Aug. 27, 1940. A. H. GROEGER 2,212,563

REFRIGERATOR DOOR LATCH

Filed Aug. 19, 1938 2 Sheets-Sheet 1

Fig. 1.

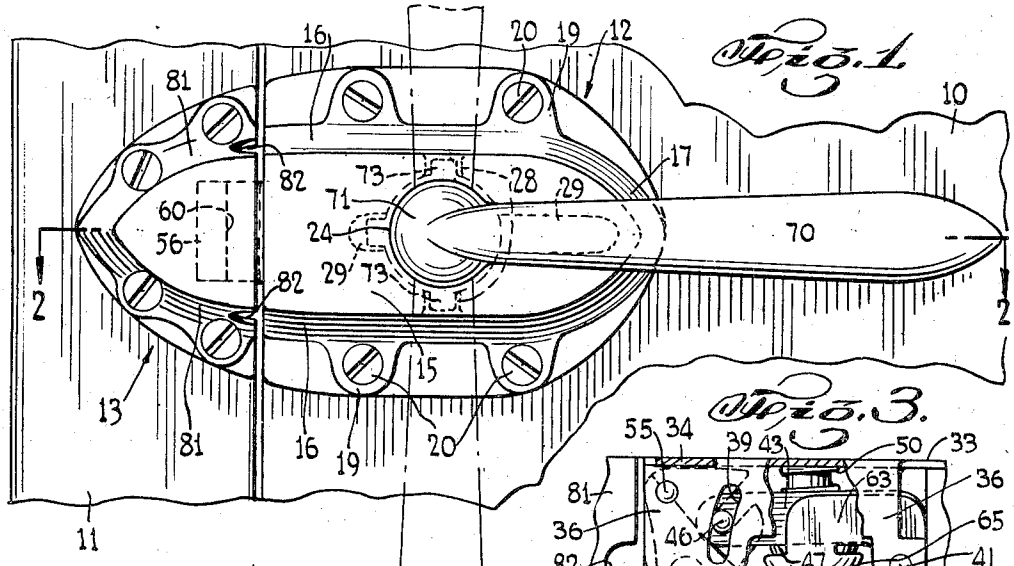


Fig. 3.

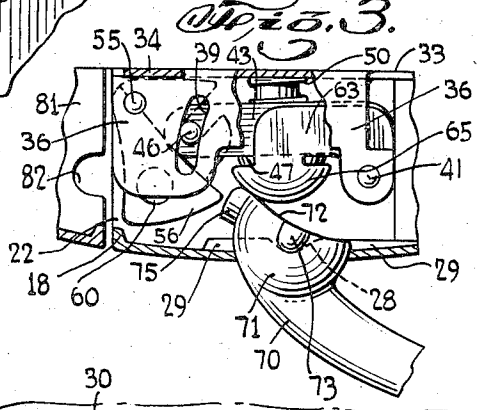


Fig. 2.

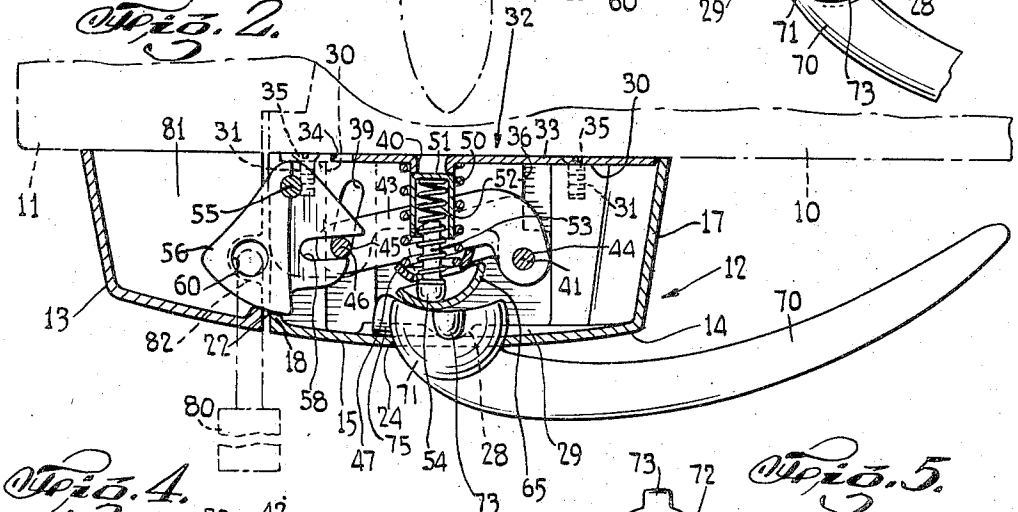


Fig. 4.

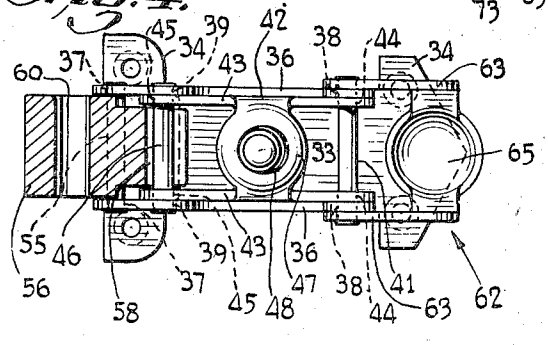
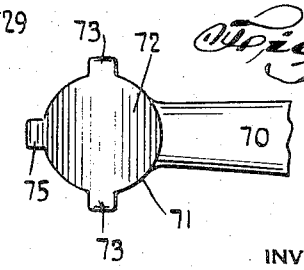


Fig. 5.



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Fig. 6.

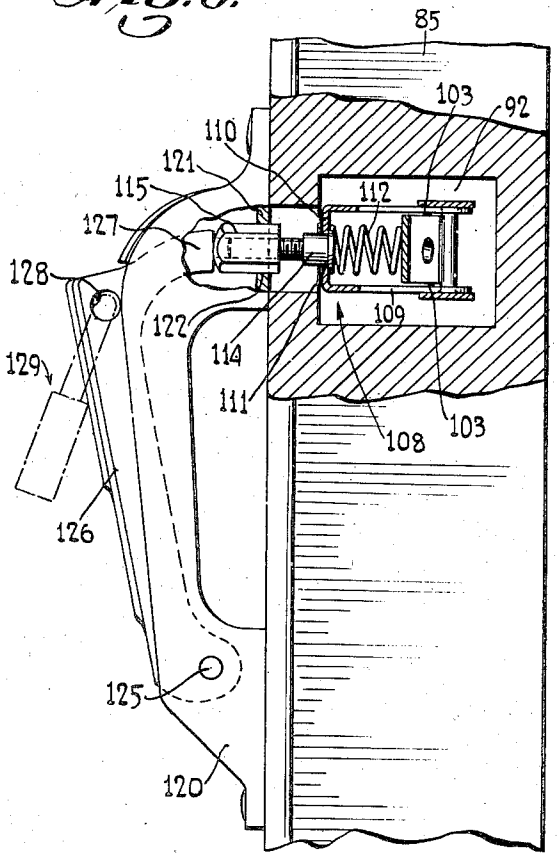


Fig. 7.

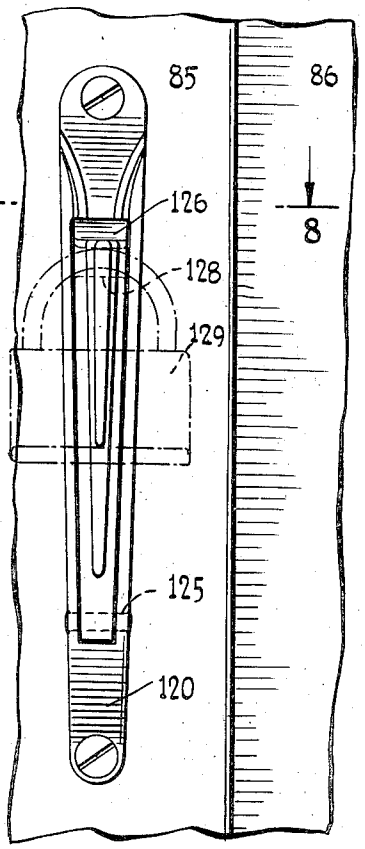


Fig. 8.

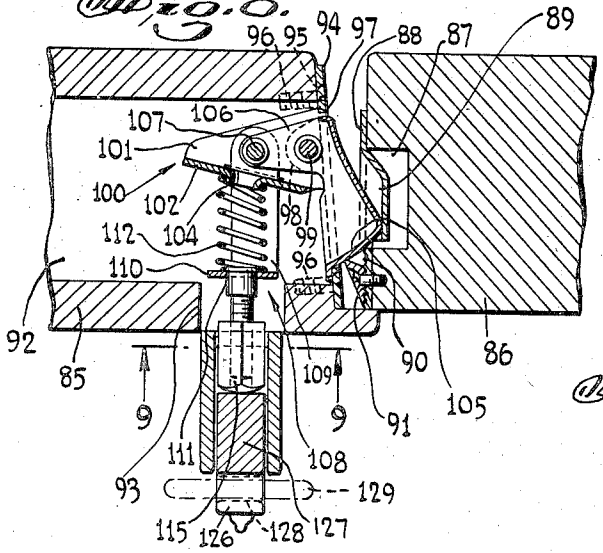
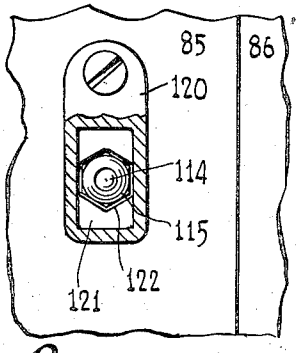


Fig. 9.



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2,212,563

REFRIGERATOR DOOR LATCH

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Application August 19, 1938, Serial No. 225,765

16 Claims. (Cl. 292—22)

This invention relates to latches for doors of refrigerators, and the like closures.

An object of this invention is to provide a latch of the character described having a handle to retract the tongue of the latch, means being provided to easily adjust the handle to a plurality of angular positions relative to the edge of the door on which the latch is mounted, and the handle being operable to retract the tongue in any of the adjusted positions.

Thus, for a door with the latch at arm's height, the latch may be set with the handle pointing outward, horizontally. For a door with the latch above arm's height, the handle may be set to point downwardly, and for a door with the latch below arm's height, the handle may be set to point upwardly. The same latch may thus be set to various positions to make it convenient to open the refrigerator door, and obviates the necessity for stocking different latches with handles in different angular positions.

Another object of this invention is to provide a latch of the character described, having a spring pressed tongue, the spring being normally substantially under no strain or compression when the tongue is not retracted, and said spring being strained or compressed only when the tongue is retracted, whereby to extend the life of the spring.

Still another object of this invention is to provide in a latch of the character described, a main spring, normally expanded, and compressed only when the tongue is retracted upon pulling back the handle, and a second auxiliary spring to prevent looseness and play in the handle.

A further object of this invention is to provide a latch of the character described having a tongue engaging the keeper and formed with an opening adapted to receive a padlock or pin to prevent retraction of the tongue, and opening of the door, the keeper being provided with notches to accommodate such padlock or pin.

A yet further object of this invention is to provide a concealed latch for a refrigerator door having a tongue adapted to be retracted by pressing a lever on a handle fixed to the door, improved means being provided to adjust the latch for various size doors and to hold the latch operating mechanism in adjusted position.

Yet another object of this invention is to provide in a latch of the character described, a casing adapted to be attached to a door, a handle having a rocking connection relative to said casing, and an assembly including a tongue and means to retract the tongue when the handle is rocked about its connection, said assembly being insertible into the casing and fixed thereto as a complete unit, and removable therefrom as such.

A still further object of this invention is to provide a strong, rugged and compact door latch of the character described, which shall be relatively inexpensive to manufacture, easy to assemble, install and adjust, smooth and positive in operation, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described, and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown various possible illustrative embodiments of this invention,

Fig. 1 is a front elevational view of a refrigerator door and door jamb provided with a latch and keeper embodying the invention, and showing the handle pointing out in horizontal position in full lines, and pointing up and down in vertical positions, in dot-dash lines;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a partial, top plan view of the tongue operating mechanism for the latch;

Fig. 4 is an elevational view of said mechanism, with parts in cross-section and with one part swung back;

Fig. 5 is a partial view of the handle;

Fig. 6 is a side elevational view of a concealed latch embodying the invention, and illustrating a modification;

Fig. 7 is a front elevational view thereof;

Fig. 8 is a cross-sectional view taken on line 8—8 of Fig. 7; and

Fig. 9 is a cross-sectional view taken on line 9—9 of Fig. 8.

Referring now in detail to the drawings, 10 designates a door and 11 a door jamb. Attached to the door 10, adjacent the edge of the latter, is the latch 12, embodying the invention and cooperating with a keeper 13 attached to the door jamb.

The door jamb 11 comprises a casing 14 having a front wall 15, top and bottom walls 16, end wall 17, and another end wall 18 at the edge of the door. The casing 14 is open at the rear. Extending from the top and bottom walls 16 are

apertured flanges 19 to receive screws which fasten the casing 14 to the door 10. The wall 18 disposed adjacent the edge of the door 10 is formed with a slot 22 for the purpose hereinafter appearing.

The front wall 15 is formed with a circular opening 24. The inner rim edge of said opening is preferably of part-spherical shape, for the purpose hereinafter appearing. On the inner side of the front wall 15 are a pair of diametrically opposed, aligned, vertical radial grooves or notches 28 on opposite sides of the opening 24; and a pair of diametrically opposed, horizontal radial grooves or notches 29 on opposite sides of said opening.

The casing 14 is also formed on the inside thereof and adjacent the end walls 17 and 18 with recessed shoulders 30, spaced from the door 10, for the purpose hereinafter appearing. The shoulders 30 are formed with horizontal screw threaded openings 31, perpendicular to the door 10. Fixed to the casing 14, and disposed therein, is a member 32 having a flat wall 33 contacting the door 10 and formed with pairs of apertured ears 34, contacting the shoulders 30, and fixed thereto by screws 35 passing through the apertured ears and screwed within the screw threaded openings 31.

Extending from the wall 33, toward the front wall 15, are a pair of top and bottom parallel walls 36. The walls 36 are formed with a pair of aligned openings 37 at one end and adjacent the one pair of ears 34. Said walls 36 are formed with another pair of aligned openings 38 and with a pair of aligned arcuate slots 39. The wall 33 furthermore is formed with a central forwardly extending tubular flange or boss 40, for the purpose hereinafter appearing.

Extending through the openings 38 is a shaft 41, projecting beyond said walls 36. Pivoted to said shaft is a member 42 having a pair of parallel walls 43 disposed within the parallel walls 36 and having apertures 44 at one end receiving the shaft 41. Walls 43 are furthermore formed with aligned openings 45 carrying a transverse shaft 46 passing through the arcuate slots 39. The walls 43 are interconnected by an annular portion 47 of part-spherical shape, having a central opening 48, for the purpose hereinafter appearing.

Interposed between the annular portion 47 and the wall 33 is a coil compression main spring 50, one end whereof receives the annular flange 40 on said wall 33. Disposed within the spring 50 and contacting the rim edge of the annular or tubular flange 40 is a cup shaped member 51. Disposed within said cup shaped member is an auxiliary coil compression spring 52, lighter than the spring 50. The spring 52 projects through the opening 48 in the annular portion 47 and carries a pin 53 having a head 54 at its front end, for the purpose hereinafter appearing.

Extending through the openings 37 in the walls 36 is a transverse shaft 55. Pivoted on the shaft 55 is a tongue 56 projecting through the opening 22 in wall 18 of the casing 14. The tongue 56 is formed with a transverse slot 58 receiving the transverse shaft 46, whereby pivotal movement of member 42 about the shaft 41 will cause pivotal movement of the tongue 56 about the shaft 55. Member 42 thus has a sliding pivotal connection relative to the tongue. The tongue 56 is formed with a vertical through opening 60 disposed wholly outside of the casing 14 when the tongue is in projecting position.

Pivoted to the outer ends of the shaft 41 is a member 62 having parallel walls 63 disposed on the outside of the walls 36, and receiving the latter therebetween. The walls 63 are interconnected by a dome shaped member 65, adapted to contact the head 54 of the pin 53.

As shown in Fig. 4, the member 62 may be swung away from the pin 53 when the latch is disassembled. The dome shaped portion 65 is adapted to receive and contact the part-spherical ring shaped portion 47 when member 62 is swung about the shaft 41, in the manner hereinafter appearing.

To retract the tongue 56 there is provided a handle 70 having a part-spherical shaped head 71 at one end disposed within the opening 24 of the front wall 15. The inner surface 72 of the head 71 is curved and adapted to contact the dome shaped member 65. The head 71 is provided with a pair of diametrically opposed radial projections 73 adapted to be received within the vertical notches 28 of the front wall 15 when the handle is in horizontal position. The head 71 is also provided with a radial rib or projection 75, disposed at right angles to the ribs or projections 73 and adapted to be received within one of the grooves or notches 29 when said handle is in horizontal position.

It will now be understood that the spring 50 rotates the member 42 about the shaft 41 to bring the shaft 46 to the front ends of the arcuate slots 39 for the purpose of projecting the tongue 56 through the opening 22 in wall 18 of the casing, for engagement with the keeper 13 on the door jamb 11. When the tongue 56 is projected, the spring 50 is practically under no compression or strain, being substantially fully expanded so as not to be under any strain normally when the tongue is in projected position, as for example, when the door is closed or open. The spring 52, however, presses the pin 53 against the dome shaped member 65 which in turn, presses against the inner surface 72 of the head 71 of the handle 70, so as to prevent play or looseness of the handle.

To retract the tongue 56, the handle is pulled forwardly so as to pivotally move about an axis perpendicular to the handle and parallel to the door. The head presses the dome shaped member 65, pivotally moving member 62 and compressing the spring 52. When the dome shaped member 65 contacts the ring shaped member 47, and the handle is further pulled forwardly, the spring 50 will then be compressed as the member 42 is rotated about the shaft 41 to rotate the tongue 56 in a counter-clockwise direction, looking at Fig. 2 of the drawings, to retract said tongue in said casing.

The life of the spring 50 is extended by reason of the fact that it is normally under no compression or strain, and is only compressed during the time that the handle is pulled to retract the tongue. Only the light spring 52 which prevents looseness or play in the handle is under some compression sufficient to prevent looseness or play in the handle.

It will be noted that removal of the screws 35 permits the entire operating mechanism to be removed as an assembly or unit from the casing. The members 32, 36, 62, 56, together with the shafts 41, 46 and 37, and the springs 50 and 52 and the cup shaped member 51 and the pin 53 may be assembled together and thereafter attached as a unit within the casing. The handle 70 may be assembled by passing the

handle through the opening 24 from the inside of the casing, prior to insertion of the operating unit.

Where the latch is at arm's height, it is desirous to have the handle in horizontal position. However, when the latch is below arm's height, it is desirous to have the handle in vertical position, pointing upwardly. The handle may be readily changed to vertical position, pointing upwardly, by opening the door and pressing the tongue inwardly, as shown in Fig. 3, to permit the radial projections 73, 75 to be released from the notches 28, 29. The handle may then be swung through an angle of ninety degrees to point upwardly, whereby the projections enter the notches 29 and the projections 75 enter the lower notch 28. Pressure is then released from the tongue 56 so that the springs 50 and 52 will hold the handle in operating position. The handle may similarly be swung downwardly to vertical position by pushing the tongue inwardly and holding the same while the handle is moved downwardly to such position.

It will now be understood that the handle of the latch may be adjusted to one of three positions to make the latch convenient to use.

A padlock 80 may be passed through the opening 60 in the tongue to prevent the tongue from being retracted, and hence, prevent opening of the refrigerator. The top and bottom walls 81 of the keeper may be provided with aligned notches 82, registering with the opening 60, to receive the padlock.

In Figs. 6, 7, 8 and 9 there is shown a door latch, embodying the invention, and illustrating a concealed type of latch. In said figures, 85 designates a door and 86 a door jamb. The door jamb 86 has a recess 87 at the edge thereof, and fixed to said edge is a keeper 88, having a socket portion 89 disposed within the recess 87. The keeper 88 also has a serrated portion 90 to which there is attached a strike edge 91.

The door 85 is provided with a chamber 92 extending to one edge of the door, and forming front and rear walls. The front wall is formed with an opening 93 communicating with said chamber.

Attached to the edge of the door is a plate 94 having openings 95 in the corners thereof to receive screws 96 for attaching said plate to said door. The plate 94 is formed with a central, substantially rectangular opening 97 communicating with chamber 92, and a pair of parallel apertured ears 98, projecting into the chamber and disposed at said opening.

Extending through the apertures in ears 98 is a shaft 99. Mounted on said shaft and fixed to the plate 94, is a member 100 having top and bottom walls 101 formed with openings to receive said shaft and having edge portions contacting the inner surface of the plate 94. Parallel walls 101 are interconnected by a flat wall 102, preferably inclined to the front surface of the door. Wall 102 is formed with a pair of parallel slots 103 and with a central annular flange 104.

Pivoted to the shaft 99 is a tongue member 105 projecting through the opening 97 in plate 94 and adapted to engage with the keeper 88. The tongue member 105 has parallel side walls 106 formed with apertures to receive said shaft 99. Said walls 106 are also formed with a pair of aligned openings to receive a transverse shaft 107.

Pivoted to said shaft 107 is a U-shaped member 108 having parallel side walls 109 passing through the slots 103. The walls 109 are interconnected by wall 110 formed with a central opening 111.

Interposed between the wall 110 and the wall 102, and engaging flange 104 at one end, is a coil compression spring 112 normally fully expanded and under no compression, but retaining the tongue member 105 in projected position in engagement with the keeper 88.

Fixed to wall 110 and passing through the opening 111, is a screw threaded member 114 passing through the opening 93 in the front portion of the wall 85. Screwed to the screw threaded member 114 is a polygonal member 115 projecting beyond the opening 93.

Fixed to the door 85 is a hollow handle 120 having a wall 121 covering the opening 93, but formed with a polygonal opening 122 to receive the polygonal member 115. Pivoted within the handle 120, as at 125, is a lever 126, normally projecting from the handle and having a portion 127 contacting the polygonal member 115. The projecting portion of the lever 126 is formed with a through opening 128, normally exposed and adapted to receive a padlock 129 to prevent opening of the door.

The operation of the latch will now be described:

The spring 112 normally presses the U-shaped member 108 forwardly to rotate the tongue member 105 in a counter-clockwise direction, looking at Fig. 8 of the drawings, to project the same. To open the door the handle 120 is grasped and the palm of the hand is pressed against the lever 126 to push inwardly against the screw 114 for compressing the spring 112 and rotating the tongue member 105 in a clockwise direction, looking at Fig. 8 of the drawings, to retract the same. Since the spring 112 is normally under substantially no compression, and is compressed only when the lever 126 is pressed, said spring will last for a long term.

By rotating the polygonal member 115 about the screw 114, the latch may be adjusted to accommodate doors of various sizes. After the handle 120 is attached to the door, however, and the polygonal member 115 is received within the polygonal opening 112 of the handle, rotation of said polygonal member is prevented so that the parts remain in adjusted position.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

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

1. A latch of the character described, comprising a casing adapted to be fixed to a door, adjacent the edge of the latter, a tongue within said casing, means to project said tongue from said casing means to retract said tongue into said casing, comprising a handle having a rocking connection at one end with said casing, and being adapted to be swung about said connection away from said door to retract said tongue into said casing, and means for maintaining said handle in various angular positions relative to a plane perpendicular to the door and passing

through said connection, said handle being rockable about said connection in said various angular positions thereof to retract the tongue into the casing, said means for projecting said tongue from said casing, including a spring normally substantially fully expanded and substantially under no compression when said tongue is in projecting position.

2. A latch of the character described, comprising a casing adapted to be fixed to a door, adjacent the edge of the latter, a tongue within said casing, means to project said tongue from said casing, means to retract said tongue into said casing, comprising a handle having a rocking connection at one end with said casing, and being adapted to be swung about said connection away from said door to retract said tongue into said casing, means for maintaining said handle in various angular positions relative to a plane perpendicular to the door and passing through said connection, said handle being rockable about said connection in said various angular positions thereof to retract the tongue into the casing, said means for projecting said tongue from said casing, including a spring normally substantially fully expanded and substantially under no compression when said tongue is in projecting position, and additional spring means for preventing play and looseness of said handle and to maintain said handle in engagement with said retaining means.

3. A latch of the character described, comprising a member having an opening, a tongue within said member, means to project said tongue through the opening in said member, including a spring substantially under no strain when said tongue is in projecting position, and means to compress said spring and retract said tongue into said member, including a handle, said handle being adapted to compress said spring upon moving the handle to retract said tongue.

4. A latch of the character described, comprising a casing adapted to be fixed to a door, adjacent the edge thereof, a tongue within said casing, means to project said tongue from said casing, including a spring normally under no strain when said tongue is in projecting position, means for retracting said tongue into said casing including a handle, and additional spring means to prevent play or looseness in said handle, said handle being adapted to compress both springs when moved to retract the tongue.

5. In a latch of the character described, a member, a tongue pivoted to said member and adapted to project through said member, means for moving said tongue to a position projecting from said member, including a second member pivoted to said first member and engaging said tongue to rotate said tongue when said second member is rotated, and spring means for moving said second member, said spring means being normally under substantially no strain when said tongue is in projecting position, and means to move said second member and compress said spring means for retracting said tongue into said casing.

6. A latch of the character described, comprising a casing adapted to be attached to a door, adjacent the edge of the latter, said casing having an opening, a tongue within said casing, means for projecting said tongue from said casing, and means for retracting said tongue into said casing, said latter means comprising a handle having a part-spherical head received within said opening, a plurality of projections on said head and disposed within said casing, and fixed means on the inside of the casing to engage said projections.

7. A latch of the character described, comprising a casing adapted to be attached to a door, adjacent the edge of the latter, said casing having an opening, a tongue within said casing, means for projecting said tongue from said casing, and means for retracting said tongue into said casing, said latter means comprising a handle having a part-spherical head received within said opening, a plurality of projections on said head and disposed within said casing, fixed means on the inside of the casing to engage said projections, and spring means to retain said projections in engagement with said last means.

8. In a latch of the character described, a casing adapted to be attached to a door, adjacent the edge of the latter, a member fixed to the casing and carrying a shaft, a second member pivoted to said shaft and carrying a second shaft, parallel to the first shaft, a third shaft carried by said first member and disposed parallel to said first two shafts, a tongue pivoted to said third shaft and having a slot receiving said second shaft, a coil compression spring interposed between said first two members to rotate said second member about said first shaft for projecting said tongue from said casing, and means to rotate said second member and compress said spring for retracting said tongue into said casing.

9. In a latch of the character described, a casing adapted to be attached to a door, adjacent the edge of the latter, a member fixed to the casing and carrying a shaft, a second member pivoted to said shaft and carrying a second shaft, parallel to the first shaft, a third shaft carried by said first member and disposed parallel to said first two shafts, a tongue pivoted to said third shaft and having a slot receiving said second shaft, a coil compression spring interposed between said first two members to rotate said second member about said first shaft for projecting said tongue from said casing, and means to rotate said second member. and compress said spring for retracting said tongue into said casing, said first member being formed with an arcuate slot receiving said second shaft.

10. In a latch of the character described, a casing adapted to be attached to a door, adjacent the edge of the latter, a member fixed to the casing and carrying a shaft, a second member pivoted to said shaft and carrying a second shaft, parallel to the first shaft, a third shaft carried by said first member and disposed parallel to said first two shafts, a tongue pivoted to said third shaft and having a slot receiving said second shaft, a coil compression spring interposed between said first two members to rotate said second member about said first shaft for projecting said tongue from said casing, and means to rotate said second member and compress said spring for retracting said tongue into said casing, said spring being normally substantially fully expanded and under no compression.

11. In a latch of the character described, a casing adapted to be attached to a door, adjacent the edge of the latter, and being formed with an annular opening, a member attached to said casing, a shaft on said member, a second member pivoted to said shaft, a second shaft carried by said pivoted member, a third shaft carried by said first member, a tongue pivoted

to said third shaft and engaging said second shaft, a coil compression spring interposed between said first and second members to rotate the second member about said first shaft to project said tongue from said casing, a third member pivoted to said first shaft and having a dome shaped portion, a spring interposed between said first member and the dome shaped member of said third member, a handle having a part-spherical head received within the opening in said casing and engaging said dome shaped member, a plurality of radial projections on said head and disposed within said casing, said casing being formed with a plurality of radial grooves to receive said projections.

12. In a latch of the character described, a casing adapted to be attached to a door, adjacent the edge of the latter, and being formed with an annular opening, a member attached to said casing, a shaft on said member, a second member pivoted to said shaft, a second shaft carried by said pivoted member, a third shaft carried by said first member, a tongue pivoted to said third shaft and engaging said second shaft, a coil compression spring interposed between said first and second members to rotate the second member about said first shaft to project said tongue from said casing, a third member pivoted to said first shaft and having a dome shaped portion, a spring interposed between said first member and the dome shaped member of said third member, a handle having a part-spherical head received within the opening in said casing and engaging said dome shaped member, a plurality of radial projections on said head and disposed within said casing, said casing being formed with a plurality of radial grooves to receive said projections, said first spring being normally substantially expanded and under no strain when said tongue is projected from said casing.

13. In combination, a door having a chamber extending to one edge of the door and forming front and rear walls, the front wall of said door being formed with an opening, a member fixed to the edge of said door to cover said chamber, said member being formed with an opening, a tongue pivoted to said member and adapted to project through the opening in said member, a second member pivoted to said tongue, spring means interposed between said first and second members, a screw on said second member, a handle fixed to said door and having a wall covering the opening in the front wall of said door, said wall being formed with a polygonal opening, a polygonal member screwed to said screw and being non-rotatably received within said polygonal opening, and a member pivoted to said handle and disposed therein and having a portion projecting therefrom, and a portion engaging said polygonal member.

14. In a latch of the character described, a member, a tongue pivoted to said member and adapted to project through said member, means for moving said tongue to a position projecting from said member, including a second member pivoted to said first member and engaging said tongue to rotate said tongue when said second member is rotated, spring means for moving said second member, said spring means being normally under substantially no strain when said tongue is in projecting position, means to move said second member and compress said spring means for retracting said tongue into said casing, and additional spring means pressing against said moving means and likewise adapted to be compressed by said means when the latter is actuated to retract said tongue.

15. In a latch of the character described, a casing adapted to be attached to a door adjacent the edge of the latter, a member fixed to the casing and disposed within said casing, a second member pivoted to the first member, a tongue pivoted to said member about an axis parallel to the pivotal axis of said pivoted member, means on said pivoted member to rotate said tongue when said pivoted member is rotated, spring means to rotate said pivoted member for projecting said tongue from said casing, and means to rotate said pivoted member for retracting said tongue into said casing.

16. In a latch of the character described, a casing adapted to be attached to a door adjacent the edge of the latter, a member fixed to the casing and disposed within said casing, a second member pivoted to the first member, a tongue pivoted to said member about an axis parallel to the pivotal axis of said pivoted member, means on said pivoted member to rotate said tongue when said pivoted member is rotated, spring means to rotate said pivoted member for projecting said tongue from said casing, means to rotate said pivoted member for retracting said tongue into said casing, said casing having an opening, and said means comprising a handle having a part-spherical head received within the opening of the casing, a plurality of radial projections on said head and disposed within said casing, fixed means within the casing to receive said projections, said handle being rotatable about an axis perpendicular to the door to various angular positions, and said handle being adapted to be rotated about an axis parallel to the door in its various angular positions to move said pivoted member for retracting said tongue.

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