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2,924,480

MORTISE LOCK

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Application August 21, 1956, Serial No. 605,360

7 Claims. (Cl. 292—336.3)

This invention relates to a lock of the general type known as a mortise lock. Locks of the particular class are adapted to be inserted in an opening in a door leading from the edge of the door. Thus, the lock case is generally quite thin and has a front portion adapted to lie in alignment with the edge of the door, the case itself resting in the opening formed in the door. For operating the usual rollbacks of the lock, one or more spindles are used, those spindles being generally rotated by knobs, handles or levers, the knobs or the like being mounted for rotation relatively to roses on the faces of the door, and those roses being secured to the wood of the door or to the metal of the door where a metal door is employed. The spindle or spindles enter the lock case by traversing aligned openings in the door and the lock case.

Those skilled in the art will appreciate that because the roses are secured to the door at each side of the door, there is frequently a misalignment of the knobs or levers and the spindles operated thereby relatively to the mechanism in the lock case. Because of this difficulty, mortise locks have lost much of their popularity during the last decade, despite the fact that mortise locks have many features of considerable value.

I have now conceived a construction that makes possible the placing of a lock within the usual mortise opening and the easy assembly to the lock case of bearing means for its operating spindles and knobs extending through openings in the faces of the door in which the lock has been mounted. These bearing means become, in effect, integral portions of the lock case, and since they support the knobs and spindles or other operating parts of the lock, the final operating lock is, in effect, a single integral construction on which are mounted all the operating parts. There is no actual dependence on a portion of the door to hold the lock parts in operating relation.

As a feature of my invention, the lock case carries suitable means thereon for interlocking with separate bearings inserted through openings in the sides of the door, and as a more particular feature of this part of the invention, I prefer to equip the lock case with threaded abutments for the purpose.

As a more particular feature of the invention, the abutments may take the form of bearing sleeves utilized for mounting rollbacks within the lock casing. Thus, I prefer to utilize bearing sleeves for the rollbacks, the bearing sleeves extending a slight distance outwardly away from the casing and being preferably threaded to support bearing members that may then be assembled thereto from the faces of the door through the openings formed at the faces. In this way, it is quite simple to align the rollback mounting means with knobs or handles, and spindles carried thereby, that are adapted to rotate the rollbacks.

Those skilled in the art are fully aware of the fact that it is difficult to secure the necessary knob roses to the door, when mortise locks are used. As a further feature

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of my invention, I utilize rose securing means that extend between each rose and the bearing member at the side of the door on which the rose is located. Preferably, the bearing member acts against a portion of a spring that may in one form be star shaped, with another portion of the spring pressing the rose against the side of the door. With this type of assembly, the rose is maintained yieldingly in position, while movable into proper alignment with the face of the door. This will not in any way affect the bearing member and its relation to the lock, nor the mounting of the knob or lever on the mounting member. Therefore, the knob will naturally be held in correct alignment with the rollback and the other operating parts carried by the case. In this way my lock, in effect, is a completely assembled operating unit, operating independently of its position on the door, and with its latchbolt and latchbolt operating parts assembled in what is essentially an integral structure.

I have thus outlined rather broadly the more important features of my invention in order that the detailed description thereof that follows may be better understood, and in order that my contribution to the art may be better appreciated. There are, of course, additional features of my invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception on which my disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of my invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of my invention, in order to prevent the appropriation of my invention by those skilled in the art.

In the drawings:

Fig. 1 shows mounted on a door a mortise lock that embodies my invention.

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1.

Fig. 3 is an exploded view showing parts of my invention.

Fig. 4 shows the rose and bearing assembly.

Referring now more particularly to Fig. 2 of the drawings, each numeral 10 indicates the thin side plate of the usual case of a mortise lock, that case being shown in position in a mortise opening 11 formed in a door D. The lock case has the usual front plate 12, shown in Fig. 1, through which it is mounted on the door in a conventional manner. In the lock case is lock mechanism that is also conventional and need not be described in detail. It is important, however, to know that the mechanism has two rollbacks 13, 14 that rotate in aligned relation to the openings formed in the side plates 10 of the lock case. A spindle 15 of usual cross section extends through those openings into bores formed in rollbacks 13, 14, and is equipped with knobs or handles 16, 17 at the opposed sides of the door, all as will be well understood by those skilled in the art. Rotation of the handles 16, 17 will rotate the rollbacks together if one spindle is used, but split or two piece spindles may be required. Also, the lock may or may not be equipped with stop work for locking and releasing the rollbacks, all as is standard practice.

In the extremely novel construction that I have now conceived, novel means are used for mounting the rollbacks 1, 14 on the side plates 10 of the lock case, and these same means are utilized to hold in place mountings for the handles 16, 17. Since I prefer to make the opposed sides of the mortise lock alike, insofar as my novel construction is concerned, I need describe only the assembly at one side of the lock. As best seen in Figs. 2 and 3, a bearing sleeve 19 is secured to each

plate 10 of the lock case. Each bearing sleeve 19 is made integral with its side plate 10 through a flange 20 that may be turned over the inner side of the plate 10, with the flange positioned preferably in a recess so that it will not project into the case. Each bearing sleeve 19 has an inner bearing surface 21 for its particular rollback. The outer end of each sleeve 19 extends only slightly from the outer surface of its plate 10 of the lock case so that the lock case may readily be inserted into the door opening 11, and is formed with screw threads 22. To coax with those screw threads 22, I form threads on the inner end of each of two handle bearings 18, thus enabling me to assemble the handle bearings to the lock case after the case has been inserted into the mortise opening 11 of the door. To facilitate this assembly of handle bearings 18, I show each bearing formed with a slot 22a, Figs. 2 and 4, that can be engaged by a suitable tool.

Merely by way of example, I show the outer end of each handle bearing 18 in Fig. 2 projecting slightly beyond the outer surface of the door, but the actual position of that end is not important, as will appear in due course. It is important, however, to observe that I form the outer end of each handle bearing 18 with an inner bearing surface 23 on which a handle 17 is adapted to rotate. It will thus be appreciated that each handle bearing 18 supports a handle on the lock case 10. Obviously, therefore, I do not use a part of the door for supporting the handles or knobs, and I actually support the handles on means integral with the mortise lock case. Through that arrangement, handles 16, 17 and spindle 15 will be held positively in aligned relation to the rollbacks 13, 14 of the mortise lock. At the same time, I still preserve the feature of a lock case insertible into a narrow mortise opening and having within the lock case a complete lock structure.

I shall now describe more particularly the mounting of the knob roses. Thus, I show in Fig. 2 a rose 24 at each side of the door D. Each rose 24 has a central opening 25, and in the preferred form of my invention the opening 25 has such a diameter as to receive the shank of the corresponding handle 16 or 17. On the inner periphery of each rose 24 I form a flange 26 that is adapted to retain a spring 27 relatively to the inner side of the rose. The construction of the spring 27 will be best understood if we refer now to Figs. 3 and 4 of the drawings. I prefer to form the spring 27 from wire that is bent to form a series of angular inner and outer portions 28, 29 that are so arranged as to form what I term a star shaped spring, with the spring somewhat conical in its initial condition, shown in Fig. 3.

This star shaped spring 27 I pre-assemble to the rose 24 and to the handle bearing 18 whereby to form a sub-assembly, shown in Fig. 4. To do this I snap the outer angular portions 29 of the spring behind the flange 26 on the rose 24, and I snap the spring 27 about the bearing 18 with the inner spring portions 28 engaged behind a peripheral flange 30 that I form on the bearing 18. Thus, when the bearing 18 is assembled to the case plate of the lock case 10, that case having been previously mounted in the door, the bearing 18 will press the spring 27 toward a flattened position as shown in Fig. 2, thereby tensioning the spring 27 to press the rose 24 against the outer door surface. It will be understood that the spring 27 will be effective substantially around the periphery of the rose 24, thus holding the rose against the door surface even though the lock may be somewhat misaligned relatively to the door. Moreover, the rose 24 will be held against the door even though the lock may be mounted on doors of different thickness. Naturally, it is conceivable that the spring 27 that I utilize may have spiral or other particular form, although I do prefer to utilize a spring that is star shaped. Actually, it is merely necessary that the spring have inner and

outer portions that by their action will press the rose 24 relatively to handle bearing 18.

Of course, the sub-assembly that comprises the handle bearing 18, rose 24 and spring 27 will be applied to the sleeve 19 on lock case 10 prior to the assembly of the handle 17 to the lock. The rose 24 will then lie in assembled position against the door surface, with its opening 25 in position to receive the shank of handle 17. The handle 17 will then be inserted through opening 25 into assembled relation to the handle bearing 18, with the handle supported through bearing surface 23 for rotation on bearing 18. It will be noted that, when assembled, the exact longitudinal position of handle 17 relatively to the rose opening 25 is not important, since it is merely necessary that the opening 25 permit the mounting of the handle on handle bearing 18.

It will be appreciated that the exceedingly novel construction I have described enables me to support each lock handle 16, 17 on the side plates of the mortise lock case. In other words, I do not actually need the roses for the proper mounting and functioning of the mortise lock. Since I support the handles on the case, I can hold the handles positively in aligned relation to the case. In addition, the roses 24 are supported by the lock case and do not require, for their mounting, screws or other means on the door. Still further, I wish to call attention to the fact that my invention enables me to make the rose 24 very small in diameter. This will be appreciated when it is realized that the rose does not need to cover a large opening in the door, and does not require securing means on the door surface.

I believe that those skilled in the art will now appreciate fully the advantages of my novel mortise lock construction, and understand that I have contributed to the lock industry a mortise lock that has all its operating parts functioning independently of the mounting on the door.

I now claim:

1. In a lock of the class described, a lock case having a thin metal side plate and adapted to be mounted in a mortise opening in a door, a bearing sleeve secured in an opening in said plate and defining an internal bearing, a rollback rotatably mounted on said internal bearing, a portion of said bearing sleeve extending away from the outward surface of said plate a very short distance and having screw threads formed thereon, a threaded sleeve member adapted to be inserted through a bore formed in the side of the door leading to the mortise opening and into engagement with the threads of said bearing sleeve whereby to become a part of said lock case and bearing sleeve, a rose having an opening in central aligned relation to said rollback, and a spring bearing between parts of said rose and sleeve member and acting when said sleeve member is engaged with the threads of the bearing sleeve to press said rose against the side of the door.

2. In a lock of the class described, a lock case having a thin metal side plate and adapted to be mounted in a mortise opening in a door, a bearing sleeve secured in an opening in said plate and defining an internal bearing, a rollback rotatably mounted on said internal bearing, a portion of said bearing sleeve extending away from the outward surface of said plate a short distance and having screw threads formed thereon, a threaded sleeve member adapted to be inserted through a bore formed in the side of the door leading to the mortise opening and into engagement with the threads of said bearing sleeve whereby to become a part of said lock case and bearing sleeve, operating means for the lock extending through a central opening in said sleeve member into said bearing sleeve, a rose for said operating means having an opening in central aligned relation to said rollback and adapted to move longitudinally relatively to said sleeve member, and yielding means engaged between parts of said rose and said sleeve member to press the rose longitudinally

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whereby to hold said rose against the side of the door when said member is engaged with the threads of said bearing sleeve.

3. In a mortise lock of the class described, a lock case having a thin metal side plate and adapted to be mounted in a mortise opening of a door, a bearing sleeve secured in an opening in said plate and defining an internal bearing, a rollback rotatably mounted on said internal bearing, a portion of said bearing sleeve extending away from the outward surface of said plate a short distance and having screw threads formed thereon, a threaded sleeve member adapted to be inserted through a bore formed in the side of the door leading to the mortise opening and into engagement with the threads of said bearing sleeve whereby to become a part of said lock case and bearing sleeve, a spindle extending through said sleeve member into said rollback, a rose having an opening through which said spindle extends, spring means extending between said sleeve member and rose to urge said rose against the door, a knob assembled to said spindle in aligned relation to the opening in the rose, and a bearing surface on which said knob rotates on said sleeve member with the sleeve member supporting the knob.

4. In a lock, a lock case equipped with the usual lock operating spindle and adapted to be mounted in an opening in a door, a securing sleeve having a central axial bearing opening, threaded means securing said sleeve to the lock case with the bearing opening of the sleeve surrounding said spindle, a rose having an opening, said rose formed to lie in an assembled position against the side of the door with the said opening in the rose in central aligned relation to said lock operating spindle, and spring means extending between said securing sleeve and said rose and applying pressure against the rose to hold it in assembled position relatively to the door.

5. In a lock, a lock case equipped with the usual lock operating spindle and adapted to be mounted in an opening in a door, a securing sleeve having a central axial bearing opening, threaded means securing said sleeve to the lock case with the bearing opening of the sleeve surrounding said spindle, a rose having an opening, said rose formed to lie in an assembled position against the side of the door with the said opening in the rose in central aligned relation to said lock operating spindle, a spring engaged about said securing sleeve, and said spring having a small portion bearing against said securing sleeve and a larger portion lying against a part of said rose whereby to apply pressure against the rose to urge it to assembled position relatively to the door.

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6. In a lock, a lock case adapted to be mounted in a mortise opening in a door, a threaded portion on said lock case surrounding an opening into said case, a securing sleeve having threads whereby it is secured to said threaded portion on said lock case, a rose having an opening, said rose formed to lie in an assembled position against the side of the door with the said opening in the rose in central aligned relation to said opening into the lock case, lock operating means extending through the openings in said case, securing sleeve and rose, said securing sleeve formed with a bearing surface whereby said sleeve supports said lock operating means relatively to the lock case, and means extending between said securing sleeve and said rose and applying pressure against the rose to hold it in assembled position relatively to the side of the door.

7. In a lock of the class described, a lock case having opposed sides formed as thin metal side plates and adapted to enter and be mounted in a mortise opening extending from the edge of a door inwardly of the door, a bearing sleeve secured in an opening in each thin metal side plate and defining an internal bearing, said bearing sleeves being so short that said lock case and sleeves are together insertible inwardly into the mortise opening from the edge of the door thereof, rollbacks rotatably mounted on said internal bearings of said bearing sleeves, a sleeve member adapted to be inserted through a bore formed in each side of the door leading to the mortise opening, means through which the sleeve members when in said bores are assembled to the bearing sleeves whereby to become in effect an integral part of said lock case and bearing sleeves, with said sleeve members extending laterally from the case into the bores in the sides of the door, each of said sleeve members having also an internal bearing surface positioned axially outward from the internal bearing on which the corresponding rollback rotates, a knob mounted for rotation on the bearing surface of each of said sleeve members and supported through that member relatively to the lock case, and spindle means extending between said knobs and said rollbacks whereby rotation of said knobs effects rotation of said rollbacks.

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