July 27, 1926. 1,593,852

J. H. SHAW

PANIC BOLT

Filed August 29, 1923 3 Sheets-Sheet 1

Fig. 1.

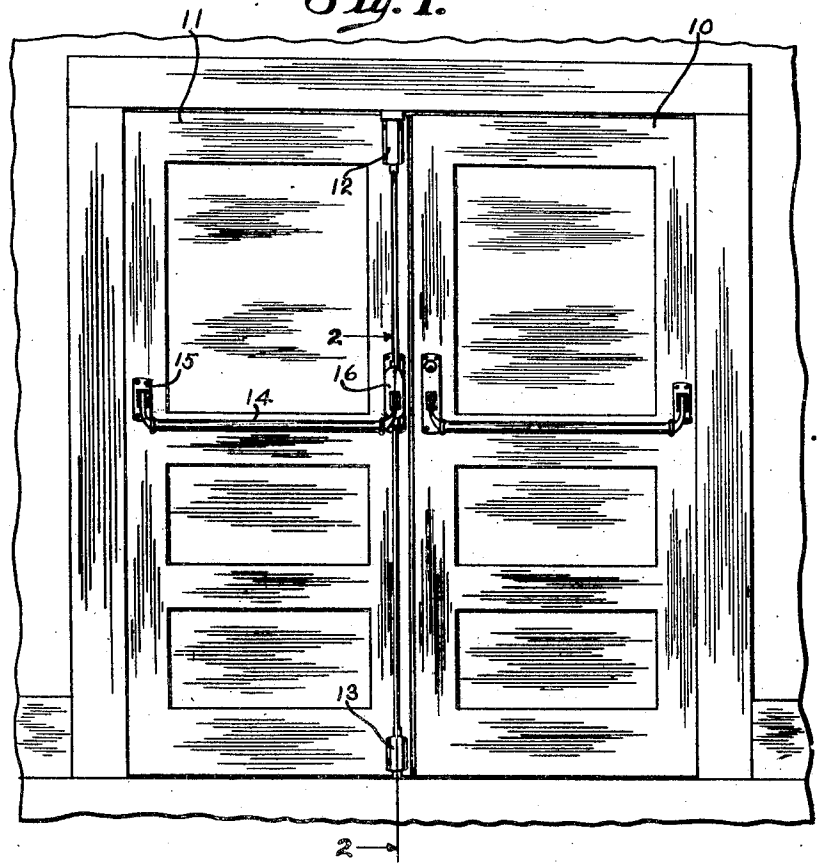


Fig. 6.

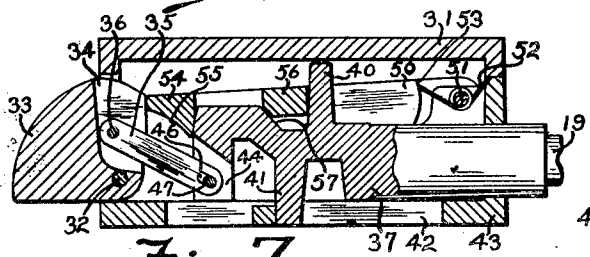


Fig. 9.

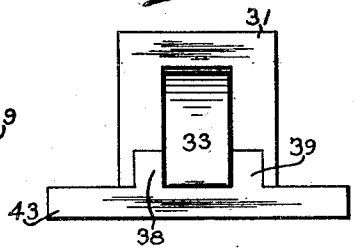
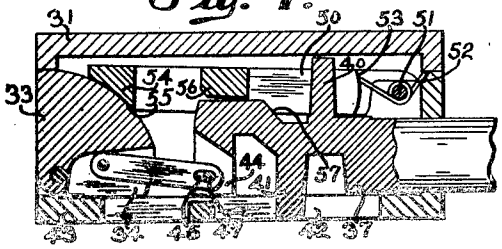


Fig. 7.



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July 27, 1926. 1,593,852

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PANIC BOLT

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Fig. 2.

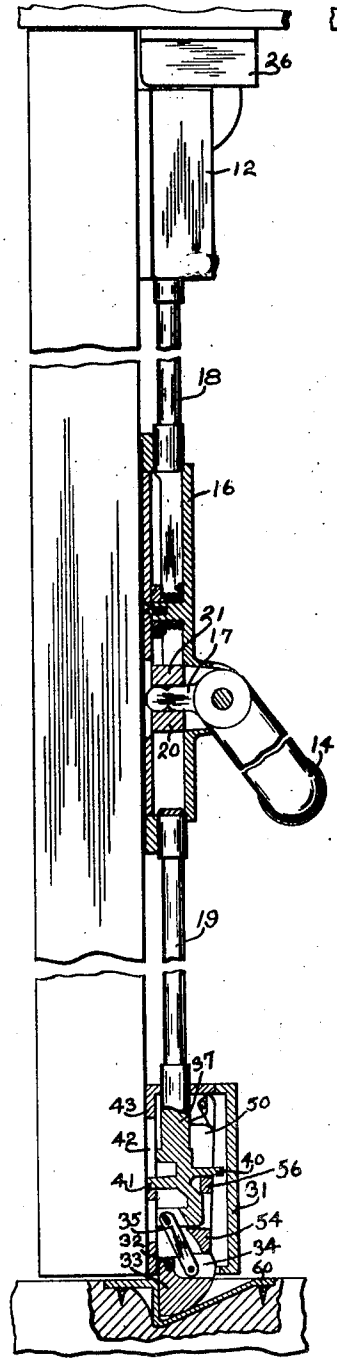


Fig. 3.

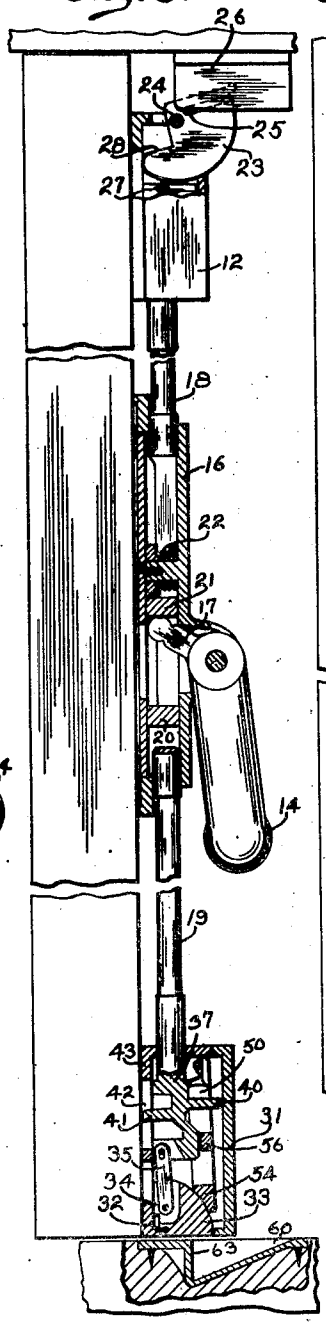
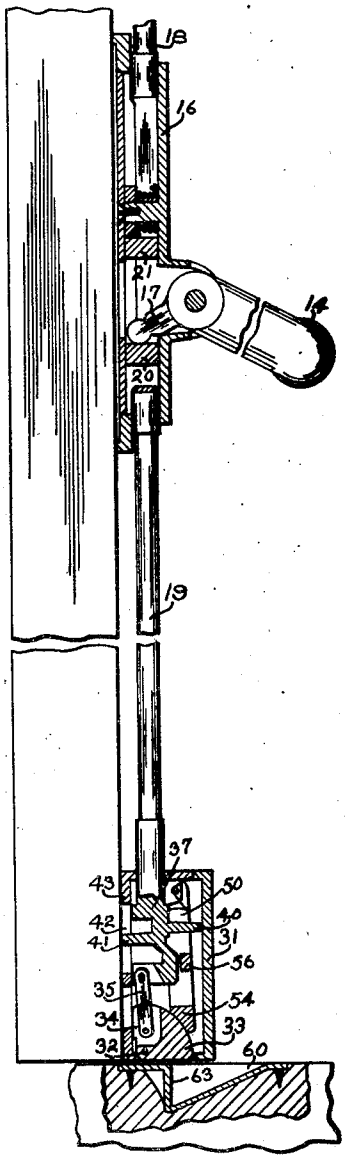


Fig. 4.



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July 27, 1926. 1,593,852

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PANIC BOLT

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Fig. 5.

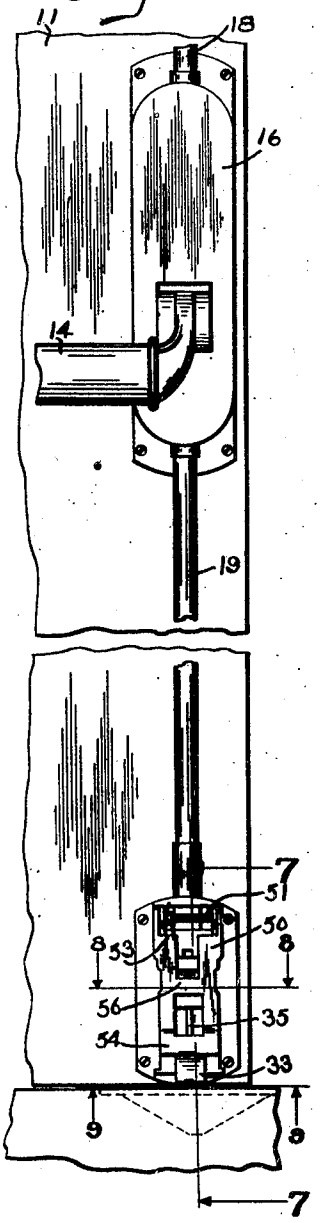


Fig. 8.

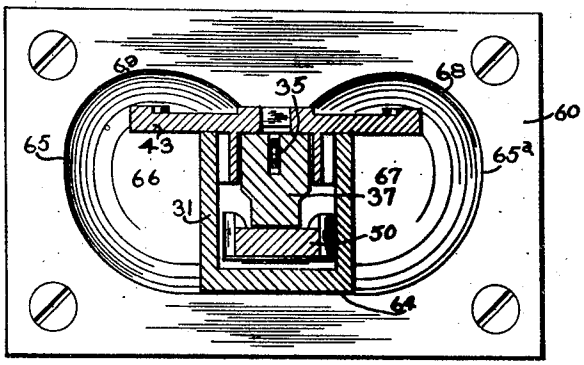


Fig. 10.

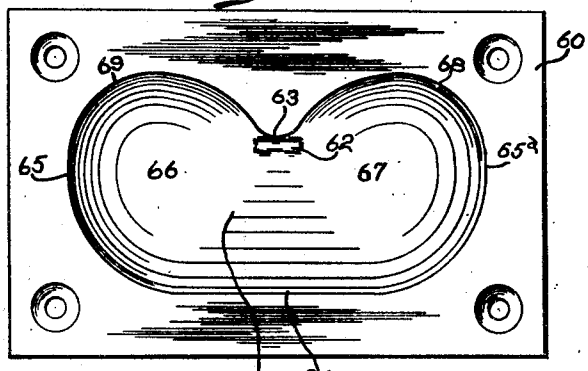
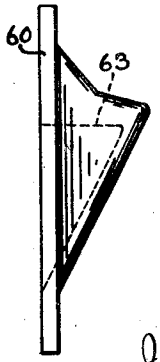


Fig. 11.



Inventor

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Patented July 27, 1926. 1,593,852

UNITED STATES PATENT OFFICE.

JOHN H. SHAW, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO SARGENT & COMPANY, OF NEW HAVEN, CONNECTICUT.

PANIC BOLT.

Application filed August 29, 1923. Serial No. 659,956.

This invention relates to emergency exit locks or so-called panic bolt locks of the type which are applied to the door of school houses, theaters, department stores, or other public buildings for facilitating exit where a fire or the like causes panic, and are usually applied to one of a pair of swinging doors where one of the doors normally remains closed.

This invention relates more particularly to panic bolt mechanism in which the doors are provided with bolts adapted to engage keepers or strike plates on the lintel and floor, respectively, and arranged to be released from said strike plates or keepers by the operation of a panic bar on the inner face of the door. In some of its aspects, however, the principles of my invention are not limited to this type of device, although shown in connection therewith in the accompanying drawings.

It quite often occurs in case of a panic that so much pressure is applied to the door as to render it impossible to withdraw the bolts from their keepers on account of the friction due to such pressure. A bolt may work perfectly when being tried out under ordinary conditions, but when its operation is attempted in a panic, the pressure against the inner side of the door will cause the bolt to bind so tightly against the keeper that it is practically impossible to retract it.

It is also necessary in such structures to provide mechanism whereby the bolts, when retracted to permit the door to open, will be retained in this retracted position so that the door will freely close, although usually a spring is provided to urge the bolts normally to protracted position. In some instances, a detent is provided in the bolt case to hold the bolt in retracted position, and a lug or stop is provided on the door frame to coact with the detent when the door is closed to release the bolt and permit its protraction by the actuating spring. Such a mechanism, however, is more or less complex and expensive and not always positive in operation.

One object of my invention is to overcome the defects mentioned above and to provide a bolt which will roll or swing pivotally into its case out of engagement with the door strike so as to be practically frictionless in its operation.

Another object of my invention is to provide a panic bolt mechanism such that pressure upon the door will tend to urge the bolt to retracted position, instead of preventing such movement by causing the bolt to bind against the keeper, as has been the case heretofore.

Another object of my invention is to provide panic bolts for the upper and lower edges of a door which will normally be retained in retracted position when the door is opened but will be moved in a novel manner to protracted position when the door is closed.

A still further object of my invention is to provide a form of bolt and cooperating door strike or keeper such that the operation of the bolt will tend to prevent accumulation of dirt in the keeper opening, which would otherwise interfere with the protraction of the bolt.

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

In the accompanying drawings:

Fig. 1 is a front elevational view of a door provided with a lock embodying my improvements;

Fig. 2 is a side elevational view of my panic bolt mechanism, some of the parts being shown in section on line 2—2 of Fig. 1;

Fig. 3 is a view similar to Fig. 2, showing the parts as the door is being opened;

Fig. 4 is a sectional view of my panic bolt mechanism, showing the parts as the door is about to be closed;

Fig. 5 is a front elevational view of the panic bolt mechanism with the cover of the case of the lower bolt removed;

Fig. 6 is a sectional view of the bolt mechanism at the bottom of the door, showing the parts when the bolt is in protracted position;

Fig. 7 is a section on line 7—7 of Fig. 5, showing the bolt in retracted position;

Fig. 8 is a section on line 8—8 of Fig. 5:

Fig. 9 is a sectional view on line 9—9 of Fig. 5;

Fig. 10 is a top plan view of the door strike or keeper secured in the floor or threshold;

Fig. 11 is a side elevational view of the same.

I have shown at 10 and 11 a pair of doors, such as are commonly used in public build-

ings, the door 11 being designed to remain normally in closed position. The panic bolt structure includes a bolt mechanism generally designated by the numeral 12 adapted to cooperate with a strike plate or keeper on the lintel, and the second bolt mechanism 13 designed to cooperate with a keeper in the floor or threshold of the door. These bolts are adapted to be operated by means of a lever or panic bar 14 pivoted to an escutcheon plate 15 and to a case 16 secured upon the door which encloses the operating mechanism for the bolts. The end of the panic bar adjacent the case 16 is provided with a finger 17 which extends into the case and is adapted to operate the bolt controlling rods or plungers 18 and 19.

These rods extend within the case 16 and are, therefore, provided with laterally disposed lugs 20 and 21, respectively, either one of which the finger 17 is adapted to engage. The mechanism within the case 16 may be like that shown in the patent to H. G. Voight, No. 1,345,841, wherein the rods 18 and 19 are connected by a walking beam so that when one is moved upwardly, the other is moved downwardly, to simultaneously protract or retract the bolts on the upper and lower edges of the door. The lug 20 is attached to the upper rod 18 and the lug 21 to the lower rod 19, so that, as shown in Fig. 3, a movement of the lever 14 downwardly from the normal position shown in Fig. 2 causes the finger 17 to move the lug 21 and, therefore, the rod 19 upwardly and, through the walking beam referred to, causes a simultaneous downward movement of the rod 18 to retract the bolts from engagement with the keepers. A movement of the panic bar 14 upwardly from normal position, as shown in Fig. 4, causes the same movement of the rods by exerting a downward pressure on the lug 20 secured to the rod 18. When the panic bar is released, the rods are urged toward the edges of the door to protract the bolts by the coil spring 22, all of which is more fully shown in the Voight patent, above referred to.

The upper bolt mechanism 12 may be of the type shown in the application of William J. Carroll, Serial No. 659,969 filed August 29, 1923, wherein a bolt 23 of semi-circular shape is pivoted to the case at 24 and provided with a slot 25 to receive a horizontally disposed post (not shown) secured to the keeper plate 26. The upper end of the rod 18 is provided with a dogging member 27 which is adapted to move upwardly behind a shoulder 28 on the bolt 23 when the door is moved to closed position, and the bolt is protracted. This dogging member, by engaging behind the shoulder 28, maintains the bolt against being turned to protracted position by pressure upon the door. When, however, this member is withdrawn by the actuation of the rod 18 by the panic lever 14. the bolt is free to move to a position shown in Fig. 3, wherein the door is released on the top. In this position the dogging member 27 engages below the lower side of the bolt 23 and the rods 18 and 19 are prevented from moving outwardly under the influence of the spring 22. The bolt 23 and, likewise, the bolt at the lower edge of the door, to be described hereinafter, are thus prevented from being protracted until the door is again closed.

The lower bolt mechanism designated generally by the numeral 13 comprises a case 31, to the lower edge of which is pivoted at 32 a bolt 33. This bolt is adapted to have a pivotal or rotary movement and is provided with a recess 34 in which is received the end of a link 35 which is pivoted to the bolt at 36. At its other end, the link 35 is connected to a bolt operating member or slide 37 secured to the lower end of the operating rod 19. This slide is reciprocably mounted in the case 31 between a pair of guides 38 and 39, extending longitudinally of the casing, and is further guided in its movements by means of oppositely projecting lugs 40 and 41, the former being adapted to engage the under surface of the cover of the case, while the latter operates in a slot 42 in the base plate 43 of the casing.

In the lower end of the operating member 37 is provided a slot 44 to receive the adjacent end of the link 35, the link being provided with a somewhat elongated slot 46 which receives a pin 47 secured to the member 37, so as to provide a loose or lost motion connection between the operating member 37 and the bolt 33.

Above the operating mechanism a detent or dogging stirrup 50 is pivoted to the case upon the pin 51, and a spring 52 wound about this pin and re-acting against the case and against a shoulder 53 on the stirrup member tends to hold this member in a depressed position, as shown in Fig. 6. This stirrup member is provided at its lower end with a cross piece 54 adapted to engage behind the bolt 33 to dog it in protracted position. It will be apparent that otherwise the bolt could be swung to retracted position merely by an opening pressure upon the door. The member 54 may be beveled upon its lower surface, as shown at 55, so that it will ride easily over the bolt 33 when once its edge is raised above the rear edge of the bolt. The stirrup 50 is provided with a second cross bar or member 56 intermediate its length, which is adapted to rest upon a beveled shoulder 57 provided upon a portion of the operating member 37.

It will be observed that when the operating rod 19 is drawn upwardly, the shoulder 57, by engagement with the cross member 56, will cause the stirrup 50 to be raised,

as shown in Fig. 7, until its lower edge is above the rear edge of the bolt 33. Due to the form of connection between the stem 37 and the link 35 provided by the elongated slot 46 and pin 47, this movement of the stirrup will be effected prior to the beginning of the retraction of the bolt by the link which takes place upon a continued movement of the rod 19. While a continued movement of this rod will, of course, retract the bolt by swinging it pivotally about the pin 32, in practice such an operation will probably not take place, as immediately the cross member 54 of the stirrup is moved from its dogging position behind the bolt 33, the bolt will be retracted by engagement with the keeper upon an opening movement of the door. That is, if pressure is applied to the door in an opening direction, the bolt will be free to swing into the lock case, as shown in Fig. 7, and this movement will, of course, be effected by the keeper. When the door is opened, the rod 19, and with it the rod 18, will be retracted, and both will be retained in this position due to the contact of the dogging member 27 with the lower side of the upper bolt 23. This serves to retain the bolt 33 in retracted position until the door is again closed and the bolt 23 swung upwardly about its pivot, so that the dog 27 will be permitted to move upwardly behind the shoulder 28. In this manner, the bolt 33 is prevented from gouging the floor when the door is swinging to and from closed position.

Secured in the threshold or floor below the lower edge of the door to cooperate with the bolt 33 is a strike plate 60 of novel construction provided with a recess 61. This recess 61 is relatively deep at a point designated by the numeral 62 where it is provided with an abrupt vertically disposed shoulder 63 which cooperates with the bolt. From the point 62, the bottom of the recess slopes upwardly toward the rear edge 64 of the recess and also in a lateral direction toward the sides 65 and 65a. The front edge of the recess 61 is not parallel with the front edge of the strike plate, as the shoulder 63 projects inwardly beyond the adjacent edges of the recess to provide the two lobes 66 and 67, the edges 68 and 69 of which extend forwardly beyond this shoulder. The resulting conformation provides that the deepest part of this recess is at the shoulder 63, and the bottom of the recess has a somewhat gradual slope upwardly from this point toward the edges in all directions away from this shoulder.

As a result, when the door is closed and the bolt 33 released so that it may be protracted by the spring 22 and the force of gravity, the bolt enters the strike opening with a rotary or gouging motion, which serves to push any accumulated dirt from in front of the keeper shoulder 63 outwardly into the lobes 66 and 67. As the bottom of the recess slopes upwardly all about the circumference of these lobes, the dirt is crowded or pushed out of the strike opening and does not remain compacted against the keeper 63 in the path of the bolt. The projection of the keeper 63 into the recess beyond the front edges 68 and 69 thereof permits the dirt or dust accumulated in the keeper opening to be pushed outwardly and forwardly at a point adjacent the shoulder 63 and tends to prevent its accumulation in front of this shoulder.

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 the details shown but is capable of variation and modification within the spirit of the invention and within the scope of the appended claims.

Claims on the invention of the keeper are presented in my co-pending application, Serial 100,543, filed April 8, 1926.

What I claim is:

1. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivoted to the case to move to protracted and retracted positions by a rotary movement, means to dog said bolt in protracted position to hold the door closed, said bolt being adapted to be retracted by an opening movement of the door when the dogging means is inoperative, means to move said dogging member to inoperative position, said means being also connected to said bolt to actuate the same.

2. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivoted to the case to move to protracted and retracted positions by a rotary movement, means to dog said bolt in protracted position to hold the door closed, said bolt being adapted to be retracted by an opening movement of the door when the dogging means is inoperative, means to move said dogging member to inoperative position, said means having a lost motion connection with said bolt whereby a continued movement thereof retracts the bolt after said dogging means is rendered inoperative.

3. In a panic bolt lock, a case secured adjacent the edge of the door, a bolt pivoted to the case to move to protracted and retracted positions by a rotary motion, and adapted to be retracted into the case by contact with the door strike, a dogging member pivotally mounted in the case and adapted to engage the bolt to dog it in protracted position, a panic bar mounted on the door and an operating rod extending longitudinally of the door and actuated by said panic bar and controlling said dog.

4. In a panic bolt lock, a case secured to the door near the edge thereof, a bolt mount-

ed on a pivot fixed in the case and adapted to be swung about its pivot to retracted position by contact with the strike, means to urge said bolt normally to protracted position, and means to hold the bolt in said retracted position when the door is open.

5. In a door lock, a case, a bolt mounted on a fixed pivot therein to be moved to retracted position by contact with the door strike when the door is opened, a bolt operating member slidably mounted in the case and connected to said bolt to move it about its pivot, and means to hold said bolt in retracted position when the door is open.

6. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivotally mounted therein and adapted to be retracted by contact with the strike, a manually operable bolt operating member mounted on the door and connected to said bolt, means to normally urge said bolt to protracted position, and means including said bolt operating member to hold the bolt in retracted position against the action of said urging means when the door is open.

7. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivotally mounted therein and adapted to be retracted by contact with the strike, a bolt operating member mounted on the door and connected to said bolt, means to normally urge said bolt to swing about its pivot to protracted position, and means to hold the bolt in retracted position against the action of said urging means when the door is open, said means being released to permit protraction of the bolt when the door is closed.

8. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivotally mounted therein, a bolt operating member mounted on the door and connected to said bolt, means to normally urge said bolt to swing about its pivot to protracted position, and means to hold the bolt in retracted position about its pivot against the action of said urging means when the door is open, and means to dog said bolt in protracted position.

9. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt mounted on a fixed pivot therein, a bolt operating member mounted on the door and connected to said bolt, means to normally urge said bolt to protracted position, means to hold the bolt in retracted position against the action of said urging means when the door is open, said means being released to permit protraction of the bolt when the door is closed, and means to dog said bolt in protracted position.

10. In a panic bar lock, a case adapted to be mounted in the edge of the door, a bolt pivotally mounted in the case to swing about its pivot and to contact with the door strike, a dogging member pivoted in the case and adapted to dog the bolt in protracted position, a bolt operating member slidably mounted in the case and connected to the bolt to operate the same, and clamping means upon said bolt operating member to engage said dog and move it to inoperative position prior to the retraction of the bolt.

11. In a panic bar lock, a case adapted to be mounted in the edge of the door, a bolt pivotally mounted in the case to swing about its pivot and to contact with the door strike, a dogging member pivoted to the case and adapted to dog the bolt in protracted position, a bolt operating member slidably mounted in the case having a lost motion connection with the bolt to operate the same, and camming means upon said bolt operating member to engage said dog and move it to inoperative position prior to the retraction of the bolt.

12. In a panic bar lock, a lock case mounted at the upper edge of the door, a second lock case mounted at the lower edge of the door, bolt operating mechanism mounted on the door intermediate said lock cases, a bolt pivoted to each of said cases and adapted to cooperate with strike members on the lintel and floor respectively, dogging means to hold said bolts in protracted position, actuating means for said dogging means, and means to retain said bolts in retracted position when the door is open.

13. In a panic bar lock, a lock case mounted at the upper edge of the door, a second lock case mounted at the lower edge of the door, bolt operating mechanism mounted on the door intermediate said lock cases, a bolt pivoted to each of said cases and adapted to cooperate with strike members on the lintel and floor, respectively, dogging means to hold said bolts in protracted position, actuating means for said dogging means, one of said bolts being retained by gravity into retracted position when the door is open, and said bolt, when in such position, retaining the other bolt in retracted position.

14. In a panic bar lock, a lock case mounted adjacent the lower edge of the door, a bolt pivotally secured to the lock case and adapted to be retracted by a rotary motion, a strike plate mounted below the door and having a keeper to cooperate with said bolt, said strike plate being provided with a recess extending on three sides of said keeper.

15. In a panic bar lock, a lock case mounted adjacent the lower edge of the door, a bolt pivotally secured to the lock case and adapted to be retracted by a rotary motion, a strike plate mounted below the door and having a keeper to cooperate with said bolt, said strike plate being provided with a recess extending on three sides of said keeper, and the bottom of said recess sloping upwardly in all directions away from said keeper.

16. In a panic bar lock, a lock case mounted adjacent the lower edge of the door, a bolt pivotally secured to the lock case and adapted to be retracted by a rotary motion, a strike plate mounted below the door and having a keeper to cooperate with said bolt, said strike plate being provided with a recess, the bottom of which extends upwardly in all directions away from said keeper.

17. In a panic bar lock, a lock case mounted adjacent the lower edge of the door, a bolt pivotally secured to the lock case and adapted to be retracted by a rotary motion, a strike plate mounted below the door and having a keeper to cooperate with said bolt, said strike plate being provided with a recess in front of the keeper, and the bottom of said recess sloping downwardly theretoward, whereby the end of the bolt, in its movement to protracted position, remains closely adjacent the bottom of the recess.

18. In a panic bar lock, a case mounted adjacent the edge of the door, a bolt pivotally secured to the case to move to protracted and retracted positions by a rotary motion, a strike plate mounted in the door jamb and having a keeper to cooperate with said bolt, said strike plate being provided with a recess in front of the keeper, the bottom of which slopes downwardly theretoward, and said bolt being provided with a beveled face whereby said face fits snugly against the bottom of the recess when the bolt is protracted.

19. In a panic bar lock, a lock case mounted adjacent the edge of the door, a bolt pivotally connected to said case to move to protracted position by a rotary motion, a strike plate mounted adjacent the door and provided with a keeper to engage said bolt, said strike plate being provided with a recess forwardly of said keeper, and said recess being enlarged to extend laterally beyond said keeper, whereby dirt accumulated in front of the keeper will be forced into the enlarged part of the recess by the movement of the bolt.

20. In a door holding mechanism, a casing, a bolt pivoted in the casing to swing to protracted position, dogging means on the casing to dog the bolt in such protracted position, an operating rod having a lost motion connection with said bolt to cause the retraction of the same, and means whereby the actuation of said rod will move the dogging means to inoperative position.

21. In a door holding mechanism, a casing, a bolt pivotally mounted in the casing to swing to protracted position, an operating rod having a lost motion connection with said bolt to move the same to retracted position, a dogging member pivoted in the casing in a superposed position relative to part of said rod to dog the bolt in protracted position, and means whereby the actuation of said rod moves the dogging member to position to release the bolt.

22. In a door holding mechanism, a casing, a bolt pivotally mounted in the casing to swing to protracted position, an operating rod having a lost motion connection with said bolt to move the same to retracted position, a dogging member pivoted in the casing in a superposed position relative to part of said rod to dog the bolt in protracted position, and means whereby the actuation of said rod moves the dogging member to position to release the bolt prior to the beginning of the retracting movement.

23. In a door holding mechanism, a casing, a bolt pivotally mounted in the casing to swing to protracted position, an operating rod having a lost motion connection with said bolt to move the same to retracted position, a dogging member pivoted in the casing in a superposed position relative to part of said rod to dog the bolt in protracted position, means whereby the actuation of said rod moves the dogging member to position to release the bolt prior to the beginning of the retracting movement, and means to hold said bolt in retracted position within the lock when the door is open.

24. In a panic bar lock, a lock case mounted adjacent the lower edge of the door, a bolt mounted in the case adapted to be moved to protracted and retracted positions, a strike-plate mounted below the door and having a keeper to cooperate with the bolt, said strike-plate being provided with a recess extending on three sides of said keeper.

In witness whereof, I have hereunto set my hand this 23rd day of August, 1923.

JOHN H. SHAW.