This invention relates to deadlocking latch bolts for tubular locks. It will be appreciated that the latch bolts of the particular kind are equipped with mechanism having several parts for controlling the deadlocking operation. Thus, there is a need for some description for deadlocking the bolt, and a part that is effective when the door opens to hold the dog in release position. There is also a part whose function is to allow the bolt to be retracted in a normal way when the bolt is engaged with a strike in the closed position of the door.

Those parts, together with the necessary latch tube, springs and possibly further parts, are designed while taking into consideration the throw of the latch bolt, or in other words, the distance the bolt moves between its fully retracted and projected positions. Moreover, different locks may have different throws of latch bolt. Therefore, that has added to the cost of the locks, because it then was necessary to manufacture an entirely different set of parts for each corresponding throw of the deadlocking bolt mechanism. Our invention relates particularly to a novel deadlocking bolt mechanism having parts that are standardized to a large extent, so that many of the same parts can be used whether the bolt has one throw or another, and reducing the cost of the locks.

The form of our invention that we prefer and that we show in this application utilizes a construction much like that shown in the patent to Golden et al., No. 2,768,014. Thus, there is a trigger bolt that will be depressed by a strike, and that has a tail controlling a deadlocking dog through cam action. In the novel concept of our invention, we utilize cams that are formed in different longitudinal positions on the trigger bolt tail. Each of those cams is designed while taking into consideration a different throw of the latch bolt. Then, by assembling the bolt mechanism in one way or another, the trigger bolt and dog will have that relation which is necessary to operate the dog in the proper way when the latch bolt is designed for a particular throw.

As an important feature of our invention, we equip a latch bolt mechanism of the class described with a control part that can be used to apply a predetermined control to a deadlocking dog whether the part has one movement or another, due to different throws of the latch bolt. More particularly, we form the control part with cams designed each to effect the proper movement of the deadlocking dog when the latch bolt has a different throw, and each made effective through the assembly of the dog and the control part in a particular relation to each other. As a further part of our invention we utilize novel means for mounting the deadlocking dog for coaction with the control part.

We have thus outlined rather broadly the more important features of our invention in order that the detailed description thereof that follows may be better understood, and in order that out contribution to the art may be better appreciated. There are, of course, additional features of our invention that will be described hereinafter and which will form the subject of the claims appended hereeto. Those skilled in the art will appreciate that the conception on which our disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of our invention.
Thus, a dog 18 has a relatively wide rear end portion 28 that is formed on its opposed edges with trunnions 29. A pair of openings 30 are formed in angular relation to each other on an upper end of latch tube 12, the trunnions 29 being assembled in those openings through a movement of the dog 18 in an upward direction in latch tube 12. A lower part of the tube 12 has a pair of openings 31 that are like the openings 30, and to which we shall refer again.

As shown in FIGS. 1, 4 and 6, a curved wire spring 32 is assembled in latch tube 12 with a medial portion of the spring engaged behind a lug 33 on the lower part of the tube. Spring 32 has angular end portions 34 that are bent in a notch 35 in the end portions 28 of dog 18, and that are arranged to press the portion 28 in an upward direction. Thereby the spring 32 holds dog 18 assembled with its trunnions 29 engaged with surfaces of the openings 30, while the spring pressure also tends to rotate dog 30 to deadlocking position, or in other words, toward the shoulder 19 on latch bolt tail 13.

Referring to FIGS. 1 and 2, the trigger release 21 is quite like that shown in the Golden et al. patent, being formed with a cam surface 36 for coacting with deadlocking dog 18, and a rear end portion 37 that is engaged by bolt retainer 16. For guiding the trigger release 21, the latch bolt tail 13 has a finger 38a that is bent to extend under the lower edge of trigger release 21. Those persons skilled in the art will understand that bolt retainer 16, when moving to retract the latch bolt, will also move trigger release 21 to cause the dog 18 in a release position, if it is not already in that position.

We equip the latch tube 12 with a rear end wall 38 that is formed by bending an integral part of the tube. Wall 38 supports conventional rivets 39, FIG. 2, that guide the bolt springs 14, 15. Also, wall 38 has an opening 40, FIG. 4, in which slide the bolt tails 13 and 25 and trigger release 21. The usual angular lugs 41 are formed on end wall 38 to interlock with a casing 42 on which bolt retainer 16 slides. As will be appreciated when considering FIGS. 1 and 2, the end wall 38 is actually arranged at the end of latch tube 13, with dog 18 and spring 32 positioned forwardly of that wall and entirely within the tube. The particular arrangement makes it possible to utilize the bolt mechanism 10 with a bolt retainer 16 that moves very close to the end wall 38, as shown in FIG. 1.

Thus far we have referred to the construction that is shown in FIG. 1, and we shall now refer to FIG. 3 in order to explain how standardized parts of our construction may be used for a different lock. In FIG. 3, we show 10, in which a latch bolt 111 has a longer throw than does the latch bolt 11 in FIG. 1, latch bolt 111 actually differing somewhat from bolt 11 and having lugs 122 that allow bolt 111 to move farther forward when projected. That mechanism 110 naturally will be used with a bolt retainer 116 that moves a greater distance than does the retainer 16. It will be remembered from the description we have already made that the movements of the trigger bolt will be referred to the projected position of the latch bolt, yet we use with the latch bolt 111 the same trigger bolt 20 that was used in assembling the construction of FIG. 1. Moreover, we use the same deadlocking dog 18 and spring 32. To do that, we assemble the dog 18 below the trigger bolt tail 25, with the trunnions 29 engaged in the lower pair of openings 31 on the latch tube 12. Then, we assemble medial portion behind a lug 33a on the upper part of latch tube 12. Dog 18 then will coact with the cam 27 on the lower edge of trigger bolt tail 25. Since in FIG. 3 the latchbolt 111 and trigger bolt 20 are farther projected, cam 27 now will effect a proper operation of deadlocking dog 18.

To coact with the deadlocking dog 18 in FIG. 3, the tail 111 on latchbolt 111 has a shoulder 119 that is positioned slightly farther toward the rear as compared to the shoulder 19 in FIG. 1. The guide fingers 138a naturally will be positioned to coact with the upper edge of trigger release 21. Also, in FIG. 3 we have chosen to show latch bolt 113 formed with a rear end portion 117 that is related to the other. The tail 113 of the latch bolt 111 to be used with locks in which the bolt retainer 116 operates in a position that is farther from the rear end of latch tube 12. We then use a trigger release 121 that is longer than the trigger release 21.

Further, in FIG. 3, the latch tube 12 and front plate 23 as well as the dog 18, trigger bolt 20, and spring 32 are the same parts that are used in assembling the construction of FIG. 1.

We believe that it will now be clear that our invention enables us to manufacture deadlocking bolt mechanisms that have different specifications and that are adapted to be used with different locks, while using parts that are standardized to a large extent. Thus, through the concept of our invention we need design merely one latch tube, one trigger bolt, one deadlocking dog, and one deadlocking spring, for assembly in different deadlocking mechanisms that can be used with locks requiring a different throw of the latch bolt. Thereby, it is possible to reduce very considerably the cost of manufacturing the latch bolts. We believe, therefore, that the very considerable reduction in the invention will be understood and that the merits of our invention will be fully appreciated by those skilled in the art.

We now claim:

1. In a lock of the class described having a latchbolt moving between projected and retracted positions relatively to a latch tube, a dog movable in said tube for deadlocking said bolt against movement to retracted position, a longitudinally movable control part for controlling said deadlocking bolt, said control part moving relatively to a position that is predetermined by the design of the lock for a particular amount of latchbolt throw between retracted and projected positions, dog coating surfaces having like shape formed in different longitudinal positions on said control part, and means for mounting the deadlocking dog in the latch tube in alternate positions to coact with one of said surfaces so that the same control part may be used to control the dog whether the latch bolt is designed for one throw or another.

2. In a lock of the class described having a latchbolt moving between projected and retracted positions relatively to a latch tube and a dog movable in said tube for deadlocking the bolt against movement to retracted position, a trigger bolt movable longitudinally and having a tail for controlling said deadlocking dog, said trigger bolt moving relatively to a position that is predetermined by the design of the lock for a particular amount of latchbolt throw between retracted and projected positions, like cams formed in different longitudinal positions on said trigger bolt tail and adapted each for coaction with the deadlocking dog, and means for assembling said dog in said latch tube in positions to coact selectively with one of the trigger bolt cams, so that the same trigger bolt may be assembled in the tube to control the dog whether the latchbolt is designed for one throw or another.

3. In a lock of the class described having a latchbolt moving between projected and retracted positions relatively to a latch tube, and a dog movable in said tube for deadlocking the bolt against movement to retracted position, a trigger bolt movable longitudinally and having a tail for controlling said deadlocking dog, said trigger bolt moving relatively to a position that is predetermined by the design of the lock for a particular amount of throw between retracted and projected positions, a pair of cams formed in different longitudinal positions on upper and lower sides of said trigger bolt tail and adapted each for coaction with the deadlocking dog, and means for assembling said dog in positions selectively above or below the trigger bolt tail in the latch tube, whereby one of said cams may control said dog and the same trigger bolt may be assembled in the tube to control the dog.
whether the latchbolt is designed for one throw or another.

4. In a lock of the class described, a dog for deadlocking a latchbolt, a trigger bolt for controlling the position of the deadlocking dog, said trigger bolt including a head and a tail extending longitudinally from said head, a pair of cams formed each in a different longitudinal position on the tail of the trigger bolt, and a surface on each of the cams on the trigger bolt tail for coacting with the deadlocking dog when the dog and trigger bolt are in a particular relation to one another.

5. In a lock of the class described having a longitudinally moving latchbolt, a dog for locking said latchbolt, and a longitudinally movable trigger bolt, said trigger bolt including a tail for controlling the locking dog, the improvement that comprises a pair of cams formed in different longitudinal positions on the tail of the trigger bolt, and a surface on each of said cams for coacting with the locking dog, each of said cam surfaces enabling the trigger bolt to control the dog when said bolt and dog are in a particular relation to one another.

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