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TITLE

Door with a shutter device.

BACKGROUND OF THE INVENTION

5 Various means of precaution against
strangers are available for those who are
hesitant to allow entry to a person at the
entrance before knowing the identity of the
person or the intent of the visitor. Among
these means of precaution against strangers
10 are door chains, fish eye lenses and TV
monitors. However, door chains and fish eye
lenses require one's presence at the door,
and TV monitors require a relatively
sophisticated and costly set up.

15 In view of the aforesaid problems with
conventional devices for precaution against
strangers, this invention offers a door with
a shutter device that can be operated either
directly by hand, or electrically from a
20 distance, to allow one to see the visitor
without opening the door.

BRIEF DESCRIPTION OF THE INVENTION

According to the present invention there is provided a door construction, comprising a first door panel having a plurality of through holes, a shutter panel moveably disposed to overlap said door panel, said shutter panel having a plurality of through holes of the same size and configuration as the openings of said door panel, a spring member for urging said shutter panel to remain at ^a~~the~~ first position, operating means for selectively moving said shutter panel from ^{said}~~the~~ first position where said openings of said shutter panel are out of alignment with said openings of said door panel, to a second position where said openings of said shutter panel are aligned with said openings of said door panel, said operating means comprising an operating rod having a first end connected to said shutter panel and a second end resiliently retained with respect to said door panels, said operating rod having a shoulder, a dog member with which said

shoulder of said operating rod engages when said shutter door is in said first position, and a pull rod operatively connected to said operating rod by a bell crank which, when
5 said pull rod is pulled, first causes said shoulder to disengage from said dog member and second causes said shutter panel to move from said first position to said second position.

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DRAWINGS

Figure 1 is a cross-sectional top view of a door with a shutter device of this invention, showing the arrangement of the door panels and the shutter panel;

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Figure 2 is a front view of the door with a shutter device of this invention, with the front door panel partially in section, and the operating device omitted from the drawing;

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Figure 3 is a schematic drawing showing the arrangement of the through holes when the shutter panel is in the "CLOSED" position;

Figure 4 is a schematic drawing showing the arrangement of the through holes when the shutter panel is in the "OPEN" position;

Figure 5 is a schematic view of the shutter panel showing the arrangement of the operating device; and

Figures 6 to 12 are examples of alternative shapes of the through holes that might be employed in the door panels and shutter panel.

DETAILED DESCRIPTION OF THE INVENTION

As shown in Figure 1, a door with shutter device of this invention comprises a door 1 having a front door panel 1A and rear door panel 1B, and a shutter panel 2 moveably disposed between front and rear door panels 1A and 1B. Front door panel 1A is provided with a plurality of through holes H1A, and rear door panel 1B is also provided with a plurality of through holes H1B identical in shape and corresponding in size and configuration with through holes H1A of front door panel 1A. Shutter panel 2 is provided with a plurality of through holes H2

identical in shape and corresponding in size and configuration with through holes H1A and H1B of front and rear door panels 1A and 1B.

In a preferred embodiment, as shown in Figure 2, shutter panel 2 is moveably suspended to an upper part 1C of door 1 with links 21, and urged from one side by spring member 22 disposed between a side edge 2A of shutter panel 2 and a side part 1D of door 1. A stopper 23 is provided within door 1 at the opposite side of shutter panel 2 so as to stop shutter panel 2 at a "CLOSED" position where through holes H2 of shutter panel 2 are out of alignment with through holes H1A and H1b of front and rear door panels 1A and 1B, as shown in Figure 3. Through holes H1A, H1B and H2 are so arranged that there is a sufficient space between each two neighbouring through holes H1A and H1B of a door panel 1A or 1B to cover through holes H2 of the shutter panel 2 when shutter panel 2 is at its "CLOSED" position, so that each through hole is "CLOSED" at this position.

Shutter panel 2 can be moved in

direction X as shown in Figure 2 to an "OPEN" position where through holes H2 of shutter panel 2 are moved to come into alignment with through holes H1A, H1B of front and rear door panels 1A and 1B, as shown in Figure 4. A stopper 24 (Figure 2) is provided to stop shutter panel 2 at the "OPEN" position. With shutter panel 2 at this "OPEN" position, one can see the object or person on the opposite side of the door 1 through the aligned holes H2, H1A and H1B.

The door with shutter device of this invention is further provided with an operating device, as schematically illustrated in Figure 5. The operating device includes a pull rod 42 to be pulled by hand to move shutter panel 2 manually, and an electric circuit operable by switches 52, 53 and 54, to move shutter panel 2 electrically, to be described below.

As shown in Figure 5, shutter panel 2 is provided with spring 22 which urges shutter panel 2 against stoppers 23, so as to keep shutter panel 2 in the "CLOSED"

position. An operating lever 36 is provided to cooperate with pull rod 42. Operating lever 36 has one end pivotally connected to side part 2A of shutter panel 2 with hinge 2B, and another end extending in the same direction in which shutter panel 2 is moved to the "OPEN" position and resiliently suspended to a structural part of the door with spring 38. Operating lever 36 is provided with a step, or shoulder 36A to engage with a dog member 39, which is fixedly provided onto the structural part of the door to block the movement of operating lever 36 towards the left, in a direction along which shutter panel 2 is moved to the "OPEN" position. Operating lever 36 has a projection 36B to actuate switch 37, and a stud 36C.

A bell crank 41 having a hook 41A on one end and an arm 41B on another end is pivotally disposed between operative lever 36 and pull rod 42 with arm 41B pivotally connected to pull rod 42 and with hook 41A engaging stud 36C in such a manner that when

pull rod 42 is pulled in the Y direction,
hook 41A is rotated to depress stud 36C
downwards causing operating lever 36 to pivot
downwards with respect to hinge 2B, and
5 second push stud 36C towards the left, or in
the X direction, as pull rod 42 is pulled
further in the Y direction, so as to pull
shutter panel 2 to move it in the X
direction. The downwards pivoting movement
10 of operating lever 36 causes shoulder 36A to
disengage from dog member 39 thus releasing
the "blocking" of the movement of operating
lever 36, and at the same time causing
projection 36B to engage with switch 37 to be
15 explained later.

The electric circuit includes a first
solenoid 31 having a plunger 31A connected to
side part 2A of shutter panel 2, a second
solenoid 32 having a plunger 32A with one end
20 connected to tongue member 35 which extends
through the body of dog member 39 and abuts
the upper side of operating lever 36, and
another end operatively connected to switch
33. First solenoid 31 is electrically

connected to a power source S through switch 33 which is normally open. When switch 33 is closed to energise first solenoid 31, plunger 31A is actuated to pull shutter panel 2 in the X direction. Second solenoid 32 is electrically connected to the power source S through parallel switches 52, 53 and 54.

When one of the switches 52, 53 and 54 is closed, second solenoid 32 is energised to activate plunger 32A in such a manner that tongue member 35 extends to push operating lever 36 to pivot downwards. Shoulder 36A of operating lever 36 is thus caused to disengage from tongue member 35 and as soon as shoulder 36A is disengaged from dog member 39, switch 33 is closed to energise first solenoid 31. A spring 34 is provided to urge plunger 32A to return when solenoid 32A is de-energised, so as to keep switch 33 open and tongue member 35 at a retracted position.

Switch 37, which is normally open, is closed when operating lever 36 is caused to pivot downwards, so as to light a lamp 51 for lighting the object at the entrance. In

Figure 5, 57 is an electric door lock which can be opened by turning on switch 55 or 56.

5 By releasing pull rod 42 after pull rod 42 has been pulled to move shutter panel 2 in the X direction, shutter panel 2 is moved back to the original position by the pressure of spring member 22, and operating lever 36 is also moved back to the original position, with its free end pulled upwards to cause
10 shoulder 36A to engage with dog member 39.

By releasing the switch 52, 53 or 54 after it has been depressed to close and to move shutter panel 2 in the X direction, shutter panel 2 and operating lever 36 return
15 in the same way as operated with pull rod 42 manually.

Switch 52 may be conveniently mounted at the door side while switches 53 and 54 may be installed at other places to facilitate a
20 remote operation. Switches 55 and 56 for electric door lock 57 may be installed at the same place as switches 53 and 54.

While round holes have been illustrated for through holes H1A, H1B and H2 of the

front and rear door panels 1A and 1B and shutter panel 2, holes or slots or other shapes such as diamond shaped holes as shown in Figure 6, flower shaped holes as shown in Figure 7, square holes as shown in Figure 8, vertical rectangular holes as shown in Figure 9, slanted rectangular holes as shown in Figure 10, straight vertical slots as shown in Figure 11 and wavy vertical slots as shown in Figure 12, are equally applicable to a door with a shutter device of this invention. Furthermore, it is to be understood that the shutter panel as described above can also be installed onto a door having one door panel instead of two. Other modifications can also be made without departing from the spirit and scope of the invention as defined in the appended claims.

CLAIMS

1. A door construction, comprising a first door panel having a plurality of through holes, a shutter panel moveably disposed to overlap said door panel, said shutter panel having a plurality of through holes of the same size and configuration as the openings of said door panel, a spring member for urging said shutter panel to remain at ^a~~the~~ first position, operating means for selectively moving said shutter panel from ^{said}~~the~~ first position where said openings of said shutter panel are out of alignment with said openings of said door panel, to a second position where said openings of said shutter panel are aligned with said openings of said door panel, said operating means comprising an operating rod having a first end connected to said shutter panel and a second end resiliently retained with respect to said door panels, said operating rod having a shoulder, a dog member with which said shoulder of said operating



25 rod engages when said shutter door is in said
first position, and a pull rod operatively
connected to said operating rod by a bell
crank which, when said pull rod is pulled,
first causes said shoulder to disengage from
said dog member and second causes said
30 shutter panel to move from said first
position to said second position.

2. A door construction as claimed in
Claim 1, which further comprises a second
door panel having a plurality of openings
identical to and corresponding with said
5 openings of said first door panel, and said
shutter panel being disposed between said
first and second door panels.

3. A door construction as claimed in
either Claim 1 or Claim 2, wherein said
operating means further comprises an electric
circuit which includes a first solenoid
5 adapted to cause said shoulder to disengage
from said dog member when said solenoid is
energised, a first switch adapted to be
closed when said shoulder is disengaged from
said dog member, a second solenoid adapted to



10 cause said shutter panel to move from said
first position to said second position when
said second solenoid is energised, said
second solenoid being electrically connected
to a power source through said first switch,
15 and a plurality of switches in parallel
connection for electrically connecting said
first solenoid to the power source.

4. A door construction substantially
as herein described with reference to Figures
1 to 5 as modified by Figures 6 to 12 of the
accompanying drawings.

