June 24, 1947. C. BLUM 2,422,771

DOOR FASTENER

Filed April 13, 1945

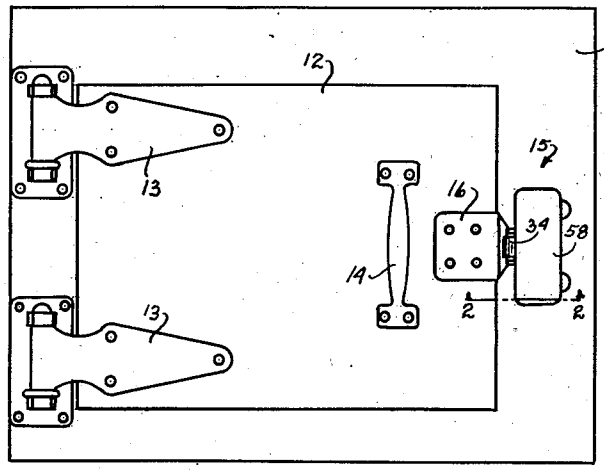


Fig. 1.

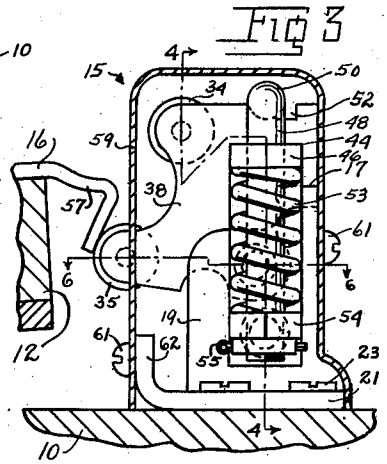


Fig. 3

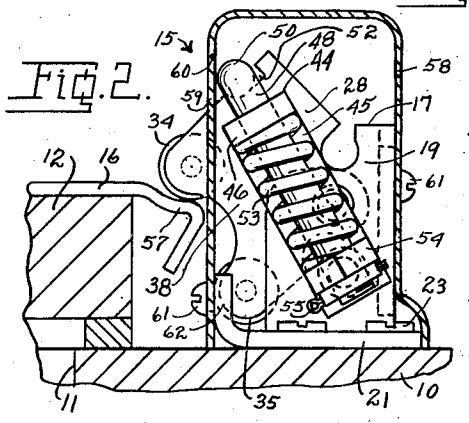


Fig. 2.

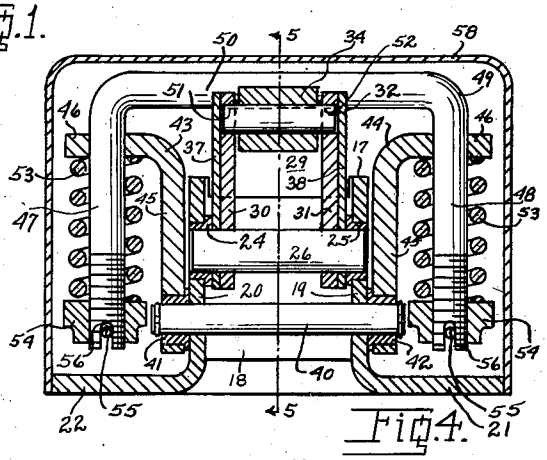


Fig. 4.

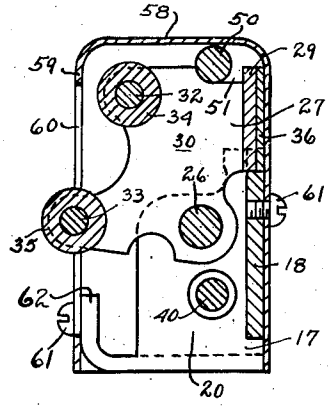


Fig. 5.

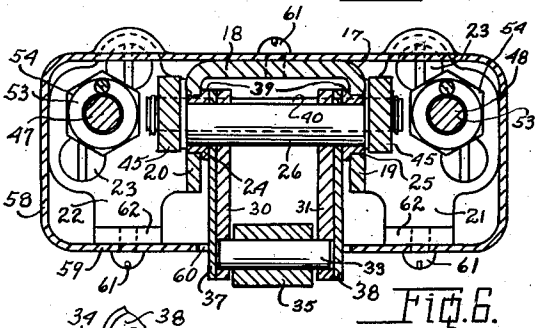


Fig. 6.

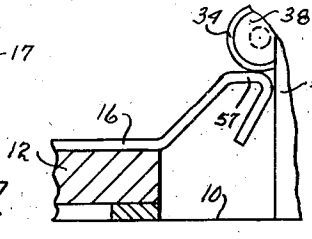


Fig. 7.

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DOOR FASTENER

Chase Blum, Cincinnati, Ohio

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11 Claims. (Cl. 292—79)

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This invention relates to improvements in fasteners, particularly door fasteners or latches as employed on large heavy doors such for example as refrigerator doors, storage vault doors, and the like.

The principal object of this invention is the provision of a door fastener that is of durable construction and efficient in operation to ensure the tight closing of doors of the general character above mentioned.

Another object of this invention is the provision of a door fastener that is simple and economical to manufacture and install, and embodying sturdy parts to insure long life and smooth operation.

Another object is to provide a device of the kind referred to, in which all of the working parts are encased and protected from injury by impact and by exposure to dirt, water, dust and other foreign substances.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification considered in conjunction with the accompanying drawings forming a part thereof, and in which:

Fig. 1 is a plan view of a device embodying the improvements of this invention.

Fig. 2 is an enlarged, cross-sectional view of the fastener of this invention as seen from line 2—2 of Fig. 1.

Fig. 3 is a view similar to Fig. 2 showing the parts of the fastener in a second position.

Fig. 4 is a transverse cross-sectional view through the fastener taken on line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken at right angles to that of Fig. 4 on line 5—5 of said Fig. 4.

Fig. 6 is a horizontal, cross-sectional view taken on line 6—6 of Fig. 3.

Fig. 7 is a fragmentary view similar to Fig. 2, partly in elevation and partly in section, showing a modification in the latch plate and forming a detail of the invention.

Throughout the several views of the drawings, similar reference characters are employed to denote the same or similar parts.

The fastener is illustrated as applied to the door of a refrigerator but it is to be understood that refrigerator doors are not the sole use to which it may be applied. As shown in the drawings, the reference character 10 indicates the front or a wall of a refrigerator having an opening 11 therein, closed by a door 12 hingedly connected to wall 10 by hinges 13. The door may be actuated about its hinge pins by a handle 14 secured to the door at the edge opposite to that

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which carries the hinges 13. The door is held in closed position by the fastener or latch of this invention indicated in general by the reference numeral 15, and carried by the wall 10, to cooperate with a latch plate 16 carried by the door 12.

The door fastener comprises a supporting bracket 17 having a body portion of generally U-shaped cross section, and which includes a back portion 18 and arms 19 and 20 extending respectively one from each side of the back portion 18. The lower ends of the arms 19 and 20 are respectively outwardly disposed as at 21 and 22 forming wings through which the supporting bracket 17 is secured, by screws 23, to the refrigerator front or wall 10. The bracket arms 19 and 20 are provided with aligned perforations in each of which is a bushing 24 and 25 for the latch or fastener pivot shaft 26.

The latch or fastener proper comprises a latch element carrier 27, and a shaft retainer 28. The latch element carrier has a back member 29 and side members 30 and 31 respectively, projecting one from each side of the back member. Below the back member, the side members 30 and 31 are provided with aligned apertures through which the pivot shaft 26 extends. The forward ends of the side members 30 and 31 near their upper edges, are provided with aligned apertures for rotatably supporting a first roller shaft 32 and near their lower edges with other aligned apertures for rotatably supporting a second roller shaft 33. Rotatably mounted on said roller shafts are respectively a first roller 34, and a second roller 35. The shaft retainer 28 has substantially the same cross-section as the latch elements carrier, and includes a back member 36 from each side of which projects a side member 37 and 38. These side members, similar to side members 30 and 31, are provided with aligned apertures for the latch pivot shaft 26. Said side members 37 and 38 do not carry the roller shafts 32 and 33, but they form end closures for the roller shaft apertures to prevent the shafts from being inadvertently dislodged from their carrier.

By reference to Figs. 4, 5 and 6, it will be noted that the latch elements carrier 27 and shaft retainer 28 are formed to be nested, with their respective back members 29 and 36 in close contact and their side members 30 and 31 and 37 and 38 likewise in close contact. It should be noted that the said carrier and retainer are operated as a unit about the latch pivot shaft 26. The said carrier-retainer unit operates, that is oscillates, from the position shown in Fig. 2 to the position shown in Fig. 3, between the arms 19 and 20 of

the supporting bracket 17. To eliminate play and lateral movement between these parts and provide a desirable bearing, the pivot shaft bushings 24 and 25 are each provided with a radial flange 39, thereby affording a face bearing for the outer side of the carrier-retainer unit during its oscillations.

The supporting bracket sides 19 and 20, below the latch pivot shaft apertures, and slightly rearwardly thereof, are provided with apertures in alignment with one another through which extends a spring yoke pivot shaft 40. The ends of the shaft 40 beyond the supporting bracket are received in bushings 41 and 42 carried by the lower ends of spring abutment brackets 43 and 44. The brackets 43 and 44 are each L-shaped in cross section, having the bushings 41 and 42 in one leg 45 thereof, and an aperture in each of the remaining legs 46 through which passes the arms 47 and 48 of U-shaped spring yoke 49. The base 50 of the yoke 49 extends across the carrier-retainer unit and is received in aligned notches 51 and 52 in said unit sides. A spring 53 encircles each of the yoke arms 47 and 48, abutting on its upper end with the leg 46 of its bracket and abutting on its lower end with a nut 54 threaded on the lower end of its yoke arm. The nuts 54 may be adjustably threaded onto their respective yoke arms to properly compress the springs 53, and the nuts may be retained in adjusted position by cotter pins 55 passing therethrough and through slots 56 in the lower ends of the yoke arms.

The spring yoke 49 and parts associated therewith are oscillated with the latch parts on the bushings 41 and 42 outside the supporting bracket 17, and to eliminate play and lateral movement between these parts the said bushings 41 and 42 are each provided with a radial flange providing a face bearing for the outer sides of the supporting bracket 17.

It is believed that the operation of the fastener or latch is obvious from the drawings, particularly Figs. 2 and 3, but briefly is as follows:

As will be noted from the drawings, and as was mentioned above, the spring yoke pivot shaft 40 has its axis disposed slightly rearwardly of the fastener or latch proper pivot shaft 26 and the springs 53 are under compression. With the parts in the position of Fig. 3, the spring yoke tends to oscillate the carrier-retainer unit in a clockwise direction since the spring pull is on the right of the pivot shaft 26. This movement of the carrier-retainer unit is limited by the engagement of the lower edge of back members 29 and 36 with the upper edge of the back portion 18 of the supporting bracket, as seen most clearly in Fig. 5. With the parts in the position shown in Fig. 2, the spring yoke tends to oscillate the carrier retainer unit in a counter-clockwise direction since the spring pull is on the left of the pivot shaft 26. This movement of the carrier retainer unit is limited by the door engaging the refrigerator front or wall 10, and the force of the spring causes the tight closing of the door around the opening 11.

In order to actuate or oscillate the latch mechanism from the position of Fig. 2, to that of Fig. 3, it is only necessary to exert a pull on the door handle 14 whereupon the latch plate lip 57 engaging the first roller 34 oscillates the fastening mechanism in a clockwise direction, to the point where the force of springs 53, through the yoke 49, snaps the latching mechanism to the open position. Conversely, a push on the handle 14 with the door in the position of Fig. 2, causes the latch plate lip 57 to engage the second roller 35 and oscillate the fastening mechanism in a counter-clockwise direction to the point where the springs 53 and yoke 49 snap the latching mechanism to the operative position for holding the door tightly closed.

In Fig. 7 is shown a modification of the latch plate 16 in that the lip 57 is elevated above the plate proper to accommodate a thinner door, for example, than that illustrated in Figs. 2 and 3, or to permit the use of a door flush with the surface of the front or wall 10. It will be appreciated that various modifications may be made in the relation of the latch plate proper and its lip.

The entire fastening or latching mechanism is adapted to be enclosed in a housing or cover 58 which, to accommodate the operation of the latch elements or rollers 34 and 35, has its front 59 provided with an opening 60. The cover 58 is secured in place by screws 61 projecting through the cover into the supporting bracket back portion 18 and through the cover front into lugs 62 upstanding from the supporting bracket wings 21 and 22.

What is claimed is:

1. In a fastener of the class described, the combination of a supporting bracket, a perforated latching elements carrier, latching elements each including a roller shaft shiftable axially in the carrier perforations, a shaft retainer including spaced arms embracing the latching elements carrier and overlying the roller shaft ends to prevent axial shifting of the shafts relative to the carrier, means for oscillatably mounting the latching elements carrier and shaft retainer as a unit on the supporting bracket for oscillation to and from fastening and unfastening positions, and spring means pivotally mounted on said supporting bracket for holding the latching elements carrier and shaft retainer in their fastening and unfastening positions.

2. In a fastener of the class described, the combination of a supporting bracket, a perforated latching elements carrier, latching elements each including a roller shaft shiftable axially in the carrier perforations, a shaft retainer including spaced arms embracing the latching elements carrier and overlying the roller shaft ends to prevent axial shifting of the shafts relative to the carrier, means for oscillatably mounting the latching elements carrier and shaft retainer as a unit on the supporting bracket for oscillation to and from fastening and unfastening positions, cooperating abutment means on said latching elements carrier-shaft retaining unit and supporting bracket determining the unlatched position, and yielding means pivotally carried by the supporting bracket and connected to the latching elements carrier retaining unit for holding the abutment means in contact and for holding the latching elements carrier-shaft retaining unit in fastening position.

3. In a fastener of the class described, a latching unit comprising a latching elements carrier of general U-shape, including spaced parallel perforated arms, shafts rotatably mounted in the perforations of the carrier arms, rollers mounted on said shafts, a shaft retainer of the same general shape as the carrier and including spaced arms embracing the latching elements carrier arms, the shaft retainer arms abutting the ends of the latching elements shafts in the carrier to preclude axial shifting of the shafts, and means for pivotally mounting the latching unit for os-

cillation to and from fastening and unfastening positions.

4. In a fastener of the class described, the combination of a supporting bracket, a latching unit comprising a latching elements carrier of general U-shape, shafts rotatably mounted in the arms of the carrier, rollers rotatably mounted on said shafts, a shaft retainer of general U-shape embracing the latching elements carrier whose arms retain the latching elements shafts in the carrier, means for pivotally mounting the latching unit on the supporting bracket for oscillation to and from fastening and unfastening positions, a U-shaped yoke having its base connected with the latching unit, yoke brackets pivotally mounted on the supporting bracket and connected with the yoke arms, and spring means on said yoke arms yieldably reacting on the yoke brackets for effecting the oscillation of the latching unit and retaining the same in fastening and unfastening positions.

5. A fastener for use with a swinging door and adapted to be operated by a plate on the door comprising a first latching roller contacting the door plate when the door is in a closed position, a second latching roller contacting the door plate when the door is ajar, a U-shaped carrier including a pair of perforated spaced arms, a shaft for each latching roller rotatably mounted in the perforations of the carrier arms, a U-shaped retainer including spaced imperforate arms embracing the carrier and abutting the shaft ends to prevent disassociation of the shafts from the carrier, means for oscillatably mounting the carrier and parts associated therewith to effect contact of the latching rollers and door plate, said door plate upon movement of the door initiating oscillation of the carrier and parts associated therewith through the latching roller contacted thereby, and yielding means for completing the oscillation of the carrier and parts carried thereby, and holding same in its oscillated position until reverse oscillation is initiated by the door.

6. A fastener for use with a swinging door and adapted to be operated by a plate on the door comprising a first latching roller contacting the door plate when the door is in a closed position, a second latching roller contacting the door plate when the door is ajar, a U-shaped carrier, a shaft for each latching roller rotatably mounted in the arms of the carrier, a U-shaped retainer embracing the carrier whose arms prevent disassociation of the shafts and carrier, means for oscillatably mounting the carrier and parts associated therewith to effect contact of the latching rollers and door plate, said door plate upon movement of the door initiating oscillation of the carrier and parts associated therewith through the latching roller contacted thereby, a U-shaped yoke having its base connected with the carrier, yoke brackets connected with the yoke arms and pivotally mounted laterally of the pivotal mounting of the carrier, and spring means on said yoke arms yieldably reacting on the yoke brackets for causing the yoke to complete the oscillation of the carrier and parts associated therewith and holding same in its oscillated position until reverse oscillation is initiated by the door.

7. A fastener of the class described, comprising in combination, a supporting bracket including a back, a pair of perforated arms extending in spaced parallelism at right angles to the back, a pair of angularly disposed wings providing feet for mounting the bracket upon a support, a

latching elements carrier of substantial U-shape, including a back and a pair of spaced parallel arms, the latter being fitted between the spaced arms of the supporting bracket, transverse pivot means pivoting the carrier arms to the bracket arms for rockingly mounting the carrier within the bracket, a yoke shaft passing transversely through a pair of perforations in the bracket arms at a location remote from the arms of the carrier, a yoke bracket on each end of the yoke shaft, each yoke bracket comprising a perforated outwardly directed leg, an inverted U-shaped yoke having a base, and a pair of spaced parallel arms each having a free end, the yoke arms passing through the leg perforations of the yoke brackets while the base of the yoke rests in edge-contact upon the carrier arms, a pair of compression springs one of which surrounds each yoke arm between the yoke bracket leg and the free end of the yoke arm, and adjustable means on the free ends of the yoke arms to maintain a compressed condition of said springs.

8. A fastener of the class described, comprising in combination, a supporting bracket including a back, a pair of perforated arms extending in spaced parallelism at right angles to the back, a pair of angularly disposed wings providing feet for mounting the bracket upon a support, a latching elements carrier of substantial U-shape, including a back and a pair of spaced parallel arms, the latter being fitted between the spaced arms of the supporting bracket, transverse pivot means pivoting the carrier arms to the bracket arms for rockingly mounting the carrier within the bracket, a pair of yoke brackets each having an end pivoted upon a bracket arm at a location remote from the carrier pivot means, each yoke bracket including a perforated angularly directed leg, an inverted U-shaped yoke having a base, and a pair of spaced parallel arms each having a free end, the yoke arms passing through the leg perforations of the yoke brackets while the base of the yoke rests in edge-contact upon the carrier arms, and yielding means associated with the yoke arms to maintain the yoke base in yielding contact upon the carrier arms.

9. A fastener of the class described, comprising in combination, a supporting bracket including a back, a pair of perforated arms extending in spaced parallelism at right angles to the back, a pair of angularly disposed wings providing feet for mounting the bracket upon a support, a latching elements carrier of substantial U-shape, including a back and a pair of spaced parallel arms, the latter being fitted between the spaced arms of the supporting bracket, transverse pivot means pivoting the carrier arms to the bracket arms for rockingly mounting the carrier within the bracket, a pair of yoke brackets each having an end pivoted upon a bracket arm at a location remote from the carrier pivot means, each yoke bracket including a perforated angularly directed leg, an inverted U-shaped yoke having a base, and a pair of spaced parallel arms each having a free end, the yoke arms passing through the leg perforations of the yoke brackets while the base of the yoke rests in edge-contact upon the carrier arms, yielding means associated with the yoke arms to maintain the yoke base in yielding contact upon the carrier arms, a displaceable cover enclosing the supporting bracket, the yoke, and said yielding means, and fastening means securing the cover to the supporting bracket.

10. In a door fastener, the combination which

comprises, a supporting bracket including an upstanding back, a pair of spaced parallel upright arms integral with the back and disposed at an angle thereto, and a pair of angularly disposed wings providing feet for mounting the bracket upon a support, snap-action door fastening means on the bracket, and a cover fitted over the bracket to house the back, the arms, and the feet thereof.

11. In a door fastener, the combination which comprises, a supporting bracket including an upstanding back, a pair of spaced parallel upright arms integral with the back and disposed at an angle thereto, and a pair of angularly disposed wings providing feet for mounting the bracket upon a support, snap-action door fastening means

on the bracket, a cover fitted over the bracket to house the back, the arms, and the feet thereof, and means for detachably securing the cover to the back and the feet of the bracket.

CHASE BLUM.

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The following references are of record in the file of this patent:

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