Sept. 3, 1963 J. A. G. GERARD 3,102,609

STRUCTURES

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FIG. 1

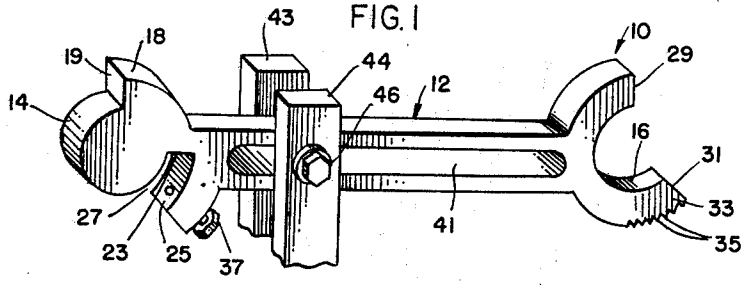


FIG. 2

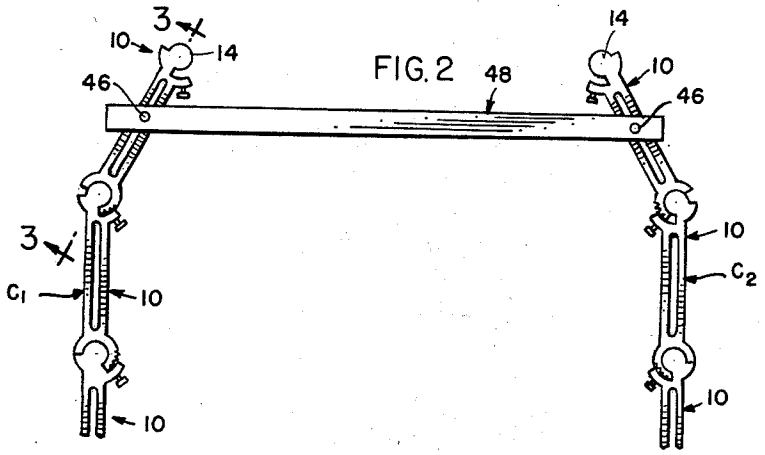


FIG. 3

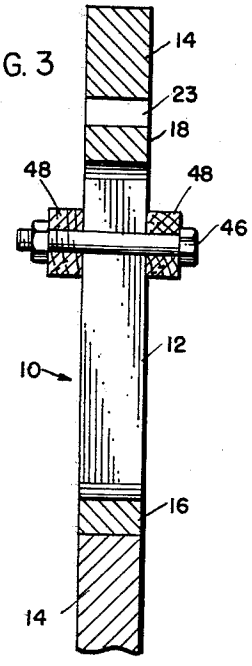
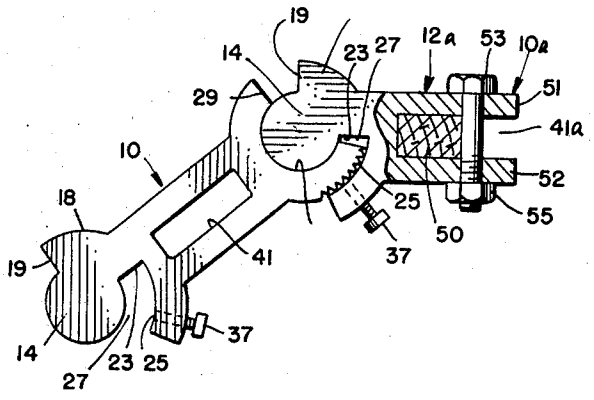


FIG. 4



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FIG. 5

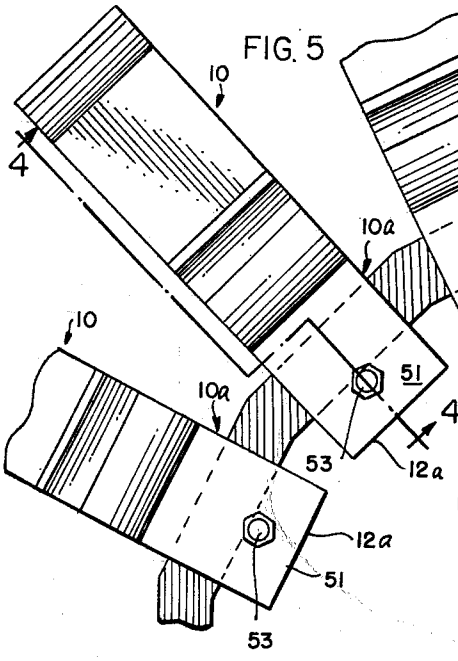


FIG. 6

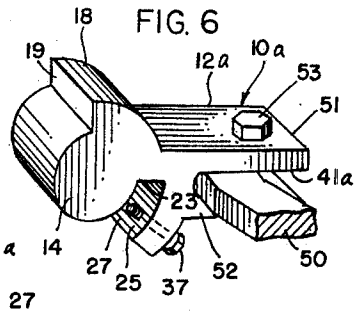


FIG. 7

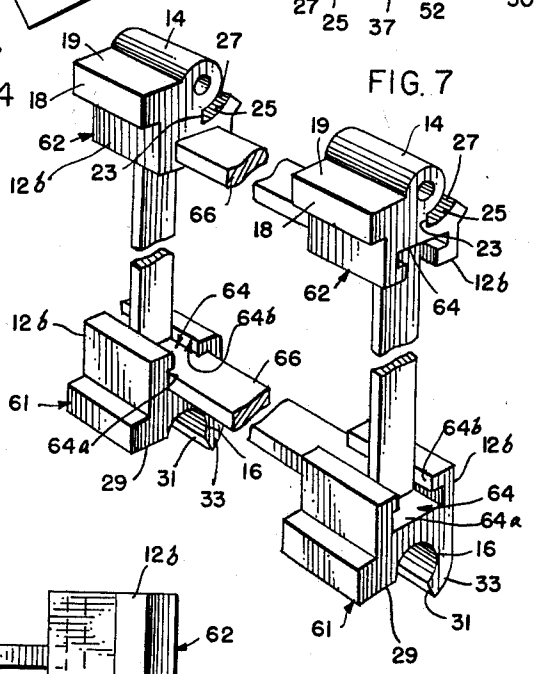
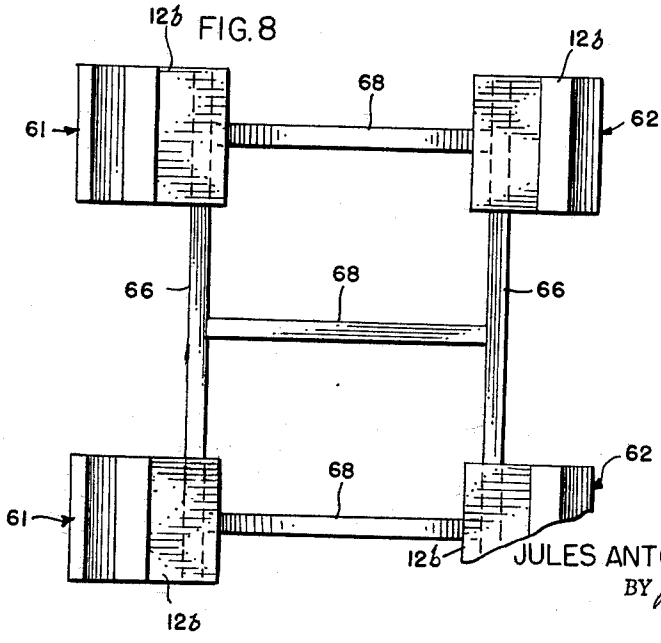


FIG. 8



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3,102,609

STRUCTURES

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Filed Sept. 18, 1957, Ser. No. 684,747
5 Claims. (Cl. 189—34)

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 invention is to enable novel structural members to be connected together in a novel and expeditious manner by means of a cylindrical articulation.

A further object of the present invention is to afford novel prefabricated structural members each having 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 with the male and female parts on each member connected to complementary female and male parts, respectively, of other members, in such a way as to wedge the successive structural members in relation to one another that their opposite faces may be selectively disposed either in the same plane or in the form of a dihedron of desired opening.

Another object of the present invention is to enable flat or curved walls, vaults, arches, floors, roofs, and the like, to be quickly and easily constructed in a novel and expeditious manner.

Another object of the invention is to enable the walls of dwellings, or other buildings, or the like, to be constructed in a novel and expeditious manner by the use of novel prefabricated structural elements connected together by cylindrical articulation.

Another object of the present invention is to enable frameworks to be quickly and easily constructed in a novel and expeditious manner.

An object ancillary to the foregoing is to enable beams or other structural elements of frames to be supported in a novel and expeditious manner by novel prefabricated structural elements which may be interlockingly supported by other prefabricated structural elements in a novel and expeditious manner.

A further object of the present invention is to afford novel prefabricated structural elements which may be interlockingly connected together in chains to constitute the openwork skeleton ribs of roofings of various sizes, shapes and dimensions.

Another object of the present invention is to afford novel structures having male and female parts at the opposite ends thereof and which parts are joined together by an open framework.

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 the preferred embodiments of the present invention and the principles thereof and what I now consider to be the best mode in which I 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 embodying the principles of my invention;

FIG. 2 is a side elevational view of a structure embodying structural members of the type shown in FIG. 1;

FIG. 3 is an enlarged fragmentary detail sectional view taken substantially along the line 3—3 of FIG. 2;

FIG. 4 is a side elevational view, with certain parts broken away, of a modified form of my invention, taken substantially along the line 4—4 in FIG. 5;

FIG. 5 is a top plan view of the form of my invention shown in FIG. 4;

FIG. 6 is a perspective view of the form of my invention shown in FIG. 4;

FIG. 7 is a perspective view of another modified form of my invention; and

FIG. 8 is a top plan view of the form of my invention shown in FIG. 7.

In FIGS. 1 to 3, inclusive, of the drawings, building blocks or structural members **10** embodying the principles of my invention are shown to illustrate the preferred embodiment of my invention.

My novel building blocks or structural members **10** may be used to rapidly erect or construct walls, arches, floors, and temporary forms, or the like, as will be discussed in greater detail presently.

Each of the building blocks **10** embodies a substantially rectangular-shaped elongated 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 in the other end thereof, the recess **16** being substantially 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.

An abutment member **18** projects upwardly from the male connecting member **14** and has a flat end face **19** which is disposed substantially perpendicularly to the length of the body member **12**. The connecting member **14** is connected, on the other side, to a radially disposed flat surface **23** which is preferably set off two-hundred and seventy degrees in a counter clockwise direction, as viewed in FIG. 1, with respect to the surface **19**. The flat surface **23** is connected at its opposite side thereof from the connecting member **14** to an arcuate surface **25** on the body member **12**, which latter surface is disposed in parallel spaced relation to the adjacent surface of the connecting member **14** to thereby define a downwardly opening arcuate-shaped groove or recess **27** projecting downwardly from the flat surface **23**, as viewed in FIG. 1.

At the other side of the body member **12**, the substantially cylindrical-shaped recess **16**, whose diameter corresponds to that of the connecting member **14**, is connected, at one side, to a flat surface **29**, which forms the upper edge portion of that end of the body member **12**, and is disposed substantially perpendicular to the length of the body member **12**. The recess **16** is connected at its other side to a radially disposed flat surface **31** which is preferably set off two-hundred and twenty-five degrees in a counter clockwise direction, as viewed in FIG. 1, to the surface **29**. The surface **31** forms the outer end of an arcuate-shaped lip **33** which projects outwardly of the surface **29** and which is complementary in cross-sectional size and shape to recess **27**.

The lip **33** on each of the building blocks **10** has a plurality of parallel teeth **35** extending transversely across the outer periphery thereof, FIGS. 1 and 2. A screw **37** is threadedly mounted in the other end of the body member **12** in such position that the narrower end or point thereof may be projected inwardly from the arcuate surface **25** toward the male connecting member **14**.

In the use of my novel building blocks **10**, they may be connected in end-to-end relation to each other by withdrawing the screw **37** into the body member **12**, and then sliding the male connecting member **14** on one building block **10** longitudinally into the recess **16** in another building block **10**. During this movement of the male connecting member **14** into the recess **16**, the lip **33** around the recess **16** is moved into the recess **25** outwardly of the connecting member **14**. The two building blocks **10**, which are thus connected together, may be rotated relative to each other around the longitudinal axes of male connecting member **14** between a position wherein the adjacent surfaces **19** and **29** are disposed in juxtaposition to each other, and a position wherein the adjacent surfaces **23** and **31** are disposed in juxtaposition to each other. After the blocks **10** have been rotated relative to each other into the desired adjusted position between the two aforementioned extreme positions, the screw **37** may be advanced into the body member **12** to thereby engage the point thereof with the teeth **35** on the lip **33** to thereby hold the thus assembled blocks **10** in such adjusted position.

An elongated slot **41** extends longitudinally through substantially the entire length of the body member **12**, FIG. 1. The slot **41** affords means by which beams, rafters and other similar structural members may be connected to the building block **10**. Thus, for example, two beams **43** and **44** are shown connected to a building block **10** in FIG. 1, with the beams **43** and **44** disposed on opposite sides of the body member **12**, and with a bolt **46** extending through the beams **43** and **44** and the slot **41**, the bolt **46** clamping the beams **43** and **44** in adjusted position to the body member **12**.

My novel building blocks **10** are particularly well adapted for the construction of the skeletons of sloping roofs, arches, domes, and the like, although it will be appreciated by those skilled in the art that they may also be used for other purposes such as, for example, in the construction of scaffolding and studding in buildings, and the like.

In FIG. 2, two courses C1 and C2 of building blocks **10** are shown in oppositely disposed spaced relation to each other. Each of the courses C1 and C2 shown in FIG. 2 comprises three building blocks **10** with the two lowermost blocks **10** disposed substantially vertically, and the uppermost block **10** slanted inwardly toward the other course C2 or C1, respectively. A beam or rafter, which may take the form of two members **43** and **44**, shown in FIG. 1, is shown extending between the two uppermost building blocks **10** in FIG. 2, in substantially horizontally extending relation, the ends of beam **48** being secured to the respective uppermost blocks **10** by the bolts **46**.

It will be seen that construction such as shown in FIG. 2 may be readily used to afford rafters in a roof, scaffolding, or temporary supports for holding temporary flooring for workmen as they finish a roof, and the like.

Also, it will be noted that my novel building blocks **10** may be made either narrow or wide, and when they are made relatively narrow are particularly well adapted for use as the upright structural members in the walls and roof of greenhouses, and the like.

Also, it will be noted that my novel building blocks or structural members **10** may be mounted on the complementary ends of building blocks such as shown in my copending application for United States Letters Patent, Serial No. 684,748, filed September 18, 1957, now abandoned.

In the modified form of my invention shown in FIGS. 4 to 6, inclusive, parts which are the same as parts shown in FIGS. 1 to 3, inclusive, are indicated by the same reference numerals, and parts which are similar but differ somewhat from parts shown in FIGS. 1 to 3, inclusive, are indicated by the same reference numerals with the suffix "*a*" added thereto.

In FIGS. 4 to 5, inclusive, a modified form of building block **10***a* is shown which includes an elongated body member **12***a* having the male cylindrical-shaped connecting member **14**, the abutment member **18**, the flat surfaces **19** and **23**, the recess **25**, and the screw **37** of the block **10** shown in FIGS. 1 to 3, incluusive. The other end of the body member **12***a* is substantially channel-shaped to afford a substantially U-shaped slot **41***a* therein.

My novel block **10***a* is particularly well adapted for holding structural reinforcing members which are to be placed at the ridge of a framework in the form of a dome, or the like, and in FIGS. 4 and 5, the blocks **10***a* are illustrated as mounted on building blocks **10** at the ridge of such a framework to hold a polygonal rib **50** in horizontally disposed inward position relative to the building blocks **10**. The rib **50** may be mounted in the slots **41***a* in the body members **12***a* of the blocks **10***a*, and a bolt **53** may be extended through portions **51** and **52** of the body member **12***a*, defining the opposite sides of the slots **41***a*, outwardly of the rib **50**, and the portions **51** and **52** may be clamped together on the rib **50** by suitable means such as, a nut **55** on the bolt **53**, to thereby securely hold the rib **50** in the body members **12***a* of the blocks **10***a*.

It will be appreciated by those skilled in the art that the blocks **10***a* may also be mounted on the upper end portion of other types of building blocks, such as, for example, blocks of the form shown in my aforementioned copending application for United States Letters Patent, Serial No. 684,748, without departing from the purview of my invention.

In FIGS. 7 and 8 of the drawings, a modified form of my invention is shown which is particularly well adapted for constructing open framework such as, for example, studding, scaffolding framework, framework for roofing, and the like.

In FIGS. 7 and 8, parts which are the same as parts shown in FIGS. 1 to 3, inclusive, are indicated by the same reference numerals, and parts which are similar but differ somewhat from parts shown in FIGS. 1 to 3, inclusive, are indicated by the same reference numerals with the suffix "*b*" added thereto.

In FIGS. 7 and 8, two mounting blocks **61** are shown disposed opposite respective ones of two other mounting blocks **62**. Each of the mounting blocks **61** and **62** embodies a body member **12***b*, having an elongated slot **64**, which is substantially T-shaped in cross section, extending through one side thereof.

On the opposite side thereof from the slot **64**, each of the blocks **61** embodies the recess **16**, the flat surface **29**, the lip **33**, and the flat surface **31**, of the building block **10** shown in FIGS. 1 to 3, inclusive.

Similarly, each of the building blocks **62** embodies the male connecting member **14**, the abutment member **18**, the flat surfaces **19** and **23**, the curved surface **25**, and the recess **27** of the building blocks **10** shown in FIGS. 1 to 3, inclusive.

The building blocks **61** and **62** may be mounted on the complementary ends of building blocks such as shown in FIGS. 1 to 3, inclusive, or as shown in my aforementioned copending application for United States Letters Patent, Serial No. 684,748, with each pair of blocks **61** and **62** so disposed relative to each other that the slots **64** face toward each other. The pairs of building blocks **61** and **62** may be disposed in parallel spaced relation to each other longitudinally of the slots **64**, and timbers or beams **66**, which are substantially complementary in shape to the enlarged head portions **64***a* of the slot **64**, may be mounted in the head portion **64***a* of adjacent aligned blocks **61** and adjacent aligned blocks **62**, respectively, FIGS. 7 and 8. Transverse beams or timbers **68** may be disposed in transversely extending relation to the beams **66** and may be secured thereto by suitable means such as nailing, or the like, any beams, such as the two end beams **68** shown in FIGS. 7 and 8, which extend between blocks **61** and **62** being of such

cross-sectional size that they may extend through the reduced end portions **64***b* of the slots **64** into engagement with the beams **66** disposed at the opposite ends thereof.

It will be seen that with this construction, an open framework may be quickly and easily assembled, and that the pairs of parallel blocks **61** and **62** may be disposed as close, or as far away from each other, as is desired in the particular construction being built.

From the foregoing, it will be seen that my novel invention enables walls, buildings, frameworks, temporary forms, floors, roofs, and the like, to be constructed in a novel and expeditious manner.

Also, it will be seen that I have afforded a novel form of building block, or structural element, which is practical and efficient in operation and may be readily and economically produced commercially.

Thus, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that these are capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. In a building structure, elongated structural members, connecting means on the ends of said structural members for rotatably connecting said structural members together, certain of said structural members being disposed in spaced relation to each other and having elongated slots therethrough, and frame means adjustably mounted in said slots and extending between and through said last mentioned structural members.

2. The combination as defined in claim 1, and in which said connecting means comprise complementary male and female connecting members mounted on opposite ends of said structural members.

3. The combination as defined in claim 1 and in which said slots are substantially U-shaped openings in respective ones of said certain structural members.

4. The combination as defined in claim 1 and in which said slots are substantially T-shaped in cross-section and are disposed in ends of respective ones of said certain structural members, and in which said frame means comprise supporting means substantially complementary in shape to said slots.

5. The combination as defined in claim 1 and in which said slots are substantially T-shaped in transverse cross-section and are disposed in ends of respective ones of said certain structural members, and in which said frame means comprise elongated members mounted in said slots in longitudinal alignment therewith, and other elongated members mounted on and carried by said first mentioned elongated members and extending transversely thereto.

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