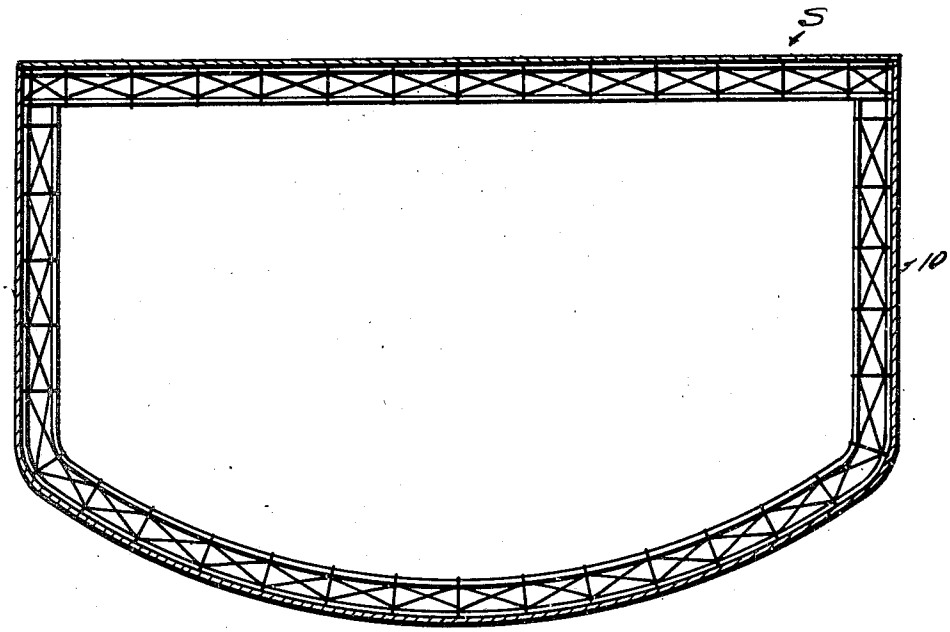
Oct. 10, 1939. J. L. WALSH 2,175,983

METHOD OF FORMING A BUILDING STRUCTURE

Filed Nov. 26, 1937 3 Sheets-Sheet 1

Fig. 1.



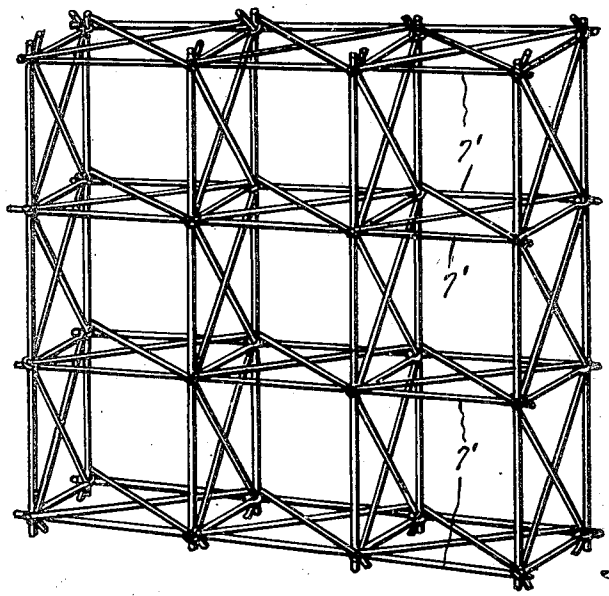


Fig. 4.

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Filed Nov. 26, 1937 3 Sheets-Sheet 2

Fig. 2.

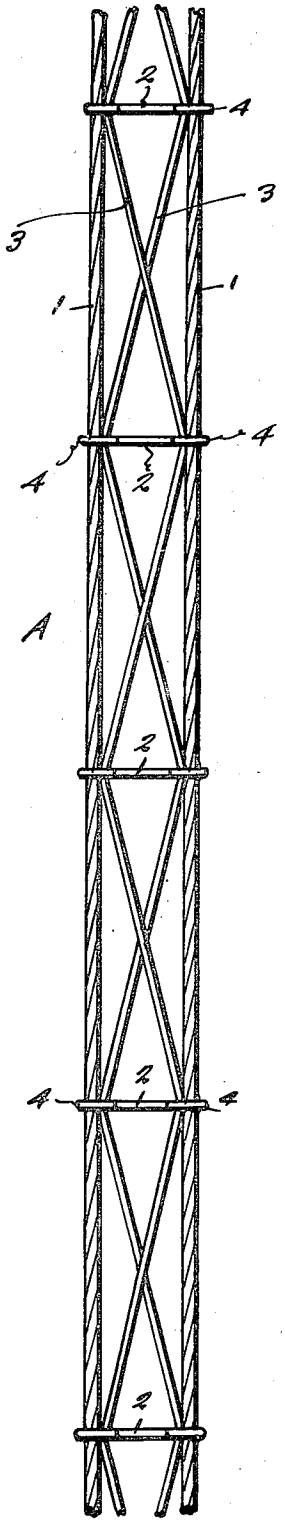
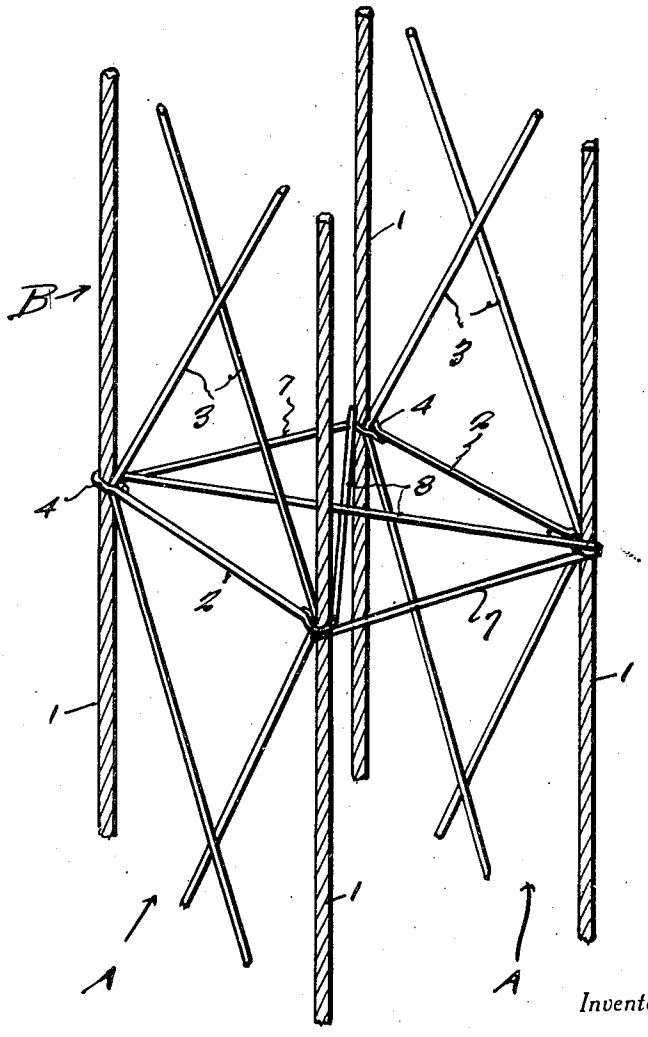


Fig. 3.



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Filed Nov. 26, 1937 3 Sheets-Sheet 3

Fig. 5.

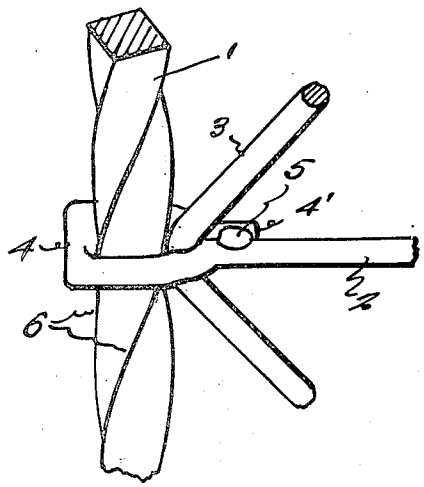


Fig. 7.

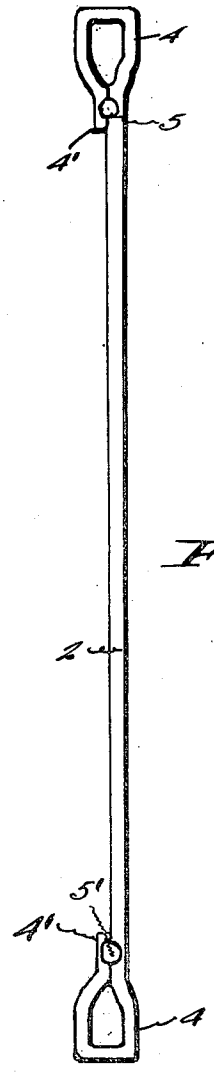
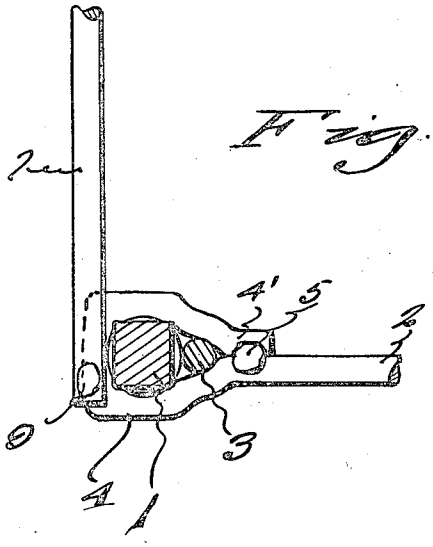


Fig. 6.



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UNITED STATES PATENT OFFICE

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METHOD OF FORMING A BUILDING STRUCTURE

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Application November 26, 1937, Serial No. 176,671

1 Claim. (Cl. 29—148)

This invention relates to a method of forming a building structure of steel or other suitable metal, the general object of the invention being to provide a framework for the structure composed of metal bars welded together so as to provide an integral structure of great strength, light weight and which is proof against fire, storms, insects, earthquakes and other destructive forces. The invention can be used in various kinds of buildings, boats, foundations, etc., and parts of the structure can be formed in a factory or the like and assembled on the job, with some of the tie rods or braces welded on the job.

Another object of the invention is to provide the main rods with non-circular portions around which certain of the brace rods are looped to prevent relative turning movement of these parts with the ends of the loops welded to the said brace, with some of the other braces passing through the loops and the weld being made to one side of the main rod and said other brace, with other braces resting on and welded to portions of the loops.

In describing the invention in detail, reference will be had to the accompanying drawings wherein like characters denote like or corresponding parts throughout the several views, and in which:

Figure 1 is a transverse sectional view through a boat or scow constructed in accordance with this invention.

Figure 2 is a side view of a girder constructed in accordance with this invention.

Figure 3 is a perspective view of a column composed of two girders connected together by brace bars.

Figure 4 is a fragmentary view of a structure composed of two columns connected together.

Figure 5 is a detail perspective view showing how a transverse brace is looped about the main member and a diagonal brace with the end of the loop forming part welded to the main part of the transverse brace.

Figure 6 is a sectional view through Figure 5 and showing a connecting brace resting on and welded to a portion of the looped part.

Figure 7 is a view of a transverse brace formed with the loops at its ends and showing the points of welds.

In carrying out the invention a plurality of girders A is formed, one of which is shown in details in Figure 2. This girder is composed of the main parallel rods 1, the transverse braces 2 spaced apart and connecting the rods or members 1 together and the diagonal braces 3 which pass through the loops 4 of the members 2, through which also pass the members 1, the diagonal braces forming an X between each pair of the members 2.

As shown more particularly in Figures 5, 6 and 7 each loop 4 is formed by bending each end of a member 2 to form a substantially rectangular loop with the end 4' placed against a main part of the member and welded thereto as shown at 5. As shown in Figures 5 and 6 each main member 1 is preferably of non-circular shape in cross section or of such a shape that when twisted in whole or in part substantially sharp ridges 6 are formed of spiral shape and then an apex of the bent member 3 is placed against the member 1 after which an end of a member 2 is bent around the member 1 and the apex of the member 3 with the end of the member 2 pressed against that portion of said member adjacent the point where it joins the looped part 4 and then the parts are welded as shown at 5. This bending causes the looped part of the member 2 to firmly engage the members 1 and 3 and the part 6 will bite into the looped part and thus relative turning movement between the parts 1 and 2 is prevented. As shown in Figure 2 each member 3 passes through a loop 4 at one end of a member 2 and then through the opposite loop of the adjacent member 2 so that the two members 3 between each pair of members 2 form an X. While welding the end of the loop to a main part of the member 2 to one side of the parts 1 and 3 there is no danger of the welding action weakening the loop and the welding can be easily and quickly done due to the small amount of metal which is necessary to be heated for the welding action. Thus a girder as shown at A in Figure 2 and composed of the pair of members 1, the transverse members 2 and the diagonal members 3, is of the maximum strength as all the parts are firmly held together and twisting and other relative movements between the parts are prevented.

Figure 3 shows a column B composed of a pair of girders which are connected together by the transverse bars 7 and the diagonal bars 8. The ends of the bars 7 and 8 engage portions of the loops 4 of the members 2 and are welded thereto as shown at 9 in Figure 6, the transverse bars 7 engaging the outer portions of the loops and are slightly spaced from the members 1 as also shown in Figure 6. As will be seen in Figure 3 the diagonal bars 8 are also transversely arranged with respect to the length of the column. Thus in order to form a column from two girders it is simply necessary to use a pair of the bars 7 and

a pair of the bars 8 at each connecting point or at each point, preferably, where the cross bars 2 connect with the girders.

In forming a structure composed of a plurality of columns or a plurality of girders long transverse bars 7' may be used in place of the relative short bars 7 shown in Figure 3, these bars 7' connecting together a plurality of the girders and they are arranged at the outer sides of the members 1 of the girders so as to facilitate the connection of siding of suitable material and type to the structure, without interference from the members 1 and other parts of the structure.

As the parts are of relatively light material they can be bent or shaped into curves and the like so as to form the roof as well as the sides and other parts of a building and also to form the hull of a boat or scow such as shown at S in Figure 1 which shows the bottom, sides and deck of the boat constructed in a manner somewhat similar to the structure shown in Figure 4 with the sides vertical and the bottom bowed downwardly and the sheeting or "skin" 10 suitably connected with the members 7 or 7' which are connected, as before described, with the outer portions of the loops 4 at the outer sides of the structure and with the interior lining, flooring or the like connected with the loops at the inner side of the structure. By laying a structure somewhat similar in Figure 4 in a horizontal position, such structure can be used in the foundation of a building and this is especially desirable in swampy or soft ground and the structure can be used as reinforce means for concrete in various places. If desired the girders can be constructed in a factory and connected together on the job or the entire structure can be constructed on the job from parts previously cut to the desired dimensions for the job and an apparatus, such as that forming the subject matter of another application of mine, may be used for the formation of the structure.

Before the ends of the transverse rods 2 are bent around the other rods, such ends are heated and are then bent and welded and as the ends of the rods cool they bite tightly into the bite forming portions of the main rods 1. This prevents a spring action in the bent portions of the rods which might occur if the rods are bent when cold and this would prevent a rigid joint and would also interfere with the welding.

Having described the invention, what is claimed as new is:

The herein described method of connecting together a main rod, an angle rod and a pair of straight rods extending at right angles from the main rod comprising in forming bite portions on the main rod, placing the apex of the angle rod against a portion of the main rod, then heating an end of one of the straight rods and looping said end around the main rod and the apex of the angle rod and pressing the free end of the looped portion against another portion of the looped rod with said free end extending parallel to the portion which it contacts, then welding the two contacting portions together with parts of the loop firmly engaging the bite portions of the main rod and the apex of the angle rod and then welding a portion of the second straight rod to the bight of the loop.

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