July 4, 1950 A. G. DEAN 2,514,033

DOOR OPERATOR

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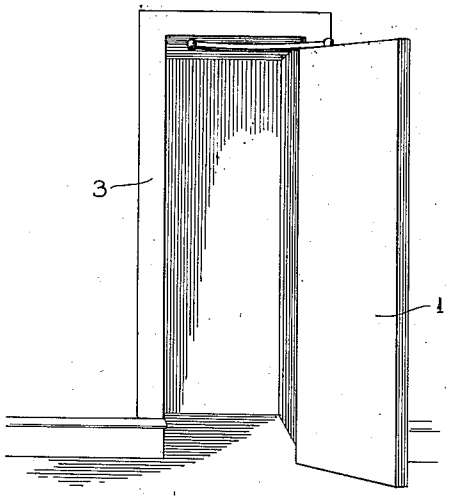


FIG. 1

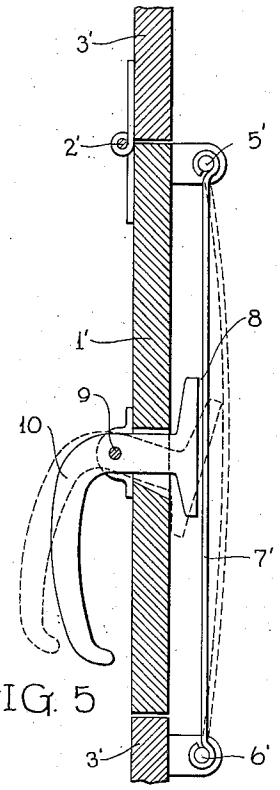


FIG. 5

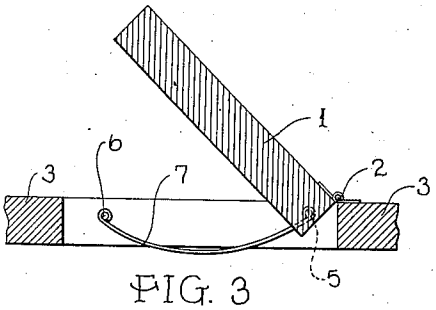


FIG. 3

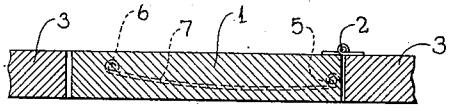


FIG. 2

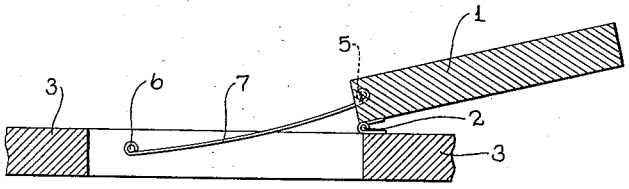


FIG. 4

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DOOR OPERATOR

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4 Claims. (Cl. 16—73)

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This invention relates to closure operators as for doors and the like and has for an object the provision of improvements in this art.

One of the particular objects is to provide a very simple and inexpensive device for operating doors and the like.

Another object is to provide an operating device which is mounted to move over a dead center point of a closure to hold it securely in either open or closed position.

Another object is to provide a resilient closure operator which also functions as a locking device to maintain the closure in a predetermined position until released.

The above and other objects and advantages of the invention will be apparent from the following description of an exemplary embodiment, reference being made to the accompanying drawings, wherein:

Figure 1 is a front elevation of a door equipped with an operating device according to the present invention;

Figure 2 is a horizontal section looking upward with the door in closed position;

Figure 3 is a similar section showing the door partly open;

Figure 4 is a similar section showing the door fully open; and

Figure 5 is a similar section of a modification in which the closing element is also employed for locking the door in closed position.

A closure such as a door 1 is mounted by hinges 2 upon a fixed support such as a frame 3. At a convenient point, as for example at the top of the door there is secured by pivot pins 5 and 6 to the door and frame respectively, a stiff resilient rod-like spring element 7. This rod spring has an inherent slight deviation from straight but is so nearly straight as to keep the door firmly closed, as shown in Figure 2.

When the door is opened the spring is bent as its movable pivot pin 5 moves over dead center position defined by a straight line passing through the axis of pivot pins 5 and 6 and the axis of the door hinge. The spring bends in the direction of its inherent set curvature. It will work even if it is perfectly straight and without inherent set but is somewhat harder to move out of initial position.

If the door is not otherwise stopped it will swing out until the spring is substantially straight again, as shown in Figure 4. Here it holds the door against closing and against engagement with the adjacent wall. The door must be pulled against the spring until past dead

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center position to close, just as was the case in opening.

In the Figure 5 embodiment, the spring 7' is mounted just as before on pivots 5' and 6'; but a camming element 8 is placed on the door 1' where it may engage the spring 7'. The camming element is mounted on a pin 9 and provided with a handle 10. The spring has an inherent tendency to bend inward toward the cam 8 and thus holds the door securely locked until the handle 10 is operated to bend the spring in the opposite direction, as indicated in dotted lines.

The further action of the spring is the same as in the other embodiment. If from open position the spring, due to its predisposition or preset, bends in the opposite direction from that in which it was forced to bend when the door was opened it will do no harm.

It will thus be seen that the invention provides a very simple, inexpensive and easily installed device for operating doors or the like and for locking them in closed position.

While two embodiments of the invention have been illustrated and described by way of example, it is to be understood that there may be various embodiments within the limits of the prior art and the scope of the subjoined claims.

What is claimed is:

1. An operator for a hinged closure, comprising a stiff flexible rod-like element mounted at opposite ends to the closure and to a fixed anchorage in a position to be compressed endwise and bent when the closure is moved from a predetermined position, a straight line passing through the ends of the element crossing over the hinge axis of the closure when the closure moves between extreme positions, the element having a residual bow toward a resisting part to hold the closure in a predetermined position until the element is bowed in the opposite direction to release the closure, and means for shifting the element from its position of residual bow to the opposite side of its axis for bowing in action.

2. An operator for a hinged closure, comprising a stiff resilient rod-like element mounted at opposite ends to the closure and to a fixed anchorage in a position to be compressed endwise and bent when the closure is moved from a predetermined position, a straight line passing through the ends of the element crossing over the hinge axis of the closure when the closure moves between extreme positions, the element having a residual bow toward a resisting part to hold the closure in a predetermined position until the ele-

ment is bowed in the opposite direction to release the closure, and means for bowing the element to the releasing position.

3. Apparatus of the character described, comprising in combination, a closure hinged to swing between closed and open position, a spring rod element connected at opposite ends to the closure and to a fixed anchorage; the element having an inherent bow slightly past dead center when the closure is closed and in a direction to engage a fixed part and hold the closure securely against opening, and a latch for bowing the element in the opposite direction to permit the closure to open.

4. Apparatus of the character described comprising in combination, a closure hinged to a frame, and a stiff resilient spring rod element hinged at one end on a movable axis to the closure at a point adjacent the closure hinged axis and at the other end on a fixed axis to the frame at a point more distant from the closure hinge axis than said movable axis so that in one of the closed and open positions of the closure, the spring rod is substantially straight, said movable axis being so located that when the closure is moved from closed to open position the movable axis passes across a straight line between the closure hinge axis and said fixed axis of the spring rod element; whereby the closure initially

resists opening movement and thereafter is urged toward open position by the spring rod element, said spring rod being substantially straight but with a very slight bend such that if the rod be compressed by pressure on its ends in an attempt to operate the closure, it will move toward the closure and lock by halting its bending movement in this direction to prevent opening of the closure, and means for initially bending the spring rod past dead center in the direction away from the closure, whereby it is free to bend further to permit the closure to be opened.

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