

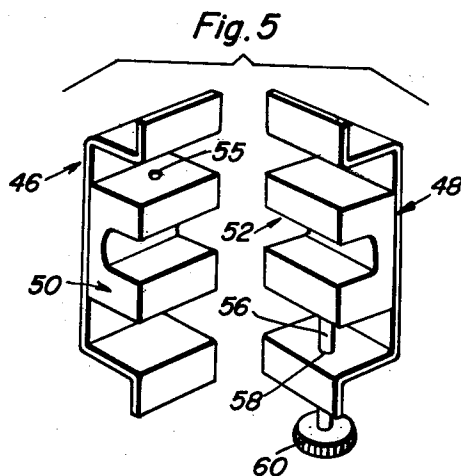
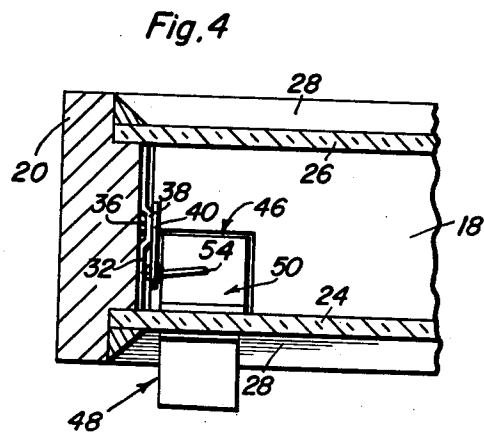
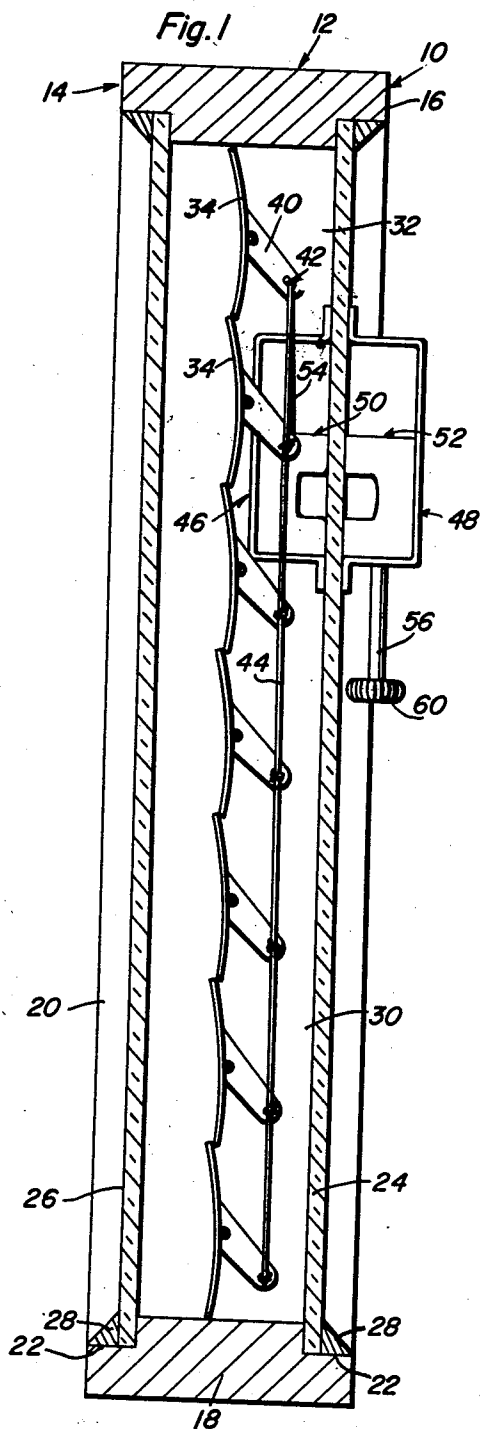
April 21, 1964

Z. A. JOHNSON ETAL
MAGNETICALLY OPERATED SHUTTER

3,129,471

Filed Oct. 24, 1961

2 Sheets-Sheet 1



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Fig. 2

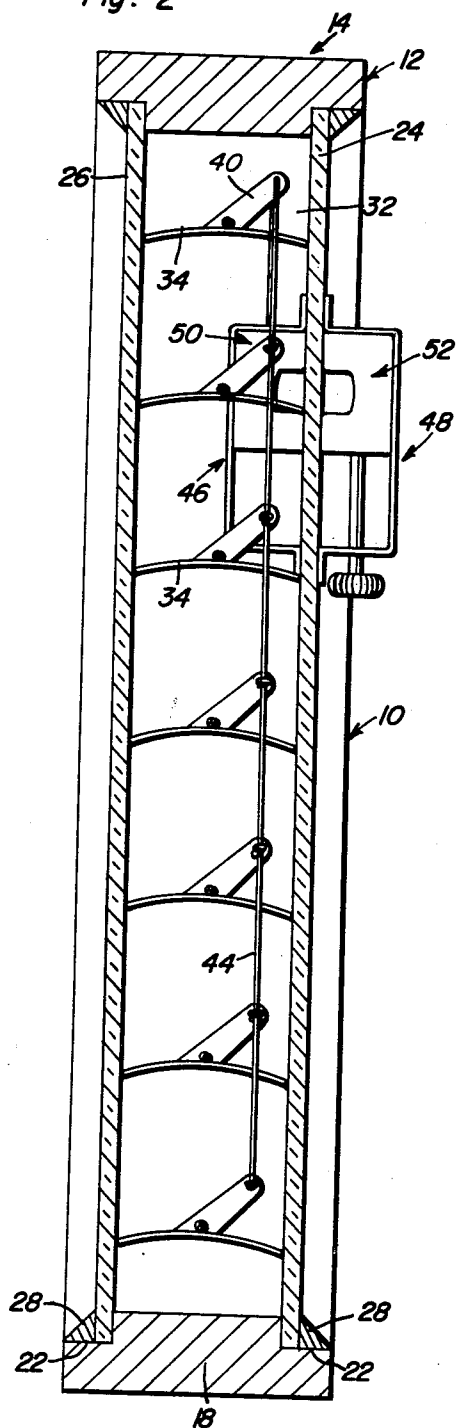
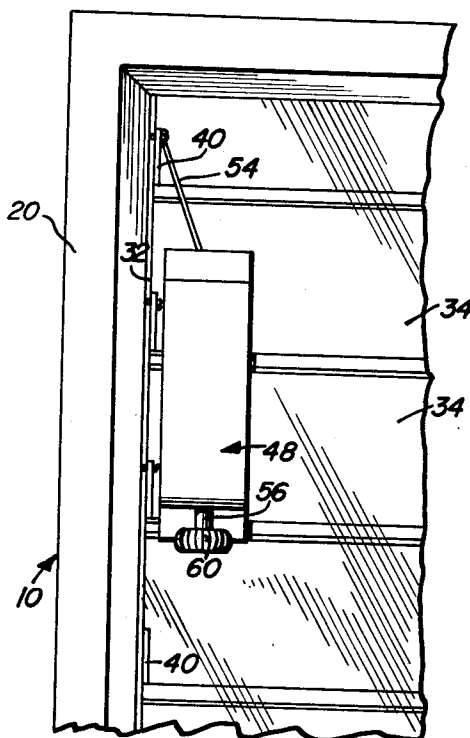


Fig. 3



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3,129,471

MAGNETICALLY OPERATED SHUTTER

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Filed Oct. 24, 1961, Ser. No. 147,244
2 Claims. (Cl. 20—56.5)

This invention relates to a novel and useful magnetically operated shutter and storm window assembly.

The provision of two laterally spaced panes of glass in a window construction have for quite some time been recognized as a means for providing an insulation barrier between the inside of the window and the outside thereof. Accordingly, there have been constructed many different types of storm window constructions utilizing a pair of laterally spaced panes of glass which are secured to the frame of the window construction in fluid tight sealing engagement therewith about the peripheral edges of the two panes of glass. In this manner, a sealed dead air space between the two panes of glass is provided and acts as quite effective insulation against the transfer of heat from one side of the window construction to the other.

Since the advent of shutters having tiltable slats there has also been an attempt to combine a double pane storm window construction with a shutter assembly by mounting the shutter slats between the two panes of glass of a storm window construction. In this manner, not only is a storm window construction provided but also a window construction whose shutter assembly may be actuated to adjust the amount of light passing through the window. However, all previously known attempts at providing combined storm window and shutter assemblies have necessitated an actuator for actuating the shutter assembly disposed between the two laterally spaced panes in the storm window construction and the actuator must necessarily be operable from the exterior of one side or the other of the storm window construction. Consequently, various types of gear mechanisms with operating shafts projecting from one side of the windows have been provided but these types of constructions have had one serious drawback in that it is substantially impossible to positively seal the area between the laterally spaced panes of the window construction from the exterior of the window. Of course, if the shutter structure were provided with electric motor means disposed between the double panes of the window construction suitable electrical conductor means could be passed through the window frame in fluid tight sealing engagement therewith, but the provision of reversible electric motor means for operating a shutter assembly and storm window construction of this type would greatly increase the cost of production. Accordingly, it is the main object of this invention to provide a double pane storm window construction and shutter assembly whose shutter assembly may be readily operated from a position exteriorly of the area between the double panes of glass of the storm window construction and in a manner not necessitating communication with the area disposed between the spaced panes of the storm window construction.

A further object of this invention, in accordance with the immediately preceding object, is to provide a combined window and shutter assembly whose shutter assembly is disposed exteriorly of the window pane of the window assembly and which may be actuated from inwardly of the window construction without the provision of actuating means extending through any portion of the window construction.

A still further object of this invention, in accordance with the preceding objects, is to provide a combined storm window and shutter assembly whose shutter assembly includes a first magnetic actuator mounted for movement

in a plane generally paralleling and immediately adjacent one pane of the storm window construction and constructed of ferrous material whereby a second and magnetic actuator may be disposed on a remote side of that window pane and moved in sliding contacting relation with the window pane in order to effect similar movement of the first actuator secured to the shutter assembly.

A final object to be specifically enumerated herein is to provide a combined storm window and shutter assembly which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a vertical sectional view taken through the shutter and storm window construction of the instant invention;

FIGURE 2 is a vertical sectional view similar to that of FIGURE 1 but showing the shutter assembly in an alternate position;

FIGURE 3 is a fragmentary side elevational view of the storm window and shutter assembly;

FIGURE 4 is a fragmentary horizontal sectional view of the assembly illustrated in FIGURES 1–3; and

FIGURE 5 is a view in perspective showing the first and second magnetic actuators of the shutter assembly.

Referring now more specifically to FIGURES 1 and 2 of the drawings it will be seen that the storm window and shutter assembly of the instant invention is generally referred to by the reference numeral 10. The storm window portion of the assembly 10 is generally referred to by the reference numeral 12 and includes an open framework generally referred to by the reference numeral 14. The framework or window frame 14 includes upper and lower members 16 and 18 and opposite side members 20. Each of the members 16, 18 and 20 is similarly formed and may be formed in a manner rendering the frame 14 of one-piece construction. Each side of the frame 14 includes a recess 22 and a pair of window panes 24 and 26 are secured in the recesses 22 in any convenient manner such as by air-tight caulking 28 or the like. In this manner, the peripheral edge portions of each of the panes 24 and 26 are secured to the frame 14 in fluid tight sealing engagement therewith and inasmuch as the frame 14 is itself constructed of fluid impervious material as are the panes 24 and 26, the area 30 defined between the panes 24 and 26 is sealed from ambient atmosphere.

A pair of mounting plates 32, see FIGURES 3 and 4, may be secured to the inner surface of the opposite side members 20 of the frame 14 in any convenient manner. A plurality of shutter slats 34 are each provided with opposite end stub axle portions 36 which are rotatably journaled in the inwardly offset mid-portion 38 of the mounting plates 32. In this manner, each of the shutter slats 34 is pivotally mounted for oscillatory movement about its longitudinal center line.

Each of the slats 34 includes a crank arm 40 which is apertured as at 42 on its free end and an elongated connecting member 44 is secured between the free ends of the lever arms 40 for connecting the shutter slats 34 together for simultaneous and equal oscillatory movement.

First and second slide guide members generally referred to by the reference numerals 46 and 48 are bonded to op-

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posite surfaces of the pane 24 in any convenient manner and are generally U shaped in longitudinal cross section.

A first actuator generally referred to by the reference numeral 50 and comprising a magnet is guided for movement along the inner surface of the pane 24 by means of the first slide guide 46 and a second magnetic actuator generally referred to by the reference numeral 52 is guided for movement by means of the second slide guide 48 for sliding contacting engagement with the outer surface of the pane 24. It will be noted from FIGURES 1 and 2 of the drawings that the slide guides 46 and 48 are disposed immediately opposite each other and accordingly that the actuators 50 and 52 by means of their magnetic attraction for each other will each move in response to movement of the other.

A connector 54 is secured to an opening 55 formed in the first actuator 50 in any convenient manner and passes through an opening (not shown) formed in the slide guide 46. With one end of the connector 54 secured through the opening 55 and the other end of the connector 54 secured to the uppermost lever arm 40, upon vertical sliding movement of the actuator 50, the shutter slat 34 may be oscillated between the two positions illustrated in FIGURES 1 and 2.

It will be noted that an operating rod 56 is secured at its upper end to the lower end of an actuator 52 in any convenient manner and is slidably received through an opening 58 formed in the slide guide 48. The lower end of the rod 56 is provided with an operating knob 60 and upon vertical reciprocation of the knob 60, the actuators 52 and 50 will be similarly reciprocated thereby effecting oscillatory movement of the shutter slats 34.

By providing a shutter assembly which may be actuated from the exterior of a hermetically sealed chamber in which the shutter slats are disposed, the main objection to shutter slats will be eliminated. That is to say, there will be no opportunity for dust and other foreign material to collect on the shutter slats. Accordingly, only the outer surfaces of the panes 24 and 26 must be cleaned.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those

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skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In a window including an upright frame having a pair of upright and spaced-apart panes mounted therein, a shutter assembly mounted in said frame between said panes and including a plurality of movable slats at least some of which are operatively connected to a first actuator, means mounting said first actuator for guided movement up and down along and in sliding contacting relation with the inner surface of one of said panes, a second actuator, means mounting said second actuator for movement up and down along and in sliding contacting relation with the outer surface of said one pane, said first and second actuators being magnetically responsive and at least one of said actuators having magnetic properties, said means mounting said actuators for movement comprising guides bonded to opposite sides of said one pane, said guides each comprising a body generally U-shaped in cross-section including a pair of generally parallel legs interconnected at corresponding ends by means of a bight portion and define a recess between the legs opening toward the adjacent side of said one pane, the free ends of the legs of each body being bonded to the corresponding side of said one pane with the bight portion of each body extending up and down said one pane.

2. The combination of claim 1 wherein said actuators include portions coacting with portions of the corresponding guides preventing movement of said actuators away from said one pane and out of sliding contacting engagement therewith.

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