ABSTRACT: A mortise lock is equipped with a lever of bell-crank shape, through which a deadbolt controls an indicator stud or button that is positioned a considerable distance above the deadbolt and the latchbolt retracting knob. The lever coacts with the indicator stud through a cam portion that is symmetrical to permit operation without regard to the hand of installation.
MORTISE LOCK WITH LATCHBOLT AND DEADBOLT, ESPECIALLY FOR HOTEL GUEST ROOM DOORS

The mortise lock is provided with latchbolt and deadbolt, especially for hotel guest room doors, and fitted with an indicating member located in the escutcheon plate, said indicating member being moved by the deadbolt and making distinguishable from outside the respective position of said deadbolt.

Kens are mortise locks of the above type where the indicating member consists of an indicating sheet slidably flush with the door, mostly marked with colors or lettered corresponding, and coupled to the deadbolt by a connecting pin extending through the lock case plate or the lock cover. With an arrangement like this, the indicating member mounted to slide flush generally can be perceived and the position of the deadbolt indicated by its can be recognized only from vicinity and by front plan view, not, however, at an oblique angle of view or from a somewhat remote distance. Moreover, this also requires constantly sufficient lighting conditions, all the more since the positions of the indicating sheet cannot be determined by touch. Furthermore, the connecting pin between dead bolt and indicating member of these known mortise locks is loaded in bending to a not inconsiderable degree, especially in the case of thick doors, if the movement of the indicating sheet arranged in the door hardware and acting on the free end of said connecting pin is impeded, for instance, by dirt, warping of the metal sheet and the like occurring after use of some length of time. Finally, the connecting pin can be screwed into the deadbolt only after the lock has been inserted in the door, which means that such loose parts can easily get lost on the construction site.

It is also known to equip a mortise lock with an indicator stud that is located on an upper portion of the lock, and that is movable between retracted and projected positions corresponding to positions of a dead bolt. Such indicator studs are more easily seen, and in addition enable the dead bolt positions to be determined by touch. However, the indicator studs only indicate the position of the deadbolt operating means rather than the position of the deadbolt, and frequently utilize mechanism that is complex in form and that introduces several points of wear between the bolt and the stud. Further, in some instances the indicator stud is connected through parts that are mounted outside the case that contains the mortise lock mechanism, so that they do not actually form a part of a lock unit.

It is therefore an object of the invention to provide a mortise lock of the aforementioned type not having the above-mentioned disadvantages, but rather featuring an indicating member of easy design not susceptible to trouble, from which the dead bolt positions indicated by it can still be distinguished clearly from a somewhat remote distance and even in case of unfavorable lighting conditions and, in addition to that, with the dead bolt positions being easily determinable by touch from outside.

It is a further object to provide a mortise lock having an indicator stud that will be controlled through means entirely contained within the case of the mortise lock and offering a direct connection with few points of wear between the stud and a dead bolt.

According to the invention, this object is essentially attained in that the indicating member is designed to be an indicator stud capable of being moved out of the escutcheon plate perpendicular to the plane of the door. In this manner, the service personnel of an hotel can, for instance, check at a glance the doorlocks of an entire suite of rooms as to whether the deadbolt is in lock or retracted positions.

In addition to that, the indicator stud can easily be detected by touch owing to its movability perpendicular to the plane of the door, which is essential, for instance, in case of insufficient lighting of hotel corridors. Finally, this also results in a constructive simplification of the lock mechanism as the portion milled out in the lock cover, the wing of the door, and the escutcheon plate corresponding to the length of the deadbolt throw and required so far is now replaced by a simple bore for the indicator stud.

In accordance with an advantageous characteristic of the invention, the indicator stud is so mounted in a cross bore located in the escutcheon plate above the handle opening to slide against the actuating face of a spring incorporated in said bore, the interior end of the indicator stud being extended, wall and extending into the path of movement of a swiveling lever accommodated in the lock case and pivoted to the deadbolt. Owing to its arrangement above the door handle, the indicator stud can be perceived even better, since it is not concealed by the handle. The spring pushes the indicator stud into the cross bore located in the escutcheon plate, as soon as it is no longer acted upon and pushed out by the swiveling lever connected to the deadbolt.

To permit an optional use of the indicator stud for left-hand doors or right-hand doors on the one or the other side of the door, the swiveling lever is designed to be a bellcrank having two angular surfaces arranged at its free top end so as to be symmetrical respectively to the center plane of the lock case, said angular surfaces being designed as inclined contact surfaces for the end of the indicator stud extending into the path of movement of the bellcrank. This also permits, if need be, to provide two indicator studs at the same time, viz, one on the exterior side of the door and one on the interior side.

Further characteristic features of the invention are described with the aid of an exemplified embodiment illustrated in the drawings. In these drawings:

FIG. 1 shows a plan view of the novel mortise lock with the lock cover removed and FIGS. 2 and 3 show one section each along the line 2-2 of FIG. 1 with the indicator stud retracted and extended respectively.

The mortise lock illustrated essentially consists of dead bolt 1, latch bolt 2, handle hub 3, latch bolt spring 4, lever tumbler plates 5, lever tumbler spring 6, lever latch 7, and handle hub spring 8 all of these being mounted on a usual type of mortise lock case. Bell crank 10 mounted in the upper portion of the lock case by means of swivel pin 11 is pivoted to deadbolt 1 by pin 9. At the free end 12' of its upper arm 12 extending mainly horizontally, swiveling lever 10 is provided with two angular surfaces 13, 14 optionally coating with the interior stepped end 15' of indicator stud 15 depending on whether indicator stud 15 is located on the one or the other side of the door. Indicator stud 15 is mounted in a bore 16' of escutcheon plate 16 so as to be horizontally slidable. On its side facing the lock, bore 16' is so shouldered that spring 17 can be mounted in the annular clearance 16' formed by said shouldered. One end of spring 17 bears against collar 15' of indicator stud 15 and its other end against shoulder 16' of bore 16'

If, from starting the position of dead bolt 1 shown in FIG. 1, lever tumbler plates 5 are lifted against the action of spring 6 by means of a key not indicated and deadbolt 1 is moved out on further turning of the key into its position marked by a dash dotted line, bellcrank 10 swivels clockwise about swivel pin 11 into the position also marked by a dash dotted line, through which the upper end 12' of arm 12 swings down and angular surface 13 acts upon end 15' of indicator stud 15. On further movement of dead bolt 1 and the swiveling motion of bellcrank 10 involved, indicator stud 15 is pushed out from escutcheon plate 16 against the action of spring 17 so as to be clearly visible, as illustrated in FIG. 3, all the more since said indicator stud is not concealed by the door handle arranged underneath. Now, the position of indicator stud 15 can also easily be determined by touch. The decisive factors for the sliding throw of indicator stud 15 are the lock case width on the one hand and overall incline and length of angular surfaces 13 and 14 respectively on the other hand. Thus, for instance, the throw of indicator stud 15 can be elongated, if required, by providing only one inclined contact surface 13 for and 12' of arm 12. Said inclined contact surface 13 will then extend over the entire lock case width just like end 15' of indicator stud 15.

The operations described above take place in the reverse order when the deadbolt is retracted. Bellcrank 10 swivels anticlockwise about pin 11 through which angular surfaces 13
are disengaged from the stepped end 15' faces 13 are disengaged from the stepped end 15' of indicator stud 15 so that spring 17 can push the indicator stud into bore 16' of escutcheon plate 16.

We claim:

1. In a mortise lock having a case and a deadbolt movable on said case, bolt actuating mechanism for moving said deadbolt to projected and retracted positions relatively to the lock case, and an indicator stud mounted relatively to a point above the bolt actuating mechanism on one side of the lock case and movable to positions indicating the positions of the deadbolt, the improvement that comprises a lever pivoted within the lock case and having a lower portion engaging the deadbolt so as to be rotated by the deadbolt when moving to its projected and retracted positions, and an upper portion of said lever in coacting relation to said indicator stud whereby to control movements of said stud.

2. The invention set forth in claim 1 in which said upper portion of the lever moves in the central plane of said case in position to coact with the indicator stud whether said stud is mounted relatively to one side or the other of the case.

3. An invention set forth in claim 2 in which said indicator stud is spring pressed to a retracted position, and said upper portion of the lever is formed at opposed sides with cam surfaces for pressing said stud to a projected position when the deadbolt projects.

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