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(54) Device for displaying changing advertisements applied via an adhesive film

(57) A device for displaying changing advertisements comprising a frame (1) supporting a couple of rollers (4a, 4b), a band (6) carrying the advertisements, extending between the rollers (4a, 4b), and motor means connected to said frame (1) and engaging with the rollers (4a, 4b) for operating alternatively one of them, thus controlling the winding of the band thereon. Band (6) comprises a one-piece base sheet (20) and a number of pre-printed film portions (21), fit to be removably connected to the outer face of the base sheet (20) for forming the advertisements thereupon. The device may also comprise brake means (14) for continuously slowing down the rollers (4a, 4b), supported by the frame (1), the motor means (9) comprising respective geared motors (9), associated to the rollers (4a, 4b).

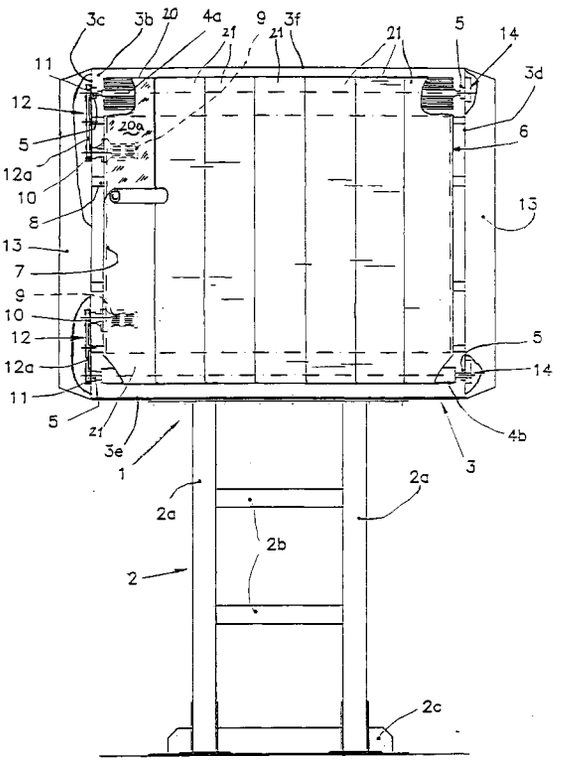

Fig. 1

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Description

[0001] The present invention relates to the field of devices for displaying changing advertisements and namely it concerns a display device with a continuous motor-driven carrier band.

[0002] In known devices for displaying changing advertisements, a continuous band is unwound with an intermittent motion between a couple of parallel, duly spaced rollers, supported within a box-shaped frame having a suitable opening. Thus, a number of advertisements carried by the band are displayed in succession through the opening of the frame. When the band is completely unwound from a roller, the motion thereof is reversed, and the advertisements are displayed in an opposite order.

[0003] The motion of the band is controlled by an electric motor, which operates intermittently one roller or the other, via suitable means, depending on the direction of said motion. The rollers are provided with a freewheel system, whereby each roller can idle in the direction of rotation which is opposite to the operation one. As a consequence, when one of the rollers is operated, causing the band to be wound around it, the unwinding of the band from the other roller is assisted. A device for blocking the rollers against rotation operates when the motion of the band is stopped, so that the latter is kept still during the displaying phase of each advertisement.

[0004] The bands which are commonly used in the above described devices are formed by a number of consecutive portions, connected each other in a removable way, each of them carrying a single advertisement. This system permits to remove and replace each advertisement independently, thus being a much satisfactory solution when compared to one-piece band systems. In fact, a one-piece band has to be completely replaced even when just a single advertisement has become out-of-date. The connection between the adjacent pieces is accomplished by means of metal hinges.

[0005] However, the procedure of replacement of an advertisement is not a very simple one. After having remarkably loosened the band, the piece to be replaced has to be removed by pulling out the metal pivot pins of the hinges. Then, the pins have to be set back in position to connect a new piece to the rest of the band. Such procedure is long and difficult and has to be accomplished by specialised workers.

[0006] Known devices are not fully satisfactory also as far as their operation is concerned. Firstly, the supplementary width brought about by the hinges may cause an irregular winding of the band over the rollers, involving undesirable sliding phenomena, distortions of the images and/or writings in the advertisement, and an early wear of the band. Besides, the hinges reduce the strength of the band, and for this reason the tension of the band is kept modest. This involves uncontrolled sliding phenomena in the band, resulting in folds which, besides making it difficult to read the advertisements, may give rise to a dangerous overload of the whole structure, due to the effect of the wind.

[0007] An unsuitable tension of the band occurs especially when its motion stops, the band tending to unwind excessively from the relevant roller, which rolls idly. As a consequence, when the blocking system acts, the band has already formed apparent folds.

[0008] On the other hand, the unsmooth motion of the band, also in its starting step, can easily cause failures of the mechanical components. The problem is even more serious when the band is remarkably long and wide, to the extent that in many cases one is compelled to limit the number and the size of the advertisements to be displayed.

[0009] It is an object of the present invention to overcome the above mentioned drawbacks, providing a device for displaying changing advertisements with a continuous motor-driven carrier band which can be put under a suitable tension in order to assure a fully satisfactory operation, in particular as far as the legibility of the advertisements is concerned.

[0010] A particular object of the present invention is to provide a display device of the above mentioned kind which, thanks to a more effective control of the sliding of the band, can assure a suitable tension thereof in any condition and even when the size of band itself increases to a reasonable extent, thus always permitting a good legibility of the carried advertisement.

[0011] According to the invention, said objects are achieved with a device for displaying changing advertisements comprising a frame supporting a couple of rollers, a band carrying the advertisements, extending between the rollers, and motor means connected to the frame and engaging with the rollers for operating alternatively one of them, thus controlling the winding of the band thereon. The device is characterised by the fact that the band comprises a one-piece sheet and a number of pre-printed film portions, fit to be connected to the outer face of the base sheet for forming said advertisements thereupon.

[0012] In a preferred embodiment of the device according to the invention, a printable PVC film is used, of a type that is known for similar purposes. The film is made adhesive by means of an acrylic glue which assures a removable connection. The adhesion of the film, although quite strong - i. e. such that detachment phenomena can not occur even when bending stresses affect the band when it slides - is wholly removable. To achieve this result, the outer side of the base sheet provides a PVC coating as well, having a smooth surface preventing the adhesion with respect to oils and fat substances in general.

[0013] In this way, the strength of a one-piece band, and then the possibility of establishing a suitable tension in order to assure a perfect legibility of the advertisements and to make the effects of the wind negligible, does not affect the opportunity of easy replacing the advertisements. On the contrary, such operation can be

fulfilled much more easily than in the case of modular bands, simply tearing away from the base sheet the film portions of the out-of-date advertisement and replacing them with new ones. The operation is carried out on the outside of the device, without needing to unmount the band or even to loosen it.

[0014] The lack of the portion-connecting hinges results in a uniform thickness of the band. Thanks to this, its winding on the rollers is particularly regular.

[0015] Another important advantage accomplished by the invention is in connection with the simplicity and the low cost of the print on the film, which can be carried out with flexographic, typographic and offset methods and which can be followed by overprint operations, e.g. needle ones.

[0016] Advantageously, in order to further assist a more effective control of the sliding of the band, and thus a suitable tensioning thereof, the display device according to the invention comprises brake means for continuously slowing down the rollers, supported by the frame. The motor means further comprise respective geared motors, associated to the rollers.

[0017] Further features and advantages of the device for displaying changing advertisements applied via an adhesive film according to the present invention will be apparent from the following description of an embodiment thereof, given as an example and not limitative, with reference to the attached drawings wherein:

- figure 1 is a front view of the motor-driven display device according to the invention, partly broken, some parts being omitted;
- figure 2 is a schematic side view of the device of figure 1;
- figure 3 shows a brake system of the rollers of the device of figure 1
- figure 4 is a cross sectional view of the device taken along lines IV-IV of the assembly of figure 3.

[0018] With reference to the above figures, the display device according to the invention comprises a frame 1, formed in a substantially conventional way by a support 2, with two uprights 2a standing from a base 2c fit to be fixed to the ground. Uprights 2a are mutually connected by cross members 2b and hold a substantially parallelepiped box like portion 3. In greater detail, box like portion 3 comprises a bottom wall 3e, connected to uprights 2a, from the edges of which a front wall 3a, a back wall 3b and opposite side walls 3c, 3d orthogonally extend, respectively. Front wall 3a is indicated in figure 2 but has been omitted in figure 1 for the sake of clarity. Box like portion 3 comprises also a cover wall 3f and shells 13, connected to side walls 3c and 3d and defining in cooperation therewith respective chambers in which the components, described hereinafter, supported by said walls, are located and protected.

[0019] Two parallel rollers 4, an upper one 4a and a lower one 4b, extend between side walls 3c, 3d of box like portion 3. Rollers 4a and 4b are placed adjacently to cover wall 3f and bottom wall 3e, respectively, and are supported by side walls 3c, 3d via bearings 5 of a known type, not described in detail. A bearing 5 can be seen in particular in figure 5.

[0020] A band 6 is connected to rollers 4 so as to be windable around them, a part of it being stretched between the same rollers 4 adjacently to front wall 3a, substantially in a parallel way thereto. Band 6, shown in the figures in an arrangement almost completely wound around upper roller 4a, carries on the outer face a series of advertisements, which can be seen from the outside through an opening 7 formed in front wall 3a. The outline of opening 7 is indicated with a dashed line in figure 1.

[0021] In greater detail, with reference namely to figure 1, band 6 is formed by a base sheet 20 made of a woven layer, strengthened by a polyester impregnation and provided on the outer side 20a with a white, dull PVC coating having a smooth surface preventing the adhesion of oils and fat substances in general. The coating is about 0.5 mm thick, while the overall thickness of base sheet 20 is about 2 mm.

[0022] PVC film portions 21, having a thickness of 70÷80 μm, are prepared applying on one side an acrylic glue coating, about 25 μm thick, and printing on the other side respective sections of advertisements to be composed. Thus, film portions 21 are stretched over outer side of base sheet 20, in order to compose the advertisements. The operation is accomplished when base sheet 20 has already been installed, acting from the outside of frame 1, through opening 7 which makes band 6 accessible. In the depicted embodiment film portions 21 consist of strips having a length substantially equal to the height of the advertisement to be composed, said strips being placed side by side on base sheet 20 so that the complete width of the advertisement is covered.

[0023] The extension of band 6 is assisted by a skeleton 8 placed between back wall 3b an side walls 3c, 3d of frame 1. Skeleton 8 comprise a quadrilateral panel 8a which defines a guiding passageway of band 6, in co-operation with front wall 3a and in correspondence with opening 7. Although not shown in the figures, openings are formed in panel 8a, so that the band can be illuminated from the back by light means, which are optional and not depicted in the figures, thus permitting the legibility of the advertisements at night.

[0024] Rollers 4 are connected for operation to respective geared motors 9 via drive means 12 comprising a cog belt 12a. Motors 9 are supported inside box-like portion 3, by one of the side walls, in the depicted example that indicated at 3c. More precisely, each belt 12a engages with pulleys 10 and 11 supported on the outer face of side wall 3c respectively by the free end of the driving shaft of a motor 9 and by the free end of the relevant roller 4a, 4b.

[0025] Each geared motor 9 operates the relevant roller 4a, or 4b in order to control the winding of band 6 around it. At the same time band 6 is unwound from the

other roller 4b or 4a, the stretched part thereof sliding upwards or downwards when the upper roller 4a or the lower one 4b is operated, respectively. Therefore, said operation occurs in opposite directions of rotation in the two rollers, i.e. with reference to the view of figure 2 counterclockwise for upper roller 4a and clockwise for lower one 4b.

[0026] The above described motion of the band is allowed owing to the fact that each pulley 11 is connected to the relevant roller 4 via a conventional freewheel system, letting the roller itself rotate idly in the direction opposite to the operation one and thus assisting the unwinding of band 6 when it is pulled by the operation of the other roller controlled by the relevant motor 9.

[0027] Each roller 4 is associated to a brake system 14, supported by side wall 3d and engaging with the relevant end of the roller, i. e. the end opposite to the operation one. Brake system 14 associated to roller 4b is shown in detail in figures 3 and 4 and comprises a couple of brake shoes 15 pivotally supported by outer face of panel 3d.

[0028] Semicylindrical seats 16 are symmetrically formed in shoes 15, in correspondence to the distal end thereof. Seats 16 are lined by respective halves 17a of a bushing 17, which in this way can grip the end of roller 4b extending outwards from side wall 3d. A screw 18 engages with seats 19 formed transversally in shoes 15, in correspondence to the distal ends thereof, beyond seats 16. The rotation of screw 18 permits to adjust the grip action exerted by the two halves 17a of bushing 17, and then to reduce or increase the braking friction on roller 4b.

[0029] The device further comprises a PLC control system, not shown in the figures, arranged in an electric panel with other control and power electric components. The PLC system is provided with photoelectric sensors detecting the position of band 6, in a way which is obvious to a skilled person and thus not described in detail.

[0030] The work of the display device according to the invention is apparent from the above. Typically, the control system starts and stops the operation of one of the rollers 4a, 4b via the relevant geared motor 9, as a function of the inputs provided by the photoelectric sensors, until band 6, winding with an intermittent motion around the operated roller, displays all the carried advertisements, each of them being kept still in correspondence to opening 7 of front wall 3a for a predetermined time. When band 6 has been completely wound, the operation shifts to the other roller 4, so that the motion is reversed, and the advertisements are displayed in an opposite order. However, said motion can be reversed when the band is in correspondence of a different position from that completely wound/unwound, whereby the display cycle of the various advertisements can be actually programmed at will.

[0031] In order to compose the images and/or writings forming the advertisement, an operator has only to take care in matching the edges of film portions 21 each other, when these are applied on base sheet 20. However, possible errors can be easily remedied thanks to the fact that the adhesion is removable, whereby the film can be easily detached and applied once again in a correct position.

[0032] If an out-of-date advertisement must be replaced, it is made accessible through front opening 7, making band 6 slide. Then, the relevant film portions 21 are torn away from base sheet 20 and new ones can be applied. Removed film portions 21 can be directly wound around a cylindrical support and possibly used again for forming the same advertisement on another similar display device.

[0033] In general, and namely when the applied film replaces an out-of-date advertisement, it is advisable to clean the outer face 20a of base sheet 20, e.g. by means of heptane or other equivalent solvent, in order to remove dirt or adhesive particles of the previously applied film. In fact, said particles could prevent an effective adhesion.

[0034] When the temperature is very low, i.e. about 0° C or lower, the adhesive could lose, at least partially, its properties, making it difficult to remove and apply the film. This can be avoided by heating band 6, during such operations, by means a warm air flow which is fed into box-like frame 1 through side openings, not shown.

[0035] Adjustable brake systems permit to accomplish a smooth start of both rollers 4, when each operation is exerted. Besides, they assure a uniform rotation and a smooth stop of the rollers when band 6 moves and is stopped, respectively. In this way, an undue unwinding of band 6 is not permitted, and folds which could distort the images and/or writings of the advertisement are prevented. Said unwinding is prevented during the stop phase too, and so the stretched portion of band 6 is always kept in a flat condition.

[0036] In the display device according to the invention a geared motor 9 is associated to each roller 4, this permitting to choose small sized motors and simple and compact transmissions. Furthermore, motor 9 which is not working provides a supplementary braking action on the relevant roller 4. It will be apparent from the above that the problems related to the unsmooth motion of band 6 and to its inadequate stretching are solved in a fully satisfactory way.

[0037] Thanks to the above described advantageous features, the device according to the invention can effectively support and move a very long band 6, and consequently display quite a lot of advertisements. The adequate stretching of the band, assisted also by skeleton 8, prevents the tear thereof. In normal operating conditions the mechanical components of the device are never loaded abruptly, this resulting in an higher overall reliability when compared to that of prior art devices.

[0038] Screw 18 is adjusted periodically in order to maintain an effective braking action as bushing 17 gradually wears and thus loosens its friction action. In any case, bushing 17 can be easily replaced when com-

pletely worn. As an alternative to screw 18, brake shoes 15 can be provided with suitably loaded spring means, keeping bushing 17 elastically closed around the end of the relevant roller 4.

[0039] Even if the above described brake systems 14, being simple and effective, are considered advantageous, they may be replaced by equivalent solutions, e. g. electromagnetic friction systems. Besides, the accelerations in the start phase may be limited, with the purpose of increasing further the overall operation smoothness, by using inverters or analogous electronic start systems of motors 9.

[0040] The whole frame 1 can be advantageously built with anti-corrosion iron plates and sections. Obviously, the size of frame 1, as well as the overall power of the motors and the dimensions of all the components may vary as a function of the size and of the number of the advertisement to be displayed.

[0041] Variations and/or modifications can be brought to the device for displaying changing advertisements applied via an adhesive film according to the present invention, without departing from the scope of the invention as defined in the attached claims.

Claims

1. A device for displaying changing advertisements comprising a frame (1) supporting a couple of rollers (4a, 4b), a band (6) carrying the advertisements, extending between said rollers (4a, 4b), and motor means connected to said frame (1) and engaging with the rollers (4a, 4b) for operating alternatively one of them, thus controlling the winding of the band thereon, characterised by the fact that said band (6) comprises a one-piece base sheet (20) and a number of pre-printed film portions (21), fit to be removably connected to the outer face of said base sheet (20) for forming said advertisements thereupon.

2. The device according to claim 1, wherein said portions (21) are made of a printable PVC film, made adhesive by means of an acrylic glue which assures a removable connection.

3. The device according to claim 2, wherein said film has a thickness of 70÷80 μm, and is made adhesive by applying on one side thereof an acrylic glue coating about 25 μm thick.

4. The device according to any of the previous claims, wherein said base sheet (20) comprises a woven layer, on the side thereof (20a) aimed at supporting said film portions a PVC smooth coating being applied.

5. The device according to claim 4, wherein said PVC coating of said base sheet (20) is about 0.5 mm thick.

6. The device according to claim 4, wherein said PVC coating of said base sheet (20) has anti-adhesion properties with respect to oils and fat substances in general.

7. The device according to anyone of the previous claims, comprising brake means (14) for continuously slowing down said rollers (4a, 4b), supported by said frame (1), said motor means (9) comprising respective geared motors (9), associated to said rollers (4a, 4b).

8. The device according to claim 7, wherein said brake means (14) comprise a couple of pivotable brake shoes (15) for each roller (4a, 4b), respective transversal seats (16), having a substantially semicylindrical shape, being symmetrically formed in said shoes (15), said seats (16) being fit to grip an end of the relevant roller (4a, 4b), said brake means (14) further comprising means (18, 19) for adjustably closing said seats (16) around said end.

9. The device according to claim 8, wherein a bushing (17) is removably placed between said seats (16) of said brake shoe (15) and the end of the relevant roller (4a, 4b).

10. The device according to claim 8 or 9, wherein said adjustable closing means (18, 19) comprise screw means (18) extending between the free ends of said brake shoes (15).

11. The device according to claim 8 or 9, wherein said adjustable closing means are of an elastic type.

12. The device according to any of the claims from 7 to 11, wherein said geared motors (9) comprise inverter systems or analogous electronic start systems for assuring a smooth start thereof.

13. The device according to any of the previous claims, wherein a skeleton (8) is placed between said rollers (4a, 4b), comprising a panel (8a) which defines a guiding passageway of band (6), in co-operation with a front wall (3a) of said frame (1).

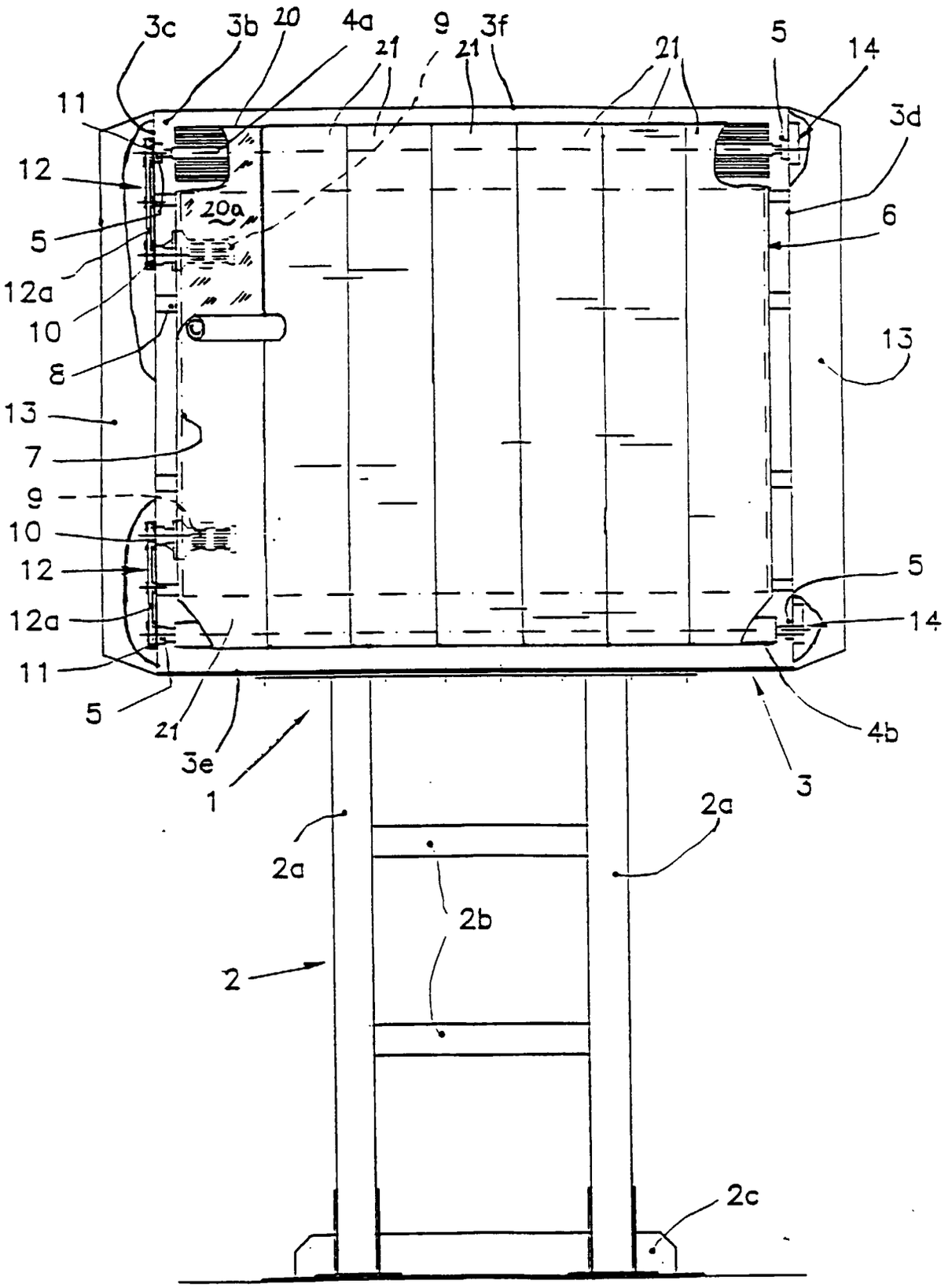
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Fig. 1

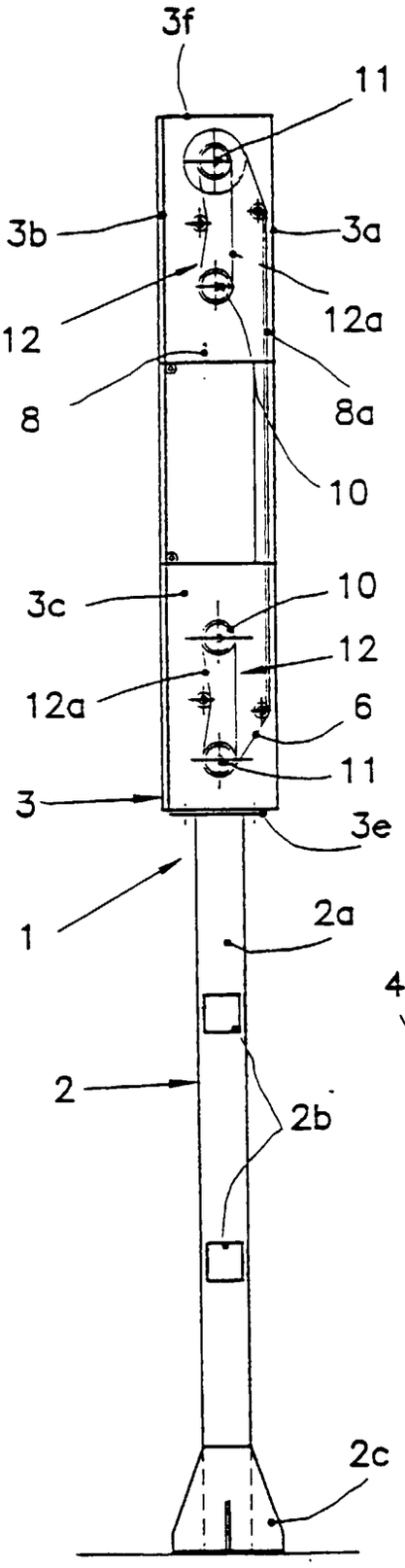

Fig. 2

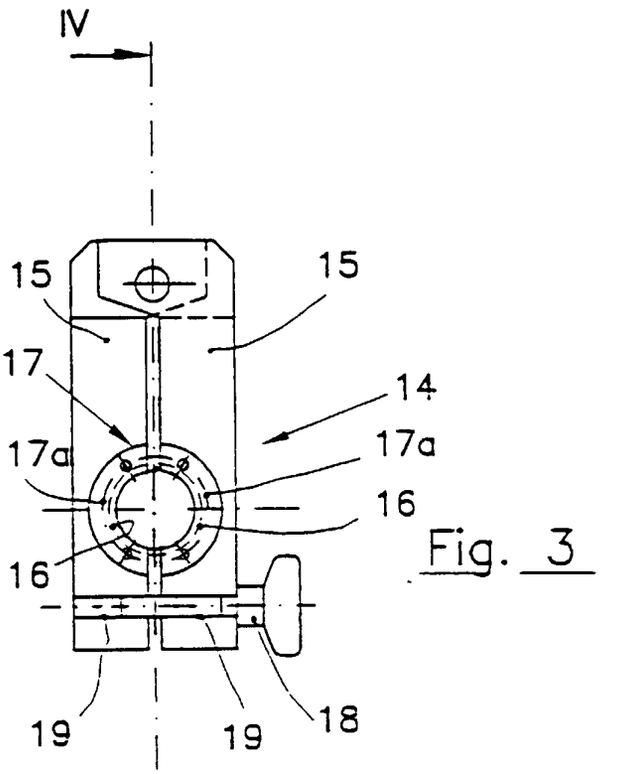

Fig. 3

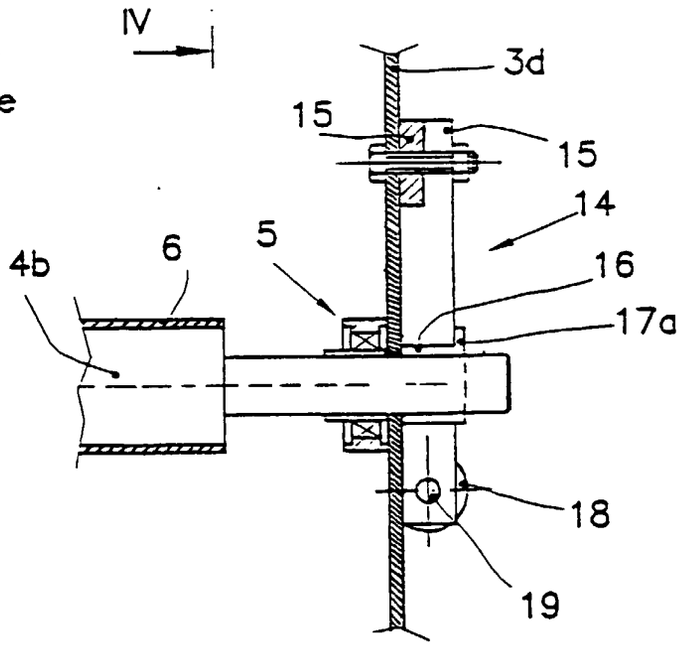

Fig. 4