



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.05.2007 Bulletin 2007/22

(51) Int Cl.:
A63H 11/18 (2006.01) A63H 13/02 (2006.01)

(21) Application number: **06124392.9**

(22) Date of filing: **20.11.2006**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR
 Designated Extension States:
AL BA HR MK YU

(30) Priority: **29.11.2005 US 740613 P**
25.10.2006 US 552732

(71) Applicant: **HASBRO, INC.**
Pawtucket, Rhode Island 02862 (US)

(72) Inventors:
 • **Maddocks, Richard J.**
Barrington, RI 02086 (US)
 • **Olson, Jeffrey H.**
West Warick, RI02888 (US)
 • **Hall, Peter**
Beeston, Kings Lyn
Norfolk PE32 2XL (GB)

(74) Representative: **Skone James, Robert Edmund**
Gill Jennings & Every LLP
Broadgate House
7 Eldon Street
London EC2M 7LH (GB)

(54) **Realistic coordinating of specific body part movements in mechanical toys**

(57) A realistic electro-mechanical toy that can replicate lifelike resting and active positions and movements of animals and other creatures while they are supported on a surface as well as when they are picked up by a user by coordinating the positioning and movement of specific body parts. To this end it is regarded that through observation of real live animals, the animals are seen to drop down or droop their legs when they are picked up off a supporting surface. Cats in particular can easily be shown to drop down or droop their legs in what looks like a relaxed and non-flexing position when they are picked up from a supporting surface. An upper limb portion (22)

facilitates extension of an intermediate limb portion (24) when the upper limb portion is in its extended position, and retracts the intermediate limb portion when the upper limb portion is in its resting position with a biased joint (30) positioning the intermediate limb portion (24) to its extended position when the body is elevated away from a supporting surface. Accordingly the limbs of the present invention provides for emulating this drop down or drooping leg positioning by overriding the retracting function of each limb portion when the body is elevated from a supporting surface providing a realistic drop down leg feature in each limb.

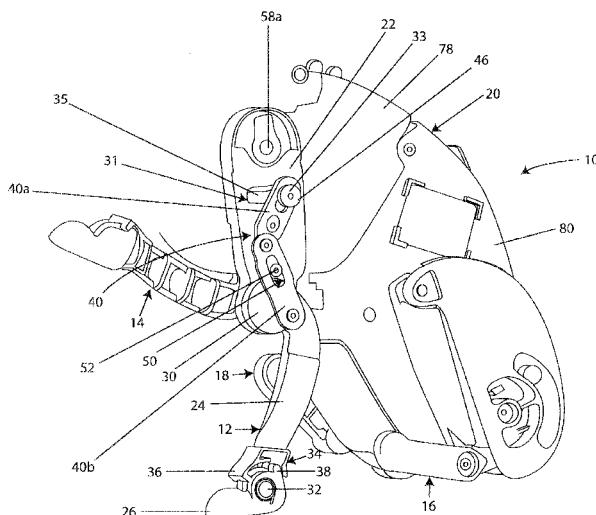


FIGURE 1B

Description

[0001] The present invention relates to mechanical toys with movable body parts. More particularly, the invention relates to a realistic electro-mechanical toy that can replicate lifelike resting and active positions and movements of animals and other creatures while they are supported on a surface as well as when they are picked up by a user by coordinating the positioning and movement of specific body parts.

[0002] The toy industry has seen an evolution of technology in recent years which has coincided with a consumer demand for more and more realistic toys and games. Several sectors of the toy industry have used technological advancements to make toys and games more realistic and lifelike. For example, video games are more realistic and lifelike than anyone could have imagined even ten years ago, baseballs can measure their own velocities when thrown, and dolls can now speak, walk, and even roller skate. As technology continues to improve, consumers want toys that have more capabilities or that are more realistic.

[0003] Consumer driven evolutions in the industry is found in toys embodied as creatures, animals, dolls and various other life forms real or imagined. To provide a more realistic and interactive doll or toy, a cost - technology trade off becomes important. As is known, new technologies cannot typically be implemented to meet customer demands because of other constraints played on the industry by consumers. One of the most important constraints is cost. Therefore, even though technologies may exist to meet consumer demands, those technologies cannot be applied to this industry until they have adapted in such a way as to be more cost effective. To this end, the toy industry has employed relatively inexpensive motors and linkage assemblies to provide realistic mechanical dolls and toys. However, although such dolls may provide some realistic movable body parts, the dolls do not exhibit realistic limb movements and postures in both active and resting positions, while the doll is supported on a surface as well as when the doll is picked up to be held by a user.

[0004] Recent attempts to increase the realism of a doll or toys' appendage has focused on improved structures in the appendage system. One improved appendage system is disclosed in U.S. Patent No. 6,843,703 entitled "Electromechanical Toy" to Iaconis et al., issued January 18, 2005, and assigned to Applicants' Assignee. The 703 patent incorporates an arm fixed to rotate in a circular path at one end and having a second unfixed end capable of movement in a non-circular path, providing an uncomplicated and low cost appendage system which provides realistic movement in response to sensed conditions.

[0005] In view of the foregoing, a need exists for a limb or appendage system to coordinate realistic limb movements and postures in both active and resting positions, while the doll or toy is supported on a surface as well as

when the doll or toy is picked up to be held by a user, such that the doll or toy provides lifelike movements facilitating realistic interaction with a user.

[0006] Briefly summarized, an embodiment of the invention provides realistic mechanical toy operations that can replicate lifelike resting and active positions and movements of animals and other creatures while they are supported on a surface as well as when they are picked up by a user by coordinating the positioning and movement of specific body parts. An upper limb portion facilitates extension of an intermediate limb portion when the upper limb portion is in its extended position, and retracts the intermediate limb portion when the upper limb portion is in its resting position with a biased joint positioning the intermediate limb portion to its extended position when the body is elevated away from a supporting surface. Accordingly the limbs of the present invention provides for emulating this drop down or drooping leg positioning by overriding the retracting function of each limb portion when the body is elevated from a supporting surface providing a realistic drop down leg feature in each limb.

[0007] Additional objects and advantages of the invention will be set forth below with reference to the drawings and the detailed description. It is to be understood that the invention is not limited in its application to the details of the examples provided in the description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or carried out for a variety of applications and in various ways.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG. 1A is a perspective view of a toy of the present invention illustrating a front upper limb portion in a second extended position;
FIG. 1B is a perspective view of an embodiment of the present invention illustrating a linkage assembly coupled to the front upper limb portion in the second extended position;
FIG. 1C is a perspective view of an embodiment of the present invention illustrating a gear sector linkage coupled to the front upper limb portion in the second extended position;
FIG. 2 illustrates the front upper limb portion of the toy in a first resting position;
FIG. 3 illustrates a rear limb of the toy; and
FIG. 4 illustrates a cam drive assembly of the toy.

[0009] A realistic electro-mechanical toy, generally shown in FIG. 1A as reference numeral 10, providing limbs which emulate movements and positions of real live animals and other creatures both while they are being supported on a surface as well as when they are picked up to be played with by a user. To this end it is regarded that through observation of real live animals, the animals

are seen to drop down or droop their legs when they are picked up off a supporting surface. Cats in particular can easily be shown to drop down or droop their legs in what looks like a relaxed and non-flexing position when they are picked up from a supporting surface. The toy 10 of the present invention provides for limbs which emulate this drop down or drooping leg positioning by overriding the retracting function of each limb portion when the toy 10 is elevated from a supporting surface providing a realistic drop down leg feature in each limb. The toy 10 may look like a variety of animals and creatures real or imagined with any number of movable limbs, and in an embodiment, the toy 10 takes on the shape of a cat and includes a pair of front limbs 12 and 14, and a pair of rear or hind limbs 16 and 18 each attached to a torso having a spine, upper portion and lower portion etc., hereafter referred to as body 20.

[0010] Front limb 12 mimics a cat's front limb and includes three limb portions namely an upper limb portion 22, an intermediate limb portion 24 and a lower limb portion 26. It is contemplated however, that a front limb of a different creature or animal embodied by the present invention may contain more or less than three limb portions. Upper limb portion 22 is pivotally attached to the body 20 allowing reciprocatory movement of the upper limb portion 22 between a first resting position as seen in FIG. 2 and a second extended position as seen in FIGS. 1A-C. A drive assembly generally referred to as reference numeral 28 and seen in FIG. 4, is coupled to the upper limb portion 22 and a motor (not shown) is included in the body 20 or coupled to the body 20 for driving movement of the upper limb portion 22.

[0011] The intermediate limb portion 24 is pivotally attached to the upper limb portion 22 which extends the intermediate limb portion 24 when the upper limb portion 22 is in the second extended position as seen in FIG. 1B, and retracts the intermediate limb portion 24 when the upper limb portion 22 is in the first resting position as seen in FIG. 2. A spring biased joint 30 is operative to bias the position of the intermediate limb portion 24 to the second extended position when the body 20 is elevated away from a supporting surface, such as when a user picks up the toy 10 to play with it. In an embodiment, the spring biased joint connects the intermediate limb portion 24 to the upper limb portion 22, however, in another embodiment, the spring biased joint may connect an upper limb portion to the body, as can be seen in the rear or hind limbs 16 and 18 and further discussed below.

[0012] A lower limb portion 26 is pivotally attached to the intermediate limb portion 24 by a spring biased joint 32 as seen in FIG. 1B. The spring biased joint is operative to bias the lower limb portion 26 to an extended position when the upper limb portion 22 is in the first resting position as seen in FIG. 2, as well as when the body 20 is elevated away from a supporting surface such as when the toy 10 is picked up by a user. Further, a stop assembly 34 is coupled to the lower limb portion 26 limiting the range of movement of the lower limb portion. In an em-

bodiment, the stop assembly 34 comprises a fixed barrier portion 36 that contacts a protrusion 38 attached to or integral with the lower limb portion 26 preventing pivoting of the protrusion 38 beyond the fixed barrier portion 26, however any standard stop assembly known in the art could also be utilized to limit the range of movement of the lower limb portion 26.

[0013] Movement of the front limb portions is driven by the motor and directed by the drive assembly 28 which cooperates with a linkage assembly 40 and/or a gear sector linkage 100 coupled to limb portions 22 and 24. The drive assembly 28 (discussed in detail below) includes a cam mechanism 56 and a linkage 58, having two arms 58a and 58b, coupled to upper limb portion 22 at arm 58a for directing the reciprocatory movement of limb portion 22. Further, a stop assembly 31 is linked to the upper limb portion 22 for limiting the range of movement of limb portion 22. The stop assembly 31, as seen in FIGS. 1A-C and 2, comprises a fixed post, screw, or protrusion 33 attached to or integral with the body 20 extending through a slot 35 cut through front upper limb portion 22. As is seen in FIGS. 1A-C and 2 the range of reciprocatory movement of upper limb portion 22 extends to the length of the slot 35 as the post 33 stops movement of the limb portion 22 beyond the slot length. Likewise, alternative stop assemblies, known in the art, or a post located on either side of the width of the upper limb portion 22 rather than extending through the limb portion, can also be utilized in alternate embodiments of the present invention.

[0014] The linkage assembly 40 discussed herein includes two generally flat, elongated, and non-flexible links 40a and 40b which work together to extend and retract the intermediate limb portion 24 when the upper limb portion 22 is in the second extended position as seen in FIG. 1B, and in the first resting position as seen in FIG. 2, respectively. Elongated link 40a includes ends 41 and 43 and end 41 of link 40a is pivotally attached, by a screw, or pin, or any other known means, to upper limb portion 22 at attachment point 42 toward a distal end 23 of upper limb portion 22, as seen in FIG. 1B. Link 40a further includes a generally oval opening 44 at end 43 opposite the attachment point 42 through which the fixed post, screw, or protrusion 33 attached to or integral with the body 20 extends. As seen in the embodiment of FIG. 2, post 33 is also part of stop assembly 31 extending through opening 44 and slot 35 in the upper limb portion 22. Post 33 also includes a lip 46 which engages link 40a preventing link 40a from slipping off post 33 while post 33 is allowed to move within the perimeter of opening 44 as the upper limb portion 22 extends and retracts.

[0015] Similar to link 40a, elongated link 40b includes ends 45 and 47, however, end 45 is pivotally attached, by a screw, or pin, or any other known means, to intermediate limb portion 24 at an attachment point 48 toward a proximate end 25 of intermediate limb portion 24, as seen in FIG. 1B. Link 40b further includes a generally oval opening 50 toward end 47 opposite the attachment

point 48 through which a fixed post, screw, or protrusion 52 attached to or integral with the upper limb portion 22 extends. Post 52 also includes a lip 54 which engages link 40b preventing link 40b from slipping off post 52 while post 52 is allowed to move within the perimeter of opening 50 as the upper limb portion 22 extends and retracts. As a result of the linkage assembly 40, as described above, extension of the upper limb portion 22 simultaneously pivots both links 40a and 40b translating into the simultaneous extension of intermediate limb portion 24. Likewise, retraction of the upper limb portion 22 simultaneously pivots both links 40a and 40b translating into the simultaneous retraction of the intermediate limb portion 24.

[0016] Front limb 14 includes the same three limb portions, connections, and linkages as described for front limb 12 and moves and positions simultaneously and in the same manner as described for front limb 12. As front limbs 22 and 24 are extended, links 40A and 40B are rigid and strong enough to hold the toy 10 in a cat-like sitting position, as seen in FIGS. 1A-B. Additionally, as front limbs 22 and 24 are retracted, links 40A and 40B pivot to retract the front limb portions such that the toy appears as a cat resting in a laying position as partially seen in FIG. 2.

[0017] In a present described embodiment, movement of the front upper limb portions may be directed by the drive assembly 28 cooperating with the gear sector linkage 100 coupled to limb portions 22 and 24 and operative to extend the intermediate limb portion 24 when the upper limb portion 22 is in the second extended position as seen in FIG. 1C, and retract the intermediate limb portion 24 when the upper limb portion 22 is in the first retracted position. The gear sector linkage 100 discussed herein includes a first gear sector link 102 coupled to the upper limb portion 22 and cooperating with a second gear sector link 104 (indicated by dashed line reference and inset illustration to FIG. 1C) at least partially contained within the spring biased joint 30 and coupled to the intermediate limb portion 24, as seen in FIG. 1C.

[0018] First gear sector link 102 is generally flat, elongated and coupled through a pivot point 106 fixed to the upper limb portion 22. First gear sector link 102 has a first end 108 which includes a span of teeth that engage with teeth included in second gear sector link 104 extending and retracting the intermediate limb portion 24 as the first gear sector link 102 rotates around pivot point 106. To this end, the drive assembly 28 provides the gear assembly of first and second sector gears 102, 104 coupling the upper limb portion to the intermediate limb portion for directing movement of the intermediate limb portion. First gear sector link 102 has a second end 110 which includes a captive elongated slot 112 through which post 33 extends, providing a stop assembly linked to the upper limb portion for limiting the range of movement of the upper limb portion similar to described stop assembly 31.

[0019] As described above, post 33 is attached to or

integral with the body 20 and moves within the perimeter of slot 112 rotating the first gear sector link 102 about pivot point 106 as the upper limb portion 22 is extended and retracted. Engagement of first gear link 102 with second gear link 104 as link 102 is rotated extends and retracts the intermediate limb portion 24 as the upper limb portion 22 is extended and retracted, respectively. As front limbs 22 and 24 are extended, links 102 and 104 are rigid and strong enough to hold the toy 10 in a cat-like sitting position, as seen in FIG. 1C. Additionally, as front limbs 22 and 24 are retracted, links 102 and 104 pivot to retract the front limb portions such that the toy appears as a cat resting in a laying position.

[0020] In another embodiment, movement of the front upper limb portions may be directed by the drive assembly 28 cooperating with a gear assembly coupling the upper limb portion 22 to the body 20 for directing movement of the upper limb portion 22. The gear assembly contemplated may include a stop assembly similar to stop assembly 31, described above, for limiting the range of movement of the upper limb portion. As the drive assembly 28 extends and retracts the upper limb portion 22, the coupled gear assembly simultaneously extends and retracts the intermediate limb portion 24, respectively, and the spring biased joint coupling limb portions 22 and 24 together biases the limb portion 24 to an extended position.

[0021] The cam mechanism 56, as seen in FIG. 4, includes a disc shaped cam member 60 with an attached or integral pin 62, and an elongated follower 64 or actuator linkage thereof. Elongated follower 64 has a generally oval shaped slot 66 formed at an end 68, defined by slot wall 70 and including surface 70a which, when actuated, engages pin 62 of cam 60. Likewise, follower 64 has a generally oval shaped slot 72 at end 74, opposite end 68, defined by slot wall 76 and including surface 76a which, when actuated, engages linkage 58. More specifically, as motor 20 rotates cam 60, pin 62 rides along follower surface 70a at end 68, translating into a back and forth reciprocatory movement of follower 64. At the same time, arm 58b of linkage 58 engages follower surface 76a at end 74 transferring the reciprocatory movement of follower 64 to upper limb portion 22 which is attached to arm 58a of linkage 58. As a result, the rotation of cam 60 by motor 20 is translated into the reciprocatory movement of the upper limb portion 22.

[0022] The cam mechanism 56, as seen in FIG. 4, is also linked to the body 20 which separates into an upper body portion 78 and a lower body portion 80, as seen in FIGS. 1A-C. A body linkage 82, as seen in FIG. 4, couples both body portions 78 and 80 to the cam mechanism 56 which is operable to move the body portions in opposite directions. Linkage 82 has generally a wide V shape with an end 84 coupled to lower body portion 80 and an end 86 coupled to upper body portion 78 and also coupled to linkage arm 58b. As a result of the connections to linkage 82, rotation of cam mechanism 56, which translates into the reciprocatory movement of linkage 58 and thus upper

limb portion 22, as discussed above, translates into the simultaneous movement of body portions 78 and 80 away from each other when the upper limb portion 22 is in the first resting position and movement of body portions 78 and 80 toward each other when the upper limb portion 22 is in the second extended position, as seen in FIGS. 1A-C.

[0023] This separating and coming together of body portions 78 and 80 further coordinates the realistic positioning and movement of specific limb portions, and also serves to generate a kneading motion commonly seen in real cats while in a downward position with retracted front limbs. The kneading motion occurs with movement of the body portions 78 and 80 while the toy 10 is in a first resting position, as seen in FIG. 2. The body portions 78 and 80 are separated from each other in the first resting position and subtle movement of body portions 78 and 80 toward and away from each other make the front limbs appear to move back and forth and simulate a real cat's kneading motion.

[0024] Rear or hind limb 16 mimics a cat's rear or hind limb and includes three limb portions namely a rear upper limb portion 84, a rear intermediate limb portion 86 and a rear lower limb portion 88. It is contemplated however, that a rear limb of a different creature or animal embodied by the present invention may contain more or less than three limb portions. Rear upper limb portion 84 is pivotally attached to body 20, and more particularly, to the lower body portion 80, as seen in FIG. 3. The rear upper limb portion 84 is coupled to an axel linked to the motor for moving the limb portion 84 between retracted and extended positions. In an embodiment, the rear upper limb portion 84 is attached to the body by a spring biased joint 90 biasing the limb portion 84 to an extended position when the body 20 is elevated away from a supporting surface such as when the toy 10 is picked up by a user. This drop down limb feature overrides the retracting movement of the limb providing a realistic limb feature which emulates a live cat's hind limb which droops in what looks like a relaxed and non-flexing position when they are picked up off a supporting surface. Further linked to the rear upper limb portion 84 is a stop assembly 92 limiting the range of movement of the limb portion 84. The stop assembly 92, as seen in FIG. 3, is the same structure and acts in the same manner as seen with stop assembly 31, discussed above, however, other embodiments of the invention may utilize alternative known stop assemblies.

[0025] A rear intermediate limb portion 86 is pivotally attached to the rear upper limb portion 84 and is retracted and extended as the rear upper limb portion 84 retracts and extends, respectively. A rear lower limb portion 88 is pivotally attached to the rear intermediate limb portion 86 by a spring biased joint 94, as seen in FIG. 3. The spring biased joint is operative to bias the rear lower limb portion 88 to an extended position when the body 20 is elevated away from a supporting surface such as when the toy 10 is picked up by a user. Further, a stop assembly

may be coupled to the rear lower limb portion 88 for limiting the range of movement of the lower limb portion. The stop assembly coupled to the rear lower limb portion 88 is the same structure and acts in the same manner as seen with stop assembly 34 discussed above, however, other embodiments of the invention may utilize alternative known stop assemblies.

[0026] Rear limb 18 includes the same three limb portions, connections, and linkages as described for rear limb 16 and moves and positions simultaneously and in the same manner as described for rear limb 16.

[0027] It should be appreciated that a wide range of changes and modifications may be made to the embodiments of the inventions as described herein. It is intended that the foregoing detailed description be regarded as illustrative rather than limiting. While there have been illustrated and described particular embodiments of the inventions, it will be appreciated that numerous changes and modifications will occur to those skilled in the art, and it is intended in the appended claims to cover those changes and modifications which fall within the true spirit and scope of the present invention.

Claims

1. An apparatus for realistic movement of a body part, comprising:
 - a body;
 - an upper limb portion pivotally attached to said body allowing reciprocatory movement of the upper limb portion between a first resting position and a second extended position;
 - a biased joint:
 - an intermediate limb portion pivotally attached to said upper limb portion;
 - said upper limb portion extending said intermediate limb portion when said upper limb portion is in the second extended position, and retracting said intermediate limb portion when said upper limb portion is in the first resting position with the biased joint being operative to bias the position of the intermediate limb portion to the second extended position when said body is elevated away from a supporting surface.
2. The apparatus as recited in claim 1, further comprising a lower limb portion pivotally attached to said intermediate limb portion by a spring biased joint which is operative to bias the lower limb portion to an extended position when the upper limb portion is in the first resting position, and a stop assembly coupled to the lower limb portion for limiting the range of movement of the lower limb portion.
3. The apparatus as recited in claim 1 or claim 2, further comprising a drive assembly coupled to the upper

limb portion and a motor in the body for driving movement of the upper limb portion.

4. The apparatus as recited in claim 3, wherein the drive assembly comprises a cam mechanism coupled to the motor driving a linkage attached to the upper limb portion for directing movement of the upper limb portion. 5
5. The apparatus as recited in any of the preceding claims, wherein the intermediate limb portion is attached to the upper limb portion by a spring biased joint, and further comprising a linkage assembly coupled to the upper limb portion and the intermediate limb portion for extending and retracting the intermediate limb portion when the upper limb portion is in the second extended position and the first resting position, respectively. 10
6. The apparatus as recited in claim 3, wherein the drive assembly comprises a gear assembly coupling the upper limb portion to the intermediate limb portion for directing movement of the intermediate limb portion, and comprising a stop assembly linked to the upper limb portion for limiting the range of movement of the upper limb portion. 15 20 25
7. The apparatus as recited in any of the preceding claims, wherein the biased joint couples the upper limb portion to the body for directing movement of the upper limb portion, and further comprising a stop assembly linked to the upper limb portion for limiting the range of movement of the upper limb portion. 30
8. The apparatus as recited in any of the preceding claims, wherein the body comprises an upper body portion and a lower body portion moving in opposite directions, wherein the body portions are separated when the upper limb portion is in the first resting position and the body portions are together when the upper limb portion is in the second extended position. 35 40
9. The apparatus as recited in claim 4 and claim 8, further comprising a body linkage coupling the body to the cam mechanism for driving the body portions apart when the upper limb portion is in the first resting position and together when the upper limb portion is in the second extended position. 45
10. A method for coordinating realistic movement of a body part in an apparatus including a body, an upper limb portion pivotally attached to the body allowing reciprocatory movement of the upper limb portion between a first resting position and a second extended position, a biased joint, and an intermediate limb portion pivotally attached to the upper limb portion, comprising the steps of : 50 55

extending the intermediate limb portion when the upper limb portion is in the second extended position; and

retracting the intermediate limb portion when the upper limb portion is in the first resting position with the biased joint being operative to bias the position of the intermediate limb portion to the second extended position when the body is elevated away from a supporting surface.

11. An apparatus according to any of the preceding claims, wherein the upper limb portion is a front upper limb portion and the intermediate limb portion is a front intermediate limb portion, the apparatus further comprising a rear upper limb portion pivotally attached by a second biased joint to said body allowing reciprocatory movement of the rear upper limb portion between a first resting position and a second extended position; and

a rear intermediate limb portion pivotally attached to said rear upper limb portion; the front and rear upper limb portions extending the front and rear intermediate limb portions, respectively, when the front and rear upper limb portions are in the second extended position, and retracting the front and rear intermediate limb portions, respectively, when the front and rear upper limb portions are in the first resting position, with the first spring biased joint being operative to bias the position of the front intermediate limb portion to the second extended position and the second biased joint being operative to bias the position of the rear upper limb portion to the second extended position when said body is elevated away from a supporting surface.

12. The apparatus as recited in claim 11, further comprising a front lower limb portion pivotally attached by a third biased joint to the front intermediate portion, and a rear lower limb portion pivotally attached by a fourth biased joint to the rear intermediate limb portion, with the third and fourth biased joints being operative to bias the position of the front and rear lower limb portions, respectively, to the second extended position when the body is elevated away from a supporting surface.

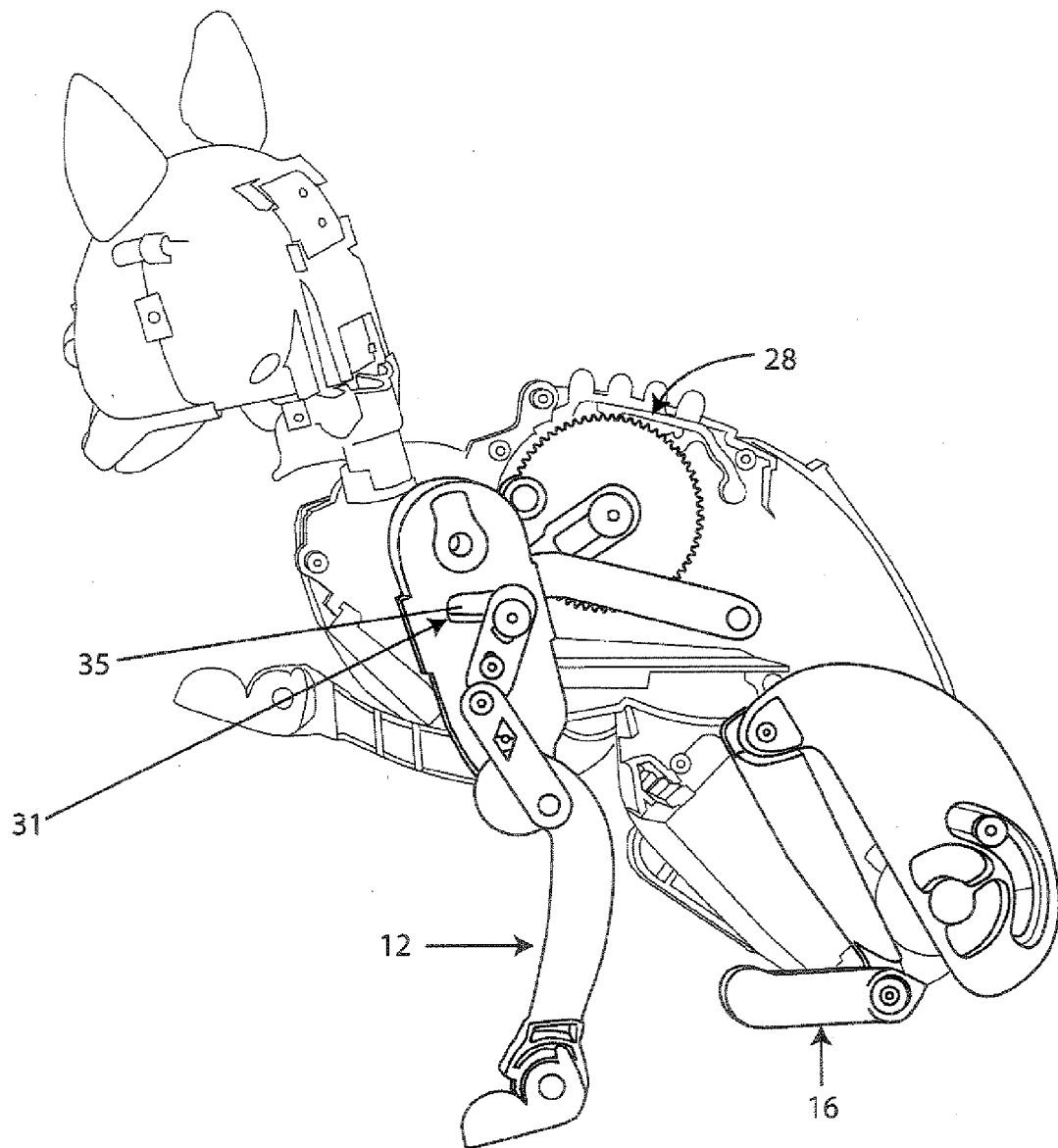


FIGURE 1A

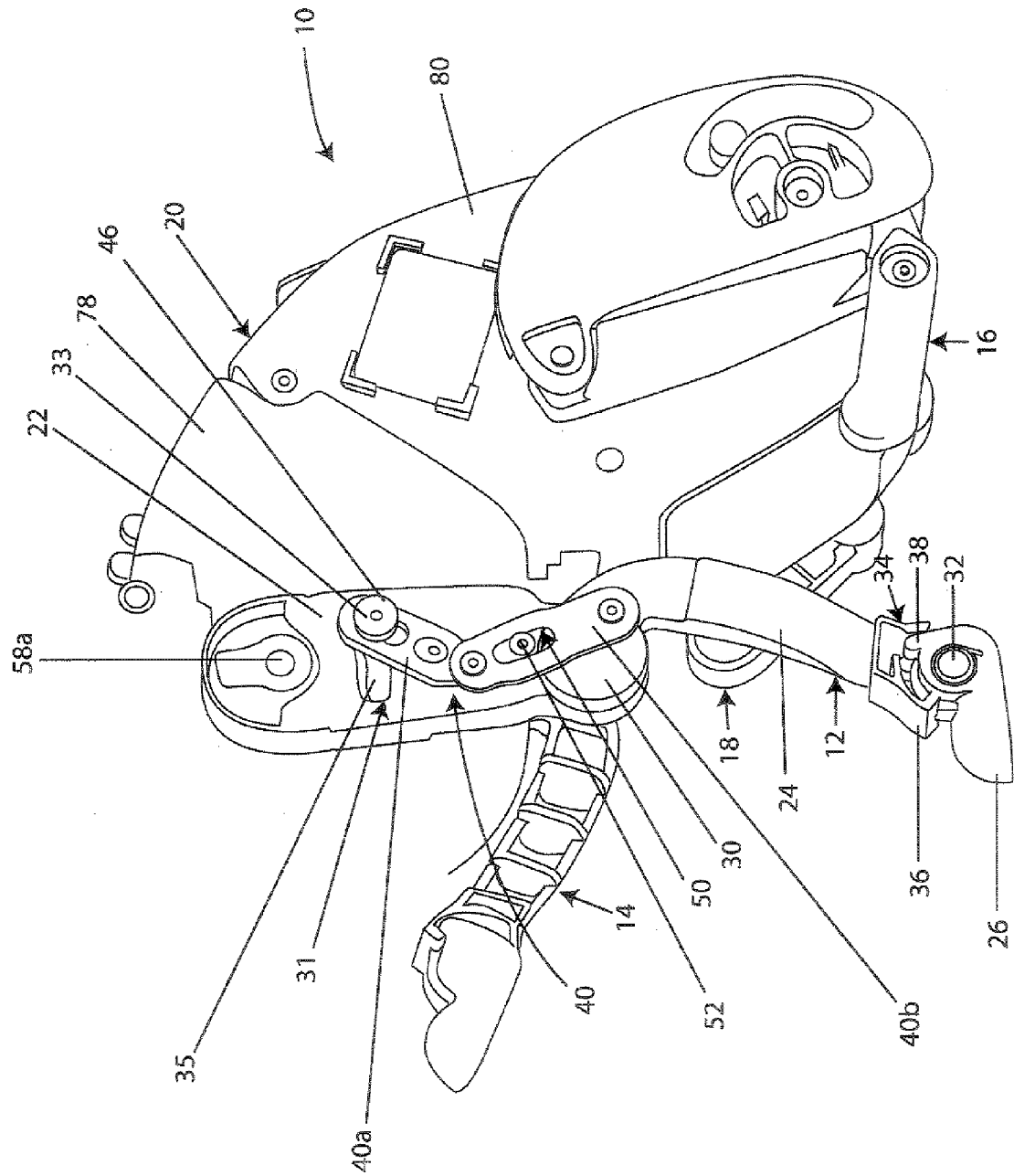


FIGURE 1B

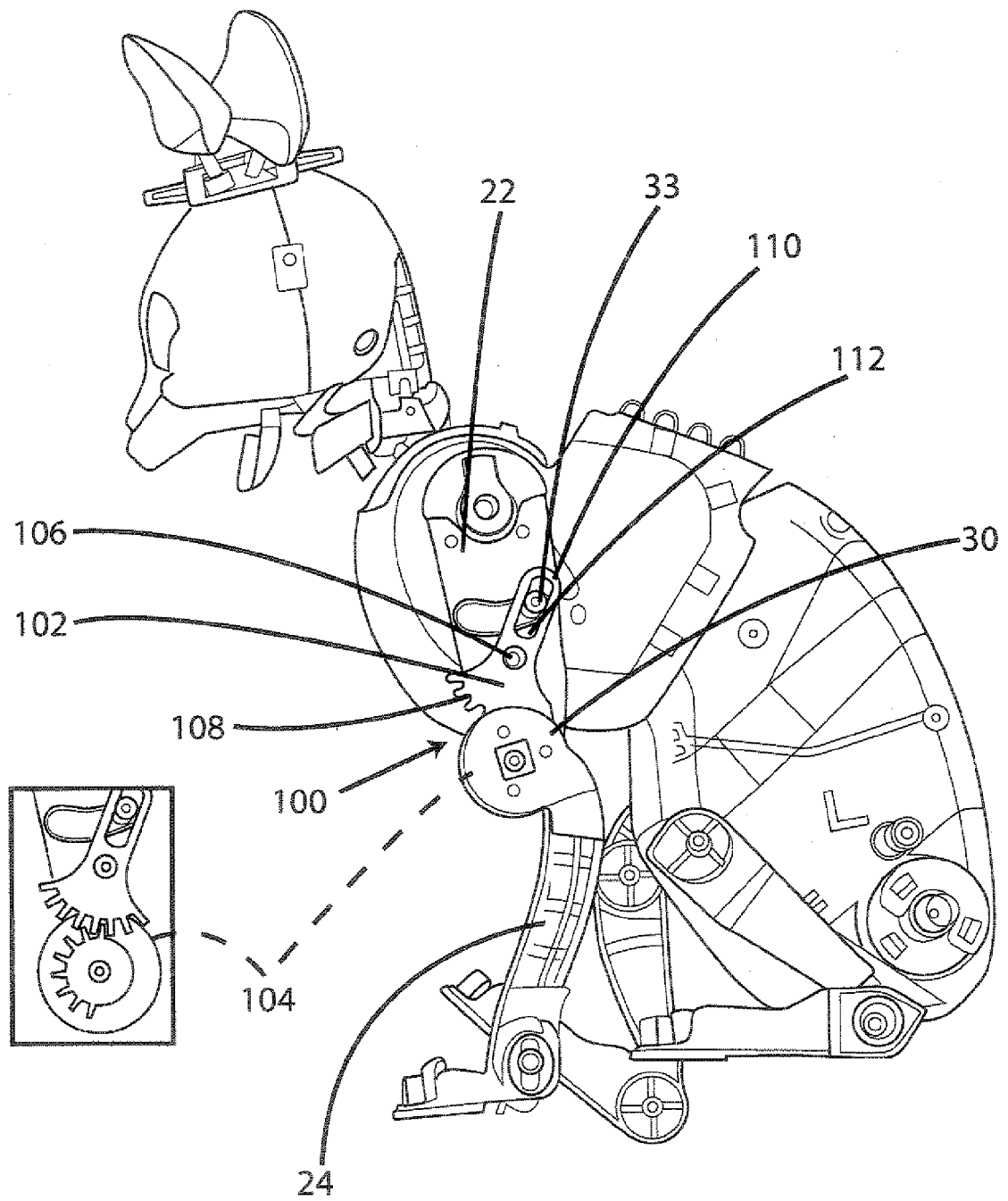


FIGURE 1C

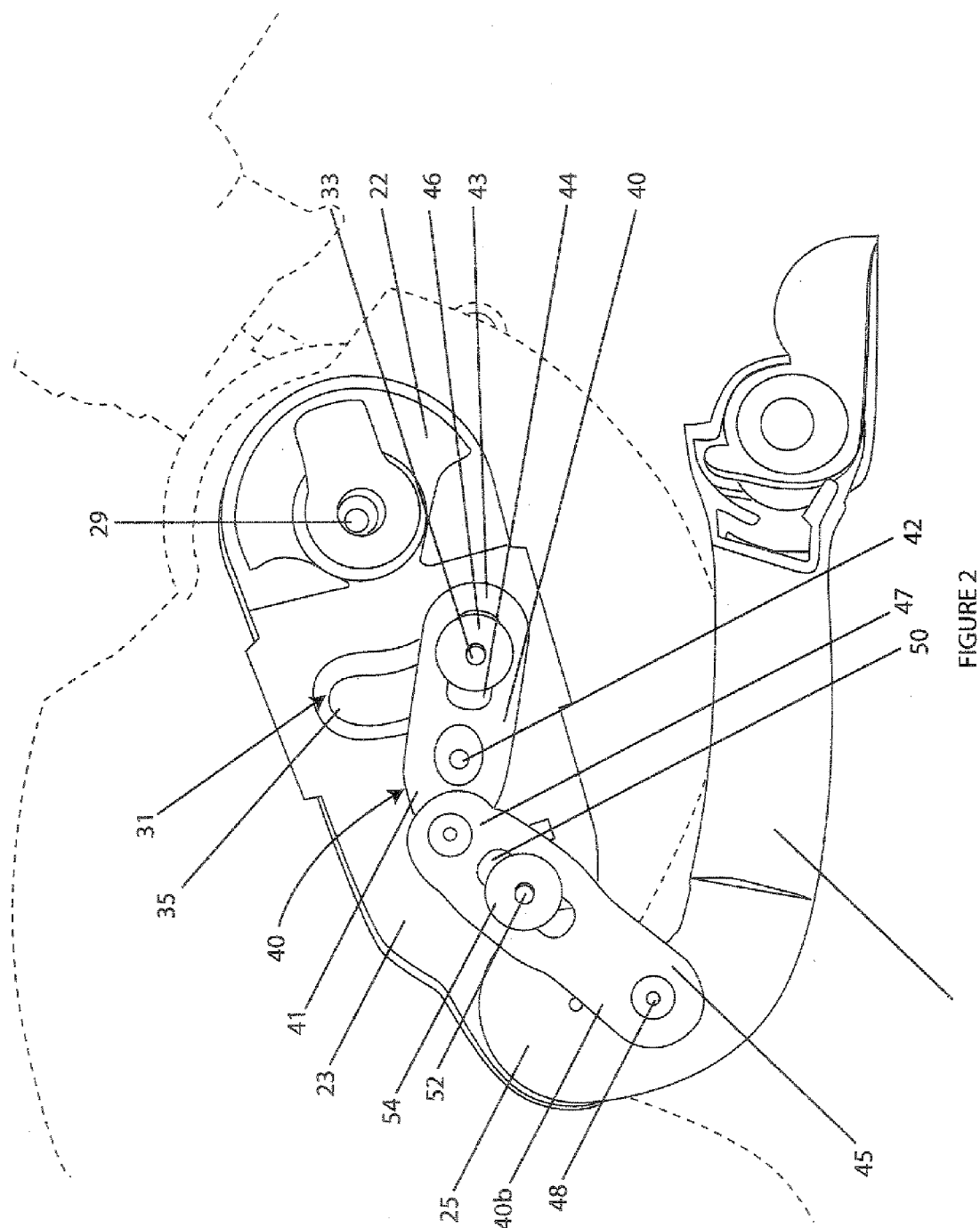


FIGURE 2

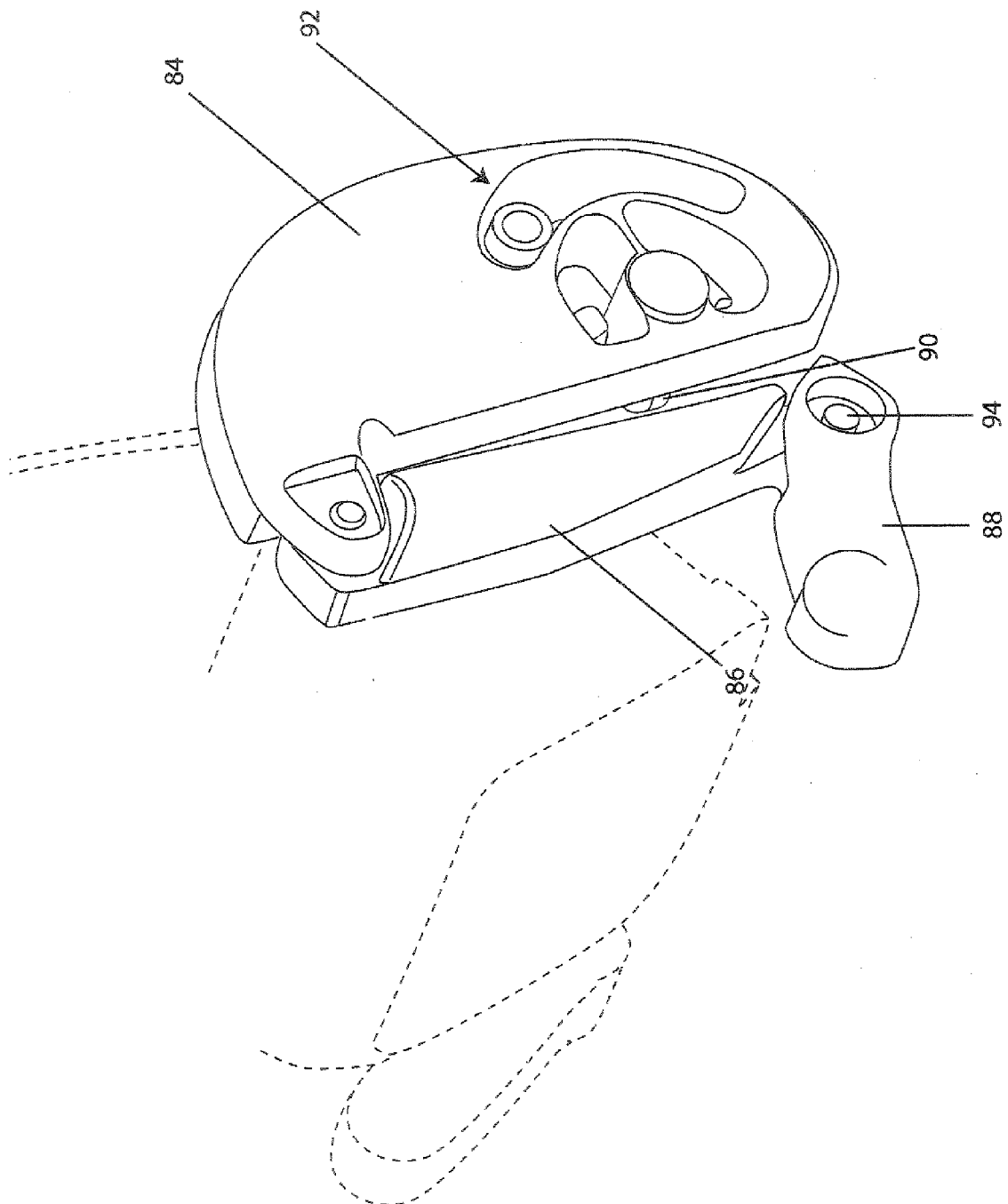


FIGURE 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 12 4392

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 120 343 A (MIGLIORATI SOSTENE [LU]) 19 September 2000 (2000-09-19)	1,3,5,10	INV.
A	* column 2, line 52 - column 4, line 30; figures *	2,4,6-9, 11,12	A63H11/18 A63H13/02

A	US 6 752 683 B1 (GODFREY THOMAS P [US]) 22 June 2004 (2004-06-22)	1-12	
	* column 3, line 12 - column 4, line 32; figures 1-3,5 *		

A	WO 01/60474 A (DSLE SYSTEM S A [CH]; ZORLONI RICCARDO [IT]) 23 August 2001 (2001-08-23)	1-12	
	* page 3, line 21 - page 6, line 17; figures 1-7 *		

A	US 3 195 270 A (GLASS MARVIN I ET AL) 20 July 1965 (1965-07-20)	1-12	
	* column 3, line 27 - column 4, line 61; figures *		

The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A63H
1 Place of search Munich Date of completion of the search 3 April 2007 Examiner Lucas, Peter			
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 12 4392

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-04-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6120343	A	19-09-2000	AT 253963 T 15-11-2003
			BR 9905775 A 29-08-2000
			CA 2285810 A1 04-06-2000
			DE 69819739 D1 18-12-2003
			DE 69819739 T2 12-08-2004
			DK 1005886 T3 22-03-2004
			EP 1005886 A1 07-06-2000
			ES 2209060 T3 16-06-2004
			IT RM990458 A1 22-01-2001
			JP 2000167259 A 20-06-2000
			PT 1005886 T 30-04-2004
US 6752683	B1	22-06-2004	NONE
WO 0160474	A	23-08-2001	AU 3044401 A 27-08-2001
US 3195270	A	20-07-1965	NONE

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 6843703 B [0004]