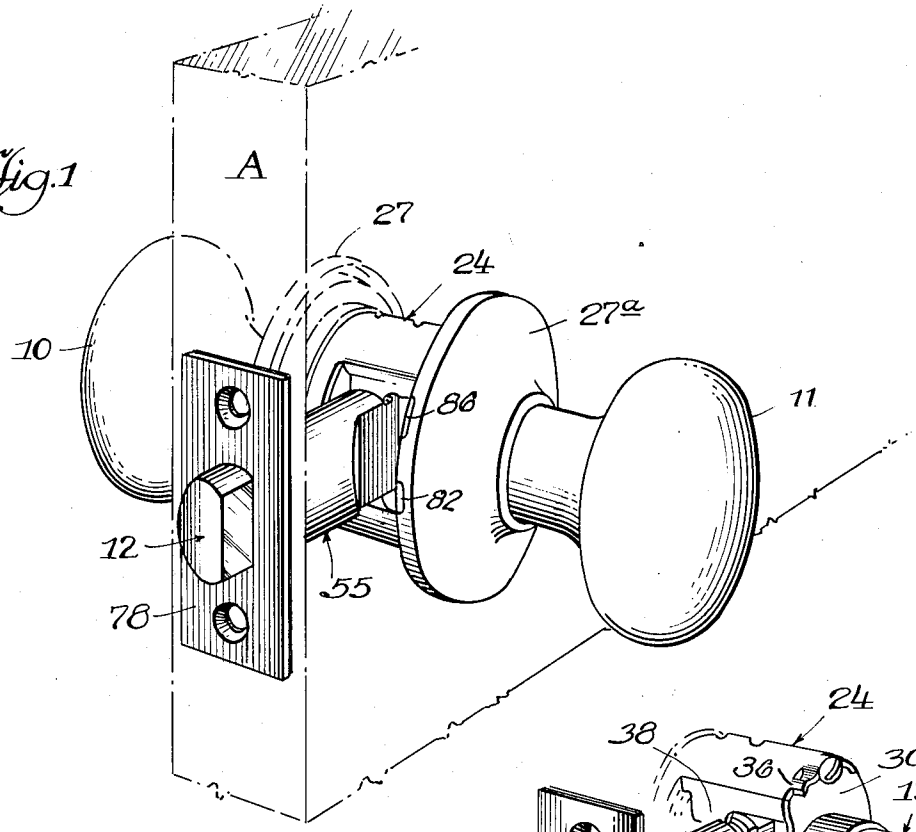
Feb. 7, 1956 E. W. NORTH 2,733,945

DOOR LATCH

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Fig. 1



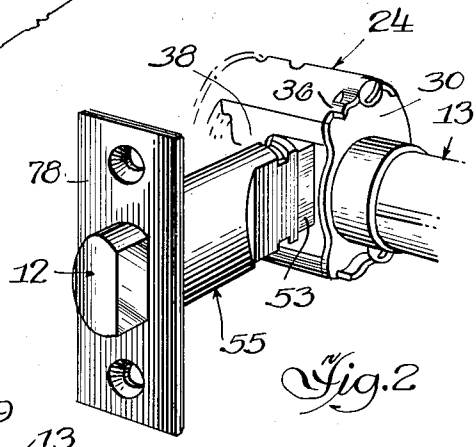


Fig. 2

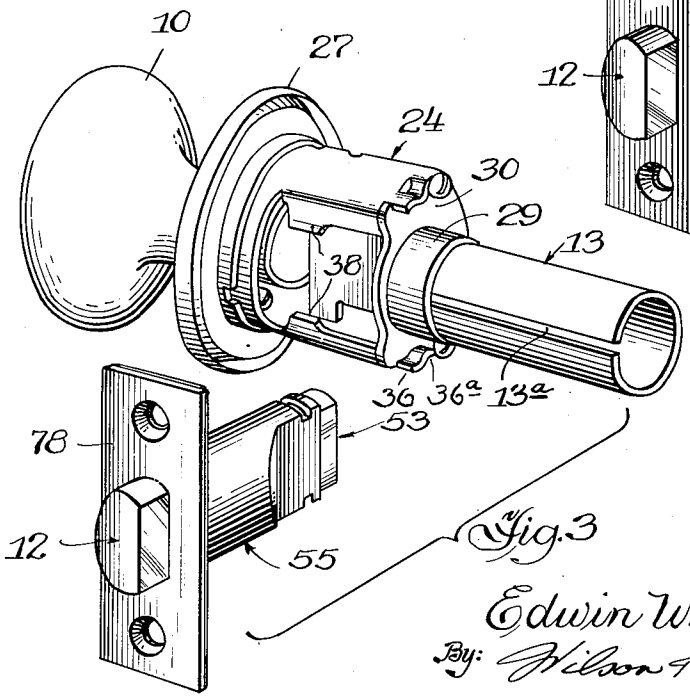


Fig. 3

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DOOR LATCH

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Fig. 3a

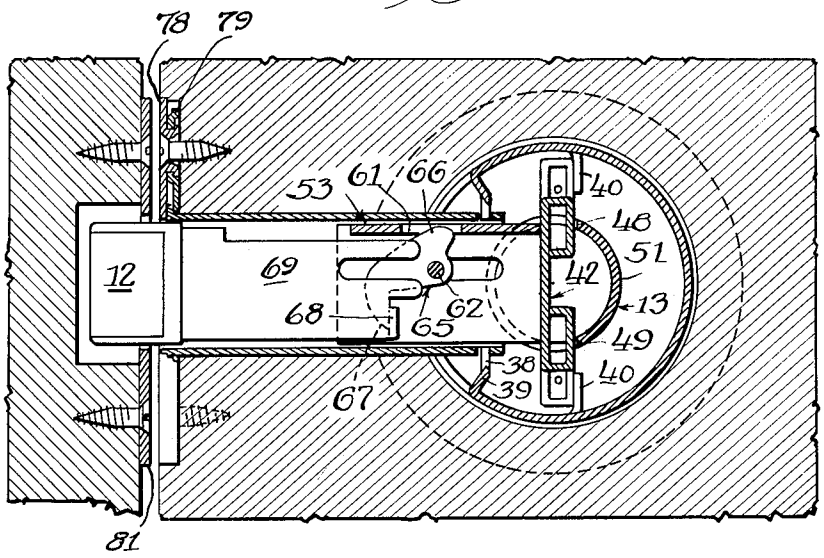


Fig. 4

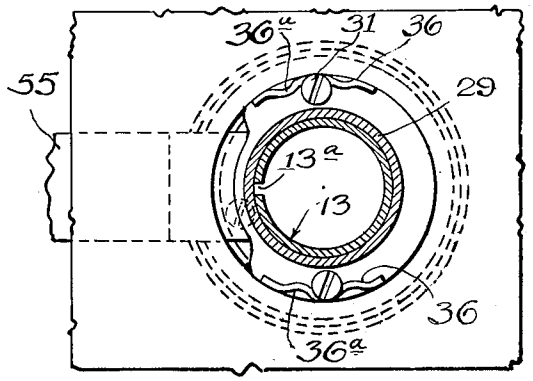


Fig. 5

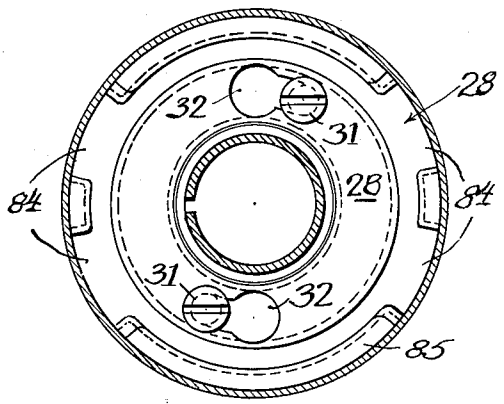
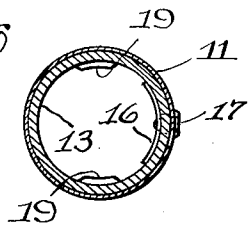


Fig. 6



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DOOR LATCH

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Fig. 1a

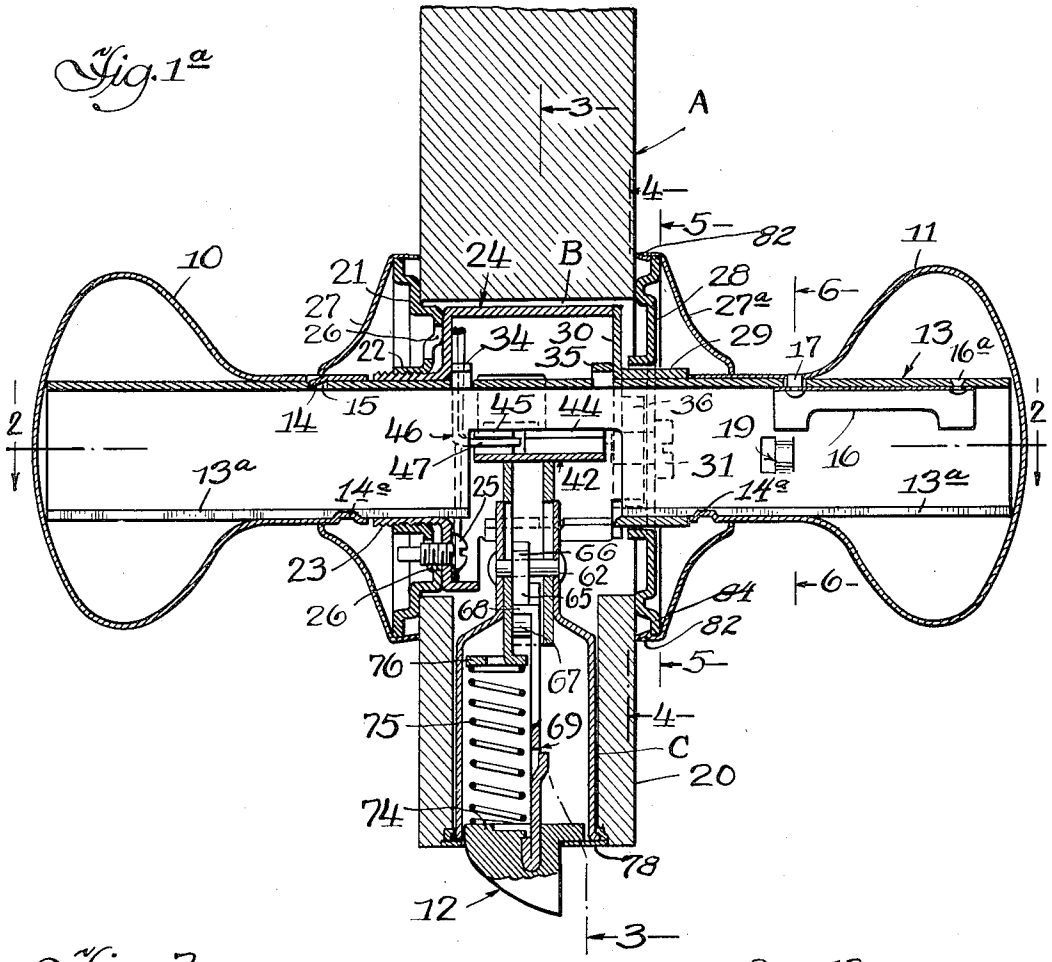


Fig. 7

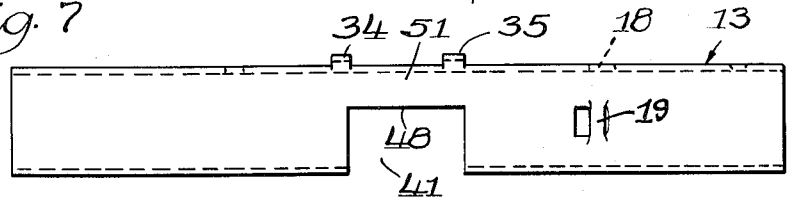


Fig. 8

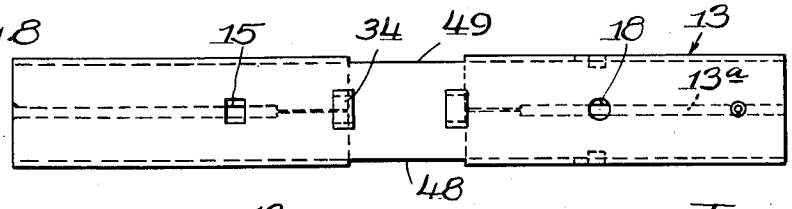
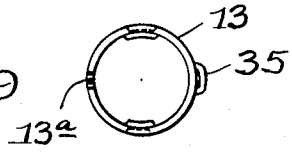


Fig. 9



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DOOR LATCH

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Fig. 2a

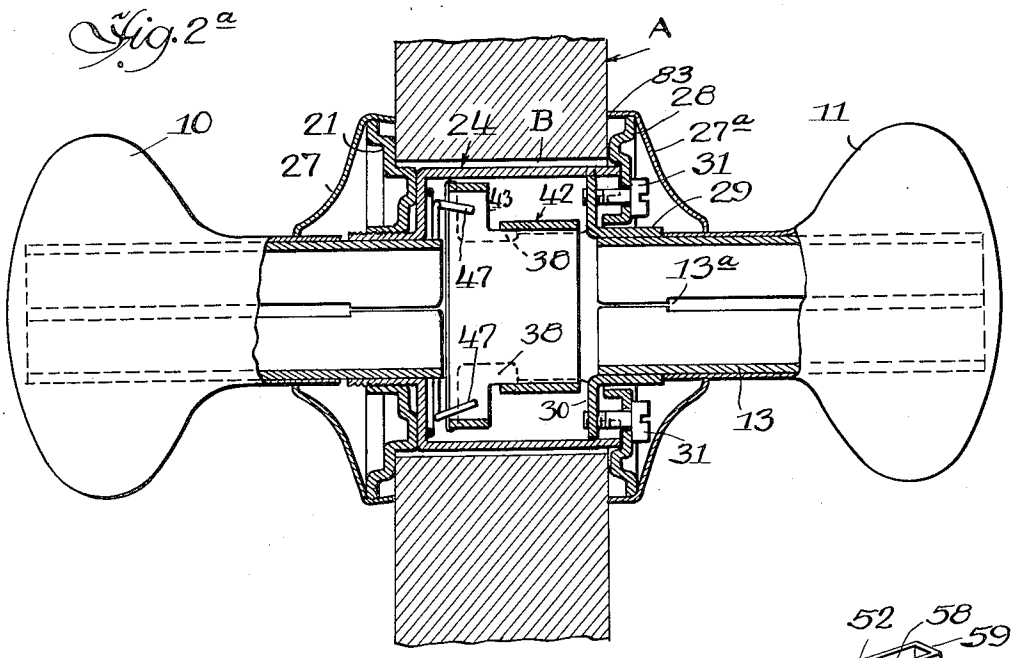


Fig. 12

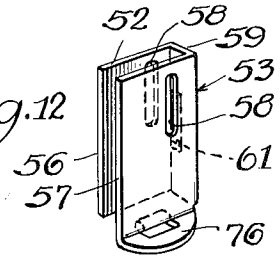


Fig. 10

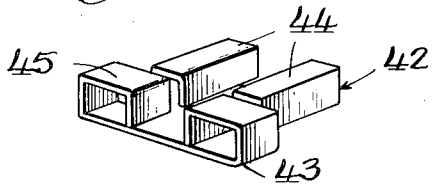
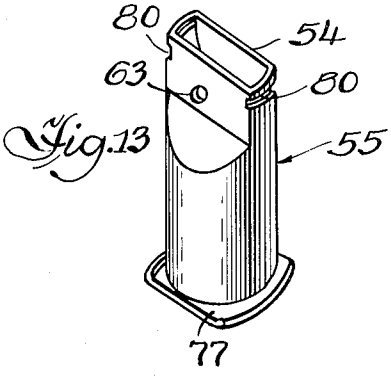


Fig. 13



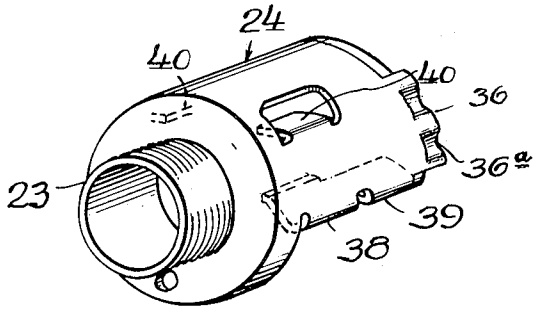


Fig. 11

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DOOR LATCH

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Application July 25, 1951, Serial No. 238,465

6 Claims. (Cl. 292—169)

The present invention relates to so-called builders' locks and more particularly to a novel latch construction for permitting access through a passageway and into or out of a room or enclosure by a mere turning of the knob at either side of the door or closure.

Among the objects of the present invention is the provision of a novel latch construction and a novel means for and manner of actuating the latching bolt. In the disclosed embodiment, there is provided a single, integral tubular member connecting the knobs at the opposite sides of the door or closure, and this tubular members is provided with integral camming means or mechanism for actuating a separate pusher plate whereby to retract a latch bolt.

Another important feature of the present invention is the novel latch assembly and its construction and arrangement whereby to eliminate any coupling or interconnection between the means for actuating the latch slide and the latch unit. This greatly facilitates installation of the component parts of the latch assembly in the door or closure.

A further object of the present invention is the provision of a novel latch bolt assembly in which a thrust or pressure applied against the actuating mechanism causes retraction of the bolt. In the novel embodiment of the present invention, the thrust or push imparted to the slide of the latch bolt assembly and the manner of connecting this slide through a rocker member or camming means to the latch bolt is such as to require movement of this slide through but a fraction of the throw or movement of the latch.

The present invention further comprehends the provision of a novel latch construction and assembly for a door or closure for a passageway, and a novel means and manner of mounting this assembly in the door or closure. As the latch bolt assembly and the tube assembly are arranged and inserted into their respective openings in the door or closure as separate units which are united upon insertion into the resulting latch assembly, considerable saving in time, labor and expense is effected by the present novel construction and manner of installation.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawings, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawings:

Figure 1 is a view in perspective of the novel latch assembly shown as mounted in the side rail of a door.

Fig. 2 is a fragmentary view in perspective showing the manner of assembling the latch bolt unit inserted in the edge of the door and the center housing inserted into an opening extending through the door.

Fig. 3 is an exploded or disassembled view of the novel latch assembly but with the inner knob, its escutcheon plate and the clamp plate removed.

Fig. 1ª is a view in horizontal cross section taken longitudinally through the latch assembly and showing the manner of mounting it in a door or other closure.

Fig. 2ª is a view in vertical cross section taken in a plane represented by the line 2—2 of Fig. 1ª, and viewed in the direction of the arrows.

Figs. 3ª, 4, 5 and 6 are vertical cross sectional views taken in planes represented by the lines 3—3, 4—4, 5—5 and 6—6, respectively, of Fig. 1ª and viewed in the direction of the arrows.

Fig. 7 is a top plan view of the center cam tube.

Fig. 8 is a view in side or rear elevation of the center cam tube.

Fig. 9 is a view in end elevation of the center cam tube.

Fig. 10 is a view in perspective of the pusher plate for actuating the lock mechanism for releasing the latch bolt.

Fig. 11 is a perspective view of the center housing.

Fig. 12 is a view in perspective of the pusher member.

Fig. 13 is a perspective view of the bolt housing.

Referring more particularly to the disclosure in the drawings and to the novel illustrative embodiment therein shown, the present novel latch assembly is primarily adapted for use in a door or closure allowing free access or passage between rooms or into and out of a room or other enclosure. Thus by turning either of the knobs **10** or **11** at the opposite sides of the door or closure, a latch bolt **12** may be readily retracted and the door or closure opened.

As shown more clearly in Figs. 1ª, 2ª and 3ª, the knob **10** is clinched or attached to one end of a slotted, centrally located cam tube **13** by means of an interlocking projection **14** seating in a recess **15** and a projection **14ª** seating in the longitudinal slot **13ª** of the tube. The knob **11** is detachably mounted onto the hollow cam tube **13** by means of a snap spring **16** (Figs. 1ª, 2ª and 6) positioned within the cam tube and anchored at one end to the interior of the tube by a rivet or other securing means **16ª** and at its other end provided with a projection **17** adapted to project into and through aligned openings or recesses **18** in the cam tube **13** and knob **11**. The tube **13** is also provided with spaced internal projections or stops **19** disposed at the opposite sides of the spring for preventing lateral movement thereof.

At one of the sides of the rail **20** of a door or other closure A in which the latch assembly is mounted, there is provided a clamp plate **21** having an internally threaded collar **22** permitting axial adjustment of the threaded shank **23** of a housing **24**, this clamp plate abutting or engaging one side or face of the door rail **20** when the lock or latch assembly is in adjusted position in an opening B provided for its reception in the door. After this clamp plate **21** is rotated or moved to its set or adjusted position, a screw **25** carried in the housing **24** enters an opening or slot **26** in the clamp plate and holds this plate against rotation and prevents it from backing off the threaded shank **23**. An escutcheon **27** covers this clamp plate.

At the opposite side of the door A there is provided a clamp plate **28** slidable over the collar **29** of a housing cover **30** and this clamp plate is mounted and held in adjusted position against the face of the door rail by machine screws **31**. These screws are threaded into the cover plate and the head and shank thereof are adapted to be received in oppositely disposed keyhole slots **32** in the clamp plate **28** as more particularly shown in Figs. 2ª and 5 of the drawings. When this clamp plate **28** is mounted over the heads of these screws **31** and the clamp plate is rotated so that the shanks of these screws are disposed in the narrow or reduced end of the slots **32** and

tightened, the clamp plates 21 and 28 and the housing 24 with its cover 30 are locked or retained in clamped position within the opening B in the door rail.

The center cam tube 13 is an integral split tubular member that projects completely through the latch assembly and is provided with spaced, lateral or radial projections 34 and 35 (Figs. 7, 8 and 9) against which the end wall of the housing 24 and its cover 30 abut as shown in Fig. 1a. This housing is provided with oppositely spaced and longitudinally extending projections or tongues 36 which project through similarly spaced peripheral slots in the periphery of the housing cover 30 whereby to prevent relative rotation therebetween. This is shown clearly in Fig. 4 and which also shows the contour of this cover with a portion or segment thereof cut away at its forward edge. To lock this cover 30 onto the housing, the projections or tongues 36 are undulated or crimped at 36a with the undulations locking or anchoring the cover in place.

The center housing 24 is cut away or open at its outer or forward portion (see Figs. 1a, 3a and 11) and thereat provided with a pair of inwardly extending or inturned tongues or flanges 39 each provided with an inturned projection 38, and a pair of inturned tongues or flanges 40, the functions of which will be later more fully explained. Mounted within the housing 24 and in the cutout 41 of the center cam tube is a pusher plate 42 (see Figs. 1a, 3a, 7 and 10). This pusher plate is of substantially channel shape and provided with a widened or expanded portion 43 at one end. The body of this pusher plate and its widened end portion 43 have their opposite sides bent inwardly to provide spaced, inwardly projecting or inturned and returned flanges 44 and 45 (Fig. 10). A coil spring 46 within housing 24 has its inturned ends 47 projecting inwardly into the channels or spaces formed by the end portion 43 and its inturned flanges 45. By so locating the ends 47 of the coil spring 46, this coil spring carries and controls the movement of the pusher plate 42. Upon release of the knob being turned, the ends 47 of the coil spring 46 spring-bias the pusher plate or follower to its normal or inoperative position with the camming edges or surfaces 48 and 49 moved to the position shown in Fig. 3a, and upon rocking of this floating pusher plate or follower by these camming edges upon turning a knob, either inturned tongue or flange 40 provides a fulcrum on the interior of the housing 24 for such rocking movement.

As shown more clearly in Fig. 3a, the edges or cam surfaces 48 and 49 of the central arcuate portion 51 of the cam tube 13 engage or abut against the flanges 44 and 45 so that when the tube is rotated upon turning of a knob 10 or 11, either edge or cam surface 48 or 49 engages against the flanges 44 and 45 at one or the other side of the pusher plate 42. This pusher plate 42 is held in contact with the inner end 52 of a pusher or slide member 53 slidably mounted in a reduced neck 54 of a bolt housing 55, and is adapted to be depressed or forced inwardly by turning movement of either knob which rotates the tubular cam member 13, and the latter in turn through its cam surfaces 48 and 49 pivots or rocks the pusher plate 42 which presses against the pusher 53 and applies a thrust to force this pusher member outwardly through its connecting mechanism to retract the latch bolt 12.

To retract the latch bolt 12 by depressing or pushing against the pusher or slide member 53, the latter is channelled with the sides 56 and 57 provided with oppositely disposed elongated slots 58 and the connecting wall 59 provided with an elongated slot 61 (see Figs. 1a, 3a and 12). An pin 62 having its ends mounted in openings 63 in the bolt housing 55 (Fig. 13), carries a bolt cam or rocker arm 65 having an end or shoe 66 projecting into the slot 61, and its other end 67 seating forwardly of and against a flange or projection 68 on the inner end of a bolt bracket 69. This bolt bracket is staked and coined

or otherwise affixed (Fig. 1a) to the inner end 74 of the latch bolt 12. A compression spring 75 seating at one end against inner end or face 74 of the latch bolt 12 and at its other end seating or abutting against a seat or ledge 76 on the forward or outer end of the pusher slide 53, spring-biases the latch bolt 12 to extended, locking or latching position.

In the operation, rotation of a knob 10 or 11 applies a thrust or pressure to the pusher or slide member 53, through rotation of the cam surfaces or edges 48 or 49 (Figs. 3a, 7 and 8) of the tube 13 and their engagement with the pivotally mounted pusher plate 42, whereupon movement of the material defining the upper edge of the slot 61 in the member 53, carries along the end or shoe 66 of the bolt cam or rocker arm 65, thereby causing the other end 67 of this cam or rocker arm to engage the flange or projection 68 on the inner end of the bolt bracket 69 whereby to retract the latch bolt 12. Immediately upon release of the knob that has been turned, the spring 46 returns the pusher plate 42 to its normal or inoperative position and the compression spring 75 returns the latching bolt 12 to its latching or extended position. In operation, the distance traversed by the pusher or slide member 53 in retracting the bolt is approximately one-half the distance traversed by the latch bolt, which permits a highly compact assembly.

As shown in Figs. 1a, 3a and 13, the open and enlarged outer end of the latch bolt housing 55 is flanged at 77 and this flanged end is clamped between an outer latch face plate 78 having an opening through which the latch bolt projects and a back plate 79 which are preferably clinched together and the assembly retained in position by screws or the like. A strike plate 81 is shown as mounted on the door jamb by screws or other securing means.

In the assembly of the parts in the door A (see Figs. 1, 2 and 3), the cam tube assembly including the knob 10, the center cam tube 13, the housing 24, pusher plate 42 and associated parts on the clinched side of the assembly (the left side as viewed in Figs. 1 and 1a), but excluding the knob 11, clamp plate 28 and escutcheon 27a, are mounted in the transverse opening B of the door as an assembled unit. This assembly is shown in Fig. 3 in the manner in which it is inserted. Also the latch bolt assembly including the housing 55 with its latch face plate 78 and back plate 79, the pusher or slide member 53 and associated parts (Figs. 1a, 12 and 13), are mounted as an assembled unit in the opening or bore C provided therefor in the edge of the door. When installing the latch construction, these two assembled units are partially inserted into their respective openings with the latch bolt unit aligned with the opening in the central housing 24 and with the central open part 41 of the cam tube assembly. When in this position and before the cam tube assembly is inserted to the limit of its position, the pusher or slide member 53 and the inner end of the reduced neck 54 of the bolt housing 55, are free to enter the opening in the housing 24 (between the inturned flanges 39) and in the opening 41 in the cam tube. When the latch bolt assembly is then forced into the ultimate position it occupies in its door opening, further longitudinal movement of the cam tube assembly toward its operative position causes the projections 38 on the flanges 39 (Figs. 1, 2 and 3) on the housing 24 to enter the slots 80 in the reduced end 54 of the bolt housing 55 whereby these units are held in assembled relation. The flanges 40 on the housing 24 each provide a fulcrum by which the pusher plate 42 is adapted to be pivoted or rocked by the cam surfaces or edges 48 and 49 of the cam tube 13 (Fig. 3a).

After the cam tube assembly or unit and the latch bolt assembly or unit are joined or assembled as above described, the face plate 78 is attached by screws or other securing means after which the clamp plate 28, escutcheon 27a and knob 11 on the inner or snap-on side of the

novel lock construction are assembled, the knob **11** being aligned by its projection **14a** in the slot **13a**. To facilitate assembly of the parts, the escutcheon **27a** unlike the escutcheon **27** which is clinched onto its clamp plate **21**, is detachably anchored onto its clamp plate **28** by a pair of oppositely disposed snaps or detents **82** provided on its inturned flange **83** and adapted to interlock with and snap over circumferentially spaced and outwardly or forwardly disposed arcuate projections **84** on the peripheral flange **85** of the clamp plate (Figs. 1a, 2a and 5). Preferably, the flange **83** of the escutcheon **27a** is provided with a slot or notch **86** (Fig. 1) to permit the insertion therein of a relatively sharp tool or instrument to pry off the escutcheon and allow for its ready removal after the knob **11** has been removed upon depressing the projection **17** of the spring **16**.

Having thus disclosed the invention, I claim:

1. In a door latch assembly adapted to be mounted in a door opening for retracting a latch bolt, a latch-operating unit comprising a cylindrical housing having an opening in its forward wall and spaced projections in the housing, a single continuous tube rotatably mounted in the opposite ends of the housing and extending through the housing and door opening, a knob secured to each of the opposite ends of the tube, said tube being notched intermediate its ends and adjacent the opening in the housing to provide an arcuate section having longitudinally extending and laterally spaced camming edges located within the housing, a pusher plate conformably received in the notched portion of the tube and free to pivot within said housing about one of said projections when one side of the plate is engaged and rocked by a camming edge upon rotation of the tube in either direction, spring means carrying the pusher plate and controlling its movement, and a slide member abutting the other side of the pusher plate for retracting the latch bolt upon the application of pressure to the slide member by rocking of the pusher plate.

2. In a door latch assembly including a latch bolt unit and a latch-operating unit, said latch-operating unit comprising a housing conformably received in an opening in the door and provided with an opening in its forward wall and spaced inwardly projecting tongues, a single continuous tubular member projecting completely through and rotatable in the housing and door and having a knob secured to each of its opposite ends, said tubular member being cut away intermediate its length where it projects through the housing to provide spaced camming edges inwardly of the opening in the housing, and a spring-mounted rocking member freely pivoted within the cut-away portion of said tubular member between the camming edges and the opening in the housing and adapted to be rocked about either of said tongues as a fulcrum by the camming edges engaging and tilting said member as the tubular member is rotated by the turning of a knob for retracting the latch bolt.

3. In a door latch assembly including a latch bolt unit installed in an opening in the edge of the door and a latch-operating unit mounted in a communicating opening, said latch operating unit comprising a housing and a tube projecting through the housing and the opening in the door communicating with the first mentioned opening and extending at an angle with respect thereto, a knob mounted on each end of the tube for turning the tube from either side of the door, spaced camming edges on said tube, spaced projections in the housing, a spring-mounted floating member freely pivoted in the housing and rocked about either of said projections in the housing by engagement of its rear surface by a camming edge as either knob is rotated and in turn rotates the tube, and a slide member having a free end projecting through an opening in the housing and engaged by the front surface of said floating member and pushed by pivotal movement of said floating member for retracting and thereby releasing the latch bolt.

4. In a latch construction for permitting free passage through a door or other closure of a passageway including a latch bolt spring-biased to latching position, mechanism for retracting said latch bolt including a hollow housing mounted in an opening extending through the closure, an integral tube rotatably mounted in the housing and extending therethrough to the opposite sides of the closure, a knob affixed to each end of the tube, means for retracting the latch bolt and having a part projecting into the housing through an opening in a wall thereof, a floating member in said housing having one side thereof in engagement with the projecting part of the retracting means, a spring mounting for said floating member, spaced projections in said housing each providing a fulcrum about which the floating member is adapted to be rocked, and cam surfaces on said tube for engaging the opposite side of said floating member and rocking said member about one of said projections and causing its first mentioned side to press against the projecting part of said retracting means to retract the latch bolt and permit opening of the closure.

5. In a latch construction for a door or other closure provided with a latch bolt, a latch operating unit comprising a stationary housing adapted to be mounted within an opening in the closure, a single tubular member rotatably mounted in the housing and with its ends projecting therethrough to the opposite sides of the closure, a knob mounted on each end of the tubular member to rotate said member from either side of the closure, camming means on the tubular member within the housing, a pusher projecting into the housing for retracting the latch bolt upon the application of pressure to the pusher, a floating pusher plate in said housing located between said camming means and said pusher and rocked by said camming means when either knob and the tubular member are rotated for acuating the pusher and retracting the latch bolt, a pair of projections in said housing either of which provides a fulcrum about which the pusher plate pivots when the tubular member is rotated, and means for spring-mounting said pusher plate and spring-biasing the latter to its inoperative position upon release of the knob.

6. In a door latch assembly including a latch bolt and a latch bolt operating unit, said unit comprising a stationary cylindrical housing conformably received in the opening, a single continuous tubular member projecting completely through the housing and door and journalled in said housing, a knob secured to each of the opposite ends of the tubular member, said tubular member being journalled in said housing and cut away intermediate its length where its projects through the housing to provide thereat laterally spaced and longitudinally extending camming surfaces, a pusher plate loosely mounted within and located substantially diametrically of the housing and in the cut-away portion of the tubular member to bridge the camming surfaces, a coil spring anchored intermediate its ends in said housing, and anchoring means on said pusher plate for receiving and anchoring the opposite ends of the coil spring for spring-biasing the pusher plate and the camming surfaces to inoperative position upon release of the knobs, said pusher plate being engaged and tilted against the tension of said spring by the camming surfaces as the tubular member is rotated by the turning of a knob to retract the latch bolt.

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