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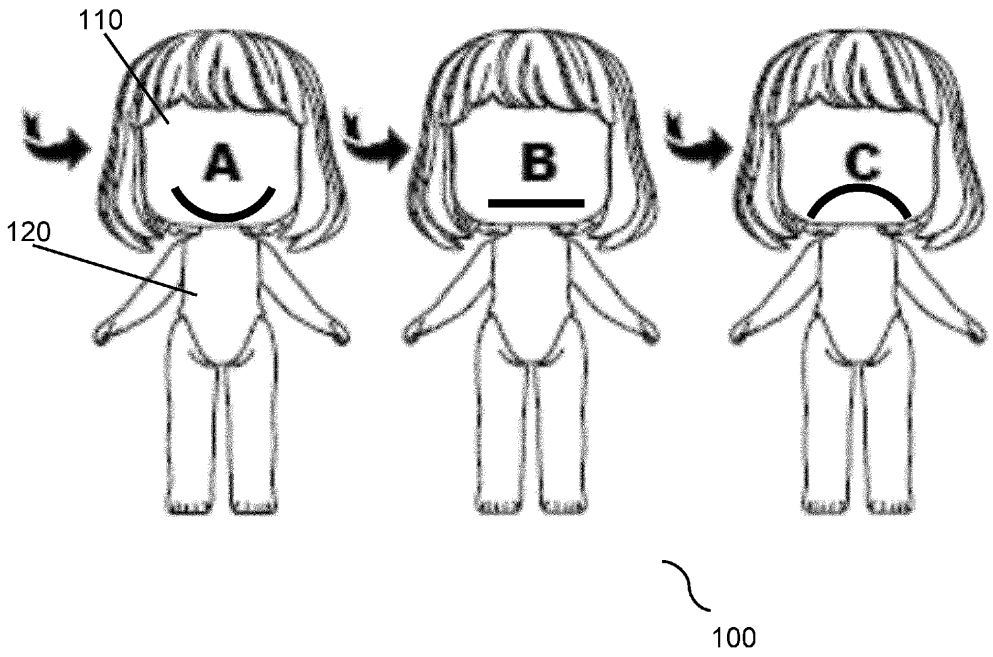
(54) **ROTATING SYSTEM FOR TOYS**

(57) Different aspects of the invention refer to a rotating system for toys which facilitates the rotation between two parts by children. On one hand, the rotating system is supple enough to facilitate the rotating action and on the other hand rigid enough to prevent unintended rotation. An effortless snapping action is enabled which guarantees the toy is rotated to the correct view intended by the designer. Also, the rotation does not cause continuous changes of views unless intentional force is exerted upon. Hence, the rotating system enables intuitive manipulation without effort by children whilst ensuring the designer's intentions are respected as unintentional rotations are prevented.

FIG. 1



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Description

TECHNICAL FIELD

[0001] This invention is placed in the technical field of toys, and in particular, refers to a rotating system for facilitating the rotation of toys with multiple parts.

BACKGROUND ART

[0002] Toys exist which are made up from multiple, or at least two, parts. In some situations, it is interesting to provide the same part with different properties and/or configurations, however, so far, existing toys have a very limited capability of providing different configurations. Further, toys meant for children are usually rigid and difficult to manipulate.

[0003] Therefore, a need exists to effectively solve these described problems.

SUMMARY OF THE INVENTION

[0004] It is an object of the invention to provide solutions to the mentioned problems. In particular, it is an object of the invention to provide a rotating system for toys which facilitates passing from one toy configuration to another by children. The different configurations are given by different views of the same toy part. On one hand, the rotating system must be supple enough to facilitate the rotating action and on the other hand rigid enough to prevent unintended rotation. An effortless snapping action is enabled which guarantees the toy is rotated correct view intended by the designer. Also, the rotating system prevents continuous changes of views unless an intentional force is exerted upon. Hence, the rotating system enables intuitive manipulation without effort by children whilst ensuring the designer's intentions are respected as unintentional rotations are prevented.

[0005] It is therefore one object of the invention to provide an optimized rotating system for toys.

[0006] It is another object of the invention to provide a toy comprising the optimized rotating system.

[0007] This objective is achieved by means of the feature combination of the independent claims. Preferred embodiments are defined in the dependent claims. In this manner, some or all of the problems of the afore-described background art are resolved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The features and advantages of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify corresponding elements in the different drawings. Corresponding elements may also be referenced using different characters.

FIG. 1 shows one aspect of an example toy incorporating the rotating system of the invention.

FIG. 2 shows another aspect of an example toy incorporating the rotating system of the invention.

FIG. 3 shows the unassembled rotating system according to the preferred embodiment of the invention.

FIG. 4 shows an amplified view of the components of the example toy incorporating the rotating system of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0009] **FIG. 1** shows one aspect 100 of an example toy incorporating the rotating system of the invention. The rotating system of the invention can be integrated into any toy comprising at least two parts, that is, a first part 110 and a second part 120. In this example, the toy has a humanoid figure, with hair, a head, and the rest of the body, wherein the head corresponds to the first part 110 and the rest of the body to the second part 120. The hair is optional as the toy exhibits the same rotating properties even without hair.

[0010] One of the advantageous properties enabled by the rotating system of the invention is that it enables rotating the head whilst the hair and the rest of the body remain unchanged. As can be seen from the drawing, by a simple and swift displacement of the head, for example, by gently pressing and rotating the face of the toy using the fingers, or the thumb, the head is rotated. In one aspect, this action can be achieved by holding the second part with one hand, while the head is rotated by the other hand. In another aspect, this action can be achieved by holding both parts with one hand, while the head is rotated by passing the thumb over the face of the head.

[0011] In this example, the head is configured with three different faces, A, B, and C. However, only one of the faces, or head views, is visible from the same frontal angle (the central position of the letter represents the central view of the head, that is, a frontal looking face). With one rotation movement of the head, the view changes, and the face is made to change from A to B. With another rotation movement of the head, the view changes again, and the face is made to change from B to C. With yet another rotation movement of the head, the view changes yet again, and the face is made to change from C to A, that is, back to the initial face. If each face is designed differently (as an example, face A is a smiley face, face B a neutral look, and face C a sad face), children can easily swap faces with a simple action. As can be seen from the drawing, only the head rotates, whereas the hair and the body remain fixed. The rotating action is bi-directional, that is, the views can change in both directions. As seen from above, one direction is defined from A to B to C in an anti-clockwise direction, whereas the other direction is defined from C to B to A in a clockwise direction.

[0012] The rotating system is configured to exhibit at least two properties. A first property is that, once the ro-

tating force applied to the first part is larger than a threshold, the first part continues to rotate until it stabilizes, or snaps into, the next stable state (corresponding to switching from one view to the next). This enables configuring a low threshold for small children or toddlers, so that it does not require much effort to start the movement. Further, as soon as the threshold is surpassed, the first part continues to rotate until it snaps into place in the next state. This snapping action is intuitive for children as they do not quite control the force they exert on toys, however, as soon as they start the rotation, they do not have to worry when to stop it, as the first part continues to rotate and stops in the required position. This is important as the required position corresponds to a full next face as intended by the designer, that is, a complete and correct face, and not one which remains partially, or completely, hidden due to an incomplete rotation by the child.

[0013] The second property of the rotating system is that it exhibits resistance to unwanted rotations. In this sense, once the first part snaps into place in one state, it requires another conscious action to change state again, as it will not continue rotating by itself. In other words, each snapping action places the first part into one stable state, which requires again a force above the threshold to cause rotation again into a next state.

[0014] Therefore, the combined effect of both properties is that a toy results which enables children with little strength and coordination to play by trying out intuitive movements and causing a toy to completely change faces without effort, however without accidentally causing more than a single change at a time.

[0015] **FIG. 2** shows another aspect 200 of the example toy of FIG. 1 incorporating the rotating system of the invention. The rotating system of the invention comprises stopping means, which permits, within a same state, a small angular displacement of the first part with respect to the second part. This displacement does not require a force exceeding any threshold, and it also does not snap into place. It is a simple displacement, which proceeds to a maximum angle defined by the stopping means. In terms of the humanoid example, one such displacement represents the entire head of the humanoid looking approximately 45° to the right or to the left. The skilled person understands that a different angle can be set by a corresponding configuration of the stopping means. Whereas in the previous aspect the whole head changes views, in this aspect, the same view is maintained, however a slight change of angle is allowed.

[0016] The rotating system can be applied to any other configuration of at least two parts, wherein it is desired that one part rotates with respect to the other, thereby visualizing different views with different properties. Although the drawings depict a humanoid figure, the toy can also be animal like, or any object like. In another example aspect, the first part is a head (without hair) with different faces, and the second part is a support to rest the toy on a surface. For example, the support could be fixed to the surface, such as a table, and the head could be grasped by, for example, three fingers and made to rotate. In yet another example aspect, the first part is the top part of a space rocket, the second part is the bottom part, and by means of rotation different views of the top part can be visualized, for example, the contents inside an astronaut's quarters.

[0017] One can foresee that the different properties of each part could comprise not only a different design, but also color, shape, dimension, or functionality, and the like. It would even be possible to construct a toy comprising more than one rotating system, thereby enabling a complex toy with multiple parts to exhibit a myriad of different possibilities. For example, a space station could have one rotating system configuring different views of the astronaut's quarters in relation to the main body of the station, whereas another rotating system would configure different views of a shuttle docked to the same station. Any combination is possible.

[0018] **FIG. 3** shows the rotating system according to the preferred embodiment of the invention. The rotating system comprises a top unit 310, a resilient component 320, a middle unit 330 and a bottom unit 340.

[0019] The top unit and the bottom unit are configured to fix together to form a single unit. In one aspect, this fixing is achieved by means of a screw and hole configuration. The bottom unit comprises a hole 342 configured with the dimensions to receive a corresponding screw 312. This facilitates mounting the structure by the skilled artisan. However, the skilled artisan understands that other types of fixing configurations are also possible as long as the two units are fixed in such a manner that they do not fall apart whilst allowing minor relative rotational movement between them.

[0020] The top unit comprises a bottom interface 314 comprising an axially inwards extending protrusion (not shown), in this example, in the shape of a semicircle, configured to couple with a corresponding hollow 343 configured at the top interface 342 of the bottom unit 340. This coupling enables a small relative movement between the top and bottom units, allowing the angular displacement of the head as depicted in FIG. 2. The stopping means comprises these corresponding engaging means, acting together to stop the rotation of the top unit more than a predetermined angle, for example, between 30° and 70° (although any other angle is also possible).

[0021] When the rotating system is assembled, the top of the resilient member 320 abuts against the bottom of the top unit 310. Hence, the top unit bottom interface 314 is configured to act as a stop, exerting a counterforce as the resilient component presses against the top unit.

[0022] The bottom unit 340 is configured to be fixed at its bottom end 348 to the second part 120 of the toy, to form a single unit, without any relative displacement between them. The skilled artisan understands that other types of fixing configurations are also possible as long as the bottom unit and the second part are fixed in such a manner that there is no relative movement between them. The bottom unit 340 is further dimensioned to pass

through a through hole (not shown) of the middle unit 330.

[0023] The middle unit 330 comprises first part fixing means 334 configured to couple with the first part 110 in such a manner that an angular force exerted on the first part will couple to the middle unit, causing it to rotate as well. In one aspect, the first part fixing means are two, oppositely placed, longitudinal guides configured to fit into corresponding longitudinal rails (not shown) configured inside the first part.

[0024] The middle unit 330 comprises a top interface 332 for contacting the top unit 310 allowing relative movement between them. The top interface 332 comprises a through hole (not shown) for allowing the passage of the aforementioned screw 312. The top interface 332 further comprises a perimetral seat with a diameter configured for lodging the resilient component 320, such as a spring. The perimetral seat is so configured that, when the rotating system is assembled, in part by bringing the top unit and the middle unit together, with the resilient component in between, held together by the screw, a space is left between the top and middle units, allowing the longitudinal displacement of the middle unit to and from the top unit. The space also allows the resilient component to contract and expand.

[0025] The middle unit 330 comprises a bottom interface 338 for contacting the bottom unit 340 allowing relative movement between them. The middle unit bottom interface 338 comprises a through hole dimensioned to receive the top of the bottom unit. The top of the bottom unit comprises a cylinder-shaped part 344 configured to pass through the middle unit through hole.

[0026] Further, the middle unit bottom interface 338 comprises engaging means 336 configured to moveably engage with corresponding bottom unit 340 engaging means 346. The engaging means are configured in such a manner that a relative rotational movement between the two units will cause the middle unit to displace up and down. In one aspect, the engaging means are a saw-toothed configuration, wherein displaced versions of the same engaging means are configured in both the middle unit and the bottom unit, so that they fit into eachother interspaced, like the top and bottom rows of human teeth do.

[0027] In the example of FIG. 1, the interface is configured with a saw-toothed configuration of three peaks and corresponding three troughs. This enables configuring a first part 110 with three different views (or faces). On the other hand, any other number of views or faces can be configured as a function of the number of peaks and troughs of the saw-toothed interface.

[0028] Now that the separate components of the rotating system have been described, one example process for the assembly of the rotating system will be described. First, the bottom unit is passed through the middle unit bottom through hole. Second, the resilient component is placed on the middle unit top interface. Third, the top unit is abutted against the resilient member and pressed down, sandwiching the resilient component and the middle unit between the top and bottom units. Finally, in the fourth step, the top and bottom units are screwed together. This completes the assembly of the rotating system.

[0029] As mentioned, this rotating system can be integrated or assembled together with any toy with comprises at least two parts. In one aspect, it is possible, after the fourth step, to attach the toy first part 110 to the middle unit fixing means 334, that is, after assembling the rotating system. In another aspect, the toy first part 110 can be attached after the first step and before the second step, depending on assembly line preferences. In a similar fashion, regarding the bottom unit, it is possible to attach the toy second part 120 to the bottom unit bottom end 348 at any point depending on assembly line preferences, for example, before the first step, after the fourth step, or at any other step of the rotating system assembly. **FIG. 4** shows an amplified view of the components of the example toy of FIG. 1, depicting separately the rotating system of the invention, the first part1 10, the second part 120, and the optional hair components.

[0030] Now that the assembly of the rotating system to a toy, comprising at least two parts 110, 120, has been described, the rotating system in operation will be described in more detail. As mentioned, once assembled, relative movement is possible between two main sections. On one hand, the first part section comprises the middle unit 330 and the first part 110 coupled, or otherwise fixed, together. On the other hand, the second part section comprises the top unit 310, the resilient component 320, the bottom unit 340, and the second part 120, coupled, or otherwise fixed, together. In a rest state, the peaks and corresponding troughs of the bottom and middle unit interfaces are coupled together and resting in a stable state (peak - trough state). During play, the second part 120 is normally held with one hand, while the first part 110 is rotated. As the first part rotation starts, the teeth and troughs separate from eachother, as allowed by the vertical spacing between the middle and top units, as the resilient component contracts (that is, the spring coils). If, before reaching the peak of the teeth (peak - peak state), the rotating movement is stopped and the parts released, they will fall back to their previous state (peak - trough state) under the counter-force exercised by the resilient component. In other words, the spring recoils and as it expands, forces the two parts to separate. However, if the rotating movement continues over a threshold defined by the height of the peaks and troughs, or their design, each tooth will fall into the next trough, and due to the pressure exercised by the resilient component, complete its rotation to the next stable position (next peak - trough state), where they are completely coupled in resting position again. This completes the description of one rotation movement, changing a single view of the first part 110 in relation to the second part 120.

[0031] Therefore, the interface parameters (height, or separation, or number of teeth, or peaks and troughs, or size, or dimensions, or other design details) can be configured in such a manner to set a threshold which allows

small children and toddlers to make a rotation action easily, without effort. As soon as the threshold is overcome, the first part will completely rotate into its next view, and fall into place, or snap, without complication. Due to the features described, the rotation is not continued, as it requires another intentional rotation action before effecting another view change.

[0032] Therefore, the features of the different embodiments and aspects of the invention provide a rotating system for toys which facilitates the simple and intuitive depiction of different views by children. An effortless snapping action is enabled which guarantees the toy is rotated to the correct view intended by the designer. Also, the rotation does not cause continuous changes of views unless intentional force is exerted upon. Hence, the rotating system enables intuitive manipulation without effort by children whilst ensuring the designer's intentions are respected as unintentional rotations are prevented.

[0033] What has been described comprises various example embodiments. As it is not possible nor viable to describe all the possible combinations and permutations of the inventive concept which would result in a large number of embodiments, and redundant paragraphs, it is understood that, after a direct and objective reading of this disclosure, the skilled artisan would derive these different possible combinations and permutations from the various described embodiments and aspects. Consequently, the intention is to encompass all of these alterations, modifications, and variations that fall under the scope of the enclosed claims. The skilled artisan understands that the description of the presented embodiments does not limit the invention, nor do the drawings.

[0034] In the following, further examples of the invention are provided:

A rotating system for a toy which comprises at least two parts to be rotated relative to each other, the rotating system comprising: a top unit coupled to a bottom unit defining a longitudinal axis and leaving a space configured for housing a resilient component and a middle unit, wherein the middle unit is moveably housed in-between the top and bottom units and configured to rotate around the longitudinal axis as well as to displace longitudinally along the longitudinal axis; and wherein the middle and bottom units are configured with complementary engaging means at their interface.

The rotating system, wherein the bottom unit comprises a hole configured with the dimensions to receive a corresponding screw, and the top unit is coupled to the bottom unit by means of the screw and hole configuration. The rotating system, wherein the top interface of the middle unit comprises a perimetral seat with a diameter configured for lodging the resilient component, and dimensioned to leave a space when the rotating system is assembled, the space allowing the resilient component to contract and expand as well as the longitudinal displacement of the middle unit to and from the top unit. The rotating system, wherein the complementary engaging means are configured in such a manner that a relative rotation movement between the middle and bottom units will cause the middle unit to displace up and down, displacing from one stable state to another. The rotating system, wherein the complementary engaging means are configured to allow the middle unit to separate longitudinally from the bottom unit as it rotates from a first coupling with the bottom unit to a next coupling with the bottom unit. The rotating system, wherein, as the rotating force applied to the middle unit surpasses a threshold, it continues to rotate until it stabilizes into a next stable state defined by a different coupling between the middle and bottom units. The rotating system, wherein the complementary engaging means are configured with corresponding peaks and troughs, wherein displaced versions of the same engaging means are configured in both the middle unit and the bottom unit, so that they fit into eachother interspaced. The rotating system, wherein the complementary engaging means is configured with at least two pairs of peaks and trough. The rotating system, wherein the complementary engaging means is configured as a saw-toothed configuration. The rotating system, wherein the complementary engaging means are configured to exert a resistance to rotating forces below the threshold. The rotating system, wherein the resistive force is defined by configurable parameters of the complementary engaging means, such as height, separation, number of peaks/troughs, size, dimensions, or other design details. The rotating system, wherein the top unit and bottom unit are configured with complementary stopping means configured to allow, within a same stable state, small angular displacements of the first part with respect to the second part, in either direction, until a maximum angle defined by the stopping means.

A toy comprising at least two parts, the toy comprising the rotating system according to any of the preceding claims configured into any two parts of the at least two parts for facilitating their relative rotation with respect to each other, wherein a first part of the at least two parts is coupled to the rotating system middle unit and the second part of the at least two parts is coupled to the rotating system bottom unit.

The toy wherein the first part of the at least two parts couples to the middle unit in such a manner that a rotation movement of the first part will couple to the middle unit, causing it to rotate as well. The toy wherein the first part is configured with at least two views, and the rotating system engaging means is configured to correspond to the same number of views. The toy wherein the toy has a humanoid or

animal figure, comprising a head with different faces and a rest of the body, wherein the head corresponds to the first part and the rest of the body corresponds to the second part. The toy wherein the second part is a support to rest on a surface. The toy wherein the first part is the top part of any figure, and the second part is the bottom part. The toy wherein the toy is a space station comprising a first rotating system configuring different views of the astronaut's quarters in relation to the main body of the station, and further comprising a second rotating system configuring different views of a shuttle docked to the main body of the station.

Claims

1. A rotating system for a toy which comprises at least two parts to be rotated relative to each other, the rotating system comprising:

   a top unit coupled to a bottom unit defining a longitudinal axis and leaving a space configured for housing a resilient component and a middle unit, wherein the middle unit is moveably housed in-between the top and bottom units and configured to rotate around the longitudinal axis as well as to displace longitudinally along the longitudinal axis; and
   wherein the middle and bottom units are configured with complementary engaging means at their interface.

2. The rotating system according to claim 1, wherein the bottom unit comprises a hole configured with the dimensions to receive a corresponding screw, and the top unit is coupled to the bottom unit by means of the screw and hole configuration.

3. The rotating system according to claim 2, wherein the top interface of the middle unit comprises a perimetral seat with a diameter configured for lodging the resilient component, and dimensioned to leave a space when the rotating system is assembled, the space allowing the resilient component to contract and expand as well as the longitudinal displacement of the middle unit to and from the top unit.

4. The rotating system according to claim 3, wherein the complementary engaging means are configured in such a manner that a relative rotation movement between the middle and bottom units will cause the middle unit to displace up and down, displacing from one stable state to another.

5. The rotating system according to claim 4, wherein the complementary engaging means are configured to allow the middle unit to separate longitudinally from the bottom unit as it rotates from a first coupling with the bottom unit to a next coupling with the bottom unit.

6. The rotating system according to claim 5, wherein, as the rotating force applied to the middle unit surpasses a threshold, it continues to rotate until it stabilizes into a next stable state defined by a different coupling between the middle and bottom units.

7. The rotating system according to claim 4, wherein the complementary engaging means are configured with corresponding peaks and troughs, wherein displaced versions of the same engaging means are configured in both the middle unit and the bottom unit, so that they fit into eachother interspaced.

8. The rotating system according to claim 7, wherein the complementary engaging means is configured with at least two pairs of peaks and trough.

9. The rotating system according to claim 4, wherein the complementary engaging means is configured as a saw-toothed configuration.

10. The rotating system according to claim 4, wherein the complementary engaging means are configured to exert a resistance to rotating forces below the threshold.

11. The rotating system according to claim 10, wherein the resistive force is defined by configurable parameters of the complementary engaging means, such as height, separation, number of peaks/troughs, size, dimensions, or other design details.

12. The rotating system according to claim 2, wherein the top unit and bottom unit are configured with complementary stopping means configured to allow, within a same stable state, small angular displacements of the first part with respect to the second part, in either direction, until a maximum angle defined by the stopping means.

13. A toy comprising at least two parts, the toy comprising the rotating system according to any of the preceding claims configured into any two parts of the at least two parts for facilitating their relative rotation with respect to each other, wherein a first part of the at least two parts is coupled to the rotating system middle unit and the second part of the at least two parts is coupled to the rotating system bottom unit.

14. The toy according to claim 13,

    wherein the first part of the at least two parts couples to the middle unit in such a manner that a rotation movement of the first part will couple

to the middle unit, causing it to rotate as well;
or, wherein the first part is configured with at least two views, and the rotating system engaging means is configured to correspond to the same number of views.

15. The toy according to claim 14,

wherein the toy has a humanoid or animal figure, comprising a head with different faces and a rest of the body, wherein the head corresponds to the first part and the rest of the body corresponds to the second part;
or, wherein the second part is a support to rest on a surface;
or, wherein the first part is the top part of any figure, and the second part is the bottom part;
or, wherein the toy is a space station comprising a first rotating system configuring different views of the astronaut's quarters in relation to the main body of the station, and further comprising a second rotating system configuring different views of a shuttle docked to the main body of the station.

FIG. 1

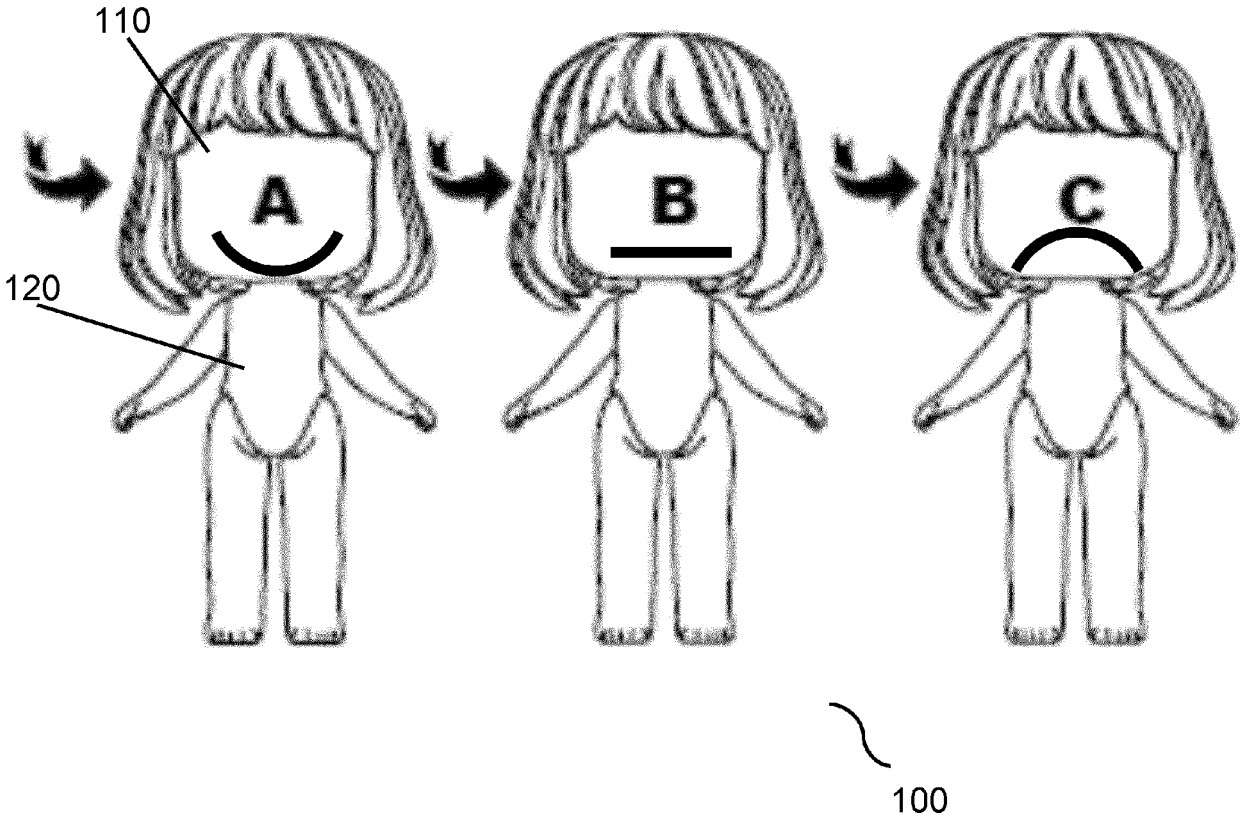

FIG. 2

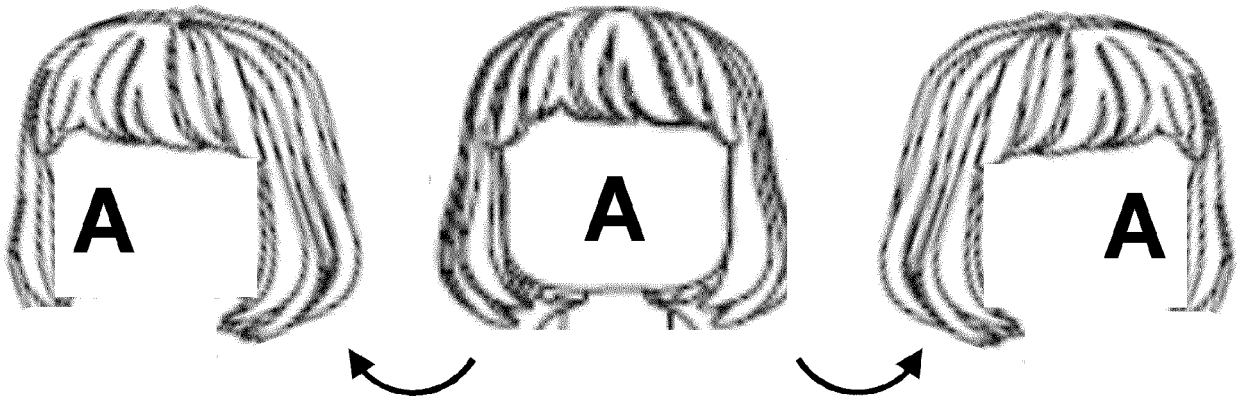

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FIG. 3

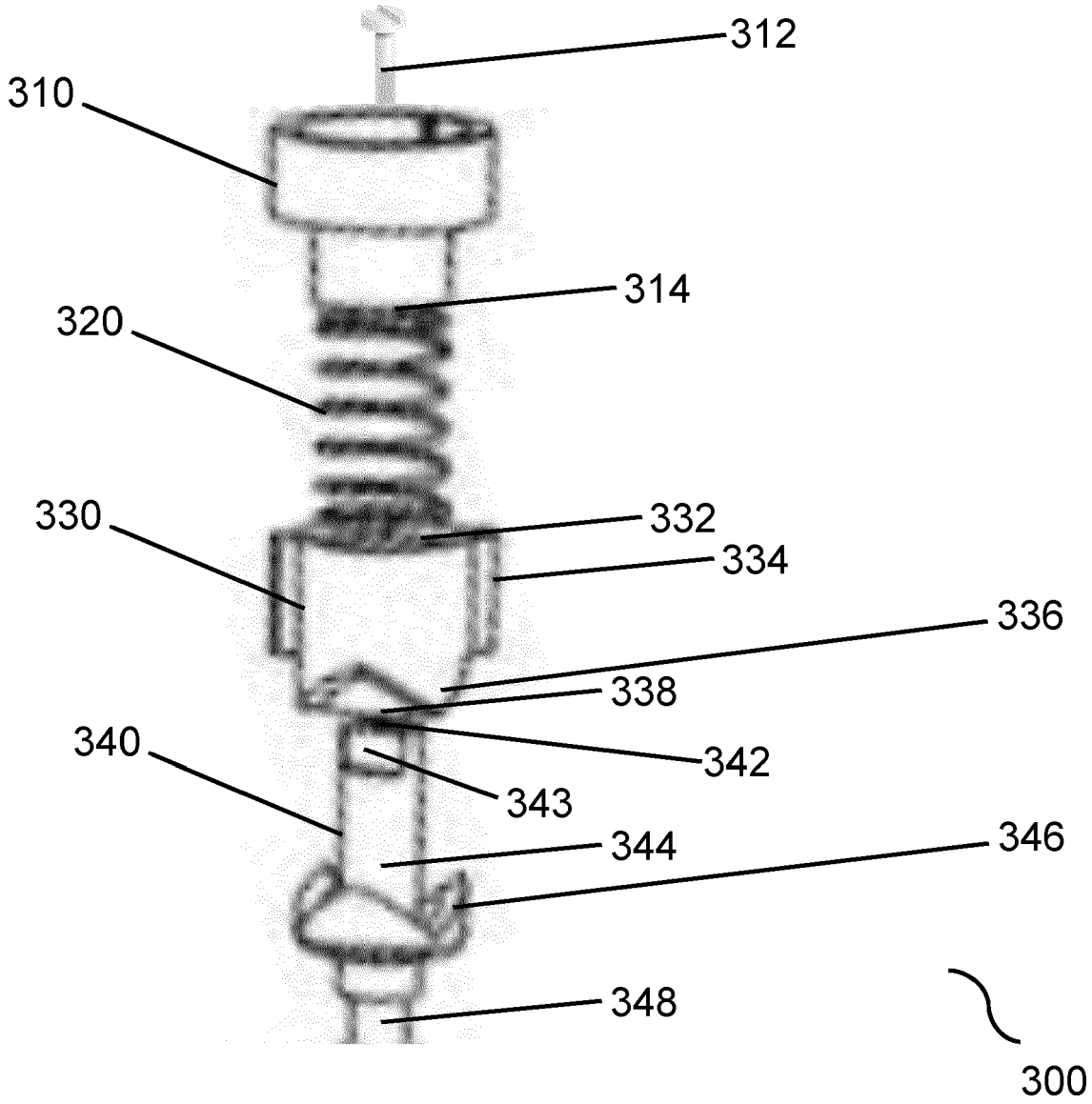
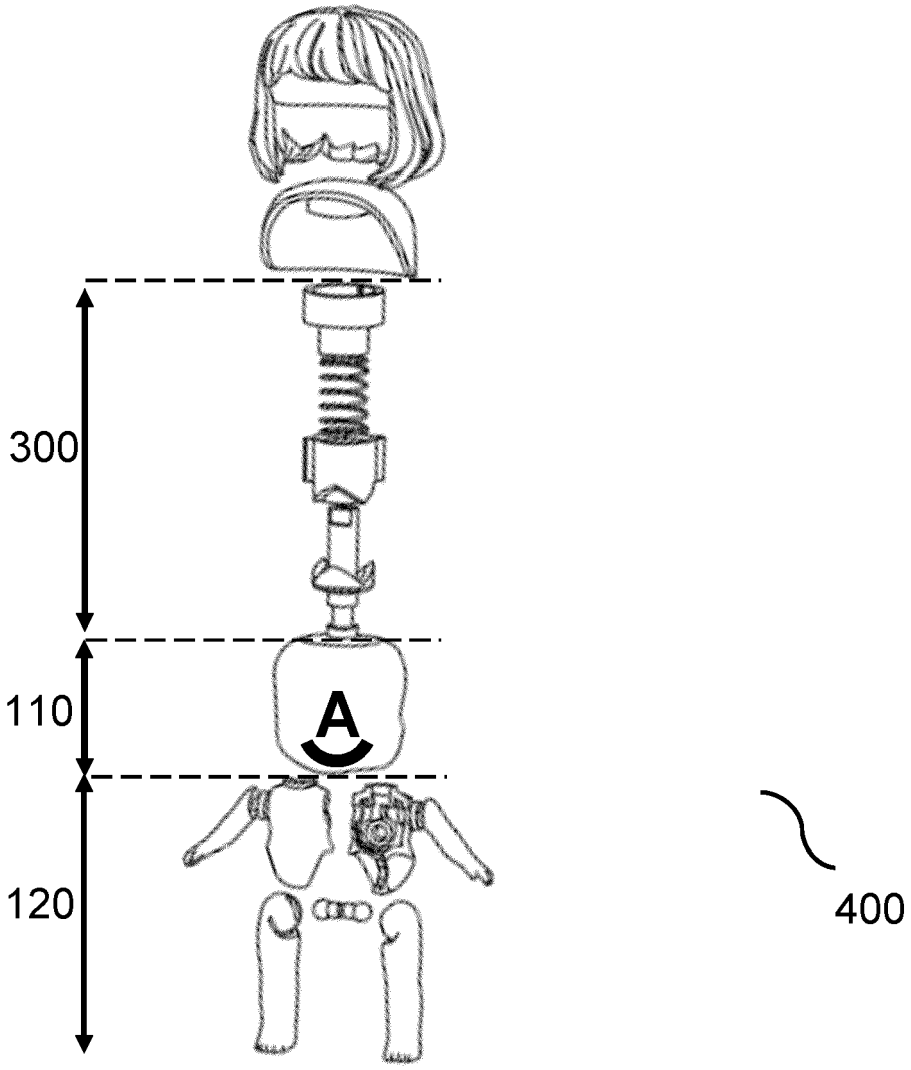


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 5015

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A63H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 September 2021	Turmo, Robert

CATEGORY OF CITED DOCUMENTS

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06-09-2021

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