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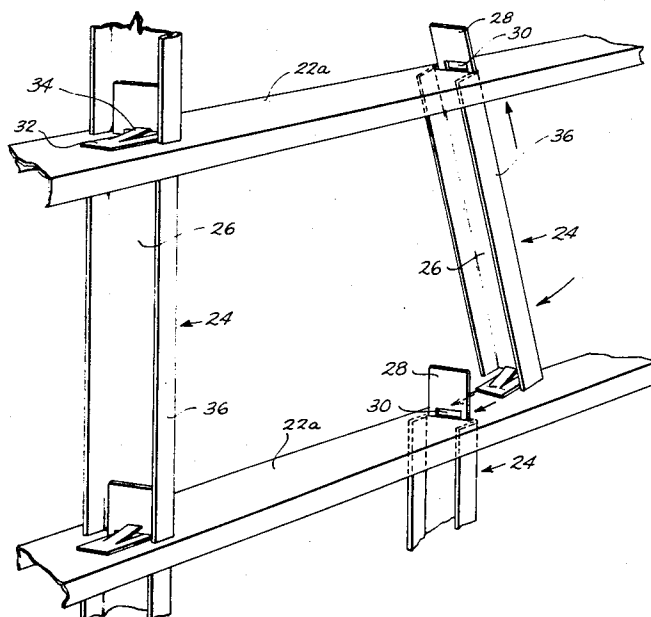
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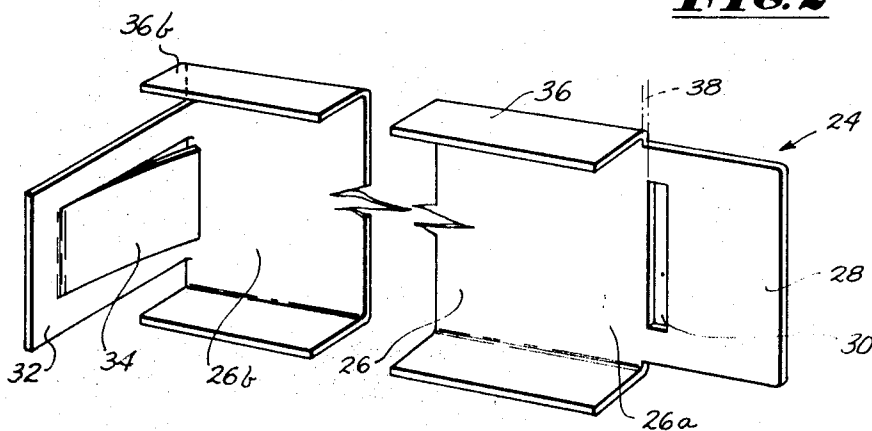
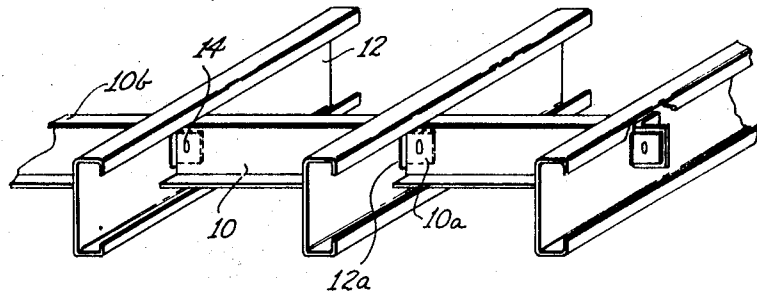
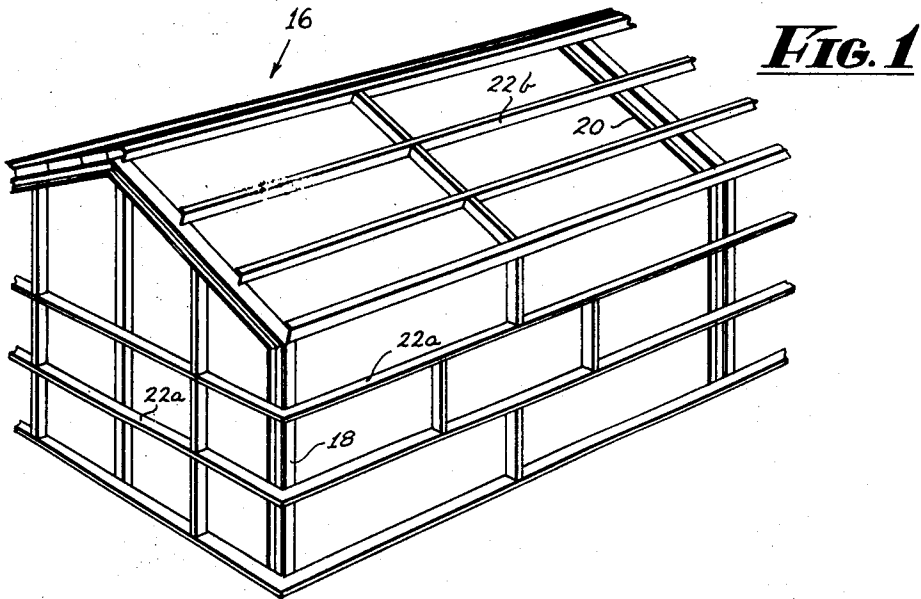
[54] **SELF-FASTENING SPACER FOR STRUCTURAL MEMBERS**  
**10 Claims, 6 Drawing Figs.**

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**348, 735, 488, 90, 477; 287/103, 54 C,**  
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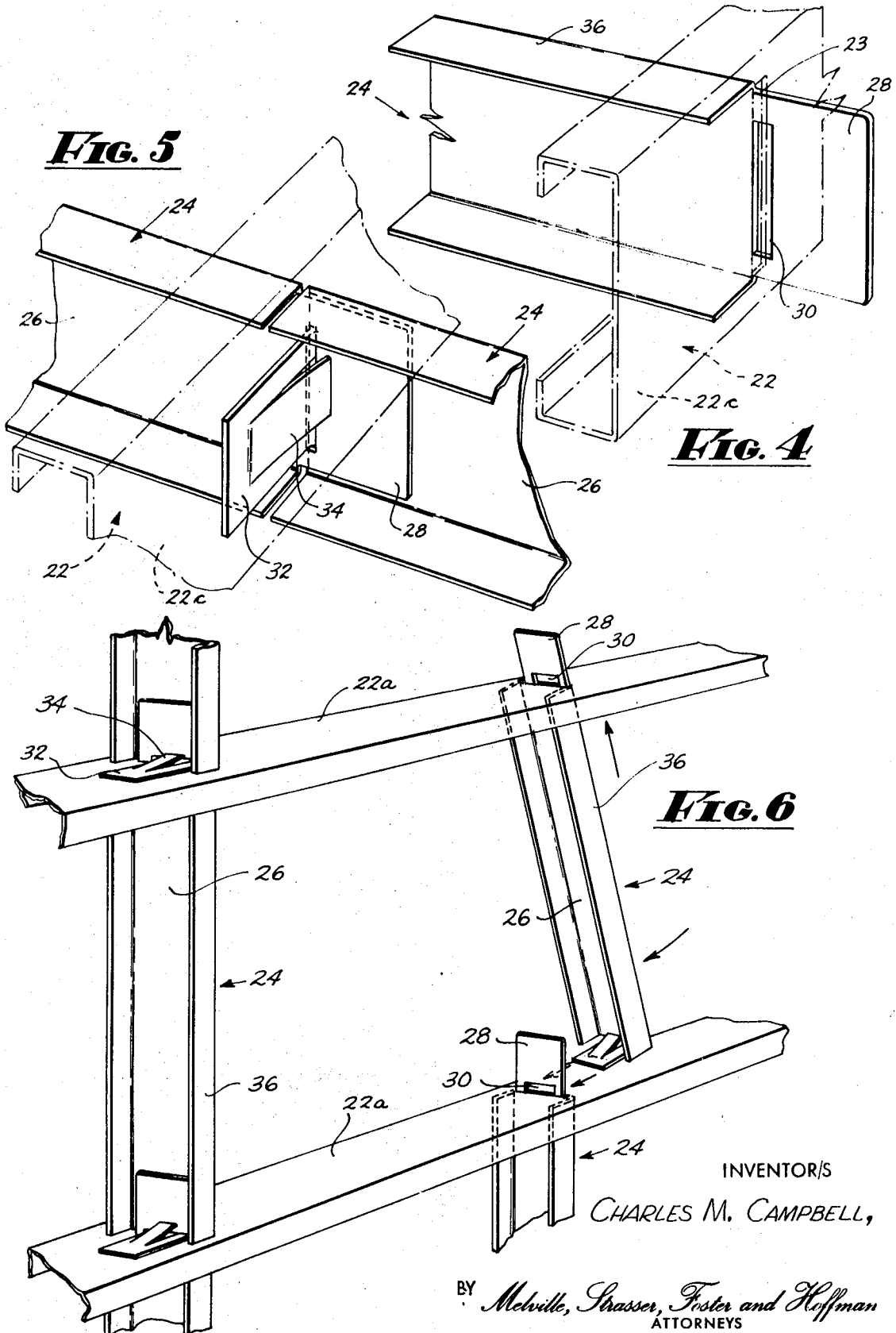
**ABSTRACT:** A self-fastening spacer for intermediate support of structural members, such as purlins and girts, to aid in preventing sagging, twisting and rotation thereof. The spacer is provided with at least a web section having at one end a reduced tongue portion which is provided with an eye, and at the other end with a locking tongue which is substantially normal to the web and is provided with retaining means integral therewith. Accordingly, when the reduced tongue portion of the spacer is fit through a perforation in a structural member, the locking tongue on an adjacent spacer may be driven through the eye such that the retaining means locks therein.





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## SELF-FASTENING SPACER FOR STRUCTURAL MEMBERS

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

This invention relates to structural members and more particularly to spacers for intermediate support of structural members, such as purlins and girts, which are transverse to the rafters and columns in a framed metal building.

#### 2. Description of the Prior Art

The spacer is useful in metal buildings, especially of the framed type which are constructed of columns and rafters and where roofing sheets are supported by longitudinal structural purlin members and the wall-surfacing material is supported by longitudinal girt members. This is so because in most applications the purlins and girts must be supported intermediate the respective rafters and columns by some type of spacer which serves as a tension member to prevent, for example, sagging in the plane of the roof or wall, and to prevent twisting or rotation of the purlin or girt section.

The prior art has utilized a variety of spacers. The spacers 10 disclosed in FIG. 2 are exemplary of such spacers. As can be seen, the spacers 10 have a reduced section or tongue 10a on one end adapted to fit through a perforation 12a in the purlin 12. The tongue 10a is then attached by a bolt 14 through bolt holes punched in the end of an adjacent spacer. Such a structure is effective as both a tension member, and, by virtue of the shoulders 10b abutting the purlin 12, as a moment-resisting member. However, such spacers have proven to be undesirable because of extra erection costs.

### SUMMARY OF THE INVENTION

The present invention provides a self-fastening spacer which is effective as both a tension member, and by virtue of the shoulders abutting the purlins or girts, prevents twisting or rotation, but which is much simpler to install than prior art spacers and does not require bolting. Briefly, the spacer comprises at least a web section which is provided at one end with a reduced tongue portion adapted to fit through a perforation in a structural member, such as a purlin or girt, and attach to the end of the web of an adjacent spacer. The web is provided with at least a shoulder portion thereon before the reduced portion so as to preclude its being pulled through the perforation. An eye is located in the reduced portion of the spacer and a locking tongue having retaining means integral therewith is provided at the other end of the spacer substantially normal to the web. Accordingly, when the reduced tongue portion of a spacer is fit through a perforation in a structural member, such as a purlin or girt, the locking tongue on an adjacent spacer may be driven through the eye so that the retaining means is locked therein.

For most effective operation in preventing rotation of the structural member, the shoulder of the spacer should preferably be a flange extending the length of the spacer, and the flange shoulders on the end of the spacer should substantially abut the web of the structural member when the spacers are in the erected position. Accordingly, the distance between the eye on the reduced tongue portion on the spacer and the flange shoulders on the spacer should preferably equal the thickness of the web of the structural member. Further, the other end of the spacer having the locking tongue should be dimensioned so that the locking tongue and the termination of the spacer flanges are coplanar, i.e., in the same transverse plane.

As can be seen, the spacer of the present invention is self-fastening so that it may easily be erected and eliminate the extra erection costs required in connection with conventional spacers. Accordingly, it will now be more attractive to utilize lighter structural members, such as strutted purlins and girts, which require the use of spacers. In lieu of heavier sections.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of an exemplary metal building of the rigid frame type.

FIG. 2 is a perspective view showing purlins utilizing exemplary prior art spacers.

FIG. 3 is a perspective view of a self-fastening spacer according to the present invention.

FIG. 4 is a perspective view showing the reduced tongue portion of the spacer as it fits through a perforation in a structural member.

FIG. 5 is a further perspective view showing how a locking tongue on an adjacent spacer may be driven through the eye in the reduced tongue portion so that the retaining means which is integral therewith retains the locking tongue therein.

FIG. 6 is a perspective view which further shows the method of assembly of the spacers according to the present invention.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

A typical metal building 16 of the framed type is disclosed in FIG. 1. As can be seen, the building frame includes the columns 18 and the rafters 20 which are provided with transverse structural members 22 thereon, such as the girts 22a, which support the wall-surfacing material, and the purlins 22b, which support the roof sheeting. While the various columns 18, rafters 20 and transverse structural members 22 have been illustrated in an exemplary embodiment as channels, it will, of course, be understood that other shapes, such as, for example, Zee sections, may be utilized.

In practice, it is desirable for purposes of economy to provide as light a section as possible for the transverse structural members 22. However, such lighter sections require the use of spacers for intermediate support between the columns 18 and the rafters 20 so as to preclude sagging, twisting and rotation thereof.

A spacer 24 according to the present invention, which may best be seen in FIG. 3, comprises at least a web section 26 which is provided at one end 26a with a reduced tongue portion 28 having an eye 30 therein. A locking tongue 32 having retaining means, such as the retaining clip 34, integral therewith is provided at the other end 26b substantially normal to the web 26. A shoulder portion is provided on the web 26 immediately preceding the reduced tongue portion 28, so that the web 26, as will be more fully explained hereinafter, will be precluded from being pulled through the perforation 23 in a transverse structural member 22. Preferably, shoulders are provided in each of the ends of the web 26, the shoulders comprising parallel flanges 36 which extend the length thereof.

It should be emphasized that the terms used herein, such as tongue, eye and retaining clip, are intended to be generic terms which include numerous obvious minor departures from the particular embodiment illustrated. For example, the eye 30 may have various shapes, the locking tongue 32 could be modified, such as by merely bending over the web section 26, and various configurations may be used for the retaining clip 34 so long as they prevent disengagement of the locking tongue 32, such as by merely extending the length of the locking tongue 32 and doubling it back on itself.

In practice, the distance 38 between the eye 30 in the reduced tongue portion 28 and the flanges 36 is substantially equal to the thickness of the web 22c of the transverse structural members 22. Additionally, the end 26b of the web 26 is coplanar with the locking tongue and the shoulders 36b of the flanges 36.

FIGS. 4, 5 and 6 show how the spacer 24 of the present invention is utilized with a transverse structural member 22. In practice the reduced tongue portion 28 is fit into a perforation 30 in the web 22c of the member 22. The locking tongue 32 of an adjacent spacer 26 is then driven into the eye 30. Due to the fact that the distance 38 between the eye 30 and the shoulders 36 is equal to the thickness of the web 22c, and to the fact

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that the locking tongue 32 is substantially normal to the web 26 and is coplanar with the end 26b of the web 26 and the shoulders 36b of the flanges 36, the shoulders of flanges 36 will abut the web 22c. Accordingly, the spacer 24 is effective as both a tension member, and, by virtue of the shoulders 36 abutting the web 22c, as a moment-resisting member.

As can be seen, the spacer 24 of the present invention is self-fastening and eliminates the use of screw rods or flange plates and bolts, minimizing erection costs.

What we claim is:

1. In a metal building provided with transverse structural members thereon for supporting wall-surfacing material and roof sheeting, and with spacers extending between and affixed to adjacent ones of said structural members for intermediate support of said structural members to preclude sagging, twisting and rotation of said structural members, each said spacer comprising at least a web section which is provided at one end with a reduced tongue portion adapted to fit through a perforation in said structural member and fixedly attached to the end of the web of an adjacent spacer, said web being provided with at least a shoulder portion between said web and said reduced tongue portion which precludes said web from pulling through said perforation, the improvement which comprises an eye located in said reduced tongue portion of said spacer and a locking tongue at the other end thereof having retaining means integral therewith, said locking tongue being substantially normal to said web, whereby when said reduced tongue portion of said spacer is fit through a perforation in said structural member, said locking tongue on an adjacent spacer may be driven through said eye and said retaining means will retain said locking tongue therein.

2. The structure according to claim 1, wherein said retaining means comprises a retaining clip.

3. The structure according to claim 2, wherein the distance between said eye on said spacer and said shoulder is substantially equal to the thickness of the web of said structural member.

4. The structure according to claim 3, wherein said shoulder

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comprises a flange extending the length of said spacer, one end of said flange being coplanar with the end of said web and said locking tongue, whereby the flange shoulders on said spacer substantially abut the web of said structural member.

5. The structure according to claim 4, wherein said spacer comprises a C-shaped channel.

6. A self-fastening spacer for intermediate support of structural members, such as purlins, girts and the like, to aid in preventing sagging, twisting and rotation thereof, which comprises at least a web section which is provided at one end with a reduced tongue portion adapted to fit through a perforation in a structural member and attach to the end of a web of an adjacent spacer, said web being provided with at least a shoulder portion between said web and said reduced tongue portion which precludes said web from pulling through said perforation, an eye located in said reduced tongue portion of said spacer, and a locking tongue at the other end thereof having retaining means integral therewith, said locking tongue being substantially normal to said web, whereby when said reduced tongue portion of said spacer is fit through a perforation in a structural member, said locking tongue on an adjacent spacer may be driven through said eye, and said retaining means will retain said locking tongue therein.

7. The spacer according to claim 6, wherein said retaining means comprises a retaining clip.

8. The spacer according to claim 7, wherein the distance between the eye on said reduced tongue portion of said spacer and said shoulder is substantially equal to the thickness of the web of the desired structural member having the perforation through which it will be inserted.

9. The spacer according to claim 8, wherein said shoulder comprises a flange extending the length of said spacer, one end of said flange being coplanar with the end of said web and said locking tongue, whereby the flange shoulders on said spacer substantially abut the web of the desired structural member with which they will be used.

10. The spacer according to claim 9, wherein said spacer comprises a C-shaped channel.

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