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DOOR HINGE ASSEMBLY

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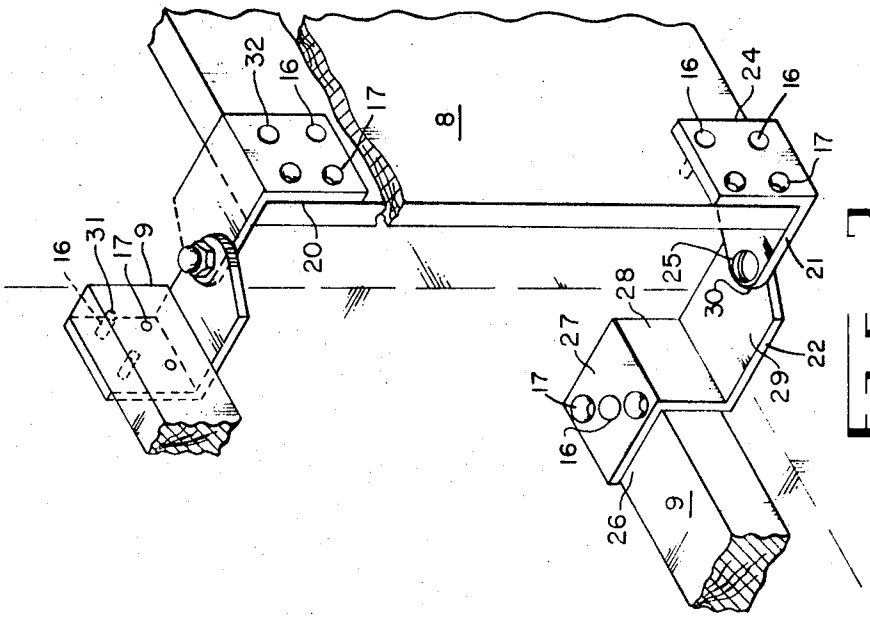


FIG - 2

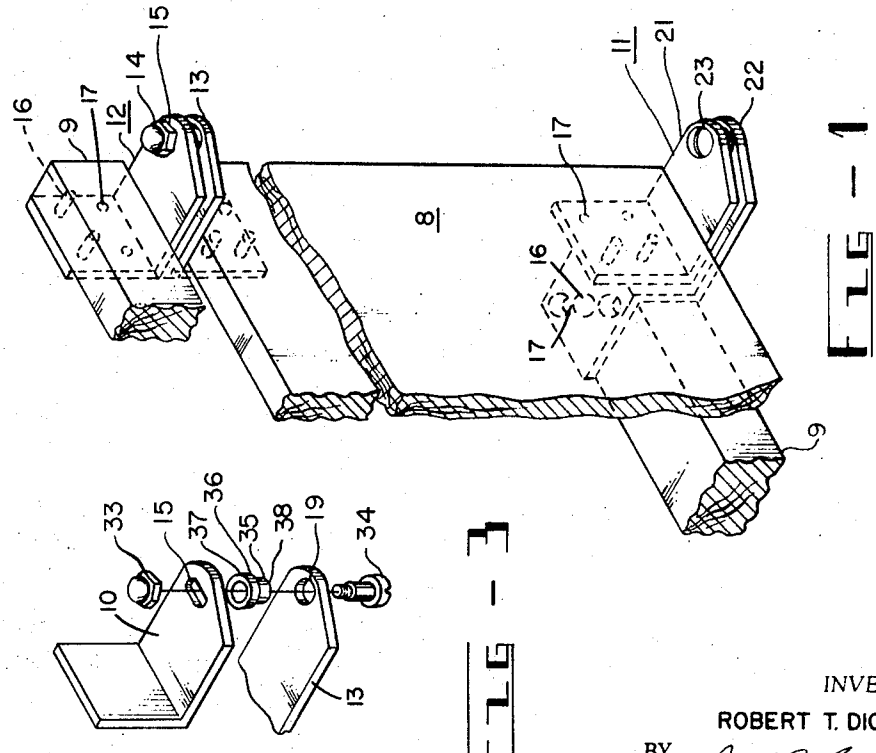


FIG - 1

FIG - 3

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DOOR HINGE ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

This invention relates to a door hinge assembly and more particularly to an upper and lower hinge assembly structure having installation aligning features facilitating mass production and installation of doors on cabinets and the like and providing ease of movement of doors to different locations, and which hinge structure is installed in a manner that forces on the hinge structure do not tend to pull the hinge structure from the doors and the door supporting rails.

BACKGROUND OF THE INVENTION

Cabinets with doors are usually installed against walls or the like at their point of use. This normally requires that the cabinets be entirely constructed in place, which involves an expensive and permanent on-site construction. Thus, after such cabinets are constructed on-site, it is difficult to make changes in the cabinet structure or to hang new doors. Others have found it more advantageous and less expensive to prefabricate cabinets with doors and then assemble and install the previously constructed cabinets and doors on-site. This method of construction is particularly adapted to mass producing cabinets, drawers, and doors. However, mass produced cabinets have the problem of being difficult to correctly position the previously constructed doors, jambs and rails at the point of installation and of not being sufficiently flexible to permit quick, easy and selective repositioning of the doors, drawers, and the like. Usually in mass produced cabinets that are assembled on-site, the hinges have already been joined to the doors and the door rails prior to the installation and thus minor variations in the assembly can become very troublesome. Further, in cabinet furniture of the prefabricated type that can be modified into different configurations having selective numbers of shelves and drawers, various replaceable clamps and door rails are used to facilitate easy and fast installation and conversion on-site. Yet replacing a door in such a conversion usually requires expensive skill and time in manipulating the hinges.

SUMMARY OF THE INVENTION

In the manufacture of cabinets having modifying or converting capabilities, it is thus very important to have doors with hinges that can be easily and rapidly changed without incurring misalignment and other problems.

It is therefore an object of my invention to provide a novel and improved hinge assembly.

It is another object of my invention to provide a novel and improved hinge assembly which has doors that can be rapidly, quickly and accurately installed.

It is another object of my invention to provide a novel and improved hinge assembly that is particularly adapted for on-site assembly of previously mass produced cabinet assemblies.

It is another object of my invention to provide a novel and improved door hinge assembly that facilitates movement of an entire door relative to a door rail without requiring movement of the hinges on the door or the door rail.

It is another object of my invention to provide a novel and improved door hinge assembly having frictionless hinged pivot connections.

It is another object of my invention to provide a novel and improved hinge assembly for doors that is rugged in construction, relatively simple to manufacture, assemble and install, and which is comparatively inexpensive.

In a simple and yet novel and unique way, my invention provides a hinge assembly having a double alignment feature that facilitates fast and easy door conversion. My hinge assembly is also particularly adapted for mass production and on-site assembly and installation of doors on cabinets. Time consuming installation by skilled carpenters is effectively reduced by my invention, and yet the hinge assembly is durable, rugged and provides a rigid mounting of the door to the door rail. When installed and hinged, the door has a freedom of movement over 270 degrees that provides unobstructed access to the cabinet.

The hinge assembly comprises a top hinge assembly and a bottom hinge assembly. The top hinge assembly generally comprises two hinge plates that are pivotally connected by connecting means that may use a Teflon washer as the bearing surface. One of the hinge plates of the top hinge assembly is secured to the vertical inside edge of the door, and protrudes outwardly so that the pivot connecting means is laterally extended forward of the door. The other door hinge plate fits under the upper door rail and is secured against the inside surface of the rail. Both the upper and lower hinge plates are provided with alignment means that permits easy positioning of the plates, and thus the door, at the exact desired location.

The bottom hinge assembly comprises a pair of bottom hinge plates. One of the plates fits against the bottom door rail and has an integral vertical portion with two horizontal portions. The other plate is secured to the inside of the door and has a horizontal portion that extends under the bottom edge of the door and forward of the door. A pivot connecting means, such as used in the top hinge assembly secures the horizontal portions of both bottom plates together for pivotal movement.

Further details, features and advantages of the present novel and unique door hinge assembly will become more apparent from the following description taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a perspective view of a cabinet door being supported by the hinge assemblies in the closed position.

FIGURE 2 is a perspective view of the cabinet door in a 180° open position.

FIGURE 3 is an exploded view of the pivotal connecting means used for pivotally securing the plates of the hinge assemblies.

Referring now to the drawing in which like reference characters designate like or corresponding parts, there is shown in FIGURE 1, a partly broken away cabinet door **8** pivotally mounted on a door rail structure **9**. A top hinge assembly **12** and a bottom hinge assembly **11** provide pivotal support for the door **8** with respect to the frame structure **9**. The top hinge assembly **12** comprises a first hinge plate **10**, a second hinge plate **13**, and a pivotal connecting means **14**. The first hinge plate **10** comprises a horizontal portion and a vertical portion. The horizontal portion has a slotted aperture **15**, see FIGURE 3, for correcting minor horizontal misalignment of the door **8** when installed in rail **9**. The vertical portion has dowel shaped aligning means **16** and mounting holes **17** for exact positioning and securing of plate **10** to the rail **9**. The second hinge plate **13** also comprises a horizontal portion and a vertical portion. The vertical portion has aligning means **16** and mounting holes **17** and the horizontal portion has an aperture **19**. The aligning means

16 and mounting holes 17 of the second hinge plate 13 facilitate positioning and securing the second hinge plate 13 to the upper inside vertical surface area 20 of the door 8. The slotted aperture 15 is positioned over aperture 19 so that the pivotal connecting means 14 can be projected therethrough.

The bottom hinge assembly 11 comprises a first bottom hinge plate 22 and a second bottom hinge plate 21 that are pivotally connected by a pivotal connecting means 23. The first bottom hinge plate 22 has a vertical portion 28 integrally positioned between two horizontal portions 27 and 29. The horizontal portion 29 has the same slot 30, not shown, as slot 15 illustrated in FIGURE 3. The plate 22 is fitted against and over the bottom door rail 9 and is secured thereto by rivets or the like inserted in a predrilled hole in joint 9 to correctly position the plate 22 on the rail 9. The second bottom hinge plate 21 comprises a pair of integrally joined horizontal and vertical portions. The vertical portion 24 has the similar alignment means 16 and the mounting holes 17 for securing plate 21 in an aligned position to the inner surface of door 8. The horizontal portion of plate 21 has an aperture 25 similar to aperture 19 in FIGURE 3 for receiving the pivotal connection 23, that is the same as illustrated in FIGURE 3.

As illustrated in FIGURES 1 and 2, alignment members 16 are provided in each plate for fixedly mounting the hinge plates to the door and door rail. The alignment members 16 can take the form of rivets, dowels or the like that project into holes 31 drilled in the door 8 and rail 9 structures. Each hinge plate is thus provided with at least two alignment members 16 that assure a fixed positioning of the hinge plate at a predetermined location on the door and rail structure. Referring to FIGURE 3 the pivotal connecting means 14 and 23 comprise a nut 33, a bolt 34 and a Teflon washer 35. The Teflon washer 35 is provided with a shoulder 36 that places a large outside diameter 37 next to a narrow outside diameter 38. The narrow diameter 38 of the Teflon washer 35 is slightly smaller than apertures 19 and 25 so that the Teflon washer 35 seats therein. The larger end 37 provides a bearing surface between the first and second hinge plates 12 and 13 and between the first and second bottom hinge plates 21 and 22. The nut 33 and bolt 34 secures the top and bottom hinge assemblies in a tight yet pivotal engagement that prevents movement in slots 15 and 30.

OPERATION

In operation, the door jambs, rails and doors are precut and holes 31 predrilled at the factory. Also plates 12 and 22 are normally secured to the door rails and plates 13 and 23 are normally secured to the doors at the factory. The door rails are then carried in unassembled or preassembled form to the point of installation. After final joining of the door rails in accordance with a predetermined layout, the doors are secured by the pivotal connecting means 14 and 23 at the designated position. Minor misalignments are compensated for by adjusting the shank of bolts 34 in slots 15 and 30.

Where an existing, installed door is to be removed to install a larger door, then nuts 33 are removed and a larger door having the same exact top and bottom plates 13 and 23 are installed using wider vertically spaced top and bottom plates 12 and 22. Again minor adjustments in the door position can be accomplished in the manner previously described.

It should be noted that the hinge plates provide sturdy, rugged and strong horizontally extended plates for connection of the pivot means, which plates are so installed that the usual forces exerted are either in alignment with or are normal to the means securing the plates to the rails and the door. For example, the first bottom plate 22 is secured to the top surface of rail 9 with the vertical portion abutting the side of the rail 9. Thus downward forces exerted on the horizontal portion 29 tend to force the vertical portion 28 into the rail 9 and pulling forces on the alignment members 16 or the securing screws in apertures 17 are substantially normal thereto. Pulling forces in all the other plates are in the direction into the support and thus such forces do not tend to pull out or loosen the screws in apertures 17.

It should be understood that the rivet or dowel means 16, that are integrally mounted or welded to each hinge plate and used for precise portioning of the plate, can be positioned at different locations on the plates if desired.

Although an embodiment of the invention is illustrated and described herein, it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the invention and it is my intention to cover, in the appended claims, all such changes and modifications as come within the scope of my invention.

Having disclosed my invention, I now claim:

1. A door hinge assembly comprising in combination, a top hinge assembly and a bottom hinge assembly, said top hinge assembly having a first top hinge plate and a second top hinge plate, said first top hinge plate having a horizontal surface and an integral upright surface, said upright surface has a given boundary width in the horizontal direction, said horizontal surface extends outwardly in a direction normal to the plane of said upright surface, which horizontal surface is substantially within said boundary width, first mounting means for fastening said upright vertical surface of said first top hinge plate to the inside vertical area of a horizontally positioned door rail, said second top hinge plate having a horizontal surface with a downward vertical surface, said downward vertical surface has a given boundary width in the horizontal direction, said horizontal surface of said second top hinge plate extends outwardly in a direction normal to the plane of said downward vertical surface, which horizontal surface of said second top hinge plate is substantially within said boundary width of said downward vertical surface, second mounting means for fastening said downward vertical surface to the inside vertical surface of said door with said horizontal surfaces of said first and second top hinge plates substantially abutting and projecting outwardly from said door and door rail through a space therebetween when said door is closed to a position adjacent said door rail, first connecting means for pivotally connecting said horizontal surfaces of said first and second top hinge plates, which first connecting means is positioned within said boundary width of said first top hinge plate and said second top hinge plate, said horizontal surface of said first top hinge plate has a slot shaped aperture that is aligned parallel with the plane of said integral upright vertical surface of said first top hinge plate for slidably receiving said first connecting means, said first connecting means having first holding means for holding a given position in said slot, said horizontal surface of said second top hinge plate has an aperture for receiving said first connecting means, bearing means being positioned in said apertures and between said horizontal surfaces for reducing the friction in the turning of said second top hinge plate relative to said first top hinge plate, and said bottom hinge assembly supporting the lower portion of said door, said bottom hinge assembly comprises a first bottom hinge plate and a second bottom hinge plate, said first bottom hinge plate having a bottom horizontal surface and an integral upright surface and another horizontal bottom surface fixed to the upper portion of said upright surface, said upright surface of said first bottom hinge plate has a given boundary width in the horizontal direction, said horizontal bottom surface extends outwardly in a direction normal to the plane of said upright surface of said first bottom hinge plate, which horizontal bottom surface is substantially within said boundary width, third mounting means for fastening said another horizontal bottom surface to the top surface of a horizon-

tally positioned bottom door rail, said second bottom hinge plate having a horizontal surface with an upward vertical surface, said upward vertical surface of said second bottom hinge plate has a given boundary width in the horizontal direction, said horizontal surface of said second bottom hinge plate extends outwardly in a direction normal to the plane of said upright surface of said upward vertical surface of said second bottom hinge plate, which horizontal surface of said second bottom hinge plate is substantially within said boundary width, fourth mounting means for fastening said upward vertical surface to the inside vertical surface of said door, said bottom horizontal surface of said first hinge plate and said horizontal surface of said second bottom hinge plate projecting outwardly from said door and door jamb when said door is closed to a position adjacent said door rail, second connecting means for pivotally connecting said projecting horizontal surfaces, which second connecting means is positioned within said boundary width of said first bottom hinge plate and said second bottom hinge plate, said upright surface of said first bottom hinge plate abuts the outer surface of said bottom door rail, said horizontal

surface of said first top hinge plate has a slot shaped aperture for slidably receiving said second connecting means, said second connecting means having second holding means for holding a given position along said slot, said slot shaped aperture being substantially aligned parallel with said upright surface of said first bottom hinge plate, said horizontal surface of said second bottom hinge plate having an aperture for receiving said second connecting means, and second bearing means being positioned in said aperture and between said horizontal surfaces for permitting reduced friction turning of said second bottom hinge plate relative to said first bottom hinge plate.

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