Feb. 8, 1966 J. DEHM 3,233,358

CENTRALLY APERTURED CIRCULAR CONSTRUCTION BLOCK

Filed Feb. 4, 1964

FIG. 1

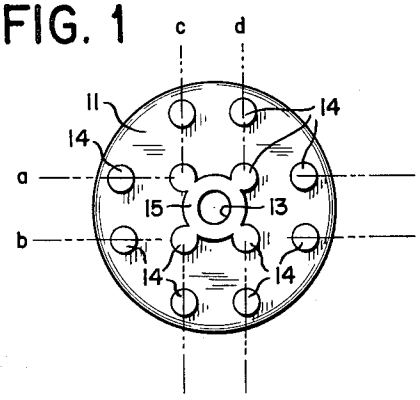


FIG. 2

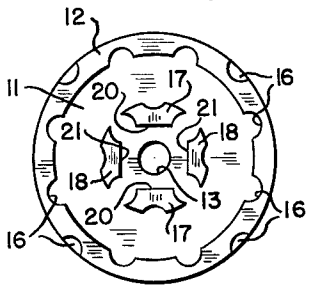


FIG. 3

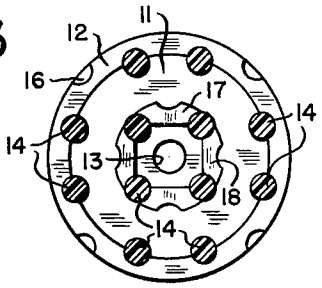


FIG. 5

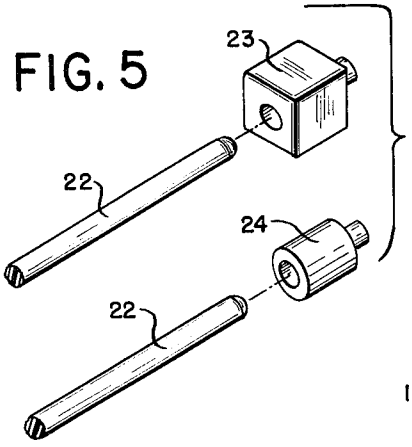


FIG. 4

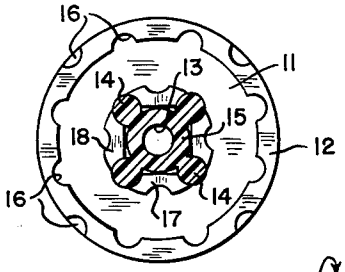


FIG. 6

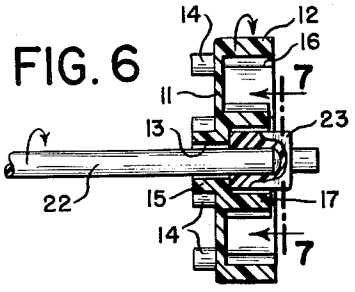


FIG. 8

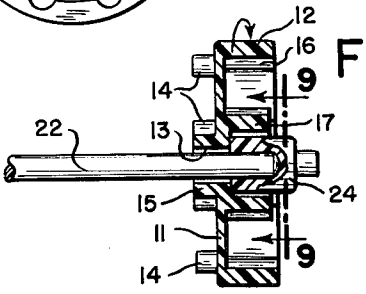


FIG. 7

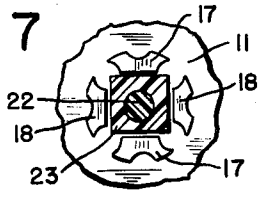
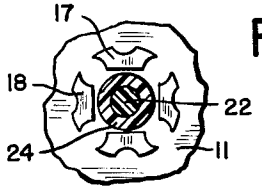


FIG. 9



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CENTRALLY APERTURED CIRCULAR CONSTRUCTION BLOCK

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6 Claims. (Cl. 46—25)

This invention relates to toy building blocks, and in particular to a unique circular or wheel-like building block element for use in conjunction therewith.

Toy building blocks are usually rectilinear objects of various related sizes that are adapted to be easily interconnected and disconnected to permit the construction of miniature buildings and similar structures. The blocks are commonly hollow, essentially five sided (i.e., a top wall and four side walls) structures of molded plastic, the outer surface of the top wall of each block being formed with a plurality of small cylindrical pegs or projections arranged equidistantly in one or more parallel and perpendicular rows (or, stated differently, arranged in one or more longitudinally extending and/or one or more laterally extending rows, the cylindrical projections in each row being spaced equidistantly from each other and from the adjacent projections in any row perpendicular thereto). The hollow interior of each block is provided with means for frictionally gripping the exterior cylindrical projections on the top of another block so that the two blocks can readily be connected together to form a larger structure. In one well-known type of building block the frictional gripping means comprises one or more cylindrical projections extending downwardly from the inner surface of the top wall of the block, each such inner projection being adapted to be inserted in frictional contact between a group of four of the exterior projections on the top wall of the other block. In another type of building block, the frictional gripping means comprises a number of vertical semicylindrical grooves formed in the four side walls of the block, each groove being positioned for frictional engagement with one of the external projections on the top of the other block.

I have now devised a unique circular building block that is adapted to be used in conjunction with rectilinear building blocks of the general type hereinbefore referred to—namely, essentially five-sided building blocks the top walls of which are provided with a plurality of cylindrical projections equidistantly disposed in longitudinal and lateral rows—and that is further adapted to be rotatably or non-rotatably mounted on an axle in the manner hereinafter described. My new circular building block comprises a circular top wall and a cylindrical side wall extending downwardly at the periphery of the top wall, the top wall being formed with a conventional array of exterior cylindrical projections disposed in the usual longitudinal and lateral rows and the side wall being formed with a number of vertical semicylindrical grooves each of which is adapted to engage one of the exterior projections on the top of another building block. The top wall of the circular block is formed with a centrally disposed opening or hole adapted to receive a cylindrical axle or rod, and the four exterior cylindrical projections on the top wall located nearest the center hole are disposed about the center hole equidistantly therefrom. Moreover, the four centermost exterior projections may be connected to each other by a web through which the center hole extends. The inner surface of the top wall is formed with at least one, and preferably two, pairs of downwardly extending lugs, one of the lugs of each pair being disposed on one side and the other lug of said pair being disposed on the opposite side of the center hole at right angles to the lugs of the other pair. Each interior lug is positioned adjacent the center hole so that it will frictionally engage two of the exterior cylindrical projections on the top of any other similar building block—both rectilinear and circular. Moreover, the facing surfaces of the lugs of each pair of lugs are substantially planar to permit the circular block to be mounted on an axle in a manner hereinafter described so that it either is freely rotatable or is non-rotatable with respect to the axle.

My invention will be better understood from the following description thereof in conjunction with the accompanying drawings of which

FIG. 1 is a plan view of the top of a circular building block of my invention,

FIG. 2 is a plan view of the bottom of the circular building block of FIG. 1,

FIG. 3 is a plan view of the bottom of the circular building block of FIG. 1 showing in section the exterior cylindrical projections on the top of another building block of the type not having a web joining the centermost projections,

FIG. 4 is a plan view of the bottom of the circular building block showing in section four interconnected cylindrical projections on the top surface of another circular building block adjacent the center hole thereof,

FIG. 5 is a perspective view of an axle provided with a rectilinear end cap and of an axle provided with a cylindrical end cap,

FIG. 6 is a sectional view of a circular building block non-rotatably mounted on an axle fitted with a rectilinear end cap,

FIG. 7 is a fragmentary plan view of the bottom of the building block of FIG. 6 showing in section the axle and rectilinear end cap,

FIG. 8 is a sectional view of a circular building block rotatably mounted on an axle fitted with a cylindrical end cap, and

FIG. 9 is a fragmentary plan view of the bottom of the building block of FIG. 8 showing in section the axle and cylindrical end cap.

As shown best in FIGS. 1 and 2, my new circular building block is provided with a circular top wall **11** and a cylindrical side wall **12** extending downwardly at the periphery of the top wall. The top wall **11** is formed with a centrally disposed hole **13** adapted to receive an axle or rod on which the circular block may be rotatably or non-rotatably mounted as hereinafter described in accordance with my invention. The top wall **11** is also formed with a plurality of exterior cylindrical projections **14** located on the outer surface of the top wall and arranged in one or more longitudinally extending rows (designated rows "*a*" and "*b*" in FIG. 1) and in one or more laterally extending rows (designated rows "*c*" and "*d*" in FIG. 1), the projections in each row being equally spaced from each other and from adjacent projections in any row perpendicular thereto in the manner known in the art. The four centermost of the exterior projections **14** on the top wall of the circular block are disposed about the center hole **13** equidistantly therefrom, and these four cylindrical projections are advantageously connected to one another by a web **15** through which the center hole **13** extends. The side wall **12** of the circular building block is formed with a plurality of vertical semicylindrical grooves **16** each of which is positioned to engage one of the exterior cylindrical projections **14** on the outer surface of the top wall of another building block. That is to say, the vertical grooves **16** formed in the side wall **12** are positioned to engage the longitudinally and laterally arranged exterior cylindrical

projections on the outer surface of the top wall of another rectilinear or circular building block.

The bottom or under surface of the top wall **11** of the circular building block is provided with at least one pair of downwardly extending lugs **17**, and preferably is provided with a second pair of downwardly extending lugs **18**. One lug of each pair of lugs **17** is disposed on one side of the center hole **13** and the other lug of this pair is disposed on the opposite side of the center hole at right angles to the lugs **18** of the other pair of lugs as shown best in FIG. 2 of the drawing. Each of the downwardly extending lugs **17** and **18** is positioned with respect to the center hole **13** so that it will engage two of the exterior projections **14** on the outer surface of the top wall of another building block. Thus, as shown in FIG. 3, the longitudinally and laterally extending exterior projections **14** on the outer surface of another building block (shown in section in FIG. 3) are not only received in the semicylindrical grooves **16** formed in the side wall **12** of my circular building block but in addition are frictionally contacted by the downwardly extending lugs **17** and **18** of the block. The downwardly extending lugs **17** and **18** are similarly adapted to engage the four centermost exterior cylindrical projections **14** formed on the outer surface of other circular building blocks in accordance with my invention, the interconnecting web **15** (if any) being received in the space between the lugs **17** and **18** as shown in section in FIG. 4. The facing surfaces of the lug of each pair of lugs (that is, the facing surfaces **20** of the first pair of lugs **17** and the facing surfaces **21** of the second pair of lugs **18**) are substantially planar and parallel to each other as shown clearly in FIG. 2 of the drawing. This important feature of the lugs of each pair permit the circular building blocks to be mounted on an axle extending through the center hole **13** in a way such that the block either is freely rotatable or is non-rotatable with respect to the axle.

As previously mentioned, each of my circular building blocks is adapted to be mounted on an axle **22** which extends through the centrally disposed hole **13** formed in the top wall of the building block. Moreover, the axle is advantageously provided with an end cap that fits snugly on the end of the axle and thereby prevents the circular building block from sliding off the axle. As shown in FIG. 5 the end cap may be either rectilinear (i.e., end cap **23**) or cylindrical (i.e., end cap **24**) in configuration. When the rectilinear end cap **23** is placed at the end of the axle **22** and the axle is inserted in the center hole **13** of a circular building block, the flat sides of the end cap **23** engage or contact the planar surfaces **20** and **21** of the downwardly extending lugs **17** and **18** as shown in FIGS. 6 and 7, thereby preventing the circular building block from rotating on the axle. Conversely, when the axle **22** provided with the rectilinear end cap **23** is rotated, the circular block is also rotated thereby providing for positive rotation of the circular block if such is desired. In like manner, when the axle **22** is fitted with a cylindrical end cap **24** and the axle is inserted in the center hole of a circular building block as shown in FIG. 8, the smooth cylindrical surface of the end cap **24** may contact but does not forcibly engage the planar surfaces of the downwardly extending lugs **17** and **18**, thus permitting the circular block to rotate freely on the axle **22**. This relationship between the circular end cap **24** and the downwardly extending lugs **17** and **18** of the circular building block is clearly shown in FIGS. 8 and 9.

From the foregoing description of my new building block, it will be seen that the block is not only adapted to be used in the usual manner with other circular building blocks and with rectilinear building blocks having the same arrangement of exterior cylindrical projections, but in addition is provided with a unique arrangement of interior, downwardly extending lugs **17** and **18** which permit the circular building block to be mounted on an axle so that it is either freely rotatable with respect to the axle or is not rotatable with respect thereto. This unique feature of my circular building block makes it possible to construct wheeled vehicles and a wide variety of mechanical devices employing either power driven or free-turning circular elements. Accordingly, it will be seen that I have made an important contribution to the art to which my invention relates.

I claim:

1. A building block which comprises a circular top wall and a cylindrical side wall extending downwardly at the periphery of the top wall, the top wall being formed with a centrally disposed hole adapted to receive an axle and with a plurality of exterior cylindrical projections disposed equidistantly on the outer surface of the top wall in longitudinal and lateral rows, the four centermost of said exterior projections being disposed about said center hole equidistantly therefrom, the side wall being formed with a plurality of vertical semicylindrical grooves each of which is positioned to engage one of the exterior cylindrical projections on the outer surface of the top wall of another building block, the interior surface of the top wall being provided with at least one pair of downwardly extending lugs, one lug of said pair being disposed on one side and the other lug of said pair being disposed on the opposite side of the center hole, each lug being positioned with respect to the center hole to engage two of the exterior projections on the outer surface of the top wall of another building block, the facing surfaces of the lugs of said pair being substantially planar and parallel to each other.

2. A circular building block which comprises a circular top wall and a cylindrical side wall extending downwardly at the periphery of the top wall, the top wall being formed with a centrally disposed hole adapted to receive an axle and with a plurality of exterior cylindrical projections disposed equidistantly on the outer surface of the top wall in longitudinal and lateral rows, the four centermost of said exterior projections being disposed about said center hole equidistantly therefrom, the side wall being formed with a plurality of vertical semicylindrical grooves each of which is positioned to engage one of the exterior cylindrical projections on the outer surface of the top wall of another building block, the interior surface of the top wall being provided with two pairs of downwardly extending lugs, one lug of each pair being disposed on one side and the other lug of said pair being disposed on the opposite side of the center hole at right angles to the lugs of the other pair, each lug being positioned with respect to the center hole to engage two of the exterior projections on the outer surface of the top wall of another building block, the facing surfaces of the lugs of said pair being substantially planar and parallel to each other.

3. A circular building block which comprises a circular top wall and a cylindrical side wall extending downwardly at the periphery of the top wall, the top wall being formed with a centrally disposed hole adapted to receive an axle and with a plurality of exterior cylindrical projections disposed equidistantly on the outer surface of the top wall in longitudinal and lateral rows, the four centermost of said exterior projections being disposed about said center hole equidistantly therefrom and being connected to each other by a web through which the center hole extends, the side wall being formed with a plurality of vertical semicylindrical grooves each of which is positioned to engage one of the exterior cylindrical projections on the outer surface of the top wall of another building block, the interior surface of the top wall being provided with at least one pair of downwardly extending lugs, one lug of said pair being disposed on one side and the other lug of said pair being disposed on the opposite side of the center hole, each

lug being positioned with respect to the center hole to engage two of the exterior projections on the outer surface of the top wall of another building block, the facing surfaces of the lugs of said pair being substantially planar and parallel to each other.

4. A circular building block which comprises a circular top wall and a cylindrical side wall extending downwardly at the periphery of the top wall, the top wall being formed with a centrally disposed hole adapted to receive an axle and with a plurality of exterior cylindrical projections disposed equidistantly on the outer surface of the top wall in longitudinal and lateral rows, the four centermost of said exterior projections being disposed about said center hole equidistantly therefrom and being connected to each other by a web through which the center hole extends, the side wall being formed with a plurality of vertical semicylindrical grooves each of which is positioned to engage one of the exterior cylindrical projections on the outer surface of the top wall of another building block, the interior surface of the top wall being provided with two pairs of downwardly extending lugs, one lug of each pair being disposed on

one side and the other lug of said pair being disposed on the opposite side of the center hole at right angles to the lugs of the other pair, each lug being positioned with respect to the center hole to engage two of the exterior projections on the outer surface of the top wall of another building block, the facing surfaces of the lugs of said pair being substantially planar and parallel to each other.

5. The combination with the circular building block of claim 4 of an axle extending through the center hole of the block and a rectilinear end cap on said axle, the flat sides of said end cap contacting and engaging the planar surfaces of the downwardly extending lugs.

6. The combination with the circular building block of claim 4 of an axle extending through the center hole of the block and a cylindrical end cap on said axle, the smooth cylindrical side of said end cap slidably contacting at least a portion of the planar surfaces of the downwardly extending lugs.

No references cited.

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