Dec. 9, 1952 R. T. KEATING 2,620,509

DOOR HINGE

Filed June 10, 1950

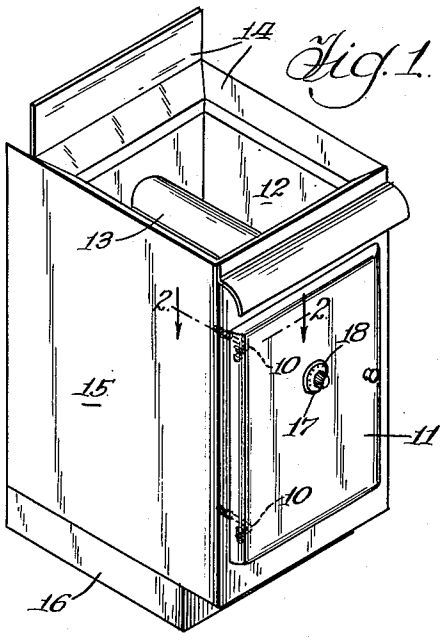


Fig. 1.

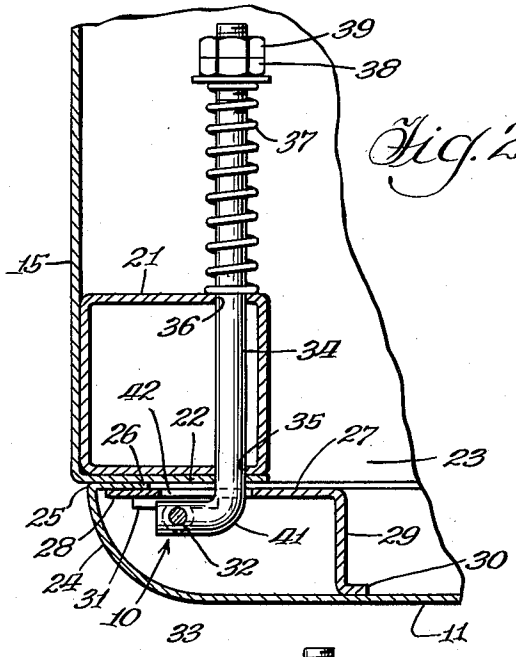


Fig. 2.

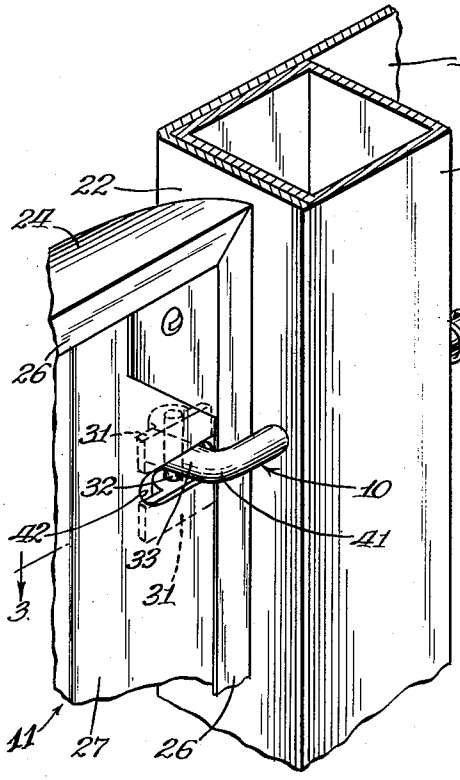


Fig. 4.

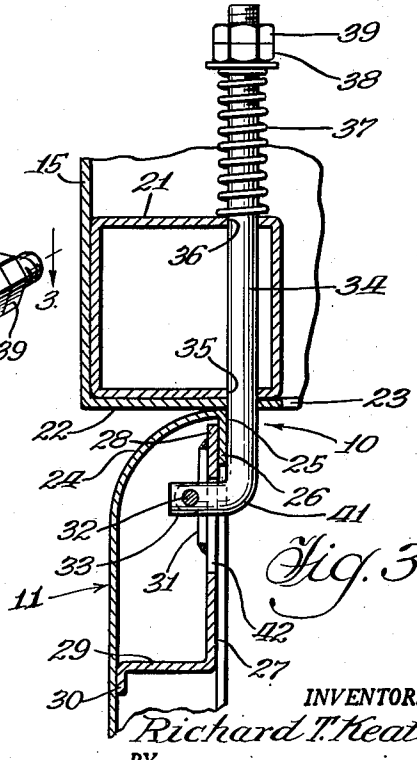


Fig. 3.

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DOOR HINGE

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6 Claims. (Cl. 16—135)

1

This invention relates to hinges and has particular reference to a novel concealed hinge having means for holding a door closed or open at will. In the preferred embodiment of the invention, the several component parts of the hinge are so designed that it is particularly well suited to use in connection with the doors of sheet metal cabinets.

It is a primary object of the invention to provide a hinge of the concealed type which, while entirely out of view, is adapted to hold the door firmly closed, or to hold it fully open when once moved to the open position, and to limit its swinging movement to prevent it from swinging beyond fully opened position.

A further object of the invention is to provide a concealed hinge of more simplified construction than those heretofore used, yet of greater physical strength and so designed that it is long lasting and not subject to mechanical difficulties, particularly difficulties arising from minor misalignment of the parts, which cause so much trouble with conventional hinges.

It is a further object of the invention to provide a concealed door hinge having spring means to hold the door either open or closed, wherein the effective force exerted by the spring is easily and conveniently adjusted as required.

A further object is to provide an improved and simplified concealed hinge wherein the several parts employed are simple in construction and may be economically manufactured by ordinary factory methods, so that the hinge may be produced in large quantities in a convenient and economical manner.

Further objects will appear in the disclosure hereinafter, wherein the invention is described in a preferred embodiment illustrated in the present drawings, of which:

Figure 1 is a perspective view of a deep fryer having a sheet metal housing and a door thereon hinged in accordance with the present teachings;

Figure 2 is a fragmental detail sectional view taken substantially on the plane of the line 2—2 of Figure 1 and illustrating a hinge as contemplated by this disclosure;

Figure 3 is a view similar to Figure 2, but showing the parts of the hinge in the positions they assume when the door is in fully open position; and

Figure 4 is a fragmental perspective view of the inside of the door and a portion of the corner post of the cabinet, showing the several parts in fully open position.

2

As illustrated, the hinges 10 comprising the subject matter of the present invention are shown as applied to the door 11 of a deep fryer having a tank 12, heat transfer tube 13 and splash shield 14, all surrounded by and enclosed in a sheet metal cabinet 15 mounted on a base portion 16. As shown, the door has a center perforation 17 through which a regulating dial 18 of the gas burner of the device may be adjusted, but this is of course a matter of choice and forms no part of the present invention.

It is contemplated, however, that the door 11 shall be mounted on the hinges 10 to provide unrestricted access to the gas burner and to the other interior parts of the unit, and it is in the construction of these hinges that the novelty of the present invention resides.

With reference now to Figures 2 and 3, it will be seen that the cabinet 15 includes a corner post 21 which, as shown, is in the form of a square metal tube, over which the sheet metal of the cabinet 15 is folded to form a front flange 22 surrounding the open doorway 23 of the unit. The door 11 comprises a single integral metal plate or sheet having its top, bottom and side edges shaped inwardly in gradually curved portions 24 terminating in a right angle bend 25 and inwardly extending flanges 26. The flanges 26 (which extend around the top, bottom and both sides of the door) define the inner plane of the door which is spaced from the outer sheet 11 a distance sufficient to give an appearance of adequate thickness to the door structure. Also, the contoured surfaces 24 give considerable rigidity to the entire door member. The door may be provided, however, with a vertical reinforcing member 27 having its outer edge 28 secured to the inwardly extending flange 26 on the hinge side of the door and being offset at 29 so that its inner flange 30 extends to and may be welded on the inner surface of the outer metal sheet 11 of the door structure.

The hinge mechanism with which the present invention is concerned comprises a pair of brackets 31 secured to the inner surface of the reinforcing member 27 and spaced apart from each other, but joined by a vertical hinge pin 32. The hinge pin 32 extends through an aperture in a right angled offset portion 33 of a hinge slide or mounting rod 34, which extends inwardly through apertures 35 and 36 in the corner post 21 of the cabinet and is provided at its inner end with a coiled compression spring 37, an adjusting nut 38 threaded on the end of the rod 34 and a lock nut 39 to secure the adjusting nut against accidental loosening. The rod 34 is thus con-

nected to the offset portion 33 by a right angle bend 41, and the reinforcing member 27 is cut away with an oversize aperture 42 to clear the rod and permit the hinge to swing between the closed position illustrated in Figure 2 and the fully opened position illustrated in Figures 3 and 4.

It will be seen from examination of these figures that as the door is opened, it will tend to pivot on the extreme edge 25 and will draw the hinge pin 32 outwardly to shift the slide 34 longitudinally in the apertures 35 and 36, compressing the coil spring 37. Thus, the force exerted by the spring 37 will normally tend to hold the door closed and will offer controlled resistance to opening movement until the parts have moved to a position approaching the fully open position of Figure 3. As the parts assume this position, the edge portion 25 of the door will have moved to the right beyond the center of the hinge pin 32 and to a point where it comes into abutting relation with the slide rod 34. The slide rod 34 thus acts as a limiting stop for the hinge and limits the opening movement thereof, without the necessity of any additional auxiliary devices as are customarily employed in other hinged structures. Moreover, the door, when once opened to the right angle position illustrated in Figure 3, will maintain itself in open position, since the point of contact between the inner edge 25 of the door and the front flange 22 of the cabinet is now to the right of the center of the hinge pin 32, so that the inward force exerted on the hinge pin by the compression spring 37 tends to swing the door further open and is restrained by the contact between the inner edge of the door and the surfaces of the slides 34 on both the upper and lower hinges. It will be understood, of course, that while only one hinge of the door has been illustrated in detail, it is contemplated that both of the hinges 10 will be identical, and that they will be positioned above each other and with the hinge pins in substantial alignment.

It is to be noted, however, that the functioning of this form of hinge will not be materially affected by slight misalignments of the two or more hinge pins 32 which may be employed, since the axis of the cylindrical slide rods 34 is at right angles to the axis of the hinge pins, so that if any minor misalignments exist between these pins, the slide rods 34 may rotate slightly in the apertures 35 and 36 and give adequate compensation therefor without imposing undue strains on the door or making it difficult to open and close. This is accomplished, moreover, without any detrimental effect on the efficiency of the hinges in holding the door in its closed position, since in the closed position illustrated in Figure 2, the center of the hinge pins 32 is spaced considerably inwardly from the extreme edge 25 of the door panel so that the combined effects of both of the springs 37 of the hinges draw the door panel inwardly to hold it in firmly closed position.

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

1. The combination, with a door mounting post and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket within the recess and spaced inwardly of the door panel from the said one edge thereof; and a slide rod slidably mounted in the door post in a position offset from the location of said hinge pin, a lateral extension from one end of said slide rod extending to and supporting said hinge pin, and spring means urging the extension of said slide rod and the hinge pin toward said supporting post, said spring means comprising a compression spring coiled adjacent the other end of the slide rod, with an adjusting nut threaded on said last-named end of said rod to vary the degree of compression of said spring, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

2. The combination, with a door mounting post and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket within the recess and spaced inwardly of the door panel from the said one edge thereof; and a cylindrical slide rod slidably mounted in the door post in a position offset from the location of said hinge pin, a lateral extension from one end of said slide rod extending to and supporting said hinge pin, and spring means urging the extension of said slide rod and the hinge pin toward said supporting post, said spring means comprising a compression spring coiled adjacent the other end of the slide rod, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

3. The combination, with a door mounting post and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket within the recess and spaced inwardly of the door panel from the said one edge thereof; and a cylindrical slide rod slidably mounted in the door post in a position offset from the location of said hinge pin, a lateral extension from one end of said slide rod extending to and supporting said hinge pin, and spring means urging the extension of said slide rod and the hinge pin toward said supporting post, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

4. The combination, with a door mounting post

and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket within the recess and a cylindrical slide rod slidably mounted in the door post and extending to and supporting said hinge pin, and spring means urging said hinge pin toward said supporting post, said spring means comprising a compression spring coiled adjacent the other end of the slide rod, with an adjusting nut threaded on said last-named end of said rod to vary the degree of compression of said spring, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

5. The combination, with a door mounting post and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket, said bracket and hinge pin being housed wholly within the recess and a cylindrical slide rod slidably mounted in the door post and extending through an aperture in said reinforcing member and supporting said hinge pin, and spring means urging said hinge pin toward said supporting post, said spring means comprising a compression spring coiled adjacent the other end of the slide rod, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when

the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

6. The combination, with a door mounting post and a door panel having a recessed reinforcing member along one edge thereof forming a recess with said panel proper, of a hinge comprising a hinge pin on a bracket, said bracket and hinge pin being housed wholly within the recess and a slide rod slidably mounted in the door post and extending through an aperture in said reinforcing member and supporting said hinge pin, and spring means urging said hinge pin toward said supporting post, said slide rod having an angle bend and said pin extending through said bend, said door panel edge being parallel to the axis of said hinge pin, said hinge pin and bracket, said slide rod and said door panel edge being so positioned with relation to each other that said door panel edge is on one side of the axis of said hinge pin when the panel is in open position and is on the opposite side of said hinge pin when the panel is in closed position whereby said spring means holds said panel in stationary position against said door post in either position.

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