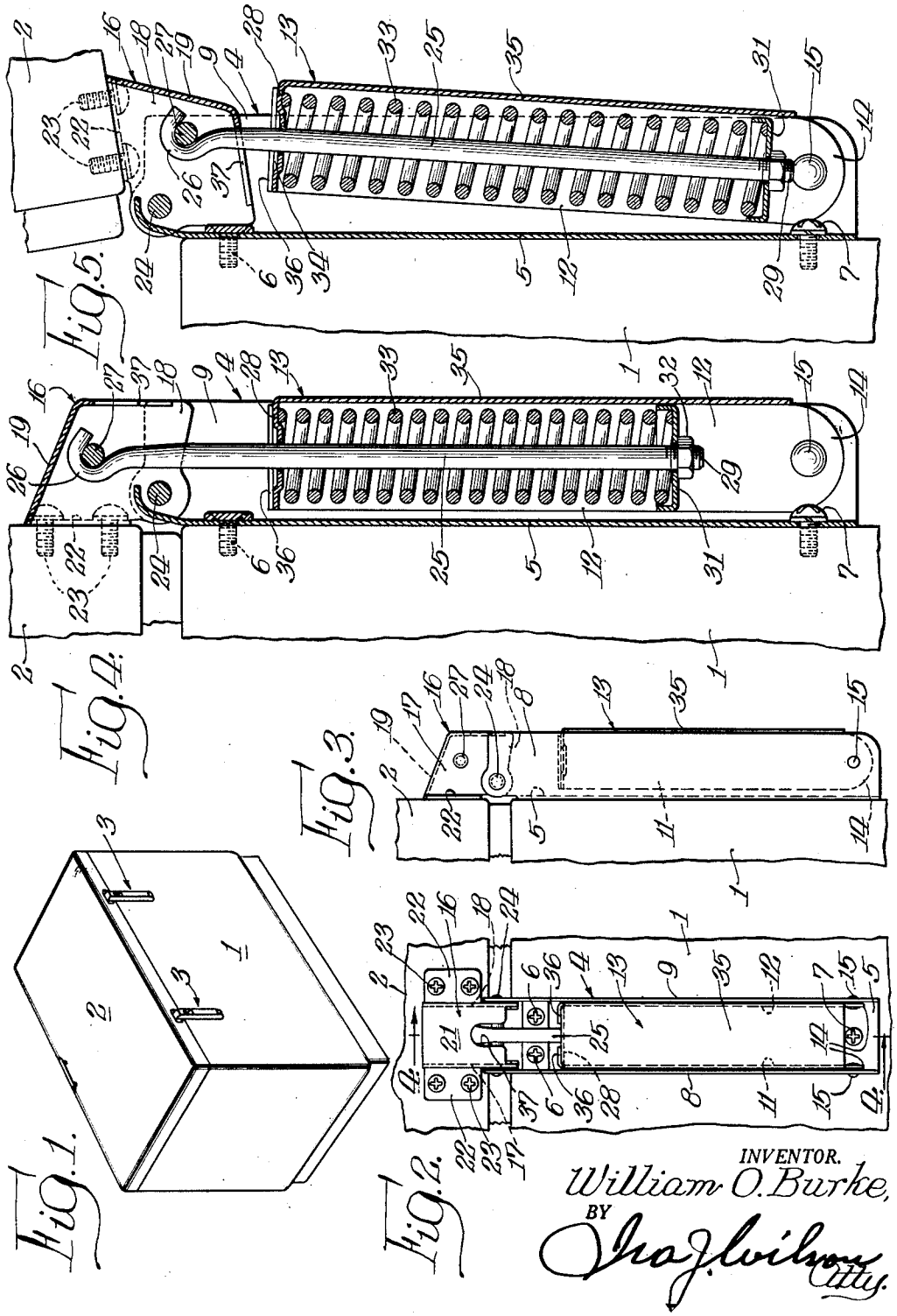
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SPRING HINGE FOR LOW-TEMPERATURE CABINETS

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SPRING HINGE FOR LOW-TEMPERATURE CABINETS

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The present invention relates to a spring hinge construction and more particularly to a novel spring hinge assembly for use in pivotally or swingably mounting a relatively heavy lid, closure or the like for the storage compartment of a chest type cabinet or other enclosure. Although the invention is shown as applied to a cabinet of the type employed in refrigerating or low temperature storage units, it is to be understood that the invention is not limited thereto but is applicable wherever it is desired to effect reduction in the effort or force required in raising and lowering a relatively heavy lid, closure or the like for securing access to an enclosure.

In prior chest type cabinets and especially those designed for home use, difficulty is frequently experienced when attempting to carry or move such a cabinet through a door or other access opening due to the depth of the projecting or exposed hinges. The present hinge is designed so as to obviate such difficulties and it is, therefore, an important object of the present invention to provide a novel hinge assembly so constructed, arranged and designed as to provide a compact unit in which the minimum depth is obtained when the lid or closure is in its lowered or closed position and in which position the chest or cabinet is carried or moved about.

The present invention further comprehends the provision of a novel hinge construction in which the lower hinge member pivots in its base or supporting bracket in such manner that when the lid or closure is in its lowered or closed position this hinge member is disposed and nested within and parallel to the hinge base closely adjacent the rear of the cabinet or chest, and when the lid or closure is raised to its elevated or open position this hinge member pivots or tilts outwardly from the lower end of the base to assume an outwardly and upwardly inclined position with respect thereto.

A further object of the present invention is the provision of a novel spring-loaded hinge device in which the spring compression is readily adjusted for the desired initial adjustment, but is also adjustable to adapt the hinge device to lids or closures of varying weights and to balance and retain any such lid or closure in a desired open position to allow ready access to and facilitate the insertion or removal of food or other content from the storage compartment. This is of extreme importance for in all such cabinets for the refrigeration or storage of frozen foods the lids or closures therefor are relatively heavy and unless provision is made for facilitating opening

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and closing and for balancing or retaining the lid or closure in open, elevated position, the ordinary housewife would experience considerable difficulty especially in raising and holding the lid or closure open when inserting or removing food.

Further objects are to provide a construction or maximum simplicity, efficiency, economy and ease of assembly and operation, and such further objects, advantages and capabilities as will later more fully appear and are inherently possessed thereby.

The invention further resides in the construction, combination and arrangement of parts illustrated in the accompanying drawing, and while there is shown therein a preferred embodiment, it is to be understood that the same is susceptible of modification and change, and comprehends other details, arrangements of parts, features and constructions without departing from the spirit of the invention.

In the drawing:

Figure 1 is a view in perspective of a low temperature or frozen food cabinet or chest equipped with the novel hinge assembly of the present invention, the view being taken from the rear of the cabinet.

Fig. 2 is an enlarged view in rear elevation of one of the hinges and showing the manner in which the hinge is assembled and applied to the cabinet.

Fig. 3 is a view in side elevation of the assembled hinge of Fig. 2.

Fig. 4 is a view in vertical cross section taken in a plane represented by the line 4—4 of Fig. 2, but on an enlarged scale.

Fig. 5 is a view in vertical cross section similar to Fig. 4 but with the lid or closure moved to elevated or open position and showing the relationship and location of the hinge members and associated parts when in open position.

Referring more particularly to the disclosure in the drawing and to the novel embodiment therein selected to illustrate the invention, there is shown a refrigerator or frozen food cabinet comprising a receptacle or container 1 provided with a lid or closure 2 hinged along its rear edge to the upper rear edge of the container and permitting access to the food compartment or storage space. The lid or closure for such a cabinet is generally of relatively heavy insulated construction that provides a positive seal for the storage space when in closed position. However, because of its weight, size and leverage, difficulty is experienced by the housewife or user in raising the lid and serious injury may result in lowering the lid

should it fall freely or unchecked unless provision is made for counterbalancing such weight and leverage.

By the present invention the relatively heavy weight and large dimensions of the lid or closure are effectively counteracted whereby the user is relieved of the excessive effort required in its opening and closing. This is accomplished by the novel hinge construction of the present invention. As shown in Fig. 1, two similar hinges located in spaced relation and each designated by the reference numeral 3 are provided, although it is to be understood that any suitable number of these hinges may be employed depending upon the size of the cabinet and size and weight of the lid.

Each hinge 3 includes a fixed hinge base or support 4 having its rear wall 5 rigidly secured adjacent its upper and lower ends to the receptacle or container 1 by screws or other attaching means 6 and 7. This hinge base or support is of substantially channel shape with the spaced vertical side walls 8 and 9 opening outwardly to receive therebetween inwardly projecting spaced sides 11 and 12 of a channel-shaped hinge member 13. These sides 11 and 12 are each pivotally mounted or journalled adjacent their lower end at 14 upon the lower end of the side walls 8 and 9, respectively, of the hinge base 4 by means of a journal or rivet 15 whereby the hinge member 13 is permitted to pivot within and with respect to the base or support 4, and when the lid or closure 2 is in closed position (Figs. 3 and 4) the hinge member 13 is disposed in vertical position and nested within the base or support 4.

A lid wing or cup-shaped hinge member 16 is provided with spaced side walls 17 and 18, a downwardly inclined top surface 19 merging into a depending wall 21, and a pair of laterally projecting flanges 22, 22 by which it is rigidly secured to the rear edge of the lid or closure 2 by screws or other attaching means 23. This lid wing or hinge member 16 is pivotally connected to the hinge base 4 by a cross pin 24 projecting through aligned openings in the side walls 8 and 9 of the hinge base 4 and the adjacent side walls 17 and 18 of the lid wing or hinge member, the opposite ends of this pivot being deformed or otherwise held against displacement but permitting free pivotal movement between the lid wing or hinge element 16 and the hinge base 4.

As appears more clearly in Figs. 4 and 5, a spring retainer rod 25 pivotally connects the lid wing or hinge member 16 to the hinge member 13 swingably mounted in the hinge base 4. This retainer rod is provided with a hook 26 at its upper end projecting into the lid wing 16 and hooked onto a pivot pin 27 bridging and with the ends thereof secured in the side walls 17 and 18 of the lid wing. The rod projects downwardly through an opening in the top plate 28 of the hinge member 13 and its lower threaded end 29 projects through an opening in a cup-shaped guide washer 31 and is secured thereto by a nut 32 which upon adjustment alters the compression on a coil compression spring 33.

This compression spring 33 at its lower end seats within and bears against the washer 31, and at its upper end bears against the top 28. To maintain the upper end of this compression spring in alignment, the top 28 is centrally depressed at 34 to provide an annular groove or recess thereabout in which the upper end of the spring seats. By rotating the nut 32 the initial compression of the coil spring may not only be increased or decreased but the hinge may be adapted to lids of varying weights and also to hold the lid in open position or in various positions of balance and leverage.

The top plate 28 is shown as formed integral with the base or outer surface 35 of the channel forming the hinge member 13, and the opposite sides 11 and 12 thereof are bent inwardly to provide inturned flanges 36 with their ends spaced apart sufficiently to permit passage of the spring retainer rod 25 therebetween.

Fig. 4 discloses the hinge assembly with the lid or closure 2 in lowered or closed position. When in this relation, the spring retainer rod 25 and the hinge member 13 are disposed in vertical position with the hinge member 13 aligned with and nested within the hinge base or support 4. In this position, the spring is under maximum compression and generally some latch or locking device is provided to retain the lid or closure in closed and sealed relation with the container or receptacle.

As the lid or closure is moved to open position as disclosed in Fig. 5, the lid hinge wing 16 rotates about its pivotal connection 24 with the base 4, and the pivot pin 27 and hooked end 26 of the retainer rod 25 carried in the hinge wing are swung outwardly in a clockwise direction. In such swinging movement the coil spring 33 expands and carries therewith the guide washer 31 and retainer rod 25, and the spring, retainer rod and hinge member 13 pivot outwardly in a clockwise direction away from the hinge base or support 4 about the rivets 15. To permit the lid to be moved to its maximum open or elevated position as appears from Fig. 5, the depending wall 21 of the lid wing or hinge member 16 is provided with a notch or cut-out 37, and when the lid is in this fully open position the upper edge defining this cut-out provides a stop or abutment against which the retainer rod 25 engages. In this fully open position, the forces tending to move the lid or closure to its lower, closed position will be substantially in balance.

As the lid or closure is moved downward toward its closed or lowered position, the effect of its weight and leverage becomes increasingly greater, but at the same time the rate of compression and the resistance of the coil spring 33 increases and resists or opposes this force.

From the above description and the disclosure in the drawing, it will be readily apparent that the present invention comprehends a novel compact hinge construction for assisting in the raising of a heavy lid or closure by reducing the effort or force required of the user in opening, and also restraining the weight and leverage of the lid or closure so as to prevent it from slamming and injuring the user as well as causing damage to the cabinet.

Having thus disclosed the invention, I claim:

1. A combined hinge and support for pivotally mounting a relatively heavy lid upon a cabinet and assisting in opening and closing of the lid, comprising an elongated and outwardly channelled hinge base adapted to be attached to the rear of and project from the cabinet, a pair of hollow hinge members one of which is adapted to be attached to the lid and which is pivotally mounted upon the base and the other pivotally mounted at its lower end in the base and adapted to be nested therein, a spring retainer rod extending into the hollow of the last mentioned hinge member and movable therewith with one end pivotally connected to the hinge

member which is adapted to be attached to the lid and the other end slidably mounted in the hinge member in the base, and a coil compression spring encompassing the retainer rod within and movable with the hinge member in the base and bearing at one end against a fixed part on the last mentioned hinge member and at its other end against a part on the retainer rod and adjustable with respect to the last mentioned hinge member.

2. A combined hinge and support for pivotally mounting a relatively heavy lid upon a cabinet, comprising a hinge base adapted to be secured to and project from the rear of the cabinet, a pair of hinge elements one of which is adapted to be attached to the rear of the lid and which is pivotally mounted upon the upper end of the base and the other pivotally mounted at its lower end in the lower part of the base in such manner that this hinge member is moved into and nested therein when the lid is closed, and spring-loaded means for assisting in the movement of the lid to open and closed position and balancing the lid when in fully open position, said means including a connecting rod extending into the hinge element in the base and longitudinally movable therein, spaced guides through which the rod projects one of which is fixed in and the other movable within the hinge element in the base, the outer end of said rod projecting beyond the fixed guide and pivotally connected to the hinge element adapted to be attached to the lid and the inner end adjustably connected to the movable guide, and a compression spring encompassing the rod within the hinge element in the base with its opposite ends bearing against the guides and under maximum compression when the lid is closed.

3. A combined hinge and support for pivotally mounting a relatively heavy lid upon a cabinet and for assisting in the opening and closing of the lid, comprising on outwardly opening channel-shaped hinge base adapted to be secured to the cabinet and a pair of hollow hinge elements one of which is adapted to be attached to the lid and pivotally connected to the base and the other pivotally mounted in the base, a spring retainer rod extending into the hollow of said other hinge element and provided with a hooked upper end and a threaded lower end, a guide washer for receiving the threaded lower end of the rod and adjustable in said other hinge element, a coil compression spring encompassing the retainer rod within said other hollow hinge element and bearing at its upper end against an end wall of this hinge element and at its lower end against the guide washer, and a pivot pin carried in the hollow of the first mentioned hinge element to one side of the pivotal connection between this hinge element and the base and engaged by the hooked end of the retainer rod, whereby when the lid is closed the spring is under maximum compression and assists in moving the lid to open and closed position.

4. A hinge construction for pivotally mounting and supporting a relatively heavy lid upon a storage cabinet and assisting in the raising and lowering of the lid, comprising a channelled base adapted to be attached to the exterior of the cabinet and opening outwardly and rearwardly, a hollow hinge member pivotally mounted at its lower end in the lower end of the base and adapted to be moved bodily into and nested within the base when the lid is closed, a hinge wing adapted to be secured to the lid and pivotally connected to the upper end of the base whereby the lid may be swung to open or closed position, a projection carried in the hinge wing, a spring retainer extending into the hollow of the hinge member and pivotally connected at its upper end upon said projection, spaced guide members through which the retainer projects one of which is fixed to the hinge member and the other of which is slidable therein and which is connected to the lower end of said retainer, and a coil spring encompassing the retainer and bearing at its opposite ends against the guide members.

5. A hinge construction for pivotally mounting and supporting a relatively heavy lid upon a storage cabinet and assisting in the raising and lowering of the lid and retaining the lid balanced in fully open position, comprising an outwardly channelled base adapted to be mounted at the rear of the cabinet, a hollow hinge member pivotally mounted at its lower end in the base and adapted to be moved into and nested within the base when the lid is close, a hinge wing adapted to be secured to the rear of the lid and pivotally connected to the upper end of the base, and spring-loaded means adapted to assist in the movement of the lid to open and closed positions and adapted to balance the lid when in fully open position, said means including a connecting rod extending into the hollow of the hinge member and longitudinally shiftable therein, spaced guides through which the rod projects one of which is fixed to the hinge member and the other loose and movable therein, a compression spring encompassing the rod with its opposite ends bearing against the guides and tending to swing the lid to open position, the outer end of said rod being pivotally connected to the lid wing and the inner end connected to the movable guide, and means for adjusting the position of the movable guide on the rod whereby to vary the initial compression on the spring.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
374,584	Cook	Dec. 13, 1887
2,030,324	Schmidt	Feb. 11, 1936
2,325,897	Waltman	Aug. 3, 1943
2,500,057	Borgerd et al.	Mar. 7, 1950