Nov. 9, 1937. W. S. EDWARDS 2,098,776

BOLT CUSHIONING MEANS FOR LOCKS

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Fig.1.

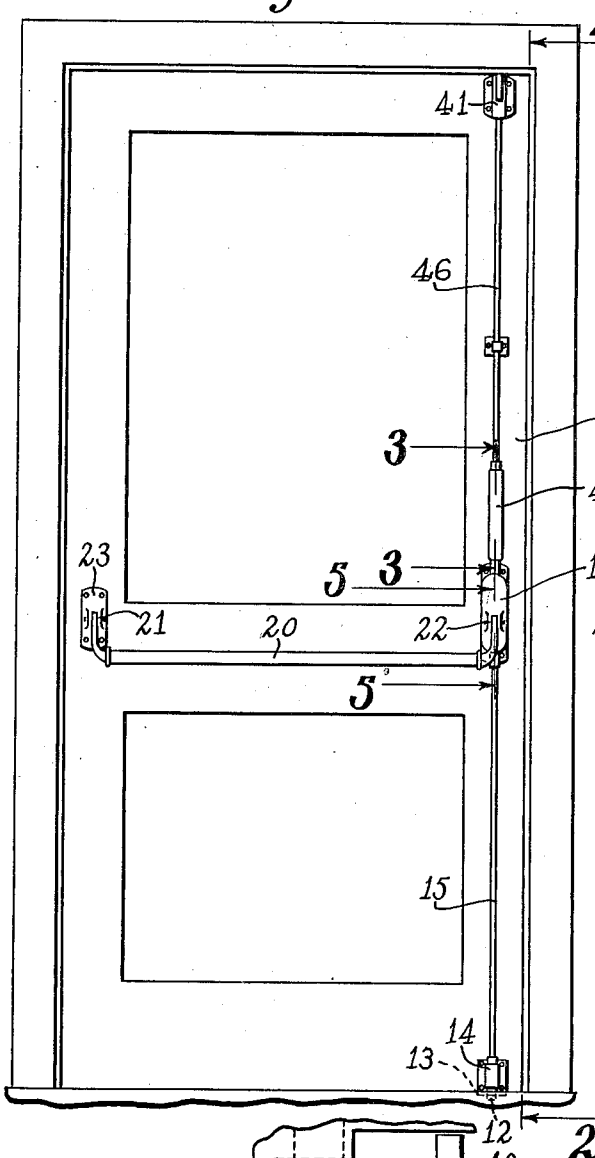


Fig.2.

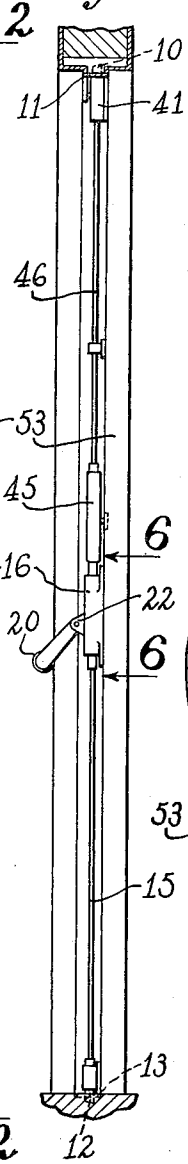


Fig.3.

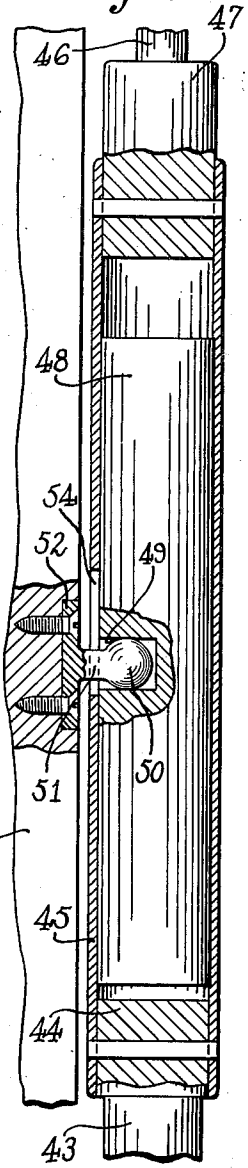
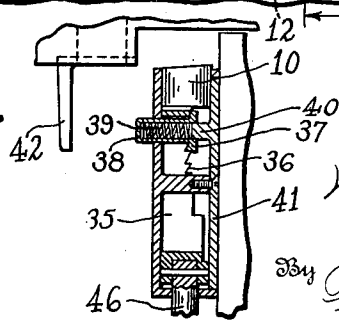


Fig.4.



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Fig. 5.

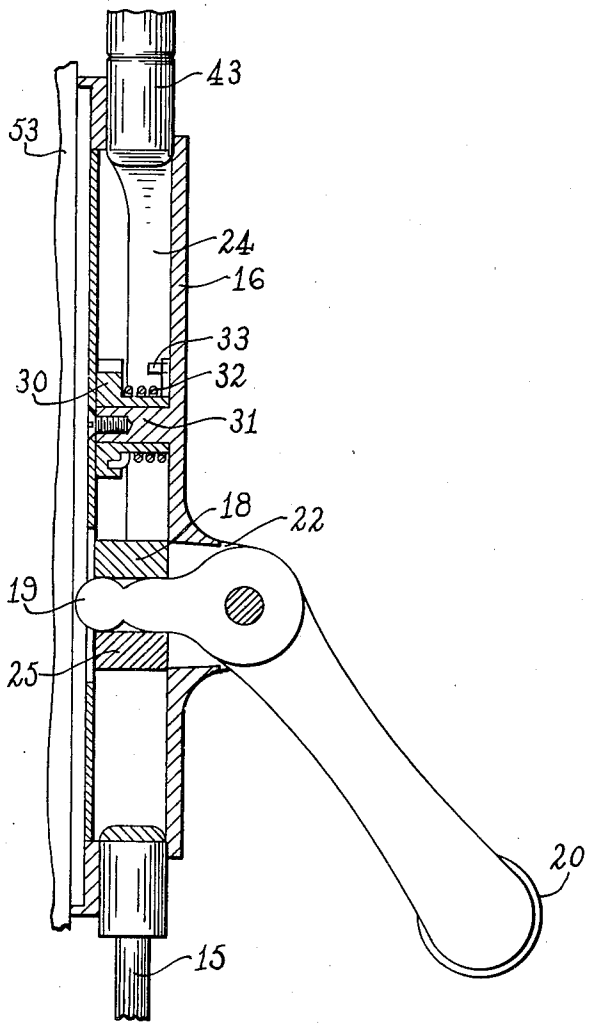
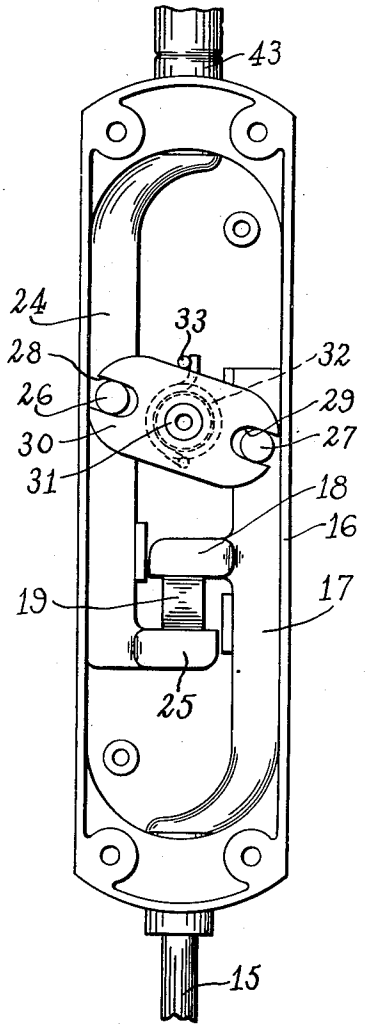


Fig. 6.



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BOLT CUSHIONING MEANS FOR LOCKS

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Application June 8, 1936, Serial No. 84,095

12 Claims. (Cl. 292—92)

This invention relates particularly to emergency exit locks or so-called panic bolt locks of the type which are applied to the doors of school houses, theaters, stores, or other public buildings, although it is applicable to locks used in other relations as well. The particular construction shown is employed in connection with a lock structure of the character wherein bolts are provided at the upper or lower edges of the door, or both, to engage with a strike plate on the lintel or floor, respectively.

In the construction of a type of lock of this character, such, for example, as shown in Patent No. 1,345,041 issued to H. G. Voight, June 29, 1920, bolts are provided at the upper and lower edges of the door which are operated from mechanism located in a casing arranged at an intermediate height upon the door, the mechanism in turn being actuated by a swinging bar pivotally secured upon the door. As far as the present invention is concerned, however, any suitable type of operating mechanism may be employed, the type shown being merely for purpose of illustration and being the type shown in the Voight patent referred to.

It is also more or less usual in a lock of this character to provide means to hold the bolt or bolts in retracted position when the door is open, and to arrange for their release when the door is closed, so that they may spring automatically into engagement with the respective strike plates. When the bolts are thus projected after the release of the detent holding mechanism which holds them in retracted position, such protraction is often attended by an excessive and objectionable amount of noise, and the present invention particularly relates to means for cushioning the protraction of the bolt or bolts so that this operation will take place quietly, but will at the same time take place positively so that the door will be held shut when moved to closed position.

As shown in the drawings, this mechanism for cushioning the protraction of the bolts consists of a piston or plunger secured to the door and disposed within a tubular member or cylinder which is secured to one of the sliding bolts.

One object of the present invention is to provide a cushioning or silencing means to prevent the noise which usually attends the protraction of a bolt of the usual door lock.

A still further object of the invention is the provision in a panic bolt lock in which the bolts are protracted by operation of a spring or similar means, of a mechanism for cushioning the protraction of such bolts to deaden the noise usually accompanying this operation.

A still further object of the invention is the provision in a lock of the panic bolt type having bolts at both upper and lower edges of the door, of a single means for cushioning the protraction of both of said bolts while at the same time not interfering with the automatic and prompt protraction of these bolts to engage the respective strike plates when the door is closed.

Other objects of the invention consist in the provision of an extremely simple and inexpensive means for cushioning the protraction of bolts of the type described; the provision of means for the purpose stated which may be interposed in the connection between the operating mechanism and the bolt itself; and the provision of means for the purpose stated which may be readily and easily secured to the door without interfering with the neat appearance of the lock, and which may be easily and readily applied to a panic bolt type of lock already in use.

To these and other ends the invention consists in the novel features and combinations of parts to be hereinafter described and claimed.

In the drawings:

Fig. 1 is an elevational view of a door to which is applied a lock embodying my invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view through the check or cushioning means on line 3—3 of Fig. 1;

Fig. 4 is a sectional view of the bolt mechanism employed at the upper edge of the door;

Fig. 5 is a sectional view on line 5—5 of Fig. 1; and

Fig. 6 is a sectional view on line 6—6 of Fig. 2.

Referring to the drawings, I have shown my improvements applied to a panic bolt mechanism embodying a bolt 10 at the upper edge of the door to cooperate with a strike plate 11 secured to the lintel, and a bolt 12 at the lower edge of the door cooperating with a strike plate 13 secured to the floor or threshold. The bolt 12 is slidably mounted in a casing 14 secured at the lower edge of the door, and to the bolt is secured an operating rod 15 extending upwardly into a casing 16 secured upon the door, which casing contains the operating mechanism.

To the upper end of the rod 15 is secured a slide member 17, which member is slidably mounted within the casing 16, as shown more particularly in Fig. 6. This slide member is offset laterally with respect to the rod 15 so that it is guided against the side wall of the casing 16, and the slide member is provided with a lug

or finger 18, the lower surface of which is adapted to be engaged by the end 19 of one arm of the cross bar 20 pivoted upon lugs 21 and 22. The lugs 21 are carried by a plate 23 secured at one side of the door, while the lugs 22 may be conveniently formed upon the casing 16.

Also mounted in the casing 16 is a similar slide member 24 carrying at its lower end a finger 25 adapted to be engaged upon its upper surface by the end 19 of the arm of the bar 20. This slide member 24 serves, as will be later described, to actuate the bolt 10 at the upper edge of the door.

Upon the slide members 17 and 24 are disposed pins or bosses 26 and 27 disposed in slots 28 and 29 of a walking beam or rocker 30 pivoted upon the post 31 within the casing 16.

The mechanism thus far described is similar to that shown in the Voight patent referred to, and it will be understood that when the panic bar 20 is moved either upwardly or downwardly about its pivot, it will engage and move the finger 18 or the finger 25, as the case may be. This imparts movement to the slide 17 or the slide 24, which, through the walking beam 30, will effect movement of the other slide member, and thus both bolts 10 and 12 will be withdrawn from their respective keepers. The position of the parts shown in Fig. 6 is that in which the bolts are in protracted position, and the parts are urged to this position by means of a spring 32 coiled about the post 31, one end of this spring being connected to the walking beam 30 and the other end reacting against a post 33 secured to the casing 16. It will thus be seen that as soon as the panic bar 20 is released after the bolts have been retracted, this spring will tend to protract the bolts and return the panic bar to its normal position.

One of the bolts may be and preferably is provided with means to hold it in retracted position when the door is open. It will be understood that in the particular lock shown, wherein the two bolts are connected by the walking beam 30, such mechanism connected with one of the bolts will also hold the other in retracted position. As illustrated, this means is provided in connection with the bolt at the upper edge of the door, as shown in Fig. 4. This bolt 10 is provided at the upper end of a slide 35 upon one side of which ratchet teeth 36 are formed to be engaged by a detent 37 provided upon a plunger 38 urged outwardly by the spring 39 and mounted upon a post 40, this post being provided upon the casing 41 within which the slide 35 is mounted. When the slide 35 and bolt 10 have been drawn downwardly or retracted, the detent 37 will engage one of the ratchet teeth 36 and the bolt will be held in retracted position as long as the door is open. When the door is closed, however, the plunger 38 strikes a stop 42 arranged upon the lintel of the door and is forced inwardly, thus disengaging the detent 37 from the ratchet teeth 36 and allowing the bolt to be protracted by the spring 32 into engagement with its strike plate 11. The lower bolt is, of course, protracted at the same time. The construction and operation of this upper bolt mechanism is more fully explained in Patent No. 1,674,760 of June 26, 1928, to William J. Carroll.

The actuating mechanism within the case 16 is connected to the upper bolt 10 by means which includes the cushioning means for the protraction of the bolt, as will now be described. To the upper end of the slide member 24 within the case 16 is secured a short rod 43 having an enlarged upper end 44 fitting snugly into and secured to the lower end of a tubular member or cylinder 45. A rod 46 is secured at its upper end to the lower end of the bolt member 35, and at its lower end has an enlarged portion 47 which fits snugly into and is secured to the upper end of the cylinder 45 so that the cylinder constitutes a part of the connection between the slide member 24 and the upper bolt 10.

Within the cylinder 45 is disposed a piston 48. This piston makes a fairly snug fit in the cylinder, but has sufficient clearance to permit the slow escape of air therearound from each end of the cylinder. Adjacent its intermediate portion the piston is provided with a recess 49 within which is disposed the rounded head 50 of a stud 51 secured upon a plate 52, which is in turn secured to the door 53, the stud 51 extending through an elongated slot 54 in the cylinder.

It will be apparent that the piston is thus fixed to the door, and that when the upper bolt is operated the cylinder will be moved with respect to the piston, this movement being permitted by reason of the elongated slot 54. As the cylinder moves relatively to the piston, the air in one end thereof will be compressed and will serve to check and retard this movement until it has leaked out through the clearance space between the piston and the inner wall of the cylinder. This will serve to cushion the movement of the bolt and will render its movement quiet and practically noiseless.

The operation of the device as described is as follows: When the door is closed the panic bar 20 may be moved about its pivots to retract the bolts 10 and 12 from their respective strike plates. This result will be effected due to the operation of the walking beam 30 regardless of the direction in which the bar 20 is moved. The door may then be opened. When the bar is released the spring 32 will tend to return the bar and the bolts 10 and 12 to their original protracted positions. This movement will, however, be prevented in the structure shown by the detent 37 which engages the member 35 of the upper bolt and holds it in protracted position, the lower bolt being, of course, likewise held in protracted position.

When the door is moved to closed position, the plunger 38 strikes the stop 42 and disengages the detent 37 from the ratchet teeth 36 of the member 35. The bolts are then released and immediately urged toward their protracted position by the spring 32. The door will then be closed against the jamb and the bolts will be in position to enter the openings in the respective strike plates. This movement of the bolts will be retarded, however, by the cushioning mechanism, for when the cylinder 45 moves upwardly with respect to the piston 48, air will be trapped in the lower end of the cylinder and will retard upward movement of the cylinder, which, of course, will retard the outward movement of the bolts. The bolts will thereafter move slowly and gradually into their final positions, this movement being cushioned and rendered practically silent by the action of the piston and cylinder.

While I have shown and described a preferred embodiment of my invention, it will be understood that it is not to be limited to all of the details shown, but is capable of modification and variation within the spirit of the invention and within the scope of the appended claims.

What I claim is:

1. A door lock comprising a lock bolt positioned adjacent the edge of a door, actuating mechanism secured to the door at a point remote from said bolt for controlling the same, connecting means between said actuating mechanism and the bolt, and pneumatic means carried by the door and engaging a part of said connecting means to retard the movement of the bolt to protracted position.

2. A door lock comprising a lock bolt positioned adjacent the edge of a door, actuating mechanism secured to the door at a point remote from said bolt for controlling the same, connecting means between said actuating mechanism and the bolt, and means to retard the movement of the bolt to protracted position, said means comprising a cooperating piston and cylinder, one of said parts being secured to said connecting means and the other of said parts being secured to the face of the door.

3. A panic bar lock comprising a bolt adapted to be slidably mounted at the edge of a door, actuating mechanism for said bolt secured to the door at a point remote from said bolt, connecting means between said actuating mechanism and said bolt, said means being movable with respect to the door and comprising a cylinder, and a piston within the cylinder and secured against movement with respect to the door to cooperate with the cylinder to cushion the movement of the bolt to protracted position.

4. In a panic bar lock, a bolt secured to an edge of the door, a casing secured to the door at a point remote from said bolt, actuating mechanism within said casing, means connecting said actuating mechanism to the bolt to move the same to protracted and retracted positions, and means in said connection and outside of said casing to cushion the movement of the bolt to protracted position.

5. In a panic bar lock, a bolt secured to an edge of the door, a casing secured to the door at a point remote from said bolt, actuating mechanism within said casing, means connecting said actuating mechanism to the bolt to move the same to protracted and retracted positions, spring means within said casing to urge the bolt to protracted position, means to hold said bolt in retracted position when the door is open, and pneumatic means to cushion the movement of the bolt to protracted position against the action of said spring means, and a part of said cushioning means being included in said connection between the actuating means and the bolt.

6. In a panic bar lock, a bolt secured to an edge of the door, a casing secured to the door at a point remote from said bolt, actuating mechanism within said casing, means connecting said actuating mechanism to the bolt to move the same to protracted and retracted positions, spring means within said casing to urge the bolt to protracted position, means to hold said bolt in retracted position when the door is open, and means to cushion the movement of the bolt to protracted position against the action of said spring means, said cushioning means comprising a cylinder serving as a part of said connecting means and a piston secured to the door and disposed within said cylinder.

7. In a panic bar lock, a bolt secured to an edge of the door, a casing secured to the door at a point remote from said bolt, actuating mechanism within said casing, means connecting said actuating mechanism to the bolt to move the same to protracted and retracted positions, spring means within said casing to urge the bolt to protracted position, means to hold said bolt in retracted position when the door is open, and means to cushion the movement of the bolt to protracted position against the action of said spring means, said cushioning means comprising a cylinder movable with said connecting means and a piston secured to the door and disposed within said cylinder, and said cylinder having an elongated slot therein, and means projecting through said slot to secure the piston to the door.

8. In a lock, a pair of sliding bolts arranged in parallelism and interconnected to move in opposite directions, an operating member therefor to effect the movement of said bolts, and a single pneumatic cushioning means to retard the movement of both said bolts to protracted positions.

9. In a lock, a bolt slidably connected at each of two opposite edges of a door, said bolts being interconnected to move together in opposite directions, an operating member to actuate said bolts to retracted position, means to urge said bolts to protracted position, pneumatic means to cushion the movement of one of said bolts to protracted position against the action of said spring, and said means also cushioning the movement of the other bolt through the interconnection between said bolts.

10. In a panic bolt lock, a pair of bolts slidably mounted at the opposite edges of a door, actuating mechanism mounted on said door between the bolts, connecting means between said actuating mechanism and each of said bolts, said bolts being interconnected to move together in opposite directions, and one of said connecting means including as a part thereof means to cushion the movement of the bolts to protracted position.

11. A door lock comprising a lock bolt positioned adjacent the edge of a door, a casing mounted upon the door, actuating mechanism in said casing for controlling the bolt, connecting means between said actuating mechanism and the bolt, and means without the casing to cushion the movement of the bolt to protracted position.

12. A door lock comprising a bolt positioned adjacent the edge of a door, a casing mounted upon the door at a point remote from the bolt, actuating mechanism in said casing for controlling the bolt, and connecting means between said actuating mechanism and the bolt, said connecting means comprising means disposed exteriorly of said casing to cushion the bolt to protracted position.

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