

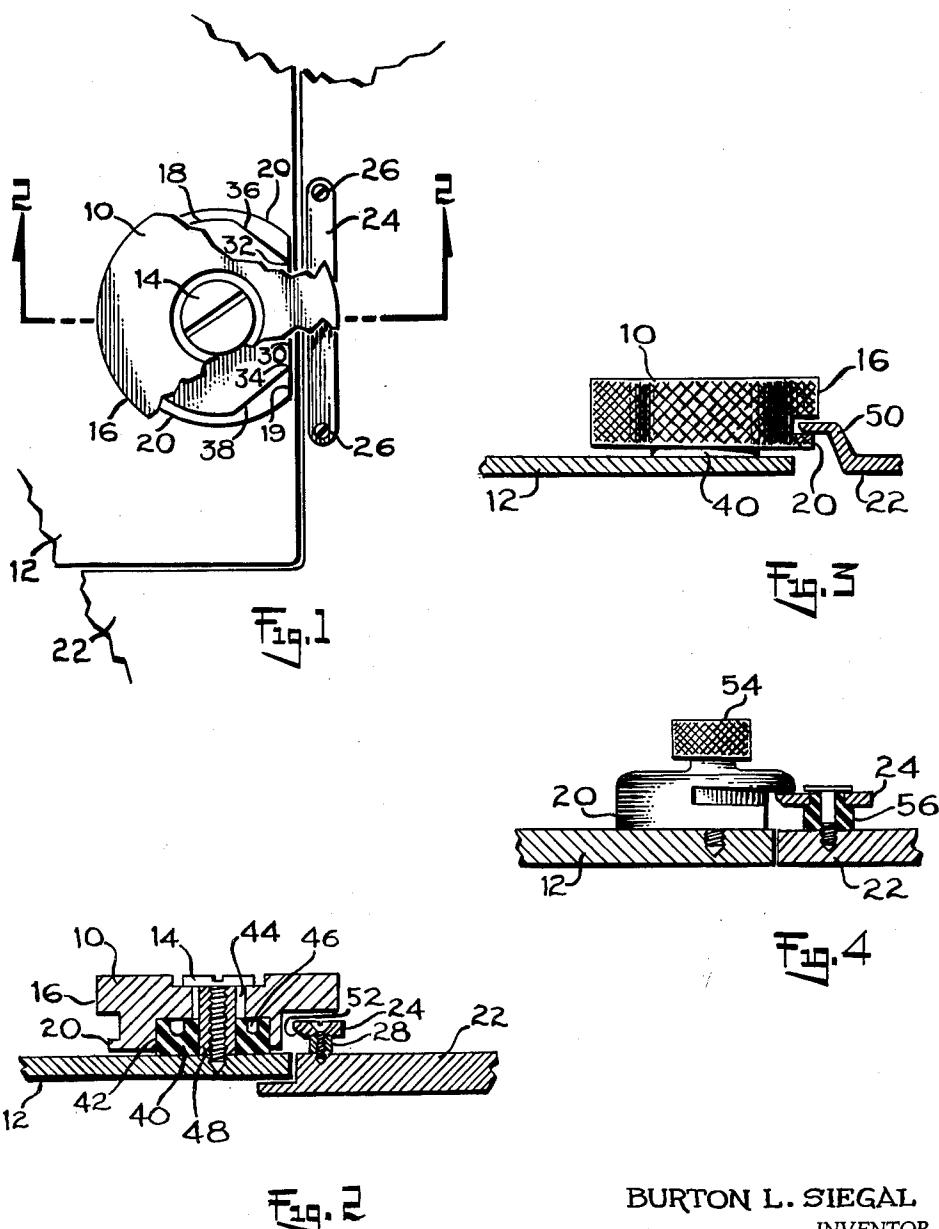
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LATCHING APPARATUS

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LATCHING APPARATUS

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My invention relates generally to latching apparatus and more particularly to latching apparatus which combines a knob capable of operating both the latch and the door to which the latch is fastened.

Latching apparatuses for securing drawer fronts, hinged doors, and similar appointments have heretofore been known and used to a great extent. These prior art devices are known to include variously pivoted tongues, sliding bolts, and sundry friction-type fasteners; and representative latches of each type have been adapted to provide a number of desirable features.

It is a general object of my present invention to provide a novel latching apparatus which is readily adaptable for use in a wide variety of circumstances and which is capable of combining desirable features to a degree heretofore unknown.

Another object of my invention is the provision of latching apparatus which is positively acting into its latched and unlatched positions and which incorporates a knob for operating both the latch and the door to which the latch is fastened.

Yet another object of my invention is the provision of latching apparatus which is reversibly rotatable into its latched and unlatched positions.

These and other objects are realized in accordance with a specific illustrative embodiment of the invention wherein a knob body rotatably mounted to a door engages a locking bar affixed to the doorframe.

In the drawings:

Figure 1 is a partially cutaway top view of latching apparatus in accordance with my invention;

Figure 2 is a sectional side view of the embodiment shown in Figure 1;

Figure 3 is a side view in partial section of another embodiment of my invention which is particularly suitable in cases requiring facility in use of the knob; and

Figure 4 is a side view in partial section of yet another embodiment of my invention which is particularly suitable where a small diameter knob is desired.

Referring now to the drawings, I show in Figure 1 a knob body 10 rotatably mounted to a hinged door 12 by some suitable means such as screw 14. Knob body 10 is comprised of a graspable hand piece or knob 16, a cam 18, and a segmented disc 20, all of which may be integrated into a single part or unit as by casting or molding. I locate knob body 10 in such a position on door 12 that I am enabled of both operating door 12 by means of the hand piece and latching door 12 to its surrounding doorframe or jamb 22 accordingly as will be brought out hereinbelow. Hand piece 16 may be provided with a coarsened, scribed or knurled peripheral surface for convenience in use or for ornamentation.

To doorframe 22 I rigidly fasten a locking bar 24 as by screws 26 or in some other suitable manner, locking bar 24 being advantageously raised above doorframe 22 by tubular spacers 28 in order to accommodate disc 20 between the locking bar and the doorframe.

Thus, whenever the flat side 30 of cam 18 which coin-

cides with the secant side 19 of the segmented disc 20 takes the position shown in Figure 1, door 12 may be drawn open. Correspondingly, this position will herein-after be referred to as the unlatched position, although it is realized that door 12 may also be pushed shut when disc 20 is in this position.

Contrariwise, whenever disc 20 is rotated out of the unlatched position as by rotating hand piece 16, either the toe 32 or the toe 34 of cam 18 will interfere with locking bar 24, that is, locking bar 24 will oppose toe 32 or toe 34. Because of the method of resiliently mounting knob body 10, which method will be described hereinbelow, an increased application of torque can result in an eccentric rotation of knob body 10; and eventually flat side 36 or flat side 38 of cam 18 will correspond with locking bar 24. For the purpose of my invention, these two subsequent positions are identical and will be herein-after referred to as the latched position because, in either of such positions, bar 24 is constrained between disc 20 and hand piece 16 except for the clearance which is allowed bar 24 between disc 20 and hand piece 16. Figure 3 illustrate this latched position.

It follows then that after disc 20 has been rotated from the unlatched to the latched position in order to secure door 12, a subsequent reverse rotation can bring disc 20 back to the unlatched position in order to permit opening the door.

Eccentric rotatability of knob body 10 is implemented by the provision of a resilient member 40 which is received into the rearwardly opening recess 42 of knob body 10. By resisting radial compression, member 40 provides a centering action on knob body 10. By being resilient, member 40 is permissive of eccentric rotation of knob body 10 within the limits defined by core 44, core 44 being of sufficient diameter to allow passage of either toe 32 or toe 34 past bar 24. Accordingly, the centering action of member 40 combines with the opposable nature of bar 24 and cam 18 to provide my latching apparatus with a positive detent action.

Resilient member 40 is shown as a molded rubber piece having an annular compression recess 46; and although this construction is preferred, member 40 may be a solid rubber washer or O ring, a clock spring free at both ends, or some similar element. When resilient member 40 is a rubber element, it may be slightly compressed axially in order to prevent chattering of door 12 in the latched position and of knob body 10. Furthermore, a bushing 48 may be provided to facilitate any rotations of member 40 about screw 14 and to regulate any axial compression of member 40.

Segmented disc 20 and cam 18 may cooperate with an outwardly-formed indentation 50 of doorframe 22 as well as with an affixed locking bar 24, accordingly as shown in Figure 3. In order to lead segmented disc 20 into the latched position, locking bar 24 or outwardly-formed indentation 50 may advantageously be provided with a chamfered surface 52. As will be apparent to those skilled in the mechanical arts, chamfering disc 20 has equivalents in chamfering either bar 24 or indentation 50. Provision of such a chamfered surface is particularly desirable when a compressible gasket, not shown, is interposed between door 12 and doorframe 22.

Cam 18 is illustrated as having three flat sides 30, 36, and 38 for purposes described hereinabove. However, two flat sides could be made to serve, one associated with each in the latched and the unlatched position. Furthermore, a plurality of flat sides associated alternately with latched and unlatched positions could also be employed providing that disc 20 is appropriately segmented to coincide with each of the unlatched positions. The flat sides 30, 36, and 38 are shown separated by approximately

sixty degrees; but this need not be the case. Other spacing angles, e.g. ninety degrees, may also be used.

Other equivalent constructions may be employed to vary additional details of my invention. For example, in cases where frequent operation of door 12 is anticipated, I facilitate use of hand piece 16 by making the heel of cam 18 and the periphery of disc 23 coextensive with hand piece 16 and by knurling the surfaces thereof, as is shown in Figure 3. Hand piece 16, for the sake of convenience, may also be reduced to a relatively small diameter hand piece 54, as shown in Figure 4; and where clearance of the knob body 10 is an important consideration, hand piece 16 may be made thin.

In order to provide purchase for employ in operating door 12, knob body 10 is preferably raised slightly from door 12 as by resilient member 40 cooperating with bushing 48 or by shims, not shown. Advantageously, knob body 10 may be made of metal or, where extensive handling and/or corrosion is a factor, of a plastic material such as nylon. However, knob body 10 need not be recessed to accept resilient member 40. For the purposes of my invention, the obviously equivalent scheme of providing resilient mounting posts 56 in order to render locking bar 24 reciprocable rather than having knob body 10 eccentrically rotatable may be substituted.

Furthermore, when only two flat sides are provided on cam 18, resilient member 40 need not surround screw 14 but may take the form of a circular section. In similar manner, recess 42 may be forwardly-opening with member 40 restrained by a washer placed beneath the head of screw 14.

While my present invention, as to its features and details of construction, has been described in specific terms referring to the illustrative embodiments shown, I have no desire to be limited thereby. Rather, I intend to cover the invention broadly within the spirit and scope of the following claims.

I claim:

1. Apparatus for latching a door to a doorframe comprising: cam means including a plurality of flat sides for locating said cam means in at least one latched and at least one unlatched position; a graspable knob fastened to one surface of said cam means; a segmented disc fastened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in an unlatched position; a locking bar operably engageable with said cam means and constrainable between said knob and said disc in a latched position; and a resilient member adapted to facilitate relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

2. Apparatus for latching a door to a doorframe comprising: cam means including a plurality of flat sides for locating said cam means in at least one latched and at least one unlatched position; a graspable knob fastened to one surface of said cam means; a segmented disc fastened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in an unlatched position; a locking bar operably engageable with said cam means and constrainable between said knob and said disc in a latched position; and a resilient member arranged with said cam means for facilitating relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

3. Apparatus for latching a door to a doorframe comprising: cam means including a plurality of flat sides for locating said cam means in at least one latched and at least one unlatched position; a graspable knob fastened to one surface of said cam means; a segmented disc fas-

tened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in an unlatched position; a locking bar operably engageable with said cam means and constrainable between said knob and said disc in a latched position; and a resilient member arranged with said locking bar for facilitating relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

4. Apparatus for latching a door to a doorframe comprising: cam means including a plurality of flat sides for locating said cam means in a first latched position, a second latched position, and an unlatched position disposed between the first and the second latched positions; a graspable knob fastened to one surface of said cam means; a segmented disc fastened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in the unlatched position; a locking bar operably engageable with said cam means and constrainable between said knob and said disc in the first and the second latched positions; and a resilient member arranged with said cam means for facilitating relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

5. Apparatus for latching a door to a doorframe comprising: cam means rotatably affixed to the door, including a plurality of flat sides for locating said cam means in a first latched position, a second latched position, and an unlatched position disposed between the first and the second latched positions; a graspable knob fastened to one surface of said cam means; a segmented disc fastened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in the unlatched position; a locking bar affixed to the doorframe, operably engageable with said cam means and constrainable between said knob and said disc in the first and the second latched positions; and a resilient member arranged with said cam means for facilitating relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

6. Apparatus for latching a door to a doorframe comprising: cam means rotatably affixed to the door, including a plurality of flat sides for locating said cam means in a first latched position, a second latched position, and an unlatched position disposed between the first and the second latched positions; a graspable knob fastened to one surface of said cam means for operating said door and for rotating said cam means; a segmented disc fastened to the opposite surface of said cam means, including a secant side which forms a common surface with a flat side of said cam means in order to allow opening and closing of the door in the unlatched position; a locking bar including a chamfered plate affixed to the doorframe, operably engageable with said cam means and constrainable between said knob and said disc in the first and the second latched positions; and a resilient member arranged with said cam means for facilitating relative lateral displacement between said cam means and said locking bar to permit the passage of said cam means from one to another of the latched and unlatched positions.

7. A latching device for securing a door to a doorframe including: a knob rotatable into a latched and an unlatched position; a locking bar opposing a portion of said knob for arresting motion of the door in one direction; a segmented disc arranged with said knob for arresting motion of the door in the opposite direction, in-

cluding a secant side for permitting the door to be opened and closed; a cam secured between said knob and said disc and adapted to be engageable with said locking bar for locating said knob in the latched and the unlatched positions; and a resilient member arranged with said cam to permit eccentric rotatability of said cam from one to another of the positions.

8. A latching device for securing a door to a doorframe including: a knob reversibly rotatable into a latched and an unlatched position; a locking bar opposing a portion of said knob for arresting motion of the door in one direction; a segmented disc arranged with said knob for arresting motion of the door in the opposite direction, including a secant side for permitting the door to be opened and closed; a cam secured between said knob and said disc, including a first and a second flat side adapted to be engageable with said locking bar for locating said knob in, respectively, the latched and the unlatched positions; and a resilient member arranged with said cam to permit eccentric rotatability of said cam from one to another of the positions.

9. A latching device for securing a door to a doorframe including: a knob reversibly rotatable into a latched and an unlatched position; a locking bar opposing a portion of said knob for arresting motion of the door in one direction; a segmented disc arranged with said knob for arresting motion of the door in the opposite direction, including a secant side for permitting the door to be opened and closed; a cam between said knob and said disc, said cam including a first and a second flat side adapted to be engageable with said locking bar for locating said knob in, respectively, the latched and the unlatched positions; and a resilient, rubber member of

hollow, cylindrical shape arranged with said cam and being deformable so as to permit eccentric rotatability of said cam from one to another of the positions.

10. A knob latch of the class wherein a locking bar fastened to a doorframe is constrainable between two co-operatively positionable elements movably fastened to a door, comprising: a knob body including a hand piece, a cam, and a segmented disc fastened together in series and rotatably mounted to the door, and a resilient member received into a recessed portion of said knob body so as to allow eccentric rotation thereof and so as to provide centering thereof in order to engage the cam of said knob body with the locking bar.

11. A knob latch of the class wherein a locking bar fastened to a doorframe is constrainable between two co-operatively positionable elements movably fastened to a door, comprising: a knob body including a knurled hand piece, a cam, and a segmented disc fastened together in series and rotatably mounted to the door whereby the locking bar is constrainable between the knurled hand piece and the segmented disc; and a resilient member received into a recessed portion of said knob body so as to allow eccentric rotation thereof and so as to provide centering thereof in order to engage the cam of said knob body with the locking bar.

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