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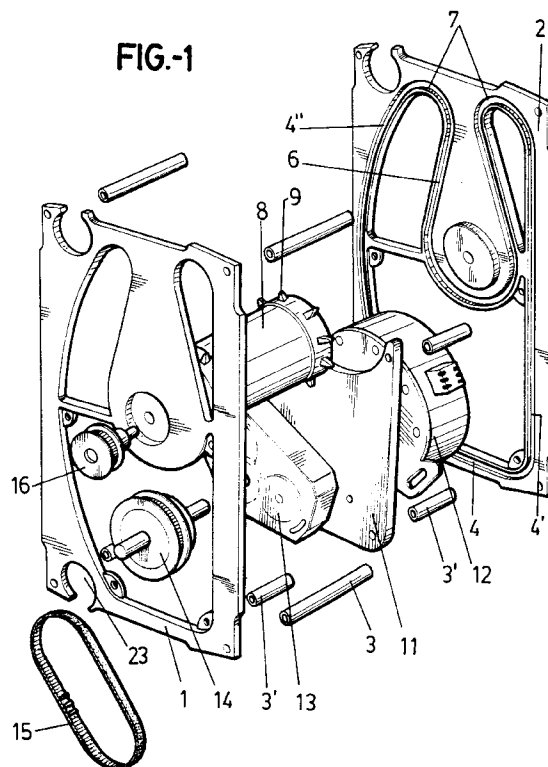
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(54) **Improvements in cyclic image viewers.**

(57) Improvements to viewers used in recreational machines, in which the figures are arranged along a continuous band (5), and based on the fact that said band (5) is supported and guided by a chassis in the form of a pair of parallel plates (1) and (2), joined by spacers (3), with the particular characteristic that each of the opposing faces of said plates are provided with a groove (4) designed to receive the corresponding edge of the continuous band (5) with play, acting as a means of guiding said band. Said grooves (4) undergo a sharp inflection along of one of the minor sides thereof, defining a kind of loop (6) where the continuous band (5) is driven by the corresponding pulling drum (8).

This special system for guiding the continuous band (5) enables the grooves (4) to define a straight section (4') and a curved section (4''), converting the viewer into a reversible element which can present either a flat or a convex curved working area by simply inverting its position in the assembly.



The present invention relates to cyclic image viewers, such as those used in recreational machines, and more particularly to viewers in which the images are carried by a continuous, flexible band along which they are uniformly distributed.

The improvements of the invention are aimed at achieving perfect guidance of the continuous band, enabling its position to be adjusted perfectly according to any practical requirement, the support of the continuous band and its driving means furthermore constituting a compact assembly of reduced volume.

BACKGROUND OF THE INVENTION

In the field of recreational machines mentioned above, and more particularly in the field of recreational machines which give out cash prizes, a set of viewers is used, normally three or four, in which a set of figures or symbols appear cyclically as if they were carried by a set of rotating drums, said viewers showing a certain combination at the end of each play, possibly corresponding to a prize.

One of the wide range of solutions available regarding the configuration of these "drums" involves the use of a continuous band made of a flexible material, generally a suitable plastic material, on which said figures are conveniently printed and partially visible through a window.

Among others the Spanish utility models 261.860, 270.005, 271.429, 287.665, 9100716, 9100717 and 9202785 describe examples of this type.

All of these examples share the common feature of a line of perforations on at least one of the edges of the continuous band in order to move the band by means of a pulling drum with the help of one or more rollers, normally one or two although sometimes there are three, designed to establish the trajectory of the continuous band, in particular the trajectory of said band past the corresponding viewing window.

From what has been said above it can be deduced that in any case two rollers are provided in correspondence with the viewing window, the continuous band following a straight trajectory between them. This may be desirable in certain cases but not always, since the idea of this type of viewer is to achieve an appearance similar to that of a rotating drum. In many cases it would therefore be desirable for the trajectory of the continuous band past the viewing window to be curved, in particular when said viewing window extends vertically so that several figures can be seen simultaneously, the one corresponding to the winning line and, for example, one or two figures immediately above or below.

Furthermore, the housing of these viewers is fixed to the corresponding support plate by means of "clips" and, although these clips make assembly and disassembly an extremely fast and simple process,

when the time comes to actually disassemble the viewer an excessive deformation force is often applied to the tab or tabs which constitute the clip, causing said tab to break such that the entire support plate has to be replaced, with the resulting cost and complexity which this implies.

Furthermore, it is also common that, in time, these toothed tabs used to clip the viewer housing to the support plate undergo permanent deformation, leading to an excess amount of play and therefore the undesirable mobility of the viewer.

DESCRIPTION OF THE INVENTION

The improvements proposed by the present invention have been conceived in order to solve this problem in an entirely satisfactory way, and are therefore based on the use of a totally different system for guiding the continuous band, based not on the use of rollers but on the use of two symmetrical grooves provided in the opposing faces of two plates which constitute the chassis of the viewer, said grooves being designed to receive the corresponding edges of the continuous band with a considerable amount of play and therefore forming a closed trajectory corresponding to that which said band is supposed to follow.

It can be deduced from the above that this new system for guiding the band enables it to follow practically any straight or curved trajectory, and can therefore be adapted according to the specific requirements of each case.

According to another of the characteristics of the invention, said grooved plates which constitute the chassis, and which obviously are conveniently joined by means of spacers so as to adopt a configuration which is appreciably rectangular and relatively extended in the direction of the cyclic movement of the images, are each provided with grooved sections on their major edges, one straight and one curved, such that a particular cyclic viewer can be used in either of two positions without having to be modified, in one of said positions the band moving in a straight line past the viewing window and in the other the band following a convex curved trajectory.

According to another of the characteristics of the invention, said grooves in the plates which constitute the chassis, which have an appreciably peripheral trajectory, as well as defining the straight and curved sections described above, undergo a sharp inflection at a mid-point of one of the minor sides, defining a kind of internal loop designed for fitting the continuous band to the inevitable pulling drum. This abrupt inflection of the continuous band may be helped by a pair of rollers which, apart from guiding the band as in the case of the rollers of conventional viewers, help it to follow the sharp bends along its trajectory, it being possible to fit two more freely rotating rollers at the other two inflections which the band undergoes

along the other minor side of the chassis.

In any case, an intermediate plate is positioned at a mid-point between the two above mentioned plates, in the half other than the one in which the pulling drum is located, said intermediate plate being located inside the continuous band and constituting the support for the motor and the drive transmission unit for said pulling drum.

Said motor may be a D.C. motor, but is preferably an impulse or stepper motor, whilst the drive transmission has the form of a reduction box to which the axis of the motor is connected through the intermediate wall, said reduction box being provided with the corresponding set of gears, with the particular characteristic that said axis of the motor, apart from constituting the drive transmission element, constitutes the means of supporting said reduction box, said box being also provided with a grooved tab by means of which it is fixed to the intermediate wall with the help of a screw, such that before said screw is tightened said reduction box can be pivoted about the axis of the motor in order to adjust the tension in the transmission belt which drives the drum or roller that pulls the continuous band, as will be seen later on.

Three parallel axes emerge from said reduction box, one of them constituting the output axis provided with a toothed pulley which, by means of the corresponding belt, drives another toothed pulley of smaller diameter conveniently fixed to the axis of the roller which pulls the continuous band, such that only these two pulleys and the belt which connects them emerge from the main housing or chassis of the viewer, implying a minimal increase in the dimensions of said viewer. The other two axes, which correspond to intermediate transmission points, each end in discs which are situated within the chassis and read by the corresponding opto-couplers for carrying out the classic and inevitable positional control of the continuous band such that, as is also conventional, one of said discs is used to control the "zeroing" of the band whilst the other is used to control the number of figures which pass the viewing window after the zero point. In this way, by reading said discs, said reading operation is not affected by any possible deterioration of the continuous band, as a result of which it is more reliable, and at the same time it the band breaks the machine could continue to operate, with no errors whatsoever, except that it would not display any images to the player, unlike in the conventional case where it is the band itself which is read.

Nevertheless, it is also possible for a freely rotating pivoting plate to be mounted on the output axis of the motor next to the transmission pulley which drives the pulling drum or roller, said pivoting plate being provided with an arm ending in a small roller designed to press against the transmission belt and act as a means of tensing said belt, the pivoting plate therefore being permanently pulled by a spring which tends

to make it pivot in the appropriate direction.

Complementarily, the end of the pulling drum or roller opposite the end at which the driven pulley is fitted ends in a miniature pinion which is housed in a small housing in the chassis with the help of a corresponding closing cover, said housing also housing a reduction crown gear whose output axis, which passes through said cover, is connected to a disc provided with a groove at a point on its perimeter and with a line of small holes inside the level of said groove designed to activate a double optical reader which can detect both the passing of said groove as well as that of each of said holes, thereby enabling both the zeroing of the continuous band as well as the position of each of the images to be controlled.

According to another of the characteristics of the invention, said optical reader, and more particularly the printed circuit board associated with it, is mounted directly onto the chassis of the viewer with the help of guides made in the hollow interior of said chassis and which can be accessed from the outside.

Obviously, the transmission ratio between said pinion and said reduction crown gear is such that the passing of the holes in the plate in front of the optical reader is correctly synchronized with the motion of the images of the cyclic viewer assembly.

Finally, in order to solve the conventional problem regarding the fixing of the viewer assembly to the corresponding support plate, a device is provided which is designed to be conveniently fixed to the housing of said viewer, said device taking the form of a double cam which opposes the toothed tab on which it acts and which can adopt two positions 180° out of phase, in one of said positions, and together with the housing itself of the element in question, it constitutes a kind of clamp which immobilizes the toothed tab in a clamped position, whilst when it is rotated into the opposite position and the toothed tab is freed, it acts on the inner face thereof, deforming it against its natural elasticity, by a small amount in order to avoid the deterioration of said tab but enough to detach it from the corresponding rebate in the element which it was fixing.

In this way, and in accordance with the object of the invention, the toothed tabs which fix the support element are clamped and fixed under normal conditions, such that said element is perfectly stable, whilst when it is necessary to disassemble said support element they enable the retaining tabs to be easily elastically deformed without the risk of causing their deterioration.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the present invention be better understood, the accompanying drawings show by way of non-limiting example one practical embodiment of the invention.

In said drawings:

Figure 1 shows an exploded perspective view of a cyclic image viewer according to the improvements which form the object of the present invention.

Figure 2 is an internal front elevation view of one of the plates which make up the viewer shown in the previous figure.

Figure 3 is an exploded view similar to that of figure 1, showing an alternative embodiment of the viewer in which a pair of rollers help to guide the continuous band.

Figure 4 is a representation similar to those of the previous figures, showing another alternative embodiment of the viewer in which there are four rollers which help to guide the continuous band.

Figure 5 shows the viewer of figure 3 in the assembled state where the working face is a flat section of the continuous band.

Figure 6 shows the same viewer as the previous figure, where this time the working face is a convex curved section of the continuous band.

Figure 7 shows a partial perspective view of the cyclic image viewer of the previous figures showing the reduction unit in detail.

Figure 8 is a lateral elevation view of the assembly shown in the previous figure.

Figure 9 is a cross section of the same assembly taken through the axis of the pulling roller.

Figure 10 shows a perspective view of a cyclic image viewer similar to that of the previous figures but in which the drive transmission unit has been modified.

Figure 11 is another perspective view of the viewer shown in the previous figure seen from the opposite lateral face.

Figure 12 shows a perspective and exploded detail of the part of the viewer where the transmission belt tensioner is fitted.

Figure 13 shows another perspective and exploded detail of the viewer, this time at the position of the reduction unit which drives the control disc.

Figure 14 shows a partial perspective view of a viewer like the one shown in the previous figures fitted to the corresponding support plate and fixed thereto by means of clips provided with the detachment and clamping device which constitutes another of the characteristics of the invention.

Figure 15 is an upper or external plan view of the cam which forms part of said device.

Figure 16 is a lower plan view of the same cam.

Figure 17 shows a profile of the cam.

Figure 18 shows a detail in cross section taken along the line A-B of figure 15.

Figure 19 shows another detail in cross section, this time taken along the line C-D of figure 16.

DESCRIPTION OF PREFERRED EMBODIMENT

As can be seen from these figures, and more particularly from figure 1, the cyclic viewer according to the improvements described comprises a pair of symmetrical parallel plates 1,2 which may be substantially thin, as can be seen in figure 1, and which are joined by means of spacers 3 or by any other suitable means, said plates 1 and 2 having the particular characteristic that their opposing faces are provided with grooves 4 designed to house the respective edges of the continuous band 5 that carries the figures, said grooves being more than sufficiently deep to ensure the stability of the edge regions of the continuous band 5 inside them, the width of said grooves ensuring that said band can move with play.

More particularly, the basically rectangularly shaped groove 4 in the plates 1 and 2 follows a trajectory in which it is possible to define a straight section 4' along to one of the major sides of the plates, and an appreciably convex curved section 4'' corresponding to the opposite side such that, depending on the position of the viewer assembly relative to the viewing window of the machine, the continuous band presents a straight trajectory, as in the case of figure 5, or a convex curved trajectory, bearing a considerable likeness to a drum of considerable diameter, as shown in figure 6.

This enables a particular cyclic image viewer, the one shown in figures 5 and 6, to be used in two different types of recreational machine, differing also in terms of the position which the continuous band 5 is to take up behind the viewing window.

In any case, the groove 4 which defines the trajectory of the continuous band 5 undergoes a sharp internal inflection along of the minor sides of the plates 1 and 2, defining a section in the form of a loop 6 in which said groove may even disappear, becoming a simple step open to the outside between the inflection zones 7, the pulling drum 8 being positioned within the area defined by said loop 6 of each plate 1,2, said pulling drum being provided at its edges with classical lines of teeth 9 which act on the holes 10 in order to pull said band.

In addition to the structure described, a smaller intermediate plate or wall 11 is provided between said plates 1 and 2 in the part of the chassis furthest away from the area in which the pulling drum 8 is located, one of the faces of said intermediate wall or plate 11 constituting the support for the motor 12 which drives said drum, its other face constituting the support for the reduction unit 13 which is driven by said motor 12 and which drives the pulley 14, preferably toothed, which in turn, and with the help of a belt 15, drives another pulley 16 conveniently joined to the axis of the pulling drum 8. Obviously, the belt 15 and the two pulleys 14 and 16 may be substituted by two directly or indirectly engaged toothed crown gears.

The intermediate wall or plate 11 may in turn be joined to the lateral plates 1 and 2, within the grooves 4, by means of spacers 3', as shown in figure 1, or by means of internal walls 17 that emerge from said plates 1 and 2 following a trajectory similar to that of the grooves 4, as is shown in figure 3, such that the intermediate wall 11 is located between the openings defined by these walls 17 and is conveniently fixed thereto.

According to this alternative embodiment shown in figure 3, at the positions corresponding to those of the inflection zones 7 of the guide groove, it is possible to arrange supports 18, set back from the plates 1, and 2, on each of which are mounted freely rotating discs 19 constituting supports for the edges regions of the continuous band, tending to help the said band to follow the sharp bends in the region of said inflections 7 as it moves longitudinally along the guide grooves 4.

As is shown in figure 4, it is also possible for these discs 19 to take the form of rollers 20 which are also free to rotate on the chassis, and that these rollers 20 work together with two other rollers 21 situated at the other two inflection points or zones of the continuous band 5 next to the other two vertices of the plates 1 and 2 which constitute the chassis.

Contrary to what might at first appear to be the case, these rollers 20 and 21 of the embodiment shown in figure 4 imply the need for a greater force to move the continuous band 5, and therefore in said example shown in figure 4 a D.C. motor 22 is used instead of the stepper motor 12 of the previous examples.

In any case, the structure described is complemented with any conventional means of detecting and controlling the position of the continuous band 5 at all times, such as for example by means of optocouplers which may be situated at any point on the continuous band itself, using the holes 10 thereof, colours, bar codes, etc., or said means may be separate from the continuous band, on elements which move in synchronization with it, connected for example to the transmission output 13, although the reading method used does not affect the basis concept of the invention in any way.

In an analogous way, the plates 1 and 2 may be provided close to their vertices with cut-outs 23 for fitting lamp holders 24 for illuminating the working area of the continuous band, although again this does not affect the basic concept of the invention which, as has been said above, is based fundamentally on the system for guiding the continuous band based along the grooves 4 made in the plates 1 and 2, making it possible to define straight trajectories 4' and convex curved trajectories 4'' for said continuous band, which in turn enables the cyclic viewer to be adapted according to any practical requirements.

Returning now to the transmission from the mo-

tor 12 to the pulling drum 8, the axis 25 of said motor passes through the wall 11 and enters the reduction box 13, said reduction box being situated on the other side of said wall 11 and supported at two points, the axis 25 itself and a tab 26 provided with a slightly curved elongated groove or hole 27 whose centre of curvature coincides with the axis 25 and through which passes a screw 28 to fix it firmly to the intermediate wall 11 after having pivoted said reduction box 13 as necessary in order to adjust the tension in the transmission belt 15 that connects the pulley 14, joined to the output axis 29 of said reduction box 13, to the pulley 16, joined in turn to the axis 30 of the pulling roller 8, the amount by which said pulleys 14 and 16 protrude from the plate 1 of the viewer being such that the belt 15 operates at a minimum distance from said plate, as can best be seen in the cross section shown in figure 9, implying a minimal increase in volume of the viewer in question.

Apart from the transmission axis 29 which drives the pulling roller 8, two more axes 31 and 32 emerge from said reduction box 13 at intermediate points of the set of gears within said reduction box 13, said axes 31 and 32 ending in discs 33 and 34 respectively provided with indicators 35 or holes 36 for carrying out the drive control by means of corresponding optocouplers 31,37' mounted directly on the outside of the reduction box 13, or by any other suitable reading means, providing they do not project from the housing defined by the chassis of the viewer, again as can be seen in the cross section shown in figure 9.

This results in an extremely compact drive unit which has a minimal effect on the overall volume of the viewer, thereby enabling the viewers to be grouped as close together as possible, and furthermore by carrying out the readings for the positional and stop control of the continuous band 5 on said discs 33 and 34, i.e. separately from the continuous band 5 as in the conventional case, said readings are more reliable and independent of anything which may accidentally happen to said band.

According to the alternative embodiment shown in figures 10 to 13, a pivoting plate 38 is mounted on said output axis 29 of the drive unit, said pivoting plate being preferably provided with a collar 39 which moves inside another collar 40, coaxial with the axis 29 and emerging as a single piece from the intermediate wall 11, said plate 38 being provided with an elongated hole 41 through which passes a screw 42 joined to an appendix 43 laterally adjacent to the collar 40, said screw 42 acting as a limiting stop for the pivoting movement of the plate 38 which is pulled by a spring 44 connected between a small hole 45 in said plate and a pivot 46 that emerges from the intermediate wall 11, said plate 38 being further provided with an arm 47, parallel to its pivoting axis, on which is mounted a small, freely rotating roller 48 which presses against the transmission belt 15 as a means of keep-

ing it tense.

Complementarily, the end of the axis 30 of the pulling drum or roller 8 opposite the driven pulley 16, ends in a pinion 49 located inside a small housing 50 in the chassis, said housing also housing a reduction crown gear 51, retained by a cover 52 which closes the housing 50 and which is fixed to the chassis by means of screws 53 or any other suitable means, the axis of the reduction crown gear 51 passing through said cover 52 and being connected to an external disc 54, to which it transmits the rotational motion of the pulling roller, said disc 54 being provided with a radial groove 55 and a peripheral line of holes or windows 56 that are detected by an optical reader 57 connected to a printed circuit board 58 which is mounted directly onto the chassis 1 with the help of guides 59 in the hollow interior of said chassis, such that said optical reader can be fitted by simply sliding it into place such that it is housed mostly within the chassis, again implying a minimal effect on the overall volume of the device.

Obviously, the ratio between the pinion 49 and the reduction crown gear 51, and the diameter of the plate 54, are such that the groove 55 passes in front of the optical reader 57 each time that the continuous band 5 completes a full trajectory, whilst the displacement in time between the holes 56 coincides in turn with the displacement in time between the images 60 of the continuous band 5 as they pass the viewing windows 61,61'.

Finally, in order to fix each viewer 1 assembly to the corresponding support plate 62, as shown in figures 14 and onwards, in correspondence with at least one of the toothed tabs 63 which constitute the means of fixing the viewer 1 to said support plate 62, when the tooth 64 of said tab 63 is snapped into a stepped rebate 65 in the element 1, said element 1 incorporates a cam 66 joined to said element 1 by means of an axis 67 which enables it to rotate freely.

More particularly, the cam 66 consists of a flat body, indicated by the reference 66, provided with a central hole 68, through which passes said pivot axis 67, and further provided at its edge with a stepped rebate 69 whose opening 70 is substantially widened, the depth of said rebate 69 depending on the thickness of the toothed tab 63, and more particularly on the corresponding height of the external surface of said toothed tab 63 above to the corresponding face of the body or chassis of the viewer 1, such that when in the clamped position shown in figure 14, said tab 63 is gripped or restrained between the cam 66 and the viewer 1 and is thereby immobilized with no possibility of play.

On the half of the cam 66 furthest away from the stepped rebate 69 mentioned above, and parallel to its opening 70, said cam 66 is provided with a wide bezel 71, said bezel being outwardly oriented, i.e. oriented away from the viewer 1, and designed to act on the

inclined surface 72 of the tooth 64 of the tab 63 when the cam is rotated in the opening or unclamping direction, thereby causing said tab 63 to elastically deform so that its tooth 64 is released from the stepped rebate 65 of the element 1, but at the same time said deformation being the minimum necessary to achieve this effect such that there is absolutely no risk of said tab 63 breaking by forcing it excessively.

Finally, it only remains to be said that the axis of rotation 67 of the cam 66 is positioned on the element to be fixed 1 at a distance relative to the toothed tab 63 such that when said cam is in an intermediate position in which the edge 73, where the opening 70 leading to the stepped rebate 69 and the bezel 71 are located, is parallel to the far, free end 74 of the toothed tab 63, these elements do not interfere with each other, enabling the element 1 to be fitted to the support plate 62 by simple pressure as if the release and clamping device did not exist and, from such an intermediate position, if the cam is rotated in one direction it causes the toothed tab 63 to become clamped and if it is rotated in the other direction it causes said tab 63 to be elastically deformed sufficiently to release the viewer 1.

Claims

1. Improvements to cyclic image viewers, in particular to viewers in which the physical carrier for said images consists of a continuous, elastically deformable band, made preferably of a plastic material, which is driven by a suitable motor unit so as to move past a viewing window through which it is partially visible, characterized essentially in that the means of supporting and guiding said band (5) consist of a pair of plates (1) and (2) which, with the help of spacers (3), constitute a chassis in which said plates (1) and (2) are parallel and symmetrical, with the particular characteristic that the opposing faces of said plates are each provided with a peripheral groove (4) designed to receive the corresponding edge of the continuous band (5), said groove being sufficiently deep to ensure the stability of the band inside it and sufficiently wide to receive the edges of the band with play, said groove (4) defining two sections, preferably along the major sides of the plate (1, 2), a straight section (4') and an opposing curved section (4'') defining guide sections for said band (5) corresponding to straight and convex curved trajectories respectively for the band.

2. Improvements to cyclic image viewers according to claim 1, characterized in that said guide groove (4) in each of the plates (1, 2) which constitute the chassis undergoes a sharp inflection along one of

the minor sides thereof, defining a kind of internal loop (6) where the continuous band (5) is fitted to the inevitable pulling drum (8) in order to move said band, the diameter of said loop (6) made by the grooves (4) corresponding to that of the pulling drum (8), said drum being provided at its ends with projections for supporting the edge regions of the band, said edge regions being provided with teeth (9) which act on the classical holes (10) in the continuous band (5).

3. Improvements to cyclic image viewers according to the previous claims, characterized in that optionally and at positions corresponding to the inflection zones (7) which define the entrance of the central loop (8), a pair of discs (19) are arranged on each plate, freely rotating on corresponding supports (18) and constituting travelling supports which make it easier for the continuous band to follow the sharp bends at said inflection zones (7). 15
4. Improvements to cyclic image viewers according to claims 1 and 2, characterized in that between the plates (1) and (2), both at the sharp inflection zones (7) of the groove (4) at the entrance of the loop (6) and at the less acute inflections of the opposite part of said grooves, freely rotating rollers (20) and (21) respectively are arranged to support the edge regions of the continuous band (5) at these points of inflection. 25
5. Improvements to cyclic image viewers according to the previous claims, characterized in that in the space between the plates (1) and (2) which constitute the chassis, in the half other than the one in which the pulling drum (8) is located, is arranged a reduction/drive unit (12, 13) for driving the pulling drum (8), further incorporating in any suitable part of the chassis any means, again conventional and suitable, for detecting and controlling the position of the continuous band (5) and more particularly the position of the figures which appear on said continuous band relative to the window through which said images are viewed. 35
6. Improvements to cyclic image viewers according to claims 1 and 5, characterized in that the reduction box (13), via which the electric motor (12) drives the output pulley (14), is arranged such that it can pivot about the axis (25) of the motor (12) and is provided laterally with a grooved tab (26) through the elongated hole (27) of which passes a screw (28) for fixing the reduction box (13) firmly to the intermediate wall (11) once the tension has been adjusted in the belt (15) which transmits the motion from said output pulley (14) 40

to the pulley (16) which is joined to the axis of the pulling drum (8).

7. Improvements to cyclic image viewers according to claim 6, characterized in that apart from the transmission axis (29) which ends in said output pulley (14), two more axes (31) and (32), parallel to the previous one, emerge from the reduction box (13) at intermediate points of the transmission within said reduction box, said axes (31) and (32) ending in discs (33) and (34) respectively, also set back within the chassis defined by the plates of the viewer, said discs being provided with holes (35) and (36) or any other type of indicator which, with the help of respective optocouplers (37, 37') or other suitable reading means, enable the electric motor (12) to be controlled in order to carry out the stop control of the continuous band (5) and more particularly of the figures thereof which can be seen through the corresponding viewing window. 45
8. Improvements to cyclic image viewers according to claims 1 and 5, characterized in that a freely rotating pivoting plate (38) is mounted on the output axis (29) on which is also mounted the pulley (14) that drives the pulling drum (8), said pivoting plate (38) being provided with an arm (47), parallel to said axis (29), on which is mounted a small, freely rotating roller (48) which opposes the transmission belt (15), said pivoting plate (38) being further provided with a spring (44) connected between it and the viewer, said spring tending to make said plate pivot such that the roller (48) presses against the transmission belt (15) as a means of keeping it tense. 50
9. Improvements to cyclic image viewers according to claim 8, characterized in that the end of the axis (30) of the pulling drum or roller (8) opposite the end driven by the motor (12), ends in a small pinion (49) situated inside a small housing (50) in the chassis or body of the viewer (1) and provided with a corresponding cover, said housing also housing a reduction crown gear (51) which is driven by said pinion and which, by means of its own axis which passes through said cover, drives an external disc (54) close to the corresponding lateral wall of the chassis (1) and provided with a radial groove at a point on its perimeter and with a concentric peripheral line of equiangularly spaced holes or grooves (56) coinciding numerically with the images (60) of the continuous band (5), said external plate working together with an optical reader (57) which controls the zeroing of the of the viewer assembly by means of said groove (55), and the unit advance of the images by means of the holes (56), the chassis (1) incor- 55

porating a pair of channelled guides (59) in the space next to where the motor is located in order to fit, by sliding, the printed circuit board (58) to which said optical reader (57) is connected.

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- 10.** Improvements to cyclic image viewers according to claim 1, characterized in that in correspondence with at least one of the tabs (63) which constitute the clips for fixing it to the corresponding support plate (62), the body (1) of the viewer incorporates a cam (66) in the form of a flat body fixed to said viewer close to the rebate (65) which receives the toothed tab (63) such that it can rotate freely, said cam (66) being provided on its lower face, or face closest to said element and at the edge of said cam, with a stepped rebate (69) designed to receive the toothed tab (63) when the cam is rotated into the clamped position, whilst the opposite edge of said cam is provided with a bezel (71), said bezel being outwardly oriented, i.e. oriented away from the element to which the cam is fixed, and designed to act on the inclined surface (72) of the tooth (64) of the tab, thereby causing the elastic deformation and release of said tab.

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- 11.** Improvements to cyclic image viewers according to claim 10, characterized in that the opening of the stepped rebate (69) of the cam (66) through which the toothed tab (63) enters is widened to make said entrance easier.

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- 12.** Improvements to cyclic image viewers according to claims 10 to 11, characterized in that the axis of rotation (67) of the cam (66) is positioned on the viewer (1) such that when said cam is in an intermediate position, in which the edge of said cam where the opening leading to the stepped rebate (69) and the bezel (71) are located is parallel to the free end of the toothed tab (63), the cam is a short distance away from said toothed tab and, from this intermediate position, if the cam is rotated in one direction it causes the toothed tab (63) to be clamped to the viewer (1), and if it is rotated in the other direction it causes said tab (63) to be elastically deformed sufficiently to release it.

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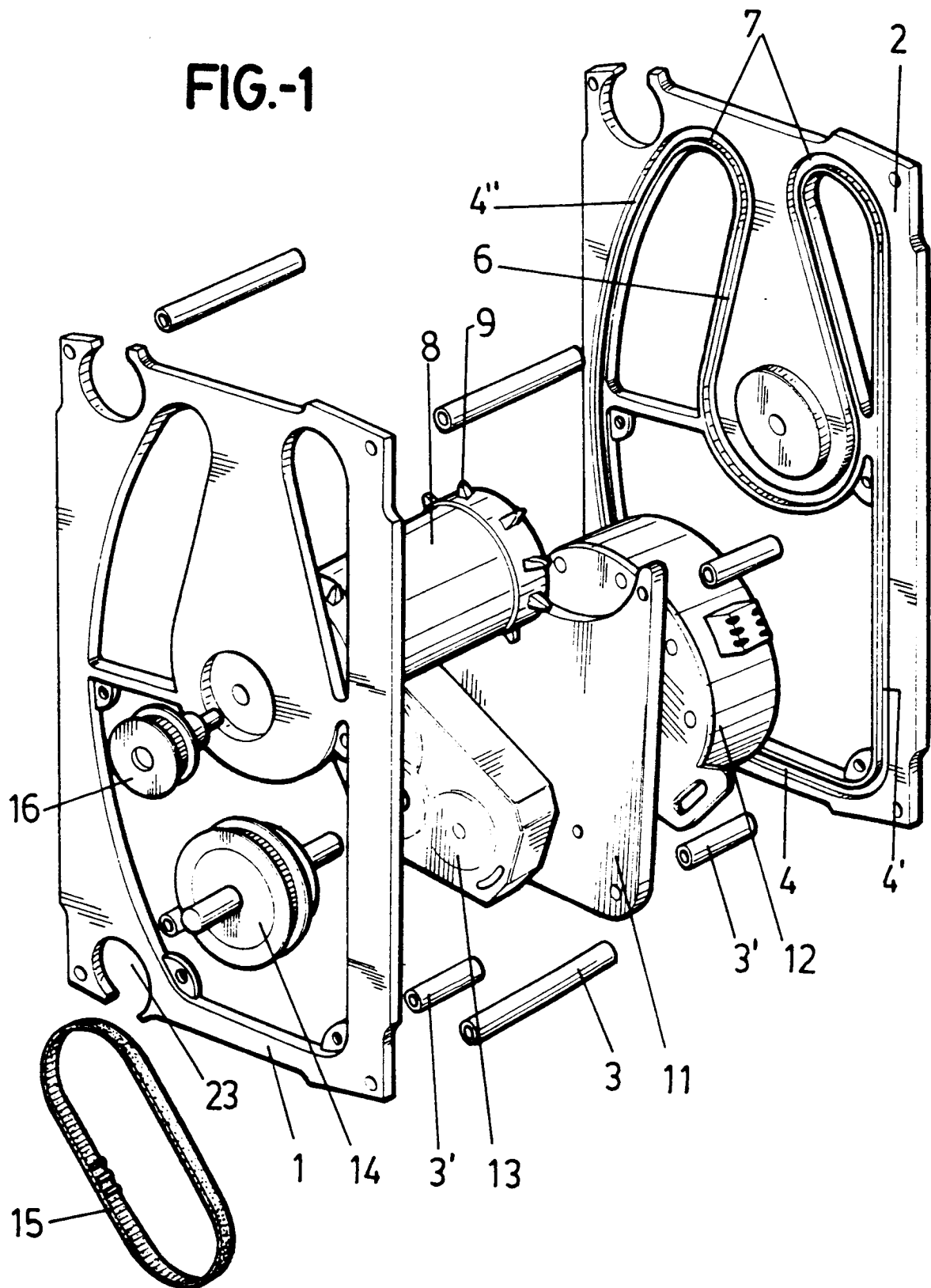
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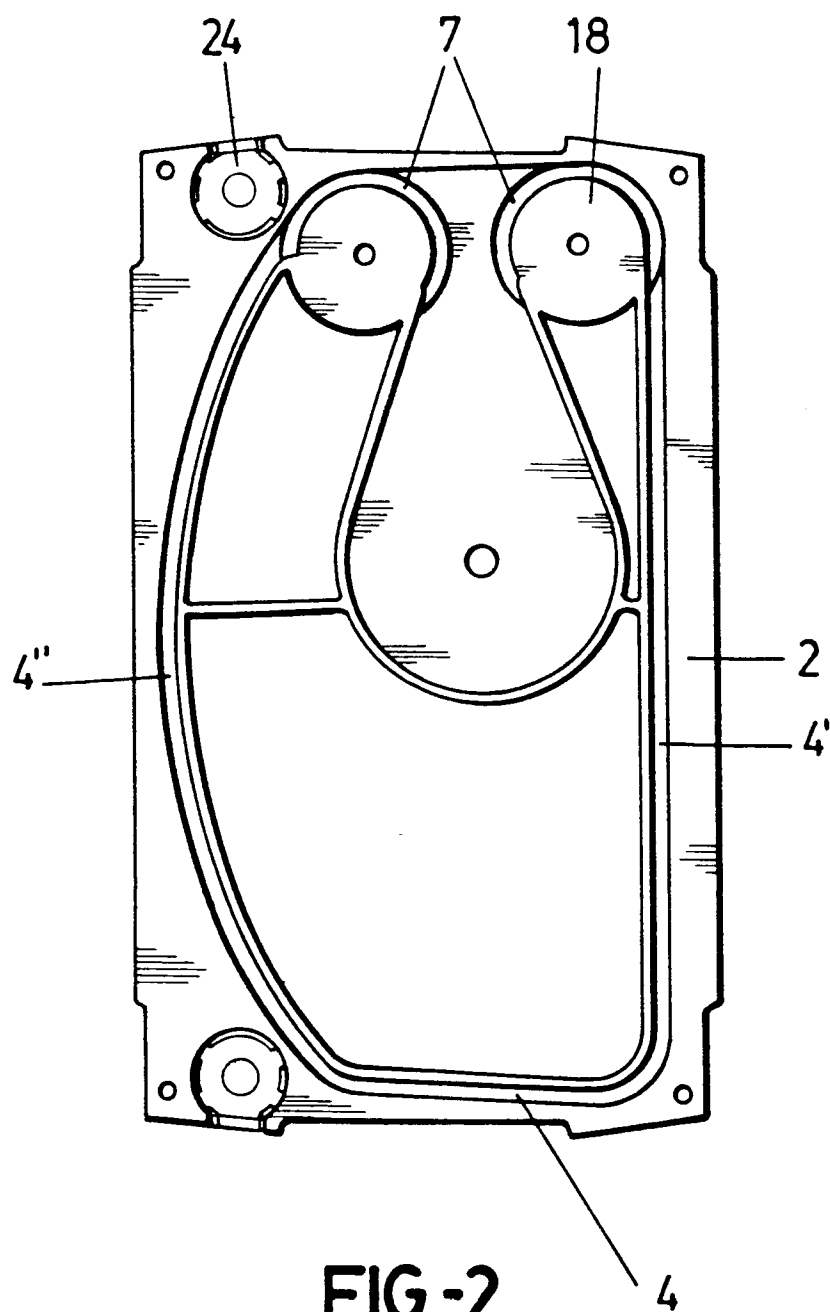
45

50

55

FIG.-1





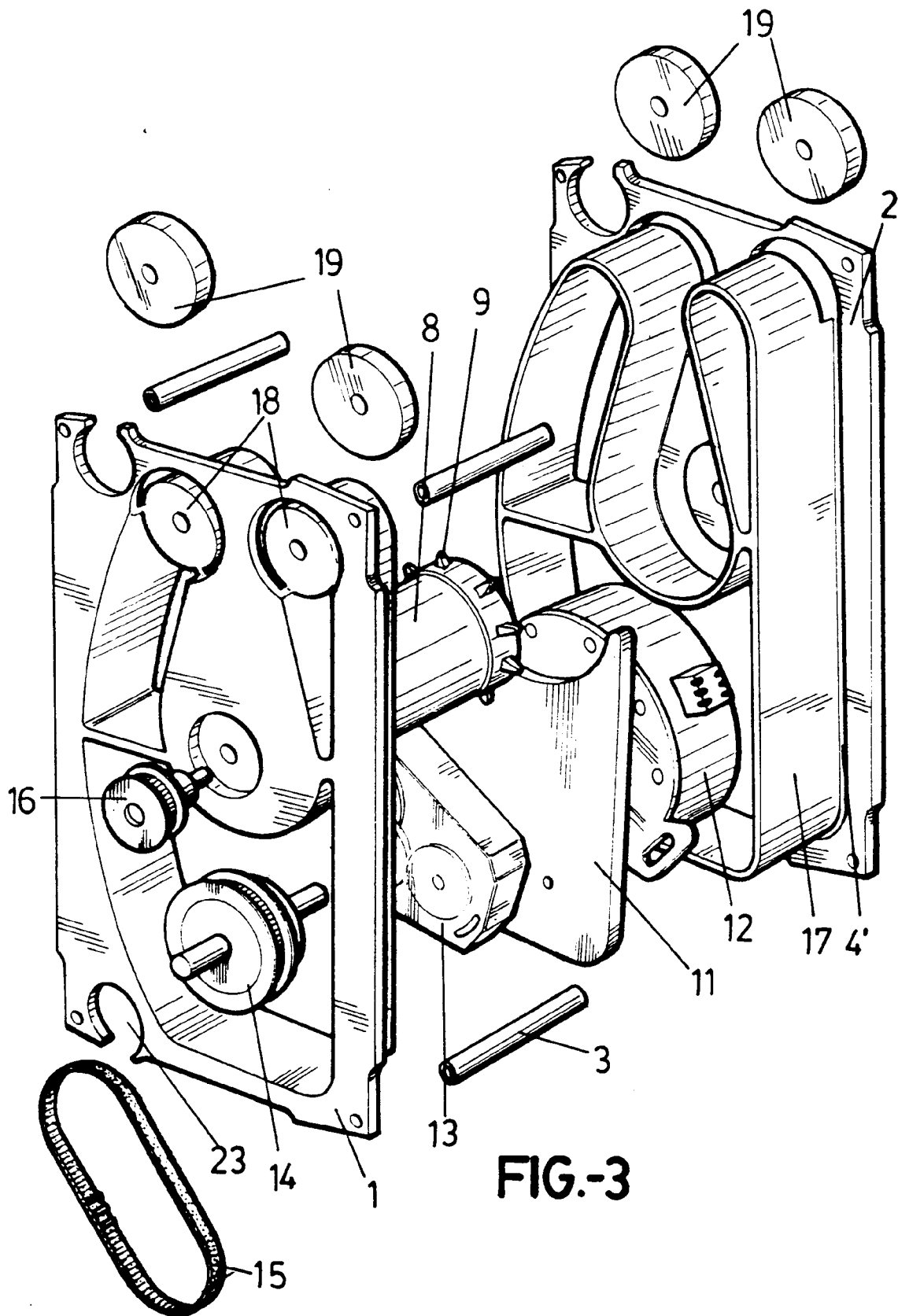


FIG.-3

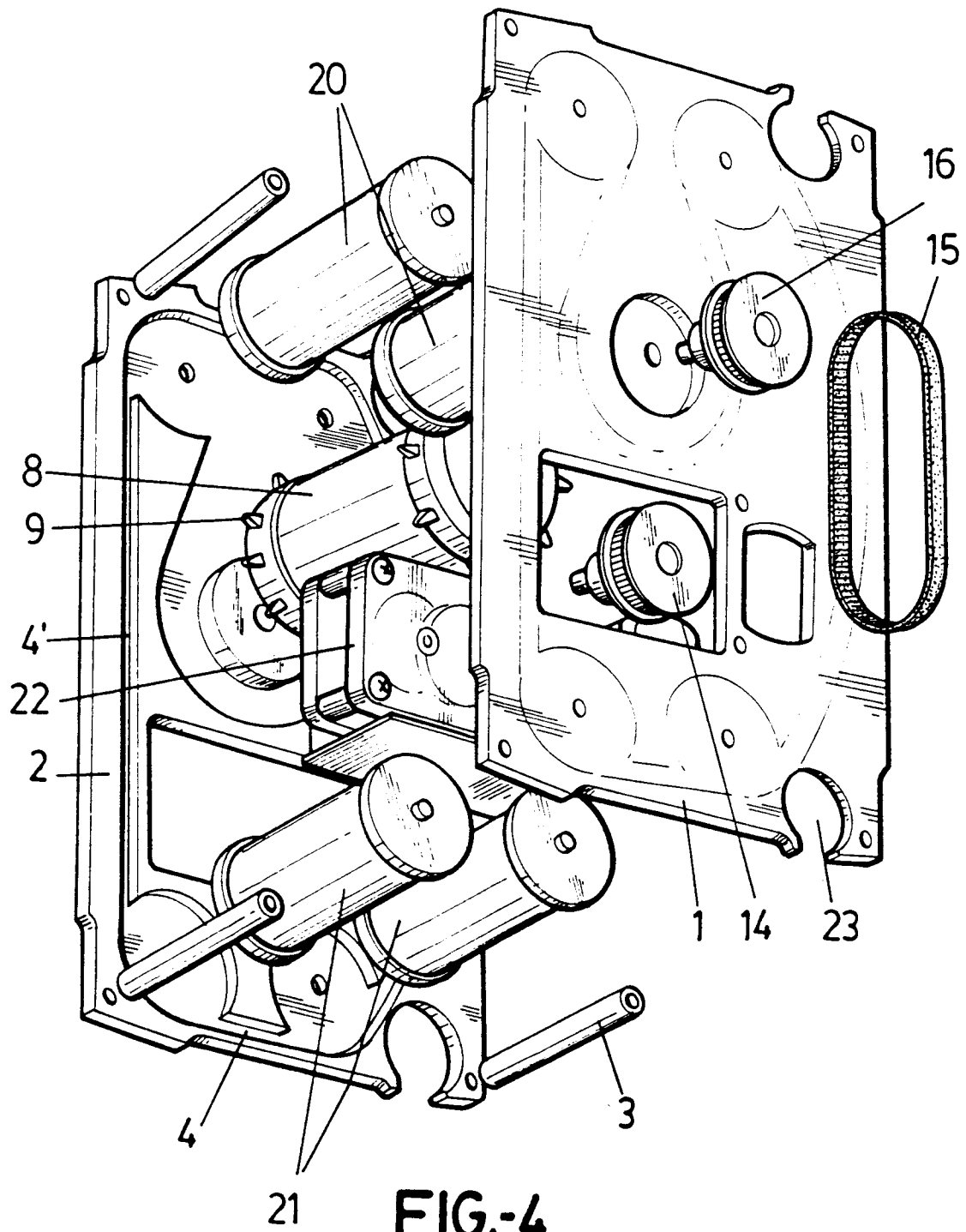


FIG.-4

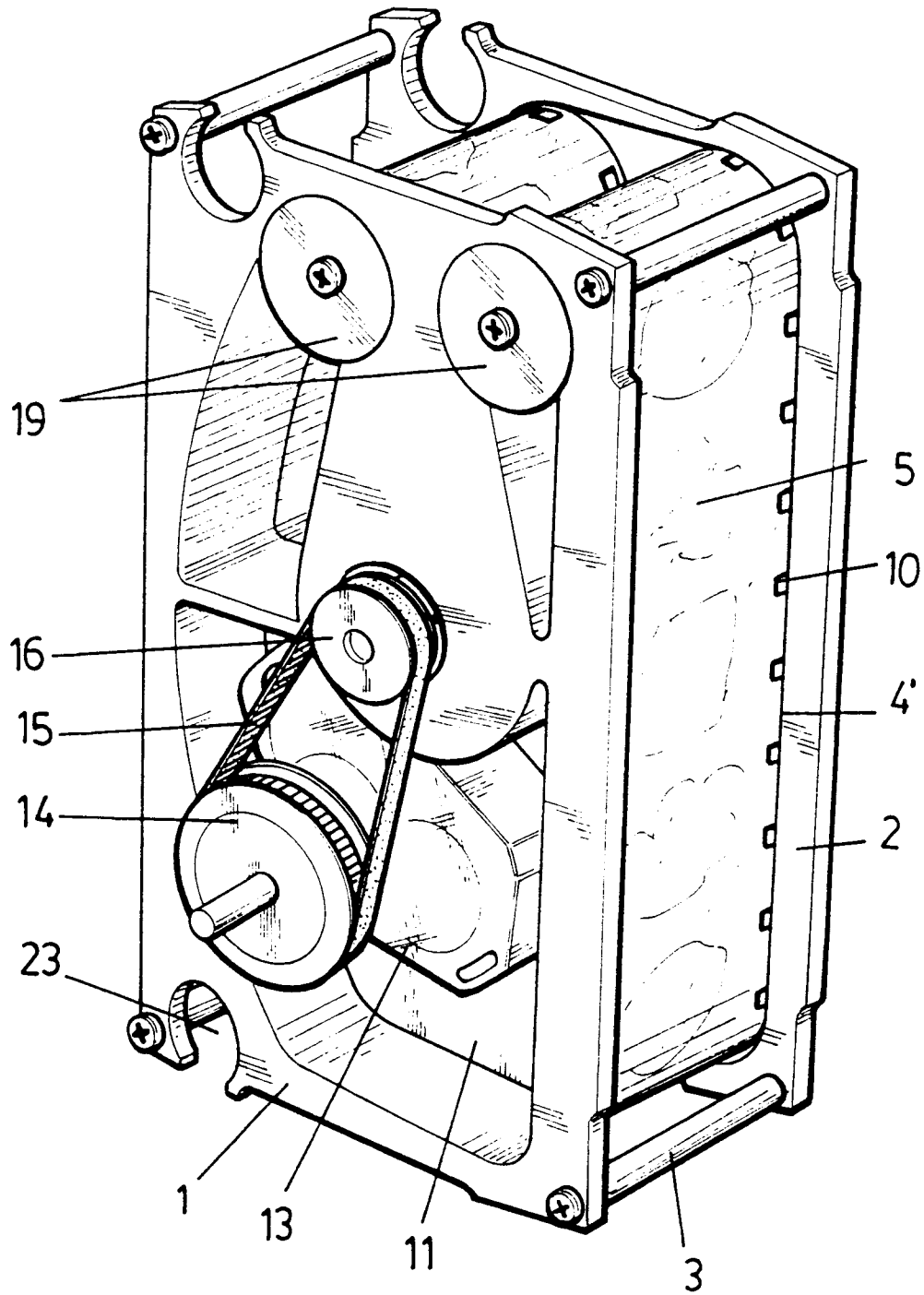
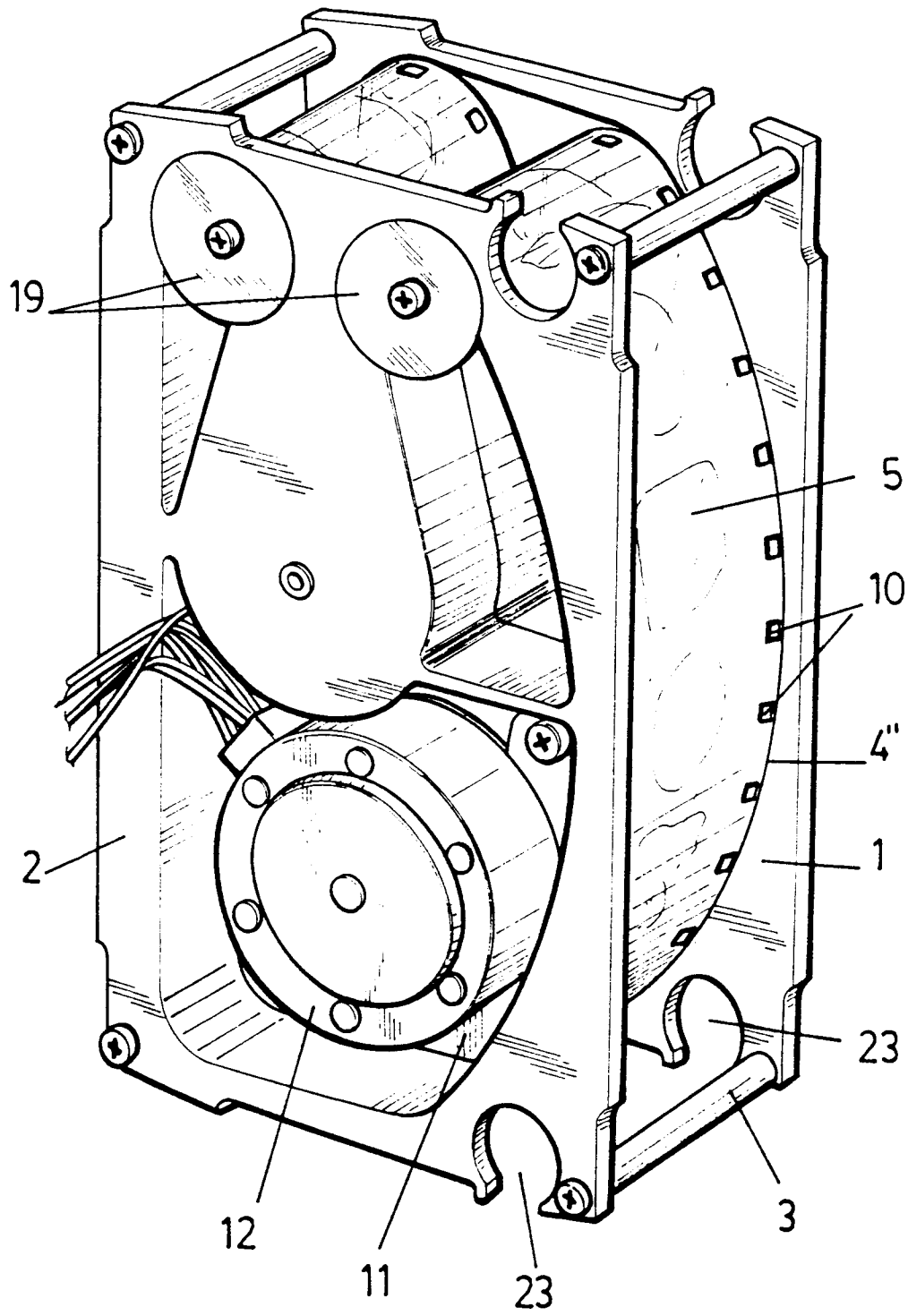


FIG-5

FIG.-6



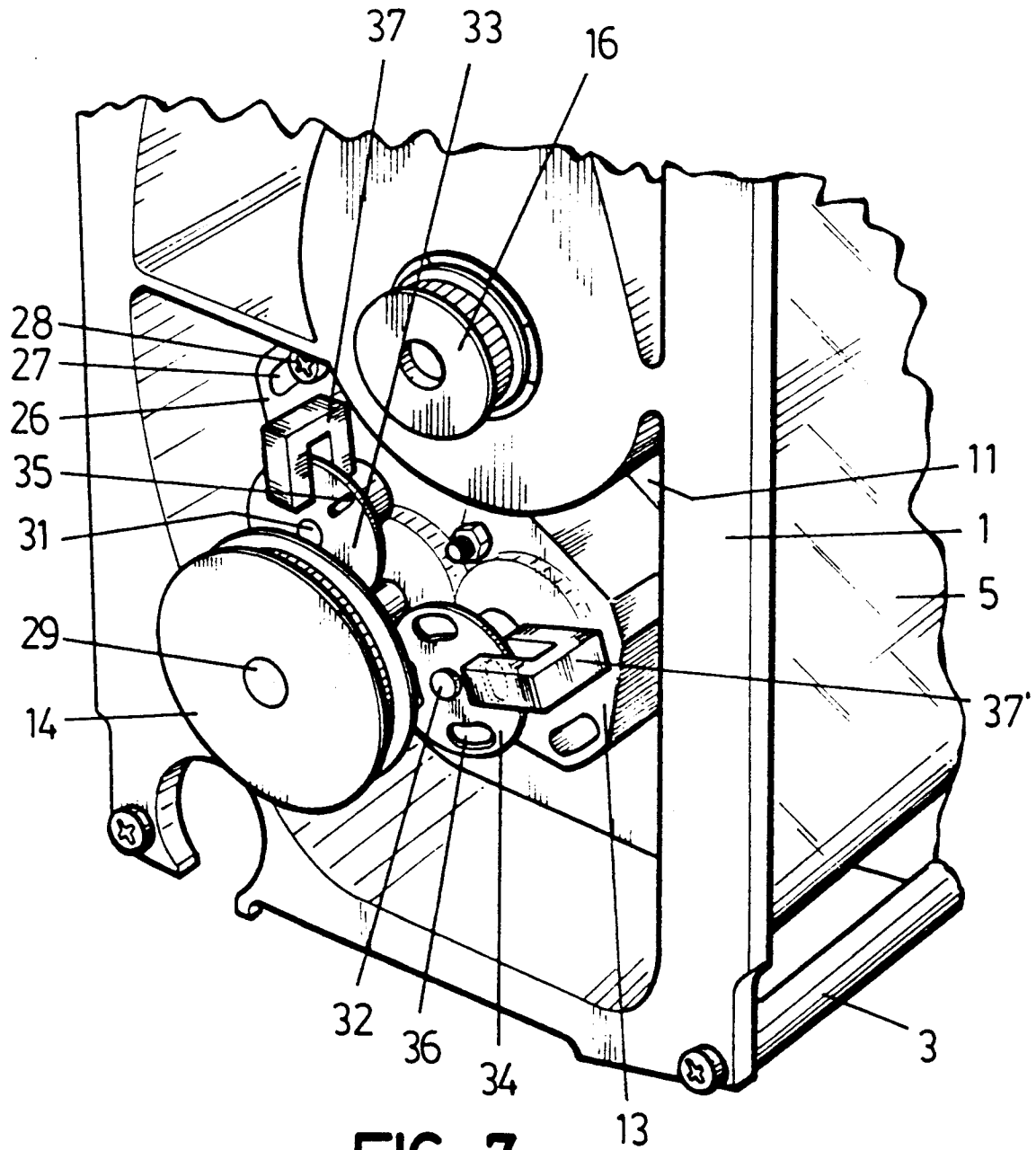


FIG.-7

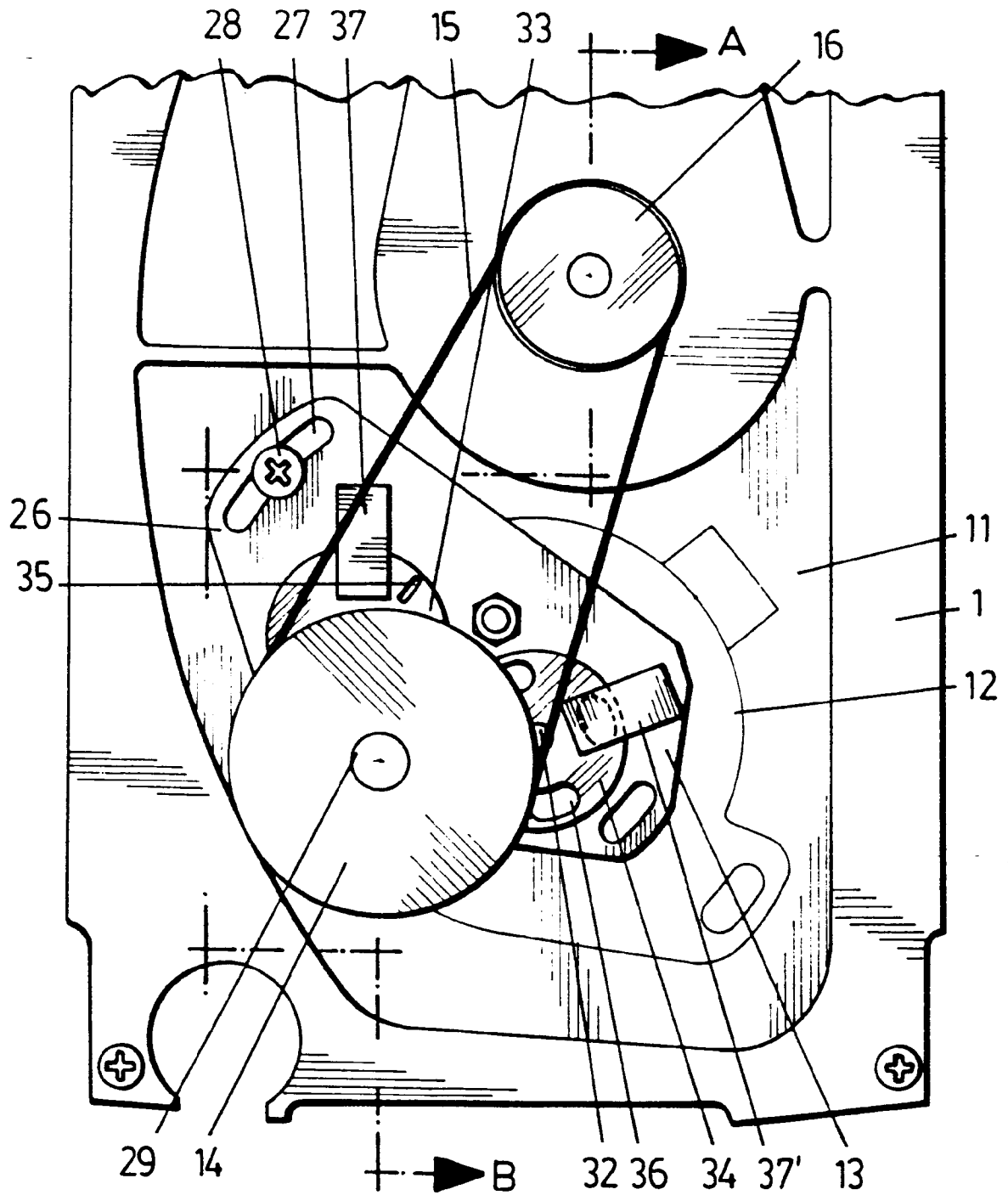


FIG.-8

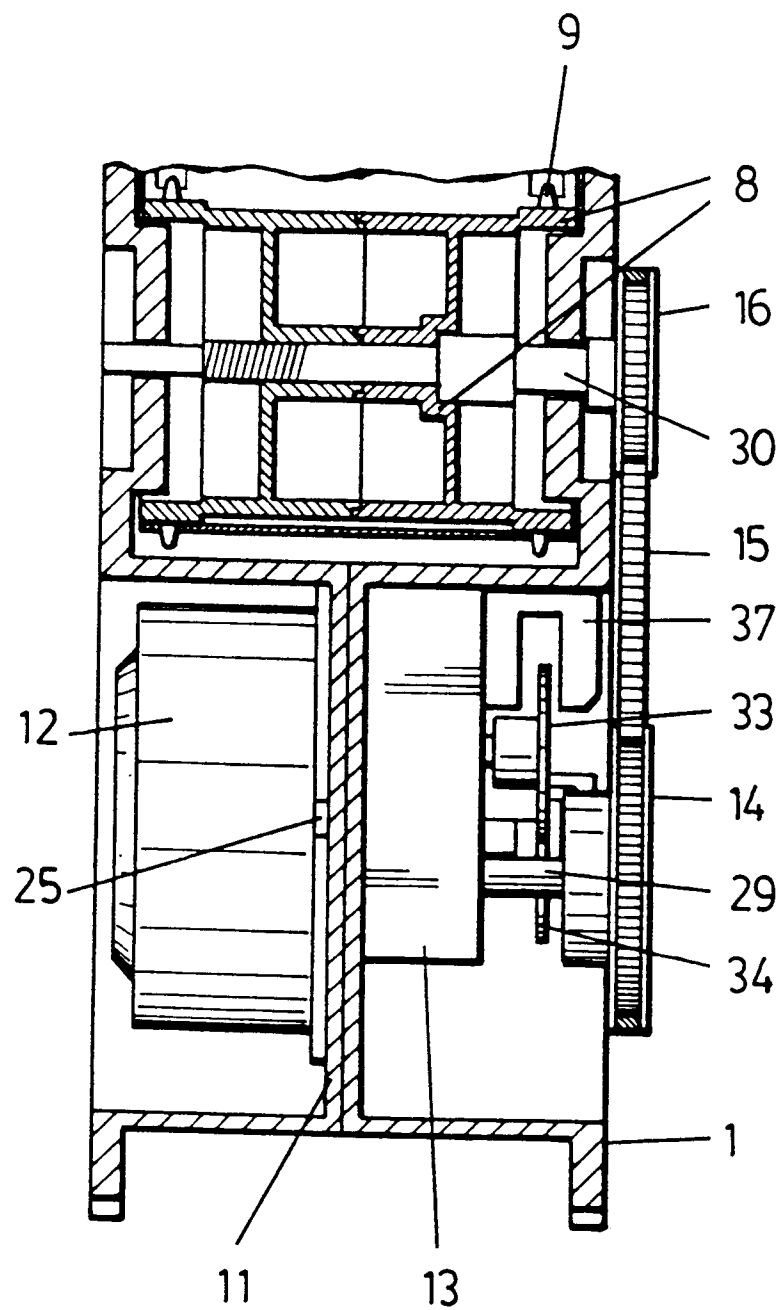


FIG.-9

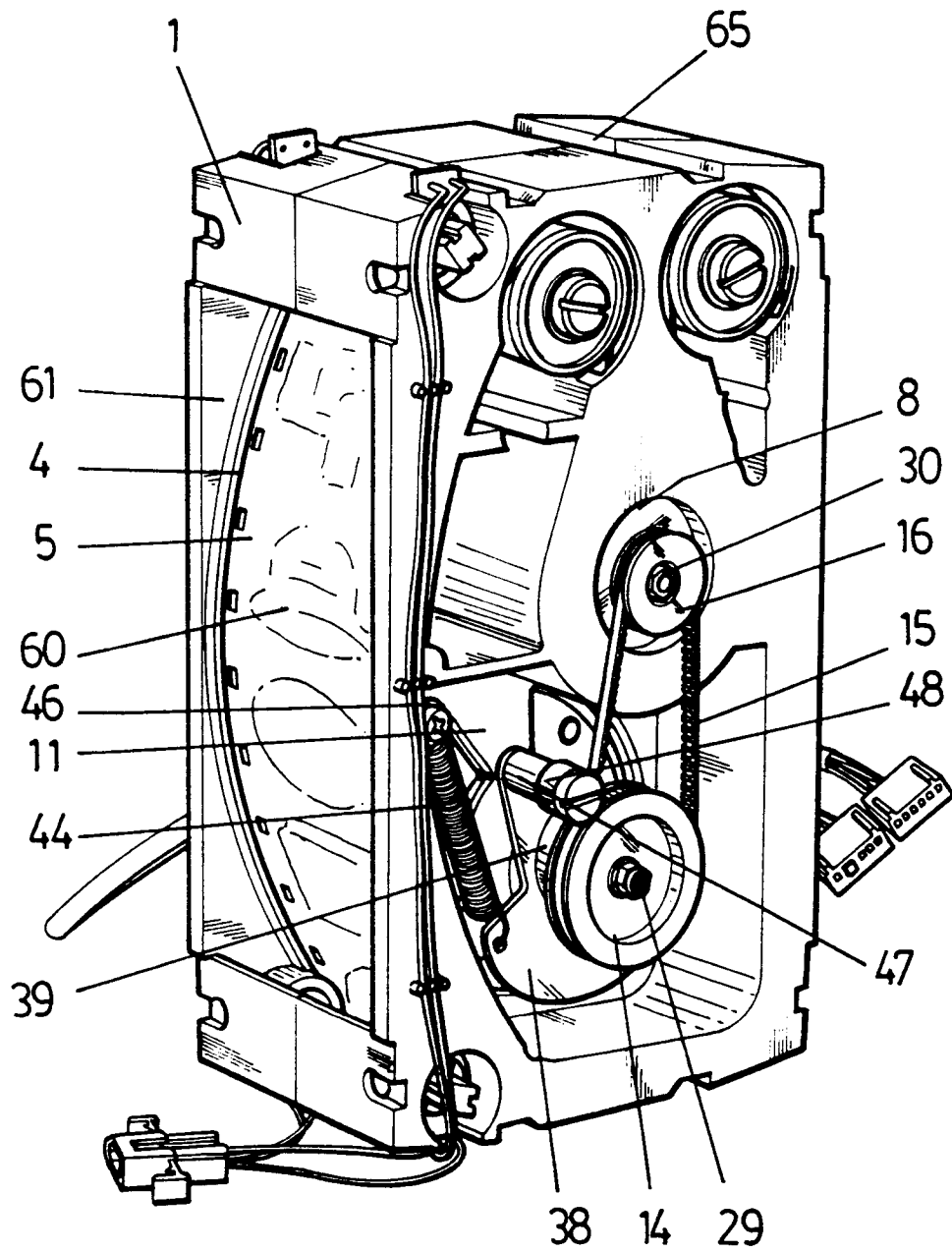


FIG.-10

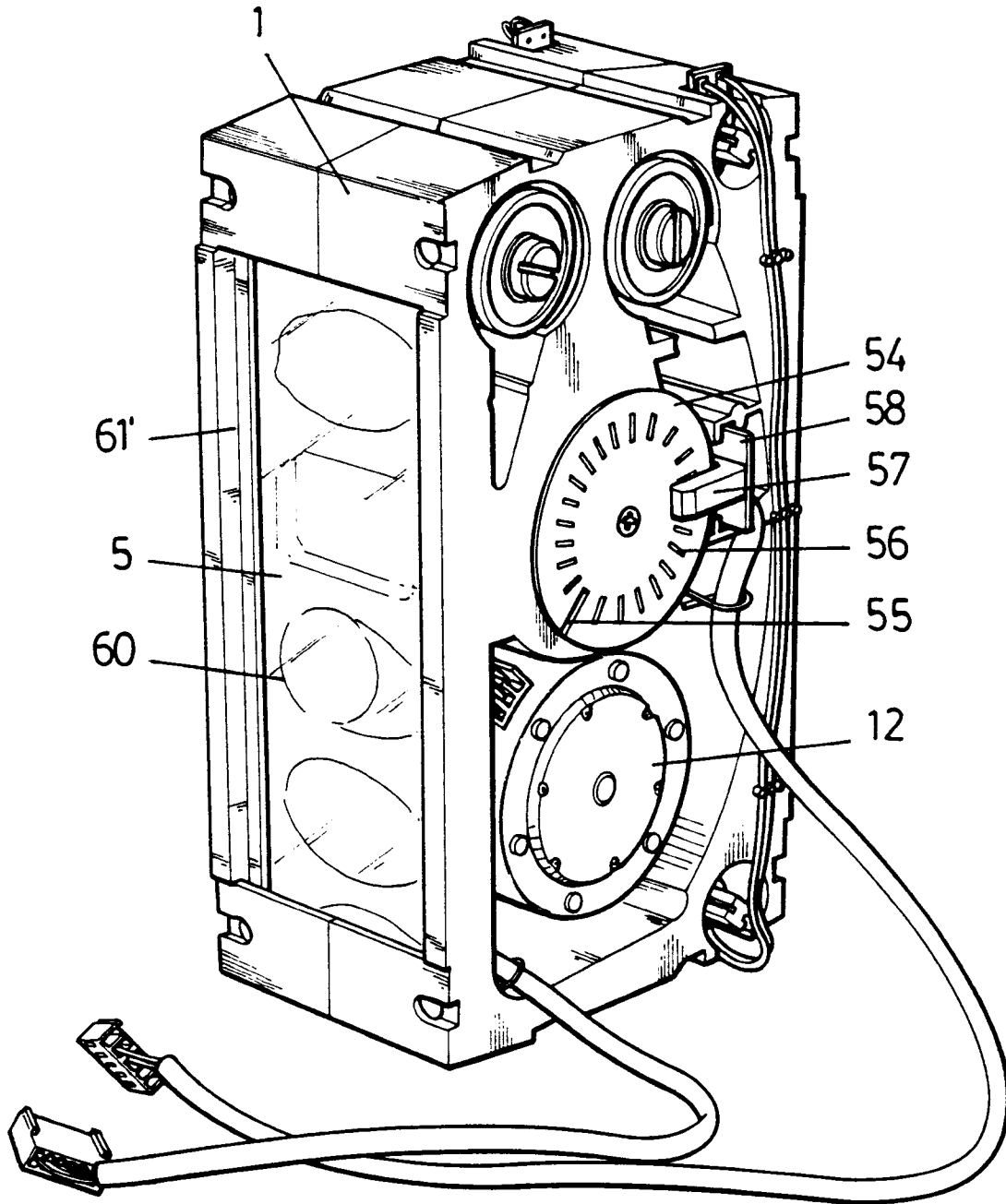


FIG-11

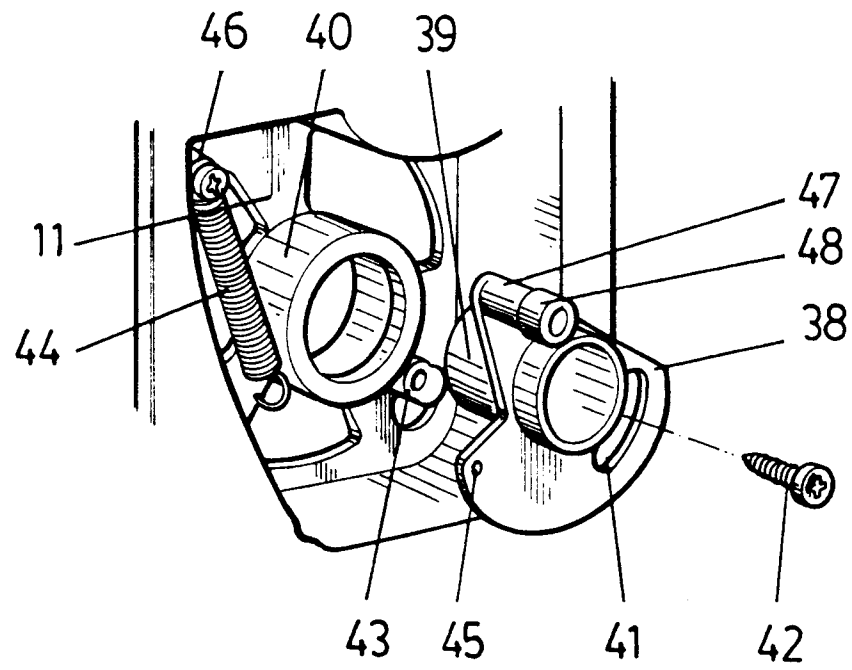


FIG.-12

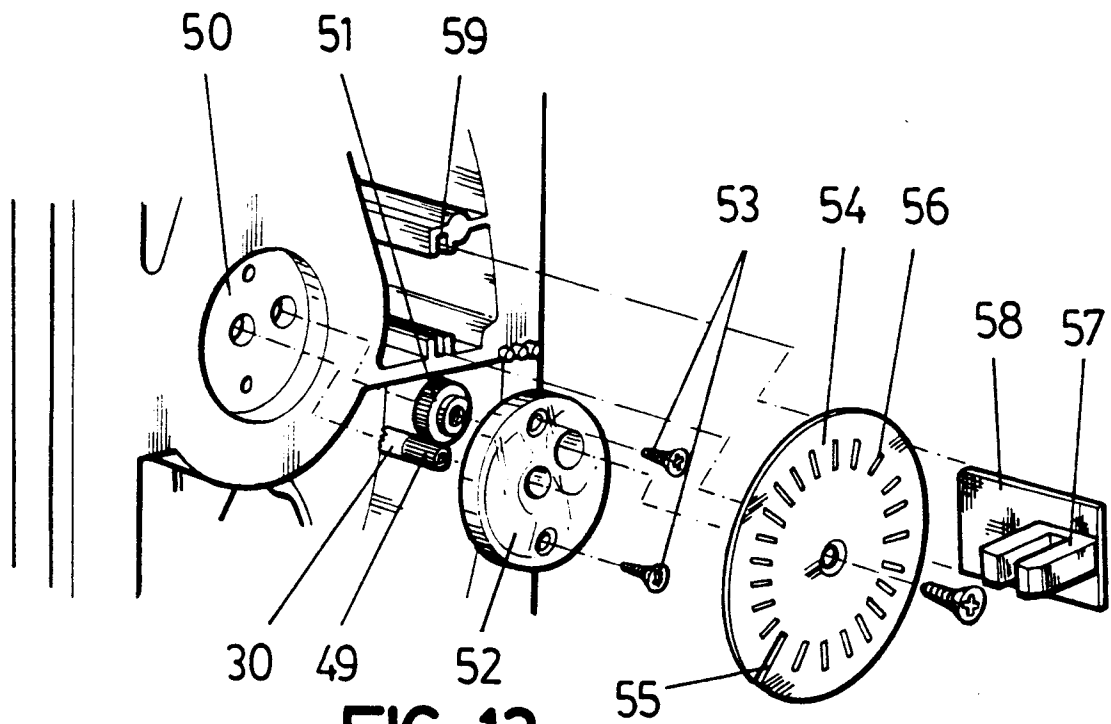


FIG.-13

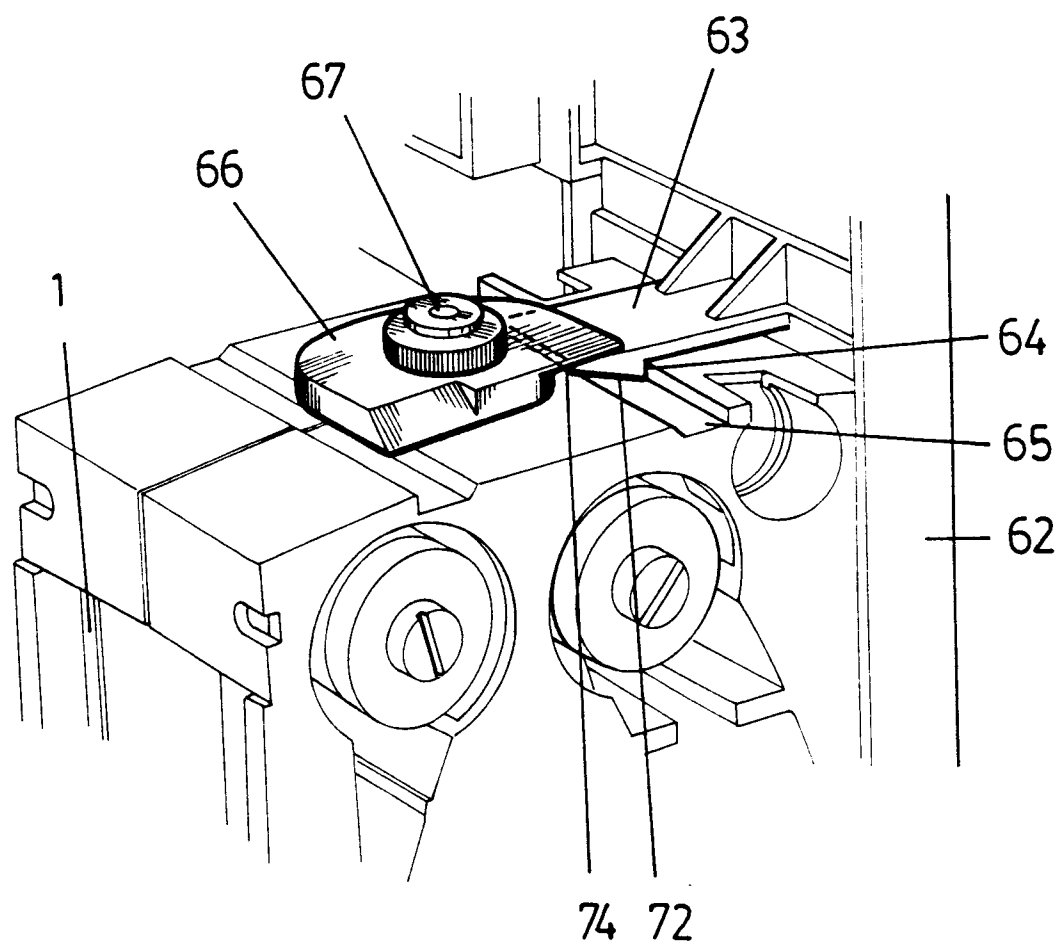


FIG.-14

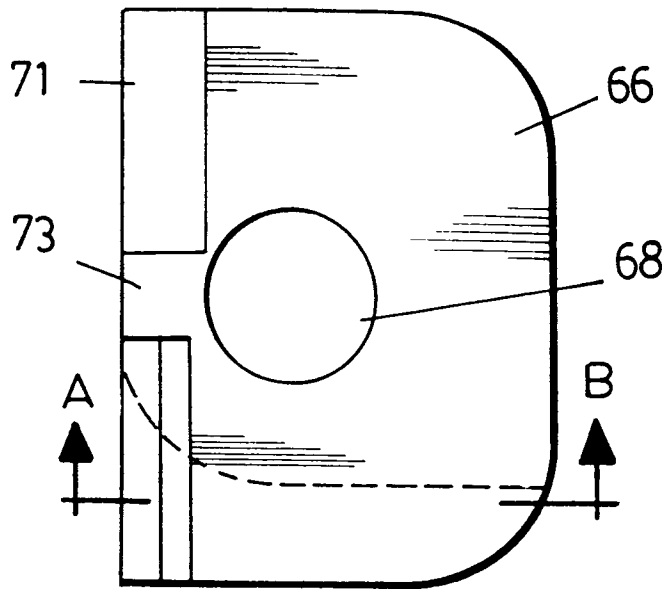


FIG.-15

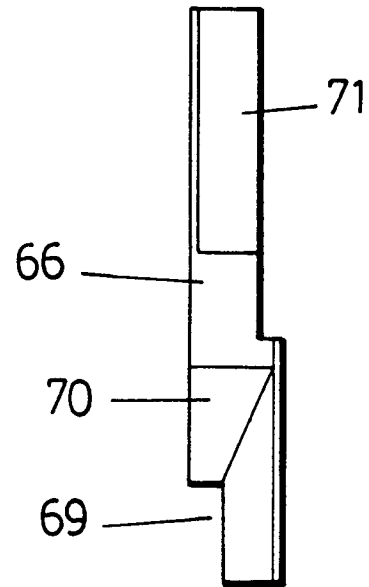


FIG.-17

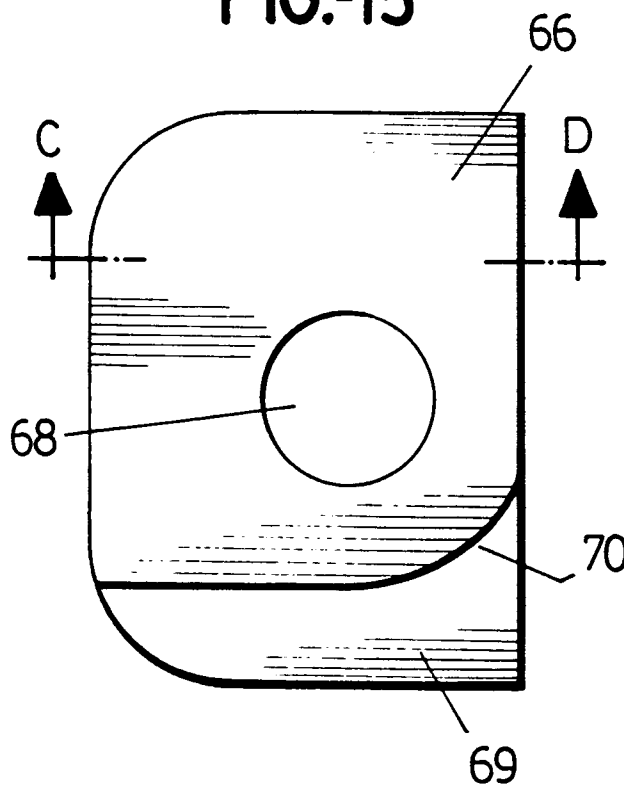


FIG.-16

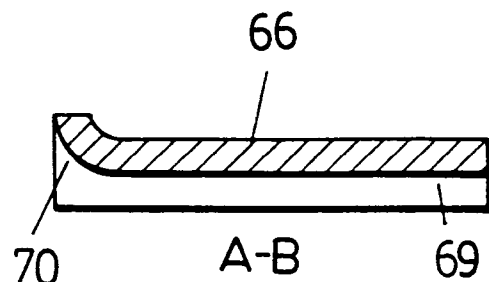


FIG.-18

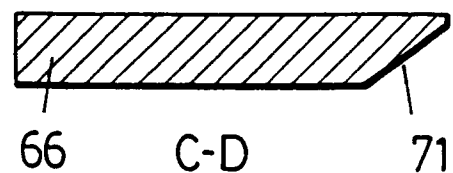


FIG.-19



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 50 0101

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X	GB-A-2 150 335 (GUTIERREZ)	1	G07F17/34
A	* claim 1; figure 1 * ---	2-12	
A	GB-A-2 067 810 (QUESTENCO LIMITED)	1-12	
A	* claim 1; figure 7 * ---	1-12	
A	GB-A-2 052 823 (HEYWOOD ET AL)	1-12	
A	* claim 1; figure 1 * ---	1-12	
A	GB-A-2 068 620 (JPM LIMITED)	1-12	
	* claim 1; figure 1 * -----		
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		15 September 1994	Kirsten, K
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