

NOTICE OF ENTITLEMENT

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the applicant and nominated person in respect of an application for a patent for an invention
entitled "Information displayer with interchangeable boards"

filed under Australian Application No. 45825/93

state the following:

PART 1 - Must be completed for all applications.

The person(s) nominated for the grant of the patent

~~is (are) the actual inventor(s)~~

☒ has, for the following reasons, gained entitlement from the actual inventor(s)

The nominated person is a person who would if a patent were
granted upon an application made by the actual inventor(s)
be entitled to have the patent assigned to is

PART 2 - Must be completed if the application is a Convention application.

The person(s) nominated for the grant of the patent is (are):

the applicant(s) of the basic application(s) listed on the patent request form

or

entitled to rely on the basic application(s) listed on the patent request form by reason of the following:

The basic application(s) listed on the request form is (are) the first application(s) made in a Convention
country in respect of the invention.

PART 3 - Must be completed if the application was made under the PCT and claims priority.

The person(s) nominated for the grant of the patent is (are)

☒ the applicant(s) of the application(s) listed in the declaration under Article 8 of PCT

or

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of the following:~~

The basic application(s) listed in the declaration made under Article 8 of the PCT ^{as} ~~is (are)~~ the first
application(s) made in a Convention country in respect of the invention.

Dated this 2 day of February 19 95

Signed

Status

Signatory's Name

VIDEOTRON S.r.l.

(Fausto FLAMMINI - Managing Director)

F.B. RICE & CO PATENT ATTORNEYS



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- (56) Prior Art Documents
US 2195249
US 1700435
US 1599646
- (57) Claim

1. An information display apparatus provided with interchangeable display signs, in the form of sheets including:-
at least one carrier means for storing a number, n, of sheets;
means to select a sheet to be displayed;
grasping means to grasp the selected sheet to be displayed; and
means to move the sheet from the carrier means so that the sign may be displayed and to bring back the same to the carrier means, characterised in that:-
said sheets are selectively interchangeable;
the carrier means is releasably coupled to the display apparatus, so that it can be removed and replaced with other carrier means storing different sheets;
in that said carrier means moves in a stepwise fashion, with the number of steps corresponding to the number (n) of sheets provided in the carrier means; and
in that the stepwise movement is obtained by a means of a stepper motor, controlled by a pre-programmed microprocessor.



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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

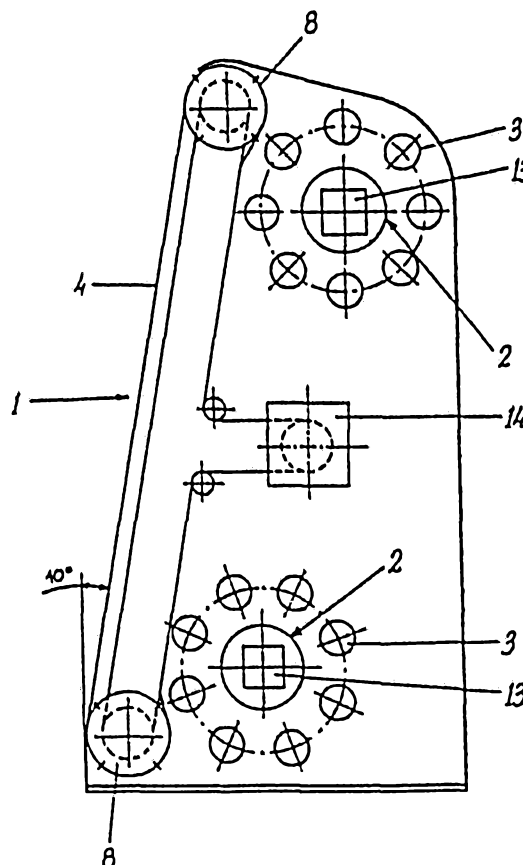
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675960

(54) Title: INFORMATION DISPLAYER WITH INTERCHANGEABLE BOARDS

(57) Abstract

The present invention relates to an information displayer with interchangeable boards (4, 102, 202), comprising at least a container (2, 101, 201) of n boards (4, 102, 202), provided with means to selectively take out said n boards, means to grasp the board to be displayed; and means to bring the board in a display position and to bring back the same into the container.



INFORMATION DISPLAYER WITH INTERCHANGEABLE DISPLAY SIGNS

The present invention relates to an information displayer with interchangeable boards/display signs.

More particularly, the invention relates to a device of the above kind
5 that allows the display of different display sheets, particularly advertising boards in a selective manner.

It is well known to those who are experts in the art that relatively recently different kinds of devices have been realised, which allow one to change an image displayed towards the public.

10 A first device of this kind provides a number of horizontal triangular-shaped elements that can rotate about their horizontal axis, so that, by rotating in synchronism the different faces, it is possible to change the message that is visible to the public according to a predetermined timing.

It is well evident that this kind of device is rather limiting under a
15 functional point of view, in fact it allows the vision of only three different advertising messages, and only according to a rigid sequence.

Furthermore, if it is desired to replace the advertising message, it is practically necessary to replace all the device, such an operation involving high costs and remarkable practical drawbacks.

20 A second kind of device to display different images to the public already available on the market is the one comprising a sheet wound on two rolls and having a sequence of images to be displayed printed on it.

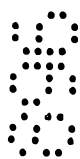
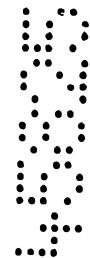
By winding and unwinding the sheet on said rolls, it is possible to change the message shown to the public.

25 In this case the number of available messages can also be high, although it is in any case is limited by the sizes of the sheet.

However, the above device does not allow to propose the messages according to a casual and selective sequence, since the sequence is determined by the order of the messages printed on the sheet.

30 Furthermore, it is very difficult, troublesome and expensive, or even impossible or economically not convenient, to replace the sheet with another one having a different group of advertising messages.

In GB-A-182 964 a picture displaying apparatus is disclosed, said
35 apparatus comprising removable picture roll drums or carriers and preferably means for rendering the picture exhibiting mechanism inoperable unless it is in the correct operating position.



In US-A-1 700 435 an automatic advertising machine is described wherein a number of advertisements are singly and consecutively brought into view.

In view of the above, the Applicant has studied and realised a
 5 displayer of multiple information or images that allows the display of images according to a casual sequence, i.e. according to any pre-established sequence.

In a particular aspect, the present invention also seeks to provide an image displayer wherein the display information is located in two "loaders"
 10 that can be easily and quickly replaced without the need to move or modify the structure of the displayer.

Thus, according to a first aspect of the invention, there is provided an information display apparatus provided with interchangeable display signs, in the form of sheets including:-

15 at least one carrier means for storing a number, n, of sheets;
 means to select a sheet to be displayed;
 grasping means to grasp the selected sheet to be displayed; and
 means to move the sheet from the carrier means so that the sign may
 be displayed and to bring back the same to the carrier means, characterised
 20 in that:-

 said sheets are selectively interchangeable;
 the carrier means is releasably coupled to the display apparatus, so
 that it can be removed and replaced with other carrier means storing
 different sheets;

25 in that said carrier means moves in a stepwise fashion, with the number of steps corresponding to the number (n) of sheets provided in the carrier means; and

 in that the stepwise movement is obtained by a means of a stepper motor, controlled by a pre-programmed microprocessor.

30 Preferably the information display apparatus, comprises two carrier means, each carrier means storing n boards, one, upper, carrier means being disposed substantially above the other, lower, carrier means, and grasping means for grasping the sheet to be displayed from the upper carrier means or from the lower carrier means.

35 Conveniently, each one of said carrier means is provided with n supports one support being provided for each sheet, from which supports the sheets are taken to be displayed, and to which supports the sheets are

returned, and wherein the sheets remain wound on the support when they are not being displayed.

The supports may comprise cylindrical supports biased by harmonic steel springs.

5 Preferably the stepwise movement is obtained by a stepper motor for each carrier means, that transmits motion to the carrier means by means of a toothed flange.

The grasping means may comprise movable elements arcuately spaced at 45^0 angles about a rotatable cylinder, which elements are arranged
10 to project from the cylinder to grasp the board by means of a lever system controlled by an actuator means.

Conveniently the actuator means is a solenoid.

Preferably, the means to bring the sheet into a display position and to bring the same sheet back into the carrier means, include one or more
15 magnetic springs for positioning the board.

In a preferred embodiment the carrier means includes a container and said means to selectively take out said sheets comprises a first pin element, provided externally on the container, slidable along a slot which extends through the container, the pin being engagable in a hole defined in
20 the sheets; and

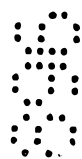
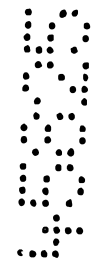
a second pin element, provided at the bottom of the container, and extending parallel to the first pin, couplable with said hole defined by the sheets, said container being movable along a direction parallel to the axis of said pin elements.

25 Preferably, the container is moveable in a stepwise fashion, with the number of steps corresponding to the number of sheets provided in the container.

It is preferred that the container is movable by means of a stepper motor, controlled by a pre-programmed microprocessor, that operates a cam
30 having n tracks.

Conveniently, the first pin element is moved along said slot by an electric motor.

The grasping means may comprise elements, which are arranged on a rotatable cylinder arcuately spaced at 120^0 to each other, and which can be
35 moved to project from the cylinder to engage the board, or withdrawn into the cylinder to release the board, by means of an actuating device.



Conveniently, the actuator means is a solenoid.

In a preferred embodiment, two sets of display signs in the form of sheets are provided, disposed on an articulated chain system rotating around pulley means, and at least one motor is provided to move said chain.

5 The information display apparatus, may include only a single motor which is arranged to operate two such chain systems, one chain system rotating in a clockwise direction, the other in an anti-clockwise direction, said motor being connected, by a belt or other suitable means, to one of the pulleys associated with each chain.

10 Conveniently, each one of said display signs includes a cylindrical container, inside a hub over which the sheet rolls up, spring means being provided to bias the sheet to roll up around the hub.

It is preferred that selective display of the sheets occurs by means of a rigid bar provided on a front portion of the display apparatus, said bar
15 being moved by a motor and transmission means, and being adapted to engage coupling means provided on the outer edge of the display sign.

Conveniently, the transmission means comprise chain means which rotate around sprocket means.

It is preferred that each display sign defines a set of perforations
20 matable with said movable elements, said perforations being spaced from other at a pitch corresponding to the distance between said movable elements.

Conveniently, two metallic reinforcing strips defining perforations are provided on each sheet.

25 Typically, two inner reinforcing metallic strips are provided on each sheet.

The present invention will be now described in an illustrative but not limitative way, according to its preferred embodiments, with particular reference to the Figures of the enclosed drawings, wherein:

30 Figure 1 is a side view of a first embodiment of the information displayer according to the invention;

Figure 2 is a front view of the information displayer of Figure 1;

Figure 3 is a view in vertical section of a rotatable roll and of an upper "loader" of the information displayer of Figure 1;

35 Figure 4 is vertical section showing the lever mechanism controlled by the solenoid for a grasping step of the displayer of Figure 1;



Figure 5 is vertical section of the displayer of Figure 1 showing the outlet and return path of the board;

Figure 6 is a plan view of the board of the displayer of Figure 1;

Figure 7 is a partial, cut-away view of a second embodiment of the
5 displayer according to the invention;

Figure 8 is a plan view of a board of the displayer of Figure 7;

Figure 9 is a view in vertical section of the displayer of Figure 7;

Figure 10 is a view in vertical section of the displayer of Figure 7
with the displayed board;

10 Figure 11 is a further view in vertical section of the displayer of
Figure 7 having the board container displaced;

Figure 12 is a lateral view of a third embodiment of the displayer
according to the invention;

Figure 13 is a front view of the displayer of Figure 12;

15 Figure 14 is a perspective view of a board for a displayer according to
the invention; and

Figure 15 is a partial view of the board of Figure 14.

Referring to Figures 1 to 6 of the enclosed drawings, it can be noted
that the information display apparatus/information displayer is an
20 electromechanical device provided with an automatic selective system that
allows one to display alternatively, from the above or from the bottom and
according to a desired sequence, a number n of images printed on
boards/sheets.

The displayer 1 comprises two carrier means 2 or "loaders" bearing
25 the display signs in the form of sheets, arranged one at the top and one at the
bottom, and having each one n cylinder 3 with display sheets 4, said carrier
means 2 having a rotating motion, as it will be more clear in the following.

Every single loader 2 is provided, as already said with a number n
housing cylinders 3, one for every sheet 4 to be displayed. In the Figures,
30 every loader 2 provides eight cylinders 3.

Each one of the display sheets 4, see in particular Figure 6, is
provided with transverse steel strips 5, 6, the outer ones being provided with
perforations 7 spaced of a predetermined pitch.

The arrangement to the display sheets 4, both for the upper loader 2
35 and for the lower loader 2, is made up, as it can be observed in Figures 3 and
4, of a cylinder/roll 8 provided with eight sectors 9, preferably movable

sectors, arranged at 45° to each other, operated by suitable levers 10 controlled by the solenoid 11.

The roll 8 can rotate in the directions of arrows A of Figure 5.

There is further provided a plurality of magnetic belts 12 (see Figure 2) that are useful to obtain a proper display of the sheet 4.

The steel strips 5, 6 provided on each sheet 4 have the goal to reinforce the same allowing to obtain an optimum display and to reinforce the edges that engage with the movable sectors and over which said perforations 7 are realised to drag the sheet 4.

Obviously, in case the sheet 4 is resized with a material sufficiently resisting, it would be not necessary to provide said strips 6, 7.

The motion of the cylinders 3 according the direction of the arrows 8 in Figure 5 is obtained by a stepper motor 13 having a number of steps corresponding to the number n of sheets 4 provided.

To display the different sheets 4 according to suitable and pre-established sequences, the stepper motor 13 is controlled by a microprocessor (not shown) with a suitable software.

The operation of the displayer 1 according to the invention will be described in the following with reference to a displayer wherein the different sheets 4 are sequentially displayed, but it is obvious that the same principles are valid in case of a casual pre-established display of the display signs.

The upper loader 2 is positioned so as to present the end edge of the sheet 4 rolled up on the corresponding preloaded cylinder 3 along a perfect vertical direction, see in particular Figure 3, so that the movable sector B, moved by the solenoid 11, can be positioned within the corresponding perforation 7 on the edge of the same sheet 4. The same operation is valid for every other sheet 4.

Now, by means of a stepper motor 14, the roll 8 starts its rotation until reaching of the complete display of the sheet 4, see clear arrows A, A' of Figure 5.

To bring back the sheet 4 just displayed in the original position, wound again within its cylinder 3, the roll 8 rotates in an opposite direction, according to the dark arrows A, A', helped during this rotation by the springs 15 provided within the cylinder 8 and loaded during the preceding unrolling step for the display.

It is to be noted how, at the same time of the beginning of the return step of the sheet 4 displayed, the movable sector 9 placed on the bottom roll 8 of the displayer 1 is already engaged with the end edge of the sheet prepared by the lower loader 2 according to the work sequence exposed above, being so possible to start a new and immediate display of a new sheet 4, in this case from the bottom to the above, so that which dead times usually necessary to change the sheet to be displayed are completely eliminated.

In order to obtain the display of all the n sheets 4, it is sufficient that the upper and lower loaders 2, following to rotation due to the stepper motor 14, prepare the end edge of the next sheet 4 as described and according to the alternation criteria between the upper one and the lower one.

From the above, it is well evident how, programming the stepper motors 13 of the loaders 2 by the already mentioned microprocessor, it will be possible to determine the desired casual display sequence of the various sheets 4.

Coming now to observe Figures 7 to 11, it is shown a second embodiment of the displayer according to the invention comprising a container 101 for n display signs/sheets 102, and movable, as it will be more specifically described in the following, along a direction perpendicular with respect to the plane of the sheets 102.

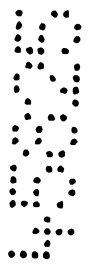
The container 101 is provided with n housings (not shown), one for each sheet 102.

The container 101 has a first pin 103 slidable according to arrows A within a slot 104, provided externally with respect to the same container 101, and a second pin 105 provided at the bottom of the container 101.

Each one of the sheets 102 (see Figure 8) is provided with transverse steel strips 106, 107, the outer two of which (106) present perforations 108 spaced at a predetermined pitch.

On the strips 106 there is provided an hole 109 for the insertion of the pins 103 and 105, as it will be evident in the following. The arrangement to display the sheets 102 is made up of a roll 110 provided with three movable sectors 111 arranged at 120° each other and operated according to the direction of arrow B by solenoids 112 (see Figure 9).

Roll 110 rotates along directions indicated by arrow C.



A magnetic strip 113 is provided that allows to obtain an optimum display of the sheet 102.

The strips 106 and 107 provided on the sheet 102 reinforce the same at the same time as obtaining its optimum display, and, moreover, reinforce the edges that engage with the movable sectors 111, and over which the perforations are realised.

Obviously, in cases where the material of the sheets is sufficiently resistant, the strips 106, 107 may be unnecessary.

The pin 103 is moved along the slot 104 by a motor (not shown).
The motion of the container 101 according to the direction of arrow D is obtained by a stepper motor (not shown) and a cam (not shown) having a number of profiles corresponding to the number n of sheets 102 provided.

To display the different sheets 102 according to suitable and pre-established sequences, the stepper motor will be controlled by a microprocessor with a suitable software.

The operation of the information displayer according to the invention is as follows. and it is quite similar to the one of the displayer of Figures 1 to 6.

It will be now described in the following the way how the different sheets 102 are sequentially displayed, but it obvious that the same principles are valid in case a pre-established casual display of the sheets 102 is wished.

The container 111 will be in a completely lifted position, so that the pin 103, see dashed lines in Figure 9, engages within the hole 109 of all the sheets 102.

Advancing the pin 103 along the slot 104, until the position shown in full line in Figure 9 is reached, the sheet 102 is brought with its first perforation 106 corresponding with the first movable sector 111.

Said sector 111 is operated by the solenoid 112 and therefore engages the sheet. 102.

Now, by the stepper motor and the cam contour (not shown), the container 101 descend of a step so that the pin 103 disengage the hole 109 of the sheet 102 coupled to the movable element 111, that will be free to be dragged by the roll 110, by the three movable elements 111, until reaching its complete display.

To bring back the board 102 within the container 101. the roll 110 rotates in an opposite direction with respect to the preceding one till

bringing the sheet 102 with the hole 109 in correspondence of the pin 103. The container 101 is now lifted of a step so that the pin 103 engages again the hole 109 of the sheet 102 formerly displayed and, sliding again along the slot 104 towards the bottom, brings back the board 102 within the container.

5 To display the next sheet 102, the container 101 is slided of a step downward, so that the pin 105 engages the hole 109 of the board formerly displayed.

Now, the pin 103, sliding upward along the slot 104, will bring the second sheet 102 in correspondence with the movable element 111 and the above described cycle can be repeated.

It is well evident that in this case too, suitably programming the stepping motor that controls the motion of the container 101 it will be possible to determine the desired casual display sequence of the different sheets 102.

15 Referring now to Figures 12 to 15, the embodiment shown provides two chains 201 each comprising twelve display signs/sheets 202 connected by articulated joints to realise the chain structure so that each chain rotates about two pair of pinions 203, 204, the first ones (203) being idle and the second ones (204) being connected through the transmission 205 with a
20 motor 206.

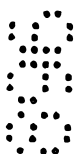
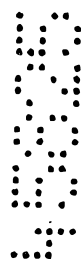
The chains 201 made up by single panels 202 are realised opposite and symmetrical each other and, employing idle wheels that allow a single rotation direction, the motion can be controlled by a single motor 206.

Hooking and releasing of the board to be displayed is realised by a plurality of hooks 207 provided along a rigid bar 208, the ends of which are
25 coupled to the links of two chains 209 moved by a motor 210 (see Figure 13).

Each single sheet 202, see Figures 14 and 15, is included within a container or "magazine" 211 comprising a hub 212, rotating inside the container 211, and having the sheet 202 rolled up on it, by the action of a
30 spiral spring 213.

Along the edge of each sheet opposite to the edge coupled with the container 211, it is provided a number of openings 214 that couple with the hooks 207 of the rigid bar 208.

The programming of the display sequence of the different boards is
35 realised in a way similar to the one already described with reference to the above mentioned embodiments.

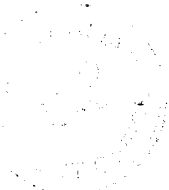
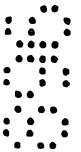


In this case, by the motor 206, a sheet 202 from one of the two chains 201 is brought in a display position, and said sheet 202 will be displayed by the translation of the rigid bar 208, through the action of the system comprised of chains 209 and motor 210, said rigid bar 208 having
5 grasped the sheet 202 involved by the coupling of the hooks 207 with the openings 214.

While displaying the sheet 202 according to the pre-established sequence, the rigid bar 208 determines the roiling up of the sheet 202 formerly displayed inside the corresponding roll 211 by the resuming action
10 of the spring 213.

It should be pointed out that this kind of sheet, as well as the display mechanism, can be used for the other embodiments too.

The present invention has been described with specific reference to its preferred embodiments, but it is to be understood that changes and/or
15 modification can be introduced by those skilled in the art without departing from the scope of the invention as defined in the enclosed claims.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. An information display apparatus provided with interchangeable display signs, in the form of sheets including:-
 - at least one carrier means for storing a number, n , of sheets;
 - 5 means to select a sheet to be displayed;
 - grasping means to grasp the selected sheet to be displayed; and
 - means to move the sheet from the carrier means so that the sign may be displayed and to bring back the same to the carrier means, characterised in that:-
 - 10 said sheets are selectively interchangeable;
 - the carrier means is releasably coupled to the display apparatus, so that it can be removed and replaced with other carrier means storing different sheets;
 - in that said carrier means moves in a stepwise fashion, with the
 - 15 number of steps corresponding to the number (n) of sheets provided in the carrier means; and
 - in that the stepwise movement is obtained by a means of a stepper motor, controlled by a pre-programmed microprocessor.
2. An information display apparatus according to claim 1, characterised in that it comprises two carrier means, each carrier means storing n sheets, one, upper, carrier means being disposed substantially above the other, lower, carrier means. and grasping means for grasping the sheet to be displayed from the upper carrier means or from the lower carrier means.
3. An information display apparatus according to claim 2, characterised in that each one of said carrier means is provided with n supports, one
- 25 support being provided for each sheet, from which supports the sheets are taken to be displayed, and to which supports the sheets are returned, and wherein the sheets remain wound on the support when they are not being displayed.
4. An information display apparatus according to claims 2 or 3, characterised in that said supports comprise cylindrical supports biased by harmonic steel springs.
5. An information display apparatus according to claim 1, characterised in that the stepwise movement is obtained by a stepper motor for each
- 35 carrier means, that transmits motion to the carrier means by means of a toothed flange.

6. An information display apparatus according to any one of the preceding claims, characterised in that the grasping means comprise movable elements arcuately spaced at 45° angles about a rotatable cylinder, which elements are arranged to project from the cylinder to grasp the board
5 by means of a lever system controlled by an actuator means.
7. An information displayer apparatus according to claim 6, characterised in that said actuator means is a solenoid.
8. An information display apparatus according to any one of the preceding claims, characterised in that said means to bring the sheet into a
10 display position and to bring the same sheet back into the carrier means, include one or more magnetic springs for positioning the board.
9. An information display apparatus according to claim 1, characterised in that the carrier means includes a container and said means to selectively take out said sheets comprises a first pin element, provided externally on the
15 container, slidable along a slot which extends through the container, the pin being engagable in a hole defined in the sheets; and
a second pin element, provided at a bottom end of the container, and extending parallel to the first pin, couplable with said hole defined by the sheets, said container being movable along a direction parallel to the axis of
20 said pin elements.
10. An information display apparatus according to claim 9, characterised in that said container is moveable in a stepwise fashion, with the number of steps corresponding to the number of sheets provided in the container.
11. An information display apparatus according to claims 9 or 10,
25 characterised in that said container is movable by means of a stepper motor, controlled by a pre-programmed microprocessor, that operates a cam having n tracks.
12. An information display apparatus according to one any of claims 9 to 11, characterised in that said first pin element is moved along said slot by an
30 electric motor.

13. An information display apparatus according to any one of claims 9 to 12, characterised in that said grasping means comprise elements, which are arranged on a rotatable cylinder arcuately spaced at 120° to each other, and which can be moved to project from the cylinder to engage the board, or
 5 withdrawn into the cylinder to release the board, by means of an actuating device.

14. An information display apparatus according to claim 13, characterised in that said actuator means is a solenoid.

15. An information display apparatus according to claim 1, characterised
 10 in that two sets of display signs in the form of sheets are provided, disposed on an articulated chain system rotating around pulley means, and in that at least one motor is provided to move said chain.

16. An information display apparatus according to claim 15, characterised in that it includes only a single motor which is arranged to
 15 operate two such chain systems, one chain system rotating in a clockwise direction, the other in an anti-clockwise direction, said motor being connected by a belt or other suitable means with one of the pulleys associated with each chain.

17. An information display apparatus according to any one of the
 20 preceding claims, characterised in that each one of said display signs includes a cylindrical container, inside a hub over which the sheet rolls up, spring means being provided to bias the sheet to roll the sheet up around the hub.

18. An information display apparatus according to any one of the
 25 preceding claims, characterised in that selective display of the sheets occurs by means of a rigid bar provided on a front portion of the display apparatus, said bar being moved by a motor and transmission means, and being adapted to engage coupling means provided an outer edge of the display sign.

19. An information display apparatus according to claim 18,
 30 characterised in that said transmission means comprise chain means which rotate around sprocket means.

20. An information display apparatus according to any one of the
 preceding claims 1 to 16 and 18 to 19, characterised in that each display sign defines a set of perforations matable with said movable elements, said
 35 perforations being spaced from other at a pitch corresponding to the distance between said movable elements.

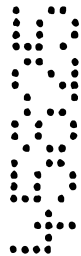
21. An information display apparatus according to claim 20, characterised in that two metallic reinforcing strips defining perforations are provided on each sheet.
22. An information display apparatus according to any one of the
5 preceding claims, characterised in that two inner reinforcing metallic strips are provided on each sheet.
23. An information display apparatus substantially as hereinbefore described with reference to and as shown in Figures 1 to 6 or Figures 7 to 11 or Figures 12 to 15 of the drawings.

DATED this thirty-first day of July 1996

VIDEOTRON S.R.L.

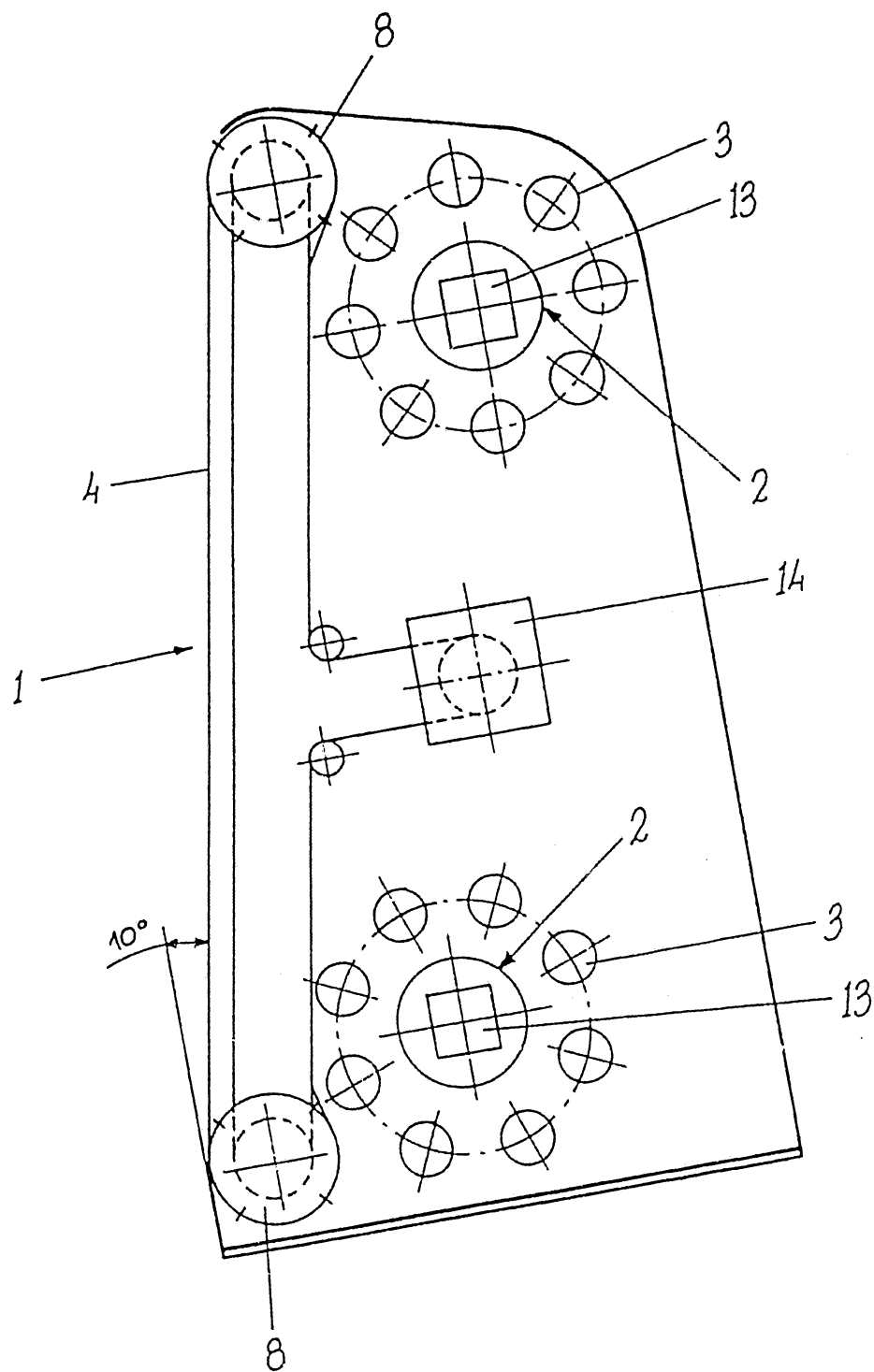
Patent Attorneys for the Applicant:

F.B. RICE & CO.



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FIG. 1



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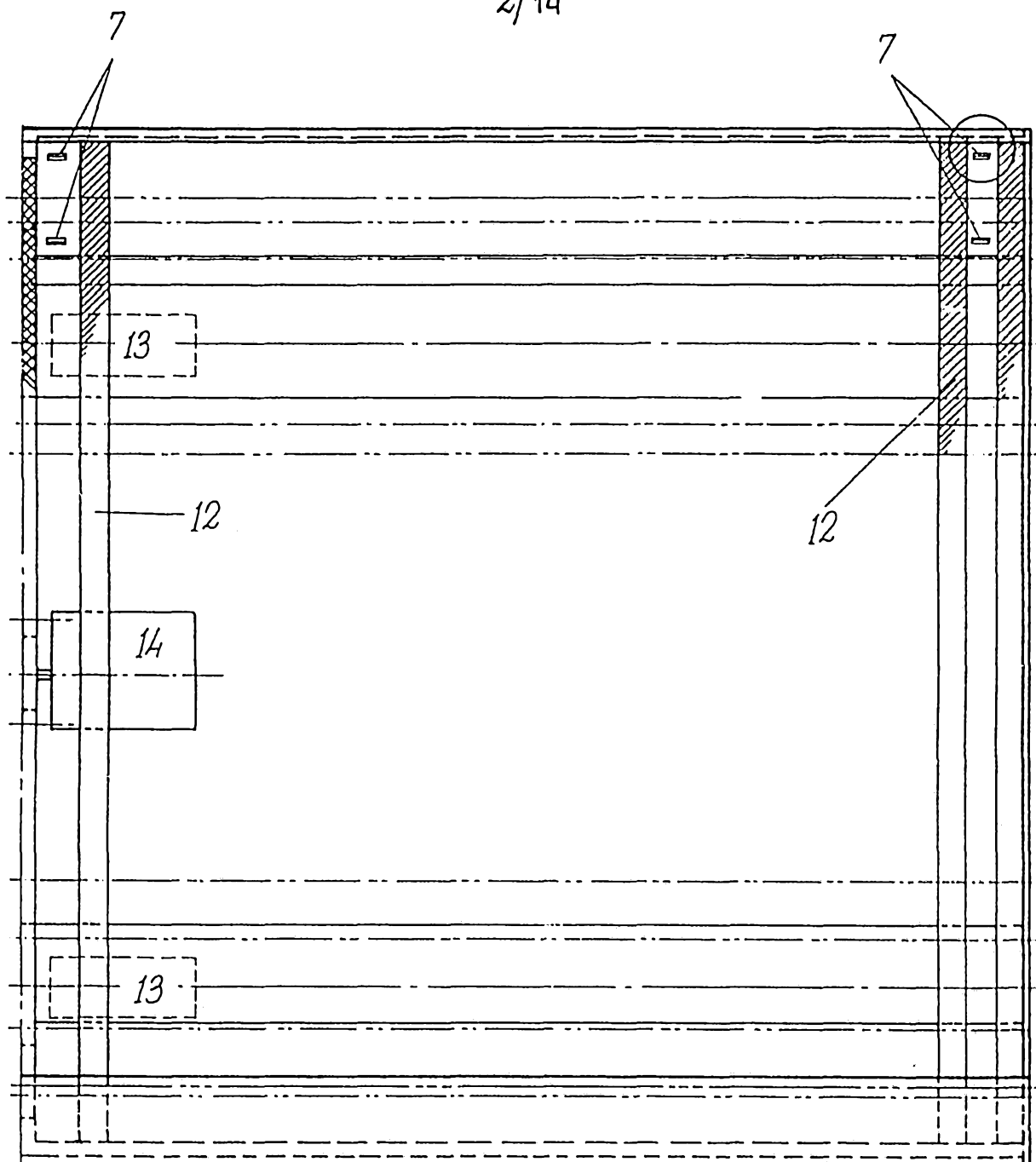


FIG. 2

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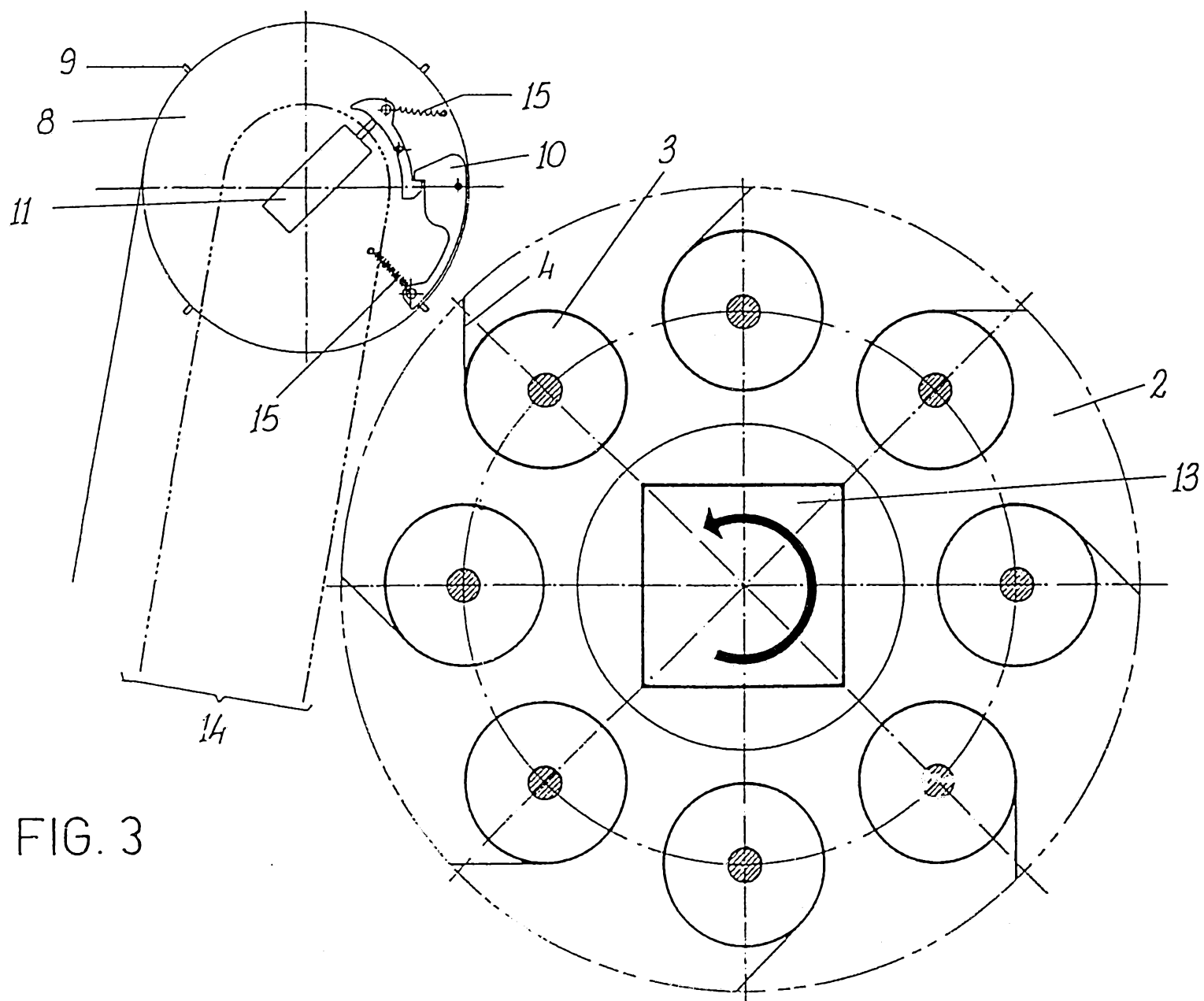
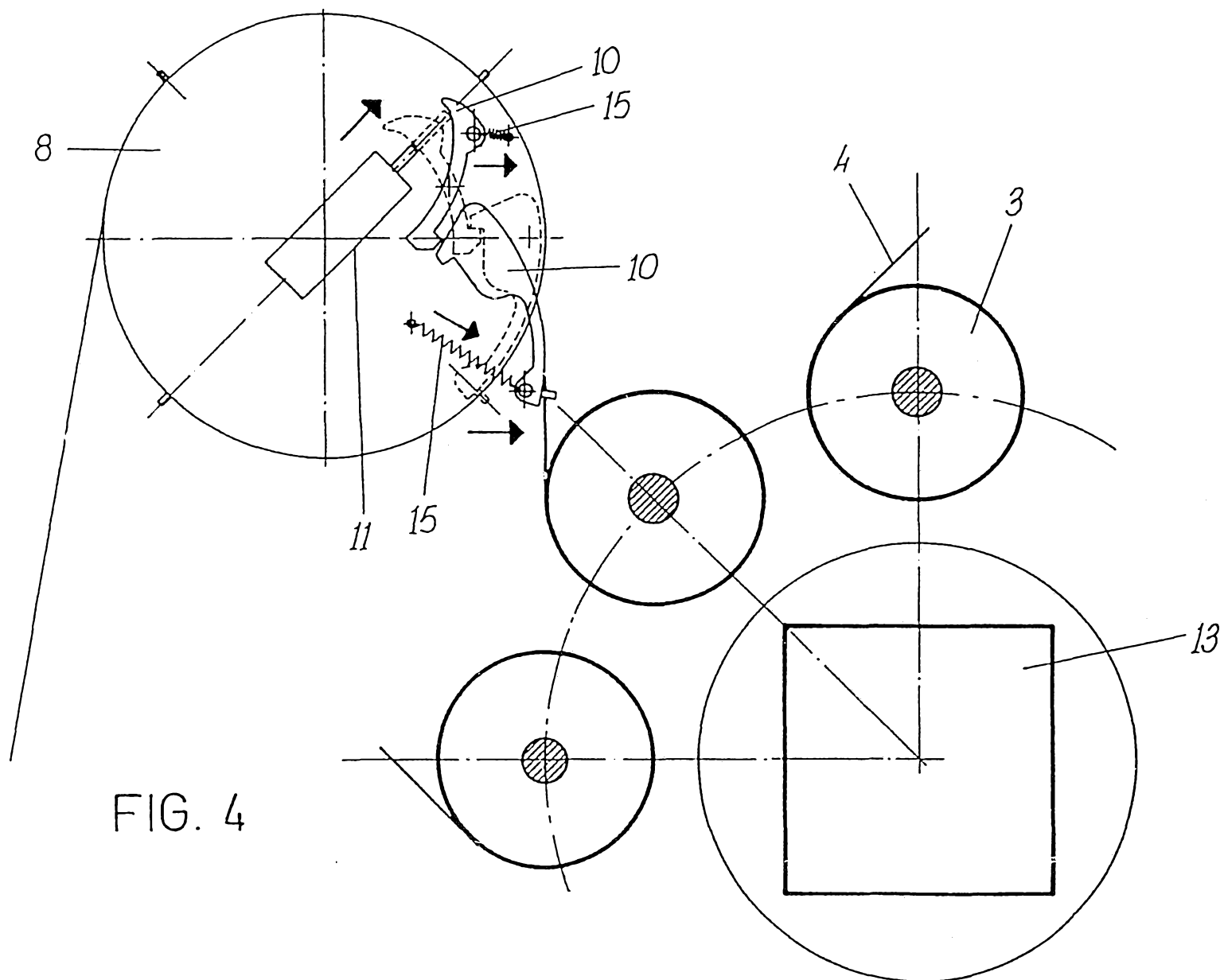


FIG. 3

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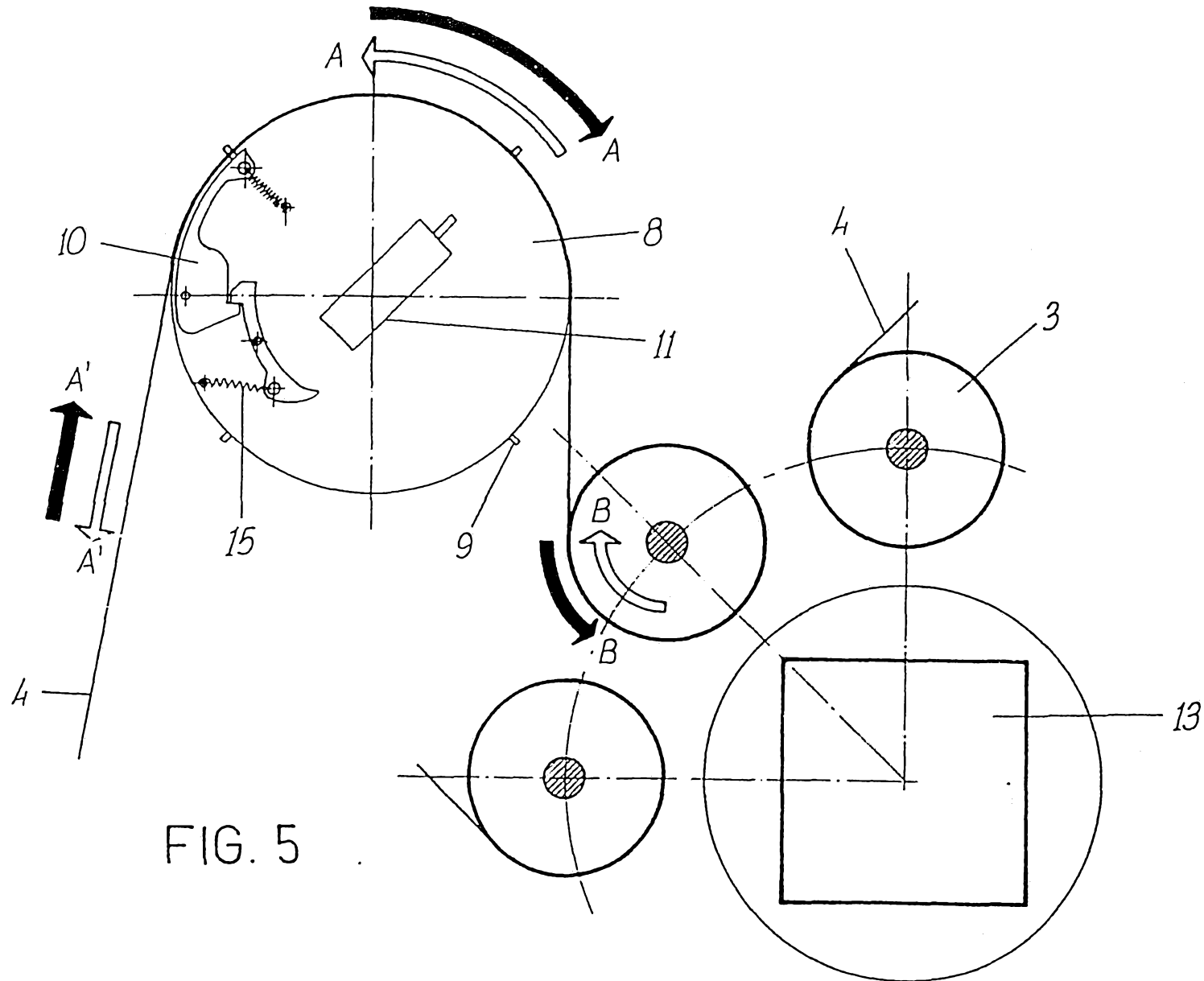


FIG. 5

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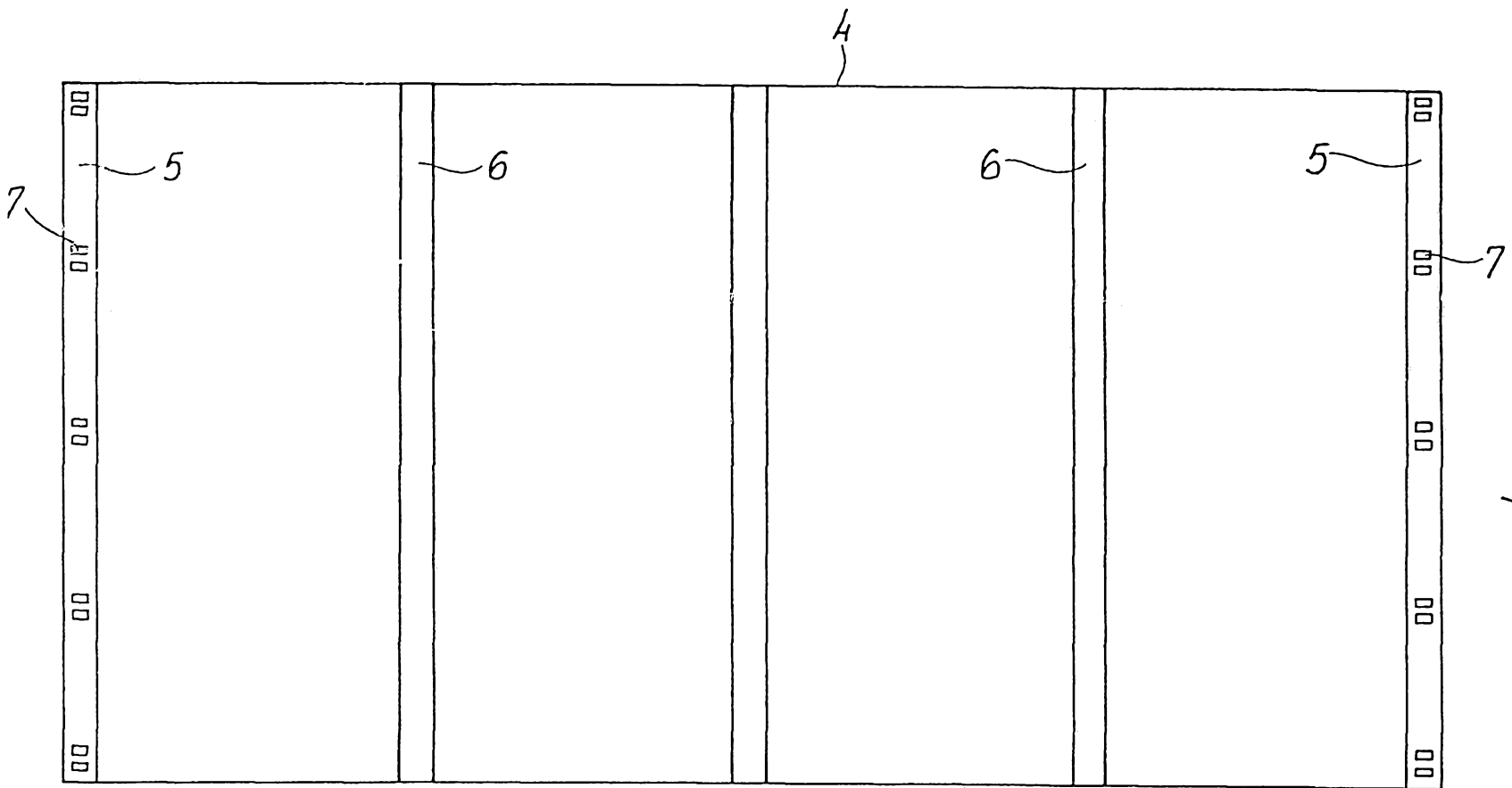


FIG. 6

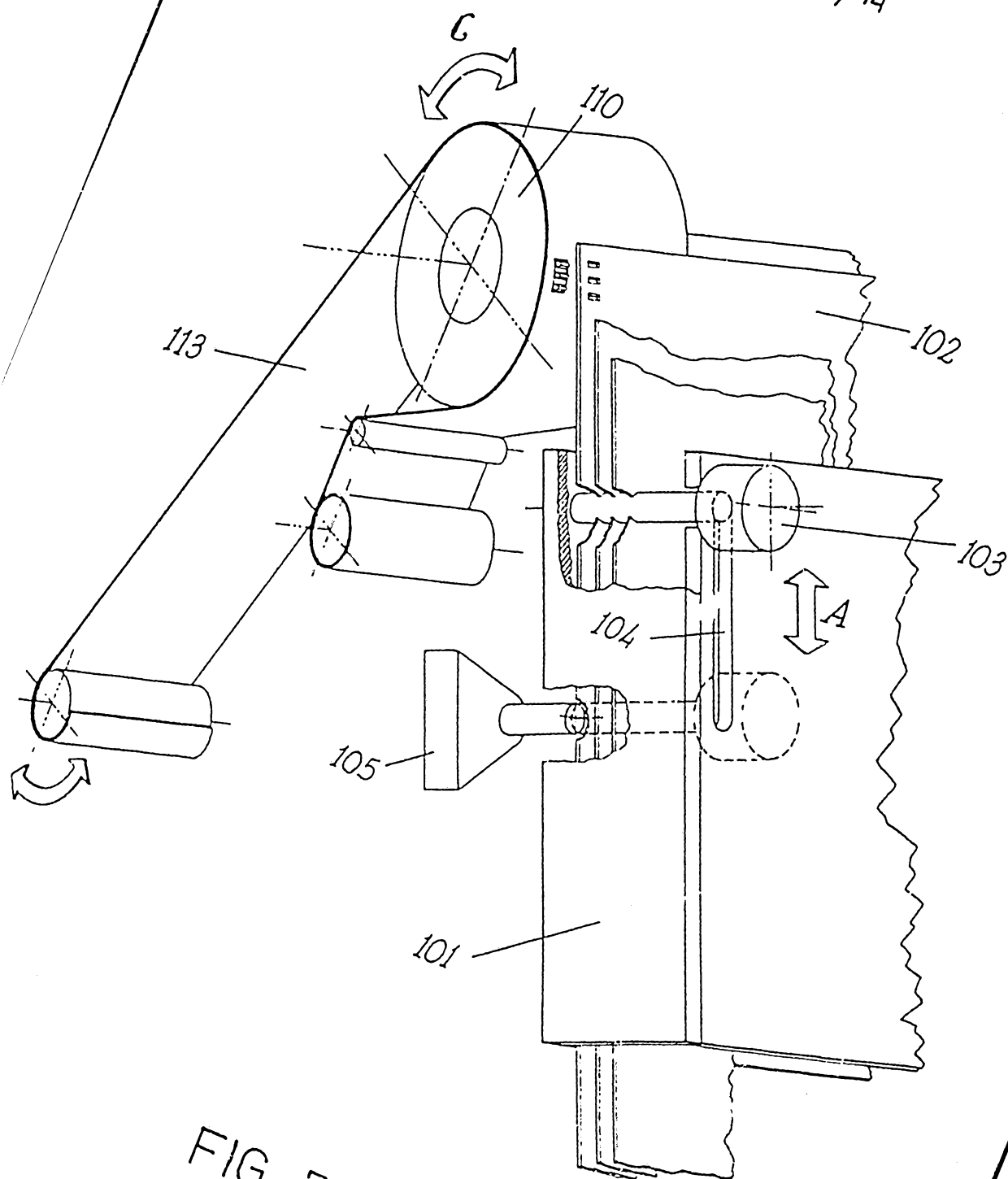


FIG. 7

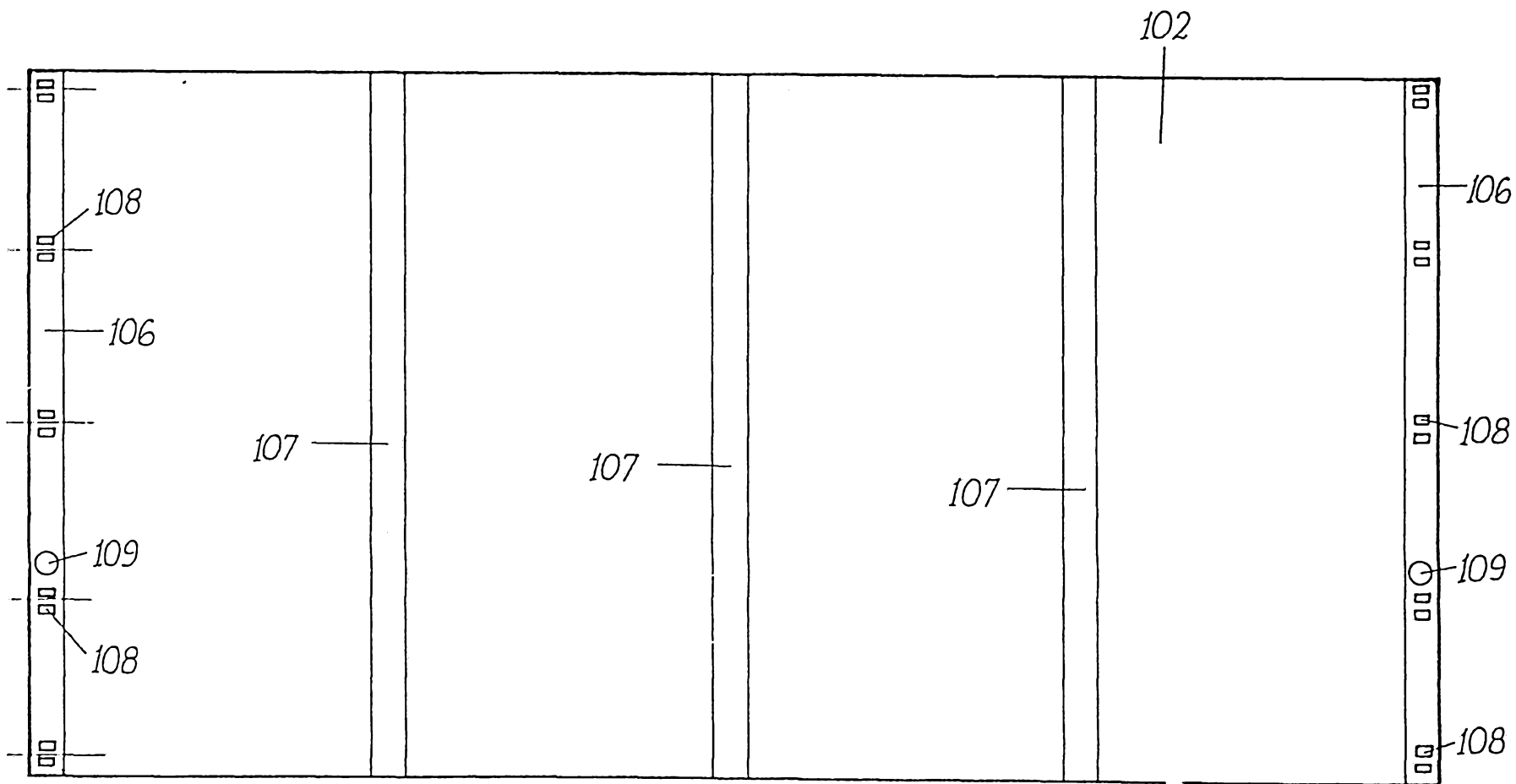


FIG. 8

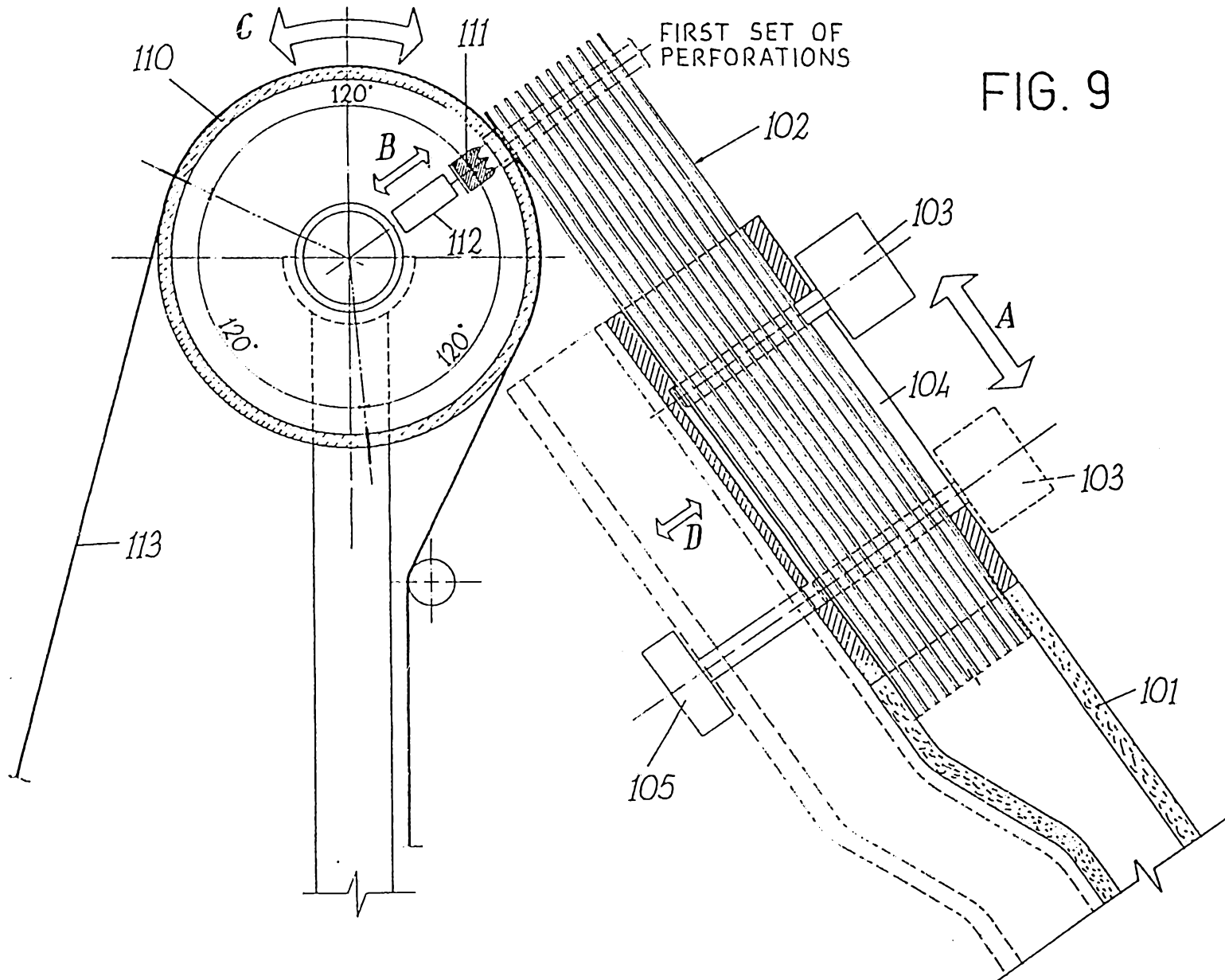


FIG. 9

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FIG. 10

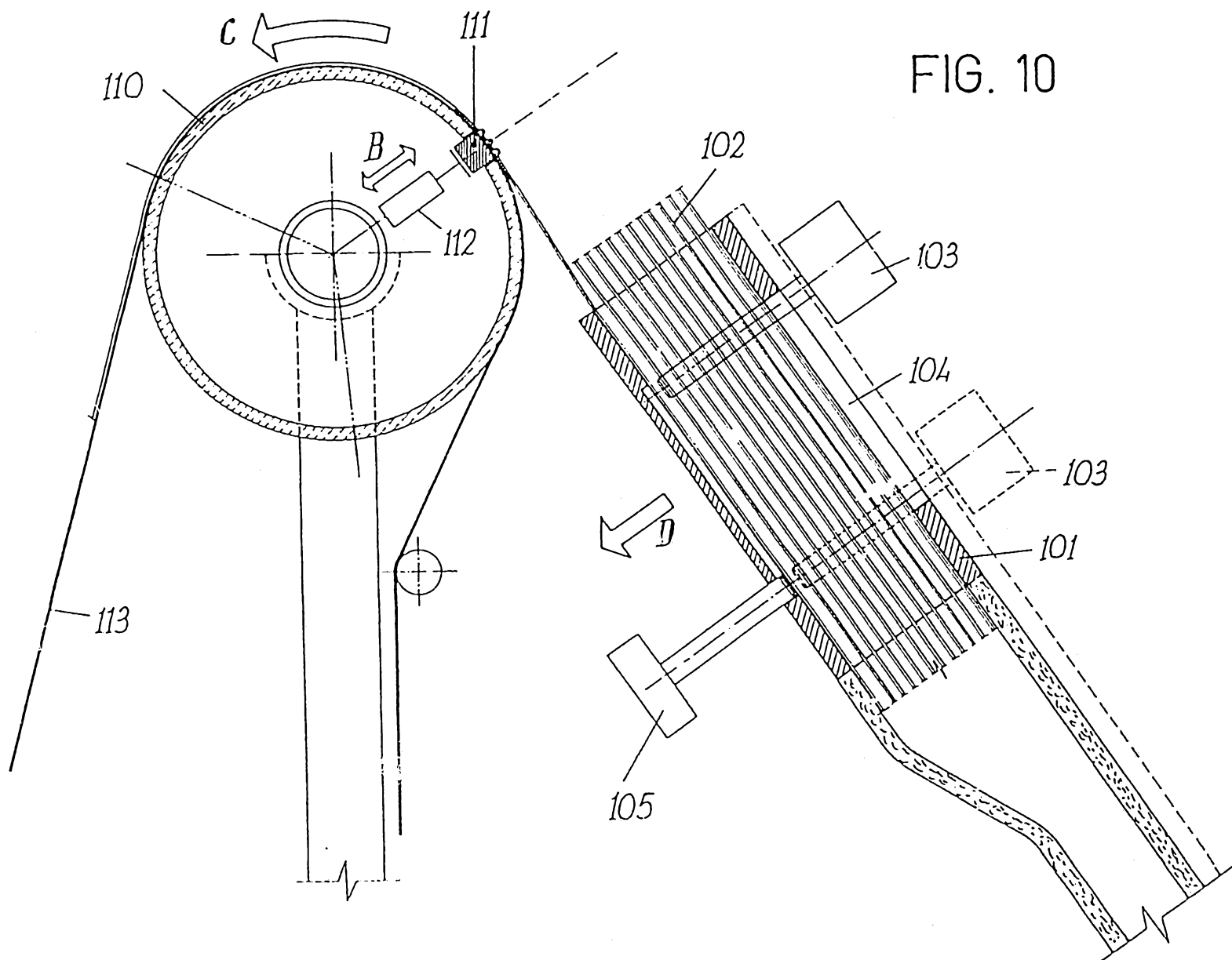


FIG. 11

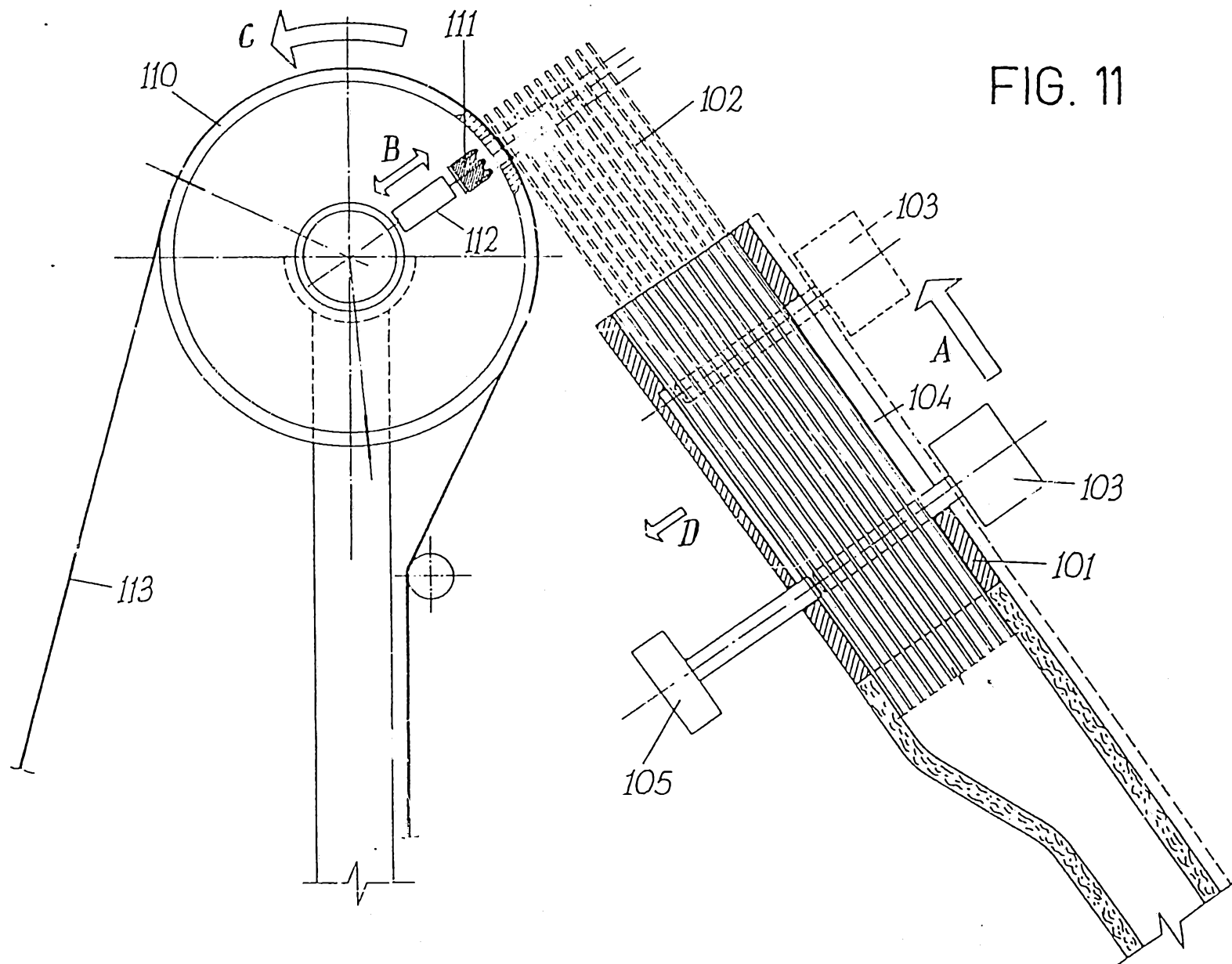
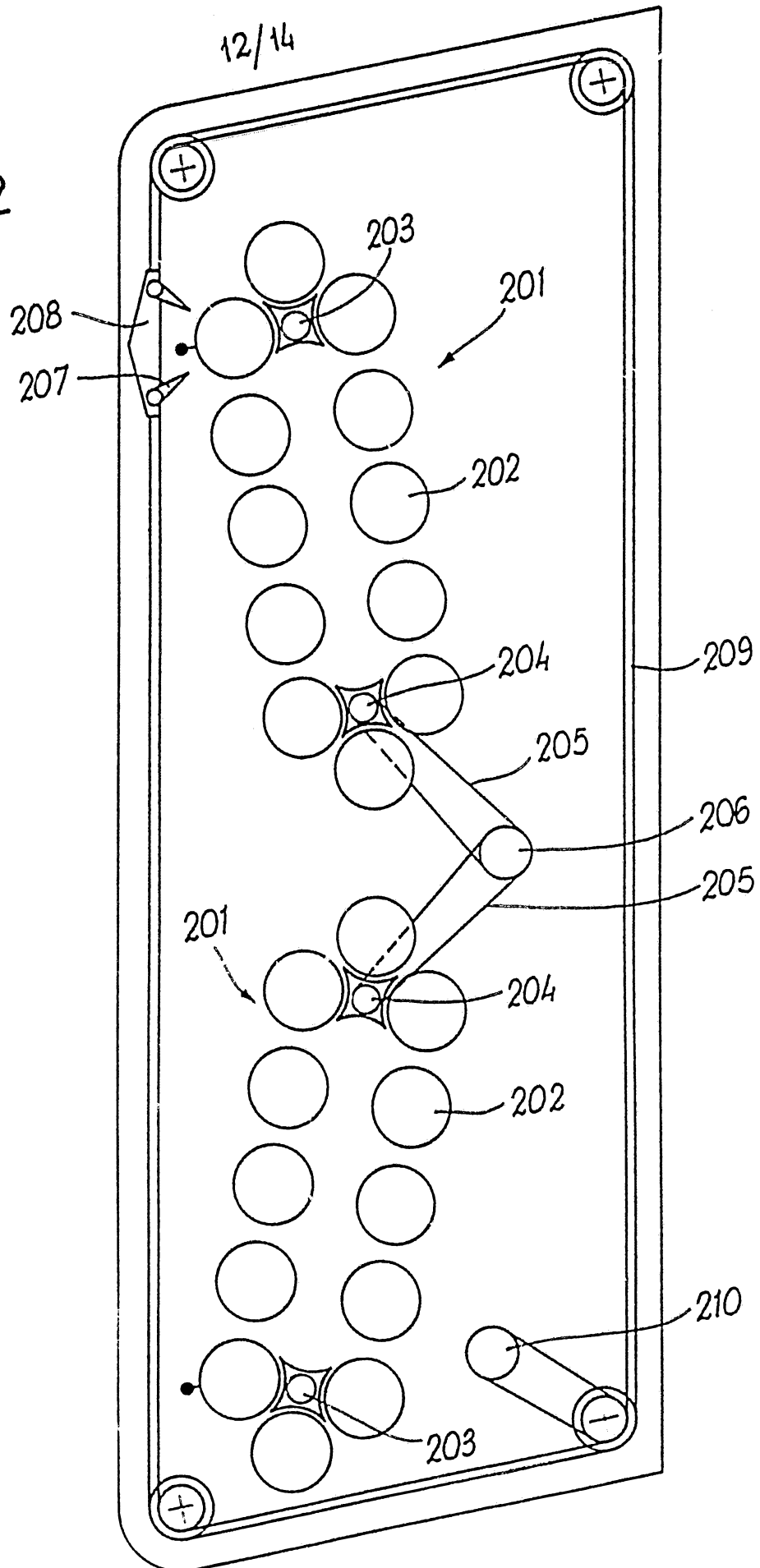


FIG. 12



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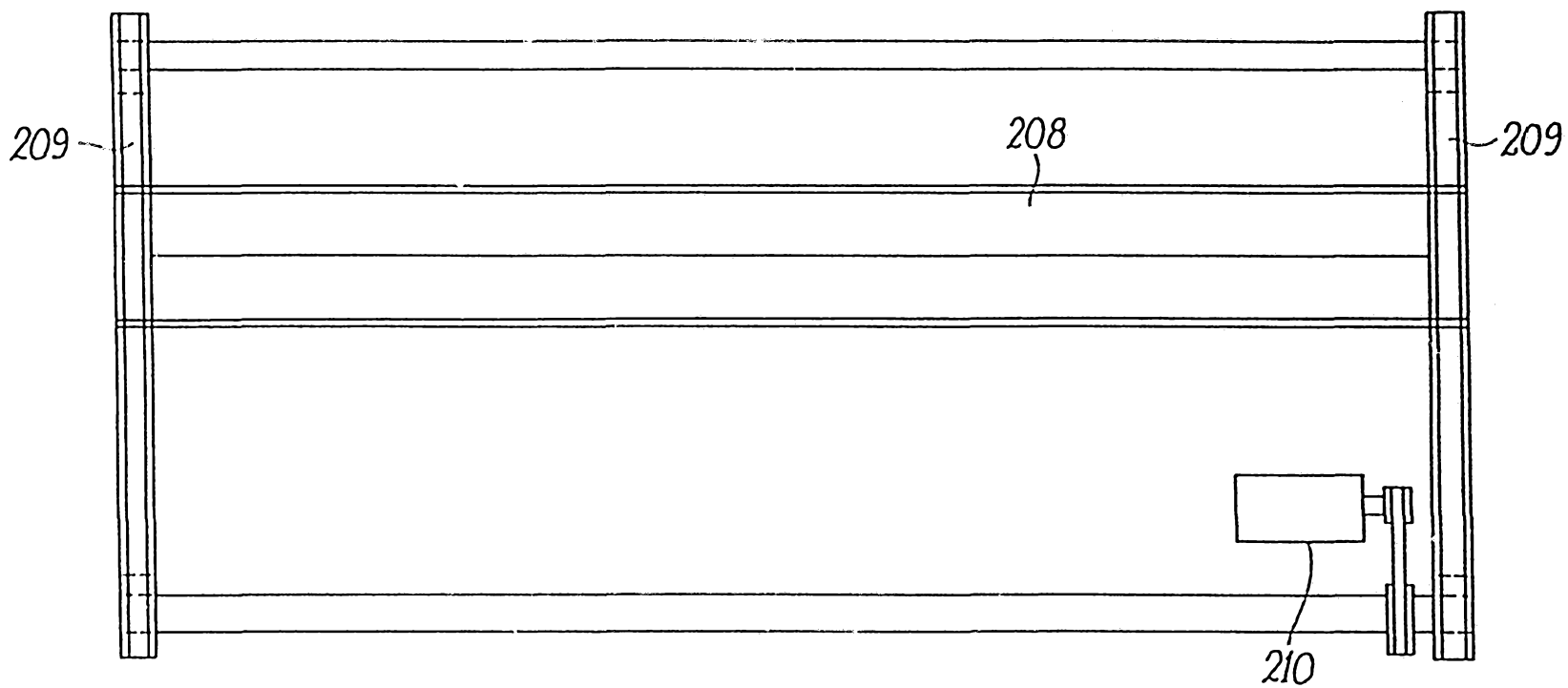


FIG. 13

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FIG. 14

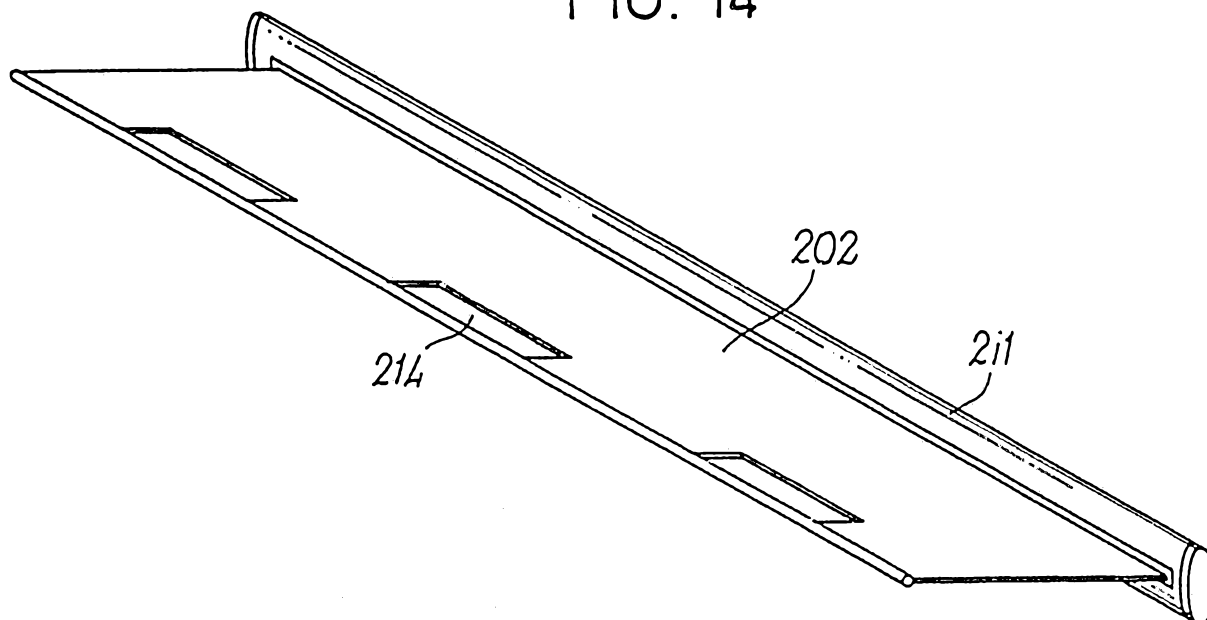
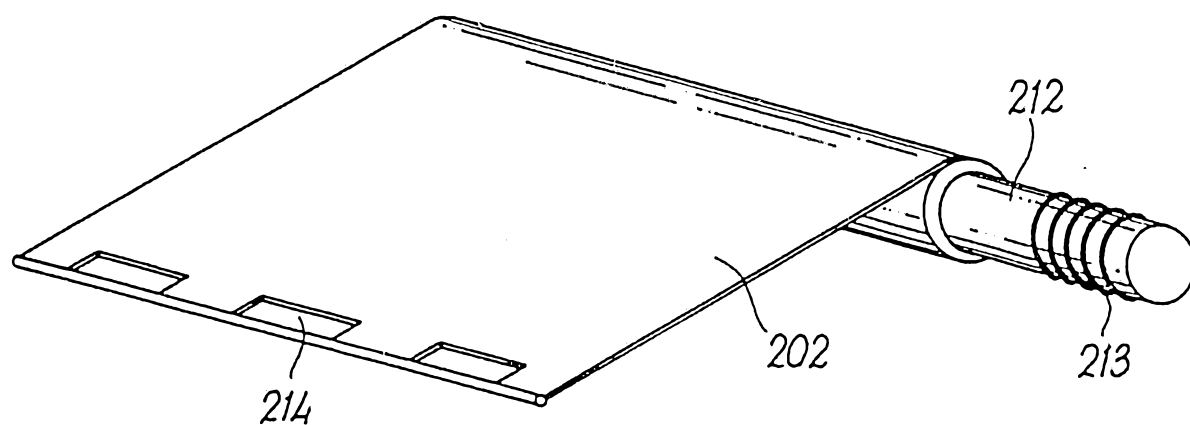


FIG. 15



INTERNATIONAL SEARCH REPORT

PCT/IT 93/00071

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 G09F11/32		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	G09F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US,A,2 195 249 (J. HUTCHINSON) 26 March 1940 see page 1, right column, line 16 - page 2, left column, line 39; figures 1-14 ---	1-6, 17-21
X	US,A,1 700 435 (J. DUVAL) 29 January 1929 see page 3, line 8 - page 4, line 78; claims; figure 6 ---	1-6, 17-21
X	US,A,1 599 646 (G. CLARK) 14 September 1926 see the whole document ---	1-6, 17-21
X	FR,A,2 647 246 (OPTION) 23 November 1990 see the whole document ---	1,5-7, 19-22
	-/--	
¹⁰ Special categories of cited documents : ^{"A"} document defining the general state of the art which is not considered to be of particular relevance ^{"E"} earlier document but published on or after the international filing date ^{"L"} document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) ^{"O"} document referring to an oral disclosure, use, exhibition or other means ^{"P"} document published prior to the international filing date but later than the priority date claimed ^{"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 ^{"X"} document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step ^{"Y"} document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. ^{"&"} document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
19 OCTOBER 1993	27 10. 93	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	GALLO G.G.	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
X	GB,A,182 964 (H GREEN ET AL.) 10 August 1922 see the whole document -----	1-6,8,9, 17-19

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

IT 9300071
SA 77001

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
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19/10/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-2195249		None	
US-A-1700435		None	
US-A-1599646		None	
FR-A-2647246	23-11-90	None	
GB-A-182964		None	