

Nov. 7, 1967

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3,350,812

LIMB MEMBER FOR A DOLL

Filed April 7, 1965

3 Sheets-Sheet 1

FIG. 1.

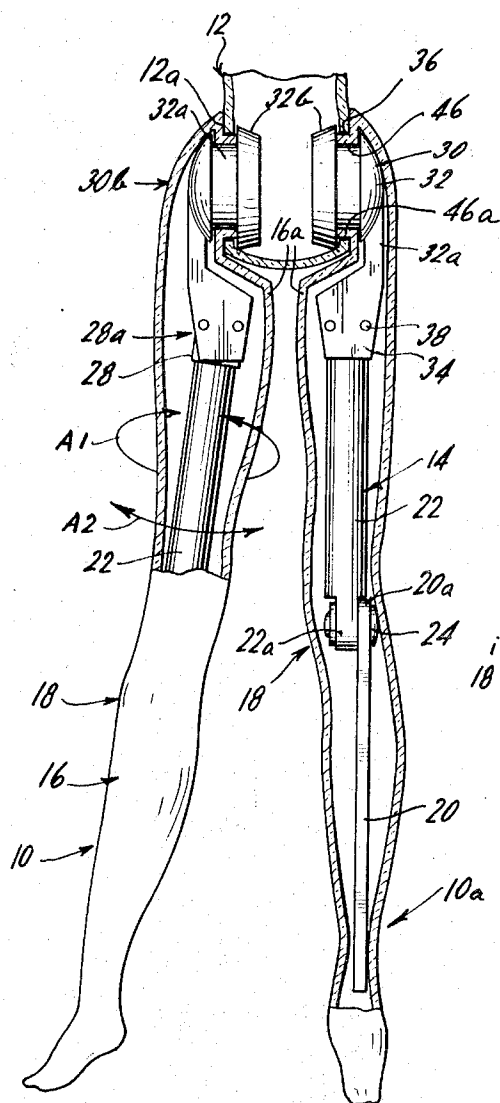


FIG. 2.

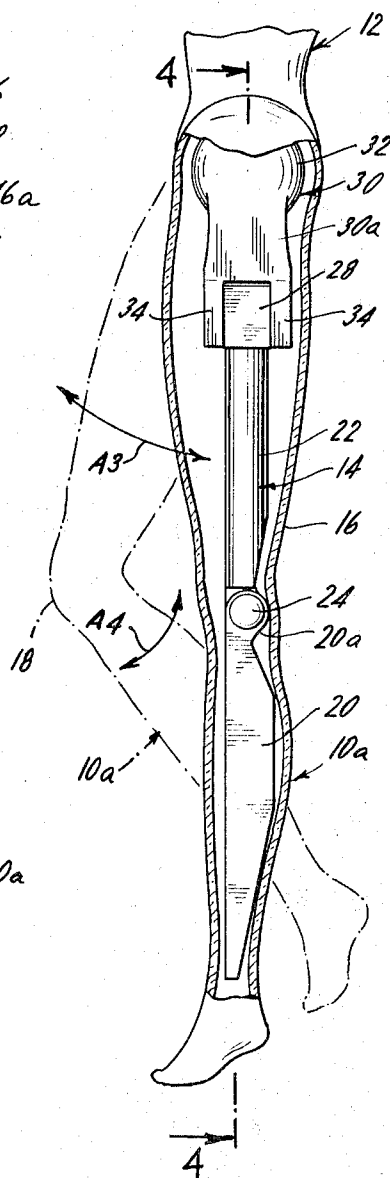
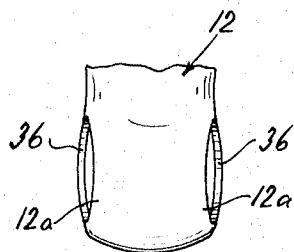


FIG. 6.

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FIG. 3.

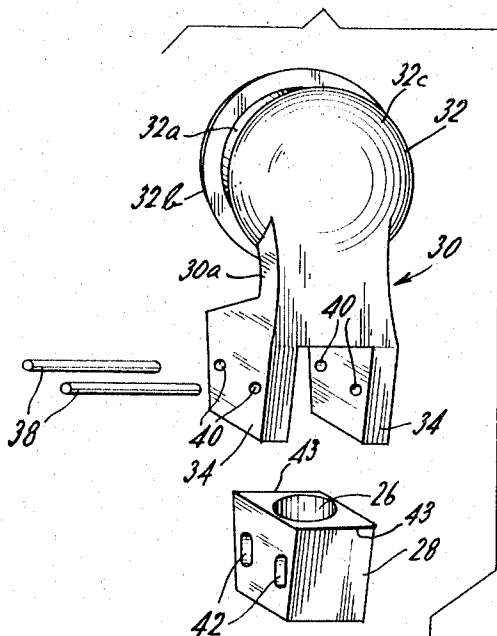
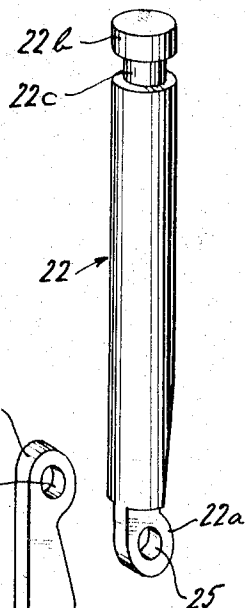
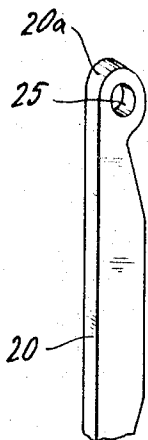


FIG. 4.

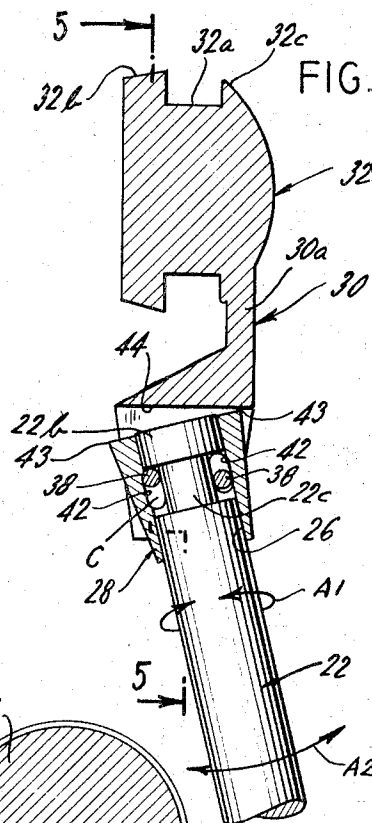
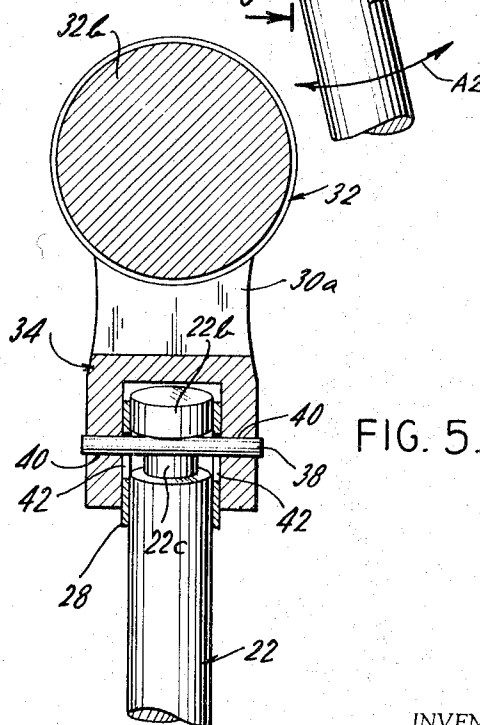


FIG. 5.

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FIG. 7

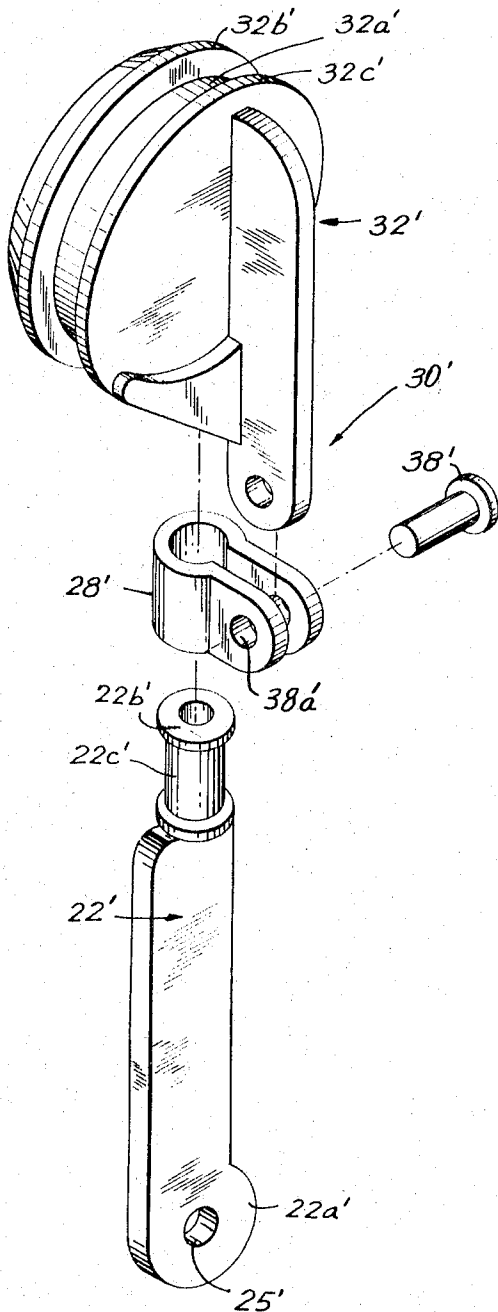
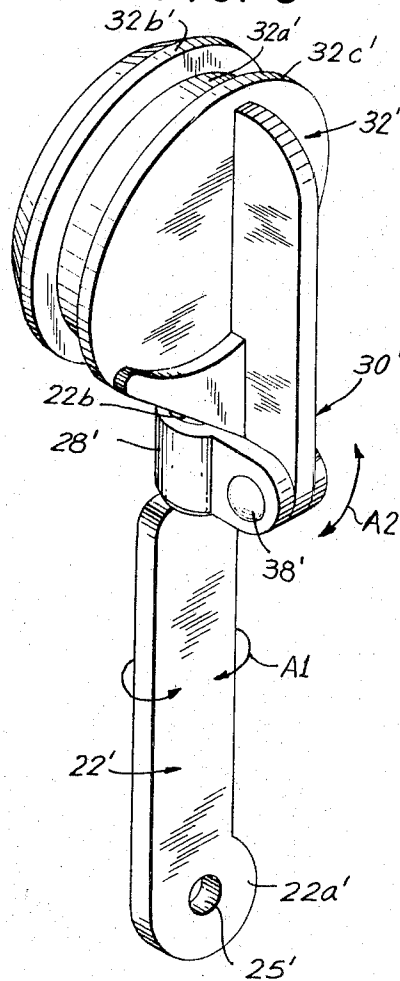


FIG. 8



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LIMB MEMBER FOR A DOLL

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ABSTRACT OF THE DISCLOSURE

An articulating doll's limb terminating in a cylindrical section having a reduced diameter section which is held in place by two pins which straddle the reduced diameter section, the limb being freely rotatable about its longitudinal axis and also having a degree of rocking movement about the axis of the pins.

The present invention relates generally to dolls, and more particularly to a limb member construction for a doll having multi-directional degrees of movement which permits posing the doll in a great variety of positions.

As may be readily appreciated, the play value of a doll is related to the variety of positions in which the doll can be posed, and also to the degree to which a life-like quality is simulated by the doll in these posing positions. Both of these results can be achieved by making suitable provision in the construction of the limb members of the doll, and in particular in the legs thereof, for movement of these limb members into these posing positions. For example, if human movements are simulated, each doll leg should be pivotal about its connection to the doll body to simulate leg movement about the hip joint, bendable at approximately a mid-point of its length to simulate knee movement, and also have the additional two degrees of movement rendering it twistable about its lengthwise axis as well as movable through leg positions of movement towards and away from each other. The last named degree of movement would permit, for example, a crossed-leg posing position. The limb member features of construction which provide these degrees of movement should furthermore be operable to permit these movements simultaneously, and should not be too costly to incorporate in the doll, nor require complicated and difficult assembly procedures.

Broadly, it is an object of the present invention to provide a limb member for a doll which can be articulated through all the important degrees of movement simulating human movements, and greatly increasing as a consequence of these movements the posing position possibilities and play value of the doll. Specifically, it is an object to provide a construction for a limb member for a doll which has at least four degrees of simultaneous movement, and in which these movements are achieved with features of construction which are economically provided. More particularly, an object of the present invention is to provide a limb member having parts which lend themselves to mass production as plastic molded articles of manufacture, and which are adapted to be easily and readily assembled together with a minimum of skilled labor.

Broadly, a limb member construction demonstrating features of the present invention when employed as a doll's leg includes a skeletal mechanism pivotal about its connection to the doll and also pivotal about a point along its length, these two pivots corresponding to the hip and knee joints, and the mechanism having an appropriate degree of swinging movement about each of these two pivots. Additionally, the mechanism is provided with two more degrees of movement by features of construction

thereof incorporated in the mechanism at a location between the hip and knee joints or pivots. These additional degrees of movement render the legs movable towards and away from each other, and also twistable about the longitudinal axis of each of the legs.

Specifically, a limb member construction demonstrating features of the present invention as related to a doll's leg includes an assembly of an internal limb member and an outer leg-shaped covering for the limb member. This limb member is comprised of two elements, pivotally connected to each other at a location corresponding to the knee joint; and at one end the member is additionally pivotally connected to the doll body so that it is pivotal about the doll's simulated hip joint. Between the hip and knee joints, the upper of the two limb member elements, or the element thereof which corresponds to the thigh, terminates in a generally cylindrical shape which is provided with a reduced diameter section spaced inwardly of the end thereof and about which the limb member is rotatable about its longitudinal axis for twisting of the leg. This end of this limb member element is rotatably received in a bearing block and retained therein by two transversely disposed pins which straddle the reduced diameter section. The engagement of this element by these pins at the reduced diameter section thereof prevents removal of the limb member from the bearing block without interfering with rotation of the limb member. Additionally, the limb member can be rocked from one retaining pin to the other through positions of movement transverse to the leg longitudinal axis, thereby providing a most important degree of movement which, for example, permits a crossed-leg posing position which is not usually possible with a posing doll.

The above brief description, as well as further objects, features and advantages of the present invention, will be more fully appreciated by reference to the following detailed description of a presently preferred, but nonetheless illustrative embodiment in accordance with the present invention, when taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a front elevational view of the legs and lower body portion of a doll having features of the present invention, the legs and body portion being partially broken away to illustrate internal details of construction;

FIG. 2 is a side elevational view, projected from FIG. 1, in which a portion of one leg is again broken away to expose internal details of construction thereof, and additionally this leg is illustrated in phantom perspective in a position of movement;

FIG. 3 is an exploded perspective view of the individual elements comprising the leg or limb member of FIGS. 1, 2;

FIG. 4 is a partial elevational view, on an enlarged scale and in section taken on line 4—4 of FIG. 2, further illustrating the construction of the limb member and two important degrees of movement of the same;

FIG. 5 is an enlarged elevational view similar to FIG. 4, in section taken on line 5—5 of FIG. 4, illustrating the pivotal axis of the limb member for the position of movement illustrated in FIG. 4; and

FIG. 6 is a partial elevational view of the lower torso of the doll;

FIGS. 7 and 8 relate to a second embodiment of an articulating limb member for a doll demonstrating features of the present invention, namely, to wit:

FIG. 7 is an exploded perspective view similar to FIG. 3 but illustrating an alternative construction for providing one of the degrees of movement for said limb member; and

FIG. 8 is similarly a perspective view but illustrating said limb member in an assembled condition.

Reference is now made to FIGS. 1, 2 in which there is illustrated an identically constructed pair of legs 10, 10a demonstrating features for a limb member for a doll according to the present invention. The features of construction of the legs 10, 10a and the features of the connection thereof to the doll body 12 which provides the advantages of the present invention could also be applied to the arms of the doll, and thus no limitation is intended by the description herein of these features with particular reference to the legs 10, 10a. Except for the subscript "a" in the general reference designation of the legs which preserves the separate identity of these legs and promotes a better understanding of FIGS. 1 and 2, this lower case subscript has otherwise been omitted as unnecessary in this description; the identical parts of the two legs 10, 10a and of the doll body 12 being herein designated by the same reference numeral.

As is illustrated in FIGS. 1, 2, each of the legs 10, 10a is identically constructed and connected to the doll body 12 so as to have four degrees of movement herein depicted by the double-headed reference arrows designated A1-A4. Each of the legs 10, 10a is comprised of an internal or skeletal mechanism in the form of a generally elongated limb member, generally designated 14, and a pliable leg-shaped body or covering 16 suitably disposed about the limb member 14. In essence therefore, the limb member 14 corresponds to a skeleton, and the covering 16, which is preferably fabricated of an elastomeric material to achieve a desired degree of pliability, provides both in appearance and function a simulated "skin" for the same. As will be more fully explained herein, and as is illustrated by leg 10 of FIG. 1, each of the legs 10, 10a can be twisted about the longitudinal axis of the limb member 14 as illustrated by arrow A1, and also articulated through positions of movement illustrated by the arrow A2. Additionally, and as is illustrated by leg 10a of FIG. 2, each of the legs 10, 10a is pivotal about the connection of the limb member 14 to the doll body 12 as depicted by the arrow A3, and as illustrated by the arrow A4 is also bendable, as at 18, at a point along the length of the limb member 14 which corresponds to the location thereon where the knee of each of the legs 10, 10a would be expected to be provided.

Proceeding now to FIGS. 3-5 and to a detailed description of the limb member 14, it will be better understood how provision is made in the limb member 14 for the degrees of movement A1-A4 in each of the legs 10, 10a. Included in the construction of each limb member 14 are two elements 20 and 22 pivotally connected to each other so as to simulate knee movement in the posing of the doll 12 at the previously referred to knee-joint 18 of each leg 10, 10a. Preferably each of the elements 20, 22 are plastic articles of manufacture, and the respective ends which are pivotally connected to each other, as by the pivot pin 24 disposed in a tight fit through the aligning openings 25, are molded or machined in terminal circular configurations 20a, 22a so as to facilitate pivotal movement about the axis of the pin 24. Element 22, forming the upper portion of each leg 10, 10a or what corresponds to the thigh, will be understood to be generally cylindrical in shape, particularly at its uppermost end 22b. Either suitably molded in the first instance or subsequently machined in this end 22b of element 22, is a reduced diameter section 22c about which the limb member 14 is rotatable or twistable about its longitudinal axis. Rotatably receiving this cylindrical end 22b of the element 22 within a through bore 26, is a bearing block 28 which permits this degree of rotational twist A1 in the limb member 14 and thus in each leg 10, 10a, while the cylindrical end 22b of the element 22 is at all times securely retained and prevented from inadvertent detachment from the bearing block 28. Additionally, the block 28 and element 22 rotatably housed therein is movable through positions of movement depicted by the arrow A2. The degree of movement A2 is of particular importance

in the posing of the doll 12 since it permits a crossed-leg posing position and other posing positions which are not usually possible, and which greatly add to the play value of the doll 12.

To provide the simultaneous degrees of movement A1 and A2 in each limb member 14, the connection of element 22 to the doll 12 is achieved through a limb-suspending member 30 having a socket 32 at one end and opposite end bifurcated extensions 34. The lower portion of the doll 12, or what corresponds to the lower torso, is provided with opposite limb-receiving openings 36 into which each of the legs 10, 10a is rotatably disposed. The opposite side walls 12a of the doll lower torso 12 which are provided with these leg-receiving openings 36 are slightly inclined (see FIG. 6) so that there is a slight life-like converging attitude in the legs 10, 10a when they are mounted in the openings 36. It should also be noted that by virtue of the upper portion 16a of the limb body or cover 16 following the contour of the extensions 34 of the member 30, the fullness of the thigh is realistically simulated.

Block 28 with element 22 therein is mounted between the bifurcated extensions 34, the interconnection of the block 28, the element 22, and the member 30 being achieved by spaced pins 38 force fit at their opposite ends in aligned openings 40 in the extensions 34. Between the extensions 34, the pins 38 extend through slots 42 in the block 28 which open into the vertical through bore 26 and which enable the pins 38 to straddle the reduced diameter section 22c of the limb member 14 beneath terminal larger diameter section 22b. By so engaging the element 22, the pins 38 prevent disengagement of the limb member 14 from the block 28 without interfering with or preventing rotative movement A1 of the limb member 14 about the reduced cylindrical section 22c straddled by the pins 38. Moreover, the limb member 14, as is best illustrated in FIG. 4, has a limited degree of rocking movement A2 about the transversely disposed pins 38. The extent of this movement may be limited by the oversized clearance C provided the slots 42, or in the alternative by abutment of the edges 43 of the block 28 against the undersurface 44 of the medial portion 30a of the member 30, whichever is more desirable since one movement stop is as effective as the other.

Providing the limb member 14 with the degree of movement A3 is the socket portion 32 of the member 30 which, as was previously mentioned, is rotatably mounted in the limb-receiving opening 36 of the doll 12. As is best shown in FIGS. 1 and 4, included in construction of the socket 32 is a reduced diameter section 32a bordered on opposite sides by larger diameter sections 32b and 32c. The limb member 14 is disposed through an opening 46 in the upper portion 16a of the leg-shaped covering 16 into the hollow interior of this covering, the immediate surrounding covering portion 46a about the opening 46 being suitably shaped to snap into place about the socket section 32a and cover over the outer socket section 32c. After completion of the sub-assembly of limb member 14 and covering 16, the limb member socket 32 is snapped into the limb-receiving opening 36 and is rotatable therein through positions of movement A3.

A doll 12 provided with limb member 14, either as legs 10, 10a as herein described or as arms, is capable, by virtue of the degrees of movement A1-A4 of being posed in a great variety of positions, and has a simulated life-like quality to a remarkable degree in these posing positions. Additionally, it will be noted that the limb member 14 or articulated skeleton of the doll 12, is interconnected part-to-part by an interfitting of one member into another. For example, the socket 32 fits within the leg-receiving opening 36, the limb end 22b within the bore 26 of the bearing block 28, the pins 38 within the openings 40 and slots 42, and finally the pivot pin 24 within the aligned openings 25 of the limb elements 20, 22. Thus, to retain the posed positions of the doll 12 it is

necessary only to dimension the interfitting parts so that there is sufficient frictional resistance to movement to achieve this result, and at the same time permit changing the posing positions by overcoming this frictional resistance when it is desired to do so.

From the foregoing, it should be appreciated that a limb construction 14 of the present invention applied to a posing doll 12 permits a variety of posing positions which literally are too numerous to specifically mention. There is nevertheless demonstrated in FIGS. 1 and 2, two posing positions which illustrate the effect of each of the four degrees of movement A1-A4 permitted by the features of construction of the limb member 14. Thus, demonstrated in FIG. 1 is a classic modeling position in which the legs 10, 10a are spread a moderate distance from each other, and the leg 10 smartly turned to the side; a posing position requiring compound leg movement. More particularly, required for this posing position is leg movement A2 about the pivot 28a located between the knee and hip pivots 18 and 30b respectively, and rotative movement A1 about the longitudinal axis of the limb member 14. In FIG. 2, the full line and phantom perspective representations of the leg 10a demonstrate posing positions of movement of this leg requiring pivoting movement A4 about the knee pivot 18 and pivoting movement A3 about the rotative axis of the socket 32 or what is herein designated the hip pivot 30b.

Reference is now made to FIGS. 7 and 8 in which a second embodiment of a limb member is illustrated, and in which the same but primed reference numerals are used to identify similarly functioning parts of each. This limb member embodiment also includes a socket construction 32' for being rotatably mounted in the body of a doll, and additionally is provided with a member 30' extending from said socket construction. The equivalent of a bearing block in the form of a spring member 28' is pivotally mounted with a rivet 38' on the extended end of the member 30'. In practice, the reduced diameter section 22c' of the upper limb member or element 22' is rotatably mounted within said spring member 28'. Thus, the upper leg element 22', as in the previously described embodiment, has pivotal movement A2 about the rivet 38' and also rotative movement A1 within the retaining spring member 28'. Additionally, the entire construction is rotatable about the reduced diameter section 38a' of the socket 32' and, although not shown, it will be understood that the lower leg element of the limb member is appropriately pivotally mounted, as at 25', to the terminal section 22a' of the leg element 22'.

A latitude of modification, change and substitution is intended in the foregoing disclosure, and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1. In a limb construction for a doll, a generally elongated limb member having a generally cylindrical shape at one end thereof, a section of reduced diameter in said cylindrical end of said limb member spaced inwardly of the end thereof and about which said limb member is rotatable about its longitudinal axis, and means connecting said limb member to said doll including a member pivotally mounted at one end to said doll and having bifurcated extensions at its other end, a block having a cylindrical bore rotatably receiving therein said cylindrical end of said limb member, and spaced transversely disposed retaining means mounting said block between said bifurcated extensions and extending on opposite sides of said reduced diameter section for retaining said limb member within said block while permitting rocking movement of said limb member and block between said bifurcated extensions about said spaced apart retaining means.

2. In a limb construction for a doll, a pivotally interconnected two-piece generally elongated limb member having a generally cylindrical shape at one end thereof, a section of reduced diameter in said cylindrical end of said limb member spaced inwardly of the end thereof and about which said limb member is rotatable about its longitudinal axis, and means connecting said limb member to said doll including a member pivotally mounted at one end to said doll and having bifurcated extensions at its other end, a block having a cylindrical bore rotatably receiving therein said cylindrical end of said limb member, and spaced transversely disposed retaining means mounting said block between said bifurcated extensions and extending on opposite sides of said reduced diameter section for retaining said limb member within said block while permitting rocking movement of said limb member and block between said bifurcated extensions about said spaced apart retaining means.

3. In a limb construction for a doll, a pivotally interconnected two-piece generally elongated limb member having a generally cylindrical shape at one end thereof, a section of reduced diameter in said cylindrical end of said limb member spaced inwardly of the end thereof and about which said limb member is rotatable about its longitudinal axis, a member pivotally mounted at one end to said doll and having bifurcated extensions at its other end, a block having a cylindrical bore for rotatably receiving therein said cylindrical end of said limb member and having spaced slots disposed transversely of and opening into said cylindrical bore, and retaining means disposed within such spaced slots mounting said block between said bifurcated extensions and extending on opposite sides of said reduced diameter section for retaining said limb member within said block while permitting rocking movement of said limb member and block between said bifurcated extensions about the spaced apart retaining means.

4. A doll having a body provided with limb-receiving openings therein, and at least one limb member for said doll comprising a pivotally interconnected two-piece generally elongated limb member having a generally cylindrical shape at one end thereof, a section of reduced diameter in said cylindrical end of said limb member spaced inwardly of the end thereof and about which said limb member is rotatable about its longitudinal axis, a member pivotally mounted at one end within said limb-receiving opening and having bifurcated extensions at its other end, a block having a cylindrical bore for rotatably receiving therein said cylindrical end of said limb member and having spaced slots disposed transversely of and opening into said cylindrical bore, and spaced retaining pins of lesser diameter than said slots disposed within said spaced slots mounting said block between said bifurcated extensions and extending on opposite sides of said reduced diameter section for retaining said limb member within said block while permitting rocking movement of said limb member and block between said bifurcated extensions about said spaced apart retaining pins.

References Cited

UNITED STATES PATENTS

1,713,993	5/1929	Campi	287-3
2,174,932	10/1939	Weis	46-161
2,776,152	1/1957	Ianuzzi	46-163 XR
2,887,822	5/1959	Baggott	46-173 XR
3,010,253	11/1961	Ostrander	46-161
3,016,652	1/1962	Gardel	46-173 XR

FOREIGN PATENTS

350,076	10/1905	France.
194,858	1/1907	Germany.

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