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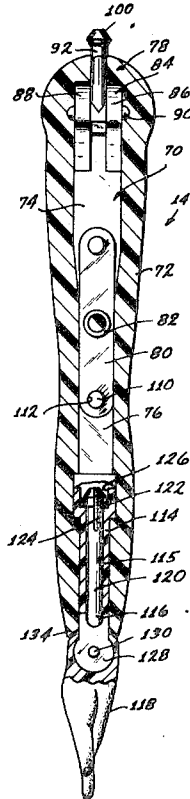
[54] **ARTICULATED FASHION DOLL**  
**1 Claim, 11 Drawing Figs.**

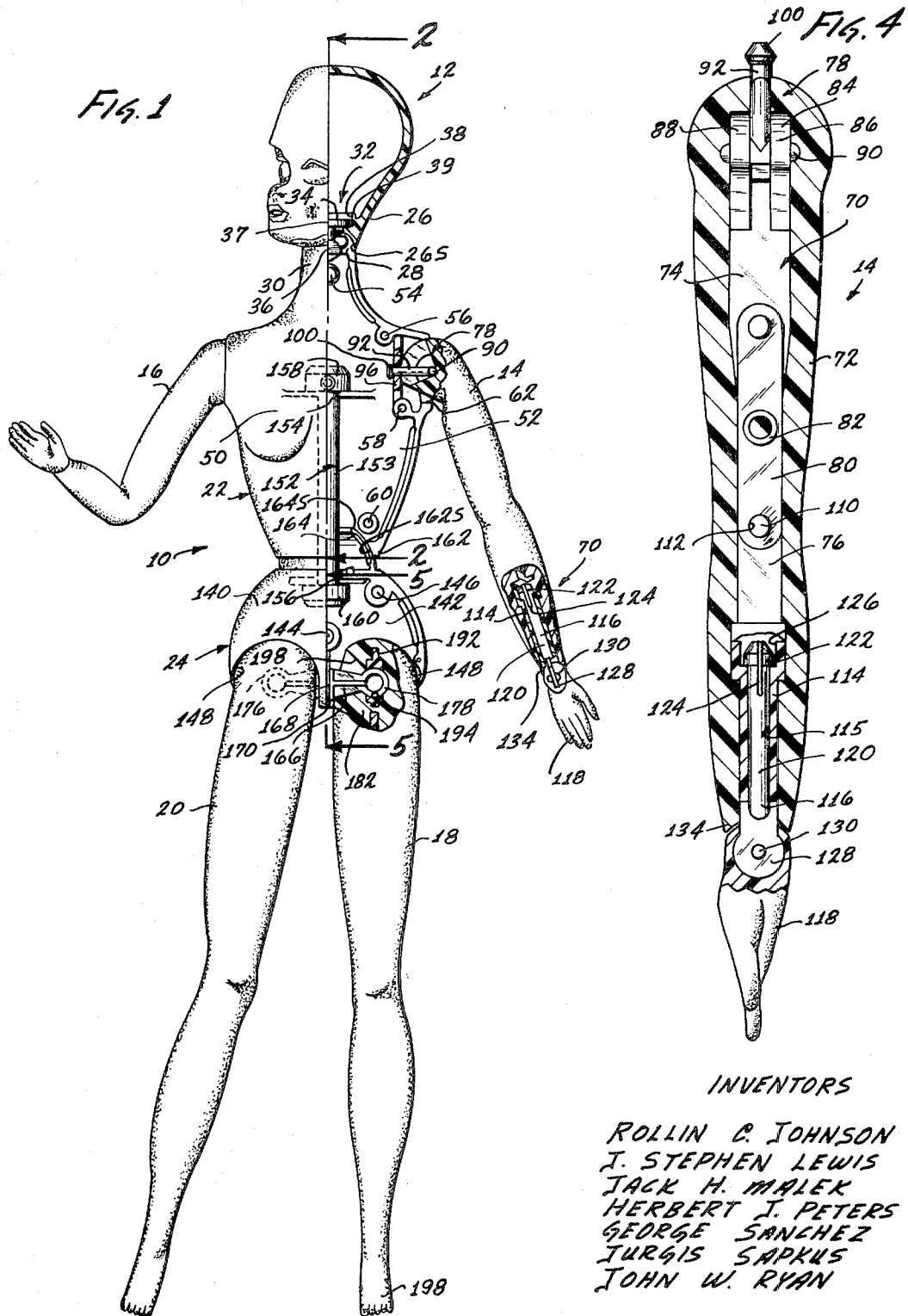
[52] U.S. Cl..... **46/161, 46/163**

[51] Int. Cl..... **A63h 3/20**

[50] Field of Search..... **46/161, 163, 173, 162**

**ABSTRACT:** A doll of lifelike appearance with limbs that move in a lifelike manner. The head of the doll is coupled to the neck by a double ball-and-socket joint that permits turning and tilting of the head. The upper arm is connected to the shoulders by a combined ball-and-socket and pin joint, while the hand is coupled to the arm by a double-pin joint. The leg is connected to the torso by a sidewardly extending ball-and-socket joint that allows the legs to move apart and together as well as to kick up and back, while the foot is connected to the lower leg by a ratchet joint to position the foot for low and high heel shoes.





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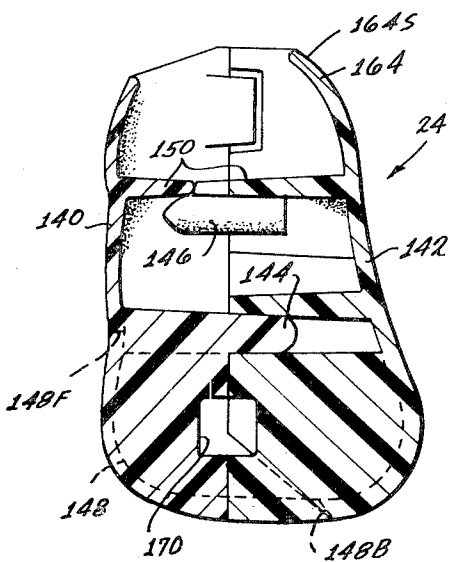
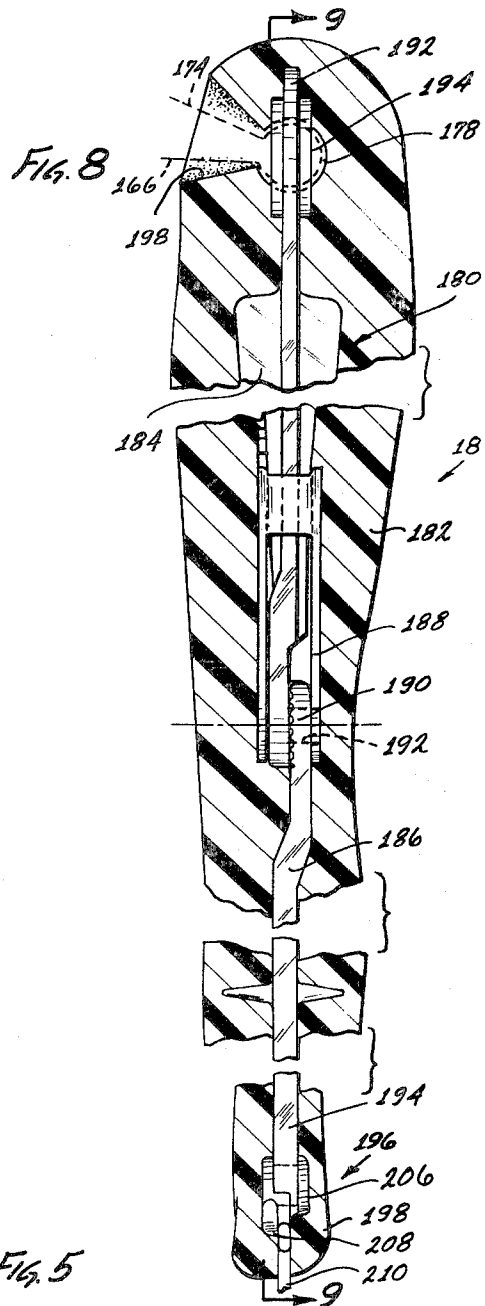
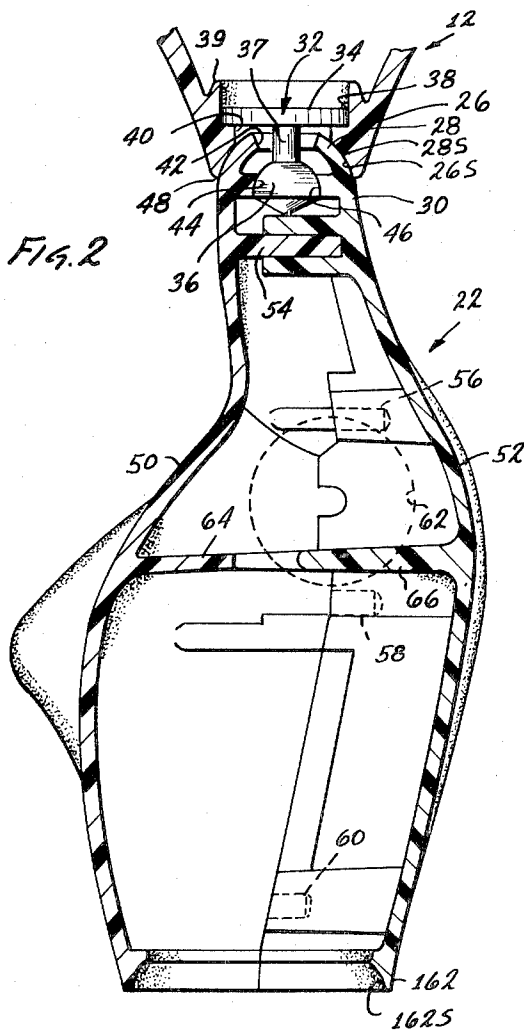


FIG. 5

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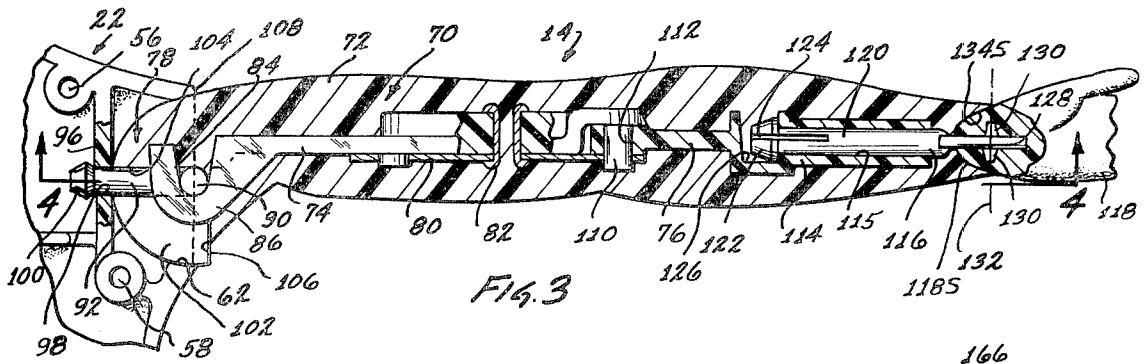


Fig. 3

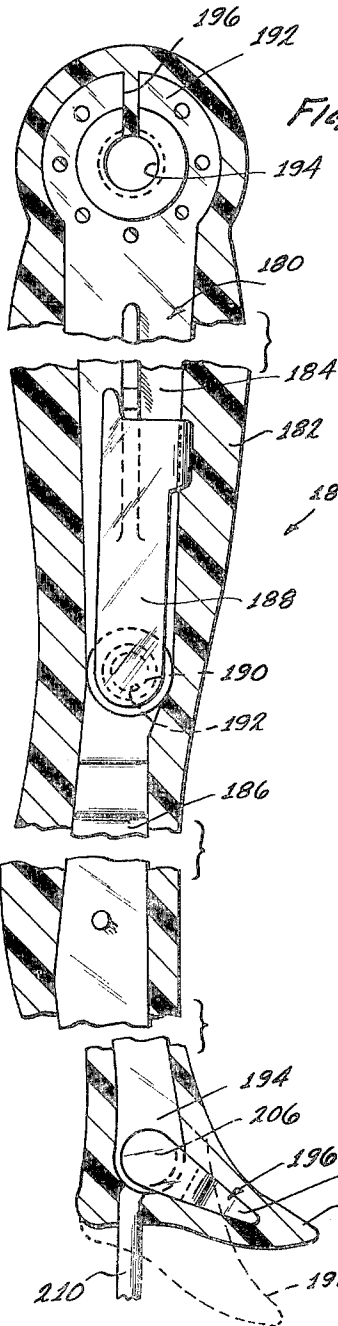


Fig. 9

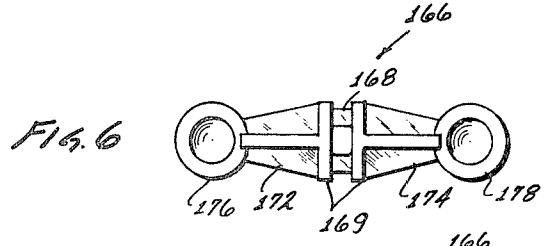


Fig. 6

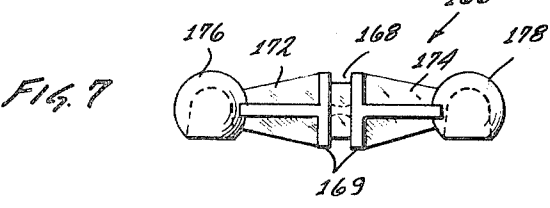


Fig. 7

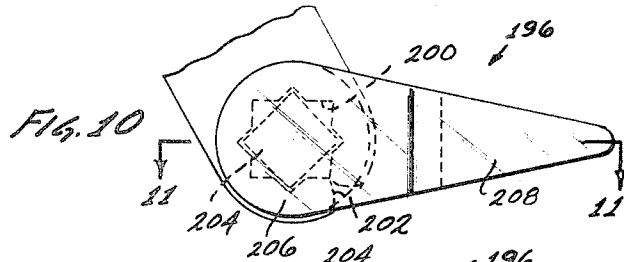


Fig. 10

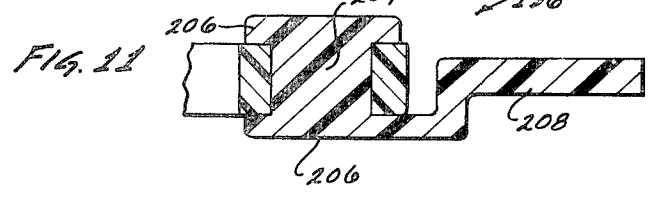


Fig. 11

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## ARTICULATED FASHION DOLL

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

This invention relates to dolls with articulated limbs.

## 2. Description of the Prior Art

A wide variety of dolls have been constructed with articulated limbs for simulating the human figure in many poses. While joint constructions are known which permit a wide range of movement, they generally result in a limb of unnatural appearance. Furthermore, such joints have generally been complicated and expensive. Joints of relatively simple construction which allowed natural limb movements and a natural limb appearance would enable the construction of inexpensive yet highly entertaining dolls.

## OBJECTS AND SUMMARY OF THE INVENTION

An object of the present invention is to provide dolls of natural appearance and movement.

Another object is to provide a doll of relatively simple construction which can be posed in a wide variety of positions.

Still another object is to provide a female fashion doll which can assume poses appropriate to a fashion model.

In accordance with the present invention, a doll is provided which has limbs of relatively natural appearance which can be moved to pose the doll in a wide variety of orientations. In one embodiment of the invention, a fashion doll is provided which has a neck, waist, arms and legs that can be moved in a lifelike manner. The neck has a convex upper end and the head has a concave portion that moves on the neck to enable the head to rotate and to tilt about 10° up and down without creating a gap between the head and neck. A head connector has one end fixed to the head and has an opposite end with a ball that is engaged with a socket in the neck to hold the head onto the neck.

The upper arms of the doll are joined to the torso by T-shaped pins that allow pivoting around two axes to enable the arms to acquire any position. The stem of the T-shaped pin is rotatably mounted on the torso shoulder to permit a 360° rotation of the upper arm about an axis passing along its length. The arm is pivotally joined to the cross the the T-shaped pin to enable the arm to be pivoted into raised and lowered positions. The upper end of the arm is convex and it is held against a concave depression in the torso shoulder to prevent the creation of a gap between them as the arm pivots. The elbow contains a joint for raising and lowering the lower arm, while the wrist contains a joint that permits rotation and swiveling of the hand.

The upper and lower sections of the torso are joined by a rubber armature that is under tension. At the doll's waist where the torso sections are in contact, one torso section is convex and the other concave to permit relative tilting while preventing the appearance of a gap. The rubber armature holds the torso sections tightly together to provide friction between them that helps to retain them in any posed position. The armature also permits rotation of the torso sections relative to each other.

The upper leg is joined to the torso by a sidewardly extending ball-and-socket joint that permits the leg to be raised upward or backward. A cone-shaped aperture in the leg covering permits the leg to also swivel away from and toward the other leg. The knee contains a joint for bending the lower leg backward. The ankle has a swivel joint that latches in either of two positions to simulate foot positions for wearing low and high-heeled shoes.

The novel features of the invention are set forth with particularity in the appended claims. The invention will best be understood from the following description when read in conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation view, partly in section, of a doll constructed in accordance with the invention;

FIG. 2 is a sectional side view of the upper doll torso and head taken on the line 2—2 of FIG. 1;

FIG. 3 is a sectional front view of the left arm assembly of FIG. 1, but with the arm in a raised position;

FIG. 4 is a sectional view of the arm assembly of FIG. 3, taken on the line 4—4 thereof;

FIG. 5 is a sectional side view of the lower doll torso taken on the line 5—5 of FIG. 1;

FIG. 6 is a front elevation view of the leg axle of the doll of FIG. 1;

FIG. 7 is a plan view of the leg axle of FIG. 6;

FIG. 8 is a sectional front view of the left leg assembly of the doll of FIG. 1;

FIG. 9 is a sectional side view of the leg assembly of FIG. 8 taken on the line 9—9 thereof;

FIG. 10 is a partial side elevation view of the ankle portion of the leg assembly of FIG. 8; and

FIG. 11 is a sectional view taken on the line 11—11 of FIG. 10.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates a doll constructed in accordance with the invention which represents a female fashion model, the doll having a torso 10, head 12, left and right arms 14, 16 and left and right legs 18, 20. The head, arms and legs are each movable with respect to the torso; and the upper torso section 22 and lower torso section 24 are movable with respect to each other. In addition, different portions of the arms and legs can be pivoted relative to each other. The various body parts are constructed to allow posing of the doll in a wide variety of positions which may be normally assumed by the human body, particularly those appropriate to a female fashion model, yet the parts are constructed to provide a close to natural appearance in any of such positions.

The head, as shown in FIGS. 1 and 2 has a lower end 26 with a concave surface 26S which is received on a convex upper end 28 of the neck portion 30 of the torso. The head and neck are held together by a coupling 32 which has an upper end 34 held to the head, a lower end 36 held to the neck and a center portion 37 extending through apertures in the head and neck. The lower end of the head has head bracket means 39 with a recess 38 which receives the upper end of the coupling, and an aperture 40 through which the coupling extends. The coupling extends down through an aperture 42 in the neck, and the lower end of the coupling is received in a socket 44 formed in the neck.

The lower end 36 of the coupling is formed as part of a sphere or ball which can pivot in the socket 44. The center of curvature 46 of the ball and socket is the same as the center of curvature of the convex neck surface 28S and concave head surface 26S. Thus, the head can tilt up and down relative to the neck, the head being restrained from upward movement by the coupling and restrained from downward movement by the concave and convex head and neck surfaces 26S, 28S. The aperture 42 in the neck limits the amount of up and down head tilting to about 10° in any direction, before the coupling abuts the walls of the neck aperture. Within this limit of tilt, no gap appears between the head and neck, so that it has a natural appearance. The double ball-and-socket joint also allows unlimited turning of the head on the neck about a vertical axis.

It may be noted that a similar head movement could be achieved by the use of a convex head portion and concave depression in the neck instead of the reverse. However, this would result in the line 48 where the front of the head and neck meet being located down along the neck when the head is tilted up, which would produce an unnatural appearance. The joint arrangement allows for head tilting in any direction as well as rotation, with a relatively simple single joint assembly that provides for a close to natural appearance.

The upper torso section 22 is formed by front and rear halves 50, 52 that can be held together. Pin 54 and pairs of pins 56, 58 and 60 of the front torso half are held in corresponding holes formed in the rear half. The two torso halves

also form arm apertures 62, for receiving the doll arms, and have bracket portions 64, 66 for engaging a torso connector that connects the upper and lower torso sections. A more complete description of the arm apertures and torso connector will be given below.

FIGS. 1, 3 and 4 show the details of the left arm 14, the right arm having a similar construction. The arm 14 comprises an armature assembly 70 which is surrounded by a covering 72 of flexible, flesh colored material such as a vinyl plastic. The armature assembly includes an upper arm insert 74, a lower arm insert 76, and a shoulder pin 78 for joining the upper arm insert to the upper torso section. An elbow retainer member 80 keeps the upper and lower inserts together, and a rivet 82 joins the elbow retainer to the upper arm insert.

The upper end 84 of the upper arm insert is bifurcated with both portions 86, 88 thereof of a hooklike shape that defines a bearing aperture. The shoulder pin 78 is of T-shape, with the cross portion 90 pivotally engaged by the hooked upper end 84 of the arm insert. The stem portion 92 of the shoulder pin extends between the bifurcated portions 86, 88 and thence to the upper torso 22. A bracket 96 on the upper torso has an aperture 98 for receiving the stem portion of the shoulder pin. The aperture 98 forms a bearing that defines an axis of rotation for the doll arm that extends along the length of the arm when the arm is raised. A boss or enlarged end 100 on the pin retains it on the torso bracket. The coupling between the stem portion 92 of the pin and the torso bracket 96 allows a 360° rotation of the arm about a substantially horizontal axis that passes through the axis of the stem portion 92.

The flexible covering 72 completely surrounds the upper arm insert, except for a slot 102 therein. The slot 102 extends about 90° between the positions 104 and 106, and is only as wide as the shoulder pin portion 92. The covering surrounds the hooklike end 84 to prevent the shoulder pin from coming out when the arm is raised up. When the arm 14 is raised to a horizontal position, as shown in FIG. 3, the pin abuts the covering at position 104, which prevents raising of the arm any higher. This does not detract appreciably from the versatility of doll movement required for play, and anyway, further raising of the arm would cause interference between the arm and the upper edge of the torso at 108. Thus, the arm has a lifelike appearance, and can be rotated about a horizontal axis and pivoted up to the horizontal.

The lower arm insert 76 is joined to the upper arm insert to enable natural elbow pivoting. A trunnion 110 on the upper insert projects through a hole 112 in the lower insert to enable pivoting between them. The elbow retainer 80 fits over the boss to keep in engaged with the lower insert, while the rivet 82 holds the retainer in place. The covering 72 is flexible enough to allow the arm to pivot at the elbow. The fit between the trunnion 110 and hole 112 provides sufficient interference to keep the elbow posed in any position to which it is bent.

The lower arm insert 76 has a tubular end portion 114 including passageway 115 opening toward the hand location, which receives a wrist insert 116 that holds the doll hand 118. The wrist insert 116 includes a shaft portion 120 with an enlarged upper end 122. A slot 124 (see FIG. 1) is formed in the upper end to split it into two portions. The enlarged end 122 can be inserted into an enlarged chamber area 126 of the arm insert, but cannot be readily pulled out therefrom. Once inserted into the lower arm, the wrist insert can be rotated about its shaft portion to rotate the hand 118 to any angle thereabout.

The lower end 128 of the wrist insert forms a disc which has a pair of trunnions 130 that pivotally connect it to the hand, to permit hand pivoting about an axis 132 that is perpendicular to the length of the arm. This allows the doll wrist to be bent up and down to achieve a variety of positions assumed by a fashion model in sophisticated poses. The disc form of the end 128 allows it to pivot even though it is surrounded by covering material. The outer end 134 of the lower arm has a concave surface 134S while the inner end of the hand has a convex surface 118S to allow them to rotate on each other without the

appearance of a gap. The centers of rotation of the surfaces 118S and 134S are on the same axis 132 as the trunnions.

The lower torso section 24, which is shown in FIGS. 1 and 5, is constructed of front and rear halves 140, 142. A pin 144 and a pair of pins 146 on the front-half fit into corresponding holes in the rear-half to hold the halves together. The lower torso halves form leg apertures 148 for receiving the legs. A pair of bracket portions 150 near the top of the torso section are provided for engaging a torso connector. As shown in FIG. 1, a torso connector 152 extends between the upper and lower torso sections to join them. The connector, which is constructed of rubber or other elastic material, has a rod portion 153 that projects through apertures 154, 156 in the connector bracket portions of the torso sections, and has enlarged ends 158, 160 that retain it in place.

The lower end 162 of the upper torso section has a concave surface 162S, while the upper end 164 of the lower torso section has a convex surface 164S that enables the doll to swivel at the waist. The connector 152 is installed in a slightly stretched state so that there is substantial friction between the torso sections to hold them in any position to which the doll has been posed. The connector allows the torso sections to be swiveled to some extent, because of its long length and elastic construction which enables appreciable bending. The connector also allows the torso sections to be rotated relative to each other, and holds them posed in any relative rotational configuration.

A leg axle 166, shown in FIG. 1, 6 and 7 couples the legs to the lower torso section. The leg axle has a center section 168 which is held in a torso aperture 170 and which has flanges 169 for preventing sideward axle shifting, a pair of cruciform connector portions 172, 174 extending outwardly from the center section, and a pair of ball members 176, 178 at the outer ends of the cruciform portions. The ball members engage the legs 18, 20 to hold them while allowing the legs to kick up and back, and to spread apart and together.

FIGS. 1, 8 and 9 illustrate the left leg 18, the right leg being constructed in a similar manner. The left leg comprises a leg armature assembly 180 which is surrounded by a covering 182 of flexible, flesh colored material such as a vinyl. The armature assembly includes an upper leg insert 184, a lower leg insert 186, a knee retainer 188 for holding the upper and lower leg inserts together, and a foot insert 196 joined to the lower leg insert.

The upper end 192 of the upper leg insert has a socket 194 for holding the ball 178 of the leg axle. A slot 196 is formed in the socket to enable slight spreading to receive the ball during assembly of the doll. The flexible leg covering has a cone-shaped aperture 198 extending sidewardly from an inner side of the leg to the socket, to allow the connector part 178 of the leg axle to extend to the socket. The ball 178 and socket 194 allow the leg to be raised or "kicked" up or back without limit, until the leg abuts the walls of the leg apertures 148 in the lower torso at the limits 148F and 148B thereof. The cone-shaped aperture 198 allows the leg to pivot away from the other leg up to 20° by reason of the fact that it radiates at an angle from the socket. The cone-shaped aperture also allows the leg to rotate about an axis extending along its length, by up to 20°. Thus, the leg-to-torso joint uses a single-leg axle member 166 and relatively simple sockets on the legs, to provide a joint which enables a variety of leg movements using a leg of natural appearance.

The lower leg insert 186 is joined to the upper leg insert to enable natural knee pivoting. A trunnion 190 on the upper leg insert projects through a hole 192 in the lower insert to enable pivoting between them. The knee retainer 188 lies on either end of the trunnion to hold it on the lower insert. The leg covering 182 is flexible enough to permit substantial knee bending.

The lower end 194 of the lower leg insert holds a foot armature or insert 196 which can be adjusted to hold the foot 198 in a position for wearing low heel shoes or in a position 198A for wearing high heel shoes. As also shown in FIGS. 10 and 11,

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the lower end or ankle portion of the leg insert has an eight-sided bearing hole 200, and a slot 202 leading from the end to the bearing hole. The foot insert has a four-sided shaft portion 204 that projects through the bearing hole and flanges 206 either end for retaining it thereon. An outer end 208 of the foot insert extends from one of the flanges. The foot insert can be pivoted relative to the lower leg insert, and it is latched at every one-eighth turn. The portions of the lower leg insert on either side of the slot 202 therein spread slightly to allow the foot portion to pivot. The foot portion is normally held in only two positions, one to adapt the doll to wear flat or low heel shoes, and the other to adapt it to wear high heel shoes in a natural manner.

The legs are constructed by placing a complete leg armature assembly in a mold which is then filled with the flexible material of the covering 182. A cone-shaped member (not shown) is used to hold the upper end of the armature assembly in place, while a bracket 210, shown in FIGS. 8 and 9 is used to hold the lower portion in place. After the vinyl or other covering material is formed about the armature the bracket 210 is broken off at a point within the heel so it does not protrude (only a hole is left in the heel).

Thus, the invention provides a fashion doll of natural appearance which is capable of being posed in a wide variety of configurations appropriate to such a doll. Although particular

embodiments of the invention have been described and illustrated herein, it is recognized that modifications and variations may readily occur to those skilled in the art and, consequently, it is intended that the claims be interpreted to cover such modifications and equivalents.

We claim:

1. In a doll of natural human appearance, with arms having lower arm portions of pliable material, the improvement comprising:

A substantially rigid tubular armature portion embedded in said lower arm portion, said tubular armature portion having a passageway opening toward the hand location which includes an enlarged chamber portion remote from the hand location;

a hand assembly comprising a substantially rigid pin with a shaft portion in said tubular portion, said shaft portion including a knob at its inner end in said chamber portion to enable pin rotation while preventing removal of the pin, said pin including an outer end with a bearing thereon, said bearing comprising a disc with integral trunnions extending from either side thereof at its axis, and said assembly including a hand embracing said disc and pivotally mounted on said trunnions.

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