Feb. 5, 1929. 1,701,303

W. C. JONES

STEEL LUMBER

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Fig. 1.

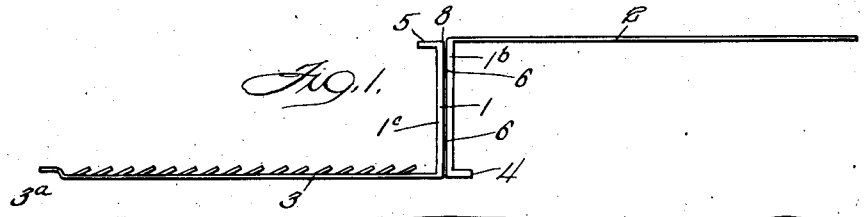


Fig. 2.

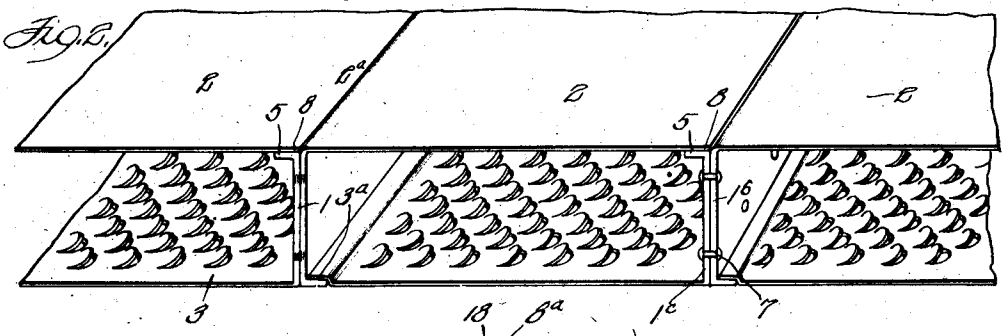


Fig. 3.

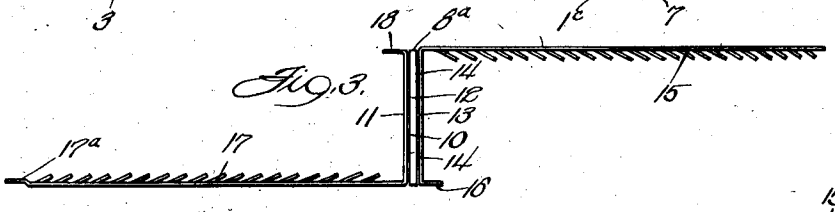


Fig. 4.

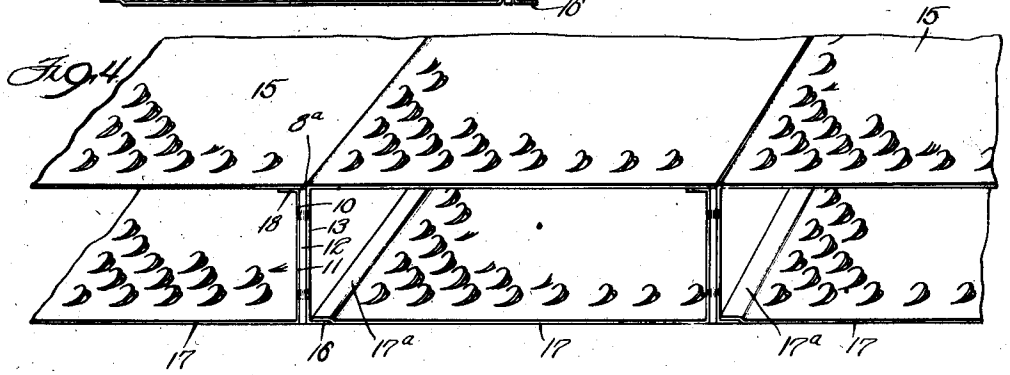


Fig. 5.

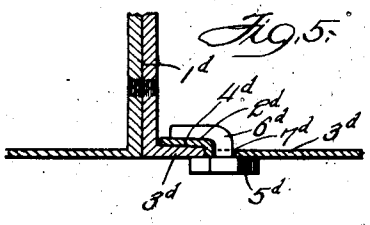
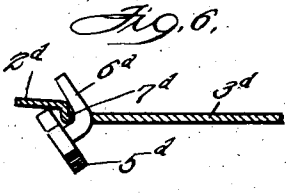


Fig. 6.



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STEEL LUMBER

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Fig. 7.

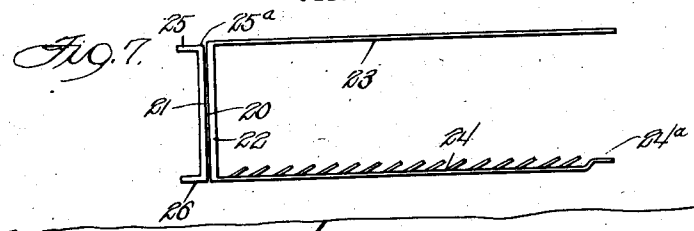


Fig. 8.

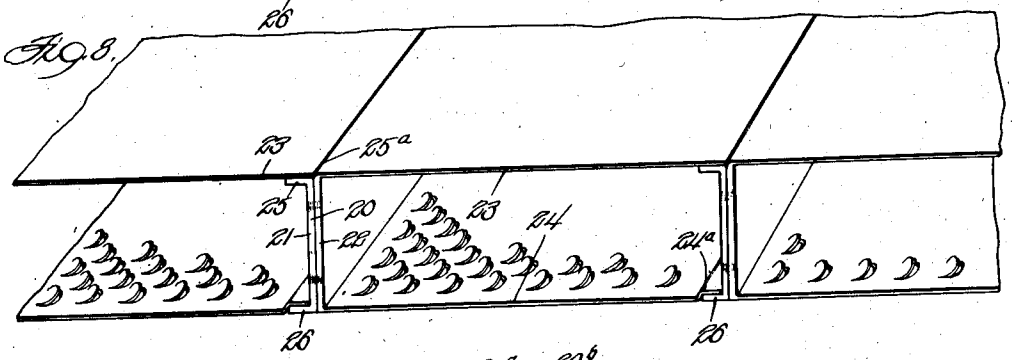


Fig. 9.

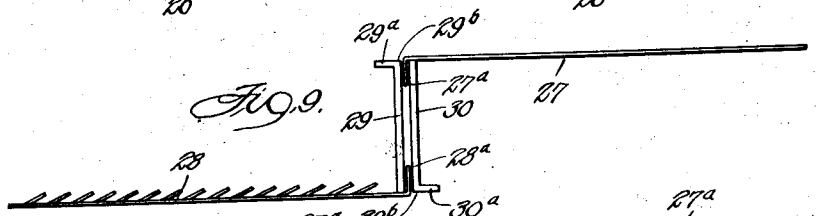


Fig. 10.

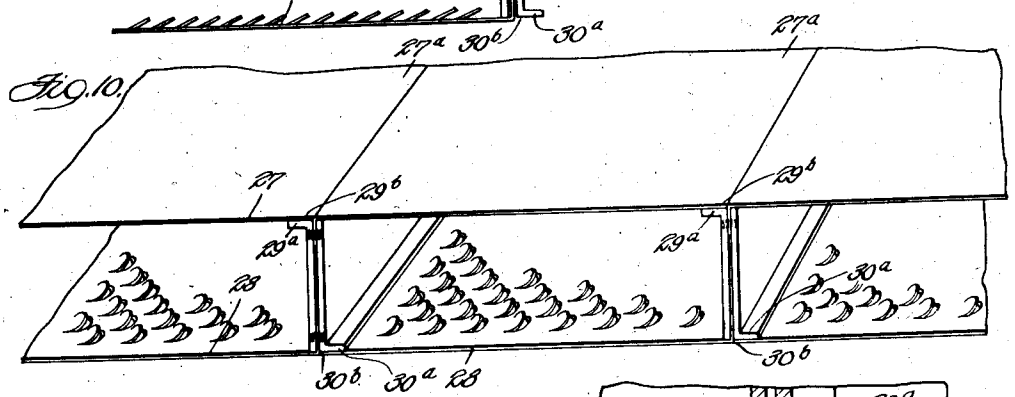


Fig. 11.

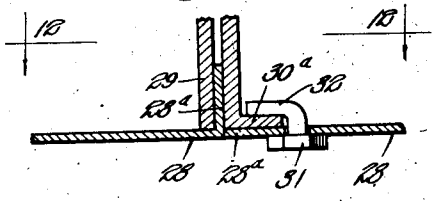
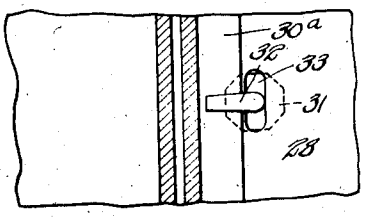


Fig. 12.



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STEEL LUMBER

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Fig. 13.

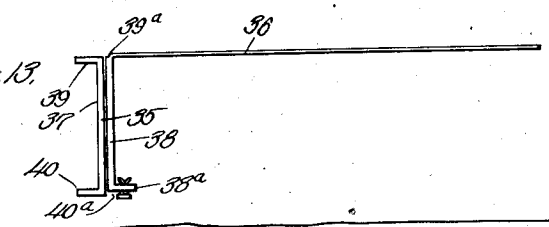


Fig. 14.

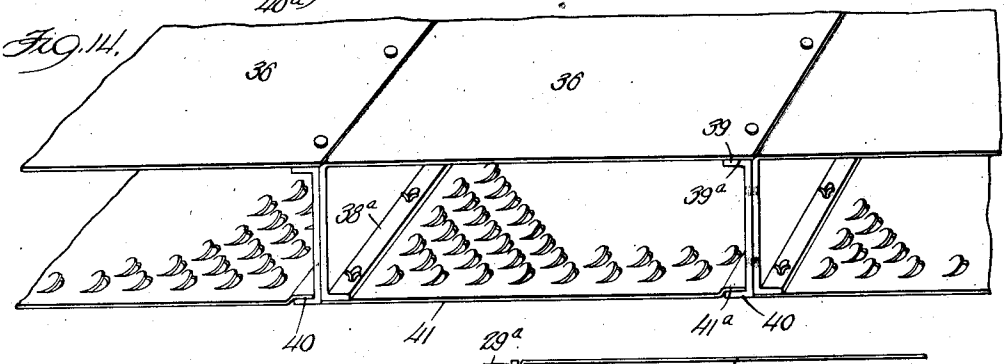


Fig. 15

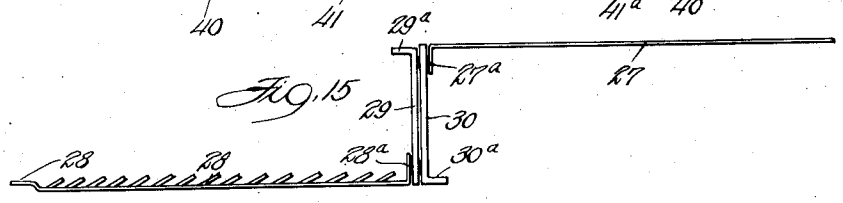


Fig. 16

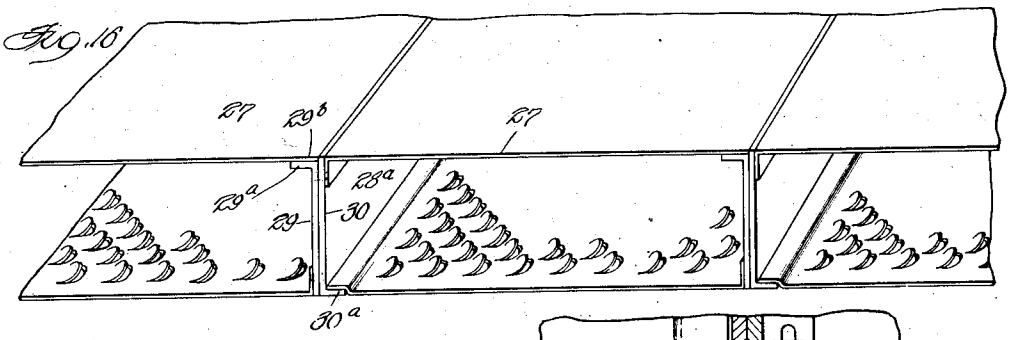


Fig. 18.

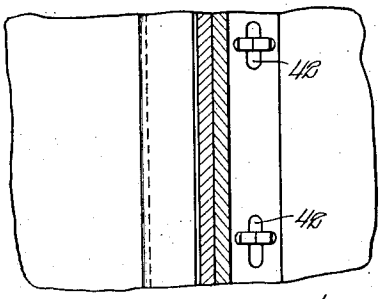
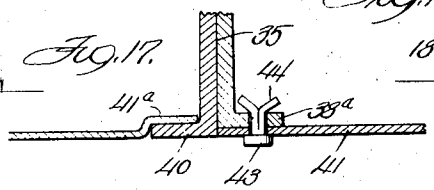


Fig. 17.



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STEEL LUMBER

Filed Oct. 19, 1925 4 Sheets-Sheet 4

Fig. 19.

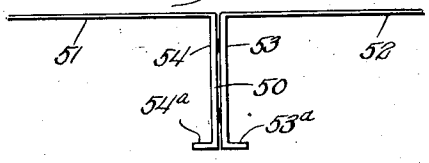


Fig. 20.

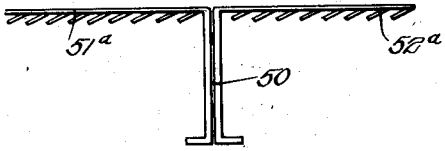


Fig. 21.

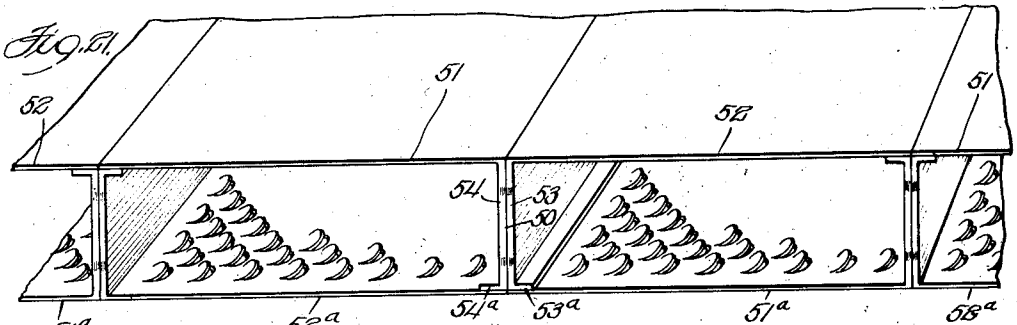


Fig. 22.

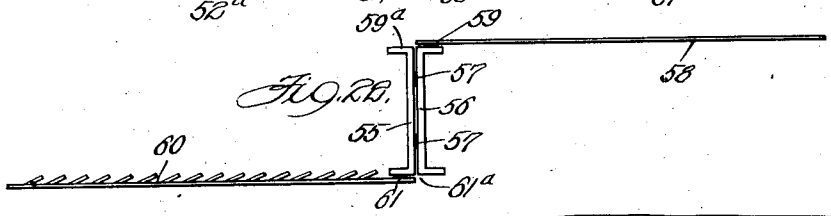


Fig. 23.

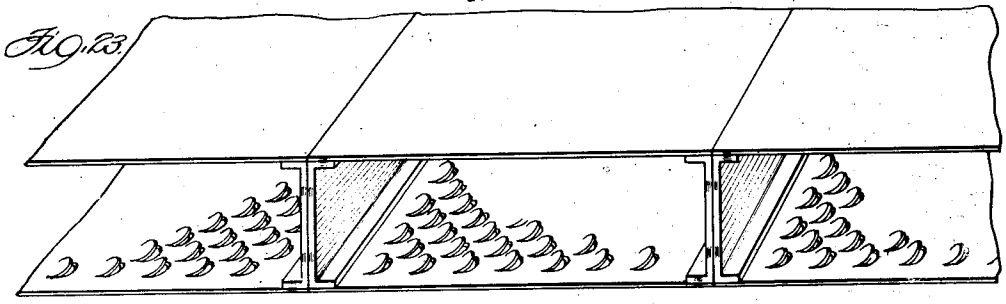
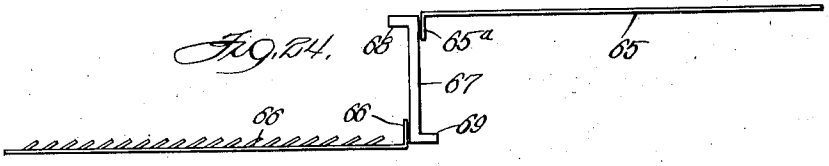


Fig. 24.



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Patented Feb. 5, 1929. 1,701,303

UNITED STATES PATENT OFFICE.

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STEEL LUMBER.

Application filed October 19, 1925. Serial No. 63,217.

My invention relates to steel lumber and it has special reference to a steel lumber combination section that may be fabricated into a self contained unitary structure at the factory or before installation, and which comprises a relatively thick weight supporting studding portion and one or more relatively thin sustaining plate portions extending laterally therefrom, this combination section constituting a plurality of steel members that are permanently secured together by welding or other equivalent means into a permanently organized self contained lumber section that may be shipped, handled and installed as a unit.

More particularly my present invention refers to a steel lumber combination section of the character indicated above which may be fabricated into a self contained unitary structure, preferably from standard steel parts that are capable of being readily assembled and secured to one another to form a permanently organized section that will serve either as a combination stud and exterior and interior lathing, or as a combination joist and the associated lathing or flooring, or as any other combination of weight supporting studding portion and relatively thin sustaining plate portion of a building construction.

By means of my present invention, steel lumber combination sections of the aforesaid character may be conveniently and economically manufactured from a plurality of steel members that are permanently secured together to form a one piece self contained unitary structure that may be readily handled and installed to serve as a substitute for the wooden members that have heretofore entered into a building construction.

To compare specifically such corresponding wooden members entering into a building construction with the steel lumber of my present invention, I may state that wooden parts, such as joists, rafters, studs, lathing, flooring and the like are made in separate and distinct pieces, each requiring separate manufacturing, handling and assembling in order to incorporate them properly into a building structure.

Steel lumber has heretofore been proposed and manufactured but the various elements such as joists, studs, rafters, flooring, lathing and the like have been made as separate and individual pieces. Such separate members as joists, rafters and studs, which serve as the weight supporting elements of a building construction, have been built up from sheet steel parts, such as angle irons, channel irons, plates and the like. They were assembled into a building construction as separate individual units and the lathing, flooring and the like was, of necessity, secured to the said weight supporting elements after the latter had been installed, thus necessitating that each individual unit be separately handled and applied which required skilled labor to fit and match the various individual parts together in a building construction.

It has also been proposed to manufacture steel lumber combination sections by rolling the section from a single piece of metal; such a steel lumber section requires expensive and heavy rolling equipment and consequent heavy investment, and, in some instances, the handling of heavy and difficult pieces. Moreover, as a result of the rolling operation, these sections may be subjected to internal stresses due to the fibres becoming distorted or altered. This may result in greater or more objectionable twisting, distortion or warping when subjected to unduly high heat effects as in accidental fires in buildings in which such steel sections may be incorporated. These features are minimized or avoided in the structures of my present invention.

By means of my present invention, I am able to construct a steel lumber combination section which does not embody any of the foregoing disadvantages and, at the same time, possesses many advantages heretofore absent from steel lumber.

Steel lumber combination sections embodying a form of my present invention are constructed from light weight members, usually of standard form and, if desired, of comparatively thin members wherein the internal stresses may be minimized. No expensive rolling equipment is necessary for manufacturing the various members that constitute my present steel lumber combination section, since all of these members are of comparatively light weight and simple form but, when organized to form the built-up section, are capable of supporting the requisite weights or loads that may be imposed upon them in the building structure. By permanently securing these various light weight members to one another to form an integral

unitary structure by spot welding or other equivalent means, I am able to form a lumber combination section that has a relatively thick weight supporting studding portion as well as one or more sustaining plate portions extending laterally therefrom which latter constitute the lathing, either internal or external, flooring or ceiling or the like, all constituting a self contained permanently organized combination unit that dispenses with subsequent fitting and matching by metal workers when being incorporated into a building construction.

Again, I am able to fabricate completely my steel lumber combination section at the factory from the aforesaid comparatively simple and light weight members into standard unitary sections that may be assembled into a building construction thereby avoiding waste, expense, mistakes and delays incidental to the handling and assembling of individual steel lumber sections heretofore described.

Moreover, the class of labor required to install the steel lumber combination section of my present invention need not be skilled since my new lumber combination section is cut to size and completely formed at the factory prior to installation which eliminates the necessity of employing structural steel workers for matching, fitting and assembling my lumber sections into a building construction. The means which I employ for securing the steel lumber combination sections of my present invention to one another are so simple, convenient and readily applied that no skilled labor need be utilized for this purpose.

A building construction embodying my present steel lumber combination sections may be speedily erected because my present lumber sections are self sustaining and consequently a number of floors can be installed at the same time, since the weight supporting element is incorporated into the building structure simultaneously with the flooring and ceiling.

Other objects of my invention will be hereinafter described and for a better understanding of the nature, scope and characteristic features of my invention, reference may be had to the following description and the accompanying drawings, in which—

Figure 1 is a cross sectional view showing a Z-shaped self contained and unitary steel lumber combination section embodying one form of my invention which comprises a relatively thick weight supporting portion and relatively thin sustaining plate portions extending laterally therefrom thereby constituting a steel lumber section built up from a plurality of members and which may be fabricated and completely organized at the factory and thereafter shipped, handled and installed as a unitary structure;

Fig. 2 is a perspective view showing the method of assembling the lumber sections of Fig. 1 in a building construction;

Fig. 3 is a modified form of the Z-shaped self contained unitary steel lumber combination section of Fig. 1;

Fig. 4 is a perspective view showing the assembly of the lumber sections of Fig. 3 in a building construction;

Fig. 5 is a detailed view, partially in elevation and partially in section, showing means for attaching adjacent steel lumber sections to each other in a building construction;

Fig. 6 is a view showing how the fastening means of Fig. 5 may be assembled in relation to a steel lumber section prior to the final positioning of the fastening means in the building construction;

Fig. 7 is a cross sectional view of a U-shaped self contained steel lumber combination section embodying a modified form of my present invention;

Fig. 8 is a perspective view showing the assembly of the steel lumber sections of Fig. 7 in a building construction;

Fig. 9 is a cross sectional view showing a modified form of the Z-shaped self contained built-up steel lumber combination section that is illustrated in Fig. 1;

Fig. 10 is a perspective view showing the assembly of the steel lumber sections of Fig. 9 into a building construction;

Fig. 11 is a detailed view, partially in elevation and partially in section, showing a structure whereby adjacent steel lumber combination sections, such as those illustrated in Figs. 9 and 10, may be connected to one another;

Fig. 12 is a plan view taken on the lines 12—12 of Fig. 11;

Fig. 13 is a cross sectional view of an L-shaped self contained unitary steel lumber combination section embodying a modified form of my present invention;

Fig. 14 is a perspective view showing the assembly of the L-shaped self contained unitary steel lumber combination sections of Fig. 13 into a building construction;

Fig. 15 is a cross sectional view of a modified form of a Z-shaped steel lumber combination section which is constructed in accordance with my present invention;

Fig. 16 is a perspective view showing the assembly of the steel lumber sections of Fig. 15 in a building construction;

Fig. 17 is a detailed view, partially in elevation and partially in section, of means for connecting adjacent steel lumber sections to one another and being adapted particularly to apply to the building construction shown in Fig. 14;

Fig. 18 is a plan view taken on the line 18—18 of Fig. 17;

Fig. 19 is a cross sectional view of a

T-shaped self contained unitary steel lumber combination section embodying a modified form of my present invention;

Fig. 20 is a view of a T-shaped steel lumber combination section similar to that of Fig. 19, except that the sustaining plate portions are perforated or otherwise deformed to serve as lathing portions.

Fig. 21 is a perspective view showing the assembly of the T-shaped steel lumber combination sections of Figs. 19 and 20 into a building construction;

Fig. 22 is a cross sectional view showing a modified form of a Z-shaped self contained unitary steel lumber combination section embodying another form of my invention;

Fig. 23 is a perspective view showing the assembly of the steel lumber sections of Fig. 22 in a building construction; and

Fig. 24 is a cross sectional view showing a further modification of the Z-shaped steel lumber combination section of Fig. 22.

The term "studding portion" as used herein contemplates a relatively thick or heavy weight load or stress supporting portion of a building construction or structure and comprises in its meaning such members as joists, studs and the like that are adapted to serve as the weight supporting elements or members of a building construction. Likewise the terms "sustaining plate portion," "lathing portion" and "flooring" are used synonomously and comprise in their meaning the flooring, the lathing, either external or internal, on the ceiling or side walls and the like, which elements of a building structure are relatively thin and light in comparison to the studding portion and are of sufficient width, in conjunction with the adjacent lumber sections in a building construction, to span the space between adjacent studding portions.

Referring to Figs. 1 and 2, the self contained unitary steel lumber combination section comprises a relatively thick weight supporting studding portion 1 and two sustaining plate portions 2 and 3 that extend laterally and in opposite directions from the studding portion 1 and adjacent to its edges. The sustaining plate portion 3 is shown as being perforated or deformed and, therefore, may serve as lathing, while the sustaining plate portion 2 may serve as a flooring. The steel lumber combination section is built-up of two members, one constituting the flooring portion 2 and a relatively thick portion 1^b which is bent at right angles to the flooring portion 2. A bent-over portion 4 serves as an exposed flange formed upon the studding portion 1 of the built-up lumber section. Similarly, the lathing portion 3 is provided with a relatively thick portion 1^c which is positioned back to back with respect to the portion 1^b. A bent-over portion serves as a second exposed flange formed upon the studding portion 1 of the built-up lumber section. The portion 1^b and the portion 1^c are welded to each other or otherwise permanently secured as shown diagrammatically at 6, to form a unitary structure with all the parts permanently organized. I have shown also that in Fig. 2 the portion 1^b may be permanently secured to the portion 1^c by means of rivets 7. The flange 4 which projects from the studding portion 1 opposite to the lathing portion 3 has its lower surface preferably coplanar with the lower surface of the lathing portion 3, while the flange 5, which extends from the studding portion 1 opposite to the flooring portion 2 is depressed below the upper surface of the flooring portion 2, thereby providing a recess 8 in order that the outer edge of the flooring portion of the next adjoining lumber section may rest upon the flange 5 and, at the same time, permit of the flooring portion of the adjoining lumber section being in the same plane as the flooring portion 2, as shown in Fig. 2.

The member of the built-up steel lumber section comprising the flooring portion 2, the portion 1^b and the flange 4 may be rolled into a single unitary member which is subsequently formed as shown. In the same manner the member comprising the flange 5, the portion 1^c and the lathing portion 3 may be rolled into a unitary member and subsequently formed. The two members may then be positioned back to back, as shown, and welded or otherwise permanently secured to each other in order to constitute a self contained built-up unitary lumber section that comprises a relatively thick weight supporting studding portion and relatively thin sustaining plate portions 2 and 3 extending laterally therefrom and constituting respectively the flooring and the lathing.

The Z-shaped lumber section of Fig. 1 is fabricated completely at the factory or before installation, and, consequently, is shipped, handled and installed as a single unit without necessitating any riveting, welding or any other operation being performed by skilled labor for incorporating it into a building construction.

As I have hereinbefore explained, the studding portion 1 may be formed by placing the two members 1^b and 1^c back to back and welding them to each other but in lieu of the welding these two portions may be permanently secured to each other by means of rivets, such as the rivets 7 of Fig. 2.

In Fig. 2 the Z-shaped self contained steel lumber combination sections of Fig. 1 are shown in assembled position in a building construction. The sustaining plate portions 2 constitute a coplanar surface that may serve as the flooring of the upper story. Likewise, the sustaining plate portions 3 are coplanar and by reason of their being perforated or deformed may serve as lathing for the ceil-

ing of the lower story of a building construction. The relatively thick studding portions serve as the weight supporting elements of the building. The outer edges 2^a of the upper sustaining plates 2 of each lumber section are supported upon the flanges 5 of the studding portions 1 of the next adjacent lumber section and are received in the recessed portions 8 formed by the flanges 5 so that the flooring portions 2 may form a contiguous coplanar surface. The lathing portions 3 are provided at their outer edges with offsets 3^a and when the lumber section is in assembled position this offset 3^a rests upon the flange 4 on the studding portions 1 of the next adjacent lumber section. In this fashion, the sustaining plate lathing portions 3 are supported at their outer edges upon the studding portions of the adjoining steel lumber sections.

The self contained built-up steel lumber combination section, of Figs. 1 and 2 may be made up into staple lengths, namely, 12 feet, 14 feet, 16 feet and the like, corresponding to the standard lengths in which wooden lumber heretofore employed in building construction was furnished. In conformity with standard dimensions and spacings of members employed in building construction, when wooden lumber is utilized, the studding portion 1 may, for illustration, be from 4″ to 6″ wide or larger and about 1/8″ or more in thickness and the sustaining plate portions 2 and 3 may be 12″, 16″, 24″ wide or the like, and approximately 1/32″ thick or more. In building construction, it is customary to space the studdings, namely the joists and studs on 16″ centers and for this reason 16″ may be adopted as a suitable and convenient transverse dimension for the sustaining plate portions 2 and 3. The depth of the studs, joists and the like usually entering into a standard building construction often varies from 4″ to 6″ and these transverse dimensions may be adopted for the studding portion 1 of my present steel lumber combination section.

It is to be understood, however, that I am not to be limited by the dimensions herein specified, inasmuch as it may be desirable to space the studding portions of adjacent lumber sections greater or less distances from each other than those mentioned and also the depth of the studding portions may be increased or decreased, as desired, as well as the thickness thereof. The same comments pertain to the dimensions herein specified for the sustaining plate portions. All dimensions given are merely illustrative.

It will now be observed that the self contained steel lumber combination section of Fig. 1, when assembled into the building construction, does not require the aid of skilled labor, particularly metal workers, because such steel lumber sections are completely organized and fabricated into unitary sections at the factory or before installation and, consequently, no subsequent fitting or matching is required when installing them. These lumber combination sections may be handled conveniently as units and the flooring and the lathing are simultaneously incorporated into the building with the positioning of the studding portions. By reason of my present steel lumber, excess weight is eliminated, as well as unnecessary work because all waste, expense, mistakes and delays are avoided which are usually incidental to field fabrication. Therefore, the labor required for erecting a building construction made up of my present steel lumber combination sections is reduced to a minimum. Moreover, the steel lumber sections are self sustaining and may be completely installed at one time. Moreover, my present steel lumber provides a durable and permanent building construction which is fireproof, inasmuch as wooden flooring, wooden lathing and wooden studding have been completely supplanted by employing my self contained steel lumber combination sections.

In Fig. 3 I have shown a modified form of the self contained Z-shaped steel lumber combination section of Fig. 1. In this modified form the relatively thick studding portion 10 is built up of three thicknesses of metal, 11, 12 and 13 that may be permanently secured to one another by means of spot welding. The portion 13 is formed from a plate of uniform thickness comprising a thin sustaining plate portion 15 and a flange 16. Similarly, the portion 11 is formed from a plate of uniform thickness comprising the thin sustaining plate portion 17 and the flange 18. The member constituting the portions 13, 15 and 16 is preferably integrally formed and of uniform thickness throughout. Similarly, the member comprising the portions 11, 17 and 18 is preferably integrally formed and of uniform thickness throughout. As a consequence, these two integrally formed members are relieved of all internal stresses because their fibers do not become distorted during manufacture inasmuch as they are rolled into a section of uniform thickness. Of course, I am not to be limited to a construction which employs members of uniform thickness because the separate members may possess different thicknesses such as the members comprised in the built-up lumber of Fig. 1.

The relatively thick plate 12 is interposed between the portion 11 and the portion 13 and when these three members are welded to one another they constitute a relatively heavy studding portion that serves as the weight supporting element of a building construction. The sustaining plate portion 15 may be perforated to serve as the lathing for an inner or outer wall, and the sustaining plate portion 17 may likewise be perforated or deformed, as

shown, in order to serve as lathing for a wall. When the combination steel lumber section of Fig. 3 is installed in a building construction, there will be little or no tendency for the sustaining plate portions 15 and 17 to warp or distort even under the considerable heat of a fire, inasmuch as internal stresses and strains have been minimized. The flange 18 adjacent to the upper edge of the portion 11 terminates on a surface below the upper surface of the sustaining plate portion 15 in order to provide a recess 8^a which, in the assembled building construction, serves to receive the outer edge of the upper sustaining plate portion of an adjoining Z-shaped lumber section, as shown in Fig. 4. The lathing portion 17 is provided at its outer edge with an offset 17^a which, in the assembled building construction, rests upon the flange 16 formed upon the studding portion of an adjacent lumber section.

The self contained steel lumber combination sections of Fig. 3 are assembled in a building construction by positioning them in side-by-side relation, as shown in Fig. 4. This steel lumber section of Fig. 3 is similar to the steel lumber section of Fig. 1 in that it is a Z-shaped self contained unitary built-up structure that is organized completely at the factory or before installation and is made from a plurality of members that are welded to one another or permanently secured to one another by any suitable means. The studding portion 10, which constitutes a weight supporting element of the building construction, is considerably thicker than the sustaining plate portions 15 and 17 because it is made up of a plurality of members placed back to back with an interposed reenforcing plate 12, all being welded together or otherwise permanently secured to one another before installation.

In Figs. 5 and 6 I have shown a means for connecting a sustaining plate portion 3^d of one lumber section to the studding portion 1^d of an adjoining lumber section. In this instance, the studding portion 1^d is provided at its lower edge with a flange 3^d that is shown as possessing an inclined upper face 4^d. The flange 3^d, therefore, serves in the nature of a wedge. The outer edge of the sustaining plate portion 3^d is provided with an offset 2^d, as shown in Fig. 6, which rests upon the flange 3^d in the manner shown. The fastening member 5^d is provided with a bent-over shank portion 6^d which is projected through an opening 7^d formed in the sustaining plate portion 3^d adjacent to the offset portion 2^d. The fastening member 5^d is positioned in the opening 7^d after the manner substantially as shown in Fig. 6 before the offset portion 2^d engages the wedge shaped flange 3^d. This is accomplished by reason of the open space provided underneath the offset 2^d adjacent to the tilted head of the fastening means 5^d, as shown in Fig. 6. After the fastening member 5^d is positioned as shown in Fig. 6 and subsequent to positioning the offset portion 2^d upon the flange 3^d, the attaching means 5^d may then be moved to the position shown in Fig. 5. Thereupon, the offset 2^d is forced by wedge action into intimate contact with the flange 3^d.

I have not shown the building construction of Figs. 2 and 4 as being provided with the attaching means of Figs. 5 and 6 but it will readily be perceived that such attaching means or any other suitable means, even welding, may be utilized for securing adjacent lumber sections to one another in the event that it is desired to hold the offset portions of the sustaining plates of one lumber section in contact with the studding portions of the adjacent lumber sections.

In Fig. 7 I have shown a U-shaped steel lumber combination section made up of a plurality of members that are welded or otherwise permanently secured to one another to form a self contained unitary structure. The studding portion 20 comprises a section 21 that is permanently secured to a central portion 22 from which an upper sustaining plate portion 23 and a lower sustaining plate portion 24 extend laterally. The portions 22, 23, and 24 may, if desired, be formed from a rolled unitary section which is subsequently formed into a U-shape, as shown. The member 21 may be formed into a channel shape having laterally projecting flanges 25 and 26, the flange 25 extending below the upper surface of the adjacent sustaining plate portion 23 in order to provide a recess 25^a. If desired, the portions 22, 23 and 24 may be formed from a flat plate of uniform thickness. The studding portion 20 is formed from a plurality of members 21 and 22 that are placed back to back and permanently secured to each other by welding or any other suitable means. In this fashion, a relatively thick studding portion 20 is provided that serves as the weight supporting element of a building construction.

The U-shaped steel lumber combination sections of Fig. 7 may be assembled into a building construction as shown in Fig. 8. Herein, the upper sustaining plate portions 23 constitute a flooring, while the sustaining plate portions 24 are perforated, ribbed or deformed in any suitable fashion to serve as the lathing for the ceiling. The sustaining plate portion 24 is provided at its outer edge with an offset 24^a which is received upon the exposed flange 26 of the adjoining lumber section. When the side-by-side lumber sections are assembled as shown in Fig. 8 the outer edges of the upper sustaining plate portions 23 are received in the recesses 25^a of the next adjoining steel lumber sections. In this manner, the several sustaining plate portions 23 are contiguous with one another to form a coplanar surface and

similarly the offsets 24ª, by resting upon the flanges 26 of the adjoining lumber sections, serve to position the lower sustaining plate portions 24 in a contiguous coplanar surface.

Reference may now be had to Fig. 9 wherein a modified form of a Z-shaped self contained steel lumber combination section embodying another form of my invention is illustrated. Herein, the sustaining plate portions 27 and 28 are formed from separate relatively thin plates which are bent adjacent to one of their edges to form upstanding flange portions 27ª and 28ª, respectively. The flanges 27ª and 28ª are received between two relatively thick members 29 and 30, being provided, respectively with flanges 29ª and 30ª. The relatively thick members 29 and 30 are positioned back to back with the flanges 27ª and 28ª interposed therebetween and all are permanently secured to one another, preferably by welding in order to form a relatively thick weight supporting studding portion for the lumber section. The flanges 29ª and 30ª project outwardly in opposite directions from the studding portion and each is depressed below the surface of the adjacent plate sustaining portion in order to provide recesses 29ᵇ and 30ᵇ, respectively. In this manner, a self contained steel lumber combination section is permanently organized from a plurality of members that are secured to one another, preferably by welding. In consequence thereof, the Z-shaped lumber sections of Fig. 9 may be completely fabricated at the factory and before installation and shipped, handled and assembled into a building construction as a unitary combination section.

The steel lumber section of Fig. 9 may be assembled into a building construction, as shown in Fig. 10. The outer edges 27ª of the upper sustaining plate portions 27 are received in the recesses 29ᵇ formed adjacent to the flanges 29 upon which they are supported. The outer edges 28ª of the lower sustaining plate portions 28 are in contact with the flanges 30ª and are received in the recesses 30ᵇ formed adjacent thereto.

The outer edges 28ª of the lower sustaining plate portions 28 may be welded to the flanges 30ª, if desired, or, they may be attached thereto by the means shown in Fig. 11. Herein, a connecting bolt 31 is provided with a bent-over shank 32 that holds the edge 28ª of the sustaining plate 28 in intimate contact with the flange 30ª by engaging the upper surface of the flange 30ª. Inasmuch as the outer edge 28ª of the sustaining plate portion 28 is not, in this instance, provided with an offset, it is necessary to perforate the plate 28 with spaced elongated perforations 33, as shown in Fig. 12. In applying the attaching bolt 31, the shank 32 is passed through the elongated opening 33 and then turned at right angles to the longitudinal dimension of the elongated opening 33, thereby holding the outer edge 28ª of the plate 28 firmly against the lower face of the flange 30ª. In this manner, the outer edge of a sustaining plate portion of one lumber section may be secured to the studing portion of the next adjoining lumber section.

In Fig. 13 I have shown a modified form of a steel lumber combination section built up into an L-shape constituting a relatively thick studding portion 35 and a relatively thin sustaining plate portion 36. The studding portion 35 may be formed, if desired, from a channel section 37 that is placed back to back to a portion 38 which may be formed integrally with a sustaining plate portion 36. The portions 37 and 38 are permanently secured to each other, preferably by welding. The channel section 37 provides exposed laterally extending flanges 39 and 40, the former flange being depressed below the upper surface of the sustaining plate portion 36 to provide a recess 39ª and the latter flange 40 extending beyond the lower edge of the portion 38 in order to provide a recess 40ª. The portion 38 is provided at its lower edge with a bent-over portion 38ª which constitutes an exposed flange extending oppositely from the exposed flange 40.

In a building construction the L-shaped built-up steel lumber combination section of Fig. 13 may be assembled together, as shown in Fig. 14. Herein, the outer edge of the sustaining plate portion 36 of a lumber section is received in the recess 39ª and is supported upon the flange 39 of the next adjoining lumber section. Consequently, the side-by-side sustaining plate portions 36 form a contiguous coplanar surface that may serve either as a flooring or as a lathing. In the structure shown in Fig. 14 the sustaining plate portions 36 serve as flooring. The lathing is formed up of a plurality of side-by-side individual plates 41 each of which is provided along one of its edges with an offset portion 41ª. When the plate 41 is in position the offset portion 41ª rests upon the exposed flange 40 of the studding portion. The other edge of the sustaining plate portion 41 may be secured to the flange 38ª of the studding portion as shown in Figs. 17 and 18. The flange 38ª is provided at spaced intervals with elongated perforations 42 and correspondingly positioned and shaped perforations are formed in the edge of the plate 41. Holding pins 43 that are severally provided with a split bifurcated shank 44 are extended through the elongated and registering openings 42 formed in the plate 41 and, in the flange 38ª. The pins 43 are first turned at right angles to their positions shown in Figs. 17 and 18 and in this manner the bifurcated shanks 44 may be projected through the elongated openings 42. In this manner the pins 43 serve as a holding means for securing the outer

edges of the lathing plates 41 to the studding portion 35 of the steel lumber combination sections.

In Fig. 15 I have shown a modified form of the Z-shaped steel lumber section of Fig. 9. Herein, the sustaining plate portion 27, which is provided with a bent-over flange 27ª, and the sustaining plate portion 28, which is provided with the bent-over flange portion 28ª, are secured to two side-by-side relatively thick portions 29 and 30 but the flanges 27ª and 28ª, instead of being interposed between the members 29 and 30, as shown in the structure of Fig. 9, are placed exteriorly of the members 29 and 30. The members are all permanently secured to one another, preferably by welding, to form a self contained permanently organized steel lumber combination section.

The Z-shaped steel lumber sections of Fig. 15 may be assembled into a building construction by positioning them, side-by-side as shown in Fig. 16. Herein, an offset portion 28 formed on the outer edge of the sustaining plate portion 28 rests upon the flange 30ª that projects laterally from the studding portion 30 of an adjacent lumber section. Similarly, the flange 29ª also projecting laterally from the studding portion 30 supports the outer edge of the sustaining plate portion 27 of the next adjoining steel lumber section, but the flange 29ª is depressed below the surface of the sustaining plate portion 27 in order to provide a recess 29ᵇ which receives the outer edge of the sustaining plate portion 27 of the next adjoining lumber section. Of course, the attaching means of Figs. 5 and 6 may be employed in the construction shown in Fig. 16 in order to secure the offset portions 28ª to the flanges 30ª and, again, the attaching means shown in Fig. 17 and Fig. 18 may be employed for securing the outer edges of the sustaining plate portions 27 to the laterally extending flanges 29ª.

In Fig. 19 I have shown a steel lumber combination section comprising a relatively thick central portion 50 and two laterally extending plate sustaining portions 51 and 52 which extend in opposite directions from the same edge of the studding portion 50 which lumber section, therefore, constitutes a T-shaped self contained steel lumber combination section having a relatively thick weight supporting studding portion 50 intermediate of the two oppositely extending and coplanar sustaining portions 51 and 52. In the specific form shown in Fig. 19, the T-shaped lumber section is formed from a plurality of members that are permanently secured or welded together to form a self contained unit but, of course, it is to be understood that I am not to be limited to the specific structure shown herein. A preferred form of my present T-shaped lumber section may be made from two pieces of uniform thickness or may be formed from two pieces, each of which comprises a relatively thin portion that serves as the sustaining plate portion and a relatively thick portion which, in conjunction with the corresponding relatively thick portion of the other member, serves as a relatively thick weight supporting studding portion 50. The two relatively thick portions 53 and 54 may be permanently secured to one another by welding or otherwise, by positioning them back to back, as shown in Fig. 19. Also, the flanges 53ª and 54ª may be formed upon the portions 53 and 54 respectively.

By reason of the T-shaped conformation of the steel lumber section, it is necessary in order to build up a combination studding, flooring and lathing construction to incorporate therein a second T-shaped steel lumber combination section as shown in Fig. 20. The construction of the steel lumber combination section of Fig. 20 is similar in all respects to the T-shaped steel lumber section of Fig. 19, except that the sustaining plate portions 51ª and 52ª are perforated or otherwise deformed in order to serve as a lathing.

In Fig. 21 I have shown the incorporation of the T-shaped steel lumber sections of Figs. 19 and 20 in a building construction. Alternate T-shaped lumber sections serve to supply the flooring, while the intermediate T-shaped lumber sections serve to form the lathing, as shown. In other words, alternate T-shaped sections may be placed upright and in this circumstance the sustaining plate portions are not perforated but serve as contiguous coplanar flooring members, while the intermediate T-shaped lumber sections are inverted in order that the perforated or otherwise deformed sustaining plate portions may form a contiguous and coplanar perforated lathing structure. The outer edges of the sustaining plate portions, whether perforated or not, may be secured to the studding portions of the adjoining lumber sections by any of the means herein described. A wall for plaster, external or internal, may likewise be built up by providing lathing portions on both sides of the assembled lumber sections as shown in Fig. 4.

The Z-shaped lumber section of Fig. 22 is formed by placing back to back two channel shaped members 55 and 56 that are welded at 57 to each other or otherwise permanently secured to form a built-up relatively thick weight supporting studding portion. A sustaining plate member 58 is welded or otherwise permanently secured to the channel member 56 by welding, such as shown at 59 and, similarly, a sustaining plate portion 60 is secured at 61 to the channel member 55 by welding or otherwise. In this manner, a Z-shaped built-up steel lumber combination section is fabricated from a plurality of members that are welded or otherwise permanently secured to one another to form a self con-

tained unitary combination section that may be incorporated into a building construction. The sustaining plate portion 58, by being secured to the channel member 56 in the manner shown, provides a recess 59ª which is adjacent to the channel member 55 and similarly the sustaining plate portion 60, by being secured to the channel member 55 as shown provides a recess 61ª that is adjacent to the channel member 56.

When the Z-shaped steel lumber sections of Fig. 22 are assembled into a building construction by positioning them side-by-side, as shown in Fig. 23, the outer edge of the sustaining plate portion 58 of one lumber section is received in the recesses 59ª of the next adjoining steel lumber section and, similarly, the outer edge of the sustaining plate portion 60 is received in the recess 61ª of the next adjoining steel lumber section. Consequently, the sustaining plate portions 59 unite to form a contiguous coplanar surface that may serve either as the flooring or lathing of a building construction, and likewise the sustaining plate portion 60 may unite to form a coplanar contiguous surface that may serve either as the flooring or the lathing.

In Fig. 24 a Z-shaped steel lumber section is shown as being built up from two relatively thin sustaining plate portions 65 and 66 that are provided with upstanding flanges 65ª and 66ª, respectively. The plates 65 and 66 are secured to a relatively thick portion 67 by welding the flanges 65ª and 66ª thereto. The relatively thick portion 67 is provided along its longitudinal edges with flanges 68 and 69 that project laterally therefrom and in opposite directions from each other. In this fashion a self contained unitary Z-shaped steel lumber combination section is fabricated from a plurality of members that are permanently secured to one another by welding or other equivalent means.

While I have shown my present steel lumber combination sections in most of the drawings as being incorporated into a building construction to serve as joists, upper flooring and lathing for a ceiling under said flooring, it is readily observed that my steel lumber combination sections may serve in a similar fashion as studs, inner lathing and outer lathing as indicated in Fig. 4 or as any other equivalent combination in a building construction.

The combination sections of my invention, irrespective of their shape, whether L-shape, Z-shape, U-shape, or T-shape are all fabricated into a permanently organized, self contained unitary section before installation and this may conveniently be done at the factory so that the combination section may be handled, shipped and installed as a unit. Moreover, by thus fabricating the combination sections of my present invention all fitting, matching and the like in the field are obviated and the installing thereof into a building construction may be done by relatively unskilled labor since all structural metal working is dispensed with, since no field work is required other than the assembling of the separate combination sections and the securing of them together, as herein explained.

In manufacturing or fabricating my present steel lumber combination sections, comparatively light weight and simple members may be employed thus greatly enhancing the ease and convenience of building up the combination sections which serve as the weight supporting elements in a building construction, as well as the sustaining plate portions such as the lathing and flooring. Again, by employing light weight members, no heavy rolling equipment is necessary and the light weight members may constitute standard steel forms which are organized at the factory to serve as the weight supporting elements of a building structure.

While I have herein shown and described several embodiments of my present invention, it is to be understood that these are typical and not all inclusive and that I do not desire to be limited to the specific structures shown and described since many modifications may be made without departing from the spirit and scope of the appended claims.

I claim:

1. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and a relatively thin sustaining plate portion extending laterally therefrom and being of sufficient width, in conjunction with the adjoining lumber section, to span the space between adjacent studding portions, said studding portion constituting a composite structure fabricated from a plurality of members that are permanently secured to one another and, in conjunction with said sustaining plate portion, forming a self contained unitary combination section complete for installation in a building construction.

2. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and a relatively thin sustaining plate portion extending laterally therefrom and possessing a width suitable to span the space between studding portions of adjacent lumber sections, said steel lumber combination section being fabricated from a plurality of members that are permanently secured to one another to form a self contained unitary structure complete for installation in a building construction.

3. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and a relatively thin sustaining plate portion extending laterally therefrom and possessing a width suitable to span the space between studding portions adjacent lumber sections, the said studding

portion consisting of a plurality of members positioned back to back and being permanently secured to each other, and the said steel lumber combination section forming a self contained unitary structure complete for installation in a building construction.

4. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and relatively thin sustaining plate portions extending laterally therefrom adjacent to the edges of said studding portion and severally being of sufficient width, in conjunction with the adjoining structure, to span between adjacent studding portions, said sustaining plate portions having their edges bent over and interposed between side-by-side members constituting said relatively thick studding portion whereto said sustaining plate portions are permanently secured, said steel lumber combination section forming a self contained unitary structure complete for installation in a building construction.

5. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and relatively thin sustaining plate portions extending laterally therefrom and in opposite directions from one edge of said studding portion and severally being of sufficient width, in conjunction with the adjoining lumber section, to span the space between adjacent studding portions, said steel lumber combination section being fabricated from a plurality of L-shaped members placed back to back and permanently secured to one another to form said relatively thick studding portion, said combination lumber section forming a self contained unitary structure complete for installation in a building construction.

6. A steel lumber combination section comprising a relatively thick weight supporting studding portion, and relatively thin sustaining plate portions extending laterally therefrom and severally being of sufficient width, in conjunction with the adjoining structure, to span between adjacent studding portions, said studding portion constituting a composite structure comprising a plurality of members welded to each other and said sustaining plate portions being permanently secured to said studding portion, thereby forming a steel lumber combination section that is fabricated from a plurality of members and constituting a self contained unitary structure complete for installation in a building construction.

7. A building construction comprising side-by-side steel lumber combination sections, each combination section comprising a relatively thick weight supporting studding portion and at least one relatively thin sustaining plate portion extending laterally therefrom, said sustaining plate portion being of sufficient width, in conjunction with the adjoining lumber section, to span the space between the studding portions of the adjacent lumber sections, and attaching means projected through spaced openings formed adjacent to the outer edge of said sustaining plate portion in order to secure said adjoining lumber sections to each other.

8. A building construction comprising side-by-side steel lumber combination sections, each combination section comprising a relatively thick weight supporting studding portion and at least one relatively thin sustaining plate portion extending laterally therefrom and being of sufficient width, in conjunction with the adjoining lumber section, to span the space between the studding portions of the adjacent lumber sections, said combination lumber sections when in assembled positions having their sustaining plate portions contiguous and suitably supported at their outer edges by the adjoining lumber section, and attaching devices projected through spaced openings formed in said sustaining plate portions for securing adjacent lumber sections to each other.

9. A building construction comprising side-by-side steel lumber combination sections, each combination section comprising a relatively thick weight supporting studding portion and at least one relatively thin sustaining plate portion extending laterally therefrom and possessing a width suitable to span the space between studding portions of adjacent lumber sections, and attaching devices projected through spaced openings formed adjacent to the outer edge of said sustaining plate portions in order to secure said sustaining plate portions to the studding portions of the adjoining lumber sections.

10. A building construction comprising side-by-side steel lumber combination sections, each of which comprises a relatively thick weight supporting studding portion and a relatively thin sustaining plate portion that extends laterally from one side of said studding portion and possessing a width suitable to span the space between adjacent lumber sections, said sustaining plate portion having an offset formed on its outer edge, means on said studding portion for supporting said offset portion of the sustaining plate portion of the adjacent lumber section, and devices projected through spaced openings formed adjacent to the outer edge of said sustaining plate portion for securing the latter to said means formed on said studding portion.

11. A building construction comprising side-by-side steel lumber combination sections, each of which comprises a relatively thick weight supporting studding portion and a relatively thin sustaining plate portion that extends laterally from one side of said studding portion and possessing a width suitable to span the space between adjacent lumber sections, said sustaining plate portion

having an offset formed on its outer edge, means on said studding portion for supporting said offset portion of the sustaining plate portion of the adjacent lumber section, said sustaining plate portion having spaced longitudinal openings formed adjacent its outer edge, and fastening devices provided with bent-over shanks for inserting through said longitudnal openings, said fastening means then being rotated to clamp the sustaining plate portion firmly to the means formed on said studding portion.

12. A building construction comprising side-by-side steel lumber combination sections, each comprising a relatively thick weight supporting studding portion and at least one relatively thin sustaining plate portion extending laterally therefrom and possessing a width suitable to span the space between adjacent studding portions, said studding portion being provided with a flange which engages the outer edge of the sustaining plate portion of the next adjoining lumber section, this outer edge of said sustaining plate portion being provided with spaced longitudinal openings, and attaching devices provided with bent-over shanks for projecting through said longitudinal extending openings, said attaching devices being rotatable in said openings in order to clamp the sustaining plate portion of one lumber combination section to said flange on the studding portion of the adjoining lumber combination section by means of said bent-over shanks on said attaching devices.

In witness whereof, I have hereunto subscribed my name.

WALTER CLYDE JONES.