions (5) with inclined sides (6) arranged outwardly with respect to vertexes (7), and with ends (8) of a zone (9) including a cavity (10).
5. A device according to claims 1 and 4, characterised in that said cavity (10), arranged orthogonally, receives sectors (12), which preferably are sintered when said element (2) is made of plastic polymers.
6. A device according to claims 1 and 3 to 5, characterised in that it comprises said support member (1) made of plastic polymers, including a bifurcation (14) with terminals (13) conforming to said cavity (10), and further including straight sides (15) above inclined sides (16) with reinforcements (17), arranged above opposite sectors (18) disposed parallelly to the perpendicular axis of the support member (1).
7. A device according to claims 1 and 6, characterised in that said sectors (18) are connected by means of a connector (21), and have holes (19) adapted to drive means (20).
8. A device according to claims 1 and 7, characterised in that said connector (21) comprises a plurality of connecting sectors (22) between slits (23), having protrusions (24) conforming a recess (25) inside a cavity (26).
9. A device according to claim 1, characterised in that said element (2) is made of treated wood, and is connected to a support member (1), of metallic wire, the latter having terminals (13) which are bent from a bifurcation (14), and is twined to form

an annular sector (18).

10. A device according to claim 1, characterised in that it comprises a support member (27), suited to be used with cables whereon the elements (2), usually made
5 of polymer plastics, can roll, said support member (27) comprising wheels (2) formed by at least two parts (28) including partial zones of said recess (3) and bottom (4), the latter being arranged between raised parallel portions (29) having planar vertexes (30).

10 11. A device according to claims 1 and 3 to 10, characterised in that said parts (28) of the rolling element are mutually connected by said connector (21), and in that said support member (27) is adapted to the size of said element (2) and has a shell (31), which is preferably metallic, laminar, and semi-elliptic.

15 12. A device according to claims 1 and 11, characterised in that it comprises said element (2) supported on an axis (32) made of plastic polymers including a filler, said axis being provided with a head (33) located on a shaft (34) extending to an extremity (35), and the latter having ridges or edges (24) sized according to a sensible recess (25) disposed inside a cavity (36), in a body (37) with a
20 corresponding head (33').

13. A device according to claim 1, characterised in that it comprises a support member (38) especially suited for rods for "vetrage" sticks, wherein said element (2) consists of two half-spheres (39) including zones of said recess (3) and bottom (4),
25 said half-spheres being connected by said connector (21).

14. A device according to claims 1 and 13, characterised in that it comprises said element (2) supported by an axis (40) having ends (41) removably introduced inside

cavities (42) obtained on vertical portions (43) arranged between arcuated portions (44, 45) of a shell (46), the latter being preferably semi-rigid and made of brass.

15. A device according to claims 1 and 14 , characterised in that it comprises said
5 element (2) supported by a plurality of sintered sectors (47) , and an interposed elastic means (48) which allows displacements of said ends (41) inside said cavities (42).

16. A device according to claim 1, characterised in that, according to an embodiment
10 suited for wooden or metallic rods (50), it comprises a support member (49) having a shell (51) which normally is sensibly elastic, convex, and made of brass, this shell having arcuated portions (52,53) with unequal shape, and said element (2) being arranged between diametrically opposite straight portions (54).

15 17. A device according to claims 1 and 16, characterised in that it comprises said element (2) which is formed by parts (55) connected by said connector (21) , supported on an axis (56) having ends (57) located inside cavities of said zones (54) of said shell (51) and between small rollers (58) of steel, the latter being received in hollow protrusions (59) formed on said parts (55).

20

18. A device according to claims 1 and 17, characterised in that it comprises said shell (51) with edges (56) provided with sectors (61) formed by said elastomers.

19. A device according to claim 2, characterised in that it has a support member (62),
25 especially designed for said rods (50) and formed of various parts (63,64,65) of plastic polymers.

20. A device according to claims 2 and 19, characterised in that two parts (63, 64) of

said parts (63, 64, 65) are connected by a plurality of said connectors (21) , and said two parts (63, 64) being connected to a further part (65) which is integrally formed, and also to an element (66) which preferably is laminar and is made of brass.

- 5 21. A device according to claims 2 and 20, characterised in that it comprises an element (66) inside a recess (67') between raised perimetral edges (68') of said parts (63, 64), enclosing a plurality of cylindrical elements (2), having spherical ends (67) located inside a shaped recess (68); said elements being tangent to said rods (50).
- 10 22. A device according to claims 2 and 21, characterised in that it comprises various opposite slits (70) which are associated with curved terminals or ends (71) of said element (66), said slits being located on the apex (69) of said parts (63, 64).
23. A device according to claims 2 and 22, characterised in that said two parts
- 15 (63,64) are inserted on protrusions (72) of vertexes (73) of a bifurcation (74) of said integrally formed body (65), wrapped by said element (66), whose dorsal side is provided with a known annular sector (75).
24. A device according to claims 2 and 23, characterised in that between said slits
- 20 (70) and parts (63,64) , there is provided a means (76) formed of said elastomers or similar materials, which co-operates with dorsal sides of said rods (50).
25. A device according to claims 2 and 24, characterised in that said part (65), particularly for determining motionless states of the curtains, comprises inside a
- 25 cavity (77), a locking device (78) including a body (79) on a shaft (80), and with a head (81) provided with edges (82) conforming to a sector (83) made of said elastomers, associated to said rods (50), said head facing an elastic means (84) and a planar zone (85) which has a bore (86) adapted to said shaft (80), and with a pad (88)

and a hole (89) for said drive means (20).

26. A device according to claim 1, characterised in that it comprises a support member (90) with a shell (91) formed by two parts (92, 92'), wherein each of these
5 parts comprises partial zones of a cavity (77).

27. A device according to claim 1 and 26, characterised in that it comprises said element (2), preferably made of plastic polymers, having a recessed configuration conforming to the shape of said rods (50), and having sides (94) with spheres (95)
10 inserted inside recesses (96) adapted to their shape, said recesses being arranged on opposite sides (97) of said parts (92, 92') which have frontal isolating sectors (61), and said parts being interconnected by means of a plurality of said connector components (21 to 26) in positions (93') which preferably are intermediate between outer and inner edges (98, 99) thereof.

15

28. A device according to one or more of the preceding claims 1 to 27, characterised in that it comprises a plurality of said elements (2), which are arranged on a shell body base, which is usually fixed and made of the aforesaid materials.

20 29. A device according to claims 1, 13, 17, characterised in that it may comprise toric elastic rings on bottoms (4) of said element (2).

30. A device according to claims 1 and 29, characterised in that it comprises said element (2) with or without said toric rings in said devices (1, 27, 38), said toric
25 rings being adapted to said rods or cables or to conforming metallic and/or plastic section bars, which are extruded or laminated accordingly.

31. A device according to claims 1, 14, 16, 17, characterised in that said shells

(31,49,51) are obtained from sectioned sectors of extruded bars, preferably of light alloys.

32. A device according to one or more claims 1 to 31, characterised in that said
5 elements (2), said shells (31,49,51) , and said parts (63,64 and 92,93) are made of pigmented or neutral polymers or glass, or else of treated wood and metal alloys, or finally of light anodised alloys.

33. A device according to claims 1 to 32, characterised in that said support members
10 (1, 27, 38, 49, 62, 90) are automatically driven by related drive means, in particular by toothed belts or cables having continuous rings.

34. A device according to claims 1 to 33, characterised in that said rods (50) are
rotatable and have helical peripheral protrusions, and may be rotated by mechanized
15 drive means, and in case the rotation is automatically performed, said means may comprise radio-wave apparatus, light intensity sensors, or sensors for detecting the environmental temperature or the outside temperature.

35. A device according to one or more of the claims 25, 28, 32, 33, characterised in
20 that said locking device (78) has sectors (83) associated to said support members, and/or sensors and related mechanical means interlocked to said apparatus, including said pad (88) on said shaft (80).

36. A device according to claims 2 and 35, characterised in that it comprises said
25 locking device (78), which may be associated to said support members (62), or to conventional support members sliding on said wooden or metallic means.

37. A device according to claim 1, wherein the support member (1) has a

discontinuous bifurcation (14') in order to be able to pass beyond and above intermediate cylindrical support elements for rods (50), cables, or the like.

38. A combination between a device according to claim 36, and a cylindrical support
5 element (100) for rods (50), cables, or the like, wherein said support element (100) is provided with a recess (101) in its distal end (102), forming a seat (101) for part of the circumference of the rod (50), cable or the like.

AMENDED CLAIMS

[received by the International bureau on 17 May 2001 (17.05.01);
original claims 1 – 38 replaced by new claims 1 – 17 (7 pages)]

1. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (14', 18') for supporting the curtain, suited for connection to a drive means (20), and a rolling element (2) apt to contact, in a rolling manner, the external surface of a rod (50) with a substantially circular cross-section, the said rod (50) on which said rolling element (2) may displace itself, being devoid of longitudinal guides or rails used to perform said displacement, and said rolling element (2) being formed by a wheel or roller (2) having a circular groove (3) conforming to the circular cross-section of said rod (50), characterised in that said support member (14', 18') is formed by a discontinuous bifurcation (14'; 18') realised in the form of a twined wire, in order to be able to pass beyond intermediate cylindrical support elements (100) of the rod (50), said cylindrical support elements (100) having a recess (101) in their distal ends (102), forming a seat (101) for part of the circumference of the rod (50).
2. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (1) for supporting the curtain, suited for connection to a drive means (20), and a rolling element (2) apt to contact, in a rolling manner, the external surface of a rod (50) or a cable with a substantially circular cross-section, the said rod (50) on which said rolling element (2) may displace itself, being devoid of longitudinal guides or rails used to perform said displacement, and said rolling element (2) being formed by a wheel or roller (2) having a circular groove or central circular channel (3), conforming to the circular cross-section of said rod (50) or cable, said element (2) having said circular groove or central circular channel (3) with a bottom (4), being located between parts (1') forming said support member (1), said element (2) having raised portions (5) with inclined sides (6) arranged outwardly with respect to vertexes (7), and ends (8) of a zone (9) including a cavity (10), characterised in that :

- said cavity (10) receives sectors (12) made of sintered material, to reduce friction, when said element (2) is made of plastic polymers;
 - said parts (1') have upper terminals (13) conforming to said cavity (10), and lower opposite sectors (18) connectable by means of a connector (21), with holes (19)
 - 5 adapted to receive said drive means (20);
 - said connector (21) comprises a plurality of connecting sectors (22) arranged between slits (23), and having protrusions (24) to engage a recess of a cavity (26) formed on the opposite sector (18).
- 10 3. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (27) for supporting the curtain and suited for connection to drive means (20), and a rolling element (2) apt to contact in a rolling manner the external surface of a cable, with a substantially circular cross-section, the said rolling element (2) having a central circular channel (3) with a
- 15 bottom (4) conforming to the circular cross section of said cable, characterised in that:
- said rolling element (2) is a wheel formed by two parts (28), the latter defining partial zones of said central circular channel (3) and bottom (4) arranged between raised parallel portions (29) with planar vertexes (30);
 - 20 - said two parts (28) of the wheel (2) are mutually connected by a connector (21);
 - said support member (27) is adapted to the size of the wheel (2) and has a shell (31) which is preferably metallic, laminar and elliptic;
 - said wheel (2) is supported on an axis (32), and said axis is formed by mutually connectable parts (34, 37), including a head (33) located on a shaft (34) extending to
 - 25 an extremity (35) with ridges (24) sized according to a recess (25) formed inside a cavity (36) of the other part (37), the latter having a similarly shaped head (33').
4. A device for supporting and displacing curtains, used together with other devices

of the same kind, comprising a support member (38) for supporting the curtain, suited to be connected to a drive means (20), and a rolling element (2) apt to contact, in a rolling manner, the external surface of rods (50) with a substantially circular cross-section, the said rod (50) being devoid of longitudinal guides or rails used to perform said displacement, and said rolling element (2) forming a wheel or roller (2) with a circular groove (3), conforming to the circular cross-section of said rod (50), characterised in that :

- the element (2) is formed by two parts, preferably two half-spheres (39) defining partial zones of said circular groove or recess (3) and bottom (4), and the half-spheres being connected by a connector (21);
- the element (2) is supported by an axis (40), having ends (41) introduced in a removable way inside cavities (42) obtained on vertical portions (43) arranged between arcuated portions (44, 45) of a shell (46), the latter being preferably semi-rigid and made of brass;
- said element (2) is supported on said axis (40) by a plurality of sintered sectors (47), and an interposed elastic means (48) is provided to allow the introduction or the removal of said ends (41) inside or from said cavities (42).

5. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (49) for supporting the curtain, suited to be connected to drive means (20), and a rolling element (2) apt to contact, in a rolling manner, the external surface of a rod (50) with a substantially circular cross-section, on which said rolling element (2) may be displaced, the said rod (50) being devoid of longitudinal guides or rails used to perform the displacement, and the rolling element being formed by a roller (2) having a circular groove adapted to the shape of the rod (50), characterised in that:

- said support member (49) comprises a shell (51), which is substantially elastic, convex, and is preferably made of brass; said shell (51) having arcuated portions

(52, 53) with unequal shape, and said element (2) being arranged between diametrically opposite straight portions (54) of the shell (51);

- said element (2) is formed by parts (55) connected by a connector (21), and is supported on an axis (56) having ends (57) located inside cavities of said straight portions (54) of the shell (51), and between small steel rollers (58) which are received in hollow protrusions (59) formed on said parts (55) of the roller (2).

6. A device according to claim 5, characterised in that said shell (51) has edges (56) provided with sectors (61) made of an elastomer or like material, used to absorb impact energy and reduce noise when two similar devices (49) come close to each other during the movement of the curtain performed by said drive means (20).

7. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (62) especially designed for a rod (50), and suited to be connected to drive means (20), said device further comprising rolling elements (2), apt to contact in a rolling manner the external surface of said rod (50) with a circular cross-section, said rod (50) being devoid of longitudinal guides or rails used to perform said displacement, and said rolling elements (2) comprising at least two transversally spaced apart rollers, preferably with a cambered cross-section and whose axes enclose an angle ensuring the stability of the curtain and conforming to the rod shape, characterised in that :

- said at least two rollers (2) are substantially incorporated inside an annular structure which may be assembled from separate parts (63, 64, 65);
- said separate parts (63, 64, 65) are preferably made of plastic polymers.

8. A device according to claim 7, characterised in that two parts (63, 64) of said parts (63, 64, 65) are connected together by a plurality of connectors (21), and said two

parts (63, 64) are connected to the remaining part (65) which is integrally formed, and also to an annular element (66) which preferably is laminar and is made of brass.

- 5 9. A device according to claim 8, characterised in that said annular element (66) is received in a recess (67') between raised circumferential edges (68') of said parts (63, 64, 65) which enclose a plurality of rollers (2) with spherical ends (67) located inside a shaped recess (68); said rollers (2) being tangent to said rod (50).
- 10 10. A device according to claim 9, characterised in that it comprises various opposite slits (70) which are associated with curved ends (71) of said element (66), said slits being located on the apex (69) of said parts (63, 64).
11. A device according to claim 10, characterised in that said two parts (63, 64) are
15 inserted on protrusions (72) of vertexes (73) of a bifurcation (74) of said integrally formed body (65), which is enclosed by said annular element (66), whose dorsal side is provided with a known annular sector (75).
12. A device according to claim 11, characterised in that between said slits (70) and
20 parts (63, 64), there is provided a means (76) made of an elastomer or similar material, which co-operates with a dorsal side of said rod (50).
13. A device according to claim 12, characterised in that said part (65), particularly for determining motionless states of said curtains, comprises inside a cavity (77) a
25 locking device (78) including a body (79) on a shaft (80), and a head (81) provided with edges (82) conforming to a sector (83) made of said elastomer, apt to engage said rod (50); said head (81) facing an elastic means (84) and a planar zone (85) with a bore (86) adapted to said shaft (80); a pad (88) and a hole (89) being provided on

the shaft (80), and the hole (89) being apt to engage said drive means (20).

14. A device for supporting and displacing curtains, used together with other devices of the same kind, comprising a support member (90) for supporting the curtain,
5 which is suited to be connected to a drive means (20), and comprising further a rolling element (2) apt to contact, in a rolling manner, the external surface of a rod (50) having a substantially circular cross-section, said rod (50) being devoid of longitudinal guides or rails used to perform said displacement, said rolling element being formed by a roller (2) having a shape adapted to the shape of the rod (50),
10 characterised in that:
- said support member (90) is a shell (91) formed by two parts (92, 92'), wherein each of these parts comprises partial zones of a cavity (77);
 - said roller (2) is substantially totally incorporated inside the support member (90);
 - said roller (2) is preferably made of plastic polymers;
 - 15 - said roller (2) has sides (94) with spheres (95) inserted inside recesses (96) adapted to the shape of the spheres (95); said recesses (96) being arranged on opposite sides (97) of said parts (92, 92') which preferably have frontal isolation sectors (61), and said parts (92, 92') being interconnected by means of a plurality of connector components (21 to 26) in positions (93) which preferably lie between outer
20 and inner edges (98, 99) of the support member (90).

15. A device according to claim 2, 4 or 5, characterised in that the rolling element (2) comprises toric elastic rings on its bottom (4).

- 25 16. A device according to claims 3, 4 or 5, characterised in that said shell (31; 46; 51) is made of sectioned sectors of extruded bars, preferably of light alloys.

17. A device according to any of the preceding claims, characterised in that said

support members (1, 27, 38, 49, 62, 90) may also be automatically driven by associated drive means, in particular by toothed belts or the like.

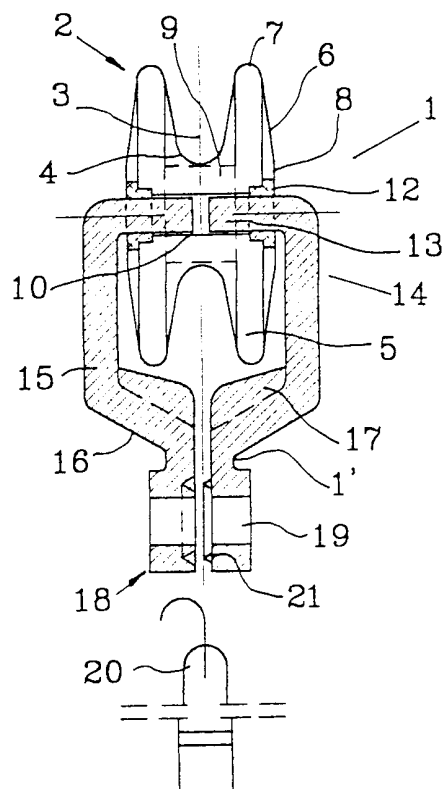


FIG. 1

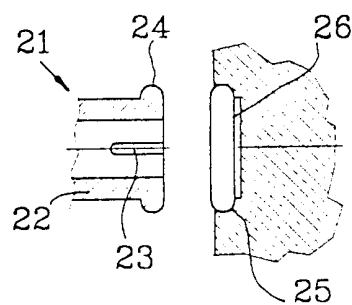


FIG. 2

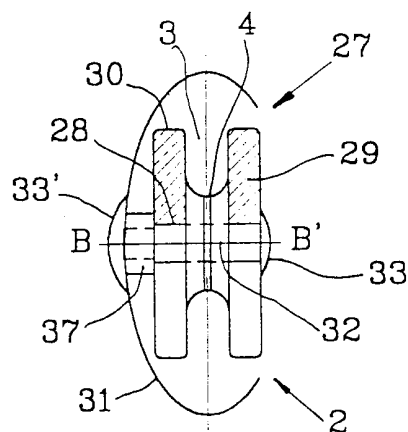


FIG. 3

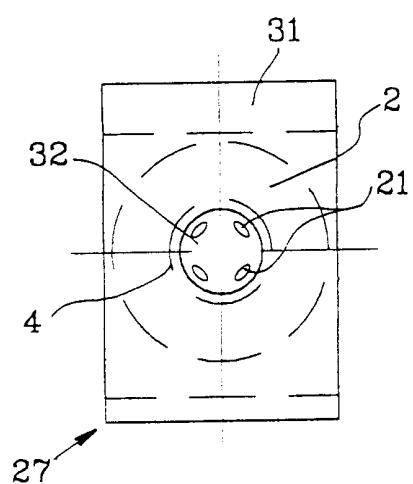


FIG. 4

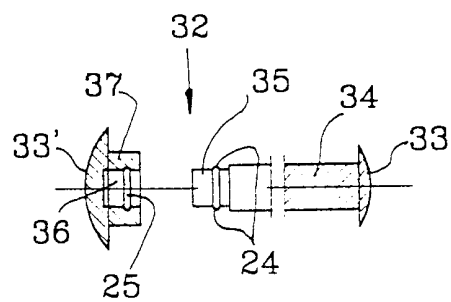


FIG. 5
B-B'

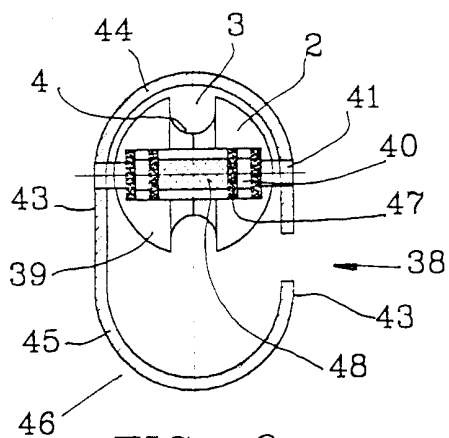


FIG. 6

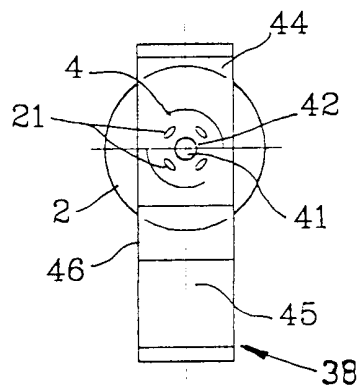


FIG. 7

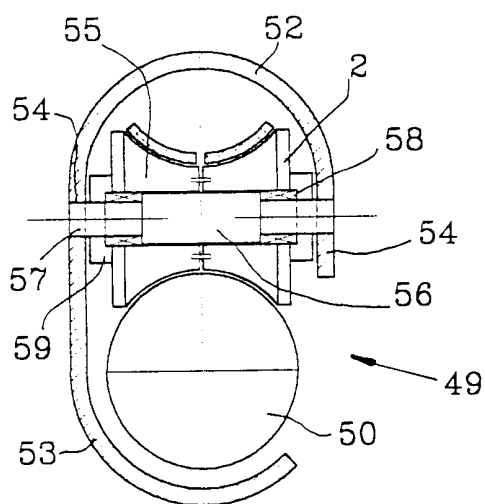


FIG. 8

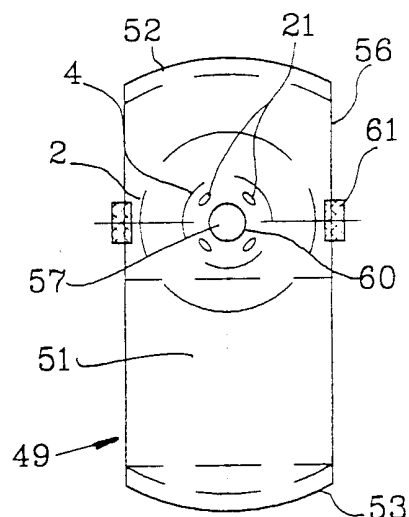


FIG. 9

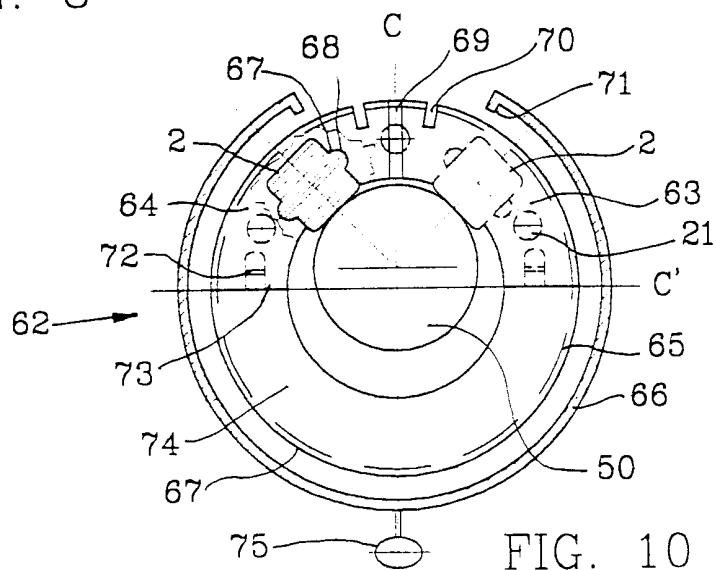


FIG. 10

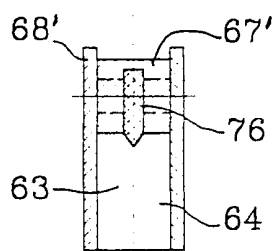


FIG. 11
C-C'

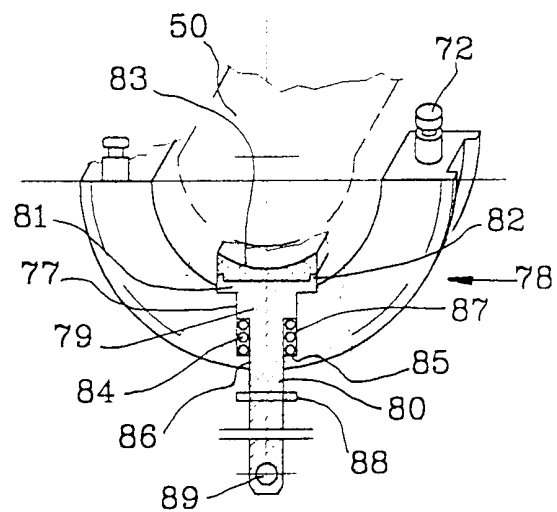


FIG. 12

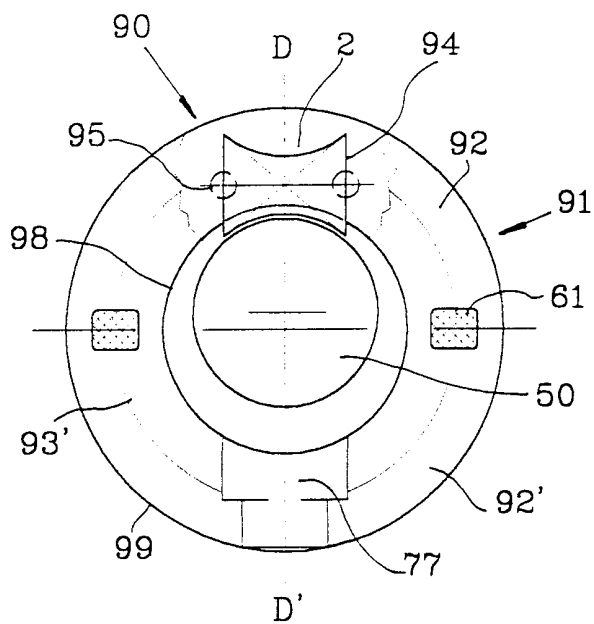


FIG. 13
D'

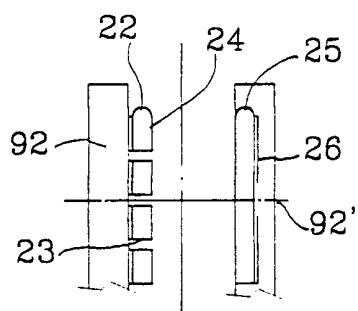


FIG. 15

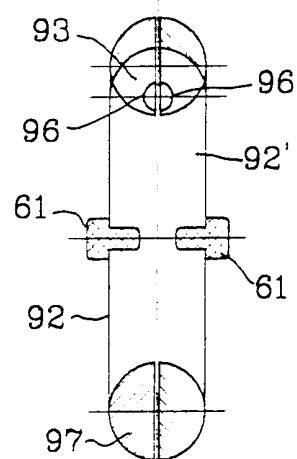


FIG. 14
D-D'

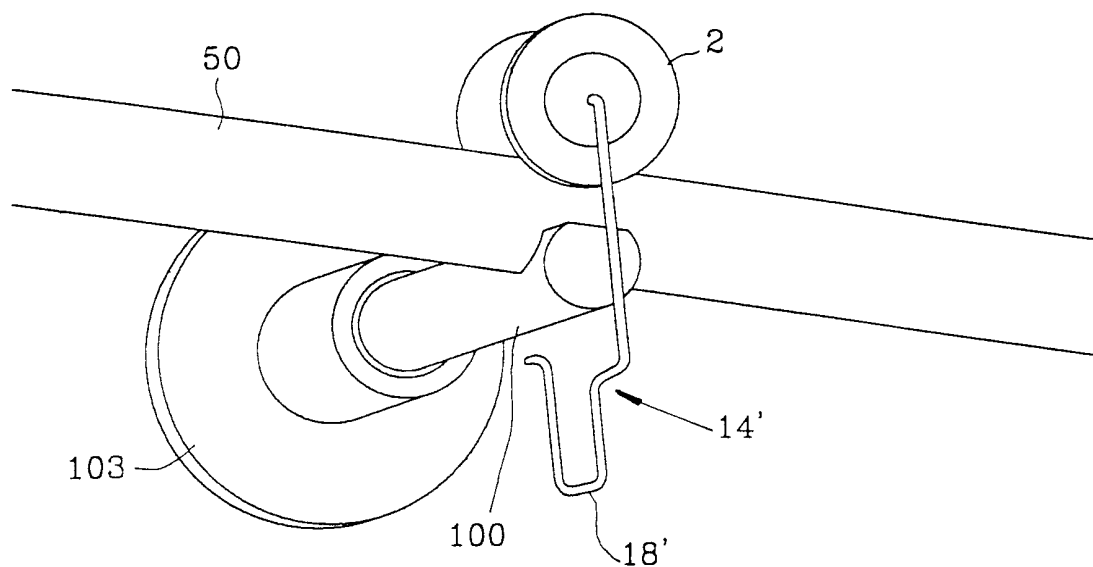


FIG. 16

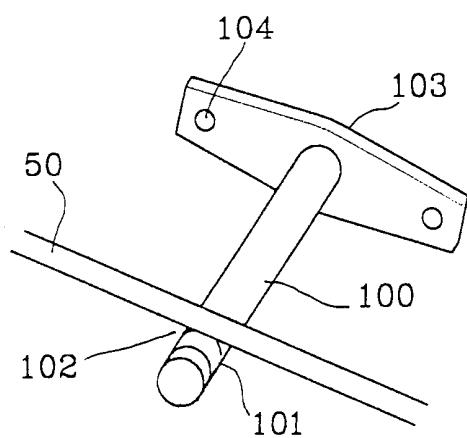


FIG. 17

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 00/00500

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47H15/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 802 348 C (G. GRASSER) 28 December 1950 (1950-12-28) the whole document	1, 3
Y		4, 10
A		16
X	US 1 598 669 A (G. ANGEVINE) 7 September 1926 (1926-09-07) page 1, line 70 -page 2, line 23; figure 1	1, 3
Y	GB 254 058 A (E. CHALMER) 1 July 1926 (1926-07-01) figure 2	4
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *O* document referring to an oral disclosure, use, exhibition or other means
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- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

21 March 2001

Date of mailing of the international search report

27/03/2001

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INTERNATIONAL SEARCH REPORT

Int. l. Application No

PCT/IT 00/00500

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 591 897 A (E. CHALMER) 21 July 1925 (1925-07-21) page 2, line 30 - line 54 page 3, line 36 - line 55; figures 1,2,6,7	2
Y	----	10
A	GB 575 201 A (W. GOOSEY) 7 February 1946 (1946-02-07) the whole document -----	11,16-18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 00/00500

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 802348	C	NONE	
US 1598669	A	07-09-1926	NONE
GB 254058	A	NONE	
FR 591897	A	21-07-1925	NONE
GB 575201	A	NONE	