April 21, 1959 W. L. CLIFTON, JR 2,882,711

DOOR AND LOCK ASSEMBLY

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Fig 1.

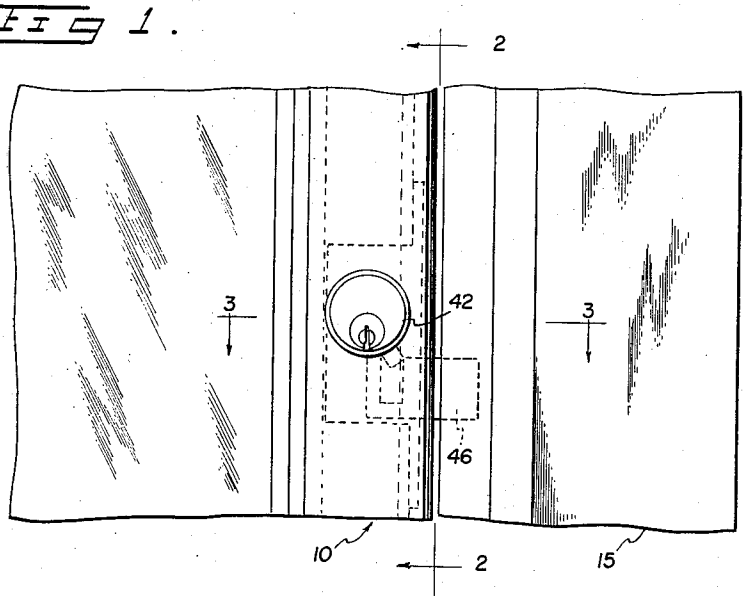


Fig 2.

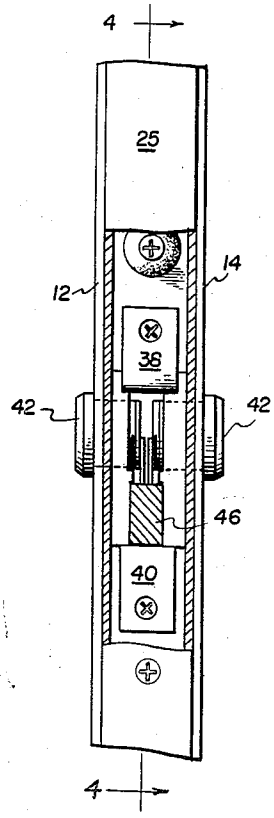
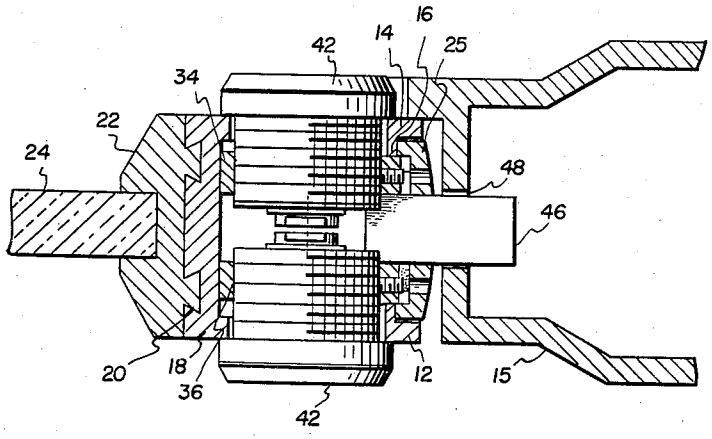


Fig 3.



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FIG 5.

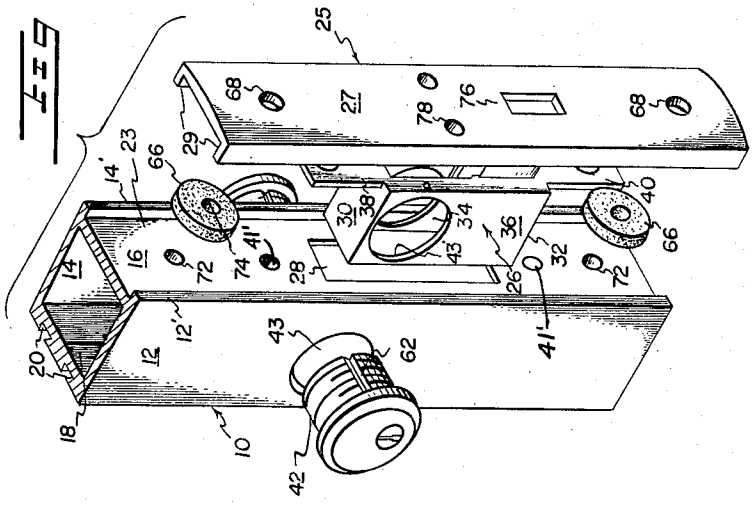


FIG 6.

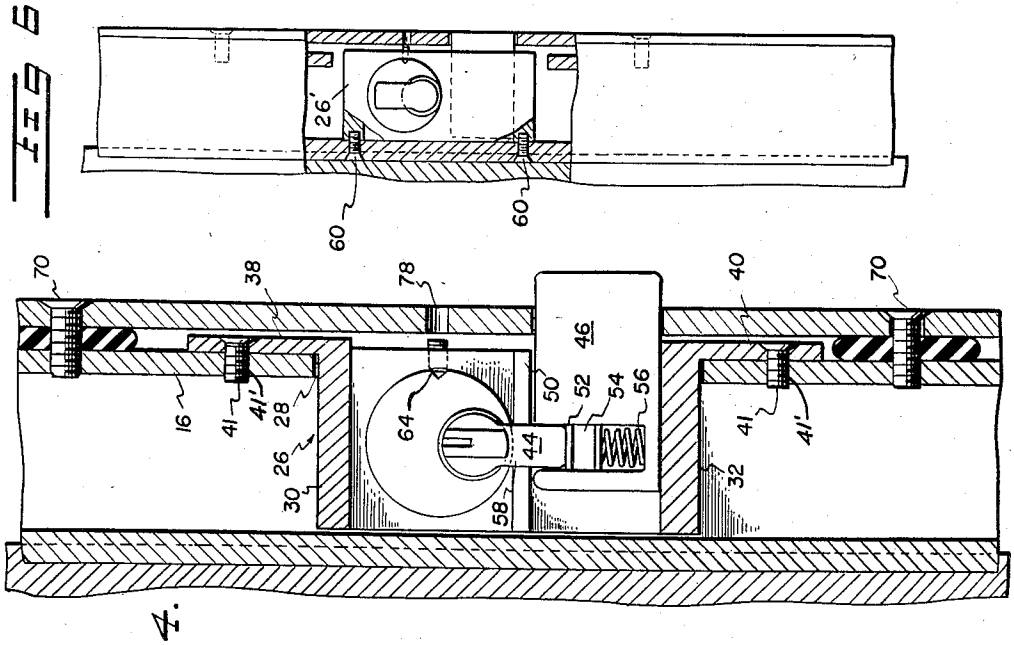


FIG 4.

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DOOR AND LOCK ASSEMBLY

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Application February 1, 1954, Serial No. 407,373

9 Claims. (Cl. 70—451)

This invention relates to door and lock assemblies and more particularly to an assembly of a door and a door locking mechanism especially useful in connection with metal doors.

It is an object of this invention to provide an assembly of a door stile and a door locking mechanism which is easily assembled and disassembled.

It is a further object of this invention to provide a door and lock assembly in which all of the locking elements are contained in a one-piece housing which may be easily installed or removed from the door stile.

It is a still further object of this invention to provide an assembly of a door stile and a lock mechanism in which the lock mechanism is a sub-assembly adapted to be received in a recess in the door stile.

Still another object of the invention is to provide an assembly of a door stile and a lock casing which permits accurate dimensional control of all parts to insure complete interchangeability.

Still a further object of the invention is to provide in combination with the door and lock assembly an adjustable astragal which eliminates the necessity for face plates thereby presenting a pleasing continuous appearance, which allows control of clearance at the strike edge of the door stile, and which provides easy access to the lock case.

In accomplishing these objectives, this invention provides a one-piece lock casing which receives a pair of key-operated locking cylinders having rotatable cam members operating a lock throw member. The throw member is also received in the lock casing and includes a spring-biased saddle member which cooperates with the cam members to advance or retract the throw member. The casing which contains the lock elements is adapted to be received in the interior of a hollow door stile through a recessed web adjacent the strike edge of the door stile. An adjustable astragal is mounted along the strike edge of the door stile in such manner as to cover the lock casing, at the same time permitting freedom of movement of the lock throw member. The astragal is removable to permit access to the lock casing and also is adjustable to permit adjustment of the clearance between the door stile and the strike edge of the door frame.

Further objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a front elevation view, partially cut away, of a door having a lock assembly in accordance with the invention, the door being shown in locked relation with respect to a door frame;

Fig. 2 is a view in section along line 2—2 of Fig. 1, with the astragal partially cut away to show the manner in which the lock is attached to the door stile;

Fig. 3 is a view in section along line 3—3 of Fig. 1;

Fig. 4 is a view in section along line 4—4 of Fig. 2;

Fig. 5 is a perspective exploded view of the door stile and lock assembly of Figs. 1–4; and

Fig. 6 is a side elevation view, partially cut away, showing a slightly modified form of door stile and lock assembly in unlocked position.

Referring now to the drawings, the door stile generally indicated at 10, which may be made of aluminum or some other suitable metal, and is of substantially hollow rectangular shape in horizontal cross-section, comprises front and rear walls 12 and 14, respectively, and side walls or webs 16 and 18. The web 16 is disposed adjacent the strike edge of the door stile while the web 18 is spaced from the strike edge. The web 18 is provided with vertically extending dovetail slots 20 which engage the member 22 which carries the door panel 24. The web portion 16 is spaced inwardly a short distance from the outer edges 12' and 14' of the front and rear walls 12 and 14 to thereby define a channel 23. An adjustable astragal 25 which will be described in more detail hereinafter is adapted to be received in the channel 23.

In accordance with the invention, a lock casing generally indicated at 26 passes through an opening 28 in the web 16 and is positioned in the interior of the hollow door stile 10. The lock casing 26 is a generally rectangular hollow member having top and bottom walls 30 and 32 which lie in planes parallel to each other but perpendicular to the planes of the front and rear walls 12 and 14 of the door stile 10. The top and bottom walls 30 and 32 of the lock casing are joined together by front and rear walls 34 and 36 which lie in planes substantially parallel to each other and also parallel to the front and rear walls 12 and 14 of the door stile.

In the form of the invention shown in Figs. 1–5, the lock casing 26 is provided at its end directed toward the strike edge of the door stile with attachment flanges or bracket members 38 and 40 which are respectively connected to the top and bottom walls 30 and 32 of the casing. The brackets or flanges 38 and 40 are attached to the web member 16 by means of screws 41 which pass through apertures 41' in the web 16 and serve to retain the casing 26 securely in position within the door stile 10.

The front wall 12 of the door stile and the corresponding wall 36 of the lock case are provided with aligned circular apertures 43 and 43', respectively, to receive a lock cylinder 42 which may be of a conventional type. Similarly, the rear wall 14 of the door stile and the corresponding wall 34 of the lock case are provided with aligned apertures to receive another lock cylinder 42. The two lock cylinders 42 permit the door to be locked or unlocked from either the inside or outside of the door. Each of the lock cylinders 42 supports at its innermost end a key-operated locking cam 44 which is engageable with a horizontally slidable throw member 46 carried by the casing 26. The throw member 46 is movable into the actuated position shown in Figs. 1, 3 and 4 to engage a recess 48 provided in the door frame 15.

The throw member 46 is supported by the upper surface of the bottom wall 32 of the casing and is guided along its upper edge by track or guide members 50 which project laterally inwardly from the inner surfaces of the walls 34 and 36 of the lock casing. The throw member 46 is provided with a vertical recess 52 which extends downwardly from the upper surface of the throw member. A saddle 54 is vertically movable up and down in the recess 52. The saddle 54 is normally biased to an upward position by a spring 56. One end of spring 56 bears against the underneath surface of the saddle 54 and the opposite end of the spring bears against the bottom surface of the recess 52. The upward movement of saddle 54 is limited by the guide members 50.

When the throw member 46 is in an unlocked or retracted position, rotation of the key member in a direction which rotates the cam 44 in a counterclockwise di-

rection with respect to the view shown in Fig. 4 causes the cam 44 to depress the saddle member 54 against the upward biasing force of the spring 56. The cam 44 begins to force the throw member 46 forwardly into locking position. In the position shown in Fig. 4, the cam 44 is in dead center position. When the cam is moved just slightly beyond dead center in a counterclockwise direction, the force of the spring 56 will suddenly and forcibly raise the saddle 54 and eject the cam 44 from the slot 52, at the same time forcing the throw member 46 to its extreme advanced or locking position. To unlock the door and return the throw member 46 to its unlocked position, the key of either one of the cylinders 42 is turned in such manner as to rotate the cam member 44 in a clockwise direction with respect to the view shown in Fig. 4 to thereby depress the saddle 54 against the biasing force of the spring 56 and cam the throw member 46 to the left toward the unlocked position. When the cam member 44 passes the dead center position shown in Fig. 4, the spring will forcibly raise the saddle 54 and eject the cam 58 from the slot 52 and, in so doing, force the throw member 46 to its extreme retracted or unlocked position.

In the modified construction shown in Fig. 6, the lock case 26' is not provided with angle brackets 38 as in the construction of Figs. 1–5. Instead, the case is supported within the door stile by means of screws 60 which pass through the wall 18 of the door stile and into the top and bottom walls of the lock casing.

In order to retain the lock cylinders 42 in a fixed position with respect to the lock casing, each of the lock cylinders is provided with an axially extending groove 62 on its outer surface and a set screw 64 passes through the outer face of the lock casing and into engagement with the groove of the lock cylinder to thereby retain the lock cylinder in place.

As will best be seen in the view of Fig. 5, the astragal 25 is provided with an outer face 27 and a pair of inwardly disposed edge members 29. The lateral width of the astragal is just slightly less than the lateral width of the channel 23 formed by the outer edges 12' and 14' of the front and rear walls 12 and 14 of the door stile so that the astragal is received within the channel 23. The astragal 25 extends for the entire height of the door stile and is spaced from the door stile preferably by means of resilient spacer members 66, of which two are shown in the drawings. The spacers 66 are disposed in the space between the outer surface of web 16 and the inner surface of the portion 27 of the astragal. The astragal 25, the resilient spacers 66 and the web 16 are respectively provided with aligned apertures 68, 74 and 72 through which screws 70 pass to secure the astragal to the web. The clearance between the outer face 27 of the astragal and the strike edge of the door frame may be adjusted by adjustment of the screws 70 to thereby adjust the spacing between the astragal 25 and the web 16. Due to the resilient characteristics of the spacer members 66, these members change their dimensions to conform to the changed spacing of the astragal 25 with respect to the web 16. The astragal is provided with a rectangular aperture 76 to permit passage of the lock throw member 46. As can be seen from the drawings, the size of aperture 76 is such that throw member 46 substantially fills the aperture whereby the outer face 27 of the astragal presents a substantially continuous appearance, unbroken by any lock face plate. The astragal is also provided with apertures 78 to permit adjustment of the set screws 64 which retain the locking cylinders 42 in position without the necessity of removing the astragal.

It can be seen from the foregoing that there is provided in accordance with this invention an improved assembly of a door and locking mechanism in which the locking mechanism is contained in an easily removable sub-assembly received within the door stile. Furthermore, the use of the adjustable astragal permits easy adjustment of the clearance between the door stile and the strike edge of the door frame and, at the same time, provides easy access to the lock casing contained within the door stile.

While there have been shown and described particular embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications can be made therein without departing from the invention and, therefore, it is aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as my invention is:

1. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls and defining therewith a channel opening toward the strike edge of said door stile, a lock mechanism positioned within said hollow door stile, said door stile web having an opening receiving a portion of said lock mechanism and said mechanism including a lock throw member movable inwardly and outwardly with respect to the strike edge of said door stile, and astragal received within said channel, said astragal extending substantially the full length of said door stile and having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said astragal opening and substantially filling said astragal opening whereby said astragal presents a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in said channel in adjustable spaced relation to said web.

2. A door and lock assembly according to claim 1 wherein said astragal mounting means includes resilient spacer members located between said astragal and said web.

3. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls and defining therewith a channel opening toward the strike edge of said door stile, a lock mechanism positioned within said hollow door stile, said door stile web having an opening receiving a portion of said lock mechanism and said mechanism including a lock throw member movable inwardly and outwardly with respect to the strike edge of said door stile, a lock cylinder for moving said lock throw member extending through the front wall of said door stile and having a key receiving opening therein, means in said lock mechanism engaging said lock cylinder to maintain said cylinder in a predetermined position with respect to said front wall, an astragal received within said channel, said astragal extending substantially the full length of said door stile and having an opening therein providing access to said lock cylinder engaging means, said astragal also having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said opening and substantially filling said opening whereby said astragal presents a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in said channel in adjustable spaced relation to said web.

4. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls and defining therewith a channel opening toward the strike edge of said door stile, a lock mechanism positioned within said hollow door stile, said door stile web having an opening receiving a portion of said lock mechanism and said mechanism including a lock throw member movable inwardly and outwardly with respect to the strike edge of said door stile, two lock cylinders each operable to move said lock throw member, one of said cylinders extending through the front wall of said door stile and the other cylinder extending through the rear wall of said door stile, both cylinders having a key receiving opening therein whereby the door can be locked from either side, an astragal re-

ceived within said channel, said astragal extending substantially the full length of said door stile and having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said astragal opening and substantially filling said astragal opening whereby said astragal presents a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in said channel in adjustable spaced relation to said web.

5. A door and lock assembly according to claim 4 wherein said lock mechanism includes means engaging each lock cylinder to maintain said cylinder in a predetermined position with respect to the wall through which said cylinder extends, and said astragal includes openings providing access to said cylinder engaging means.

6. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls and defining therewith a channel opening toward the strike edge of said door stile, a lock mechanism including a lock casing having flange members extending therefrom and engaging said web to retain said mechanism in position within said hollow door stile, said web having an opening therein receiving said lock casing and said casing being movable outwardly with respect to said door stile through said opening, said lock mechanism also including a lock throw member, an astragal received within said channel, said astragal extending substantially the full length of said door stile and having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said astragal opening and substantially filling said astragal opening whereby said astragal presenst a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in said channel in adjustable spaced relation to said web.

7. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls adjacent the strike edge of said door stile, a lock mechanism positioned within said hollow door stile, said door stile web having an opening receiving a portion of said lock mechanism and said mechanism including a lock throw member movable inwardly and outwardly with respect to the strike edge of said door stile, an astragal overlying said web, said astragal extending substantially the full length of said door stile and having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said astragal opening and substantially filling said

astragal opening whereby said astragal presents a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in overlying relation to said web.

8. A door and lock assembly according to claim 7 wherein said astragal mounting means is adjustable and includes means for maintaining said astragal in adjustable spaced relation to said web.

9. A door and lock assembly comprising a hollow door stile having front and rear walls, a web extending between said front and rear walls adjacent the strike edge of said door stile, a lock mechanism positioned within said hollow door stile, said door stile web having an opening receiving a portion of said lock mechanism and said mechanism including a lock throw member movable inwardly and outwardly with respect to the strike edge of said door stile, a lock cylinder for moving said lock throw member extending through the front wall of said door stile and having a key-receiving opening therein, means in said lock mechanism engaging said lock cylinder to maintain said cylinder in a predetermined position with respect to said front wall, an astragal overlying said web, said astragal extending substantially the full length of said door stile and having an opening therein receiving said lock throw member, said throw member being movable inwardly and outwardly with respect to said strike edge through said opening and substantially filling said opening whereby said astragal presents a substantially unbroken surface at the strike edge of said door stile, and means mounting said astragal in adjustable spaced relation to said web.

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