Feb. 25, 1941. G. W. ALDEEN 2,233,278

CATCH

Filed Oct. 14, 1938 2 Sheets-Sheet 1

Fig. 1.

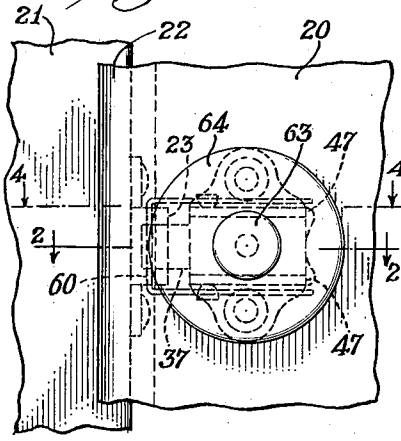


Fig. 2.

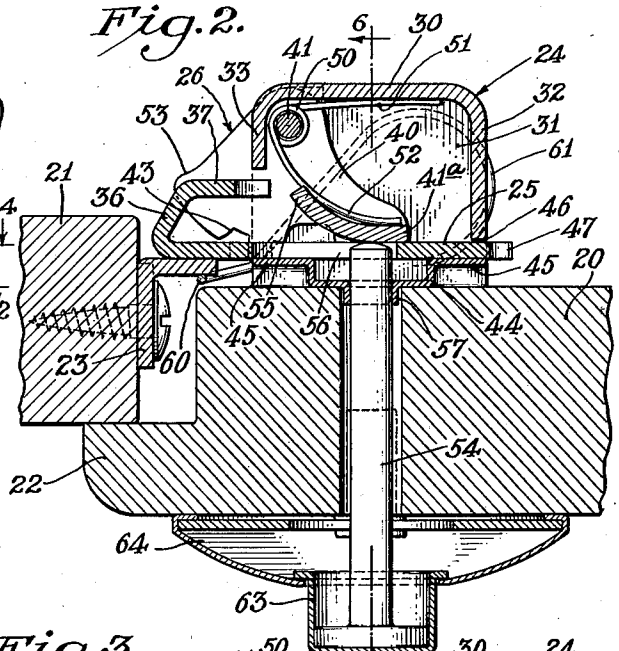


Fig. 3.

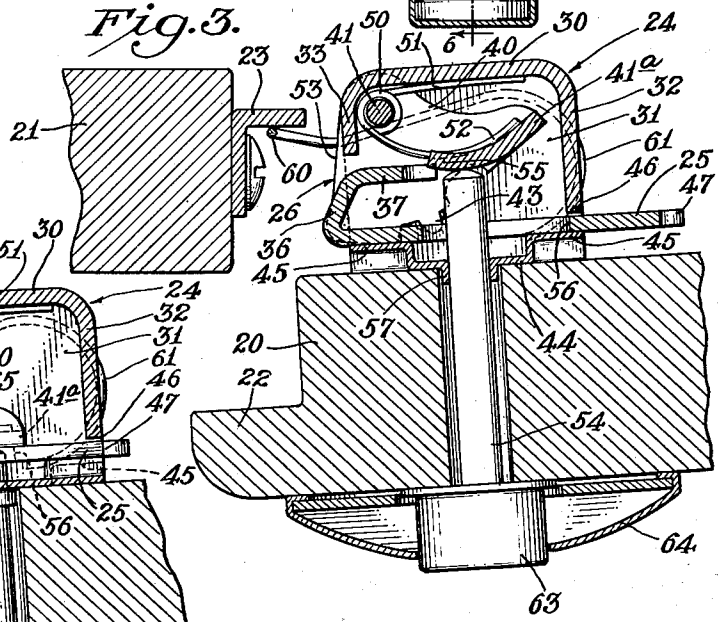
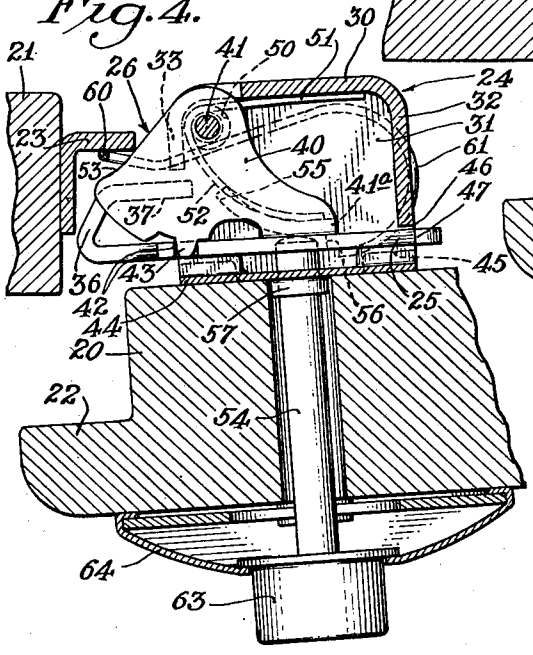


Fig. 4.



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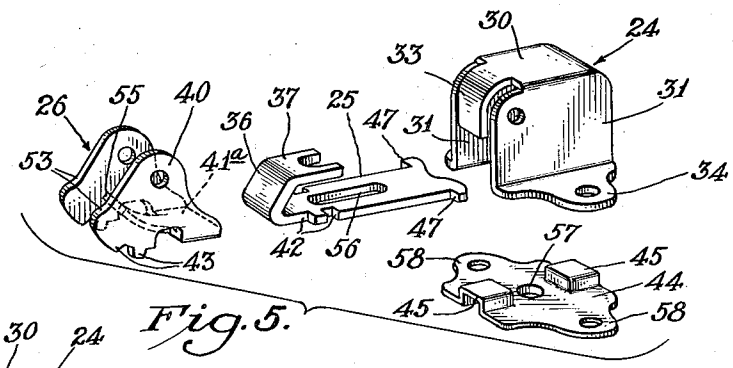


Fig. 5.

Fig. 6.

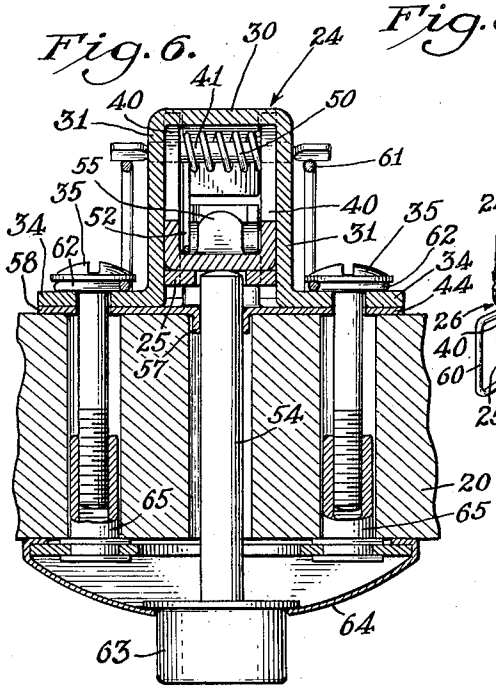


Fig. 7.

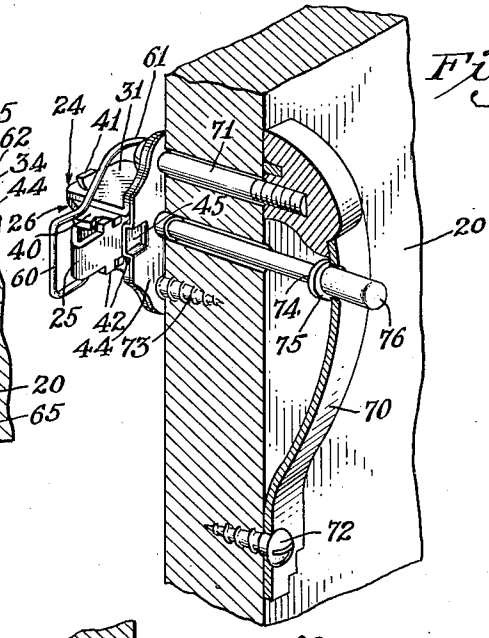
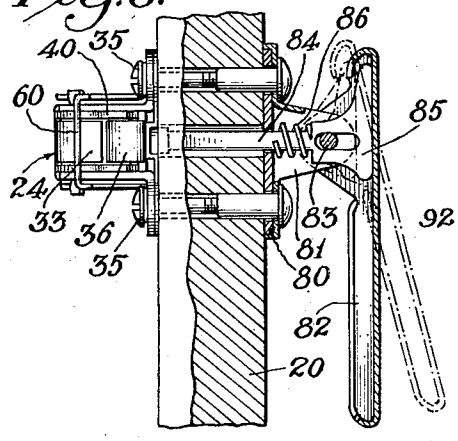


Fig. 8.



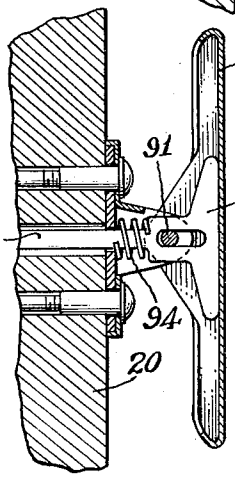


Fig. 9.

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UNITED STATES PATENT OFFICE

2,233,278

CATCH

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Application October 14, 1938, Serial No. 234,886

13 Claims. (Cl. 292—191)

The invention relates generally to catches and more particularly to a catch for the door of a cabinet or cupboard.

The general object of the invention is to provide a novel catch which has a positive locking action when engaged with its strike, but may be easily released manually and passes the strike with a smooth easy action upon closing the door.

It is also an object to provide a novel catch having a bolt movable by an actuator which constitutes the sole means for moving the bolt.

A further object is to provide a novel catch provided with a bolt having a rectilinear movement and actuated by a pivoted member so related to the strike that in closing the door the pivoted member and strike coact in such a manner as to provide a smooth easy action in swinging the bolt.

Another object is to provide a novel catch all the principal parts of which are adapted to be made of sheet metal so that the catch is relatively inexpensive to manufacture.

Still another object is to provide a catch of the foregoing general character, which may, if desired, be provided with a spring for throwing open the door upon release of the catch, the spring being of a simple form and easily installed.

A still further object is to provide a novel catch which is manually releasable by a simple push pin extending through the door and adaptable for use in connection with different types of handles.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary front view of a door of a cabinet provided with a catch embodying the features of the invention.

Fig. 2 is an enlarged horizontal section taken on the line 2—2 of Fig. 1 and showing the door in its closed position.

Fig. 3 is a section similar to Fig. 2 but showing the catch with its parts in their disengaged position and the door slightly open.

Fig. 4 is an enlarged horizontal section taken on the line 4—4 of Fig. 1 and showing the door about to be closed.

Fig. 5 is a perspective view showing various parts of the catch.

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

Fig. 7 is a perspective view showing a modified form of door handle adapted for use in connection with the catch.

Fig. 8 is a section showing another type of door handle adaptable for use with a catch.

Fig. 9 is a fragmentary section showing still another type of door handle adapted for use with a catch.

As mentioned above, a catch embodying the features of the invention is adapted for use in connection with the door of a cabinet, cupboard or the like. For purposes of illustration, a fragment of the cabinet is shown in the drawings, comprising a door 20 and a door frame 21. As shown herein, the door 20 has a lip 22 extending around its periphery and adapted to abut against the outer face of the frame 21 when the door is closed.

The catch is adapted to be mounted on the inner face of the door and has an operating member extending through a hole in the door for actuation by manually operable means mounted on the outer face of the door. The catch is adapted to cooperate with a strike 23 mounted on the door frame. In the present instance the strike 23 comprises a small angle plate having one leg secured to the edge surface of the door frame as by screws and the other leg extending parallel to the door.

The catch is generally of the spring type, that is, of the type which automatically locks upon closing the door. A catch embodying the features of the invention comprises generally a bolt engageable with the strike 23 when the door is closed, and an actuator for the bolt which constitutes the sole means for moving the bolt whether it be by the manually operable means, or under the influence of the spring, or in coaction with the strike 23 upon closing the door. The bolt has a rectilinear movement, thereby effecting a positive locking action, but because of the fact that it is actuated under all circumstances solely by the actuator, it is easily retracted upon manipulation of the hand operable means and has a smooth easy action upon closing the door. The catch is so constructed that its various parts may be made of sheet metal, and a spring may be utilized with the catch for throwing the door open when the bolt is retracted, which spring is attachable when the catch is installed upon the door. The bolt actuator is operated by means of a simple push pin extending through the door, necessitating only the provision of a hole therethrough for the passage of the pin and making the catch adaptable for use with various types of handles.

As shown in the drawings, the preferred embodiment of the invention comprises a casing, in-

dicated generally at 24, adapted to be secured on the inner face of the door 20. Slidably mounted within the casing 24 is a bolt 25 and an actuator, indicated generally at 26. The casing 24 is made of sheet metal and comprises a top wall 30, two side walls 31 at right angles to the top wall 30, and a back wall 32. The casing also has a front wall 33 which is cut short, as shown in Figs. 2, 3 and 5, to permit the bolt 25 to extend beyond the casing and engage the strike 23. The side walls 31 are extended and bent outwardly, as at 34 (see Figs. 5 and 6), to lie flat against the inner face of the door 20 and be secured thereto as by screws 35.

The bolt 25 comprises a flat strip of metal having its forward or strike engaging end bent at an angle away from the door, as at 36, and thence inwardly toward the casing, as at 37. The bolt actuator 26 comprises a pair of sector-shaped side portions 40 lying parallel to and just inside of the side walls 31 of the casing. The portions 40 are pivotally supported by a pin 41 located adjacent their apex, the pin being in turn supported by the side walls 31 of the casing. The sector-shaped portions 40 are stamped from sheet metal and are integral with a connecting web portion 41a located at the rear part of their arcuate edges.

The actuating member 26 is associated with the bolt 25 in such a manner as to cause the bolt to have a rectilinear movement upon pivotal movement of the actuator 26. Preferably the association between the actuator 26 and the bolt is of the rack and pinion type. To this end, the side edges of the bolt are notched, as at 42 (see Figs. 4 and 5), to provide teeth constituting a rack meshing with gear teeth 43 cut in the arcuate edges of the sector-shaped portions 40 of the actuator. Thus upon swinging motion of the actuator 26 the bolt is moved back and forth within the casing, the forward end of the bolt moving sufficiently to pass by the strike 23.

The bolt is supported for such rectilinear movement by a plate, indicated at 44, constituting a closure for the casing 24. The plate is provided with a pair of indented portions 45 providing flat surfaces upon which the bolt may slide. At its rear end the bolt extends beyond the casing through an aperture provided by cutting the end of the rear wall 32 short, as indicated at 46. The forward end of the bolt is held against the sliding surface 45 by the engagement of the gear teeth 43 on the actuator. When the bolt is in its locking position, as shown in Fig. 2, an outwardly directed force on the door tends to move the bolt away from the door. As will be noted from Fig. 2, the contact of the bolt with the actuator is substantially in line with the pivotal axis of the actuator. Thus, with such force on the door, there is no tendency to swing the actuator and consequently no tendency to unlock the door. To prevent the bolt from moving too far in the direction of its locking position, the rear end of the bolt is provided with a pair of ears 47 extending laterally beyond the side edges of the bolt to engage with the rear edges of the side walls 31 of the casing. The bolt is thus limited in its forward movement.

To cause the bolt to automatically move to its locking position, a torsion spring 50 is mounted on the pivot pin 41 for the actuator. One end of the torsion spring (indicated at 51) bears against the inner surface of the top wall 30 of the casing, while the other end of the spring is bowed, as at 52, to bear against the web portion 41a of the actuator. Thus the spring tends to swing the actuator in such direction as to move the bolt to its locking position.

One of the prominent features of the invention lies in the provision of an actuator which causes the bolt to be retracted upon closing the door so that the bolt may pass the strike 73. It will be noted in Fig. 4 that the forward edges, indicated at 53, of the sector-shaped portions 40 of the actuator will engage the strike 23, upon closing the door, before the bolt can engage the strike. The strike thereupon has a camming action upon the edges 53 and causes the actuator to swing inwardly of the casing, thereby retracting the bolt. Since the edges 53 of the actuator are relatively long, their angle relative to the strike may be small so that the camming action is effected by a minimum of effort. Thus the bolt will be retracted upon closing the door with a smooth and easy action.

For manual operation of the catch, the actuator is adapted to be swung by means extending through the door to the exterior surface thereof. In the present instance such means comprises a push pin 54 bearing against the web portion 41a of the actuator to the rear side of the pivotal axis thereof so that the actuator will be swung in a direction to retract the bolt. In order to provide a direct bearing for the pin 54 against the actuator, the web portion 41a has an inwardly extending lip 55 curved inwardly between the sector-shaped portions 40, with a curvature such that the end of the pin 54 bears squarely against the lip 55 throughout the extent of movement of the parts. The bolt is provided with a central longitudinal slot 56 so that the pin 54 may extend therethrough into contact with the lip 55. The pin 54 is slidably supported at its inner end by a flanged aperture 57 formed centrally of the closure plate 44. The closure plate 44 is preferably held in place by laterally extending ears 58 corresponding in shape with the ears 34 of the casing. The closure plate 44 is secured in place merely by being interposed and clamped between the casing and the rear face of the door by means of the attaching screws 35.

Another prominent feature of the invention lies in the fact that the catch may be readily provided with a spring of simple construction for causing the door to swing open upon retraction of the bolt. To simplify the installation of such a spring it is constructed so that it may be secured in place by the screws 35 which attach the catch to the door. As shown in the drawings, the spring is of generally U-shaped form having its intermediate or web portion 60 adapted to engage against the front face of the strike 23. The arms of the U are bowed out of the plane of the U, as indicated at 61, to extend adjacent the side walls 31 of the casing and toward the attaching screws 35. The ends of the spring are looped, as at 62, to fit under or be held by the heads of the attaching screws 35. When the door is open, the spring occupies the position indicated at Figs. 3 and 4. However, upon forcing the door closed, the bowing 61 of the arms of the spring is increased, as shown in Fig. 2, since the strike holds the web portion 60 of the spring while the door is forced inwardly. Upon retraction of the bolt, the resiliency of the spring bearing against the strike causes the door to swing outwardly. The spring is preferably held under an initial tension or bowing by extending the ends of the pivot pin 41 to engage the bowed portions of the spring, as shown in Figs. 3, 6 and 7.

Since a catch embodying the features of the invention is manually operable by means of a simple push pin, it is adaptable for use with various types of handles. As shown in Figs. 1 to 6, inclusive, the push pin **54** is provided on its outer end with a simple push button **63** secured to the outer end of the pin. The push button **63** is slidably supported by an escutcheon plate **64** which preferably is secured to the front face of the door by the screws **35** utilized for securing the catch to the rear face. Thus tubular nuts **65** secured to the escutcheon plate **64** extend rearwardly through holes drilled in the door for engagement with the screws **35**, as shown in Fig. 6.

In Fig. 7 I have shown a modified form of handle for use in connection with the device. As shown in this figure a handle **70** is provided, the upper end of which is preferably secured to the door by one of the screws, indicated at **71**, by which the catch is attached to the rear face. The lower end of the handle **70** may be secured to the door by an ordinary screw **72** and the lower end of the catch may be secured to the door by a similar screw **73**. The push pin, indicated at **74**, in this instance is provided with a flange **75** abutting against the inner face of the handle and an outwardly projecting portion **76** extending through the handle. Thus the handle **70** may be grasped and the thumb utilized for operating the push pin **74**.

In the forms shown in Figs. 8 and 9, a tilting type of handle is used. Thus in Fig. 8 an escutcheon plate **80** is secured to the front face of the door by the screws utilized for attaching the casing thereto. The escutcheon plate **80** has a pair of forwardly extending ears **81** pivotally supporting a handle **82** by a pin **83**, the portion of the handle **82** adapted to be grasped by the hand, extending downwardly from the pivot. The push pin, indicated at **84**, carries on its outer or front end an L-shaped portion **85** slidably mounted on the pin **83** and extending into the upper portion of the handle **82**. On pulling the lower portion of the handle **82** outwardly, the L-shaped portion **85** is forced inwardly, causing the push pin to operate the catch. A small compression spring **86** is preferably placed around the push pin **84** to bear between the escutcheon plate **80** and the L-shaped portion **85** to cause the push pin **84** to slide outwardly and the handle to assume a vertical position when not in use.

In Fig. 9 I have shown a handle somewhat similar to that shown in Fig. 8, except that it is adapted to operate the push pin either by pushing or pulling at the top or bottom thereof. As shown in this figure, the handle, indicated at **90**, extends equally above and below its pivot **91**. The push pin, indicated at **92**, has a T-shaped head **93** slidably supported on the pivot pin **91** and pressed outwardly by a compression spring **94**. On pushing or pulling either the upper or the lower portion of the handle **90** the push pin **92** will be forced inwardly to operate the catch, and the spring **94** will hold the handle in a vertical position when not in use.

In operation, assuming that the door is closed, as shown in Fig. 2, the push button **63** is pushed inwardly, causing the push pin **54** to swing the actuator **26** against the action of the torsion spring **50**. The gear teeth on the actuator slide the bolt inwardly of the casing so that it may pass the strike **23**. As soon as the bolt has cleared the strike **23**, the pressure of the door opening spring due to the bowing **61** thereof causes the door to swing open. Upon release of the push button the torsion spring **50** swings the actuator to move the bolt to its locking position.

Upon closing the door, the edges **53** of the side portions **40** of the actuator first contact the strike **23**. Upon further inward movement of the door, the strike has a camming action on the edges **53** causing the actuator to retract the bolt. As soon as the edges **53** in the bolt have passed the strike, the torsion spring **50** causes the actuator to swing and move the bolt to its locking position. Such locking position is determined by contact of the ears **47** on the rear end of the bolt with the casing. Should there be a force tending to open the door when the bolt is in such locking position, the pressure thereby exerted upon the bolt is transmitted to the actuator, but since the point of contact of the actuator and the bolt is directly in line wih the pivotal axis of the actuator, as shown in Fig. 2, such pressure has no tendency to swing the actuator.

From the foregoing, it will be evident that I have provided a catch adaptable for use in connection with cabinet or cupboard doors, which has a positive locking action because of the rectilinear movement of the bolt, and may be easily operated manually to release it. The catch is of the spring type, that is, one in which the bolt is automatically retracted to permit the door to close and automatically returns to its locking position. By virtue of the fact that the strike contacts the bolt actuator on the relatively long gradually sloping surfaces **53**, the parts are easily moved by contact with the strike and the bolt moves back with a smooth easy action. Thus the strike does not contact the bolt to cause retraction thereof, but rather contacts the actuator, and the latter constitutes the sole means for moving the bolt. The parts of the catch are so constructed that they may be made of sheet metal, thus affording an inexpensive construction. The spring for causing the door to swing open upon retraction of the bolt is of extremely simple construction and may be readily installed. Because the catch is manually operable by a simple push pin, it is obvious that it is adaptable for use with various types of handles.

I claim as my invention:

1. A catch of the character described comprising, in combination, a bolt having a rectilinear movement to and from its locking position, and a pivoted member for moving the bolt, said bolt being moved to and from its locking position solely by said member when the catch is operated by hand, when the bolt is caused to be retracted upon closing the door, or when spring operated.

2. A catch of the character described comprising, in combination, a bolt engageable with a strike and having a rectilinear movement to and from its locking position, a pivoted member for actuating said bolt in both directions, a manually operable pin for swinging said member to retract the bolt, and a torsion spring for swinging said member to move the bolt to its locking position, said pivoted member also being engageable by the strike for swinging it to retract the bolt.

3. A catch comprising, in combination, a bolt, a pivoted member for actuating the bolt, and a pin for swinging the pivoted member, said member being made of sheet metal and having a pair of spaced sector-shaped portions pivoted adjacent their apex, and a web portion connecting the sector-shaped portions, said web portion be-

ing cut away to provide a lip curved to bear squarely against the end of the pin throughout the movement of the parts.

4. A catch comprising, in combination, a bolt comprising a flat strip of sheet metal, a pivoted member for actuating the bolt comprising a pair of spaced sector-shaped portions pivoted adjacent their apex, and a web portion connecting one end of the arcuate edges of said sector-shaped portions, the arcuate edges of said sector-shaped portions having teeth meshing with teeth cut in the edges of said bolt.

5. A catch comprising, in combination, a bolt comprising a flat strip of metal having teeth in its side edges, and a member for actuating the bolt pivoted on an axis parallel to the plane of the bolt and comprising a pair of sector-shaped portions pivoted adjacent their apex and having teeth in their arcuate edges meshing with the teeth in said bolt.

6. A catch comprising, in combination, a casing, a bolt slidable in the casing, one end of the casing having an opening through which the bolt extends and serving as a guide for the adjacent end of the bolt, and a member pivotally supported in the casing for actuating the bolt, said member coacting with the casing in guiding the other end of the bolt.

7. A catch comprising, in combination, a casing, a bolt mounted in said casing and extending therefrom for engaging a strike, means for securing the casing to a door, and a spring secured by said means and engageable with said strike for opening the door when the bolt is retracted.

8. A catch comprising, in combination, a casing adapted to be secured to a door by screws, a bolt mounted in said casing and extending therefrom for engaging one side of a strike, and a wire spring having a U-shape with the arms of the U bowed out of the plane of the U and held by said screws, the intermediate portion of the U being positioned to engage the other side of the strike, the spring being compressed by closing the door and thereby swinging the door open when the bolt is retracted.

9. A catch of the character described comprising, in combination, a bolt adapted to engage a strike when in its locked position, and means for actuating said bolt in both directions, said means being operable manually and by contact with the strike upon closing the door for moving the bolt in one direction and being spring actuated for moving the bolt in the other direction.

10. A catch of the character described comprising, in combination, a bolt adapted to engage a strike when in its locked position, an actuator for moving the bolt to and from its locked position, said actuator being operable in one direction by contact with the strike upon closing the door, manually operable means for moving said actuator in the same direction, and a spring bearing against said actuator for moving it in the opposite direction.

11. A catch comprising, in combination, a casing adapted to be secured to the inner surface of a door, a bolt slidably mounted in the casing parallel to and adjacent said inner surface and having a flat portion, a member mounted in said casing and having operating contact with the bolt at the respective side edges of said flat portion, and a pin for operating said member adapted to extend through the door and bearing against said member intermediate said side edges, said bolt having a slot through which said pin extends.

12. For a door having a catch adapted to engage a strike and adapted to be secured to the door by screws passing through a pair of spaced ears, a device for opening the door when the catch is released comprising a wire spring bent generally into the shape of a U with the intermediate portion of the U adapted to engage the front face of the strike when the door is closed, each arm of the U being reversely bowed out of the plane of the U to exert a torsional force tending to open the door, the ends of the arms being formed to fit around and to be held in place by the screws for securing the catch to the door.

13. For a door having a catch adapted to engage a strike and adapted to be secured to the door by screws passing through a pair of spaced ears, a device for opening the door when the catch is released comprising a wire spring bent generally into the shape of a U with the intermediate portion of the U adapted to engage the front face of the strike when the door is closed, each arm having its free end fixedly secured by the one of the screws for securing the catch to the door, and each arm being shaped to exert a torsional force tending to open the door.

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