(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 008 374 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.06.2000 Bulletin 2000/24

(51) Int. Cl.[7]: **A63H 13/00**

(21) Application number: **99810942.5**

(22) Date of filing: **18.10.1999**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **11.12.1998 CH 246598**

(71) Applicant: **DSLE System S.A.**
6900 Lugano (CH)

(72) Inventor: **Zorloni, Riccardo**
20030 Baruccana(Milano) (IT)

(74) Representative:
Fiammenghi-Domenighetti, Delfina
Fiammenghi-Fiammenghi,
Via San Gottardo 15
6900 Lugano (CH)

(54) Magnetically animated toy

(57) A magnetically animated toy (1) is described which comprises one or more puppets (2i) and a fixed structure (6); permanent magnets (3, 3a, 4, 5) are fixed to the puppets (2i), and fixed permanent magnets (12, 13) and permanent magnets (18, 19) which are moved by drive means (7) are attached in suitable positions to the fixed structure (6): the interaction between the magnets attached to the said structure and those fixed to the puppets (2i) creates the illusion of bringing these puppets to life.

FIG.1A

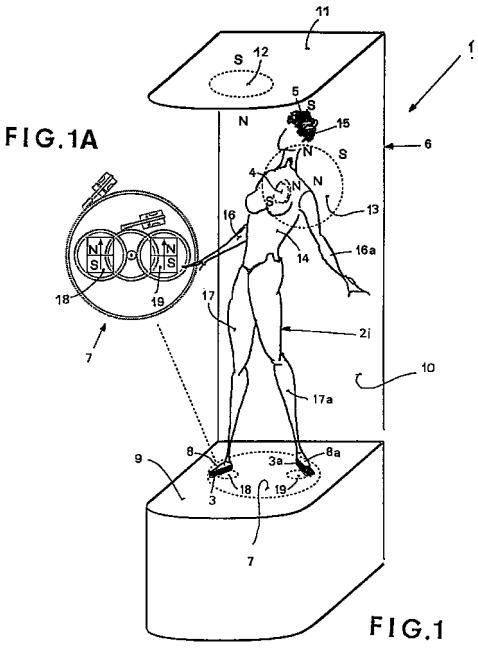


FIG.1

EP 1 008 374 A2

Description

[0001] The present invention relates to the field of magnetically animated toys, and more particularly to those toys consisting of one or more puppets positioned close to a fixed structure of suitable shape, in which toys appropriately positioned and orientated permanent magnets are mounted on both the puppets and the said fixed structure, the magnets on the fixed structure being moved using suitable drive means.

[0002] The end result is one whereby the puppet or puppets are moved by remote control, without any mechanical contact, as a result of the forces generated by the interaction of the magnetic fields generated by the abovementioned magnets.

[0003] This type of toy comes under the category of toys which have been devised since earliest times to look like and act like human beings by "animating" them - a term precisely expressing the concept whereby the toys in question are brought to life in some way, or better still given a "character" of their own.

[0004] Evidently, the more life-like the puppet, or rather the more natural its movements, the more successful the toy will be in achieving its purpose.

[0005] The inventor of the present innovation has noted that, among the examples of toys of this type encompassed by the current state of the art, such as for example those described in patent US-A-5,370,569 and in European patent applications nos 94108478.2 and 93305825.7, the magnetically generated movements of the puppets are too jerky and/or too schematic and repetitive, with the result that even very young children, having observed these toys in action, immediately realise that the puppet's movements are unrealistic.

[0006] In order to avoid these drawbacks and achieve the objective that all inventors working in the toy industry set themselves, i.e. that of animating their toys in the most life-like way possible, the inventor of the toy according to the present invention has come to the conclusion that the following criteria must apply simultaneously:

1) each of the puppets' principal anatomical parts, i.e. its head, torso, arms, legs and feet need to be articulated together so that each can rotate relative to the other around their common point of articulation, and

2) during each puppet's movements, these anatomical parts must assume, as a result of their magnetic animation, positions similar to those of a real person, and these positions must change continuously during the movement in a manner consistent with the anatomy and type of activity performed by the character represented by the puppet.

[0007] In order to achieve this, the inventor has come up with a toy of the type in question in which various suitably positioned and orientated permanent magnets are fixed inside both the fixed structure and the various anatomical parts of each puppet, these magnets making it possible to achieve the desired results as described above when the puppets are animated by moving some of the permanent magnets in the fixed structure (i.e. those positioned beneath the feet of each puppet) using suitable drive means.

[0008] All this is achieved by the innovation described in the present application, in which the subject of the invention consists of a magnetically animated toy as described in the preamble of the appended Claim 1 and as characterized by the details contained in the characterizing part of that claim.

[0009] A preferred example of a possible embodiment of a toy according to the present invention will now be described by way of non-limiting and non-binding example. In so doing, reference will also be made to the appended drawings which show:

- Figure 1 shows a schematic perspective view of the abovementioned embodiment in which the toy consists of a single puppet associated with a fixed structure;
- Figure 1a shows a plan view of the detail illustrating the drive means positioned underneath the horizontal surface shown in Figure 1 and on which the puppet's feet rest;
- Figure 2 shows a schematic perspective view of the parts of a typical puppet in which permanent magnets are fixed;
- Figure 3 shows a side view of part of the profile of the typical puppet shown in Figure 1, illustrating the orientation of the poles of the various permanent magnets;
- Figure 4 shows a plan view of a preferred embodiment of the means for driving the movable magnets in the fixed structure;
- Figure 5 shows a front view of the drive means of Figure 4; and
- Figure 6 shows a perspective view of another embodiment of the toy of the invention with a number of puppets together with their associated drive means, capable of sliding horizontally and with a reciprocating motion in order to simulate a fashion show.

[0010] Examining Figure 1 first of all, it illustrates an embodiment of a magnetically animated toy according to the invention in which a single puppet 2i is attached to a fixed structure 6 in order to simulate a dancing ballerina.

[0011] The said fixed structure 6 comprises a first horizontal surface 9 made of materials having a low coefficient of friction and used as the floor of the catwalk or "cube" on which the dance is performed: the feet 8, 8a of the puppet 2i rest on this surface 9.

[0012] The fixed structure 6 also comprises a second horizontal surface 11, arranged to form a sort of

ceiling above the head of the puppet 2i, and a vertical surface 10 positioned in the vicinity of the latter.

[0013] Fixed to the head 15, torso 14 and to each foot 8, 8a of the puppet there are permanent magnets 5, 4, 3, 3a which are positioned and orientated as illustrated for a typical puppet in Figures 2 and 3, while positioned behind all three of the said surfaces 9, 10, 11, of the fixed structure there are additional magnets 12, 13, 18, 19, the polarities of which are orientated such that the following conditions apply simultaneously:

- the magnet 12 in the said second horizontal surface 11 is fixed and exerts a force of attraction on the magnet 5 fixed on the head 15 of the puppet 2i;
- the magnet 13 in the said vertical surface 10 is also fixed and exerts a force of repulsion on the magnet 4 fixed to the torso 14 of the puppet 2i;
- the magnets 18 and 19, which are movable given that they are connected to drive means 7 which will be explained in greater detail below, attract with a sufficient force the magnets 3, 3a fixed underneath the feet 8, 8a of the puppet 2i.

[0014] By activating the said drive means, the motion of the movable magnets 18 and 19 entrains the magnets 3, 3a and with them the feet 8, 8a of the puppet, which slide on the horizontal support surface 9 having a low coefficient of friction.

[0015] By imparting a desired rhythm and speed to the motion of the feet 8, 8a, the puppet 2i can be moved so that it appears to be dancing, sliding and/or rotating its feet 8, 8a on the "stage" 9.

[0016] All the anatomical parts of the puppet 2i, such as its head 15, its torso 14, its legs 17, 17a and its feet 8, 8a are articulated together in accordance with known methods so that they can rotate relative to each other around their common points of articulation, just like the limbs and the anatomical parts of a real person.

[0017] As a result of the fact that it is articulated, the puppet 2i needs to be held in the upright position while it performs its dance moves without any lateral support: this function is provided by the said fixed magnet 12 which exerts a force of attraction on the magnet 5 - and consequently on the head 15 of the puppet 2i - which is a continuous force but one whose direction and intensity vary as the position of the head 15 changes as the latter moves during the dance: it is therefore possible to mimic extremely effectively the head movements of a real person as they dance.

[0018] This realistic effect is also enhanced by the fact that, while the puppet 2i rotates about a vertical axis, its orientation and its distance relative to the said fixed magnet 13 positioned behind the vertical wall 10 vary, this magnet exerting, as has already been mentioned, a force of repulsion on the magnet 4 in the torso 14 of the puppet 2i. As a result, while the head 15 is always orientated towards the said fixed magnet 12, the torso will be repelled to a greater or lesser extent by the said fixed magnet 13 as the dance progresses, resulting in a relative rotational movement between the head 15 and the torso 14, between the latter and the legs 17, 17a and between these and the feet 8, 8a of the puppet, giving a surprisingly realistic effect.

[0019] The desired theatricality of the effect actually imparted to the toy is achieved by selecting the drive means 7 of the toy 1, which are designed to move the feet 8, 8a of the puppet 2i, in a suitable manner.

[0020] One solution put forward by the inventor envisages (see Figures 1A, 4 and 5) fixing the two movable magnets 18, 19 - which, as already stated, attract the magnets 3, 3a keeping them in contact with the horizontal surface 9 - onto two horizontal gear wheels 23, 24 having parallel vertical axes, these wheels pivoting on a gear wheel 20 of relatively large diameter and both meshing with a pinion 25 inserted between them, the pinion being coaxial and integral with another gear wheel 26 which is positioned underneath and parallel to the first two gear wheels 23, 24 and is actuated by a worm screw 28 powered by a small electric motor 27.

[0021] This motor can, for example, in turn be activated by acoustic pulses generated by music or noises using an electronic interface unit of known type.

[0022] By suitably constructing the said interface unit (which is not shown on account of its general nature), it is possible for the rotational motion of the said gear wheels 23, 24 forming a pair, geared down as described previously, also to be of reciprocating type, as indicated by the arrows R, S and T in Figure 4, and/or of varying speed, so that the rotational motion of the feet 8, 8a of the puppet or puppets 2i simulates realistic dance movements.

[0023] Furthermore, in order to make the resulting movement of the feet and body of a puppet even more realistic, the said relatively large gear wheel 20, on which the said two gear wheels 23, 24 together with the pinion 25 and the other gear wheel 26 connected to the worm screw 28 all pivot, is itself made to rotate by a worm screw 22 and its associated small electric motor 21, being given a suitable motion corresponding to that of the feet of a puppet as described above in order to recreate the realistic movements of a dancer which, as is known, consist in the dancer rotating her lower limbs, twisting and/or bending her torso or her entire body and moving her head.

[0024] It has thus been possible to produce a toy which is truly and surprisingly life-like, especially when its operation is combined with the playing of music (or when it is the music itself which coordinates and provides the rhythm for the movements of the puppet or puppets).

[0025] A toy according to the invention can comprise a number of puppets 2i, each of which is provided with its own drive means 7 as described and, so as to enhance the theatrical effect of the toy as a whole, the inventor has also envisaged the possibility of having each of the said drive means 7 running on guide racks,

using small drive belts or similar means actuated by additional electric motors controlled independently of each other (for example, in accordance with a preset time sequence).

[0026] It is thus possible, as illustrated in Figure 6, to simulate a fashion show with several models (three in the example illustrated) which, in addition to being animated so that their articulated anatomical parts perform the composite movements described above, also move cyclically in the directions indicated by the arrows A, B, C.

[0027] Needless to say, all the puppets 2i as well as the fixed structure 6 must be made of non-magnetic materials so that the fields of the various magnets are not dissipated. The use of plastic substances is recommended, these substances being chosen from among those usually employed within the technological field of the invention.

[0028] It would be virtually impossible fully to quantify the number of embodiments of the toy that can be obtained from the invention, embodiments that, although differing from those described above, are still inspired by the teachings contained in the appended Claim 1.

[0029] The number, type and form of the puppets may vary, as may the arrangement and form of the parts which make up the fixed structure and the type of drive means, in order to recreate an infinite number of scenarios with various animated activities.

[0030] Such embodiments will nevertheless be encompassed within the scope of protection conferred by the present patent application.

Claims

1. Magnetically animated toy (1) comprising one or more puppets (2i) on each of which one or more permanent magnets are fixed, and a fixed structure (6), located close to the said puppets (2i), to which are attached one or more magnets (18, 19) moved by drive means (7) which cause their position and orientation relative to the said permanent magnets fixed to the puppets (2i) to vary, characterized in that each of the said puppets (2i) is provided with at least one permanent magnet (3, 3a) fixed underneath each of its feet (8, 8a), with at least one additional permanent magnet (4) fixed to its torso (14) and with at least one other permanent magnet (5) fixed to its head (15), the arms (16, 16a), torso (14), head (15) and legs (17, 17a) and feet (8, 8a) of the said puppets (2i) being articulated together so that each can rotate relative to the other around their respective points of articulation, while the said fixed structure (6) comprises a first horizontal surface (9) having a low coefficient of friction and on which the feet (8, 8a) of the puppets (2i) rest, a vertical surface (10) positioned in the vicinity of each puppet, and a second horizontal surface (11) positioned above the heads (15) of the said puppets (2i), and at least one fixed permanent magnet (12, 13) is mounted both behind the said second horizontal surface (11) and behind the said vertical surface (10) so as to attract and repel respectively and with sufficient force the said permanent magnets (5) and (4) fixed to the head (15) and to the torso (14) of each puppet (2i), while one or more additional permanent magnets (18, 19) are placed underneath the said first horizontal surface (9) and are moved by the said drive means (7) so as to interact with the said magnets (3, 3a) fixed to the feet (8, 8a) of the puppets (2i), thereby animating the latter.

2. Toy according to Claim 1, in which the said drive means (7) consist, in the case of each puppet (2i), of a first horizontal gear wheel (20) actuated by a first small electric motor (21) via a first worm screw (22), and of a pair of additional gear wheels (23, 24) which carry two permanent magnets (18, 19) and which pivot on the said first gear wheel (20) with their axes arranged vertically and are driven by a second worm screw (28) which is actuated by a second small electric motor (27) and is connected to the gear wheels by transmission means (25, 26, 27, 28) designed to produce a speed reduction.

3. Toy according to Claim 2, in which the said two gear wheels (23, 24) forming a pair both mesh with a pinion (25) of smaller diameter which is coaxial and integral with a third gear wheel (26) having a diameter approximately equal to that of the said two gear wheels (23, 24) and meshing with the said second worm screw (28).

4. Toy according to either of Claims 2 and 3, in which the said means (7) for moving the puppets (2i) are slidably mounted on the said fixed structure (6) and are provided with means designed to cause them to slide in predetermined directions (A, B, C), parallel to the said first horizontal surface (9) on which the feet (8, 8a) of the puppets (2i) rest.

5. Toy according to one of the preceding claims, in which the said drive means (7) are activated by acoustic pulses.

6. Toy according to one of Claims 1 to 4, in which the said drive means (7) are activated by playing music produced by electronic equipment built into the toy itself or connected to it.

FIG.1A

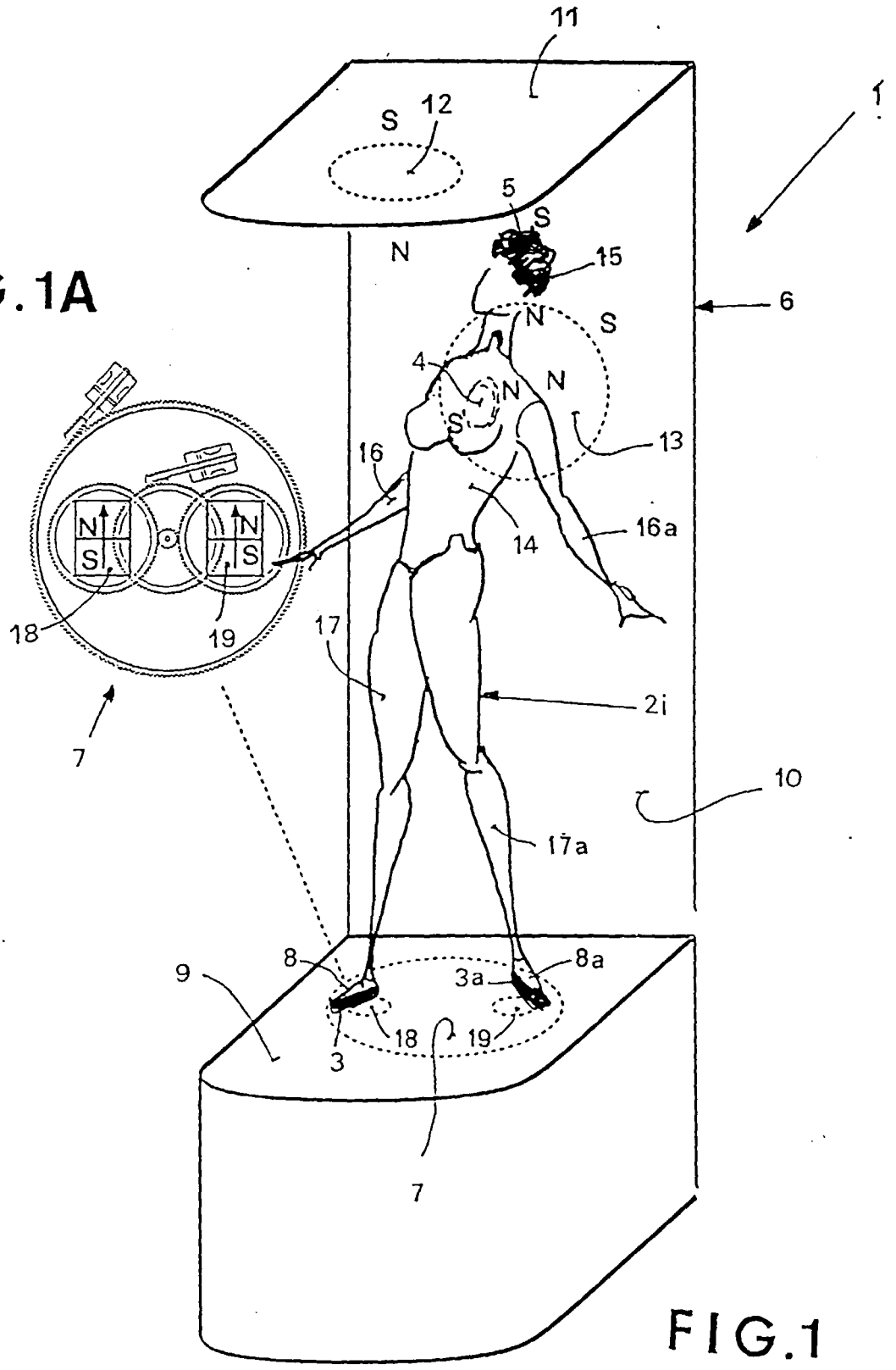

11
1
12
S
5
S
N
15
6
N
S
4
N
N
S
13
16
14
16a
N
S
N
S
18
19
17
2i
7
10
17a
8
8a
9
3a
18
19
3
7

FIG.1

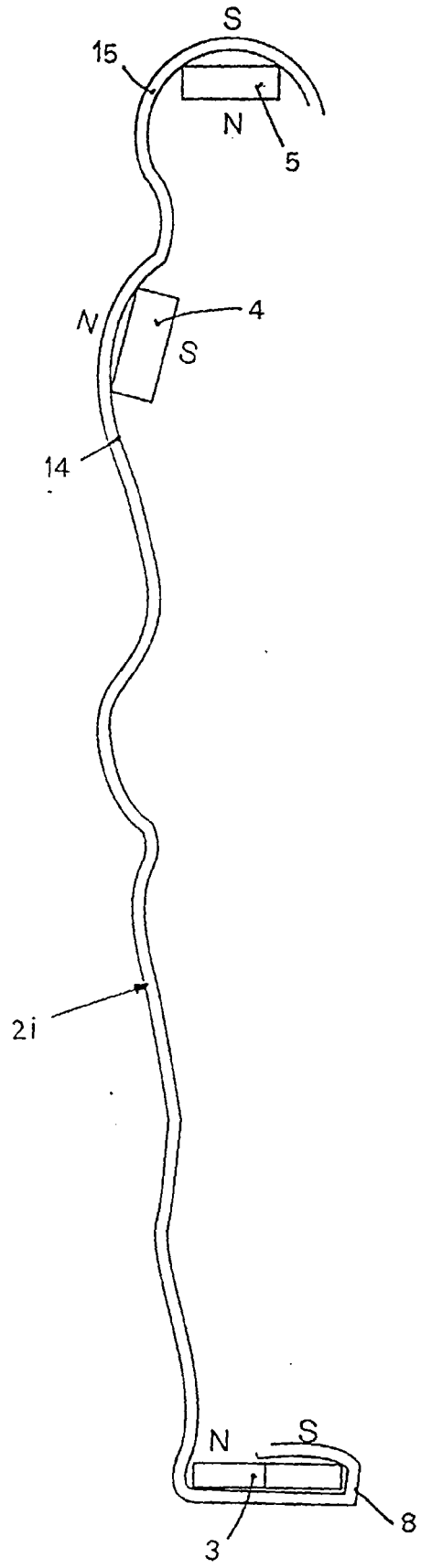


FIG. 3

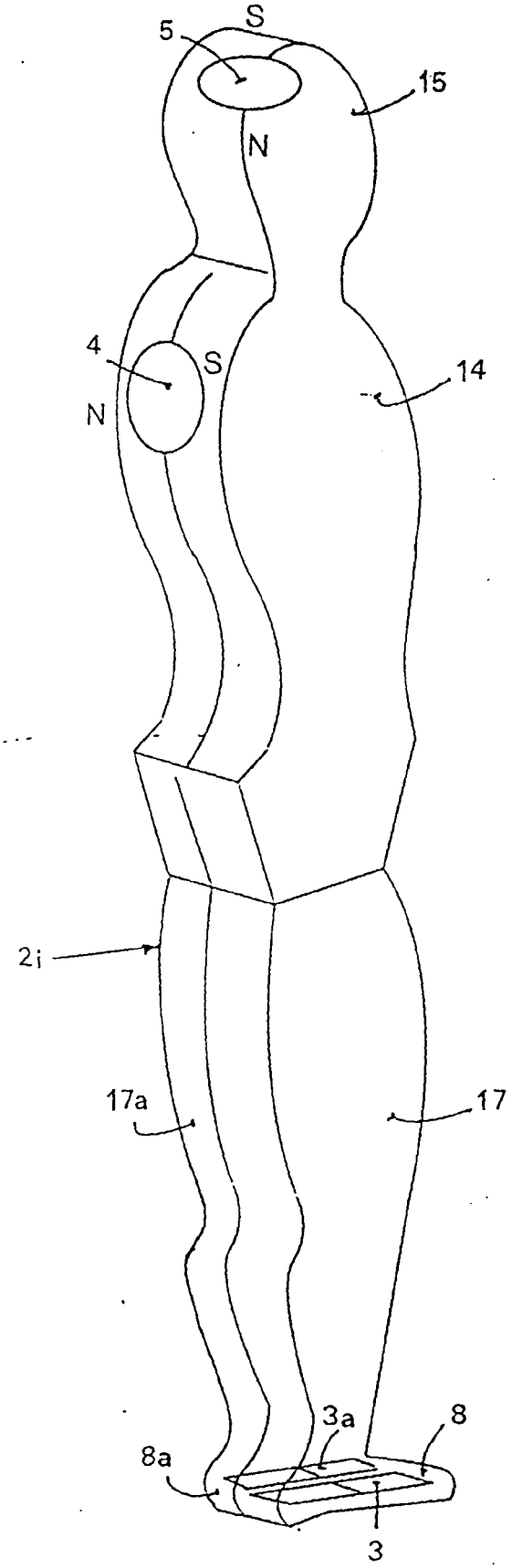
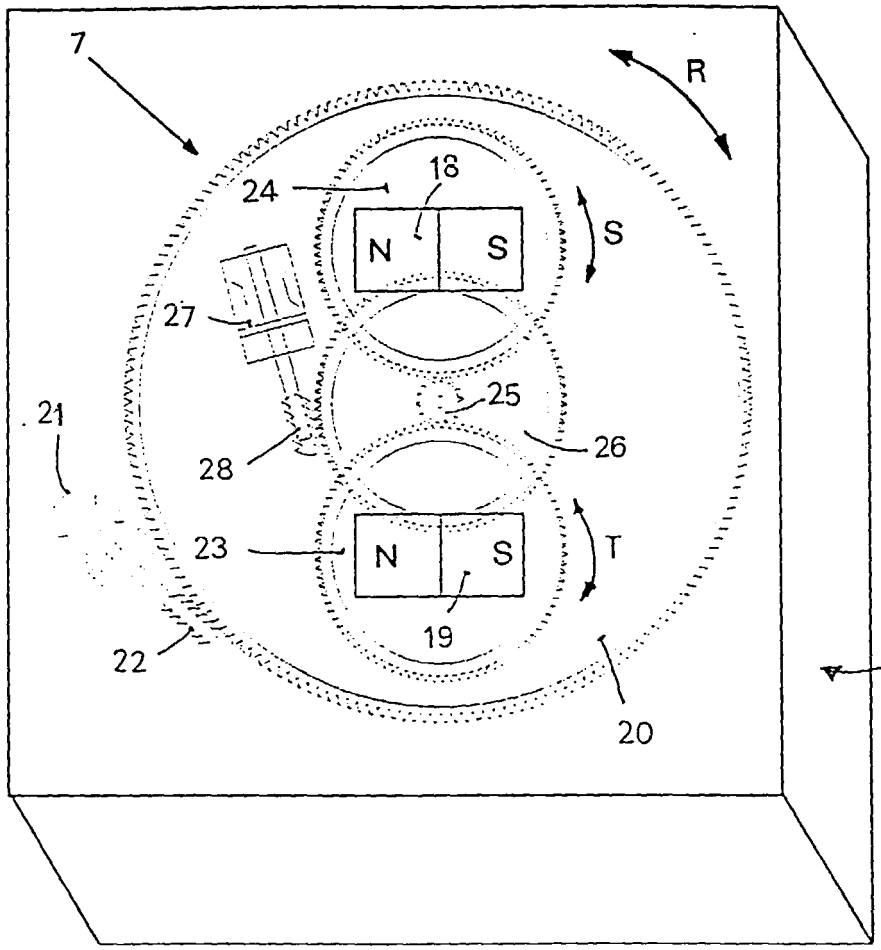


FIG. 2

FIG. 4



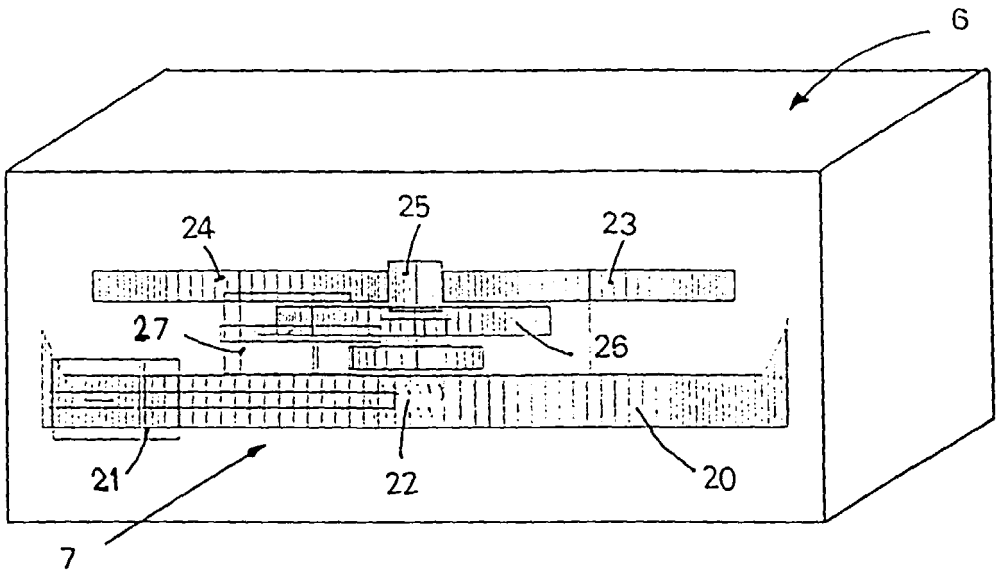


FIG. 5

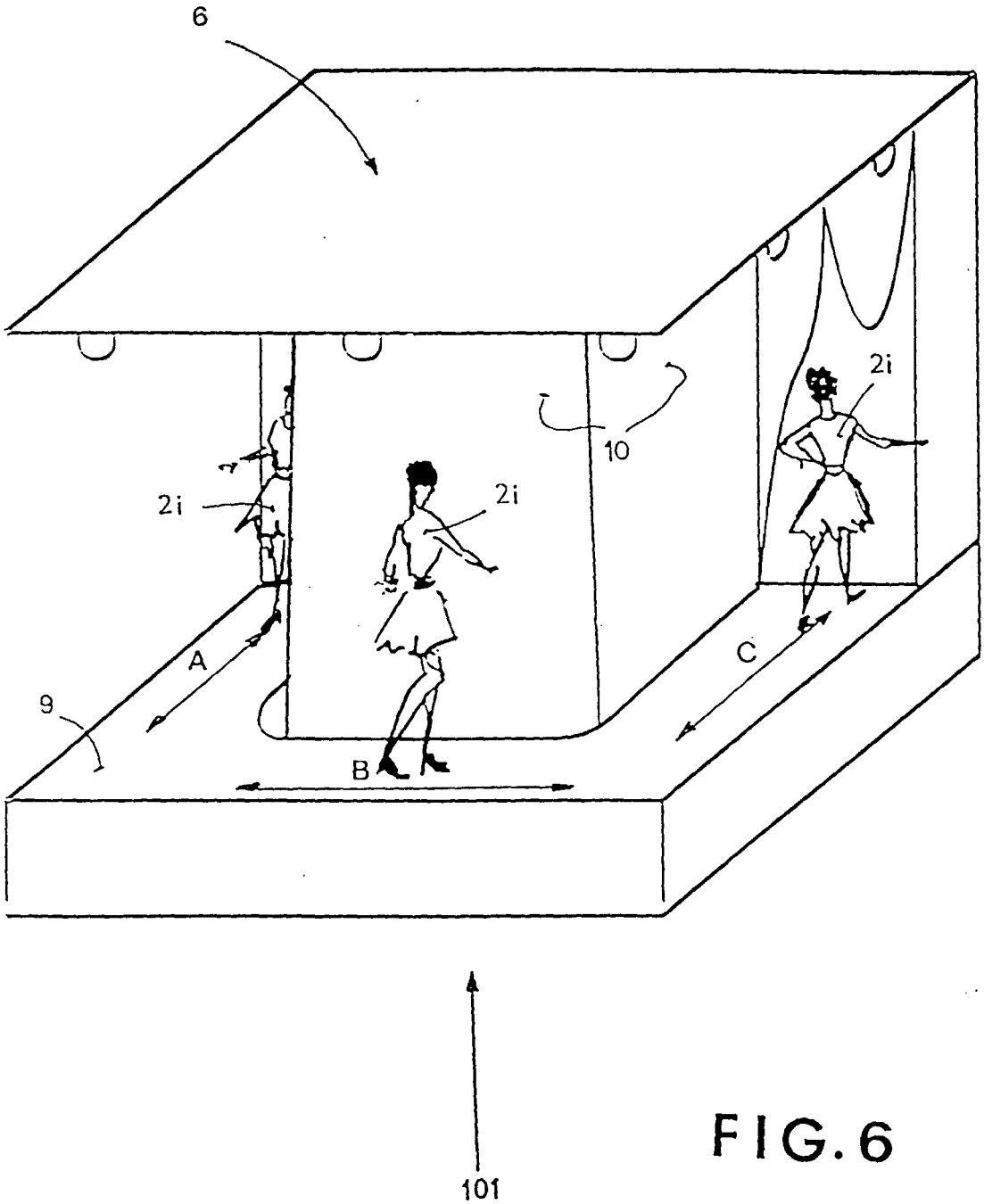


FIG.6