Our invention relates to a rigid frame building and method of making the same.

Pre-fabricated sectional buildings for various uses are known to the art. These comprise frames including familiar trusses formed of a number of small members triangulated to make the truss.

One object of our invention is to provide a rigid frame sectional building of more economical construction than the conventional type.

Another object of our invention is to provide a rigid frame sectional building which eliminates the flimsy X bracing, which is customarily used in the prior art in the plane of the lower chord of the trusses.

Still another object of our invention is to provide a rigid frame sectional building providing additional head room while avoiding the awkward and wasteful truss construction.

A further object of our invention is to provide a rigid frame sectional building which may be more expeditiously shipped, fabricated and erected.

A still further object of our invention is to provide a sectional building which is of more rigid construction than has heretofore been achieved.

Other and further objects of our invention will appear from the following description.

In the accompanying drawings which form part of the instant specification and are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views;

Fig. 1 is a perspective view with parts broken away showing a rigid frame sectional building embodying the construction of our invention.

Fig. 2 is an elevation showing two elements of the rigid frame.

Fig. 3 is an elevation showing one of the elements of the rigid frame which when joined to the elements shown in Fig. 2, will make one complete transverse rigid frame.

Fig. 4 is a plan view of an I-beam showing the lines of cutting to produce columns used in our invention.

Fig. 5 is a sectional view taken on the line 5--5 of Fig. 1.

Fig. 6 is a sectional view taken on the line 6--6 of Fig. 3.

Fig. 7 is a sectional view taken on the line 7--7 of Fig. 3.

A “rigid frame” building is one which obtains its rigidity by virtue of immobile joints, in distinction to one in which the rigidity is imparted by triangulation of smaller steel members to form trusses.

The transverse members of the building are virtually integral beams formed in the desired shape. Each transverse member in the rigid frame construction is called a “bent.” Each bent comprises two columns which are rigidly connected to knees or “haunches,” to which the roof beam is secured to the columns.

Referring now to Fig. 2, it will be seen that column 1 supports a haunch 2, which is welded or otherwise integrally secured to the column 1.

The roof beam is composed of two members 3 and 4, which may be conventional I-beams, welded at 5 and reinforced by an angle plate 6.

For ease in transportation, we form each bent of three pieces, two members each comprising a column 1 and a haunch 2, and a roof beam member. Each haunch 2 is drilled with holes 7.

Each end of the roof beam is drilled with holes 8.

Plates 9 are adapted to be secured to the roof beam end and haunch to connect the same by means of bolts or rivets 10. The junction is made near the point of inflection which is the point of zero moment. In this manner we are enabled to pre-fabricate a bent in three sections for ease in transportation, and yet retain the necessary rigidity for a rigid frame building.

It is to be understood, of course, that the junction between the roof beam and the haunch may be made in any other suitable manner as, for example, by welding or the like.

The haunch 2 is formed of a web 11 and upper and lower flanges 12 and 13. The roof beam 4 is of I-beam cross section. The haunch 2 is welded to the column 1 and a web 14 is welded to the column, as can be readily seen by reference to Figs. 2 and 3. This web adds strength at the point of increased stress.

The columns 1, of course, carry a compression load. They carry, too, a moment which increases upwardly. For this reason we form our columns 1 with a web 15 of increasing width. In forming our columns, we take an I-beam 16, shown in Fig. 2, and cut it into two portions along the line 17, thus forming two columns from a single I-beam. Each member formed by cutting the I-beam 16 into two parts, is provided with only one flange 18. In order to increase the strength of our columns and at the same time provide means for securing the sides of the building between bents, the webs 15 are provided with a plurality of openings 19, as can be readily seen by reference to Figs. 1, 2 and 3.

The side wall sections adapted to be secured
between bents are made up in one piece and shipped as such. A cross sectional view of a section is shown in Fig. 5, in which a panel 20 of galvanized corrugated sheet metal is spot-welded along its edges to angle members 21 and 22 respectively. The angle members are the same length as the height of the web 18 of a column. The angles 21 and 22 have one web thereof spot-welded to the sheet metal panel 20. The other webs 19 and 12, respectively, are provided with holes corresponding to the holes 15 of the webs 16 of the columns 1.

When two adjacent panel sections 20 are aligned on each side of a web 16, they may be bolted to the web 18 by bolts 23, as can readily be seen by reference to Fig. 5. When the panels are securely bolted in place, each column 1 will then become a tapered built-up I-beam column. It will be seen that our construction at once secures the panels in place and forms the I-beam columns of the bents.

Doors and windows as desired are installed in the panels 20 in the shop. By reference to Fig. 1, it will be seen that a window 24 is provided in the panel section 20.

Purlins are made of standard mill-shaped channels 25 and bolted to the top flange of the I-beam portions of the bents. The purlins 25 support a galvanized sheet metal roof 26, as can be readily seen by reference to Figs. 1 and 2. Crossed rods 27, which can readily be seen in Fig. 1, are secured in the plane of the purlins and necessary nays to give rigidity.

Stringers 28 may be welded to the angles 21 and 22 of each panel, and the corrugated sheet metal 20 spot-welded to the stringers to give the panels the desired rigidity.

The column portions of the bents are tied together by stringers 29 and form the bottom margin of each panel. It is understood, of course, that the bents may be supported by any suitable foundation, such as concrete piers or concrete walls.

It will be seen that we have accomplished the objects of our invention. The panel sections, bent sections, roof purlins, roof sheeting, and rods may be easily shipped to any desired location, and buildings of various sizes may be readily constructed in the field from the pre-fabricated parts.

The length of the building is determined by the number of bents employed. The distance between bents is governed by the width of the panels.

Buildings according to our invention are more economically constructed than those of conventional construction. Our construction eliminates the flimsy X bracing, such as is usually used in the frame of the lower chord of regular trusses.

Our construction enables additional head room to be obtained, and produces a more modern building of neater appearance. Our construction, furthermore, gives a building a more rigid character than has heretofore been the case with sectional buildings of the prior art.

If desired, insulation may be placed between the stringers 28 and between the purlins 25, and any desired sheeting secured over the insulation, giving a building the interior of which presents a finished appearance.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of our claims. It is further obvious that various changes may be made in details within the scope of our claims without departing from the spirit of our invention. It is, therefore, to be understood that our invention is not to be limited to the specific details shown and described.

Having thus described our invention, we claim:

1. In a rigid frame building, a bent having substantially vertical side portions each formed with a web of progressively increasing width in the direction of its height, said side portions having integral flanges adjacent the interior of the building, a built-up flange comprising a pair of angle irons secured to the web, side walls for said building, said side walls being secured to said angle irons.

2. A rigid frame building comprising a plurality of bents, each formed with substantially vertical portions of T-shaped cross section, the respective flanges of said T's being faced toward the interior of said building, said wall panels for said building extending between said bents, each of said panels having vertically disposed angle iron margins, adjacent angle iron margins being bolted to webs of said portions of T-shaped cross section, thereby simultaneously forming built-up vertical members of I-beam cross section and securing the side walls in place.

3. A rigid frame building comprising a plurality of bents, each formed with substantially vertical portions of T-shaped cross section, the respective flanges of said T's being faced toward the interior of said building, said wall panels for said building extending between said bents, each of said panels having vertically disposed angle iron margins, adjacent angle iron margins being bolted to webs of said portions of T-shaped cross section, thereby simultaneously forming built-up vertical members of I-beam cross section and securing the side walls in place, said vertical members being formed with webs of increasing width in the direction of the height of the building.

4. A rigid frame building comprising a plurality of bents, each formed with substantially vertical portions of T-shaped cross section and a roof beam portion of I-beam cross section, the respective flanges of said T's being faced toward the interior of said building, said wall panels for said building extending between said bents, each of said panels having vertically disposed angle iron margins, adjacent angle iron margins being bolted to webs of said portions of T-shaped cross section, thereby simultaneously forming built-up vertical members of I-beam cross section and securing the side walls in place, purlins supported by the roof beam portions of said bents, and roof- ing supported by said purlins.

5. A rigid frame building comprising a plurality of bents, each formed with substantially vertical portions of T-shaped cross section, the respective flanges of said T's being faced toward the interior of said building, said wall panels for said building extending between said bents, each of said panels having vertically disposed angle iron margins and stringers secured to said angle irons, sheet metal supported by said stringers and angle irons, adjacent angle iron margins being bolted to webs of said portions of T-shaped cross section, thereby simultaneously forming built-up vertical members of I-beam cross section and securing the side walls in place.

6. A rigid frame building comprising a plurality of bents, each formed with substantially vertical portions of T-shaped cross section and a
roof beam portion of I-beam cross section, the respective flanges of said T's being faced toward the interior of said building, side wall panels for said building extending between said bents, each of said panels having vertically disposed angle iron margins, adjacent angle iron margins being bolted to webs of said portions of T-shaped cross section, thereby simultaneously forming built-up vertical members of I-beam cross section and securing the side walls in place, said vertical members being formed with integral haunches at their upper ends, said haunches being joined to the ends of said roof beam portion at the points of inflection.

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