This invention relates to a latch operating unit of the cylindrical type and more particularly to such a unit as described in the co-pending applications of Ernest L. Teich and Irving J. Fletcher, Serial No. 211,939, now Patent No. 2,701,160, granted January 1, 1955, and Serial No. 211,940, filed February 19, 1951, and which is adapted to be modified to perform different desired functions by the addition or substitution of parts in the mechanism of said unit.

It is well known by those skilled in the art that, when such units are installed in a door, or the like, it is necessary to remove the inner operating knob so that the unit may be inserted into the hole in the door which is to receive it. Also, some of the said units require plain operating knobs for some functions and others require a knob having a lock therein, such as shown in Patent No. 2,675,692 of Nicholas A. Welch, granted April 20, 1954, for other functions. When a key-controlled lock is used in said door knobs, it is desirable to have the lock positioned so that the key will always be received with the notches thereof at the top as it is being inserted into the lock.

It is therefore an object of this invention to provide improved means for detachably connecting the operating knobs to the latch retracting mechanism so that they may be easily detached and replaced thereon.

It is a further object of this invention to provide connecting means for the operating knobs of such units which will permit a knob to be detached from the unit and replaced with another knob having a lock unit therein for adapting the unit to a function requiring key-controlled operation.

A further object of the invention is to provide improved means for permitting positioning of the knob in the unit so that a key-controlled lock therein will always receive the key in the same position regardless of whether the unit is installed in a left or a right hand door.

A still further object of this invention is to provide improved means for detachably connecting the operating knob to the roller member in the mechanism of such unit so that the knob may be detached from the unit independently of the roller block and without disturbing the position of the roller block in the mechanism.

Other objects and advantages of the present invention will be more clearly understood from the following description and the accompanying drawings in which:

Fig. 1 is a sectional plan view of a lock operating unit embodying the present invention, with parts thereof being shown in elevation.

Fig. 2 is a sectional end view of said unit on line 2--2 of Fig. 1.

Fig. 3 is a sectional side view of the unit on line 3--3 of Fig. 2.

Fig. 4 is a sectional end view of said operating unit illustrating the inner knob shank securing bar.

Fig. 5 is a similar view, but illustrating the securing bar for the outer knob shank.

As illustrated in the drawings, the said unit includes generally a case 5, an inner operating knob 6, and an outer operating knob 7.

The case 5 is cup-shaped, preferably constructed of sheet metal and has a bottom wall 10 at the outer end thereof. A tubular outer sleeve 11 is rigidly secured to the said bottom wall 10 and a similar inner sleeve 12 is rigidly secured to the cover plate 13 which fits within the open end of the case 5; said sleeves being secured to their respective parts by silver soldering or the like.

Within the said case 5, there is provided a sub-frame 14 which has side arms 15-15 with outwardly extending perpendicular projections 16-16 that fit within the notches 17-17 in the case 5 to retain the sub-frame in position. Each of said side arms also has laterally extending inwardly bent projections 18-18 having openings therein which receive a bar 19 that secures a retractor guide bar 20 to the said projections 18-18 and also retains a retractor spring 21 in position.

The retractor is constructed of a U-shaped member 22 having inwardly bent prongs 23, that are adapted to receive the dove-tailed portion at the end of a connecting link of a conventional latch, not shown, which is operated by the said retractor. This U-shaped member 22 slidably fits between the guide bars 20-20 and has secured thereto, at opposite sides thereof, plates 24-24 which are provided at their opposite sides with projections 25-25 that are engaged by the operating ends of the rollback plates 26-26. Each of said rollback plates is provided with a shank 27 that fits within opposed notches 28 in annular connectors 29 which are rotatably mounted within enlarged portions 29-a in the bores of the sleeves 11 and 12 and which open into said case from hub-forming end portions of the sleeves that extend into the case through the ends thereof. Endwise movement of these connectors is prevented by the shoulders which are formed by the said enlarged portions in the interior of the said bores and the side plates 24-24 of the retractor. The shanks 27 have enlarged portions 30 which fit within the bores of the connectors and thereby retain the rollback bars therein.

The retractor plates 24 are provided with inwardly bent tabs 24-a which are disposed at opposite sides of the bars 19 and are in abutment with the movable ends of the springs 21 so as to normally bias the said retractor outwardly into its normal position, as illustrated in Fig. 3. When either of the knobs 6 or 7 are rotated, it will rotate its respective connector 29 which will in turn rotate the respective rollback 26 and thereby draw the retractor rearwardly into the case 5 and operating the latch. When the knob is released, the springs 21 will force the retractor outwardly and also return the rollback and the knob to their normal position.

The outer knob 7 has a shank 31 which is rotatable within the sleeve 11 and is provided with prongs 32 that extend into corresponding notches in the respective connector 29 for rotating it upon the operation of the knob 7 and thereby cause retraction of the retractor and operation of the latch.

The inner knob 6 has a shank 33 which is rotatable within the sleeve 12 and the said shank has prongs 34 that extend into corresponding notches in the respective connector 29 so as to cause rotation of said connector upon rotation of the knob 6 for the operation of the respective rollback 26.

It will be noted that the cover plate 13 has lateral extensions 35-35 which fit within the notches 17 and over the projections 16 of the sub-frame and thereby retain the said sub-frame in position. The cover plate is secured to the case by means of screws 36-36 which extend through the projections 35 and 16, and through the case 5 and the bottom 10 thereof, and are threaded to thinned portions 37-37 of the securing bar 38 which extends through a slot 39 in the outer sleeve 11 and into an annular groove.
The shank 33 of the inner knob is similarly rotatably secured to the inner sleeve 12 by means of two prongs 44—44 at the opposite ends thereof which straddle the sleeve 12 to radially retain the bar within the slot 42. At the upper portion of the bar there is provided an offset prong 45 which is radially movable within a notch 46 in the cover 13 and receives the coils of a spring member 47 that has oppositely extending stem portions 48—48 which project under hook shaped lugs 49—49 on the cover 13 and normally urges the securing bar 41 into securing position within the annular groove 43.

It will be noted that, in our improved construction above described, the knobs 6 and 7 may be readily detached from the unit by simply moving the securing members 38 and 41 to disengage the knob shanks and permit them to be withdrawn from the sleeves 11 and 12. Therefore, when it is desired to assemble the unit to a door by inserting the case 5 into an opening provided for it in said door, the inner knob 6 is readily removed by simply raising the securing bar 41 against the tension of the spring 47 and pulling the shank 33 out of the sleeve 12. This will leave the respective connector 29, and the rollback 26 which is supported thereby, in their normal positions in the lock mechanisms and thus avoid disturbance of said mechanism when the knobs are detached therefrom.

When such a lock unit is equipped with plain operating knobs and it is desired to adopt the unit for key controlled operation, the outer knob 7 may be readily detached by removing the screws 36—36 from the securing bar 38 and lifting the said bar to remove it from the groove 40 thereby releasing the shank 31 and permitting detachment of the knob. Another knob with a lock unit therein may then be substituted for the plain knob. If the key slot in the lock is not in the correct position to receive the key when disposed in the desired direction, such as with the notches therein at the top, the entire knob may be detached and rotated for a distance of 180° so as to bring the lock in position to receive the key in the desired direction.

I claim:

1. A latch operating unit comprising a case having an end wall, a sleeve projecting from said end wall; the bore of said sleeve having an enlarged portion opening inwardly into the case and defined by an annular shoulder in said bore, a retractor slidably mounted within the case, a rollback for operating said retractor, a knob having a shank rotatably mounted within the sleeve for operating the said unit, a connector for securing said shank to the rollback; said connector comprising an annular member rotatably mounted in the enlarged portion of the sleeve bore and extending inwardly into the case from the end portion of the sleeve and having a pair of opposed slots in the inner end thereof opening inwardly into said case; the said rollback having a bar portion contained in said slots and an enlarged circular portion fitting within a bore in the connector for retaining the rollback attached thereto, and a pair of prongs on the said shank projecting into a pair of notches extending across the outer end of the connector for detachably securing the shank to the connector to permit the knob and shank to be detached from the unit independently of the connector.

2. A latch operating unit comprising a case having an end wall, a sleeve projecting from said end wall, the bore of said sleeve having an enlarged portion opening inwardly into the case and defined by an annular shoulder within said bore, a retractor slidably mounted within the case, a rollback for operating said retractor, a knob having a shank rotatably mounted within the sleeve for operating the said unit, a connector detachably securing the said shank to the rollback, the said connector comprising an annular member rotatably mounted in the enlarged portion of the sleeve bore and positioned therein by the said annular shoulder and extending inwardly into the case from the end portion of the cylinder and having a pair of opposed slots in the inner end thereof opening inwardly into said case, the said rollback having a bar portion contained in said slots and an enlarged portion fitting within a recess in the connector for positioning the rollback, a separable connection between the outer end of the connector and the shank permitting the knob and shank to be detached from the said unit independently of the connector, and releasable means in said sleeve for retaining the shank in engagement with the connector.

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