Sept. 7, 1954 L. G. WALTER, JR 2,688,733

ELECTRIC CURRENT CARRYING HINGE WITH SPRING

Filed June 21, 1952

Fig. 1.

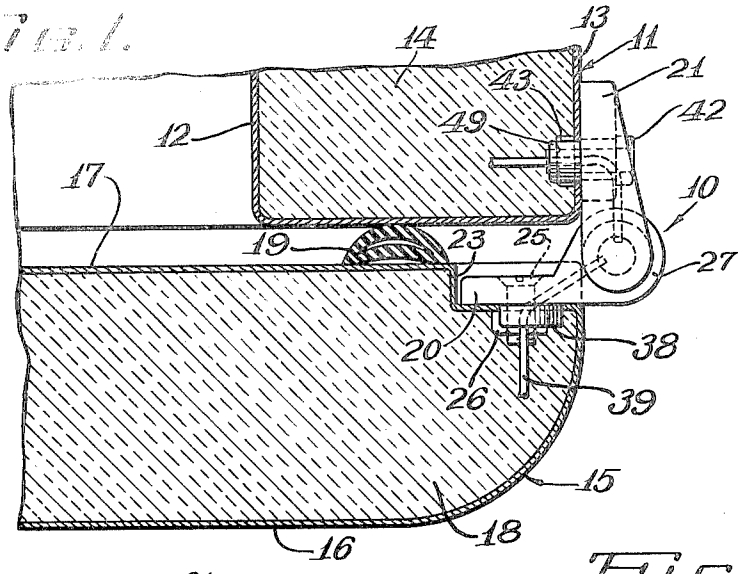


Fig. 2.

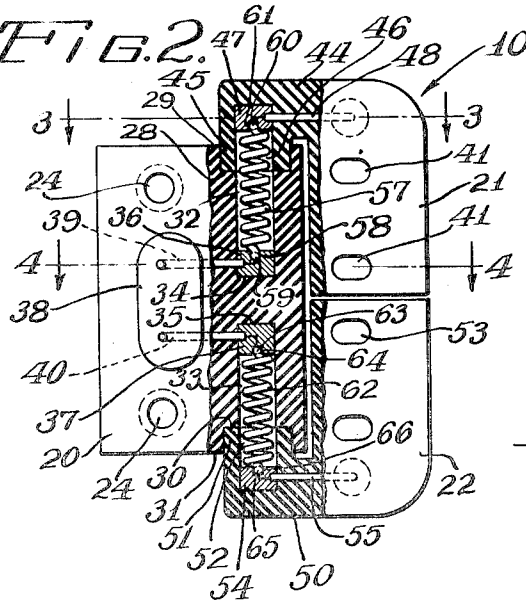


Fig. 3.

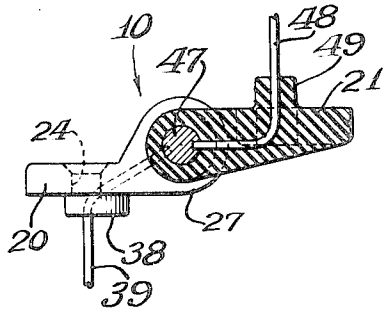
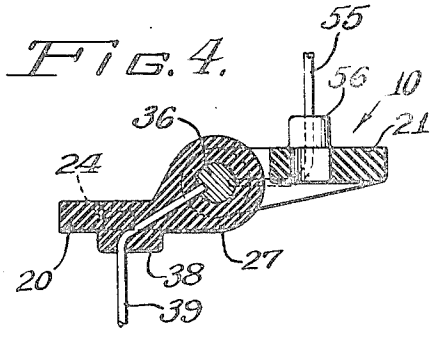


Fig. 4.



INVENTOR.
Leonard G. Walter Jr.
BY Pauline Pippel
Atty.

Patented Sept. 7, 1954

2,688,733

UNITED STATES PATENT OFFICE

2,688,733

ELECTRIC CURRENT CARRYING HINGE WITH SPRING

Leonard G. Walter, Jr., Evansville, Ind., assignor to International Harvester Company, a corporation of New Jersey

Application June 21, 1952, Serial No. 294,865

2 Claims. (Cl. 339—4)

1

This invention relates generally to a hinge and more particularly to a hinge which will conduct an electric current from a stationary surface to a movable surface.

In order to keep butter in a useable condition within a refrigerator cabinet, it is necessary to maintain it at a higher temperature than the food storage compartment of the cabinet. One common means of accomplishing this is to provide a butter keeper compartment mounted on the inner panel of the refrigerator door with a heating element positioned in heat exchange relation with the butter keeper. The heating element is generally an electrical unit having automatic means for controlling the flow of electric current thereto so that the butter keeper compartment will be maintained at a proper temperature. Most refrigerator cabinets are cooled by an electrically operated refrigeration system whereby there is a readily accessible supply of electrical current for the heating element. In order to provide a refrigerator cabinet which is neat in appearance, it is advantageous to provide the hinges of the compartment door with means for conveying an electrical current from the cabinet to the door.

It is one object of the present invention to provide a hinge which will conduct an electric current from a cabinet to a door.

Another object of the invention is to provide a hinge comprising a hinge butt and hinge leaves which are connected by resilient means that biases the parts in a predetermined direction.

Another object of the invention is to provide a hinge in which the resilient means will conduct an electric current between the hinge butt and hinge leaves.

Another object of the invention is to provide an electric current conducting hinge which is simple in structure and can be easily assembled and disassembled.

Another object of the invention is to provide an electric current conducting hinge which is neat in appearance and economical to manufacture.

Other objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of the hinge with a portion of a cabinet and door being shown in section.

2

Fig. 2 is a side elevational view of the hinge with portions broken away.

Fig. 3 is a sectional view taken along line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken along line 4—4 of Fig. 2.

Referring to the drawings for a more detailed description of the invention, an electric current carrying hinge is designated generally by reference numeral 10. The hinge 10 is shown attached to a refrigerator cabinet 11 which comprises two spaced apart walls 12 and 13 with thermal insulating material 14 disposed therebetween. Pivotally connected to the cabinet 11 by hinge 10 is a door 15 comprising spaced apart walls 16 and 17 having a suitable thermal insulating material 18 positioned therebetween. A rubber gasket 19 is secured to the door 15 by any suitable means whereby the space between the door 15 and the cabinet 11 will be sealed when the door 15 is in closed position. It is common to provide a refrigerator door, such as the one shown, with a butter compartment and to supply an electrical heating element for maintaining the compartment at a desired temperature. In order to provide a cabinet which is neat in appearance, it is advantageous to construct the hinge 10 in such a manner that it will conduct an electric current from the cabinet 11 to the door 15. In such a construction, there will be no need for unsightly electrical conducting wires between the door 15 and the cabinet 11.

In the present invention, the hinge 10 comprises a hinge leaf 20 and a pair of hinge butts 21 and 22 fashioned from any suitable non-electrical conducting material such as nylon, pheral-formaldehyde compounds, melamine formaldehyde or some other molding plastic material. The hinge leaf 20 is generally rectangular shaped and fits into a depressed portion 23 provided in door 15. Two spaced apart holes 24 extend through the hinge leaf 20 in which screws 25 are positioned and secured to the door 15 by nuts 26. The leaf 20 is provided with an enlarged cylindrical shaped portion 27 along one edge having a circular shaped depression 28 formed in the upper end 29 and a similar circular shaped depression 30 formed in the lower end 31 in axial alignment with depression 28. Two axially aligned cylindrical cavities 32 and 33 are provided along the center line of the depressions 28 and 30 respectively. The bottoms 34 and 35 of the cavities 32 and 33 respectively are located in spaced relationship. A conductor block 36 fits within cavity 32 against the bottom 34 thereof

and a similar conductor block 37 fits within cavity 33 adjacent the bottom 35 thereof. Leaf 20 is provided with a post 38 which extends through an opening provided in the depressed portion 23 of the door 15. Two insulated wires 39 and 40 extend through openings provided in the leaf 20 and are connected to the conductor blocks 36 and 37 respectively. The wires 39 and 40 are shown in the drawings as being broken but it is to be understood that they are to be connected to a heating element or other electrical element disposed within the door 15.

The upper hinge butt 21 is provided with a flat portion which fits against the outer wall 13 of the cabinet 11. Two spaced apart slots 41 are provided in hinge butt 21 through which screws 42 extend with the inner ends thereof being secured to the wall 13 by nuts 43. The butt 21 is provided with an offset portion 44 having a downwardly extending circular shaped projection 45. The outside diameter of the projection 45 is slightly smaller than the inside diameter of the depressed portion 28 so that the projection 45 fits within the depression 28 in sliding relationship. A cylindrical cavity 46 extends along the center line of the projection 45 so that it is in axial alignment with the caviy 32. A conductor block 47 is secured within the cavity 46 and an insulated wire 48 has one end connected to the block 47. The wire 48 extends through an opening provided in the butt 21 into the cabinet 11 and may be connected to a suitable electrical supply (not shown). Hinge butt 21 is provided with a post 49 which fits into an opening provided in the outer wall 13 of the cabinet 11.

The lower hinge butt 22 is spaced below the hinge butt 21 with an offset portion 50 extending below the hinge leaf 20. A circular shaped projection 51 extends into the depression 30 in sliding relationship thereto. A cylindrical cavity 52 is provided in the projection 51 in axial alignment with the cavity 33 of the hinge leaf 20. Spaced apart slots 53 extend through the hinge butt 22 with screws 42 positioned therethrough which cooperate with nuts 43 for securing the hinge butt 22 to the outer wall 13 of the cabinet 11. A conductor block 54 is secured within the cavity 52 and an insulated wire 55 has one end connected to the block 54. Hinge butt 22 is provided with a post 56 which fits into an opening provided in the cabinet wall 13. The wire 55 extends through an opening provided in the hinge butt 22 into the cabinet 11 and may be connected to a power supply. As can be readily seen from this description, the door 15 will be pivotally secured to the cabinet 11 by the hinge 19. A plurality of hinges may be provided if additional strength is required. As the door 15 is moved, the depressed portions 28 and 30 of the hinge leaf 20 will rotate about the projections 45 and 51.

A coiled spring 57 is disposed within the cavities 32 and 46. The conductor block 36 is provided with a slot 58 in which the lower end 59 of the spring 57 is fixedly secured. The upper end 60 of the spring 57 is fixedly secured in a slot 61 provided in conductor block 47. The wire 48 extends through the conductor block 47 and is electrically connected to the upper end 60 of the spring 57. The lower end 59 of the spring 57 is connected to the wire 39 in a similar manner. A second coiled spring 62 is disposed within the cavities 33 and 52 with the upper end 63 fixedly secured in a slot 64 provided in conductor block 46 and the lower end 65 fixedly secured in a slot 66 provided in the conductor block 54. The wire 40 is connected to conductor block 37 which is electrically connected to the upper end 63 of the spring 62 and the wire 55 is connected to conductor block 54 which contacts the lower end 65 of the spring 62. The two springs 57 and 62 as well as the conductor blocks 36, 37, 47 and 54 are constructed from a material that is a good conductor of electricity so that an electrical current will be conducted from the wires 48 and 55 to the wires 39 and 40. The springs 57 and 62 may be calibrated to allow as much as a 180° rotation of the hinge leaf 20. As the door 15 is opened, the springs 57 and 62 will be put in tension so that they will bias the door 15 toward closed position.

The hinge 19 can be easily assembled to the door 15 and cabinet 11. If failure of one of the springs should occur, it can be easily reached by removing the adjacent hinge butt. The springs 57 and 62 are removably attached to the conductor blocks so that they can be easily replaced. From the foregoing description, it can be seen that the hinge 19 is neat in appearance and will conduct an electrical current from the cabinet 11 to the door 15.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is:

1. A hinge comprising a hinge leaf which is provided with a depressed portion, a hinge butt having a projection which is rotatively secured in said depressed portion, said hinge butt and said hinge leaf being formed of a material which is a poor conductor of electricity, said hinge leaf being provided with a first cavity along the center line of said depressed portion, said hinge butt being provided with a second cavity in axial alignment with said first cavity, a first electrical conductor block fixedly secured in said first cavity, a second electrical conductor block fixedly secured in said second cavity, and a coiled spring positioned within said cavities with one end secured to said first conductor block and the opposite end secured to said second conductor block, a first conductor mounted through said hinge leaf and connected to said first electrical conductor block, a second conductor mounted through said hinge butt and connected to said second electrical conductor block, whereby an electric current will be carried between said conductors by said spring, and said spring being formed to bias said hinge leaf in a predetermined direction.

2. A hinge comprising a hinge leaf having a substantially flat body portion and a cylindrically shaped portion formed at one longitudinal edge of said body portion, said cylindrically shaped portion having a pair of cylindrically shaped depressions formed in both of the ends thereof, mounting means formed in said body portion of said hinge leaf whereby said hinge leaf is mountable to a cabinet door, a hinge butt formed of two separate elements, each of said elements formed to have a flat body portion and a cylindrically shaped portion formed at one longitudinal edge thereof, said cylindrically shaped portions of said hinge butt elements being adapted to engage the cylindrically shaped depressions of said hinge leaf, mounting means formed in the flat body portions of said elements of said hinge butt, whereby said hinge butt is

mountable to a cabinet in cooperation with said hinge leaf, a pair of cavities formed in said cylindrically shaped portion of said hinge leaf, said cavities positioned longitudinally therein along the center line of said cylindrically shaped depressions, a second pair of cavities formed in said cylindrically shaped portions of said elements of said hinge butt, said second pair of cavities positioned longitudinally therein along the center line thereof, whereby two closed cylindrical cavities are formed in said hinge, said hinge leaf and said hinge butt further formed of a material which is a poor conductor of electricity, four electrical conductor blocks fixedly secured in each end of said closed cylindrical cavities, a pair of coiled springs said coiled springs mounted within said closed cylindrical cavities and connected to said electrical conductor blocks, said coiled springs tensioned so that said hinge leaf is pivotally biased in a predetermined direction in relation to said hinge butt,

a first pair of electrical conductors, mounted through said hinge leaf, each of said first pair of electrical conductors further connected to one of said electrical conductor blocks secured within said first pair of cavities, and a second pair of electrical conductors, each of said second pair of electrical conductors mounted through one of said elements and connected to one of said electrical conductor blocks secured within said second pair of cavities.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
384,102	Warner	June 5, 1888
1,428,863	Smith	Sept. 12, 1922
1,744,040	Elzer	Jan. 21, 1930
1,878,363	Bangs	Sept. 20, 1932
2,193,488	Morley	Mar. 12, 1940