

May 10, 1949.

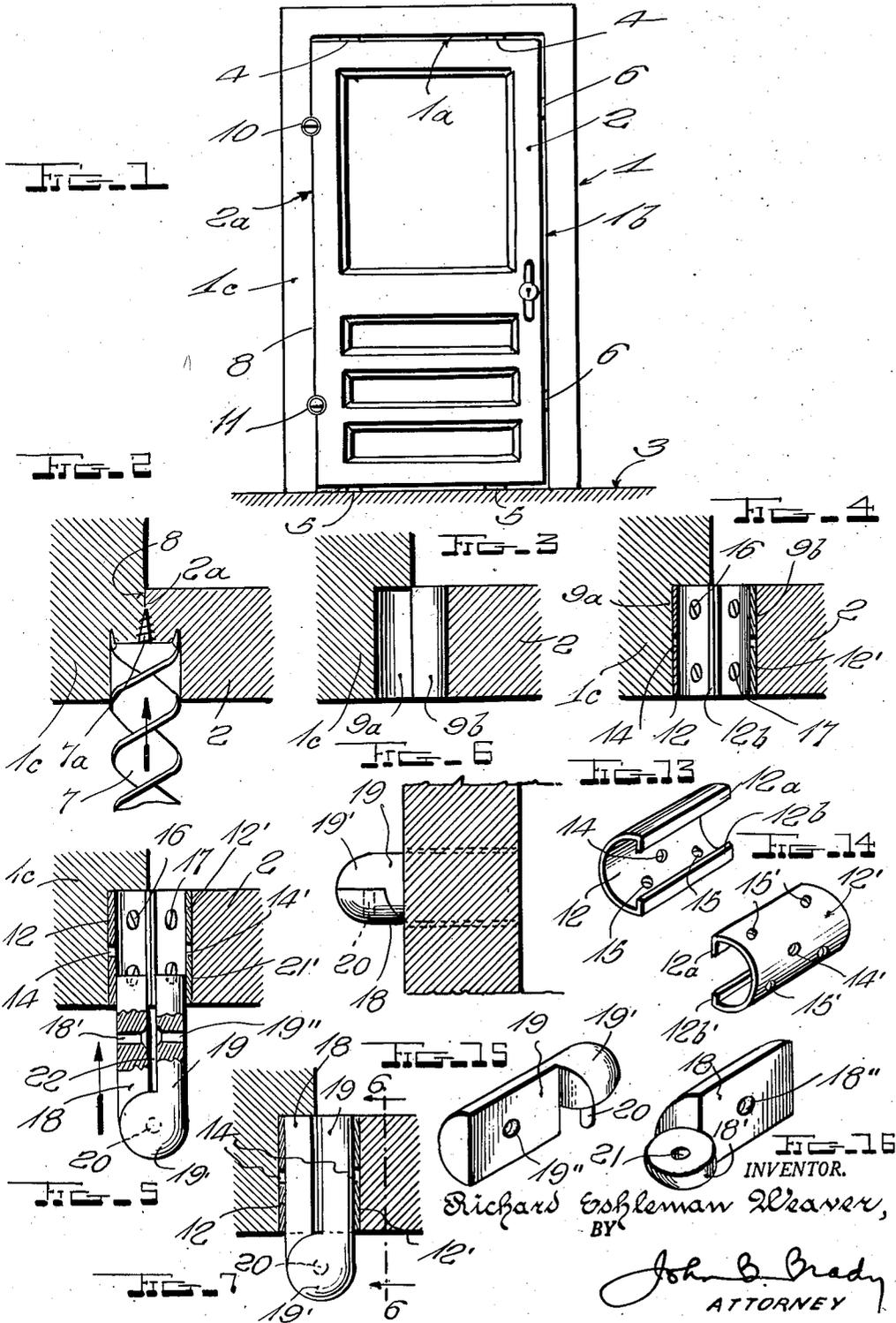
R. E. WEAVER

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HINGE

Filed Jan. 30, 1947

2 Sheets-Sheet 1



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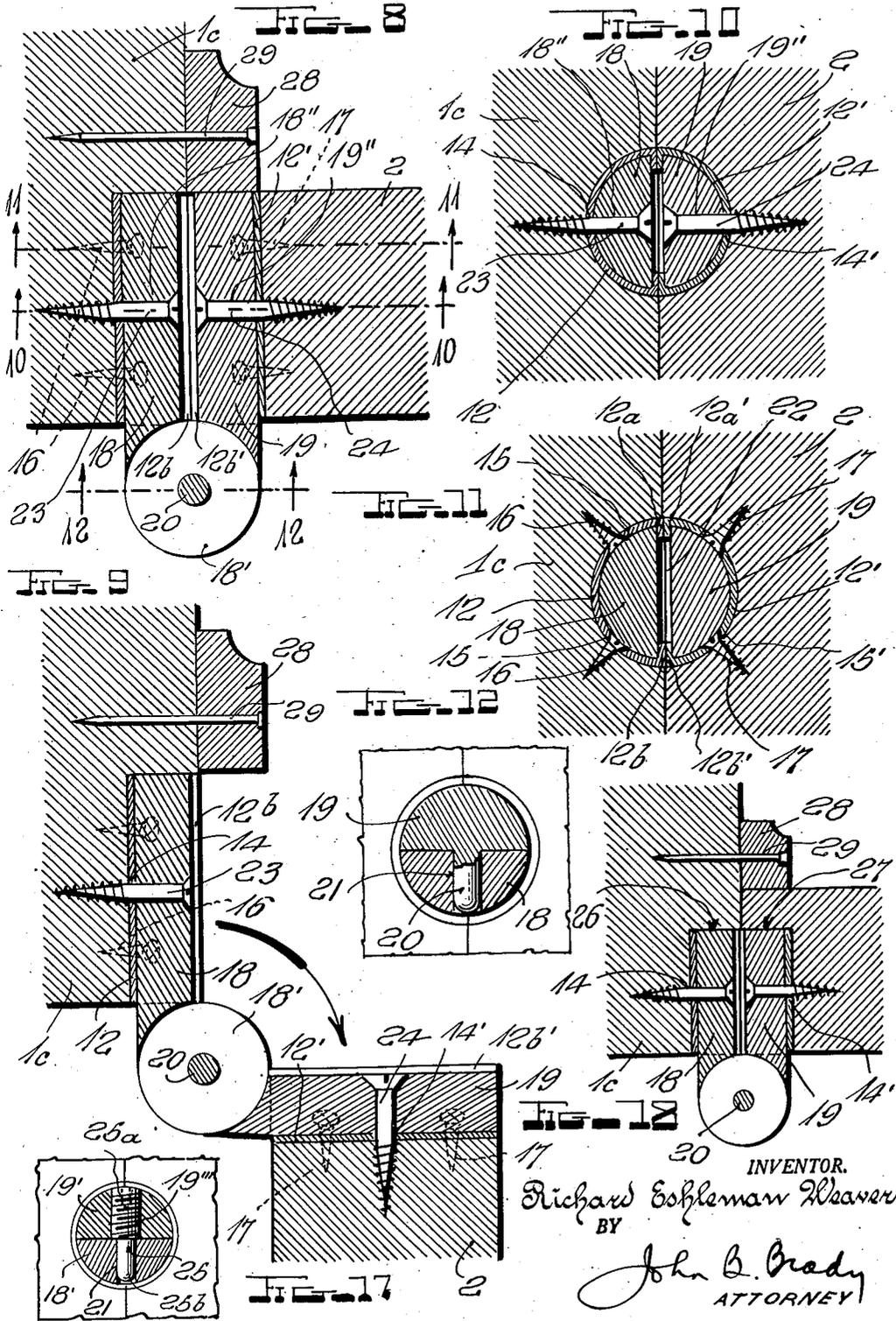
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

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HINGE

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8 Claims. (Cl. 16—149)

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My invention relates broadly to hinges and more particularly to an improved construction of hinge requiring a minimum of material and effort for its application to parts to be hinged.

One of the objects of my invention is to provide an improved construction of hinge which may be inexpensively manufactured on a mass production scale and which may be inexpensively installed for the mounting of hinged parts with a minimum of skill and without the expenditure of time heretofore necessary in the mortising of parts to be hinged.

Another object of my invention is to provide an improved construction of hinge which may be installed between hinged parts by simply drilling a hole between the parts, introducing rail-like guiding liners in the coating parts and inserting within the rail-like guiding liners a two-section hinge having parts corresponding in sectional contour with the sections provided by the rail-like guiding liners.

Another object of my invention is to provide an improved construction of hinge in which rail-like guiding liners of symmetrical construction are applied to the parts to be hinged and a two-part pivoted hinge having sections corresponding in contour to the section of the rail-like guiding liners moved into position in the rail-like guiding liners for hinged mounting the coating parts to be hinged.

Still another object of my invention is to provide a practical construction of hinge which may be formed from plastic material by inexpensive processes of molding.

Other and further objects of my invention reside in the simplified construction of hinge and the method of mounting the hinge as set forth more fully in the specification hereinafter following by reference to the accompanying drawings in which:

Figure 1 is front elevational view of a door with the hinge construction of my invention applied thereto; Fig. 2 is a view illustrating the initial step which is taken in mounting the coating parts to be hinged by the drilling of a hole therebetween providing a semi-cylindrical recess in the stationary part and an aligned semi-cylindrical recess in the movable part; Fig. 3 shows the completed bore after the coating parts have been drilled as in Fig. 2; Fig. 4 illustrates the coating parts wherein each semi-cylindrical recess has applied thereto a rail-like guiding liner in accordance with my invention; Fig. 5 illustrates the manner of inserting a two-part pivoted hinge in the rail-like guiding liners in the coat-

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ing parts in accordance with my invention; Fig. 6 is a side elevational view of the hinge and the relation thereof to the parts to be hinged, the view being taken substantially on line 6—6 as a section of Fig. 7 through the hinged door; Fig. 7 is a top plan view of the two-part hinge in position within the rail-like guiding liners, the view showing the coating parts to be hinged and the rail-like guiding liners in horizontal section; Fig. 8 is a horizontal view taken through the two-part hinge, the rail-like guiding liners and the coating parts to be hinged and showing the hinge in closed position; Fig. 9 is a view similar to Fig. 8 but showing the door moved to open position; Fig. 10 is a vertical sectional view taken substantially on line 10—10 of Fig. 8; Fig. 11 is a vertical sectional view taken substantially on line 11—11 of Fig. 8; Fig. 12 is a vertical sectional view taken substantially on line 12—12 of Fig. 8; Fig. 13 is a perspective view of one of the rail-like guiding liners employed in the hinge construction of my invention; Fig. 14 is a perspective view of the coating rail-like guiding liners employed in the hinge construction of my invention; Fig. 15 is a perspective view of one of the hinged sections employed in the hinge of my invention; Fig. 16 is a perspective view of the coating hinged section employed in the hinge of my invention; Fig. 17 is a vertical sectional view through a modified form of pintle construction employed in the hinge of my invention; and Fig. 18 is a horizontal sectional view showing a manner of mounting the hinge of my invention so that one end of the hinge is substantially concealed by terminating the bore in the coating parts to be hinged short of the total depth thereof.

Referring to the drawings in detail reference character 1 in Figure 1 designates the wood framing of a door within which the wooden door 2 is to be mounted with respect to the floor line 3. The door 2 is finished substantially to size as in the conventional practice and is then centered with respect to the floor line 3 and the top of the frame 1 at 1a by the insertion of suitable sets of wedges which I have represented at 4 and 5. Another set of wedges 6 is inserted between the lefthand edge of the door 2 and the righthand edge 1b of the framing 1. Thus the door 2 is so positioned with respect to the lefthand side 1c of the framing 1 that the lefthand edge 2a of the door 2 extends in intimate alignment with the lefthand side 1c of the framing 1. While so centered an auger bit 7 is operated to drill a hole in the wood between the lefthand side 1c of the framing 1 and the lefthand edge of the door

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2 at 2a as represented in Fig. 2. Auger bit 7 has the screw-threaded end 7a thereof centered on the junction line 8 between the lefthand framing 1c of frame 1 and the lefthand edge 2a of door 2 so that the auger bit 7 drills and cuts a hole between the coacting parts to be hinged where one semi-cylindrical portion or recess of the said hole is formed at 9a in the stationary framing 1c and the other aligned semi-cylindrical recess 9b is formed in the movable part to be hinged, that is, door 2 as shown in Fig. 3. The drilling of one hole suitably spaced below the top of the door 2 and another hole suitably elevated above the bottom of the door 2 as represented in Fig. 1 constitute the preparation necessary for hanging the door. No chiselling or mortising as conventionally required is necessary. Such chiselling or mortising normally requires the skill of an experienced carpenter with the incidental expenditure of time and inherent expense of installation. The installation preparation in the present arrangement may be accomplished with the expenditure of minimum time and skill.

After the drilling of the two holes as hereinbefore described in the position 10 and 11 with respect to the door 2 and associated framing 1, the aligned semi-cylindrical apertures are ready to receive the rail-like guiding liners of my invention. These rail-like guiding liners have been shown in Figs. 13 and 14 and are symmetrical in construction and may be merely reversed with respect to each other to permit the mounting thereof in the aligned semi-cylindrical recesses 9a and 9b. The rail-like guiding liner shown in Fig. 13 comprises the sheet metal stamping 12 which is die pressed in semi-circular section to form a semi-cylindrical part having radially inturned rail-like portions 12a and 12b extending longitudinally of the liner 12. The rail-like portions 12a and 12b are coplanar and are directed toward each other. A central aperture 14 is formed in the liner 12 with symmetrically arranged apertures 15 distributed therearound. The apertures 15 are counter-sunk to permit the passage of the filister head screws 16 into the wood of the stationary part 1c of the door framing 1 thereby presenting a smooth semi-cylindrical surface along which the hinge may be moved.

The coacting rail-like guiding liner shown in Fig. 14 is identical in construction with the construction of the liner 12 shown in Fig. 13 and I have indicated the corresponding parts by similar primed reference characters, that is, the liner as indicated at 12' of semi-cylindrical contour having radially extending rail-like portions 12a' and 12b' directed toward each other in coplanar relation. The liner 12' is provided with a central aperture 14' with symmetrically distributed apertures 15' therearound. The apertures 15' are counter-sunk adjacent the interior surface of liner 12' to receive the filister head screws 17 which enter the movable part or door 2 presenting a smooth interior surface along which the hinge may be inserted.

With the rail-like guiding liners 12 and 12' in position as illustrated in Fig. 4, the hinge of my invention may be inserted to both key the parts and hingedly connect the parts as represented more clearly in Figs. 5-18. The hinge comprises a pair of substantially semi-cylindrical parts shown at 18 and 19. The parts 18 and 19 formed from metal may be cast, drop forged, die pressed or otherwise fabricated from metal with sufficient temper imparted thereto to provide that de-

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gree of toughness necessary to withstand the shock and shear strains to which the hinge is subjected in use. When formed from plastic the parts of the hinge may be reinforced with metal and molded to provide a strong and lasting hinge of extremely low cost.

The shape of the coacting part 19 of the hinge has been shown more clearly in Fig. 15 while the shape of the other coacting part 18 of the hinge is shown more clearly in Fig. 16. It will be observed that the part 18 has an extended portion of semi-cylindrical section which is slightly longer than the length of the rail-like guiding liner 12, while the part 19 of the hinge shown in Fig. 15 has a semi-cylindrical section of a length slightly longer than the length of the rail-like guiding liner 12'. The semi-cylindrical body portions of each of the hinge sections 18 and 19 terminate in enlarged substantially semi-spherical end portions represented at 18' and 19'. The semi-spherical end portion 19' carries a pintle 20 therein adapted to enter an aligned recess 21 in the semi-spherical end portion 18' of hinge portion 18. Thus the two hinged parts when closed upon themselves constitute substantially a cylinder having a diametrical extending space between semi-cylindrical portions 18 and 19 thereof. The semi-cylindrical portions 18 and 19 serve as keys adapted to enter between the rail-like guiding liners 12 and 12'. The flat surfaces of the semi-cylindrical portions 18 and 19 of the hinge slide directly against the rail-like portions 12a-12b and 12a' and 12b' respectively separated by a gap 22 therebetween. The gap 22 has a width equivalent to the thickness of the adjacent rail-like abutting portions 12a-12a' and 12b-12b'. Thus the semi-cylindrical portions 18 and 19 of the hinge corresponding in contour with the section of the rail-like guiding liners 12 and 12' are slid as represented in Figs. 5-7 to a position keying the swinging door 2 and the stationary frame 1c together. When the semi-cylindrical portions 18 and 19 are moved to the limit of the required keying position in which the ends of the semi-cylindrical parts 18 and 19 are substantially coplanar with the ends of the rail-like guiding liners 12 and 12' filister head screws 23 and 24 are introduced through the apertures 18'' and 19'' in the semi-cylindrical parts 18 and 19 of the hinge, the screws passing through the central apertures 14 and 14' in the rail-like guiding liners 12 and 14 respectively and serving to secure the hinge in position.

The apertures 18'' and 19'' are each counter-sunk in the diametrical faces of the semi-cylindrical portions 18 and 19 of the hinge so that the filister heads of the screws 23 and 24 are countersunk therein and form no obstruction with respect to the movement of the hinged parts with respect to each other. This is accomplished by separating the moving part from the stationary part as represented in Fig. 17 to permit access to each of the screws 23 and 24 to enable the screws to be readily screwed home to a firm binding position. When thus fastened the door on the pivots provided by the pintles extending through the respective hinges in the positions 10 and 11 may be closed with reference to the framing as represented in Fig. 8.

In lieu of the form of pintle illustrated in Figs. 12 and 15 in which pintle 12 extends from the semi-spherical end 19' of part 19, I provide a screw-threaded removable pintle 25 as represented in Fig. 17. In this arrangement the semi-spherical end 19' of part 19 is drilled and tapped

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as represented at 19'' to receive the screw-threaded portion 25a of the pintle 25. The smooth wall portion 25b of reduced section of pintle 25 enters recess 21 in the semi-spherical end 18' of the part 18 of the hinge. Thus upon breakage of the pintle 25, a replacement pintle may be readily installed.

As represented in Fig. 18 the hinge of my invention may be installed in a concealed manner by limiting the depth of the bore so that the semi-cylindrical recesses extend only to a depth indicated by reference characters 26 and 27 in the stationary part 1c and movable part 2. Thus the ends of the semi-cylindrical portions 18 and 19 of the hinge are concealed and do not protrude or extend through the door as I indicated in the views illustrating my invention in Figs. 1-17. All other features of my invention as illustrated in Figs. 1-17 are contained in the arrangement shown in Fig. 18.

For purposes of providing a finished appearance to a door installed in accordance with my invention herein suitable ornamental molding 28 may be installed with respect to the stationary part 1c of the door framing by appropriate fastening means such as nailing as represented at 29. In this arrangement the molding 28 has a sufficient depth to conceal the end of the semi-cylindrical part 19 and rail-like guiding liner 12' when the door 2 is in closed position as represented in Fig. 8 thereby maintaining a finished and ornamental appearance for the door installation.

The hinge of my invention is so constructed that mass production inexpensively on a quantity basis may be effected. Installation of the hinge is so simple that a high degree of experience is not necessary. Moreover, the installation can be made quickly thereby saving building costs and expediting building construction. Removal of the door from the hinge may be accomplished very simply by either removing the hinges or swinging the door to open position as illustrated in Fig. 17 and slightly raising the door to elevate part 19 of the hinge with respect to part 18 sufficiently to allow the pintle 20 to clear the socket opening 21. The removal can also be accomplished by unscrewing the screw threaded pintles 25 from their positions in part 19' of the hinge. Removal of the hinges from the door can also be very simply accomplished by unscrewing screws 23 and/or 24 to enable the freed portion of the hinge to be slid out from the associated rail-like guiding liner. Where it may be desirable to prevent ready removal of the door the upper and lower hinges 10 and 11 represented in Fig. 1 may be reversed with respect to each other so that the pintle of the upper hinge 10 is directed downwardly while the pintle of the lower hinge 11 is directed upwardly. The two pintles directed toward each other serve as a confining means to secure the door with respect to the door framing.

While I have described my invention in certain of its preferred embodiments I realize that modification may be made and I intend no limitations upon my invention other than may be imposed by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States is as follows:

1. In a hinge structure, a rail-like semi-cylindrical guiding liner disposed in each of two adjacent semi-cylindrical recesses with rail-like members thereon abutting face to face in diametrically opposite positions and a hinge compris-

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ing a pair of semi-cylindrical parts hingedly connected together and operative to slidably enter said rail-like guiding liners with the semi-cylindrical parts of said hinge abutting against the rail-like members of said semi-cylindrical liners.

2. A hinge structure comprising a rail-like guiding liner of semi-cylindrical contour secured within each of two adjacent semi-cylindrical recesses with rail-like extensions thereon abutting face to face and a hinge comprising a pair of pintle connected semi-cylindrical members slidable into said rail-like guiding liners and adapted to be keyed by the rail-like extensions on said rail-like guiding liners.

3. A hinge construction comprising a rail-like guiding liner of semi-cylindrical section disposed in each of two adjacent semi-cylindrical recesses, said rail-like guiding liners having longitudinally extending rails thereon directed in coplanar relation toward each other and a hinge formed by mutually pivoted semi-cylindrical parts, one of said parts adapted to slidably enter one of said rail-like guiding liners and the other of said parts adapted to slidably enter the other of said rail-like guiding liners for swingably mounting said swingable part with respect to said stationary part.

4. A hinge for interconnecting a stationary part and a swingable part comprising in combination a stationary cylindrical plug-like hinge diametrically divided into a pair of substantially semi-cylindrical parts pivotally mounted with respect to each other, a pair of substantially semi-cylindrical rail-like guiding liners secured in abutting portions of the stationary and swingable parts to be connected, means for securing said rail-like guiding liners to said respective stationary and swingable parts and means for fastening the semi-cylindrical parts of said hinge through said liners and into said stationary and swingable parts.

5. A hinge system comprising a rail-like guiding liner disposed in each of two adjacent recessed parts and including a pair of integrally connected diametrically extending rail portions, and a hinge comprising a pair of pivotally connected substantially semi-cylindrical members, said members being respectively slidable into the rail-like guiding liners in abutment with the rail portions.

6. A hinge system comprising a rail-like guiding liner disposed in each of two adjacent recessed parts and including a pair of integrally connected diametrically extending rail portions, a hinge comprising a pair of pivotally connected substantially semi-cylindrical members, said members being respectively slidable into the rail-like guiding liners in abutment with the rail portions and fastening means extending through the semi-cylindrical hinge members and through said rail-like guiding liners.

7. A hinge comprising a substantially cylindrical plug-like member including a pair of co-acting substantially semi-cylindrical portions each having a substantially flat diametrically extending inner face terminating in a substantially semi-spherical end portion having a flat diametrically disposed face extending in a plane substantially normal to the plane of the first mentioned flat face of said member, a substantially semi-cylindrical rail-like guiding liner substantially enveloping each of the substantially semi-cylindrical portions of said hinge, means for attaching one of said rail-like guiding liners to a stationary member, means for attaching the

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other of said rail-like guiding liners to a swingable member and means pivotally interconnecting said semi-spherical end portions.

8. A hinge for swingably suspending a movable surface member with respect to a stationary surface member, comprising in combination with a bore extending between said members with one semi-cylindrical portion of the bore recessed into the stationary member and the aligned semi-cylindrical portion of the bore recessed into the movable portion, a pair of symmetrical rail-like guiding liners, each having diametrically extending coplanar rail portions terminating in spaced relation to each other, a hinge in the form of a cylindrical plug divided vertically into a pair of semi-cylindrical portions and divided horizontally into a pair of semi-spherical portions, means pivotally interconnecting said semi-spherical portions, said semi-cylindrical portions being slidable into and out of said rail-like guiding liners and engageable behind said coplanar

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rail portions, means for securing said rail-like guiding liners to said stationary surface member and to said movable surface member and separate means for securing the semi-cylindrical portions of said hinge to said semi-cylindrical rail-like guiding liners and to said stationary surface member and said movable surface member.

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