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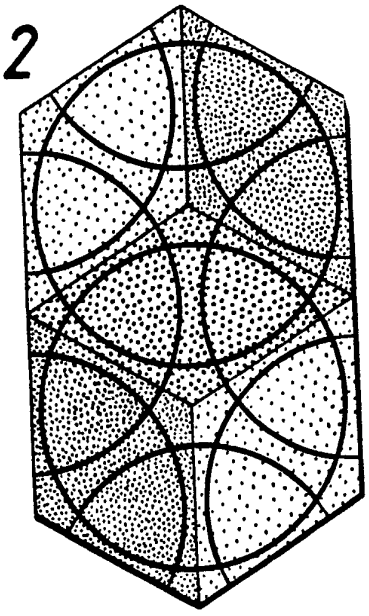
(54) Shunting puzzles

(57) A manipulative puzzle is formed from a three layer laminate of interlocking parts and consists of at least two overlapping circles of common radius and of which the part or parts in the area of overlap are symmetrical with each of the circles so that it can be moved with other parts around either of the circles. Different parts are coloured or patterned differently so that movement of parts around the circles changes the appearance of the puzzle. The pieces are held in position by complementary tongue-and-groove arrangments (4, 5, 6).

FIG.2



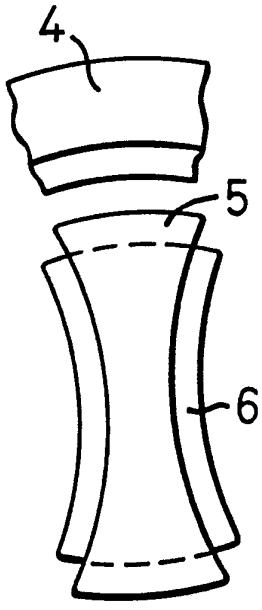


FIG.8a

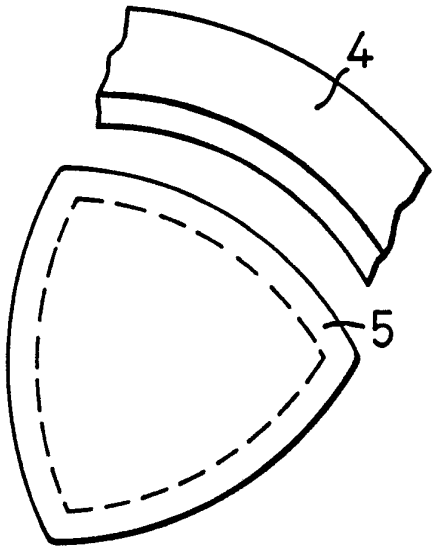


FIG.8b

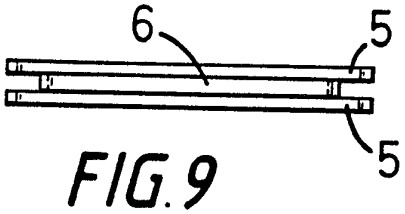
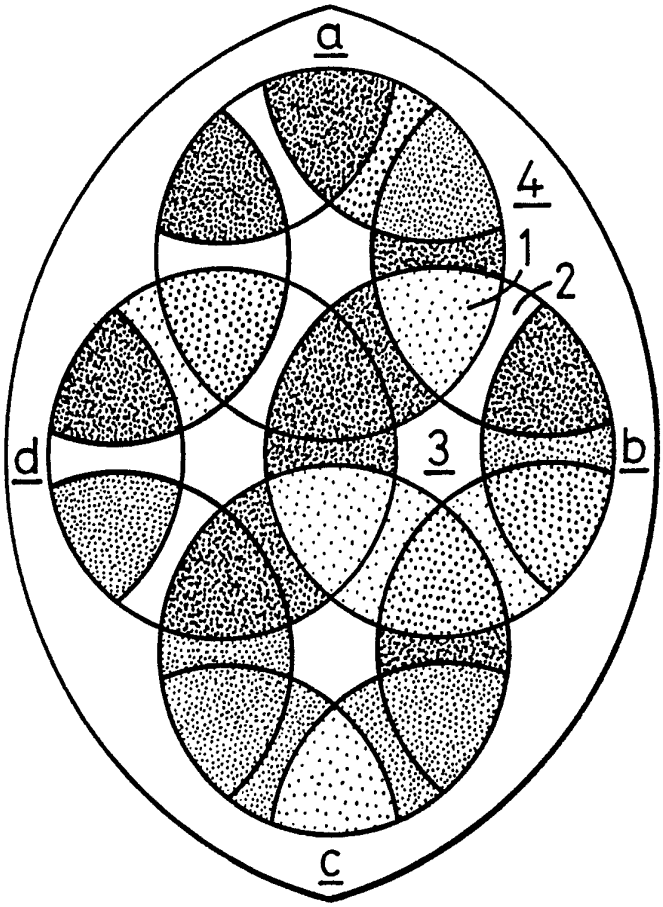


FIG.9

GB 2 229 642 A

FIG.1



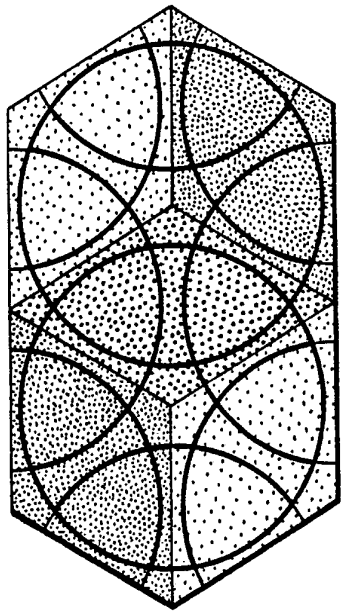
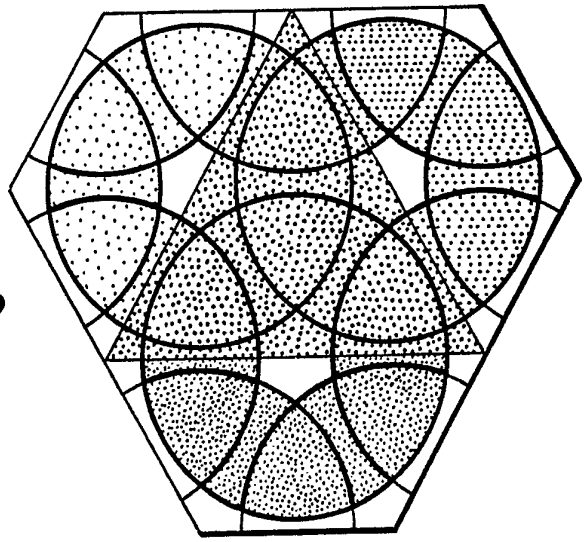


FIG.2

FIG.3



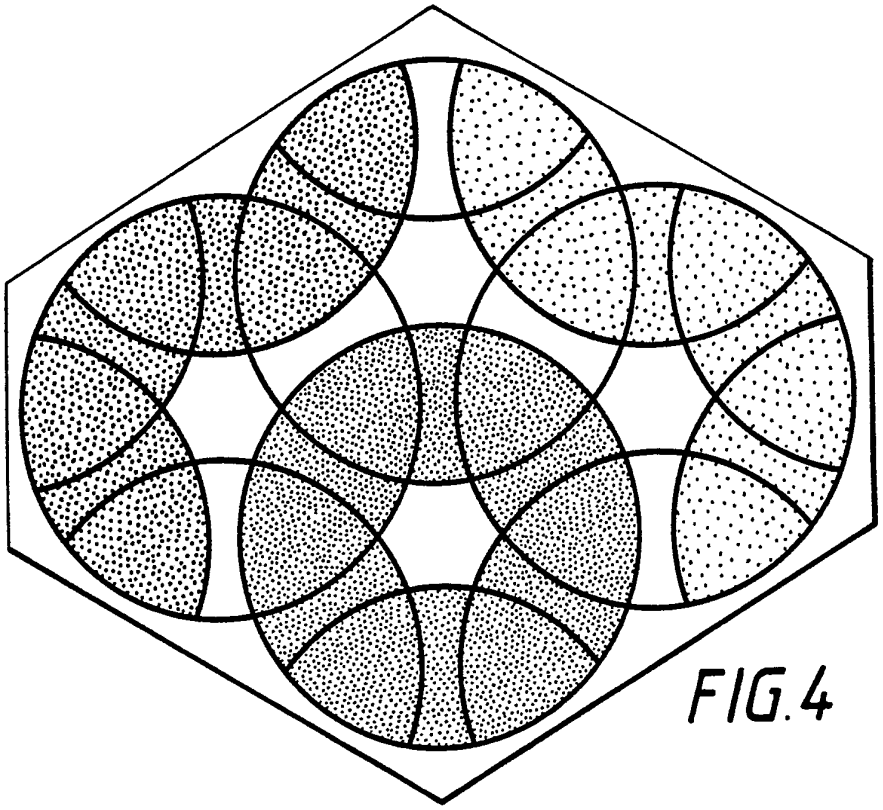


FIG.4

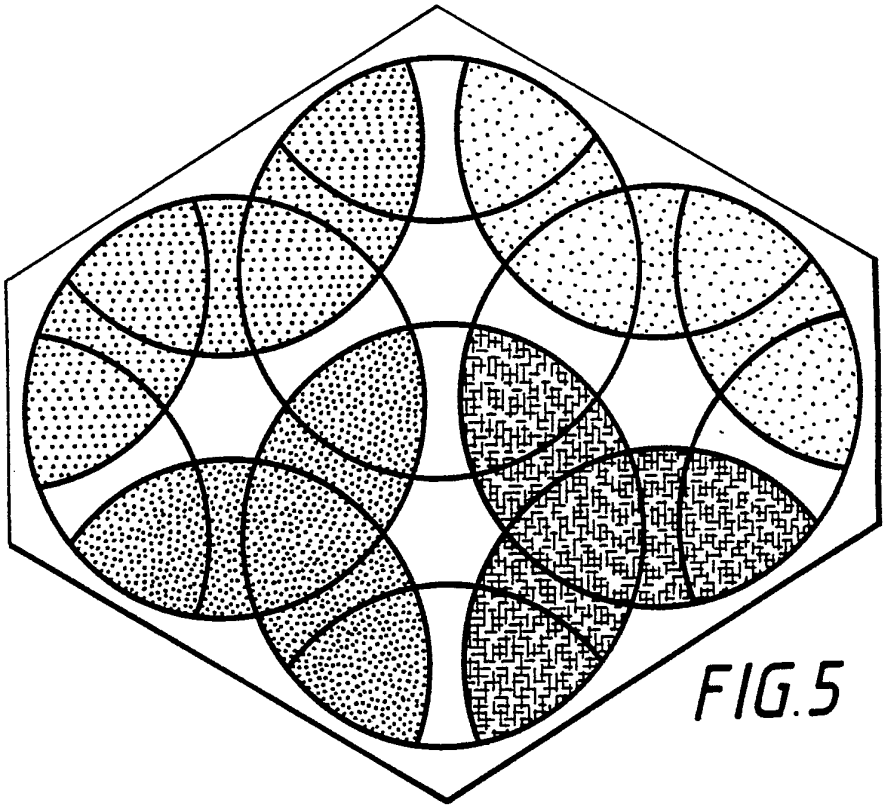


FIG.5

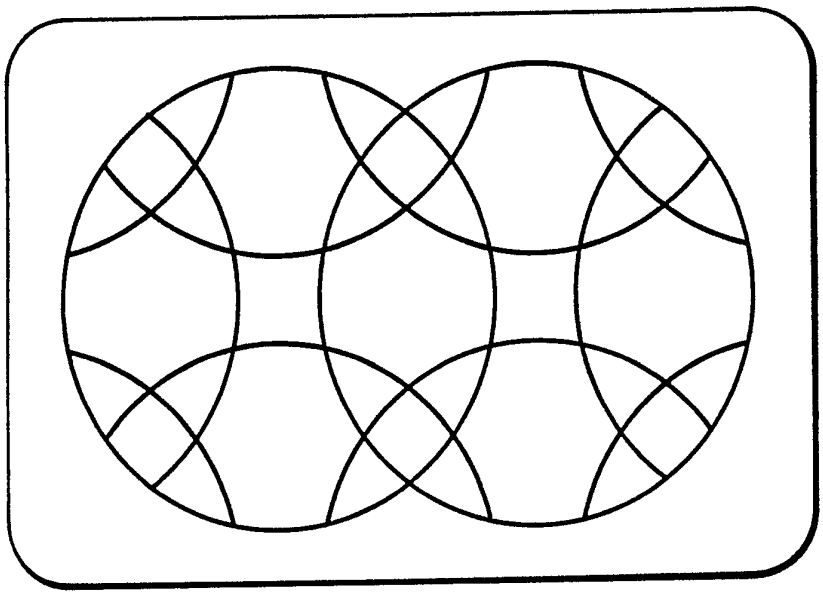


FIG. 6

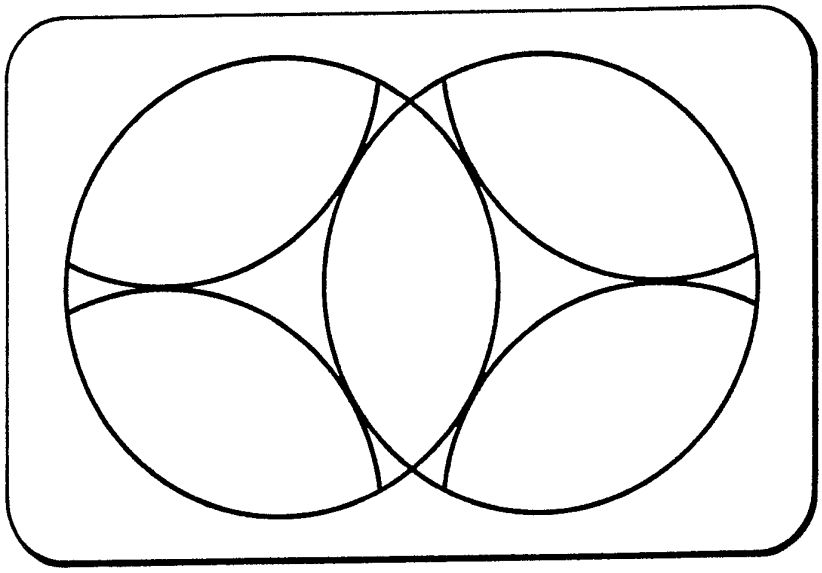


FIG. 7

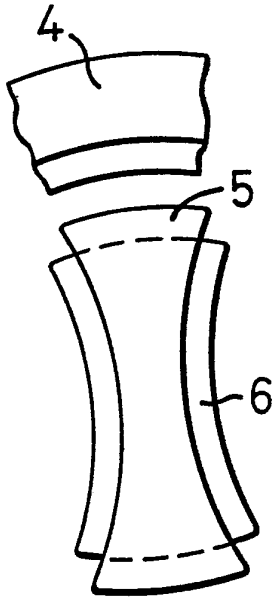


FIG.8a

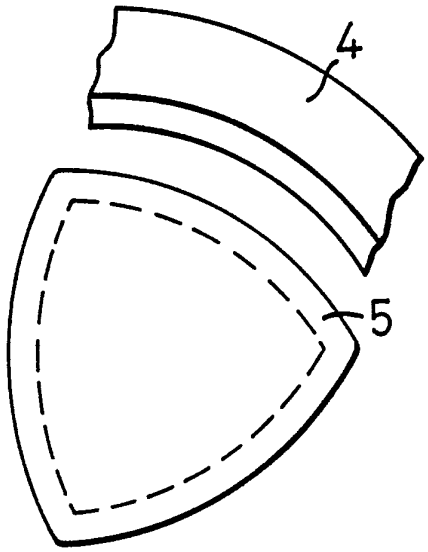


FIG.8b

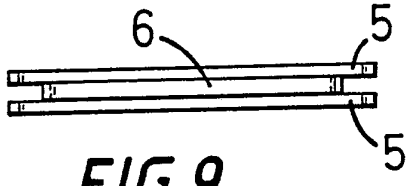


FIG.9

MANIPULATIVE PUZZLES

The present invention relates to manipulative puzzles.

There is a well-known form of manipulative puzzle which comprises a laminar carrier frame and a plurality of movable parts located within said carrier frame by a tongued and grooved locking arrangement which enables the movable parts to be moved relative to one another two dimensionally to solve the puzzle. This puzzle uses a space within a series of numbers or letters perhaps fifteen in say four lines and the problem is, by using the space, to manipulate the parts until they are rearranged into a suitable order, which may be numerical or some other sequence such as in suits of cards.

Another kind of manipulative puzzle is the well-known Rubic's cube where a three-dimensional device has a number of elements which can be moved relative to one another in a three-dimensional manner

to provide a complex change to the pattern of the elements within say a cube or a cylinder.

The present invention is concerned with providing a puzzle which is in laminar form like the well-known sequential numbers puzzle but allows for a complex pattern change comparable to that of the Rubic's cube.

Accordingly the invention is characterized in that the movable parts are each defined with arcuate side edges and are arranged to form at least two circles of the same radius which overlap in a common zone which is in shape symmetry in each of the circles, so that within said common zone the parts may be moved with and around one of said circles as the other parts in that circle are moved, and with and around the other circle as the parts in that other circle are moved.

Of course, movement around one or other of the circles can only happen in one of those circles at a time. To enable this to be achieved, all parts need to have arcuate edges whose radius is the same as the circles, and all parts within a circle should be arranged with symmetry with respect to that circle.

With such an arrangement the movable parts may be in the form of a pattern of different colours or different symbols and by being able to be moved around one circle, or around the other circle, it enables parts to be manipulated from one part of the puzzle to another in order to produce a desired visual effect or to solve the puzzle. The visual effect may be a pattern, preferably symmetrical, of coloured parts, but that is not essential, other visual devices can be used or for example a complete picture may be encompassed within all the parts whereby correct arrangement of the movable parts enables the picture to show up correctly.

In its simplest form, the device consists of two overlapping circles. It is however quite feasible to have any number of overlapping circles in which case movable parts can progress from one circle to the next and then on to other circles in the system.

The common zone of overlap will in the simplest form occur between two circles, but arrangements with a common zone between three circles, or even four are possible.

The device may be single sided in which case the user only needs to look at the one side when solving the problem, but it is also possible to arrange the parts with colours on both sides (which may be the same or different) so that both sides of the device present puzzles both of which have to be solved by movement of the various movable parts.

A number of embodiments of the invention will now be described by way of example with reference to the accompanying diagrammatic drawings in which:-

Figure 1 shows a plan view of a first embodiment;

Figures 2, 3 and 4 show plan views of second, third and fourth embodiments;

Figure 5 shows a reverse plan view of the Figure 4 embodiment;

Figures 6 and 7 show plan views of fifth and sixth embodiments, and

Figures 8A, 8B and 9 show detail of some of the components used to make up the puzzle.

Referring firstly to Figure 1 which shows the first embodiment, it can be seen that there are four overlapping circles of the same radius each with movable parts 1, 2 and 3 each of which has arcuate side edges, the edges in all cases being an arc of a circle of the same radius as each of the four overlapping circles and the part 1 being three sided so as to be capable of being a common zone to three of the four circles.

Considering the four circles as A, B, C and D, if we look firstly at circle B, all the parts can be rotated about the central part 3 in which case each of the parts 1 and 2 move around the periphery of circle B bringing different movable parts 1 and 2 respectively into overlap with different movable parts of one of the circles A or C or D, or in the case of the triangular parts 1 into overlap with two of the circles. Rotation should be to bring the parts back into symmetry to enable the further movements in the other circles to take place.

It is then possible to rotate any of the other circles A, C or D in which case different component parts are brought into overlap with circle B during the rotational movement. By rotating first one circle and then another, component parts can progress round the puzzle to change the overall presented pattern.

The pieces are held together within an external carrier frame 4 and are interlocked together by a tongued and grooved arrangement as shown in Figures 8A, 8B and 9.

Referring to Figures 8A, 8B and 9, each component part consists of three layers, two outer layers 5 and an inner layer 6 which provides a tongue or a recess between the outer layers 5 to allow for a tongue and groove arrangement. Conveniently these may be of plastics sheet material. Very simply, in alternate movable parts either the inner layer 6 extends outwardly of the outer layer 5 in order to provide a tongue (see Figure 8A) or it defines a recess as seen in the plan view to provide a groove as is shown in Figure 8B and in Figure 9.

The carrier frame 4 and each central zone 3 can then be made up from the laminate in the same way so that the inner layer 6 projects to form a tongue to the grooves of the movable components. Or, as an alternative, the outer layers of the frame 4 and central zones 3 can be dispensed with.

In all of these cases, the tongues and grooves can be reversed if desired.

With the tongue and groove arrangement all the component parts interlock and hold together and are capable of moving in circular paths about any of the various circles. Referring back to Figure 1, it will be noted that the central movable part 3 of each circle always remains on that circle and simply rotates around its central axis. All other components can move around the periphery of one circle and therefore come into the common zone of another circle so that when that circle is moved the parts can move onwards through the puzzle.

In designing such a puzzle, once the puzzle has been assembled with its mechanical components in place, any kind of pattern can then be printed on the top which may or may not coincide with the segments of the

circle. Referring to Figure 2, a diamond pattern is printed on the puzzle which bears no relation to the circles, and in this case what happens is that when various component parts are moved within the puzzle the diamonds cease to be diamonds and the object then is to reassemble them into that shape.

Figure 3 is an arrangement with three overlapping circles where a diamond pattern overlays the circles when in the correctly assembled position.

Figure 4 is another embodiment where four overlapping circles are used to provide a pattern which has to be reassembled.

Figure 5 is the obverse plan view of the Figure 4 arrangement and in this case a different pattern exists on the underside of the pattern of the puzzle from that on the topside and this makes solution of the puzzle that much more difficult.

In all the examples described up to now, the circles consist of components surrounding a hexagonal central part 3. It is not essential for the central part 3 to be hexagonal, it can be three-sided or

four-sided or whatever is convenient, or may not be present at all in some arrangements.

Figure 6 shows an arrangement where the central component 3 of each circle is four-sided while Figure 7 shows a similar arrangement where the central part 3 is three-sided. The consequence of these different arrangements may mean that there are more individual differently shaped parts within each circle, however each of these parts will always be made up of arcuate sides of the radius of the base circles, and in all cases the system will work provided the layout of components is symmetrical to each circle and at any of the rest points there is always a circular line defining each of the base circles. A further requirement is that all edges round any complete rotatable circles should be either tongues or grooves.

CLAIMS

1. A manipulative puzzle comprising a carrier frame and a plurality of movable parts located within said carrier frame by a tongued and grooved locking arrangement which enables the moving parts to be moved relative to one another to solve the puzzle characterised in that the movable parts are each defined with arcuate side edges and are arranged to form at least two circles of the same radius which overlap in a common zone which is in shape symmetry with each of the circles so that within said common zone differentially patterned parts may be moved within and around one of said circles as the other parts in that circle are moved, and with and around the other circle as the parts in that other circle are moved.

2. A puzzle according to claim 1 in which the movable parts are formed from a three layer laminate in which the central layer is extended or recessed relative to the other layers to provide an interlocking tongue and groove arrangement.

3. A puzzle according to claim 1 or claim 2 in which the puzzle is double sided with parts having different patterning on each side so that the arrangement of the moving parts can provide a different appearance on the two sides.

4. A puzzle substantially as herein described with reference to the accompanying drawings.

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