

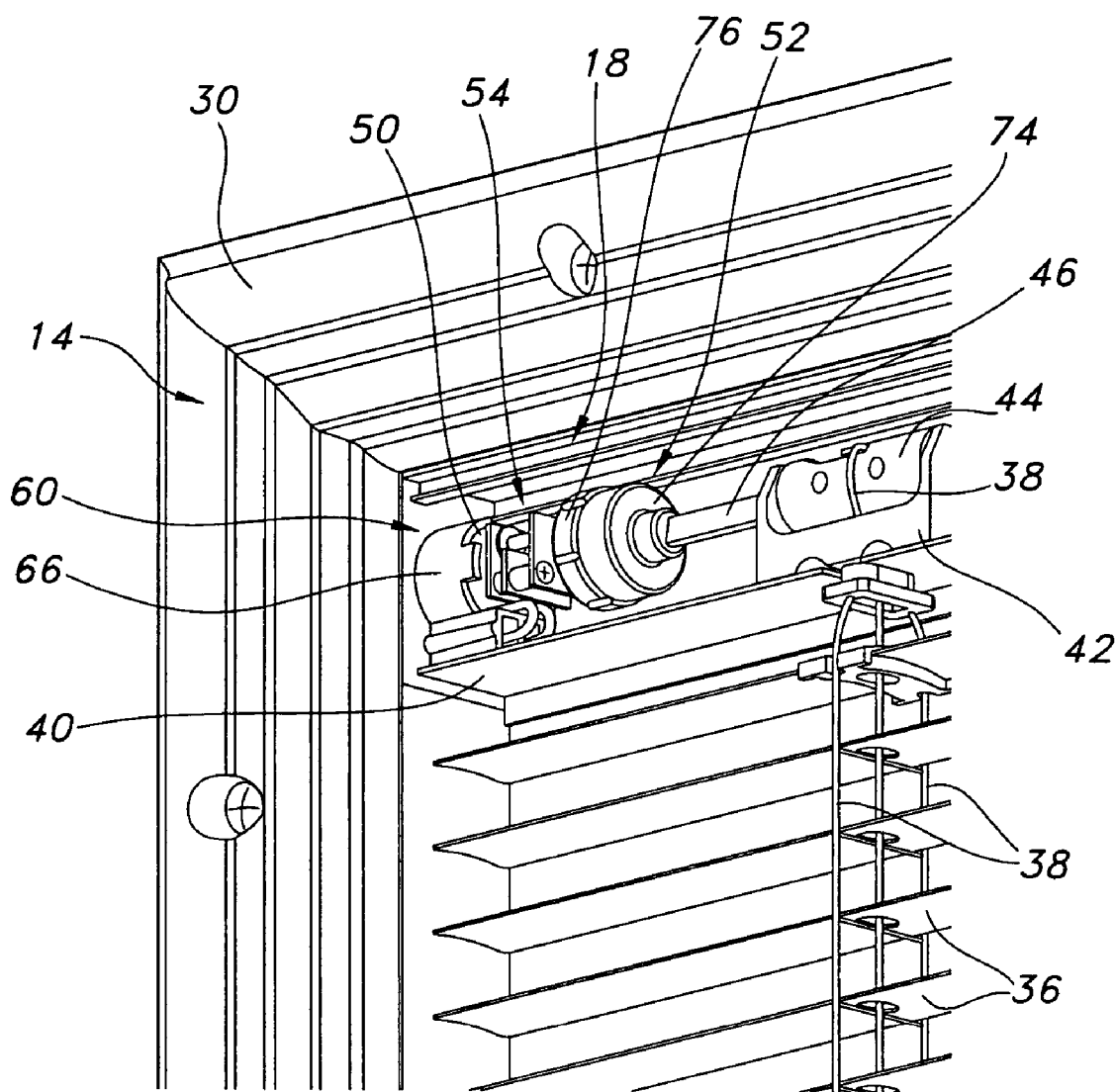


US 20070144684A1

(19) **United States**(12) **Patent Application Publication**  
**Hutchings et al.**(10) **Pub. No.: US 2007/0144684 A1**(43) **Pub. Date: Jun. 28, 2007**(54) **DOOR GLASS ASSEMBLY WITH POWERED  
BLIND**(22) Filed: **Dec. 27, 2005**(76) Inventors: **Douglas F. Hutchings**, Rockford, MI  
(US); **Richard L. Homer**, Grand  
Haven, MI (US); **Lee W. Davis**,  
Holland, MI (US); **Andrew R.**  
**Krochmal**, Grand Haven, MI (US)**Publication Classification**(51) **Int. Cl.**  
**A47H 1/00** (2006.01)(52) **U.S. Cl.** ..... **160/107**(57) **ABSTRACT**

A self-contained, electrically powered door glass unit including a glass assembly, a window covering within the glass assembly, an electric motor driving the window covering, a battery pack powering the motor, and a frame adapted to support the unit within a door. The frame includes first and second frame halves, and the battery pack is supported by only one of the frame halves.

Correspondence Address:

**WARNER NORCROSS & JUDD LLP**  
**900 FIFTH THIRD CENTER**  
**111 LYON STREET, N.W.**  
**GRAND RAPIDS, MI 49503-2487 (US)**(21) Appl. No.: **11/318,809**

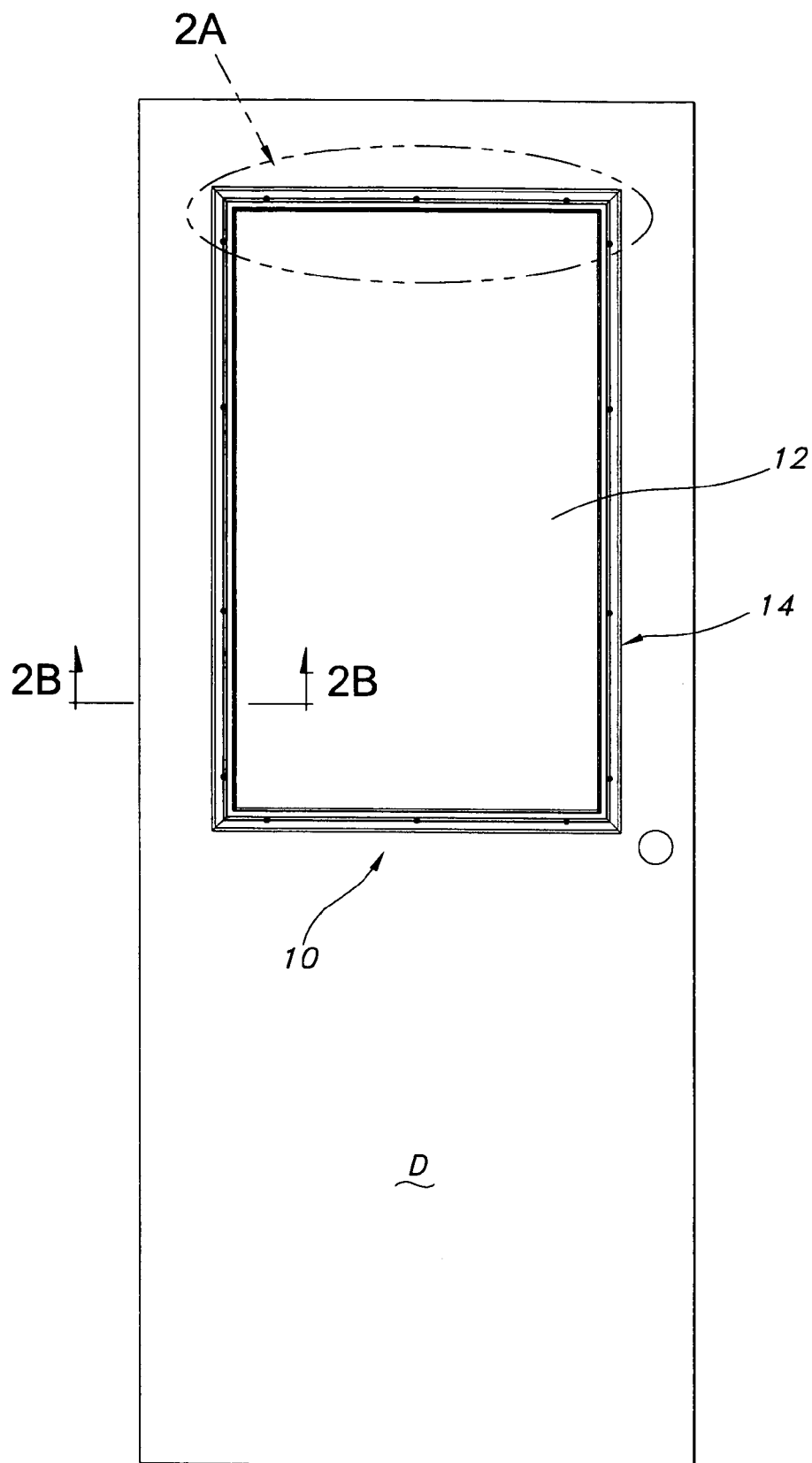
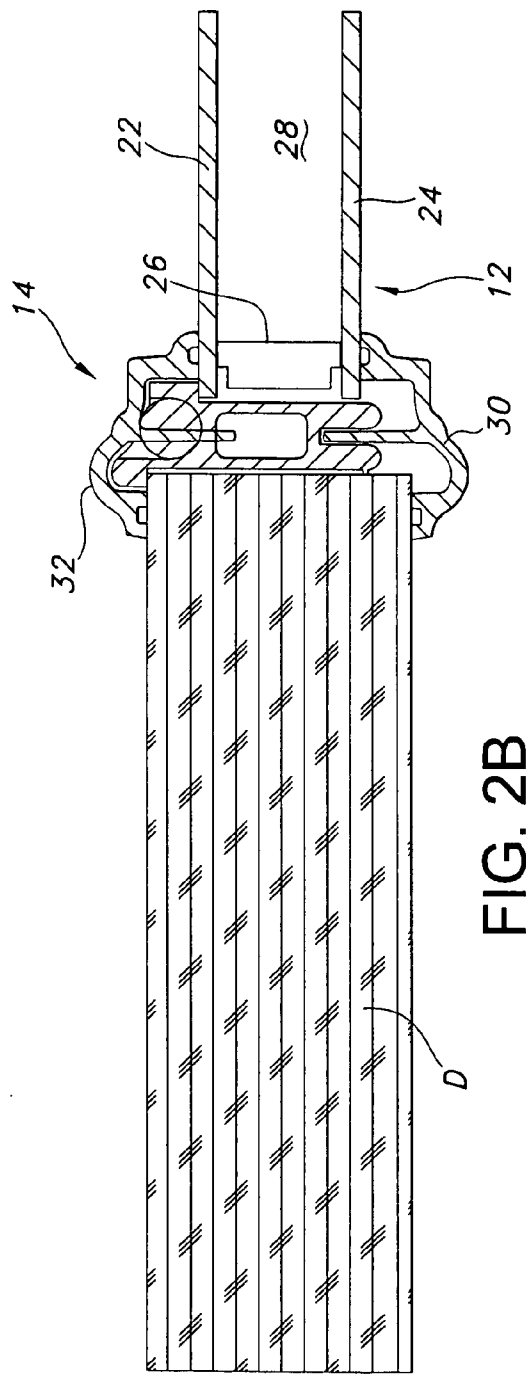
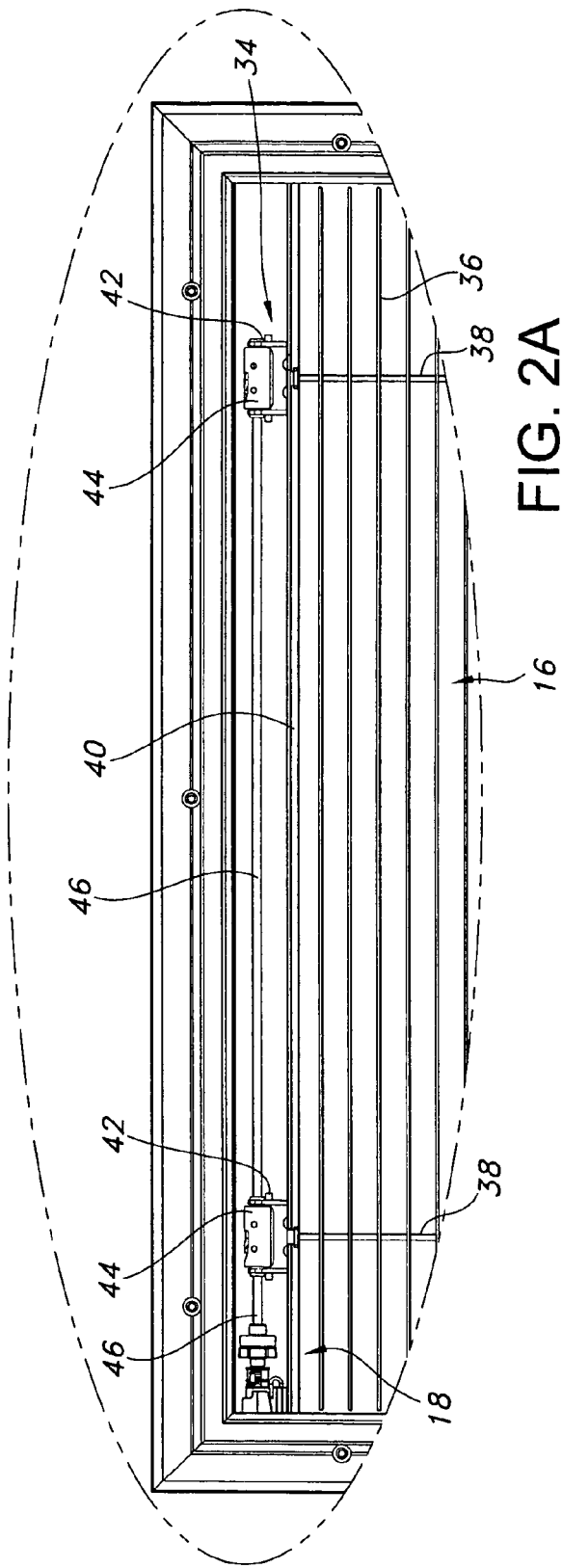


FIG. 1



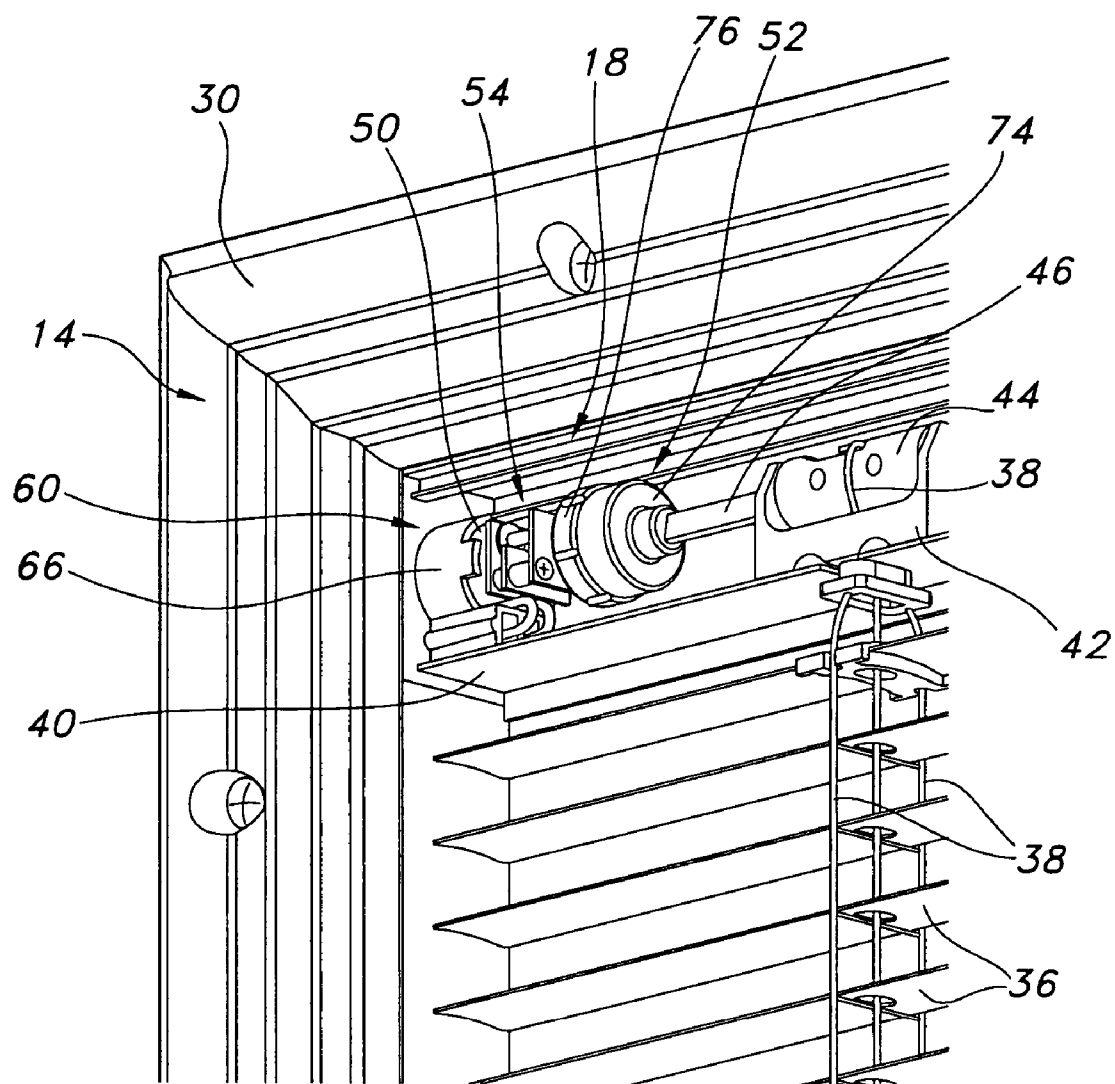


FIG. 3

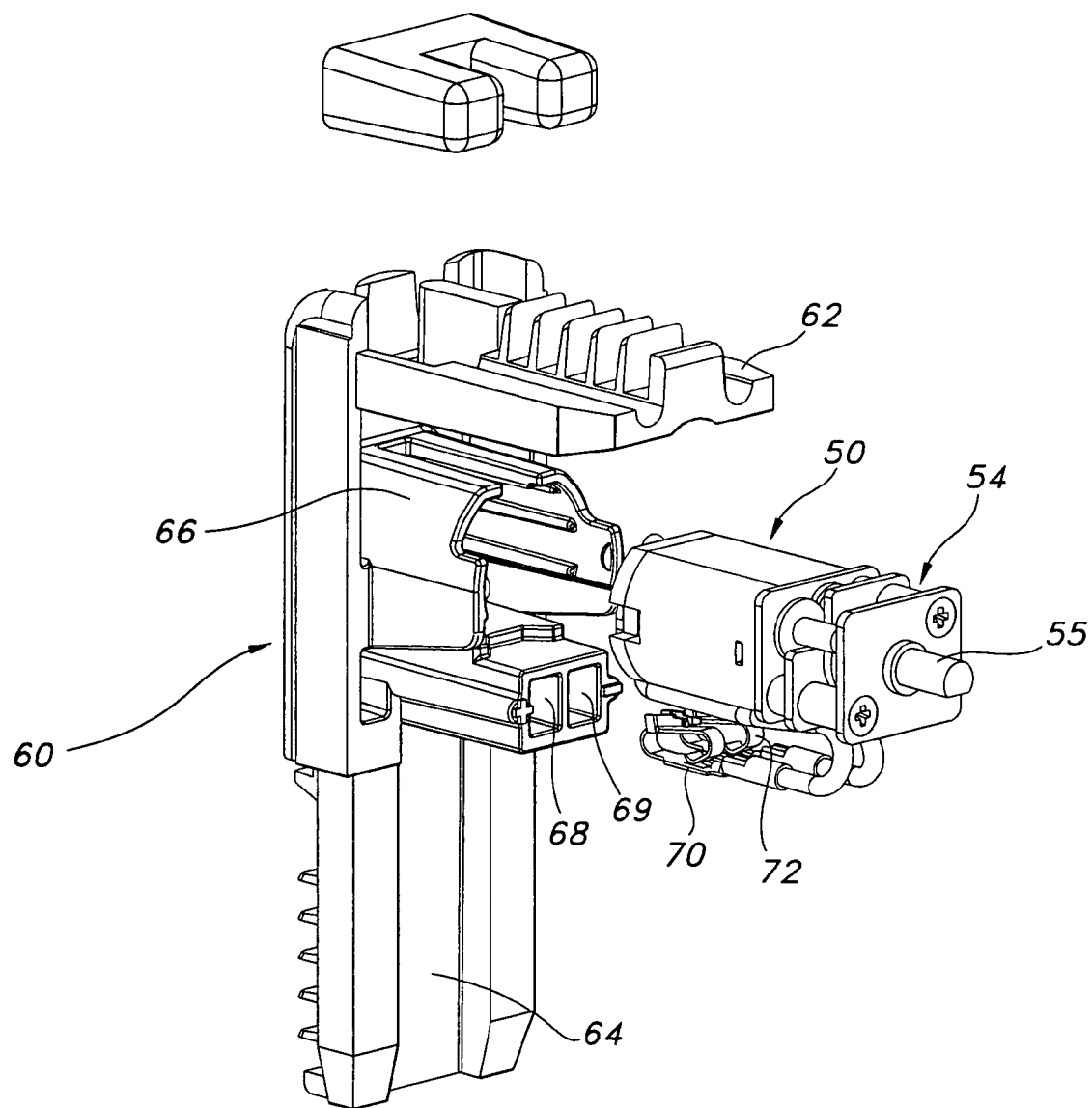


FIG. 4

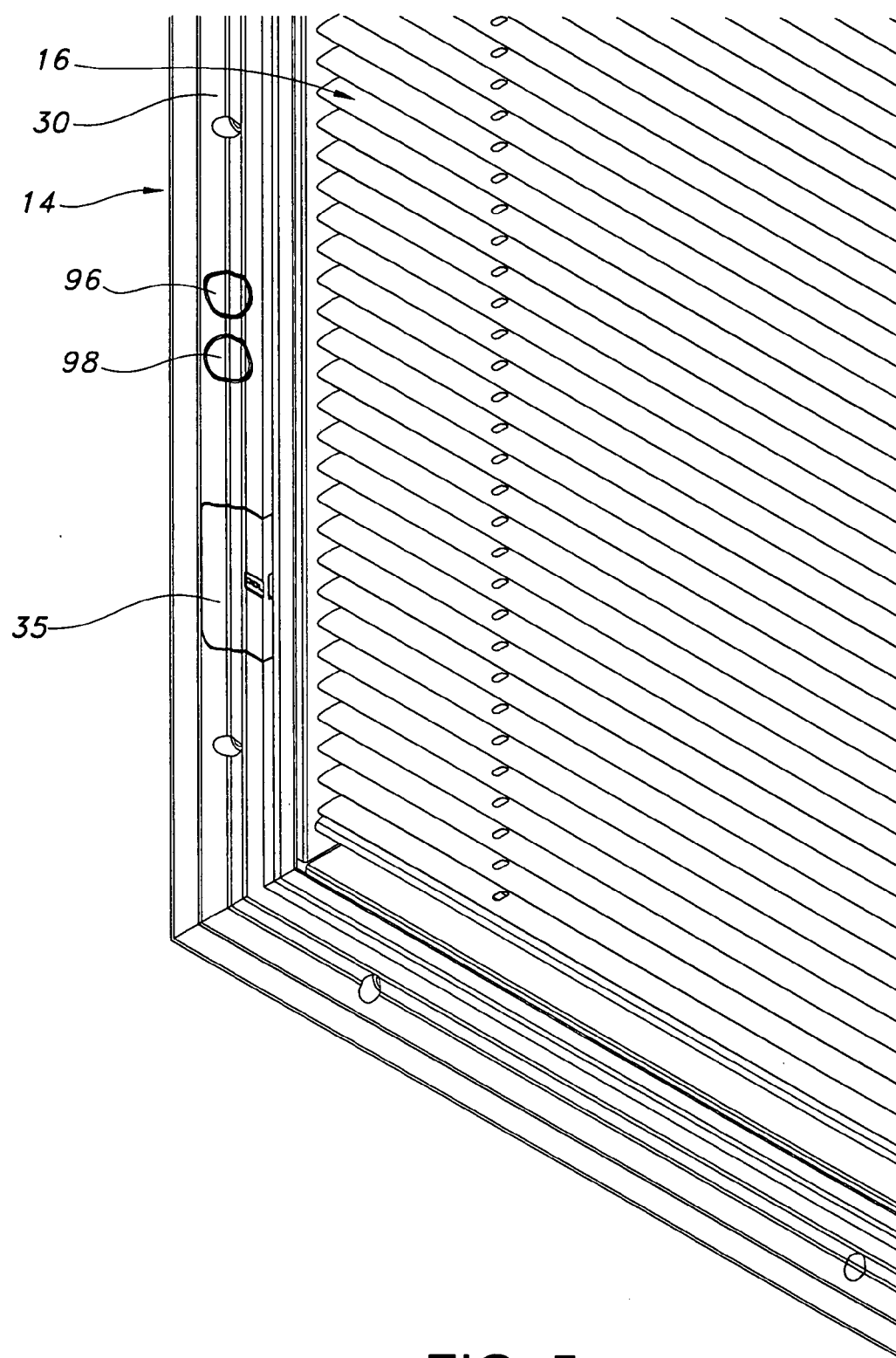


FIG. 5

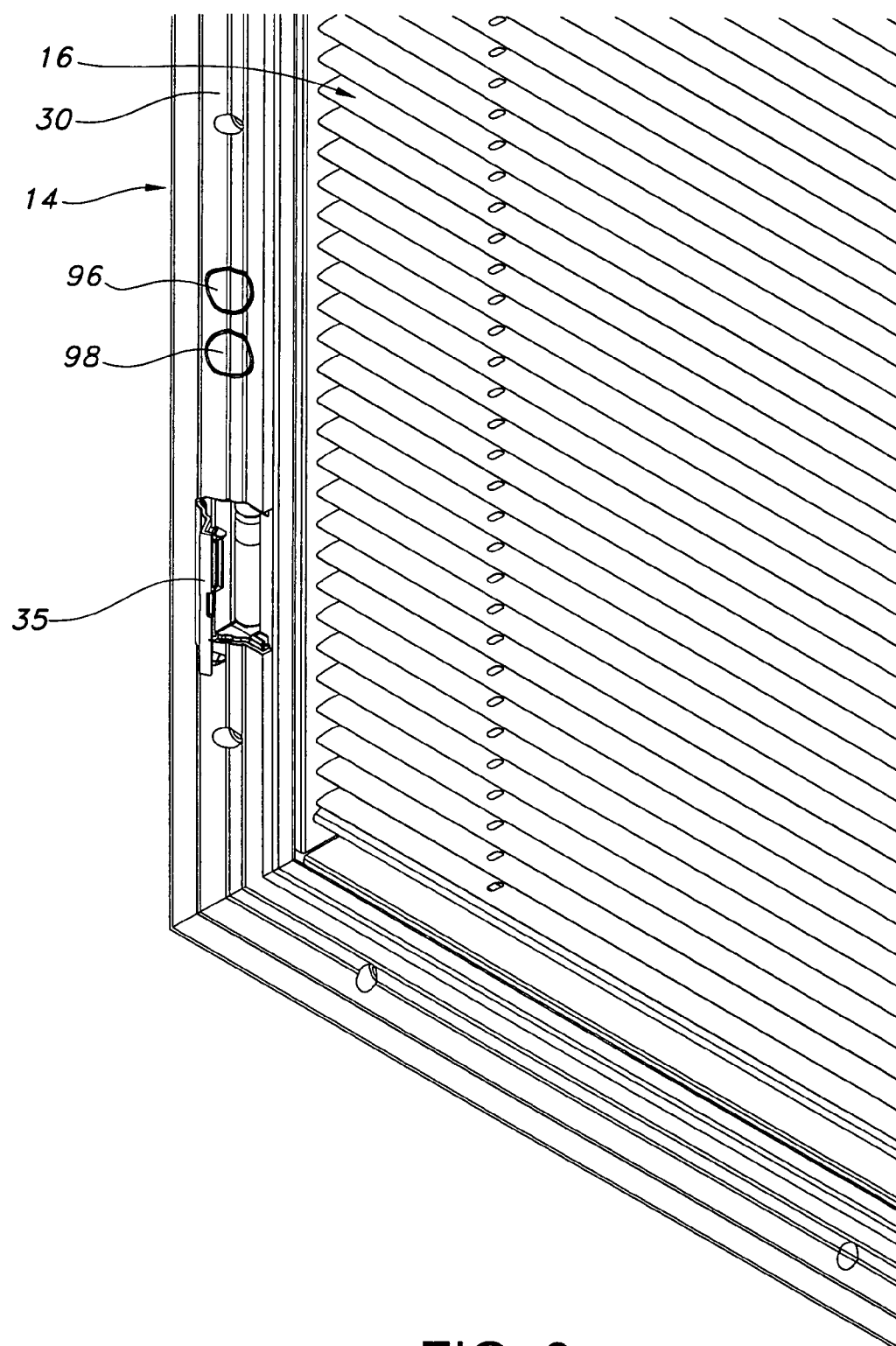


FIG. 6

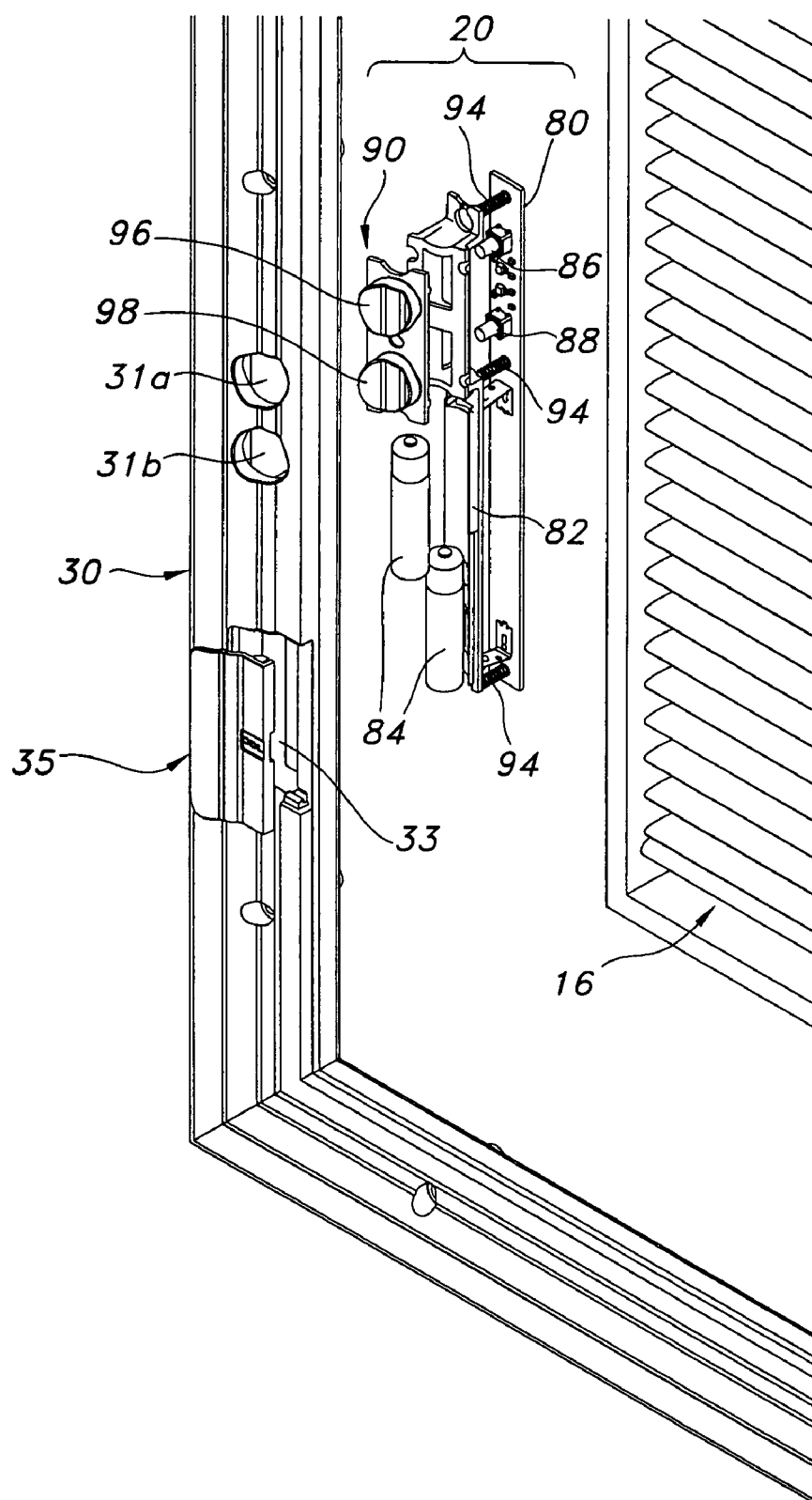


FIG. 7



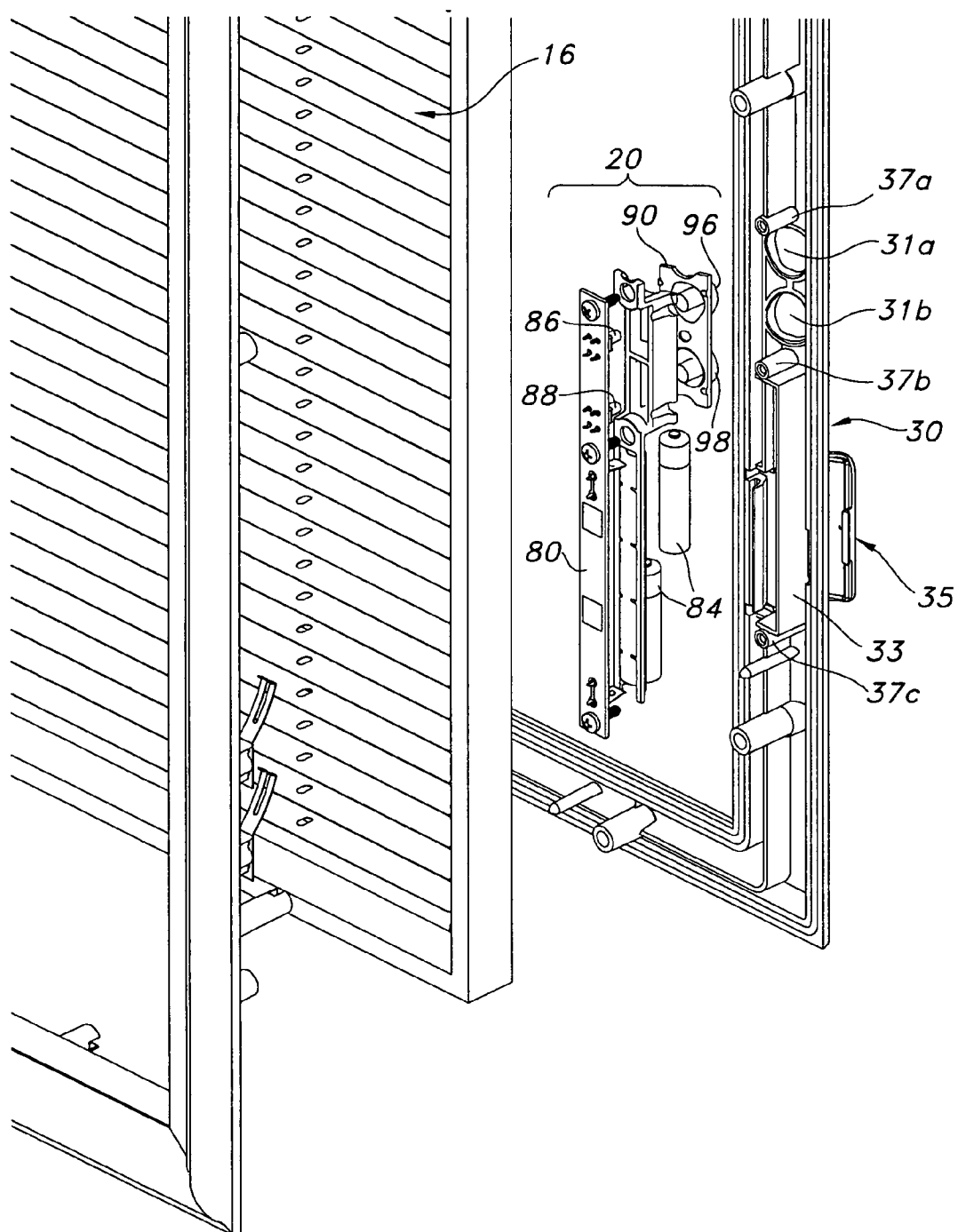


FIG. 8

## DOOR GLASS ASSEMBLY WITH POWERED BLIND

### BACKGROUND OF THE INVENTION

[0001] The present invention relates to door glass and window assemblies, and more particularly to door glass and window assemblies that include integral blinds.

[0002] The incorporation of blinds into door glass and other window assemblies and has gained widespread acceptance. Typically, such assemblies include an insulated glass (IG) defining an enclosed space between two panels. The blind is positioned between the two panels, and actuators are provided outside of the glass to operate the blind (e.g. tilt and/or to raise/lower).

[0003] As an option, the blind can be "powered," including an electric motor. A powered blind can be tilted and/or raised/lowered in response to the actuation of one or more electric switches, or a remote control. However, the incorporation of a powered blind into insulated glass presents a challenge. Specifically, electrical power must be provided to the electric motor. This is particularly challenging in the environment of door glass and other window assemblies where electrical power typically is not readily available.

### SUMMARY OF THE INVENTION

[0004] The aforementioned problems are overcome in the present invention in which a door glass or other window assembly includes an improved powered blind having a clutch between the electric motor and the blind. The clutch permits the motor to continue rotating even after a physical limit or stop on the blind is reached. This construction prevents motor burn out and therefore enhances the life of the powered blind. The door glass assembly includes a pair of frame halves and a power pack secured between the frame halves. The power pack is secured to only one of the two frame halves. Consequently, the frame halves may be separated without fear of the power pack coming loose and/or falling out of the assembly. In a preferred aspect, the one frame half includes a battery compartment door to permit access to replaceable batteries in the battery pack. The invention has applicability beyond the disclosed powered blinds and can be used in conjunction with any electrically powered device or option in a door glass or other window assembly.

[0005] These and other objects, advantages, and features of the invention will be more fully understood and appreciated by reference to the description of the current embodiment and the drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 is a plan view of the door glass assembly of the present invention installed within a door;

[0007] FIG. 2A is an interior view of the upper portion of the door glass assembly showing the interior of the blind header;

[0008] FIG. 2B is a fragmentary cross sectional view taken along line 2-2 in FIG. 1;

[0009] FIG. 3 is a fragmentary perspective view of the upper corner of the door glass assembly with a portion of the blind header removed to show the motor and the clutch;

[0010] FIG. 4 is a perspective exploded view of the corner key and the electric motor;

[0011] FIG. 5 is a fragmentary perspective view of the lower corner of the door glass assembly in which the power pack is installed;

[0012] FIG. 6 is a view similar to FIG. 5 but with the battery compartment door removed;

[0013] FIG. 7 is a fragmentary perspective exploded view showing the power pack from the front;

[0014] FIG. 8 is a fragmentary perspective exploded view showing the power pack from the back.

### DESCRIPTION OF THE CURRENT EMBODIMENT

[0015] A door glass assembly constructed in accordance with a preferred embodiment of the invention is illustrated in the drawings and generally designated 10. The assembly 10 includes a door glass 12, a frame 14, a blind 16, a drive mechanism 18, and a power pack 20. The drive mechanism 18 is powered by the power pack assembly 20 to operate the blind 16.

[0016] The door glass 12 is generally well-known to those skilled in the art. The door glass 12 includes a pair of glass panels 22 and 24 connected to and separated by a spacer frame 26. The panels are hermetically sealed to the spacer frame 26. An enclosed space 28 is defined between the glass panels 22 and 24.

[0017] The frame 14 is also generally known to those skilled in the art. The frame 14 includes an inner frame half 30 and an outer frame half 32. The two frame halves are intersecured using screws or other well-known techniques to support the door glass 12 within a door D.

[0018] The frame 14 also includes several features illustrated in FIGS. 7-8 that are not well known. First, the inner frame half 30 defines a pair of apertures 31a and 31b which receive actuator buttons as will be described. Second, the inner frame half 30 includes a battery access opening/compartment 33 covered by a door 35. Suitable constructions for the access opening 33 and the door 35 are and will be known to those skilled in the art. Third, the inner frame half includes power pack mounting bosses 37a, 37b, and 37c. The functions of these elements will be described below in conjunction with the description of the power pack 20.

[0019] The window blind 16 also is well known to those skilled in the art. The window blind includes an actuator assembly 34 and a plurality of slats 36 suspended therefrom on a cord ladder 38. The actuator assembly includes a header 40, supports 42; barrels 44, and a rod 46. The header extends the full width of the door glass between the spacer frame to support and enclose the other components of the actuator assembly 34. The supports 42 are secured to the header 40 and rotatably support the barrels 44. The cord ladder 38 is wound around the barrels 44. The barrels 44 are fixedly mounted on the drive rod 46 so that rotation of the rod results in rotation of the barrels. As disclosed, the blind is capable of tilting the slats 36, but not raising and lowering the slats. It will be readily appreciated to those skilled in the art that the present invention can be extended to a window blind in which the slats can be raised and lowered, and/or to blinds

having combinations of features. The invention can be further extended to any window covering associated with the glass assembly 12.

[0020] The drive assembly 18 includes an electric motor 50 and a clutch 52. The motor 50 is of conventional design and includes an integral gear reducer 54 and an output drive shaft 55. In the preferred embodiment, the electric motor is sold as Model No. 12GN-A4S by Sanyo.

[0021] As illustrated in FIG. 4, the motor 50 is supported within a corner key 60 of the spacer frame 26. The corner key includes a pair of arms 62 and 64 for receiving aluminum spacer frame pieces in conventional fashion. The corner key 60 also includes an integral motor mount 66 for closely receiving and supporting the motor 50. The corner key 60 also defines a pair of electrical clip receptacles 68 and 69 for receiving the electrical leads 70 and 72 on the motor. Although not specifically shown, the leads are connected through the corner key 60 to electrical wires (not shown) extending to the battery pack.

[0022] The clutch 52 (FIG. 3) includes a first clutch piece 74 and a second clutch piece 76. The first clutch piece 74 is fixedly secured to the rod 46 for rotation therewith. Similarly, the second clutch piece 76 is connected to the output shaft 55 of the motor 50 for rotation therewith. Each clutch piece 74 includes a button magnet (not visible). The two magnets together provide adequate attraction between the two pieces such that the motor 50 rotates the rod 46 when the blind is between its physical travel limits. The magnetic attraction permits relative movement between the pieces 74 and 76 when the rod 46 reaches a physical or travel limit. In that case, the clutch 52 permits the electric motor 50 to continue rotating even after the rod 46 stops at one of the physical limits of the blind 16. In the current embodiment, the physical limits are the two opposite directions in which the blind slats may be tilted. Alternatively, the physical limits could be the raising and/or lowering of the blind, or any other physical parameter of the blind 16 or other window covering.

[0023] The power pack 20 is perhaps best illustrated in FIGS. 7-8 and includes a board 80, a battery cradle 82, batteries 84, switches 86 and 88, and a button plate 90. The board 80 supports the battery cradle 82 and the switches 86 and 88 in conventional fashion. The batteries 84 are replaceable within the battery cradle 82 also in conventional fashion. Three screws 94 attach the board to the inner frame half.

[0024] The button plate 90 includes a pair of buttons 96 and 98 physically aligned with the switches 86 and 88, respectively. The buttons 96 and 98 protrude through the holes 31a and 31b respectively in the inner frame half 30. Conventional electrical connections (not illustrated) extend between the switches 86 and 88 and the electric motor 50. Actuation of the switch 86 drives the motor and the blind slats in a first direction, and actuation of the switch 88 drives the motor and the blind slats in the opposite direction.

#### Assembly and Operation

[0025] The glass assembly 12, frame 14, and blind 16 are fabricated and assembled in generally conventional fashion. Only the steps, features, and functions associated with the present invention are described below.

[0026] The corner key 60 is used in fabricating one corner of the spacer frame 26 to provide a means of supporting the motor 50. Also, the first clutch piece 74 is fixedly secured to the blind actuator rod 46, and the second clutch piece is fixedly secured to the output shaft 55 of the motor 50. The motor 50 is inserted into the motor mount 66 on the corner key 60, and the electrical leads 70 and 72 fit into the receptacles 68 and 69 (see FIG. 4). As the components are assembled, the two clutch pieces 74 and 76 come into contact with one another as illustrated in FIG. 3.

[0027] The power pack 20 is assembled and attached to the inner frame half 30. More specifically, the button plate 90 is aligned so that the two buttons 96 and 98 are positioned in the apertures 31a and 31b respectively. Finally, the board 80 having the battery support 82 and the switches 86 and 88 thereon is mounted to the inner frame by securing the screws 94 in the corresponding bosses 37 in the inner frame. Wires 100 (not shown) extend between the switches 86 and 88 and the electric motor 50 to provide power to the motor in response to actuation of the switches.

[0028] Following installation, the door glass assembly has the appearance illustrated in FIGS. 1 and 5-6. Depression of either of the buttons 96 or 98 will result in tilting of the blind in either of its two opposite directions. Consequently, the homeowner can easily depress one of the buttons to actuate tilting. The batteries may be easily accessed for installation and/or removal by removing the battery compartment cover 35 as illustrated in FIG. 6. The present invention provides a means of preventing motor overheating. Specifically, the clutch mechanism enables the motor to continue turning even if the rod is prevented from turning. Also, the present invention provides a unique power arrangement integration into a door glass or other window assembly.

[0029] The above description is that of a current embodiment of the invention. Various alterations and changes can be made without departing from the spirit and broader aspects of the invention as defined in the claims, which are to be interpreted in accordance with the principles of patent law including the doctrine of equivalents.

#### 1. A door glass assembly comprising:

a glass assembly;

an electrical component requiring electrical power;

a self-contained electrical power source electrically connected to said electrical component; and

a frame adapted to support said glass assembly, said electrical component, and said power source within a supporting door so that said power source is hidden from normal view.

2. A door glass assembly as defined in claim 1 wherein said electrical component comprises an electric motor.

3. A door glass assembly as defined in claim 2 wherein: said glass assembly comprises an insulated glass defining an enclosed space; and

said door glass assembly further comprises a window covering within said enclosed space and having a component driven by said electric motor.

4. A door glass assembly as defined in claim 1 wherein said frame includes first and second frame halves, said power source supported by only one of said frame halves.

5. A door glass assembly as defined in claim 4 wherein: said power source includes replaceable batteries; and said frame further includes an access door providing access to said replaceable batteries.

6. A door glass assembly as defined in claim 1 wherein: said power source further includes a switch; and said frame includes an actuator button operatively connected to said switch, said actuator button movable to permit actuation of said switch.

7. A window assembly comprising:

a panel;

a device requiring electrical power;

an electrical power source; and

a frame adapted to support said panel, said device, and said power source.

8. A window assembly as defined in claim 7 wherein: said frame includes first and second frame halves; and said power source is supported by only one of said frame halves.

9. A window assembly as defined in claim 7 wherein: said power source includes replaceable batteries; and said frame includes an access door providing access to said replaceable batteries.

10. A window assembly as defined in claim 7 wherein: said power source includes at least one switch; and said frame includes at least one actuator button each operatively connected to one of said switches and permitting actuation of said aligned switch.

11. A window assembly as defined in claim 7 wherein said device requiring electrical power comprises a window covering and an electric motor driving said window covering.

\* \* \* \* \*