

Nov. 3, 1970

J. DOGGART ET AL

3,537,209

DOLL WITH ASYMMETRICALLY LOCATED ARM AND/OR LEG JOINT SOCKETS

Filed Feb. 26, 1968

6 Sheets-Sheet 1

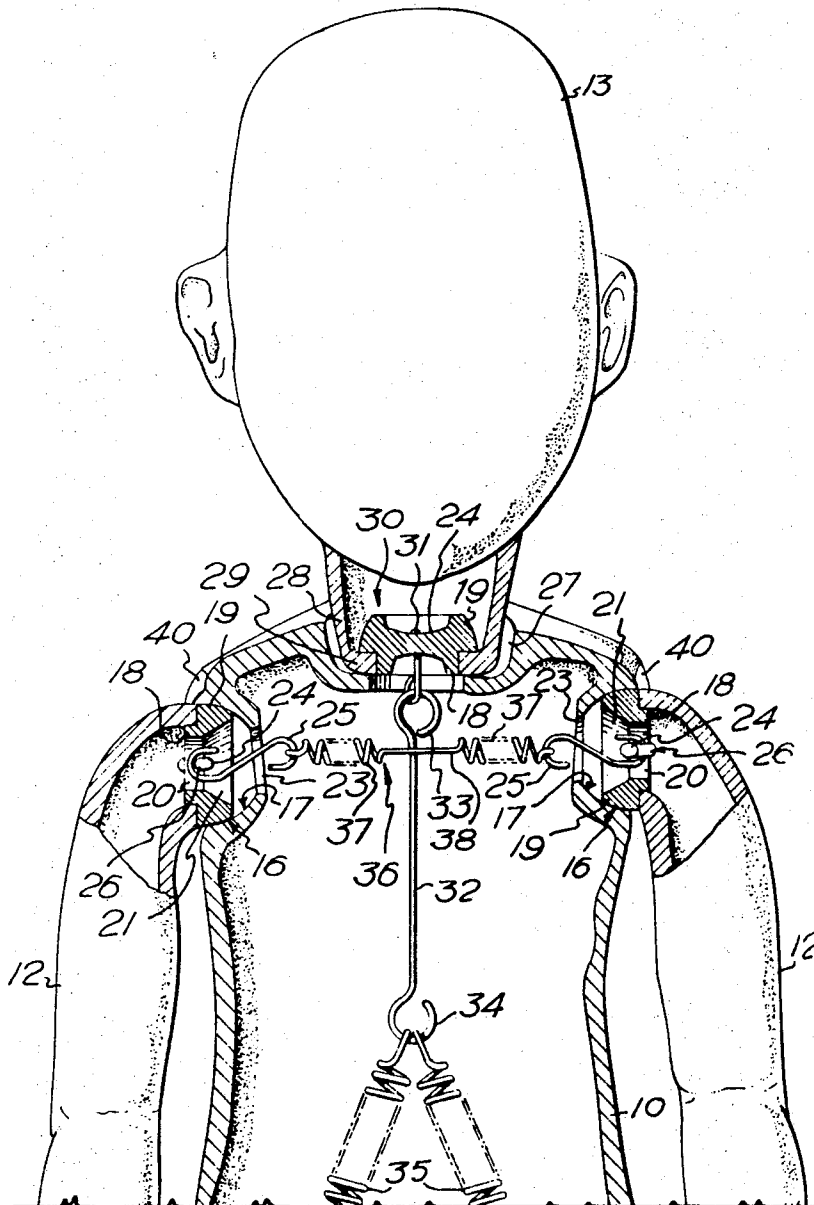


FIG. 1a

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6 Sheets-Sheet 2

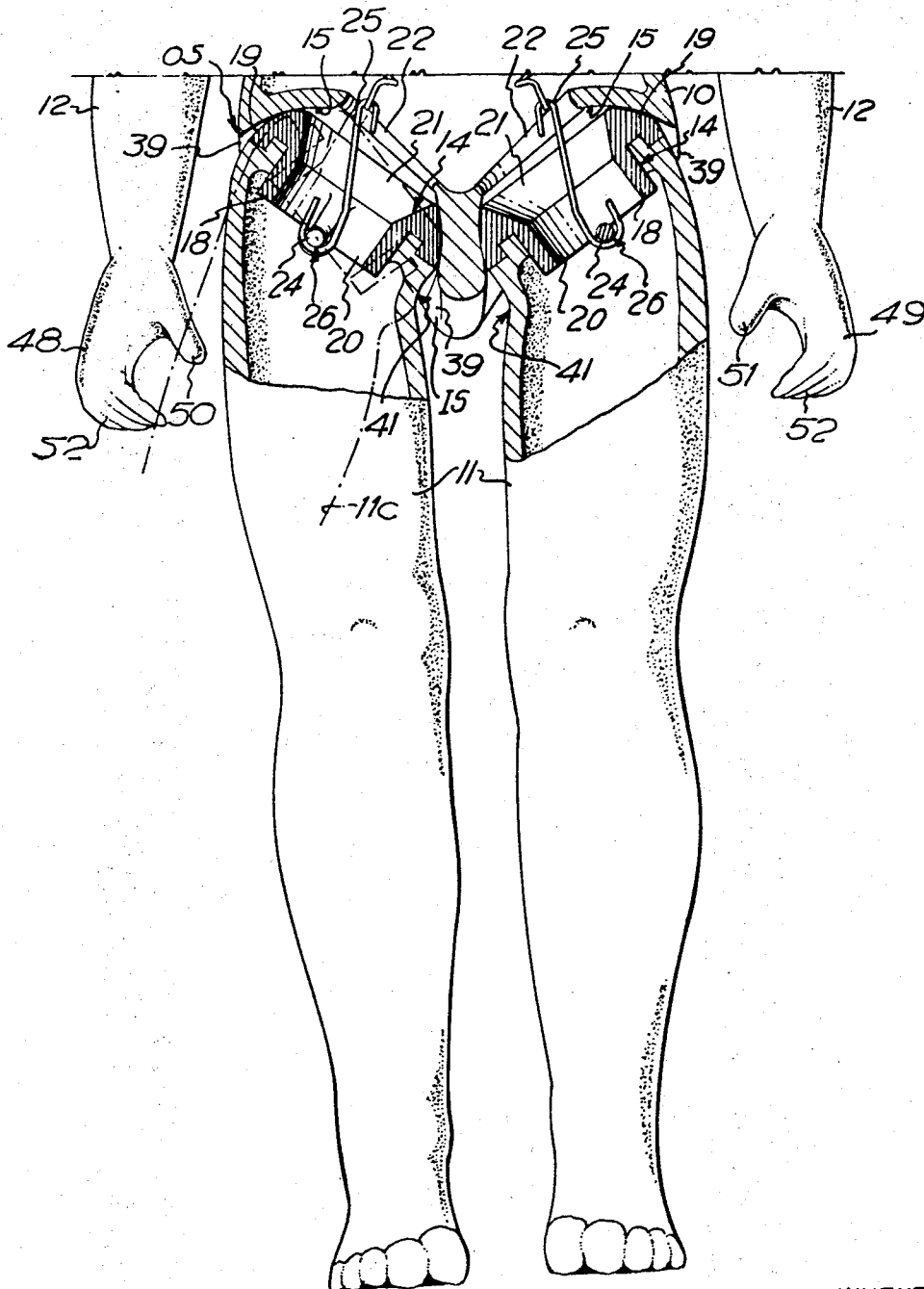


FIG. 1b.

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6 Sheets-Sheet 3

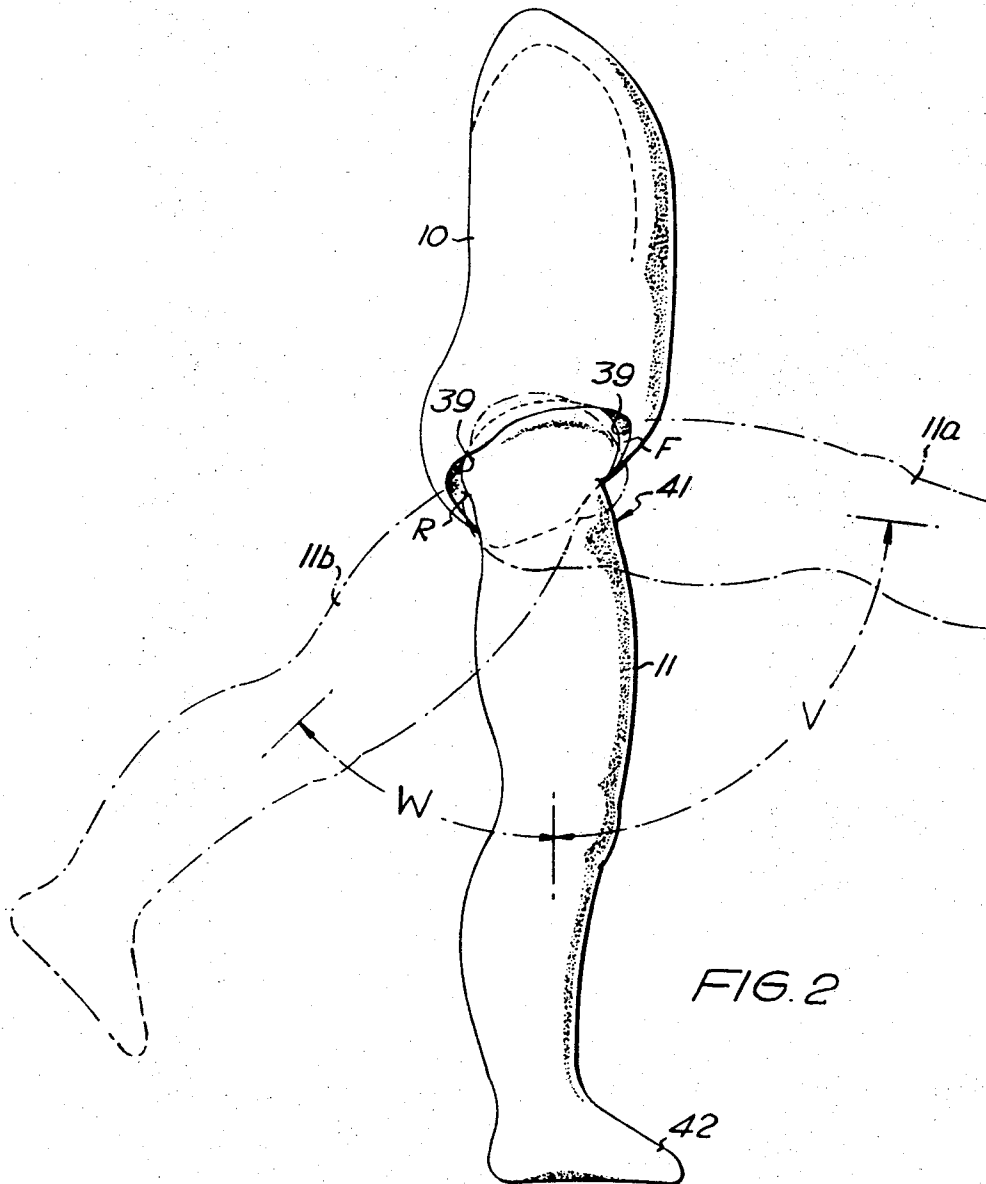


FIG. 2

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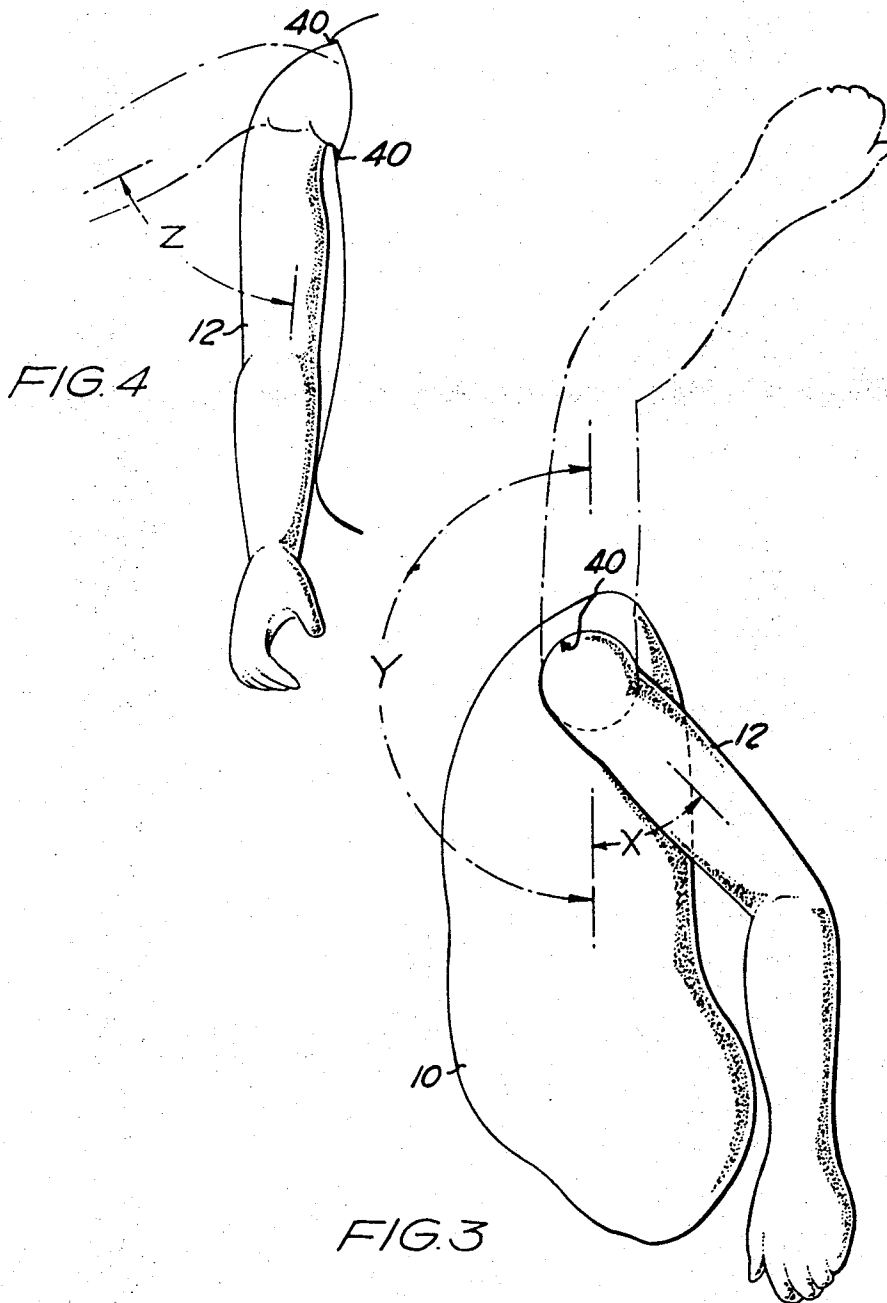
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6 Sheets-Sheet 4



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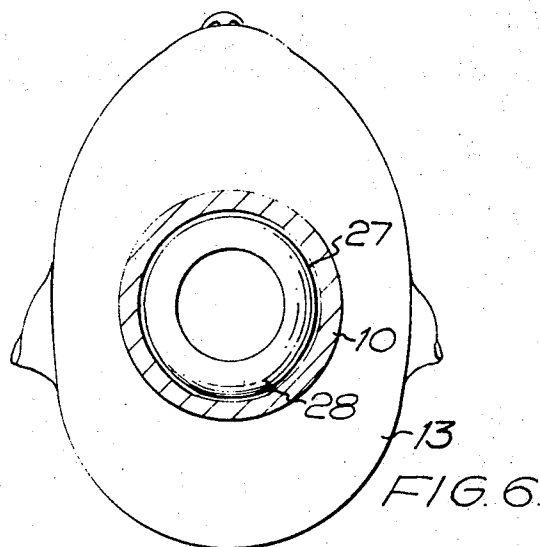
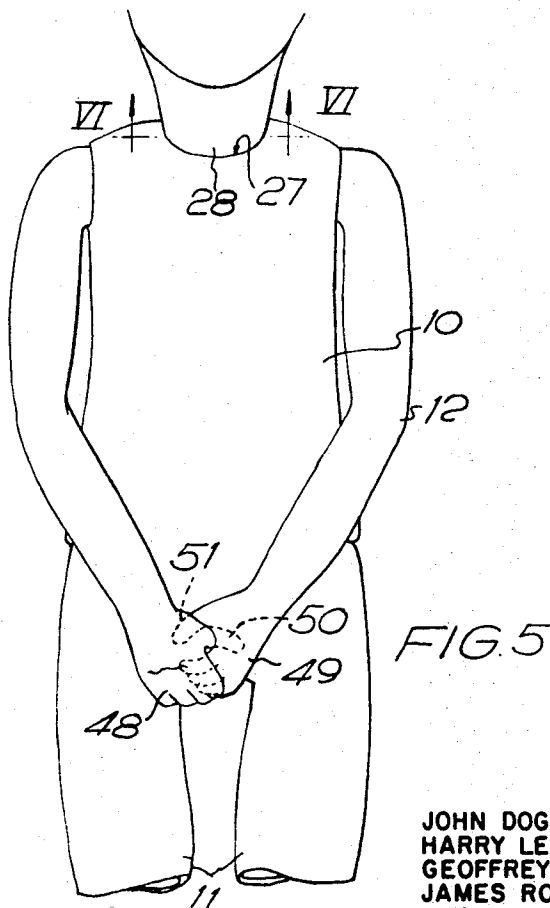
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6 Sheets-Sheet 5



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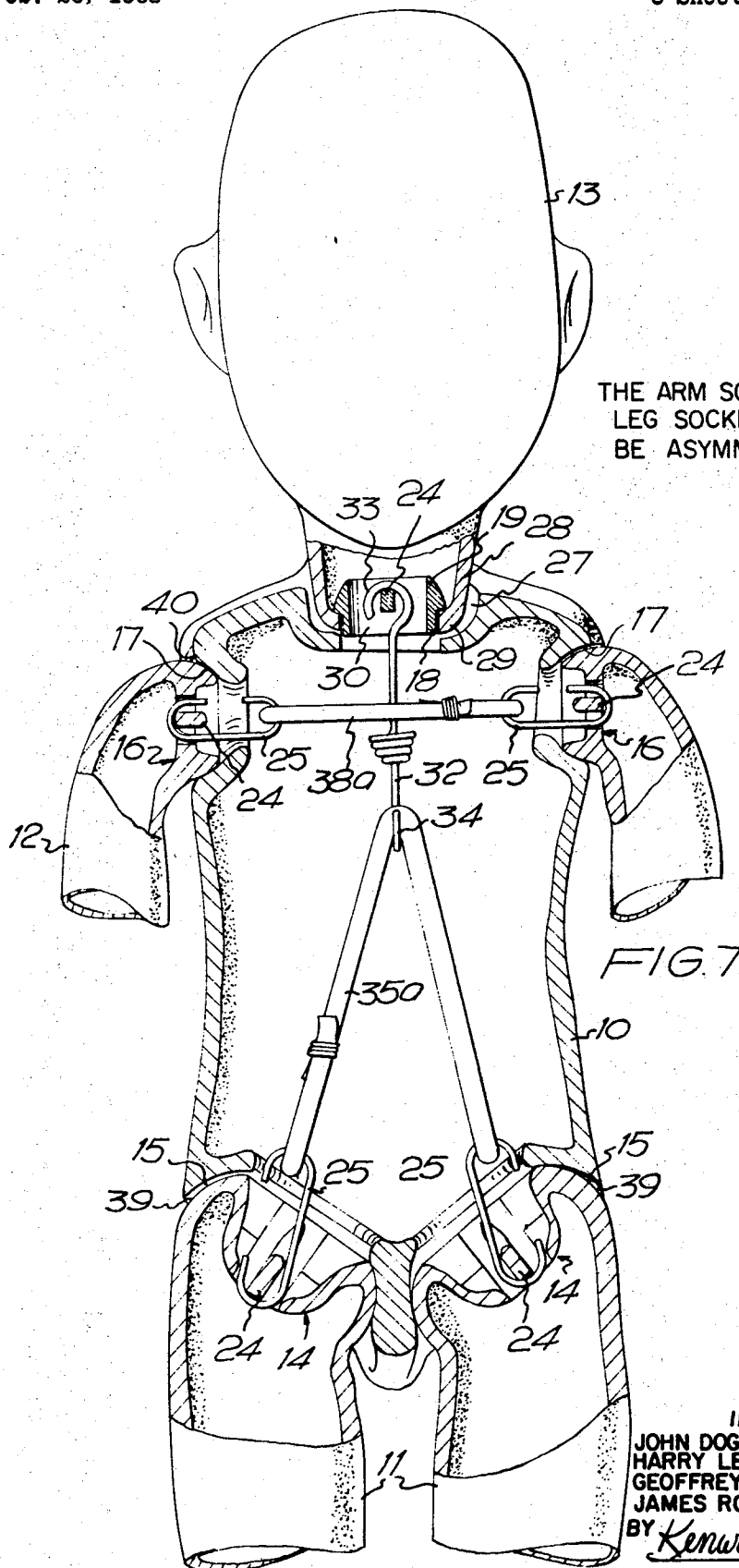
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THE ARM SOCKETS OR
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3,537,209

DOLL WITH ASYMMETRICALLY LOCATED ARM AND/OR LEG JOINT SOCKETS

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U.S. Cl. 46—161

2 Claims

ABSTRACT OF THE DISCLOSURE

A toy comprising a body to which is connected a plurality of limbs, the body having, for each limb, a depression or socket containing a bearing surface which is substantially part-spherical and is surrounded by a skirt, each limb having, at its appropriate end, a joint member which locates in the respective depression or socket, being retained therein by resilient means within the body and connecting to the joint member which has a complementary part-spherical bearing surface, each skirt and the respective limb adjacent the joint member thereof being complementally shaped to restrict the possible movement of the limbs at least partially to correspond with the possible movement of a corresponding natural limb, by the skirt obstructing movement of the limb. The doll body arm and leg sockets may be asymmetrically placed to produce slight differences in arm and/or leg length.

BACKGROUND OF THE INVENTION

Field of the invention

This invention concerns toys, such as dolls and toy animals, of the type comprising a body to which are connected a plurality of limbs, the connection being such as to enable the limbs, rigid in themselves, to be swung or moved to desired positions relative to the body.

Here following, reference will generally be made to "dolls," as being the primary form of the toys to which the invention may be applied. It is to be understood, however, that where reference is made to "dolls," such references are equally well applicable to other toys having a body to which are connected movable limbs.

Description of the prior art

Dolls are already known wherein the body is provided, for each limb, with a socket formed by a generally concave depression in the body and into which engages a corresponding protrusion on the appropriate end of the limb, the limb being held to the body by a resilient member, such as a spring, disposed within the body and connecting to an appropriate point on the protrusion.

Such known arrangements generally permit the limbs each to be swung or moved in such a manner that the protrusion on the limb can rotate through 360° (i.e. a complete revolution) within the respective socket and can move universally after the manner of a ball joint. Accordingly, the limbs can be moved or swung to positions or attitudes which are outside the scope of possible movement of the natural limbs they are intended to simulate. The dolls can, therefore, have their limbs moved to positions wherein the doll has a grotesque appearance.

SUMMARY OF THE INVENTION

An object of this invention is to provide a doll construction, the limbs of which are restricted in their possible movement so as more nearly to approximate the possible movement of the corresponding natural limbs.

This is achieved by the provision, in accordance with the present invention, of a toy comprising, a body to

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which is connected a plurality of limbs, said body having, for each limb, a depression or socket containing a bearing surface which is substantially part-spherical and being surrounded by a skirt, each limb having at its appropriate end, a joint member which locates in the respective depression or socket, being retained therein by resilient means within the body and connecting to the joint member which has a complementary part-spherical bearing surface, each skirt and the respective limb adjacent the joint member thereof being complementally shaped to restrict the possible movement of the limbs at least partially to correspond with the possible movement of a corresponding natural limb, by the skirt obstructing movement of the limb.

Preferably, each joint member has an opening therein, the resilient means comprising, for each limb, a connector extending into the opening in the respective joint member and serving to assist in restricting the possible limb movement by engagement against part of the surface defining said opening. Conveniently, said part of said surface defining the opening, in each of the joint members of limbs, is generally frusto-conical in shape, the widest end thereof being directed into the respective depression or socket in the body.

Conveniently, each such connector is in the form of an S-shaped or C-shaped metal hook connecting the respective limb to resilient means in the form of springs or elastic bands within the body.

To ensure that the resilient means do not influence the positions of the limbs, and the latter will remain in any position to which they may be moved without tending to move the joint members out of their depressions or sockets, the resilient means conveniently connect with the respective joint members substantially at the centers of the respective bearing surfaces.

In manufacture, e.g. by molding from plastics, the joint members are conveniently each in the form of an annular element appropriately secured into the relative ends of the respective limbs. Alternatively, the joint members may be formed integrally with the respective limbs.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be fully understood, it will be described further, by way of example, with reference to the accompanying drawings in which:

FIGS. 1a and 1b (collectively referred to herein as FIG. 1) together constitute a front elevation, partly in section, of a doll constructed in accordance with the present invention;

FIG. 2 is a diagrammatic side elevation illustrating the possible front to rear movement of one of the legs of the doll of FIG. 1;

FIG. 3 is a view similar to FIG. 2, but illustrating the possible front to rear movement of one of the arms of the doll of FIG. 1;

FIG. 4 is a fragmentary front view illustrating the possible lateral or sideways movement of the arm of FIG. 3;

FIG. 5 is a fragmentary front view showing how the arms can be moved towards each other;

FIG. 6 is an enlarged detached cross-section taken on the line VI—VI of FIG. 5; and

FIG. 7 is a fragmentary view similar to FIG. 1 but showing a modified construction of the doll.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring firstly to FIG. 1, a doll constructed in accordance with the invention comprises a substantially rigid hollow molded plastic body 10, shaped generally to simulate a child's body, and having limbs in the form of two legs 11 and two arms 12 as well as a head 13 movably connected thereto.

At the upper end of each leg 11 is provided a respective joint member 14 locating into a respective depression or socket 15 in the body 10, and similar joint members 16 are provided on the upper ends of the arms 12 and locate into corresponding depressions 17.

As shown, each such joint member 14, 16 is in the form of an annular insert composed of a sleeve or spigot portion 18 which enters into a corresponding opening in the end of the respective limb and a flange portion or collar portion 19 which butts against corresponding faces on the respective limb, these inserts 14, 16 being appropriately secured in position by means of an adhesive, by bonding or by welding.

The opening through each of the annular inserts comprises a generally cylindrical part 20 disposed within the sleeve or spigot portion 18 of the insert, and a flared or generally frustoconical portion 21, the latter having its widest end opening into the respective depression or socket 15 or 17 and registering with a corresponding opening 22 or 23 respectively within such depression or socket 15 or 17.

The depressions or sockets 15, 17 are each shaped to provide a part-spherical bearing surface for the respective joint member or insert 14, 16 the flange portions or collar portions 19 of the latter having at least part of their outer curved surfaces of complementally part-spherical shape, so that in the absence of any restraining influence each of the limbs 11 and 12 would be capable generally of universal movement, after the manner of a ball and socket joint arrangement. Restraining influence is, however, provided as will later become evident.

At the free end of each sleeve or spigot portion 18 of each joint member 14, 16, a bridge piece 24 extends diametrically thereacross. A shallow niche (not visible in the drawings) is provided substantially at the midpoint of each such bridge piece 24 for engagement therewith of one end of a respective S-shaped hook-like connector 25, the disposition of such niche being such that the connector 25 will locate therein and the point of contact 26 between the connector and the bridge piece 24 is substantially at the center of the bearing surfaces of the respective joint member 14 or 16 and depression or socket 15 or 17.

In the upper part of the body 10 is a neck recess 27 into which fits a neck part 28 of the head 13, such neck part 28 generally being of hollow tubular form with an inwardly directed flange or lip 29 provided on its lower end and merging into the head at its upper end. Fitting into the neck part 28 so as to provide a spring anchorage therein is an insert 30 which, for convenience, is substantially identical in form with the joint members 16 of the arms 12. This insert 30 is arranged with its sleeve or spigot portion 18 projecting downwards and fitting into the flange or lip 29 with the flange or collar portion 19 thereof resting on such lip 29, and serves primarily to provide the bridge piece 24 for connection thereto of a respective S-shaped hook-like connector 31 for retaining the head 13 to the body 10.

Depending from the connector 31 is a coupling rod 32 having a loop 33 at its upper end for engagement therein of the connector 31 and having a similar loop 34 at its lower end for connection thereto of resilient means for retaining the joint members 14 of the legs 11 in their depressions or sockets 15. Such resilient means is in the form of two helical springs 35 each connected by its upper end to the loop 34 and engaged with the respective connector 25 by being hooked thereto. Such springs 35 are under tension and serve, in addition to retaining the joint members 14 within their depressions or sockets, to retain the neck part 28 of the head 13 in the neck recess 27.

Resilient means extending between and hooked by its ends to the connectors 25 of the arms 12 is in the form of a spring coupling 36 comprising two sets of windings 37 interconnected by and integrally formed with a linear

intermediate portion 38, this coupling 36 being under tension and serving to retain the joint members 16 of the arms 12 in their depressions or sockets 17.

Each of the depressions or sockets 15 and 17 is shaped so as to provide therearound, where such depressions or sockets merge with the adjacent parts of the body 10, respective skirts 39 and 40, parts only of which are visible in FIG. 1. It will be appreciated that the height or shape of the skirt 39, 40 at any particular point (that is to say the extent of such skirt considered in a direction outwardly of the respective bearing surface of the depression or socket or the distance of the extremity of such skirt from such bearing surface), determines the amount by which the respective limb 11 or 12 can be swung within its depression or socket towards such point, the limb being arrested by engagement of the relative portion thereof against the point under consideration. Accordingly, it will be appreciated that with appropriate shaping of the skirts 39 and 40 and of the adjacent parts of the respective limbs 11 and 12, restriction of the possible movement thereof, as compared with free universal movement thereof, as compared with free universal movement thereof after the manner of a ball and socket joint, can be achieved.

This can be explained somewhat more clearly first with reference to FIG. 2 of the drawings, which figure illustrates the possible forward and rearward movement of one of the legs 11. This leg 11 is shown in full lines in its normal or upright position corresponding generally with the joint member 14 thereof being relatively symmetrically disposed in its depression or socket 15, it being understood that the axes of the two depressions or sockets 15 diverge from one another in the forward direction and are slightly forwardly inclined relative to the vertical, as can be appreciated in conjunction with FIG. 1.

At the front of the body 10, the skirt 39 is shaped so as to terminate relatively forwardly or spaced away from the adjacent joint member as indicated exaggeratedly at F, and the thigh of the leg 11 is shaped at the front and inside thereof only with a depression at 41. At the rear of the body 10, the skirt 39 is relatively closer to the joint member as indicated exaggeratedly at R and while the adjacent part of the thigh is somewhat shaped, it does not have so marked a depression. Accordingly, if the leg 11 is maintained in an orientation with its foot 42 extending straight forwards, such leg can be swung in a forward direction to the position indicated in dotted lines at 11a by an angle V which is considerably greater than the angle W by which such leg can be swung backwards to the dotted line position indicated at 11b. This corresponds approximately to the possible movement, from its upright position, of a natural leg.

The depression 41 increases to a maximum at the inside thigh below the crotch (see FIG. 1). As a consequence, if the leg 11 is turned so that its foot 42 is slightly out-turned, then the angle V by which the leg 11 can be swung forward is increased as a result of a deeper part of the depression 41 registering with the front part F of the skirt 39. This again corresponds to the possible movement of a natural leg which can be kicked forward and upwards somewhat more easily and to a greater extent when the foot is slightly out-turned, than when the foot is pointing straight forward.

Referring back to FIG. 1, the possible sideways or lateral movement of each leg 11 is, to some extent, limited by co-operation between the skirt 39 and the configuration of the thigh there-adjacent in a manner as just explained. Additionally, however, use is made of the connectors 25 in conjunction with the conical parts 21 of the openings through the respective joint members 14. FIG. 1 shows the right leg of the illustrated doll (the leg at the left hand side of the figure) in full lines in its upright position and with the joint member 14 generally symmetrically disposed in its socket 15. If now such leg is swung sideways to the dotted line position in-

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licated at 11c, then the possible swinging movement is eventually limited by abutment of the surface of the conical part 21 against the connector 25, and reliance is not placed upon the outside part OS of the skirt 39. If such outside part of the skirt had to be relied upon, it might be necessary for it to overhang the outside thigh of the leg 11 in which case other movements of the leg 11 might be restricted, and in any event it would detract from the pleasant appearance of the doll.

Now that the forward and backward movements and the sideways movements of the leg have been explained separately, it will readily be appreciated that compound movements are appropriately restricted by the skirt and shape of the adjacent part of the leg and/or the connector 25 engaging with the surface defining the opening in the joint member 14, and that with appropriate shaping and dimensioning of the relative parts the leg movement can be restricted to approximate possible natural leg movements, the extent of such movement varying according to the twisted position of the leg, (i.e. foot forward, foot pointing inward or foot pointing outward), if desired. The extent by which the leg can be twisted as aforesaid can, of course, be restricted by use of appropriately stiff springs 36 and connectors 25.

From the foregoing, it will be appreciated that detailed consideration of the formation of the skirts 40 of the arm depressions or sockets 17 is not necessary, and that by appropriate shaping of such skirts 40 and shaping and dimensioning of the inserts 16 and respective connectors 25, the arm can be restricted to forward and backward swinging movement through respective angles X and Y (FIG. 3), and sideways swinging movement Z (FIG. 4), with appropriate variation of these possible movements and compounds thereof according to whether or not the arm is twisted from the "thumb forward" position shown in these figures.

It is to be observed from FIG. 1 that the two legs 11 of the doll are not of the same effective length, the right leg of the doll (that on the left hand side of the figure) being effectively slightly longer than the left leg. This is done intentionally, since it enables the doll to be stood up in positions with its legs apart in postures which better resemble natural postures than would be the case if the legs were of equal lengths. Different effective leg lengths can be achieved by making the legs themselves of different overall lengths or by arranging the two leg associated sockets 15 asymmetrically in the body 10 with respect to the doll axis or by a combination thereof.

FIG. 5 illustrates particularly suitable configurations for the arms 12 and hands 48 and 49 provided thereon. As with the legs 11, the overall lengths of the arms are different, and the different effective lengths may be achieved, as before, by making one of the arms 12 longer than the other and/or by an asymmetric arrangement of the arm-associated sockets 17 with respect to the doll axis. It can, further, be achieved by providing a bend at the elbow of each arm, with the bend in one of the arms different from that in the other arm. Such bends have not been shown in FIG. 1, to avoid obscuring the sectioned parts of the body, but they are shown clearly in FIG. 5 from which it will be seen that the left arm 12 of the illustrated doll is made both longer and with a somewhat sharper bend than the right arm. This shaping and dimensioning of the arms 12 again serves to ensure that the doll's appearance simulate that of a natural child, it being readily appreciated that a child's arms are hardly ever held in a substantially straight disposition.

Turning now to the hands 48 and 49 it will be seen from FIG. 1, that these are formed with the thumbs 50, 51 respectively in generally straight dispositions and with the fingers 52 slightly bent, this corresponding to how a person's hands are likely to be held naturally. It will also be seen that the hand arrangement is such that the backs of the hands are turned slightly forwards. This shaping of the hands 48 and 49, coupled with the fact that

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the overall effective lengths of the arms are slightly different enables the arms to be moved to the "hands-clasped" position illustrated in FIG. 5, wherein the thumb 50 of the right hand engages into the gap between the thumb 51 and fingers 52 of the left hand. While FIG. 5 shows the hands 48, 49 clasped in front of the body, the doll can be arranged with the hands clasped behind the back.

The head 13 of the doll, having its neck flange 29 fitting into the concave depression 27 is able to be moved, within limits as determined by the springs 36 tending to retain the neck 28 in the depression 27, to nodding, lolling, and head-back posture. In addition, rotation of the head 13 relative to the body 10 is possible. Restriction of such rotation to correspond approximately with that possible in a human is achieved, as is illustrated in FIG. 6, for example, by making the neck recess 27 noncircular, and the neck 28 slightly oval so that reaction between the walls of the recess 27 and the neck 28 tends to resist head rotation outside the limits corresponding to those possible in a natural person.

As will have been evident from the foregoing description, the illustrated doll has the advantage over prior known dolls in that its limbs and head can, to a large extent, be positioned only in natural dispositions, so that the attitudes adopted by the doll, when its limbs and head are moved, simulate realistically those of a small child. This makes the doll particularly attractive to children.

In the above described embodiment, the joint members 14 and 16 are illustrated as being separate parts secured into openings in the appropriate ends of the respective limbs.

This form of construction enables the inserts 14 and 16 to be made by injection molding or produced to comparatively accurate shapes while the limbs themselves can be made separately by appropriately more convenient or economical molding techniques, such as slush molding wherein a so-called "skin" in a hot condition has to be extracted through a small aperture in a mold, in that the end of the limb can correspond with the largest diameter or overall cross-section thereof, thereby providing the largest possible size of aperture in the mold for such extraction.

It is possible, however, for the joint members to be formed integrally with their respective limbs, and such a possibility is shown in the embodiment of FIG. 7 wherein the leg joint 14 and arm joint members 16 are formed integrally, e.g. by slush molding techniques using appropriately constructed molds, with their respective limbs. The neck 28 in this case is shown as being provided with a separately formed joint member 30, but the latter can, if desired, also be formed integrally.

The embodiment of FIG. 7 differs from that already described in that the resilient means serving to retain the limbs in position are in the form of elastic (e.g. strong rubber) bands 38a and 35a, these engaging with the respective joint members by C-shaped connectors. No connector 31 is provided between the coupling rod 32 and the joint member 30 of the neck 28, in this embodiment, the coupling rod 32 being connected by its loop 33 directly to the bridge piece 24 of the joint member 30.

In the doll of the invention, it is not essential that the connectors 25 assist in limiting possible movement of the limbs, although it will be appreciated that simplification of the shape of or improvement of the appearance of the skirts of the sockets can be achieved thereby.

It is desirable, of course, that the springs 35, 38 or the bands 35a, 38a, should act on the respective joint members at the centers of the respective bearing surfaces as explained, since this assures that the springs or bands do not influence the positions taken by the limbs, but serve primarily to retain the joint members in their sockets. Resilient means other than the described helical springs or elastic bands can be used.

The invention is not limited to the precise details of the foregoing examples, and variations may be made thereto.

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More particularly, it will be evident from the introduction hereof that the invention is not intended to be limited to dolls, and it can equally be applied, with appropriate shaping of the limb sockets and joint members, to any limbed toy, such as a toy animal.

We claim:

1. A toy comprising a body, a plurality of limbs connected to said body, said body having, for each limb, a depression or socket containing a bearing surface which is substantially part-spherical and being surrounded by a skirt, each limb having, at its appropriate end, a joint member which locates in the respective depression or socket, being retained therein by resilient means within the body and connecting to the joint member which has a complementary part-spherical bearing surface, each skirt and the respective limb adjacent the joint member thereof being complementally shaped to restrict the possible movement of the limbs at least partially to correspond with the possible movement of a corresponding natural limb, by the skirt obstructing movement of the limb, the toy being in the form of a doll, the limbs being the arms and legs of the doll, and means for achieving different effective lengths for said legs, said means comprising an asymmetrical arrangement of the respective leg-associated depressions or sockets with respect to the doll axis.

2. A toy comprising a body, a plurality of limbs connected to said body, said body having, for each limb, a depression or socket containing a bearing surface which is substantially part-spherical and being surrounded by a skirt, each limb having, at its appropriate end, a joint member which locates in the respective depression or

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socket, being retained therein by resilient means within the body and connecting to the joint member which has a complementary part-spherical bearing surface, each skirt and the respective limb adjacent the joint member thereof being complementally shaped to restrict the possible movement of the limbs at least partially to correspond with the possible movement of a corresponding natural limb, by the skirt obstructing movement of the limb, the toy being in the form of a doll, the limbs being the arms and legs of the doll, and means for achieving different effective lengths for the said arms, said means comprising an asymmetrical arrangement of the respective arm-associated depressions or sockets with respect to the doll axis.

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