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(54) THREE-DIMENSION PUZZLE

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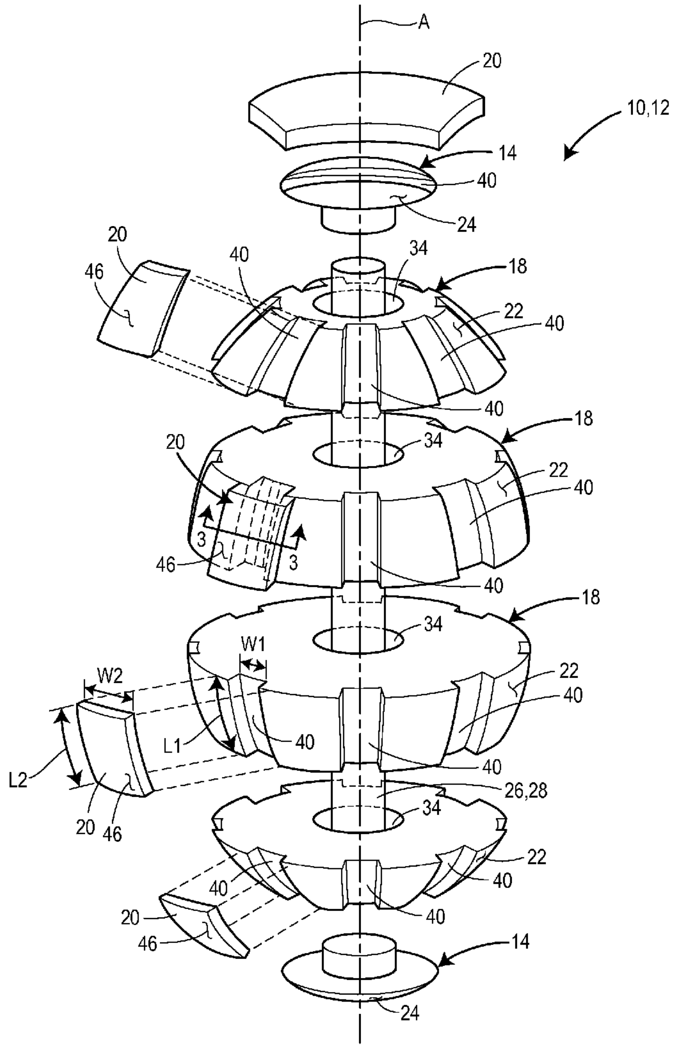
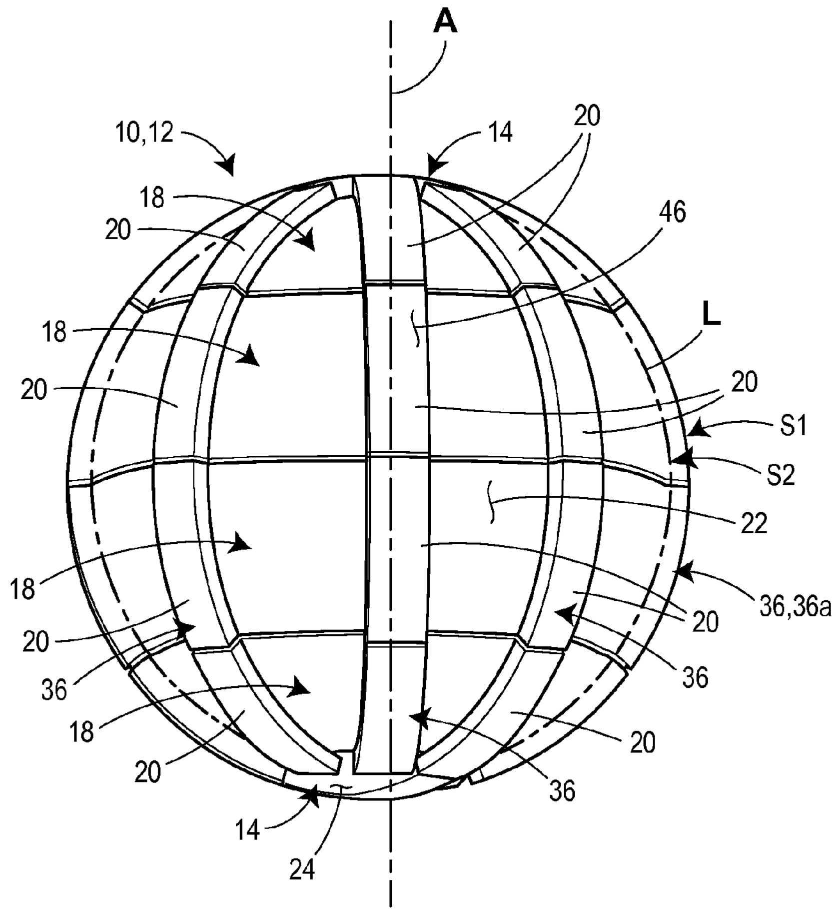
(52) **U.S. Cl.**
CPC *A63F 9/0826* (2013.01)

(57) **ABSTRACT**

A generally spherical three-dimensional puzzle includes first and second polar caps (**14**) disposed on opposite ends of a primary axis (A) of the puzzle. A plurality of base rings are stacked on the primary axis between the first and second polar caps. Each base ring is rotatable about the primary axis and relative to the other base rings and polar caps. The base rings and polar caps collectively share an infinite number of lines of longitude (L) passing through the polar caps. Additionally, the puzzle includes a plurality of slidable segments (**20**) disposed adjacent to external surfaces (**22**) of the base rings and polar caps. The plurality of slidable segments are slidable together along a common line of longitude of the puzzle when the base rings occupy a predetermined rotational state.




A
10,12
14
20
18
20
46
18
L
20
20
S1
S2
22
18
36,36a
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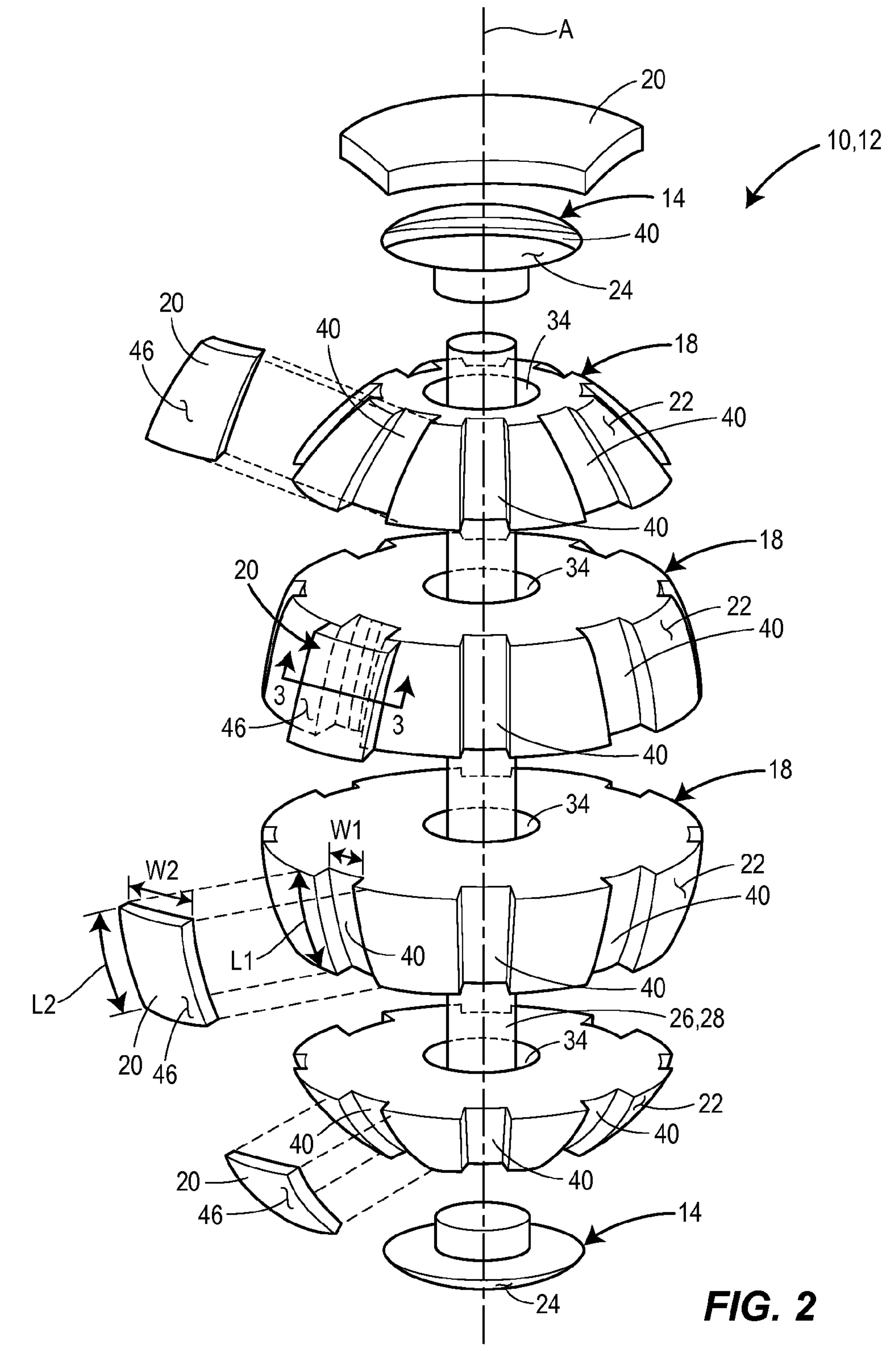
20
36
36
18
20
20
36
14
24

FIG. 1


A
20
10,12
14
40
24
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18
22
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18
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34
22
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3
40
18
34
W1
W2
22
40
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40
40
L2
26,28
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40
20
40
46
14
24

FIG. 2

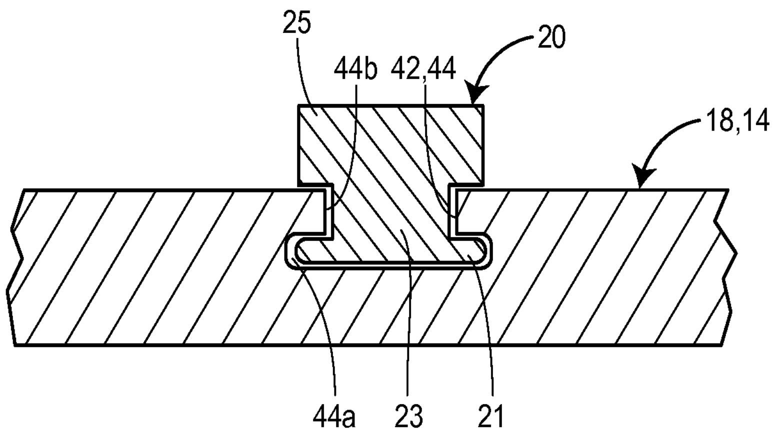
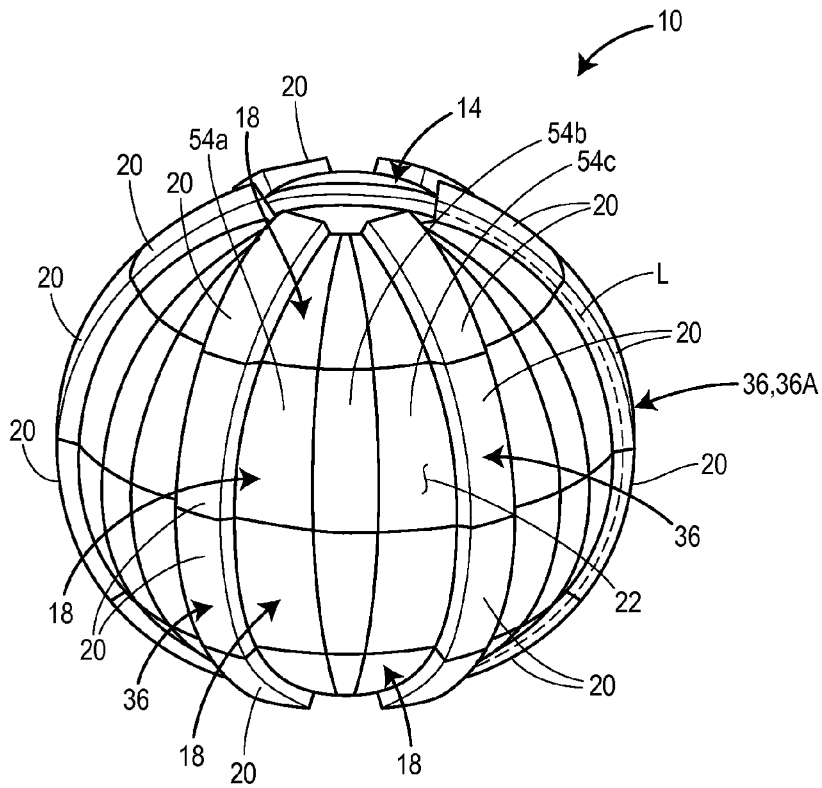


FIG. 3


10
20
14
18
54a
54b
54c
20
20
20
20
L
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20
36,36A
20
20
36
18
22
20
36
20
18
20
18

FIG. 4

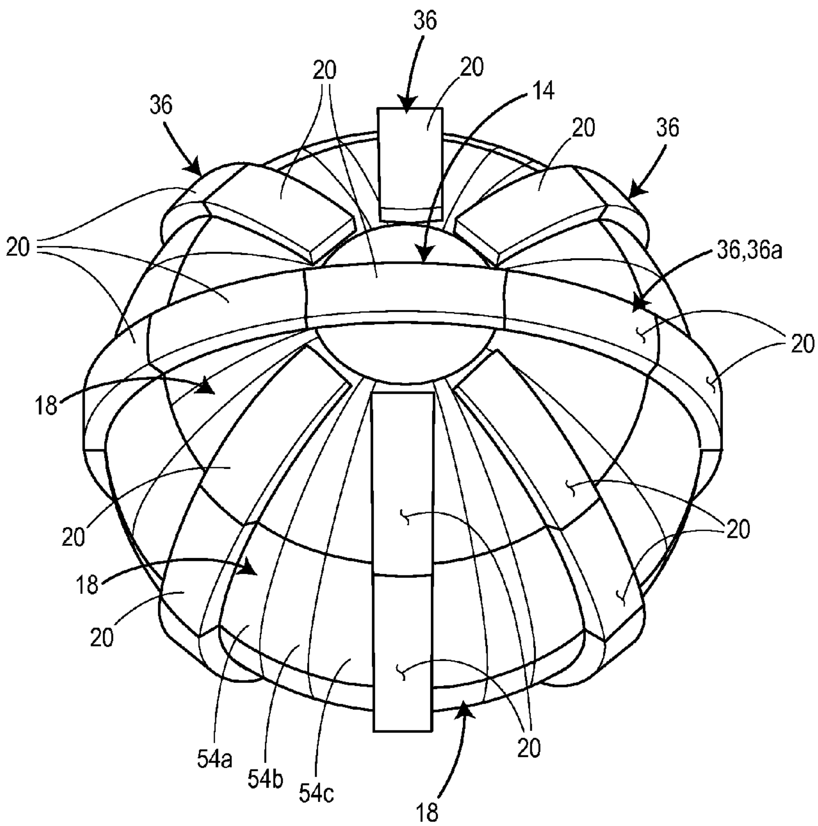

FIG. 5

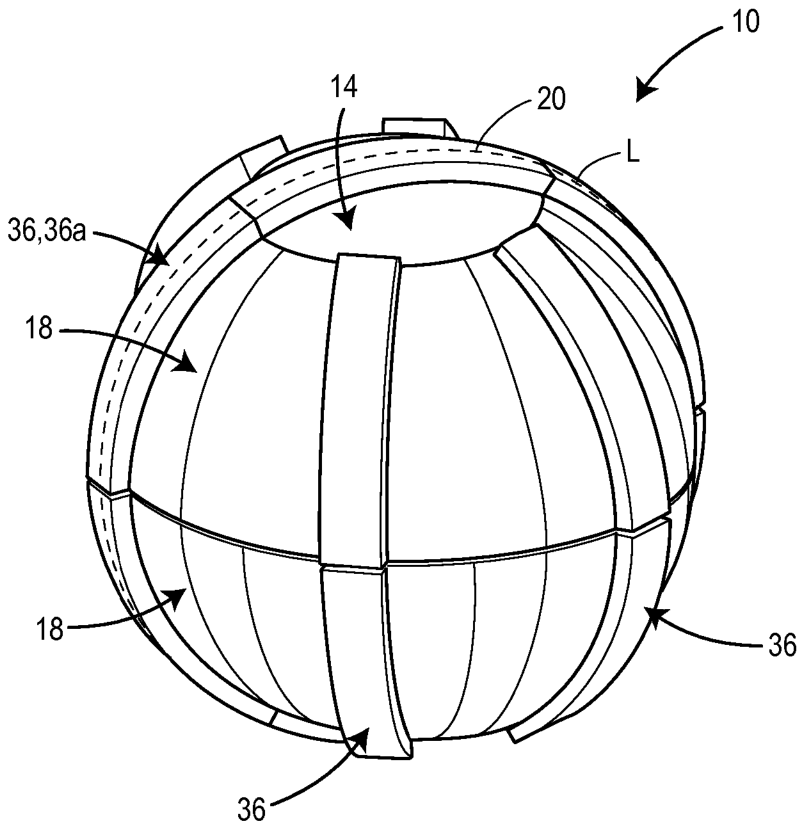

FIG. 6

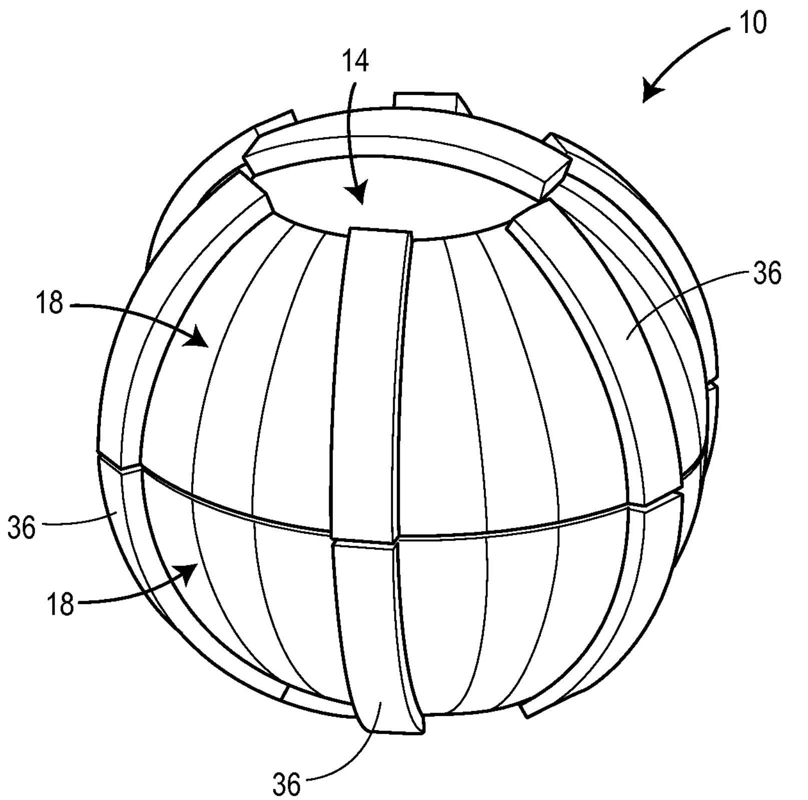

FIG. 7

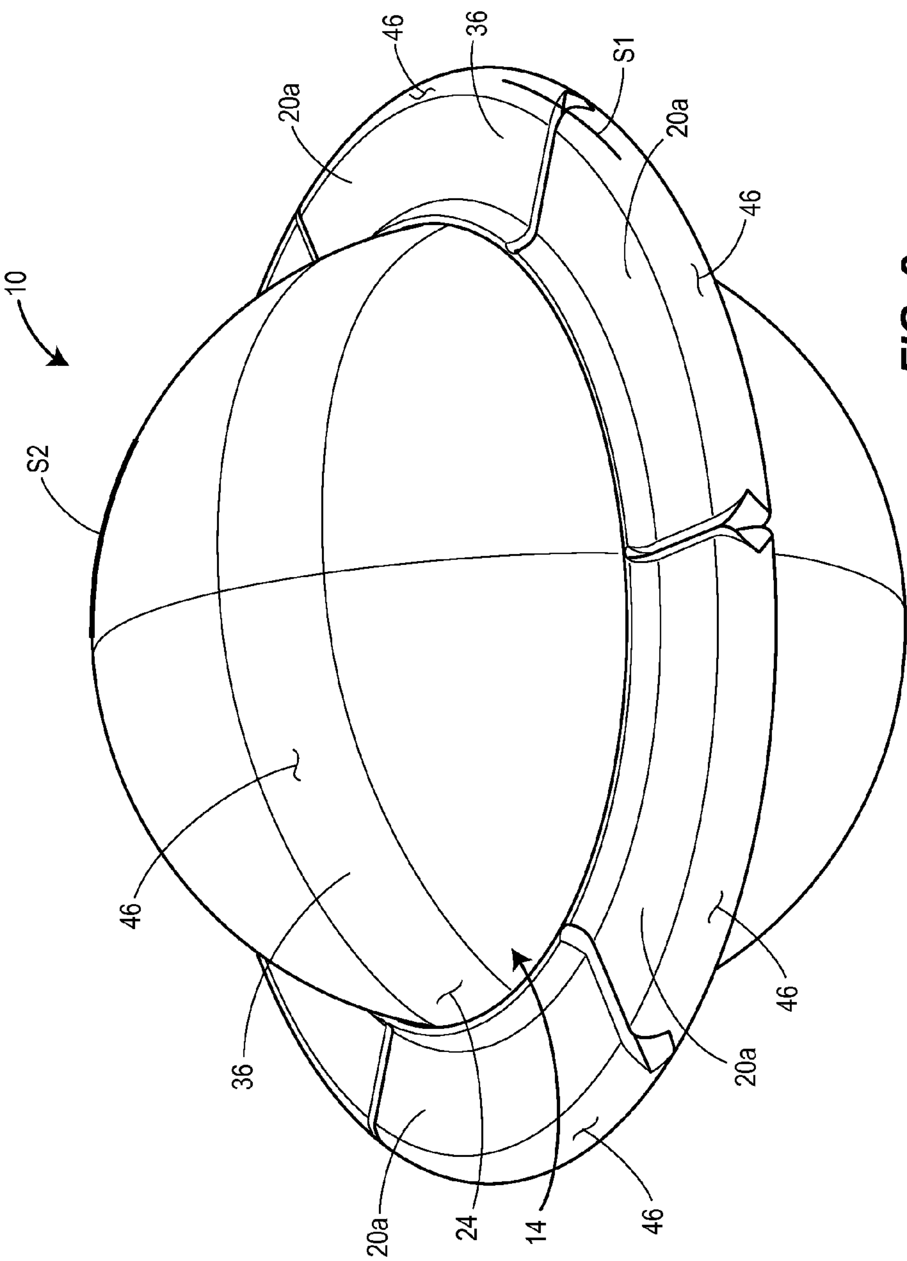

FIG. 8

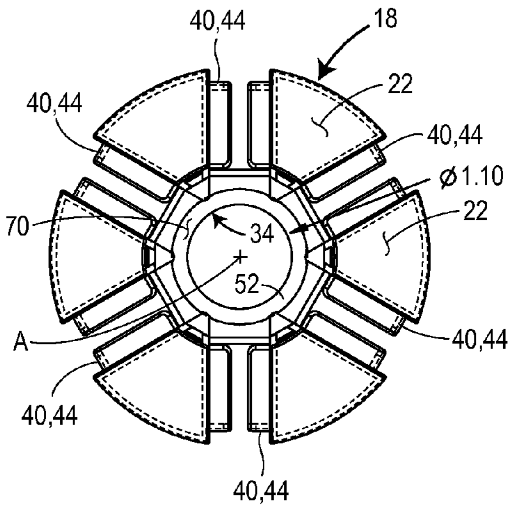

FIG. 9

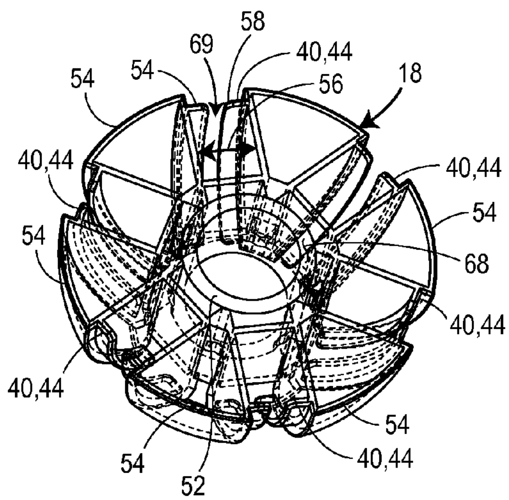

FIG. 10

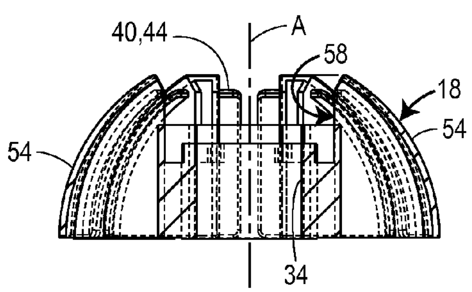

FIG. 11

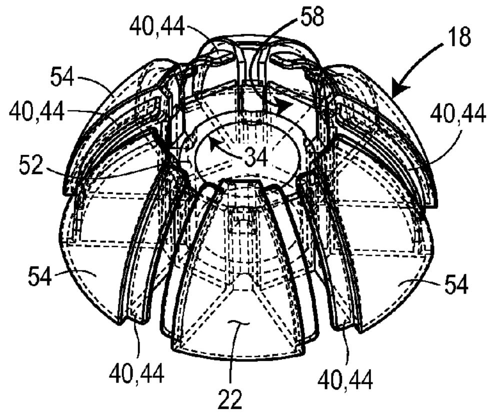

FIG. 12

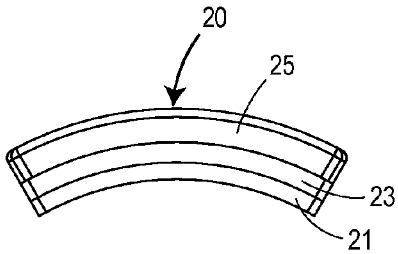

FIG. 13

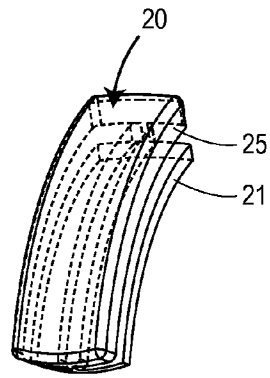

FIG. 14

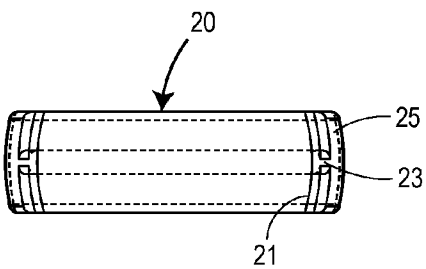

FIG. 15

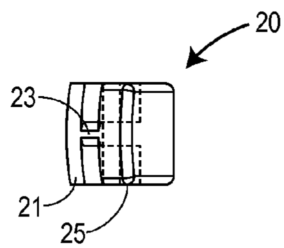

FIG. 16

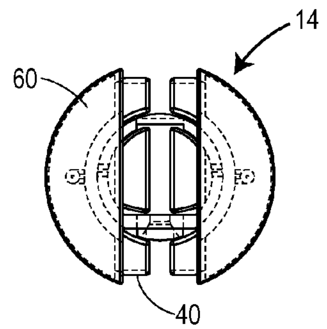

FIG. 17

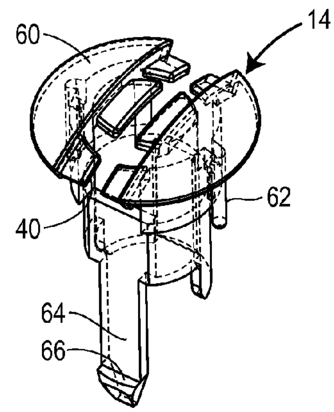

FIG. 18

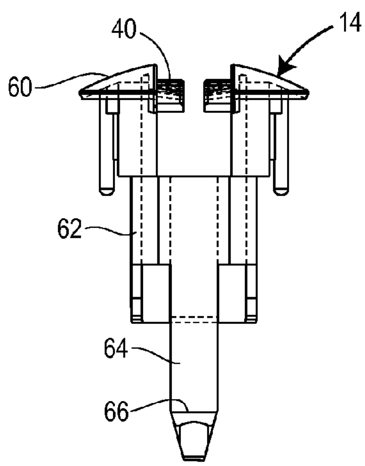

FIG. 19

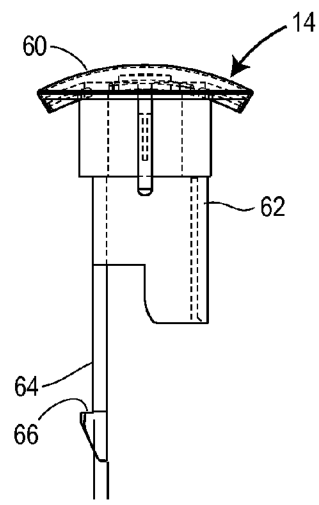

FIG. 20

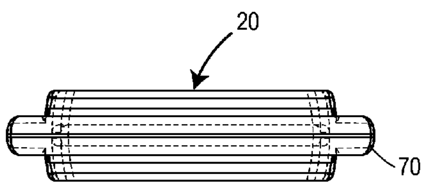

FIG. 21

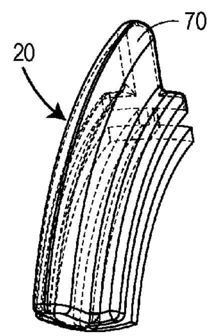

FIG. 22

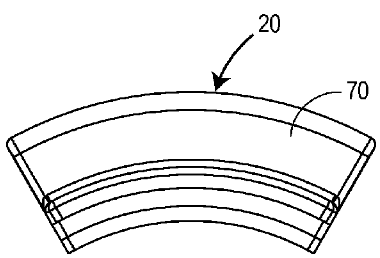

FIG. 23

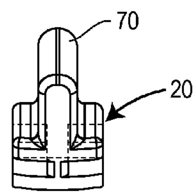

FIG. 24

THREE-DIMENSION PUZZLE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] Priority is claimed to U.S. Provisional Patent Application No. 61/797,924, filed Dec. 19, 2012, the entire contents of which are incorporated herein by reference.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to a puzzle and, more particularly, a three-dimensional puzzle.

BACKGROUND

[0003] Puzzles are popular pastimes that can be entertaining, educational, and intellectually stimulating. Traditional puzzles have always been constructed in two-dimensions, whereby a predetermined image or graphic is cut up into a plurality of pieces that can be separated and reassembled. The complexity of these two-dimensional puzzles has historically depended on the number of pieces and the level of detail in the image or graphic. To add a level of complexity and entertainment to puzzles, a number of three-dimensional puzzles have been developed including, for example, Rubik's Cube. In addition to challenging the user's mental and visual acuity, three-dimensional puzzles can also exercise a user's motor skills and physical dexterity.

SUMMARY OF THE DISCLOSURE

[0004] A generally spherical three-dimensional puzzle includes first and second polar caps disposed on opposite ends of a primary axis of the puzzle. A plurality of base rings are stacked on the primary axis between the first and second polar caps. Each base ring is rotatable about the primary axis and relative to the other base rings and polar caps. The base rings and polar caps collectively share an infinite number of lines of longitude passing through the polar caps. Additionally, the puzzle includes a plurality of slidable segments disposed adjacent to external surfaces of the base rings and polar caps. The plurality of slidable segments are slidable together along a common line of longitude of the puzzle when the base rings occupy a predetermined rotational state.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. **1** is a perspective view of one version of a puzzle constructed in accordance with the principles of the present disclosure.

[0006] FIG. **2** is an exploded view of part of the puzzle of FIG. **1**.

[0007] FIG. **3** is a cross-section taken through line **3**-**3** of FIG. **2**.

[0008] FIG. **4** is a perspective view of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0009] FIG. **5** is a perspective view of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0010] FIG. **6** is a perspective view of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0011] FIG. **7** is a perspective view of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0012] FIG. **8** is a perspective view of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0013] FIG. **9** is a top view of a base ring of another version of a puzzle constructed in accordance with the principles of the present disclosure.

[0014] FIG. **10** is a bottom perspective view of the base ring of FIG. **9**.

[0015] FIG. **11** is a side cross-section view of the base ring of FIG. **9**.

[0016] FIG. **12** is a perspective view of the base ring of FIG. **9**.

[0017] FIG. **13** is a side view of an alternative version of a sliding segment constructed in accordance with the principles of the present disclosure.

[0018] FIG. **14** is a perspective view of the slidable segment of FIG. **13**.

[0019] FIG. **15** is a top view of the slidable segment of FIG. **13**.

[0020] FIG. **16** is an end view of the slidable segment of FIG. **13**.

[0021] FIG. **17** is a top view of an alternative polar cap constructed in accordance with the principles of the present disclosure.

[0022] FIG. **18** is a perspective view of the polar cap of FIG. **17**.

[0023] FIG. **19** is an end view of the polar cap of FIG. **17**.

[0024] FIG. **20** is a side view of the polar cap of FIG. **17**.

[0025] FIG. **21** is a top view of another alternative slidable segment constructed in accordance with the principles of the present disclosure.

[0026] FIG. **22** is a perspective view of the slidable segment of FIG. **21**.

[0027] FIG. **23** is a side view of the slidable segment of FIG. **21**.

[0028] FIG. **24** is an end view of the slidable segment of FIG. **21**.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0029] The present disclosure is directed to a new and unique three-dimensional puzzle generally in the form of a sphere. The puzzle includes a plurality of rotatable base rings and a plurality of slidable segments carried on the base rings. The slidable segments can be moved around the puzzle through rotational manipulation of the rings. When one or more groups of the slidable segments are aligned along a line of longitude of the sphere, that group can be moved around the puzzle along the line of longitude. The rings and slidable segments can have one or more types of indicia such as colors, numbers, letters, etc. The object of the puzzle is to arrange the base rings and slidable segments relative to each other such that the indicia occupy a predetermined configuration relative to each other to "solve" the puzzle.

[0030] Referring now to FIGS. **1**-**3**, one version of a puzzle **10** constructed in accordance with the present disclosure includes a generally spherical body **12** including a pair of polar caps **14**, a plurality of base rings **18**, a plurality of slidable segments **20**, and a primary axis A. The pair of polar caps **14** are disposed at opposite ends of the puzzle **10** on the primary axis A. The plurality of base rings **18** of this version of the puzzle **10** includes four (4) base rings **18** stacked on the primary axis A between the polar caps **14**. Each base ring **18** is rotatable about the primary axis A relative to the other base rings **18** and relative to the polar caps **14**, as will be described in more detail below. As can be understood, the base rings **18** and polar caps **14** are encircled by an infinite number of lines of longitude L extending completely around the puzzle **10** and passing through the primary axis A at both of the polar caps **14**. As further illustrated in FIG. **1**, the plurality of slidable segments **20** are disposed adjacent to external surfaces **22** of the base rings **18** and external surfaces **24** of the polar caps **14**.

[0031] The polar caps **14**, base rings **18**, and slidable segments **20** can be coupled together in a variety of ways. FIG. **2** depicts one version of coupling the polar caps **14** and base rings **18** together on the primary axis A. In FIG. **2**, the puzzle **10** further comprises a central connector **26**, which includes an elongated rod **28** with opposing ends **30** and a central portion **32**. In this version, the opposing ends **30** of the rod **28** can be coupled to the polar caps **14** by any feasible means such as a threaded connection, a snap fit connection, an adhesive connection, a friction fit, or a pinned connection, for example, and the central portion **32** of the rod **28** can pass through central openings **34** in each of the base rings **18**, as depicted. In some versions, the central openings **34** in the base rings **18** can have a diameter that is only slightly larger than a diameter of the central portion **32** of the rod **28** such that the base rings **18** can rotate about the rod **28** with little or no frictional resistance or sufficient frictional resistance to hold the base rings **18** in a desired rotational position. In other versions, the central openings **34** in the base rings **18** can be equipped with bearing assemblies that are friction fit onto the central portion **32** of the rod **28**. Other arrangements of the base rings **18** relative to the rod **26** are also intended to be within the scope of the present disclosure.

[0032] As mentioned the opposing ends **30** of the rod **28** can be coupled to the polar caps **14**. In some versions, the polar caps **14** can be fixedly coupled to the ends **30** of the rod **16** such that the polar caps **14** are fixed against rotation relative to the rod **28**. In other versions, the polar caps **14** can be rotatably coupled to the ends **30** of the rod **26**. Rotatable coupling can be achieved through a tongue and groove connection, a friction fit connection, a bearing assembly, or some other means.

[0033] Finally, while the version of FIG. **2** includes a central connector **26** that includes the rod **28**, other versions of the puzzle **10** may couple the base rings **18** and polar caps **14** together in a different manner. For example, in one version, the base rings **18** and polar caps **14** may each include one or more annular flanges or annular recesses for coupling with an annular flange or annular recess of an adjacent base ring **18** or polar cap **14**. In this manner, it may be possible to eliminate the additional rod **28** and integrate the central connector **26** into the base rings **18** and polar caps **14**. Accordingly, it should be appreciated that the version depicted in FIG. **2** is only one possibility and other variations in construction are intended to be within the scope of the present disclosure.

[0034] Still referring to FIGS. **1** and **2**, and as mentioned, the plurality of slidable segments **20** are disposed on the puzzle **10** adjacent to exterior surfaces **22** and **24** of the base rings **18** and polar caps **14**, respectively. When the base rings **18** are rotationally aligned, as depicted in FIG. **1** for example, the plurality of slidable segments **20** can be described as being separated into plurality of aligned groups **36**, wherein each group **36** extends along a common line of longitude L of the puzzle **10**. In the version depicted in FIG. **1**, the puzzle includes four (4) such groups **36**. Of the four (4) total groups **36** of aligned segments **20**, one (1) group, which is identified as group **36*a*** in FIG. **1**, completely encircles the puzzle **10**. When the base rings **18** occupy the predetermined and aligned configuration depicted in FIG. **1**, the plurality of segments **20** that make up group **36*a*** are slidable together about the puzzle **10** along their shared and common line of longitude. This sliding movement is facilitated in part by the manner in which the slidable segments **20** are connected to the base rings **18** and polar caps **14**. One version of this connection is depicted in FIGS. **2** and **3**.

[0035] FIG. **2** depicts that each base ring **18** includes a plurality of guideway portions **40** formed in the external surfaces **22** thereof. Additionally, each polar cap includes a single guideway portion **40** formed in the external surfaces **24** thereof. In the currently disclosed version, each base ring **18** includes eight (8) guideway portions **40** spaced radially about the external surface **22**. When the base rings **18** occupy the aligned configuration depicted in FIG. **1**, for example, the guideway portions **40** of the base rings **18** are aligned such that the slidable segments **20** are aligned into the groups **36** discussed above. Moreover, as also discussed above, the group **36*a*** of slidable segments **30** encircles the entire puzzle **10** along the common line of longitude L. This group **36*a*** is capable of encircling the entire puzzle **10** because guideway portions **40** in each of the base rings **18** align with the guideway portions **40** in each of the polar caps **14** to collectively define a circular guideway extending along the common line of longitude L.

[0036] Each guideway portion **40** in the base rings **18** and polar caps **14** slidably supports (e.g., carry) at least one of the plurality of slidable segments **20**. More specifically, as shown in FIG. **3**, in the disclosed version, each guideway portion **40** includes a channel **44** formed in the external surfaces **22**, **24** of the base rings **18** and polar caps **14**. FIG. **3** depicts one version of such a channel **44**, which includes an interior channel portion **44*a*** and an exterior channel portion **44*b*** that is narrower than the interior channel portion **44*a***. Correspondingly, each slidable segment **20** of this version includes an interior portion **21**, a mid-portion **23** that is narrower than the interior portion **21**, and an exterior portion **25** that can be wider than the mid-portion **23**. So configured, the interior portion **21** of the slidable segments **20** can snap into the interior portions **44*a*** of the base rings **18** and polar caps **14** such that the slidable segments **20** can slide along the length of the channels **44** between the base rings **18** and polar caps **14**, but otherwise cannot be removed from the channels **44** or the puzzle **10**. While the present version of the puzzle **10** has been described as including guideway portions **40** that are channels **44**, this is merely one example and alternative constructs capable of slidably connecting the slidable segments **20** are also intended to be within the scope of the present disclosure.

[0037] Another feature of the present puzzle **10** that helps facilitate manipulation of the base rings **18** and slidable segments **20** is that each of the guideway portions **40** in the base rings **18** and polar caps **14** include a common first arc length **L1** and common first width **W1** (shown in FIG. **2**, for example). Additionally, each of the slidable segments **20** includes a common second arc length **L2** and common second width **W2** (also shown in FIG. **2**, for example). In this version, the first and second arc lengths **L1**, **L2** are generally the same, but in other versions they could be different. For example, in one version, the second arc length **L2** could be shorter than the first arc length **L1**. Common arc lengths **L1**, **L2** can ensure that the slidable segments **20** can move between any of the guideway portions **40** in the base rings **18** or in the polar caps **14** with ease and without restriction. Moreover, this ensures that as long as each slidable segment **20** is positioned completely and solely within a single guideway portion **40**, and not overlapping more than one guideway portion **40**, any one or more of the base rings **18** can be rotated relative to the others. This allows the user to manipulate the base rings **18** and slidable segments **20** in a predictable manner toward solving the puzzle **10**. In other versions of the puzzle **10**, however, the arc lengths, other dimensions, sizes, and/or shapes of the various slidable segments **20** can vary. Such variations can be desirable to increase the complexity and difficulty of the puzzle **10**.

[0038] Yet another feature of the puzzle **10** depicted and described with reference to FIGS. **1** to **3** is that, as depicted in FIG. **1**, the slidable segments **20** have external surfaces **46** that reside within a first sphere S**1** that has a diameter that is larger than a second sphere S**2** in which the external surfaces **22**, **24** of the base rings **18** and polar caps **14** reside. As such, this results in a puzzle **10** whereby the slidable segments appear to uniformly protrude or extend in a direction radially outward from the external surfaces **22**, **24** of the base rings **18**. This presents a visual and tactile cue to the user of which portions of the puzzle **10** are slidable versus which portions of the puzzle **10** are rotatable. To increase the complexity of the puzzle **10**, however, the external surfaces **46** of at least some of the slidable segments **20** can reside within the second sphere S**2** with the external surfaces **22**, **24** of the base rings **18** and polar caps **14** or alternatively, at least some of the external surfaces **22**, **24** of the base rings **18** and polar caps **14** can reside in the first sphere S**1** with the external surfaces **46** of the slidable segments **20**.

[0039] As discussed, the base rings **18**, polar caps **14**, and slidable segments **20** collectively define a puzzle **10**. Solving the puzzle **10** can include arranging the base rings **18** and slidable segments **20** into a predetermined puzzle-solved configuration. The puzzle-solved configuration is dictated by the position of the slidable segments **20**, the base rings **18**, and the polar caps **14** relative to each other. In order to determine that the puzzle **10** occupies the puzzle-solved configuration at least some of the game faces **42** of the external surfaces **22**, **24**, **46** of the base rings **18**, polar caps **14**, and slidable segments **20** can include indicia **50**. In FIG. **1**, the indicia **50** comprise different colors such that the various external surfaces **22**, **24**, **46** present a predetermined order or pattern when the puzzle **10** occupies the puzzle-solved configuration. In other versions, the indicia **50** can include generally any visual and/or tactile indicator including, for example, alphabetical characters, numerical characters, alphanumerical characters, symbols, designs, icons, portions of a graphical representation, portions of a pattern, labels, or generally any other foreseeable indicia that may be desirable for such a puzzle.

[0040] As mentioned above, the complexity and difficulty of the puzzle **10** of the present disclosure can be altered by changing the number, size, and/or configuration of the base rings **18** and/or slidable segments **20**. For example, FIG. **4** depicts one alternate version of the puzzle **10**, which is generally identical to the puzzle **10** described with reference to FIGS. **1-3**, except it includes less slidable segments **20** and the external surfaces **22** of the base rings **18** include multiple panels **54***a*, **54***b*, **54***b* disposed between adjacent groups **36** of slidable segments **20** when the rings **18** are aligned. As shown, when the base rings **18** of FIG. **4** are aligned, the puzzle **10** includes three (3) groups **36** of slidable segments **20**. In FIG. **4**, group **36***a* encircles the entire puzzle **10** along a common line of longitude L, similar to group **36***a* of FIG. **1**. The multiple panels **54***a*, **54***b*, **54***c* of between the groups **36** can include varying colors or shades of colors, for example. The visual presentation of the varying panels **54***a*, **54***b*, **54***c* can constitute portions of a greater pattern or graphic, for example, that is formed when the puzzle **10** occupies the puzzle-solved configuration. It should be appreciated that while the puzzle **10** of FIG. **4** has less slidable segments **20** than the puzzle of FIG. **1**, the presence of the panels **54***a*, **54***b*, **54***c* can add level of visual difficulty and/or entertainment to the puzzle **10**.

[0041] FIGS. **5-7** depict further variations on the puzzle **10** described above in reference to FIGS. **1-3** and FIG. **4**. In FIG. **5**, the puzzle **10** is generally identical to the puzzle **10** described with reference to FIG. **4** with the exception that it includes four (4) groups **36** of slidable segments **20** when the base rings **18** occupy the aligned configuration. In FIGS. **6** and **7**, the puzzle **10** is generally identical to the puzzle **10** described above with reference to FIG. **4**, with the exception that it only includes two (2) base rings **18** stacked between the polar caps **14**. In FIG. **6**, the base rings **18** are aligned with the polar caps **14** such that the slidable segments **20** in group **36***a* extend along a common line of longitude L of the puzzle **10**. In FIG. **7**, the base rings **18** are rotated out of alignment with the polar caps **14** such that no group **36** of slidable segments **20** are aligned with the polar caps **14**. In this configuration, no group **36** of slidable segments **20** can be slid around the puzzle **10** along a common line of longitude.

[0042] FIG. **8** still presents a further version of a puzzle **10** constructed in accordance with the principles of the present disclosure. In FIG. **8**, the puzzle **10** is constructed generally similarly to the puzzles **10** described previously, with that exception that it includes a first set of slidable segments **20***a* with external surfaces **46** disposed in a first sphere S1 and a second set of slidable segments **20***b* with external surfaces **46** disposed in a second sphere S2 that is also shared by external surfaces **22**, **24** of the base rings **18** and polar caps **14**, respectively. In this version of the puzzle **10**, the puzzle solved configuration could include the first set of slidable segments **20***a* being arranged along a common line of longitude L of the puzzle **10**, as depicted, or any other predetermined configuration. Regardless, the same manipulations can be made to position and reposition the base rings **18** and slidable segments **20***a*, **20***b* relative to each other, as necessary.

[0043] As mentioned, the puzzles **10** described in reference to FIGS. **1-8** are merely some examples. Other constructs of the puzzle **10** and its individual components are intended to be within the scope of the present disclosure. For example, FIGS. **9-24** depict alternative constructs for the various components (i.e., base rings **18**, slidable segments **20**, and polar caps **14**). Generally speaking, the components depicted in FIGS. **9-24** are similar to like components described with respect to prior figures, and therefore, not every detail will be repeated. For details not described in FIGS. **9-24**, it should be appreciated that such features can be either identical to those described with respect to prior versions or they can be different.

[0044] FIGS. **9-12** depict various views of one prototype of a base ring **18** constructed in accordance with the principles of the present disclosure. The base ring **18** in FIGS. **9-12** can be constructed of plastic, for example, through an injection molding process, a blow molding process, a casting process, or generally any other process. As can be seen, similar to the base rings **18** described above with reference to FIG. **2**, for example, the base ring **18** in FIGS. **9-12** includes a central opening **34**, an external surface **22**, and a plurality of guideway portions **40**. As can be seen in FIG. **10**, for example, a majority of the base ring **18** is substantially hollow to reduce weight and material. Accordingly, the base ring **18** depicted in FIGS. **9-12** can be described as including a central cylinder **52** and a plurality of hollow three-dimensional wedges **54** extending radially outward from the cylinder **52** and spaced circumferentially apart by gaps **56**, as identified in FIG. **10**, for example. Each gap **56** includes a pair of fins **58** extending toward each other from the adjacent wedges **54** but separated by a raceway **60**. So configured, each guideway portion **40** defines a channel **44** similar to the channels **44** described above with prior versions, each channel **44** defined by a combination of adjacent wedges **54** and their associated gap **56**, fins **58**, and raceway **60**.

[0045] Similar to the guideway portions described above with prior versions of the puzzle **10**, the guideway portions **40** of the base ring **18** of FIGS. **9-12** are also adapted to slidably couple a plurality of slidable segments to the puzzle **10**. FIGS. **13-16** depict one version of a slidable segment **20** constructed to be coupled to the base ring **18** of FIGS. **9-12**. In FIGS. **13-16**, the slidable segment **20** generally resembles the slidable segments **20** described with reference to FIG. **2**, for example. That is, the slidable segment **20** includes a generally arc-shaped piece of material having an interior portion **21**, a mid-portion **23** that is narrower than the interior portion **21**, and an exterior portion **25** that can be wider than the mid-portion **23**. So configured, the slidable segment **60** defines a pair of slots **60** adjacent to the mid-portion **23** and between the interior and exterior portions **21**, **25**. The slidable segment **20** is therefore adapted to couple into a guideway portion **40** of the base ring **18** of FIGS. **9-12**, for example. More specifically, the slidable segment **20** is adapted to be slid into a guideway portion **40** such that a pair of opposing fins **58** reside within the slots **60**. So configured, the slidable segments can only be removed by disassembling the base rings **18** of the puzzle **10** from each other and sliding the slidable segments **20** out of the guideway portions **40** and off of the respective base rings **18**.

[0046] While FIGS. **13-16** illustrate a version of a slidable segment **20** similar to the slidable segments described with respect to FIGS. **2** and **3**, for example, FIGS. **21-24** depict an alternative slidable segment **20** for use with the base ring **18** of FIGS. **9-12**. The slidable segment **20** in FIGS. **21-24** is similar to the first set of slidable segments **20***a* described above with reference to FIG. **8**. That is, the slidable segment **20** in FIGS. **21-24** is constructed to couple to the base ring **18** in FIGS. **9-12** in a manner the same as the segments in FIGS. **13-16**, but it additionally includes a radially protruding portion **70** that defines the slidable segment **20** as having a larger outside dimension relative to the base ring **18** to provide a different tactile and strategic appeal to the puzzle **10**, as described above with respect to FIG. **8**, for example.

[0047] Referring back to FIGS. **11** and **12**, this version of the base ring **18** also includes a cylindrical recess **58** formed in a topside thereof and extending coaxially along the primary axis A. The cylindrical recess **58** is configured to receive a portion of a polar cap **14** adapted to cooperate with the base rings **18**. FIGS. **17-20** disclose such a polar cap **14**. As shown, the polar cap **14** includes an upper button **60** and an attachment portion **62**. The upper button **60** defines the external surface **24** of the polar cap **14** when installed on the puzzle **10** and also defines the guideway portion **40** of the polar cap **14**. The guideway portion **40** of the polar cap **14** of FIGS. **17-20** is constructed substantially identical to the guideway portions **40** on the base ring **18** in FIGS. **9-12**.

[0048] The attachment portion **62** of the polar cap **14** in FIGS. **17-20** is a generally cylindrical portion adapted to reside within the cylindrical recess **58** of the base ring **18** of FIGS. **9-12**. The attachment portion **62** also includes a latching tab **64** that extends downward and terminates in a latching surface **66** for securing the polar cap **14** in the cylindrical recess **58**. For example, when the polar cap **14** is in place in the cylindrical recess **58**, the latching tab **64** extends down and such that the latching surface **66** can engage a bottom surface **68** (see FIG. **10**) of the central cylinder **52** of the base ring **18**. This prevents the polar cap **14** from easily being removed from the remainder of the puzzle **10**. In an alternative version, the latching tab **64** and latching surface **66** can also retain or couple additional base rings **18** to the base ring **18** against which the polar cap **14** directly resides. For example, one version of the puzzle **10** can have two (2) base rings **18** each of which are constructed identical to the base ring **18** depicted in FIGS. **9-12**. To arrive at the spherical shape, the two base rings **18** would be arranged as mirror images of each other. Thus, such a puzzle **10** can include two base rings **18** and two polar caps **14**. At least one of the polar caps **14** can have a latching tab **64** that is long enough such that the latching surface **66** engages a top surface **70** (identified in FIGS. **9** and **12**) of the central cylinder **52** of the base ring **18** that is opposite the base ring **18** against which the polar cap **14** resides. Thus, this latching tab **64** would secure both base rings **18** to the polar cap **14**. Other variations are of course within the scope of the present disclosure.

[0049] Based on the foregoing, it should be appreciated that the present disclosure provides a new and unique three-dimensional spherical puzzle. However, the scope of the invention is not defined by the examples described herein with respect to the drawings, but rather, is intended to encompass all change, modifications, and variations that fall within the spirit and scope of the appending claims.

1. A generally spherical three-dimensional puzzle, comprising:

first and second polar caps disposed on opposite ends of a primary axis of the puzzle;

a plurality of base rings stacked on the primary axis between the first and second polar caps, each base ring rotatable about the primary axis and relative to the other base rings and polar caps, the base rings and polar caps collectively sharing an infinite number of lines of longitude passing through the polar caps; and

a plurality of slidable segments disposed adjacent to external surfaces of the base rings and polar caps, the plurality of slidable segments slidable together along a common line of longitude of the puzzle when the base rings occupy a predetermined rotational state.

2. The puzzle of claim **1**, further comprising a plurality of guideway portions formed in the external surfaces of the base rings and polar caps, the guideway portions collectively defining at least one circular guideway extending along the common line of longitude when the base rings occupy the first predetermined rotational state.

3. The puzzle of claim **2**, wherein the plurality of guideway portions collectively define a plurality of circular guideways extending along a plurality of spaced apart lines of longitude of the puzzle when the base rings occupy the first predetermined rotational state.

4. The puzzle of claim **2**, wherein the guideway portions comprise channels formed in the external surfaces of the base rings and polar caps.

5. The puzzle of claim **1**, wherein the external surface of each base ring defines a plurality of game faces separated by the slidable segments.

6. The puzzle of claim **5**, further comprising a plurality of indicia disposed on the game faces of the base rings and on external surfaces of the slidable segments, each indicia occupying a predetermined positional relationship relative at least one other indicia when the base rings and slidable segments occupy a puzzle-solved configuration.

7. The puzzle of claim **6**, wherein each indicia comprises at least one of the following: (a) an alphabetical character, (b) a numerical character, (c) an alphanumerical character, (d) a symbol, (e) a color, (f) a design, (g) an icon, (h) a portion of a graphical representation, (i) a portion of a pattern, and (j) a label.

8. The puzzle of claim **1**, wherein external surfaces of the base rings define portions of a first spherical surface having a first diameter and an external surface of at least one of the slidable segments defines a portion of a second spherical surface having a second diameter that is greater than the first diameter.

9. The puzzle of claim **2**, wherein the plurality of slidable segments share a common first arc dimension.

10. The puzzle of claim **2**, wherein the plurality of guideway portions share a common second arc dimension.

11. The puzzle of claim **10**, wherein the first and second arc dimensions are equal.

12. The puzzle of claim **1**, wherein the polar caps are fixed against rotation relative to the primary axis.

13. The puzzle of claim **1**, wherein the polar caps are rotatable relative to the primary axis.

14. A generally spherical three-dimensional puzzle, comprising:

first and second polar caps disposed on opposite ends of a primary axis of the puzzle;

a plurality of base rings stacked on the primary axis between the first and second polar caps, each base ring rotatable about the primary axis and relative to the other base rings and the polar caps, the base rings and the polar caps of the puzzle collectively sharing an infinite number of lines of longitude passing through the polar caps;

a plurality of guideway portions formed in external surfaces of each of the plurality of base rings and polar caps, the guideway portions collectively defining at least one circular guideway extending along a line of longitude of the puzzle when the base rings occupy a first predetermined rotational state relative to each other; and

a plurality of slidable segments, each slidable segment disposed in one of the plurality of guideway portions, the plurality of slidable segments slidable together along the circular guideway between adjacent guideway portions when the base rings occupy the first predetermined rotational state.

15. The puzzle of claim **14**, wherein the plurality of guideway portions collectively define a plurality of circular guideways extending along a plurality of spaced apart lines of longitude of the puzzle when the base rings occupy the first predetermined rotational state.

16. The puzzle of claim **14**, wherein the guideway portions comprise channels formed in the external surfaces of the base rings and polar caps.

17. The puzzle of claim **14**, wherein the external surface of each base ring defines a plurality of game faces separated by the respective plurality of guideway portions.

18. The puzzle of claim **17**, further comprising a plurality of indicia disposed on the game faces of the base rings and on external surfaces of the slidable segments, each indicia occupying a predetermined positional relationship relative at least one other indicia when the base rings and slidable segments occupy a puzzle-solved configuration.

19. The puzzle of claim **18**, wherein each indicia comprises at least one of the following: (a) an alphabetical character, (b) a numerical character, (c) an alphanumerical character, (d) a symbol, (e) a color, (f) a design, (g) an icon, (h) a portion of a graphical representation, (i) a portion of a pattern, and (j) a label.

20. The puzzle of claim **14**, wherein external surfaces of the base rings define portions of a first spherical surface having a first diameter and an external surface of at least one of the slidable segments defines a portion of a second spherical surface having a second diameter that is greater than the first diameter.

21. The puzzle of claim **14**, wherein the plurality of slidable segments share a common first arc dimension.

22. The puzzle of claim **21**, wherein the plurality of guideway portions share a common second arc dimension.

23. The puzzle of claim **22**, wherein the first and second arc dimensions are equal.

24. The puzzle of claim **14**, wherein the polar caps are fixed against rotation relative to the primary axis.

25. The puzzle of claim **14**, wherein the polar caps are rotatable relative to the primary axis.

26. A method of solving a spherical three-dimensional puzzle, the method comprising:

rotating one or more of a plurality of stacked base rings about a common primary axis and into a first predetermined rotational state, whereby a plurality of slidable segments carried adjacent to external surfaces of the base rings are aligned along a common line of longitude of the spherical puzzle;

moving the plurality of slidable segments between the plurality of base rings by sliding the plurality of slidable segments together along the common line of longitude; and

positioning the base rings and slidable segments into a puzzle-solved configuration by further rotating one or more of the base rings about the primary axis, the puzzle-solved configuration arrived at when a plurality of indicia disposed on external surfaces of at least some of the base rings and slidable segments occupy a predetermined positional relationship relative to each other.

27. The method of claim **26**, wherein rotating the one or more base rings further comprises rotating the one or more base rings relative to a pair of opposing polar caps of the spherical puzzle.

28. The method of claim **27**, wherein moving the plurality of slidable segments further comprises moving at least one slidable segment between the base rings and the polar caps.

29. The method of claim **27**, wherein sliding the plurality of slidable segments comprises sliding the plurality of slidable segments within a circular guideway formed in the external surfaces of the base rings and polar caps.

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