Feb. 11, 1936. O. C. SCHMIDT 2,030,324

ACTUATING MEANS FOR CLOSURES, SUCH AS DOORS, LIDS AND THE LIKE

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Fig. 1

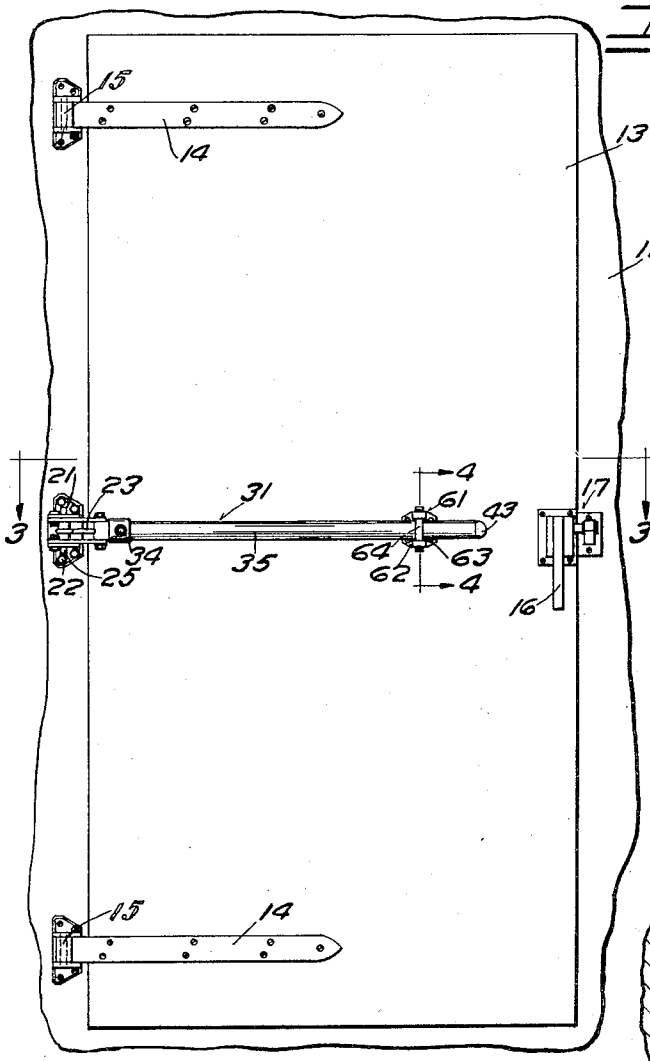


Fig. 2

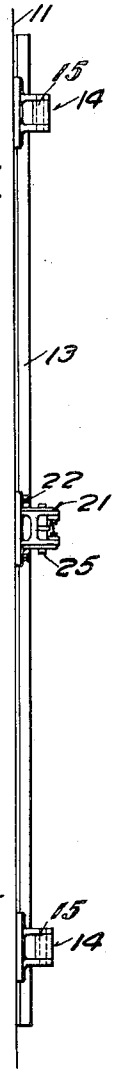


Fig. 4

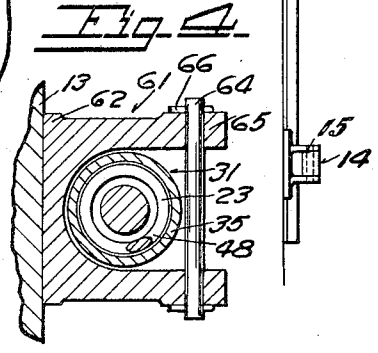
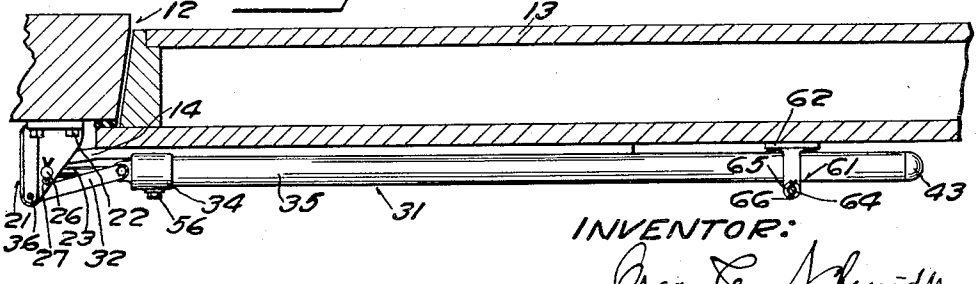


Fig. 3



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Fig. 5.

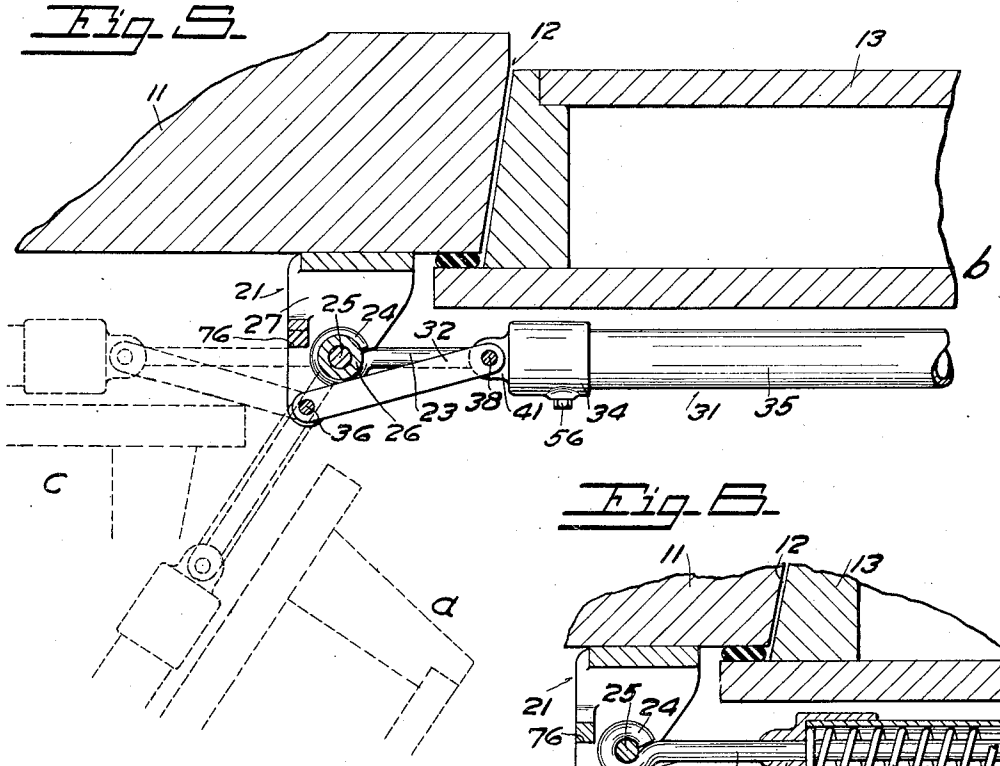


Fig. 6.

Fig. 7.

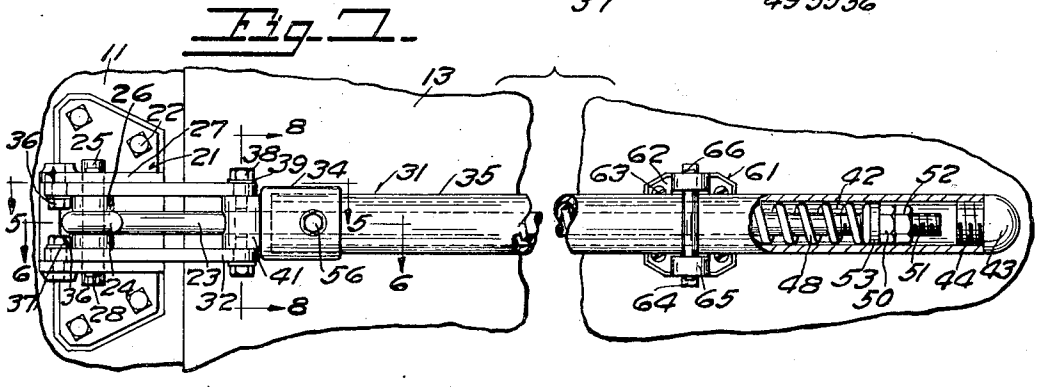
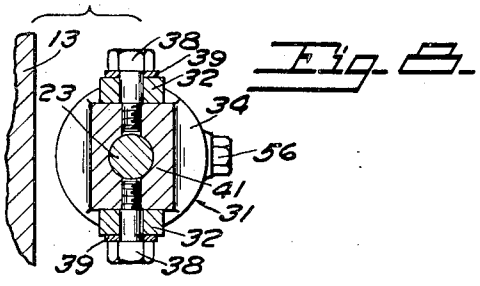


Fig. 8.



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Fig. 9

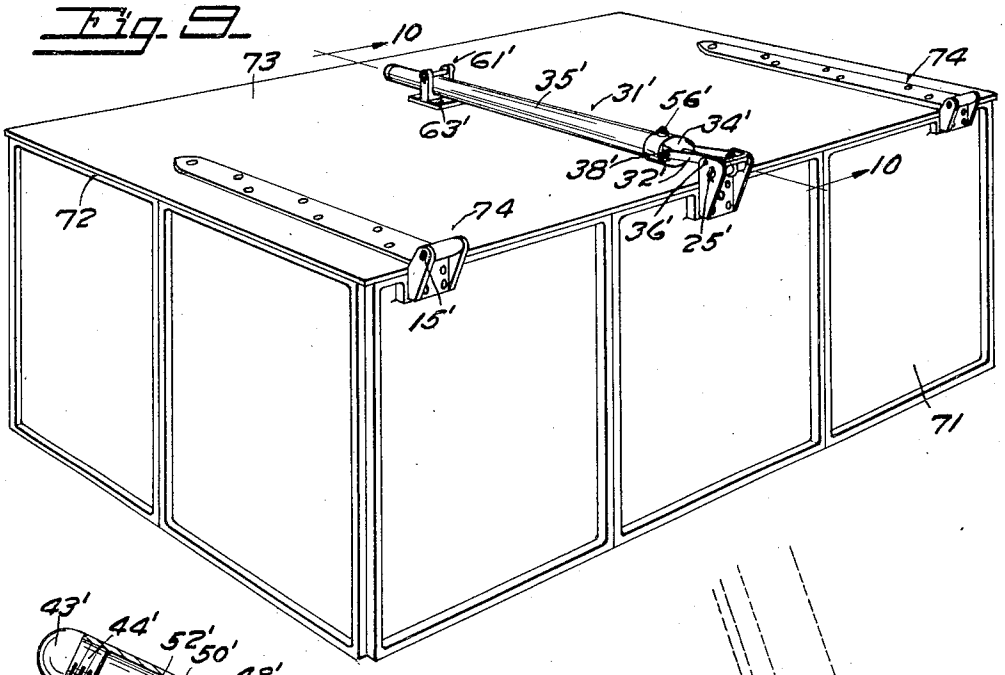
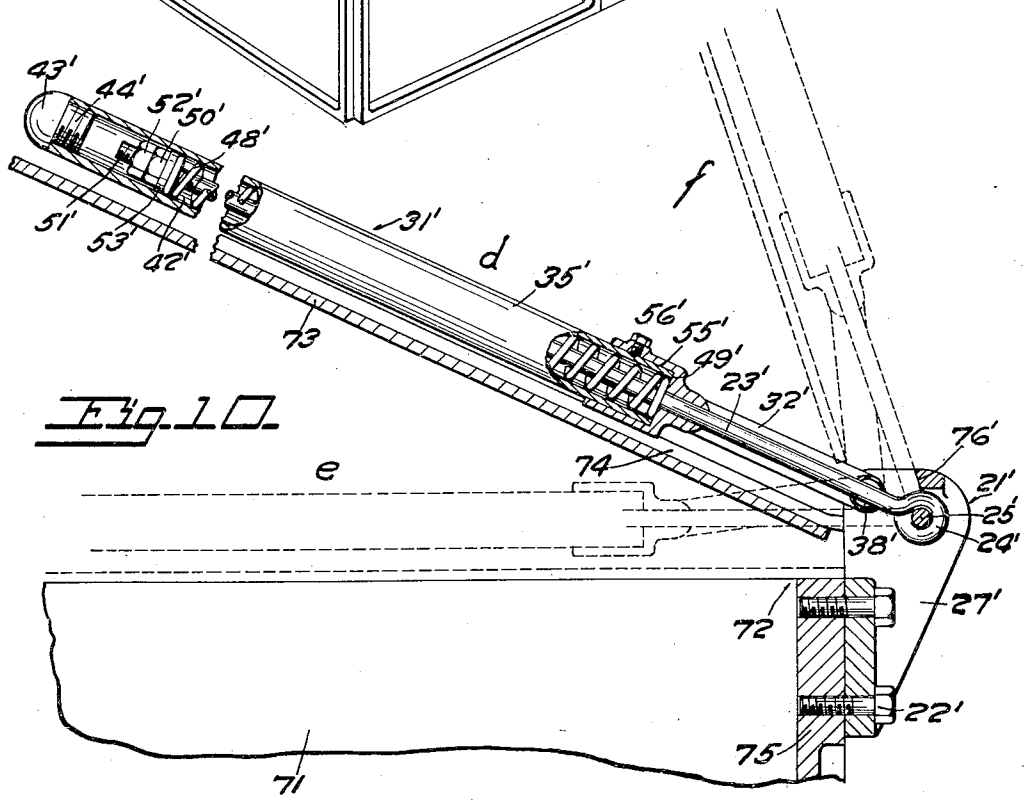


Fig. 10



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Patented Feb. 11, 1936

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UNITED STATES PATENT OFFICE

2,030,324

ACTUATING MEANS FOR CLOSURES, SUCH AS DOORS, LIDS, AND THE LIKE

Oscar C. Schmidt, Cincinnati, Ohio, assignor to The Cincinnati Butchers' Supply Company, Cincinnati, Ohio, a corporation of Ohio

Application May 27, 1935, Serial No. 23,642

5 Claims. (Cl. 16—72)

My invention relates to actuating means for automatically moving closures, and is exemplified in its preferred form as an actuating means for the door of a refrigerator, and in a modified form as an actuating means for the lid of a cooking box for cooking sausages and meat, such as used in meat packing establishments. It is primarily intended as an automatic closing means for closures.

It is the object of my invention to provide a powerful actuating means for closures of this character, of simple construction, readily assembled and provided with simple means for mounting the same on the closure and its frame.

The invention consists in novel means for accomplishing these objects, and in providing a compact arrangement of the parts.

My invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a side elevation of a refrigerator, partly broken way, having my improved device applied thereto.

Fig. 2 is an edge elevation of the same,

Fig. 3 is a cross-section of the same, taken on the line 3—3 of Fig. 1.

Fig. 4 is a cross-sectional detail view of the retaining means, taken on the line 4—4 of Fig. 1.

Fig. 5 is an enlarged longitudinal sectional view of my improved device, taken on the line 5—5 of Fig. 7, and partly broken away, showing the relation of the parts in full lines during closed position of the door, and showing the same in dotted lines in assumed dead center position of the door, and in open position of the door.

Fig. 6 is a central longitudinal section of my improved device, taken on the line 6—6 of Fig. 7, and partly broken away.

Fig. 7 is an enlarged side elevation of my improved device, partly in section, and partly broken away.

Fig. 8 is a cross-section of a detail of the same, taken on the line 8—8 of Fig. 7.

Fig. 9 is a rear perspective view of a cooking box such as used in meat packing establishments, partly broken away, having my improved device applied thereto; and,

Fig. 10 is a cross-section of the same, taken on the line 10—10 of Fig. 9, and partly broken away, showing the cooker lid in partly open position and my improved device in dead center relation in full lines, and in closed position and in fully open position in dotted lines.

A refrigerator wall is shown at 11 having an opening 12. A closure or door 13 is arranged to close this opening. It is shown hung on hinges 14 on the wall of the door opening, the hinges having hinge pintles 15 in line with each other. A handle 16 is provided on the door, a latch 17 being arranged to latch the door in closed position.

A bracket 21 is arranged to be secured to the wall of the door opening, as by screws 22. A rod 23 is pivoted to the bracket, as by having a bearing 24 about a pivot pin 25 in bearings 26 of side walls 27 of the bracket, the pin being held in place by suitable cotter pins 28 at the outer faces of said side walls in suitable holes in said pin. This pin is in line with the hinge pintles 15, so that the pivotal axis of the rod is in line with the pivotal axes of the hinges.

The terms outer and inner are herein used in analogy to the relations of the parts with the closure. The ends of parts at or beyond the outer edge of the closure are termed their outer ends, and the ends of parts extending away from said outer edge of the closure at which my improved device is secured toward the middle of the closure are termed their inner ends.

An arm 31 is pivoted to the bracket through the medium of links 32 at the respective sides of the arm. The arm may comprise a base 34 and an extension 35. The outer ends of the links are pivoted to the side walls of the bracket by means of bolts 36 passing through pivot holes in the outer ends of said links and threaded into said side walls, washers 37 being located between the heads of said bolts and said links. The links are shown located between the side walls.

The inner ends of the links are pivoted to the outer end of the arm by means of bolts 38, the bolts passing through holes in said links, and being threaded into the respective sides of the outer end of the arm, the arm being located between the links, and washers 39 being located between the heads of the bolts and the links.

The base of the arm is provided with a bearing 41 in which the rod 23 is located, and which is slidable on the rod. The rod is preferably located between the ends of the bolts 38. The arm is provided with a bore 42, as by forming the extension as a tube, the inner end of which is closed by a plug 43 having a reduced stem 44 suitably connected with the inner end of the tube.

A helical spring 48 surrounds the rod, the outer end of the spring having abutment against an annular shoulder 49 in the arm, and the inner end of the spring having abutment at the inner end of the rod. This last-named abutment is shown as a nut 50 adjustable about the threaded end portion 51 of the rod, a jam nut

52 clamping the parts in adjusted relation. A washer 53 is located between the nut 50 and the inner end of the spring and helps to center the rod in the tube. This adjustment is for the purpose of adjusting the tension of the spring. The washer and the spring center the rod in the tube during lengthwise movements of the tube or arm with relation to the rod during opening and closing movements of the door, for respectively compressing or relieving the spring.

The tube is preferably releasable from the base of the arm, as by locating the same in a socket 55 in said base, and clamping the same in the socket by a set bolt 56 threaded in the base. The tube is readily removed by releasing the set bolt 56 for exposing the adjusting means of the spring, and is readily reconnected with the base after the adjustment is made.

The spring normally urges the arm in closing direction of the door during part of the movement of the door, but if the door be swung open sufficiently far, the urge of the spring is to move the arm away from the door. In order to hold the arm to the door, so that the urge of the spring can be imparted to the door in either of the directions of movement of the arm, the arm is held to the door by means of a retainer 61, comprising lugs extending from a plate 62 secured to the door, as by means of screws 63. A pin 64 in bearings 65 in the lugs is held in said bearings by means of cotter pins 66 located in holes in said pin at the outer faces of the lugs. The pin 64 closes the retainer for holding the arm to the door. The arm may be readily separated from the door by removal of the pin.

I have in Figs. 9 and 10 exemplified my improved device as applied to the lid of a cooking box, such as used in cooking sausages and meats in meat packing establishments. In these figures similar parts of my improved device are designated by similar but primed reference numerals.

The body of the cooking box is represented at 71, having an opening 72 arranged to be closed by a closure or lid 73 which is hinged to the body or wall of the opening by hinges 74. The bracket 21' is of somewhat different form from the bracket 21, as it is shown secured to an upright wall 75 of the body of the cooking box, the closure or lid 73 being at right angles to this wall when in closed position, whereas, in Figs. 1 to 4 inclusive the bracket is secured to the wall 11 of the refrigerator, which is parallel with the outer face of its closure or door 13.

In Figs. 9 and 10 the axis of the pivot 25' of the rod is in line with the pivotal axes of the hinge pintles 15' for the cooking box lid. The axes of the pivotal connections for the rod and the link are in relative arrangements to each other similar to the relative arrangements of these axes in the device applied to the refrigerator door, but are slightly orbitally moved with relation to the face of the lid, as it will be noted by a comparison between Figs. 5 and 10, that the dead center positions of the door and lid are somewhat different with relation to their openings.

In Fig. 5 the dead center position of the door is shown in dotted lines at *a*, its closed position is shown in full lines at *b*, and its fully open position is shown in dotted lines at *c*. In Fig. 10 the dead center position of the lid is shown in full lines at *d*, its closed position is shown in dotted lines at *e*, and its fully open position is shown in dotted lines at *f*.

There is preferably a stop to limit the swinging movement of the closure when the same is in fully open position. This stop is shown as a lug 76 on the bracket in Fig. 5, arranged to be contacted by the rod, and as a lug 76' on the bracket in Fig. 10, arranged to be contacted by the rod.

My improved device automatically closes the door, lid or other closure throughout a certain range of its movements, and acts to automatically further open the closure throughout another range of its movements, and holds the closure in open or neutral position between said ranges of movements.

The pivotal axis of the rod is at one side of the plane in which the pivotal axes at the respective ends of the links are located, and is between said last-named axes when the closure is in closed position.

When the closure is moved outwardly from closed position, the arm, by reason of its link connection and the locations of the pivotal axes of the links, has a lengthwise movement imparted thereto crosswise of the face of the closure, thereby compressing the spring and increasing the pressure of the spring upon the closure. The spring is normally compressed sufficiently to exert closing pressure on the closure. The pressure of the spring is sufficient to automatically close the latch when a latch is employed. The urge of the spring to automatically close the closure continues until the closure has been manually moved to such open position that the plane in which the pivotal axes of the pivots at the respective ends of the links are located, has moved about the pivotal axis between the outer end of the link and the bracket, so that the pivotal axes of the link and the pivotal axis of the rod are in the same plane, in which relation the parts are in dead center relation, and the closure is thereby held in neutral position.

If the door is manually moved to further open the same, the plane of the pivotal axes of the pivots of the links is moved past the pivotal axis of the rod, and the pressure of the spring is exerted to further automatically move the closure in the same direction, namely, into fully open position, until there is coaction with the stop 76, 76'. If, however, it is desired to close the closure when at dead center position, it is only necessary to initiate the movement of the closure from its dead center position toward its closing position, whereupon the spring becomes effective to automatically fully close the closure.

In closing the closure from fully open position, the initial portion of the movement causes further pressure upon the spring until dead center position of the closure is reached, after which upon initial manual urge upon the closure in closing direction, the spring automatically moves the closure to automatically fully close the closure.

Referring to Fig. 10, the dead center position of the lid is shown at *d*. If it is desired to load or to empty the cooking box, the lid is urged upwardly, after which it automatically opens to full extent, as shown by its position *f*, and if it is desired to close the lid the lid is manually moved downwardly past its dead center position, exemplified at *d*, whereupon it automatically moves to fully close the lid and to maintain the lid in tightly closed position.

My improved device provides ready and simple means whereby the closure is automatically held in neutral position, from which it may be initially urged in closing direction or in fully open direction, and thereupon automatically move into closed position or fully open position; and where-

by the closure is easily manipulated by the operator; and provides a device which is simple and economical in structure and which exerts great pressure upon the closure so as to fully close the same and to retain the same in fully closed position. My improved device further dispenses with counterbalancing devices for the lids of cooking boxes and closures in similar relations.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In actuating means of the character described, the combination of a bracket arranged to be secured to the wall of a closure opening, an arm arranged for shiftable connection with the closure, a helical spring extending lengthwise of the arm, a rod therein having pivotal connection at its outer end with said bracket, the outer end of said spring having abutment on said arm, the inner end of said spring having abutment on the inner portion of said rod, and a link having pivotal connections at its respective ends with the outer end of said arm and said bracket, the axis of said first-named pivot being normally at one side of the plane of the axes of said second-named pivots when the closure is closed.

2. In actuating means of the character described, the combination of a bracket arranged to be secured to the wall of a closure opening, an arm arranged for movement in lengthwise direction along the face of the closure, a helical spring extending lengthwise with relation to said arm, a rod extending lengthwise along said spring and having pivotal connection at its outer end with said bracket, the outer end of said spring having abutment on said arm, the inner end of said spring having abutment on the inner portion of said rod, and a link having pivotal connections at its respective ends with the outer end of said arm and with said bracket, said last-named pivots normally located in a plane at one side of said first-named pivot, said first-named pivot normally located between said second-named pivots, and said link movable during opening of the closure so that all said pivots are in said plane extended, in which relation the closure is held in open position by reason of the dead center relation of said pivots.

3. The combination with a closure and hinges therefor having hinge pintles, of a bracket secured to the closure opening, a rod having pivotal connection with said bracket, the pivotal axis of said connection being in line with the pivotal axes of said pintles, a tubular arm into which said rod extends, a link having pivotal connection at one of its ends with said bracket and pivotal connection at its other end with said arm, a helical spring in said tubular arm about said rod, the outer end of said spring having abutment on said arm and the inner end of said spring having abutment on said rod, and a retainer for said arm on said closure.

4. In actuating means of the character described, the combination of a bracket arranged to be secured to the wall of a closure opening, an arm arranged to be moved endwise along the face of the closure, a helical spring extending lengthwise with relation to said arm, a rod therein having pivotal connection at its outer end with said bracket, the outer end of said spring having abutment on said arm, the inner end of said spring having abutment on the inner portion of said rod, and a link having pivotal connections at its respective ends with the outer end of said arm and with said bracket, the axis of said first-named pivot being normally at one side of the plane of the axes of said second-named pivots when the closure is closed, and said plane movable when opening the closure to position all said axes in the same transverse plane and thereby hold the closure in open relation.

5. In actuating means of the character described, the combination of a bracket arranged to be secured to the wall of a closure opening, an arm arranged to be moved endwise along the face of the closure, a helical spring extending lengthwise with relation to said arm, a rod therein having pivotal connection at its outer end with said bracket, the outer end of said spring having abutment on said arm, the inner end of said spring having abutment on the inner portion of said rod, and a link having pivotal connections at its respective ends with the outer end of said arm and with said bracket, the axis of said first-named pivot being normally at one side of the plane of the axes of said second-named pivots when the closure is closed, and said plane movable when opening the closure to position all said axes in the same transverse plane and thereby hold the closure in open relation, and said plane movable past the axis of said first-named pivot upon further opening movement of the closure whereby said spring urges the closure in opening direction.

OSCAR C. SCHMIDT.