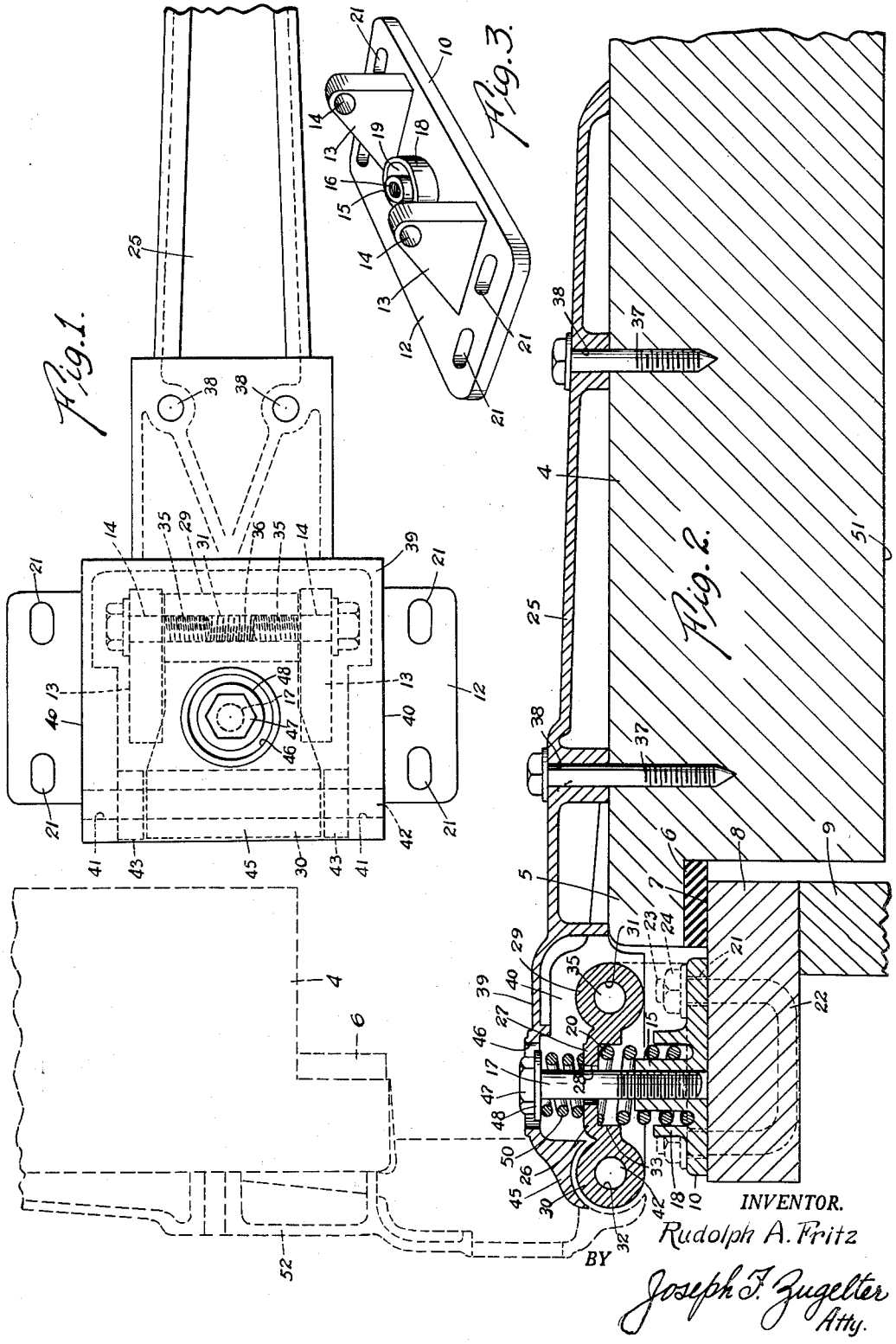
Nov. 15, 1955 R. A. FRITZ 2,723,418

ADJUSTABLE HINGE

Filed May 11, 1953



United States Patent Office 2,723,418 Patented Nov. 15, 1955

2,723,418

ADJUSTABLE HINGE

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Application May 11, 1953, Serial No. 354,165

12 Claims. (Cl. 16—131)

The present invention relates to an adjustable hinge, and is concerned particularly with hinges for very heavy doors which may be subjected to hard usage, shocks and strains.

An object of the invention is to provide an improved form of adjustable hinge constructed to withstand severe abuse and hard usage.

Another object of the invention is to provide for simple and expeditious adjustment or variation of offset between the plane of the hinge strap and the plane of the mounting face, thereby to accommodate the hinge to doors of varying thickness, and to provide for a variation of gasket pressure between the door and its frame.

A further object is to provide an adjustable hinge which is so constructed and mounted, as to relieve and reduce gasket wear, while at the same time providing for a leak-proof seal between the door and the door frame.

Another object of the invention is to provide in an adjustable hinge, means for absorbing shock and strain which, in the case of other forms of hinges, generally results in destructive bending, springing, or disalignment of parts.

Another object is to provide a hinge including adjustment features for the purposes above stated, and in which the butt of the hinge strap is made hollow or cup-shaped, to serve as a cover for concealing and protecting the adjusting mechanism.

The foregoing and other objects are attained by the means described herein and illustrated upon the accompanying drawing, in which:

Fig. 1 is a front elevational view of the adjustable hinge completely assembled, a portion of the length of the hinge strap being broken away to conserve space.

Fig. 2 is a longitudinal cross-sectional view of the hinge, shown applied to a door and door frame.

Fig. 3 is a perspective view of a mounting base forming part of the adjustable hinge.

In the drawing, 4 indicates a refrigerator door or other heavy door, having a circumferential flange 5 which may carry a suitable member or gasket 6 to butt against the circumferential margin 7 of a door frame 8. The character 9 indicates a portion of the frame defining the door opening of a storage compartment or other space to be closed by the door 4. The member 8 may be considered a facing board of the frame, serving as an element upon which the hinge base may be mounted. So far as the present invention is concerned, door 4 may be of any type generally employed for closing and sealing a compartment, it being understood that such doors are sometimes insulated, or may be made hollow or perhaps solid as indicated upon the accompanying drawing. These factors are of no importance or concern in connection with the present invention.

As illustrated upon Fig. 3, the hinge structure includes a mounting base indicated generally by the character 10, which consists of a substantially flat plate portion 12 from which extends the pair of spaced parallel ears or lugs 13, 13. The ears or lugs extend in a common

direction from the plane of the base plate 12, and each is provided near its outer end with a transverse bore 14, the bores being in axial alignment.

Between the spaced ears or lugs 13 is formed or applied a laterally extending boss 15, which may be drilled and internally threaded as at 16, to receive the end of an adjusting screw indicated at 17 upon Fig. 2. If desired, the boss 15 may be encircled by a cylindrical wall or flange 18, spaced from the exterior of the boss, to provide a circular well 19 for receiving and supporting a helical compression spring 20, indicated upon Fig. 2. For the purpose of mounting the base 10 upon the frame member 8, the end margins of the mounting base may be provided with a series of elongate openings or slots 21 adapted to receive suitable fasteners extending from the frame member 8. In the example illustrated by Fig. 2, the fasteners which secure the mounting base to the door frame are shown as U-bolts 22, which have terminal ends 23 externally threaded to receive the nuts 24. That portion of the U-bolt which is intermediate the threaded ends, may be suitably embedded in the material of the frame member 8. The elongate openings or slots 21 of the mounting base provide for a limited amount of shifting of the base upon the frame member 8, as an aid to proper centering of the door within the opening of the frame. That edge of the mounting base which is nearest the door-adjacent edge of the frame 8 comprises the forward edge of said base.

As will be evident by referring to Fig. 2, the strap or leaf 25 of the hinge is not to be pivoted directly upon the mounting base element 10, but instead, the required connection is made between the parts through the intermediary of a rocker member or link 26 which surrounds the adjustment screw 17. The rocker member or link may consist of a plate 27 having a substantially central opening or perforation 28 to loosely accommodate the adjustment screw, so that the rocker member might move lengthwise of the screw. At opposite ends of the rocker member may be formed the cylindrical barrels or eyes 29 and 30, and these are arranged in spaced parallelism so that the longitudinal bores 31 and 32 thereof are likewise parallel and spaced apart at opposite sides of the adjustment screw 17. The underside of the rocker member, concentrically of the opening 28, may be bored or otherwise formed to provide a well 33 for one end of the compression spring 20.

The barrel 29 of the rocker member has pivotal connection with the extending ears or lugs 13 of the mounting base, which connection may be established by means of any suitable form of pivot device. In the example illustrated, the required pivotal connection is made by means of screws 35 which pass through the bores 14 of the ears 13, and enter the ends of the hollow barrel 29. As will be readily understood, the pivotal connection could be made using a single screw or bolt, or any suitable shaft or pin capable of serving as a pivot member. In the embodiment shown, the threaded ends of the screws 35 engage the internal threads 36 of the barrel bore 31, this construction providing for locking or fixing the barrel 29 relative to the ears 13, in the event that fixation of the hinge adjustment should be considered desirable in any particular case. It will be appreciated, of course, that the screws 35 need not be drawn tight if free rocking movement of member 26 is considered necessary or desirable in any given case. This feature will be further explained hereinafter.

Attention is now directed to the hinge strap or leaf 25 which generally is secured to the door by means of screws 37 or other suitable fasteners. These screws may pass through perforations 38 provided in the hinge strap. At the hinging end of the strap, there is provided a butt or enlargement 39 which is hollow or cup-

shaped this being for the purpose of providing a cover for concealing and protecting the rocker member and the adjusting mechanism associated therewith. The hollow butt or cover includes opposed side walls **40** which may be transversely bored as at **41** to snugly receive a shaft or pin **42** providing a pivotal connection between the hinge strap and the hollow barrel **30** of the rocker member **26**. To insure frictionless rotation of the hinge strap relative to the rocker member and about the pivot shaft or pin **42**, suitable anti-friction bearings **43—43** may be interposed between the ends of the barrel **30** and the side walls **40** of the hinge butt. These bearings may be in the form of short cylinders surrounding the pin or shaft **42**, and impregnated with a suitable lubricant, in accordance with common practice. At the rear end **45** of the butt, a portion **45** thereof may overlie and substantially cover the bearings **43** and the barrel **30**.

Substantially centrally of the cover or enlarged butt portion **39** of the hinge strap, there may be formed an access opening **46** through which the adjustment screw **17** and its head **47** may extend. Opening **46** is to be of sufficient size to permit freedom of movement of the adjustment screw head **47** and its washer **48** therethrough. Depending upon the extent to which the spring **20** may be placed under compression, the head **47** of the adjustment screw may extend more or less through the opening **46**.

At this stage of the description, it is desirable to point out that the hinge structure may be assembled either with or without interposing the outer or secondary compression spring **50** between the head **47** of the adjustment screw and the body of the rocker member **26**. If the secondary spring **50** is omitted, the screw head **47** or its washer **48** will bear directly upon the rocker member **26**, and in that event a screw **17** shorter than that shown in the drawing may be employed. Moreover, with the secondary spring **50** omitted, the rocker member will be permitted a rocking movement in one direction only, against the force of spring **20**. Such a construction provides for adjustment of the offset between the outer face of the door and the outer face of the frame, and compression of the gasket **6** may thereby be regulated.

In the alternative, use of the secondary or outer spring **50** permits limited rocking movement of the rocker member **26** in two directions lengthwise of the adjustment screw **17**, but normally the offset established by rotating the adjustment screw **17** will be maintained. The advantage of interposing the compression spring **50**, is that the hinge will yield to some extent in the event that the back of the door be subjected to force, or perhaps to shock, such as might result from a heavy object falling or thrust against the inside face **51** of the door. The construction described will accordingly be seen to protect the hinge and the parts to which it is attached, from destruction or disalignment in the event that the door is subjected to abuse or hard usage. The springs also serve to absorb shock resulting from slamming the door to closed position.

As indicated by the broken lines **52**, the hinge of this invention carries the door in such manner that the door when opened at 90 degrees, cannot to any extent conflict with the passage of trucks or other objects requiring use of the full width of the doorway. In other words, the door when opened at right angles leaves the full width of the door opening unobstructed. Another advantage of the present hinge structure is that it ensures contact of the gasket **6** upon the seat **7** with a direct abutting action, rather than a rolling or sliding action which aggravates gasket wear and deformation. It is to be expected, therefore, that doors provided with adjustable hinges of the type herein disclosed will require much less servicing and maintenance work than doors otherwise hinged.

From the foregoing, it will readily be understood that the adjustable hinge of the present invention possesses many features of advantage over other forms of hinges, and that it may be manufactured and assembled with a minimum of labor and expense. The mounting base and the rocker member may be produced as simple metal castings, if desired. The hinge strap or leaf **25** can be formed in one single piece, either as a casting or as a stamping. The remaining parts may be standard items of manufacture.

It is to be understood that various modifications and changes may be made in the structural details of the device, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim is:

1. A hinge for application to a door and a frame, comprising in combination: a hinge strap including a butt, and a transverse hinge pin carried by the butt, a mounting base including a substantially flat plate portion, a pair of spaced ears having ends extending in a common direction from the plate portion, and screw-threaded means between said ears for threadedly receiving the threaded end of an adjustment screw, a rocker member in the form of a perforate link having opposite ends, means pivoting one end of the link to the hinge pin of the hinge strap butt, means pivoting the other end of the link to the extending ends of the spaced ears, an adjustment screw having a head and a screw-threaded end, said end passing through the perforation of the link and engaging the screw-threaded means of the mounting base, with the head of said screw disposed adjacent to one face of the link to limit rocking thereof in one direction about the pivot means of the ears, and spring means yieldingly urging the link toward the head of the adjustment screw.

2. A hinge for application to a door and a frame, comprising in combination: a hinge strap including a butt, and a transverse hinge pin carried by the butt, a mounting base including a substantially flat plate portion, a pair of spaced ears having ends extending in a common direction from the plate portion, and screw-threaded means between said ears for threadedly receiving the threaded end of an adjustment screw, a rocker member in the form of a perforate link having opposite ends, means pivoting one end of the link to the hinge pin of the hinge strap butt, means pivoting the other end of the link to the extending ends of the spaced ears, an adjustment screw having a head and a screw-threaded end, said end passing through the perforation of the link and engaging the screw-threaded means of the mounting base, with the head of said screw disposed adjacent to one face of the link to limit rocking thereof in one direction about the pivot means of the ears, spring means yieldingly urging the link toward the head of the adjustment screw, and a shock-absorbing cushion means between the link and the adjustment screw head.

3. A hinge for application to a door and a frame, comprising in combination: a hinge strap having an enlarged cup-shaped butt end perforated to provide access to the interior thereof, said cup-shaped butt having opposite side walls, a hinge pin spanning said side walls and included within the hollow interior of the butt, a mounting base including a substantially flat plate portion, a pair of spaced ears having ends extending in a common direction from the plate portion, and screw-threaded means between said ears for threadedly receiving the threaded end of an adjustment screw, a rocker member in the form of a perforate link having opopsite ends, means pivoting one end of the link to the hinge pin of the hinge scrap butt, means pivoting the other end of the link to the extending ends of the spaced ears, an adjustment screw having a head accessible through the perforation of the enlarged hinge butt, and a screw threaded end passing through the perforation of the link and engaging the screw-threaded means of the mounting base, with the head of said screw disposed adjacent to one face of the

link to limit rocking thereof in one direction about the pivot means of the ears, and yielding means constantly urging the link toward the head of the adjustment screw.

4. A hinge for application to a door and a frame, comprising in combination: a hinge strap having an enlarged cup-shaped butt end perforated to provide access to the interior thereof, said cup-shaped butt having opposite side walls, a hinge pin spanning said side walls and included within the hollow interior of the butt, a mounting base including a substantially flat plate portion, a pair of spaced ears having ends extending in a common direction from the plate portion, and screw-threaded means between said ears for threadedly receiving the threaded end of an adjustment screw, a rocker member in the form of a perforate link having opposite ends, means pivoting one end of the link to the hinge pin of the hinge strap butt, means pivoting the other end of the link to the extending ends of the spaced ears, an adjustment screw having a head accessible through the perforation of the enlarged hinge butt, and a screw threaded end passing through the perforation of the link and engaging the screw-threaded means of the mounting base, with the head of said screw disposed adjacent to one face of the link to limit rocking thereof in one direction about the pivot means of the ears, yielding means constantly urging the link toward the head of the adjustment screw, and a shock-absorbing cushion means between the link and the adjustment screw head.

5. A hinge constructed in accordance with claim 3, wherein the enlarged cup-shaped butt of the hinge strap is of sufficient proportions and depth, to substantially confine the adjustment screw, the link-like rocker member, and the yielding means aforesaid.

6. A hinge constructed in accordance with claim 3, wherein the enlarged cup-shaped butt of the hinge strap covers the mounting base, and is of such size and depth as to receive within its confines the adjustment screw, the link-like rocker member, and the yielding means aforesaid.

7. A hinge constructed in accordance with claim 1, wherein at the means pivoting the link to the mounting

base ears, is included a clamping means whereby the pivotal connection at said ears may be fixed against movement.

8. A hinge comprising a mounting base, a hinge strap, a connecting link, means adjustably interconnecting the link to and locking it against relative motion with the base, and means pivotally mounting the hinge strap to the link for free relative movement thereto.

9. A hinge for application to a door and a frame, comprising in combination: a mounting base for application to the frame, a hinge strap for application to the door, a connecting link, means adjustably interconnecting the link to and locking it against relative motion with the base, and means pivotally connecting the hinge strap to the link for free movement relative to said base and link.

10. A hinge according to claim 9, wherein the pivotal connection of the hinge strap with the link is beyond the connection of the link with the base and remote from the door-adjacent edge of the frame.

11. A hinge according to claim 9, wherein the connection of the link with the base is between the pivotal connection of the hinge strap with the link and the door-adjacent edge of the frame.

12. A hinge comprising a mounting base having a forward edge, a hinge strap, a connecting link, means adjacent the forward edge of the base adjustably interconnecting the link to and locking it against relative motion with the base, and means pivotally mounting the hinge strap to the link remote from the forward edge of the base for free movement relative to said base and link.

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