

Sept. 19, 1961

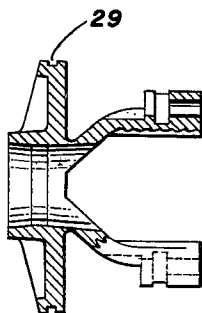
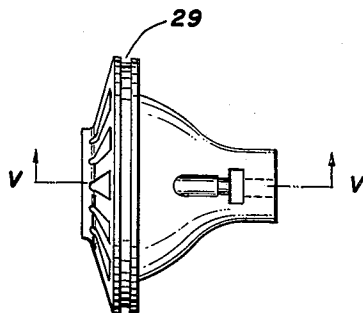
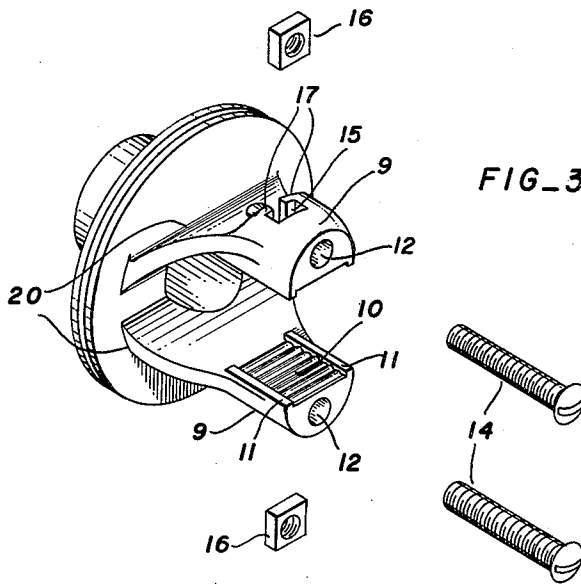
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3,000,659

INTERLOCKING MECHANISM FOR TUBULAR DOOR LOCKS

Filed July 27, 1959

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FIG_4

FIG_5

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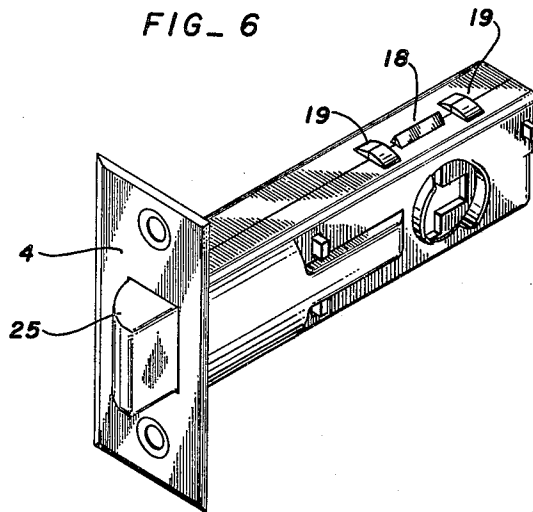
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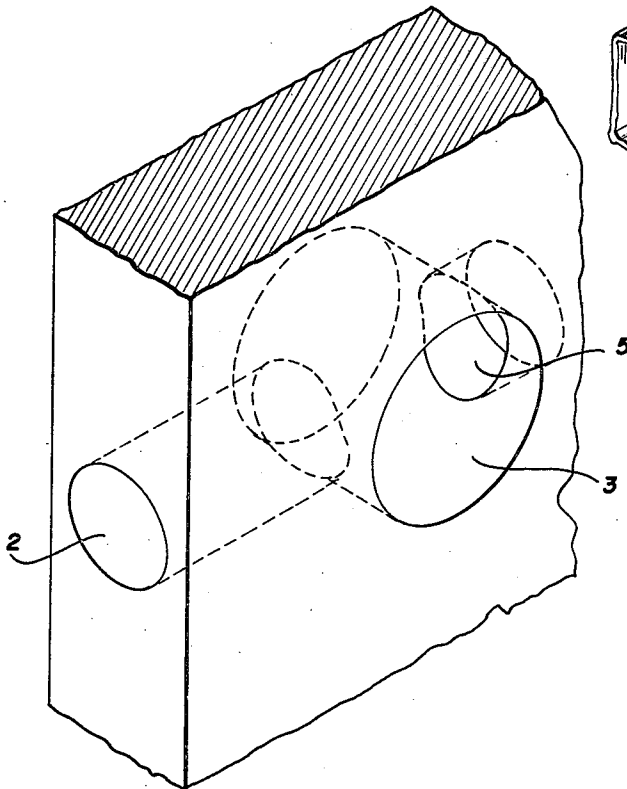
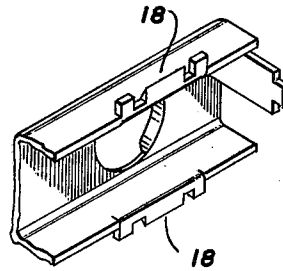
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FIG_6



FIG_7



FIG_8

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INTERLOCKING MECHANISM FOR TUBULAR DOOR LOCKS

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Tubular type door locks of the character disclosed in this application consist of two units, two-wit a latch bolt unit which is inserted in a hole drilled in the edge of the door, and a latch bolt actuating unit which is inserted in a hole drilled through opposite faces of the door. This invention relates to an interlocking mechanism for properly positioning, supporting, and aligning the units when installed in a door and for positively interlocking and rigidly clamping the units with relation to each other and the door in which they are installed.

The present invention relates to and is an improvement or simplification of the general structure shown in our former Patent No. 2,804,334 entitled "Interlocking Mechanism for Tubular Door Locks," issued August 27, 1957. In that patent the clamping jaws and associated mechanism which formed a part of the latch bolt actuating unit, interlocked with the inner end of the latch bolt unit and rigidly secured the two units with relation to each other and the door in which they were installed. The clamping jaws and associated mechanism were constructed of numerous metal parts which were formed by complex punch press operations, a fairly costly procedure, and added to that was the high labor cost of assembling and securing the parts with relation to each other.

The object of the present invention is generally to improve and simplify the construction and operation of the door lock as a whole; to reduce the number of parts required; to form or mold a single inexpensive one-piece unit which will take the place of the numerous parts formerly required, said unit including a pair of flexible clamping jaws; and further, to prevent premature clamping of the jaws during installation of the lock in a door.

The invention is shown by way of illustration in the accompanying drawings:

FIG. 1 is a vertical longitudinal section of the tubular lock showing the position of the clamping jaws before the clamping screws are tightened.

FIG. 2 is a similar section showing the clamping screws tightened and the jaws in gripping position to secure the latch bolt unit.

FIG. 3 is a perspective view of the plastic unit, said view also showing the metal nuts which are inserted in the clamping jaws of the plastic unit, and also showing the clamping screws.

FIG. 4 is a plan view of the plastic unit.

FIG. 5 is a vertical longitudinal section taken on line V—V of FIG. 4.

FIG. 6 is a perspective view of the latch bolt unit.

FIG. 7 is a perspective view of a portion of the latch bolt unit housing, and

FIG. 8 is a perspective view of that portion of the door which is drilled or bored to receive the lock.

Referring to the drawings in detail and especially FIG. 8 where a portion of a wooden door is shown, it will be noted that two holes have been drilled in the door, one into the edge of the door as indicated at 2, and the other at right angles thereto or transversely through the door as indicated at 3. The door lock to be fitted or mounted in the door consists of two units, one known as the latch bolt unit is shown in perspective in FIG. 6. This unit is inserted in the opening 2, and is secured in place by screws extending through the faceplate 4 disposed at the outer end of the unit. The hole 2 extends

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beyond the hole 3 as indicated at 5, hence, if the hole 2 has been drilled to proper size, there will be little if any play at the inner end of the latch bolt unit, as it is supported substantially throughout its entire length, but if the hole has been drilled oversize or if the lock replaces another lock where the hole 2 is oversize, or if the lock is installed in a hollow metal door, there will be a considerable amount of both vertical and lateral play.

The second unit is known as the latch bolt supporting and actuating unit. This unit in the main consists of two clamping plates indicated at 6 and 7 in FIGS. 1 and 2; the plate 6 will be known as the inner clamping plate and the plate 7 as the outer. Both plates are provided with a hub 8 and these serve as bearings for a spindle or spindles hereinafter to be described.

The outer clamping plate 7 may be made of a plastic material known by the trade names nylon, Delrin, etc. The bearing hub 8 is formed integrally with the plate 7 and so are a pair of clamping jaws generally indicated at 9—9. The whole piece is molded, see FIG. 3. Saw-like teeth or serrations 10 are formed on the inner faces of the jaws and on each side of the teeth 10 are formed longitudinally extending guide rails 11—11. Longitudinally extending holes 12—12 are formed in each jaw during the molding operation for the reception of a pair of clamping screws 14—14. At the inner ends of the holes are formed pockets 15—15 for the reception of metallic nuts 16—16 to receive the clamping screws. It should also be noted that at the inner ends of the pockets 15 are formed a pair of inturned ribs 17—17 which frictionally engage and retain the screws 14.

In actual practice, after the latch bolt unit has been inserted in hole 2 of the door, the next operation is to insert in hole 3 the jaws of the outer clamping plate, or in other words, the jaws 9—9 of the plastic unit shown in FIG. 3; the nuts 16 and the screws 14 having already been applied. When the unit is inserted, the jaws 9 will straddle the inner end of the latch bolt unit and as such form a support therefor. When the clamping plate is properly centered with relation to the hole 3, the latch bolt unit will assume its correct vertical position, thus, if the hole 2 is oversize the longitudinal central axis of the latch bolt unit will coincide with the longitudinal central axis of the hole 3 as the inner ends of the latch bolt unit will be supported solely by the jaws 9 and does not depend on the wall of the hole 5. The jaws 9 not only support the inner end of the latch bolt unit, but they also interlock therewith to secure the latch bolt unit against endwise removal from the hole 2. This is accomplished as follows.

By referring to FIG. 6 it will be noted that V-shaped ribs 18 project from the upper and lower faces of the latch bolt housing, also that there are lugs 19 at each end of the ribs, and the lugs are spaced from the ribs to receive the longitudinally extending guide rails 11 of the clamping jaws between them; thus, the rails 11 are guided by the lugs, and the teeth or serrations 10 overlie the ribs 18, hence a positive interlock will be formed between the clamping jaws and the latch bolt unit, as the ribs 18 and the serrations 10 are V-shaped, so that when the clamping screws 14 are tightened to draw the jaws 9 towards each other, a secure clamping and interlocking action will result.

After the unit shown in FIG. 3 has been applied to the door, and after it has been centered with relation to the hole 3 to insure vertical positioning of the latch bolt unit, it may be necessary for the carpenter or other mechanic installing the lock to grasp the inner end of the latch bolt unit and adjust it laterally so that the inner end of the unit will assume a position central to the hole 5 or in other words, a position midway between the opposite faces of the door; this being possible as the clamping

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jaws are open as shown in FIG. 1 and hold the serrations spread apart and out of engagement with the V-shaped ribs 18 as shown in FIG. 1.

After adjustment has been made, the inner clamping plate 6 is slipped over the heads of the screws 14 as the plate has arcuate slots with enlarged openings formed at one end thereof to receive the heads of the screws, thus, by aligning the enlarged portions of the holes of the plate with the heads of the screws the plate may be slipped over them, and then by slightly rotating the plate the screws will enter the slotted portions so that when the screws finally assume clamping position there will be metal on opposite sides of the heads for the screws to engage. When the inner clamping plate has been slipped over the screws and brought into contact with the inner face of the door, the screws are tightened and when screwed up tight the clamping plates will firmly clamp the opposite faces of the door and the inner end of the latch bolt housing will be firmly gripped by the clamping jaws and rigidly secured in adjusted position as shown in FIG. 2. This is accomplished whether the hole 2 is oversize or not, as once the unit shown in FIG. 3 is inserted, and the jaws carried thereby straddle the inner end of the latch bolt housing the jaws become the sole support, and not only that, but it also permits vertical and lateral adjustment of the inner end of the latch bolt housing before it is finally secured in place by the application of the inner clamping plate 6 and the screws 14. The screws 14 have a tendency in most installations to work loose. In this structure the screws are held in place frictionally by the ribs 17.

It should be remembered that the unit shown in FIG. 3 is molded from a flexible material and as such the clamping jaws are flexible to a certain degree and they are at least sufficiently flexible to permit the jaws to move towards each other from the position shown in FIG. 1 to the clamping position shown in FIG. 2 where they engage the ribs 18. It will be noted by referring to FIGS. 1 and 3 that the clamping jaws are joined to the clamping plate 7 at the points indicated at 20 and that they curve upwardly and outwardly therefrom, thus, when the clamping screws 14 are finally tightened, and only then, the resultant force will cause the jaws to move towards each other sufficiently to clamp and rigidly secure the latch bolt housing. The force which causes the jaws to move towards each other is a pull or tensional force exerted by the clamping screws, and as this force can only be exerted during the final tightening of the screws there can be no premature clamping of the jaws or tendency to disturb adjustments previously made. In our former Patent 2,804,334 the clamping jaws were actuated by camming action of the clamping screws, and the jaws would engage the latch bolt housing prior to the final tightening of the screws, thus tending to pull the latch bolt unit towards the inside plate during the final tightening of the screws. This caused a bind or twist to develop which definitely interfered with smooth and proper action of the lock.

It should be understood that the latch bolt unit contains a latch bolt such as indicated at 25, and any suitable form of connected retracting mechanism; similarly that either one or two spindles may be employed which will be supported by the hubs 8 of the respective clamping plates, and that the spindles will be provided with a roll back mechanism which will actuate the retractor and the latch bolt. A spindle 27 and a knob 28 are shown in FIGS. 1 and 2 and they may be inserted with the unit shown in FIG. 3 or at any time thereafter.

If the holes 2 and 5 are oversize and the inner end of the latch bolt housing is not rigidly secured between the clamping jaws and is not properly aligned or positioned when the clamping plates are pulled together by the clamping screws a bind or twist may develop which will definitely interfere with smooth and proper action, giving

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anyone operating the lock a feeling that the lock is improperly applied or that the lock is defective or poorly constructed. By constructing a tubular lock as here illustrated and installing it as described, all the above objections and defects are overcome and a smoothly operating and dependable lock results.

In FIGS. 1, 2, 4 and 5 an annular groove 29 is shown as formed in the outer edge of the clamping plate 7, this groove receives the detents 30 of an outer rose or escutcheon plate 31. A similar groove is formed in the plate 6 as this plate is made up of two spot welded plates spaced apart at the periphery, thus, an annular groove is formed for the reception of an inner rose or escutcheon plate.

Having thus described our invention, what we desire to claim and secure by Letters Patent, is:

1. In a door lock, having a latch bolt unit and a latch bolt actuating and supporting unit, said supporting unit comprising a pair of clamping plates engaging opposite faces of a door, a pair of flexible clamping jaws carried by the clamping plates, said jaws being engageable with the top and bottom sides of the latch bolt unit, and tension means for imparting tension to the clamping jaws, said tension causing the jaws to move into clamping engagement with the latch bolt unit.

2. In a door lock, having a latch bolt unit and a latch bolt actuating and supporting unit, said supporting unit comprising a pair of clamping plates engaging opposite faces of a door, a pair of flexible clamping jaws carried by one of said clamping plates, said jaws being engageable with the top and bottom sides of the latch bolt unit, a pair of screws extending through the other clamping plate and having threaded engagement with the clamping jaws, said screws when tightened imparting tension to the jaws causing movement of the jaws toward each other into clamping engagement with the latch bolt unit.

3. In a door lock, having a latch bolt unit and a latch bolt actuating and supporting unit, said supporting unit comprising a pair of clamping plates engaging opposite faces of a door, a pair of flexible clamping jaws carried by one of said clamping plates, said jaws being engageable with the top and bottom sides of the latch bolt unit, a pair of screws extending through the other clamping plate and having threaded engagement with the clamping jaws, said screws when tightened exerting a pull on the jaws causing the jaws to move toward each other into clamping engagement with the latch bolt unit.

4. In a door lock which includes a latch bolt unit and a latch bolt actuating unit, an outer and an inner clamping plate carried by the latch bolt actuating unit, said clamping plates being engageable with the opposite faces of a door in which the lock is mounted, a pair of flexible clamping jaws formed integrally with the outer clamping plate, said jaws being engageable with the top and bottom sides of the latch bolt unit for clamping said unit there between, a pair of nuts carried by the clamping jaws, and a pair of clamping screws extending through the inner clamping plate and having threaded engagement with the nuts carried by the clamping jaws, said screws when tightened exerting a pull on the jaws causing the jaws to move toward each other into clamping engagement with the latch bolt unit.

5. In a lock of the character described, a latch bolt unit and a latch bolt actuating unit, said latter unit including an inner and an outer clamping plate engageable with the inner and outer faces of a door in which the units are mounted, a pair of flexible clamping jaws formed integrally with the outer clamping plate, said plate and clamping jaws being made of a molded flexible material and said clamping jaws being engageable with the top and bottom sides of the latch bolt unit, a pair of pockets formed one in each jaw, a metallic nut insertable in each pocket, a pair of clamping screws extending through the inner clamping plate and having

threaded engagement with the nuts carried by the clamping jaws, said screws when tightened imparting tension to the jaws causing the jaws to move toward each other into clamping engagement with the latch bolt unit, and a pair of spaced apart ribs adjacent each nut receiving a pocket between which the screws pass when tightened, said ribs frictionally engaging and retaining the screws.

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