Jan. 29, 1963 D. ALBINSON 3,075,235

HINGE

Filed July 27, 1960 2 Sheets-Sheet 1

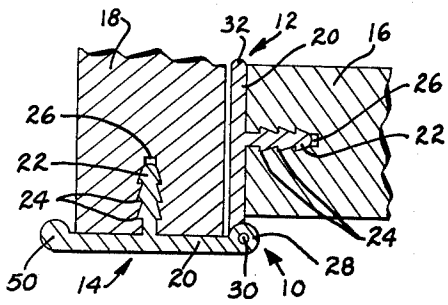


FIG. 1

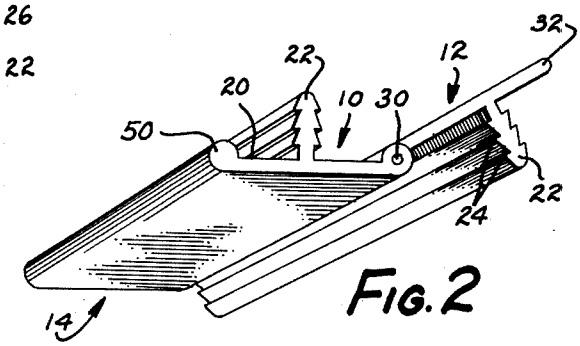


FIG. 2

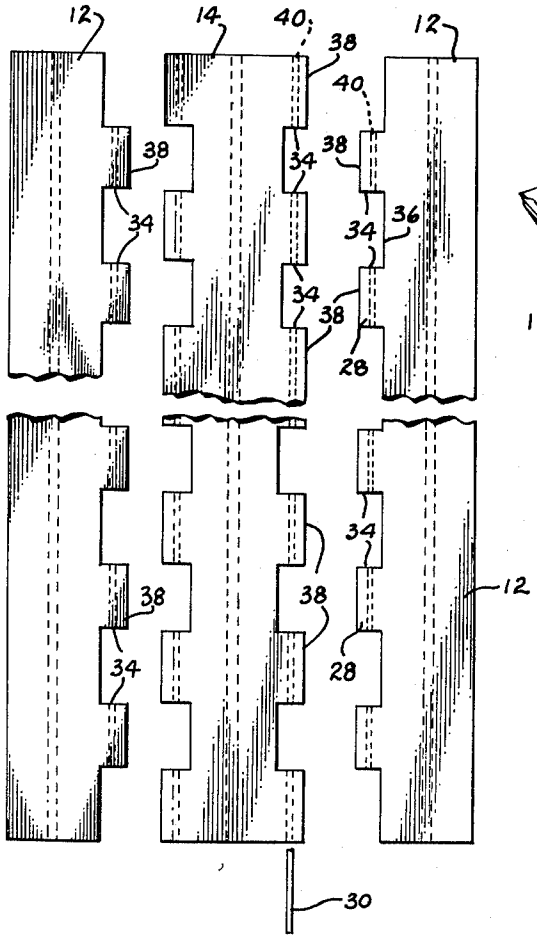


FIG. 3

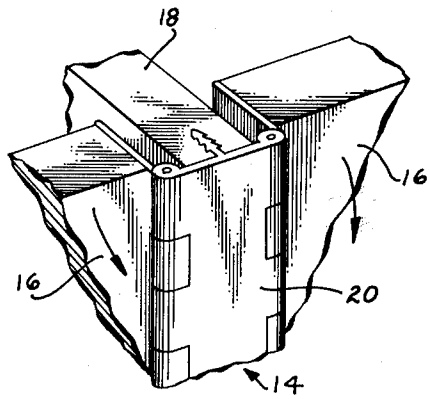


FIG. 4

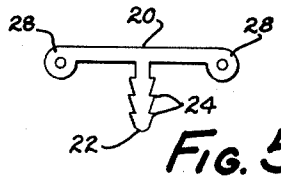


FIG. 5

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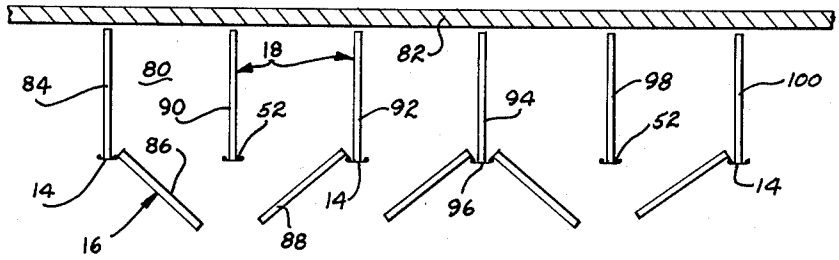


FIG. 6

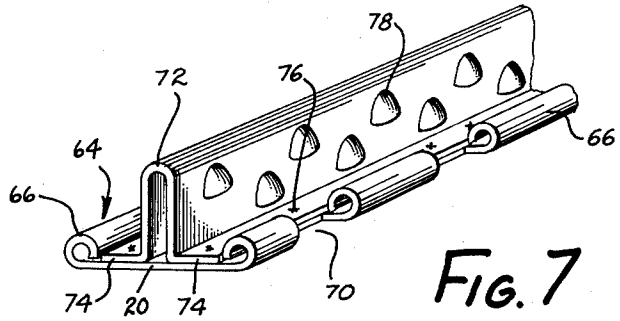


FIG. 7

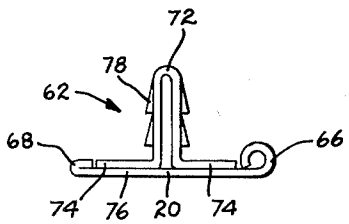


FIG. 8

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United States Patent Office

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HINGE

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Filed July 27, 1960, Ser. No. 45,634
1 Claim. (Cl. 16—159)

This invention concerns hinges, and more particularly hinges especially designed for the quick and accurate assembly of prefabricated constructions by unskilled personnel.

One of the major difficulties in the assembly of prefabricated construction elements, such as doors and wall panels, is the accurate hanging of hinged parts, such as doors. Where the prefabrication is such that the exact relative position of the parts can be ascertained in advance, hinges can be mounted and screw holes provided in advance, so that no positioning problem is involved during assembly. Such cases, however, are rare, and in most assembly jobs, the doors have to be fitted to the wall panels in accordance with the particularities of the building in which the wall panels and doors are to be installed. More particularly, it may not be known in advance in some situations whether the door is to be made to open clockwise (left-hand door) or counterclockwise (right-hand door). Also, it may become necessary to hang the door higher or lower on the wall panels in order to provide more or less clearance under the door for a rug, threshold, or the like. Such positioning has heretofore involved an accurate measuring operation on the assembly site which the assembling personnel is often not sufficiently skilled to perform satisfactorily. Furthermore, any such assembly was at best a heavily time-consuming operation and a considerable bottleneck in the assembly of prefabricated structures. Finally, conventional hinges not only fail to hide defects in the edges of doors, but are likely to cause additional defects due to careless handling of tools by the assembler.

The present invention solves these problems by providing a continuous longitudinally symmetrical hinge extending throughout the entire height of the door and covering the entire hinge edge of the door. The hinge of the invention is provided with a drive spline which enables the hinge to be quickly lined up with the door at any desired height and permanently affixed to the door by a few blows with a rubber-headed hammer. In practice, the door portion of the hinge can even be affixed to the door at the factory, whereupon the door need only be set up at its proper height at the assembly site and the wall portion of the hinge driven into a preformed slot in the wall panel by a few hammer blows. Where the proper height of the door is known in advance, as for example in prefabricated modular storage units, both portions of the hinge are factory-mounted, and the door is assembled with the wall panels merely by aligning the hinge portions and inserting a hinge pin wire into the opening provided therefor.

It is therefore the primary object of this invention to provide a continuous hinge which permits quick and accurate positioning of a door with respect to a wall panel without the aid of tools other than a hammer.

It is a further object of this invention to provide a strong and rigid hinge which can be attached to a construction element without the use of extraneous fastening devices.

It is a still further object of this invention to provide a hinge which completely covers any blemishes in the door edge.

It is another object of this invention to provide a continuous hinge which strengthens rather than weakens the construction element to which it is attached.

It is still another object of this invention to provide a hinge system for prefabricated modular storage units in which two basic hinge portion shapes can provide hinges for any conceivable construction arrangement.

These and other advantages of the present invention will become readily apparent from the following description taken in connection with the accompanying drawings in which:

FIG. 1 is a horizontal cross section of a hinge constructed according to this invention in the installed condition;

FIG. 2 is a perspective view of an assembled hinge according to the invention, the door and wall panel being omitted;

FIG. 3 is an exploded elevation illustrating the method of assembly of a double-ended hinge with two doors;

FIG. 4 is a perspective view of a storage unit module showing the use of a double-ended hinge for hinging two doors;

FIG. 5 is a horizontal section of a double-ended panel hinge constructed according to the invention;

FIG. 6 is a diagrammatic view of various construction conditions encountered in the construction of prefabricated storage units showing the hinge elements used in each condition;

FIG. 7 is a perspective view of a double-ended hinge member showing an alternative mode of fabrication; and

FIG. 8 is a horizontal section through a single-ended hinge member made by the mode of fabrication of FIG. 7.

Basically, the invention teaches the use of a long strip-like hinge made of a hinged pair of rigid plates, each of which forms the crossarms of a T, the trunk of the T being a drive spline or other continuous material-engaging means which can be driven into the wood of the door or wall panel and permanently seats itself in the wood much in the same manner as a fishhook seats itself in the fish. The hook-like elements of the drive spline engage the material of the door or wall panel and hold the hinge plate firmly in place. The plates are normally intended to be placed on the edges of the door or wall panel. Therefore, they are made somewhat wider than the edge of the door or panel to which they are to be affixed so that they will provide a cover for the edge and thus hide any imperfections or tool marks which may mar the appearance of the edge. The plate is preferably formed of thick stock so as to be not only rigid, but also sturdy in appearance. As discussed hereinbelow, the parts of the hinge may either be extruded from a material such as aluminum, or rolled from a material such as pre-punched steel strip. The plate is preferably made a little wider than the edge of the door or panel so that the rounded edge of the plate can protect the door or panel from damage near its edge and also provide a framing effect pleasing to the eye. Because of the use of the drive spline, the outer surface of the hinge plate can be imperforate, thus also adding rigidity to the structure and assuring a neat and pleasant appearance. The two basic components of the invention are obtained one by forming a

hinge-pin-receiving bulb on only one side of the hinge plate, the other by forming hinge-pin-receiving bulbs on both sides. The two-bulb or panel component in turn may be made with both bulbs continuous; or one bulb may be cut out at intervals to receive the bulb of a one-bulb or door component, while the other bulb of the panel component remains continuous so as to provide a protective and ornamental effect; or both bulbs may be cut out to receive door components. Each of these species has a specific purpose which will be described hereinafter.

Referring now to the drawings, a hinge according to this invention is generally shown at **10**. The hinge consists of two components **12** and **14** attached, respectively, to a door **16** and a wall panel **18**. Each of the components **12**, **14** is made up of a base plate **20** on which is formed a drive spline **22** with sharp material-engaging ridges **24**. Slots **26** may be precut into the door and panel so as to assure correct centering of the members **20** with respect to the edges of the door **16** and panel **18**. Each base plate **20** of the door component **12** has formed on one end thereof a bulb **28** which is drilled axially to receive a hinge or pivot pin **30**. The opposite edge of the base plate **20** of door component **12** is rounded as at **32** to form a smooth and pleasantly appearing contour. The panel component **14** is similar to the door component **12**, except that the panel component **14** has bulbs **28** formed on both of its edges for a purpose hereinafter described. As is more clearly shown in FIG. 3, each of the bulbs **28** which is to receive a hinge pin is cut out at intervals along the surfaces **34** and relieved along the line **36**, so that alternate sections of each bulb may be removed.

The cutouts are so positioned that each hinge component is symmetrical about a horizontal plane lying midway between its upper and lower ends. This symmetry is best illustrated in FIG. 3, and accounts for the reversibility of the components described hereinafter. When the door and panel are to be assembled together, the remaining sections **38** of the bulbs **28** are internested until the longitudinal holes **40** drilled therethrough become aligned so that a hinge pin **30** can be inserted therein to hold the hinge together.

Manufacture

The hinge of this invention can be manufactured in a variety of ways. As a matter of illustration, two practical ways are shown in the drawings. The hinges shown in FIGS. 1, 2 and 5 are made from aluminum extrusions. As originally extruded, the bulb or bulbs **28** formed along the edges of the extrusions are imperforate and continuous, as indicated at **50** in FIGS. 1 and 2. This extrusion without any further processing forms the trim strip indicated at **52** in FIG. 6. In order to form the one-bulb species of door panel components, one of the bulbs **50** is cut out at intervals as shown in FIG. 3. The recesses formed by this cutting may serve as guides for a drill which is then used to drill the hinge pin hole **40** into the bulb **50** to turn it into a perforate bulb **28** . It is immaterial which one of the bulbs **50** is cut out, because the cutouts are symmetrical with respect to the top and bottom ends of the strip, as shown in FIG. 3, so that the single-hinge species of panel component is reversible to form either a left-hand or right-hand hinge. If it is now desired to form a double-hinged species of panel component, the other bulb **50** is likewise cut out and drilled as shown in FIG. 3. One-bulb or door component **12** is always cut out in a manner complementary to the panel component **14**, as best shown in FIG. 3. Due to the symmetry of the cutouts in component **12**, it too is reversible to provide either a left-hand or a right-hand hinge.

Referring now to FIGS. 7 and 8, an alternative form of the panel and door components manufactured according to a different mode of fabrication are shown at **62** and **64**. The base plate **20** in each instance is formed of stripped steel whose edges are rolled into either a bulb configuration **66** or into a rounded edge **68** (FIG. 8).

Cutouts **70** may be pre-punched into the edges of the steel strip forming the base plate **20** as required. The drive splines in the embodiments of FIGS. 7 and 8 is manufactured from a second steel strip **72** whose flanges **74** are spot or seam welded to the base plate **20** as at **76**. Hook-like teeth **78** are pre-punched into the strip **72** to hold the drive spline formed by the strip **72** in the door or wall panel in the same manner as the surfaces **24** of the extruded embodiment shown in FIGS. 1, 2 and 5.

Assembly

Depending on the use to be made of the hinge, the components of the hinge may either be shipped separately from the doors and wall panels and assembled with the door and wall panels at the construction site or they may be attached to the doors and panels, or one of them, at the factory. In either event, the doors and wall panels, with their respective hinge components in place, are set up in operating position, and a hinge pin wire **30** is inserted into the holes **40** to secure the hinge components together. Where the insertion of a hinge pin wire is impractical, the hinge components may be entirely pre-assembled, in which case the hinge components would have to be attached to at least one of the door or wall panel elements at the assembly site. FIG. 4 shows the relation of the elements involved in this invention as used in a two-module storage unit with one left-hand and one right-hand door being hinged on the central panel.

Operation

The operation of the hinge of this invention is best illustrated in FIG. 6. A number of prefabricated storage unit modules **80** are disposed along a building wall **82**. The modules are separated by wall panels **18** and are closed by doors **16**. Assuming that wall panel **84** is the end panel, the component **14** required on the end of panel **84** would be of the single-hinged species, as shown in FIG. 1. Inasmuch as door **86** is a left-hand door and door **88** is a right-hand door, wall panel **90** carries only a trim strip **52** on which both bulbs are continuous and imperforate. Wall panel **92** is provided with another single-hinged component **14**, but this time the component **14** is turned so as to have the cutouts on the left side instead of the right. Finally, panel **94** illustrates the use of a double-hinged panel component **96** similar to that shown in FIG. 4. Panel **98** and its panel component **52** are identical to panel **90**, and panel **100** and its component **14** are the same as panel **92**.

It will readily be seen from the foregoing that this invention provides a simple, yet strong and durable hinge construction for prefabricated buildings, furniture, or the like. Since there are no screws in this construction, overtightening of screws with a consequent stripping of the wood thread is effectively prevented. At the same time, the rigidity of the hinge member actually strengthens the wood to which it is attached. The pounding of the hinge into place actually accomplishes three operations in one by mounting the hinge, covering the edge and strengthening the wood all at the same time. In addition, since only two basic components or four stock items made therefrom are necessary to provide hinges for any conceivable construction condition, the hinge of this invention is inexpensive to fabricate and to stock, and yet the neat and strong appearance of the hinge is likely to instill confidence in the purchaser. Obviously, many modifications of this invention are possible and all such modifications should be construed to be within the scope of this invention unless otherwise stated specifically by the following claim.

I claim:

In combination with a door and a wall panel each having an exposed edge, a hinge having a pair of rigid elongated strip-like plates covering said exposed edges of said panel and said door, material-engaging means extending longitudinally throughout the entire length of

each of said plates on one side thereof, one of said plates being mounted on said door by means of said material-engaging means thereon, and the other of said plates being mounted on said wall panel by means of said material engaging means thereon, internested discontinuous hinge-pin-receiving means extending longitudinally along adjacent edges of said plates, and means extending through said hinge-pin-receiving means to couple said plates together, said plates being so disposed that only one of said plates is hidden when said door is closed.

References Cited in the file of this patent

UNITED STATES PATENTS

731,138	Stearns	June 16, 1903
1,321,277	Barta	Nov. 11, 1919
1,576,870	Stevens et al.	Mar. 16, 1926
1,613,838	Lindeken	Jan. 11, 1927
2,268,669	Moore	Jan. 6, 1942
2,277,176	Wagner	Mar. 24, 1942
2,705,820	Torrence	Apr. 12, 1955
2,927,340	McMahan	Mar. 8, 1960