A block puzzle consisting of three blocks, one being characteristically "O"-shaped and the other two being characteristically "C"-shaped, is described. These blocks are slidably engageable into a mutually perpendicular interlocking arrangement in which each block passes through the other two blocks substantially concealing the "O"-shape of the one block and the "C" shape of the other two blocks. In various embodiments, the central openings in the blocks are respectively of angular, oval and hexagonal in shape.
FIG. 3
MORTISED BLOCK PUZZLE

FIELD OF THE INVENTION

This invention relates to block puzzles of the type wherein component blocks are adapted to be assembled into a specified relationship referred to as a “solution.” More particularly, the present invention relates to a class of block puzzles wherein component blocks are adapted to be assembled into a mutually perpendicular interlocking arrangement.

BACKGROUND OF THE INVENTION

Block puzzles of the class to which the present invention relates have been known for many years. It is recognized that they can provide not only a source of amusement and diversion, but also a test of skill and perceptive ability. Typically, the component blocks are rectilinear in shape and are provided with recesses, notches or the like which permit assembly of the puzzle into a desired “solution.” When so assembled, the blocks appear to pass through one another in three dimensions; and the recesses, notches or the like are substantially concealed from view. Block puzzles of this class are disclosed in U.S. Pat. No. 2,836,421 granted to W. D. Turner on May 27, 1958, and in Canadian Pat. No. 94,613 granted to S. J. Curtis on June 17, 1905.

The patents to Turner and Curtis disclose block puzzles having a relatively large number of component blocks. Eleven blocks are used for a solution to the block puzzle disclosed by Curtis; six blocks are used for a solution to the block puzzle disclose by Turner. In each case, a relatively complex array of notches and slots are provided in the component blocks.

It is recognized that in some case a block puzzle consisting of a relatively large number of component blocks may be desirable. However, it is considered that a block puzzle consisting of relatively few component blocks is also desirable. Individuals are less apt to be discouraged from seeking a solution to a block puzzle consisting of relatively few blocks than they are when confronted with a seemingly complex puzzle consisting of a relatively large number of blocks. Moreover, from the point of view of manufacturing the component blocks or a block puzzle on a production scale, it is obviously preferable to have as few differently shaped blocks as possible.

An object of the present invention is to provide a block puzzle of the class described, and which has a minimal number of component blocks.

A further object of the present invention is to provide a block puzzle where there may be minimal variation in the geometry of the component blocks.

SUMMARY OF THE INVENTION

In a broad aspect of the present invention, there is provided a block puzzle consisting of three blocks, one of which has a characteristic “O”-shape, and two of which have a characteristic “C”-shape. The blocks are slidable engageable into a mutually perpendicular interlocking arrangement in which each block passes through the other two blocks substantially concealing the “O”-shape of the one block and the “C”-shape of the other two blocks.

The “O”-shape of the one block is formed by an aperture passing through the block. The “C”-shape of the other two blocks is formed by a “T”-shaped slot passing through the block. The “T”-shape may be thought of as consisting of a “cap portion” (viz., the top of the “T”) and a “stem portion” (viz., the portion of the “T” extending transversely down from the cap portion).

For a given block puzzle, the dimensions of the aperture of the “O”-shaped block and the dimensions of the cap portion of the slots of the “C”-shaped blocks are substantially the same. However, as will be seen, there are a variety of possible shapes for the blocks.

Preferably, apart from the stem portion of the “T” shaped slots in two blocks, the overall shape of the component blocks for a block puzzle in accordance with the present invention are substantially the same. The “solution” to the puzzle will then have geometrical symmetry in three dimensions. Also, to manufacture the blocks on a production scale, it would then be necessary to have manufacturing provision for two different blocks rather than three different blocks (viz., facility to manufacture “O”-shaped blocks and a facility to manufacture “C”-shaped blocks).

It may be noted that U.S. Pat. No. 1,270,181 granted to A. McElveen discloses a puzzle which may consist of only three blocks. One of the blocks is “O”-shaped and the other two blocks could be said to be “C”-shaped. However, the “C”-shape of the two blocks is not imparted by a “T”-shaped slot as in the case of the present invention; rather, it is imparted by a notch or recess in the block. Moreover, the puzzle disclosed by McElveen is not one wherein the component blocks are assembled into a mutually perpendicular interlocking arrangement. When the puzzle is assembled, the two “C”-shaped blocks stand in parallel relation to each other rather than in a mutually perpendicular interlocking relation. Further the component blocks of the McElveen puzzle do not slidably engage to arrive at a solution—the solution depends upon mechanical distortion to engage the blocks.

The present invention will now be described with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view illustrating component blocks of a block puzzle in accordance with the present invention.

FIG. 2 shows a perspective view of a final solution to a block puzzle using the blocks of FIG. 1.

FIG. 3 shows a perspective view of a partially completed solution to a block puzzle using the blocks of FIG. 1.

FIG. 4 shows a perspective, plan and top view of one component block of a variant block puzzle in accordance with the present invention.

FIGS. 1, 2 and 3 illustrate a block puzzle at various stages of assembly. The shape of the component block is entirely rectilinear. In the usual course of events, a person would be presented with blocks 1, 2 and 3 as shown in FIG. 1 and be required to assemble the block into the arrangement shown in FIG. 2. He or she should not have the benefit of viewing the intermediate stages of assembly shown in FIG. 3.

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

FIGS. 1, 2 and 3 illustrate a block puzzle at various stages of assembly. The shape of the component block is entirely rectilinear. In the usual course of events, a person would be presented with blocks 1, 2 and 3 as shown in FIG. 1 and be required to assemble the block into the arrangement shown in FIG. 2. He or she should not have the benefit of viewing the intermediate stages of assembly shown in FIG. 3.
For purposes of simplifying the following discussion, 4,198,053 
there will be no immediate reference to tolerancing of 
various dimensions. When, for example, it is said or 25 
noted that a block having a specified thickness, (say  
thickness "T") slides into a space having the same speci- 
ed dimension "T" to accommodate such thickness,  
en it is to be understood and inferred that there is  
finite tolerancing of the dimensions to permit the  
block to readily slide into the space. 

Block 1 has a length L, a width W, and a depth or  
thickness T as indicated in FIG. 1. The width W is three 
mes the thickness T (or 3T), and the length L is a  
length greater than three times the thickness T. Block 1 
given a characteristic "O"-shape by the presence of  
perure 4 which passes depthwise through the block,  
and which is centrally disposed widthwise and length- 
wise of the block. It may be formed, or conceived of  
as having been formed, by removing from the central  
portion for a rectangular parallelepiped of dimensions  
W and T, a piece of material in the shape of a smaller  
rectangular parallelepiped having dimensions T  
(length), T (width), and 3T (length) with surfaces paral- 
lel to those of the larger block 1. 

As can be seen in FIG. 1, blocks 2 and 3 each have a 
characteristic "C"-shape which is imparted by the pre- 

cence of a "T"-shaped slot in each block. In block 2, the 
"T"-shaped slot consists of a step portion 5 and a stem  
portion 7. In block 3, the "T"-shaped slot consists of a  
ap portion 6 and a stem portion 8. The dimensions of 
blocks 2 and 3 are substantially the same as each other, 
and apart from the provision of stem portions 7 and 8,  
the dimensions of blocks 2 and 3 are substantially the 
"T"-shape as those of block 1. Stem portions 7 and 8 may be  
formed, or conceived of as having been formed, by  
subtracting that part of a block such as block 1 which  
part forms a longitudinal 

de of an aperture such as aperture 4 in block 1. Such  
entral one-third portion is a cubic parallelepiped hav- 
ing dimensions T on each side. Thus, the stem portions  
cubic having dimensions T on each side. 

The purpose of stem portions 7 and 8 becomes appar-  
t as indicated in FIG. 3 which illustrates an inter- 
mediate stage in the assembly of the puzzle. To "solve" 
the puzzle, the first step is to insert block 2 into aperture  
of block 1 to the position shown in FIG. 3 where face  
of block 2 is flush with face 10 of block 1. When block  
is in this position, the next step is to move block 3 
ouward in the direction of arrow 11 until the lower 
portion is emphasized by shading for purposes of illus- 
ation in FIG. 3) abuts face 13 of block 2. During this  
step, block 1 passes through the rectangular aperture  
block 2, block 2 passes edgewise through stem por- 
on 8, and portion 12 of block 3 passes through stem  
portion 7 and into rectangular aperture 5 of block 2. 

Finally, after block 3 has been moved into the abutting  
position described, block 3 is moved to the left in FIG.  
until stem portion 7 of block 2 has disappeared into  
angular aperture 4 of block 1. The blocks will then  
aver 4 as is shown in FIG. 2 and the presence of  
perture 4 in block 1 and the "T"-shaped slots in blocks  
and 3 will not be readily apparent. 

A cursory consideration of FIGS. 2 and 3 reveals that  
ne respective lengths of each of the blocks do not have  
be the same nor does the rectangular aperture of any  
ene or more the blocks have to be centered lengthwise  
the block. The respective lengths and such centering  
be upon the symmetry of the assembled puzzle.
will be noted that the cross-section of the block taken with depthwise and depthwise of the block is such as to permit the block to be lengthwise slidably engaged into a cap portion of a "T"-shaped slot having dimensions like cap portion 21. The cross-section of stem portion 22 taken with depthwise and depthwise in relation to block 20 may be thought of as consisting of a rectangular portion having a width T (depthwise of block 20) and a length T/2 (widthwise of block 20) combined with a semicircular end portion having a radius T/2. The complete 20 block puzzle in accordance with the present invention and which includes block 20 as shown in Fig. 4 would also include a second block (not shown) like block 20, and a third block (not shown) like block 20 but without the opening presented by stem portion 23. A "solution" to the puzzle thus defined would proceed in essentially the same manner as the "solution" described for the block puzzle of Figs. 1, 2 and 3.

Fig. 5 illustrates a portion of another variant block puzzle in accordance with the present invention. This 20 portion is a generally "C"-shaped block 30, including a "T"-shaped slot consisting of a cap portion 31 and a stem portion 32. Block 30 has a length L, a depth or thickness T, and a width W equal to three times the thickness T. As may be seen with reference to the plan view of block 30, the cap portion has a generally hexagonal cross-section which may be thought of as consisting of a central square portion having a width T (widthwise of block 30) and a length L (lengthwise of block 30) combined with two isosceles triangular end portions, one at each lengthwise end of the square portion. Each triangular end portion has a base of length T contiguous with a lengthwise end of the central square portion and a height of length T. Referring to the top view of block 30, it will be noted that the cross-section of the block taken with depthwise and depthwise of the block is such as to permit the block to be lengthwise slidably engaged into a cap portion of a "T"-shaped slot having dimensions like cap portion 31. The cross-section of stem portion 32 taken with depthwise and depthwise in relation to block 30 may be thought of as an isosceles triangle having a base of length T (depthwise of block 30) and a height T (widthwise of block 30). A complete block puzzle in accordance with the present invention and which includes block 30 as shown in Fig. 5 would also include a second block (not shown) like block 30, and a third block (not shown) like block 30 but without the opening presented by stem portion 32. A "solution" to the puzzle thus defined would proceed in essentially the same manner as the "solution" described for the 50 block puzzle of Figs. 1, 2 and 3.

Other variations which do not detract from the interlocking arrangement of the present invention as it is generally conceived, are possible or may become apparent to those skilled in the art. For example, component 55 blocks 1, 2 and 3 shown in Figs. 1, 2 and 3 may be streamlined or curved over the portions of the blocks exposed to view when the blocks 1, 2 and 3 are assembled into the "solution". To the extent that such variations or other variations within the proper scope of the following claims do occur to other persons, it is to be understood that they constitute part of the present invention.

I claim:

1. A block puzzle consisting of:

(a) a first block having a characteristic "O"-shape imparted by a non-rectangular aperture in said first block; and

(b) second and third blocks, each of which blocks a characteristic "C"-shape imparted by a "T"-shaped slot in the block; said blocks being slidably engageable into a mutually perpendicular interlocking arrangement in which each block passes through the other two blocks substantially concealing the "O"-shape of said first block, the "T"-shape of said second block, and the "C"-shape of said third block.

2. A block puzzle consisting of:

(a) a first block having a length, a depth, and a width substantially equal to three times said depth, a having a characteristic "O"-shape imparted by aperture extending lengthwise of the block, centrally disposed widthwise of the block and passing depthwise through the block;

(b) a second block having a length, a depth substantially equal to said depth of said first block, an width substantially equal to said width of said first block, and having a characteristic "C"-shape imparted by a "T"-shaped slot, said "T"-shaped slot comprising of:

(i) a cap portion extending lengthwise of the block centrally disposed widthwise of the block a passing depthwise through the block;

(ii) a stem portion extending widthwise of the block transversely from a lengthwise side of said cap portion and passing through the block;

(c) a third block having a length, a depth substantially equal to said depth of said first block and a width substantially equal to said width of said first block and having a characteristic "C"-shape imparted a "T"-shaped slot, said "T"-shaped slot comprising of:

(i) a cap portion extending lengthwise of the block centrally disposed widthwise of the block a passing depthwise through the block;

(ii) a stem portion extending widthwise of the block transversely from a lengthwise side of said cap portion and passing depthwise through the block;

wherein:

(A) the cross-section of said first block tak withdepthwise and depthwise of depthwise of said first block such as to permit said first block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said second block, and such to permit said first block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said third block;

(B) the cross-section of said second block tak withdepthwise and depthwise of said second block such as to permit said second block to be lengthwise slidably engaged into said aperture of said first block, and such as to permit said second block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said third block;

(C) the cross-section of the said third block tak withdepthwise and depthwise of said third block such as to permit said third block to be lengthwise slidably engaged into said aperture of said first block, and such as to permit said third block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said second block; and

wherein:
7 said aperture of said first block has a substantially uniform oval cross-section taken lengthwise and widthwise in relation to said first block, said oval cross-section consisting of:
(i) a centrally disposed rectangular portion, the length of which portion measured lengthwise of said first block is substantially equal to one half said depth, the width of which portion measured widthwise of said first block is substantially equal to said depth;
(ii) two semicircular end portions disposed one at each lengthwise end of said rectangular portion, each semicircular end portion having a radius substantially equal to one half said depth;
(iii) said cap portion of the "T"-shaped slot of said second block has a substantially uniform oval cross-section taken lengthwise and widthwise in relation to said second block, said oval cross-section consisting of:
(i) a centrally disposed rectangular portion, the length of which portion measured lengthwise of said second block is substantially equal to two times said depth, the width of which portion measured widthwise of said second block is substantially equal to said depth;
(ii) two semicircular end portions disposed one at each lengthwise end of said rectangular portion, each semicircular end portion having a radius substantially equal to one half said depth;
(ii) said cap portion of the "T"-shaped slot of said third block has a substantially uniform oval cross-section taken lengthwise and widthwise in relation to said third block, said oval cross-section consisting of:
(i) a centrally disposed rectangular portion, the length of which portion measured lengthwise of said third block is substantially equal to two times said depth, the width of which portion measured widthwise of said third block is substantially equal to said depth;
(ii) two semicircular end portions disposed one at each lengthwise end of said rectangular portion, each semicircular end portion having a radius substantially equal to one half said depth;
(iv) said stem portion of the "T"-shaped slot of said second block has a substantially uniform cross-section taken depthwise and widthwise in relation to said second block, said cross-section of said stem portion consisting of:
(i) a rectangular portion, the length of which portion measured widthwise of said second block is substantially equal to one half said depth; the width of which portion measured lengthwise of said second block is substantially equal to said depth;
(ii) a semicircular portion having a radius substantially equal to one half said depth, the base of said semicircular portion being contiguous with the lengthwise end of said rectangular portion away from said cap portion of the "T"-shaped slot of said second block;
(iii) said stem portion of the "T"-shaped slot of said third block has a substantially uniform cross-section taken depthwise and widthwise in relation to said third block, said cross-section of said stem portion consisting of:
(i) a rectangular portion, the length of which portion measured widthwise of said third block is substantially equal to one half said depth; the width of which portion measured lengthwise of said second block is substantially equal to said depth;
(ii) a semicircular portion having a radius substantially equal to one half said depth, the base of said semicircular portion being contiguous with the lengthwise end of said rectangular portion away from said cap portion of the "T"-shaped slot of said third block;
(iii) said blocks being slidably engageable into a mutually perpendicular interlocking arrangement in which each block passes through the other two blocks substantially concealing the "O"-shape of said first block, the "C"-shape of said second block, and the "C"-shape of said third block.
3. A block puzzle consisting of:
(a) a first block having a length, a depth, and a width substantially equal to three times said depth, and having a characteristic "O"-shape imparted by an aperture extending lengthwise of the block, centrally disposed depthwise of the block and passing depthwise through the block;
(b) a second block having a length, a depth substantially equal to said depth of said first block, and a width substantially equal to said width of said first block, and having a characteristic "C"-shape imparted by a "T"-shaped slot, said "T"-shaped slot consisting of:
(i) a cap portion extending lengthwise of the block, centrally disposed widthwise of the block and passing depthwise through the block;
(ii) a stem portion extending widthwise of the block transversely from a lengthwise side of said cap portion and passing through the block;
(c) a third block having a length, a depth substantially equal to said depth of said first block, and a width substantially equal to said width of said first block, and having a characteristic "C"-shape imparted by a "T"-shaped slot, said "T"-shaped slot consisting of:
(i) a cap portion extending lengthwise of the block, centrally disposed widthwise of the block and passing depthwise through the block;
(ii) a stem portion extending widthwise of the block transversely from a lengthwise side of said cap portion and passing depthwise through the block;

wherein:
(A) the cross-section of said first block taken widthwise and depthwise of said first block is such as to permit said first block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said second block, and such as to permit said second block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said third block;
(B) the cross-section of said second block taken widthwise and depthwise of said second block is such as to permit said second block to be lengthwise slidably engaged into said aperture of said first block, and such as to permit said second block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said third block;
(C) the cross-section of said third block taken widthwise and depthwise of said third block is such as to permit said third block to be length-
wise slidably engaged into said aperture of said first block, and such as to permit said third block to be lengthwise slidably engaged into said cap portion of the "T"-shaped slot of said second block;

and wherein:

(a) said aperture of said first block has a substantially uniform hexagonal cross-section taken lengthwise and widthwise in relation to said first block, said hexagonal cross-section consisting of:

(i) a centrally disposed square portion, the length of each side of said square portion measured lengthwise and widthwise of said first block being substantially equal to said depth;

(ii) two isosceles triangle end portions disposed one at each side of said square portion which sides extend widthwise of said first block, each triangular end portion having a base contiguous with a side end of said square portion, and having a height substantially equal to said depth;

(b) said cap portion of the "T"-shaped slot of said second block has a substantially uniform hexagonal cross-section taken lengthwise and widthwise in relation to said second block, said hexagonal cross-section consisting of:

(i) a centrally disposed square portion, the length of each side of said square portion measured lengthwise and widthwise of said second block being substantially equal to said depth;

(ii) two isosceles triangle end portions disposed one at each side of said square portion which sides extend widthwise of said second block, each triangular end portion having a base contiguous with a side end of said square portion, and having a height substantially equal to said depth;

(c) said cap portion of the "T"-shaped slot of said third block has a substantially uniform hexagonal cross-section taken lengthwise and widthwise in relation to said third block, said hexagonal cross-section consisting of:

(i) a centrally disposed square portion, the length of each side of said square portion measured lengthwise and widthwise of said third block being substantially equal to said depth;

(ii) two isosceles triangle end portions disposed one at each side of said square portion which sides extend widthwise of said third block, each triangular end portion having a base contiguous with a side end of said square portion, and having a height substantially equal to said depth;

(d) said stem portion of the "T"-shaped slot of said second block has a substantially uniform isosceles triangle cross-section taken depthwise and widthwise in relation to said second block, the base of said triangle being contiguous with the cap portion of the "T"-shaped slot of said second block, measured the length of said base lengthwise of said second block being substantially equal to said depth, the height of said triangle being substantially equal to said depth;

(e) said stem portion of the "T"-shaped slot of said third block has a substantially uniform isosceles triangle cross-section taken depthwise and widthwise in relation to said third block, the base of said triangle being contiguous with the cap portion of the "T"-shaped slot of said third block, the length of said base measured lengthwise of said third block being substantially equal to said depth, the height of said triangle being substantially equal to said depth;

(f) said blocks being slidably engageable into a mutually perpendicular interlocking arrangement in which each block passes through the other two blocks substantially concealing the "O"-shape of said first block, the "C"-shape of said second block and the "C"-shape of said third block.

4. A block puzzle as defined in claim 2, wherein the shape and dimensions of said first, second and third blocks are substantially the same, apart from the provision of said stem portions in said second and third blocks.

5. A block puzzle as defined in claim 3, wherein the shape and dimensions of said first, second and third blocks are substantially the same, apart from the provision of said stem portions in said second and third blocks.