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(54) **Apparatus for moving an object**

Vorrichtung zum Bewegen eines Gegenstands

Appareil servant à déplacer un objet

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an apparatus for moving an object, and in particular, but not exclusively, to an apparatus for use in moving an object and forming part of a plaything.

BACKGROUND TO THE INVENTION

[0002] Many circumstances exist which require a specific manipulation of an object in order to present or provide a desired effect. For example, objects such as signs or the like may be permitted to display a greater number of images, icons, illustrations or the like if they are moved or manipulated in a particular manner, than could be available should the sign be held stationary.

[0003] For example, US Patent 2,957,252, attributed to William Pain, relates to globe support and orientating device, the device comprising: a globe supported by a plurality of spring-loaded castors; and a wheel which may be moved into engagement with the globe to rotate the globe about a first axis. The wheel is mounted to a rotatable turntable which permits the wheel to be rotated such that the globe can be rotated about a different axis.

[0004] Furthermore, many amusing display routines or performances may be achieved by skilfully manipulating a prop that is presented to an audience. For example, a known 'magic' trick can be performed by skilled performers by drawing a first arrow on one side of a piece of card and a second arrow on the reverse side of the card. The card can be rotated around different axes to present a variety of different orientations of the arrows to an audience. A diagrammatic representation of the performance of this trick is shown in Figures 1a, 1b and 2, reference to which is now made.

[0005] Figures 1a and 1b show the front and back of a piece of card 10, each side displaying an arrow 12, 14, which are orientated at 90 degrees with respect to each other. Figure 2 shows a performer's left and right hands 16, 18 which rotate the card 10 around a diagonal axis 20. As the card 10 is rotated, the arrow 14 on the reverse side, which in this example is originally pointing in an upwards direction, will be rotated by 90 degrees so that when it is presented to the front, it will appear in the same orientation as the arrow 12 when said arrow 12 was originally presented to the front. Continued rotation of the card 10 about this axis 20 will thus result in the arrows 12, 14 consistently pointing in the same orientation when presented to the front. The performer typically narrates the movement of the card 10 with an amusing story, during which the performer changes the axis of rotation by moving his hands 16, 18 to rotate the card around the other diagonal axis 22. This results in the arrows 12, 14 being presented to the audience in one orientation and then another, in this case from orientated right then orientated left, then right, and so on.

[0006] The result can surprise, intrigue and amuse the audience since the card now shows arrows pointing in a different direction to that originally shown.

[0007] However, performance of this trick requires skill in manipulating the card 10 in the correct manner in order to ensure that the desired effect or illusion is created.

SUMMARY OF THE INVENTION

[0008] According to a first aspect of the present invention, there is provided an apparatus for moving an object about separate axes of rotation, said apparatus comprising:

rotary drive means;
a first driven member adapted to be rotatably coupled to the rotary drive means to rotate an object about a first axis of rotation;
a second driven member adapted to be rotatably coupled to the rotary drive means to rotate the object about a second, different, axis of rotation; and
control means adapted to rotatably couple at least one of the first and second driven members to the rotary drive means.

[0009] In one arrangement, the first driven member may be adapted to be permanently rotatably coupled to the rotary drive means. Alternatively, the first driven member may be adapted to be selectively rotatably coupled to the rotary drive means.

[0010] Additionally, the second driven member may be adapted to be permanently rotatably coupled to the rotary drive means. Alternatively, in a preferred embodiment the second driven member is adapted to be selectively rotatably coupled to the rotary drive means.

[0011] In one embodiment of the present invention, the control means may be adapted to rotatably couple the first and second driven members alternately to the rotary drive means. This arrangement will accordingly result in rotation of the object about one axis of rotation at any one time.

[0012] Alternatively, the control means may be adapted to rotatably couple the first and second driven members to the rotary drive means simultaneously. Accordingly, this arrangement may permit simultaneous rotation of the object about the first and second axes of rotation.

[0013] Preferably, the first driven member comprises a mounting arrangement adapted to support the object. Accordingly, when the first driven member is rotatably coupled to the drive means, and the drive means is activated, the mounting arrangement will be caused to rotate about the first axis of rotation, thus resulting in the object supported thereon also being rotated about said first axis of rotation.

[0014] Preferably, the rotary drive means comprises a drive shaft. Advantageously, the control means may be adapted to selectively rotatably couple the first and second driven members to the drive shaft to cause the re-

quired rotation of the object about the first and second rotational axes.

[0015] In a preferred arrangement, the second driven member is carried by the first driven member, and more particularly by the mounting arrangement of the first driven member. Preferably, the object is secured to the second driven member. Accordingly, in this arrangement the object is mounted on the mounting arrangement of the first driven member via the second driven member.

[0016] At least one of the first and second driven members may be hollow. This may, for example, permit electrical cabling, fibre optic cabling or the like to be passed therethrough. This may permit the object to be illuminated or alternatively permit transmission of power or electrical signals through the member. The object may comprise translucent and/or opaque regions. Accordingly, the object may selectively project a display onto or through the object, for example but not exclusively to provide a backlit display or to project onto a wall, ceiling or the like.

[0017] Preferably, the second driven member comprises a secondary drive shaft. Preferably, the secondary drive shaft is secured to the object such that rotation of the secondary drive shaft causes corresponding rotation of the object. Advantageously, the secondary drive shaft is adapted to be rotatably coupled to the rotary drive means via a rotary transmission means. Preferably, the rotary transmission means comprises a gear train. Alternatively, the rotary transmission means may comprise a rack and pinion gear mechanism, belt or chain drive mechanism or the like.

[0018] In one preferred embodiment of the present invention, the control means may comprise a lever mechanism or the like, advantageously mounted on the first driven member. Advantageously, said lever mechanism may be adapted to securely engage the rotary drive means when rotation of the object is required about the first axis of rotation. Advantageously also, the lever mechanism may be adapted to disengage the rotary drive means when rotation of the object is required about the second axis of rotation. Beneficially, when the object is required to be rotated about the second axis of rotation, the lever mechanism may be adapted to disengage the rotary drive means and engage a fixed structure to secure the first driven member against rotation, such that rotation of the rotary drive means is advantageously transmitted to rotation of the second driven member carried on the first driven member. Advantageously, the fixed structure may be a housing of the apparatus, such as a casing or frame or the like.

[0019] The lever mechanism may be actuated by an electromagnet switching arrangement or the like.

[0020] In an alternative embodiment of the present invention, the control means may comprise locking means to selectively secure the second driven member to the rotary drive means. The locking means may be adapted to selectively secure the second driven member to the rotary drive means via the mounting arrangement of the first driven member. Advantageously, the locking means may be adapted to engage the mounting arrangement to permit rotation of the object about the first axis of rotation when the first driven member is rotated.

[0021] The control means may further comprise torque storage means, such as a torsion spring. Preferably, the torque storage means is adapted to be secured between the rotary transmission means and the second driven member. Accordingly, in this arrangement, when the locking means is engaged, the second driven member will be rotationally constrained relative to the first driven member. Advantageously, rotation of the first driven member transmits rotation to the torque storage means via the rotary transmission means. Advantageously, rotation of the torque storage means permits rotational potential energy to be stored in the storage means.

[0022] Beneficially, when the object is required to be rotated about the second axis of rotation, the locking means may be disengaged. Accordingly, the torque stored in the torque storage means may be released to rotate the second driven member to rotate the object about the second axis of rotation.

[0023] Advantageously, the control means may be adapted to rotatably couple the rotary drive means to the first driven member for a duration sufficient to permit a predefined angle of rotation of the object about the first axis to be achieved. In one preferred embodiment, the control means may also be adapted to rotatably couple the rotary drive means to the second driven member for a duration sufficient to permit a predefined angle of rotation of the object about the second axis to be achieved. Preferably, the control means is adapted to rotatably couple the rotary drive means to the first and second driven members alternately at a frequency selected to permit intermittent rotation of the object about the first and second axes by predetermined angles of rotation. Accordingly, the control means when operating in this manner will permit the object to be rotated by a predetermined angle of rotation about the first axis, and then subsequently permit the object to be rotated by a predetermined angle of rotation about the second axis.

[0024] In a preferred embodiment of the present invention, the control means is adapted to be operated automatically. Alternatively, or additionally, the control means may be adapted to be manually operated, for example by an user.

[0025] Preferably, the apparatus further comprises a motor coupled to the rotary drive means to cause rotation thereof.

[0026] Preferably also, the apparatus comprises variable speed control means adapted to selectively vary the angular velocity of the rotary drive means. Advantageously, the variable speed control means may be adapted to vary the angular velocity of the rotary drive means in accordance with, for example, the selection of which of the first and second driven members is rotatably coupled thereto. In a preferred embodiment of the present invention, the variable speed control means is adapted to decrease the angular velocity of the rotary drive means

when rotatably coupled to the first driven member, and to increase the angular velocity of the rotary drive means when rotatably coupled to the second driven member. Accordingly, in this particular arrangement, the object will be rotated about the second axis of rotation at a greater angular velocity than about the first axis of rotation. The variable speed control means may alternatively be adapted to cause the object to rotate faster about the first axis of rotation than the second axis of rotation.

[0027] The variable speed control means may be adapted to cause the driven members to be rotated in one direction of rotation about the first and second axes. Alternatively, and in a preferred embodiment, the variable speed control means is adapted to cause the first driven member to rotate in reverse directions of rotation about the first axis of rotation. Accordingly, the object may be moved to both oscillate and rotate about the first axis of rotation. Additionally, or alternatively, the variable speed control means may be adapted to cause the second driven member to rotate in reverse directions of rotation about the second axis of rotation.

[0028] Advantageously, the variable speed control means may comprise a variable speed motor. Electronic control circuitry may be provided to control the variation of the speed of the motor. The electronic control circuitry may be programmable so as to enable the circuitry to be programmed to vary the speed of the motor in the required manner or sequence. Conveniently, such electronic control circuitry, for example a programmable logic controller or the like, may be adapted to operate the control means in the required manner.

[0029] Alternatively, and in a preferred embodiment of the present invention, the variable speed control means comprises a mechanical assembly interposed between a drive motor and the rotary drive means. The mechanical assembly may be a reverted epicyclic gear train, for example.

[0030] Preferably, the epicyclic gear train comprises a first frame and a second frame pivotally mounted to the first frame. Preferably also, the first frame supports the rotary drive means. Preferably further, the second frame support is pivotally mounted about the same axis of rotation of the rotary drive means.

[0031] Advantageously, the epicyclic gear train further comprises a first drive shaft mounted on the first frame, said first drive shaft adapted to drive a second drive shaft mounted on the second frame. Advantageously, the first drive shaft is adapted to drive the second drive shaft via an inter-engaging gear arrangement. Preferably, the first drive shaft is adapted to drive the second drive shaft via an intermediate gear wheel freely rotatably mounted on the rotary drive means. Preferably also, the second drive shaft is adapted to drive the rotary drive means via an inter-engaging gear arrangement. Advantageously, by transmitting rotary motion between the second drive shaft, which is mounted on the pivoting second frame, to the rotary drive means, variations in the rotational speed transmission may therefore be achieved by causing the second frame to be pivoted relative to the first frame.

[0032] Advantageously, the second frame may comprise a pinion gear wheel secured thereto and mounted about a pivot axis of the second frame, wherein the pinion gear wheel is adapted to engage a reciprocating rack. Thus, engagement of the reciprocating rack with the pinion gear wheel will result in the second frame being pivoted about the pivot axis. In a preferred embodiment of the present invention, the rack is coupled to the first shaft via a crank pin arrangement. Accordingly, rotation of the first shaft will provide a reciprocating drive to the rack via the crank pin.

[0033] Preferably, the object is adapted to display at least a first image and a second image, wherein the orientation of said first and second images are manipulated by movement of the object about said axes of rotation. Accordingly, the control means of the present invention may be adapted to display the first and second images in a predetermined sequence of orientations by selectively causing rotation of the object about the first and second axes of rotation.

[0034] In a further alternative embodiment of the present invention, the object may be adapted to be rotated about a third axis of rotation. Preferably, the third axis of rotation is perpendicular to the first and second axes. Conveniently, where the first and second axis are in the x-y plane, the third axis projects in the z-direction.

[0035] Advantageously, rotation of the object about the third axis may be achieved by rotation of the mounting arrangement of the first driven member about the third axis. The mounting arrangement may be adapted to be rotated by a rack and pinion gear mechanism. The rack and pinion gear mechanism may be curved to maintain the radial distance between the pinion and the object. In this arrangement, the object may be rotated or oscillated about the centre of the object such that a viewer would be unaware of the change in orientation.

[0036] Preferably, rotation or oscillation of the object about the third axis and rotation of the object about the second axis is simultaneous. Accordingly, the rotation about the third axis of rotation advantageously disguises rotation of the object about the second axis such that a viewer is unaware of the change in orientation. The housing of the apparatus may be configured to disguise the change in direction. Alternatively, the viewer may be permitted to see the rotation of the object about the third axis of rotation and will be intrigued by the moving display that is observed.

[0037] Preferably, the apparatus of the present invention is adapted for use in a plaything which comprises an object adapted to display at least a first image and a second image, wherein the orientation of said first and second images are manipulated by movement of the object about said axes of rotation.

[0038] Advantageously, the apparatus may be adapted to display all orientations of the images, for example but not exclusively arrows, in the same direction. Accordingly, the viewer or audience located at one viewing angle

is shown all orientations of the images in order to observe the apparent visual illusion.

[0039] Advantageously, the object may comprise a piece of card or other substantially planar body. Alternatively, the object may comprise a spherical or cube type body or the like.

[0040] According to a second aspect of the present invention, there is provided a plaything comprising:

an object adapted to display at least a first image and a second image;
rotary drive means;
a first driven member adapted to be rotatably coupled to the rotary drive means to rotate the object about a first axis of rotation to present the first and second images in a first sequence;
a second driven member adapted to be rotatably coupled to the rotary drive means to rotate the object about a second, different, axis of rotation to present the first and second images in a second sequence; and
control means adapted to rotatably couple at least one of the first and second drive means to the rotary drive means.

BRIEF DESCRIPTION OF THE DRAWINGS

[0041] These and other aspects of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1a is a front view of a card used in a known 'magic' trick;
Figure 1b is a back view of the card shown in Figure 1a;
Figure 2 is a further front view of the card shown in Figure 1a with a users hand also shown;
Figure 3 is a diagrammatic representation of a first portion of an apparatus in accordance with an embodiment of the present invention;
Figure 4 is a diagrammatic representation of a second portion of an apparatus in accordance with an embodiment of the present invention;
Figure 5 is a plan view of the second portion of the apparatus shown in Figure 4;
Figure 6 is a diagrammatic representation of a portion of an apparatus in accordance with another embodiment of the present invention;
Figure 7 is a diagrammatic representation of a portion of an apparatus in accordance with a further embodiment of the present invention, shown in a first position; and
Figure 8 is a diagrammatic representation of the first portion of the apparatus shown in Figure 7, shown in a second position.

DETAILED DESCRIPTION OF THE DRAWINGS

[0042] Reference is first made to Figure 3 of the drawings in which there is shown a first portion of an apparatus 30 for use in a plaything. The apparatus 30 comprises a fixed main frame 32 defining a platform 34 and an aperture 36 therein, through which aperture 36 a spherical body 38 protrudes. The spherical body 38 includes two arrows 40, 42 displayed on diametrically opposed surface portions of the body 38. In the embodiment shown the arrows 40, 42 are orientated at 90 degrees with respect to each other. In use, the apparatus 30 of the present invention is adapted to rotate the spherical body 38 alternately about axes 44, 46 which are disposed at 45 degrees relative to each other. Advantageously, the desired effect is such that rotation of the spherical body 38 about vertical axis 44 will maintain the arrows 40, 42 in the orientations shown, and rotation of the body 38 about the inclined axis 46 will cause the arrows 40, 42 to change orientation. For example, rotation of the body about axis 46 by 180 degrees will result in the arrows 40, 42 pointing in opposite directions. By manipulating the speed of rotation of the body about the respective axes 44, 46 and by alternating rotation about one axis and then the other, an audience or user viewing the spherical body 38 will be amused and intrigued by the alternating direction changes of the arrows 40, 42. For example, the spherical body 38 is adapted to be rotated or oscillated about vertical axis 44, giving an audience sufficient time to view the orientation and movement of the arrows 40, 42. However, when the spherical body is then caused to rotate about the inclined axis 46, the speed of rotation is increased to a level which would be difficult to detect with the eye, creating the illusion of an instantaneous direction change of the arrows 40, 42. Once the required direction change is achieved, the body 38 may then once again be slowly oscillated about the vertical axis 44, presenting the new orientation of arrows 40, 42 to the audience. The use of a spherical body 30 assists in providing the desired effect as this disguises the change in the axis of rotation. Although not shown, mirrors may be incorporated to further intrigue and entertain the audience.

[0043] Positioned below the platform 34 is a rotating frame 48 and a drive shaft 50 which extends into the rotating frame 48 and is aligned with the vertical axis 44. The drive shaft is rotatably supported by bearings 52, 54 which are mounted on the main frame 32. The rotating frame 48 includes a rotating shaft 56 rotatably mounted on the fame 48, wherein the spherical body 38 is mounted on said shaft 56. Accordingly, the arrangement is such that rotation of the rotating frame 48 results in rotation of the spherical body 38 about the vertical axis 44, and rotation of the rotating shaft 56 results in rotation of the body 38 about the inclined axis 46.

[0044] The drive shaft 50 includes a gear wheel 58 secured thereto, and the rotating shaft 56 includes a gear wheel 60 secured thereto, wherein the gear wheels 58, 60 are rotatably engaged via an intermediate idle gear

wheel 62 mounted on a shaft 64 secured to the frame 48.

[0045] A lever 66 is pivotally mounted on the rotating frame at pivot point 68 and is caused to pivot about point 68 by an electromagnet device 70, such as a solenoid, reciprocating an operating arm 72. The lever 66 is adapted to be pivoted between two positions: a first position in which the lever 66 is engaged with gear wheel 58, and thus drive shaft 50, via a clutch plate 74; and a second position in which the lever 66 is disengaged from the gear wheel 58 and engaged with the main frame 32. Accordingly, when in the first position the lever 66 causes the rotating frame 48 to become rotatably coupled to the drive shaft 50, such that rotation of the drive shaft 50 causes rotation of the frame 48 and thus body 38 about axis 44. As the lever 66 is engaged with the gear wheel 58 in this first position then no rotary transmission to the rotating shaft 56 is permitted. When in the second position the lever 66 causes the rotating frame 48 to become fixed to the main frame 32, preventing frame 48 from rotating, which in turn permits gear wheel 58 to drive gear wheel 62, which in turn drives gear wheel 60 to effect rotation of the spherical body 38 about axis 46. The electromagnet device 70 is controlled by a controller 76 in order to alternate rotation of the body 38 about each axis 44, 46 in the desired manner.

[0046] As shown in Figure 3. the lever 66 is biased towards the first position by way of an over-centre spring 78.

[0047] The drive shaft 50 is caused to be rotated by a motor (not shown) via a variable speed mechanism, shown in Figures 4 and 5. The variable speed mechanism is adapted to cause the drive shaft 50 to rotate at a lower rate when the body 38 is to be rotated about the vertical axis 44, and at an increased rate when the body 38 is to be rotated about the inclined axis 46. In fact, the variable speed mechanism is adapted to cause the body 38 to be oscillated about the vertical axis 44, i.e., cause reverse rotation. The variable speed mechanism will now be described with reference to Figures 4 and 5.

[0048] The variable speed mechanism, generally indicated by reference numeral 80, incorporates a reverted epicyclic wheel train, described below. The mechanism includes a fixed frame 82 and a pivoting or epicyclic frame or arm 84 pivotally mounted to the first frame 82. The drive shaft 50 extends through both the epicyclic arm 84 and the fixed frame and provides the pivot connection therebetween. Mounted on the fixed frame is a rotating crank shaft 86, and mounted on the epicyclic arm is a shaft 88. The drive shaft 50, crank shaft 86 and shaft 88 carry a number of gear wheels which are adapted to transmit and vary rotary motion from a motor (not shown) to the drive shaft 50.

[0049] In use, a motor (not shown) drives gear wheel 90 which is rigidly mounted on the crank shaft 86, which shaft 86 is accordingly rotated. Gear wheel 90 engages and drives gear wheel 92 which is freely mounted on the drive shaft 50. Rotatably fixed to gear wheel 92 is gear wheel 94 which engages and drives gear wheel 96. Gear wheel 96 may be rigidly secured to shaft 88 which will thus also rotate, or alternatively may be freely mounted on the shaft 88. Gear wheel 98 is rotatably fixed to gear wheel 96 and is therefore rotated therewith. Gear wheel 98 engages and rotates gear wheel 100 which is rigidly fixed to the drive shaft 50, causing said shaft 50 to be rotated. The specific gear ratio across the resulting gear train of the mechanism 80 may be selected in accordance with the required output speed of the drive shaft 50. However, in one preferred embodiment the crank shaft 86 is adapted to be rotated at twice the average speed of the drive shaft 50.

[0050] A pinion gear wheel 102 is secured to the epicyclic arm 84 and is mounted about drive shaft 50, wherein the pinion gear wheel 102 is adapted to engage a reciprocating rack 104. Thus, engagement of the reciprocating rack 104 with the pinion gear wheel 102 will result in the cpicyclic arm 84 being pivoted about the drive shaft 50. The epicyclic arm 84 is shown in its central position. The rack 104 is coupled to the crank shaft 86 via a crank pin 106 which engages a slot 108 defined in an end portion of the rack 104. Accordingly, rotation of the crank shaft 86 will provide a reciprocating drive to the rack 104 via the crank pin 106 and slot 108. In this way, one full rotation of the crank shaft 86 will cause the epicyclic arm 84 to be pivoted side-to-side once.

[0051] During a first half rotation of the crank shaft 86 the epicyclic arm 84 will be caused to pivot in a first direction, causing gear wheel 98 to 'walk' around gear wheel 100, resulting in a reduction in the speed of the drive shaft 50, due to the negative rotation effect. However, as the translation of rotary motion of the crank shaft 86 and crank pin 106 to reciprocating motion of the rack 104 will result in a sinusoidal variation in the reciprocating motion, as is well known in the art, a portion of the pivoting motion of the arm 84 in the first direction will be at a rate which will cause the drive shaft 50 to be rotated in a reverse direction, for a finite period. That is, for this finite period the rate of pivot of the shaft will be greater that the rate of rotation of gear wheel 98. When the arm 84 is being pivoted in the first direction, as described above, the lever 66 (Figure 3) is advantageously positioned by the electromagnet device 70 and controller 76 (Figure 3) to cause the rotating frame 48 (Figure 3) to rotate, resulting in the body 38 being rotated, or indeed oscillated due to the reverse rotation of the drive shaft 50, about the vertical axis 44.

[0052] During a second half rotation of the crank shaft 86 the epicyclic arm 84 will be caused to pivot in a second, opposite direction, causing gear wheel 98 to 'walk' around gear wheel 100 in a reverse direction, resulting in an increase in the speed of the drive shaft 50. When the arm 84 is being pivoted in the second direction as described, the lever 66 (Figure 3) is advantageously positioned by the electromagnet device 70 and controller 76 (Figure 3) to secure the rotating frame 48 and cause the shaft 56 (Figure 3) to rotate, resulting in the body 38 being rotated at the increased rate, about the inclined

axis 46.

[0053] An alternative embodiment of the present invention is shown in Figure 6 in which like components are indicated by like numerals incremented by 100. In this embodiment, a frame 148 is coupled to and rotates with a first drive shaft 150, the shaft 150 orientated on a vertical axis 144. A second driven shaft 156, orientated on a second axis 146, is supported by bearings 102, 104, mounted in the frame 148. The second shaft 156 supports a spherical body 138, the second shaft 156 comprising a disc or arm 106 which permits the frame 148 to be locked to the second driven shaft 156 for approximately one full rotation of the shaft 150. This may be achieved via a solenoid arrangement or alternatively by an electromagnet selectively engaged at the appropriate time to lock the frame 148 to the second driven shaft 156.

[0054] At such time as the second driven shaft 156 and frame 148 are engaged, a wheel or gear 158, fixed to main frame 132 and being coaxial with the first driven shaft 150 engages and rotates a second wheel or gear 160 freely rotatably mounted on the second driven shaft 156 around the wheel or gear 158.

[0055] A torsion spring 109 is mounted on the second shaft 156 and is located within a barrel or drum 110 fixedly amounted to the second gear 160. A support arm 112 is fixed to the second shaft 156 to assist in balance and support of the second gear 160 on the shaft 156. The spring 109 is fixed at one end to the second gear 160 via the barrel 110 and at the other end to the second shaft 156 via the arm 112. The arm 112 provides a fixing point such that rotation of the second gear 160 relative to the shaft 156 rotates or winds the spring to permit torque energy to be stored as potential energy. More than one spring 109 may be provided to improve the balance of the second shaft 156 and second driven gear 160.

[0056] In use, the first shaft 150 rotates through one revolution, causing the fixed gear 158 to rotate the larger gear 160. It will be noted that as the second gear 160 is free to rotate on the second shaft 156, rotation of the first drive shaft 150 does not cause direct rotation of the body 138 via the second gear 160. The body 138 is thus rotated one revolution about the first axis 144. In the embodiment shown, the second gear 160 is twice the diameter of the smaller fixed gear 158 and rotates 180 degrees about axis 146 for one rotation of shaft 150. Rotation of the second gear 160 builds a torque in the form of a rotational returning force, in the spring 109. This stored torque is equivalent to 180 degrees of rotation of the shaft 156 and is release once per revolution of the shaft 150 about the first axis 144 when the disc 106 engages a trigger or switch (not shown). On engaging the trigger, the disc 106 disengages the shaft 156 from the frame 148 permitting the shaft 156 to rotate the spherical body 138 about the second axis 146. Rotation of the shaft 156 is driven by the release of stored torque energy in the spring 109. The result is 180 degree rotation of the second shaft 156 about the second axis 146. For example, where the spherical body 138 includes two arrows 140, 142 displayed on diametrically opposed surface portions of the body 138, the arrow 140 pointing in a downwards direction and the second arrow 142 pointing to the right, the movement of the spherical body 138 results in a sequence of arrows 140, 142 down-right-up-left.

[0057] In reference to Figure 7 and Figure 8, there is shown a further alternative embodiment of an apparatus 230 for moving an object as shown in Figures 1 to 6, in which like components are indicated by like numerals incremented by 200. In this embodiment, a spherical body 238 may be configured to rotate or oscillate about an additional third axis 214 in order to disguise rotation of the body 238 about the second axis 244. The body 238 may be rotated about a first axis 244 and periodically about a second axis 246, this axis 246 being at approximately 45 degrees to the first axis 244. In a preferred embodiment, the body 238 is rotated about the second axis 246 through 180 degrees once in every 360 rotation about the first axis 244.

[0058] The images 240, 242 on the body 238 are aligned with the second axis 246 and below a plane perpendicular to the second axis 246 which bisects the spherical body 238 (shown most clearly in Figure 7). The third axis 214 projects through the centre of the spherical body 238, permitting rotation of the body 238 about its centre, and is perpendicular to the plane of the first and second axes 244, 246. Adopting the Cartesian system for representing direction in 3 dimensions, the first and second axes 244, 246 are in the x-y plane and the third perpendicular axis 214 is in the third or z direction.

[0059] In use, the apparatus 230 other than a main frame 232 may thus be rotated or oscillated about the third axis 214 from a first position as shown in Figure 7 to a second position as shown in Figure 8. Rotation about the third axis 214 of rotation occurs during rotation about the second axis 246 such that images 240, 242 displayed on the spherical body 238 are hidden from a viewer, particularly if the viewer is arranged to observe the apparatus 230 from the right (as shown in the figures). The speed of rotation means that the change of orientation is unlikely to be detected by the viewer. As per the previous embodiments described above, the shift in orientation of the spherical body 238 about the second axis 246 results in a different sequence of diagrams or arrows 240, 242 being displayed to intrigue and amuse the viewer.

[0060] In the embodiment shown in Figures 6 and 7, the rotational speed of the spherical body 238 is less critical as the images 240, 242 are essentially hidden from the viewer when the change of orientation occurs. In one embodiment, as shown by reference arrow '216', the frame 248 is rotated or oscillated about the third axis of rotation 214 by a rack and pinion gear mechanism (not shown). The rack is fixed to the frame 232 and the pinion gear is coupled to the rotating frame 248. The rack may be curved to enable the pinion to follow the desired arc about the centre of the body 238. The pinion gear comprises a pin (not shown), the pin engaging a slot or hole in the rotating frame 248. Rotation of the pinion gear

causes the pinion gear to 'walk' around the rack, the pin engages with the slot or hole to drive the rotating frame from the first position to the desired second position. The pinion gear may be driven by any means, for example and in a preferred embodiment by a motor (not shown). It will be understood that any means for rotating the apparatus about the third axis 214 may be utilised to rotate the apparatus, other than the main frame 232. Alternatively, the pinion gear may be fixed and the rack, being fixed to the rotating frame 248, moves in relation to the pinion to drive the frame 248 through the desired arc.

[0061] It should be understood that the embodiments described are merely exemplary of the present invention and that various modification may be made without departing from the scope of the invention. For example, a gear ratio, preferably a step-up gear ratio, may be provided between gear wheels 58, 60 and 62 mounted on the rotating frame 48 in order to provide a speed increase between the drive shaft 50 and the rotating shaft 56. Additionally, the effect of the mechanical variable speed mechanism 80 may be achieved by electronic control means such as a programmable chip or the like, adapted to directly vary the speed of an electric motor or the like. Furthermore, the lever 66 may be adapted to be operated manually to give a user control over which axis the spherical body may be rotated or oscillated. Preferably, but not exclusively, the lever 66 may be adapted to be operated manually to give a user control over which axis the spherical body may be rotated or oscillated, wherein control is achieved through remote control means. Additionally, any suitable symbol or sign or the like may be displayed on the spherical body 38.

Claims

1. An apparatus (30;130;230) for moving an object (38,138,238) about separate axes of rotation (44,46; 144,146;244,246,214), said apparatus (30;130;230) comprising:

rotary drive means (50;150;250);
a first driven member (48;148) adapted to be rotatably coupled to the rotary drive means (50; 150;250) to rotate an object (38,138,238) about a first axis of rotation (44; 144;244);
a second driven member (56;156;256) adapted to be rotatably coupled to the same rotary drive means (50;150;250) to rotate the object (38;138; 238) about a second, different, axis of rotation (46; 46;246); and
control means (66) adapted to rotatably couple at least one of the first (48;148) and second (56; 155;256) driven members to the rotary drive means (50;150;250).

2. The apparatus (30; 130; 230) of claim 1, wherein the first driven member (48;148) is adapted to be selectively rotatably coupled to the rotary drive means (50; 150;250).

3. The apparatus (30; 130: 230) of claim 1 or 2, wherein the second driven member (56; 156;256) is adapted to be selectively rotatably coupled to the rotary drive means (50; 150;250).

4. The apparatus (30; 130; 230) of claim 1, 2 or 3, wherein the control means (66) is adapted to rotatably couple the first (48;148) and second (56;156; 256) driven members alternately to the rotary drive means (50; 150;250).

5. The apparatus (30; 130; 230) of claim 1, 2 or 3, wherein the control means (66) is adapted to rotatably couple the first (48;148) and second (56;156; 256) driven members to the rotary drive means (50; 150;250) simultaneously.

6. The apparatus (30; 130; 230) of any preceding claim, wherein the first driven member (48;148) comprises a mounting arrangement adapted to support the object (38;138;238).

7. The apparatus (30; 130; 230) of any preceding claim, wherein the rotary drive means (50;150;250) comprises a single drive shaft (50;150;250).

8. The apparatus (30; 130; 230) of claim 7, wherein the control means (66) is adapted to selectively rotatably couple the first (48;148) and second (56;156;256) driven members to the drive shaft (50; 150;250).

9. The apparatus (30; 130; 230) of any preceding claim, wherein the second driven member (56; 156;256) is carried by the first driven member (48;148).

10. The apparatus (30; 130; 230) of any preceding claim, wherein the object (38;135;238) is secured to the second driven member (56;156;256).

11. The apparatus (30; 130; 230) of any preceding claim, wherein at least one of the first (48;148) and second (56;156;256) driven members may be hollow.

12. The apparatus (30; 130; 230) of any preceding claim, wherein the second driven member (56;1156;256) comprises a secondary drive shaft (56; 156;256),

13. The apparatus (30; 130; 230) of claim 12, wherein the secondary drive shaft (56;156;256) is secured to the object (38;138;238) such that rotation of the secondary drive shaft (56;156;256) causes corresponding rotation of the object (38;138;238).

14. The apparatus (30; 130; 230) of claim 12 or 13, wherein the secondary drive shaft (56;156;256) is

adapted to be rotatably coupled to the rotary drive means (50;150;250) via a rotary transmission means (58,60,62).

15. The apparatus (30; 130; 230) of claim 14, wherein the rotary transmission means (58,60,62) comprises a gear train (58,60,62).

16. The apparatus (30; 130; 230) of claim 14, wherein the rotary transmission means (58,60,62) comprises a rack and pinion gear mechanism.

17. The apparatus (30; 130; 230) of any preceding claim, wherein the control means (66) comprises a lever mechanism (66) mounted on the first driven member (48;148).

18. The apparatus (30; 130; 230) of claim 17, wherein the lever mechanism (66) is adapted to securely engage the rotary drive means (50;150;250) when rotation of the object (38;138;238) is required about the first axis of rotation (44;144;244);, and to disengage the rotary drive means (50;150;250) when rotation of the object (38;138;238) is required about the second axis of rotation (46;146;246).

19. The apparatus (30; 130; 230) of claim 18, wherein, when the object (38;138;238) is required to be rotated about the second axis of rotation (46;146;246), the lever mechanism (66) is adapted to disengage the rotary drive means (50;150;250) and engage a fixed structure (32; 132;232) to secure the first driven member (48;148) against rotation.

20. The apparatus (30; 130; 230) of any one of claims 1 to 16, wherein the control means (66) comprises locking means (74) to selectively secure the second driven member (56; 156;256) to the rotary drive means (50;150;250).

21. The apparatus (30; 130; 230) of claim 20, wherein the locking means (74) is adapted to selectively secure the second driven member (56;156;256) to the rotary drive means (50;150;250) via the mounting arrangement (48;148) of the first driven member (48; 18).

22. The apparatus (30; 130; 230) of any preceding claim, wherein the control means (66) comprises torque storage means (109).

23. The apparatus (30; 130; 230) of claim 22, wherein the torque storage moans(109) is adapted to be secured between rotary transmission means (58,60,62) and the second driven member (56;356; 256) and, in use, rotation of the first driven member (48;148) transmits rotation to the torque storage means (109) via the rotary transmission means (58,60,62), and rotation of the torque storage means (109) permits rotational potential energy to be stored in said storage means (109).

24. The apparatus (30; 130; 230) of claim 23 when dependent on any one of claims 20 to 22, wherein, in use when the object (38;138;238) is required to be rotated by the second driven member (56;156;256), the locking means (74) is disengaged such that the torque stored in the torque storage means (109) is released to rotate the second driven member (56; 156;256).

25. The apparatus (30; 130; 230) of any preceding claim, wherein the control means (66) is adapted to rotatably couple the rotary drive means (50;150;250) to the first driven member (48;148) for a duration sufficient to permit a predefined angle of rotation of the object (38;138;238) about the first axis (44;144;244) to be achieved.

26. The apparatus (30; 130; 230) of any preceding claim, wherein the control means (66) is adapted to rotatably couple the rotary drive means (50;350;250) to the second driven member (56;156;256) for a duration sufficient to permit a predefined angle of rotation of the object (38;338;238) about the second axis (46; 146;246) to be achieved.

27. The apparatus (30; 130; 230) of any preceding claim, wherein the control means (66) is adapted to rotatably couple the rotary drive means (50; 150;250) to the first (48;148) and second (56;156;256) driven members alternately at a frequency selected to permit intermittent rotation of the object (38;138;238) about the first (44;144;244) and second (46; 146,246) axes by predetermined angles of rotation.

28. The apparatus (30; 130; 230) of any preceding claim, further comprising a motor coupled to the rotary drive means (50; 150;250) to cause rotation thereof.

29. The apparatus (30; 130; 230) of any preceding claim, further comprising variable speed control means (80) adapted to selectively vary the angular velocity of the rotary drive means (50; 150;250).

30. The apparatus (30; 130; 230) of claim 29, wherein the variable speed control means (80) is adapted to vary the angular velocity of the rotary drive means (50,150;250) in accordance with the selection of which of the first (48;148) and second (56; 156;256) driven members is rotatably coupled thereto.

31. The apparatus (30; 130; 230) of claim 29 or 30, wherein the variable speed control means (80) is adapted to decrease the angular velocity of the rotary drive means (50;150;250) when rotatably coupled to

the first driven member (48;148), and to increase the angular velocity of the rotary drive means (50; 150; 250) when rotatably coupled to the second driven member (56;156;256).

32. The apparatus (30; 130; 230) of claim 29, 30 or 31, wherein the variable speed control means (80) is adapted to cause the driven members (48,56; 148,156;256) to be rotated in one direction of rotation about the first (44;144;244) and second (46; 146; 246) axes.

33. The apparatus (30; 130; 230) of claim 29, 30 or 31, wherein the variable speed control means (80) is adapted to cause the first driven member (48;148) to rotate in reverse directions of rotation about the first axis (44;144;244) of rotation.

34. The apparatus (30; 130; 230) of any one of claims 29 to 33, wherein the variable speed control means (80) may comprise a variable speed motor.

35. The apparatus (30; 130; 230) of any one of claims 29 to 33, wherein the variable speed control means (80) comprises a mechanical assembly interposed between a drive motor and the rotary drive means (50;150;250).

36. The apparatus (30; 130; 230) of claim 35, wherein the mechanical assembly is a reverted epicyclic gear train.

37. The apparatus (30; 130; 230) of claim 35 or 36, wherein the mechanical assembly comprises a first frame (82) and a second frame (84) pivotally mounted to the first frame (82).

38. The apparatus (30; 130; 230) of claim 37, wherein the first frame (82) supports the rotary drive means (50;150;250).

39. The apparatus (30; 130; 230) of claim 37 or 38, wherein the second frame support is pivotally mounted about the same axis of rotation of the rotary drive means (50;150;250).

40. The apparatus (30; 130; 230) of claim 37, 38 or 39, wherein the mechanical assembly further comprises a first drive shaft (86) mounted on the first frame (82), said first drive shaft (86) adapted to drive a second drive shaft (88) mounted on the second frame (84).

41. The apparatus (30; 130; 230) of claim 40, wherein the first drive shaft (86) is adapted to drive the second drive shaft (88) via an inter-engaging gear arrangement (90,92,94,96).

42. The apparatus (30; 130; 230) of claim 41, wherein the first drive shaft (86) is adapted to drive the second drive shaft (88) via an intermediate gear (92) wheel freely rotatably mounted on the rotary drive means (50;30:250).

43. The apparatus (30; 130; 230) of claim 40, 41 or 42, wherein the second drive shaft (88) is adapted to drive the rotary drive means (50;150;250) via an inter-engaging gear arrangement (98,100).

44. The apparatus (30; 130; 230) of any one of claims 37 to 43, wherein the second frame (84) comprises a pinion gear wheel (102) secured thereto and mounted about a pivot axis of the second frame (84), wherein the pinion gear wheel (102) is adapted to engage a reciprocating rack (104).

45. The apparatus (30; 130; 230) of claim 44, wherein the rack (104) is coupled to the first shaft (86) via a crank pin arrangement (146).

46. The apparatus (30; 130; 230) of any preceding claim, wherein the object (38;138;238) is adapted to display at least a first image (40) and a second image (42), wherein the orientation of said first (40) and second (42) images are manipulated by movement of the object (38;138;238) about said axes of rotation (44,46;144,146;244,246,214).

47. The apparatus (30; 130; 230) of any preceding claim, wherein the object (38;138;238) is adapted to be rotated about a third axis of rotation (214).

48. The apparatus (30; 130; 230) of claim 47, wherein the third axis of rotation (214) is perpendicular to the first (44; 144;244) and second (46;146;246) axes.

49. The apparatus (30; 130; 230) of claim 47 or 48, wherein rotation of the object (38;138;238) about the third axis (214) is achieved by rotation of the mounting arrangement of the first driven member (48;148) about the third axis (214).

50. The apparatus (30; 130; 230) of claim 47, 48 or 49, wherein rotation of the object (38;138;238) about the third axis (214) and rotation of the object (38;138; 238) about the second axis (46; 146;246) is simultaneous.

51. The apparatus (30; 130; 230) of any preceding claim adapted for use in a plaything which comprises an object (38;138;238) adapted to display at least a first image (40) and a second image (42), wherein the orientation of said first (40) and second (42) images are manipulated by movement of the object (38;138; 238) about said axes of rotation (44,46;144,146; 244,246,214).

52. The apparatus (30; 130; 230) of claim 51 wherein the first driven member (48; 148) is adapted to be rotatably coupled to the rotary drive means (50; 150; 250) to rotate the object (38;138;238) about a first axis (44;144;144) of rotation to present the first (40) and second (42) images in a first sequence.

53. The apparatus (30; 130; 230) of clam 51 or 52, wherein the second driven member (56;155;256) is adapted to be rotatably coupled to the same rotary drive means (50;150;250) to rotate the object (38; 138;238) about a second, different, axis of rotation (46;146;246) to present the first (40) and second (42) images in a second sequence.

Patentansprüche

1. Vorrichtung (30; 130; 230) zum Bewegen eines Gegenstandes (38; 138; 238) um gesonderte Rotationsachsen (44, 46; 144, 146; 244, 246, 214), wobei die Vorrichtung (30; 130; 230) Folgendes umfasst:

rotierende Antriebsmittel (50; 150; 250),
ein erstes angetriebenes Element (48; 148), das dafür eingerichtet ist, drehbar an die rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden, um einen Gegenstand (38, 138, 238) um eine erste Rotationsachse (44; 144; 244) zu drehen,
ein zweites angetriebenes Element (56; 156; 256), das dafür eingerichtet ist, drehbar an die gleiche rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden, um den Gegenstand (38; 138; 238) um eine zweite, abweichende, Rotationsachse (46; 146; 246) zu drehen, und
Steuerungsmittel (66), die dafür eingerichtet sind, wenigstens eines von dem ersten (48; 148) und dem zweiten (56, 156; 256) angetriebenen Element drehbar an die rotierenden Antriebsmittel (50; 150; 250) zu koppeln.

2. Vorrichtung (30; 130; 230) nach Anspruch 1 wobei das erste angetriebene Element (48; 148) dafür eingerichtet ist, selektiv drehbar an die rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden.

3. Vorrichtung (30; 130; 230) nach Anspruch 1 oder 2, wobei das zweite angetriebene Element (56; 156; 256) dafür eingerichtet ist, selektiv drehbar an die rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden.

4. Vorrichtung (30; 130; 230) nach Anspruch 1, 2 oder 3, wobei das Steuerungsmittel (66) dafür eingerichtet ist, das erste (48; 148) und das zweite (56, 156; 256) angetriebene Element abwechselnd drehbar an die rotierenden Antriebsmittel (50; 150; 250) zu koppeln.

5. Vorrichtung (30; 130; 230) nach Anspruch 1, 2 oder 3, wobei das Steuerungsmittel (66) dafür eingerichtet ist, das erste (48; 148) und das zweite (56, 156; 256) angetriebene Element gleichzeitig drehbar an die rotierenden Antriebsmittel (50; 150; 250) zu koppeln.

6. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das erste angetriebene Element (48; 148) eine Anbringungsanordnung umfasst, die dafür eingerichtet ist, den Gegenstand (38, 138, 238) zu tragen.

7. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das rotierende Antriebsmittel (50; 150; 250) eine einzige Antriebswelle (50; 150; 250) umfasst.

8. Vorrichtung (30; 130; 230) nach Anspruch 7, wobei das Steuerungsmittel (66) dafür eingerichtet ist, selektiv das erste (48; 148) und das zweite (56, 156; 256) angetriebene Element drehbar an die Antriebswelle (50; 150; 250) zu koppeln.

9. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das zweite angetriebene Element (56; 156; 256) durch das erste angetriebene Element (48; 148) getragen wird.

10. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei der Gegenstand (38; 138; 238) an dem zweiten angetriebenen Element (56; 156; 256) befestigt ist.

11. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei wenigstens eines von dem ersten (48; 148) und dem zweiten (56, 156; 256) angetriebenen Element hohl sein kann.

12. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das zweite angetriebene Element (56; 156; 256) eine sekundäre Antriebswelle (56; 156; 256) umfasst.

13. Vorrichtung (30; 130; 230) nach Anspruch 12, wobei die sekundäre Antriebswelle (56; 156; 256) derart an dem Gegenstand (38; 138; 238) befestigt ist, dass eine Drehung der sekundären Antriebswelle (56; 156; 256) eine entsprechende Drehung des Gegenstandes (38; 138; 238) bewirkt.

14. Vorrichtung (30; 130; 230) nach Anspruch 12 oder 13, wobei die sekundäre Antriebswelle (56; 156; 256) dafür eingerichtet ist, über ein drehbares Übertragungsmittel (58, 60, 62) an das rotierende Antriebsmittel (50; 150; 250) gekoppelt zu werden.

15. Vorrichtung (30; 130; 230) nach Anspruch 14, wobei das drehbare Übertragungsmittel (58, 60, 62) einen Getriebezug (58, 60, 62) umfasst.

16. Vorrichtung (30; 130; 230) nach Anspruch 14, wobei das drehbare Übertragungsmittel (58, 60, 62) einen Zahnstangen-Getriebemechanismus umfasst.

17. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das Steuerungsmittel (66) einen Hebelmechanismus (66) umfasst, der an dem ersten angetriebenen Element (48; 148) angebracht ist.

18. Vorrichtung (30; 130; 230) nach Anspruch 17, wobei der Hebelmechanismus (66) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) sicher in Eingriff zu nehmen, wenn eine Drehung des Gegenstandes (38; 138; 238) um die erste Rotationsachse (44; 144; 244) erforderlich ist, und die rotierenden Antriebsmittel (50; 150; 250) auszurücken, wenn eine Drehung des Gegenstandes (38; 138; 238) um die zweite Rotationsachse (46; 146; 246) erforderlich ist.

19. Vorrichtung (30; 130; 230) nach Anspruch 18, wobei, wenn es erforderlich ist, dass der Gegenstand (38; 138; 238) um die zweite Rotationsachse (46; 146; 246) gedreht wird, der Hebelmechanismus (66) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) auszurücken und eine feststehende Struktur (32; 132; 232) in Eingriff zu nehmen, um das erste angetriebene Element 48;148) gegen eine Drehung zu sichern,

20. Vorrichtung (30; 130; 230) nach einem der Ansprüche 1 bis 16, wobei das Steuerungsmittel (66) Verriegelungsmittel (74) umfasst, um das zweite angetriebene Element (56; 156; 256) selektiv an den rotierenden Antriebsmitteln (50; 150; 250) zu befestigen.

21. Vorrichtung (30; 130; 230) nach Anspruch 20, wobei das Verriegelungsmittel (74) dafür eingerichtet ist, das zweite angetriebene Element (56; 156; 256) über die Anbringungsanordnung (48; 148) des ersten angetriebenen Elements (48; 148) selektiv an den rotierenden Antriebsmitteln (50; 150; 250) zu befestigen.

22. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das Steuerungsmittel (66) Drehmometrtspeichermittel (109) umfasst.

23. Vorrichtung (30; 130; 230) nach Anspruch 22, wobei das Drehmomentspeichermittel (109) dafür eingerichtet ist, zwischen den rotierenden Übertragungsmitteln (58, 60, 62) und dem zweiten angetriebenen Element (56; 156; 256) befestigt zu sein, und bei Anwendung eine Drehung des ersten angetriebenen Elements (48; 148) die Drehung über die rotierenden Übertragungsmittel (58, 60, 62) zu dem Drehmomentspeichermittel (109) überträgt und eine Drehung des Drehmomentspeichermittels (109) ermöglicht, dass potentielle Rotationsenergie in dem Drehmomentspeichermittel (109) gespeichert wird.

24. Vorrichtung (30; 130; 230) nach Anspruch 23, soweit abhängig von einem der Ansprüche 20 bis 22, wobei, wenn es bei Anwendung erforderlich ist, dass der Gegenstand (38; 138; 238) durch das zweite angetriebene Element (56; 156; 256) gedreht wird, das Verriegelungsmittel (74) ausgerückt wird derart, dass das in dem Drehmomentspeichermittel (109) gespeicherte Drehmoment freigesetzt wird, um das zweite angetriebene Element (56; 156; 256) zu drehen.

25. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das Steuerungsmittel (66) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) für eine Dauer an das erste angetriebene Element (48; 148) zu koppeln, die dazu ausreicht, zu ermöglichen, dass ein vordefinierter Rotationswinkel des Gegenstandes (38; 138; 238) um die erste Achse (44; 144; 244) erreicht wird.

26. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das Steuerungsmittel (66) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) für eine Dauer an das zweite angetriebene Element (56; 156; 256) zu koppeln, die dazu ausreicht, zu ermöglichen, dass ein vordefinierter Rotationswinkel des Gegenstandes (38; 138; 238) um die zweite Achse (46; 146; 246) erreicht wird.

27. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei das Steuerungsmittel (66) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) abwechselnd mit einer Frequenz an das erste (48; 148) und das zweite (56; 156; 256) angetriebene Element zu koppeln, die dafür ausgewählt ist, eine intermittierende Drehung des Gegenstandes (38; 138; 238) um die erste (44; 144; 244) und die zweite (46; 146; 246) Achse um vorbestimmte Rotationswinkel zu ermöglichen.

28. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, die ferner einen Motor umfasst, der an die rotierenden Antriebsmittel (50; 150; 250) gekoppelt ist, um eine Drehung derselben zu bewirken.

29. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, die ferner regelbare Dreh-

zahlsteuerungsmittel (80) umfasst, die dafür eingerichtet sind, selektiv die Winkelgeschwindigkeit der rotierenden Antriebsmittel (50; 150; 250) zu verändern.

30. Vorrichtung (30; 130; 230) nach Anspruch 29, wobei das regelbare Drehzahlsteuerungsmittel (80) dafür eingerichtet ist, die Winkelgeschwindigkeit der rotierenden Antriebsmittel (50; 150; 250) in Übereinstimmung mit der Auswahl zu verändern, welches von dem ersten (48; 148) und dem zweiten (56; 156; 256) angetriebenen Element drehbar an dieselben gekoppelt ist.

31. Vorrichtung (30; 130; 230) nach Anspruch 29 oder 30, wobei das regelbare Drehzahlsteuerungsmittel (80) dafür eingerichtet ist, die Winkelgeschwindigkeit der rotierenden Antriebsmittel (50; 150; 250) zu verringern, wenn sie drehbar an das erste angetriebene Element (48; 148) gekoppelt sind, und die Winkelgeschwindigkeit der rotierenden Antriebsmittel (50; 150; 250) zu steigern, wenn sie drehbar an das zweite angetriebene Element (56; 156; 256) gekoppelt sind.

32. Vorrichtung (30; 130; 230) nach Anspruch 29, 30 oder 31, wobei das regelbare Drehzahlsteuerungsmittel (80) dafür eingerichtet ist, zu bewirken, dass die angetriebenen Elemente (48, 56; 148, 156; 256) in einer Rotationsrichtung um die erste (44; 144; 244) und die zweite (46; 146; 246) Achse gedreht wenden.

33. Vorrichtung (30; 130; 230) nach Anspruch 29, 30 oder 31, wobei das regelbare Drehzahlsteuerungsmittel (80) dafür eingerichtet ist, zu bewirken, dass sich das erste angetriebene Element (48; 148) in entgegengesetzten Rotationsrichtungen um die erste Rotationsachse (44; 144; 244) dreht.

34. Vorrichtung (30; 130; 230) nach einem der Ansprüche 29 bis 33, wobei das regelbare Drehzahlsteuerungsmittel (80) einen Motor mit regelbarer Drehzahl umfassen kann.

35. Vorrichtung (30; 130; 230) nach einem der Ansprüche 29 bis 33, wobei das verstellbare Drehzahlsteuerungsmittel (80) eine mechanische Baugruppe umfasst, die zwischen einen Antriebsmotor und die rotierenden Antriebsmittel (50; 150; 250) geschaltet ist.

36. Vorrichtung (30; 130; 230) nach Anspruch 35, wobei die mechanische Baugruppe ein umgekehrtes Umlaufgetriebe ist.

37. Vorrichtung (30; 130; 230) nach Anspruch 35 oder 36, wobei die mechanische Baugruppe einen ersten Rahmen (82) und einen zweiten Rahmen (84), der schwenkbar an dem ersten Rahmen (82) angebracht ist, umfasst.

38. Vorrichtung (30; 130; 230) nach Anspruch 37, wobei der erste Rahmen (82) die rotierenden Antriebsmittel (50; 150; 250) trägt.

39. Vorrichtung (30; 130; 230) nach Anspruch 37 oder 38, wobei die zweite Rahmenstütze schwenkbar um die gleiche Rotationsachse wie die rotierenden Antriebsmittel (50; 150; 250) angebracht ist.

40. Vorrichtung (30; 130; 230) nach Anspruch 37, 38 oder 39, wobei die mechanische Baugruppe ferner eine erste Antriebswelle (86) umfasst, die an dem ersten Rahmen (82) angebracht ist, wobei die erste Antriebswelle (86) dafür eingerichtet ist, eine zweite Antriebswelle (88) anzutreiben, die an dem zweiten Rahmen (84) angebracht ist.

41. Vorrichtung (30; 130; 230) nach Anspruch 40, wobei die erste Antriebswelle (86) dafür eingerichtet ist, die zweite Antriebswelle (88) über eine wechselseitig eingreifende Getriebeanordnung (90, 92, 94, 96) anzutreiben.

42. Vorrichtung (30; 130; 230) nach Anspruch 41, wobei die erste Antriebswelle (86) dafür eingerichtet ist, die zweite Antribswelle (88) über ein Zwischengetrieberad (92) anzutreiben, das frei drehbar an den rotierenden Antriebsmitteln (50; 150; 250) angebracht ist.

43. Vorrichtung (30; 130; 230) nach Anspruch 40, 41 oder 42, wobei die zweite Antriebswelle (88) dafür eingerichtet ist, die rotierenden Antriebsmittel (50; 150; 250) über eine wechselseitig eingreifende Getriebeanordnung (98, 100) anzutreiben.

44. Vorrichtung (30; 130; 230) nach einem der Ansprüche 37 bis 43, wobei der zweite Rahmen (84) ein Ritzelrad (102) umfasst, das an demselben befestigt und um eine Schwenkachse des zweiten Rahmens (84) angebracht ist, wobei das Ritzelrad (102) dafür eingerichtet ist, eine hin- und hergehende Zahnstange (104) in Eingriff zu nehmen.

45. Vorrichtung (30; 130; 230) nach Anspruch 44, wobei die Zahnstange (104) über eine Kurbelzapfenanordnung (106) an die erste Welle (86) gekoppelt ist.

46. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei der Gegenstand (38; 138; 238) dafür eingerichtet ist, wenigstens ein erstes Bild (40) und ein zweites Bild (42) anzuzeigen, wobei die Ausrichtung des ersten (40) und des zweiten (42) Bildes durch eine Bewegung des Gegenstandes (38; 138; 238) um die Rotationsachsen (44,

46; 144, 146; 244, 246, 214) manipuliert wird.

47. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, wobei der Gegenstand (38; 138; 238) dafür eingerichtet ist, um eine dritte Rotationsachse (214) gedreht zu werden.

48. Vorrichtung (30; 130; 230) nach Anspruch 47, wobei die dritte Rotationsachse (214) senkrecht zu der ersten (44; 144; 244) und der zweiten (46; 146; 246) Achse ist.

49. Vorrichtung (30; 130; 230) nach Anspruch 47 oder 48, wobei eine Drehung des Gegenstandes (38; 138; 238) um die dritte Achse (214) durch eine Drehung der Anbringungsanordnung des ersten angetriebenen Elements (48; 148) um die dritte Achse (214) erreicht wird.

50. Vorrichtung (30; 130; 230) nach Anspruch 47, 48 oder 49, wobei eine Drehung des Gegenstandes (38; 138; 238) um die dritte Achse (214) und eine Drehung des Gegenstandes (38; 138; 238) um die zweite Achse (46; 146; 246) gleichzeitig erfolgen.

51. Vorrichtung (30; 130; 230) nach einem der vorhergehenden Ansprüche, eingerichtet für eine Verwendung in einem Spielzeug, das einen Gegenstand (38; 138; 238) umfasst, der dafür eingerichtet ist, wenigstens ein erstes Bild (40) und ein zweites Bild (42) anzuzeigen, wobei die Ausrichtung des ersten (40) und des zweiten (42) Bildes durch eine Bewegung des Gegenstandes (38; 138; 238) um die Rotationsachsen (44, 46; 144, 146; 244, 246, 214) manipuliert wird.

52. Vorrichtung (30; 130; 230) nach Anspruch 51, wobei das erste angetriebene Element (48; 148) dafür eingerichtet ist, drehbar an die rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden, um den Gegenstand (38; 138; 238) um eine erste Rotationsachse (44; 144; 244) zu drehen, um das erste (40) und das zweite (42) Bild in einer ersten Folge zu zeigen.

53. Vorrichtung (30; 130; 230) nach Anspruch 51 oder 52, das zweite angetriebenen Element (56; 156; 256) dafür eingerichtet ist, drehbar an die gleichen rotierenden Antriebsmittel (50; 150; 250) gekoppelt zu werden, um den Gegenstand (38; 138; 238) um eine zweite, abweichende Rotationsache (46; 146; 246) zu drehen, um das erste (40) und das zweite (42) Bild in einer zweiten Folge zu zeigen.

Revendications

1. Dispositif (30;130;230) pour déplacer un objet (38,138,238) autour d'axes de rotation séparés (44,46;144,146;244,246,214), ledit dispositif (30; 130,230) comprenant:

un moyen d'entraînement en rotation (50;150; 250);
un premier élément entraîné (48;148) adapté pour être couplé de manière rotative au moyen d'entraînement en rotation (50;150;250) pour faire tourner un objet (38,138,238) autour d'un premier axe de rotation (44;144;244);
un second élément entraîné (56;156;256) adapté pour être couplé de manière rotative au même moyen d'entraînement en rotation (50;150;250) pour faire tourner l'objet (38;138;238) autour d'un deuxième axe de rotation (46;146;246), différent; et
un moyen de commande (66) adapté pour coupler de manière rotative au moins un des premier (48;148) et second (56;156;256) éléments entraînés au moyen d'entraînement en rotation (50;150;250).

2. Dispositif (30; 130; 230) selon la revendication 1, dans lequel le premier élément entraîné (48;148) est adapté pour être couplé de manière rotative au moyen d'entraînement en rotation (50;150;250), et ce de manière sélective.

3. Dispositif (30; 130; 230) selon la revendication 1 ou 2, dans lequel le second élément entraîné (56;156; 256) est adapté pour être couplé de manière rotative au moyen d'entraînement en rotation (50;150;250), et ce de manière sélective.

4. Dispositif (30; 130; 230) selon la revendication 1, 2 ou 3, dans lequel, le moyen de commande (66) est adapté pour coupler de manière rotative le premier (48;148) et le second (56;156;256) éléments entraînés au moyen d'entraînement en rotation (50;150; 250), et ce de manière alternative.

5. Dispositif (30; 130; 230) selon la revendication 1, 2 ou 3, dans lequel le moyen de commande (66) est adapté pour coupler de manière rotative le premier (48;148) et le second (56;156;256) éléments entraînés au moyen d'entraînement en rotation (50;150; 250), et ce de manière simultanée.

6. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le premier élément entraîné (48;148) comprend un agencement de montage adapté pour supporter l'objet (38; 138;238).

7. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen d'entraînement en rotation (50;150;250) comprend

un arbre d'entraînement simple (50;150;250).

8. Dispositif (30; 130; 230) selon la revendication 7, dans lequel le moyen de commande (66) est adapté pour coupler de manière rotative le premier (48;148) et le second (56;156;256) éléments entraînés à l'arbre d'entraînement (50;150;250), et ce de manière sélective.

9. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le second élément entraîné (56; 156;256) est porté par le premier élément entraîné (48;148).

10. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel l'objet (38; 138;238) est fixé sur le second élément entraîné (56; 156;256).

11. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel au moins un des premier (48;148) et second (56;156;256) éléments entraînés peut être creux.

12. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le second élément entraîné (56;156;256) comprend un arbre d'entraînement secondaire (56;156;256).

13. Dispositif (30; 130; 230) selon la revendication 12, dans lequel l'arbre d'entraînement secondaire (56; 156;256) est fixé sur l'objet (38;138;238) de manière à ce que la rotation de l'arbre d'entraînement secondaire (56;156;256) entraîne une rotation correspondante de l'objet (38;138;238).

14. Dispositif (30; 130; 230) selon la revendication 12 ou 13, dans lequel l'arbre d'entraînement secondaire (56;156;256) est adapté pour être couplé de manière rotative au moyen d'entraînement en rotation (50; 150;250) par le biais d'un moyen de transmission de rotation (58,60,62).

15. Dispositif (30; 130; 230) selon la revendication 14, dans lequel le moyen de transmission de rotation (58,60,62) comprend un train d'engrenages (58,60,62).

16. Dispositif (30; 130; 230) selon la revendication 14, dans lequel le moyen de transmission de rotation (58,60,62) comprend un mécanisme d'engrenage à crémaillère.

17. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen de commande (66) comprend un mécanisme à levier (66) monté sur le premier élément entraîné (48;148).

18. Dispositif (30; 130; 230) selon la revendication 17, dans lequel le mécanisme à levier (66) est adapté pour s'engager d'une manière sûre avec le moyen d'entraînement en rotation (50;150;250) lorsqu'une rotation de l'objet (38;138;238) autour du premier axe de rotation (44;144;244) est nécessaire et pour se désengager du moyen d'entraînement en rotation (50;50;250) lorsqu'une rotation de l'objet (38;138; 238) autour du deuxième axe de rotation (46;146; 246) est nécessaire.

19. Dispositif (30; 130; 230) selon la revendication 18, dans lequel, lorsqu'il est nécessaire de faire tourneur l'objet (38;138;238) autour du deuxième axe de rotation (46;146;246), le mécanisme à levier (66) est adapté pour se désengager du moyen d'entraînement en rotation (50:150:250) et s'engager avec une structure fixe (32;132;232) pour empêcher une rotation du premier élément entraîné (48;148).

20. Dispositif (30; 130; 230) selon l'une quelconque des revendications 1 à 16, dans lequel le moyen de commande (66) comprend un moyen de verrouillage (74) pour fixer sélectivement le second élément entraîné (56;156;256) sur le moyen d'entraînement en rotation (50; 150;250).

21. Dispositif (30; 130; 230) selon la revendication 20, dans lequel le moyen de verrouillage (74) est adapté pour fixer sélectivement le second élément entraîné (56;156,256) sur le moyen d'entraînement en rotation (50;150;250) par le biais de l'agencement de montage (48;148) du premier élément entraîné (48; 148).

22. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen de commande (66) comprend un moyen de mémorisation de couple (109).

23. Dispositif (30; 130; 230) selon la revendication 22, dans lequel le moyen de mémorisation de couple (109) est adapte pour être fixé entre le moyen de transmission de rotation (58,60,62) et le second élément entraîné (56;156;256) et, lors de l'utilisation, la rotation du premier élément entraîné (48;148) transmet la rotation au moyen de mémorisation de couple (109) par le biais du moyen de transmission de rotation (58,60,62) et la rotation du moyen de mémorisation de couple (109) permet de mémoriser l'énergie potentielle de rotation dans ledit moyen de mémorisation (109).

24. Dispositif (30; 130; 230) selon la revendication 23 lorsqu'elle est dépendante de l'une quelconque des revendications 20 à 22, dans lequel, lors de l'utilisation, lorsqu'il est nécessaire que le second élément entraîné (56;156;256) fasse tourner l'objet (38;138;

238), le moyen de verrouillage (74) est désengagé de manière à ce que le couple mémorisé dans le moyen de mémorisation de couple (109) soit libéré pour faire tourner le second élément entraîné (56; 156;256).

25. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen de commande (66) est adapté pour coupleur de manière rotative le moyen d'entraînement en rotation (50;150;250) au premier élément entraîné (48;148) pour une durée suffisante pour permettre d'obtenir un angle de rotation prédéfini de l'objet (38;138;238) autour du premier axe (44;144;244).

26. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen de commande (66) est adapté pour coupler de manière rotative le moyen d'entraînement en rotation (50;150;250) au second élément entraîné (56; 156; 256) pour une durée suffisante pour permettre d'obtenir un angle de rotation prédéfini de l'objet (38;138; 238) autour du deuxième axe (46;146;246).

27. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel le moyen de commande (66) est adapté pour coupler de manière rotative le moyen d'entraînement en rotation (50;150;250) au premier (48;148) et au second (56; 156;256) éléments entraînés, et ce de manière alternative, à une fréquence choisie de manière à permettre une rotation intermittente de l'objet (38,138; 238) autour du premier (44;44;244) et du second (46;146;246) axes suivant des angles de rotation prédéterminés.

28. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, comprenant, en outre, un moteur couplé au moyen d'entraînement en rotation (50;150;250) pour causer la rotation de ce dernier.

29. Dispositif (30, 130; 230) selon l'une quelconque des revendications précédentes, comprenant, en outre, un moyen de commande à vitesse variable (80) adapté pour faire varier sélectivement la vitesse angulaire du moyen d'entraînement en rotation (50; 150;250),

30. Dispositif (30; 130; 230) selon la revendication 29, dans lequel le moyen de commande à vitesse variable (80) est adapté pour faire varier la vitesse angulaire du moyen d'entraînement en rotation (50;150; 250) en fonction du choix de l'élément qui, du premier (48;148) et du second (56;156;256) éléments entraînés, est couplé de manière rotative à celui-ci.

31. Dispositif (30; 130; 230) selon la revendication 29 ou 30, dans lequel le moyen de commande à vitesse variable (80) est adapté pour réduire la vitesse angulaire du moyen d'entraînement en rotation (50; 150:250) lorsqu'il est couplé de manière rotative au premier élément entraîné (48;148) et pour augmenter la vitesse angulaire du moyen d'entraînement en rotation (50;150;250) lorsqu'il est couplé de manière rotative au second élément entraîné (56;156;256).

32. Dispositif (30; 130; 230) selon la revendication 29, 30 ou 31, dans lequel le moyen de commande à vitesse variable (80) est adapté pour faire tourner les éléments entraînés (48,56;148,156;256) dans un sens de rotation autour du premier (44;144;244) et du second (46;146;256) axes.

33. Dispositif (30; 130; 230) selon la revendication 29, 30 ou 31, dans lequel le moyen de commande à vitesse variable (80) est adapté pour faire tourne le premier élément entraîné (48;148) dans des sens de rotation inverses autour du premier axe de rotation (44;144;244).

34. Dispositif (30; 130; 230) selon l'une quelconque des revendications 29 à 33, dans lequel le moyen de commande à vitesse variable (80) peut comprendre un moteur à vitesse variable.

35. Dispositif (30; 130; 230) selon l'une quelconque des revendications 29 à 33, dans lequel le moyen de commande à vitesse variable (80) comprend un ensemble mécanique interposé entre un moteur d'entraînement et le moyen d'entraînement en rotation (50;150;250).

36. Dispositif (30; 130; 230) selon la revendication 35, dans lequel l'ensemble mécanique est un train d'engrenages épicycliques inverses.

37. Dispositif (30; 130; 230) selon la revendication 35 ou 36, dans lequel l'ensemble mécanique comprend un premier cadre (82) et un second cadre (84) monté de manière pivotante sur le premier cadre (82).

38. Dispositif (30; 130; 230) selon la revendication 37, dans lequel le premier cadre (82) supporte le moyen d'entraînement en rotation (50;150;250).

39. Dispositif (30; 130; 230) selon la revendication 37 ou 38, dans lequel le support du second cadre est monté de manière pivotante autour du même axe de rotation que le moyen d'entraînement en rotation (50;150;250).

40. Dispositif (30; 130; 230) selon la revendication 37, 38 ou 39, dans lequel l'ensemble mécanique comprend, en outre, un premier arbre d'entraînement (86) monté sur le premier cadre (82), ledit premier

arbre d'entraînement (86) étant adapté pour entraîner un second arbre d'entraînement (88) monté sur le second cadre (84).

41. Dispositif (30; 130; 230) selon la revendication 40, dans lequel le premier arbre d'entraînement (86) est adapté pour entraîner le second arbre d'entraînement (88) par le biais d'un agencement d'engrenages s'engrenant les uns dans les autres (90,92,94,96).

42. Dispositif (30; 130; 230) selon la revendication 41, dans lequel le premier arbre d'entraînement (86) est adapté pour entraîner le second arbre d'entraînement (88) par le biais d'une roue dentée intermédiaire (92) montée de manière à pouvoir tourner librement sur le moyen d'entraînement en rotation (50; 150;250).

43. Dispositif (30; 130; 230) selon la revendication 40, 41 ou 42, dans lequel le second arbre d'entraînement (88) est adapté pour entraîner le moyen d'entraînement en rotation (50;150;250) par le biais d'un agencement d'engrenages s'engrenant les uns dans les autres (98,100).

44. Dispositif (30; 130; 230) selon l'une quelconque des revendications 37 à 43, dans lequel le second cadre (84) comprend une roue dentée à pignon (102) fixée sur lui et montée autour d'un axe de pivotement du second cadre (84), dans lequel la roue dentée à pignon (102) est adaptée pour s'engrener avec une crémaillère à mouvement de va-et-vient (104).

45. Dispositif (30; 130; 230) selon la revendication 44, dans lequel la crémaillère (104) est couplée au premier arbre (86) par le biais d'un arrangement à manetons (106).

46. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel l'objet (38; 138;238) est adapté pour présenter au moins une première image (40) et une seconde image (42), dans lequel l'orientation desdites première (40) et seconde (42) images est manipulée par le mouvement de l'objet (38;138;238) autour desdits axes de rotation (44,46;144,146;244,246,214).

47. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, dans lequel l'objet (38; 138;238) est adapté pour tourner autour d'un troisième axe de rotation (214).

48. Dispositif (30; 130; 230) selon la revendication 47, dans lequel le troisième axe de rotation (214) est perpendiculaire au premier (44;144;244) et au second (46;146;246) axe.

49. Dispositif (30; 130; 230) selon la revendication 47 ou 48, dans lequel la rotation de l'objet (38;138;238) autour du troisième axe (214) est obtenue par la rotation de l'agencement de montage du premier élément entraîné (48;148) autour du troisième axe (214).

50. Dispositif (30; 130; 230) selon la revendication 47, 48 ou 49, dans lequel la rotation de l'objet (38;138; 238) autour du troisième axe (214) et la rotation de l'objet (38;138;238) autour du deuxième axe (46; 146;246) sont simultanées.

51. Dispositif (30; 130; 230) selon l'une quelconque des revendications précédentes, adapté pour une utilisation dans un jouet qui comprend un objet (38;138; 238) adapté pour présenter au moins une première image (40) et une seconde image (42), dans lequel l'orientation desdites première (40) et seconde (42) images est manipulée par le mouvement de l'objet (38;138;238) autour desdits axes de rotation (44,46; 144,146;244,246,214).

52. Dispositif (30; 130; 230) selon la revendication 51, dans lequel le premier élément entraîné (48;148) est adapté pour être couplé de manière rotative au moyen d'entraînement en rotation (50;150;250) pour faire tourner l'objet (38;138;238) autour d'un premier axe de rotation (44;144;244) pour présenter une première séquence de la première (40) et la seconde (42) images.

53. Dispositif (30; 130; 230) selon la revendication 51 ou 52, dans lequel le second élément entraîné (56; 156;256) est adapté pour être couplé de manière rotative au même moyen d'entraînement en rotation (50;150;250) pour faire tourner l'objet (38;138;238) autour d'un deuxième axe de rotation (46;146;246), différent, pour présenter une deuxième séquence de la première (40) et la seconde (42) images.

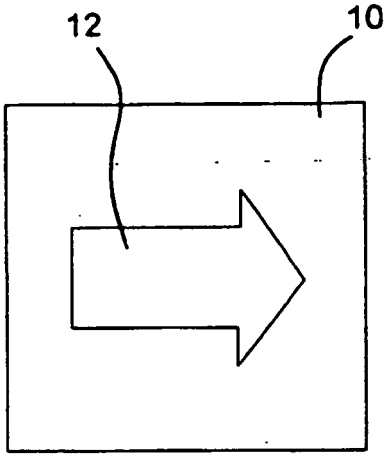

Fig 1a.

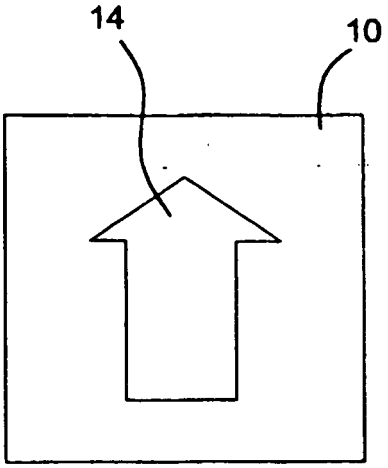

Fig 1b.

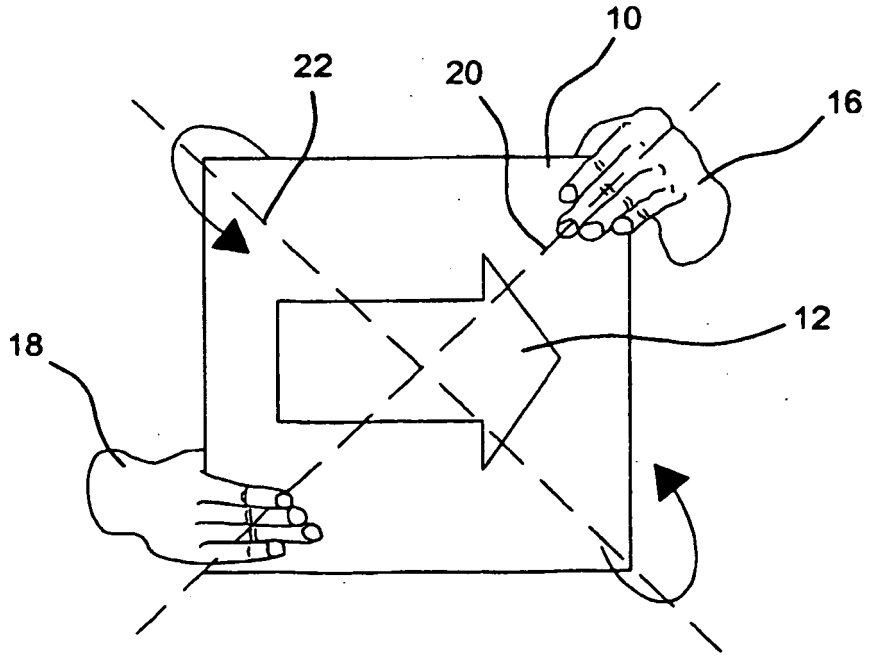

Fig 2.

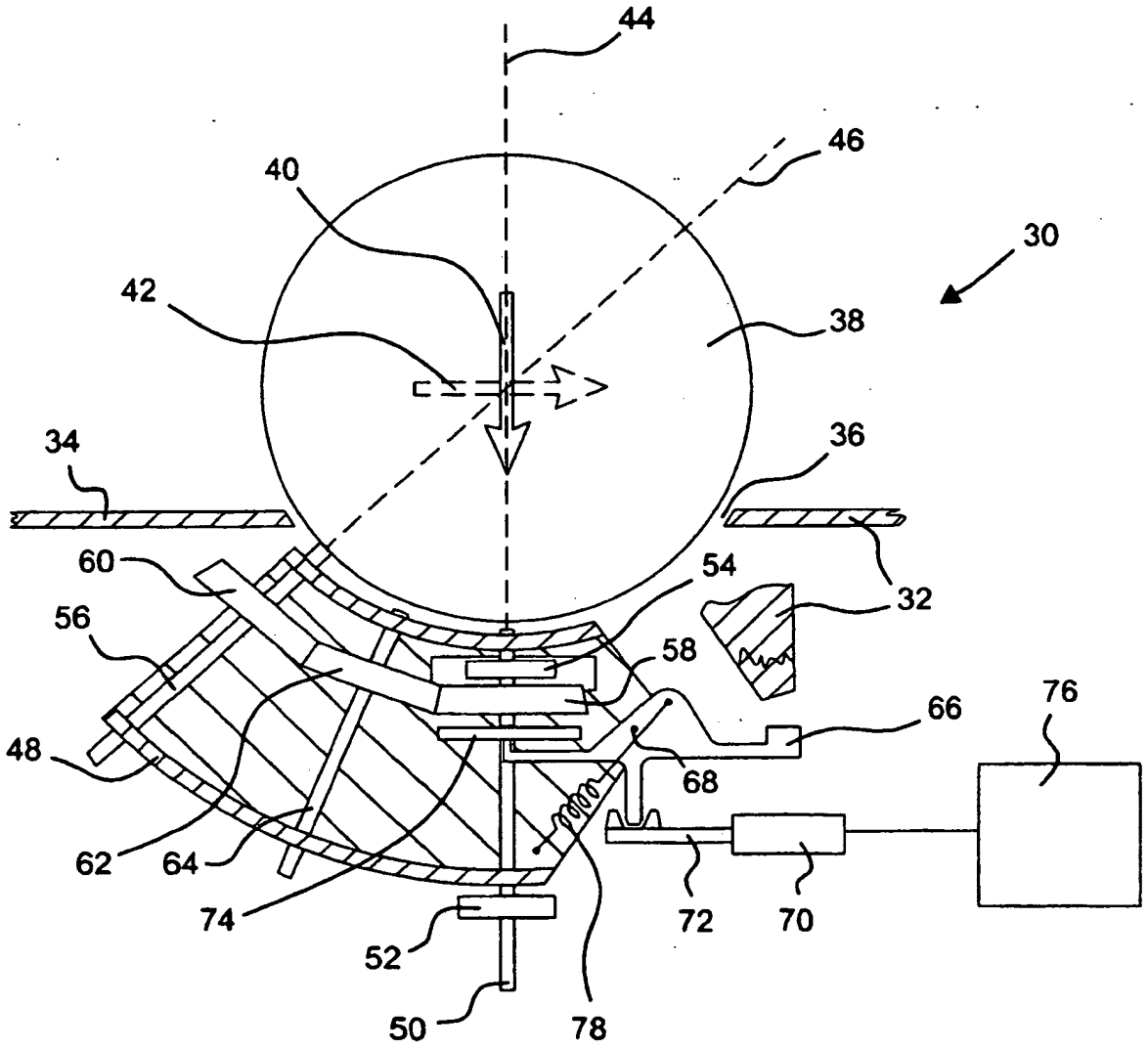
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Fig 3.

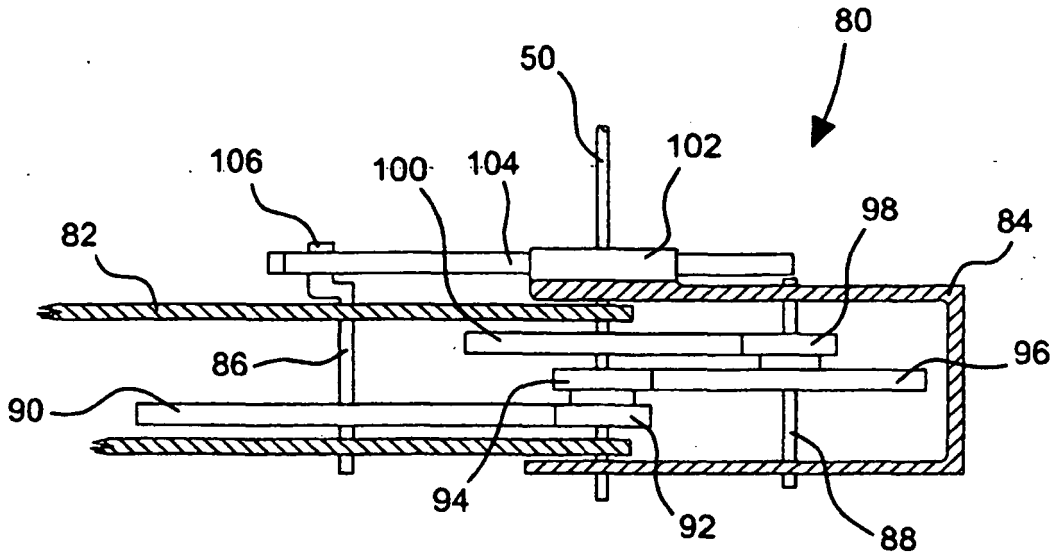
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Fig 4.

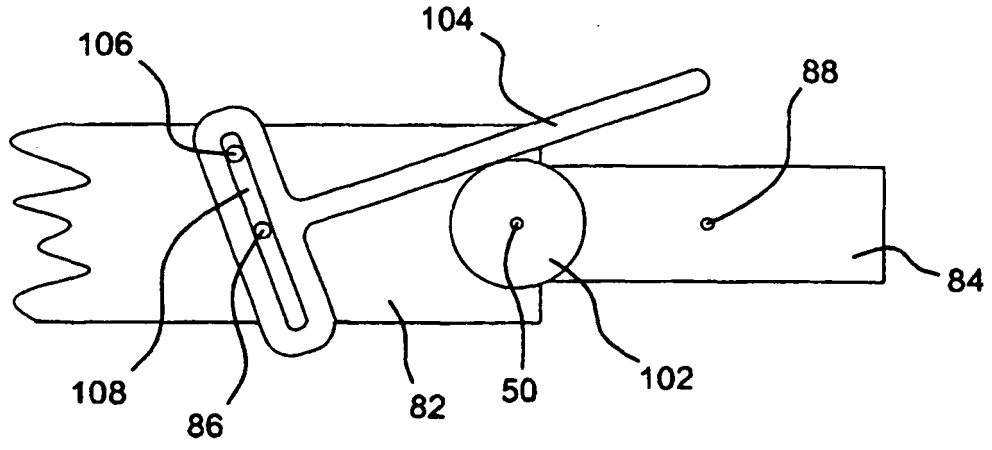
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Fig 5.

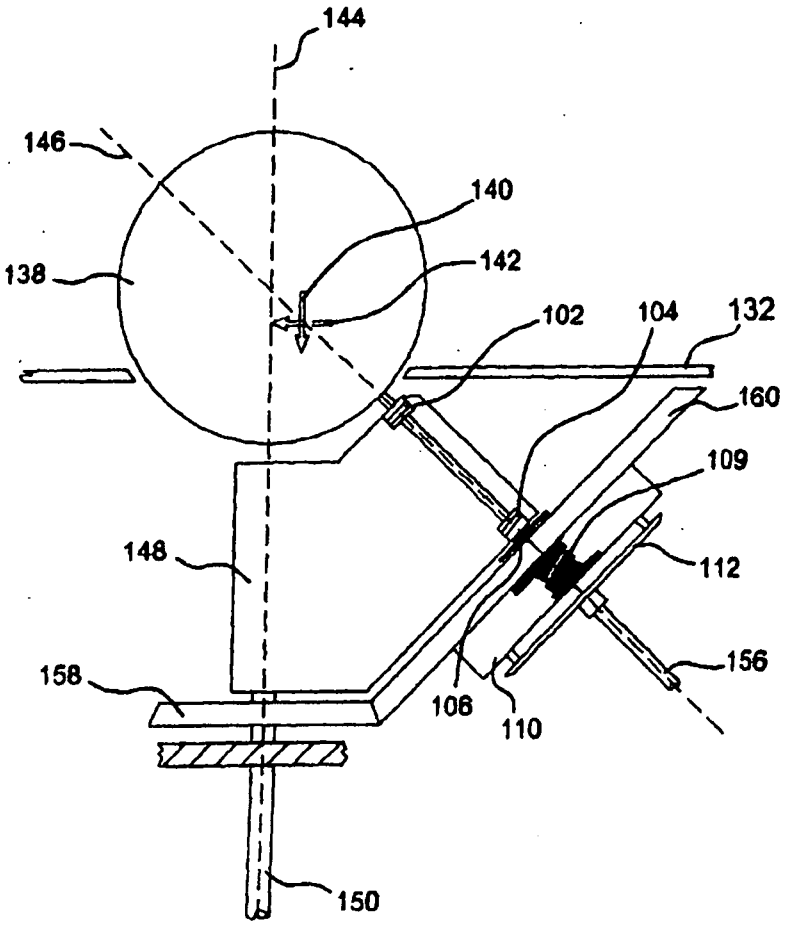
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Fig 6.

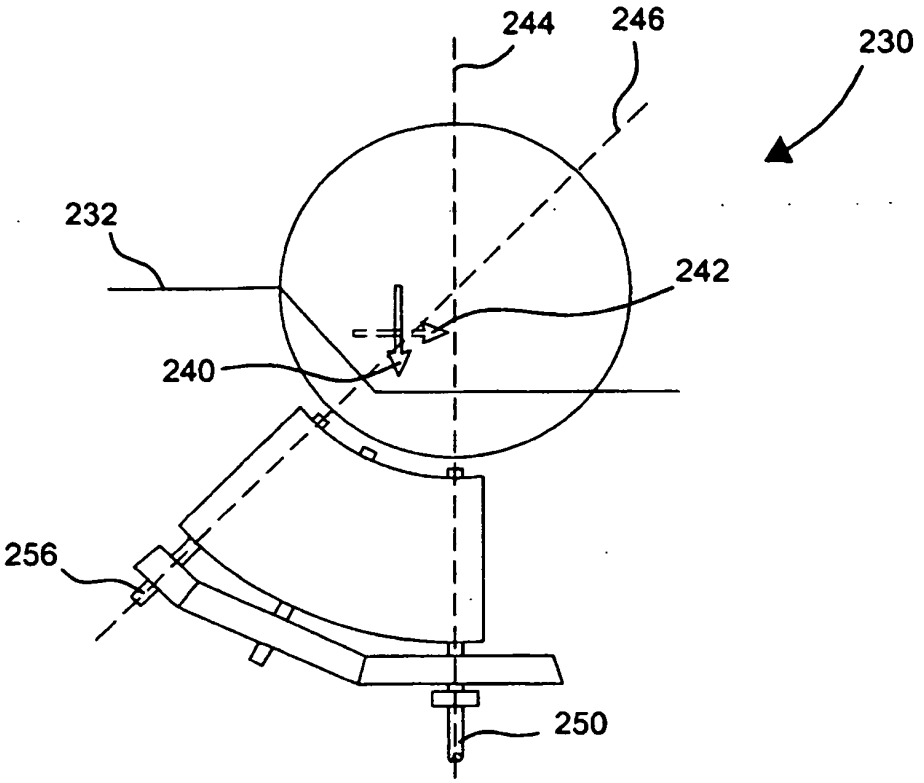

Fig 7.

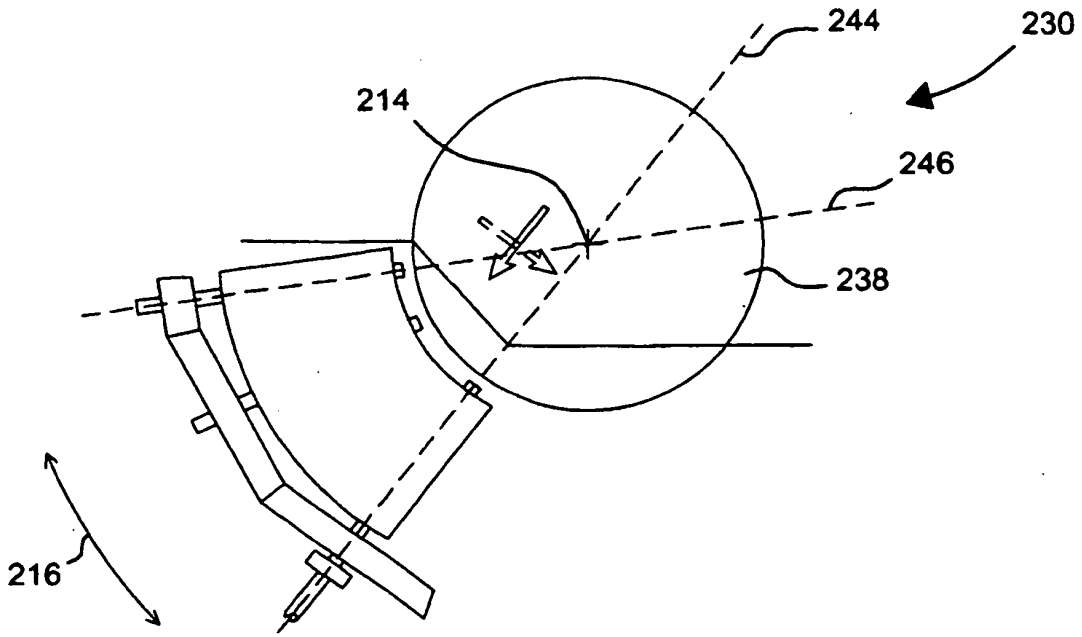

Fig 8.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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