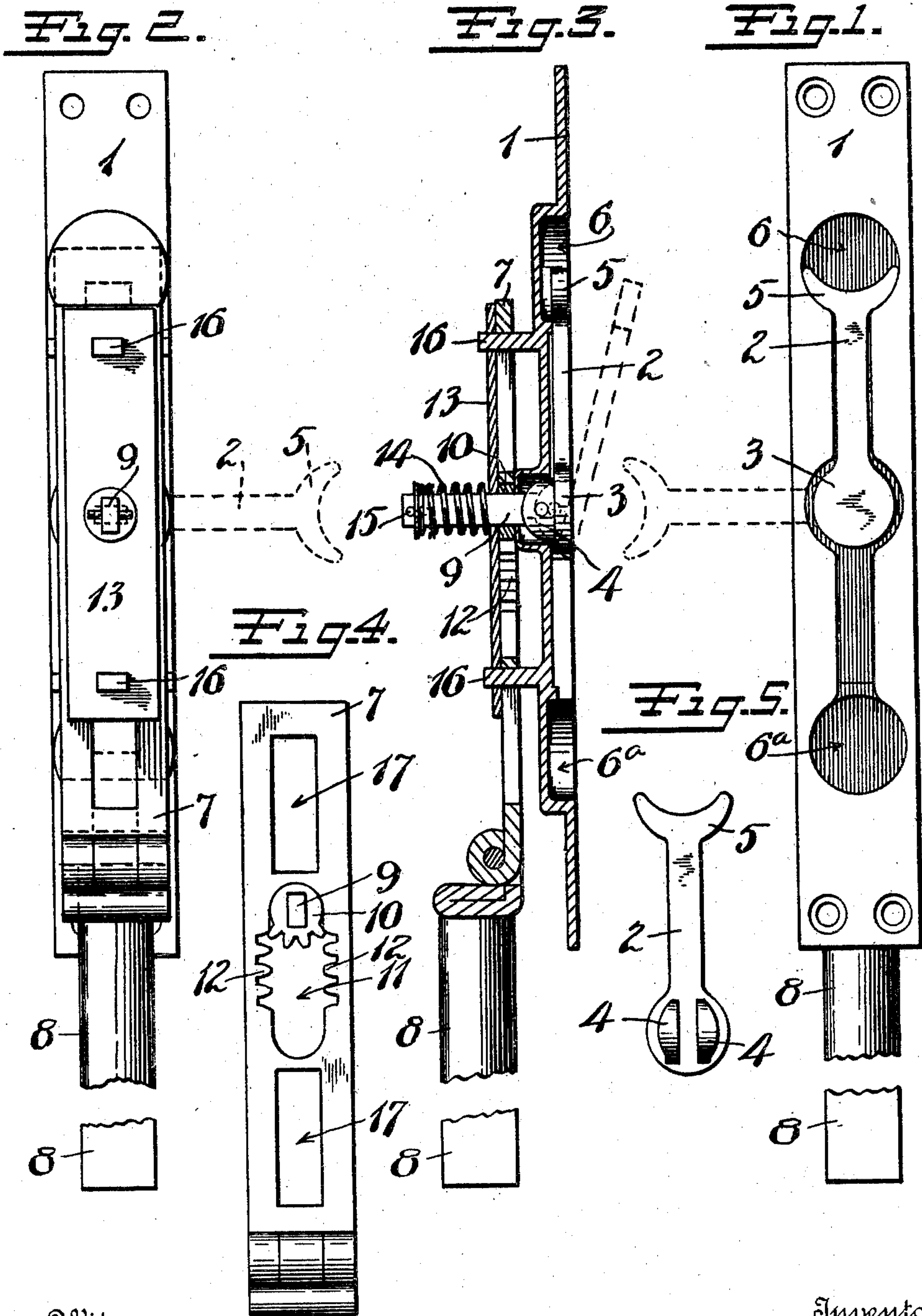


W. K. HENRY.
FLUSH BOLT.
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FLUSH BOLT.

967,377.

Specification of Letters Patent. Patented Aug. 16, 1910.

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To all whom it may concern:

Be it known that I, WILLIAM K. HENRY, a citizen of the United States, residing at New Britain, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Flush Bolts, of which the following is a full, clear, and exact description.

My invention relates to improvements in so-called "flush bolts", the object being to provide a simple and effective construction whereby the bolt may be operated with the greatest ease, and yet will be effectively restrained from free movement from the locking to the unlocking position, and vice versa, by a simple and ingenious means. The bolt is further useful in that it may be applied readily to either a right handed or a left handed door, and may have its operating member placed either at the edge or on the face of the door, as desired.

In the drawings—Figure 1 is a front view; Fig. 2 is a rear view; Fig. 3 is a vertical central section, certain parts being shown in elevation; Fig. 4 is a rear elevation of certain details; Fig. 5 is a rear view of another detail.

1 is the face plate. Mounted at a point intermediate in the length of the face plate 1 is the operating lever 2. 3 is the hub of said operating lever, the back of which hub is provided with a rearwardly extending bearing 4 for the purpose hereinafter described. Opposite the hub end of the lever 2 is a finger piece 5 of suitable design.

6—6^a are recesses or cavities in the face plate for receiving the handle end 5 of the lever, the said face plate being otherwise channeled or recessed to permit the hub and shank of said operating lever to lie flush with the surface of the face plate when the parts are in their locked or unlocked position.

At the back of the face plate is mounted a reciprocating member or slide 7, which has a piston movement to and fro, for the purpose of projecting or retracting a bolt 8.

9 is a spindle carried by the bearing 4 at the rear of the lever hub 3. This spindle 9 carries a segmental pinion 10. The slide 7 is provided with a longitudinal slot 11, while the opposite sides of said slot are provided for a part of their length with racks of teeth 12—12 with which racks the teeth of the segmental pinion 10 are arranged to

mesh. This construction is more fully described and claimed in my co-pending application Serial No. 544,585, filed February 18, 1910. As will be seen, the continued rotation of the segmental pinion 10 in either direction will operate to reciprocate the slide 7 to and fro. In the preferred construction the spindle 9 has a sliding movement through the pinion 10 and projects to the rear thereof.

13 is a backing plate which is arranged to overlie the slide 7 at its rear, being held in place and against the same in any suitable manner, for example, by a yielding spring 14 mounted on the spindle 9 and held by a pin 15. The presence of the backing plate 13 serves in this instance to steady the spindle and to hold the pinion 10 in its proper position in the slot 11, so that it will at all times engage the teeth 12—12 on the opposite sides of the latter.

When the parts are in the position shown in the drawings, the bolt 8 will be seen to be projected. To retract the bolt 8 the operator inserts his finger into the recess 6 and lifts the outer end of the operating lever 5 approximately to the position indicated in dotted lines, Fig. 3, in which position the shank of the lever 2 becomes free of the recess in the face plate 1, in which it normally stands, and then swings the lever laterally so as to turn the spindle 9 and simultaneously the pinion 10, which latter by action on one or the other racks of teeth 12—12 retracts the slide 7. When the lever arm 5 has been swung to the opposite position from that indicated in Fig. 1, it may be released by the finger, whereupon it will be drawn back into the recessed part of the face plate 1, wherein the slide 7 is restrained from free movement, the bolt being then fully retracted and there retained until it is desired to again project the same.

The advantages of this construction are manifold. All of the parts may be very simply and easily produced. The very short leverage between the spindle 9 and the teeth 12 enables the operator to move the bolt with the greatest ease, even though the parts should bind. Again, the leverage is uniform from the beginning to the end of the swinging movement of the lever arm. Again, by reason of the fact that the lever arm 2 may be swung in either direction, it is possible to apply the flush bolt to the edge of a

door which, on one surface, may have the well known overhanging strike. Since the lever may be swung in either direction, it is obvious that the presence of said strike on one side or the other will not interfere with the swinging movement of the lever in a direction opposite thereto.

Any suitable means may be employed for guiding the slide 7. For example, the back of the face plate may be provided with lugs 16—16, while said slide 7 may be provided with guide slots 17—17 arranged to receive the ends of said lugs. The backing plate 13 may likewise have recesses to stand over the ends of said lugs, as shown in Fig. 3.

In Fig. 1 I have shown in dotted lines the lever 2 in a position midway between its two normal positions, as would appear when the lever is being swung to operate the bolt 8.

It will be particularly observed that one or more teeth on the segmental pinion engage with one or more of the teeth 12—12 at all times, hence when the bolt is projected and the lever released, the slide 7 will be restrained from free movement. This forms a very important incident in this construction. It is also apparent that the teeth 12 do not extend to the ends of the slots 11, but that the ends of said slots constitute clearance spaces for the rear or untoothed side of the pinion 10, hence said slide 7 may be given the reciprocating or piston movement in both directions by a continued rotation of the pinion 10 in either direction.

It will be observed that the connection between the operating lever and the reciprocating member is what may be termed a "universal" connection since it permits said lever to partake of two movements in different planes, viz., the outwardly swinging movement to release the lever and the laterally swinging movement to operate the reciprocating member. I shall therefore in the claims refer to this connection broadly as a "universal" connection, it being understood that in the drawings I have shown only the preferred form thereof.

By locating the bearing 4 slightly away from the extremity of the hub end of the lever, the spring 14 operates to draw the lever down into the recessed portion of the face plate.

What I claim is—

1. In a bolt, a reciprocating member having a slot therein, the opposite sides of said slot being toothed, a segmental pinion mounted to rotate in said slot, the teeth on said pinion being arranged to alternately mesh with the teeth on opposite sides of said slot, and means for rotating said pinion in either direction.

2. In a bolt, a reciprocating member having two oppositely faced racks, a segmental pinion mounted to rotate between said racks, one or more of the teeth on said pin-

ion always being in engagement with one or more of the teeth on said racks, and means for rotating said pinion to operate said reciprocating member.

3. In a bolt, a reciprocating member having two oppositely faced racks, a segmental pinion mounted to rotate between said racks, one or more of the teeth on said pinion always being in engagement with one or more of the teeth on said racks, means for rotating said pinion to operate said reciprocating member, and means for holding said operating means against movement to restrain the free movement of said reciprocating member.

4. In a bolt, a reciprocating member, an operating member, a universal connection between said operating member and said reciprocating member, said reciprocating member having a rack of teeth, a pinion co-acting therewith, said operating member controlling said pinion, and spring controlled means to hold the operating member in a certain definite position to restrain the reciprocating member against free movement.

5. In a flush bolt, a reciprocating member, two oppositely arranged racks of teeth, a segmental pinion co-acting with said teeth, a spindle passing through said pinion and having a sliding movement relatively thereto, an operating member connected to said spindle and arranged to turn the same, and means to hold said operating member against any turning movement when the latter is in one position.

6. In a flush bolt, a reciprocating member, two oppositely arranged racks of teeth, a segmental pinion co-acting with said teeth, a spindle passing through said pinion and having a sliding movement relatively thereto, an operating member connected to said spindle and arranged to turn the same, means to hold said operating member against any turning movement when the latter is in one position, said operating member comprising a lever, a pivot connection between said spindle and said lever near one end of the latter, whereby when said lever is moved in one direction it will move said spindle longitudinally and when moved in another direction it will rotate said spindle.

7. In a bolt, a movable bolt member, a spindle, means for operatively connecting said spindle to said bolt member to move the latter by the rotation of the former, means for rotating the spindle comprising an externally located handle operatively connected with said spindle, means for locking said handle against movement in one direction when said handle is in one position, means for yieldingly holding said handle in said locked position, said means permitting said handle to be manually withdrawn from

said locked position by a movement in one direction, said means also permitting said handle to be moved in another direction to rotate the spindle and to operate said movable bolt member.

5 8. In a bolt, a movable bolt member, a spindle, means for operatively connecting said spindle to said bolt member to move the latter by the rotation of the former, means
10 for rotating the spindle comprising an externally located handle operatively connected with said spindle, means for locking said handle against movement in one direction when said handle is in one position,
15 means for yieldingly holding said handle in

said locked position, said means permitting said handle to be manually withdrawn from said locked position by a movement in one direction, said means also permitting said handle to be moved in another direction to rotate the spindle and to operate said movable bolt member, the means of connection between said handle and said spindle including a pivot arranged near one end of said handle. 20

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