Feb. 26, 1952 R. K. NOTTINGHAM 2,587,200

HINGE LATCH

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FIG. 1

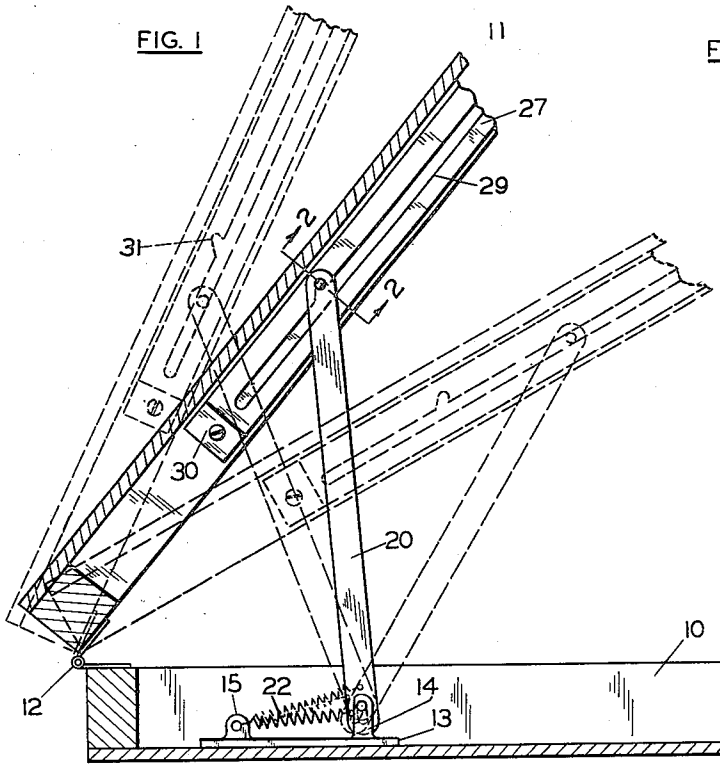


FIG. 2

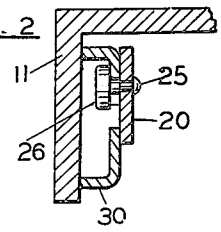


FIG. 3.

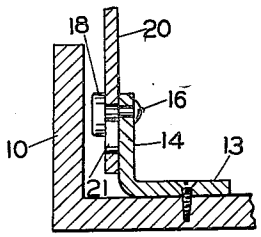


FIG. 4

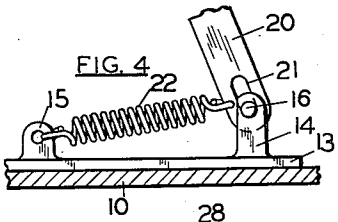


FIG. 5

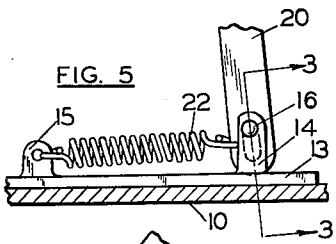


FIG. 6.

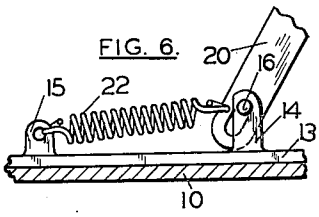


FIG. 7

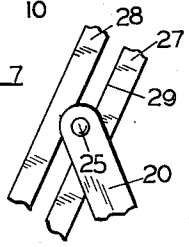
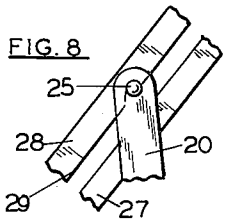


FIG. 8



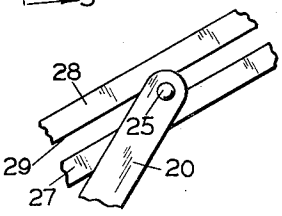
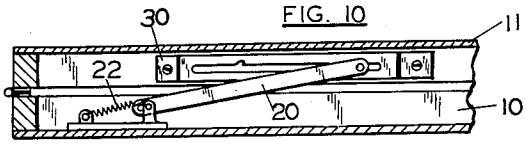


FIG. 9

FIG. 10



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HINGE LATCH

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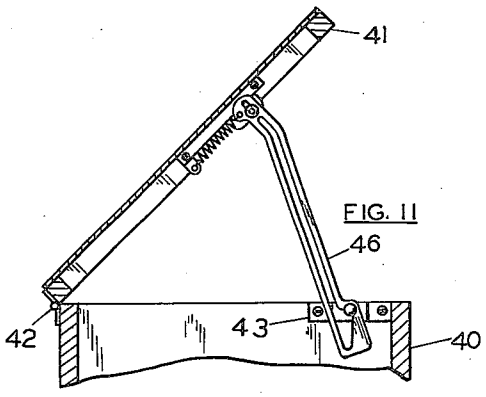


FIG. 11

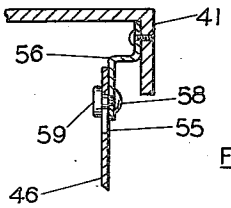


FIG. 14

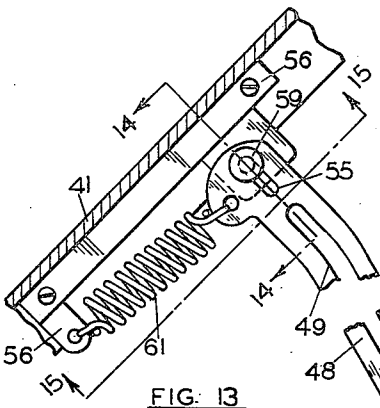


FIG. 13

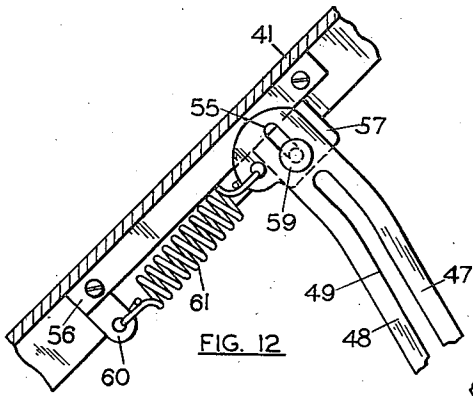
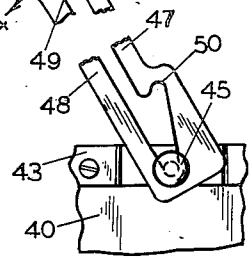
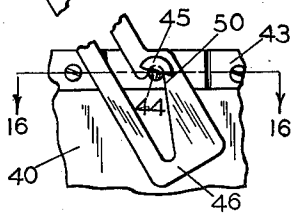


FIG. 12





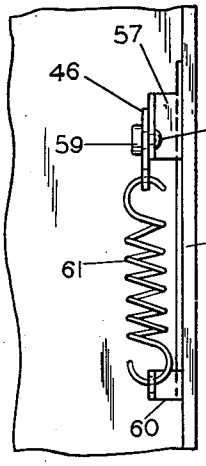


FIG. 15

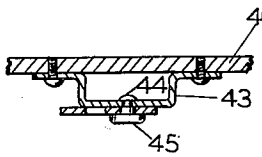


FIG 16

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HINGE LATCH

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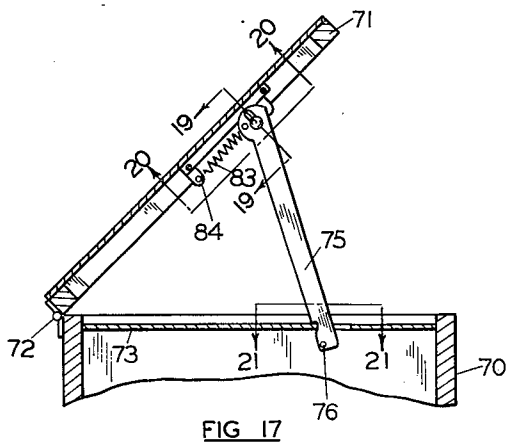


FIG 17

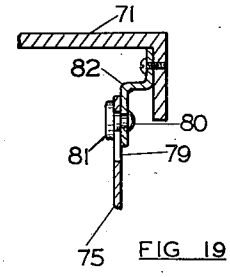


FIG 19

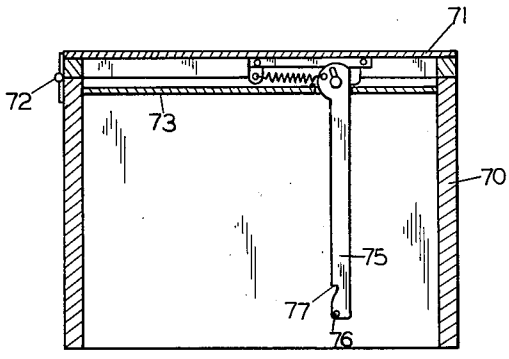


FIG 18

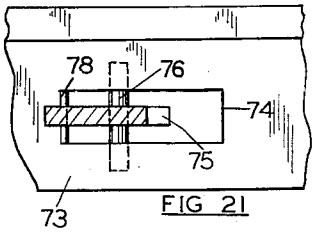


FIG 21

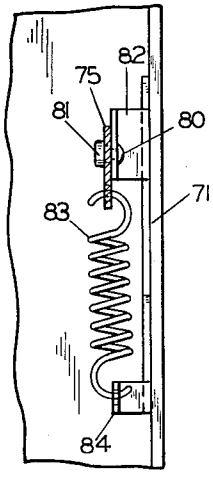


FIG 20

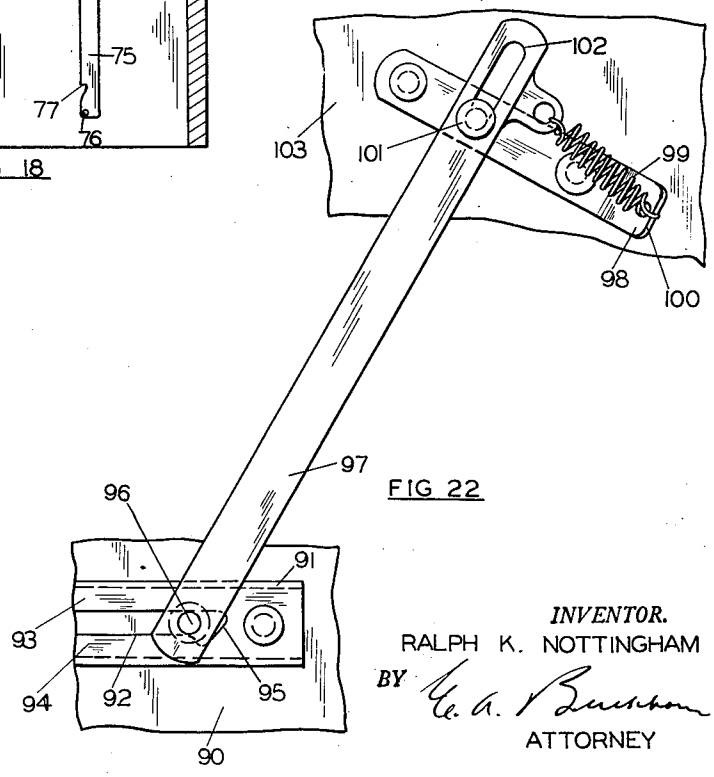


FIG 22

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Patented Feb. 26, 1952 2,587,200

UNITED STATES PATENT OFFICE

2,587,200

HINGE LATCH

Ralph K. Nottingham, Portland, Oreg., assignor to Phillips Tutch-Latch Company, a corporation of Delaware

Application June 16, 1947, Serial No. 754,792

7 Claims. (Cl. 217—60)

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My present invention relates to a hinge latch comprising a device for holding a hinged lid or the like in open position.

The principal object of the present invention is to provide a simple, inexpensive latch comprising a link and associated parts, which will automatically function to hold separable members in separated condition, and automatically function to permit closing of the members without the necessity of breaking an over-center toggle or the like. In using many containers, such as deep-freeze boxes or linen chests, it is quite often necessary or desirable to close the lid after removing objects from the container. With the conventional lid-holding toggle it is necessary to put down the object, grasp the lid with one hand, and release a toggle or latch with the other hand in order to prevent being injured by the falling lid if an attempt is made to lower the lid otherwise.

The principal object of the present invention therefore is to provide an enclosure with a lid which may be raised to an open position, and which may be thereafter closed, with the use of one hand only.

A further object of the present invention is to provide a hinged lid holding member which does not have dangerous joints capable of pinching the flesh.

A further object of the present invention is to provide a hinged box or the like with an automatic lid-holding member formed of relatively simple, easily manufactured and applied members.

The objects and advantages of the present invention will be more readily understood from inspection of the accompanying drawing taken in connection with the following specification wherein like numerals refer to like parts throughout.

In the drawings Fig. 1 is a section through a box or the like having one modification of the present invention applied thereto, the lid being shown held open in full line, and in several other positions in dotted line;

Fig. 2 is a partial section taken substantially along line 2—2 of Fig. 1;

Fig. 3 is a partial section taken substantially along line 3—3 of Fig. 5;

Fig. 4 is a partial view in elevation of a portion of the mechanism in the positions assumed when the lid has been raised;

Fig. 5 is a similar view showing the parts in the positions assumed when the lid is being held open;

Fig. 6 is a similar view showing the parts as the lid is being closed or raised;

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Fig. 7 is a partial view of another portion of the mechanism in the positions corresponding to Fig. 4;

Fig. 8 is similar to Fig. 7 with the parts corresponding to Fig. 5;

Fig. 9 is a similar view with the parts corresponding to Fig. 6;

Fig. 10 is a section through the box showing the box in its closed condition;

Fig. 11 shows a modification of the present invention applied to a deep-freeze box or the like;

Fig. 12 is a partial view of the mechanism, with parts broken away, illustrating the lid-holding position;

Fig. 13 is a view similar to Fig. 12 illustrating the parts at one stage of an opening motion;

Fig. 14 is a partial section taken substantially along line 14—14 of Fig. 13;

Fig. 15 is a partial section taken substantially along line 15—15 of Fig. 13;

Fig. 16 is a partial section taken substantially along line 16—16 of Fig. 12;

Fig. 17 is a partial section through a box having another modification of the invention applied thereto, illustrating the parts in holding position;

Fig. 18 is a similar view illustrating the parts with the lid closed;

Fig. 19 is a partial section taken substantially along line 19—19 of Fig. 17;

Fig. 20 is a partial section taken substantially along line 20—20 of Fig. 17;

Fig. 21 is a partial section taken substantially along line 21—21 of Fig. 17;

Fig. 22 is a partial view of substantilly the form of the invention illustrated in Fig. 1, showing the link in a reversed position and the operating spring attached to the lid rather than to the box.

Referring to Figs. 1 to 10 inclusive, there is illustrated a box comprising a lower portion 10 hinged to an upper portion 11 by a hinge 12. A plate 13 is fixed to the bottom of the portion 10 and is provided with a long vertical lug 14 and a short vertical lug 15. A pivot pin 16 is firmly affixed to the upper end of the long lug 14 and is provided with an enlarged head 18 closely adjacent the side wall of the portion 10. A link 20, provided with a longitudinal slot 21, is retained between the lug 14 and head 18, the pin 16 being slidable in the slot 21. A spiral spring 22 is biased between the lug 15 and the link 20, being attached to the link at a point substantially midway between the ends of slot 21, the spring extending in a transverse direction with respect to the slot.

The upper end of link 20 carries a pin 25 having an enlarged head 26, the head retaining the link in sliding engagement with the edges of a

pair of vertically spaced rails 27 and 28 formed by a longitudinal slot 29 in a long member 30 affixed to the vertical side of the portion 11. The lower edge of the upper rail 28 is provided with a notch 31 adjacent the hinge side of the box.

Operation.—Starting with the lid held open, as seen in full line in Fig. 1, the pin 25 is engaged in notch 31 (Fig. 8), and the weight of the lid has forced the link 20 downward so that the pin 16 engages the inner end of slot 21 (Fig. 5). In order to close the lid, the edge of the lid may be grasped in one hand and moved slightly upward. Since the spring 22 is over-center below the pin 16, the link 20 will be rocked clockwise when the pin 25 clears notch 31, there being a slight clicking noise as the pin 25 strikes the rail 27. The lid may now be closed and the box will appear as seen in Fig. 10. When the lid is opened the pin 25 will be held against rail 27 until link 20 passes far enough beyond the vertical that spring 22 will raise the link to the position illustrated in Fig. 4, with the pivot pin engaging the outer end of the slot. The spring 22 is now above the pin 16, exerting counterclockwise pressure on link 20 and causing the pin 25 to press against the edge of rail 28. The lid may now be lowered slightly until the pin 25 snaps into notch 31. The last lowering movement of the lid forces the link downward until pin 16 again engages the inner end of slot 21.

Second modification.—Figs. 11 to 16 inclusive illustrate a modification of the invention wherein greater simplification is achieved since the guiding slot is incorporated in the link itself, and a further modification resides in placing the over-center spring on the lid rather than on the stationary part of the box. In this modification a box 40 is provided a lid 41 attached thereto by a hinge 42. The upper edge of a side wall of the box is provided with a bracket 43 from which extends a pin 44 having an enlarged head 45 spaced from the surface of the bracket sufficiently to guide a link 46. The link is longitudinally slotted to provide spaced rails 47 and 48 separated by a slot 49. The lower end of the rail 47 is provided with a downwardly facing notch 50. The upper end of the link is provided with a short, longitudinal slot 55 substantially in line with and separated from the upper end of slot 49. The lid 41 supports a bracket 56 having a pair of lugs thereon. The outer lug 57 supports a pivot pin 58 having an enlarged head 59 spaced from the lug sufficiently to permit link 46 to be guided upon the pin 58. The lug 60 closest to the hinge of the box provides means for attaching one end of a spiral spring 61, the other end of which is affixed to link 46 substantially midway between the ends of slot 55.

Operation.—In Figs. 11 and 12 the lid is shown supported in open position, the pin 44 being engaged in notch 50 and the weight of the lid having caused pin 58 to drop to the inner end of slot 55. A slight upward movement of the lid will cause spring 61 to rock link 46 counterclockwise as soon as pin 44 clears the lip of notch 50. Upon hearing the click of pin 44 striking rail 48, the operator may lower the lid to closed position. Upon raising the lid, pin 44 will be guided against rail 48 until it strikes the lower end of slot 49 and causes the link to remain stationary while pin 58 moves to the outer end of slot 55. This causes the spring 61 to pass over-center and exert a clockwise torque on link 46. The lid may be slightly lowered until pin 44 engages notch 50, causing the pin 58 to move to the bottom of slot 55 and retain the lid in elevated position.

Third modification.—Figs. 17 to 20 inclusive illustrate a further modification wherein a long slot is eliminated, thus decreasing die cost and permitting the use of thinner material for the link. In this modification a box 70 is provided with a lid 71 hinged thereto by a hinge 72. A side edge of the box is provided with a horizontal ledge 73 having a slot 74 therein. A link 75 passes downward through the slot 74 and is prevented from passing above the ledge 73 by a transverse pin 76. The lower end of the inner edge of the lever is provided with a notch 77.

The upper end of link 75 is provided with a generally longitudinal slot 79 embracing a pivot pin 80 mounted upon a bracket 82 affixed to the lid 71, the pin having an enlarged head 81 to retain the lever in position. The bracket 82 is provided with a lug 84 spaced from the pin 80 and providing means to attach one end of a spiral spring 83, the opposite end of which is affixed to the link 75 adjacent the middle of slot 79.

Preferably the inner edge of slot 74 is bent upward to provide a transverse catch 78.

Operation.—The operation of this modification is as follows:

As seen in Fig. 17, the lid is retained in open position with the notch 77 engaging catch 78. The weight of the lid has caused the pin 80 to drop to the inner end of slot 79. When the lid is raised slightly until the notch 77 is above the catch, the spring 83 will exert counterclockwise pressure on link 75, causing it to spring outward against the forward end of slot 74 so that the lid may be lowered as seen in Fig. 18. Upon opening the lid the pin 76 will strike the ledge 73 and limit the movement of link 75, causing pin 80 to move to the outer end of slot 79, thus positioning spring 83 over-center to exert clockwise pressure. The link now presses against the rear end of slot 74 so that slight lowering of the lid will engage the catch 78 in the notch 77 and cause the pin 80 to move to the inner end of slot 79.

Fourth modification.—Fig. 22 shows substantially the same apparatus as illustrated in Fig. 1 applied to a box in such manner that the rails remain stationary while the spring moves with the lid. In this view a box 90 is provided with a member 91 parallel to its upper edge, the member being provided with a longitudinal slot 92 providing an upper rail 93 and a lower rail 94. The inner end of the lower rail 94 is provided with a notch 95. A pin 96 is fixed to the lower end of a link 97, the pin having an enlarged head to retain the link adjacent the face of the member 91. The box is provided with a lid 103 upon which is fixed a member 98 having its inner end 100 bent outward to provide a support for one end of a spiral spring 99. A pin mounted on member 98 is provided with an enlarged head 101, the pin passing through a longitudinal slot 102 in the upper end of link 97. The spring 99 is attached to link 97 at a point substantially midway of slot 102.

Operation.—The illustration shows the lid slightly raised after being held in open position so that the spring has rocked link 97 clockwise to engage pin 96 against the upper rail 93 so that the lid may now be closed. Upon opening the lid, pin 96 engages the end of slot 92 to arrest link 97 and cause the outer pin to move to the upper end of slot 102. The spring is thus moved over-center and exerts counterclockwise torque on link 97, causing the pin 96 to drop into notch

95 when the lid is slightly closed. The link 97 will be thus arrested and the upper pin will move to the inner end of slot 102 to hold the lid open as illustrated in Fig. 22.

Summary.—All modifications of the present invention comprise a latching device for holding a hinged lid in latched position with respect to a box or the like, comprising a pivot pin mounted on one of said members, a link pivotally and slidably mounted on said pivot pin, said link having a generally longitudinal, relatively short slot through which said pivot pin passes, a spiral spring having one end fixed to said one member and its other end fixed to said link at a point between the ends of said slot and extending in a transverse direction with respect to said slot when the lid is open, said pivot pin engaging the outer end of said slot when the lid is raised beyond a latched position whereby said spring tends to swing said link in one direction, the opposite end of said link having pivotal and sliding engagement with the other member, said opposite end of the link and the other member having cooperating holding means thereon relatively movable into engagement with each other by said spring when the pivot pin engages the outer end of said slot, subsequent slight lowering of said lid thereby causing relative shifting of said pivot pin to the inner end of said slot to hold the lid in latched position, said spring being thereby relatively positioned to move said cooperating holding means apart upon slight upward movement of said lid whereupon said lid may be lowered into a closed position.

Having illustrated and described various embodiments of my invention it should be readily apparent to those skilled in the art that the invention permits of other modifications in detail and arrangement. All such modifications as come within the true spirit and scope of the appended claims are considered to be part of my invention.

I claim:

1. A latching device for holding a horizontally hinged lid member in open latched relation to a member on which it is hinged, comprising a pivot pin mounted on one of said members parallel to its hinged end, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said one member and said link, said spiral spring being attached to said link at a point between the ends of said slot and extending toward the hinged end of said one member in a transverse direction with respect to said slot when the lid is open, guiding means on the other of said members extending normal to its hinged end and slidably and pivotally guiding the opposite end of said link, said opposite end of the link and said other member having cooperating holding means thereon relatively movable into engagement with each other by said spring when said pivot pin is at the other end of said slot, means to move said link longitudinally to engage said pivot pin with the outer end of said slot when said lid is raised beyond the latched position whereby said spring may move the opposite end of said link in a direction to cause engagement of said holding means, subsequent slight lowering of said lid causing opposite longitudinal movement of said link to engage said pivot pin with the inner end of said slot thus relatively positioning said spring to move the opposite end of said link in a direction to separate said holding means upon subsequent slight raising of said lid.

2. A latching device for holding a horizontally hinged lid member in open latched relation to a member on which it is hinged, comprising a pivot pin mounted on one of said members parallel to its hinged end, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said one member and said link, said spiral spring being attached toward the hinged end of said one member to said link at a point between the ends of said slot and extending in a transverse direction with respect to said slot when said lid is opened, a pair of guide rails mounted on the other of said members extending normal to its hinged end and defining a long guide slot extending parallel to the open edge of said members, and a guide pin mounted on the opposite end of said link and slidably engaging said guide slot, one of said guide rails having a notch into which said guide pin may pass to hold said members in latched open relation to each other, said link being moved longitudinally by reason of said guide pin engaging said guide slot when said lid is moved to an open position beyond the latched position whereby to position the outer end of said short slot against said pivot pin, thus relatively positioning said spring to force said guide pin into engagement with said notch upon subsequent slight closing movement of said lid from the extreme open position, the weight of said lid when released causing longitudinal return movement of said link to position the inner end of said short slot against said pivot pin to hold the lid in latched position thereby relatively shifting said spring to a position such as to urge said guide pin from engagement with said notch upon subsequent slight reopening movement of said lid.

3. A latching device for holding a horizontally hinged lid in open latched relation to a structure on which it is hinged, comprising a pivot pin mounted on said structure parallel to the hingeline of the lid, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said structure and said link, said spiral spring being attached to said link at a point between the ends of said slot and extending toward the hingeline of the lid in a transverse direction with respect to said slot when said lid is opened, a spaced pair of guide rails mounted beneath said lid defining a long guide slot extending parallel to the lid and normal to the hingeline thereof, and a guide pin mounted on the opposite end of said link and slidably engaging said guide slot, the upper one of said guide rails having a notch into which said guide pin may pass to hold said lid in latched open position, said link being pulled outwardly when said lid is moved to an open position beyond said latched position whereby to position the outer end of said short slot against said pivot pin and relatively positioning said spring to force said guide pin into engagement with said notch upon slight closing movement of said lid from the extreme open position, the weight of said lid when released causing longitudinal movement of said link to position the inner end of said short slot against said pivot pin to hold the lid in latched position thereby shifting said spring to a relative position such as to urge said guide pin from

engagement with said notch upon subsequent slight reopening movement of said lid.

4. A latching device for holding a horizontally hinged lid in open latched relation to a structure on which it is hinged, comprising a pivot pin mounted on said structure parallel to the hingeline of the lid, a link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring attached to said structure at a point generally horizontally spaced from said pivot pin toward the hingeline of the lid at one end and attached to said link at a point between the ends of said short slot at its other end, a spaced pair of rails mounted beneath said lid in a plane normal thereto and defining therebetween a long guide slot parallel to the lid and normal to the hingeline thereof, a guide pin mounted on the opposite end of said link and engaged in said guide slot, said rails being so arranged as to swing said link through a vertical position in both directions whereby upon opening said lid beyond the latched position said spring moves said link outwardly to position the outer end of said short slot against said pivot pin whereby to cause said guide pin to bear against the upper rail, a holding notch in said upper rail into which said guide pin passes upon subsequent closing movement of said lid, the weight of said lid thereupon moving said link longitudinally downward to position the inner end of said short slot against said pivot pin, said spring being thereby relatively positioned to urge said guide pin out of said notch upon subsequent slight reopening movement of said lid.

5. A latching device for holding a horizontally hinged lid in open latched relation to a structure on which it is hinged, comprising a pivot pin mounted on said lid parallel to the hingeline of the lid, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said lid and said link, said spiral spring being attached to said link at a point between the ends of said short slot and extending toward the hingeline of the lid in a transverse direction with respect to said slot when the lid is opened, a guide pin mounted on said structure, said link having a long, longitudinal slot therein in which said guide pin is engaged, said guide pin engaging the lower end of said long slot upon opening of said lid beyond the latched position, thus moving the outer end of said short slot into engagement with said pivot pin and thereby relatively positioning said spring to urge said link to swing in one direction, one edge of said long slot near the lower end thereof having a notch therein engageable with said guide pin upon subsequent slight lowering of said lid, said pivot pin thereupon relatively moving to the inner end of said short slot to hold said lid in latched position and thus relatively positioning said spring to urge said link to move said notch from engagement with said guide pin upon subsequent slight reopening of said lid.

6. A latching device for holding a horizontally hinged lid in open latched relation to a structure on which it is hinged, comprising a pivot pin mounted on said lid parallel to the hingeline of the lid, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said lid and said link, said spiral spring being attached to said link at a point between the ends of said short slot and extending toward the hingeline of the lid in a transverse direction with respect to said slot when said lid is opened, said structure having a horizontal shelf thereon and said shelf having a slot therein through which the opposite end to said link passes, the free end of said link having limiting means thereon to engage the bottom of said shelf upon opening of said lid beyond the latched position to limit movement of said link and thereby cause said pivot pin to engage the outer end of said short slot, said spring being thereby relatively posiitoned to urge said link in one direction, said link having a notch therein above said limiting means and engageable with said shelf upon slight lowering of said lid thereby causing said pivot pin relatively to move to the inner end of said short slot and relatively positioning said spring to urge said link in the opposite direction upon subsequent slight reopening movement of said lid.

7. A latching device for holding a horizontally hinged lid in open latched relation to a structure on which it is hinged, comprising a pivot pin mounted on said lid parallel to the hingeline thereof, a link pivotally and slidably engaged with said pivot pin, said link having a generally longitudinal, relatively short slot therethrough at one end in which said pivot pin is engaged, a spiral spring tensioned between said lid and said link, said spiral spring being attached to said link at a point between the ends of said short slot and extending toward the hingeline of the lid in a transverse direction with respect to said slot when said lid is opened, a spaced pair of vertically related guide rails mounted on said structure and defining a long, horizontal guide slot extending in a direction normal to the hingeline of the lid, a guide pin mounted on the opposite end of said link and engaged in said guide slot, the end of said guide slot nearest the hingeline of the lid limiting movement of said link upon opening of said lid and causing relative movement of said guide pin to the outer end of said short slot thereby relatively positioning said spring to urge the opposite end of said link in one direction, a notch defined in the lower one of said guide rails into which said guide pin moves upon slight lowering of said lid thereby causing said pivot pin relatively to move to the inner end of said short slot to hold said lid in raised position and relatively positioning said spring to urge the opposite end of said link away from said notch upon subsequent slight reopening movement of said lid.

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