

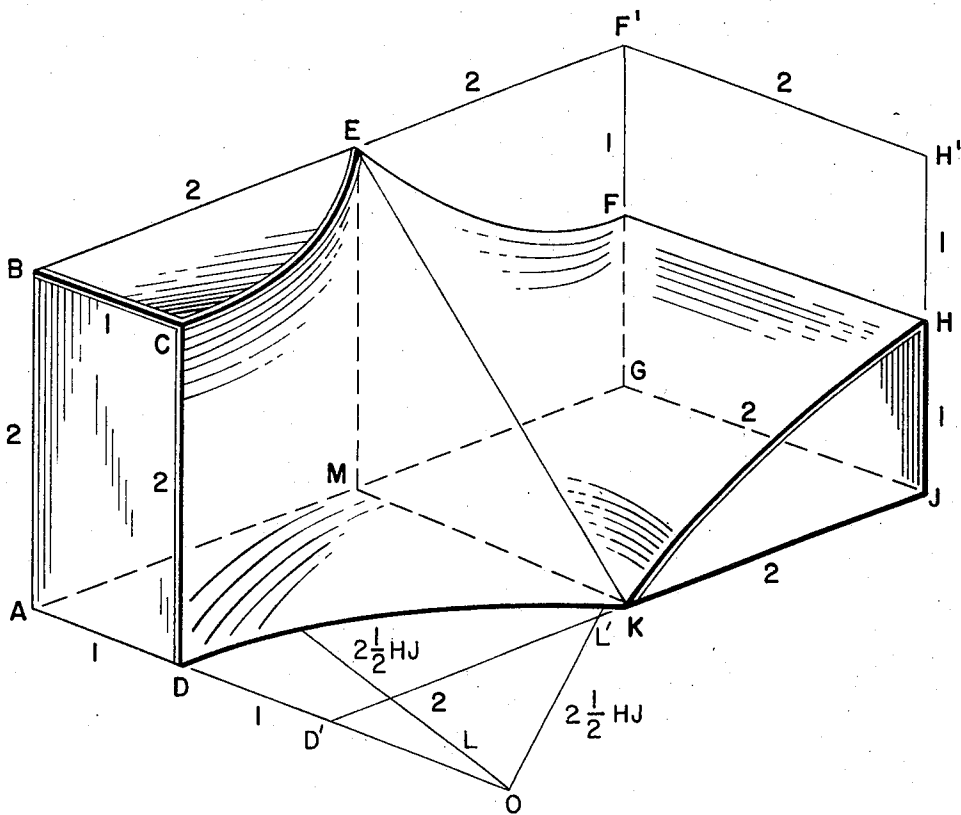
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BUILDING BLOCK

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BUILDING BLOCK

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ABSTRACT OF THE DISCLOSURE

A building block which is one-half of a rectangular solid. The block is characterized by having curved dimensions defining a surface which substantially corresponds to that surface produced by rotating one end of a plane by 90°. Fractional portions of the block are described.

Background of the invention

Building blocks are conventionally rectangular solids. Such blocks are satisfactory for many building purposes. However, the regular faces of these materials severely limit the number of designs that can be made by them.

Thus, a need exists for a device which can be used to construct a myriad of designs, but can still be combined in an easy manner to form a rectangular or cubic solid. This invention satisfies that need.

Detailed description of the invention and drawing

This invention consists of a master block and fractional parts thereof. It can be best understood by referring to the drawing.

Referring to the figure, it can be seen that there are six planar surfaces defining outer limits of the master block. Those surfaces are shown in the figure as defined by ABCD, BCE, ABEFG, FGHI, HJK and AGJKD. There is another surface which completes the conformation of the block, viz, DCEFHK.

The relative lengths of the straight line segments defining the aforesaid surfaces are also given in the figure. Thus, for example, BE, GJ, and JK are equivalent in length, as are AD and HJ. Moreover, AD is one-half as long as BE. The points D and K are connected by an arc of a circle having radius $2\frac{1}{2}$ times as long as HJ. This is shown by the dimensions given for the radii OL and OL'. Arc EF is equivalent to DK.

It can be seen that surface BCE is equivalent in size and configuration to HJK. It can also be seen that surfaces ABCD and GFHI are equivalent in size and configuration, and they are posed in space 90° to one another. (As will be apparent to a skilled practitioner, there is an equivalent to the master block shown in the figure, which equivalent is defined by a 90° rotation of the helic-like surface in the direction opposite to that defined by the shown spatial relationship of ABCD and GFHI.)

The figure also shows that the master block is one-half of a rectangular solid having the relative dimensions 4 x 2 x 2. Surfaces defining said rectangular solid are ABF'G, GF'H'I, and AGJD'. Other surfaces defining said rectangular solid are not shown completely, but they can be envisioned by drawing a perpendicular from D' parallel and in the same direction as AB, and defining the uppermost point on said perpendicular by extending line BC to intercept with said perpendicular.

Summarizing, from the configuration (and dimensions) in the drawing, it can be seen that the master block is one-half of a rectangular solid. (More specifically, seven of the eight corners of said solid (A, B, F', G, H', J, D') are shown in the drawing.) The master block has six planar surfaces and one helically inclined surface.

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Each of said planar surfaces (ABCD, BCE, ABEFG, FGHI, HJK, and AGJKD) are a portion of the surfaces defining said rectangular solid. There is a helically inclined surface which completes the conformation of the block; which surface is defined in the drawing by DCEFHK. As shown in the drawing, said helically inclined surface makes a 90° rotation as it passes through the rectangular solid. As can be seen, one edge of the helically inclined surface FH, bisects surface GJH'F' of the rectangular solid. The opposite edge of the helical surface DC, bisects the opposed surface of the rectangular solid—which opposed surface is defined by A, B, and D, together with the point in space (not shown but discussed previously) defined by extending line BC to a perpendicular from D' which perpendicular is parallel to JH'. The drawing also shows that bisectors FH and CD are transverse to one another.

When discussing the fact that the master block was one-half of a rectangular solid, one utility of the master block was made clear. Specifically, two master blocks, both having "right hand" or both having "left hand" configuration—as defined by the turn of the helic-like surface—can be nested to form a rectangular solid. This is done specifically, for example, by taking two master blocks shown in the drawing, rotating one 90° and abutting it on the other so edge FH on each block "touch" and surface ABEFG of one block coincides with surface HJK of the other.

But the utility of the master block of this invention is much broader. For example, two blocks having the configuration shown in the drawing can be melded by abutting surface FGHI of one block with surface ABCD of the other such that edges GJ and GF of one block "touch" edges AB and BC, respectively, of the other. This results in a very eye-catching continuation of the helical surface. This can be continued by using more blocks. As can be seen, use of left and right hand master blocks together greatly increases the number of shapes which can be made therefrom.

As stated above, fractional portions of the master block are embodiments of this invention. A preferred embodiment is a hemi-block formed by cutting a master block along the line EK in the drawing. It can be seen that two hemi-blocks can be melded to form a cube. This is done by taking a hemi-block and placing edge DC on top of edge HF (so corners D and H abut).

Combinations of hemi-blocks, master blocks, and right hand and left hand configurations of both blocks greatly increase the number of designs which can be made. More combinations are afforded by using fractional portions of the hemi-block.

Summarizing, a hemi-block of this invention is one-half of the above-described master block. Two hemi-blocks are shown in the figure. More specifically, they are the two fractional portions of the master block having the surface EMK. It can be seen from the diagram that two hemi-blocks can be nested to form a cube since each hemi-block is one-half of a cube. Each of the hemi-blocks have five planar surfaces. These are shown (for one hemi-block) as ABCD, ABEM, EMK, AMKD, and BCE. Completing the configuration of the hemi-block is a helically-inclined surface DCEK. As shown by the drawing, a hemi-block has one square planar surface, ABEM or KMGK. At 90° to the square surface is a planar surface which is a right angle isosceles triangle EMK. Edge EK is one edge of a helically inclined surface as well as the hypotenuse of said triangle. Said helically inclined surface is that described by a line moving transversely to the direction of the line and rotating as it so moves. Through the length of the hemi-block, such surface line rotates 45°. Thus, at the surface of the block opposing said triangular surface, the opposing edge of

the helic-like surface defines edge CD (or FH). Therefore, as shown by the figure, the surface opposing said triangular surface is one-half of a surface of said cube. In other words, at one edge, said helic-like surface bisects a square surface of the cube; compare FF'H'H with GFHJ. As shown by the drawing, all planar surfaces of the hemi-block have the configuration defined by the helic-like surface.

Building blocks of this invention can be hollow, solid, semisolid or porous. I have found that these blocks can be made of foamed aluminum or plaster. Various other metals, plastics (solid, foamed or beaded), ceramics, wood, stone, ice, glass, paper, cardboard, adobe, brick, concrete, compressed cinder, and the like. Likewise, blocks of this invention can be cast, molded, hewn, sculpted or formed by any similar technique.

It is understood that one or more surfaces of the blocks of this invention can be smooth or altered in such ways to adjoin the blocks by techniques which are known in the art. Thus, the blocks can have one or more surfaces so that they can be joined by such techniques as described in the Encyclopedia Britannica, volume 13, pages 121-126 (1954 edition). Likewise, the surfaces can have one or more surfaces with moldings such as those shown in FIGURE 5 on page 123 of volume 13 of the Encyclopedia Britannica, supra. Thus, joinery joints which can be provided are illustrated by rebated butt, plain mitre, butt joint tongued, mitred grooved and tongued, tongued and grooved, dovetailings, and the like. Various moulding effects applied to the surfaces are illustrated by cyma recta, scotia, staff bead, hollows reeds, flutes, quircks, rounded edges, and the like. Likewise, the surfaces of the blocks of this invention can have one or more surfaces as the surface modifications for interlocking described in U.S. 3,034,254 or 3,005,282.

It can be seen that there are many variations of this invention immediately apparent to a skilled practitioner that form embodiments of this invention. Thus, for example, molds for forming master blocks and fractional portions thereof are part of this invention.

Likewise, the detailed description and drawing of this invention are directed to one embodiment, specifically a block having the regular dimensions and configuration described. However, it can be seen that minor variations in sizes and configurations can be made within the spirit of the invention. Moreover, those departures in sizes and configurations normally conferred by present construction techniques do not cause a departure from the scope of this invention. Thus, blocks of this invention can have sizes and configurations within the tolerances of the known methods for forming shapes without departing from the scope of the invention. Exceedingly close tolerances are not required; for the blocks of this invention perform well without them.

As can be seen from the above, this invention can be employed to form—with two master blocks—a rectangular solid having dimensions of 10" x 5" x 5". Moreover, there are other divisions of the master block other than the hemi-block described above. For example, one could "cut" the master block shown in the figure, by a plane normal to ABCD such that said plane bisects both AB and CD, said plane extending through the block parallel to AGJKD and tangent to FH. It can be seen that two polyhedral segments so-formed can be nested to form a rectangular solid of 10" x 5" x 2½". If the polyhedral segments just described are "cut" by another plane normal to GFHJ and bisecting FH and GJ, said plane extending parallel to ABEFG and tangent to CD, then smaller segments are formed. Such segments can be combined to form a rectangular solid 10" x 2½" x 2½". If the segments and master block described above are cut by a plane EMK then solids 5" x 5" x 5", 5" x 5" x 2½", and 5" x 2½" x 2½" can be obtained.

Having fully described this invention, it is desired that it be solely limited by the lawful scope and spirit of the appended claims.

I claim:

1. A master block which is one-half of a rectangular solid, said block having six planar surfaces and one helically inclined surface DCEFHK, each of said planar surfaces being a portion of the six surfaces defining said rectangular solid;

one of said planar surfaces being a base surface DAGJK, four of the other planar surfaces being perpendicular to said base surface, two of said perpendicular surfaces which are opposed to one another having rectangular shapes ABCD, GFHJ, and such that the smaller sides of both opposing rectangles are equal in length, and the larger sides of both opposing rectangles are also equal in length, said opposing rectangular surfaces being positioned in space 90° to one another; said helical surface rotating 90° and transversely bisecting opposing surfaces of said rectangular solid such that one edge of said helical surface DC is one larger side of one of said rectangular surfaces and the opposing edge of said helical surface FH is one of said larger sides of the other of said rectangular surfaces.

2. A master block which is one-half of a rectangular solid having the relative dimensions 4 x 2 x 2, said block having six planar surfaces and one helically inclined surface, each of said planar surfaces being a portion of the six surfaces defining said rectangular solid, one of said planar surfaces being a base surface, a first straight edge of said base surface being four length units long, a second straight edge of said base surface being two inches long, normal to, and originating at one terminus of said first edge, a third straight edge of said base surface being one length unit long, normal to, and originating at the other terminus of said first edge, said second and third edge extending in the same direction from said first edge, a fourth straight edge two length units long, extending parallel to said first edge and originating at the other terminus of said second edge, the remaining terminuses of said third and fourth edges being linked by a curved edge, said curved edge being the arc of a circle having a radius of 2½ length units, the locus of the center of said circle in space being 2½ length units away from said remaining terminuses and along an imaginary extension of said third straight edge such that said locus is 1½ length units past said fourth straight edge

said second and third straight edges being edges of rectangular planar surfaces having dimensions of 1 x 2 length units;

a fourth planar surface being normal to said base surface and rectangular surfaces and having the same configuration of said base surface;

said helical surface rotating 90° and transversely bisecting opposing surfaces of said rectangular solid such that two opposing, two length unit long edges of said helix are edges of said rectangular surfaces.

3. The master block of claim 2 being further defined such that when two of said blocks having helical surfaces with righthand or lefthand configuration are conjoined so said helical surfaces and the edges of said helical surfaces which are edges of said rectangular planar surfaces of said blocks are made to abut, said two blocks will nest to form said rectangular solid.

4. The master block of claim 2 being made of plaster.

5. The master block of claim 2 being made of concrete.

6. The master block of claim 2 being made of metal.

7. The master block of claim 2 being made of foamed aluminum.

8. A hemi-block which is one-half of a cube, said block having five planar and one helically inclined surface CDEK, one of said planar surfaces ABEM being a square defining one entire face of said cube,

another of said planar surfaces ABCD being a rectangle normal to said square surface, one longer edge AB of said rectangular surface being an edge of said

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square, the shorter edges of said rectangle being one-half the length of said longer edge, another of said planar surfaces MEK opposing said rectangular surface and normal to said square surface being a substantially right angled isosceles triangle, one equal leg EM of said triangle being a side of said square surface, the other equal leg MK being perpendicular to said side and defining an edge of said cube, the hypotenuse EK of said triangle being an edge of said helical surface, said helical surface rotating 45° and bisecting the surface of said cube at the surface opposing said triangular surface, such that the edge of said helical surface bisecting the surface of said cube opposing said triangular surface is also the other longer edge CD of said rectangular surface.

9. The hemi-block of claim 8 being further defined such that when two of said blocks with helical surfaces of lefthand or righthand configuration are conjoined so said helical surfaces and the edges of said helical surfaces that are edges of said rectangular surfaces and said edges which are hypotenuses of said triangular surfaces are made to abut, said two blocks will nest to form a cubic solid.

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10. The hemi-block of claim 8 being made of plaster.
 11. The hemi-block of claim 8 being made of concrete.
 12. The hemi-block of claim 8 being made of metal.
 13. The hemi-block of claim 8 being made of foamed aluminum.

References Cited

UNITED STATES PATENTS

888,530	5/1908	Pugh	52—590
903,906	11/1908	Soss	52—594
2,201,724	5/1940	Gable	273—157
2,394,282	2/1946	Withers	273—160
3,038,278	6/1962	Hauer	52—302
3,221,459	12/1965	Hamory	52—604
3,263,322	8/1966	Brown	52—80

OTHER REFERENCES

Mathematical Models by Cundy and Rollett, 1961, pp. 135 and 182—188.

20 HENRY C. SUTHERLAND, Primary Examiner

U.S. Cl. X.R.

46—25; 52—574, 608