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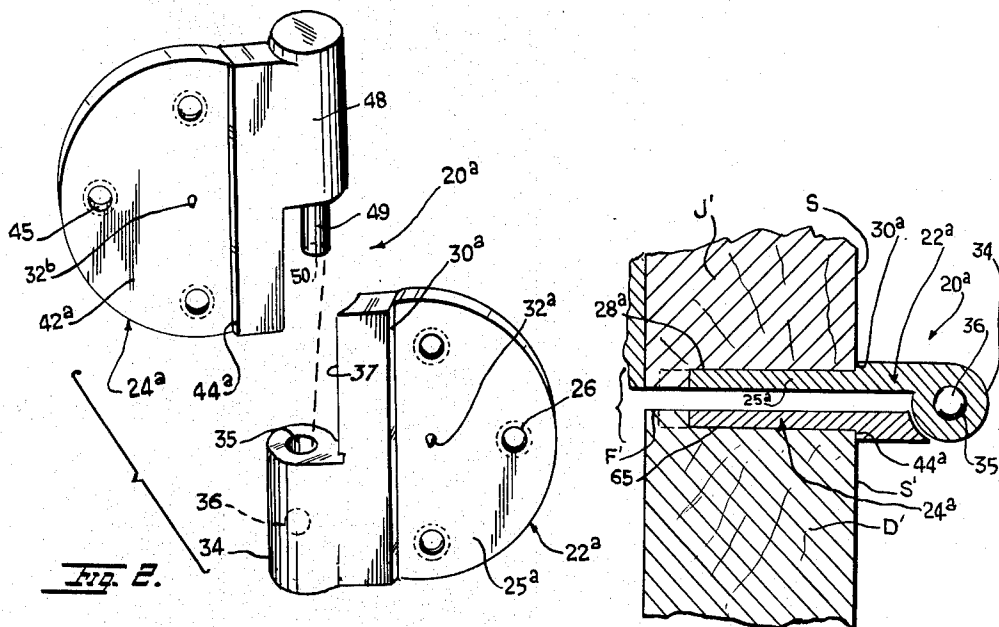
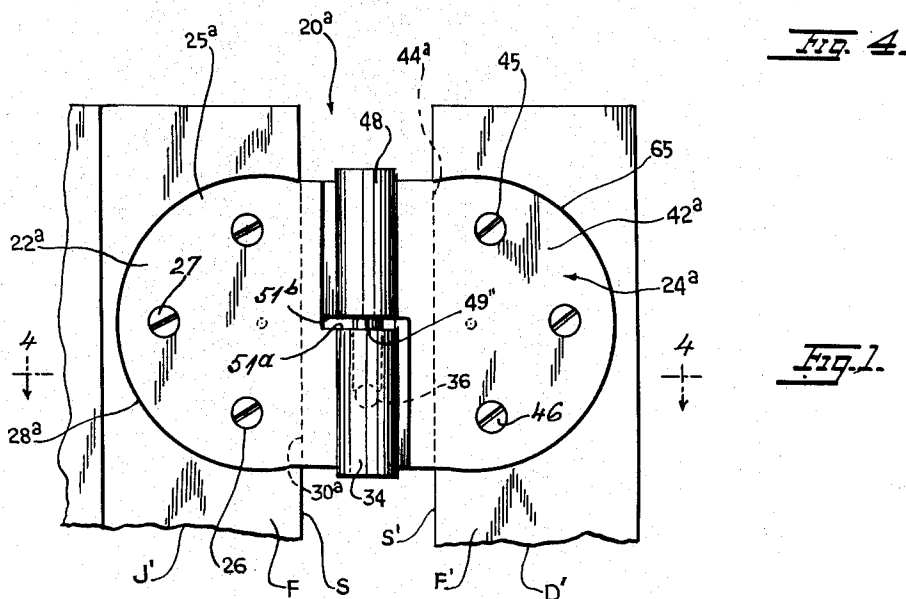
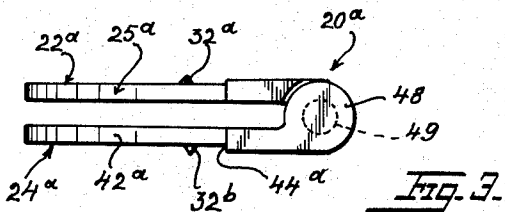
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DOOR BUTT HINGE

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2 Sheets-Sheet 1



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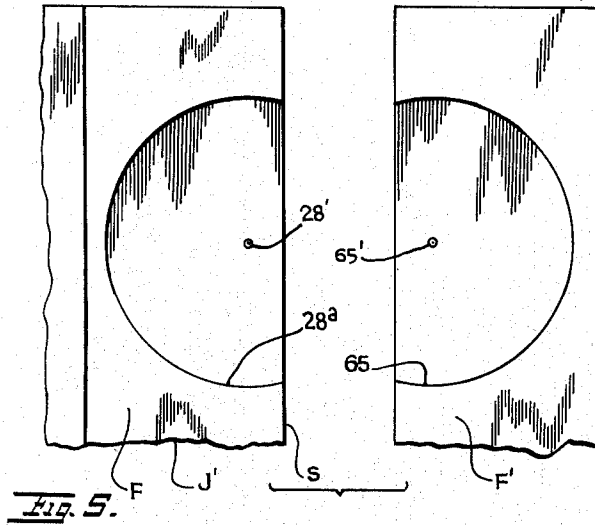
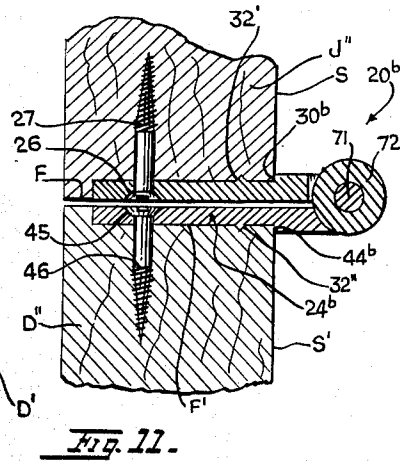
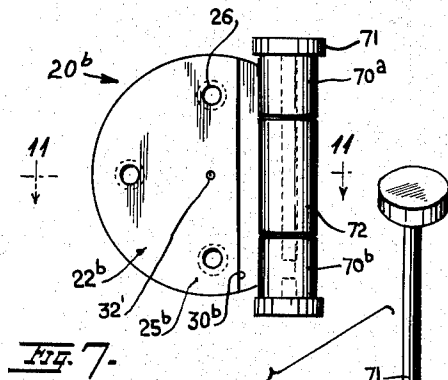
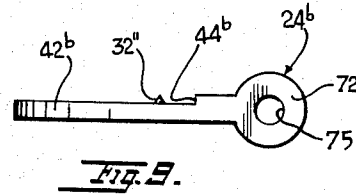
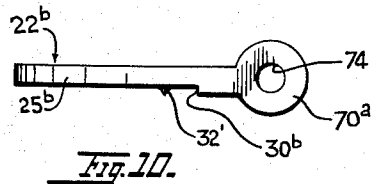
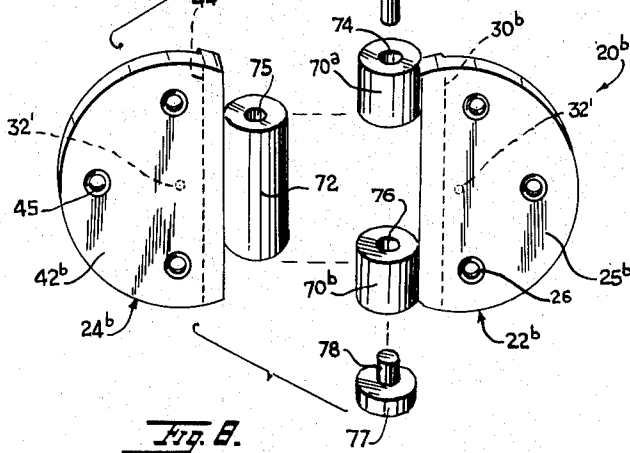
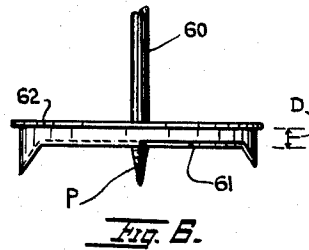
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DOOR BUTT HINGE

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2 Sheets-Sheet 2



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3,231,929

## DOOR BUTT HINGE

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1 Claim. (Cl. 16—171)

This invention concerns a novel door hinge construction.

According to the invention the hinge has two hinge plates which can be attached respectively to a door and a door jamb. Either hinge plate can be set into a generally semi-circular recess or mortise in either the door or door jamb. The hinge plates are provided with ridges which precisely locate the plates with respect to the edges of the door and door jamb. The plate which is to be set into a recess is preferably provided with a centered projecting pin which serves to locate the mortising or drilling center for forming the recess.

In one form of the invention, one hinge plate has a recess formed therein for receiving the other hinge plate in a nested and flush arrangement. The hinge plate which is to be mounted on the door may be provided with a projecting bearing shaft or rod which fits into a sleeve integral with the other hinge plate for the door jamb. Inside the sleeve is a ball bearing which supports the shaft so that the door swings freely with respect to the door jamb.

In another form of the invention, interfitting eyes or sleeves are provided on the hinge plates through which extends a removable pin.

It is therefore one object of the invention to provide a door hinge construction in which circularly curved hinge plates are employed with ridges for locating the plates with respect to edges of a door and door jamb.

A further object is to provide a door hinge as described with projecting pins at one side of one or both hinge plates to serve as the center of drilling for mortising tool.

Yet another object is to provide a novel closure cap for the knuckle structure of the hinge.

Still another object is to provide a door hinge with hinge plates including a shaft rigidly held by one plate and fitting into a sleeve rigidly held by the other plate, with a ball bearing in the sleeve rotatably supporting the shaft to permit free turning movement of the plates with respect to each other.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a front elevational view of a hinge embodying the invention, the hinge shown mounted on a door and a door jamb in open position.

FIG. 2 is an exploded rear perspective view of parts of the hinge of FIG. 1.

FIG. 3 is a top plan view of the hinge in a closed position.

FIG. 4 is a sectional view of the hinge taken on line 4—4 of FIG. 1 but with the hinge plates in closed position.

FIG. 5 is an elevational view of a door and door jamb showing recesses formed to receive parts of the hinge.

FIG. 6 is a side view of part of a mortising tool which may be used to form the recesses of FIG. 5.

FIG. 7 is a side view of a hinge embodying a modified form of the invention in closed position.

FIG. 8 is an exploded perspective view of parts of the hinge of FIG. 7.

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FIG. 9 and FIG. 10 are top plan views of the hinge plates of FIG. 7.

FIG. 11 is a sectional view taken on line 11—11 of FIG. 7 but with the hinge shown mounted on a door and jamb.

Referring in detail to the drawings, in FIG. 1 there is shown a hinge embodying the invention and indicated generally at 20<sup>a</sup>. This hinge has two hinge plates 22<sup>a</sup> and 24<sup>a</sup>. Hinge plate 22<sup>a</sup> is intended for mounting on end face F of a door jamb J'. The plate 22<sup>a</sup> has a circularly curved body portion 25<sup>a</sup> which is slightly more than semicircular. Three counter-sunk holes 26 are provided for receiving screws 27 to secure the body portion 25<sup>a</sup> in a semicircular recess or mortise 28<sup>a</sup> formed in the door jamb. The plate has a side flange 30<sup>a</sup> which abuts side S of the door jamb. A pointed projection 28' is located at the rear face of the plate. This projection is located at the center of curvature of recess 28<sup>a</sup> and of the plate 22<sup>a</sup>. Plate 22<sup>a</sup> carries an integral sleeve 34 having an axial bore 35 in which is set a hardened ball bearing 36. The axis of the sleeve is parallel to the lateral edge 37 of the plate. The plate body 25<sup>a</sup> fits into circularly curved shallow recess 28<sup>a</sup> whose depth equals that of the plate body so that the front face of the plate body is flush with end face F of the door jamb; see FIG. 4.

Hinge plate 24<sup>a</sup> is also circularly curved. Plate 24<sup>a</sup> has a lateral ridge or flange 44<sup>a</sup> which fits snugly against the side S' of door D'. The plate 24<sup>a</sup> has countersunk holes 45 to receive screws 46 which secure the plate to the door. The plate fits into a circularly curved shallow recess 65 whose depth equals the thickness of plate body 42<sup>a</sup>. Rear pointed projection 32<sup>b</sup> locates the center of curvature of the recess 65. The outer face of plate 24<sup>a</sup> fits flush with end face F' of door D'.

Plate 24<sup>a</sup> carries a laterally extending sleeve 48 in which is set a hardened cylindrical shaft 49 having a concave recess 50 at its end. The shaft fits snugly into sleeve bore 35 and the bottom end of the shaft rests on the top of ball bearing 36. Adjacent edges 51<sup>a</sup>, 51<sup>b</sup> of the sleeves 34, 48 are slightly spaced from each other as the shaft rides on the ball bearing. Due to this thrust bearing arrangement, the door turns freely with respect to the door jamb. One or more other similar hinge assemblies 20<sup>a</sup> will be provided between the door and door jamb to support the door properly in a vertical plane with respect to the vertical door jamb.

In order to form the recesses 28<sup>a</sup> and 65, plates 22<sup>a</sup> and 24<sup>a</sup> can serve as templates. By pressing the plate 22<sup>a</sup> against the door jamb with flange 30<sup>a</sup> at the edge of the jamb projection 32' will mark the door at a point which will be the center of curvature of the recess to be formed. Then a mortising tool 60 such as shown in FIG. 6 can be used to drill the recess. This tool can be driven by a manually operated brace or by a motor driven chuck in which the tool will be engaged. The tool may be provided with an externally threaded point P and shoulder 62 which limits the depth of cut of the tool to a distance D which is the distance between cutting edge 61 and shoulder 62.

FIG. 5 shows recesses 28<sup>a</sup> and 65 formed in the end faces F and F' of door jamb J' and door D' to receive the plates 22<sup>a</sup> and 24<sup>a</sup> of hinge 20<sup>a</sup>. The holes 28' and 65' are formed by point P of tool 60 (FIG. 6) which cuts the recesses. These holes are marked by the pointed projections 32<sup>a</sup>, 32<sup>b</sup> of the hinge plates which serve as templates for this purpose.

FIGS. 7—11 show another hinge 20<sup>b</sup> having two hinge plates 22<sup>b</sup> and 24<sup>b</sup>. The semicircular body 25<sup>b</sup> of plate 22<sup>b</sup> has a ridge 30<sup>b</sup> on its rear face for engaging the side S of door jamb J'' as shown in FIG. 11. A projecting pin

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32' serves to locate the center of curvature in recess 28' formed in end face F of jamb J". Two aligned sleeves or eyes 70<sup>a</sup>, 70<sup>b</sup> are provided to receive in axial alignment the sleeve 72 of plate 24<sup>b</sup>. A pin 71 fits in the aligned bores 74, 75, 76 of the interfitted sleeves 70<sup>a</sup>, 72 and 70<sup>b</sup>, respectively. A closure cap 77 with a stud 78 can be force fitted into the bottom end of sleeve bore 76.

Hinge plate 24<sup>b</sup> has a ridge 44<sup>b</sup> formed at its rear side for engaging at the intersection of the face S' and edge F' of door D". Other parts of the hinge corresponding to those of hinges 20 and 20<sup>a</sup> are identically numbered. Projecting pin 32" is provided on the rear side of plate body 42<sup>b</sup>.

It will be noted that all of the hinges are provided with ridges or flanges at their rear faces for locating the lateral edges of the hinge plates in alignment and flush with the surfaces of the door and door jamb. The hinge 20<sup>a</sup> provides a more freely swinging assembly because of the ball bearing arrangement. In addition, the door can easily be lifted off the door jamb when the door is open since the depending shafts 49 slide out of the sleeves 34 held on the door jamb. In hinge 20<sup>b</sup>, the pin 75 must be removed to disengage the hinge plates 22<sup>b</sup>, 24<sup>b</sup>.

The hinge plates can be made by mass production metal working machinery at low cost. They are strong, durable and readily replaced. They are arranged for quick locating of mortises when required. These hinge plates can be installed much quicker and more accurately than conventional rectangular hinge plates.

While we have illustrated and described the preferred embodiments of our invention, it is to be understood that we do not limit ourselves to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

Having thus described our invention, what we claim as new, and desire to secure by United States Letters Patent is:

A door hinge of the character described comprising a pair of substantially similar hinge plates one of which is adapted to be secured in fixed position to a door jamb and the other of which is adapted to be secured in fixed position to a door; each of said hinge plates comprising a flat semi-circular body section, an integral vertically disposed sleeve, and a vertically extending shoulder which is disposed between said body section and said sleeve; the

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body section of the said one of said hinge plates being adapted to be mounted in a complementary countersunk recess in said door jamb with the said shoulder thereof engaging the outer corner of said door jamb; the said sleeve of the said one of said hinge plates having an axial downwardly extending bore therein with a hardened ball bearing disposed in the bottom thereof; the said body section of the said other of said hinge plates being adapted to be mounted in a complementary countersunk recess in said door with the said shoulder thereof engaging a corner of said door; the said sleeve of the said other of said hinge plates having an upwardly extending axial bore therein in which a hardened pivot shaft is secured, said shaft extending downwardly from said sleeve into the said sleeve bore of the said one of said hinge plates with the lower end thereof engaging said ball bearing; each of said body sections having a small sharp pointed projection which extends outwardly from the rear surface thereof at the center of curvature thereof to facilitate the countersinking of the complementary recesses in which said body sections are mounted.

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