April 19, 1932. A. C. WERTH 1,854,386

DOOR HOLDER

Filed Sept. 21, 1928

Fig. 1

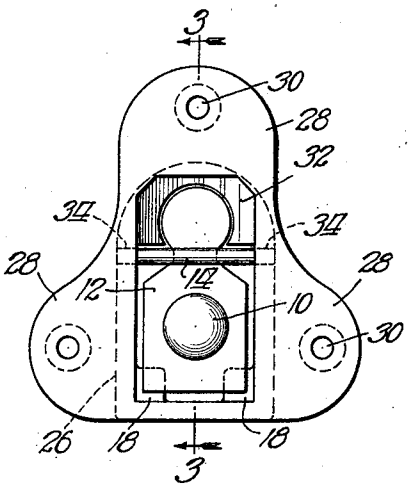


Fig. 2

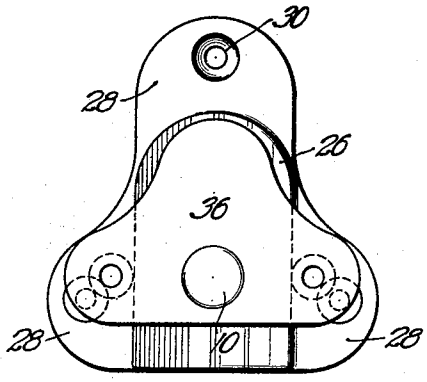


Fig. 3

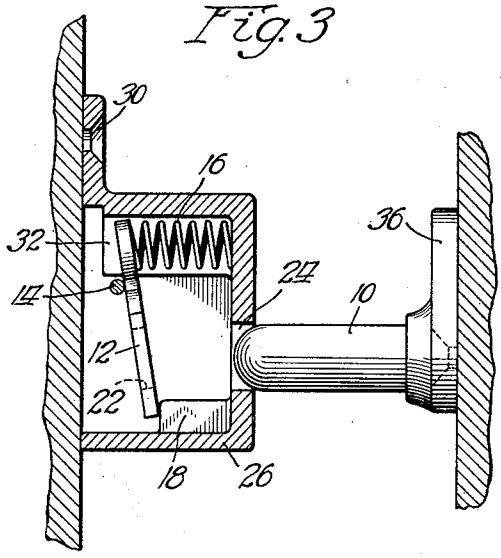
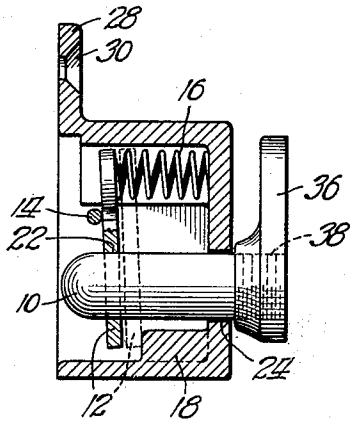


Fig. 4



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UNITED STATES PATENT OFFICE

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DOOR HOLDER

Application filed September 21, 1928. Serial No. 307,349.

My invention relates to builders' hardware and has for its object the provision of an improved holding means for doors and the like.

In the accompanying drawings Fig. 1 is an elevation of a device according to the invention from the side attached to one of the structures supporting the device.

Fig. 2 is an elevation from the side attached to the other structure.

Fig. 3 is a section on line 3—3 Fig. 1, and Fig. 4 is a section on the same plane showing the parts in a different position.

In the embodiment of the invention selected for illustration, the device comprises a stud 10 and a receiving means for said stud. These two parts of the device are mounted on supports, the receiving means being ordinarily mounted on a fixed structure such as a wall, and the stud on a movable structure such as a door which is to be held in proximity to the wall by the device.

The receiving means comprises a receiver 12 in the form of a plate floating against a fulcrum 14 and biased by spring means in the form of a single compression coil spring 16. At the end remote from the spring 16 I show means for limiting rotation around the fulcrum 14, in the form of lugs 18 underlying the corners of the plate. The plate is apertured at 22 to receive the stud 10 with a fit that will permit free sliding movement when the plate is normal to the stud. However, a very slight tipping of the plate to the position of Fig. 4 will cause the walls of the orifice 22 to grip the stud.

The tipping permitted by the lugs 18 is greater than that necessary to cause the stud to be gripped. Thus, in operation, the stud is guided at 24 by suitable guide means and upon movement into the position of Fig. 4 it tips the plate 12 by simple rotation about fulcrum 14 into the position of Fig. 4, compressing the spring 16 slightly, but primarily moving the plate an appreciable distance away from the lugs 18. In this position, the gripping action of the plate on the stud would hold up to a theoretically infinite force. However, a force in the direction of withdrawal greater than the compression in the spring 16 will move the entire plate 12 bodily without rotation of the dotted line position of Fig. 4. When this occurs, the plate is again in contact with the lugs 18 and the force acting at this point tends to rotate the plate about lugs 18 into a plane normal to the stud. This action permits the stud to slide out of the plate, sufficient friction being maintained between stud and plate during the entire movement to keep the plate in the dotted line position. When the rounded toe of the stud has moved far enough so that the stud lets go of the plate, the plate will immediately snap back to the position of Fig. 3 ready for a second operation.

It will be seen that the resistance to the entry of the stud is relatively negligible, being only the force necessary to rock the plate about the fulcrum 14 from the position of Fig. 3 to the full line position of Fig. 4. Both the force and the energy necessary to withdraw the stud are enormously larger, as this action involves the compression of the spring 16 to the dotted line position of Fig. 4 and the subsequent sliding movement of the stud in the plate under the action of a friction force which can never be less than the compression in the spring 16 in its most compressed condition. Using the plain cold-rolled steel for the stud 10 and a case hardened steel stamping for the plate 12 devices according to the invention show no material wear after 10,000 operations, which would represent approximately three years service on a door that was opened and closed about nine times daily.

I have illustrated the lugs 18 and the guide 24 formed as positions of a cast housing 26 provided with suitable flanges 28 for attaching to its support, as by wood screws or equivalent fastening devices passing through the apertures 30. This casting is also filled in at 32 to form a retaining socket for the spring 16, and its side walls support the fulcrum 14 at its ends at 34. Similarly, the stud 10 is mounted on a supporting plate 36 as by threading it at 38 or riveting the end or both.

Without further elaboration, the foregoing will so fully explain the gist of my invention that others may be applying current

knowledge readily adapt the same for use under various conditions of service.

What I claim is:—

1. A holder comprising, in combination, a plate having ends; a biasing spring engaging one end of said plate; stops positioned to engage the other end of said plate; said plate having an aperture between said stops and said spring; a fulcrum between said spring and said aperture; and stud means slidable freely through said aperture when said plate is perpendicular to said stud but of a size to be tightly gripped by a slight tilting of the plate.

2. A holder comprising, in combination, a plate having faces and ends; a compression biasing spring engaging one end of said plate; stops positioned to engage the other end of said plate on the same face as said spring; said plate having an aperture, between said stops and said spring; a fulcrum between said spring and said aperture abutting the face opposite said spring; and stud means slidable freely through said aperture when said plate is perpendicular to said stud but of a size to be tightly gripped by a slight tilting of the plate.

3. A holder comprising interpenetrating members; unitary yielding means tending to cant one of said members to cause said members to grip each other, and resisting movement of the canted member in the direction of withdrawal of the other member; and stop means limiting the movement of the canted member in the direction of withdrawal and resisting the canting action to cause said members to slip as long as the force causing withdrawal is sufficient to overcome the tension of said resisting means.

4. A holder comprising interpenetrating members; yielding means tending to cant one of said members to cause said members to grip each other; and means rendered operative by an initial movement of separation for resisting the canting action and causing said members to slip as long as the force causing separation is more than a predetermined amount.

5. A holder comprising interpenetrating members; means tending to cant one of said members to cause said members to grip each other; means resisting movement of the canted member in the direction of withdrawal of the other member; and means rendered operative only after said resisting means has been overcome, to neutralize the canting action and cause said members to slip as long as the force causing withdrawal is more than a predetermined amount.

6. A holder comprising male and female members; and automatic means acting on said female member for causing resistance to the entry of said male member up to a predetermined relatively small force, and for resisting withdrawal of said male member up to a predetermined relatively large force; said means comprising two abutment fulcrums for said female member on opposite sides of said male member and a spring acting on said female member in the direction of entry and at a point farther from said male member than the adjacent fulcrum, the fulcrum adjacent said spring being spaced inwardly to leave clearance for translational movement of said female member between the limits of movement set by said fulcrums.

7. A holder comprising male and female members; automatic means acting on one of said members for causing resistance to entry of said male member up to a predetermined relatively small force, and for resisting withdrawal of said male member up to an indefinite amount; and additional automatic means for limiting the action of said first means upon withdrawal to a predetermined maximum limit and thereafter causing said parts to slip and permit withdrawal to be completed.

8. A holder comprising male and female members; and automatic means acting on said female member for causing resistance to entry of said male member up to a predetermined relatively small force, and for resisting withdrawal of said male member up to a predetermined relatively large force without breakage; said means comprising two fulcrums for said female member on opposite sides of said male member and a spring acting on said female member in the direction of entry and at a point farther from said male member than the adjacent fulcrum.

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

ALFRED C. WERTH.