

Nov. 28, 1961

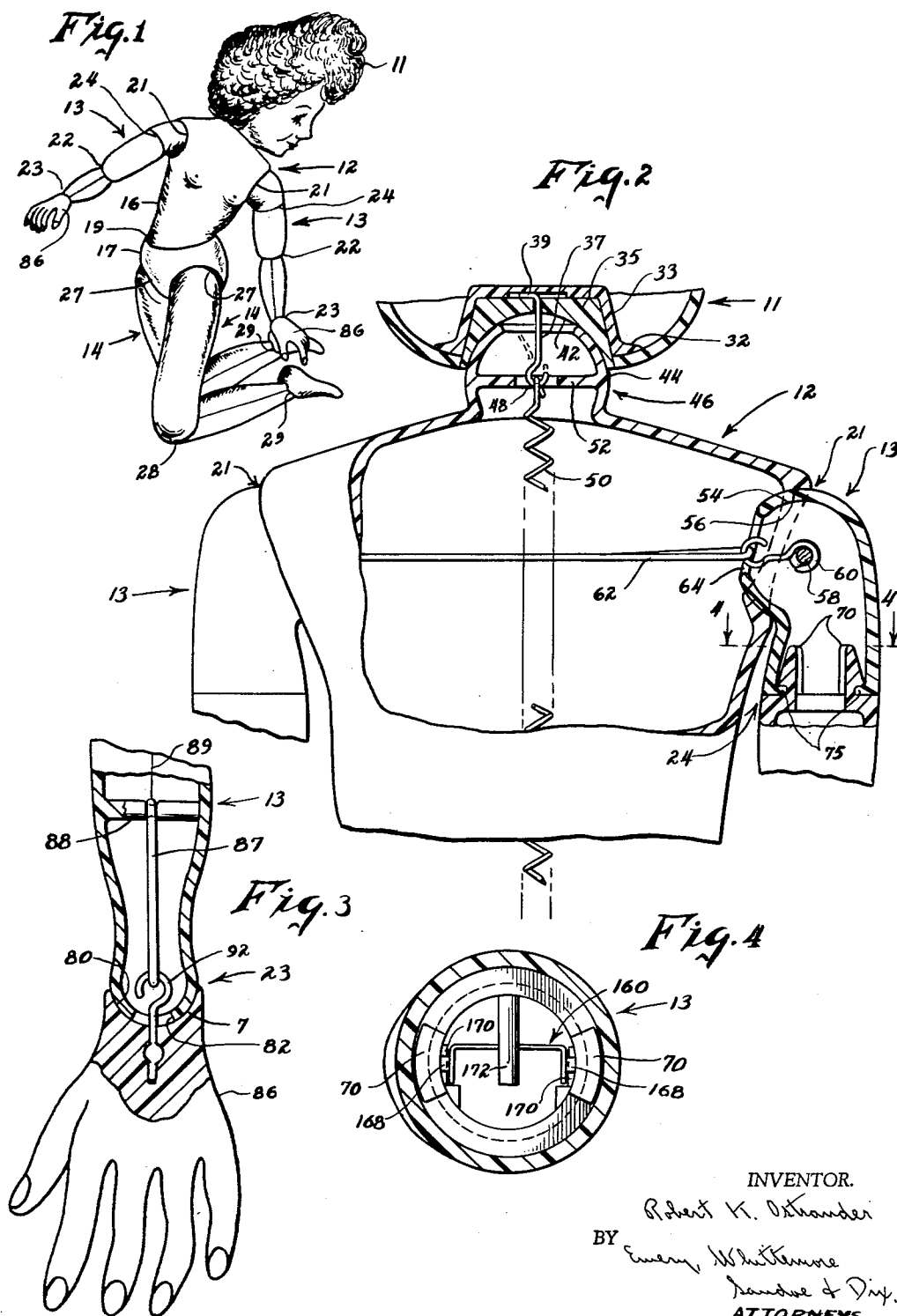
R. K. OSTRANDER

3,010,253

JOINTED DOLL

Filed Jan. 17, 1958

2 Sheets-Sheet 1



INVENTOR.

Robert K. Ostrander

BY Emory W. Whittemore
Lawson & Day,
ATTORNEYS

Nov. 28, 1961

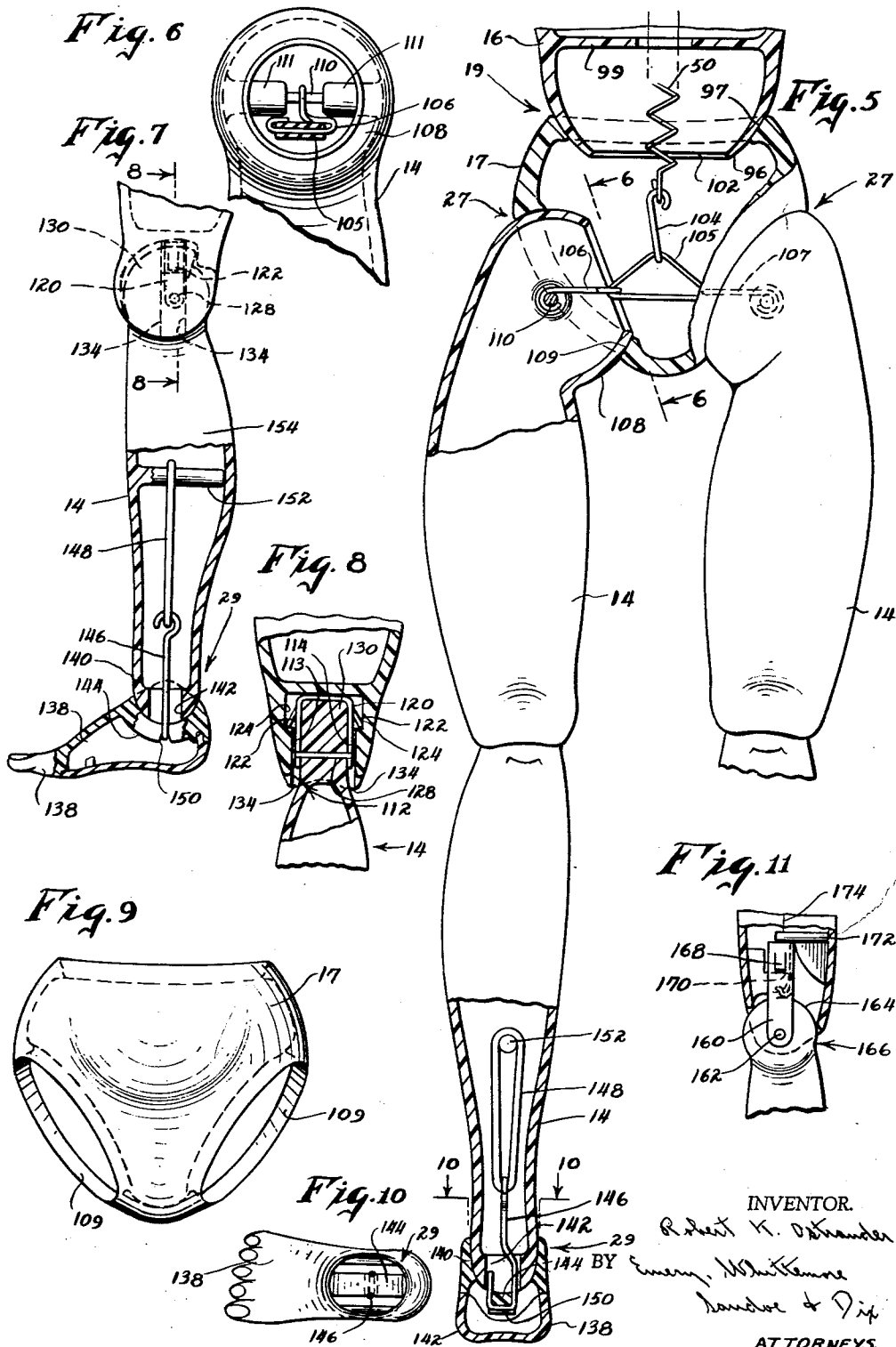
R. K. OSTRANDER

3,010,253

JOINTED DOLL

Filed Jan. 17, 1958

2 Sheets-Sheet 2



INVENTOR.

Robert K. Ostrander

BY Emory Whittemore

Attorney & Dip.

ATTORNEYS

1

3,010,253

JOINTED DOLL

Robert K. Ostrander, 497 Prospect St., Maplewood, N.J.
Filed Jan. 17, 1958, Ser. No. 709,677
2 Claims. (Cl. 46-161)

This invention relates to dolls and more especially to jointed dolls.

It is an object of the invention to provide a jointed doll which is capable of taking more different positions than any of the dolls of the prior art. More especially, it is an object of the invention to provide a fully jointed doll which is capable of taking substantially any position which the human body can take.

The invention includes a doll construction having combinations of pivoted and ball and socket connections providing the wide variety of adjustments described while at the same time having body and limb contours which approximate those of a human being. Some features of the invention relate to the manner in which the parts of the body, particularly the limbs and torso, are held in place by simple and inexpensive connections which are easily assembled.

Other objects of the invention are to provide a doll body made in two parts connected in such a way that the body can swing in any direction from the hips, and can also turn in any direction independently of the swinging movement; and in which the legs are so shaped and connected to the body, that the doll can cross its legs in realistic fashion.

Other objects, features and advantages of the invention will appear or be pointed out as the description proceeds.

In the drawing, forming a part hereof, in which like reference characters indicate corresponding parts in all the views;

FIGURE 1 is an assembly view showing a doll made in accordance with this invention;

FIGURE 2 is a greatly enlarged sectional view showing the connections of the head and arms to the upper portion of the body of the doll shown in FIGURE 1;

FIGURE 3 is an enlarged sectional view of the wrist joint of the doll;

FIGURE 4 is an enlarged sectional view taken on the line 4-4 of FIGURE 2 and showing the joint whereby the arm can be turned;

FIGURE 5 is an enlarged sectional view through the torso and leg connections, and also showing the ankle joint for one leg;

FIGURE 6 is an end view of one leg taken on the line 6-6 of FIGURE 5;

FIGURE 7 is a side view of the leg shown in FIGURE 5;

FIGURE 8 is a sectional view on the line 8-8 of FIGURE 7;

FIGURE 9 is a front elevation of the lower part of the body;

FIGURE 10 is a sectional view taken on the line 10-10 of FIGURE 5; and

FIGURE 11 is a sectional view through one of the elbow joints.

This application is a continuation-in-part of my patent application, Serial No. 640,504, filed February 15, 1957, now abandoned.

FIGURE 1 shows a doll having a head 11, a body 12, arms 13 and legs 14. The body 12 is made of upper part 16 and a pelvis or lower part 17, and these parts

2

are joined together at a ball and socket connection 19 located at the torso of the doll. This torso joint permits the upper part 16 of the body to swing in any direction and permits the upper part of the body to turn independently of the position into which it swings, as will be more fully explained in connection with one of the sectional views.

The expression "ball and socket joint" is used herein to designate a joint in which the bearing surfaces between the two parts have a substantially common center of curvature. These bearing surfaces may be merely zones of a sphere and they need not be continuous surfaces. The "center of the joint" is the center of curvature of the bearing surfaces.

The doll has each of its arms joined to the upper part 16 of the body by a ball and socket shoulder joint 21. Each arm also has an elbow joint 22 and a wrist joint 23. Between the shoulder and the elbow, there is a rotatable biceps joint 24 which permits the portion of the arm below this joint 24 to rotate.

Each of the legs 14 is connected to the lower part 17 of the body by a ball and socket leg joint 27. There is a pivoted knee joint 28 in each leg, and an ankle joint 29 for connecting the foot to the lower end of the leg. The construction of all of these joints will be described more fully in connection with the detail views.

The head 14 is preferably made of soft plastic material, such as the vinyl plastic commonly used for high-grade dolls. There is an opening in the lower end of the head which snaps over a flange 32 of an outer cap 33 extending up into the head. The peripheral edges of the opening through the head contact with an under cap 35 extending downwardly below the flange 32. The outer cap 33 and under cap 35 are secured together, preferably by cement, and there is a joining hook 37 extending downwardly from the center of the under cap 35. This joining hook 37 is preferably made of wire with an upper spiral end 39 clamped between the caps 33 and 35.

This construction secures the head to the composite cap structure; and a bottom surface 42 of the under cap 35 is concave and spherical and bears against a convex surface 44 of a neck ball 46 at the upper end of the doll body 12. The bearing surfaces 42 and 44 have a common center of curvature 48 and thus comprise a ball and socket joint on which the head can swing and turn in any direction.

The head 11 is held on the body by a joiner 50 which is preferably a helical spring or other elastic tension element which engages the hook 37, at the center of curvature 48 of the ball and socket connection of the head of the body. This joiner 50 has its lower end connected to some other part of the doll and in the construction illustrated, the joiner 50 also serves to hold the legs on the doll, as will be explained in connection with FIGURE 5.

Assembly of the doll is simplified by having the joiner 50 perform more than one function but for the present it is sufficient to understand that the joiner 50 is under tension and that it urges the hook 37 downwardly so as to maintain the bearing surfaces 42 and 44 in firm contact with one another.

In order to prevent the pull or the joiner 50 from biasing the head 14 toward a center position, the joiner 50 is located so that it extends to the center of curvature 48 of the head joint, and means are provided for maintaining the joiner 50 in a center position regardless of the position to which the head may be moved. In the construction illustrated, this means comprises an annular vane

52 extending inwardly from the sides of the neck ball 46. The center opening through the annular vane 52 is large enough to receive the upper end of the joiner 50, and as the head 14 swings on the neck ball 46, the hook 37 swings about its connection to the joiner 50 and about the center of curvature 48 without changing the tension of the joiner. This swing movement of the hook 37 is indicated in dotted lines in FIGURE 2.

The angle through which the head 14 can swing is determined by the size of the opening in the neck ball through which the hook 37 extends.

Each of the arms 13 has a spherical surface 54 at its shoulder end. This spherical surface 54 bears against a concave spherical surface 56 provided at a shoulder opening of the body. The ball surface 54 and socket surface 56 have a substantially common center of curvature 58. A cross pin 60 is located in the hollow upper end of the arm 13 and this cross pin 60 is connected with a joiner 62 at the center of curvature 58.

The joiner 62 extends through an opening 64 in the upper part of the arm 13; and the arm can swing in any direction about the center 58 until the edge of the opening 64 comes in contact with the joiner 62. The arm 13 is also free to rotate about the line of the joiner 62, and this combined rotary and swinging movement makes the shoulder joint a universal ball and socket connection with the same freedom of movement as the head on the neck ball, already described.

Rotary movement of the arm about its own length is obtained by the rotatable biceps joint 24. This joint 24 is formed by bayonet-type flexible fins 70 connected to a lower portion of the arm and inserted into an opening in the upper part of the arm where hooked ends of the fins 70 snap over a shoulder 75 formed on the inner wall of the upper part of the arm. This connection holds the parts of the arm in assembled relation but permits the lower part of the arm to rotate with respect to the upper part about an axis extending lengthwise of the arm. The flexible fins 70 are integrally connected with the lower portion of the arm 13 and preferably, though not necessarily, of one-piece construction with the part of the arm to which they are connected. These fins 70 have sufficient resilience to bend inwardly far enough to pass the shoulder 75 and then snap outwardly behind the shoulder.

The elbow joint will be described in detail in connection with FIGURE 11 after the knee joints have been described.

FIGURE 3 shows the wrist joint 23. This is a ball and socket joint including a ball section 78 in contact with a spherical bearing surface 80. There is an opening 82 in the ball section. The doll has a hand 86 and the spherical bearing surface 80 is on the inside wall of the hand at the upper end of the hand.

The hand 86 is attached to the arm by a joiner 87, preferably an elastic band. This joiner extends around a pin 88 located in the arm. This pin may be a stud molded to one-half of the forearm. The joiner 87 is preferably an endless band which is placed over the pin 88 before the two halves of the forearm are cemented together along a seam 89.

At its lower end, the joiner 87 extends around a hook 92 which is secured to the hand 86 either by molding the hand around the lower end of the hook 92, or by inserting the hook into an opening in the hand with a press fit to lock it.

The diameter of the ball section 78 is slightly larger than the lower portion of the forearm with which it merges, and this increases somewhat the angle through which the hand 86 can move with respect to the forearm. The joiner 87 passes around the hook 92 at a location which is substantially coincident with the center of curvature of the ball section 78 and the spherical bearing surface 80. This permits the hand 86 to move angularly about the center of rotation of the ball and socket joint without changing the tension of the joiner 87. In this way

the hand will remain in various angular positions and has no bias toward a center position. The joiner 87 is under substantial tension so as to maintain enough friction in the ball and socket joint to hold the hand in selected positions against the force of gravity.

FIGURE 5 shows the torso joint 19 at which the upper part 16 and lower part 17 of the doll body are connected together. A ball surface 96 at the lower end of the upper body part 16 bears against a complementary spherical socket surface 97 to provide the ball and socket joint 19. The parts 16 and 17 are held together under moderate pressure by the joiner 50 extending downwardly through the center of curvature of the ball and socket surfaces 96 and 97. There is an annular centering vane 99 for keeping the joiner 50 in position where it passes through the center of curvature of the ball and socket surfaces 96 and 97 and for causing the joiner 50 to flex about this center of curvature as the parts 16 and 17 of the body swing about this vane center. This construction prevents an off-center pull which would give this torso joint 19 a bias toward its center position.

The joiner 50 extends downwardly through an opening 102 at the bottom of the upper body part 16. The lower end of the joiner 50 is connected by a hook 104 to a section of strong gum rubber tubing 105. There are other hooks 106 and 107, which are of similar construction to the hook 104, and which are also connected to the section of tubing 105. These hooks 106 and 107 connect the right and left legs, respectively, to the body of the doll. The leg joint 27 by which each of the legs 14 is connected to the doll body, is a ball and socket joint generally similar to the shoulder joints 21 already described; but there is a particular construction of the upper ends of the legs, and the relation of the sockets and the shape of the pelvis 17 make it possible for the doll to cross its legs.

The upper end of the side portion of each of the legs 14 has a spherically shaped surface 108 which bears against a socket opening 109 in the lower portion 17 of the doll body. This spherically shaped surface 108 is off-set inwardly from the thigh portion of the leg so as to provide a substantial angular movement of the leg before the thigh portion strikes against the body of the doll at the bottom of the socket 109. The amount of this angular movement is further increased by the shape of the pelvis 17 with the sockets 109 at a substantial angle to the vertical and with a relatively short section of the body portion between them at the lower ends of the sockets 109.

In the preferred construction, the lower part of the spherically shaped surface 109 merges with the thigh portion of the leg at a substantial right angle to the thigh portion, and preferably at an angle which is an acute angle slightly less than a right angle. This also facilitates the inward swinging of the legs for crossing.

Another feature which further facilitates the crossing of the legs is the forward slope of the sockets 109. This is best shown in FIGURE 9 which is a front view clearly showing the sockets 109 not only converging toward one another as they extend downwardly but also converging toward one another as they extend forwardly.

The hook 106 extends through an opening in the upper end of the leg 14 and hooks over a pin 110 extending through the center of curvature of the spherically shaped surfaces 108 and 109. This pin 110 is secured at its opposite ends in bosses 111 projecting inwardly from opposite sides of the legs and preferably of one-piece construction with the leg as best shown in FIGURE 6. The bosses 111 are preferably made long enough so that only a relatively small length of the pin 110 is exposed and any sliding of the hook 106 lengthwise along the pin 110 does not displace the hook very

5

far from the center of curvature of the spherically shaped surface 108. This makes it unnecessary to provide a depression in the pin 110 or to have the pin otherwise of special construction for centering the hook 106.

The hook 107 is similarly connected with the other leg 14; and the hooks 104, 106 and 107 are of such length that they put the section of tubing 105 under substantial tension when the doll is assembled. This provides a sufficient pressure between the surfaces 108 and 109 to obtain friction for holding the legs in various set positions; and the section of rubber tubing 105 provides this necessary pressure without requiring as much space as would be required for a spring. The hooks 106 and 107 are substantially in line with one another, and they cooperate with the hook 104 to pull the section of tubing 105 into a triangular shape with the base of the triangle substantially in line with the hooks 106 and 107. If desired, a spring can be used for connecting the legs 14 to the body.

FIGURES 7 and 8 show the knee joint 28. This is a pivoted joint. The thigh portion of the leg 14 has a groove 112 at its lower end with straight and parallel side walls 113 and 114. A metal connection frame or liner 120 fits into the groove 112. This liner is of spring metal and it has lugs 122 which snap into recesses 124 in the side walls of the groove 112. This holds the metal liner in assembled relation with the thigh portion of the leg and the sides of the liner 120 are in contact with the sides of the groove 112.

An axle 128, preferably a rivet, extends through a tongue 130 formed at the upper end of the lower part of the leg 14. The groove 112 is closed at the front (left side in FIGURE 7) and the inside surface of the closed front of the groove, together with the surface at the top of the groove 112 are curved about a center of curvature which coincides with the axis of the rivet or axle 128.

The tongue 130 fills the space between the sides of the liner 120, and the rivet or axle 128 holds the sides of the liner 120 in contact with the sides of the tongue 130 with sufficient pressure to provide friction for holding the knee joint of the doll in any set angular position.

In the original assembly of the doll, the liner 120 is first spread and fitted over the tongue 130 so as to bring openings in the liner 120 into register with the opening provided in the tongue for the axle 128. The axle is then inserted through the openings in the liner 120 and through the opening in the tongue 130. One end of the axle 128 is preferably provided with a head before assembly, and the other end of the axle is then peened or riveted to provide a head at the opposite end of the axle so that it is permanently connected with the liner 120 and the tongue 130.

The liner 120, after being thus attached to the lower part of the leg, is pushed upwardly into the groove 112 and the side walls of the groove are sprung apart slightly until the lugs 122 pass the recesses 124. The side walls of the groove 112 then snap back into contact with the sides of the liner 120 and the knee joint is assembled. In order to prevent the liner 120 from being visible, the side walls of the groove 112 are made with recesses 134 for receiving the liner 120, and there is only a running clearance between the sides of the tongue 130 and the side walls 113 and 114 of the groove 112 ahead of and behind the liner 120.

FIGURES 5, 7 and 10 show one of the ankle joints 29. The lower end of the leg 14 extends into a socket in a foot 138. This portion of the leg which extends into the foot is formed as a tongue 140 with substantially straight and parallel side walls and a cylindrical bottom wall through which there is an opening 142. The socket in the foot 138, into which the tongue 142 extends, has substantially flat and parallel side walls confronting the

6

sides of the tongue 140 but with running clearance. An arcuate rib 144 extends across the inside of the foot 138 and forms a bottom for the socket into which the tongue 142 extends. This rib 144 is preferably molded as one piece with the upper portion of the foot and it has a radius of curvature substantially equal to that of the bottom face of the tongue 142.

The foot 138 is secured to the leg 14 by a hook 146 extending around the rib 144 through the opening 142 in the bottom of the tongue 140 and then upwardly to a joiner 148. There is a recess 150 in the bottom face of the rib 144 for preventing movement of the hook 146 along the rib 144.

The joiner 148 is preferably an endless elastic band which passes around a pin 152 located in the calf of the leg 14. As in the case of the connection of the hand to the arm, this pin 152 is preferably molded as one piece with a portion of the leg, and the joiner 148 is placed over the pin 152 before the opposite halves of the leg are cemented together along a seam 154.

The location at which the hook 146 engages the joiner 148 can be at the center of curvature of the rib 144; but this is not necessary in the case of the ankle joint because the pin 152 is far enough above the foot 132 so that there is very little angular movement of the joiner 148 as the foot 138 swings from one extreme to the other of its movement. Therefore there is not sufficient change in tension of the joiner 148 to give the foot 138 a bias toward a mid position. The tension of the joiner 148 is sufficient to provide friction between the tongue 142 and the rib 144 for holding the foot in any set position.

FIGURE 11 shows the construction of one of the elbow joints 22. This construction is somewhat similar to the knee joint. A metal liner 160 is connected to the forearm by an axle 162 at the center of curvature of a cylindrical surface 164 on a tongue 166 at the upper end of the forearm. This tongue 166 fits into the upper portion of the arm and is held there by lugs 168 struck from the resilient metal of the liner 160 in position to engage behind shoulders 170 on opposite sides of the upper portion of the arm.

In the construction shown in FIGURE 11, the limit to which the liner 160 can be inserted into the upper portion of the arm is determined by a fin 172 extending inwardly across the upper end of the liner 160. This fin 172 is preferably molded as one piece with one half of the arm, the halves being cemented together along a seam 174 before the forearm and its liner 160 are inserted into the upper portion of the arm.

The preferred construction of the doll has been illustrated and described, but changes and modification can be made and some features can be used in different combinations without departing from the invention as defined in the claims.

What is claimed is:

1. A jointed doll including legs, a knee joint in each leg, a body having a pelvis with circular openings therein for receiving the upper ends of the legs, each of the legs having a thigh portion with the surface of the upper end of said thigh portion spherical and of larger diameter than the leg-receiving openings in the pelvis, and resilient means connecting each leg to the pelvis, said spherical upper ends of the thighs which are outside of the openings in the body and at the bottom of the openings when the doll is in standing position, extending inwardly for a substantial distance beyond the inner side of the thigh that confronts the other thigh of the doll and far enough beyond the openings in the pelvis to permit the legs to swing inwardly to a position where one thigh crosses the other, and the leg-receiving openings in the pelvis facing partly forward so that projections of the longitudinal axes of said openings on a horizontal plane through the doll, when the doll is standing upright, make an obtuse angle with one another to facilitate crossing of the legs of the doll when the doll is in a sitting position.

2. The jointed doll described in claim 1 and in which the spherical upper end portion of each leg has the lower part of its surface meet the inner side of the thigh at an angle not substantially greater than a right angle.

References Cited in the file of this patent

UNITED STATES PATENTS

130,068	Parent	July 30, 1872	
1,346,953	Gould	July 20, 1920	
2,129,421	Hales	Sept. 6, 1938	10

2,551,433	
2,611,998	
2,687,594	
2,783,587	
2,791,063	5
2,804,721	
2,925,683	

747,218

Graves	May 1, 1951
Senior et al.	Sept. 30, 1952
Cleaver	Aug. 31, 1954
Gardel et al.	Mar. 5, 1957
Gardel et al.	May 7, 1957
Cohn	Sept. 3, 1957
Cohn	Feb. 23, 1960

FOREIGN PATENTS

Great Britain	Mar. 5, 1954
---------------	--------------