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(54) **Device for alternately showing display members such as advertisements and such like.**

(57) Device for alternately showing displays (7) such as advertisements, said device comprising: a housing (1) with a front panel (2) which is at least partially transparent (3) and behind which panel said displays (7) can be brought one by one. At both ends of said panel cassettes (4, 42) are positioned in each of which at least two rollers (6) are provided. On each roller (6) a display (7) is wound and by means of a beam (18) movable between both ends the free end of a display (7) can be brought towards the other end of said panel (2). Coupling means (16, 17, 21, 22; 40, 41; 46, 53) being present for coupling the end of a display (7) with said beam (18).

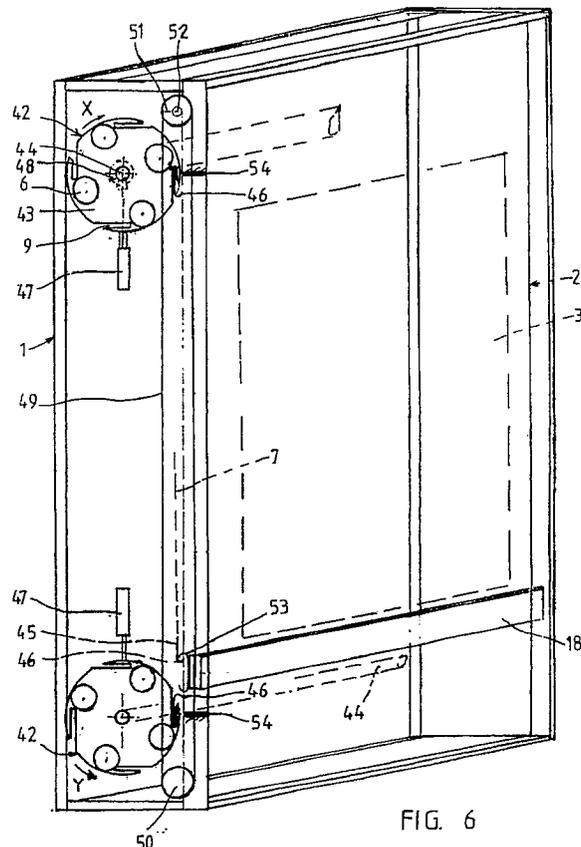


FIG. 6

DEVICE FOR ALTERNATELY SHOWING DISPLAY MEMBERS SUCH AS ADVERTISEMENTS AND SUCH LIKE.

The invention relates to a device for alternately showing display members like advertisements and such like, being provided on a sheet of paper or a such like material, said device comprising: a housing with a front panel which is at least partially transparent whereby behind this panel said displays can be brought one by one; at least two rollers positioned behind said panel at the ends of this and running parallel to each other; at least one lamp positioned behind said front panel and the display positioned near this and means for alternately bringing said displays behind said front panel.

Such a device is known by FR-A-2,152,011. In case of this known device the rollers positioned near the ends of said panel serve to guide the web of paper or foil on which said displays are provided. From said guiding rollers the web is running towards two further rollers. The web is wound onto said one roller and is drawn from the other one and when the end of the web is reached the function of said rollers is reversed.

A disadvantage of this known device is, that only when moving such web in a given direction a given sequence of showing said displays can be reached.

Further changing the displays is particularly cumbersome and so time consuming.

A further disadvantage is that when the web is passing said guiding rollers and is wound onto the supply rollers the displays will shift in respect of the web of paper or foil. By this folds may be formed in the displays.

The object of the invention is to remove these disadvantages and to that end it is provided that each display is separately provided on a roller and that at each end of said front panel at least two rollers can be provided, said rollers being biased such that each roller is trying to wind the related display on it, the free end of the display, not being connected to said roller, being provided with means which may be coupled with a coupling member being movable in said housing between the ends of said front panel.

So no long web of paper or foil has to be present onto which the displays have to be provided one by one. Also the displays can be shown in a given sequence if this is wanted.

A particular quick changing of the displays can be reached when the rollers, on which the displays are wound, are positioned in one or more cassettes, which can be releasably mounted in said housing.

Such a cassette can be prepared beforehand,

so that the related device need only to be opened to replace one cassette by another. This will take only less time which in particular is important when the device is placed in the open air.

To reduce the dimensions of a cassette in particular it will be provided that a cassette is positioned at each end of the transparent front panel.

In particular each cassette will consist of a framework in which at least two rollers are rotatably supported, one end of a display being connected to one roller and said display being wound on the roller, the free end of the display being connected to a strip of a stiff material and running parallel to said roller, said strip being provided with means for releasably connecting said strip with the coupling member, spring means being provided in said roller which can be biased by means of a knob such that the roller will try to wind the display on it.

In this case it will be provided that the strip connected to the display will come to lie in positioning slots of the frame of the cassette when the display is wound onto the roller present in said cassette.

According to a preferred embodiment of the invention the coupling member will be formed by a beam extending transverse to the direction of movement of it, said beam being guided near the longitudinal edges of the housing.

When moving two displays, being coupled with said beam, the beam substantially is positioned between said displays and in an end position, in which a display has to be shown during some time, said beam can be positioned behind a not transparent portion of the front panel.

A particularly simple device can be obtained when the movement of the beam takes place because said beam is directly or indirectly coupled with a chain or belt running over chain wheels or pulleys, said chain or belt and the related wheels or pulleys being positioned in a plane running in the direction of movement of said beam and transverse to the longitudinal direction of said beam.

According to a first embodiment a cassette substantially will have a rectangular cross-section such that in it at least two rollers can be mounted, the length of said cassette being somewhat larger than the length of said rollers.

In this case the framework of said cassette can be provided with bores either pins running transverse to the longitudinal direction of the rollers positioned in said cassette, said bores or pins cooperating with pins or bores respectively being provided in said housing such that when releasably

mounting a cassette in said housing the pins can be slid into the bores.

If necessary nuts can be used to lock the cassette on the pins. It is, however, also possible that during closing said housing, after changing a cassette, this is automatically locked onto its place.

In this case the chain for moving the beam is provided with a pin which can be coupled with the beam, said chain running at about half of the length of the rollers, the chain wheels being driven in one single direction only.

In this case the chain wheels can be provided behind a non-transparent portion of said front panel and the chain will be positioned behind the transparent portion but will not be visible in consequence of the presence of the display. Because said chain need only to exert small forces, the dimensions of said chain can be such small that these will not exercise influence on showing the displays.

This is in particular the case because mostly more than one lamp will be used to obtain a uniform dispersion of the light behind a display.

Because the driven chain wheel is always rotated in the same direction only provisions have to be present to switch the drive motor in and off at the desired points of time.

In case of this embodiment the beam is provided with a rotatable element taking care for coupling said beam with the pin provided to the chain, said rotatable element being rotated to the other one of two end positions by said pin when this is passing one of said chain wheels, such that one of two driver members, which are rotatably supported in said beam, are rotated simultaneously, said driver members releasing the display which first was coupled with the beam near the related chain wheel and coupling another display with the beam to show this afterwards.

Obviously the beam will be stationary during a given time in one end position, so when the pin coupled with it is present near one of said chain wheels so that the display, taken along from the other side, can be shown during some time. When the driven chain wheel is again rotated by the motor a display is drawn from a roller by the beam, said roller then being present near said beam. The display shown before will be wound onto a roller which is present at some distance from the beam, said beam moving towards said roller.

In this case the driver members which are rotatably supported by the beam can be in the shape of shafts running transverse to the plane of the front panel of the housing, said shafts being provided with cross pins present at mutual distances and making equal angles with each other such that when rotating a shaft over the related angle one cross pin will release a display and

another cross pin will be coupled with a display, to which end the strip connected to a display is provided with a hook extending above the display, which hook may cooperate with a cross pin but may move free along said shaft, such that said shaft may be present close to said strip.

The shaft being provided with the cross pins may carry a same number of cams with which a catch may cooperate which is biased against said cams such that the shaft can only rotate in one direction so that the coupling between a cross pin and the hook of the strip of a display cannot be unintentionally released.

Instead of using mechanical coupling elements said coupling elements can also be shaped by electromagnets connected to the movable beam, said magnets cooperating with a magnetisable strip connected to the display, the switching in and off of said electromagnets taking place when the direction of movement of the beam is reversed.

With this a switching system can be provided by which the electromagnets are switched in and off in a given sequence.

According to another embodiment the cassette is formed by two end discs with a connecting element between these, said cassette being rotatably supported by the housing, means being present to fix said cassette in various positions, a number of rollers being provided equally distributed along the circumference of said discs, said discs being provided with the positioning slots for the strips connected to the displays.

By rotating said cassettes from one position to another the connection between the beam and a strip, connected to a display, can be disengaged.

According to the invention the strip of a display is provided with a hook portion which may engage one or more hooks provided on the beam, said latter hooks being biased to a position outside said beam such that they can be pressed towards the beam when passing the hook portion of the strip connected to a display when the beam is moved in one direction, such that said hook or hooks will grip into said hook portion when the beam is moving in opposite direction.

In this way a simple and reliable connection between the beam and a strip can be obtained.

Obviously the motor for moving the beam need only have a small capacity because it has only to move the weight of the beam and has to overcome the force which is exerted to it by a display which has to be drawn from a roller against the force of a spring. Generally speaking the last mentioned force will be compensated because one display is drawn from a roller and another one is wound onto a roller because said roller is biased when the related display is drawn from said roller earlier.

The invention is further described by means of

embodiments shown in the drawing, in which:

Fig. 1 schematically shows a perspective view of a device according to the invention, given portions being omitted.

Fig. 2 schematically shows a portion of the device of Fig. 1, partly in view and partly in cross-section;

Fig. 3 schematically shows a side view of the portion shown in Fig. 2;

Fig. 4 schematically shows a perspective view of a portion of the device according to Figs. 2 and 3;

Fig. 5 schematically shows a view of another embodiment of the device according to the invention; and

Fig. 6 schematically shows a perspective view of still another embodiment of a device according to the invention.

The device shown in the Figs. 1 - 4 comprises a housing 1, which in particular in Fig. 1 is shown by broken lines. The housing comprises a front panel 2 from which the portion 3 is transparent. Said front panel 2 is in a not shown way pivotally connected to the further portions of the housing 1 such that in this way entrance to the inner side of the housing 1 is obtained.

In the housing 1 two cassettes 4 are mounted. A cassette 4 comprises a framework 5 for supported rollers 6. In each cassette 4 three rollers 6 are mounted and on each roller 6 a display 7 is wound.

As in particular appears from Fig. 2 the end of a display 7 extending outwardly from the cassette, is provided with a strip 8, the ends of which are received in slots 9, provided in the side plates 10 of the framework 5.

In each roller 6 a coil spring 11 is present, one end of which is connected to the roller and the other end to a knob 12, such that the coil spring can be pre-tensioned and a display 7 will automatically be wound onto the related roller 6, such that the strip 8 connected to the display 7 will be received into the slot 9.

Bores 13 are provided in the side plates 10 of a cassette 4 and the framework 14 of the housing 1 is provided with pins 15 onto which the cassette can be slid. If necessary a not shown screw can be applied in the side plate 10 of the cassette which screw can be turned against the pin 15.

To make it possible to draw a display 7 out of the cassette and to bring this before the transparent portion 3 of the front panel 2, the strip 8, connected to the display 7, is provided with a substantially U-shaped lug 16 with an inwardly extending hook portion 17.

To draw a display 7 from a cassette 4 a beam 18 is provided, which is movable up and down along the front panel 2 because it is connected to

T-shaped portions 19 which are provided with rollers 20 being guided by not further indicated portions of the framework 14 of the housing 1. So the beam 18 can be moved up and down in the direction of the arrow V in the Figs. 1 and 3.

Two shafts 21 are rotatably supported in the beam 18. Onto each shaft three cross pins 22 are mounted at some distance from each other as indicated in Fig. 2, and making an angle with each other of 120° , as indicated in Fig. 3.

The cross pins 22 of the shaft 21 may cooperate with a lug 16 as this is indicated in Fig. 3, a shaft 21 with the cross pins being shown at the position of such a lug 16. When a shaft 21 is rotated in the direction of the arrow P the cross pin, which in Fig. 3 is horizontally directed, will release the related lug 16 and the next cross pin 22 will engage a lug 16 of another display 7. When then the shaft is stopped the related display can be drawn out of the cassette by means of vertical displacement of the beam 18.

In a corresponding way the other shaft 21 with its cross pins 22 may cooperate with lugs 16 connected to displays 7 provided in a cassette 4 near the lower end of the housing 1. So each shaft 22 is destined to cooperate with one of said cassettes.

To move the beam 18 up and down a chain 23 is present, passing chain wheels 24. The lowermost chain wheel 24 is rotatably supported by a not further indicated portion of the framework 14 of the housing 1 and the upper chain wheel 24 is connected to a drive motor 25, being supported by a portion of the framework 14 of the housing 1.

The chain is running in a plane 26 which in Fig. 1 is only schematically indicated, said plane running transverse to the longitudinal direction of the beam 18. By this the chain will hardly be visible when a display 7 is positioned behind the front panel 2 and some lamps 27 are burning in the housing 1.

The chain 23 is provided with a pin 28 extending itself transverse to the plane 26 in which the chain is lying. The pin 28 is pivotally supported by a lever 29 which is fixedly connected to a shaft 30 which is rotatably supported by a support 31 connected to the beam 18.

As in particular appears from Fig. 2 the beam 18 will be moved upwardly when the chain wheel 24 is driven in the direction of the arrow R. When the part of the chain where the pin 28 is position, is passing the chain wheel 24, the beam 18 will be stopped and the lever 29 together with the shaft 30 will be pivoted over 180° . A lever 32 is mounted to the shaft 30 at a distance from the lever 29 and extending to another side of the shaft than the lever 29.

The levers 29 and 32 each are provided with a

pin 33, said pins being positioned at equal distances from the shaft 30 and extending transverse to the plane in which the levers move. Each of the pins 33 may cooperate with three pins 34 which at equal distances are mounted onto a disc 35. Each disc is connected to a shaft 21, in such a way that the pins 34 are running parallel to the axis of the shaft 21 but at a distance from this.

When now, as said above, the chain wheel 24 is rotated in the direction of the arrow R, see Fig. 2, the lever 29 is taking the beam 18 upwardly till the axis of the shaft 30 is in line with the axis of the chain wheel 24. Then the lever 28 is rotated over 180° and by this also the shaft 30. The pin 33, connected to the lever 29, will then move in the direction of the arrow S, see Fig. 4, and during the last portion of its movement it will take the pin 34, connected to the disc 35, with it. So when moving the pin 34 the disc 35 and so the shaft 21 is rotated over 120° , by which one of the displays 7 is released and another one is coupled with the beam 18. By rotating the shaft 30 in the way as described above the pin 33, connected to the lever 32, will be pivoted to the position 33' indicated by broken lines, without being in engagement with a pin 34 of the other disc 35.

When now, after a period that the chain wheel 24 has stand still, this chain wheel is driven again, the related display is taken along from the upper cassette 4. Then the lever 29 is positioned at the right of the shaft 30 as seen in Fig. 2 and the lever 32 is at the left side of this, such as indicated in Fig. 4 with broken lines. So then the pin 28 of the chain 23 is positioned on the portion of the chain 23 which is moving downwardly, see Fig. 2. When now the pin arrives near the lower chain wheel 24 the beam will have reached its lowest position and the pin 28 will take care for it that the lever 29 and by this the shaft 30 will be rotated in the same direction as when passing the upper chain wheel 24. By this the lever 32 with its pin 33 will engage the disc 35 of the other shaft 21, so that a display 7 from the lower cassette 4 will be coupled with the beam 18 and the display which was first coupled with it will be released.

When the beam 18 is moved downwardly and during this, as seen in Fig. 3, takes a display 7 with it by means of the shaft 21 and the cross pin 22, a force will be exerted on the related cross pin 22 by which the shaft 21 will try to rotate against the direction of the arrow P. To prevent this a catch 36 is provided on the support 31, said catch gripping in the succeeding cam portions 37 of the disc 35, so that the disc 35, at the right in Fig. 4, can be rotated only in the direction of the arrow P. For the disc 35 at the left side a corresponding catch is provided on the lower side of the support 31.

Fig. 5 shows the possibility to provide the

beam 18 with electromagnets 40, which may cooperate with magnetisable portions 41 of the strip 8, which is connected to the display 7. If wanted the strip 8 may totally consist of magnetisable material.

To move the beam 18 up and down again use can be made of the chain 23 with the pin 28 on it. If wanted a more direct coupling between the pin 28 and the beam 18 may take place, e.g. because the pin is shiftably received in an slotted hole in the support 31 connected to the beam 18. To control the electromagnets 40 limit switches can be used, which may cooperate with an electrical control system.

Fig. 6 schematically shows a device again comprising the housing 1 from which several parts are omitted either are only indicated by broken lines.

Parts corresponding to parts already described above are indicated with the same reference numbers.

In the housing 1 again two cassettes 42 are provided each consisting of two end discs 43 being connected by a connecting element 44 which at the same time may form part of the shaft by means of which the cassette 42 is rotatably supported in the housing 1. For that purpose the housing 1 is provided with two cup-shaped supports (not shown) into which the ends of the shaft 44 are received.

By means of the discs 43 four rolls 6 are supported on each of which a display 7 is wound. The free end of a display 7 is connected to a strip 45 which is provided with a hook portion 46. The ends of a strip 45 are received into the slots 9 provided in the discs 43.

The shaft 44 of each cassette 42 is coupled with a motor 47 such as e.g. by means of a pair of bevel gear wheels 48, one connected to the shaft 44 and the other to the shaft of the motor 47.

For drawing a display 7 from its roller 6 the beam 18 is present, which might be supported by means of the housing 1 in the same way as described above. Now the end of the beam 18 is connected to a belt 49 running over pulleys 50, 51, the uppermost one 51 being driven by a motor 52.

The beam 18 is at its lower and upper side provided with one or more hooks 53 which are biased outwardly in respect of the beam 18.

In Fig. 6 the beam is drawn in position just before the lower hooks 53 of it will pass a hook portion 46 of a strip 45. When this has happened the beam will engage the buffer 54 and the motor 52 will be switched off such as by means of limit switches, not shown.

When now after some time the beam 18 is moved upwardly by means of the motor 52 the upper hooks 53 of it will pass the hook portion 46 of a display 7 which is still present on the related

roller 6. Then the beam 18 will engage the upper buffer 54 and the motor 52 will be stopped while the motor 47 will take care for rotating the cassette 42 in the direction indicated by X and the hook portion 46 of display 7 of the next roller 6 will pass the hooks 53 and will be received into these. When now the beam 18 is moved again downwardly and is engaging the lower buffer 54, then the lower cassette 42 will be rotated in the direction of the arrow Y so that the hook portion of the display 7 of the next roller 6 will be received in the hooks 53.

When the cassette 42 comprises four rollers 6 the cassette will be rotated over 90° and the motor will be switched off by means of not shown limit switches.

Electronical means may be present to control the motors 47 and 52 so that the period during which a display is shown can be controlled.

If one or both cassettes 42 have to be changed by other ones the beam 18 can be brought into its lower end position and the cassette 42 then will be rotated over less than 90°, so that no other display will be connected to the beam 18. Then the beam 18 is moved upwardly and the same procedure is repeated so that both cassettes 42 are disconnected from the beam 18 and can be taken out of the housing 1. When other cassettes 42 are placed in the housing these are brought in the position as shown in Fig. 6 so that the beam 18 can be connected to the hook portions 46 of the strips 45 of the displays 7.

It will be obvious that only some embodiments of the device according to the invention are shown in the drawing and are described above and that many modifications can be applied without leaving the inventive concept.

Claims

1. Device for alternately showing display members (7) like advertisements and such like, being provided on a sheet of paper or a such like material, said device comprising: a housing (1) with a front panel (2) which is at least partially transparent (3) whereby behind this panel displays (7) can be brought one by one; at least two rollers (6) positioned behind said panel (2) at the ends of this and running parallel to each other; at least one lamp (27) positioned behind said front panel (2) and the display (7) positioned near this and means for alternately bringing said displays (7) behind said front panel (2), characterized in that each display (7) is separately provided on a roller (6) and that at each end of said front panel (2) at least two rollers (6) are provided, said rollers (6) being biased such that each

roller (6) is trying to wind the related display (7) on it, the free end of the display (7), not being connected to said roller (6), being provided with means (8, 16, 41, 45, 46) which may be coupled with a coupling member (18, 21, 22, 40, 53) being movable in said housing (1) between the ends of said front panel (2).

2. Device according to claim 1, characterized in that the rollers (6), on which the displays (7) are wound, are positioned in one or more cassettes (4, 42), which can be releasably mounted in said housing (1).
3. Device according to claim 2, characterized in that a cassette (4, 42) is positioned at each end of the transparent front panel (2).
4. Device according to claim 2 or 3, characterized in that each cassette (4, 42) consists of a framework (5; 43, 44) in which at least two rollers (6) are rotatably supported, one end of a display (7) being connected to one roller and said display (7) being wound on the roller, the free end of the display (7) being connected to a strip (8, 45) of a stiff material and running parallel to said roller (6), said strip (8, 45) being provided with means (16, 41; 46) for releasably connecting said strip (8; 45) with the coupling member (18, 21, 22, 40, 53), spring means (11) being provided in said roller (6) which can be biased by means of a knob (12) such that the roller (6) will try to wind the display (7) on it.
5. Device according to claim 4, characterized in that the strip (8, 45) connected to the display (7) will come to lie in positioning slots (9) of the frame (5; 43, 44) of the cassette (6; 42) when the display (7) is wound onto the roller (6) present in said cassette (4; 42).
6. Device according to one of the preceding claims, characterized in that the coupling member is formed by a beam (18) extending transverse to the direction of movement of it, said beam being guided near the longitudinal edges of the housing (1).
7. Device according to claim 6, characterized in that the movement of the beam (18) takes place because said beam (18) is directly or

- indirectly coupled with a chain (23) or belt (49) running over chain wheels (24) or pulleys (50, 51), said chain (23) or belt (49) and the related wheels (24) or pulleys (50, 51) being positioned in a plane (26) running in the direction of movement of said beam (18) and transverse to the longitudinal direction of said beam (18).
8. Device according to one of the claims 2 - 7, characterized in that the cassette (4) is having a substantially rectangular cross-section such that in it at least two rollers (6) can be mounted, the length of said cassette (4) being somewhat larger than the length of said rollers (6).
9. Device according to claim 8, characterized in that the framework (5) of said cassette (4) is provided with bores (10) either pins running transverse to the longitudinal direction of the rollers (6) positioned in said cassette (4), said bores (13) or pins cooperating with pins (15) or bores respectively being provided in said housing (1) such that when releasably mounting a cassette (4) in said housing (1) the pins (15) can be slid into the bores (13).
10. Device according to claim 8 or 9, characterized in that the chain (23) for moving the beam (18) is provided with a pin (28) which can be coupled with the beam (18), said chain (23) running at about half of the length of the rollers (6), the chain wheels (24) being driven in one single direction only.
11. Device according to claim 10, characterized in that the beam (18) is provided with a rotatable element (29) taking care for coupling said beam with the pin (28) provided to the chain (23), said rotatable element (29) being rotated to the other one of two end positions by said pin (28) when this is passing one of said chain wheels (24), such that one of two driver members (21, 22) which are rotatably supported in said beam (18), are rotated simultaneously, said driver members (21, 22) releasing the display (7) which first was coupled with the beam (18) near the related chain wheel (24) and coupling another display (7) with the beam (18) to show this afterwards.
12. Device according to claim 11, characterized in that the driver members which are rotatably supported by the beam (18) are in the shape of shafts (21) running transverse to the plane of the front panel (2) of the housing (1), said shafts being provided with cross pins (22) present at mutual distances and making equal angles with each other such that when rotating a shaft (21) over the related angle one cross pin (22) will release a display (7) and another cross pin (22) will be coupled with a display (7), to which end the strip (8) connected to a display (7) is provided with a hook (16, 17) extending above the display (7), which hook (16, 17) may cooperate with a cross pin (22) but may move free along said shaft (21), such that said shaft (21) may be present close to said strip (8).
13. Device according to claim 12, characterized in that the shaft (21) being provided with said cross pins (22) is carrying a same number of cams (37) with which a catch (36) cooperates which is biased against said cams (37) such that the shaft (21) can rotate in one direction only so that the coupling between a cross pin (22) and the hook (16,17) of the strip (8) of a display (7) cannot be unintentionally released.
14. Device according to one of the claims 6-8, characterized in that said coupling elements are shaped by electromagnets (40) connected to the movable beam (18), said magnets (40) cooperating with a magnetisable strip (8, 41) connected to the display (7), the switching in and off of said electromagnets (40) taking place when the direction of movement of the beam (18) is reversed.
15. Device according to one of the claims 1 - 7, characterized in that said cassette (42) is formed by two end discs (43) with a connecting element (44) between these, said cassette (42) being rotatably supported by the housing (1), means (47) being present to fix said cassette in various positions, a number of rollers (6) being provided equally distributed along the circumference of said discs (43), said discs (43) being provided with the positioning slots (9) for the strips (45) connected to the displays (7).
16. Device according to claim 15, characterized in that the strip (45) of a display (7) is provided with a hook portion (46) which may engage one or more hooks (53) provided on the beam (18), said latter hooks (53) being biased to a position outside said beam (18) such that they

can be pressed towards the beam (18) when passing the hook portion (46) of the strip (45) connected to a display (7) when the beam (18) is moved in one direction, such that said hook (53) or hooks will grip into said hook portion (46) when the beam (18) is moving in opposite direction. 5

- 17. Cassette for using in case of the device as described in one or more of the preceding claims. 10

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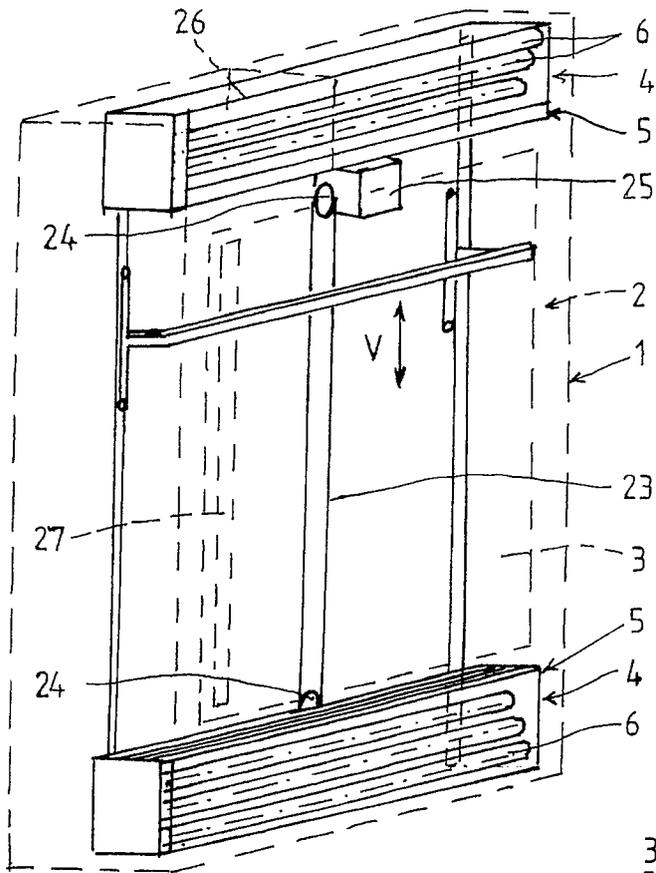


FIG. 1

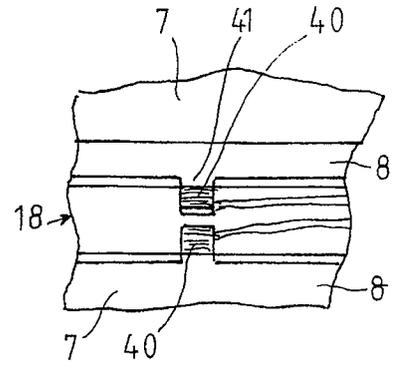


FIG. 5

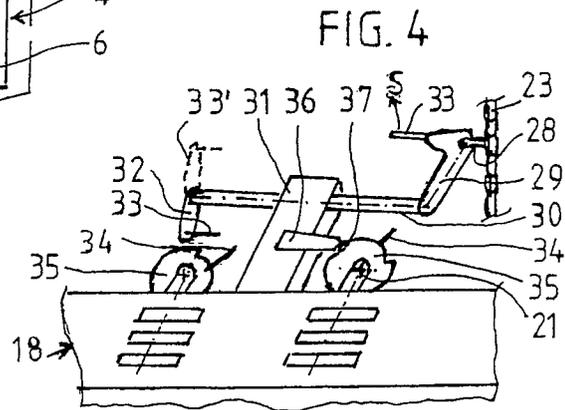


FIG. 4

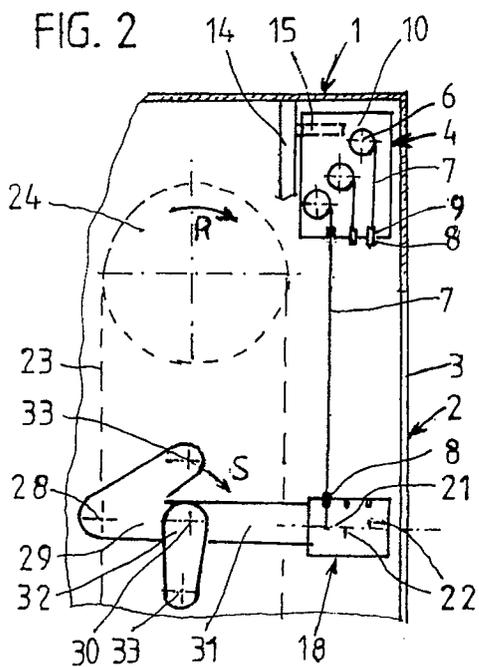


FIG. 2

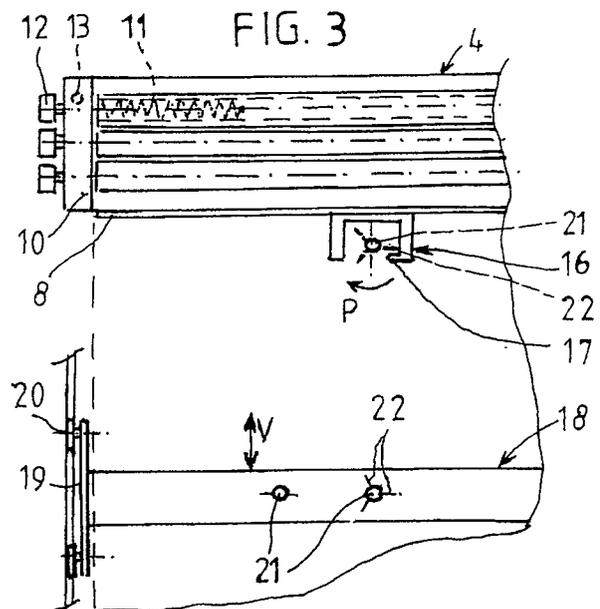


FIG. 3



EUROPEAN SEARCH
REPORT

DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
A	US-A-2 195 249 (HUTCHINSON) * Page 1, right-hand column, lines 16-37; page 3, left-hand column, lines 26-60; figures 1,2-4 * - - -	1,4,6,7
A,D	FR-A-2 152 011 (TREU) * Page 1, lines 1-22; fig. * - - -	1
A	US-A-1 599 646 (CLARK) * Page 2, lines 14-19,83-116; figure 1 * - - -	1,4,6,7
A	US-A-1 971 281 (SPRAGUE) * Page 3, lines 28-71; figures 1,5,6,10,15 * - - - - -	1
The present search report has been drawn up for all claims		
Place of search		Date of completion of search
The Hague		20 March 91
		Examiner
		GALLO G.G.
CLASSIFICATION OF THE APPLICATION (Int. Cl.5) G 09 F 11/30		
TECHNICAL FIELDS SEARCHED (Int. Cl.5) G 09 F		
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