March 29, 1932. E. H. JOHNSON 1,851,631

BUILDER'S HARDWARE

Original Filed Feb. 23, 1929 2 Sheets-Sheet 1

Fig. 1

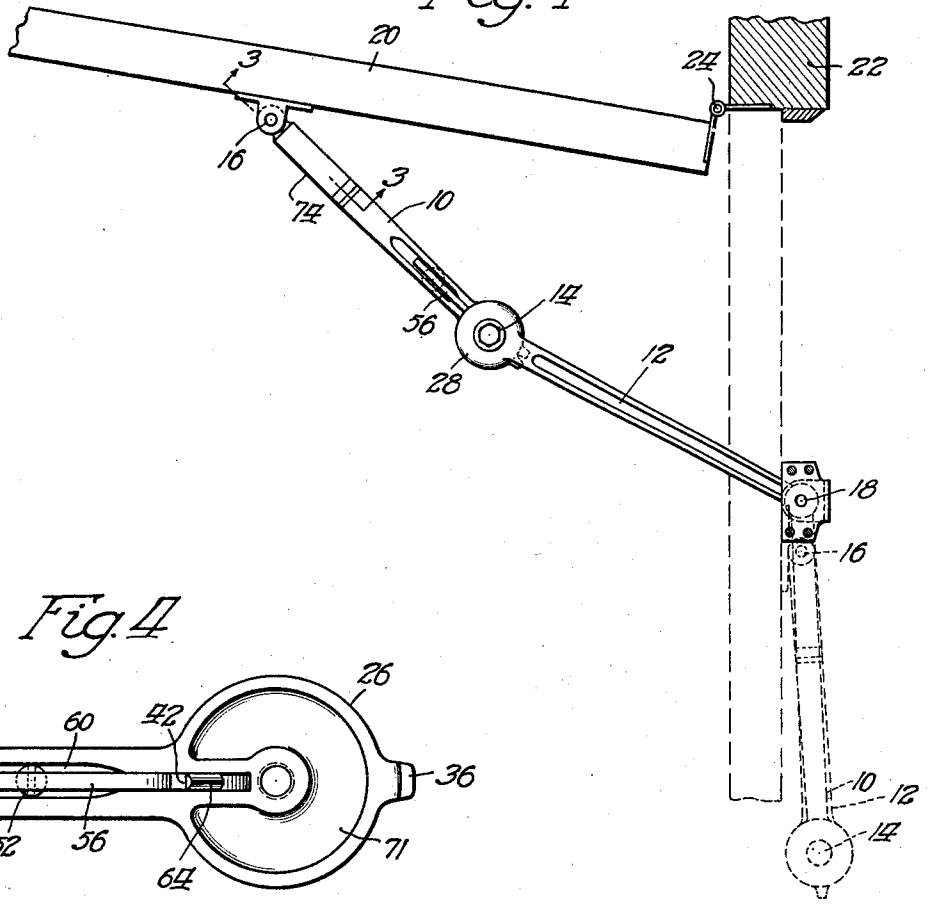


Fig. 4

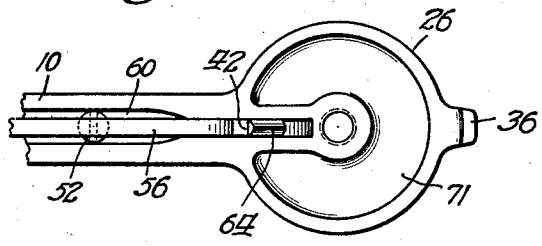
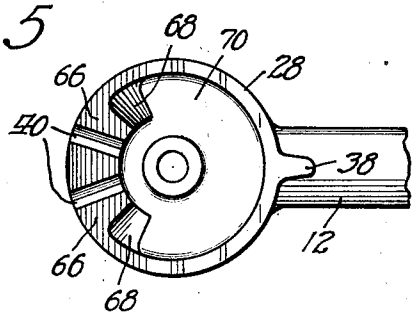


Fig. 5



Inventor
Elvin H. Johnson
By: D. H. Sweet
Atty.

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BUILDER'S HARDWARE

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Fig. 2

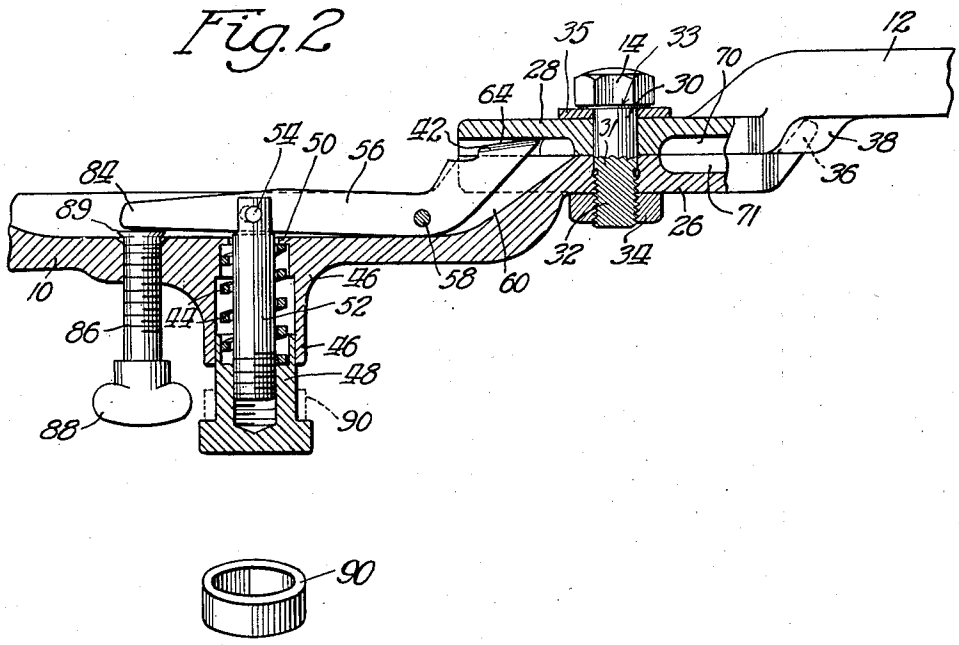
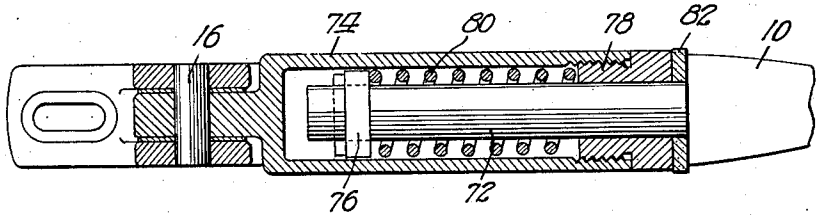


Fig. 3



Inventor
Elwin H. Johnson

By: D. A. Sweet Atty.

Patented Mar. 29, 1932 1,851,631

UNITED STATES PATENT OFFICE

ELVIN H. JOHNSON, OF WINNETKA, ILLINOIS

BUILDER'S HARDWARE

Application filed February 23, 1929, Serial No. 341,904. Renewed April 10, 1931.

My invention relates to builders' hardware and more specifically to door holders.

It includes among its objects and advantages, an improvement in manipulation and security and an extension in the range of possible operations.

In the accompanying drawings:

Figure 1 is a plan view of a holder according to the invention with the door shown diagrammatically in open position;

Figure 2 is a vertical section through the central pivot and the adjacent portions of the arms;

Figure 3 is a section on line 3—3 of Fig. 1;

Figure 4 is a plan view looking downward at the pivot end of the lower arm; and

Figure 5 is a plan view looking upward at the pivot end of the upper arm.

In the embodiment of the invention selected for illustration, the holder comprises pivoted arms 10 and 12 connected by a pintle 14. The ends of the arms remote from the pintle 14 are pivoted as at 16 and 18 to a door 20 and door casing 22 respectively. The positioning of the pivots 16 and 18 with respect to the door hinge 24, and the lengths of the arms 10 and 12 are so proportioned that the parts can move from the open position of Fig. 1 to the closed position indicated in the dotted lines in the same figures. In the open position, the arms 10 and 12 are nearly in alinement. A force tending to move the pivots 16 and 18 closer together can be resisted by a much smaller force applied to the pintle 14.

The various adjustment and control means associated with the arms have been illustrated adjacent the pintle 14. Each of the arms terminates in a flat disc or head coaxial with the pintle 14. Thus the arm 10 carries the head 26, which lies below the head 28 on the end of the arm 12. Pintle 14 has a cylindrical portion 30 passing through the head 28 and a threaded portion 32 threaded through the head 26. This makes the nut 34 a mere lock nut to keep the pintle from shifting and tightening or loosening the bearing engagement between the heads 26 and 28. As this type of holder is usually employed at the top of the door, this construction is also a safeguard against mischievous pranks, as a person unscrewing the nut 34 would not succeed in taking the door holder apart, and the upper headed end of the pintle 14 is relatively difficult of access. The cylindrical portion 30 extends a material distance into the head 28, as clearly shown at 31 in Fig. 2. This provides for transfer of the load at 31, so that the threads function only to hold the pintle in place. The upper head of the pintle 14 is also embossed with a slight annular bulge at 33 which rides on the washer 35 and keeps the corners of the head from scoring the washer.

Positive stop means are provided for preventing movement of the parts beyond the open position illustrated in Fig. 1. I have shown a toe 36 projecting outwardly and upwardly from the head 26 and a lug or fin 38 projecting downwardly from the arm 12 and outwardly from the head 28. Since these parts are symmetrical with respect to the center lines of the arms 10 and 12, as clearly indicated in Figs. 4 and 5, they operate with equal facility not only in the orientation of Fig. 1, but in the analogous orientation necessary when the hinge 24 is at the other side of the door casing, in which case, the toe 36 would strike the opposite side of the lug 38.

It is, in most instances, desirable to lock the parts in the position of Fig. 1 with a force materially greater than that of the closing spring that may be associated with the door 20 or the door holder. On the other hand, a positive lock is occasionally broken in some minor emergency or when some hasty person uses violent force upon the door. I have indicated V-shaped locking notches 40 in the lower surface of the head 28, and a locking element 42 resiliently urged in a direction to enter said notches. The spring 44 is housed in a tubular boss 46 in the arm 10 and acts on the element 42 through a force multiplying linkage. I have illustrated an adjusting nut 48 receiving the thrust developed by the abutment of the spring with the shoulder 50 at the top of its housing, and transmitting this force to a riser 52 pivoted at 54 to the outer end of the transmitting lever 56, which lever is pivoted at 58 in a housing slot 60 in the arm 10. The distance between the pivots

54 and 58 is materially greater than the distance from the pivot 58 to the element 42 constituting the active end of the lever 46. This permits the use of a lighter spring than would otherwise be required.

The force with which the element 42 is held in the position of Figs. 1 and 2 is adjustable by reason of the screw threaded connection between the nut 48 and the riser 52. The upper surface of the element 42 is made up of beveled side walls 62 lying at such an angle as to secure the best possible surface engagement with the sides of the notches 40, and an apex 64 lying at such an angle as to be horizontal when the lever is moved down to let the door close. Thus the apex will have not less than line contact with the flats 66 on either side of the notches 40 (see Fig. 5). Beyond the flats 66 the surface of the upper head recedes gently as at 68 to a recess 70. When the locking element 42 is in the recess 70 it does not make any contact with the head 28. This eliminates a great deal of wear on the pivot 14 and associated parts and a considerable amount of load and wear on the pivots 16 and 18. The lower head has a recess 71 similar to the recess 70. A filling of substantially non-liquid lubricant in these recesses will keep the parts well lubricated for a long period.

When the parts are moved abruptly to the open position shown in Fig. 1 from a closed position, it is desirable to cushion the shock occurring when the toe 36 strikes the lug 38. I have illustrated a resilient telescopic connection at the end of the arm 10. This comprises a reduced extension 72 telescoped inside a sleeve 74 connected to the pintle 16. An abutment 76 on the extension and an annular retaining nut 78 in the end of the sleeve, confine the spring 80 under a rather heavy initial tension. When the toe 36 strikes the lug 38, the remaining kinetic energy of the door will be used up in compressing the spring 80. To avoid a metallic click upon subsequent expansion of the spring 80, I provide a tough leather washer 82 between the face of the nut 78 and the shoulder at the base of the extension 72.

It is practically always desirable that the custodian of a building or the user of such a device as I have disclosed be able to render it inoperative for holding the door open. The lever 56 extends beyond the pivot 54, as indicated at 84, and overlies the upper end of an adjustment screw 86, threaded through the arm 10, and having a flat head 88 for convenient manipulation thereof. A few turns of the adjusting screw 86 will force the lever 56 into the unlocked position with the element 42 low enough to clear the flats 66, and a few turns in the opposite direction will restore the door holder to an operative automatic means for holding the door open whenever it is moved to open position. This is independent of the adjustment by means of the nut 48 which controls the amount of the force necessary to break the locking action in the position of Fig. 1 and close the door. The nut 48 is preferably made so that a pair of pliers or the like will be needed to adjust it, so that an unskilled or careless user of the device will not try to use the wrong adjustment means. The upper end of the screw 88 is enlarged by riveting as at 89, to prevent careless removal of the screw.

Under some relatively infrequent conditions of service it is desirable to be able to produce a positive lock in the position of Fig. 1. The nut 48 is capable of material adjustment on the riser 52 but its adjustment upward is limited by abutment between the end of the riser and the bottom of the hole in the nut, and its adjustment downward is limited by the end of the threads. The axial dimensions of the parts are such that a suitable range of spring tensions can be obtained, but movement of the nut as far up as possible will still leave enough clearance to permit the lever 56 to let the door swing shut. I have illustrated a ring 90 that may be positioned as indicated in Fig. 2, after which a slight adjustment of the nut 48 upwardly will bring the ring 90 against the end of the boss 46 and lock the door open in a positive manner. This ring may be sold with the other parts of the device, but it can only be positioned as in Fig. 2 by taking the nut 48 off and putting it on again, so that unintentional manipulation to secure a positive locking action will not occur.

Without further elaboration, the foregoing will so fully explain the gist of my invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

What I claim as my invention, and desire to secure by Letters Patent is:

1. A door holder comprising, in combination, rigid arms pivoted to each other, locking means for locking said arms in extended position, and means for rendering said locking means either positive, non-positive or inoperative, the means for rendering said locking means positive being a removable element, and the means for rendering said locking means inoperative being permanently associated with said arms and capable of quick manual actuation.

2. A door holder comprising, in combination, rigid arms pivoted to each other, non-positive locking means for locking the parts in extended position, stop means for said plates for limiting the opening movement to the locked position, said non-positive locking means being partly in duplicate to operate on either side of said stop means.

3. A door holder comprising, in combination, rigid arms pivoted to each other, non-positive locking means for locking the parts

in extended position, said locking means comprising a locking element movably mounted on one arm and taking into locking notches in the other arm, said element and notches being V-shaped, a spring, a connection between said spring and said locking element, means for adjusting the tension of said spring, and quick adjustable means for holding said locking element in inoperative position.

4. A door holder comprising, in combination, rigid arms pivoted to each other, non-positive locking means for locking the parts in extended position, said locking means comprising a locking element, a spring, and a force multiplying connection between said spring and said locking element.

5. A door holder comprising, in combination, rigid arms pivoted to each other, non-positive locking means for locking the parts in extended position, said locking means comprising a locking element movably mounted on one arm and taking into locking notches in the other arm, a spring, a force multiplying connection between said spring and said locking element, and means for adjusting the tension of said spring.

6. A door holder comprising, in combination, rigid arms pivoted to each other, locking means for locking the parts in extended position, said locking means comprising a locking element movably mounted on one arm and taking into locking notches in the other arm, said element and notches being V-shaped, a spring, a force multiplying connection between said spring and said locking element, means for adjusting the tension of said spring, quick adjustable means for holding said locking element in inoperative position, a removable part for making said tension adjusting means capable of adjustment to function as a positive lock, stop means for said plates for limiting the opening movement to the locked position, said locking notches being in duplicate on opposite sides of said stop means, and shock absorbing means for cushioning the opening movement by resilient axial elongation of one of said arms.

7. A door holder comprising, in combination, rigid arms pivoted to each other near their ends, the remaining ends being pivoted to a door and a door casing, one of said pivotal connections comprising superposed plates on the adjacent ends of said arms, a headed pintle axially slidable in the upper plate and threaded through the lower plate, a lock nut on the end of said pintle below the lower plate, locking means for locking the parts in extended position, said locking means comprising a locking element movably mounted on one arm and taking into locking notches in the other arm, said element and notches being V-shaped, a spring, a force multiplying connection between said spring and said locking element, means for adjusting the tension of said spring, quick adjustable means for holding said locking element in inoperative position, a removable part for making said tension adjusting means capable of adjustment to function as a positive lock, stop means for said plates for limiting the opening movement to the locked position, said locking notches being in duplicate on opposite sides of said stop means, and shock absorbing means for cushioning the opening movement by resilient axial elongation of one of said arms.

In testimony whereof, I have signed my name to this specification.

ELVIN H. JOHNSON.