

PUZZLE

TECHNICAL FIELD

This invention relates to puzzles, and more particularly to developmental puzzles for children.

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BACKGROUND

Puzzles are a type of game played by people. Puzzles vary in complexity and difficulty. One person or many people working together can attempt to complete a puzzle. People of all ages, from children to elderly attempt to complete puzzles. Working on completing puzzles develops cognitive abilities, problem solving skills, and develops pattern and color recognition capabilities. Working on puzzles is a fun, enjoyable experience.

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SUMMARY

The details of one or more embodiments of the invention are set forth in the accompanying drawings and the description below. Other features, objects, and advantages of the invention will be apparent from the description and drawings, and from the claims.

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The present disclosure relates to a children's puzzle.

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Implementations of the present disclosure include a children's puzzle including a rigid frame and a set of removable, rigid, non-interlocking pieces. The rigid frame has two opposite broad sides defining a thickness therebetween. Each broad side of the rigid frame defines multiple recesses therein. Each recess is surrounded by one or more elevated surfaces of the rigid frame. At least one of the recesses on at least one broad side of the rigid frame is configured to loosely contain multiple pieces of the set. The recesses of each of the broad sides of the rigid frame are sized to simultaneously accommodate all of the pieces of the set. The recesses of the two opposite broad sides of the rigid frame are arranged differently, so as to form respective arrangements of the pieces of the set when accommodated in the recesses. The set of removable, rigid, non-interlocking pieces each have a flat bottom surface. At least three of the pieces have different perimeter shapes. The pieces of the set and the recesses of each of the two opposite broad sides of the rigid frame

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are configured such that the pieces, as accommodated, are retained in the recesses only by gravity.

5 In some implementations, at least some of the pieces of the set each have a flat top surface opposite the bottom surface. The top and bottom surfaces define a thickness therebetween.

In some implementations, the recesses of each of the broad sides of the rigid frame are sized to simultaneously accommodate all of the pieces of the set with the bottom surfaces of the pieces against the rigid frame.

10 In some implementations, the flat top surface is flat across its entire extent and void of any recess or protrusion.

In some implementations, for at least one of the pieces with a flat top surface the top surface is smaller than the bottom surface.

15 In some implementations, the set of pieces includes a piece with a bottom surface identical in size and shape to the top surface of the piece with the top surface smaller than the bottom surface.

In some implementations, at least one of the pieces is non-planar on a side opposite the bottom surface.

20 In some implementations, the recesses on one of the two opposite sides of the rigid frame are sized to simultaneously accommodate all of the pieces of the set with the bottom surface of the non-planar piece extending away from the rigid frame.

In some implementations, the rigid frame is void of any passages connecting recesses on opposite sides of the broad sides.

In some implementations, the bottom surface of each piece is flat across its entire extent and void of any recess or protrusion.

25 In some implementations, the children's puzzle is constructed of wood.

In some implementations, the non-recessed surface of the rigid frame displays graphics associated with the respective arrangements of the pieces.

In some implementations, the recesses are each bounded by bottom surfaces displaying graphics.

30 In some implementations, the pieces of the set are of different colors.

In some implementations, on at least one of the broad sides of the rigid frame the recesses extend to a greater depth from the non-recessed surface of the rigid frame in one

region of the broad side of the rigid frame than in another region of the broad side of the rigid frame.

In some implementations, the pieces and recesses are configured such that, as accommodated in the recesses, the pieces extend above the non-recessed surface surrounding
5 the recesses.

In some implementations, at least one piece of the set has a round perimeter.

In some implementations, at least one recess of each side of the rigid frame accommodates only a single piece of the set.

In some implementations, exactly two of the pieces of the set are of identical
10 perimeter shape and size.

In some implementations, the two opposite broad sides of the rigid frame are parallel.

DESCRIPTION OF DRAWINGS

Fig. 1A is a front view of a first puzzle frame with puzzle pieces inserted into recesses.

15 Fig. 1B is a rear view of the puzzle frame of Fig. 1A with the puzzle pieces inserted into recesses to form a different arrangement.

Fig. 2A is a front perspective view of the puzzle frame of Fig. 1A with the puzzle pieces removed.

Fig. 2B is a rear view of the puzzle frame of Fig. 1B with the puzzle pieces removed.

20 Fig. 3 is a side view of the puzzle frame of Fig. 1A with the puzzle pieces inserted into recesses.

Fig. 4 is a rear view of a puzzle piece of Fig. 1A.

Fig. 5A is a front perspective view of a second puzzle frame with puzzle pieces inserted into recesses.

25 Fig. 5B is a rear view of the puzzle frame of Fig. 5A with the puzzle pieces inserted into recesses in a different arrangement.

Fig. 6A is a front perspective view of a third puzzle frame with puzzle pieces inserted in one arrangement.

30 Fig. 6B is a rear perspective view of the puzzle frame of Fig. 6A with puzzle pieces shown in a different arrangement.

Fig. 7A is a front view of a fourth puzzle frame with puzzle pieces inserted in one arrangement.

Fig. 7B is a rear view of the puzzle frame of Fig. 7A with the puzzle pieces inserted in another arrangement.

5 Fig. 8A is a perspective view of a fifth puzzle frame with puzzle pieces inserted in one arrangement.

Fig. 8B is a cross-sectional view, taken along line 8B-8B in Fig. 8A.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

10 While a number of examples have been described for illustration purposes, the foregoing description is not intended to limit the scope of the invention, which is defined by the scope of the appended claims. There are and will be other examples and modifications within the scope of the following claims.

A puzzle is a toy or game designed to challenge a person's cognitive abilities and problem solving skills. A puzzle has a rigid frame with two opposite sides. Each side has
15 multiple recesses. A set of pieces fit the recesses. The recesses of each side of the rigid frame are sized to simultaneously accommodate all of the pieces of the set and make an arrangement of the pieces.

Figs. 1A, 1B, 2A, 2B, and 3 show a children's puzzle 100 having a rigid frame 102
20 and a set of removable, rigid, non-interlocking pieces 106 that fit in recesses 110 of the rigid frame 102. The rigid frame 102 has two opposite broad sides, a first side 104 and a second side 108. The first side 104 can be a front facing side and the second side 108 can be a rear facing side. The first side 104 can interchangeably be known as the first side, the front side, or the front facing side. The second side 108 can interchangeably be known as the second
25 side, the rear side, or the rear facing side. The rigid frame has a height "H" and a length "L". The rigid frame can have a nominal height "H" of 185 mm and a nominal length "L" of 185 mm. The first side 104 and the second side 108 define a thickness 116 of the rigid frame 102. The thickness can also be denoted as "T". The rigid frame can have a nominal thickness "T" of 12 mm.

30 The first side 104 and the second side 108 can be parallel. In some cases, the thickness 116 can differ in one region of the rigid frame 102 from the thickness 116 in

another region of the rigid frame 102, as shown in Fig. 5A. Fig. 5A shows a rigid frame 502 having a foreground 512 and a background 514. The recesses 110 have a flat bottom surface 128 as shown in Fig. 2A and 2B. There are no passages or holes in the recesses between the first side 104 and the second side 108, i.e., on opposite sides of the broad sides.

5 The non-recessed surface (the first side 104 and the second side 108) of the rigid frame 102 can display graphics 126 associated with the respective arrangements of the pieces. The graphics 126 can be displayed on either or both of the foreground 512 and the background 514, as shown in Fig. 5A. The graphics 126 can be a solid color, multiple colors, or a pattern. The graphics 126 can be applied to the first side 104 and the second side 108 by
10 various means. For example, the graphics can be painted, stained, etched, carved, burned, laser engraved, stamped, or glued. On the first side, for example, the graphics can be a brown color representing a surface of the Earth. For example, the graphics can be a rock pattern representing a surface of the Earth. For example, the graphics can be both a brown color and a rock pattern representing a surface of the Earth. On the second side 108, for
15 example, the graphics can be a blue color representing an ocean. For example, the graphics can be a wave pattern representing the ocean. For example, the graphics can be both a blue color and a wave pattern representing the ocean.

 The rigid frame 102 can be constructed from wood, plastic, or metal. The rigid frame 102 can be a solid wood. For example, a solid wood can be beech, maple, pine, walnut, or
20 basswood. The rigid frame 102 can be constructed of a composite wood. For example, a composite wood can be a plywood or a medium density fiberboard. For example, the polymer or plastic film can be acrylonitrile butadiene styrene (ABS), polypropylene, or polyethylene. The rigid frame 102 can be constructed of a bio-based polymer. For example, the bio-based polymer can be based on sugar cane or corn. The rigid frame 102 can be
25 constructed of a bio-fill polymer. For example, the bio-fill polymer can be filled with bamboo or rice. The rigid frame 102 can be constructed of a rubber. For example, the rubber can be thermoplastic polyurethane (TPU), thermoplastic elastomer (TPE), or silicone. The rigid frame 102 can be constructed of a metal. For example, the metal can be aluminum or steel. The rigid frame 102 can be constructed of a ceramic.

30 As shown in Figs. 1A, 1B, 2A, 2B, and 3, each broad side (the first side 104 and the second side 108) of the rigid frame 102 defines multiple recesses 110. Multiple recesses 110 define an arrangement of the pieces 106. Referring to Fig. 2A and 2B, the first recess is

110a, the second recess is 110b, and the third recess is 110c. As shown in Fig. 2A, a recess 110c can accommodate one piece 106g or a recess 110a can accommodate multiple pieces 106a and 106b. Each recess 110 is surrounded by one or more elevated surfaces of the rigid frame 102. At least one of the recesses 110 on at least one broad side (the first side 104 and the second side 108) of the rigid frame 102 is configured to loosely contain multiple pieces 106 of the set. The recesses 110 of each of the broad sides (the first side 104 and the second side 108) of the rigid frame 102 are sized to simultaneously accommodate all of the pieces 106 of the set. In some cases, the recesses 110 are sized to simultaneously accommodate all of the pieces 106 of the set with the bottom surfaces 122 of the pieces 106 against the rigid frame 102. In some cases, the recesses 110 on one of the two opposite broad sides (the first side 104 and the second side 108) of the rigid frame 102 are sized to simultaneously accommodate all of the pieces 106 of the set with the bottom surface 122 of the non-planar piece 106 extending away from the rigid frame 102. As shown in Fig 2B, the recess 110d has a bottom surface 128 displaying graphics 126. For example, the graphics 126 is the text “FISH”. Referring to Fig. 8A and 8B, on the broad sides (the first side 804) of the rigid frame 802 has a recess 810b that extend to a greater depth than another recess 810a. Referring to Fig. 8B, as shown along cross-section 8B-8B, piece 806a is accommodated in recess 810a and piece 806b is accommodated in recess 810b.

The recesses 110 of the two opposite broad sides (the first side 104 and the second side 108) of the rigid frame 102 are arranged differently, so as to form respective arrangements of the pieces 106 of the set when accommodated in the recesses 110 described below. The recesses 110 of each of the two opposite broad sides (the first side 104 and the second side 108) of the rigid frame 102 are configured such that the pieces 106, as accommodated, are retained in the recesses 110 only by gravity.

At least three of the recesses 110 have different perimeter shapes. The perimeter shapes can be geometric shapes or organic shapes. A geometric shape is defined by a set of points or vertices and lines connecting the points in a closed chain. For example, a geometric shape can be a square, a rectangle, a circle, a triangle, a trapezoid, or an octagon. An organic shape is typically asymmetrical or irregular and tends to mimic shapes found in nature. For example, an organic shape can be cloud-like or fruit-like. For example, in Fig. 1A and 1B, piece 106g is a circle. The recesses 110 have a depth “D”. The nominal depth of the recesses 110 is 3 mm.

Referring to Figs. 1A, 1B, 2A, 2B, and 3, the set of removable, rigid, non-interlocking pieces 106 fit in recesses 110 of the rigid frame 102. The pieces 106 are easily removable by hand and are not held in the recess 110 by other means. The pieces 106 each have a flat bottom surface 122. The pieces 106 have a top surface 120. The top surface 120 and the bottom surface 122 define a puzzle piece thickness 124 shown in Fig. 3. The nominal puzzle piece thickness is 15 mm. In some cases, the top surface 120 of the pieces 106 is flat across its entire extent and void of any recess or protrusion. In some cases, the bottom surface 122 of each piece 106 is flat across its entire extent and void of any recess or protrusion. The top surface 120 can be flat or angled as shown in FIG. 6A and 6B. Puzzle piece 606b has a flat top surface 620. The puzzle piece 606b flat top surface 120 is sized to accommodate the bottom surface 122 of puzzle piece 606a. Puzzle piece 606c has an angled top surface 620. The puzzle piece 606c angled top surface 120 is sized to accommodate a surface of puzzle piece 606d. In some cases, at least one of the pieces 106 with a flat top surface 120 the top surface 120 is smaller than the bottom surface 122. In some cases, as shown in Fig. 6A the set of pieces 106 includes a piece 606b with a bottom surface 622b identical in size and shape to the top surface 620b of the piece 606b with the top surface 620b smaller than the bottom surface 622b. In some cases, one of the pieces 106 is non-planar on a side opposite the bottom surface 122. For example, as shown in Fig. 6A, piece 606a has a flat bottom surface 622a. The opposite side 620a is a point, creating a three-dimensional pyramid. In some cases, the pieces 106 and recesses 110 are configured such that, as accommodated in the recesses 110, the pieces 106 extend above the non-recessed surface (the first side 104 and the second side 108) surrounding the recesses 110.

Each piece 106 has a perimeter shape corresponding to a recess 110. At least one piece 106 fits in each recess 110. Some recesses 110 are sized to accommodate multiple pieces 106. In some cases, at least one recess 110 of each side (the first side 104 and the second side 108) of the rigid frame 102 accommodates only a single piece 106 of the set.

At least three of the pieces 106 have different perimeter shapes. The perimeter shapes are substantially similar to the geometric shapes or organic shapes discussed above. In some cases, at least one piece 106 of the set has a round perimeter. In some cases, exactly two of the pieces 106 of the set are of identical perimeter shape and size. Each piece 106 can have a solid color, multiple colors, or a pattern substantially similar to those described above.

The recesses 110 of each side (the first side 104 and the second side 108) of the rigid frame 102 are positioned to make an arrangement of the pieces 106. The non-recessed surface (the first side 104 and the second side 108) of the rigid frame 102 can display graphics 126 associated with the respective arrangements of the pieces 106.

5 Figs. 1A and 1B show a puzzle 100 with two sides defining recesses accommodating the same set of pieces in different arrangements. In this case, the first side 104 arrangement represents a house, a tree, and the sun. The graphic 126a on the first side 104 is colored to represent the ground where the house and the tree sit. Piece 106a is an oval. Piece 106b is a rectangle. Piece 106a and piece 106b are arranged to make a tree. Piece 106c is a triangle.
10 Piece 106d is a triangle. Piece 106e is a trapezoid. Piece 106f is a triangle. Piece 106c and piece 106d are arranged to make the structure of a house. Piece 106e and piece 106f are arranged to make a roof of the house. Piece 106g is a circle. Piece 106g is arranged above the house to make the sun. The second side 108 arrangement represents a boat, a fish, and the sun. The graphic 126b on the second side 108 is colored to represent the ocean where the
15 boat is sailing and the fish is swimming. Piece 106a and 106f are arranged to represent a fish. Piece 106e, piece 106b, piece 106c, and piece 106d are arranged to represent a boat and placed on the graphic 126b representing the ocean. Piece 106g is arranged above the boat, the fish, and the ocean to represent the sun.

Figs. 5A and 5B, show a puzzle 500 with two sides defining recesses accommodating
20 the same set of pieces in different arrangements. In this case, the first side 504 arrangement represents a triangle, a square, and a circle. The puzzle pieces are 506a, 506b, 506c, 506d, 506e, and 506f. The pieces are colored. The first side 504 arrangement is three regular geometric shapes, each shape including two geometric shaped pieces 506. The rigid frame 502 thickness varies creating a foreground 512 and a background 514, and defines three
25 spaced-apart recesses corresponding to the three geometric shapes of the arrangement of pieces 506. The background 514 is a solid color that differs from the foreground 512 color. Piece 506a is a circular segment. Piece 506b is another circular segment. Piece 506a and 506b are arranged to form a complete circle. Piece 506c is a rectangle. Piece 506d is a rectangle. Piece 506c and piece 506d are arranged to form a square. Piece 506e is a scalene
30 triangle. Piece 506f is an irregular quadrilateral. Piece 506e and piece 506f are arranged to make a triangle. The second side 508 arrangement is randomly spaced with no pieces 506 touching.

Figs. 6A and 6B, show a puzzle 600 with two sides defining recesses accommodating the same set of pieces in different arrangements. In this case, the first side 604 arrangement represents a cube, a cylinder, and a pyramid. The rigid frame 602 has a uniform thickness, and defines three spaced-apart recesses corresponding to the three geometric shapes of the arrangement of pieces. The puzzle pieces are 606a, 606b, 606c, 606d, 606e, and 606f. The pieces are colored. The first side 604 arrangement is three regular geometric shapes with a greater than nominal thickness creating three dimensional geometric solids. Each geometric solid includes two geometric solid pieces 606. Piece 606a is a four sided regular pyramid with a square flat bottom surface 622a. Piece 606b is a four sided trapezoidal pyramid. The flat square top surface 620b of piece 606b corresponds to the square flat bottom surface 622a of piece 606a. Piece 606a and 606b are arranged to form a four sided regular pyramid. Piece 606e is a circular segment solid. Piece 606f is a circular segment solid. Piece 606e and piece 606f are arranged to form a circular solid. Piece 606c is a tetrahedron. Piece 606d is a polyhedron. Piece 606c and piece 606d are arranged to make a cube. The second side 608 arrangement is randomly spaced with no pieces 606 touching. On the second side 608, the pieces are arranged in individual recesses. For example, piece 606a is arranged in recess 610a and piece 606b is arranged in recess 610b.

Figs. 7A and 7B show a puzzle 700 with two sides defining recesses accommodating the same set of pieces in different arrangements. In this case, the first side 704 arrangement represents a house, a tree, and the sun. The graphic 726a on the upper part of the first side 704 is blue to denote the sky. Piece 706a is an oval. Piece 706b is a right triangle. Piece 706c is a right triangle. Piece 706b and 706c are arranged to represent a tree trunk, with piece 706a arranged to represent the complete tree. Piece 706d, 706e, 706f, and 706g are isosceles triangles. Piece 706d, 706e, 706f, and 706g are arranged to represent the structure of a house. Piece 706h is an isosceles triangle. Piece 706h is arranged to represent a roof of the house. Piece 706i is a circle. Piece 706i is arranged above the house on the graphic 726 to represent the sun. The second side 708 arrangement represents three fish. The graphic 726b on the second side 708 is colored to represent the ocean where the three fish are swimming. Piece 706h, 706a, and at least one of 706d, 706e, 706f, and 706g have a graphic of an eye of a fish. Pieces 706h, 706d, and 706e are arranged to represent a first fish. Pieces 706g and 706i are arranged to represent a second fish. Pieces 706a, 706b, 706c, and 706f are arranged to represent a third fish.