Sept. 12, 1950 R. E. SLOPA 2,521,756

OVERLAP HINGE

Filed Nov. 24, 1947

Fig. 1.

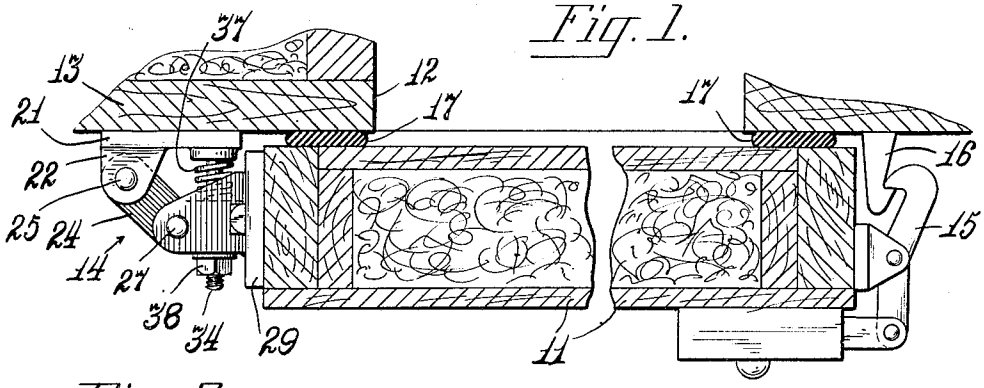


Fig. 2.

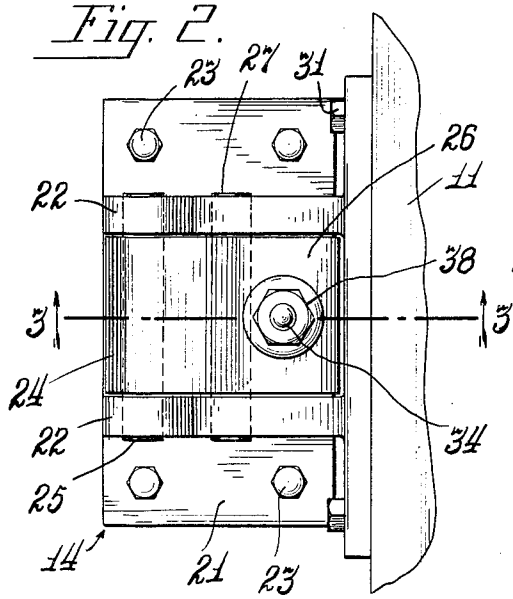


Fig. 3.

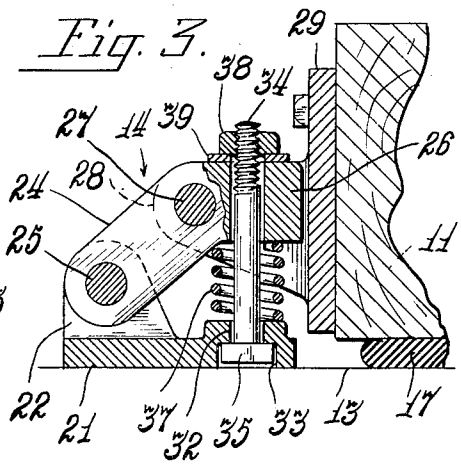
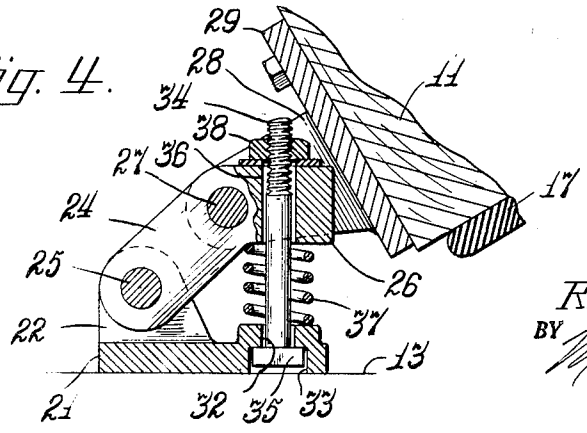


Fig. 4.



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OVERLAP HINGE

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2 Claims. (Cl. 16—131)

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This invention relates to improvements in an overlap hinge and more particularly to a novel ruggedly constructed hinge of a type that insures tight sealing contact between a door and its related door frame.

Known types of hinges or door mountings of a kind adapted to urge a door into tight sealing contact with its related door frame embody various and frequently complicated unsightly structures which, in some instances, are not entirely satisfactory in use because of the looseness in the hinge mounting or the difficulties involved in part replacement.

The hinge structure disclosed herein is concerned generally with the type of overlap hinge structure having manually manipulable means to adjust the hinge element supporting the door relative to its mounting plate so as to maintain tight sealing yieldable contact between the door and the door frame to compensate for wearing of the sealing gaskets.

It is therefore an object of the present invention to provide a novelly constructed rugged yieldable overlap hinge.

Another object is to provide, in a hinge structure, novel features of construction and assembly which will facilitate part replacement without complete dismantling of the installation.

Another object is to provide a hinge of the character referred to with novel means to vary the pressure of the door against the door frame.

Another object of the invention is to provide, in an adjustable hinge structure, means to prevent the development of looseness between the related parts irrespective of whether the door carried thereby is in open or closed position.

Other and further objects of the present invention will be apparent from the following description and claims, and are illustrated in the accompanying drawing which, by way of illustration, shows an exemplary embodiment and the principles thereof. Other embodiments of the invention embodying the same principles may be used, and structural changes may be made as desired by those skilled in the art, without departing from the present invention and the purview of the appended claims.

In the drawing:

Fig. 1 is a horizontal sectional view, partly broken away, showing a refrigerator door in closed position and supported by a hinge embodying the structure involved herein.

Fig. 2 is a elevational view of the hinge structure shown in Fig. 1.

Fig. 3 is a horizontal sectional view taken substantially on line 3—3 of Fig. 2, and showing the door in closed position.

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Fig. 4 is a sectional detail view similar to Fig. 3, showing the door in a partially open position.

The hinge structure embodying the features of the present invention is shown as applied to a door mounting for a door, which is particularly adapted for closing an opening to a chamber in which it is desired to maintain a predetermined temperature such as, for example, a cold storage chamber or refrigerator. The door is of conventional construction and is provided with suitable sealing strips or gaskets which engage the face of the door frame surrounding the opening for establishing a tight seal. In order to maintain a tight seal around the entire opening, the hinge elements provided for the mounting of the door necessarily are of a compensating type so that the edge of the door along which said hinges are mounted may be moved inwardly towards the door frame progressively to compensate for any wear in the sealing strips.

Referring more particularly to the disclosure in the accompanying drawing, the door 11 is arranged to close an opening 12 in a chamber, which opening may be surrounded by a door frame 13. It should be understood at this time that all reference herein to a door frame is inclusive of the marginal area of the chamber wall surrounding the opening. The door 11 is mounted to swing about an axis into open and closed positions, the axis preferably being located along one vertical edge of the door. As shown, such pivotal mounting of the door is obtained by the provision of a plurality of hinges generally indicated at 14. In the disclosure only one such hinge is shown, it being understood that two or more may be utilized depending upon the size and weight of the door. The hinge elements are firmly secured to one edge of the door 11 and to the face of the door frame 13. The other, or free edge of the door 11, has mounted thereon a suitable manually operable latch mechanism including a movable dog 15, carried on the door, which cooperates with a keeper 16 mounted on the door frame adjacent said edge. It should be apparent at this time that, when the door is swung into a closed position and latched, sealing strips 17 on the inside face of the door are brought into tight sealing contact with the face of the door frame so as to hermetically seal the opening.

Owing to deterioration and progressive wearing of the sealing strips 17, the hermetic seal may ultimately be destroyed unless means is

provided in the mounting of the door to compensate for such deterioration or wear. To this end, the hinge elements 14 are constructed so as to be adjusted manually for the purpose of locating the pivotal axis of the door closer to the door frame so that when the door is in closed position the sealing strips are held in tight sealing contact with the door frame.

The hinge element 14 illustrated in the drawing includes a mounting plate 21 which preferably is substantially rectangular in shape and is provided adjacent one edge and on the outwardly disposed face thereof with a pair of spaced apart ears 22. The mounting plate is secured to the door frame as by means of screws 23. A link 24, which is in the form of a bell-crank lever, is pivotally mounted at one end between the ears 22, a pivot pin 25 providing a pivotal mounting therefor. This link 24 extends outwardly from the plate 21 at an angle relative thereto so as to dispose its free end portion or arm 26 in a plane substantially parallel with the plane of the mounting plate 21 but spaced therefrom, as best shown in Fig. 3. A lateral pin 27 is carried in the link 24 midway between its ends as shown, which pin projects outwardly beyond the side faces thereof and is journalled at its ends in spaced lugs 28 extending outwardly from one face of a member 29 which is firmly secured to the edge of the door 11, as by means of screws 31.

It should be obvious at this time that the link 24 provides a connection between the member 29 and the mounting plate 21, and that the said link supports the entire weight of the door 11. Movement of the link relative to the mounting plate 21 is substantially prevented in a manner to be described in detail presently so that movement of the door 11 into open and closed positions is about the pivot pin 27.

As best illustrated in Fig. 3, the mounting plate 21 is provided with an aperture 32 communicating with an enlarged non-circular recess 33 in its bottom face, which aperture and recess are adapted to receive freely therethrough a tie-bolt 34. When the tie-bolt 34 is inserted through the aperture 32 in the manner illustrated, the non-circular head 35 thereof is snugly embraced in the recess 33 so as to prevent free rotation of said tie-bolt. The tie-bolt extends outwardly from the mounting plate 21 loosely through a bore 36 in the free end portion 26 of the link 24. A compression spring 37 is interposed between the bottom face of the free end portion 26 of the link 24 and the opposed face of the mounting plate 21, said spring being fitted over the tie-bolt 34 in the manner illustrated. The free projecting end of the tie-bolt 34 is suitably threaded to receive thereon an adjusting nut 38 and, if desired, a washer 39 may be disposed between the nut 38 and the opposed face of the free end portion 26.

In use, the nut 38 is threaded upon the tie-bolt 34 a distance sufficient to maintain the spring 37 under such compression as to insure a tight sealing contact between the sealing strip 17 and the face of the door frame 13. When so adjusted the door may be swung about its pivot 27 into open and closed positions without imparting any displacement movement to the link 24. The spring 37 tends to hold the link 24 substantially firm so that there is no looseness in the hinge mounting. As the sealing strips 17 wear or otherwise become inefficient as sealing means, the adjusting nut 38 may be adjusted on the tie-bolt 34 to thereby move the pivot 27 inwardly toward the door frame 13 a distance corresponding to the amount of wear or compression present in the sealing strip. In this manner the edge of the door carrying the hinge elements may be moved progressively inwardly towards the door frame.

Although an exemplary embodiment of the invention has been disclosed in the accompanying drawing and described in detail in the foregoing specification, it should be understood that the invention is capable of embodying a wide variety of modifications in detail structure without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. A compensating hinge for a door comprising a mounting plate adapted to be secured against a wall adjacent a side of a door opening and having ears projecting outwardly from the plate, a second mounting plate adapted to be secured against the edge face of a door at the hinged side thereof and having ears projecting outwardly at right angles to the ears of the first mounting plate when the door is closed and terminating in spaced relation to the ears of the first mounting plate, a link pivotally mounted at its outer end between the ears of the first mounting plate and extending diagonally therefrom towards the second mounting plate and terminating in an inner end portion constituting an arm disposed substantially parallel to the first mounting plate, the link being pivotally connected inwardly of said inner end portion to the ears on the second mounting plate, the second mounting plate having swinging movement to opened and closed positions of the door about its pivotal connection with the link, a bolt carried by the first mounting plate at right angles thereto and extending outwardly therefrom through an opening in the arm of said link, a spring about said bolt between the arm and the first mounting plate, and a nut upon the outer end portion of said bolt for applying pressure to the arm to tilt the link about its pivotal connection with the ears of the first mounting plate and hold the link at an adjusted angle relative to the first mounting plate.

2. A hinge for doors for closing and sealing an opening through a door frame, including a member adapted to be attached to the door, a mounting plate adapted to be attached to the door frame, a link pivotally connected to the member and to the mounting plate and having an arm extending therefrom, a tie-rod loosely connecting the arm and the mounting plate, means on the tie-rod to restrain movement of the arm along the tie-rod in one direction, and resilient means on said tie-rod for urging the arm towards said restraining means to swing the link about its pivotal connection with the mounting plate, said link movement exerting a force on the door adjacent the hinge and in a direction at right angles to the plane of the door when the door is closed.

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