March 24, 1936. W. H. PEFFLEY 2,034,830

SECTIONAL BALL PUZZLE

Filed Dec. 31, 1934 2 Sheets-Sheet 1

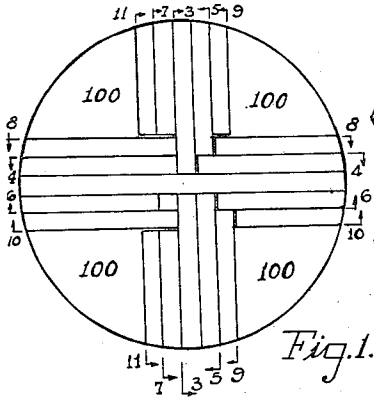


Fig.1.

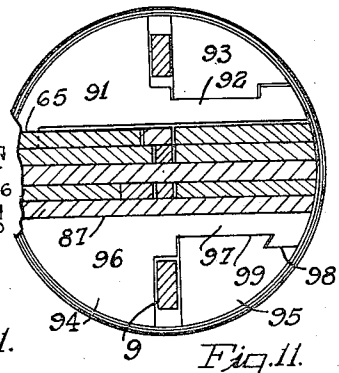


Fig.11.

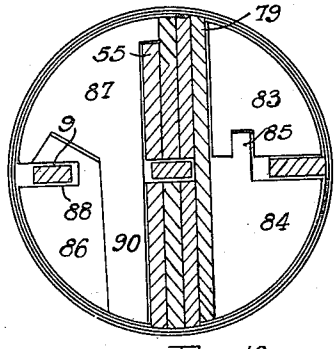


Fig.10.

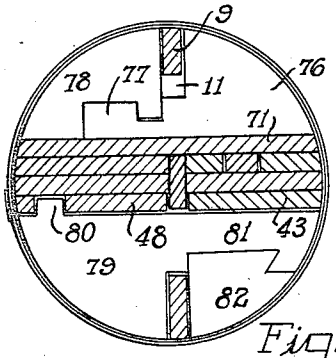


Fig.9.

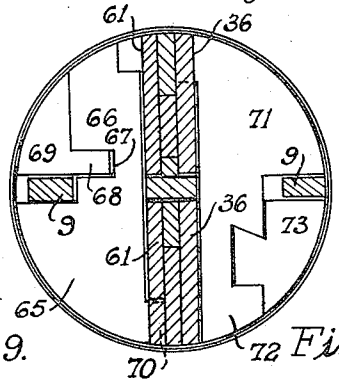


Fig.8.

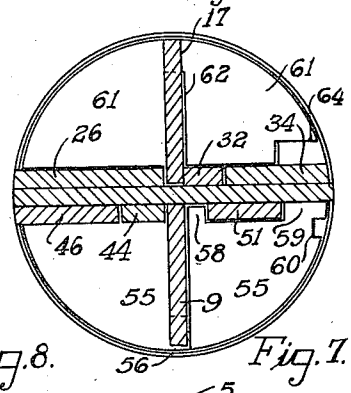


Fig.7.

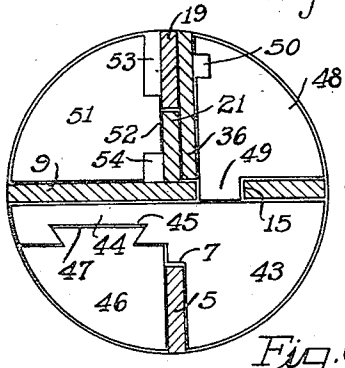


Fig.6.

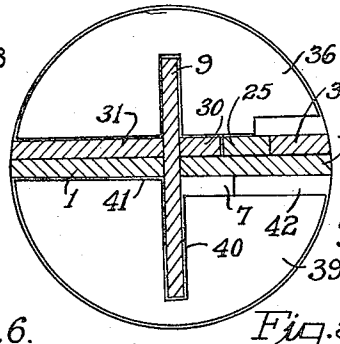


Fig.5.

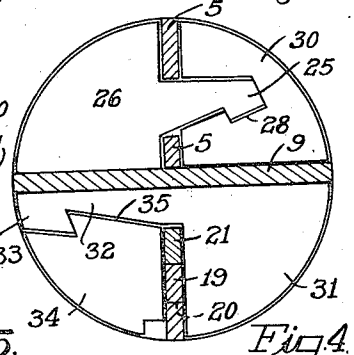


Fig.4.

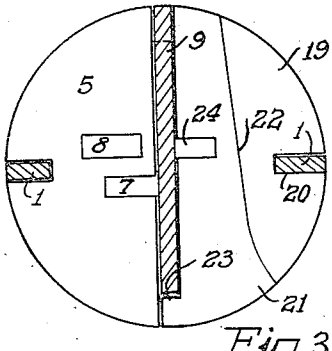


Fig.3

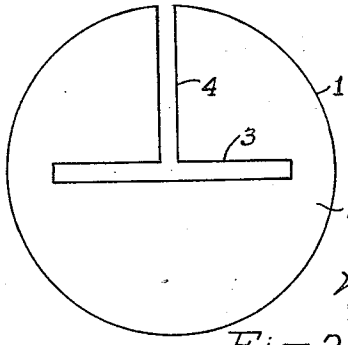


Fig.2.

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SECTIONAL BALL PUZZLE

Filed Dec. 31, 1934 2 Sheets-Sheet 2

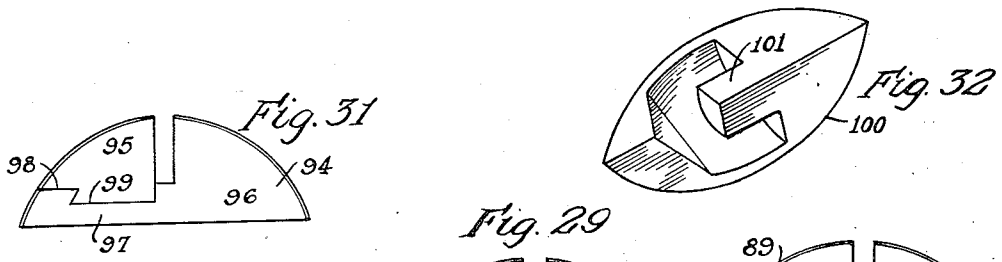


Fig. 32

Fig. 31

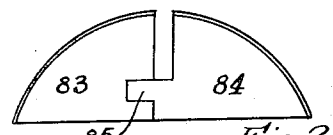


Fig. 28

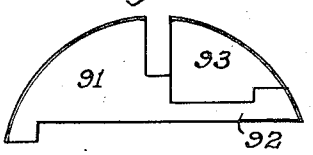


Fig. 29

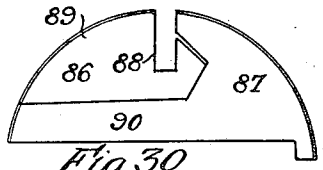


Fig 30

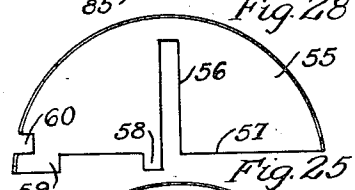


Fig. 25

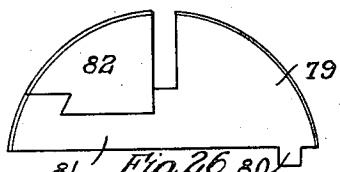


Fig. 26



Fig. 27

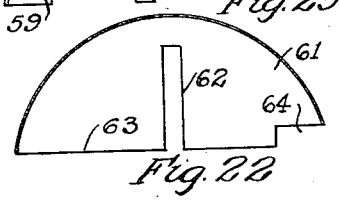


Fig. 22

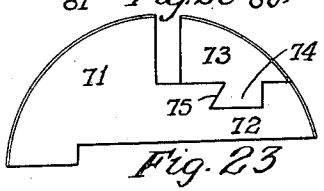


Fig. 23

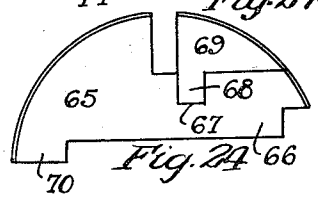


Fig. 24

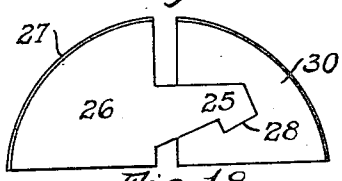


Fig. 18

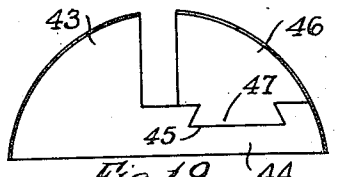


Fig. 19

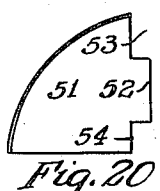


Fig. 20

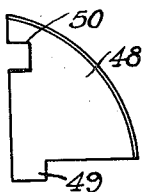


Fig. 21

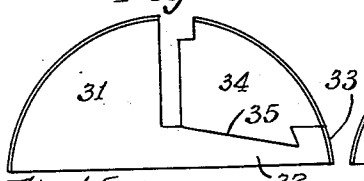


Fig. 15

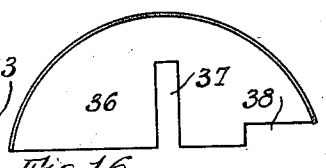


Fig. 16

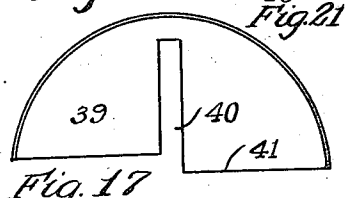


Fig. 17

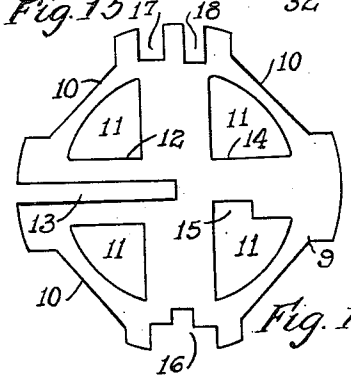


Fig. 13

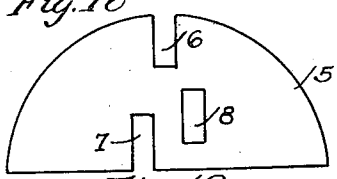


Fig. 12

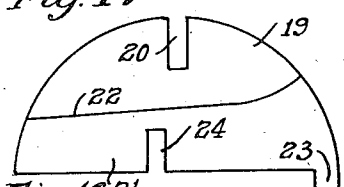


Fig. 14

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Patented Mar. 24, 1936 2,034,830

UNITED STATES PATENT OFFICE

2,034,830

SECTIONAL BALL PUZZLE

William H. Peffley, Dayton, Ohio

Application December 31, 1934, Serial No. 759,848

4 Claims. (Cl. 273—160)

This invention relates to new and useful improvements in puzzles, and particularly those comprising a sphere formed of interlocking quartered spherical sectors and segments of varying shapes.

The principal object of my invention, in its preferred form, is to provide an assembly of interlocking laminations, the first of which are assembled to form intersecting planes at right angles to each other. To these laminations other interlocking laminations are applied, and finally, to the completed lamination assembly, divided spherical sectors are applied to complete the sphere and secure all of the parts thereof into one spherical unit. By thus forming the core of the sphere of varying laminations, and further dividing each lamination into lesser interlocking parts, I have provided a puzzle that will require considerable patience and skill to assemble.

In the accompanying drawings illustrating my invention in its preferred form, Figure 1 is a view of the assembled sphere, showing the edges of the interlocking laminations. Figure 2 is a view of the foundation lamination or starter. Figure 3 is a sectional view taken on the line 3—3 of Figure 1 and showing the next step in the assembly. Figure 4 is a sectional view taken on the line 4—4 of Figure 1 and showing the next step in the assembly. Figure 5 is a sectional view taken on the line 5—5 of Figure 1 and showing a further step in the assembly. Figure 6 is a sectional view taken on the line 6—6 of Figure 1 and showing the next step in the assembly. Figure 7 is a sectional view taken on the line 7—7 of Figure 1 and showing another step in the assembly. Figure 8 is a sectional view taken on the line 8—8 of Figure 1 and showing the next advanced step in the assembly. Figure 9 is a sectional view taken on the line 9—9 of Figure 1 and showing a further step in the assembly. Figure 10 is a sectional view taken on the line 10—10 of Figure 1 and showing the last laminations in place in one plane. Figure 11 is a sectional view taken on the line 11—11 of Figure 1 and showing the last lamination in place in the plane at right angles to the section line 10—10 and ready to receive the interlocking sectors. Figure 12 is a view of the semi-circular core lamination that is notched to receive the marginal edge of the starter. Figure 13 is a view of the core member that is inserted in the center leg of the starter. Figure 14 is a view of a peripheral lamination and a wedge lamination joined together. Figure 15 is a view of a quarter circular lamination connected to another quarter circular lamination. Figure 16 is a view of a semi-circular lamination which is fitted in a slot in the core member shown in Figure 13. Figure 17 is a view of a complementary semi-circular lamination that is also inserted in the core member illustrated in Figure 13. Figure 18 is a view of a quarter circular filler lamination having a hook shaped projection that is fitted in a recess in a complementary lamination. Figure 19 is a view of a quarter-circular segment having an elongated slotted lock portion that receives a key extension on another quarter circular segment. Figure 20 is a view of a recessed quarter circular lamination. Figure 21 is a view of a quarter circular lamination formed with a square projection on one of its radial faces. Figure 22 is a view of a lamination having a radial slot in its straight face to fit the core member illustrated in Figure 13. Figure 23 shows a quarter circular lamination joined to a segment. Figure 24 is a view of a segmental lamination in locking engagement with a smaller segmental lamination. Figure 25 is a view of a semi-circular lamination formed with a radial notch which fits the core member illustrated in Figure 13. Figure 26 is a lamination locked to a small segment. Figure 27 is a view of a segment lamination having a shank projection in engagement with a smaller segment. Figure 28 is a view of two quarter-circular laminations secured together. Figure 29 is a view of a segmental lamination that is secured to a complemental lamination by a key extension. Figure 30 is a view of two interlocking laminations. Figure 31 is a view of two connected final laminations that complete the core structure of the sphere. And Figure 32 is a perspective view of a spherical sector for locking the assembled laminations together.

Referring now to the accompanying drawings for a detailed description of my invention and the assembly thereof, the numeral 1 designates the starter or foundation member comprising a disc 2 having formed in the center thereof a T slot 3 whose center leg 4 extends through the periphery of the disc and whose legs intersect at the center of the latter.

With the starter 1 in a vertical position as shown in Figure 3, a semi-circular core lamination 5 is inserted through the cross slot of the T slot 3 and moved outwardly to form a portion of the periphery of the sphere. This core lamination 5 is essentially semi-circular as shown in Figure 12, and has provided in its circular edge a notch 6 to receive the marginal edge of the starter 1 at the ends of the cross slot therein.

In its opposite straight edge another open slot 7 is formed, and adjacent the latter, a similar rectangular opening 8 is provided.

Following the assembly of the core lamination 5 with the starter 1, another core member 9 is inserted in the center leg 4 to form a third plane at right angles to each of the members 1 and 5. This core lamination 9 as shown in Figure 12, is essentially circular and has equally spaced on its periphery indented flat or straight faces 10, and between each straight face 10 and the center of the lamination, a quarter-circular opening 11. Formed in one of the axial portions 12 between adjacent openings 11, 11, is an open slot 13 extending from the periphery of the disc to the center thereof. Within this slot the solid portion of the starter 1 opposite the center leg 4 is received. In one side of the axial portion 14, opposite the axial portion 12, I have provided a notch 15 to receive a subsequent part of the puzzle, and in the circular peripheral portion of the lamination, between the axial portions 12 and 14, other notches 16, 17 and 18 to receive other laminations. (See Figures 3 and 13.)

With the core 9 held in a vertical position as shown in Figure 3, a peripheral lamination 19 is next inserted in the end of the T slot 3 opposite to the core lamination 5. The lamination 19 has formed in its curved edge an open slot 20 to receive the starter 1 at the end of the cross slot 3, and by which the former is held in place. Next a wedge lamination 21 is inserted through this slot 3 between the core member 9 and the inner tapering face 22 of the lamination 19. This wedge lamination forces the lamination 19 outwardly to its correct position. Formed on one end of the wedge lamination 21 is an ear 23 that is received in the notch 16 of the core lamination 9, and near its center the inner edge of the lamination 21 has therein an open slot 24 to receive a subsequent lamination. (See Figures 3, 13 and 14.)

Referring now to Figure 4, the partially assembled puzzle is held with the core member 9 horizontal to receive through the opening 8 in the lamination 5 a hook-shaped projection 25 formed on one side of a quarter circular filler lamination 26. On the side of the lamination 5 opposite the quarter circular portion 27 of the lamination 26, the hook-shaped projection 25 is received by a similar recess 28 formed in a complementary lamination 30 assembled thereon, thus completing the semi-circle above the core 9. (See Figures 4 and 18.)

Below the core 9 there is a similar quarter circular lamination 31 having an elongated hook-like projection 32 whose outer tip 33 extends to the surface of the sphere. This projection 32 is inserted through the slot 24 in the wedge lamination 21, and receives between it and the latter another quarter circular lamination 34 whose inner face 35 is notched to the profile of the projection 32. (See Figures 4 and 15.)

Referring now to Figures 5 and 12 for the next progressive step in the assembling of my puzzle, a semi-circular lamination 36 is next inserted, a slot 37 in its inner face being received in the recess 16 of the core 9. Also formed in the side of this lamination is an offset 38 extending to the periphery of the lamination.

Below the starter 1 a complementary semi-circular lamination 39 is inserted. This lamination has therein a radial slot 40 extending to its inner face 41, and permitting its insertion over the core 9 for reception by the slot 16 in the latter. At one side of the slot 40 the inner face 41 is offset to form a recess 42 when assembled in the puzzle.

The next step in the assembly, as shown in Figure 6, is accomplished by the insertion of a quarter-circular segment 43 having an elongated lock portion 44 that passes through the openings 42 and 7 to the opposite side of the core lamination 5. Beyond the lamination 5 the lock portion 44 has formed in its outer face a dove-tailed slot 45 to receive therein a quarter circular lamination 46 provided with a key extension 47 that is received by the slot 45.

Above the core member 9 I have provided a quarter circular lamination 48 formed with a square projection 49 on one of its radial faces, and at the inner end thereof. This projection 49 is received by the notch 15 to secure the segment within the assembly. Near the outer end of the other radial side of the lamination 48 is an open slot 50 to engage a lamination later to be added.

Opposite the lamination 48, as shown in Figure 6, is another quarter-circular lamination 51, having formed at each end of its radial side 52, adjacent the members 19 and 21, recesses 53 and 54 to receive therein subsequent laminations. (See Figures 6 and 20.)

In Figure 7 a semi-circular lamination 55 is inserted, a radial notch 56 receiving the core 9. On its inner straight face 57 projections 58 and 59 are provided for reception in the recesses 53 and 54 respectively to hold these members in inter-locking engagement. Adjacent the projection 59 I have formed in the periphery of the segment a short recess 60 to receive another lamination later to be added.

Oppositely disposed to the lamination 55 is a similar lamination 61, and likewise having a radial slot 62 in its inner straight face 63. In this slot the core 9 is received, the lamination 61 entering the slot 17 in the core. Also formed at one end of the face 63 is a recess 64 to interlock a lamination 65 next to be added.

Referring now to Figure 8, I have shown the segment lamination 65 having an elongated portion 66 that passes through one of the openings 11 in the core 9. Beyond the latter the portion 66 is provided with a recess 67 in its outer face to receive in locking engagement a key portion 68 formed on the inner face of a smaller segment lamination 69. At the end of the segment 65, opposite its elongated portion 66, there is formed on its inner face a lug 70 received by the recess 64. (See Figures 8, 22 and 24.) Opposite the laminations 65 and 69 is a similar quarter circular lamination 71 having a shank 72 that extends through another one of the openings 11 to receive beyond it a lesser segment 73 having a key projection 74 that is received by a dove-tailed slot 75 in the shank 72. (See Figures 8, 13 and 23.)

In the sectional view, Figure 9, I have shown a segment lamination 76 applied, and having a shank projection 77 that extends through another of the openings 11 in the core 9. Beyond the core 9 it is locked in place by a smaller segment 78 that engages the lamination 76.

In order to assemble the next lamination 79, which is shown in Figure 9, the lamination 48 is partially removed to allow a projection 80 on the lamination 79 to enter the recess 50. This latter lamination 79 has a shank projection 81 that projects through another one of the openings 11 in the core 9. Beyond the core the shank 81 is

locked in place by a smaller segment 82 that engages it. (See Figures 9 and 26.)

Next in order, as shown in Figure 10, quarter-circular laminations 83 and 84 are applied over the laminations 43 and 48, the lamination 84 having an offset portion 85 that projects through another one of the openings 11 in the core 9 and beyond which it engages the other segment 83.

Also applied over the face of the segments 46 and 51 are interlocking laminations 86 and 87 as shown in Figure 10. The lamination 86 is first inserted through one of the openings 11 in the core 9, and receives the latter in a recess 88 formed in its outer curved face 89. The other lamination 87 is approximately quarter circular and has an elongated extension 90 that is also inserted through the opening 11 behind the lamination 86 to force it outwardly. When thus assembled they are securely locked in place. (See Figures 10 and 30.)

Finally, as shown in Figure 11, a segment lamination 91 is applied over the face of the lamination 61. This lamination 91 has a key extension 92 that passes through one of the openings 11 in the core 9 to receive beyond the latter a complemental lamination 93.

Below the laminations 86 and 87, final laminations 94 and 95 are applied to complete the core structure of the sphere. The lamination 94 comprises a quarter-circular segment 96 having a key extension 97 that projects through one of the openings 11 in the core 9. Beyond the core 9 the complemental segment 95 is inserted. This segment 95 has on its inner face 98 a key projection 99 to engage the extension 97. (See Figures 11 and 31.)

The assembled laminations as shown in Figure 11 are now ready to be locked together. For this purpose I employ spherical sectors 100, each of which is provided on its inner face with a tongue 101 that is essentially quarter-circular in cross section. (See Figure 32.) These sectors 100 are inserted by a firm endwise movement, the tongue of each sector entering the remainder of the open spaces 11 in the core 9. The complete sphere will now appear as shown in Figure 1.

I do not wish to be limited to the details of construction and arrangement herein shown and described, and any changes or alterations, such as variations in the number, size and shape of the spherical sectors and segments, may be made within the scope of the subjoined claims.

Having described my invention, I claim:

1. A puzzle comprising a spherical assembly made up of a starting disc formed with a T-slot at its center, a semi-circular core lamination inserted through the cross portion of said T-slot, a circular core lamination inserted in the center leg of the T-slot to form a third plane at right angles to the stationary disc and the semi-circular core lamination, and a plurality of slotted and notched sector and segmental sections progressively fitted to said core assembly to form a sphere.

2. A puzzle comprising a spherical assembly made up of a starting disc formed with a T-slot at its center, a semi-circular core lamination inserted through the cross portion of said T-slot, a circular core lamination inserted in the center leg of the T-slot of the disc to form a third plane at right angles to the starting disc and the semi-circular core lamination, a plurality of slotted and notched sector and segmental sections progressively fitted to said core assembly, and spherical segments for locking the assembled sections together to form a sphere.

3. A puzzle comprising a spherical assembly made up of a starting disc formed with a T-slot at its center, a notched and slotted semi-circular core lamination inserted through the cross portion of said T-slot, a circular core lamination formed with notches in its periphery and with openings in its face portion, the last-named core lamination insertable in the center leg of the T-slot in the disc to form a third plane at right angles to the starting disc and semi-circular core lamination, a plurality of slotted and notched segmental sections progressively fitted to said core assembly, and spherical segments for locking the assembled sections together to form a sphere.

4. A puzzle comprising a spherical assembly made up of a starting disc formed with a T-slot at its center, a core lamination inserted through the cross portion of said T-slot, a second core lamination inserted in the center leg of the T-slot to form a third plane at right angles to said disc and the first core lamination, and a plurality of sector and segmental sections progressively fitted to said core assembly to form a sphere.

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