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## DOUBLE BOLT LOCK MEANS

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1 Claim. (Cl. 70—118)

This invention concerns a locking device for doors in which are provided two or more sliding bolts for reinforcing the closure of the door.

It is a principal object to provide a locking device in which at least two bolts are operated by gear means simultaneously so that the bolts engage in brackets opposite sides of a doorway. It is a further object to provide a multiple-bolt locking device in which one or more bolt bars are operated by gear means and one or more other bolt bars are operated by a cam means for engaging various parts of a doorway.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is an elevational view of a door and locking device embodying the invention.

Fig. 2 is an enlarged sectional view taken on lines 2—2 of Fig. 1.

Fig. 2A is a sectional view on an enlarged scale showing a step in the operation of the locking device.

Fig. 3 is a sectional view taken through the center of the handle of the locking device.

Fig. 4 is an elevational view of the locking device with cover plate removed.

Fig. 5 is an elevational view of another form of locking device according to the invention.

Fig. 6 is a sectional view taken on lines 6—6 of Fig. 5.

Fig. 7 is an elevational view on an enlarged scale of a portion of the locking device of Figs. 5 and 6.

In Figs. 1 to 3 there is shown a rectangular door 10 mounted in a door frame 11. Hinges 12 pivotally support the door on the door frame. Mounted on the door is the locking device 16, embodying the present invention.

The locking device includes a rectangular channel-shaped base plate 17 attached to the door by screws 15. A similarly shaped cover plate 18 is mounted on the base plate. The two plates are secured together by screws 19 passing through apertures in cover plate 18 and threaded in holes in the base plate thereby providing a housing. In the door is formed a cylindrical bore or opening 22 as best shown in Figs. 2, 2A and 3. In this bore is seated an internally threaded cylinder 23 having a flange 24. The flange seats on shoulder 25 formed at the inner end of bore 22. An externally threaded cylinder 26 is removably threaded in cylinder 23. This cylinder has an external flange 27 which abuts the outer side of the door 10 around bore 22. Rotatably mounted in the cylinder 26 is another generally cylindrical core member 28. This core member has an external flange 30 juxtaposed to flange 27. The body of member 28 is formed with circular grooves 31. Into these grooves extend setscrews 33. The setscrews are inserted radially through cylinder 26 and remain fixed

therein. The setscrews permit rotation of member 28 in cylinder 26 without permitting member 28 to move out of the cylinder 26.

Member 28 has a rectangular keyway 35 formed therein into which key 36 may be inserted for turning member 28. The inner end of member 28 terminates in a diametrically disposed flat projecting lug 37. Plate 17 is formed with an aperture through which extends the inner end of cylinder 26 and lug 37. Axially aligned with the cylinders 23 and 26 and with member 28 is a spur gear 40. This gear has a pair of spaced projecting fingers or prongs 41 at one side thereof engaging the lug 37 therebetween. A stub shaft 42 is formed axially on the other side of gear 40 and extends through a hole 43 in plate 18. This shaft has a rectangular stud 43 on which is mounted the knob handle 44. A screw 45 secures the handle on the stud.

It will be apparent that the gear 40 is journaled in hole 43 of plate 18 and the inner end of cylinder 26. It can be rotated either by turning handle 44 or by inserting a key 36 in the keyway 35 and turning the key. The teeth of gear 40 are engaged in teeth 46 and 47 of two flat bar bolts 50 and 51. Bar 50 is a short member mounted near the top of the plate 17 and is arranged to slide transversely in an outer space defined between plates 17 and 18. Stop member 49 secured by screws 29 to plate 17 limits inward movement of bar 50. Bar 51 is a longer member which extends across the door 10 and overlaps frame 11 when the bar is fully extended. The catch or bracket plates 52 and 53 on opposite sides of the frame respectively engage the free ends of bolt bars 50 and 51 when they are fully extended. A guide plate 55 is mounted on the door for guiding and supporting bar 51. Stop member 21 limits inward movement of bar 51.

When the door is closed, knob handle 44 or key 36 may be used to extend and retract both bars 50 and 51. When the free ends of bar 50 and 51 are engaged in their respective clamp plates 52 and 53, the door is securely closed. The free ends 60 of the several bars have a thickness greater than that of the body of the door, as clearly shown in Fig. 2, for providing a reinforced closure of the door.

In Figs. 5, 6 and 7, is shown a modification of the invention in which bolt bars 61 and 62 are disposed vertically perpendicularly to bars 50 and 51. These vertical bars 61 and 62 have curved grooved ends 64 which slide on the enlarged cam portion 65 of bar 51. This cammed portion has straight horizontal sections 66 and 66' and curved sections 67 and 67'. The curved sections are smoothly continuous with the top and bottom edges of bar 51.

When the bar 51 is extended to become engaged with bracket 53, the bars 61 and 62 ride over the curved cammed portions 67 and 67' while respectively moving upwardly and downwardly until the straight portions 66 and 66' are reached. In these positions the outer ends of bars 61 and 62 are respectively engaged in catch plate 70 at the top of the door frame and in a socket 71 located in the floor 72. Springs 74 and 75 are secured between anchor pins 76 mounted on the door and short arms 77 extending laterally from bars 61 and 62. These springs are tensioned when the bars are extended and serve to retract the bars as bar 51 becomes retracted.

There has thus been provided a mechanism for automatically engaging four bolt bars with top, bottom and sides of a doorway to effectively bar the door. Turning of handle 44 or key 36 in one direction serves to retract bars 50, 51, and 61, 62. Turning of the handle and key in the opposite direction extends the several bars

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simultaneously to bar and bolt the door. This construction doubles the security provided by the lock means shown in Fig. 1. Guide plates 78 and 79 are provided for guiding movements of bars 61 and 62. Each of the bracket plates and guide plates is secured to the door by a plurality of countersunk screws 80.

If desired, the locking device including plates 17, 18, bars 50, 51, 61 and 62 may be enclosed within the door if the door has a hollow double-walled structure.

In Fig. 7, bars 61 and 62 are shown disengaged from the cammed portion 65 of bar 51. This is the normal retracted position of bars 61 and 62. When the bars 61 and 62 are extended they assume the positions shown in Fig. 5 in engagement with catch plate 70 and socket 71.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

A mechanism for locking a rectangular door at top, bottom and lateral edges simultaneously; comprising, in combination, a door having an opening therein, a rectangular housing secured to the door over said opening, said housing having end openings and opposed apertures centrally thereof, a pair of closely spaced flat bars in opposed parallel relation extending horizontally through the end openings into said housing, the long edges of the bars being in alignment, the opposed edges of the bars on the inner end thereof having teeth, a shaft journaled in one of the opposed apertures in the housing, a spur gear on the inner end of said shaft inside the housing, the teeth of said gear in mesh with the teeth on the flat

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bars, a handle on the shaft outside the housing for turning the shaft, a cylinder rotatably mounted in the opening in the door, means of connection between the cylinder and gear whereby movement of the cylinder is imparted to the gear, said means of connection including spaced projecting prongs on the gear and a projecting lug on the cylinder interlocked with the prongs, said cylinder having a central keyway therein for receiving a key for turning the cylinder, one of said flat bars having an enlarged cam surface intermediate its ends, a pair of longitudinally aligned flat bars slidably mounted on the door, said latter bars being vertical and perpendicularly arranged relative to the parallel flat bars with their opposed ends in interlocking relation with the cammed surface on said one flat bar so that movement of said one flat bar is imparted to said longitudinally aligned flat bars, and means beyond top, bottom, and opposite lateral edges of the door for engaging ends of said bars, whereby turning of said handle in one direction effects simultaneous projection of all of said bars beyond the top, bottom and opposite lateral edges of the door to engage in said means respectively, and turning the handle in an opposite direction retracts all of said bars simultaneously from said means.

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