Dec. 10, 1968 W. GRONBACH 3,414,933

HINGE WITH SPRING FOR COUNTER-BALANCE OF FLAPS

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FIG. 3

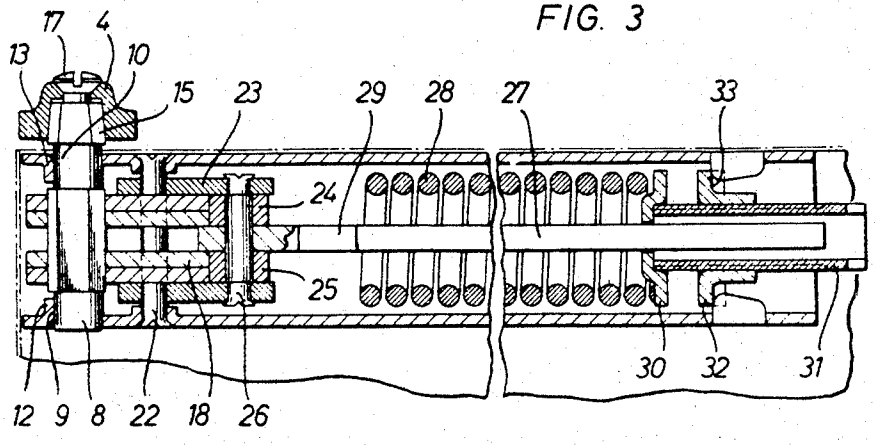
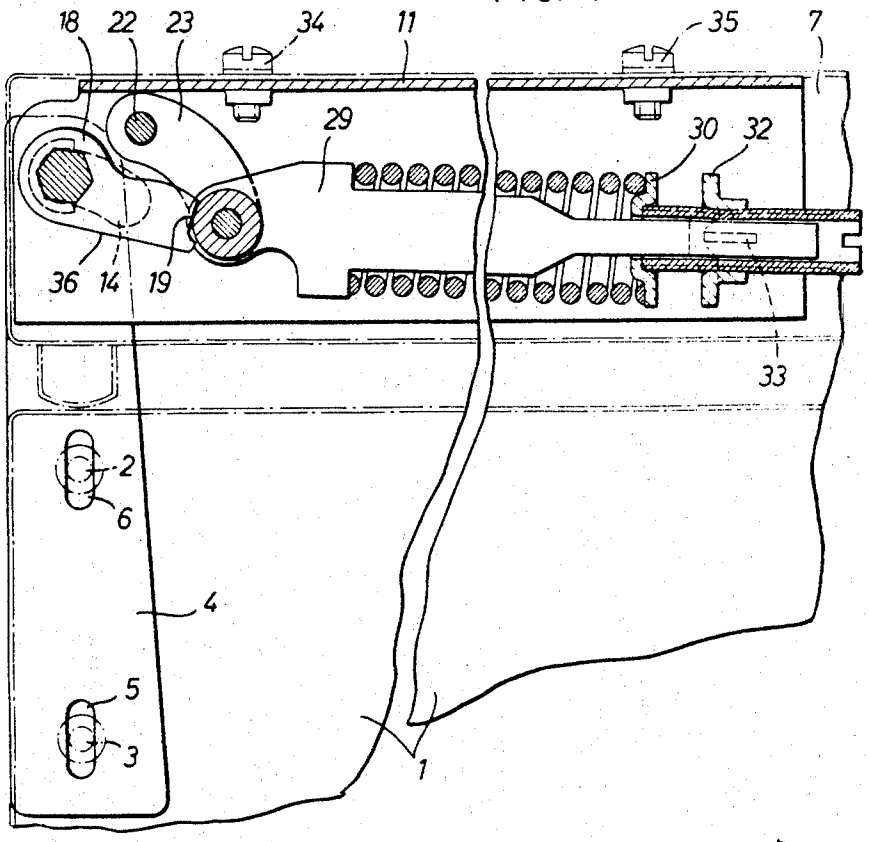


FIG. 1



Inventor
Wilhelm Gronback
By Stevens, Davis, Miller & Mosher
Attorneys

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HINGE WITH SPRING FOR COUNTER-BALANCE OF FLAPS

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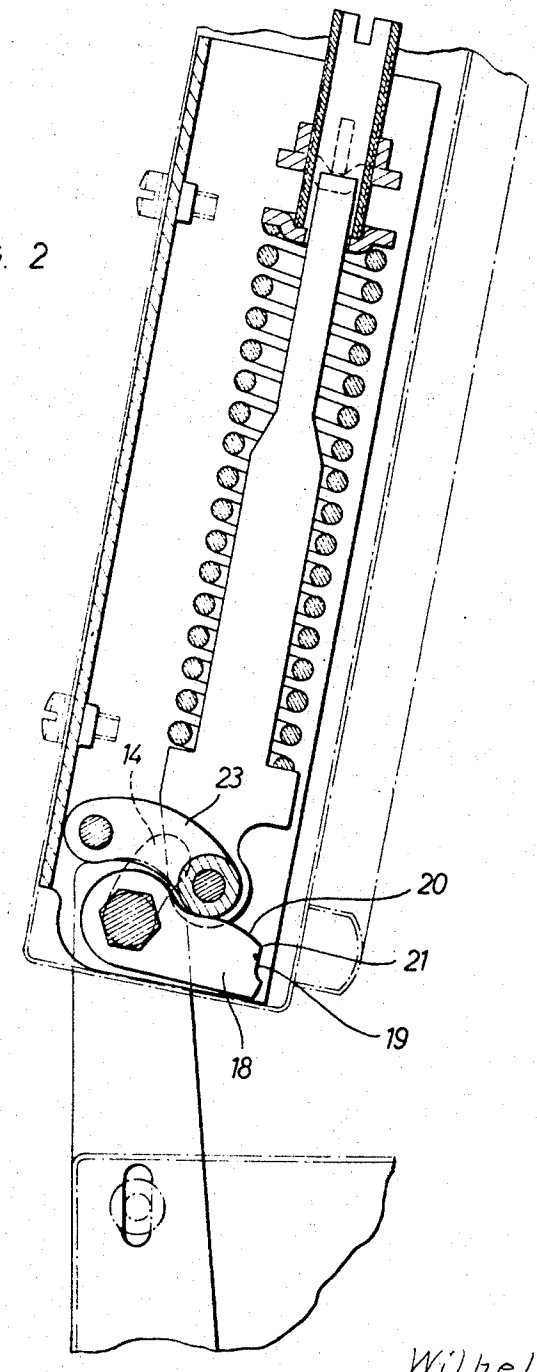
FIG. 2



Inventor
Wilhelm Gronbach
By Stevens, Davis, Miller & Mosher
Attorneys

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HINGE WITH SPRING FOR COUNTER-BALANCE OF FLAPS

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FIG. 5

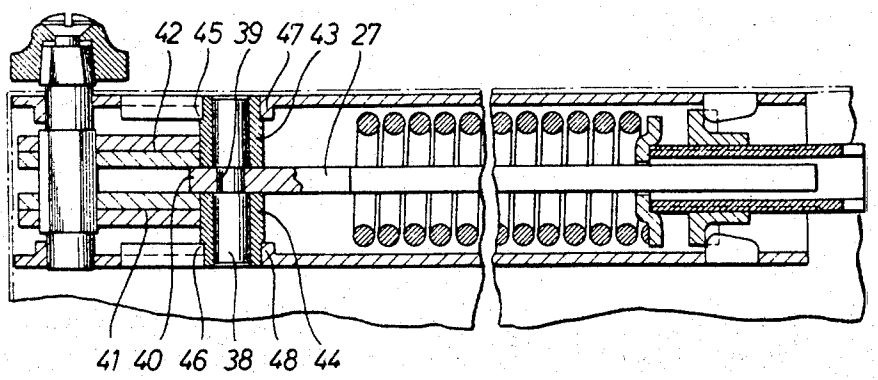
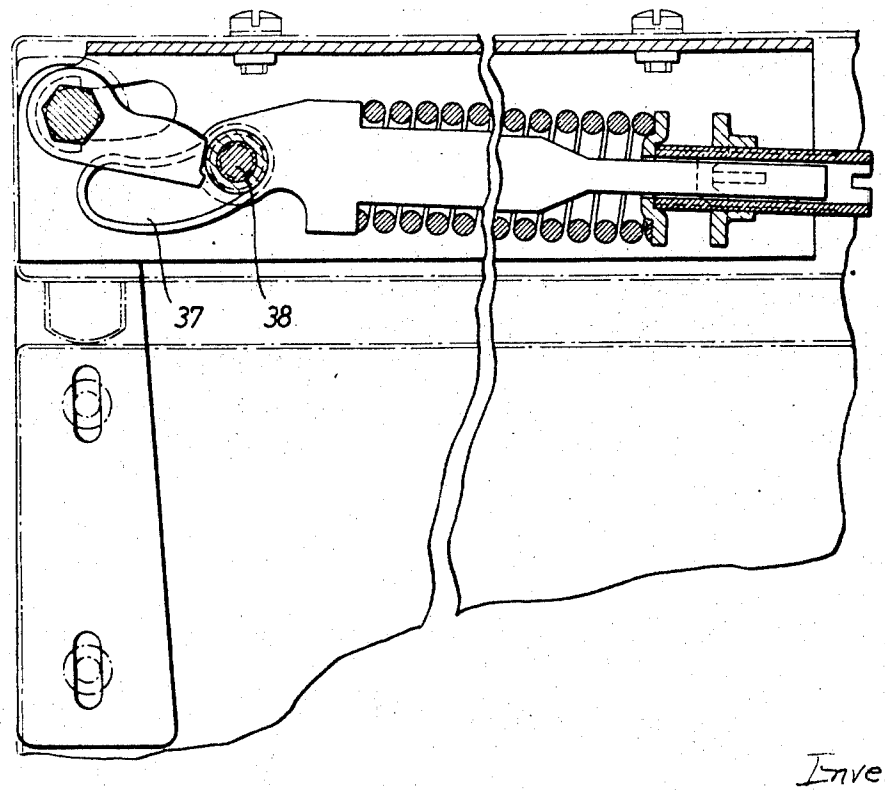


FIG. 4



Inventor
Wilhelm Gronbach
By Stevens, Davis, Miller & Mosher
Attorneys

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HINGE WITH SPRING FOR COUNTER-BALANCE OF FLAPS

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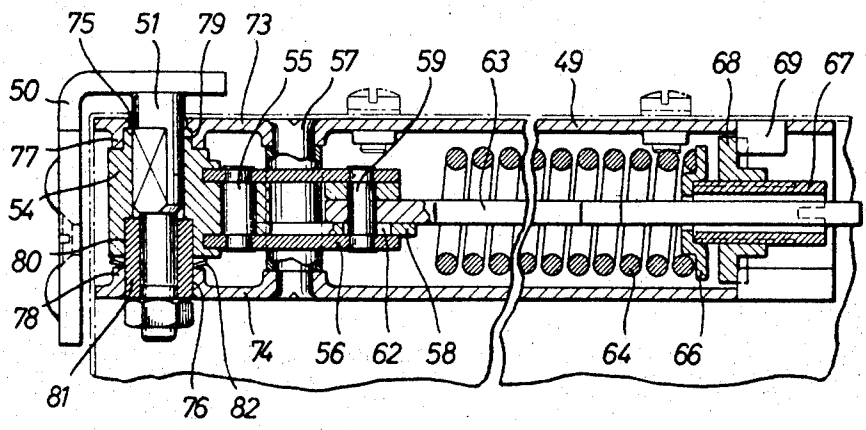
FIG. 7



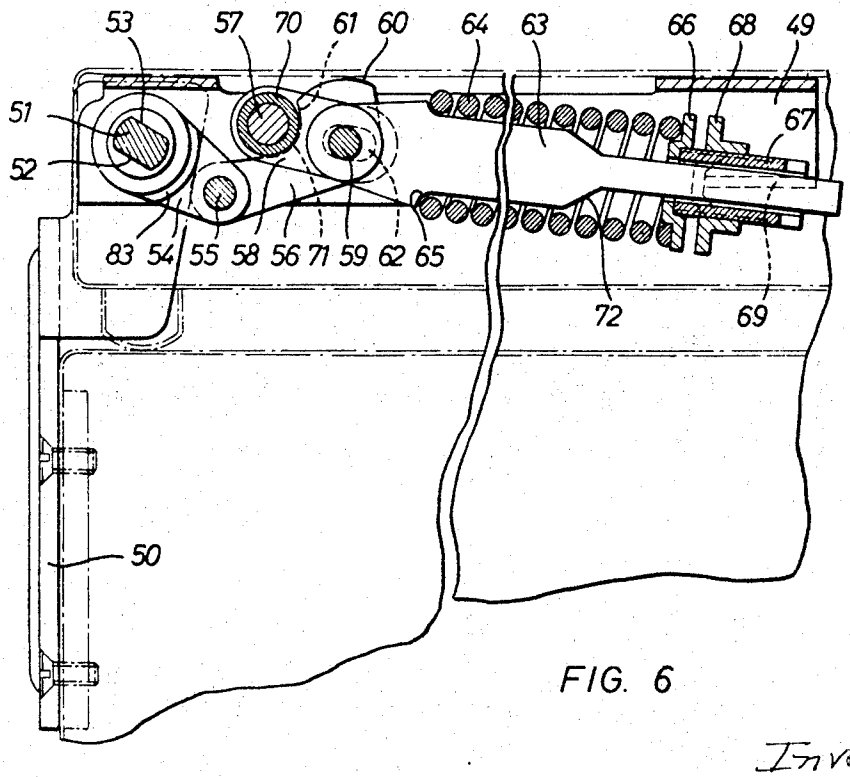


FIG. 6

Inventor

Wilhelm Gronbach

By Stevens, Davis, Miller & Mosher

Attorneys

United States Patent Office 3,414,933 Patented Dec. 10, 1968

3,414,933

HINGE WITH SPRING FOR COUNTER-BALANCE OF FLAPS

Wilhelm Gronbach, Alpenstrasse 9, Ebersberg, Germany

Filed July 26, 1965, Ser. No. 474,844
Claims priority, application Germany, Feb. 11, 1965, G 42,829
18 Claims. (Cl. 16—180)

ABSTRACT OF THE DISCLOSURE

A hinge structure for freezer cabinets of the kind having lids pivotable about a horizontal axis comprising an elongated joint member fixed to the freezer cabinet, a lid fixedly mounted on the joint member so that the pivot protrudes along its axis laterally into the lid. A counter-balancing and closing mechanism is mounted within and attached to said lid and said pivot. The hinge is arranged so that only that portion of the pivot which engages said joint member protrudes from said lid so that the insulating integrity of the lid is maintained. The counter-balancing and closing mechanism includes a curved line pivotally mounted on the pivot with its free end forming a closing curved portion and adjacent thereto in the direction of the pivot an arch-shaped compensating curved portion, said portions being separated from each other by a reversing edge. A guide arm is pivotally attached to said lid and carries rollers at the free end thereof which ride on the curved portions and over the reversing edge. A spring guide rod is pivotally mounted on the free end of the guide arm and the other end of the spring guide rod is mounted in a springlike means fixedly mounted in said lid. A compression spring is mounted on said spring guide so that the rollers in the closed position rest against the closing curved portion under pressure.

The invention concerns a hinge with spring for counter-balancing flaps, such as covers, lids, hoods, etc., especially on deep freezers, which are swivel-mounted around a horizontal axis and on which the pivot protruding laterally into the flap is mounted in a joint which is attached to the body of the freezer.

Hinges of this type are normally mounted on the outside and at the rear of the freezer. The disadvantage of this arrangement is that the cover swings out to the rear when the freezer is opened so that the freezer cannot be placed directly against the wall. The width of the freezer, which is enlarged by the external hinges, is also frequently inconvenient when the freezer is transported through doors. Finally, any external hinge affects the design of the freezer, the attractive shape of which contributes a great deal to the sales success nowadays.

The described disadvantages of the external hinges could only be eliminated, until now, by equipping the cover with one journal each at the sides around which the cover can be opened or closed. In order to render the cover torque weightless within a certain swing range, a lever arm was mounted at the cover at a certain distance from the fulcrum. The bearing of this arm is in the freezer and is supported by a spring. This design makes it impossible to construct the hinge as a finished part with counter-balance and closing mechanism but rather calls for installing the individual parts into the freezer or the lid one by one in succession. Another difficulty is presented by the fact that coil springs have linear characteristics only. The known freezers with internal hinges therefore can only offer counter-balance of weight through part of the aperture angle of the lid, depending on how the spring is designed. Another disadvantage of the existing freezers consists in the fact that the lid does not seal well in the closed position due to the lack of a reversing function of the counter-balance and closing mechanism.

As compared to this development in technology, the invention is based on the problem of designing an internal hinge which, while generating torques changing according to the cosine function, has a reversing point which can be controlled definitely, and in which the conditions have been created for comprising all the components of the counter-balance and closing mechanism in one single unit. The solution of the problem by the invention consists, in the case of a hinge of the type described previously, in the fact that the counter-balance and closing mechanism is located inside the flap and is mounted, on the one hand, on the pivot and, on the other hand, at the flap from which merely the pivot end engaging in the joint protrudes. A further extension of the invention is that the counter-balance and closing mechanism consists of a curved part mounted on the pivot and held in place from the outside, at the free end of which there is a closing curved part, connected to which in the direction of the pivot there is an arch-shaped compensating curved part. The latter two parts are separated from one another by a reversing edge. The counter-balance and closing mechanism further consists of a guide arm, at the free end of which a roller is provided which, in the closed position, rests against the closing curved part due to the effect of the spring which is swivel-mounted in the flap and is subject to initial tension. Such a counter-balance and closing mechanism ensures good sealing of the flap in the closed position without any aids.

The invented design is particularly advantageous if the entire counter-balance and closing mechanism is combined in an independent component by way of a preferably U-shaped casing. For facilitating the mounting of the mechanism, the invention has been developed further to include the extension of the boring for mounting the pivot in the casing, to a mounting longitudinal slit on one side. For improving the mounting, the invention further provides for an extension of the mounting surface of the borings on the inside of the casing by approximately semi-circular material openings.

The journals are held in place from the outside, according to the invention, in such a manner that the mounting boring of the joint is designed polyhedrally, and the appropriately designed end of the journal is designed conically, while both are connected to one another, without play, by way of a screw in a fixed position.

A further development and, at the same time, an improvement of the hinge described so far consists in designing the pivot as journal forming a unit preferably with the joint. This journal has a supporting surface for the counter-balance and closing mechanism. Whereas, according to a previous, not published proposal of the claimant, the counter-balance and closing mechanism is supported by the fixed hinge part, the present invention provides for the counter-balance and closing mechanism is located, in line with the main patent, in the part of the hinge mounted at the flap so that it can be swivelled, together with the flap, around the journal, contrary to the previous proposal. In the preferred design of the journal with the joint in one piece, there is the added advantage that the hinge makes a more elegant optical impression according to the present invention because not even a screw is visible from the outside.

A further development of the invention is the conical design of the supporting surfaces of the journal. This results in all components of the counter-balance and closing mechanism engaging without play. In practice, this is manifested by the fact that the hinge functions completely without transition.

Finally, the invention comprises a combination of the counter-balance and closing mechanism according to the above-mentioned, previous proposal of the claimant with the invention just described which had not been possible without certain modifications of the proposed older counter-balance and closing mechanism. This invention consists in the spring being supported at one end in the hinge part, which is mounted at the flap, by way of a spring guide rod with initial tension, and touching with its other end the second fixed hinge part via the end of the spring guide rod and a winnow connected to the latter; in a guide being provided for the contact point of the winnow and the guide rod, this guide consisting of a swivel arm mounted at the swivel-mounted hinge part by way of a hinge pin, whereby the free end of the swivel arm is equipped with a long hole for supporting the hinge pin connecting the winnow to the spring guide rod; in the winnow having, at the end which is connected to the swivel arm, a lateral attachment equipped with a control and retightening curve which slides on the fixed hinge pin of the swivel arm when the flap is turned and catches in the closed position. This feature ensures, on the one hand, good sealing of the flap in the closed position and eliminates any danger of self-blocking because the reversing point can be controlled perfectly. On the other hand, any noise is avoided when the flap is closed because the hinge pin in the long hole of the swivel arm can yield a little so that contact between components of the counter-balance and closing mechanism which are essentially mounted in a fixed position is avoided when the flap is closed.

A further extension of the invention is the arrangement of a fixed connection link on the journal, to the free end of which the winnow is connected. Furthermore, the counter-balance and closing mechanism is mounted in a casing equipped with bearing borings which are widened towards the inside by material adjustments; the connection link is equipped, on the one hand, with a pin-type attachment engaging in a bearing boring, and, on the other hand, with a hole into which a bushing engages which is mounted in the boring of the casing with its other end; and these components are tightened from the inside by way of a nut on the journal, while a spring ring is placed on the bushing.

The invented hinge offers the advantages of the inside hinge and ensures at the same time the noiseless functioning during opening and closing.

The invention is explained, by way of examples, in the description below, by way of drawings in various types.

FIG. 1 is a cross-section of a freezer, parts of which are not shown, with a hinge according to the invention in the closed position;

FIG. 2 is the same cross-section with the freezer lid in the opened position;

FIG. 3 is a bottom view of the invented hinge in the closed position;

FIG. 4 shows another type of the invention in a cross-section as per FIG. 1, and

FIG. 5 is a view of this second type, as shown in FIG. 3;

FIG. 6 shows a hinge according to another type of the invention in a lateral view, in the closed position, and

FIG. 7 is a cross-section of the bearing of the hinge in this type of design.

A joint **4** is attached to the freezer **1** at each side by way of screws **2** and **3** which protrude over the top of the freezer by its height. The borings for the screws **2** and **3** are designed as longitudinal slits **5** and **6** so that the joint can be adjusted in height, depending on the height of the lid **7** of the freezer. The lid **7** of the freezer is supported, by way of a pivot **8**, in support borings **9** and **10** of a casing **11** which consists of U-shaped angular metal sheets. The support surface of the borings **9** and **10** is widened by approximately semi-circular material openings **12** and **13** at the inside of the casing **11**. Finally, one of the borings is widened to form a mounting longitudinal slit **14** for supporting the pivot **8** in the casing **11** (see FIG. 2). One end of the pivot which engages into the corresponding support bearing **16** of the groove **4** is designed polyhedrally, as can best be seen in FIGURES 1 and 2. Furthermore, as can be seen best in FIGURE 3, this end of the journal is also designed conically. The support boring **16** of joint **4** is designed accordingly. Journal and joint are connected, without play, in a fixed position by way of screw **17**, as is shown in FIG. 3.

In modification of the example of the type illustrated, the joint **4** can also be designed as an angle-iron. This makes it possible to mount the joint on the rear of the freezer by way of longitudinal slits and screws. Such a modification of the type example gives the freezer a more attractive appearance because the longitudinal borings and screws at the rear of the freezer do not affect attractive designing of the freezer.

The counter-balance and closing mechanism consists of a curve link **18**, mounted on the pivot **8** which is held in place from the outside. At its free end, it is equipped with a closing curved piece **19**. This is followed, in the direction of the pivot **8**, by an arch-shaped compensating curved piece **20**. The closing curved piece **19** and the compensating curved piece **20** are separated from one another by a reversing edge **21**. In a modified design, the closing curved piece **19** can also be designed as a rear-cut edge. The closing pressure of the counter-balance and closing mechanism is thereby increased further. The customer's desires and especially the type of sealing between the freezer **1** and the lid **7** will decide which type of design should be preferred.

The counter-balance and closing mechanism further comprises a guide arm **23** mounted on a bearing shaft **22** in the casing **11**, at the free end of which two rolls **24** and **25** are arranged on a shaft **26**. The one end of a guide rod **27** for the compensating spring **28** is connected to the shaft **26** between the rolls **24** and **25**. As can be seen from FIG. 1, the coil spring **28** rests with one end on a suitably widened section **29** of the spring guide rod **27** and with the other end on a spring guide tube **31** via a stage **30**. This tube has a thread on the outside and rests on a knife-edge bearing **33** in the opposite side walls of the casing **11** through the use of a counterpoise **32** which is equipped with a thread on the inside. The tension of the coil spring **28** can be changed by turning the spring guide tube **31**.

The curved link **18** is designed rectilinear on the side opposite the arch-shaped compensating curved piece **20**, and is essentially parallel to the compensating curved piece. As can be seen from FIG. 2, this design is important so that the curved link **18**, enclosed in the lid **7**, does not impede the upwards motion of the lid **7**. In the opened position of the lid, the rear edge of the curved link is therefore parallel to the rear inner edge of the lid **7**.

In the closed position illustrated by FIG. 1, the rolls **24** and **25** rest against the closing curved piece **19** due to the pressure exerted by the spring **28** which is supported in a swivel-mounted bearing in lid **7** or in the casing **11**, enclosed in the lid, and which is subject to initial tension.

The entire compensating and closing mechanism is, thus, combined in one independent component by casing **11**, and can be placed and mounted inside lid **7** subsequently by way of the screws **34** and **35**. Only the end **15** of the journal **8**, which engages into the joint **4**, protrudes over the lid **7**. It is, thus, possible to line the lid with the necessary insulating material, without taking the counter-balance and closing mechanism into consideration. The hinge can be supplied by the supplying industry as a complete component and only has to be mounted, with a few manipulations, at the end when the entire freezer has been completed. Inserting the journal **8** with the curved link **18**, which is mounted fixedly on it, is made possible by way of the mounting longitudinal slit **14**.

The invented hinge functions in the following manner: The curved link **18**, which is mounted on the journal which, in turn, is held in place from the outside, and the almost radius-shaped curved piece **21** have the effect that the coil spring **28** cannot exert any torque on the curved link through the guide rod **27** and the rolls **24** and **25**. If, as is illustrated for a modified type, this curved piece is designed with a rear-cut, it is possible that an additional pressure is exerted in addition to the lid's own troque. In this closing position, the coil spring **28** has maximum initial tension. If lid **7** is opened to approximately 15°, the rolls **24** and **25** roll off via the reversing edge **21**, controlled by the guide arm **23**. From this moment on, there is a cosine-type counter-balancing by the combined action of the arch-shaped curved piece **20** of the curve link **18**, of the circular motion of the guide arm **23** with the rolls **24** and **25**, that is, the actual two control links, on the one hand, and the force of the coil spring **28**, on the other hand. The invented hinge offers weight counter-balancing throughout the entire opening movement of the lid **27**. On the other hand, the hinge provides excellent sealing in the closed position which can be increased further, if necessary, by a pressure in addition to the lid's own torque. These two advantages are accomplished although the entire counter-balance and closing mechanism is incorporated in the lid so that it is invisible from the outside with the execption of the end of the journal which engages in the joint and which protrudes from the lid. The hinge does, therefore, not disturb the external design of the freezer in any way.

The second type of the invention, as illustrated by FIGURES 4 and 5, differs from the type just described and illustrated by FIGURES 1 to 3 only by the components explained below. Unless modifications are specifically mentioned, the other components are the same as those of the type illustrated by FIGURES 1 to 3. Instead of the guide arm **23** provided in the type illustrated by the FIGURES 1 to 3, a curve path is now provided for in the side walls of the casing **11**. Of this path, only curve path **37** is visible in FIG. 4. The curve paths are spatially arranged in the casing in such a way that a roll axis **38**, which is mounted in them in an adjustable way, rests against the closing piece **19** of the curved link **18**, as illustrated in FIG. 4, when the roll axis is in the closed position under the effect of the spring **28** which is swivel-mounted in flap **7** with initial tension. In this closed position, the roll axis will be located at the end of the curve paths which is farthest away from the journal **8**. It can be easily understood that, from the point of view of function, the curve paths represent the equivalent to the guide arm **23** of the type illustrated by FIGS. 1 to 3.

As can be seen from FIG. 5, the roll axis **38** is equipped with a puncture **39** in the center. The spring guide rod **27** is prevented by this puncture from lateral shifting. The spring guide rod **27** protrudes with its free end **40** into the empty space between the two parts **41** and **42** of the curve link **18** whereby the spring guide rod **27** is also prevented from shifting laterally. The roll axis **38** in the casing **11** can, therefore, not shift either laterally, without it being necessary to solder it to the casing, as is necessary in the case of the bearing shaft **22** in the type illustrated by FIGURES 1 to 3. The rolls **43** and **44** have recesses at their ends at the spots **45** and **46**, and are fixed against protruding shoulders **47** and **48** of the casing **11**. The protruding shoulders **47** and **48** of the casing **11** are arranged along the curve paths **37** and provide, at the same time, a greater support area for the rolls of the roll axis **38**.

The hinge in the type illustrated by the FIGURES 6 and 7 consists of a flap hinge part **49** which is mounted at the lid, and a fixed hinge part which is attached to the base, such as, of a freezer. The fixed hinge part consists merely of a joint **50**, a journal **51** which forms one piece with this joint and which has opposing supporting surfaces **52** and **53** for the counter-balance and closing mechanism, and a connection link **54** which is fixed on the journal **51**. The supporting surfaces **52** and **53** of the journal **51** are designed slightly conically. The same applies to the corresponding boring of the connection link **54** so that no-play engagement into the components of the counter-balance and closing mechanism is ensured which is connected to the connection link as will be explained below.

A winnow **56** is swivel-mounted at the connection link **54** by way of a hinge pin **55**, and a swivel arm **58** is mounted at the flap hinge part **49** by way of another hinge pin **57**. The winnow **56** is equipped with another hinge pin **59** at its lower end and is equipped with a control curve **60** and a retightening curve **61**. The free end of the swivel arm **58** has a long hole **52** for supporting the hinge pin **59** which makes a shifting of the attached lever arm possible. Furthermore, the upper end of a spring guide rod **63** is mounted on the hinge pin **59** of the winnow **56**.

The force of a pressure spring **64**, designed as coil spring, is transmitted through the winnow **56** and the spring guide rod **63**, under guidance of the swivel arm **58**, to the fixed hinge part, that is, the connection link **54**, the journal **51** and the joint **50**. The upper end of the pressure spring **64** rests against an appropriately enlarged stage **58** of the spring guide rod **63** while the lower end rests, via a plate **66**, against a guide tube **67** which is equipped on the outside with a thread and rests on a knife-edge bearing **69** in the flap hinge part **50** through a winnow **68** which has a thread on the inside. By turning the guide tube **67**, the tension of the pressure spring **64** can be adjusted to the desired lid torque before installation.

For a description of the function, reference is made to FIG. 6 which shows the flap in the closed condition. The spring **64** presses against the hinge pin **55** at the connection link **54** via the spring guide rod **63**, the hinge pin **59** and the winnow **56**, and therefore presses against the fixed hinge part. The hinge pin **59** is passed through the swivel arm **58** in the long hole **62**. For closing the flap, the winnow **56** with its control curve **60** slides along the hinge pin **57**, which is protected by a roll **70**, until it has reached the position shown in FIG. 6. The shape of the control curve **60** makes sure that the hinge pin **59** maintains its position in the long hole **62** of the swivel arm **58** during the closing motion. Not only the flap has almost reached the closed position, the hinge pin **59** is pressed by the spring **64** against the opposite end in the long hole **62**, shown in FIG. 6. The hinge pin **59**, thus, maintains its largest possible distance from the roll **70** or the hinge pin **57** during the swivel motion of the flap. In this case, the distance of the hinge pins **59** and **57** is smaller than the distance of the journal **51** from the hinge pin **55**. It is, however, also possible to arrange the distance differently if the spring characteristics are modified accordingly. Thus, the two distances mentioned can be approximately equal if the spring characteristics are selected appropriately. Thus, when the flap **49** is turned by a certain angle, the swivel arm **58** turns simultaneously by a wider angle in the type illustrated. A change of the torques according to the cosine function is obtained by the co-functioning of the spring characteristics and the attached swivel arm.

A retightening curve **61** adjoins the control curve **60** of the winnow **56**. As can be seen by FIG. 6, that is, when the flap is closed, the spring **64** presses the spring guide rod **63** against the roll **70** and tries moving the winnow **56** to the left. In the process, it generates a torque in the flap which presses the flap against its sealing. If the retightening curve **61** is designed appropriately, the hinge pin **59** is pressed against its inner final position in the long hole **62** at the same time. Depending on the shape of the retightening curve, this final position is reached more or less. The position of the winnow and, therefore, the amount of the pressure of the flap against the sealing is determined thereby. Depending on the shape of the re-

tightening curve selected, the pressure of the flap against the sealing of the base, e.g., of a freezer, will therefore be greater or smaller. It is also possible to discharge part of the flap's own weight.

If the flap is opened by approximately 15°, the winnow **56** with the retightening curve **61** and the control curve **60** slides along roll **70** in such a way that the hinge pin **59** is pressed against the other end of the long hole **62** into the maximum distance with respect to roll **70** and thus turns around the hinge pin **57** with maximum swivel arm, rendering the flap weightless in every position.

The control curve **60** makes it possible that the swivel arm **58** always has its maximum effective length because the hinge pin **59** takes up its outside position in the long hole **62**.

As can be seen from FIG. 6, the winnow **56** is carried along, when the flap is closed, until roll **70** rests against a stop **61** on the inside of winnow **56**. By placing the stop **71** in a suitable position, it is possible to limit the final position of the flap in the pressing position, as desired.

When the flap is opened, and regardless of the size of the aperture angle, the four joints **51**, and **55**, **57** **59** take up a position to one another in which the axis of the pin hinge **57** is located outside a triangle formed towards the other hinge pins. The pressure of the spring **64** then acts on the hinge pin **55** via the spring guide rod **63**, the hinge pin **59** and the winnow **56**, and counteracts the weight of the flap. When the flap is closed, a position illustrated by FIG. 6, the rear cutting of the winnow **56** in the area of the retightening curve **61** in combination with the long hole **62** of the swivel arm **58** effects a reversal of the spring force, whereas the hinge pin **57** with the roll **70** is located in such a way that its axis lies within the triangle formed by the other three hinge pins. The spring pressure now acts in the opposite sense of rotation, and the flap is pressed against the sealing of the container with the force of the spring in addition to the force of its own weight.

In order to limit the aperture path of the flap (as a rule, a maximum aperture angle of 90° is selected), the connection link **54** has a certain diameter at the part **83** which overlaps the journal **51**. In the opened position of the hinge, the winnow **56** with its stop **71** rests against part **83**, thus preventing a further opening of the flap. By selecting the diameter of part **83** in a suitable manner, one can determine the aperture angle.

The bearing of the counter-balance and closing mechanism within the swivel-mounted hinge part **49** is illustrated by FIG. 7. The U-shaped casing of the adjustable hinge part **49** has support borings **75** and **76** in the side walls **73** and **74**. The support surfaces of these borings are enlarged by circular material settings **77** and **78** pointing towards the inside. The connection link **54** is equipped, on the one hand, with a pin-type attachment **79** extending into the support boring **75**, and, on the other hand, with an opening **80**. A bushing **81** engages into the opening **80** of the connection link **54**. This bushing is mounted with its end in the boring **76** of the side wall **74** of the casing. A spring ring **82** is arranged on the bushing **81** between the side of the connection link **54** pointing towards the casing wall **74** and the circular material setting **78**. The journal **51**, which reaches through the boring of the components illustrated in FIG. 7, is equipped with a thread at the end protruding over the inside of the flap. Due to the conical design of the supporting surfaces **52** and **53** of the journal **51**, all components of the bearing can be tightened by way of a nut from the inside on the journal. Since the bearing does, therefore, not have any play, the invented hinge functions noiselessly during opening and closing.

I claim:

1. A hinge structure for freezer cabinets or the like having lids pivotable about a horizontal axis comprising a member attached to said sabinet, a lid pivot fixedly mounted on said member so that said pivot will protrude along its axis laterally into said lid, and a counterbalancing and closing means mounted within and attached to said lid and to said pivot, said hinge being so arranged that only that portion of the pivot which engages with said member protrudes from said lid, said counterbalancing and closing mechanism consisting of a curved link pivotally mounted on said pivot, said curved link having on its free end a closing curved portion and adjacent thereto in the direction of the pivot an arch-shaped compensating curved portion, said closing curved portion and said compensating curved portion being separated from each other by a reversing edge portion, a guide arm pivotally attached to said lid, roller means attached to the free end of said guide arm, a spring guide rod, one end of said spring guide rod being pivotally mounted on the free end of said guide arm, the other end of said spring guide rod being mounted in a spring guide means fixedly mounted in said lid, a compression spring mounted on said spring guide whereby said roller means in the closed position rests against the closing curved portion under pressure.

2. A hinge according to claim **1** in which the curved link has a further edge portion opposite the arch-shaped curve portion which is shaped in such a manner that it lies parallel to the rear inner edge of said lid in the maximum opened position.

3. A hinge according to claim **1** in which one end of a spring guide is attached to said guide arm between said roller means by means of a shaft which also serves as an axle for said roller means.

4. A hinge according to claim **1** in which stop means are provided on said guide rod, said stop means acting as a thrust lock for the compression spring at the end which lies adjacent said spring guide means.

5. A hinge according to claim **1** in which said spring guide means comprises a spring guide tube threaded on the outside, said tube being supported by a knife edge bearing mounted within said casing with a winnow placed therebetween.

6. A hinge according to claim **4** in which a plate is mounted on said spring guide rod at the end opposite said stop means, said plate supporting one end of said compression spring against said guide tube.

7. A hinge according to claim **1** wherein the pressure applied to the roller by the closing curve when the lid is closed is downwardly applied to the lid through the guide arm so as to augment the weight of the lid in developing a lid-cabinet sealing force.

8. A hinge structure for freezer cabinets or the like having lids pivotable about a horizontal axis comprising a member attached to said cabinet, a lid pivot fixedly mounted on said member so that said pivot will protrude along its axis laterally into said lid, and a counterbalancing and closing means mounted within and attached to said lid and to said pivot, said hinge being so arranged that only that portion of the pivot which engages with said member protrudes from said lid, said counterbalancing and closing mechanism consisting of a curved link mounted on said pivot, the free end of said curved link having thereon a closing curved portion, adjacent said closing curved portion in the direction of said pivot an arched-shaped compensating curved portion, said portions being separated from each other by a reversing edge, a channel-shaped casing, two curved paths arranged in the side walls of a casing, roller axis mounted therein so that in the closing position it rests against the closing curved portion, and means to exert an initial bias on said roller axis against said curved link.

9. A hinge according to claim **8** in which said bias means comprises a spring guide rod one end of which is mounted in an opening in the center of said roller axis, the free end of said curved link bearing against said roller axis, shoulder portions of said roll axis being fixed against protruding portions of said casing.

10. A hinge according to claim 8 in which the pivot is a journal preferably forming a single unit with said member and which has at least one holding surface for the counterbalancing and closing mechanism.

11. A hinge according to claim 10 in which said holding surfaces of said journal are conical in shape.

12. A hinge according to claim 10 in which a spring is supported with one end resting against said casing mounted on said cover through the intermediary of a spring guide rod the other end of said spring guide rod bearing against a fixed hinge portion, a winnow attached to said spring guide rod, guide means provided at the connected point of the spring guide rod and the winnow, said guide consisting of a swivel arm mounted on said channel-shaped casing by means of a hinge pin, said arm having a slot-like opening in its free end for supporting said hinge pin and connecting said winnow with said spring guide rod, said winnow having at the end connected to the swivel arm a lateral portion carrying a control curved portion and a retightening curved portion, said lateral portion sliding along the fixed hinge pin of the swivel arm when said lid is moved to catch in the closed position.

13. A hinge according to claim 12 wherein the distance of said journal from the pin connecting the winnow with the connection link is approximately the same distance as that of the hinge pins mounted on the swivel arm.

14. A hinge according to claim 12 wherein said hinge pin is protected by a roll.

15. A hinge according to claim 10 wherein said fixed connection link is arranged on the hinge pin to which the free end of the winnow is attached.

16. A hinge according to claim 15 in which support borings which are enlarged towards the inside by material openings are provided in said casing, the connection link having a pin with one end engaging said support boring and the other end engaging with an opening in a bushing mounted in a boring of the casing, a spacing ring resting against the bushing and said pin, and said pin being tightened by means of a nut attached to said journal.

17. A hinge according to claim 10 in which a portion of the connecting link which extends over all the journals has a variable diameter so that the aperture angle of the lid can be limited by moving said winnow to rest against a portion of the connecting link with its stop.

18. A hinge structure for freezer cabinets or the like having lids pivotal about a horizontal axis, said hinge comprising a first member rigidly mounted on said cabinet, a first pivot pin mounted on said member, a second member rigidly mounted on said lid, said second member being also pivoted on said first pivot pin, a curved link mounted on said pivot pin, the free end of said curved link having thereon a closing curve portion and adjacent in the direction of the pivot thereto an arch-shaped compensating curve portion, a guide arm pivotally attached to said second member, roller means rotatably mounted on the free end of said guide arm, a spring guide, one end of said spring guide being pivotally mounted on the roller means end of said guide arm, the other end of said spring guide being mounted in a spring guide tube fixedly mounted on said second member and a compression spring mounted on said spring guide thereby placing said roller means under an initial tension.

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BOBBY R. GAY, *Primary Examiner.*

DORIS L. TROUTMAN, *Assistant Examiner.*