May 12, 1970 I. L. BERKOWITZ 3,510,986

SELF-CLOSING HINGED DOORS AND HINGES THEREFOR

Filed Oct. 1, 1968 4 Sheets-Sheet 1

FIG. 1

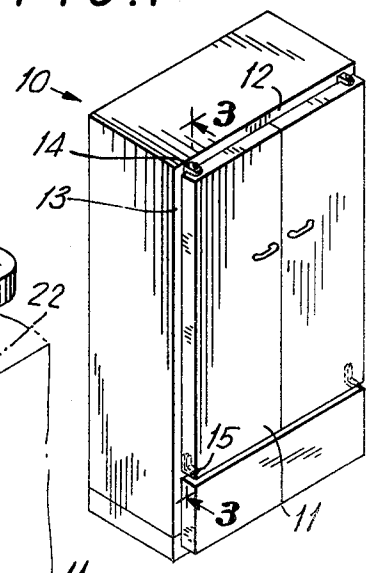
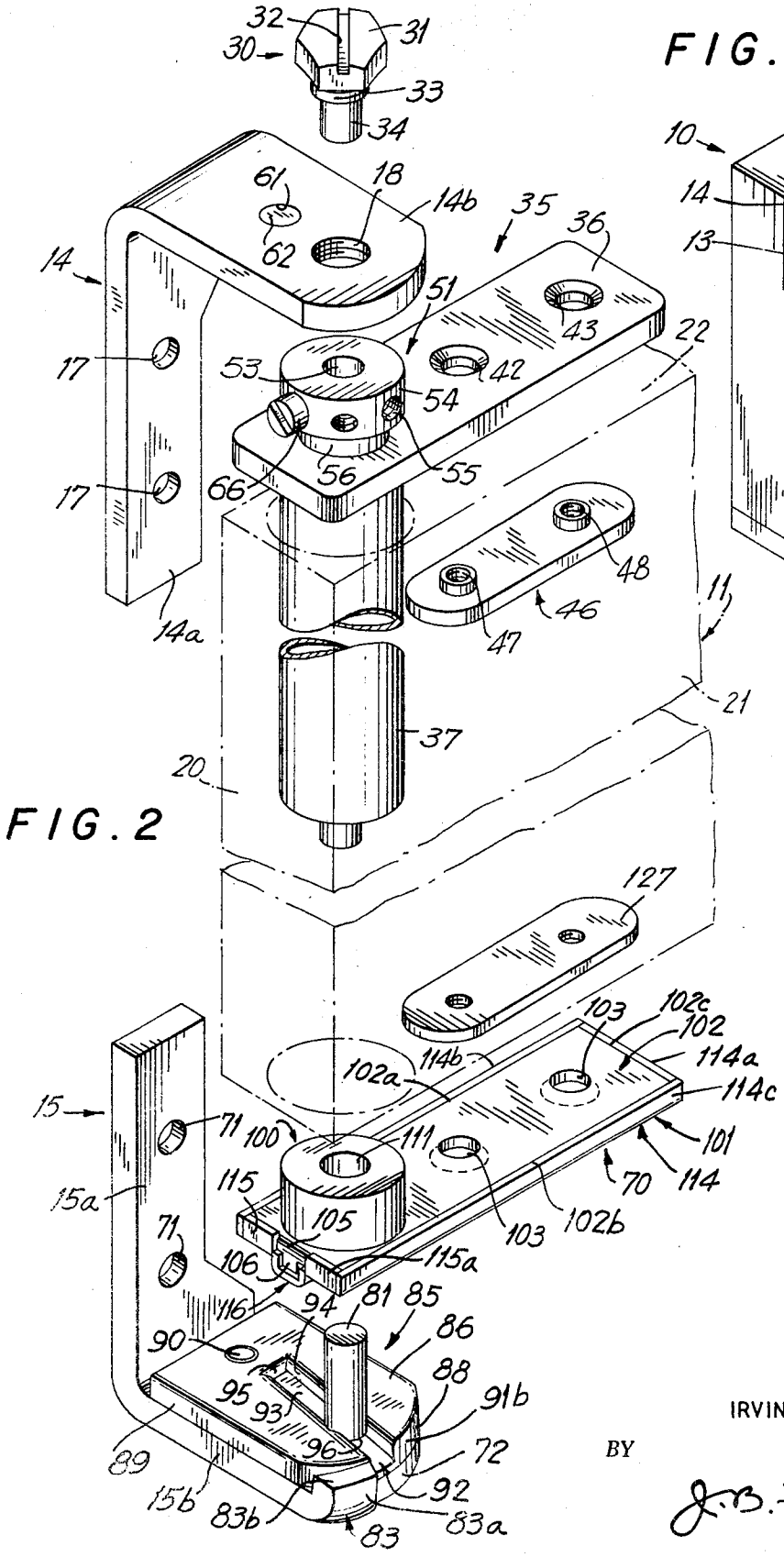


FIG. 2



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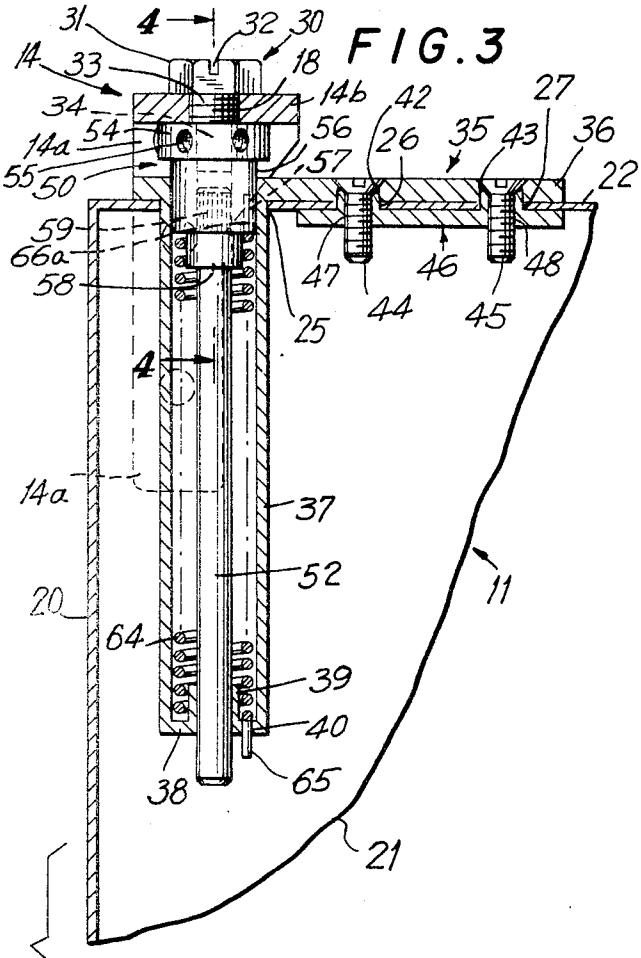
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SELF-CLOSING HINGED DOORS AND HINGES THEREFOR

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FIG. 3



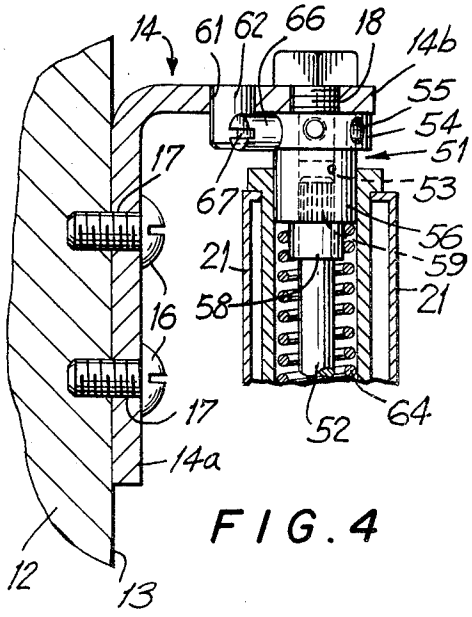
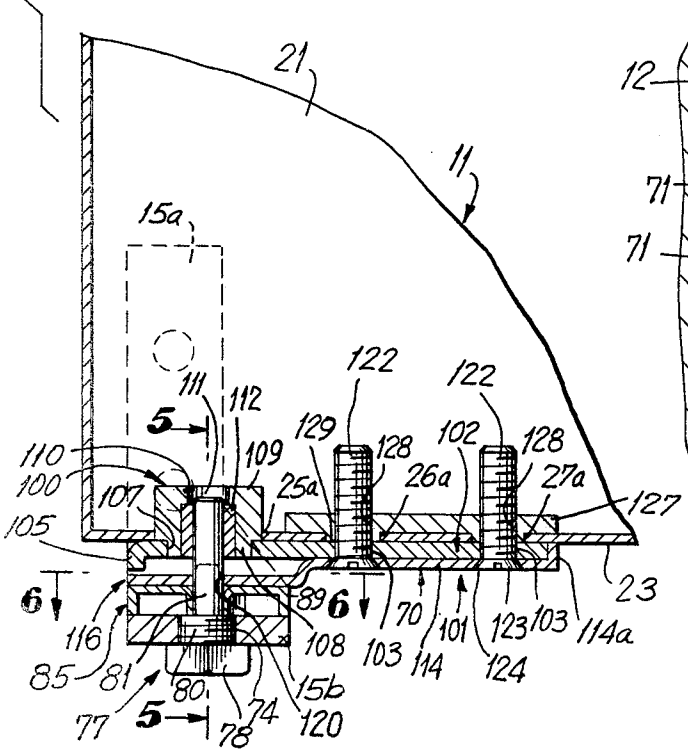
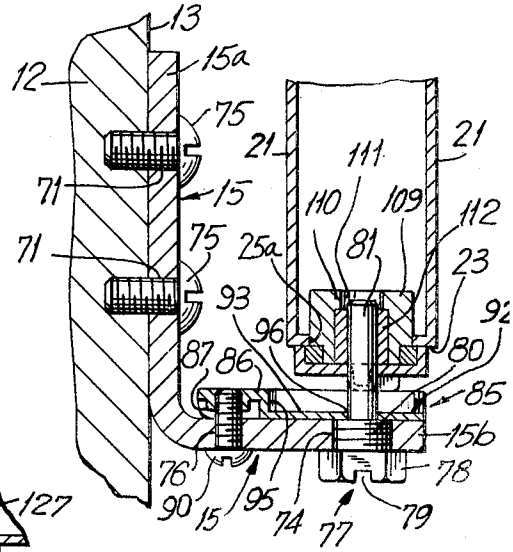


FIG. 4

FIG. 5





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SELF-CLOSING HINGED DOORS AND HINGES THEREFOR

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FIG. 6

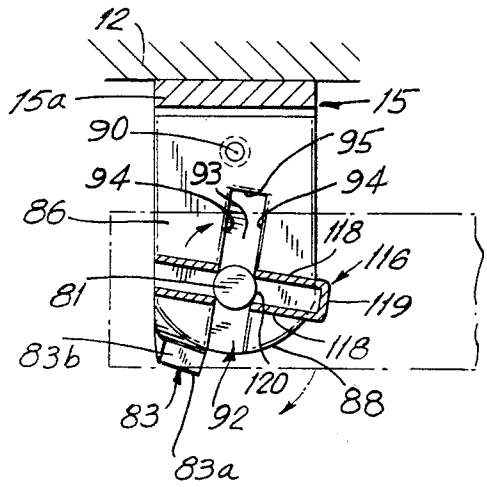


FIG. 7

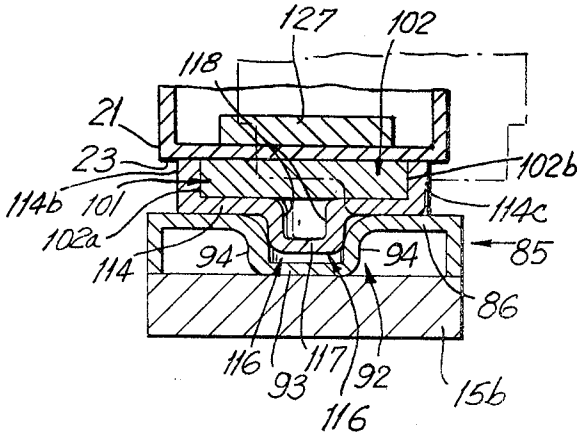


FIG. 8

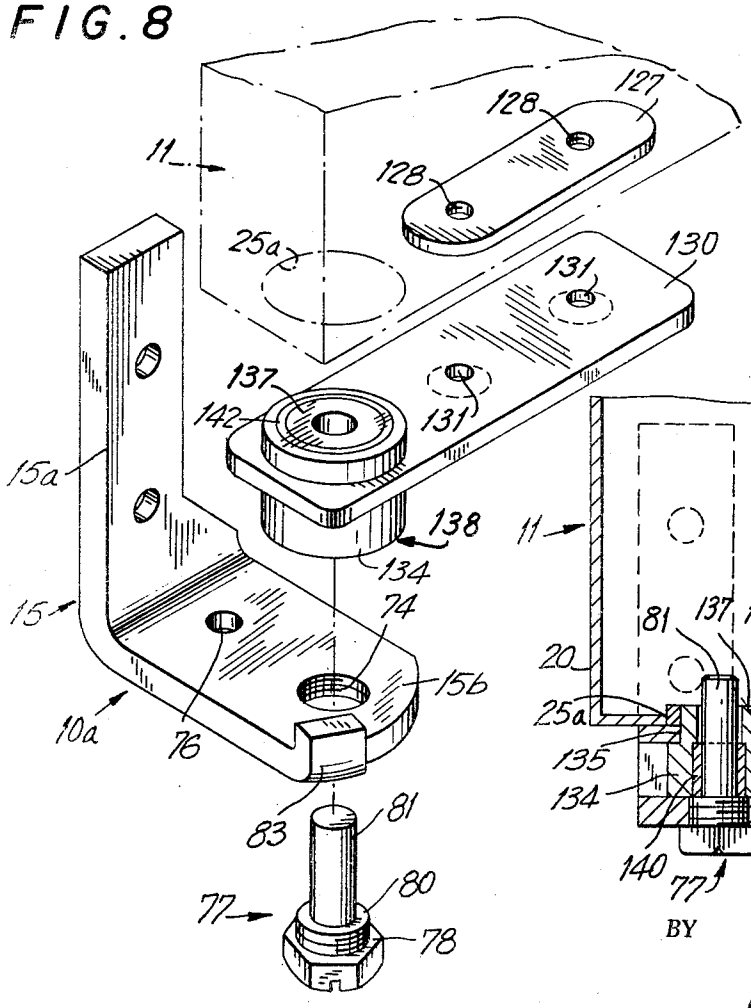
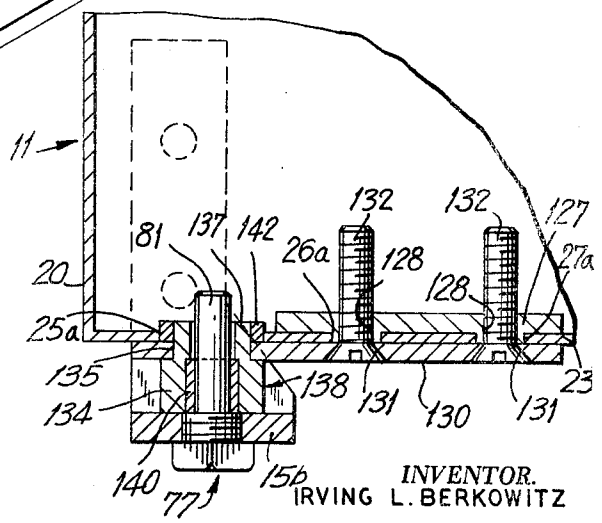


FIG. 9



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SELF-CLOSING HINGED DOORS AND HINGES THEREFOR

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FIG. 10

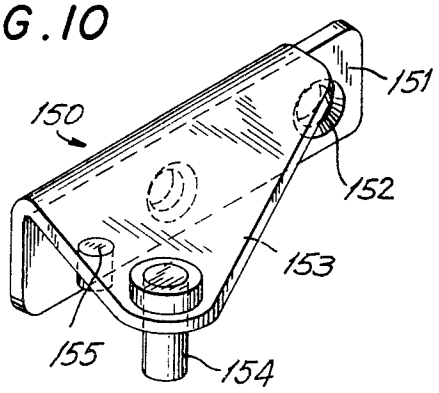


FIG. 11

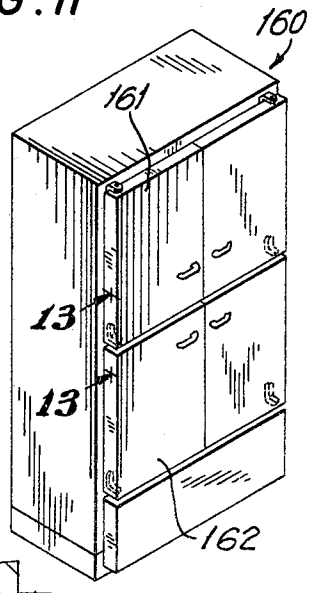


FIG. 12

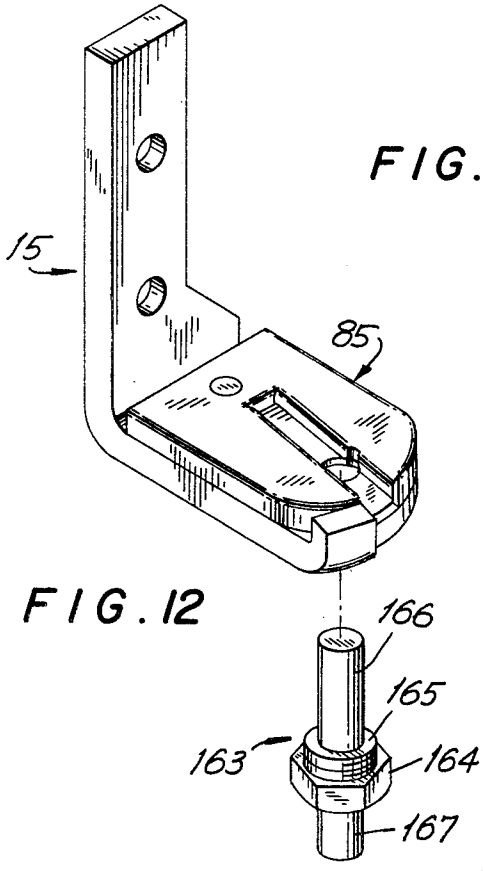
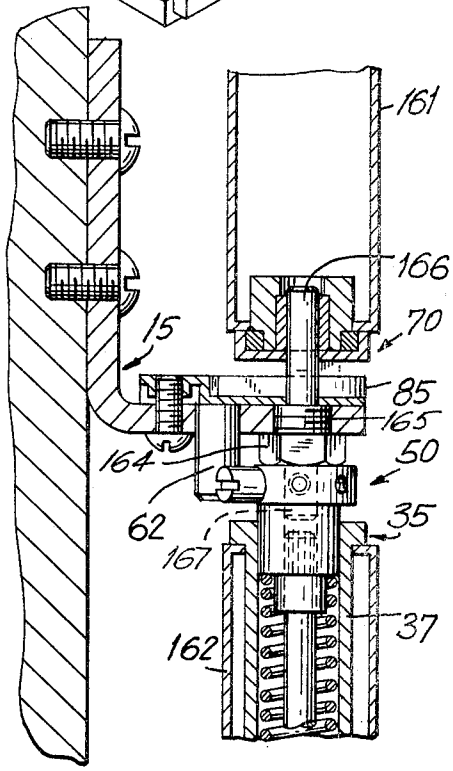


FIG. 13



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United States Patent Office 3,510,986
Patented May 12, 1970

3,510,986

SELF-CLOSING HINGED DOORS AND HINGES THEREFOR

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Filed Oct. 1, 1968, Ser. No. 774,560
Int. Cl. E05f 1/12
U.S. Cl. 49—386 16 Claims

ABSTRACT OF THE DISCLOSURE

This construction permits mounting of upper and lower flange plates onto the door jamb; then mounting of all of other hardware or hinge assembly on the door; then setting the entire door and hinge assembly onto the door jamb and inserting top and bottom removable pivot pins. The door may be removed by first removing the pivot pins. As the door opens a spring is tensioned. when a dwell position is reached, the door is held open. As the door is gently pushed further toward opening position, a stop will limit the angle of opening the door. However, the door can be raised somewhat or pushed hard to open the door fully. By a simple gentle push of the door from the dwell position in a closing direction the door will pass from the dwell position and close by itself under spring pressure. Means is provided to adjust tension of the spring pressure. In one modification the dwell position is omitted. In another modificaton hardware is provided for two doors, one above the other including a common hinge means between the two doors. The door is a hollow shell with insulation therein.

Similar aligned holes are formed in the top and bottom walls of the hollow door to receive the hardware so that the door can be reversed for use as a left or right door.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to doors for refrigerators, electronic housings, ovens, appliances, vending machines and many other types of cabinets which require a hinged door, and to pivot hinges for such doors.

Description of the prior art

Spring loaded self-closing doors are old. Devices to keep a door open, once the door is sprung to open position, is also known in the prior art.

SUMMARY OF THE INVENTION

An object of this invention is to provide a self-closing hinged door of the character described having hinge means at its upper end to support and to adjust the initial load of the self-closing spring for said door, and which is provided at its lower end with means to hinge the door and to support the weight of the door.

Another object of this invention is to provide a door of the character described in which the lower hinge has means to releasably retain the door in open dwell position at a predetermined angle, the retain means being so constructed that a gentle push on the door toward closing position will allow the door to move from dwell position and to close itself.

Yet another object of this invention is to provide a door of the character described in which the door moves down into latching open position and which yet allows the door to move up out of latching position, when the door is gently pushed toward closing position, to allow the self-closing spring means to close the door.

Still another object of this invention is to provide a door assembly and hardware for hinging the door to a door jamb, which is so constructed that to install the door it is possible to mount the upper and lower flange plates to the door jamb, to then mount other hardware to the door, and to then set the entire door assembly onto the door jamb, and insert removable top and bottom hinge pins.

Still a further object of this invention is to provide a construction of the character described having means to releasably cause the door to dwell when opened to a pre-determined angle, and stop means for stopping further opening movement of the door beyond the angle of the dwell position of the door. The construction is such that a hard push of the door in a further opening direction or slightly raising the door will permit the door to open fully. In connection with the present invention, spring tensioning means is provided to act on the door as the door is opened. The whole door drops into a dwell position when it is opened to said pre-determined angle. If the door is pushed open further, a stop will limit the angle of opening of the door. By a simple push of the door, the door will move beyond the dwell position toward closing.

A further object of this invention is to provide a highly improved hinged door which has a primary use with magnetic gasket closures which keeps the door closed within further manipulations or locks. In one modification of the improved construction, the dwell is omitted. The purpose of the dwell is to keep the door open for loading or unloading the refrigerator or container on which the door is mounted. Means is provided to adjust the tension of the door closing spring.

The door is a hollow shell with insulation therein. There is a mounting hole in the top edge portion of the door and there is a mounting hole in the bottom edge portion of the door. These holes are similar and aligned so that the door can be reversed for use as a left or right door and accept a spring cartridge assembly at the top and a hinge plate at the bottom. Other holes in the top and bottom edge portions of the door for attaching the spring cartridge and a hinge plate are also similar and aligned so that all the holes in the top and bottom of the door are the same to allow using the door as either a right or a left door. This makes for easy manufacture since both the right and left dors can be similarly drilled top and bottom. The interchangeability of the door for right and left use also applies to the hardware without the dwell.

Several different shapes and styles of top and lower brackets can be used in connection with the present invention.

It is still a further object of this invention to provide an assembly of the character described applicable to two doors hinged on a common axis, one above the other, including in the assembly, a hinge at the upper end of the upper door, at the lower end of the bottom door, and an intermediate hinge unit between the doors assembled with the lower end of the upper door and also with the upper end of the lower door.

A further object of this invention is to provide a strong, rugged and durable door of the character described and highly improved hardware therefor, which shall be relatively inexpensive to manufacture, easy to assemble and disassemble, and which shall yet be practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

This invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described and of which the scope of invention will be indicated in the following claims.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a refrigerator or container provided with a self-closing hinged door embodying the invention;

FIG. 2 is a perspective exploded view of the hinges for the door;

FIG. 3 is a vertical cross-sectional view through the door and hinges on the axis of the hinges and through the plane of the door;

FIG. 4 is a cross-sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is a cross-sectional view taken on line 5—5 of FIG. 3;

FIG. 6 is a cross-sectional view taken on line 6—6 of FIG. 3;

FIG. 7 is a transverse, vertical cross-sectional view through the lower end of the door and the adjacent hinge hardware of FIG. 3, with the door in latched dwell position, and taken on a plane offset from the axis of the hinge.

FIG. 8 is a perspective, exploded view of the hardware for the lower end of the door and illustrating a modification in which the door does not have means to latch it in open dwell position;

FIG. 9 is a cross-sectional view similar to the lower end of FIG. 3 but relating to the structure of FIG. 8.

FIG. 10 is a perspective view of a modified form of top hinge plate.

FIG. 11 is a perspective view of a refrigerator having upper and lower doors and illustrating a modified form of the invention.

FIG. 12 is a perspective, exploded view of hardware for the lower end of the lower door of the refrigerator of FIG. 11; and

FIG. 13 is a vertical cross-sectional view through hardware between the upper and lower doors of FIG. 11.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now in detail to the drawing, **10** designates a refrigerator or other container or cabinet provided with a door **11**. The refrigerator **10** has a font wall **12** povided with a door jamb **13** to which are attached upper and lower brackets **14** and **15**, on which the door is mounted in the manner hereinafter appearing.

The upper brackets **14** is angle shaped, having a vertical flange **14***a* attached to the door jamb **13** by screws **16** (FIG. 4) or in any other suitable manner. The screws **16** pass through vertical aligned openings **17** in the flange **14***a*. Extending from the upper end of flange **14***a*, at right angles thereto, is a horizontal flange or arm **14***b* projecting away from the door jamb **13**. The flange **14***b* is formed with a vertical threaded opening **18** offset sideways with respect to the openings **17**. The axis of opening **18** is the axis of rotation of the door **11**, as will appear hereinafter.

The door **11** may be hollow and has a vertical end edge wall **20** adjacent the door jamb. Extending from the wall **20** are parallel side walls **21** interconnected by a top edge wall **22** and a bottom edge wall **23**. The top wall **22** of the door is formed adjacent wall **20** with the drilled opening **25** and with a pair of smaller openings **26** and **27**. The axes of openings **25**, **26**, and **27** are longitudinally aligned. The bottom wall **23** is formed with openings **25***a*, **26***a* and **27***a* similar to and vertically aligned with the openings **25**, **26**, **27**, respectively.

Screwed to the threaded opening **18** is an upper pivot pin **30**. Said pin **30** has an upper hexagonal head **31** provided with a kerf or slot **32** to receive a screwdriver. Below the head **31** is an externally screw-threaded portion **33** which may be screwed into opening **18**. Extending below the threaded portion **33** is a vertical cylindrical pin portion **34** which project below the flange **14***b*. Mounted on the upper end of the door is a spring housing **35**. Said spring housing **35** comprises a top flange or arm **36** contacting the upper surface of door wall **22** and from which there extends downwardly through the opening **25**, a cylindrical wall or tube **37**. At the lower end of the tube **37** is an annular bottom wall **38** from which there extends upwardly, a short inner axial tube **39**. The wall **38** is formed with a small vertical hole **40** for the purpose hereinafter appearing. The arm **36** is formed with countersunk openings **42**, **43**, spaced from the axis of tube **37** the same distances that the openings **26** and **27** respectively, are spaced from the axis of the opening **25**. The outer diameter of the tube **37** is substantially similar to the diameter of the opening **25**, and the openings **42** and **43** register with the openings **26** and **27**, respectively. Screws **44** and **45** are screwed to a plate **46** placed against the underside of the door wall **22**. Plate **46** has threaded openings **47**, **48** coaxial with the openings **26**, **27**, respectively to receive the screws **44**, **45**, respectively. The plate **46** may have upstanding flanges surrounding openings **47**, **48**, and projecting upwardly through the openings **26** and **27** and into the openings **42**, **43**, respectively.

Mounted within the tube **37** is a pin assembly member **50**. Said member **50** comprises an upper member **51** to which a pin **52** is fixed in a manner hereinafter appearing.

The upper member **51** has an axial through opening **53** rotatably receiving the pin **34**. At the upper end of member **51** is an annular head **54** formed with a plurality of equiangularly spaced outwardly opening radial internally screw-threaded openings **55** communicating with the central opening **53**. Below the head **54** is a cylindrical portion **56**, journalled in the upper end of the tube **37**. Said cylinder portion **56** is formed at its underside with a vertical opening **57** similar to and symmetrically disposed to the opening **40** in the wall **38**.

The lower end of pin **52** is journalled in the tubular flange **39**. Below the upper end of pin **52** is a fixed collar **58**. Above the collar **58** is a ribbed portion **59** force fitted into the lower end of the opening **53** for fixing the pin **52** to the member **50**.

The flange **14***b* of angle shaped bracket **14** is formed with a vertical opening **61** disposed between the opening **18** and flange **14***a*. Fixed within opening **61** and projecting below said flange **14***b*, is a stop pin **62**. Screwed into one of the openings **55** is a horizontal pin **66** provided with a kerf or slot **67** to receive a screwdriver. The purpose of the pin **66** will be explained hereinafter.

Disposed within the tube **37** is a coil torsion spring **64** having a lower end **65** projecting through opening **40**, and an upper end **66***a* projecting upwardly into opening **57**. The pin **62** will engage the stop pin **66**, which may be moved from one opening **55** to another. As the door is swung open the torsion spring **64** will be further tensioned. The adjustment of the pin **66** is for the purpose of changing the initial torsional tension of the spring **64** when the door is closed.

Attached to the lower end of the door is a hinge assembly **70** cooperating with the lower bracket **15** for hingedly supporting the door on said bracket in the manner to be described hereinafter. Assembly **70** cooperates with the brackets **15** and parts, to be described, assembled therewith.

The bracket **15** comprises a vertical portion **15***a* vertically aligned with portion **14***a* of the bracket **14**. Extending at right angles to portion **15***a* is a horizontal portion **15***b* parallel to and aligned with the portion **14***b* of the bracket **14**. Portion **15***a* has vertically aligned holes **71** which are aligned vertically with the openings **17** of the bracket wall **14***a*. The horizontal flange or portion **15***b* has at its outer end a rounded portion **72** which is formed with a screw-threaded opening **74** coaxial with the openings **25**, **25***a* in the top and bottom wall portions **22**, **23**, respectively. The bracket **15** is attached to the door jamb **13** by means of screws **75** passing through openings **71** in flange **15***a*. Flange **15***b* is formed with a

through opening **76** offset from opening **74**, for the purpose hereinafter appearing.

Screwed to the flange **15***b* is a pivot member **77** (FIGS. 3 and 5). Member **77** has a hexagonal head **78** at its lower end formed with a kerf or slot **79**. Above the hexagonal head **78** is an externally screw-threaded portion **80** screwed into the opening **74**. The upper end of the screw-threaded portion **80** is substantially at the level of the upper surface of the flange **15***b*. Extending upwardly from the screw-threaded portion **80** is a coaxial pin **81** for the purpose hereinafter appearing. Flange **15***b* is formed with a permanent stop **83** which extends up to the upper surface of said flange and projects out beyond the curved portion **72**, and is located adjacent one side edge of said flange.

Mounted on the flange **15***b* is a stop plate **85**. Said stop plate **85** is in the form of a stamping. Plate **85** comprises a top wall **86** formed with a downwardly extending internally screw-threaded hub **87** coaxial with the opening **76** of flange **15***b* of bracket **15**. The outer end of wall **86** is rounded as at **88**. Extending downwardly from the sides of wall are vertical flanges **89** having lower edges contacting top surface of flange **15***b*. Extending through the openings **76** is a screw **90** having a head at its lower end contacting the underside of flange **15***b*. The upper end of the screw is screwed into the hub **87**, as shown in FIG. 5. A flange **91***b* extends downwardly from the front curved end **88** of the wall **86**. The top wall **86** of stamping **85** is formed with a depressed rib **92** inclined somewhat more than 90 degrees from the flange **15***a*. The depressed rib **92** crosses the axis of the opening **74**. Said rib comprises a bottom web **93** and parallel side flanges **94** and an inner end flange **95** spaced from the hub **87**. The bottom wall **93** and portions of the side flanges **94** are formed with a drilled opening **96** coaxial with opening **74** and through which the pin **81** projects upwardly above the stamping **85**. The leading edge **83***a* of the stop lug **83** is disposed close to the outer side of the groove formed by the depressed rib **92**. The upper surface **86** of the stamping **85** is at the level of the upper surface **83***b* of the stop lug **83**. Side walls or flanges **94** are outwardly curved adjacent top surface **86** of the stamping. The upper end of leading surface **83***a* is very slightly spaced from the plane of the inner surface of the outer flange **94**. Said surface **83***a* is in a vertical plane which intersects and rises above the curved upper end of said outer flange **94**, for the purpose hereinafter appearing.

The assembly unit **70** comprises a member **100** assembled with a stamping **101**. The member **100** comprises a flat plate portion **102** formed with a pair of spaced openings **103** registering with the openings **26***a*, **27***a* in the bottom edge wall **23**. Plate **102** at one end is formed with a downwtrdly extending flange **105** from which a central lug **106** projects downwardly. Lug **106** is disposed closer to the rear edge **102***a* of plate **102**, than to the front edge **102***b* of said plate. Plate **102** is formed with an opening **107** coaxial with the opening **25***a* of the bottom wall **23**. Force fitted into the opening **107** is the reduced lower end **108** of a sleeve **109**. Sleeve **109** has an outer diameter such as to fit into the opening **25***a*. Said sleeve is formed with an annular inwardly extending annular flange **110** at its upper end providing a central opening **111**. Within the sleeve **109** is a bearing bushing **112**. The upper end of the pin **81** is journalled in the bushing **112**. Plate **102** lies against the underside of wall **23** of the door.

Attached to the underside of the plate **102** is the stamping **101**. Said stamping **101** comprises a bottom wall **114** formed with an outer flange **114***a*, and with side flanges **114***b* and **114***c*, contacting the outer edge **102***c* and the rear and front edges **102***a*, **102***b*, respectively, of the plate **102**. Extending upwardly from the front edge of the wall **101** are spaced flange **115** and **115***a* disposed on opposite sides of the flange **105**. Said bottom wall **114** is further more formed with a depressed rib

116 adjacent its inner end. The rib **116** is so located that when the door is opened about 90° the rib **116** will drop into the groove formed by the depressed rib **92**. The rib **116** has a bottom web **117**, side flanges **118** and inner end wall **119**. The rib **116** is inclined to the side flanges **114***b*, **114***c* when the door is closed. The rib **116** is formed with a through opening **120** aligned with the central through opening in the bushing **112** and the pin **81** extends upwardly through said opening **120**. The opening **120** is formed in the web **117** and cuts through the side walls **118** of rib **116**.

The assembly **70** is attached to the bottom of the door by means of a pair of screws **122** having heads **123** at their lower end received in countersunk openings **124** in wall **114** and passing through the openings **103** in the plate **102** and through the openings **26***a*, **27***a* in the lower edge portion **23** of the door.

At the top of said lower edge portion **23** is a plate **127** formed with internally screw-threaded openings **128** to receive the upper ends of screws **122**. The plate **127** may have hubs **129** received within the openings **26***a*, **27***a*. It will be noted that the lug **106** and the flange **105** projects downwardly into the rib **116** to close its outer end.

When the door is closed, the rib **116** crosses the groove formed by the rib **92** and rides on the wall **86** of the stamping **85**. The door will swing open on the axially aligned pivot pins **81** and **34**. When the door is opened through an angle of somewhat more than 90°, the rib **116** becomes aligned with the groove formed by the rib **92** and the door, as a whole, will drop as rib **116** drops into the groove for a dwell position of the door. The door can be closed by gently pushing it in a closing direction. The junctions between the side walls **94** and the top wall **86** of member **85** are curved and the junction between the web **117** and the side flange **118** are also curved, to facilitate the closing of the door when the door has been subjected to a gentle push in a closing direction. The spring **64** will close the door once the rib **116** is out of the groove formed by the rib **92**. If the door is gently pushed in an opening direction from dwell position, rib **116** will rise in the groove but will engage the upper end edge of surface **83***a* to stop further opening movement of the door, so that the door can only open several thousands of an inch from dwell position before further opening of the door is halted. However, a hard push or lifting of the door enables the door to be opened up further or fully.

It will be noted that the door can be used for a left hand door or a right hand door because the openings **25***a* and **25** are similar and in vertical alignment, and also because the openings **26***a*, **27***a* are similar to and in alignment with the openings **26** and **27**.

In FIGS. 8 and 9 there is shown a modified construction in which the dwell of the door in open position is not employed. The upper end of the door for the modification **10***a* of FIGS. 8 and 9 is the same as shown in FIGS. 1 to 7. The lower bracket **15** of FIG. 2 is employed in the modification **10***a*. However, the stamping **85** is omitted. The hinge pin **77** shown in FIG. 5 is also employed as shown in FIG. 8. The head **78** of the hinge pin **77** contacts the underside of flange **15***b* of bracket **15**. The threaded portion **80** of the hinge pin **77** is screwed externally into the internally threaded opening **74** of the flange **15***b*, and the pin **81** projects upwardly above said flange. The opening **76** of the flange **15***b* is not used in the modification **10***a*. Attached to the underside of the door **11**, in the manner hereinafter appearing, is a plate **130**. The plate **130** is formed with a pair of countersunk openings **131** coaxial with the openings **26***a*, **27***a* of the bottom wall **23** of the door. Mounted on the upper side of portion **23** of the door **11** is a plate **127**. Screws **132** have their heads within the countersunk openings **131** in plate **130**, and their shanks are screwed to the internally threaded openings **128** in the plate **127**. Plate **130** is formed with an opening **135** coaxial with the

opening 25*a* in the bottom portion 23 of the door. Force fitted within said openings 135, 25*a* is the upper reduced end 137 of sleeve 138. Said sleeve 138 has a cylindrical portion 139 of increased diameter projecting below plate 130 and carries a bushing 140 in which the pin 81 is journalled. Force fitted onto the upper end of the reduced portion 137 of the sleeve 138 is a collar 142 which has a close fit within the opening 25*a*. The lower end of portion 139 of the sleeve 138 rests on the upper surface of the flange 15*b*.

In FIG. 10 there is shown a bracket 150 to replace the bracket 15. The bracket 150 may have a vertical flange 151 formed with openings 152 for attaching said bracket to a surface of the door jamb. Extending from the upper end of the flange 151 is a horizontal flange 153. The flange 153 may be provided with a hinge pin 154 somewhat similar to the hinge pin 30 and is also provided with a stop pin 155 similar to the stop pin 62. The bracket 150 of FIG. 10 is different in shape from the bracket 15 but serves the same purpose.

In FIGS. 11, 12, 13 there is shown another modification of the invention. In FIG. 11 there is shown a refrigerator 160 or other cabinet having upper doors 161 and lower doors 162 aligned with each other. The attachment of the upper end of the upper door 161 to the door jamb may be the same as shown in the modification of FIGS. 1 to 7. Also the attachment of the lower end of lower door 162 to door jamb may be similar to the attachment of the lower end of the door to the door jamb as in the modification of FIGS. 1 to 7. Between the doors 161, 162, there is located a bracket 15 provided with a stamping 85 as described hereinabove. Replacing hinge pin 77 of FIG. 5 is a hinge pin 163 having a polygonal wrench engaging head 164 similar to the head 78. Above the head 164 is an externally screw-threaded portion 165 similar to screw-threaded portion 80 and from which a pin 166 extends upwardly similarly to pin 81. Extending downwardly from the head 164 is a pin 167 similar to the pin 166 but projecting in an opposite direction. The pin 166 projects upwardly through the assembly 70 in the same manner as the pin 81 projects through assembly 70. The pin 167 projects downwardly into the central opening 50 in member 51 similarly to the way the pin 34 of FIG. 3 pivots the upper end of the door 11. The doors 161 and 162 are similar to each other and each is similar to the door 11. They are hollow and the upper and lower walls thereof have similar openings for reception of tube or cylinder 37 and the hubs of the attaching plates 46 and 127. Thus each door may be opened separately and each has a dwell to keep the door open to permit loading or unloading of the refrigerator or other containers to which the door is mounted, in the same manner as described for door 11.

It will be appreciated that the tension of the spring is not sufficient to cause the door to move out of dwell position by itself, but needs a gentle push to start the closing of the door.

It will thus be seen that there is provided an article in which several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As possible embodiments might be made of the above invention, and as various changes might be made in the embodiments above set forth, it is to be understood that all matter herein set forth is to be interrupted as illustrative only.

I claim:

1. In combination, a door, upper and lower brackets at the upper and lower ends, respectively, of said door, adapted to be attached to a door jamb for said door, means at the upper and lower ends of said door, respectively, to pivot said door to said brackets on a common pivotal axis for opening movement from closed position to a predetermined angular open position at one level, spring means associated with said upper pivot means and upper bracket, and projecting into said door, to cause the door to self-close, and means to adjust the initial tension of said spring means when the door is closed, and means associated with the lower pivot means and lower bracket to cause the door to dwell in said predetermined angular open position.

2. The combination of claim 1, and means associated with said lower bracket and lower pivot means, to stop the door from being opened at said level, upon the door being pushed in further door opening direction, from dwell position.

3. The combination of claim 2, and means associated with said lower bracket and lower pivot means to lift said door to a higher level upon the door being pushed in further door opening direction to ride over said stop means so that said door may be moved to fully open position from said dwell position.

4. The combination of claim 1, said dwell causing means comprising means on the lower bracket providing a flat upper surface fromed with a depressed groove, and means on the associated lower pivot means providing a flat under-face from which a rib projects downwardly, crossing said groove at said common pivotal axis, when the door is closed and supported on said flat upper surface and adapted to drop into said groove when said rib becomes aligned with said groove as the door is opened to said predetermined angular dwell position and allowing said flat under-face to rest on said upper flat surface.

5. The combination of claim 1, said door having aligned openings of similar diameter at its upper and lower ends, respectively, said pivot means having aligned members at the upper and lower end of said door of similar diameter, respectively, to be received in said openings, whereby said door can be mounted on said brackets for pivotal movement at its right side as well as on its left side.

6. The combination of claim 4, and stop means on said lower bracket to engage said rib means to prevent opening of the door beyond dwell position.

7. The combination of claim 1, a second door, means on the lower bracket to pivotally engage the upper end of the second door on said common axis, a third bracket at the lower end of said second door, means on the third bracket to pivotally mount the lower end of said second door on said common axis.

8. In combination, a door, upper and lower brackets at the upper and lower ends, respectively, of said door, adapted to be attached to a door jamb for said door, means at the upper and lower ends of said door, respectively, to pivot said door to said brackets on a common pivotal axis, spring means associated with one of said pivot means and projecting into said door, to cause the door to self close, and means to adjust the initial tension of said spring means when the door is closed, a second door, said means on the lower bracket to pivotally engage the upper end of the second door on said common axis, a third bracket at the lower end of said second door, means on the third bracket to pivotally mount the lower end of said second door on said common axis, spring means associated with the bracket for mounting the lower end of said first door and the upper end of said second door, and projecting into the upper end of said second door to cause said second door to self-close, means to adjust the initial tension of the last mentioned spring means when the second door is closed.

9. The combination of claim 8, and means associated with the pivot means at the lower end of the second door to cause said second door to dwell in a predetermined angular open dwell position.

10. The combination of claim 1, said means to pivot the upper end of said door to the upper bracket, comprising a pivot pin on said bracket extending downwardly, and means on the upper end of said door receiving said pin.

11. The combination of claim 10, said receiving means comprising a plate fixed to the upper end of said door, a tube fixed relative to said plate, a member formed with a

hole journalling said pin and being journalled in said tube, and a pin fixed to said member and extending through said tube, and said spring means comprising a coil torsion spring attached at one end to said tube and at its other end to said member.

12. The combination of claim **11**, said member being formed with a plurality of radial, angularly spaced openings, a stop pin selectively fixable in said radial, openings and radially extending therefrom, and a stop pin on said upper bracket in the path of said stop pin on said member.

13. In combination, a door, upper and lower brackets at the upper and lower ends, respectively, of said door, adapted to be attached to a door jamb for said door, means at the upper and lower ends of said door, respectively, to pivot said door to said brackets on a common pivotal axis, spring means associated with one of said pivot means and projecting into said door, to cause the door to self close, and means to adjust the initial tension of said spring means when the door is closed, and means associated with the other pivot means to cause the door to dwell in a predetermined angular open dwell position, said dwell causing means comprising a member fixed to one of said brackets and formed with a groove in its upper side, the associated pivot means comprising a pivot pin on said one of said brackets passing up through said groove, a plate fixed to the underside of said door and having a bearing receiving said pivot pin, and a member fixed to said plate and provided with a rib receivable in said groove and formed with a hole through which the pivot pin passes.

14. The combination of claim **13**, and said one of said brackets having a stop lug adjacent said groove, said groove having vertical inner side surfaces which are outwardly curved at their upper ends, said rib having outer side surfaces which are curved at their lower ends, and said stop lug having a vertical end wall substantially parallel to one of said inner side surfaces of said groove and cutting across the curvature at the upper end of one of said side surfaces of said groove.

15. The combination of claim **3**, said dwell causing means comprising means on the lower bracket providing a flat upper surface formed with a depressed groove, and means on the associated lower pivot means providing a flat underspace from which a rib projects downwardly, crossing said groove at said common pivotal axis, when the door is closed and supported on said flat upper surface and adapted to drop into said groove when said rib becomes aligned with said groove as the door is opened to said predetermined angular dwell position and allowing said lower flat surface to rest on said upper flat surface.

16. The combination of claim **15**, and stop means on said lower bracket to engage said rib means to prevent opening of the door beyond dwell position.

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