United States Patent

[11] 3,633,647

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[54] **FASTENING INTERLOCK WITH HINGE FUNCTION**
3 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **160/220,** 16/178
[51] **Int. Cl.** **E06b 3/12**
[50] **Field of Search** 160/220; 16/178; 52/588

[56] **References Cited**

FOREIGN PATENTS

800,761	9/1958	Great Britain	160/220
523,788	4/1955	Italy	160/220

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ABSTRACT: An interlocking system of structural elements of a wide range of utility made up of a series of said elements having opposite, connected ends. The elements each have one end with projecting arms, and another end with means for engaging the arms effecting a hinged connection between the adjacent elements of the system. The system comprehends mating, rectilinearly formed joints effecting a tight seal at the junctures thereof.

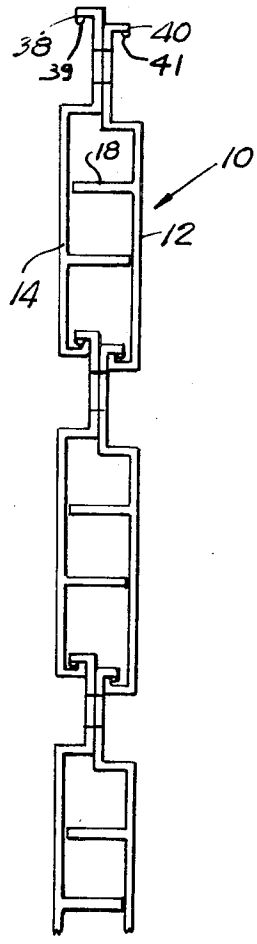


FIG. 1.

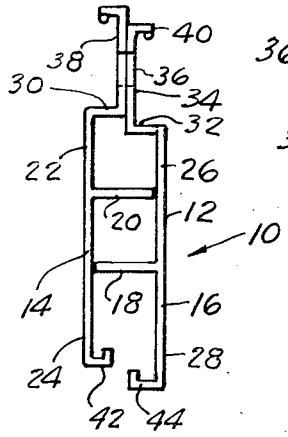


FIG. 2.

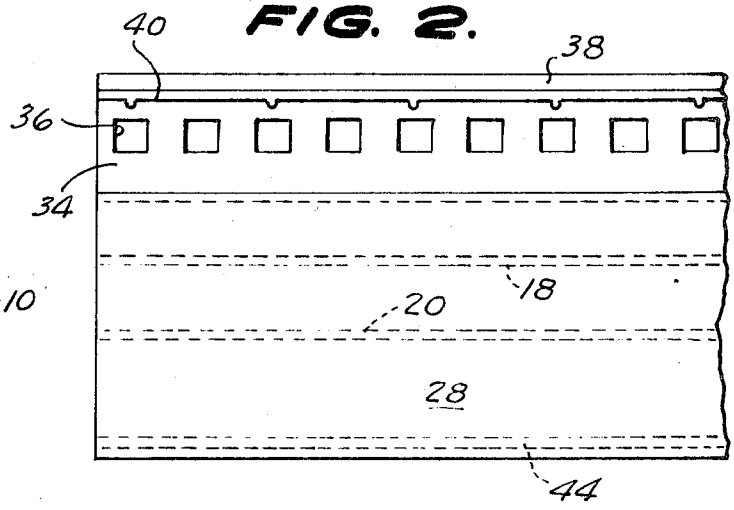


FIG. 3.

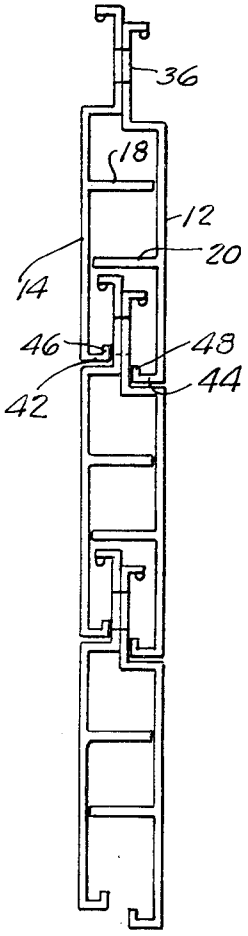


FIG. 4.

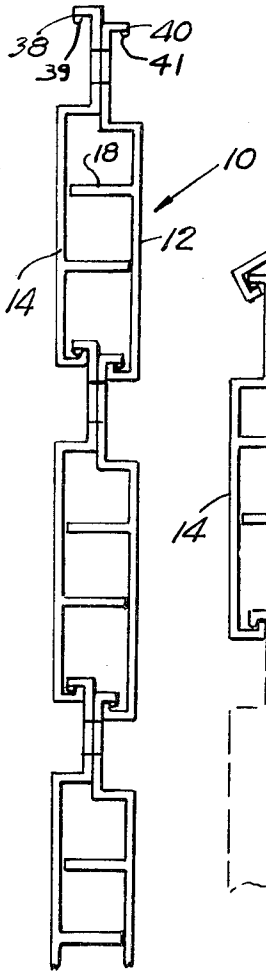


FIG. 5.

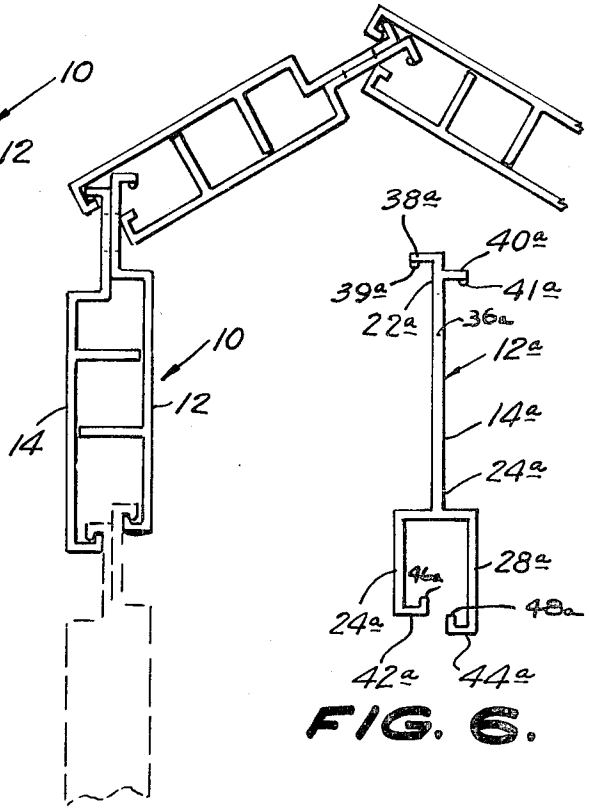


FIG. 6.

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FASTENING INTERLOCK WITH HINGE FUNCTION

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to structural members employed in an environment where security of connection and hinge operation are necessary correlated functions.

2. Statement of the Prior Art

It has heretofore been proposed, in German Pat. No. 1,145,342 to Carozzo, 1963, that an interlock system incorporating both a hinge function and the capability of linear extension be provided. Such system is successful in attaining that general objective, but does not effectively seal the element at the junctures thereof, and has been found to cause occasional malfunctions due to the curvilinear nature of the intersecting portions thereof.

SUMMARY OF THE INVENTION

The present invention is directed to a structural assembly of end connected components wherein the components are hingedly secured to one another, and are securely held from disconnection up to the limit of capability of the material of fabrication. Numerous environments of intended use are contemplated, such as in the fabrication of movable doors and awnings, fences, hanging apparatus, covers for open areas, and in any other instance wherein nonlinear mobility or rolled storage of a panel is required.

The individual structural elements making up the system of this invention are optionally provided with perforations adjacent the movable interlock means thereof. In such embodiments of the invention, a central objective is that of providing a system wherein the interlocking and movable hinge means, in conjunction with the novel shape of the adjacent body, permits flexibility in either allowing the passage of light and/or air, or in positively sealing the juncture between the elements by manipulation. At the same time, the structural elements are adapted for rolling into compact storage positions.

Another objective of importance resides in the provision of an interlock system wherein the exertion of a separating force tends to more securely lock the connection between adjacent elements.

Still another objective resides in the provision of an interlock system involving projecting arms which engage inwardly directed teeth of a next adjacent element. The arms are joined to the structural members at rectangular shoulder sections, the shoulder sections, arms and teeth being of transversely uneven arrangement, and the teeth being shaped conformably with the shoulders to permit hinge movement therebetween and facilitating rolled storage.

Other and further objects and advantages of the invention will become apparent to those skilled in the art from a consideration of the following specification when read in conjunction with the annexed drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side view showing an individual structural element of this system constructed and assembled in accordance with the teachings of the invention;

FIG. 2 is an elevational view of one of said elements;

FIG. 3 shows a series of the elements as interconnected, with the connection means positioned for blocking the passage of light therebetween;

FIG. 4 shows an extended position permitting light and air passage;

FIG. 5 shows a rolled or folded position of the elements from an opposite side; and

FIG. 6 is an elevational view showing a modification of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing in more detail, a system **10** according to this invention is therein disclosed by way of illustration,

exclusive of any particular environment of use. It will be understood that the system may be employed in fabricating items such as garage doors, swimming pool covers, awnings, or the like.

The basic structural components of the system **10** comprise a series of structural members **12** each having a first wall **14** and a second wall **16**. The walls are of a width consistent with the particular use to which they are to be put, and have interior ribs **18** and **20**, the latter being variable as to number and positioning as dictated by rigidity requirements. It is to be noted that the ribs do not interconnect the walls **14** and **16** in the illustrated form of the invention. However, in some environments of use, it may be desirable to connect the walls together. In the form shown, the rib **18** extends from the wall **16** to a point adjacent but spaced from the wall **14**. The rib **20** similarly extends from the wall **14** but is not connected to the wall **16**. This arrangement permits a certain degree of flexibility in the walls, which varies as a function of the material of fabrication, and which aids in the ability of the units to be rolled for storage.

The first wall **14** has an upper end section **22** and a lower end section **24**. Similarly, the second wall **16** includes an upper end section **26** and a lower end section **28**. The upper end section **22** of the first wall is elongated relative to the section **26** of the second wall, while the lower end section **28** is longer than the section **24** of the first wall. Extending from the upper end sections **22** and **26** are rectilinear shoulders **30** and **32** of the respective walls. The shoulders are joined together at a flat connecting portion **34**.

The connecting portion **34** is preferably provided with a series of perforations or openings **36** shown in the drawing as of square form. It will be understood that other and different configurations of the openings may be substituted without departure from the invention.

An important feature of the invention resides in the provision of outwardly extended, rectilinear interlock arms **38** and **40** which projects from the connecting portion on the walls **12** and **14**, respectively, and have rounded knobs **39** and **41**, respectively, on their distal portions. It is to be noted in the drawing that the arms **38** of each unit extend upwardly a distance greater than that of the arms **40**. At the opposite extremity of the individual elements **10**, the lower end sections **24** and **28** are spaced apart to form an opening therebetween. Each of the sections has an inwardly extended, rectilinear lower edge forming teeth **42**, **44**, respectively, the form of the teeth being opposed to the form of the arms as described hereinabove. The teeth are provided with upstanding flanges **46**, **48** to more effectively maintain a seal at the juncture point and to engage with the knobs **39** and **41**, respectively.

In FIG. **6**, a modified form of the invention is shown, wherein the members **12***a* are composed of a unitary main wall **14***a* having optional perforations **36***a*. At the upper end section **22***a*, there is a first arm **38***a* with knobs **39***a* thereon, and a second arm **40***a* with knobs **41***a*. At its opposite portion, the member **12***a* has lower end section walls **24***a* and **28***a* with inward teeth **42***a* and **44***a*. The teeth have flanges **46***a* and **48***a*.

The individual units are assembled, as by sliding the units together from the side, so that the arms **38** and **40** are disposed between the lower end sections **24** and **28** of a next adjacent element. Thus, the arms are captively engaged by the teeth **42** and **44**, linear withdrawal being blocked by the interengagement of the arms and teeth. The orientation of the elements is such that the longer arms **38** engage the teeth **42** of the lesser wall section **24**, while the arms **40** engage the teeth **44** of the elongated wall sections **28**. This permits the rolled storage of the units, as shown in FIG. **5**. Also, as a separative force is exerted on adjacent elements, the engagement of the teeth and arms becomes more positive. It will of course be understood that terminal connection means for a series of the units will vary according to the particular environment of use.

I claim:

1. A structural interlock system comprising:

a plurality of structural members each having first and second spaced-apart walls;

each wall having an upper end section and a lower end section;

the upper end sections of the first wall of each member being elevated relative to the upper end sections of the second wall;

right angular shoulder sections extending from the upper end sections of the walls, said shoulder sections being joined together at a flat connecting portion, the connecting portion being right angularly arranged with respect to the shoulder sections;

outwardly flared, right angular interlock arms projecting from the connecting portion, the arms of the first wall being elevated with respect to the arms of the second walls;

a series of depending knobs on said interlock arms;

the lower end section of the second wall being extended below the lower end section of the first wall;

inwardly directed, right angular, spaced-apart connection

teeth on the distal extremity of each of the lower end sections, defining an opening therebetween;

the depending knobs engaging the teeth and being located between the teeth and the walls; and

the interlock arms being disposed between the lower end sections of a next adjacent structural member, whereby the members are hingedly secured to one another.

2. The invention of claim 1, and:

rigidifying web members extended from the first and second walls;

the web members being connected to the respective walls and having free outer ends; and

a series of perforations in said connecting portions.

3. The invention of claim 1, and:

rigidifying web members extended from the first and second walls.

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