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Farco

(54) POSABLE TOY LINKAGE

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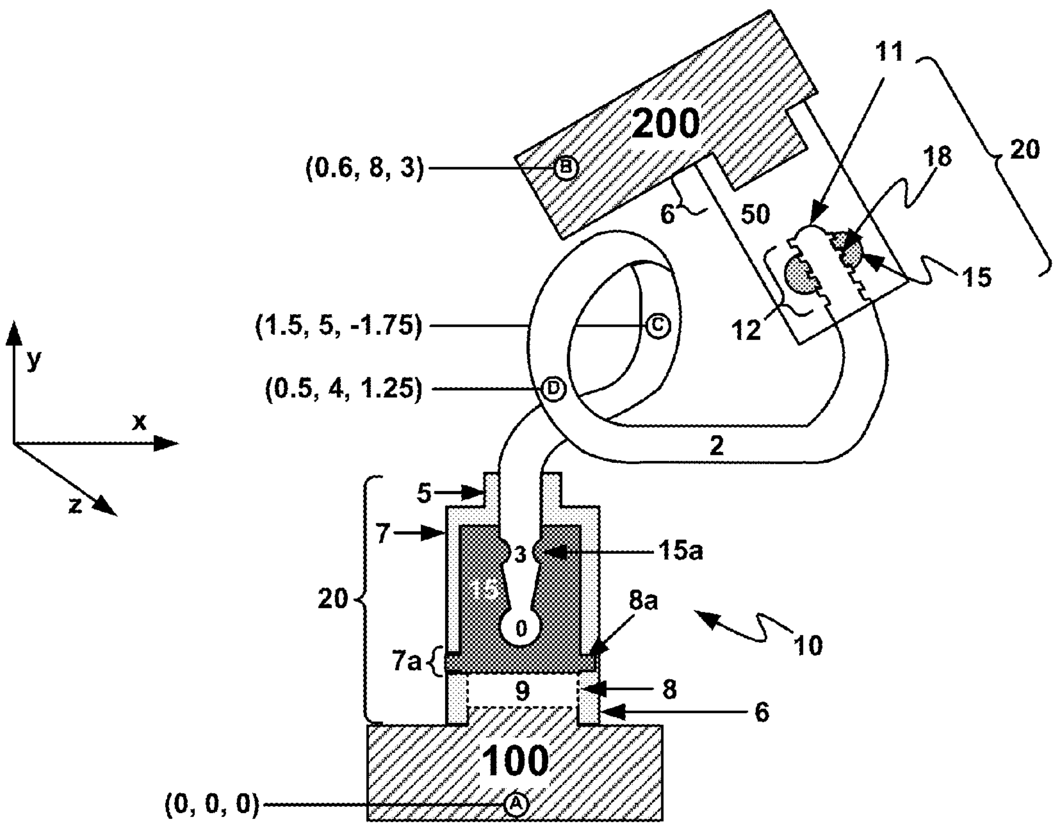
A63H 33/10 (2006.01)

(52) **U.S. Cl.**
CPC *A63H 33/103* (2013.01); *A63H 33/102* (2013.01)

(57) **ABSTRACT**

A linkage that couples a plurality of Lego blocks or Lego-like blocks is posable and configured to provide a plurality of three-dimensional orientations for the plurality of blocks it interconnects.



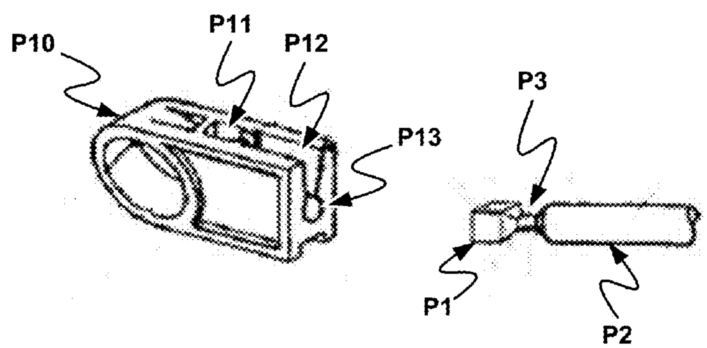


FIG. 1A (PRIOR ART)

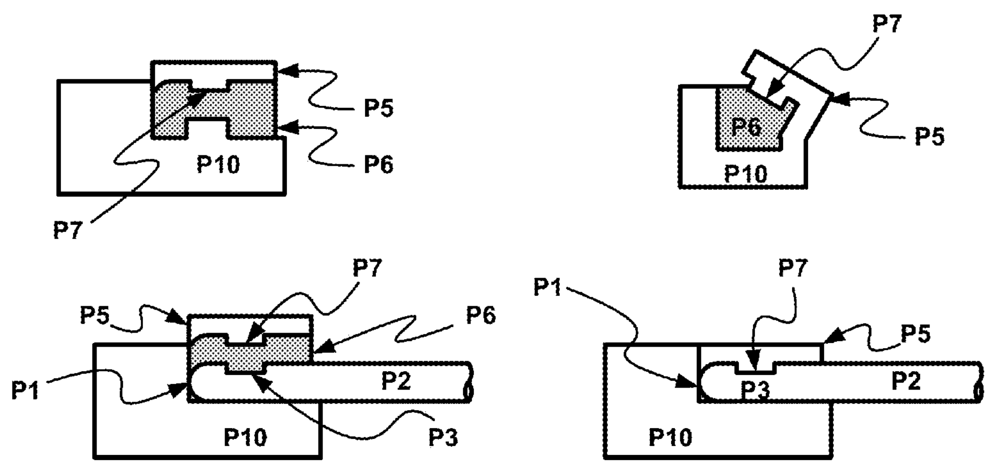


FIG. 1B (PRIOR ART)

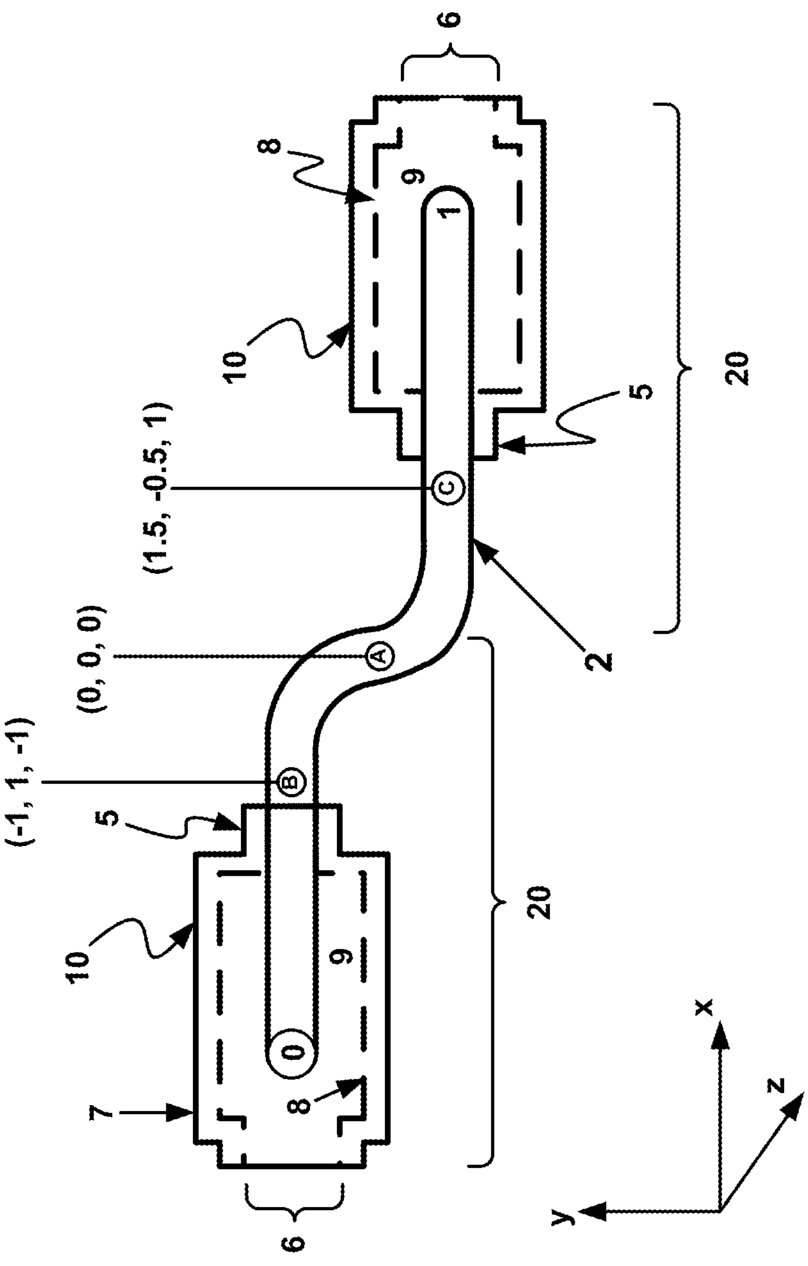


FIG. 2

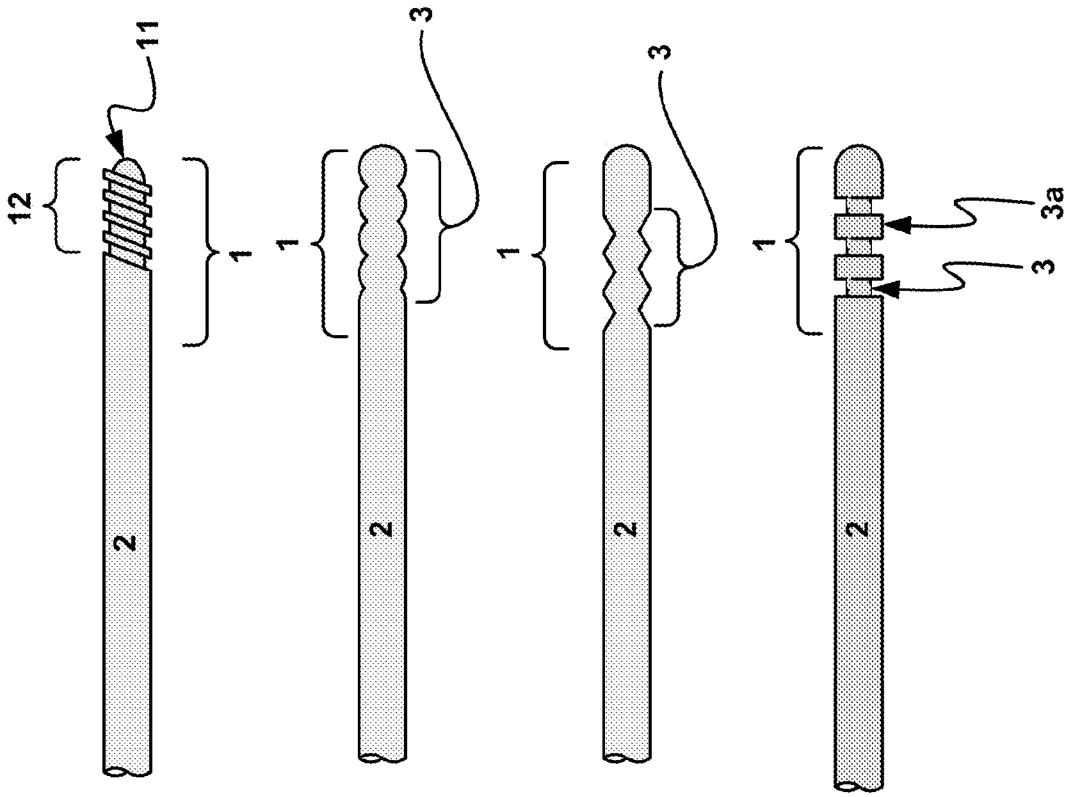


FIG. 3A

FIG. 3B

FIG. 3C

FIG. 3D

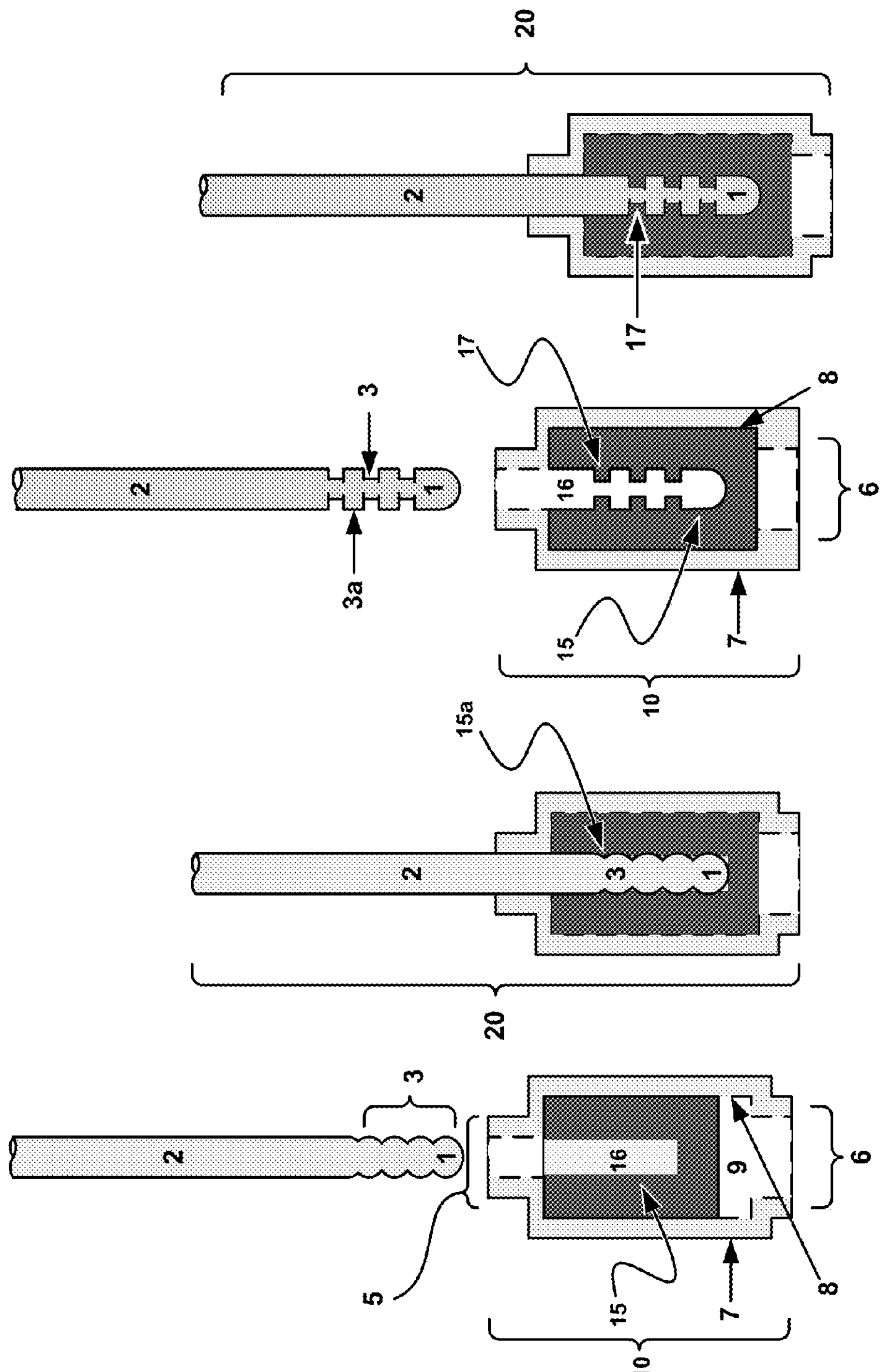


FIG. 4A FIG. 4B FIG. 4C FIG. 4D

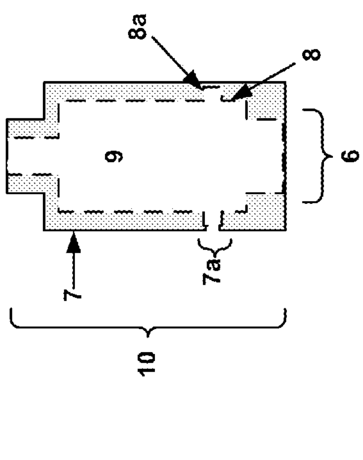


FIG. 4E

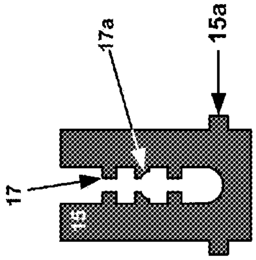


FIG. 4F

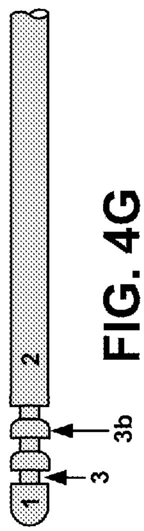


FIG. 4G

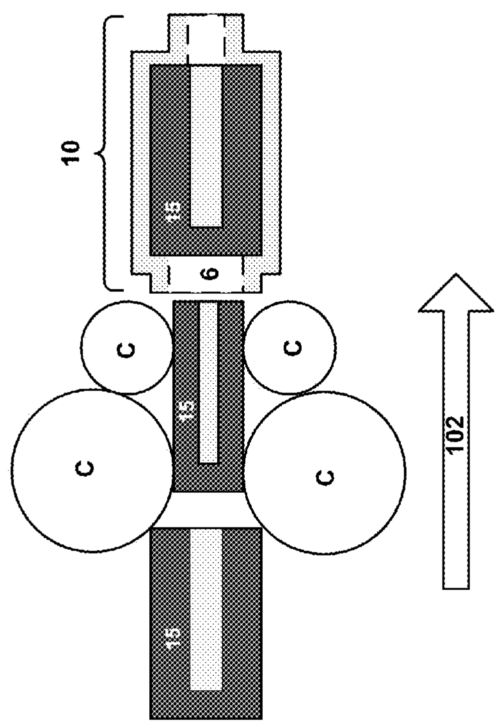


FIG. 4H

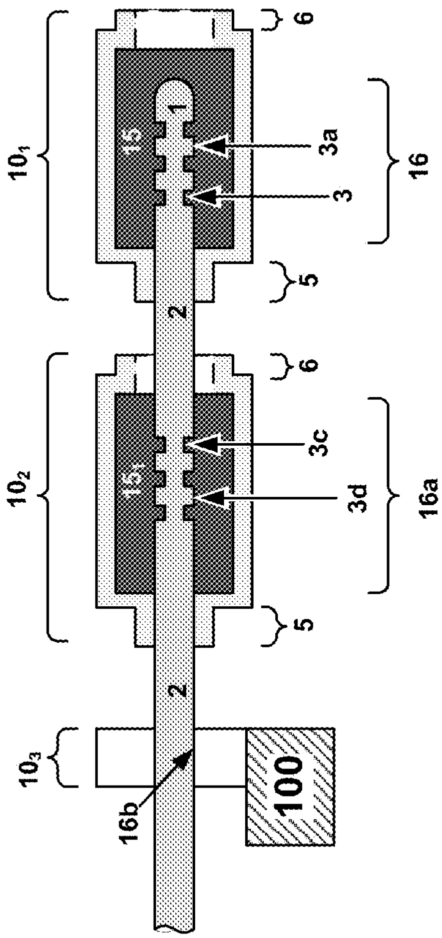


FIG. 5

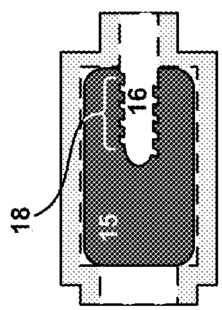


FIG. 6A

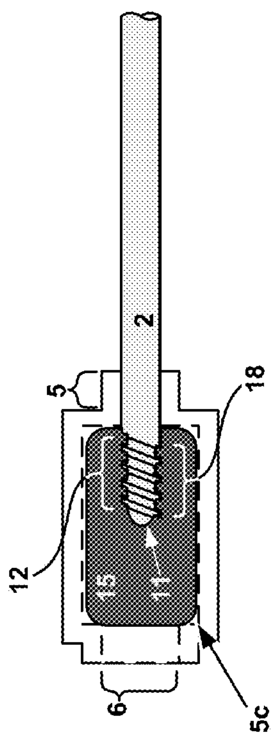


FIG. 6B

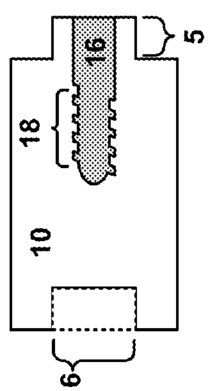


FIG. 7A

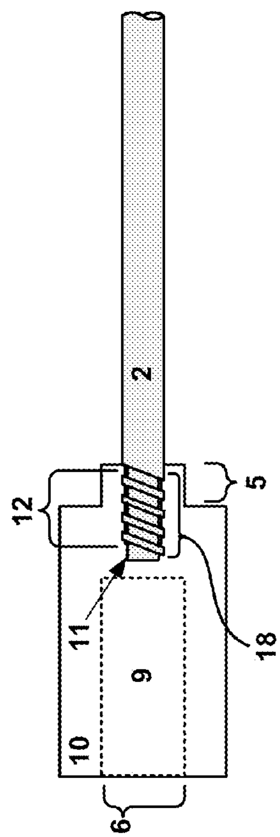


FIG. 7B

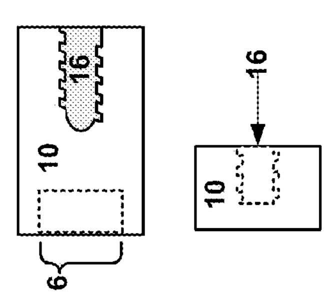


FIG. 7C

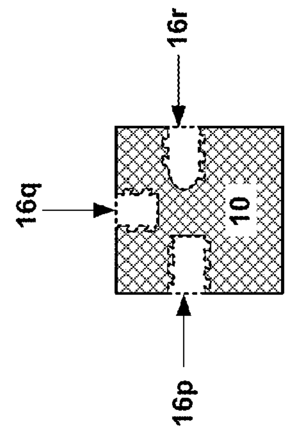


FIG. 7D

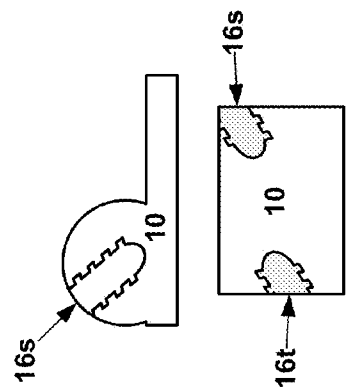


FIG. 7E

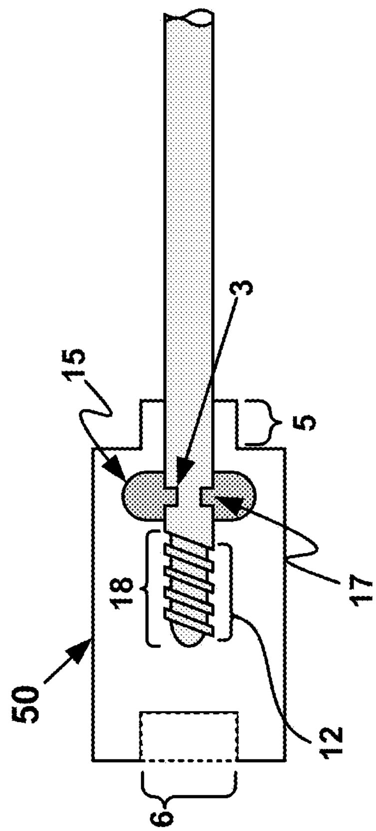


FIG. 7F

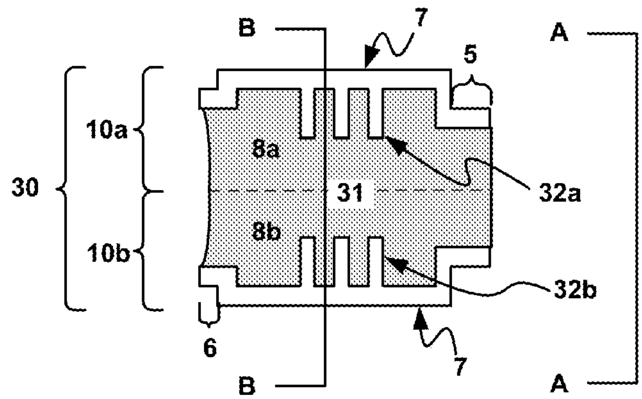


FIG. 8

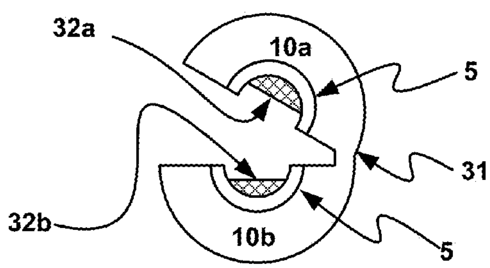


FIG. 8A

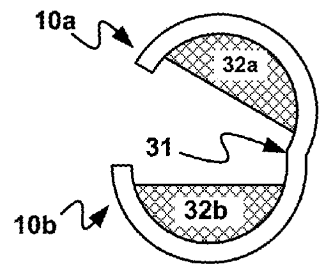


FIG. 8B

FIG. 9A

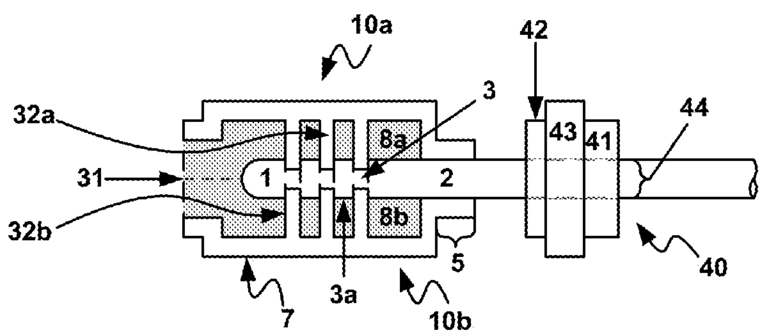


FIG. 9B

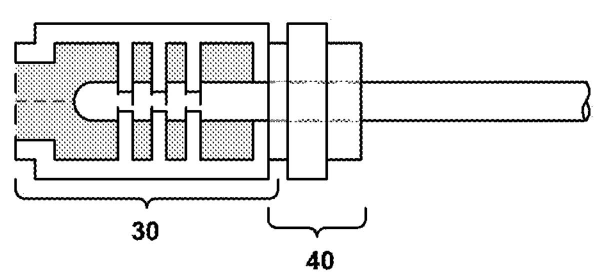


FIG. 10A

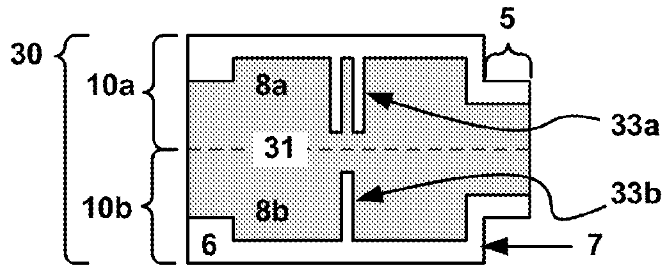


FIG. 10B

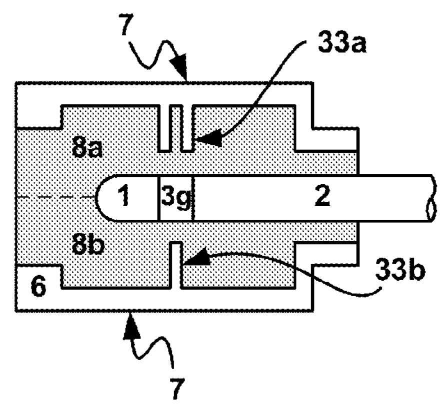
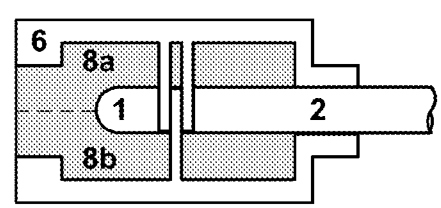


FIG. 10C



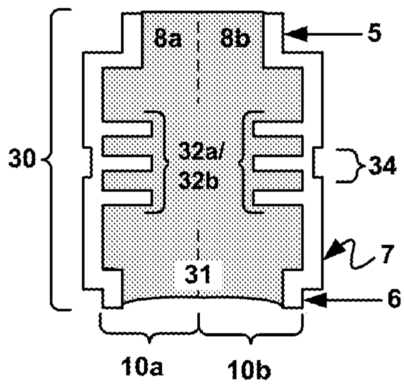


FIG. 11A

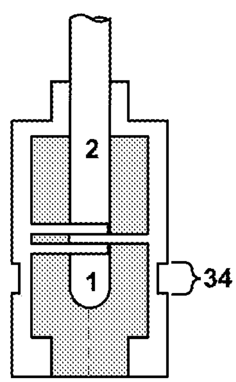


FIG. 11B

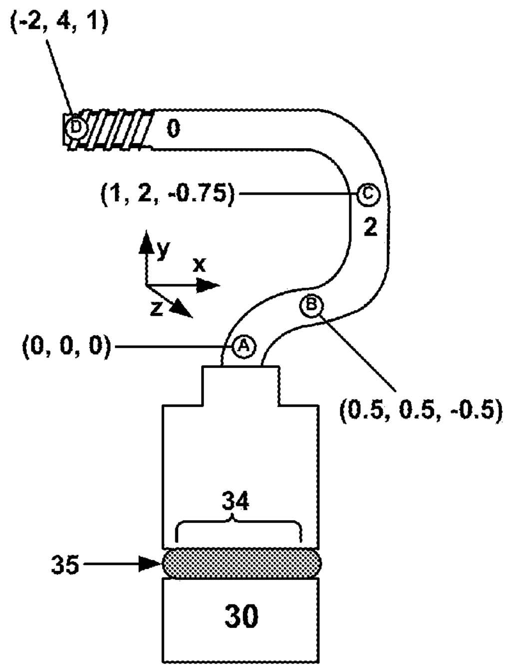


FIG. 11C

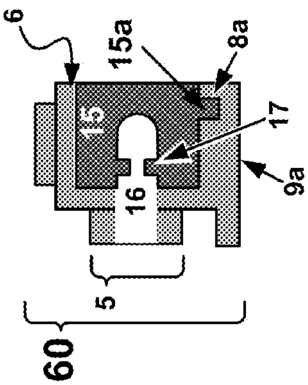


FIG. 12B

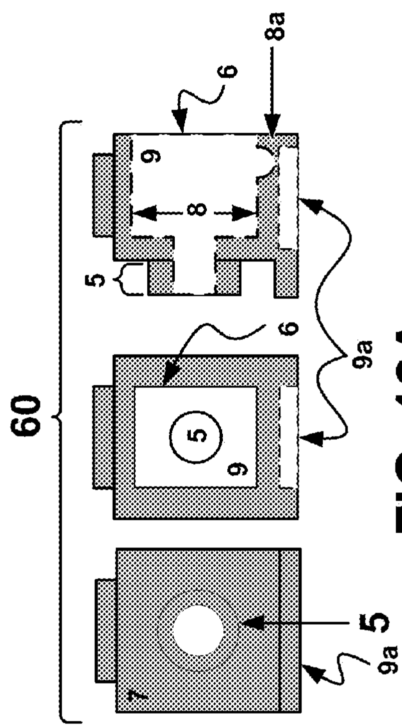


FIG. 12A

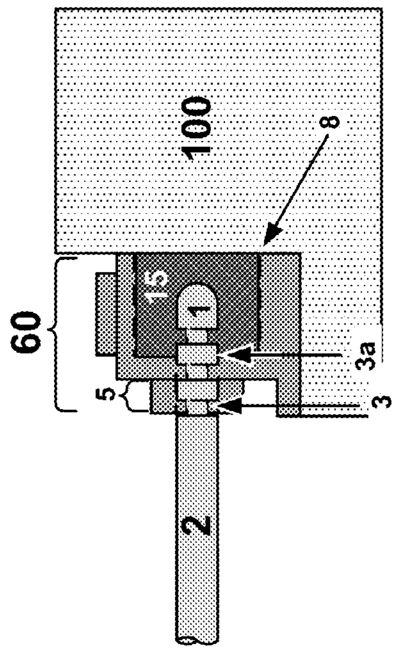


FIG. 12C

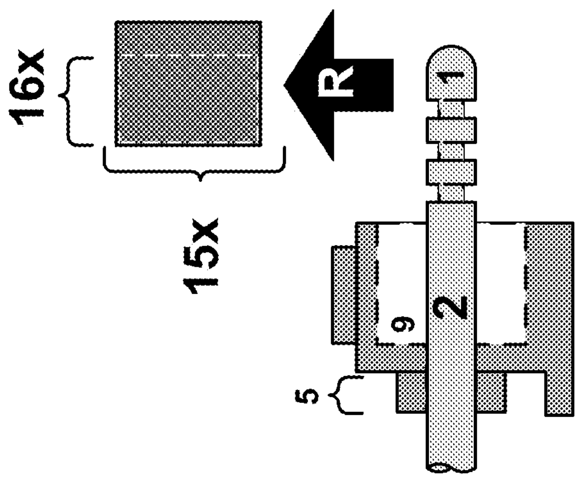


FIG. 13C

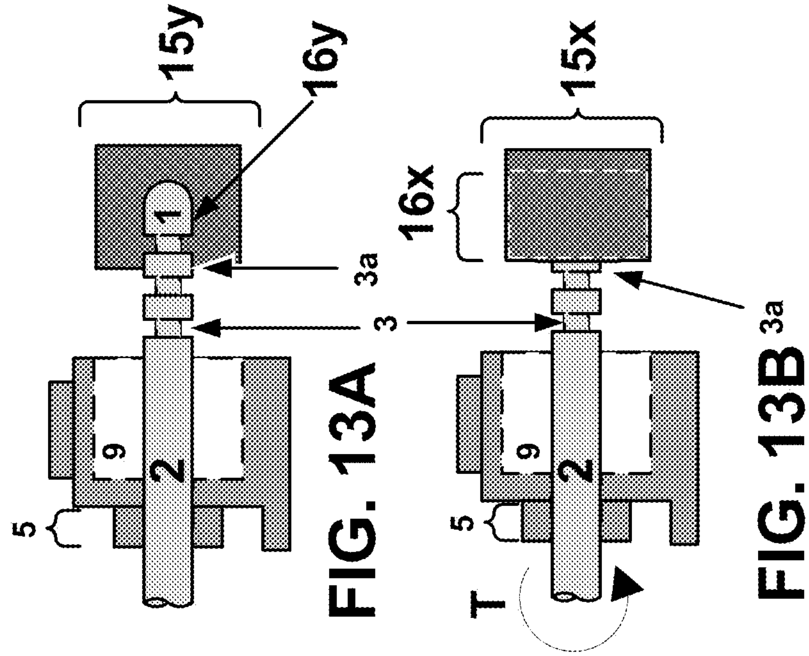


FIG. 13A

FIG. 13B

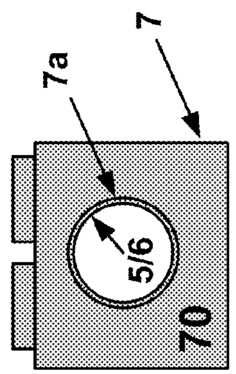


FIG. 14A

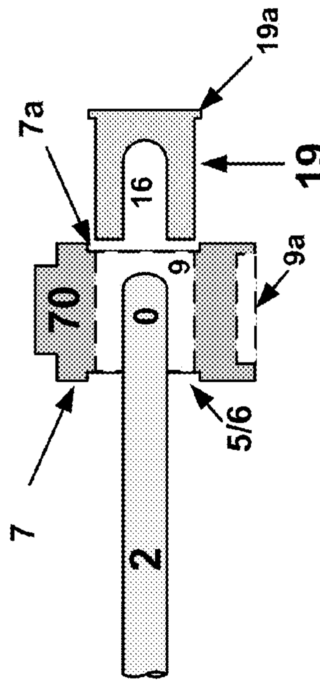


FIG. 14B

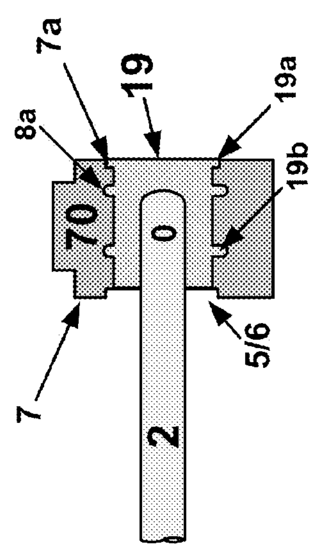


FIG. 14C

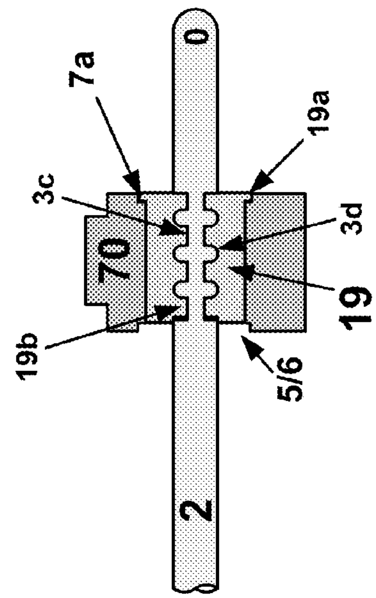
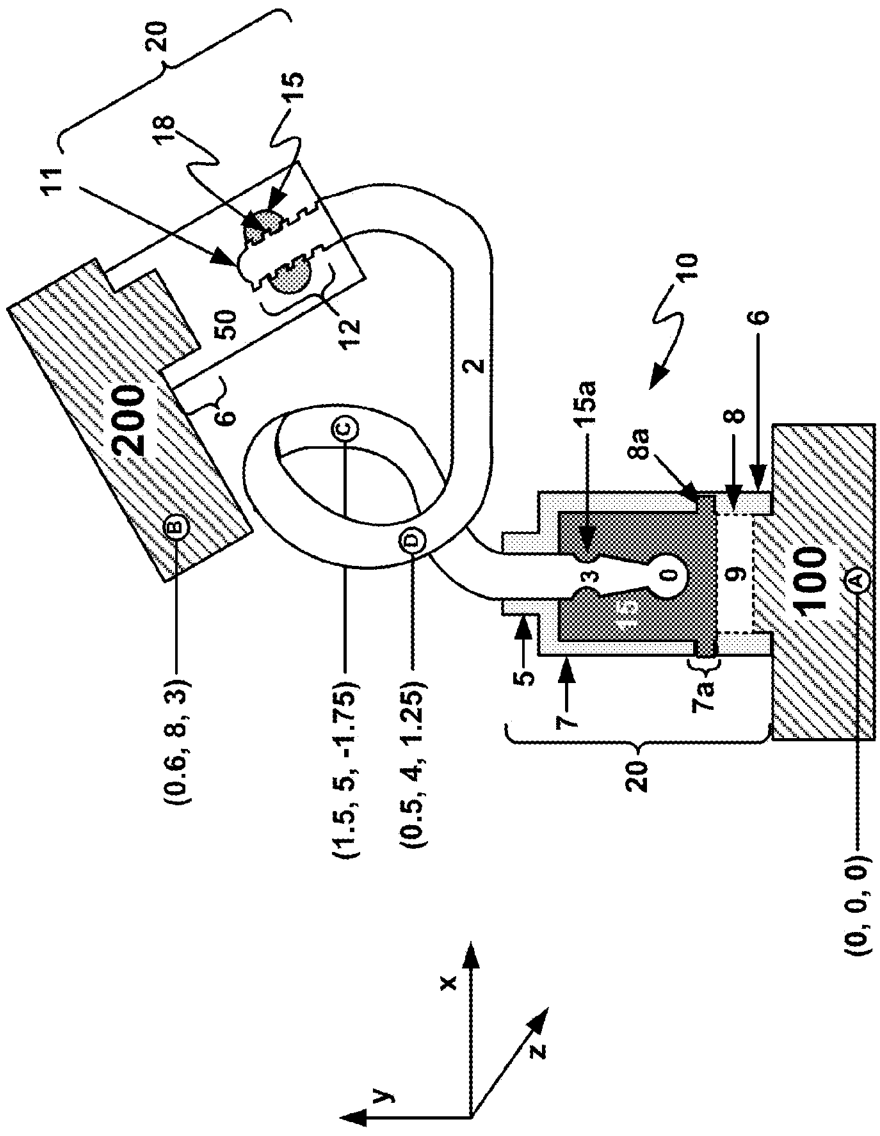


FIG. 14D

FIG. 15


20
15
18
11
12
50
200
6
2
10
15a
8a
8
6
9
100
A
B
C
D
3
0
5
7
7a
20
(0.6, 8, 3)
(1.5, 5, -1.75)
(0.5, 4, 1.25)
(0, 0, 0)
x
y
z

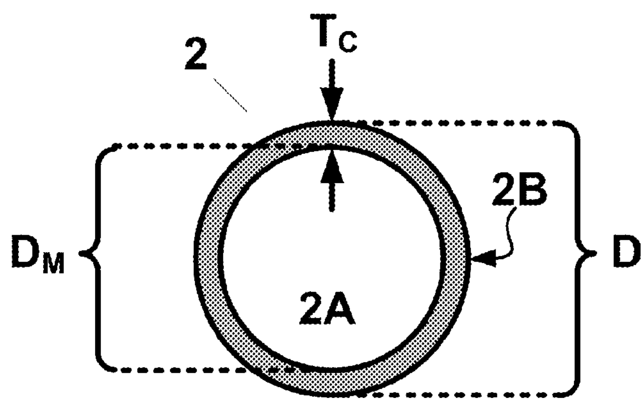


FIG. 16A

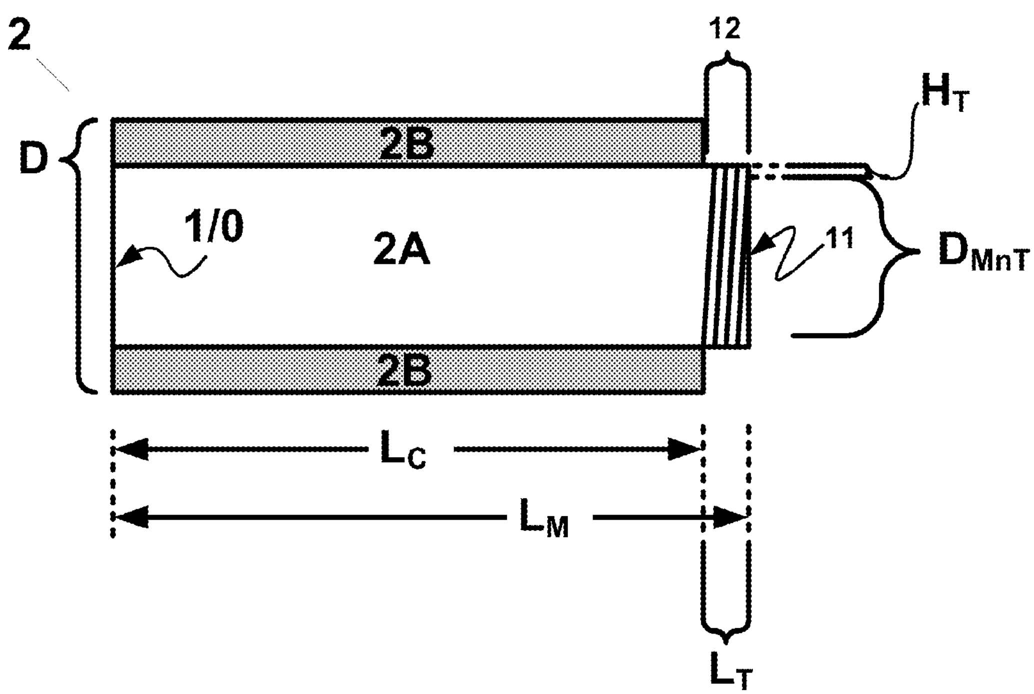


FIG. 16B

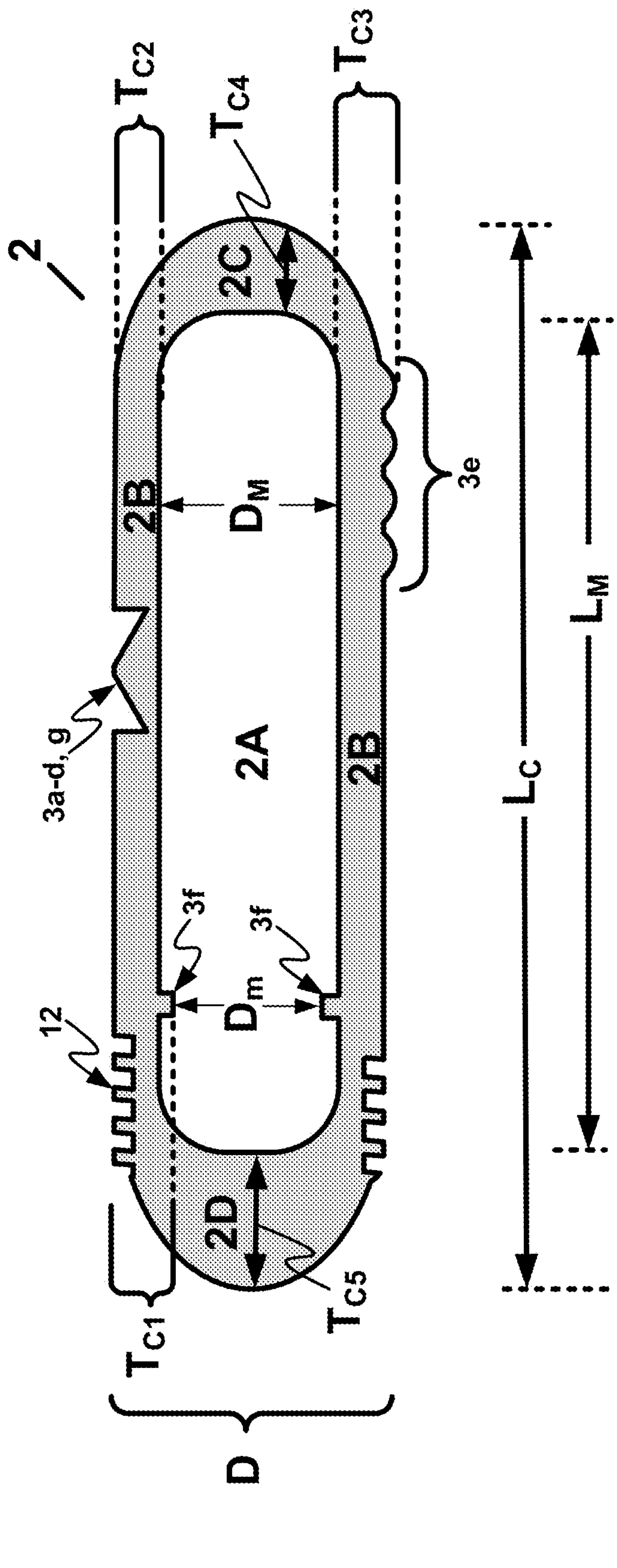


FIG. 16C

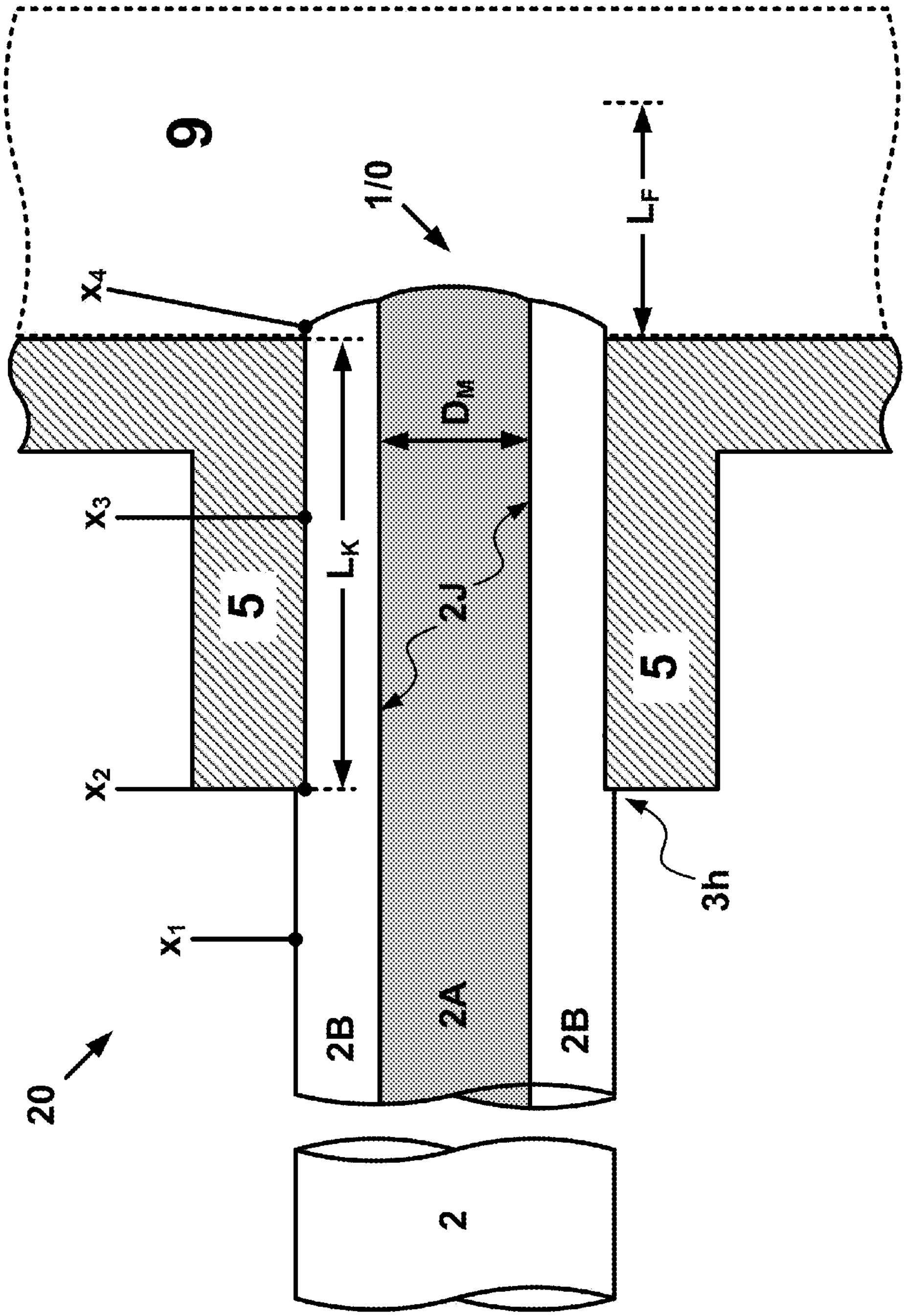
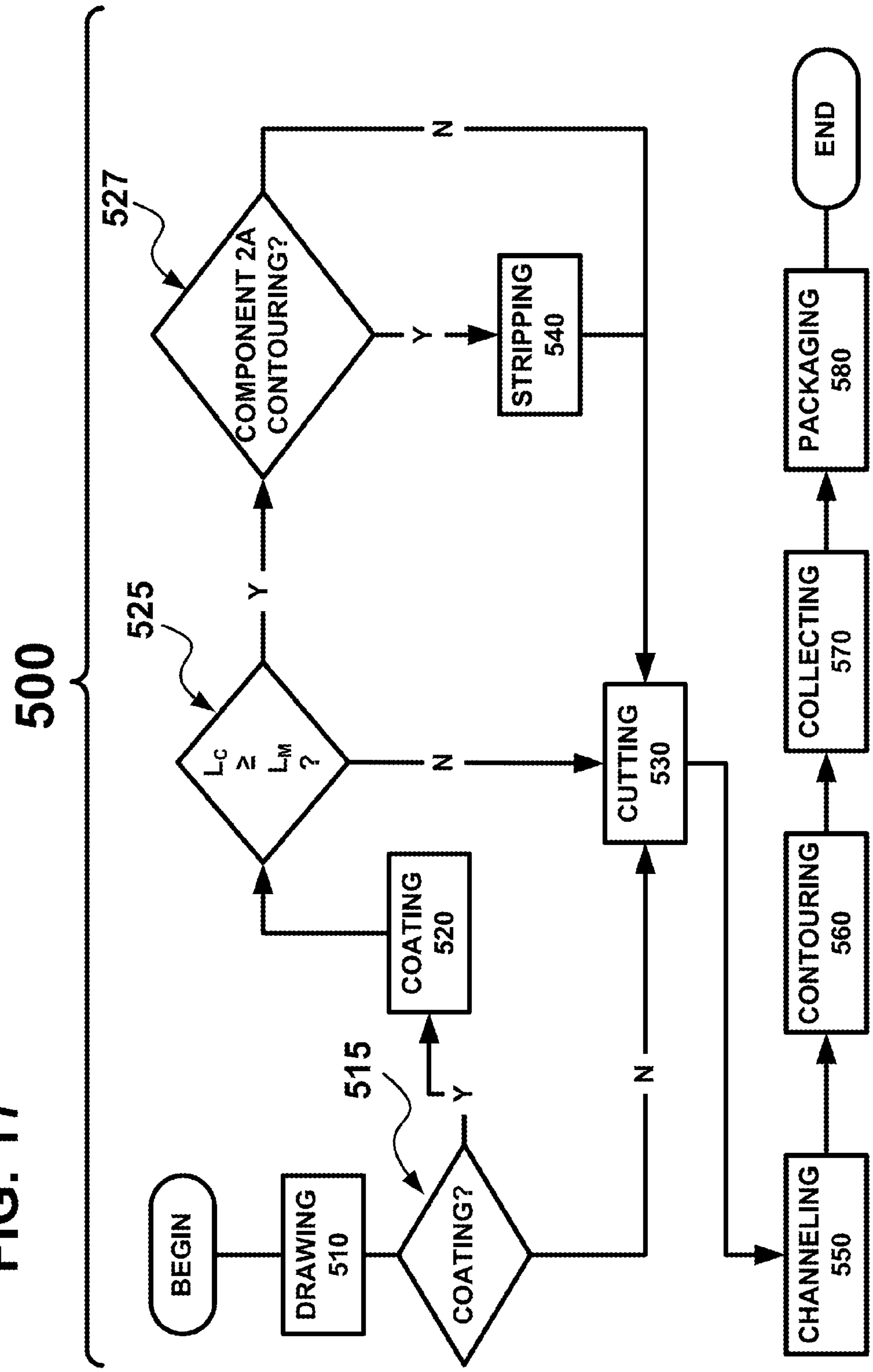


FIG. 16D

FIG. 17


500
BEGIN
DRAWING 510
COATING?
515
Y
N
COATING 520
$L_C \geq L_M$?
525
N
Y
COMPONENT 2A CONTOURING?
527
Y
N
STRIPPING 540
CUTTING 530
CHANNELING 550
CONTOURING 560
COLLECTING 570
PACKAGING 580
END

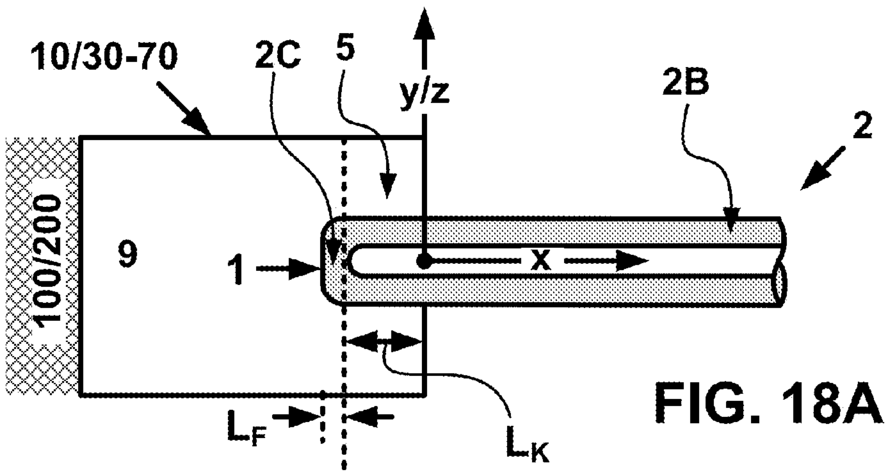


FIG. 18A

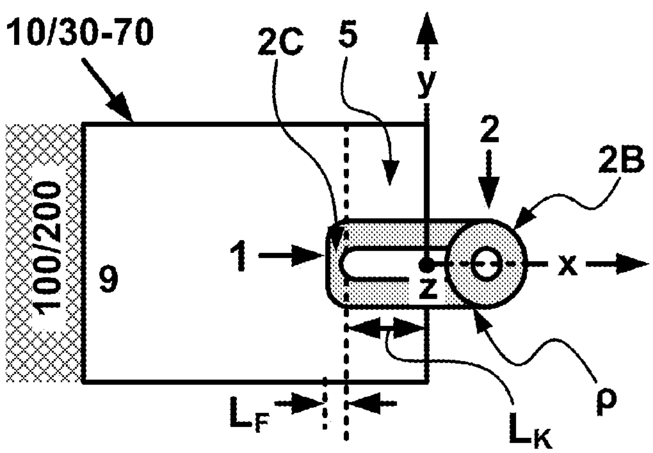


FIG. 18B

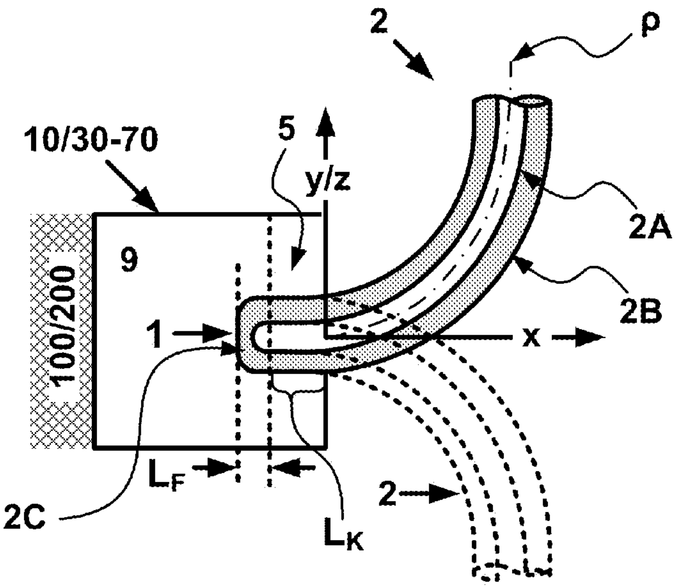


FIG. 18C

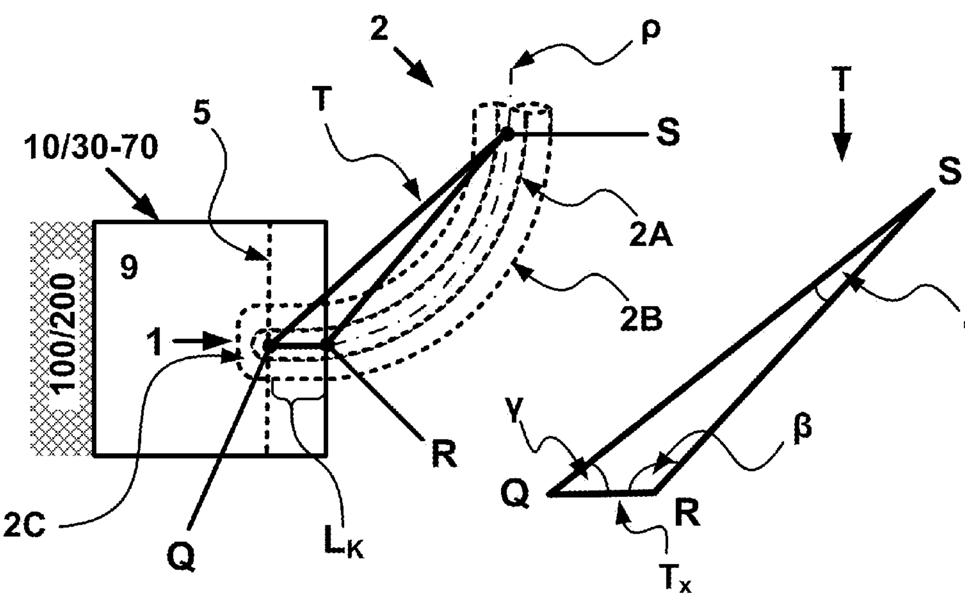


FIG. 18D

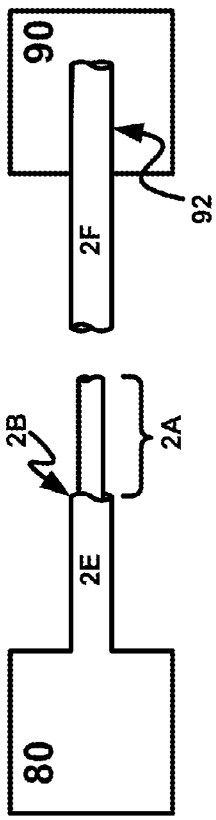


FIG. 19A

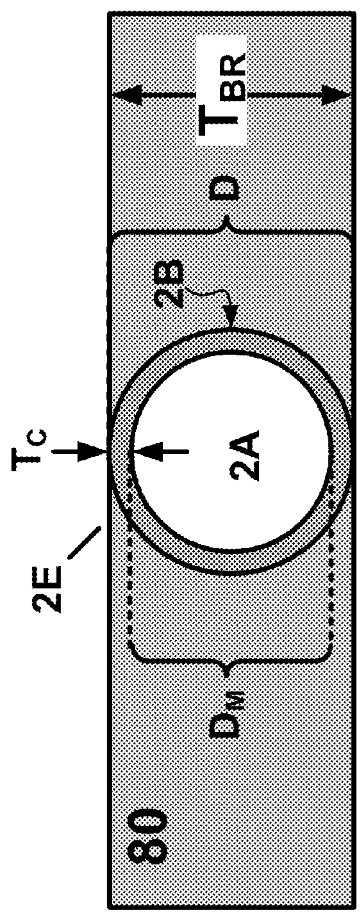


FIG. 19B

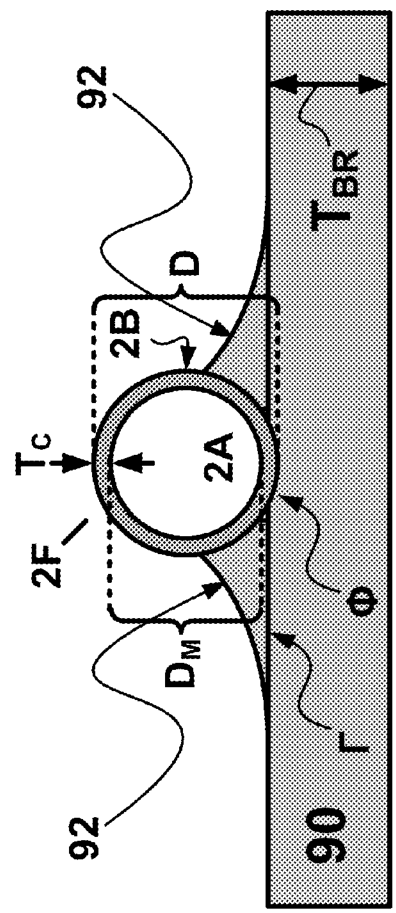


FIG. 19C

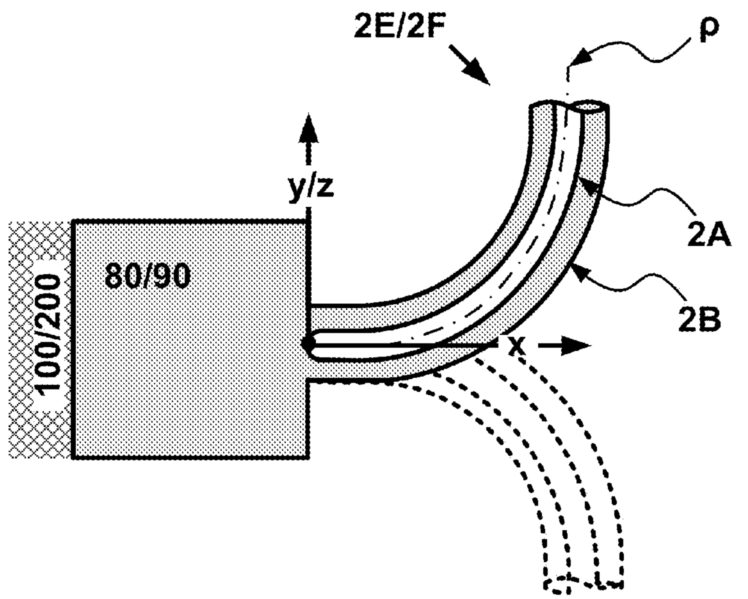


FIG. 19D

POSABLE TOY LINKAGE

RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 14/474,276, filed on Sep. 1, 2014 and claims the benefit of U.S. Provisional Patent Application Ser. No. 62/211,822, priority to each of the aforementioned applications is hereby claimed and the disclosures of each of which are incorporated herein by reference in their entirety.

FIELD OF THE INVENTION

[0002] Disclosed are embodiments of the invention that relate to, among other things, building block linkage and joint systems and methods.

BACKGROUND

[0003] Linkages for toy building blocks, such as those made by LEGO®, Duplo®, Mega Bloks, Built to Rule, K'nex, Kre-O, and others, provide limited degrees of movement and positioning in the three dimensional plane for the blocks they connect.

[0004] Flexible plastic cables, string, plastic rods, and plastic tubes have been used to connect building blocks, as illustrated and described in U.S. Pat. Nos. 5,433,549, 5,733,168, 6,000,984, 6,213,839, 6,461,215, 6,676,474, 6,843,700, and PCT/DK1991/000373. Other prior art systems are Lego® Technic Sets 5118, 7471, 8002, 8074, 8412, 8437, 8440, 8444, 8445, 8457, 8479, 8482, 8483, 8485, 8828, 8836, 8839, 8856, and 9748.

[0005] As shown in FIG. **1**A, an end P**1** is connected to a bendable plastic rod P**2** via neck P**3**. Front end P**1**, rod P**2**, and neck P**3** are shaped to be received in a complementary slot P**11**-P**13** of the receiver block P**10**. Thus, a plastic rod P**2** with necks P**3** and ends P**1** disposed on either terminus of the rod P**2** is used to tether blocks to which receiver block P**10** may couple, provided the necks P**3** and ends P**1** are capable of receipt in the receiver block slots P**11**-P**13**. In an alternative arrangement shown by FIG. **1**B, a receiver block P**10** is comprised of a jaw P**5**, a mouth P**6**, and a tooth P**7** that engages a recess/neck P**3** in a plastic rod P**2** received within block P**10**. In this arrangement, the prior art receiver block P**10** relies on plastic-on-plastic coupling between tooth P**7** and recess P**3** to maintain rod P**2** in the block P**10**, e.g., a crimping connection.

[0006] All of these linkage systems suffer disadvantages in terms of the reduction in strength from repeated use and/or exposure to heat, weakness when loaded in a direction perpendicular to their cross-section, and/or lack of ability to be bent in any number of conformations while also substantially maintaining a conformation in three-dimensional space, e.g., wilting or buckling in response to loads.

SUMMARY OF THE INVENTION

[0007] A building block system for interconnecting Lego® and non-Lego® like bricks together via use of at least a bendable metal component that has posability with and without a coating disposed on the metal surface.

[0008] By having posability, a linkage may have an unlimited range of displacement in three-dimensional space and be able to hold its conformation in loaded and/or unloaded configurations. Such a linkage may serve as a universal joint for building blocks.

[0009] The posable linkage may be coupled to a building block using one or more of the following: the building block apertures themselves, a combination of the building block apertures and intermediary components within the building block, and/or a socket or adaptor disposed within the building block either alone or in combination with other features of the building block.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIGS. **1**A-**1**B illustrate the prior art and have been previously described.

[0011] FIG. **2** illustrates an exemplary embodiment of one form of exemplary inventive building block linkage system.

[0012] FIGS. **3**A-D illustrate exemplary embodiments of exemplary building block linkages for an exemplary inventive building block linkage system and assembly method.

[0013] FIGS. **4**A-G illustrate other exemplary embodiments of other forms of exemplary inventive building block linkage systems and assembly methods.

[0014] FIG. **4**H illustrates an exemplary socket loading technique for exemplary inventive building block linkage systems.

[0015] FIGS. **5**, **6**A-B, and **7**A-F illustrate other exemplary embodiments of other forms of exemplary inventive building block linkage systems and assembly methods.

[0016] FIGS. **8** and **8**A-B illustrate views of an exemplary anchor block for various forms of exemplary inventive building block linkage systems and assembly methods.

[0017] FIGS. **9**A and **9**B illustrate still another exemplary embodiment of other forms of exemplary inventive building block linkage systems and assembly methods.

[0018] FIGS. **10**A-C, **11**A-C, **12**A-C, and **13**A-C illustrate other exemplary embodiments of anchor blocks and linkages used in forms of an exemplary inventive building block systems and assembly methods.

[0019] FIGS. **14**A-D illustrate other exemplary embodiments of adaptors for exemplary blocks and linkages used in other forms of an exemplary inventive building block systems and assembly methods.

[0020] FIG. **15** illustrates an exemplary embodiment of an exemplary inventive building block system.

[0021] FIGS. **16**A-D illustrate exemplary embodiments of linkages.

[0022] FIG. **17** illustrates an exemplary embodiment of an exemplary method of manufacture of an exemplary posable linkage.

[0023] FIGS. **18**A-D illustrate other exemplary embodiments of an exemplary inventive building block system.

[0024] FIGS. **19**A-D illustrate still further exemplary embodiments of an exemplary inventive building block system.

[0025] In the drawings like characters of reference indicate corresponding parts in the different figures. The drawing figures, elements and other depictions should be understood as being interchangeable and may be combined in any like manner in accordance with the disclosures and objectives recited herein.

DETAILED DESCRIPTION

[0026] With respect to FIG. **2**, an exemplary linkage **2** may be configured to fit within an opening **5** of a receiving exemplary building block **10** (hereinafter referred to as block or brick **10**, which may be a Lego-like brick). An exemplary brick **10** may be made of plastic, rubber, or metal, but preferably PLA or Acrylonitrile Butadiene Styrene (ABS) plastic. An exemplary brick **10** may be prismatic, cubic, spherical, conical, pyramidal, or any other form of polyhedron in shape. When assembled, the head **1** and tail **0** of an exemplary linkage **2** may be located within a cavity **9** of exemplary block **10**. In an exemplary embodiment, head **1** of an exemplary linkage **2** need not enter the exit **6** of exemplary block **10**. The opening **5** and exit **6** of an exemplary block **10** may also serve as adaptors for connecting exemplary block **10** to other building blocks. For example, in an exemplary Lego® block **10** opening **5** may be sized to fit within the exit **6** of another exemplary building block (not shown). Conversely, an exit **6** of an exemplary Lego® block **10** may be sized to fit about an opening **5** of another exemplary building block. According to these embodiments, the engagement between an exemplary linkage **2** and exemplary block **10** may be considered a joint **20**.

[0027] In one embodiment, an exemplary linkage **2** is made of a metal and is flexible yet posable. An example of posability may be that an exemplary linkage **2** can be bent into any conformation, without any limit on degrees of freedom of movement, and substantially maintain that conformation in three-dimensional space. As another example of posability, an exemplary linkage **2** may be configured to dispose at least two blocks **10**, which are adapted to receive an exemplary linkage **2**, in different positions in three-dimensional space and substantially maintain those positions over time without the need for any other movable parts but the linkage **2**. Accordingly, an exemplary linkage **2** may be the exclusive means of positioning exemplary building blocks which it interconnects. As such, an exemplary linkage **2** may allow exemplary building blocks to be translated, rotated, and/or held in positions with respect to one another in three-dimensional space. Further alternatively, an exemplary linkage **2** may couple a plurality of different block systems together, e.g., a Lego® block to a K'nex piece.

[0028] In another embodiment, an exemplary linkage **2** may have one or more of the following exemplary characteristics: (i) a wire-like shape; (ii) made out of one or more of the following and/or their combinations and/or galvanized variants: aluminum, copper, iron, or brass; (iii) dimensioned so that it can be received within an opening **5** and/or an exit **6** of an exemplary block **10**; (iv) dimensioned so that it can be received within fabric, flexible plastic, or elastomer tubing; (v) dimensioned so that its diameter is within the range of diameters between those of opening **5** and those of exit **6** of an exemplary block **10**; (vi) a diameter of approximately 0.123 inches to approximately 0.193 inches; (vii) be approximately 5- to approximately 8-gauge wire; or (viii) be an armature wire. In an exemplary embodiment, an exemplary linkage **2** is about 0.12574 inches in diameter and is made from a flexible aluminum armature wire. While an exemplary linkage **2** may preferably be circular in cross-section, any number of cross-sections of an exemplary linkage **2** may be contemplated depending on the exemplary brick with which it couples.

[0029] For example, an exemplary linkage **2** may be configured so that it and/or its head **1** or tail **0** may friction-fit within an exemplary block **10** opening **5**, exit **6**, and/or other such aperture as described herein, provided the exemplary block **10** material creating the cross-section of such opening **5**, exit **6**, and/or other such aperture does not go beyond its modulus of resilience (e.g., the cross-section may be the same as or smaller than the cross-section of an exemplary linkage **2**, head **1**, and/or tail **0**). Where multiple cross-sections are involved, an average cross-section may be used to determine the applicable modulus of resilience. An average cross-section of an exemplary linkage **2** may be the cross-section at one end of linkage **2** to the point on linkage **2** just before where the cross-section remains substantially un-changed along the length of linkage **2**. An average cross-section may be utilized for determining the average cross-section of an aperture in exemplary block **10**, e.g., measuring the cross-section from the opening **5** or exit **6**, whichever is closest to the cross-section of the aperture surface most distal to the beginning measuring point whether it be opening **5** or exit **6** as the case may be.

[0030] An exemplary linkage **2** may be included in and made out of any other material or combination of materials that results in properties equivalent to those achieved by structures with one or more of the foregoing characteristics and posabilities. For example, a metal wire may be included within an elastomer tube so that the combination of the two, which together form an exemplary linkage **2**, may have the flexibility and posability of the underlying metal wire (for example the illustrative embodiments and related disclosures of FIGS. **16**A-D). Those skilled in the material arts may be able to identify other materials of which a single exemplary linkage **2** can be made to achieve one or more of the foregoing requirements of the metal linkage **2** embodiments, such as, polymers and plastics, provided the final composition has posability.

[0031] An exemplary linkage **2** may have a plurality of orientations in three-dimensional space in which it may position blocks coupled thereto. In the illustrative embodiment of FIG. **2**, any number of different points in three-dimensional space, identified by Cartesian coordinates (x, y, z), may be found about the length of a single exemplary linkage **2**. For example, point "A" on an exemplary linkage **2** has exemplary coordinates (0, 0, 0), meaning that this portion of exemplary linkage **2** may serve as an origin position or point of comparison. Point "B", which has coordinates (−1, 1, −1), may suggest that this part of linkage **2** is located in a plane behind and above Point "A" in three-dimensional space. Point "C", which has coordinates (1.5, −0.5, 1), may suggest that this part of an exemplary linkage **2** is in a plane ahead of and under point "A." Thus, each of the blocks coupled to exemplary linkage **2** as shown in FIG. **2** are oriented and positioned in different parts of three-dimensional space. Further, an exemplary linkage **2** may be configured so that the positioning of the blocks coupled thereto in the three-dimensional space is substantially maintained. Because of its flexibility, an exemplary linkage **2** may also be configured so that its parts have different positions in three-dimensional space as bricks are displaced from one position to another. Further orientation arrangements capable with an exemplary linkage **2** may also be understood with reference to FIGS. **11**C, **15**, **18**B-D, and their related, interrelated, and interchangeable disclosures.

[0032] With reference to FIGS. **3**A-D, exemplary linkages **2** may be shown with different heads **1**. For ease of reference, head **1** may be considered the portion of an exemplary linkage **2** that may be used to join an exemplary linkage **2** to exemplary bricks **10**, although tail **0** may have the same or similar purpose for the same or different bricks **10**. Thus, head **1** has no restrictive beginning point, but may comprise one end of an exemplary linkage **2**. Likewise, tail **0** has no restrictive beginning point, but may comprise the other end of an exemplary linkage **2** opposite head **1**. In an exemplary linkage **2** of the wire-type, such linkage may have a head **1** and a tail **0** at either end. While an exemplary linkage **2** has thus far been described in such manner, the inventive system may utilize linkages **2** made up of multiple heads **1**/tails **0** depending on design purposes, e.g., linkages with “Y” shapes, “X” shapes, cruciform, and others. Unless otherwise indicated, embodiments showing only one head **1** or tail **0** of an exemplary linkage **2** do not foreclose the existence of any number of heads **1**, tails **0**, and linkage **2** types previously described. Additionally, while a head **1** or tail **0** may be used to illustrate an embodiment and describe it, it should be understood that descriptions of one may apply equally to the other.

[0033] An exemplary linkage **2** may be shown in FIG. **3**A as having a head **1** comprised of a conical or spherical terminus **11** and one or more threads or windings **12**. While shaped in this fashion, terminus **11** may be flat, concave, or any other surface. In another exemplary embodiment illustrated by FIGS. **3**B and **3**C, an exemplary linkage **2** may have a head **1** comprised of bumps or curved recesses **3** about the linkage's circumference and/or perimeter. In yet another exemplary embodiment, which may be illustrated by FIG. **3**D, an exemplary linkage **2** may have a head **1** comprised of one or more discs **3*a*** separated by one or more recesses **3**. The head **1** of an exemplary linkage **2** may comprise one or more of the aforementioned and other surface features for the purposes of serving as part of an exemplary system described herein. Such contours may be made by 3D printing, laser machining, laser sintering, CNC machining, lathes, molding, extrusions, taps, and/or dies.

[0034] The illustrative embodiment of FIG. **4**A may show parts of an exemplary inventive system. According to this illustrative embodiment, an exemplary linkage **2** may have a head **1** comprised of round surfaces **3**. An exemplary linkage **2** in FIG. **4**A may be received within exemplary brick **10** through opening **5**. In this illustrative embodiment, exemplary brick **10** may be hollow inside so that it may have a cavity **9** with inner surface **8** and an outer surface **7**. Disposed within cavity **9** of exemplary brick **10** may be an exemplary socket **15**.

[0035] According to one aspect of an inventive system, an exemplary socket **15** may be sized, shaped, and/or contoured to fit partially or completely within cavity **9**, e.g., as a prismatic, spherical, or other polyhedron shape, in order to receive and hold a head **1** or tail **0** of an exemplary linkage **2**. For example, an exemplary socket **15** may be such that it does not inhibit the use of opening **5** or exit **6** to allow exemplary brick **10** to combine with other building blocks. Alternatively, an exemplary socket **15** may be contoured so that when placed within an exemplary brick **10**, it may have recesses sized and shaped like an exemplary opening **5** or exit **6** to allow exemplary brick **10** to combine with other bricks. In an exemplary embodiment, an exemplary socket **15** may be a component of an exemplary inventive system that may be placed within exemplary brick **10** so as not to disturb its uses and functions for assembly with other building blocks.

[0036] As shown in FIG. **4**A, an exemplary socket **15** may comprise a channel **16** into which an exemplary linkage **2** may be received. Channel **16** may be sized and shaped to complement head **1** of linkage **2** when received within an exemplary socket **15**. Alternatively, channel **16** may be sized and shaped so that head **1** of linkage **2** friction-fits within an exemplary socket **15**. For example, as shown in FIG. **4**B, an exemplary inventive system **20** may have a linkage **2** with a head **1** comprised of a plurality of spherical surfaces **3**. When inserted into exemplary brick **10** containing an exemplary socket **15**, spherical surfaces **3** compress walls of cylindrical channel **16** while walls of channel **16** press against spherical surfaces **3**. In this manner, channel **16** may be molded so that compression surfaces **15*a*** hold or brace the head **1** of linkage **2** so as to maintain its reception in an exemplary socket **15** and thereby retention in exemplary brick **10**. According to another exemplary embodiment, channel **16** may be sized and shaped for bracing an exemplary linkage **2** but allow passage of other exemplary building blocks known to those skilled in the art, e.g., as may be illustrated in FIGS. **5** and **14**D.

[0037] In an exemplary embodiment, channel **16** may possess an average cross-section (as measured from its furthest depth to its terminus at the surface of an exemplary socket **15**) that is greater than 0% and up to about 15% smaller than the average cross-section of head **1** or tail **0** of an exemplary linkage **2** (as measured from the end of linkage **2** to the terminus of the contours on either head **1** or tail **0**). In an exemplary embodiment, channel **16** may be about 13% smaller in average cross-section compared to that of head **1** or tail **0** of linkage **2**. Alternatively, a cross-section or average cross-section of channel **16** may be up to any percentage smaller than a cross-section or average cross-section of head **1** or tail **0** of linkage **2** so long as the introduction of such head **1** or tail **0** of linkage **2** does not cause an exemplary socket **15** to go beyond its modulus of resilience at a given temperature and hardness.

[0038] With reference to the illustrative embodiment of FIG. **4**C, another exemplary socket **15** within exemplary brick **10** may have a contoured channel **16** having one or more grips **17** for gripping or bracing an exemplary linkage **2**, which may have a head **1** comprising disks **3*a*** and recesses **3**. As previously described with respect to channel **16**, an exemplary contoured channel **16** may have the same characteristics, such as being complementary to the shape of head **1** or be slightly smaller to create a friction-fit by way of compression surfaces **15*a***. In another exemplary embodiment, channel **16** may not be complementary to linkage **2** and/or head **1** so as to create more gripping, hugging, and/or bracing surfaces within channel **16**.

[0039] As illustrated in the exemplary embodiment depicted in FIG. **4**D, an exemplary joint **20** may comprise an exemplary linkage **2** with a head **1** comprised of alternating discs **3*a*** separated by recesses **3** braced by grips **17** in an exemplary socket **15**. According to this exemplary embodiment, complimentary grips **17** and recesses **3** may result in a robust connection between linkage **2** and exemplary brick **10**. For example, where an exemplary socket **15** may be made of an elastomer material, a linkage **2** with a head **1** comprising alternating discs **3*a*** and recesses **3** may be pushed against the grips **17** of an exemplary socket **15** causing them to deflect distally from the direction of entry of the linkage **2**. According to such an embodiment, an exemplary elastomer socket **15** with elastic grips **17** may allow the grips **17** to deflect back towards the direction of entry of linkage **2** after a linkage **2** contour passes such that they are substantially found between the linkage **2** contour (as illustrated, discs **3*a***) and adjacent to the recesses **3** of the head **1**. With respect to this embodiment, the elasticity of grips **17** may allow them to permit entry of head **1** of linkage **2** when inserted into the socket **15** while substantially resisting departure of head **1** from an exemplary socket **15** if linkage **2** experiences forces tending to displace it from an exemplary socket **15**, e.g., tension forces.

[0040] In an alternative embodiment illustrated with respect to FIGS. **4**F and **4**G, grips **17** may be modified to allow easier displacement from an exemplary socket **15** (e.g., sloped grips **17***a*) and/or discs **3***a* may be modified to allow head **1** of an exemplary linkage **2** to more easily displace from gripping socket (e.g., bowl discs **3***b*).

[0041] In another exemplary embodiment illustrated by FIG. **4**E, an exemplary brick **10** may have a crevice **8***a* in inner surface **8**. An exemplary crevice **8***a* may be of any cross-section and may span partially or fully about inner surface **8**, including about the circumference of inner surface **8**, in an intermittent arrangement about inner surface **8**, and/or in a continuous/discontinuous spiral pattern. Preferably, crevice **8***a* may be located between opening **5** and exit **6** of exemplary brick **10**. Preferably, crevice **8***a* may be only within cavity **9**. Alternatively, an exemplary crevice **8***a* may be a through-hole **7***a* connecting inner surface **8** to outer surface **7**. As will be further described, a through-hole crevice **8***a* may be useful for selective operation of system **20**.

[0042] Further illustrated in the illustrative embodiment of FIG. **4**F may be an exemplary socket **15** having wings **15***a*. Exemplary wings **15***a* may be configured to be received within an exemplary crevice **8***a* within exemplary brick **10**. While wings **15***a* may be shown as single extensions from the circumference of a circular socket **15**, they may also be shaped to spiral about the outer surface of an exemplary socket **15** so that when met with complementary spiral crevice **8***a*, such a socket **15** may be screwed into exemplary brick **10**. Accordingly, an exemplary interaction between crevice **8***a* and wings **15***a* may further increase the bracing capability of an exemplary socket **15** in an exemplary joint **20**.

[0043] As previously described with respect to a through-hole crevice **8***a*, reception of an exemplary socket **15** within an exemplary brick **10** with such a through-hole **7***a*, such as may be illustrated with respect to FIG. **4**E, may possess the added advantage of being released from exemplary brick **10** by inserting a pin or pencil point into through-hole **7***a* to depress wing **15** located in the through-hole crevice **8***a*. In so doing, an exemplary socket **15** may be released from cavity **9**. Crevice **8***a* and wings **15***a* may be complementarily shaped and/or sized to increase friction there between, e.g., crevice **8***a* may be triangular in cross-section while wings **15***a* were circular or rectangular. An exemplary brick **10** possesses one crevice **8***a* that is substantially spherical in shape while an exemplary socket **15** may have one wing **15***a* that is substantially spherical in shape. Other varieties and combinations may be configured for particular needs.

[0044] As illustrated in FIGS. **4**A-G, an illustrative inventive system **20** may be such to reduce the propensity of an exemplary linkage **2** from disengaging from exemplary brick **10** by way of an exemplary socket **15**. An exemplary socket **15** may be made of polymer, and more particularly, an elastomer material or thermoplastic, preferably an elastomer such as rubber or silicone. As an elastomer, an exemplary socket **15** may be advantageously suited for insertion in exemplary brick **10** by way of a calendaring process **102** shown in FIG. **4**H. While other forms of calendaring processes may be understood to those skilled in the art, the exemplary calendaring process illustrated diagrammatically in FIG. **4**H may show calendaring wheels C compressing elastomer socket **15** so as to fit within exit **6** of an exemplary brick **10**.

[0045] With reference to the illustrative embodiment of FIG. **5**, an exemplary linkage **2** may be comprised of a head **1** for reception within a channel **16** as well as intermediary ribs **3***c*/**3***d* extending from its own surface structures, which may be the same as or different from those on head **1** and proximal or distal to the same, for reception in a separate channel **16***a* of a separate socket **15** in a separate exemplary brick **10**. For example, an exemplary linkage **2** may have a head **1** comprising recesses **3** and fins **3***a*. The same exemplary linkage **2** according to this illustrative embodiment may have grooves **3***c* with extensions **3***d*. A first exemplary brick $\mathbf{10}_1$ may be coupled to head **1** of an exemplary linkage **2** by way of an exemplary socket **15** such that linkage **2** does not pass from exemplary brick $\mathbf{10}_1$ opening **5** to exit **6** via channel **16**. Grooves **3***c* and extensions **3***d* may also friction fit a second exemplary brick $\mathbf{10}_2$ by way of a second through-socket $\mathbf{15}_1$ whose through channel **16***a* allows full passage of an exemplary linkage **2** from opening **5** to exit **6** of the exemplary brick $\mathbf{10}_2$. Alternatively, one or more exemplary bricks $\mathbf{10}_3$ may comprise channels **16***b* that slidingly or frictionally engage the non-contoured surface of an exemplary linkage **2**. Alternatively, exemplary bricks $\mathbf{10}_3$ may also slidingly or frictionally engage both contoured and non-contoured surfaces of an exemplary linkage **2**. While exemplary brick $\mathbf{10}_3$ may be illustrated as a small exemplary brick, e.g., a 1×1 Lego® plate, exemplary brick $\mathbf{10}_3$ may be any size and shape with a channel **16***b* through its surfaces.

[0046] An exemplary multi-surface linkage **2** may be able to interact with numerous exemplary bricks $\mathbf{10}_n$ (where n is any integer) to provide building points for other exemplary blocks, e.g., exemplary building blocks **100**, on its posable surface. In other words, exemplary bricks $\mathbf{10}_2$ may be anchored by surface structures intermediary of linkage **2**'s head **1** and tail **0**, e.g., exemplary block $\mathbf{10}_3$. While such exemplary bricks have been shown having a through socket $\mathbf{15}_1$ other forms of exemplary bricks $\mathbf{10}_2$ and $\mathbf{10}_3$, with and without an exemplary socket **15** that permit full passage of an exemplary linkage **2** there through, are also suitable. Thus, an exemplary linkage **2** may act as the foundation for building numerous block structures on its flexible surfaces and may serve as a universal scaffolding for exemplary building block assemblies **100**.

[0047] With reference to the illustrative embodiments of FIGS. **6**A-B, an exemplary brick **10** may contain an exemplary socket **15** comprising a channel **16** having spiral threads **18** for complementary screw-threads **12** corresponding to head **1**, tail **0**, and/or terminus **11** of an exemplary screw linkage **2**. As illustrated in these illustrative embodiments and may be used in others, an exemplary socket **15** may possess rounded surfaces **15***c* to reduce material usage and cost of fabrication. Alternatively, rounded surface **15***c* may take the form of a funnel-like structure adjacent an opening **5** or exit **6** to facilitate reception of an exemplary linkage **2** within the channel **16**. An exemplary socket **15** may also be porous or sponge-like in material composition. While terminus **11** of exemplary screw linkage **2** may be pointed or conical, terminus **11** of an exemplary screw linkage **2** may be substantially flat, e.g., like the terminus **11** of linkage **2** in FIG. **7**B.

[0048] As illustrated in FIG. **6**B, screw threads **12** on the head **1** or tail **0** of an exemplary linkage **2** may be similar to a screw or other threaded fastener known to those skilled in the art. Likewise, threads **18** may be complementary to such screw threads **12** to allow for a robust connection between screw linkage **2** and exemplary screw socket **15**. Alternatively, an exemplary screw linkage **2** with threads **12** may be used with sockets **15** without threads **18** and rely on the modulus of resilience of an exemplary socket **15** to brace such screw linkage **2** threads. One advantage of using an exemplary screw socket **15** in the aforementioned embodiments may be to establish a greater amount of surface contacts between screw linkage **2** and its thread surfaces **12** and an exemplary socket **15**. Combining the various retention features described, e.g., grips **17** and/or screw channel **16**, in one exemplary socket **15** may provide additional linkage **2** retention properties and advantages. For example, for an exemplary linkage **2** with a screw head **1** with threads **12** and a recess **3** distal of the threads **12**, one may provide an exemplary socket **15** having a grip **17** proximal to the entry of the channel **16** and screw threads **18** distal from the entry so that the exemplary screw linkage **2** may both screw into an exemplary socket **15** and be restrained from movement by grip **17**.

[0049] As illustrated in FIG. **7**A, an exemplary brick **10** may be solid except for opening **5** in which a channel **16** with threaded wall **18** may be found and an exit **6** for receipt of an adjoining exemplary brick **10**. Exemplary screw linkage **2** may then screw into exemplary brick **10** as shown in FIG. **7**B. According to the illustrative embodiment of FIG. **7**B, an exemplary screw linkage **2** may be received within screw channel **16** and screwed into threaded wall **18** using its threads **12** extending from the head **1** and/or tail **0** of screw linkage **2**. The shape and/or dimensions of screw channel **16** may be based on the needs and loads of screw linkage **2**. Alternatively, the shape and/or dimensions of screw channel **16** may be contingent on the shape and/or dimensions of exemplary brick **10**. For example, screw channel **16** may be located adjacent to threads **18** found on opening **5** and/or exit **6**. In an exemplary embodiment, exemplary brick **10** with screw channel **16** may be capable of assembly to other bricks (not shown) using the geometries of opening **5** and exit **6** even though it may have a screw channel **16** embedded therein or threads **18** on the inside of opening **5** and/or exit **6**. This is the same for the other embodiments having a screw channel **16** in a socket **15**.

[0050] Screw channel **16** may be made by boring out an exemplary brick **10** and using a tap and die to create the threads **18** of the channel for an exemplary screw linkage **2**. Alternatively, a lathe may be utilized. Further alternatively, as disclosed herein, exemplary brick **10** containing a screw channel may be made using 3D printing technologies known to those skilled in the art.

[0051] In another exemplary embodiment illustrated by FIG. **7**B, exemplary screw linkage **2** may be received within the material of exemplary brick **10**. According to such embodiments, exemplary brick **10** may have an opening **5**, exit **6**, a cavity **9**, and a screw channel **16** disposed between opening **5** and cavity **9** or between exit **6** and cavity **9**. The screw channel **16** may be the only channel with threads **18** for interaction with threads **12** of terminus **11** of screw linkage **2**. Alternatively, threads **18** may be found within opening **5** or exit **6** of an exemplary brick **10** and optionally may require an additional screw channel **16**. The extension of threads beyond screw channel **16** to opening **5** and/or exit **6** may be provided for in any of the other disclosed embodiments involving screw linkages **2**. According to the alternative embodiment where only opening **5** and/or exit **6** possess threads **18** may reduce the amount of threading required in exemplary brick **10** and/or an exemplary socket **15**.

[0052] Other exemplary screw bricks **10** may be illustrated by way of FIGS. **7**C-E. For example, an illustrative embodiment of an exemplary screw brick **10** as shown in FIG. **7**C may not have an opening **5** but may have a screw channel **16**, an exit **6**, and a space **9** for assembly to other bricks (not shown). Alternatively, an exemplary screw brick **10** may only have a screw channel **16** and no other structures. In the illustrative embodiment of FIG. **7**D, an exemplary screw brick **10** may have a plurality of screw channels **16** of various sizes, threading, and orientations. As illustrated, exemplary screw brick **10** of FIG. **7**D may comprise one type of screw channel **16***p* and **16***q*, and another type of screw channel **16***r* in various sides of exemplary brick **10**. According to this illustrative embodiment, an exemplary multi-screw port brick **10** may permit numerous flexible linkages **2** to extend therefrom. While exemplary brick **10** may be illustrated as rectilinear, there is no requirement that exemplary brick **10** need be so. When an exemplary brick **10** may comprise one or more screw channel **16***s* about a spherical surface, such an exemplary brick **10** may allow for multiple screw linkages **2** disposed in various planes in three-dimensional space at one time, e.g., FIG. **7**E.

[0053] While screw channels **16***p*/**16***q*/**16***r* are oriented at 90 degrees, such screw channels do not need to be orthogonal to one another but may have more acute and/or obtuse angles with respect to one another. An exemplar of an exemplary brick **10** having an angled screw channel **16** may be understood with respect to FIG. **7**E. An exemplary brick **10** may have one or more angled screw channels **16***s*/**16***t* within its surfaces, including in corners or on other points of the exemplary brick **10** surface.

[0054] In another exemplary embodiment illustrated by FIG. **7**E, an exemplary brick **10** may have a hybrid of rectilinear, rounded or spherical or hemispherical surfaces into which screw channel **16***s* may be disposed. In such embodiments, an exemplary screw linkage **2** may be oriented in a plane other than one orthogonal to the surface on which exemplary brick **10** may sit, e.g., where exemplary brick **10** assembles to other bricks (not shown), screw channel **16** may be oriented at less than 90 degrees from the exemplary brick-to-brick assembly surface. Similarly, in other exemplary embodiments, a plurality of screw channels **16** may be disposed on an exemplary brick **10** so that they are both oriented with respect to one another and exemplary brick **10** at non-orthogonal positions and/or less than 90 degrees from any exemplary brick-to-brick assembly surface.

[0055] As described, an illustrative exemplary hybrid block **50** may be composed using 3D printing or other formation methods known to those skilled in the art. As illustrated in FIG. **7**F, an exemplary hybrid building block **50** may comprise an exemplary socket **15** located in a cavity **9** between a screw channel **18** and opening **5**. As illustrated, cavity **9** may hold an exemplary socket **15** having surface contours, such as grips **17**, for gripping recesses **3** of an exemplary linkage **2**. Accordingly, such an exemplary hybrid block **50** may allow an exemplary screw linkage **2**

having threads **12** and recesses **3** about its length to have a plurality of coupling regions within exemplary block **50**. In the illustrative embodiment of FIG. **7**F, an exemplary linkage **2** may screw into exemplary block **50** while also being gripped by grips **17** of an exemplary socket **15**. As illustrated, an exemplary socket **15** may act as a diaphragm or friction washer for an exemplary building block system joint **20**. Any variety and order of linkage recesses **3**, threads **12**, and surfaces **3***a*-*g*, as described elsewhere, may be used up and down an exemplary linkage **2**. As such, exemplary hybrid block **50** may have numerous sockets **15** and receiving cavities **9**, with and without contours, e.g., threads **18**, and in any order to accommodate a particular exemplary linkage **2** and/or add to retention of such linkage **2**.

[0056] With reference to the illustrative embodiments of FIGS. **8**, **8**A-B, **9**A-B, **10**A-C, and **11**A-C, an exemplary clamshell-type brick **30** (hereinafter referred to as "brick **30**") may comprise a plurality of exemplary brick portions, for example, **10***a* and **10***b*, with inner surfaces **8***a* and **8***b*, respectively, coupled via flexible portion **31**. Flexible portion **31** may be a piece of material of the same or different composition of other parts of exemplary brick **30**. In one exemplary embodiment, exemplary brick **30** may be made from a polymer, such as an acrylic, while flexible portion **31** may be comprised of a more malleable polymer. In an exemplary embodiment, flexible portion **31** may be capable of allowing exemplary brick **30** to open and close so that portions **10***a* and **10***b* abut one another so that surfaces **8***a* and **8***b* and outer surface **7** are substantially continuous. According to other illustrative embodiments, flexible portion **31** may be configured to allow exemplary brick **30** to open and close like a clam shell so that, when closed, substantially no gaps exist in one or more of outer surface **7**, inner surfaces **8***a* and **8***b*, opening **5**, or exit **6**. While the illustrative embodiment of FIGS. **8**, **8**A-**8**B illustrate one flexible portion **31** in the longitudinal direction, numerous other flexible portions **31** may be found longitudinally about exemplary brick **30** to allow opening and closing of the same.

[0057] As further illustrated by the illustrative embodiment of FIG. **8**, an exemplary brick **30** may be opened about flexible portion **31** such that two inner surfaces **8***a* and **8***b* for two halves **10***a* and **10***b*, respectively, are visible when viewing exemplary brick **30**. Teeth **32***a* and **32***b* extend outwardly from the inner surfaces **8***a* and **8***b*, respectively. While teeth **32***a*/**32***b* have been shown with rectangular cross-sections, any shape may be suitable for use for the construction of teeth **32***a*/**32***b*. A view of an exemplary cross-section made by line A-A in FIG. **8** may be illustrated in FIG. **8**A. As shown, the opening **5** of exemplary brick **30** may be opened about flexible portion **31** exposing teeth **32***a*/**32***b* and the upper surfaces **7** of halves **10***a* and **10***b*.

[0058] A view of an exemplary cross-section made by line B-B in FIG. **8** may be illustrated by FIG. **8**B. As illustrated, an exemplary brick **30** may be opened so that teeth **32***a*/**32***b* are exposed for the exemplary brick **30** halves, **10***a* and **10***b*, respectively. Again, these halves **10***a*/**10***b* open about flexible portion **31**. FIG. **9**A illustrates an exemplary operation of an exemplary brick **30**. In the illustrative embodiment of FIG. **9**A, an exemplary linkage **2** with recesses **3** and fins **3***a* at head **1** may be configured to receive a complimentarily shaped tooth **32***a*/**32***b*. Accordingly, the toothed exemplary clam brick **30** illustrated in these embodiments may be used to lock in place an exemplary linkage **2** having a properly configured head **1** based on the surface structure of an exemplary linkage **2** and the inner surface **8***a*/**8***b* structures of exemplary clam brick **30**.

[0059] In another exemplary embodiment, exemplary brick **30** may be able to retain an exemplary linkage **2** with or without additional supports. In the former scenario, a hollow exemplary cap brick **40** may be used in which a hole sized to fit an exemplary linkage **2** slides down linkage **2** to the juncture between linkage **2** head **1** and exemplary clam brick **30**. An exemplary cap brick **40** may have a peg portion **41**, a ridge portion **43**, a through-hole **44**, and a receiver portion **42** for reception with other exemplary bricks **10**/**30**/**40**/**50**/**60**/**70**/**100**. According to the illustrative embodiment of FIG. **9**A, an exemplary cap brick **40** receiver portion **42** may receive within itself the opening **5** of exemplary clam brick **30**. Accordingly, exemplary cap brick **40** may preclude exemplary clam brick **30** from opening by virtue of its holding the opening **5** of exemplary clam brick **30** together, as may be understood with respect to FIG. **9**B. Further exemplary bricks (not shown), may be attached to the peg portion **41** as needed. Exemplary cap brick **40** may take various other forms and sizes as needed and may be a portion of a building block that does not have a hollow passage for an exemplary linkage **2** there through, e.g., a 2×2 Lego® plate brick may have one stud that is an exemplary cap brick **40** and the remaining three studs or pegs as provided in the prior art.

[0060] In another exemplary embodiment of exemplary clam brick **30**, as may be seen with reference to FIG. **10**A, halves **10***a* and **10***b* may have on their inner surfaces **8***a* and **8***b*, respectively, a male receptor **33***a* and a female receptor **33***b*, each configured to couple to the other in a nested or overlapping arrangement. In use, an exemplary linkage **2** with a head hole **3***g* in head **1** may be configured for reception within exemplary brick **30** and aligned with receptors **33***a*/*b* so that when exemplary clam brick **30** closes, the receptors **33***a*/*b* intersect within and/or through head hole **3***g* of head **1** of an exemplary linkage **2**. Accordingly, as illustrated in FIGS. **10**B and **10**C an exemplary linkage may be threaded by the receptors **33***a*/*b* when exemplary clam brick **30** is closed. As may be further illustrated in FIG. **11**A, any number or arrangement of receptors **33***a*/*b* may be utilized for the particular purpose. As previously stated, receptors **33***a*/*b* may be any shape or configuration suitable for use as holding an exemplary linkage **2** received in the exemplary brick **30**.

[0061] With respect to the illustrative embodiments of FIGS. **11**A-C, an exemplary clam brick **30** may contain a groove **34** in outer surface **7** of its halves **10***a*/*b* for receiving a brace **35** therein. As illustrated, an exemplary groove **34** may be of any type of cross-section for the purpose and brace **35** may be made out of any type of material capable of holding an exemplary brick **30** together. In an exemplary embodiment, groove **34** may be a rectangular cross-section configured so that when brace **35** is placed therein, the brace **35** and outer surface **7** of exemplary brick **30** are substantially aligned.

[0062] As illustrated in FIG. **11**C, a brace **35**, which may preferably be made of an elastomer, such as rubber, is shown as being wrapped tightly about exemplary brick **30** while an exemplary linkage **2** is free to move outside of exemplary brick **30**. As another exemplary embodiment of the posability and universal orientation of an exemplary linkage **2** may be further illustrated in FIG. **11**C.

[0063] As illustrated in FIG. **11**C, an exemplary linkage **2** may exit an exemplary brick **30** at point "A." An exemplary linkage **2** may be undulated at point "B" so that it enters point (0.5, 0.5, −0.5), which means that as this part of linkage **2** ascends and proceeds to the right, it also goes behind point "A." Point "C," at coordinates (1, 2, −0.75), illustrates that an exemplary linkage **2** may be further bent behind point "B" while gravitating upwardly and further ahead of point "A" in the horizontal plane. Further illustrating the universal positioning of an exemplary linkage **2**, point "D" located at the terminus **11** of tail **0** (which is shown with spiraling threads **12** thereon) may have coordinates (−2, 4, 1) thereby showing that the tail **0** of an exemplary linkage **2** may be bent behind its origin point and brought forward of the origin, even though it began with bending behind the origin (as in points "B" and "C"). As described, an exemplary linkage **2** would be configured to maintain bricks coupled to either of its ends in this configuration in three-dimensional space. Alternatively, an exemplary linkage **2**, by virtue of its flexibility, may be configured to change these illustrated coordinates when displacing bricks coupled to its ends.

[0064] With reference to FIGS. **12**A-C and FIGS. **13**A-C, an exemplary porous brick **60** may be one possessing multiple cavities/apertures in its construction. For example, with respect to the exemplary porous brick **60** illustrated in FIG. **12**A, such exemplary brick **60** may have one or more openings **5** extending from its outer surface **7**, a first cavity **9** leading to one or more exits **6** and additional cavities **9***a*, and one or more inner surfaces **8** which may have one or more crevices **8***a*. In an exemplary embodiment, exemplary porous brick **60** may be an Erling Lego-like brick.

[0065] An exemplary porous brick **60** may be further illustrated in FIG. **12**A with views from the front, rear, and side of the exemplary brick **60**. Other types of exemplary porous bricks **60** may be readily understood by persons skilled in the art and may be used in addition to the illustrative exemplary porous brick **60** described. One or more of the openings **5** of an exemplary porous brick **60** may be configured to receive an exemplary linkage **2** therein.

[0066] In another embodiment in accordance with the illustrative features of FIG. **12**B, an exemplary porous brick **60** may receive within its inner surface **8** an exemplary socket **15** adapted to fit within one of its cavities **9** so as to close off exit **6**. In another embodiment, an exemplary socket **15** may have one or more wings **15***a* configured to be received within a crevice **8***a* in one of the cavities **9** of exemplary porous brick **60**. An exemplary fitting of an exemplary socket **15** within exemplary porous brick **60** may provide a channel **16** through opening **5** for reception of an exemplary linkage **2** therein. According to the illustrative embodiment of FIG. **12**B, an exemplary channel **16** may be a contoured channel **16** which may contain one or more grips **17**. According to an exemplary method of use of an exemplary porous brick **60** with an exemplary socket **15**, the first exemplary step may be to align an exemplary socket **15** to be placed within a complementary inner surface **8** of an exemplary porous brick **60** cavity. The second exemplary step may be to align socket channel **16** with an opening in the exemplary porous brick **60**. The third exemplary step may be to use an exemplary linkage **2** head **1** to engage the combination of exemplary porous brick **60** and an exemplary socket **15** through an opening **5**. The fourth exemplary step may be to couple exemplary porous brick **60** to adjacent exemplary bricks to preclude the disposition of an exemplary socket **15** from within exemplary porous brick **60** while in use. According to an exemplary embodiment, the third and fourth exemplary steps may be had in either order depending on needs. Further, while a contoured channel **16** may be shown, any other channels **16** (e.g., screw channels) may be contemplated as well as contoured openings **5** and/or exits **6** of such exemplary bricks **60** as per other embodiments.

[0067] With reference to FIG. **12**C, an exemplary porous brick **60** alone or in combination with an exemplary socket **15** may be connected to an exemplary brick assembly **100** in which its cavity **9** where an exemplary linkage **2** may be received is closed off by surrounding exemplary bricks in the exemplary brick assembly **100**. Exemplary brick assembly **100** may be comprised of one or more bricks compatible with exemplary porous brick **60** and receptive to its attachment and/or connection. As shown in the illustrative embodiment of FIG. **12**C, an exemplary linkage **2** may be received through opening **5** of exemplary porous brick **60**, which houses an exemplary socket **15** within its cavity **9**, and is juxtaposed by exemplary brick assembly **100** such that an exemplary socket **15** is substantially confined within exemplary porous brick **60**. According to this exemplary embodiment, an exemplary linkage **2** may have a contoured head **1**. In an exemplary embodiment, which happens to be illustrated in FIG. **12**C, recesses **3** and fins **3***a* of head **1** interact with grips **17** of contoured channel **16** of an exemplary socket **15** to substantially retain an exemplary linkage **2** within exemplary porous brick **60**.

[0068] In one aspect of the illustrative embodiments of FIGS. **12**A-C, an exemplary porous brick **60** may have the added benefit of ease of removal of an exemplary linkage **2** from an exemplary socket **15**. One exemplary illustration of such benefits may be shown with respect to FIGS. **13**A-C. As shown in the exemplary illustrative embodiment of FIG. **13**A, an exemplary linkage **2** may be used to expel an exemplary socket **15** out of a cavity **9** in exemplary porous brick **60**. In one view, the cross-section of an exemplary socket **15**, shown as socket **15***y*, shows engagement of head **1** of an exemplary linkage **2** by one or more surface contours, such as fins **3***a* and recesses **3**, although others are contemplated and may be understood to those skilled in the art. As shown in FIG. **13**A, the cross-sectional view of an exemplary linkage **2** socket channel **16***y* illustrates an exemplary engagement with head **1** of an exemplary linkage **2**, as disclosed.

[0069] FIG. **13**B illustrates a view of the exemplary porous brick **60**, an exemplary socket **15**, and exemplary linkage **2** arrangements in another aspect of operation. According to the illustrative embodiment of FIG. **13**B, while still engaged within an exemplary socket **15** and exemplary porous brick **60** but with an exemplary socket **15** expelled from exemplary porous brick **60**, an exemplary linkage **2** may be rotated, e.g., within any 360 degree movement, but more preferably 180 degrees, within opening **5** such that the exemplary socket **15** may be turned (as shown by the arrow adjacent the letter "T") in a different orientation, so that a side passage **16***x* faces perpendicular to exemplary porous brick **60**. Side passage **16***x* may be a passage from either side of socket channel **16** by which socket **15** may be slidingly disengaged from head **1** of an exemplary linkage **2**. In an exemplary embodiment, a portion **15***x* of an exemplary socket **15** may be removed (as shown by the arrow adjacent the letter "R") by slipping head **1** of an exemplary linkage **2** out of socket channel **16** by way of side passage **16***x*, as may be illustrated by FIG. **13**C.

[0070] Any disclosed socket **15** may have one or more side passages **16***x* to allow an exemplary linkage **2** to disengage from an exemplary socket **15** in either exemplary porous bricks **60** or other exemplary bricks **10** as disclosed. Side passages **16***x* may be used to allow users to switch different sockets **15** depending on needs, or allow for further materials and/or exemplary bricks **10/30/40/50/60/70** to be placed on an exemplary linkage **2** while constructing. Alternatively, slide passages **16***x* embodiments of exemplary sockets **15** may be preferable for replacing sockets **15** after repeated use.

[0071] In the illustrative embodiments of FIGS. **14**A, **14**B, **14**C and **14**D, yet other mechanisms of linkage systems may be disclosed. For example, FIG. **14**A shows an exemplary brick **70** with a passage **5/6** through its thickness for reception of parts much larger in diameter than exemplary linkage **2**. Such exemplary bricks **70** may be found in Lego® Technic sets or other non-Lego® building block systems, e.g., K'nex. Exemplary bricks **70** may have surface contours **7***a*, e.g., an indentation in surface **7**, that surround or are adjacent to their passages **5/6**. An exemplary contour **7***a* may be an indentation in the surface **7** of exemplary brick **70**.

[0072] As illustrated in FIG. **14**B, an exemplary linkage **2** with a tail **0** may be placed within the cavity **9** of the exemplary brick **70** connected by passage **5/6**. An adaptor socket **19** may possess an exemplary channel **16** configured as other disclosed channels of sockets **15** for reception of an exemplary linkage **2** therein. An exemplary adaptor socket **19** may possess one or more anchors **19***a* substantially complementary to surface contours **7***a* of exemplary brick **70**. Exemplary anchors **19***a* may take the form of lips, rims, or pegs, but may be any other structures that may serve to hold adaptor socket **19** within exemplary brick **70**, either on surface contours **7***a* of exemplary brick **70** or crevices **8***a* in exemplary brick **70** (see FIG. **14**C). Exemplary surface contours **7***a* and crevices **8***a* may be utilized within exemplary brick **70** to allow for friction fitting of adaptor socket **19** within the exemplary brick **70** cavity **9**.

[0073] An exemplary adaptor socket **19** may be sized and shaped to fit within the cavity **9** of exemplary brick **70** so as to allow an exemplary linkage **2** to couple within exemplary brick **70** despite the fact that exemplary brick **70** may not normally hold an exemplary linkage **2** to keep it from moving or exiting the brick or block. This may be done by making adaptor socket **19** larger than the passage **5/6** of exemplary brick **70** to allow an exemplary adaptor socket **19** to friction fit within the cavity **9** of the exemplary brick **70**. Alternatively, adaptor socket **19** may have surface contours **19***b*, which may be any size and cross-section as needs may be, that when combined with crevices **8***a* in exemplary brick **70** resist removal of the adaptor socket **19** while in use.

[0074] In an exemplary adapted brick **70** system illustrated by FIG. **14**C, an exemplary linkage **2** may have its tail **0** within channel **16** of adaptor socket **19**, much like an exemplary linkage **2** may fit within channel **16** of an exemplary socket **15**. One or more crevices **8***a* within cavity **9** of exemplary brick **70** may receive one or more adaptor surface contours **19***b*. Adaptor socket **19** may have a solid portion that resists further displacement of an exemplary linkage **2** into channel **16**. Alternatively, channel **16** of adaptor socket **19** may allow for complete passage of an exemplary linkage **2** there through, as illustrated by FIG. **14**D. As illustrated in FIG. **14**D, adaptor contours **19***b* may be used to brace the surface contours **3** and/or **3***a* of an exemplary linkage **2**. Thus, an exemplary adaptor socket **19** and any of its various surface contours **19***b* and anchors **19***a* may function and be formed in the same manner as an exemplary socket **15** and its compression surfaces/wings **15***a*, e.g., elastomer material and/or flexible material. Alternatively, an exemplary adaptor socket **19** may be made of a more rigid material that may be screwed or snapped into exemplary brick **70** by way of spiral contours **19***b* coinciding with screw thread crevices **8***a* within cavity **9** of exemplary brick **70**. Other snap-to-fit arrangements of an exemplary adaptor socket **19** and exemplary brick **70** may be used as well to reduce tooling for an exemplary brick **70**. An exemplary adaptor socket **19** may also be removed from an exemplary linkage **2** in similar manner to removal of an exemplary socket **15** as disclosed.

[0075] An example of an exemplary linkage **2** posability may be illustrated in FIG. **15**. According to this illustrative embodiment, FIG. **15** may show the positioning of exemplary blocks **10** and **50** in three-dimensional space. As shown by the coordinates of points "A" and "B" of exemplary blocks **10** and **50**, respectively, an exemplary linkage **2** may position the exemplary blocks and their adjoining assemblies **100** and **200**, respectively, in different positions in three-dimensional space. These exemplary blocks may be further moved with respect to one another by virtue of the flexibility of an exemplary linkage **2**. Exemplary linkage **2** may be disposed in various parts of three-dimensional space, as may be illustrated by FIG. **15**, with reference to the coordinates of points "C" and "D" on sections of an exemplary linkage **2**. According to this illustrative embodiment, the posability of an exemplary linkage **2** may substantially maintain the parts of an exemplary linkage **2** in their illustrated conformation, e.g., coordinates "C" and "D." Further, the posability of an exemplary linkage **2** may substantially maintain exemplary blocks **10** and **50** (or other exemplary blocks **30/40/60/70**) and their respective adjoining assemblies **100** and **200**, respectively, at their coordinates "A" and "B," respectively, over a span of time.

[0076] Those skilled in the art may understand various other methods and ways to secure an exemplary linkage **2** to an exemplary brick **10/30/40/50/60/70** using other techniques. Exemplary bricks **10/30/40/50/60/70** that may open or "lock" an exemplary head **1** of an exemplary linkage **2** may take various forms and variations, depending on the needs of the construction. They may involve exemplary bricks **10/30/40/50/60/70** with doors, clasps, or other moveable parts that allow an exemplary head **1** of an exemplary linkage **2** to enter and then resist exiting the exemplary brick **10/30/40/50/60/70**.

[0077] For all exemplary embodiments, whether illustrated, described, or understood from combination from the disclosures herein, exemplary bricks **10/30/40/50/60/70**, brace **35**, and/or sockets **15/19** may be printed using 3D printers known to those skilled in the art, such as those made or used by MakerBot Industries LLC of Brooklyn, N.Y. (Replicator series), Mcor Technologies Ltd. of Co Louth, Ireland (Iris series and Matrix series), 3D Systems Corp. of South Hill, S.C. (ProJet series and CubePro series), Voxeljet AG of Friedberg, Germany (VX series and VXC series), The ExOne Company of North Huntington, Pa. (S-Max, S-Print, M-Print, M-Flex, X1-Lab, and Orion series), Arc Group

Worldwide of DeLand, Fla., and Stratasys, Inc. of Eden Prairie, Minn. (Mojo, uPrint SE series, Objet series, Dimension, Fortus, and printers using FDM, WDM, and Polyjet technologies). Exemplary blocks or bricks **10/30/40/50/60/70**, brace **35**, and/or socket/adapter **15/19** may also be manufactured using extrusion, blow molding, casting, or other fabrication methods known to those skilled in the building block art. While an exemplary linkage **2** may also be 3D printed, it may also be machined from metal or equivalent materials, as described herein, using laser cutting and sintering, extrusion, stamping, or CNC machining.

[0078] In an exemplary embodiment, an exemplary socket **15** may be 3D printed within exemplary brick **10** while exemplary brick **10** is being formed. Alternatively, exemplary brick **10** may be 3D printed and socket **15** may be simultaneously 3D printed within exemplary brick **10** (e.g., an exemplary hybrid brick **50**). 3D printing fabrication of an exemplary brick **10** and socket **15** subsystem may be particularly suited for mass production of such constructs and reduce the need for physical assembly of the two structures post-fabrication.

[0079] In an exemplary embodiment, an Objet260 and Objet500 Connex Multimaterial 3D printer manufactured by Stratasys, Inc. of Eden Prairie, Minn. or a ProJet 5500X manufactured by 3D Systems Corp. of South Hill, S.C. may form exemplary brick **10/30/40/50/60/70** using one material while also using another material for the socket **15**, thereby reducing the assembly process and increasing the likelihood of precise fitting between the socket **15** and exemplary brick **10**. Any and all embodiments described herein may be formed by such simultaneous 3D printing processes known to those skilled in the building block art (e.g., exemplary hybrid blocks **50**).

[0080] In an exemplary embodiment, an exemplary socket **15** may be 3D printed within exemplary brick **10** while exemplary brick **10** is being formed. Alternatively, exemplary brick **10** may be 3D printed and socket **15** may be simultaneously 3D printed within exemplary brick **10** (e.g., an exemplary hybrid brick **50**). 3D printing fabrication of an exemplary brick **10** and socket **15** subsystem may be particularly suited for mass production of such constructs and reduce the need for physical assembly of the two structures post-fabrication.

[0081] In an exemplary embodiment, an exemplary posable linkage **2** may be fabricated to comply with the June 2010 United States Consumer Product Safety Commission Laboratory Test Manual for Toy Testing, which is incorporated herein by reference in its entirety. In one embodiment, exemplary posable linkage **2** will satisfy one or more of subsections of section 9.2 and all of section 18, in particular, section 9.2.4 Sharp Point Test, 9.2.5 Sharp Edge Test, and 9.3.6 Flexure Test of the June 2010 United States Consumer Product Safety Commission Laboratory Test Manual for Toy Testing.

[0082] As further illustrated in the exemplary embodiments of FIGS. **16**A-D, an exemplary linkage **2** may contain a component **2**A of diameter D_M and a coating or cover **2**B of thickness T_C. The cover or coating **2**B may be one or more of the covers, coatings, and/or tubings described herein and may be removable or permanently attached to component **2**A. Component **2**A may be made of a flexible metal. Alternatively, component **2**A may be made of any other material or combination of materials that in conjunction with coating **2**B has posability. An exemplar linkage **2** comprised of component **2**A and coating **2**B may have a diameter D, although an exemplary linkage **2** without a coating **2**B may have the same or similar diameter D.

[0083] D_M and T_C may be such that linkage **2** may be (i) dimensioned so that it can be received within an opening **5** and/or an exit **6** of an exemplary block **10**; (ii) dimensioned so that it can be received within fabric, flexible plastic, or elastomer tubing (all of which may be a cover or coating **2**B); (iii) dimensioned so that D is within the range of diameters between those of opening **5** and those of exit **6** of an exemplary block **10**; (iv) dimensioned to have a D of approximately 0.123 inches to approximately 0.193 inches; and (v) be dimensioned as approximately 5- to approximately 14-gauge wire. In a most exemplary embodiment, D is about 0.12574 inches in diameter and component **2**A is made from a flexible aluminum armature wire. In another exemplary embodiment, D_M may be between about 0.0625 inches and about 0.12574 inches. Additionally and/or alternatively, T_C may be between about 0.0315 inches and about 0.0070 inches. Those skilled in the art may readily understand that the features of linkage **2** in FIGS. **16**A-D are for purposes of illustration only, and these features may be changed, interchanged, isolated, combined, or otherwise varied with respect to any disclosed embodiments.

[0084] An exemplary coating **2**B may be an elastomer selected from the group comprising poly-isoprenes (e.g., rubber, natural rubber), polyethylenes (e.g., Alathon, Alkathene, Fortiflex, Hi-fax, Petrothene, Rigidex, Rotothene, Zendel), polystyrenes (e.g., Carinex, Dylene, Hostyren, Lustrex, Styron, Vestyron), polyurethane, buna-N, butyl, SBR, neoprene (Chloroprene), silicone, polybutadiene, and other flexible elastomers known to those skilled in the art. An exemplary elastomer may be colored to match one or more exemplary bricks **10/30-70** to which an exemplary posable linkage **2** may couple and/or interconnect. Additionally, coating **2**B may have structures formed on it to allow connection between the outer-most surface of linkage **2** and other Lego-like bricks. Those skilled in the art would understand the use of plasticizers to improve flexibility and ductility of an exemplary coating **2**B.

[0085] In an exemplary embodiment, an exemplary linkage **2** may be particularly dimensioned to friction-fit within the circular opening **5** used on Erling Lego blocks, such as block **60** for example, and others with such opening (block **10/30/40/50/70**), and still be maneuvered and posed in three-dimensional space while substantially maintaining their conformation, e.g., have posability. According to such an exemplary embodiment, an exemplary linkage **2** may have a D_M of about 0.0625 inches and a T_C of about 0.03125 inches. In another exemplary embodiment, an exemplary linkage **2** may have sufficient size to friction-fit within the cylindrical opening **5** used in Lego® Technic block systems, e.g., block **70**, and/or Lego® Erling blocks, e.g., block **60**, and still be maneuvered and posed in three-dimensional space while substantially maintaining their conformation, e.g., have posability. According to such an exemplary embodiment, an exemplary linkage **2** may have a D_M of about 0.0125 inches and a T_C of about 0.00074 inches. In yet another exemplary embodiment, as may be further discussed with respect to FIG. **16**D, an exemplary linkage **2** may have a coating **2**B with a T_C that is of such size and elasticity so as to deflect when entering an opening **5** and/or **6** of an exemplary building block, such as block **10/30-70**, and yet exert a force against the inner surfaces **8** of the opening **5/6** of that block that is no greater than the modulus of resilience of the structure making up the opening **5** and/or **6** of the block **10/30-70**.

[0086] In one exemplary embodiment as illustrated by FIG. **16**A, a posable linkage **2** with a D of approximately 0.1257 inches may have a **907**A or **907**C aluminum armature wire component **2**A, such as the type that is sold by The Compleat Sculptor, NY, N.Y., Sculpture House, Skillman, N.J., and such that is made and sold by Arcor Electronics, Niles, Ill. An exemplary component **2**A may have a D_M of approximately 0.06285 inch and which may be coated with an elastomer **2**B substantially about its length having a T_C of approximately 0.031925 inches. More particularly, such an elastomer **2**B may be a type of rubber.

[0087] In a first embodiment, $2*T_C+D_M$ may be the diameter of an exemplary opening **5/6** in a Lego-like block. In a second embodiment, $2*T_C+D_M$ is slightly greater than the diameter of an exemplary opening **5/6** in a Lego-like block. In a third embodiment, $2*T_C+D_M$ is equal to the diameter of the circular opening **5** in an Erling Lego block **60**. In a fifth embodiment, $2*T_C+D_M$ is equal to or slightly greater than the diameter of the circular opening **5** in an Erling Lego block **60**. Where $2*T_C+D_M$ is greater than the diameter of the aperture into which linkage **2** head **1** or tail **0** is inserted, an exemplary linkage **2** with such T_C and D_M may utilize its elastomeric qualities or take advantage of the modulus of resilience of the exemplary block opening **5/6**. An elastomeric coating **2**B may be utilized due to its ability to deform in response to contact forces and thereby allow a user to insert a linkage comprising a component **2**A with such a coating **2**B into a Lego-like block opening while maintaining friction-like contact, reduced wear on the block opening, non-contact with metal, and/or minimal manufacturing costs. Further and alternatively, an elastomeric coating **2**B may allow linkage **2** to have a D greater than the diameter of block opening **5** and/or **6** because such a coating **2**B can deform while being inserted into the same (see, for example FIG. **16**D and related disclosures). Depending on its elasticity, coating **2**B may advantageously be applied to component **2**A so that the linkage **2** may have a diameter D greater than that of the opening **5/6** into which linkage **2** is to be placed, yet still effectively friction fit with one or more exemplary blocks **10/30-70** to form one or more robust joints **20**.

[0088] According to an exemplary embodiment as illustrated in FIG. **16**B, an exemplary linkage **2** may comprise a component **2**A of length L_M and a coating **2**B of length L_C. In an exemplary embodiment, L_C is about the same length as an exemplary metal component **2**A. In another exemplary embodiment, L_C is between about 85-95% of the length of metal component **2**A so that the coating covers all but a length of the ends of the metal component **2**A that are sufficient to couple the linkage **2** of this exemplary embodiment in an exemplary block **10/30-70**, e.g., L_T. In yet another exemplary embodiment, L_C is whatever length necessary to leave about 0.090-0.150 inches of the end of a metal component **2**A exposed on either side or both sides of linkage **2**, e.g., an L_T=0.090-0.150. In another exemplary embodiment, coating **2**B may envelop metal component **2**A on all sides, as may be shown in FIG. **16**C by an exemplary face coating **2**C. In another exemplary embodiment, where a Lego brick **10/50/60/70** is used for receiving an exemplary linkage **2** of length L_C, the length L_C may be no greater than about 110-115% the length of L_M so that the linkage does not interfere with other structures trying to fit within Lego brick **10** (e.g., other Lego bricks **10**, **50-70**, other exemplary linkages **2**). In an exemplary embodiment where L_T is the length of component **2**A on which contours **3***a-e*, and **3***g* may be found, such contours **3***a-d*, and **3***g* may be disposed such that enough contours **3***a-e*, and **3***g* can frictionally engage opening **5/6** of an exemplary block **10/30-70** or the exemplary opening **16** of an exemplary socket **15**. L_C may be a function of L_M, T_C, D_M, D, L_T, and combinations thereof. In this context, "function of" refers to any known mathematical operation or series of operations involving one or more of L_M, T_C, D_M, D, L_T, and operations involving the same.

[0089] In an exemplary embodiment all lengths L_M and L_C may be based on the number of studs and/or Lego Drawing Units ("LDU") of exemplary Lego blocks **10**, e.g., two stud lengths, three stud lengths, four stud lengths, etc., as would be understood by a person of ordinary skill in the art. In an exemplary embodiment, length L_C and/or L_M may be between about 4 and about 8 LDU in length as measured from the forward-most end of the linkage **2**. In this exemplary embodiment, length L_C and/or L_M may be such as to enable linkage **2** to avoid interference between itself and other structures traveling through an exemplary block **10**. In yet another exemplary embodiment, length L_C and/or L_M may be between about 2 and about 16 LDUs in length as measured from the forward-most end of an exemplary linkage **2**, e.g., section **2**C/D or the head/tail **1/0** made up of only component **2**A. In still other exemplary embodiments, length L_C and/or L_M may have the same LDU lengths as the smallest and/or longest Lego blocks known to those skilled in the art. L_T may be a length of metal component **2**A sufficient to allow for a UNF Fine Thread #0, 7 threads, 0.010 inch chamfer and a 0.0125 inch thread relief zone between coating **2**B and the most proximal thread **12**.

[0090] In an alternative embodiment, as illustrated by FIG. **16**B, an exemplary posable linkage **2** may comprise a component **2**A of length L_M with contoured ends **3***a-d/g* and/or thread ends **12** and terminus **11** opposite head/tail **1/0**. In this illustrative embodiment, a coating **2**B may substantially cover a metal component **2**A over a distance L_C and leave exposed a length L_T for contouring **3** or threading **12**. In an exemplary embodiment where L_M is a length of component **2**A with threading, the types of thread ends **12** and lengths (L_M, L_C, and L_T) that may be used for an exemplary linkage **2** may be shown in Table 1 (those skilled in the art would understand that the value of L_T and the threading type/number of threads may correspond to one or more of the length and/or threading of channel **16**, **16***a-b* and channel threads **18** of an exemplary brick or block **10/30-70** and/or the length and threading of channels and threads in socket **15**/15_1, including the spacing and length of use of socket structures **15***a*, **17**, and/or **17***a*):

TABLE 1

Exemplary Illustrative Embodiments (FIGS. 3A, 3D, 6B, 7B, 7F, 11C, 12C, 13A-C, 15, & 16B-C)	L_M	L_C	L_T	Threading Type/number of threads
I	0.625 inches	0.400 inches	0.100 inches	UNF #0
II	1.250 inches	1.000 inches	0.100 inches	UNF #0
III	2.500 inches	2.200 inches	0.100 inches	UNF #0
IV	1.000 inches	0.700 inches	0.150 inches	8 threads
V	4.000 inches	3.750 inches	0.120 inches	7 threads
VI	8.000 inches	6.000 inches	0.550 inches	12 threads
VII	1.250 inches	0.700 inches	0.250 inches	10 threads
VIII	0.500 inches	0.300 inches	0.100 inches	6 threads
IX	3.000 inches	2.500 inches	0.250 inches	UNF #0
X	⅔ inches	⅓ inches	⅙ inches	UNF #0

[0091] In the illustrative exemplary embodiments of FIGS. **16**B-C, an exemplary linkage **2** may have threaded sections **12** that are further from the axis of the linkage **2**, e.g., they are located outside the diameter of component **2**A, with or without coating **2**B. While threaded sections **12** may be illustrated in FIG. **16**B, contoured sections **3***a-e/g* may also be used in place, or used as per the illustrative embodiment of FIG. **16**C, such that one or more of their individual heights or the average height of all such contours, extend beyond the non-threaded/non-contoured diameter of component **2**A, D_{MnT}. In an exemplary embodiment, a threaded section **12** may have a height H_T that makes the threaded section **12** have the same or slightly larger D compared to the central cross-section of linkage **2** (e.g., linkage **2** with and without coating **2**B). In an exemplary embodiment, the height of threaded section **12**, H_T, may be about 0.0625 inches from an axis running perpendicular to the cross-section of linkage **2**. At this exemplary height, threaded section **12** may couple a plurality of threaded Lego blocks **10** together, such as those illustrated and described with respect to FIGS. **7**A-F. Alternatively, threaded section **12** may couple a plurality of threaded non-Lego type blocks **10**, e.g., K'nex, Construx, together.

[0092] In an exemplary embodiment, threaded sections **12** may result from thread rolling or other such cold rolling machining processes as described with respect to FIG. **18** and which may are known to those skilled in the art. In an exemplary embodiment, the ratio of (H_T+D_{MnT}) to D is between about 0.80 to about 1.64. In an alternative exemplary embodiment, the ratio of H_T to D_{MnT} is between about 0.05 to about 0.20. Where an exemplary linkage **2** has a plurality of contours **3***a-e/g*, D_{MnT} may be calculated by taking the average cross-section as previously described, and H_T may be calculated by taking the average of the peaks and troughs of each of the plurality of contours **3***a-e/g* as compared to the D_{MnT}, where all peaks and troughs above D_{MnT} to have positive values and all peaks and troughs below D_{MnT} to have negative values.

[0093] In the illustrative exemplary embodiment of FIG. **16**C, an exemplary linkage **2** of diameter D may have a coating **2**B over substantially its entire length L_M so that L_C may represent the operative length of linkage **2**. Those skilled in the art may appreciate that FIG. **16**C may illustrate embodiments of an exemplary linkage **2** having a metal component **2**A covered in a flexible tube **2**B. Alternatively, FIG. **16**C may illustrate various surface features of an exemplary linkage **2**, but it should be understood any of the illustrated features may be found in isolation of other features or over different distances, depths, and have different shapes, angles, dimensions, configurations, and properties, including partial, intermittent, and complete covering arrangements. For example, an illustrative linkage **2** of FIG. **16**C may comprise contours **3***a-e/g* and threads **12** as disclosed for linkages **2** from FIGS. **3**A-D, but it may comprise one or more such features in different forms. For example, an exemplary linkage **2** may have a coating **2**B, wherein the coating **2**B may have threads **12** at both head **1** and tail **0** of the linkage **2**. Alternatively, coating **2**B of an exemplary linkage **2** may have only contours **3***a-e/g* and no threads along its length L_C. Any of the surface geometries illustrated by and/or described with respect to FIG. **16**C may apply equally to exemplary linkage coatings, such as coating **2**B, of any other figures, including, but not limited to, FIGS. **3**A-D, **16**A-B, **5**, **11**, and **15**.

[0094] As further illustrated by FIG. **16**C, an exemplary component **2**A may have a major diameter D_M and a minor diameter D_m. For an exemplary component **2**A with a minor diameter D_m, D_m may be dimensioned to engage one or more internal contours **3***f* of coating/tube **2**B. An exemplary contour **3***f* may allow for better adherence of coating/tube **2**B to component **2**A, may allow for greater resistance to tearing, wearing, disengagement with, or over-stretching of coating/tube **2**B, e.g., in response to flexing or movement of component **2**A. In an exemplary embodiment, an exemplary coating/tube **2**B may be dimensioned, including use of contours **3***f*, so as to allow linkage **2** to satisfy Section 9.3.6 Flexure Test of the June 2010 United States Consumer Product Safety Commission Laboratory Test Manual for Toy Testing. An exemplary D_m may also serve to participate in formation of contours on coating/tube **2**B during a coating process as discussed with respect to FIG. **18**. In this manner, a component **2**A with a particular pattern of D_M and D_m may be contoured (e.g., contours **3***a-d/g*, **12**) so that when a coating **2**B is applied, an internal contour **3***f* may be formed and an external contour **3***a-e/g* and/or **12** may be formed. As further illustrated in FIG. **16**C, coating contours **3***e* may be among any of the coatings **3***a-d/f/g/h* described herein, including combinations and patterns of the same.

[0095] As further illustrated in FIG. **16**C, an exemplary face coating **2**C may be at the head **1** and/or tail **0** of an exemplary linkage **2**. An exemplary face coating **2**C may have the same or lesser friction than coating/tube **2**B. An exemplary face coating **2**C/**2**D may provide a soft zone or flexible buffer region for an exemplary metal component **2**A to allow such a linkage **2** to satisfy any of the tests found in section 18 of the June 2010 United States Consumer Product

Safety Commission Laboratory Test Manual for Toy Testing, in particular all subsections of section 9.2 and 18, in particular, section 9.2.4 Sharp Point Test, 9.2.5 Sharp Edge Test, and 9.3.6 Flexure Test. While a face coating **2**C/**2**D may be used to satisfy the aforementioned tests, as disclosed herein, an entirely metal linkage **2** or a linkage **2** comprising flexible coatings substantially along its length but with exposed metal faces and/or ends may also be configured to satisfy the tests of the June 2010 United States Consumer Product Safety Commission Laboratory Test Manual for Toy Testing, including Sections 9.2.4, 9.2.5, 9.3.6, and 18. In an exemplary embodiment, face coating **2**C/**2**D may have a maximum amount of material at a height of 0.5D and/or $0.5D_M$. In another exemplary embodiment, face coating **2**C/**2**D may have multiple peaks, valleys, and/or protrusions of various cross sections, e.g., circular, rectilinear. Furthermore, the illustrative embodiment of FIG. **16**C may result from extrusion coating a length of component **2**A and then molding its extremes to create a face coating **2**C/D using a heated mold, lathes, presses, or other surface molding techniques known to those skilled in the art.

[0096] As further illustrated in FIG. **16**C, one or more thicknesses of coating **2**B may be found on an exemplary component **2**A of an exemplary linkage **2**. In one embodiment, coating **2**B may have a thickness T_{C1} measured from an outside contour **3***a-e/g* and/or thread **12** to an inside contour **3***f*. In another embodiment, coating **2**B may have a thickness T_{C2} measured from a non-contoured surface of the coating **2**B to the most radially proximal surface of component **2**A. In this embodiment, an area of surface of coating **2**B may be considered "non-contoured" if surfaces within the square area maintain the same perpendicular distance from the axis of component **2**A. In another embodiment, coating **2**B may have a thickness T_{C3} measured from a contoured surface **3***e* of coating **2**B to the most-radially proximal surface of component **2**A. In another embodiment, coating **2**B may have a face coating **2**C of thickness T_{C4} measured from the outer surface of face coating **2**C to the closest surface of component **2**A. In yet another embodiment, coating **2**B may have a face coating **2**D of thickness T_{C5} measured from the furthest end of linkage **2** to the furthest end of component **2**A.

[0097] In an exemplary embodiment, T_{C1}, T_{C2}, and T_{C3} are substantially equal. In another exemplary embodiment, one or more of T_{C1}, T_{C12}, or T_{C3} is no greater than about 0.01 inches to about 0.05 inches, such as, for example, 0.031925 inches. In yet another exemplary embodiment, T_{C2} is always less than T_{C1}. Alternatively, in another exemplary embodiment, T_{C3} is substantially equal to T_{C1}. In yet another exemplary embodiment, T_{C3} may be any of the values for exemplary threads **12** in Table 1. In another embodiment, T_{C4} and T_{C5} are dimensioned to comply with the June 2010 United States Consumer Product Safety Commission Laboratory Test Manual for Toy Testing, including Sections 9.2.4 and 18.

[0098] In another exemplary embodiment, T_{C4} is substantially equal to T_{C5}. Alternatively, T_{C4} may be greater than, less than, a fraction of, or a multiple of T_{C5}. In an exemplary embodiment, T_{C1}, T_{C12}, T_{C3}, T_{C4}, T_{C5}, and combinations thereof may be dimensioned to allow exemplary linkage **2** to enter one or more openings **5**/**6** of an exemplary block **10**/**30**-**70** and engage the opening **5**/**6** sufficiently to be posed while also being situated therein. In another exemplary embodiment, L_C does not necessarily equal L_M+T_{C4}. In such an exemplary embodiment, coating **2**B may have a coating surface located at L_M-T_{C4}, in particular, when the ends of component **2**A have their own contours **3***f* at their axial extrema.

[0099] As may be shown in the illustrative embodiment of FIG. **16**D, an exemplary joint **20** may be shown. As illustrated, a joint **20** can be shown in cross-section such that an exemplary linkage **2** may be cut to expose its component **2**A and coating sides **2**B and an exemplary block **10** may be cut to expose the cross-section of an opening **5**. While opening **5** has been shown, it is understood as previously described that any other opening **5**/**6** or other aperture or cavity may be contemplated. In the illustrative embodiment of FIG. **16**D, exemplary head/tail **1**/**0** of an exemplary linkage **2** has been coupled with block **10** so that an exemplary coating **2**B of a flexible type, such as, for example, an elastomer material, deflects as it enters opening **5**. While head/tail **1**/**0** may be shown with a convex surface for an exemplary linkage **2**, head/tail **1**/**0** may alternatively be any of the aforementioned shapes and surfaces described, for example, concave, jagged, labyrinthine.

[0100] Accordingly, coating **2**B has a first height X_1, which may be the radial height from the center of linkage **2**, the thickness T_C, or other measurement with a defined reference point. As coupled via opening **5**, an exemplary linkage **2** may have a junction contour **3***h* formed in its coating **2**B and which may be at a height X_2. X_2 may be slightly less than the height X_1 of coating **2**B. The portion of linkage **2** that may be coupled within an exemplary block **10**/**30**-**70** may have a coating **2**B that is at a height X_3, which is at least less than the height X_1, and may, in certain embodiments, be less than the height X_2. In an exemplary embodiment the ratio X_2/X_1 may be between about 0.925 and about 0.999. In another exemplary embodiment the ratio X_3/X_1 may be between about 0.8725 and about 0.99. In an exemplary embodiment, X_3/X_1 may be between about 0.95 and about 0.90 for both a resilient and flexible coating **2**B that may exert friction forces on the inside of opening **5** of an exemplary block **10**/**30**-**70**.

[0101] According to the illustrative embodiment of FIG. **16**D, the portion of an exemplary head/tail **1**/**0** of an exemplary linkage **2** that contacts the opening **5** of block **10**/**30**-**70** may be a length L_K. In an exemplary embodiment L_K may be less than the depth of opening **5** of block **10** measured from the outermost edge of opening **5** to cavity **8** of an exemplary block **10**, e.g., ¼ of the depth, ½ of the depth, or ¾ of the depth. Alternatively, L_K may be such that a free length of an exemplary linkage **2** within an exemplary block **10**, denoted L_F, does not interfere with other structures trying to fit within Lego brick **10** (e.g., other Lego bricks **10**, other exemplary linkages **2**). Further alternatively, L_K may be based on the number of studs and/or LDU of exemplary Lego blocks **10**, e.g., two stud lengths, three stud lengths, four stud lengths, etc. In an exemplary embodiment, length L_K may be between about 1 and about 3 LDU in length as measured from the forward-most end of opening **5**. In an exemplary embodiment, length L_F may be between about 1 and about 2 LDU in length as measured from the boundary of an exemplary cavity **9** and an exemplary opening **5** of an exemplary block **10**/**30**-**70**. Alternatively, L_F may be measured from the surface within an exemplary block **10**/**30**-**70** that either (i) lies in a plane that is orthogonal to opening **5**, or (ii) whose central axis is orthogonal to the central axis of opening **5**.

[0102] With further reference to FIG. **16**D, an exemplary linkage **2** may be coupled to an exemplary block **10/30-70** via opening **5** or any other disclosed aperture by compressing an exemplary elastomeric coating **2**B from a height of X_1 (outside of opening **5**), to a height X_2 (on the border outside or inside of opening **5**), to a height of X_3 (inside of opening **5**). In alternative embodiments, coating **2**B may regain some, all, or none of its original height X_1 once inside cavity **8** of the aforementioned exemplary block, wherein that cavity height is X_4. An exemplary internal coating **2**B height X_4 may be the height at any point on coating **2**B along L_F. In an exemplary embodiment, the ratio X_4/X_1 may be between about 0.975 and about 0.999.

[0103] FIG. **16**D may be used to illustrate one exemplary concept of the operation of an exemplary linkage **2** in terms of its activity at the block opening **5** of an exemplary block, as previously described. An elastomeric coating **2**B may be joined to component **2**A as per coating process **520** as described with respect to FIG. **17**. An exemplary coating **2**B may have a juncture **2**J with component **2**A that may contain one or more adhesives, welds, stitches, and/or impregnated material into component **2**A, or combinations of the same. Alternatively, where coating **2**B may be a tube, juncture **2**J may be a substantially non-permanent junction between component **2**A and coating **2**B, e.g. it may rely on friction or other mechanical couplings that do not modify the material of the component **2**A and/or the coating **2**B.

[0104] As will be further discussed, an exemplary linkage **2** may be coated with coating **2**B about substantially its entire length first, stripped at its ends to expose underlying metal component **2**A second, and thread rolled and/or subject to any other known thread-forming and cold rolling technique known to those skilled in the art and shown and described with respect to FIG. **17**, processes **520**, **530**, and **540** to form threads or contours on the exposed metal sections of component **2**A on length L_T. However, in an alternative exemplary embodiment, the aforementioned steps may be done in reverse order depending on the instrumentation and capabilities to coat thread-rolled and/or cold-rolled linkage metal component **2**A of an exemplary linkage **2** with coating **2**B so as not to substantially interfere with the prior-formed threading **12** of linkage **2**. In an exemplary embodiment, the threaded metal component **2**A may be screwed into chucks (not shown) and then coated with coating **2**B so that unscrewing the coated, thread-rolled component **2**A will leave un-coated the threads **12** formed prior to chuck application. While the foregoing embodiment may rely on a chuck to prevent coating of exemplary linkage **2** threads **12**, those skilled in the manufacturing art may recognize other techniques and arrangements to avoid coating the threads **12** of an exemplary linkage **2**.

[0105] FIG. **17** is an illustrative embodiment of a process **500** of manufacturing an exemplary linkage **2** for use with an exemplary block **10/30-70**, and/or linkage-block joint **20** as illustrated and/or described by way of disclosures herein and all interrelated disclosures. During an exemplary drawing step **510**, an amount of material, such as a metal, may be extruded, cut, folded, 3D-printed, sintered, machined, or otherwise formed. Those skilled in the material fabrication arts may understand the various processes involved in the formation of metal wires, such as, for example aluminum armature wire, copper wires, brass wire, and alloys and galvanized variants of the same. In another aspect of this exemplary embodiment, an exemplary drawing step **510** may include unwinding a roll or packing of previously-formed material, such as, for example, a wound length of metal wire. An exemplary drawing step **510** may include extruders, cams, pulleys, drive wheels, calendars, rollers, and other equivalent structures used by those skilled in the manufacturing art to move material from one location to another in a controllable fashion. While not as efficient, manual drawing of material for an exemplary process **500** may also be contemplated. The material drawn in drawing step **510** may be the entire linkage **2** or a component of linkage **2** (e.g., component **2**A, component **2**B, or component **2**A and **2**B alone or in combination).

[0106] Where a coating **2**B may be applied to a component **2**A via decision step **515**, an exemplary coating step **520** may involve placing a coating **2**B on a portion of or substantially about the entirety of a length of the drawn material, including placing an intermittent or discontinuous pattern about the material length. An exemplary coating step **520** may rely on spraying the material about the component **2**A, co-extruding the coating about the length of material as it is passed through the same extruder, dipping the material in a bath or mold of material and then cooled, and/or slipping the material into a coating sleeve, jacket, tube, or other integrated construct that can envelop the material. In an exemplary embodiment, the coating **2**B is a flexible material, such as fabric, rubber, and/or elastomer. In a further exemplary embodiment, the coating **2**B is silicone, rubber, or combinations/isomers thereof. In a yet further exemplary embodiment, the coating **2**B is co-extruded onto the length of wire (L_M) substantially about its entire length, such as, for example, L_C. An exemplary coating step **520** may result in one or more of the various linkage **2** embodiments illustrated and disclosed with respect to FIGS. **1-16**, and further in particular, FIGS. **16**A-D and **18**A-D.

[0107] As described, an exemplary process **500** may involve certain decision steps, such as those exemplified in decision steps **515**, **525**, and **527**. Decision steps may be undertaken manually or through use of automated methods, such as data acquisition (DAQ) equipment arranged about the process components that undertake the steps of process **500**. For example, an exemplary coating decision **515** may involve a pre-programmed computer algorithm that may take inputs from sensors installed in an exemplary process **500** assembly line, and decide whether a coating **2**B need be applied to an incoming component. According to an exemplary embodiment, a laser measurement tool known to those skilled in the art may be used to measure the distance from a fixed distance to the surface of a constituent of an exemplary linkage **2**. Thus, if the constituent, such as component **2**A, is at a larger distance than a component **2**A that is coated with **2**B, an exemplary decision step **515** may involve sending the distance measured to an algorithm that determines whether to direct the component **2**A to be coated, e.g., use of "if-than-else" statements, lookup functions such as those used in Excel Visual Basic for Applications ("VBA") which includes, but is not limited to the following exemplary functions and/or algorithms: hlookup, vlookup, getpivotdata, lookup, and match. In a more particular embodiment, an exemplary algorithm may be written in any language for operation by a computer, such as those known to persons skilled in the programming arts (e.g., C+, C++, Java, Sequel, Perl, HTML, Assembly, Visual Basic, Q Basic, and others identified via the following website as of the date of these disclosures—https://en.wikipedia.org/wiki/List_of_ programming_languages). Alternatively, those skilled in the art can control performance of an exemplary process **500** as illustratively shown in FIG. **18** via Simulink, Matlab, or other known control systems.

[0108] In an exemplary algorithmic form of decision step **525**, the measurement of an analog or digital device may be retrieved, e.g, the signal representative of the horizontal measurement between a laser and a component **2**A (referred to herein as step **525**(*i*)), compared to a known quantity, e.g., the horizontal measure of the laser origin to the linkage **2** component **2**A plus the thickness of an exemplary coating **2**B (which may be adjusted by a user) (referred to herein as step **525**(*ii*)), and take a specific action in the process **500** based on the comparison (referred to herein as step **525**(*iii*)).

[0109] For example, an exemplary decision step **525**(*ii*) may determine whether the measurement data received is less than the distance from the measurement device to linkage **2** component **2**A, and if so, instruct the processor of the computer to send a signal (analog or digital) to the controllers to progress the linkage **2** to the next step of an exemplary process **500**. Alternatively in the aforementioned exemplary embodiment, decision step **525**(*ii*) may yield a value greater than the horizontal measurement plus the thickness **2**B, in which case the activity portion of the algorithmic decision step **525**, namely, **525**(*iii*), may involve the delivery of a signal controlling coating, rotors, and actuators to move linkage **2** through a coating device, such as a polymer/elastomer extruder, in order to begin the exemplary coating **520** step of an exemplary process **500**. In an even more particular embodiment, when a laser sensor is 0.5 inches away from an exemplary component **2**A of circular cross section and measures a distance equal to or greater than about 0.53175 inches, then the sensor signals to the remainder of the systems in process **500** to put the coating **2**B on the component **2**A.

[0110] In an exemplary process **500**, decision step **525** may include analyzing whether the coating **2**B applied to an exemplary component **2**A in step **520** results in an L_C that is greater than or equal to L_M. An exemplary decision step **525** may be determined using laser scanners, optical sensors (e.g., optical LEDs to determine presence of coating via light reflected off the coating), point and roller probes to determine presence of plastic or elastomer up and down the length of linkage **2**, or manual inspection.

[0111] In an exemplary process **500**, decision step **527** may include a pre-set determination of a contoured component **2**A in addition to or exclusive of a contoured coating **2**B. Thus, an exemplary decision step **527** may be algorithmic to the extent a contoured component **2**A may be required in certain amounts based on the number of contoured coatings **2**B, based on a pattern of contoured component **2**A manufacture, or based on a demanded amount delivered to the algorithm via online or other means as a number of units. An exemplary algorithmic decision step **527** may decide whether to contour a component **2**A of linkage **2** based on a voltage or other digital input ("1" to signal contour component **2**A, "0" to signal do not contour component **2**A). As a result, in an exemplary process **500** in which component **2**A of linkage **2** is to be contoured, the coating **2**B may be removed from linkage **2** during an exemplary stripping process **540**. If contouring of component **2**A is not required, the linkage **2** may be scheduled for cutting as per an exemplary cutting process **530**.

[0112] All decision steps disclosed for an exemplary process **500** may be represented in algorithmic form as would be understood by a person of ordinary skill in the programming and manufacturing arts. Alternatively, the algorithms for an exemplary decision step **515**/**525**/**527** may be a control feed-back loop that uses the output of an exemplary process **500** at any stage of the process to determine what decision is to be made in the step. For example, an input into any one of the algorithmic versions of decision steps **515**/**525**/**527** may be the amount of contoured linkages **2** with coatings **2**B, which triggers the decision steps individually or together to balance that amount with an equal number of non-contoured linkages **2**, with and without coating **2**B.

[0113] An exemplary cutting step **530** may involve manual, semi-automatic, or automated cutting processes to shorten a length of material, whether coated or not coated as per coating step **520**. An exemplary manual cutting step **530** may include use of lathes, saws, lasers, blades, or other mechanisms known to those skilled in the manufacturing arts sufficient to separate lengths of material from other lengths of material. In an exemplary semi-automatic cutting process **530**, linkage **2**, whether coated or not coated as per coating step **520**, may be manually held while acted upon by an automatic cutting machine of the type known to those skilled in the art, such as, for example, machines and mechanisms manufactured by Schleuniger Inc. of Thun, Switzerland, such as, for example, the EcoStrip series of machinery, or the EcoStrip 9320 automatic cut and strip machine. Other like machinery and mechanisms suitable for use in an exemplary cutting process **530** are also within the knowledge of those skilled in the manufacturing arts.

[0114] Alternatively, linkage **2**, whether coated or not, may be controllably cut about its length via cams, rollers, conveyor belts, and other automated apparatus known to those in the manufacturing arts. An exemplary cutting process **530** may utilize the automated cutting system provided by machines and mechanisms manufactured by Schleuniger Inc. of Thun, Switzerland, such as, for example, the EcoStrip series of machinery, e.g., the EcoStrip 9320 automatic cut and strip machine.

[0115] An exemplary stripping step **540** may involve manual, semi-automatic, or automated stripping process. In one embodiment, an exemplary stripping step **540** may be used to shorten the amount of coating **2**B, e.g., L_C or T_C, on an exemplary component **2**A of linkage **2**. Alternatively, an exemplary stripping step **540** may be used to remove a portion of an end of linkage **2** to expose component **2**A, such as may be seen in one variant of the illustrative embodiment of FIG. **3**A where a coating **2**B may be shown as the threads **12** and the exposed end of component **2**A as terminus **11**. In an exemplary embodiment, an automatic cutting machine of the type known to those skilled in the art, such as, for example, machines and mechanisms manufactured by Schleuniger Inc. of Thun, Switzerland, such as, for example, the EcoStrip series of machinery, e.g., the EcoStrip 9320 automatic cut and strip machine. In another exemplary embodiment, an exemplary cutting process **530** and an exemplary stripping process **540** may take place before or after the other, or directly after one another, as may be the case if using an EcoStrip series machine from Schleuniger Inc., as previously stated. Other like machinery and mechanisms suitable for the aforementioned stripping process **540** are also within the knowledge of those skilled in the manufacturing arts.

[0116] An exemplary channeling process **550** may be used to redirect cut, stripped, or otherwise processed product to either a contouring process, a collecting process, and/or a packaging process, such as, for example, the exemplary contouring process (**560**), collecting process (**570**), or packaging process (**590**) illustrated and described herein. An exemplary channeling process **550** may take advantage of any form of communication mechanism for physical products known to those in the industrial arts, for example, chutes, funnels, conveyors, cams, rollers, pulleys, lifts, robotic arms, magnets, pipes, tubes, vacuum/suction mechanisms, or equivalent means of moving product in an assembly line or production facility.

[0117] An exemplary channeling process **560** may be controlled by way of motion detectors, e.g., laser, pressure, vibratory, or other contact and/or non-contact sensors, or by use of mechanical components whose revolution may either permit open and closed access to travel (e.g., gears, cams, structures with intermittent openings in a path of rotation), or other mechanical passage controls (e.g., spring-loaded doors, walls, or panels that return to closed or open state after passage of a product, sifters).

[0118] In any of the aforementioned exemplary embodiments, an exemplary channeling process **550** may be controlled via feedback loops and other digital or analytical tools to monitor product output and/or extent of production, e.g., a computer, mobile device, video camera, analog recorder, or mobile application running on one or more of a computer or mobile device, such as a smartphone. Indicia of product production may be based on product passage over sensors, passage controllers, or by scanners electronically trained to detect the final products by material composition, color, length, or other mechanical, chemical, electrical, and/or other material characteristics.

[0119] For example, an exemplary channeling process **550** may incorporate a motion sensor known to those skilled in the art to detect when a product passes along its length and from that data provide the digital or analytical tool(s) one or more of: product speed of passage and number of completed product, for example. In one aspect of the foregoing example, product speed may be sent to a mobile device via text message or other such communication to alert an operator to progress of a job. In another aspect of the foregoing example, product number can be recorded for calculating job efficiency, cost, material, and production modifications. Those skilled in the industrial arts may be aware of many metrics, formulae, and equations by which to derive indicia of production efficiency, progress, quality control, output, resource usage, and/or forecasting.

[0120] In another example, an exemplary channeling process **550** may incorporate an assembly of magnet and pressure and/or motion sensor known to those skilled in the art, which may be used to attract a product with a posable metal linkage **2** so that it contacts the pressure or motion sensor. In an aspect of this exemplary channeling process **550**, the product can be identified as having a sufficient degree of coating T_C for an exemplary posable metal linkage **2** so as to still be attracted by the magnet. In one additional aspect, the speed and pressure of the product may serve as factors to identify whether the product has been adequately coated with material **2**B, is not overweight, or is sufficiently robust for end use.

[0121] An exemplary contouring process **560** may involve a die, tap, lathe, mold, threaded die, laser, pressured water jet, heat, steam, or other work or machining station known to those skilled in the art on which a linkage **2** may be given contours **3**/**3***a-h*/**11**/**12** on or in its surface(s). A linkage **2** may bypass any of the prior processes **510**-**550** and go directly to contouring process **560**, depending on needs. For example, a 3D printing enabled process **500** may not require any material be coated (process **520**) or cut (process **530**), but may be formed in contouring process **560** which in this exemplary embodiment is exemplified by a 3D printing system, such as those described herein.

[0122] In an exemplary embodiment where a product goes through either one or more of processes **510**-**550**, an exemplary contouring process **560** comprises receiving the linkage **2** and subjecting it to roll threading or other form of cold rolling process(es) known to those skilled in the manufacturing arts. According to this exemplary embodiment, a product, such as the exemplary product embodiments illustratively disclosed and described with respect to FIGS. **16**A-D, may be formed by such a thread rolling process **560**. Equivalents of the illustrative embodiments of FIGS. **16**A-D may also be formed by an exemplary thread rolling process **560**. In another aspect of this exemplary embodiment, an exemplary thread rolling process **560** may be configured to provide threads **12** on a linkage **2** within and about the ranges and/or equivalent ranges described and disclosed with respect to Table 1.

[0123] In an exemplary contouring process **560**, a product may be acted upon by other types of grinding, cutting, sintering, welding, cold forming, and/or machining known to those skilled in the art to create contours **3**/**3***a-h*/**11**/**12** as may be illustratively shown by FIGS. **3**A-D, **4**A-D, **4**G, **5**, **6**B, **7**B, **7**F, **9**A-B, **10**B-C, **11**B-C, **12**C, **13**A-C, **14**D, **15**, **16**A-D, their related and interrelated disclosures, and any and all permutations, equivalents, and combinations thereof. For example, a die may be used to cold roll one or more of the contours **3**/**3***a-h*/**11**/**12** detailed in the aforementioned figures and related and interrelated disclosures. In another example, a sintering, lathe, laser cutter, CNC, or other material removal manufacturing process known to those skilled in the manufacturing arts may be used to create one or more of the contours **3**/**3***a-h*/**11**/**12** detailed in the aforementioned figures and related and interrelated disclosures. In one embodiment, FIG. **3**D may illustrate an exemplary contoured linkage **2** made of one material or an exemplary linkage **2** having an intermittent coating **2**B (denoted as **3***a*) and one or more exposed portions of component **2**A (denoted as **3**). In another embodiment, FIG. **3**A may illustrate an exemplary contoured linkage **2** made of one material or an exemplary linkage **2** having an intermittent coating **2**B (denoted as **12**) and one or more exposed portions of component **2**A (e.g., terminus **11**).

[0124] An exemplary collecting process **570** may involve any automated, manual, or combinations thereof whereby posable metal linkages **2** may be grouped, coupled, attached to, and/or otherwise oriented with one or more types of blocks disclosed herein, such, as for example blocks **10**/**30**-**70**, exemplary blocks **10** of FIGS. **7**A-E and **15**, exemplary blocks **50** of FIGS. **7**F and **15**, exemplary block **60** of FIG. **12**A, exemplary block **70** of FIG. **14**C and/or blocks **30**/**40**/**50**/**60**/**70** manufactured by one or more of the processes herein described. An exemplary hybrid brick **50** may be the brick provided for an exemplary collecting process **570**. An exemplary collecting process **570** may include funneling linkages **2** to repositories (e.g., buckets, bins, wells, and/or enclosures) that are also the repositories of a particular brick **10/30-70** from a similar funneling step. It may be possible to include an aspect of, part of, or a different aspect or part of the channeling process **550** described as part of the collecting process. Following collection in step **570**, an exemplary packaging process **580** may be undertaken.

[0125] In an exemplary embodiment of the packaging process **580** of the exemplary process **500** illustratively set forth by FIG. **17**, a manual or automatic packaging scheme may be utilized to place linkages **2**, one or more types of brick **10/30-70**, or combinations thereof into preformed boxes, bags, sealable bags, plastic and cardboard combinations, blisters, or other types of containers. Alternatively, an exemplary packaging process **580** may include combining an exemplary linkage **2** with one or more of the blocks collected previously as they would be assembled for use, e.g., placing a head **1** or tail **0** of a linkage **2** within an opening **5** of an exemplary block **10/30-70** to form a joint **20**. In other words, an exemplary packaging process **580** may involve packaging an exemplary joint **20** for end use by the consumer to reduce the number of loose parts in the packaging, e.g., box or bag.

[0126] Furthermore, an exemplary packaging process **580** may also involve providing instructions to the end user or customer for use of linkage **2** or joint **20** with one or more bricks **10/30-70** or other Lego-like or non-Lego-like blocks incorporating such bricks or others. Such instruction provision may be via printed matter, such as instruction manuals, or through non-print media, e.g., audio or digital means, such as television, radio, text messages, voicemail, email, websites, online video, downloads (e.g., PDF, word documents, .txt files, mp3/mpeg files, power point files), social media, or other digital distribution networks and platforms known to those skilled in the marketing arts.

[0127] Another exemplary embodiment of posability may be seen with respect to FIGS. **18**A-D. In the illustrative embodiment of FIG. **18**A, an exemplary linkage **2** having a component **2**A, which may be made out of a flexible metal, and a coating **2**B, such as, for example, an elastomer or flexible plastic coating, may be coupled to an exemplary block or blocks **10/30-70** via an opening **5**. Block or blocks **10/30-70** may be further coupled, either removably or integrally with block or blocks **100/200**, which may be the same as blocks **10/30-70**, a block described herein, or any conventional block in the prior art.

[0128] At the juncture between linkage **2** and opening **5**, an exemplary metal component **2**A of an exemplary linkage **2** may be found along a distance L_K circumscribed by opening **5** and a distance L_F beyond the walls of opening **5** and/or found in an exemplary cavity **9** of an exemplary block or blocks **10/30-70**. As previously described, component **2**A, which may be made of a flexible metal, may be located only along length L_K while a coating thickness **2**C may be found along a length L_F. Alternatively, component **2**A may be located along L_K and L_F. The ratio R of L_F to L_K may be less than about 1.0, and in an alternative embodiment is no more than about 0.75. Depending on the size and configuration of opening **5** and block or blocks **10/30-70**, ratio R may be any value that provides the benefits and advantages described herein. In another embodiment, L_F may be a length that is about equal to the thickness T_{C4} of linkage section **2**C. In another embodiment, L_F may be a length that is about equal to the thickness T_{C5} of linkage section **2**D. The person of ordinary skill in the art, by reviewing the interrelated embodiments of FIGS. **16**A-D and **18**A-D, will understand numerous interrelationships between L_C, L_M, L_F, L_K, T_{C4}, and/or T_{C5} that may be understood from the disclosures herein. In an exemplary embodiment, the person skilled in the art would understand the benefits of maintaining some length of component **2**A within opening **5** of block or blocks **10/30-70** to increase friction and/or contact forces between coating **2**B and the surface(s) of opening **5** of block or blocks **10/30-70**.

[0129] With further reference to the illustrative embodiments of FIGS. **18**A-D, an exemplary linkage **2** may be coupled to exemplary block(s) or brick(s) **10/30-70**, such as, for example Lego® blocks, Lego-like blocks, hybrid blocks, and/or 3D printed blocks, which may themselves be connected to or be integral with blocks/bricks **100/200**, such as Lego® blocks and non-Lego® blocks known to those skilled in the art. An exemplary linkage **2** may enter opening **5** of block(s) and/or brick(s) **10/30-70** along the x-axis. The plane tangent to the surface of block(s) and/or brick(s) **10/30-70** that intersects an exemplary linkage **2** may be perpendicular to the central-most axis of component **2**A. At this juncture, the x-, y-, and z-axes for the intersection of the central-most axis of linkage **2** with block(s) and/or brick(s) **10/30-70**, which together form joint **20**, may be said to have their origins located there. However, persons of skill in the art may determine other locations along an exemplary linkage **2** and/or components **2**A and **2**B, or exemplary block(s) and/or brick(s) **10/30-70** that may serve as origins for the x-, y-, and z-axes, see, e.g., FIG. **2** and FIG. **15**.

[0130] Referring to the illustrative embodiment of FIG. **18**A, the component **2**A of an exemplary linkage **2** may extend from opening **5** substantially along the x-axis while coating **2**B may or may not extend from opening **5** substantially along the x-axis due to different contours **3**/**3***a-h* in coating **2**B, intermittent application of coating **2**B on component **2**A, and/or other configurations of coating **2**B. However, in another exemplary embodiment, coating **2**B may extend substantially along the same axes as component **2**A, although it may not completely cover component **2**A of an exemplary linkage **2**. Furthermore, while coating **2**B may extend along substantially the same axes as component **2**A (e.g., the x-axis), an exemplary coating **2**B may or may not extend from the same points as component **2**A (e.g., only component **2**A may be found along length L_F, while component **2**B only begins to exist along length L_K, as may be the case for an exemplary linkage illustratively disclosed in FIG. **16**B).

[0131] Referring to the illustrative embodiment of FIG. **18**B, an exemplary linkage **2** may extend along the x-axis from opening **5** and then may be bent along the z-axis so that its cross-section is visible. While a portion of an exemplary linkage **2** may be posed in this manner, FIG. **18**B may show an entire exemplary linkage **2**, which has its head **1** covered by end coating **2**C within block(s) or brick(s) **10/30-70** and its tail portion uncoated so as to leave component **2**A exposed.

[0132] In use, an exemplary linkage **2** may be bent upon application of a user force, e.g., a positioning force that results from a user moving either the linkage **2** and/or a brick or block **10/30-70/100/200** coupled to the linkage **2**, and is not one that results exclusively from gravity acting on the linkage **2** and/or the brick or block **10/30-70/100/200** coupled thereto). Such a positioning force may cause an exemplary linkage **2** to have a pose or conformation p. In an exemplary embodiment, p may comprise an "elbow" bend (which may be at a substantially right angle) or other arc-like bend. In an exemplary joint **20**, there is minimal to no curvature ρ along length L_K, although at least some curvature ρ may be present along an exemplary linkage **2** (with or without coating **2**B) at the outside facing end of opening **5** and/or at position X_2. An exemplary curvature ρ may be one or more curved portions of an exemplary linkage **2**, and not necessarily just the portion of exemplary linkage **2** at opening **5**.

[0133] Referring to the illustrative embodiment of FIG. **18**C, an exemplary linkage **2** may extend from exemplary block(s) or brick(s) **10/30-70** along the x-axis and then be bent by a user in the y- and/or z-directions so as to have a pose or conformation p. As also illustratively shown, a portion of component **2**A and the component **2**'s thickness T_{C4} of end covering **2**C may together cover a distance of length L_F. The distance L_K illustrated may only relate to a portion of linkage **2** whose head **1** may be too long to fit within opening **5** of the particular block(s) or bricks(s). However, an exemplary linkage **2** may be configured so that the friction forces from opening **5** resulting from compression of a flexible covering **2**B against a metal component **2**A each serves to securely anchor exemplary linkage **2** within opening **5**.

[0134] As illustrated in FIG. **18**C, an exemplary linkage **2** may be bent by a user force into one or more conformations in positive and negative x-, y- and/or z-axis directions, as has been previously described. In any one of the exemplary conformations, including those illustratively disclosed with respect to FIGS. **18**C-D, an exemplary linkage **2** may substantially maintain its pose ρ over a period of time. In an exemplary embodiment, ρ may have an origin at opening **5** (as shown from the origin of the x-, y-, and z-axes) and may triangulate with the endpoint of component **2**A of an exemplary linkage **2** that is part of length L_K inside brick/block **10/30-70** (point Q), the outer-most edge of opening **5** that is parallel to the y/z axes (point R), and all points along the length of ρ (shown in dashed and dotted line in FIGS. **18**C-D) (point(s) S).

[0135] In an exemplary embodiment of posability, a posability triangle ("T") may have angles α, β, and γ between lengths QS and RS, RS and RQ, and RQ and QS, respectively. In an exemplary embodiment α is always an acute angle between QS and RS, while β and γ may be any angle between RS and RQ and RQ and QS, respectively. In another exemplary embodiment, only when portions of an exemplary linkage **2** in ρ overlap themselves may β and γ be substantially 90 degrees. For certain lengths of exemplary linkage **2**, only β may be substantially 90 degrees for one triangle T among all triangles T for a given ρ. For certain lengths of exemplary linkage **2**, β and γ may be substantially 90 degrees for a plurality of triangles T among all triangles T for a given ρ.

[0136] In another exemplary embodiment, triangle T may have coordinates on the x-, y-, and z-axes. In another exemplary embodiment, triangle T may have coordinates on the x-, and only one of the y-, and z-axes. In another exemplary embodiment, QR may be the x-axis length of triangle T or T_X, which may be substantially equal to the length of component **2**A along length L_K. In yet another exemplary embodiment, QR and/or T_X lies substantially on the central axis of component **2**A. In yet another exemplary embodiment, QR and/or T_X lies substantially on the central axis of an exemplary linkage **2**.

[0137] An exemplary posability of an exemplary linkage **2** may be contingent on the section modulus of plasticity and/or the area moment of inertia. In an exemplary embodiment, an exemplary linkage **2** may be configured so that its section modulus of plasticity (Z) may be defined by Equation 1:

$$Z_p = \frac{(D_{M\text{-}AVG} + 2T_{C\text{-}AVG})^3}{6} \qquad \text{Equation 1}$$

[0138] Where $D_{M\text{-}AVG}$ may be the average of all D_m and D_M for component **2**A about L_M plus L_T (to the extent component **2**A has such contoured ends) and $T_{C\text{-}AVG}$ may be the average of all T_{C1}, T_{C2}, T_{C3}, T_{C4}, and T_{C5} for covering **2**B about L_C. In one embodiment, a posable linkage **2** with component **2**A and **2**B may have a Z_p less than about 1.4000. In another embodiment, posable linkage **2** may have a Z_p less than about 0.58333.

[0139] In another exemplary embodiment of posability, an exemplary linkage **2** may be configured so that the area moment of inertia ("I") for component **2**A is less than that for covering **2**B. Equations 2 and 3 provide an exemplary calculation for I for a wire-like component **2**A (I_M) and a tubular covering **2**B (I_C), respectively:

$$I_M = \frac{\pi(D_{M\text{-}AVG})^4}{64} \qquad \text{Equation 2}$$

$$I_C = \frac{\pi(D_{M\text{-}AVG} + 2T_{C\text{-}AVG})^4 - (D_{M\text{-}AVG})^4}{64} \qquad \text{Equation 3}$$

[0140] In one embodiment, the smaller the area moment of inertia for an exemplary linkage **2**, the greater the posability of the exemplary linkage **2**. In an exemplary embodiment of posability, $I_M < I_C$. In an alternative embodiment of posability, I_M may be less than about 4.9×10^{-6} in^4 and, in another alternative embodiment, I_M may be less than or equal to about 7.4×10^{-7} in^4. In accordance with these and other exemplary embodiments, I_C for an exemplary linkage **2** may be less than about 2.821×10^{-5} in^4. In an exemplary embodiment, the ratio of I_C/I_M for an exemplary posable linkage **2** may be greater than about 1 but less than about 50.

[0141] As a result of being inserted into an exemplary block **10/30-70** via opening **5**, an exemplary linkage **2** may have a coating **2**B that may exert the following restoring force (F_R) against opening **5** of one or more of the exemplary blocks and/or their hybrids described by, for example, Equation 4:

$$F_R = AE[(X_2 - X_1)/X_1] \qquad \text{Equation 4}$$

[0142] Where A is the area of an exemplary coating **2**B within length L_K. An exemplary A is equal to the product of the coating **2**B thickness T_C, length L_K, and the product of the number pi (π) and linkage **2** diameter D. Alternatively, A may be equal to the product of

$$\sum_{0}^{L_K} D - D_M,$$

length L_K, and πD. Further alternatively, F_R and A may be the derivative of the force and/or area over length L_K. In a further alternative embodiment, A may be derived from any other formulae known to those skilled in the art for determining the area of coating **2**B within length L_K. E is the modulus of elasticity of an exemplary coating **2**B. The restoring force F_R may represent the force exerted by the compressed portions of coating **2**B on the inside surface of an exemplary opening **5**.

[0143] As a result of being inserted into an exemplary block **10/30-70** via opening **5**, the exemplary length L_K of an exemplary linkage **2** head/tail **1/0** may be held therein at least by a friction force F_F exerted against the coating **2**B according to, for example, Equation 5:

$$F_F=(F_R)(\mu) \qquad \text{Equation 5}$$

[0144] Where F_R is the restoration force for a deflected coating **2**B and μ is the coefficient of friction for the opening **5** of an exemplary block **10/30-70**. Thus, the dimensioning of an exemplary coating **2**B vis-à-vis opening **5** may allow for greater frictional forces to retain an exemplary linkage **2** within an exemplary block **10/30-70**. The friction forces F_F may be increased by the rigid attachment of coating **2**B to an exemplary metal component **2**A. In embodiments where blocks **10/30-70** are made of plastic, such as ABS or PLA plastic, an exemplary linkage **2** with a metal wire component **2**A having a coating **2**B adhered thereto may take greater advantage of the restoring forces F_R generated as a result of coating **2**B deflecting in response to insertion within such blocks **10/30-70**. Application of Equation 2 may be made to determine the friction force of coating **2**B (F_{Fc}) generated by the resistance forces of the opening **5** of the exemplary block **10/30-70** on coating **2**B, where μ is that for the material of coating **2**B. Use of an exemplary coating **2**B in conjunction with component **2**A may make for a more robust retention of an exemplary linkage **2** within the opening **5** of an exemplary block **10/30-70** and blocks incorporating the same.

[0145] In a further exemplary embodiment, as illustratively shown in FIGS. **19**A-D, an exemplary linkage **2** of the type disclosed may be an integrated linkage **2**E that may be integrally formed with a Lego-like block or brick **80** and/or be a welded linkage **2**F that may be mechanically/chemically attached to a block/brick **90**. Block/brick **80/90** may be a form of any block or brick **10/30-70**, coupled or integrally formed with one of blocks **100/200**, and/or may be a form of any other block or brick disclosed or known to those skilled in the art. For example, block **80** may be made out of a plastic or other material that can be integrated with the material comprising linkage **2**E. In an exemplary embodiment, block **80** may be made of ABS plastic while linkage **2**E may be made of a flexible metallic component **2**A covered by a rubber coating **2**B that is integrally molded to block **80**. In an exemplary embodiment, the material comprising linkage **2**E may be formed first and then integrated with the mold or fabrication tooling while making block **80** so that linkage **2**E can be embedded within block **80** as it is formed and/or be "captured" by the material making up block **80** so as to form one component. An exemplary linkage **2**E may be pre-treated to couple to a block **80** by increasing the surface area on the integration end of the linkage **2**E, e.g., increasing grooves, gnarling, contouring, cold rolling, and other surface area increases known to those skilled in the art. An exemplary integration end of linkage **2**E may be one or more of the head **1** or tail **0** sections of disclosed linkages **2**.

[0146] In an alternative embodiment, FIGS. **19**A and **19**C illustrate an exemplary weld linkage **2**F that may be adhered to or otherwise held by Lego-like block or brick **90** by way of glues, pressure welding, vibration welding, sintering, soldering, or plastic welding. The adhesion location for linkage **2**F to Lego-like brick **90** may be at joinder section **92**, which may be intermittent or substantially continuous along the length of linkage **2**F bounded by Lego-like brick **90**. In exemplary embodiments, linkages **2**E and **2**F, Lego-like blocks **80** and **90**, component **2**A, and coating **2**B may be interchanged with, interrelated to, combined with, used as an alternative to, and/or modified by any of the disclosures of toy linkages and related systems herein.

[0147] An exemplary integrated linkage **2**E may be embedded in block **80** as shown in FIG. **19**B. As described with respect to FIGS. **16**A-D, an exemplary integrated linkage **2**E may have an overall diameter D that may be substantially the same as or less than the thickness of block **80**, T_{BR}. Alternatively, an exemplary linkage **2**E may have a component **2**A of diameter D_M that is integrated with block **80**. According to this exemplary embodiment, component **2**A may have one section that may be integrated with block **80** and a remainder section that is not integrated with block **80**, the "free" section, that may be component **2**A in isolation, component **2**A with covering **2**B, and any form of other linkage **2** forms, components, coverings, and interrelationships disclosed. For example, an exemplary linkage **2**E may be integrated with block **80** over a length equivalent to length (i) L_K, (ii) L_K+L_F, and/or (iii) L_T. Alternatively, an exemplary linkage **2**E may have a threads **12** or contours **3***a-h* at its head **1** to allow for better integration with block **80**. In another embodiment, block **80** may be a more elaborate form of face covering **2**C/D applied to a coated linkage **2**.

[0148] An exemplary welded linkage **2**F may be coupled to block **90** as shown in FIG. **19**C. As described with respect to FIG. **16**A-D, an exemplary welded linkage **2**E may have an overall diameter D that may be substantially the same as, greater than, or less than the thickness of block **90**, T_{BR}. In an exemplary embodiment, block **90** may have a repository Φ in its surface for a welded linkage **2**F such that a portion of linkage **2**F diameter D intersects block **90** thickness T_{BR}. In another exemplary embodiment, block **90** joinder sections **92** may be formed so that the diameter D of linkage **2**F may be interconnected with a surface Γ or in the thickness T_{BR} of block **90**. An exemplary diameter D of linkage **2**F or surface Γ of block **90** may be treated to increase its surface area to permit an exemplary joinder **92** between both. While joinder **92** may be shown filling in the entire area between diameter D and block **90** surface Γ, this may not necessarily be the case, and air gaps, channels, and cavities may be present without affecting the goal. As previously described, joinder **92** may be comprised of a bonding agent or glue, a melted plastic or epoxy, a solder, a stitch, a staple, a vibration weld, pressure weld, sintered edge, and/or other weld form known to those skilled in the art. In an exemplary embodiment where linkage **2**F may be a coated linkage having a cover **2**B of thickness T_C, the thickness T_C may be smaller at joinder sections **92** than elsewhere on linkage **2**F to account for chemical/mechanical augmentations to allow coupling of linkage **2**F to brick **90**. Alternatively, an uncoated section of linkage **2**F having threads **12** and/or contours **3***a-h* may also interact with joinder section **92** and may be the sole section on linkage **2**F to couple with block **90**. In accordance with this embodiment, the smaller diameter D_m may be used to weld linkage **2**F to block **90** while the larger diameter D may exist outside of the junction zone formed by joinder **92** and surface Γ. An exemplary surface Γ may be equal to approximately 0.465*D or approximately $1.500*T_C$.

[0149] In the exemplary embodiment of FIG. **19**D, an exemplary integrated Lego-like block **80/90** may also have a user force applied to its integrated linkage **2**E or weld linkage **2**F so as to cause either linkage to maintain a pose ρ in the x-, y-, and z-plane. The origin of the pose ρ may be found at the junction of the axis of an exemplary linkage **2**E/**2**F and the orthogonal surface of Lego-like block **80/90**. If Lego-like block **80/90** does not have an orthogonal surface, then the plane tangent to the first surface which contacts linkage **2**E/**2**F may be suitable as a plane for the origin point, although persons skilled in the art may choose other suitable origin points. The ρ of an exemplary integrated linkage **2**E or weld linkage **2**F may the same or similar to that of an exemplary linkage **2** with the exception that block **80/90** necessarily will be involved in the pose. In other words, blocks **80/90**, like an elaborate face coating **2**C/**2**D are one with the linkage **2**E/**2**F. In an exemplary embodiment, $I_M<I_C$ for integrated linkage **2**E or weld linkage **2**F. According to this exemplary embodiment, the ratio of I_C/I_M for an exemplary posable integrated linkage **2**E or posable weld linkage **2**F may be greater than about 1 but less than about 55.

[0150] While exemplary linkages **2** may be illustrated in cross-section and in full by FIGS. **16**A-D, FIGS. **18**A-D, and FIGS. **19**A-D, those skilled in the art will readily understand these illustrations may apply to sections, subsections, ends, or combinations of the same for an exemplary linkage **2** in whole or in part from various vantage points and in any of the other embodiments and interrelated embodiments as disclosed and/or described.

[0151] Many further variations and modifications may suggest themselves to those skilled in art upon making reference to above disclosure and foregoing interrelated and interchangeable illustrative embodiments, which are given by way of example only, and are not intended to limit the scope and spirit of the interrelated embodiments of the invention described herein. While many of the exemplary bricks **10/30-90** have been disclosed, these exemplary bricks may be integrated components with other exemplary building blocks and need not exist in isolation. Thus, it is contemplated that the exemplary bricks **10/30-90** and their various surface structures and dimensions may be utilized in conjunction with and as integrated parts of presently available building block systems in addition to functioning on their own.

1. A toy building block linkage made out of a metal wire and an elastomer coating on the metal wire, the linkage having posability, wherein the posability comprises a ratio of an area moment of inertia of the elastomer coating to the area moment of inertia of the wire being between about 1 and about 50.

2. The system of claim **1**, wherein the posability further comprises the area moment of inertia of the elastomer coating being less than 2.821×10^{-5} in^4.

3. The system of claim **1**, wherein the linkage is integrally coupled to the at least one frictionally-interlocking building block.

4. The system of claim **2**, wherein the linkage is integrally coupled to the at least one frictionally-interlocking building block.

5. The system of claim **1**, wherein the posabililty further comprises a posability triangle comprising an angle α, an angle β and an angle γ.

6. The system of claim **5**, wherein angle β or an angle γ is greater than 90 degrees measured clockwise from the at least one wall.

7. The system of claim **6**, wherein only angle β is greater than 90 degrees measured clockwise from the at least one wall.

8. The system of claim **2**, wherein the posabililty further comprises a posability triangle comprising an angle α, an angle β and an angle γ.

9. The system of claim **8**, wherein angle β or an angle γ is greater than 90 degrees measured clockwise from the at least one wall.

10. The system of claim **9**, wherein only angle β is greater than 90 degrees measured clockwise from the at least one wall.

11. The system of claim **3**, wherein the posabililty further comprises a posability triangle comprising an angle α, an angle β and an angle γ.

12. The system of claim **11**, wherein angle β or an angle γ is greater than 90 degrees measured clockwise from the at least one wall.

13. The system of claim **12**, wherein only angle β is greater than 90 degrees measured clockwise from the at least one wall.

14. The system of claim **4**, wherein the posabililty further comprises a posability triangle comprising an angle α, an angle β and an angle γ.

15. The system of claim **14**, wherein angle β or an angle γ is greater than 90 degrees measured clockwise from the at least one wall.

16. The system of claim **15**, wherein only angle β is greater than 90 degrees measured clockwise from the at least one wall.

17. A toy building block and connection kit, comprising:

at least one frictionally-interlocking building block comprising at least one wall and at least one cylindrical stud extending upwardly from the at least one wall; and

a linkage having posability, wherein the posability comprises an area moment of inertia between about 7.4×10^{-7} in^4 and about 3.2×10^{-5} in^4.

18. The toy building block and connection system of claim **17**, wherein the area moment of inertia is between about 4.9×10^{-6} in^4 and about 3.2×10^{-5} in^4.

19. The toy building block and connection system of claim **18**, wherein the posability further comprises a section modulus of plasticity less than about 1.4000.

20. The toy building block and connection system of claim **19**, wherein the posability further comprises a section modulus of plasticity less than about 0.58333.

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