Nov. 11, 1969 J. L. BONANNO 3,477,171

TOY HAVING SHAFT-MOUNTED ROTATABLE AND PIVOTABLE APPENDAGE

Filed Nov. 15, 1966 2 Sheets-Sheet 1

FIG. 1

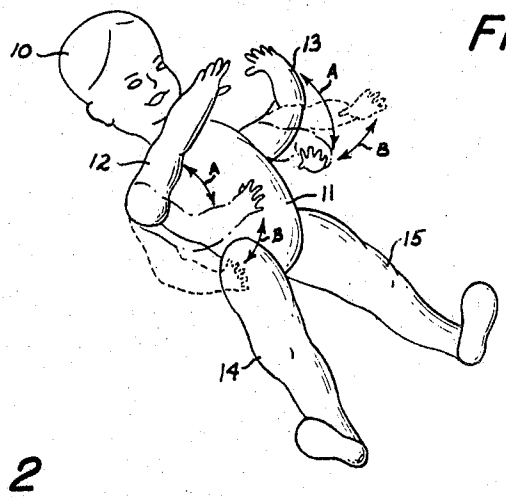
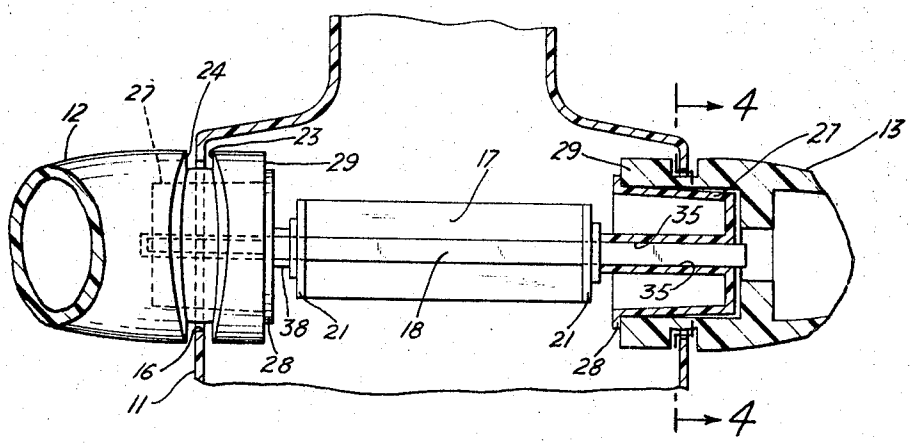


FIG. 2



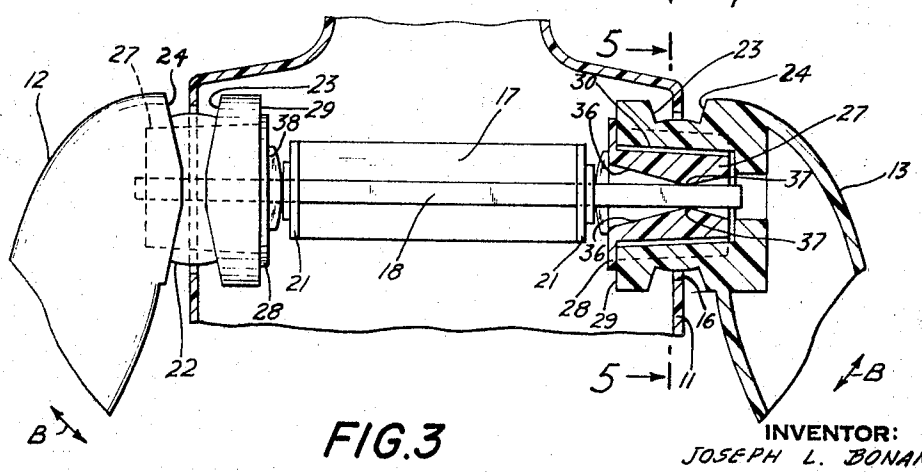


FIG. 3

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Nov. 11, 1969 J. L. BONANNO 3,477,171

TOY HAVING SHAFT-MOUNTED ROTATABLE AND PIVOTABLE APPENDAGE

Filed Nov. 15, 1966 2 Sheets-Sheet 2

FIG. 4

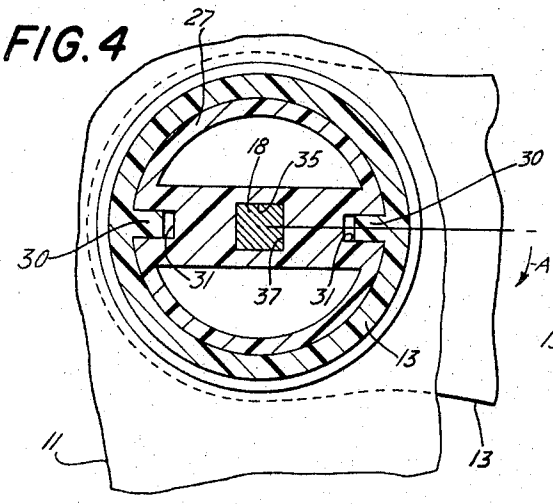
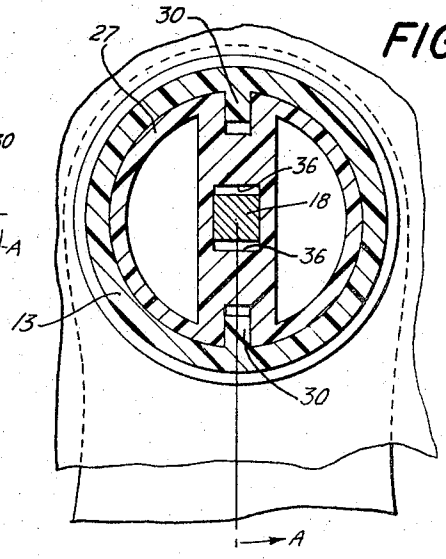


FIG. 5



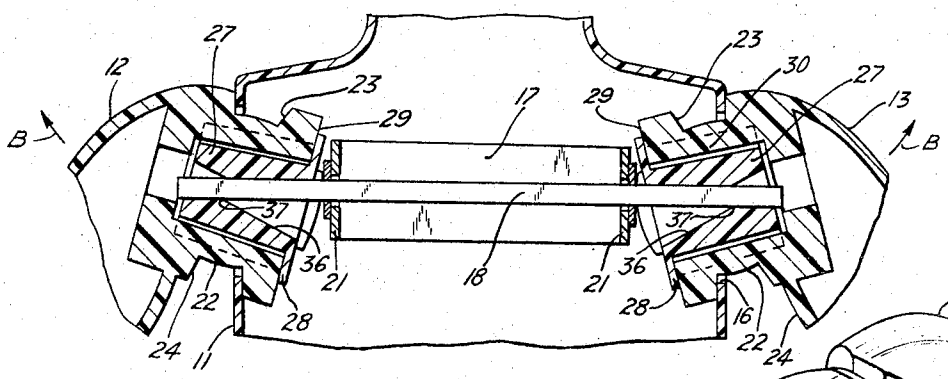
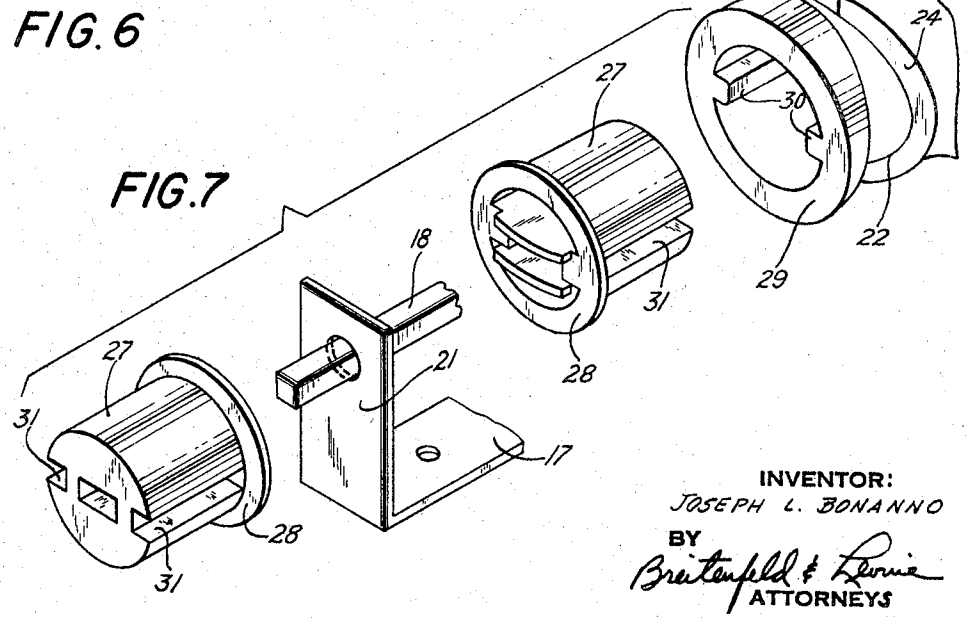


FIG. 6

FIG. 7



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TOY HAVING SHAFT-MOUNTED ROTATABLE AND PIVOTABLE APPENDAGE

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U.S. Cl. 46—161 7 Claims

ABSTRACT OF THE DISCLOSURE

Doll has hollow body with opening in shoulder region. Rotatable shaft in body terminates at one end within the opening. One end of an arm is loosely accommodated within the opening, and a sleeve is non-rotatably accommodated within hollow end of arm. Shaft has non-circular cross-section, and sleeve has a bore accommodating end of the shaft. Bore has necked-down fulcrum region intermediate its ends, and diverges in both directions therefrom. Arm has annular groove relatively narrow at two diametrically opposed points and widening therefrom.

This invention relates to a toy in which there is at least one appendage movable with respect to a body, and has particular reference to an improved swival mounting for the appendage.

The invention will be described and illustrated in connection with a human-like doll provided with movable arms, but many phases of the invention are applicable to a wide variety of animated toys, such as toy animals.

It is a general object of the invention to provide a means for mounting an appendage with respect to a toy body so that the appendage may be rotated and also pivoted about an axis perpendicular to its axis of rotation.

It is a more specific object of the invention to provide a mounting means for connecting an appendage to a rotatable shaft, within the toy body, in such a way that the appendage rotates with the shaft and is pivotable with respect to the shaft about an axis perpendicular to the axis of rotation of the shaft.

It is another object of the invention to provide a mounting means which when employed to secure the arms of a doll to a shaft within the doll's body, causes the arms to rotate with the shaft, so that the hands move lengthwise along the body, and permits the arms to be moved toward and away from each other.

It is an additional object of the invention to provide a mounting means including only a single element between the appendage and the shaft within the toy body, the element being connected to both the appendage and shaft without the use of independent fasteners.

It is a further object of the invention to provide a mounting means which is relatively inexpensive to manufacture and assemble with the other parts of the toy, and which nevertheless is durable enough to insure a long period of use.

To achieve these and other objects, the invention in one of its embodiments includes a doll body having arm holes in its shoulder region, and one end of an arm loosely accommodated within each hole. A shaft within the body is aligned with and terminates near, the arm holes. The shaft is rotatable about its longitudinal axis. Each arm is secured to an end of the shaft by means of a cylindrical sleeve non-rotatably accommodated within the hollow end of the arm. The sleeve has an internal slot of rectangular cross-section. In a longitudinal direction, the slot tapers from both ends toward a narrow neck sized to frictionally grip the shaft. Due to this fractional grip, the sleeve and hence the arm is caused to rotate with the shaft. However, due to the divergence of the slot walls outwardly from the neck, the sleeve and hence the arm are permitted to pivot, on the neck acting as a fulcrum, about an axis perpendicular to the axis of rotation of the shaft.

At the region in which each arm passes through the arm hole in the body, the arm is provided with an annular groove, but on each side of the groove, the diameter of the arm is larger than the diameter of the arm hole to limit the lateral movement of the arm with respect to the body. The groove is relatively narrow at the two diametrically opposed points through which the pivot axis of the arm pass, but the groove widens from these points to permit pivotal movement of the arm.

Additional features and advantages of the invention will be apparent from the following description in which reference is made to the accompanying drawings.

In the drawings:

FIG. 1 is a perspective view of a doll according to the invention, showing the possible movements of the arms with respect to the doll's body;

FIG. 2 is a vertical cross-sectional view taken through the shoulders of the body of the doll showing the swivel joints in one position of the arms;

FIG. 3 is a view similar to FIG. 2 showing the swivel joints in a second position of the arms;

FIG. 4 is a section taken along line 4—4 of FIG. 2;

FIG. 5 is a section taken along line 5—5 of FIG. 3;

FIG. 6, is a view similar to FIG. 3 showing the swivel joints when the arms have been pivoted away from each other to the greatest extent possible; and

FIG. 7 is an exploded perspective view of the elements comprising the pivotal joints of the arms.

Referring to FIG. 1, the toy chosen to illustrate the invention is a doll having a hollow body **11** and a pair of legs **14** and **15** attached to the lower portion of the body. A head **10** is shown connected to the top of the body in any well known manner. A pair of arms **12** and **13** are connected to the body **11** at the shoulder region of the latter, in a manner to be more fully discussed below. The connection is such as to enable the arms to move along a path parallel to the longitudinal axis of the body **11** as illustrated by arrows A, and along a lateral path as illustrated by arrows B.

As shown in FIGS. 2, 3, and 6, the body **11** is provided with arm holes **16** which accommodate the upper ends of arms **12** and **13**. Mounted within the body is a U-shaped bracket **17**. A shaft **18**, preferably having a square cross-sectional shape, passes through holes in the arms **21** of the bracket (see FIG. 7) and is thereby supported for rotation about its longitudinal axis. If desired, a suitable mechanism (not shown) may be housed within the body **11** for rotating the shaft **18**, the mechanism being actuable whenever the arms are to be moved in the direction A from one extreme position to the other.

Each arm is provided, near its upper end, with a reduced diameter region or groove **22**, and it is within this region that each arm is loosely fitted within its respective hole **16** in the body **11**. The arms are thus permitted to freely rotate, in the direction A, with respect to the body. The diameter of each arm on both sides of the groove **22** is greater than the diameter of the holes **16** to prevent removal of the arm from the body. For the purpose of assembling the arms **12** and **13** with the body **11**, the body is formed of separable front and back portions, the dividing line between the portions running through the arm holes **16**.

To permit lateral pivotal movement of the arms **12** and **13**, in the direction B, the side walls **23** and **24** of the groove **22** diverge from two diametrically opposed points of minimum spacing, best seen in FIG. 2, to two diametrically opposed points of maximum spacing, best

seen in FIGS. 3 and 6. The two points of minimum spacing lie along the pivot axis of the arm, which will be defined below. The shape of the grooves described above permits the arms **12** and **13** to be adjusted between a "hands apart" position, and a "hands together" position. In the "hands apart" position, the portion of the side wall **24** of each arm on the side of the pivot axis opposite to the doll's hand contacts the outer surface of the body **11** and the portion of the side wall **23** on the same side of the pivot axis as the hand contacts the inner surface of the body, as shown in FIG. 6. FIG. 3 shows the relationship between the grooves **22** and the arm holes **16** when the hands are in an intermediate position between the extreme "hands apart" and "hands together" positions. In the "hands together" position, which is not illustrated, the portion of the side wall **24** on the same side of the pivot as the hand contacts the outer surface of the body **11**, and the portion of the side wall **23** on the side of the pivot axis opposite to the hand contacts the inner surface of the body.

In the above discussion, it has been assumed that the arms **12** and **13** are moved together to corresponding positions. It should be pointed out, however, that each arm is movable independently in the direction B.

The connection between each arm and the shaft **18** is effected by a single element illustrated in FIGS. 2–7. The element is a generally cylindrical sleeve **27** having an outwardly projecting flange **28** at one end. The sleeve **27** is preferably formed of a slightly resilient material, such as a suitable plastic, and a sleeve is adapted to be received within the hollow upper end of each arm **12** and **13**. The flange **28** limits the movement of the sleeve into the hollow chamber in the arm by abutting the inner face **29** of the arm. Projecting into the hollow chamber in each arm **12** and **13** are two diametrically opposed ridges **30** formed integrally with the arm. The ridges are accommodated within correspondingly located longitudinal slots **31** formed in the outer surface of the sleeves **27**. Cooperation between the ridges **30** and the slots **31** produces a non-rotatable relationship between each arm **12** and **13** and its respective sleeve **27**. Nevertheless, the arm and sleeve are readily assembled simply by sliding the sleeve **27** endwise into the hollow chamber in the arm. To aid this sliding movement, the sleeve **27** is slightly tapered from its flanged end toward its other end as shown in FIG. 2.

Extending longitudinally through the center of each sleeve **27** is a specially shaped bore **34** which preferably has a rectangular cross-sectional shape. Two opposite walls **35** (FIG. 2) of the bore are parallel and spaced apart a distance equal to the corresponding dimension of the shaft **18**. The other pair of opposed walls **36** of bore **34** include a neck **37** (FIGS. 3 and 4) of minimum spacing equal to or slightly less than the corresponding dimension of the shaft **18**. The neck region **37** tightly grips the shaft **18** and defines the fulcrum or pivot axis between the shaft **18** and sleeve **27**. From the neck **37**, the walls **36** diverge outwardly in both directions thus providing the room required to permit pivotal movement between the shaft and sleeve. The light frictional contact between the walls **35** and the shaft **18** prevents free swinging of the arms, but permits the arms to be pivoted in the direction B by the application of a positive force to them.

Assembly of the sleeve **27** and shaft **18** is extremely simple, involving only the step of pushing the shaft **18** into the bore **34**. This movement is limited by the abutment of a pair of arcuate surfaces **38** against a collar **39** fixed to the shaft **18**.

It will be appreciated that the present invention provides a member **27** capable of transmitting the rotary motion of shaft **18** to each arm **12** and **13**. This is accomplished by the cooperation of the shaft with walls **35** and neck **37**, and the cooperation of ridges **30** with slots **31**. At the same time; the member **27** permits pivotal movement of each arm with respect to the shaft, via neck **37** and walls **36**. Furthermore, the member **27** may be assembled with the shaft and each arm by simply sliding the components together and without the use of independent fasteners.

The inventon has been shown and described in preferred form only, and by way of example, any many variations may be made in the invention which will still be comprised within its spirit. It is understood, therefore, that the invention is not limited to any specific form or embodiment.

What is claimed is:

1. In a toy:
- a hollow body provided with an opening, said body being defined by a wall,
- a shaft with said body terminating at one end near said opening,
- means for mounting said shaft within said body, said shaft being rotatable about its longitudinal axis with respect to said body,
- an appendage, and
- means securing said appendage to said body with one end thereof loosely accommodated within said opening,
- said appendage-securing means including means for connecting said appendage to said shaft so that said appendage rotates with said shaft but is pivotable about an axis perpendicular to the longitudinal axis of said shaft, said connecting means being non-rotatably joined to said one end of said appendage and being tightly frictionally fit on said shaft so that rotation of either one of said shaft and appendage relative to said body produces rotation of the other.

2. In a toy, the arrangement defined in claim **1**, wherein said appendage is provided with an annular groove wider than the thickness of said wall, the external diameter of said appendage in the region of said groove being smaller than the diameter of said opening but the diameter of said appendage on each side of the groove being larger than the diameter of said opening.

3. In a toy, the arrangement defined in claim **2** wherein said groove is relatively narrow at two diametrically opposed points, the pivot axis of said appendage extending through said points, the width of said groove at said points being only slightly greater than the thickness of said wall, and said groove expands to relatively wide open points between said narrow points so that pivotal movement of said appendage is permitted.

4. In a toy:
- a hollow body provided with an opening, said body being defined by a wall,
- a shaft with said body terminating at one end near said opening,
- means for mounting said shaft within said body, said shaft being rotatable about its longitudinal axis with respect to said body,
- an appendage, and
- means securing said appendage to said body with one end thereof loosely accommodated within said opening,
- said appendage-securing means including means for connecting said appendage to said shaft so that said appendage rotates with said shaft but is pivotable about an axis perpendicular to the longitudal axis of said shaft, said connecting means including a sleeve non-rotatably joined to said one end of said appendage, said sleeve having a bore of non-circular cross-section accommodating said one end of said shaft, the smallest cross-sectional dimension of said bore being no larger than a cross-sectional dimension of said shaft to produce a tight frictional fit between said sleeve and shaft, so that rotation of either one of said shaft and appendage relative to said body produces rotation of the other, and the largest cross-section dimension of said bore being larger than said

cross-sectional dimensions of said shaft to permit said sleeve to pivot with respect to said shaft about an axis perpendicular to the longitudinal axis of said shaft.

5. In a toy, the arrangement defined in claim 4 wherein said shaft has a square cross-sectional shape, and said bore has a rectangular cross-sectional shape.

6. In a toy, the arrangement defined in claim 4 wherein said bore has a relatively narrow neck between its ends, two opposed walls of said bore diverge outwardly from said neck in opposite directions, and the cross-sectional size and contour of said neck corresponding to the cross-sectional size and contour of said shaft, whereby said neck serves to define the pivot axis of said sleeve with respect to said shaft.

7. In a toy, the arrangement defined in claim 4 wherein said one end of said appendage is hollow, said sleeve being located within said hollow end, and including at

least one ridge fixed to said appendage and projecting into the interior of said one end of said appendage, and a cooperating slot in the exterior of said sleeve, the engagement between said ridge and slot serving to prevent rotation between said appendage and sleeve.

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U.S. Cl. X.R.

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