Sept. 3, 1963 P. S. PEDERSEN ETAL 3,102,367

BUILDING BLOCK

Filed Sept. 18, 1957

FIG. 1

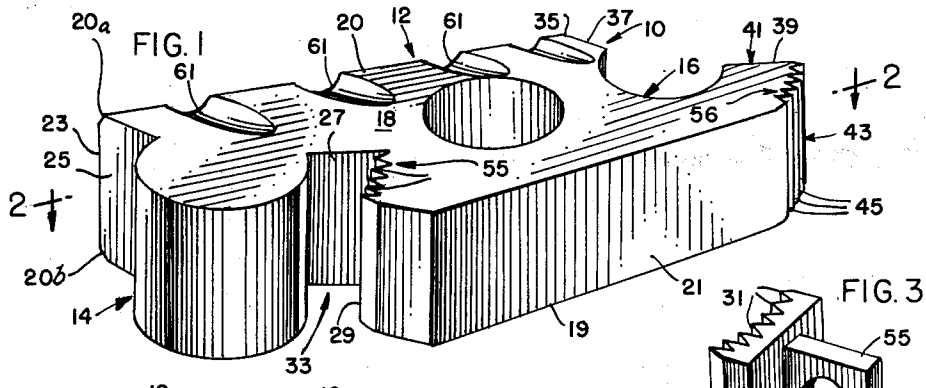


FIG. 3

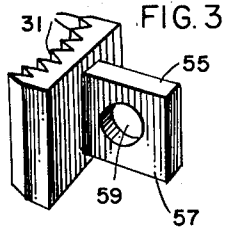


FIG. 2.

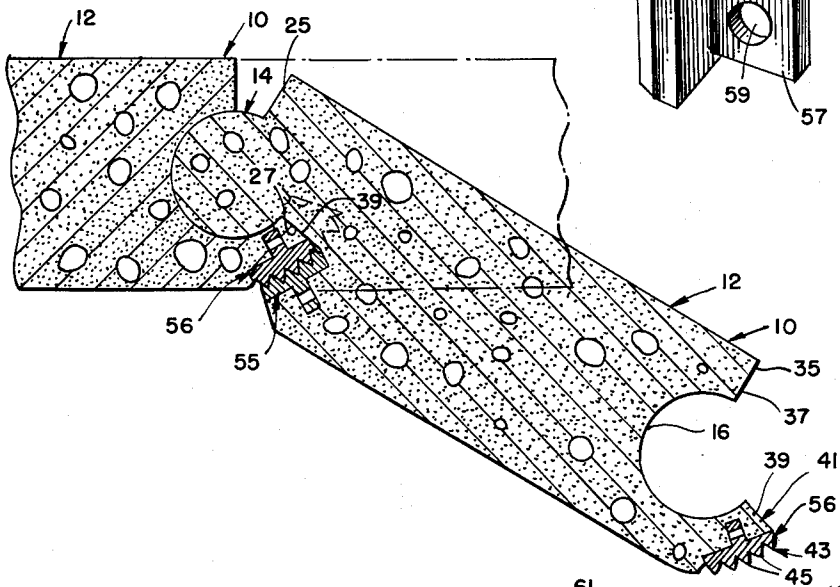
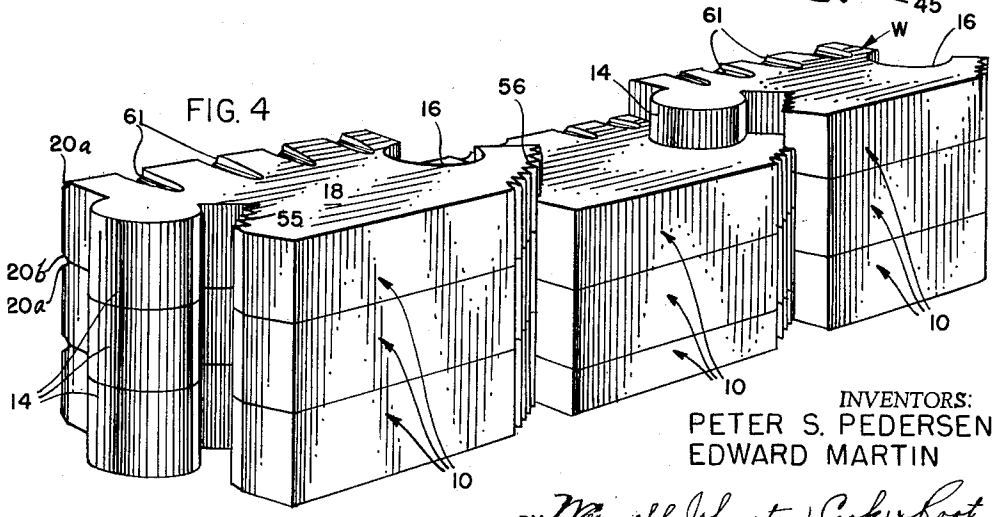


FIG. 4



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BUILDING BLOCK

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This invention relates to building structures and, more particularly, to prefabricated elements for constructing such building structures.

It is a primary object of the present invention to enable walls, buildings, frameworks, temporary forms, or other similar structures to be quickly and easily constructed by the use of novel prefabricated structural members fitted together in a novel and expeditious manner.

Another object of the present invention is to enable silos, barns, storage bins, storehouses, houses, and the like, to be constructed in a novel and expeditious manner.

Another object is to afford novel prefabricated structural members that may be used in the construction of walls and the like, in a novel and expeditious manner.

A further object of the present invention is to afford novel prefabricated structural members which may be connected together in a novel and expeditious manner.

Another object of the present invention is to enable prefabricated structural members to be afforded in the form of building blocks, or the like, which may be connected together by novel articulated connections in a novel and expeditious manner.

Yet another object is to afford novel prefabricated structural members which have complementary male and female parts on the opposite ends thereof, the parts being so constituted and arranged that the structural members may be connected together in a chain, male and female parts on each member connected to the complementary female and male parts, respectively, of other members in such a way as to enable the structural members in the chain to be latched together in a novel and expeditious manner in various positions so as to enable walls of various shapes to be quickly and easily selectively constructed.

Yet another object of the present invention is to afford novel structural members of the aforementioned type which may be quickly and easily connected together in either horizontally or vertically extending chains and may also be quickly and easily stacked vertically, with the adjacent stacks connected together in a novel and expeditious manner.

A further object of the present invention is to afford novel prefabricated structural members having complementary connecting parts, including teeth, on the opposite ends thereof, with the connecting parts constituted and arranged in such a manner that the structural members may be connected together in a chain with the teeth on the connecting members of adjacent structural members engaged with each other so as to hold the adjacent structural members in predetermined position relative to each other.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without

departing from the present invention and the purview of the appended claims.

In the drawings:

FIG. 1 is a perspective view of a structural member, in the form of a building block, embodying the principles of the present invention;

FIG. 2 is a longitudinal sectional view of a block of the type shown in FIG. 1, showing the block connected to the end portion of another like block;

FIG. 3 is a detail perspective view of a portion of the block shown in FIG. 2, and

FIG. 4 is a perspective view of a plurality of blocks embodying the construction of the block shown in FIG. 1, showing the blocks connected together in a straight horizontally extending chain.

A block **10**, embodying the principles of our invention, is shown in the drawings to illustrate the preferred embodiment of our invention.

Our novel building blocks **10** may be used to rapidly erect or construct walls, arches, temporary forms, and the like, and are particularly well adapted for the rapid construction of storage bins, silos, and the like, as will be discussed in greater detail presently.

Each of the building blocks **10** embodies a substantially rectangular-shaped body member **12** having a substantially cylindrical-shaped male connecting member **14** projecting from one end thereof, and a substantially cylindrical-shaped recess **16** formed on the other end thereof, the recess **16** being complementary in size and shape to the connecting member **14** to thereby afford a female connecting member, as will be discussed in greater detail presently.

The body member **12** has a flat upper face **18** and a flat lower face **19**, disposed in parallel spaced relation to each other. It also has two oppositely disposed parallel side faces **20** and **21** which are perpendicular to and extend between the upper and lower faces **18** and **19**.

The male connecting member **14** projects from an end **23** of the body member **12** and is preferably so disposed on the end **23** that it is substantially centered between the side faces **20** and **21**, with the longitudinal axis of the cylindrical-shaped member **14** disposed perpendicular to the planes of the faces **18** and **19** and extending through the longitudinal center lines of the latter faces.

The connecting member **14** is connected, on one side thereof, to a flat surface **25**, which forms the side edge of the end **23** adjacent to the side face **20**, and which surface is disposed substantially perpendicular to the upper and lower faces **18** and **19**. On the other side thereof, the connecting member **14** is connected to a radially disposed flat surface **27**, which is preferably set off 270 degrees in a counterclockwise direction, as viewed in FIG. 2, with respect to the surface **25**. The flat surface **27** is connected at its opposite side thereof from connecting member **14** to a generally arcuate-shaped surface **29** defined by a plurality of adjacent elongated teeth **31** extending between the upper and lower faces **18** and **19**, FIG. 1. The arcuate-shaped surface **29** on the body member **12** is disposed in parallel spaced relation to the adjacent surface of the connecting member **14** to thereby define an outwardly opening arcuate-shaped groove or recess **33** projecting outwardly from the flat surface **27**.

The substantially cylindrical-shaped recess **16** is disposed in the other end **35** of the body member **12** in parallel relation to the male connecting member **14**, and is connected at one side to the flat surface **37**, which forms the side edge portion of the end **35** adjacent to the side face **20** of the body member **12**. The recess **16** is connected at its other side to a radially disposed flat surface **39**, which is preferably set off 225 degrees in a counter clockwise direction as viewed in FIG. 2,

to the surface 37. The surface 39 forms the outer end of an arcuate-shaped lip 41, which projects outwardly beyond the surface 37 and is complementary in cross sectional size and shape to the recess 33. The lip 41 has a generally arcuate-shaped outer face 43, which is defined by a plurality of elongated teeth 45 extending between the upper and lower faces 18 and 19 of the body member 12. The teeth 45 are complementary in size and shape to the teeth 31 for a purpose which will be discussed in greater detail presently.

In using our novel building blocks 10, such as, for example, in constructing a vertically extending wall, such as the wall W shown in FIG. 4, a building block 10 may be placed in horizontally extending position on the base or foundation of the wall to be constructed, with the face 18 facing upwardly and with the block 10 extending longitudinally in the direction of the length of the wall to be constructed. Two other building blocks 10 may then be connected to the respective ends of the building block 10, with the connecting members 14 and 16 of the first building block 10 connected to the connecting member 16 and 14, respectively, of the respective other two blocks. Thus, for example, in connecting the right end as viewed in FIG. 1, of the first building block 10 to a second block, the cylindrical-shaped male connecting member 14 of the second block may be slid longitudinally downwardly into the recess 16 of the first block 10, with the lip 41 of the first block disposed in the recess 33 in the second block and with the teeth 45 in the first block disposed in meshed engagement with the teeth 31 in the second block. The lips 41, the recesses 33, and the teeth 45 and 31 are disposed on the blocks 10 in such position that as the male connecting members 14 are thus slid downwardly into the recesses 16, the lips 41 and the recesses 33 may also be similarly slid into engagement with each other, the teeth 31 sliding downwardly into engagement with the teeth 45.

At the other end of the first block 10, namely at the left end thereof as viewed in FIG. 1, a third block may be similarly connected to the first block 10. In this instance, the female connecting member 16 of the third block is slid downwardly onto the male connecting member 14 of the first block with the lip 41 and teeth 45 of the third block sliding downwardly into the recess 33 and into engagement with the teeth 31, respectively, of the first block.

If the wall being thus constructed is to be a straight wall, the second and third blocks are slid downwardly into connecting engagement with the first block 10 in such position that the surface 25 on the second block is disposed in juxtaposition to the surface 37 on the first block, and the surface 37 on the third block is disposed in juxtaposition to the surface 25 on the first block, the teeth 31 and 45 being so disposed on the blocks 10 that they will engage with each other in position to permit such engagement of the adjacent surfaces 25 and 37. When the adjacent blocks 10 are disposed in such position, the surfaces 27 thereof, such as the surface 27 of the first block 10, as shown in broken lines in FIG. 2, are spaced from the adjacent surfaces 39 of the adjacent other blocks, such as the surface 39 of the aforementioned third block 10, as shown in solid lines in FIG. 2, at an angle of forty-five degrees, the teeth 31 and 45 on the thus connected blocks being effective to hold the blocks 10 against pivoting around the cylindrical connections 16—14 away from the engagement of the adjacent surfaces 25 and 37.

If, on the other hand, it is desired to erect a wall which is not straight in a horizontal direction, such as, for example, in the construction of the walls of a substantially circular-shaped silo, storage bin, or the like, the adjacent blocks 10 may be connected together at any angle at which the adjacent teeth 31 and 45 will engage between the above described straight line position and a position wherein the blocks are disposed at an angle of forty-five degrees to each other, as shown in solid lines in FIG. 2. In this latter position, the adjacent faces 25 and 37 of the adjacent interconnected blocks will be spaced from each other, and the adjacent faces 27 and 39 of the interconnected blocks will be disposed in juxtaposition to each other, as shown in solid lines in FIG. 2.

It will be appreciated by those skilled in the art that although the surfaces 25 and 27 in each block are described herein as being in planes which are disposed at an angle of 270 degrees to each other, and the surfaces 37 and 39 are described herein as being in planes which are disposed at an angle of 225 degrees to each other, to thereby permit angular adjustment of adjacent blocks up to 45 degrees relative to each other, this is merely by way of illustration and not by way of limitation, and the surfaces may be set at any other desired practical angle necessary to permit limits of angular adjustment, other than limits of 45 degrees, without departing from the purview of this invention.

In the construction of a wall such as, for example, the wall W shown in FIG. 4, we prefer that alternate blocks 10 of the lowermost chain of blocks used in the construction of the wall be of lesser thickness, such as, for example, one-half the thickness of the other blocks in that chain. Thereafter, the blocks used in constructing the wall may be all of the same thickness until the uppermost chain of blocks is placed in position, at which time other blocks of half-thickness are added to the stacks having half-thickness blocks on the bottom thereof, to thereby level the upper surface of the wall. With this construction, it will be seen that the adjacent stacks of blocks are connected to each other throughout the length thereof. Thus, for example, as best seen in FIG. 4, the lowermost block 10 in the center stack is one-half the thickness of the lowermost blocks in the two adjacent stacks. The second block in the center stack may then be added to the lowermost block in that stack, and its lower half is thus connected to the complementary connecting members on the adjacent ends of the lowermost blocks in the two adjacent stacks. The second blocks in the two outermost stacks may then be disposed in position in their respective stacks and, when so positioned, the lower halves of their adjacent ends are connected to the upper halves of the respective adjacent ends of the second block in the center stack. This staggered relationship of adjacent blocks may be continued throughout the height of the wall being constructed until, at the top thereof, a half-block may be disposed on the center stack to level the top surface of the wall.

This construction may be used with our novel blocks in constructing curved or angular walls, as well as in the construction of a straight wall, such as the wall W shown in FIG. 4, and is particularly well adapted for constructing strong, self-supporting polygonal, or substantially circular-shaped walls for silos, storage bins, and the like, wherein the chains of blocks 10 are connected together at their ends to afford continuous, substantially annular-shaped chains.

If desired, the teeth 31 and 45 may bear indicia, not shown, thereon, which afford guide means which may be matched with each other in predetermined combinations to afford various angular positioning of the interconnected blocks 10 relative to each other. Thus, for example, with blocks such as the blocks 10, shown in the drawings, which may be connected together at various angles between a straight-line position and a 45 degree position relative to each other, one tooth 45 and the corresponding notch between teeth 31, with which it would be engaged on another block 10 to dispose the two blocks at an angle of 20 degrees to each other with suitable indicia, not shown, such as the numeral "20." Then, if it is desired to construct a wall wherein the adjacent interconnected blocks 10 are disposed at an angle of 20 degrees to each other, it would merely be necessary for the workman to match the properly marked tooth 45 with

the properly marked notch between teeth **31** of interconnecting blocks to afford a wall having the blocks **10** disposed at the desired angle relative to each other. It will be appreciated that the foregoing is merely by way of illustration, and not by way of limitation, and that, if desired, the blocks **10** may be marked with other indicia indicating other angular relationships.

Also, it will be appreciated that, if desired, the building blocks **10** may also be used to construct other structures such as, for example, arches, and the like. In the latter types of construction, the blocks **10** may be placed on end, the length thereof extending upwardly from the horizontal and with the side faces **21** forming the inner faces of the arch to be constructed.

We prefer to make the body members **12** of the building blocks **10** of concrete, or the like, but, as will be appreciated by those skilled in the art, they may be made of other suitable materials such as, for example, suitable plastic materials, pressed wood, aluminum, steel, or the like. The teeth **31** and **45** are preferably made of metal and, when the body member **12** of the blocks **10** are made of concrete or other non-metallic material, the teeth **45** and **31** may be afforded by suitable inserts, such as the inserts **55** and **56**, which are identical in construction, each being substantially T-shaped, and having a shank **57** on one end of which is disposed an enlarged head **58**. The teeth **31** and **45** are formed in the outer faces of the heads **58** of the inserts **55** and **56**, respectively, and the inserts **55** and **56**, which may be made of any suitable material, such as, steel, are embedded in the body member **12**. The shanks **57** of the inserts **55** and **56** may have openings **59** therethrough which serve as anchoring openings therein, the material from which body members **12** are formed projecting into the openings **59** to thereby assist in holding the inserts **55** and **56** in the proper position in the body members **12**.

If desired, the teeth **31** and **45** of our novel building blocks **10** may be formed of the same material and integrally with body member **12**, without departing from the purview of our invention.

As may best be seen in FIGS. 1 and 4 of the drawings, the upper edge **20***a* and the lower edge **20***b* of the side wall **20** of each of the blocks **10** is chamfered, and substantially arcuate-shaped grooves **61** are formed in the faces **18** and **19**. The grooves **61**, in each face **18** and **19**, are disposed in parallel spaced relation to each other, with each groove **61** in each face **18** and **19** disposed in parallel relation to a groove **61** in the other face **19** or **18**, and extend inwardly from the side wall **20**. They terminate at their inner ends toward the centers of the respective faces **18** and **19** in spaced relation to the side wall **21**, and, at their outer ends, open into the chamfered edges **20***a* and **20***b* of the side wall **20** and the faces **18** and **19**, respectively.

Thus, it will be seen that with the blocks **10** disposed in position wherein the faces **18** and **19** of adjacent blocks are disposed in juxtaposition to each other, the spaces formed by the adjacent chamfered edges **20***a* and **20***b* may be filled with mortar, or the like, the mortar flowing, or being forced back into the grooves **61** to afford an effective tie or lock for the mortar between the chamfered edges. The spaces between the adjacent outer end corners of the blocks **10** may also be suitably filled with mortar, or the like, to afford a well sealed, smooth walled structure.

From the foregoing it will be seen that we have afforded novel structural members, by the use of which, structures having flat walls or angular walls may be quickly and easily constructed. It will be apparent that our novel building blocks **10** are adapted for use in constructing substantially all types of structures, and are particularly well adapted for use in readily constructing curved or angular-shaped structures, such as, for example, silos, storage tanks, roofs, arches, and the like, the blocks **10** being readily connected together to afford a wall arch, or the like, of polygonal or substantially circular shape.

In addition, it will be seen that the building blocks of the present invention may be made of relatively small size such as, for example, toy building blocks, and the like.

From the foregoing it will also be seen that our invention affords novel building structure which may be readily and effectively used, and which may be readily and economically produced commercially.

Thus, while we have illustrated and described the preferred embodiment of our invention, it is to be understood that this is capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. In a building structure, two elongated body members, and means connecting said body members to each other in end-to-end relation, said means comprising a male connecting portion on one end of one of said body members, said male connecting portion having a recess having a concave arcuate surface defined by a plurality of teeth, and a female connecting portion on one end of the other of said body members mounted on said male connecting portion, said female connecting portion having an arcuate-shaped tongue having a convex arcuate surface defined by a plurality of teeth, said last mentioned teeth being meshed with said first mentioned teeth.

2. In a building structure, two elongated building blocks connected together in end-to-end relation, each of said blocks comprising an elongated body member, a connecting member on one end of one of said body members, said connecting member having a substantially cylindrical-shaped recess formed therein and having an arcuate-shaped arm projecting around said recess, said arm having an arcuate outer face having teeth formed therein, and another connecting member on one end of the other of said body members, said other connecting member having an outwardly projecting substantially cylindrical-shaped member mounted in said recess, and means on said other body member defining an arcuate-shaped recess around said cylindrical-shaped member, said last mentioned recess having one face defined by a plurality of teeth, said arm being mounted in said last mentioned recess with said first mentioned teeth engaged with said second mentioned teeth.

3. A prefabricated building block comprising an elongated body member, female connecting means on one end of said body member, and male connecting means, complementary to said female connecting means, on the other end of said body member, said male connecting means comprising an outwardly projecting cylindrical-shaped member, and means defining a recess around a portion of said last mentioned member, said last mentioned means including a member having a plurality of teeth defining one side of said recess and facing toward said cylindrical-shaped member, said female connecting member having a recess complementary to said male connecting member, and an arm extending around a portion of said last mentioned recess and complementary to said first mentioned recess, said arm having teeth, complementary to said first mentioned teeth, on the side thereof which is complementary to said one side of said first mentioned recess.

4. In a building structure, two elongated body members, and means connecting said body members to each other in end-to-end relation, said means comprising a substantially cylindrical-shaped male connecting member mounted on one end of one of said body members in position to define an arcuate-shaped recess between said male member and said body member, a substantially cylindrical-shaped female connecting member on the other of said body members and holdingly engaged with said male member, said last mentioned connecting member having an arm projecting into said recess, a metal member having a plurality of teeth thereon, said metal member being mounted on said body member in position to disposed said teeth along one side of said recess, and another metal member having a plurality of teeth thereon,

said other metal member being mounted on said arm and carried thereby with said teeth thereon disposed in engagement with said first mentioned teeth.

5. In a building structure, two prefabricated building blocks, each of said blocks comprising an elongated body portion, said body portion including one end having one substantially flat shoulder at one side thereof, and another end having another substantially flat shoulder at one side thereof, and complementary male and female connecting means on said one end and other end, respectively, for connecting said blocks together in end-to-end relation with said one shoulder and said other shoulder of the respective blocks disposed in abutting engagement with each other, said male and female connecting means on each of said blocks comprising a male connecting member projecting outwardly from said one end laterally inwardly from said one shoulder and defining with said one end an arcuate-shaped recess on the other side of said connecting member from said one shoulder, a substantially arcuate-shaped lip complementary in cross-section to said recess, said lip projecting outwardly from said other end on the opposite side thereof from said other shoulder and defining with said other end, between said lip and said other shoulder, a recess complementary in cross-section to

said connecting member, said first and second mentioned recesses of each of said blocks being adapted to receive said lip and connecting member, respectively, of the other of said blocks when said blocks are so connected together, and a plurality of projections on each of said ends, said projections on each of said ends having recesses between adjacent pairs thereof, and said projections on each of said ends being engageable in said last mentioned recesses in the other of said ends of the other block to thereby hold said shoulders in said abutting engagement when said blocks are so connected to each other.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,074	Henderson	Jan. 11, 1949
1,798,410	Fish	Mar. 31, 1931
1,978,283	Rew	Oct. 23, 1934
2,020,881	Ferris	Nov. 12, 1935
2,558,367	Madsen	June 26, 1951

FOREIGN PATENTS

849,766	France	Aug. 28, 1939
443,072	Italy	Dec. 6, 1948
507,093	Belgium	Nov. 30, 1951