July 4, 1961 R. E. BUCHHOLTZ 2,990,571

CABINET HAVING PRESSURE RELEASABLE HINGE

Filed Aug. 3, 1959

2 Sheets-Sheet 1

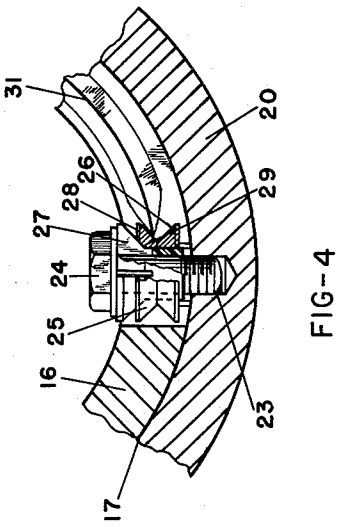


FIG-4

FIG-3

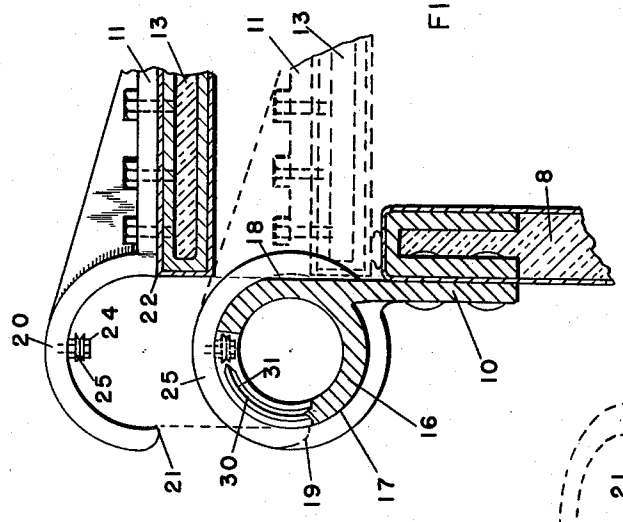


FIG-2

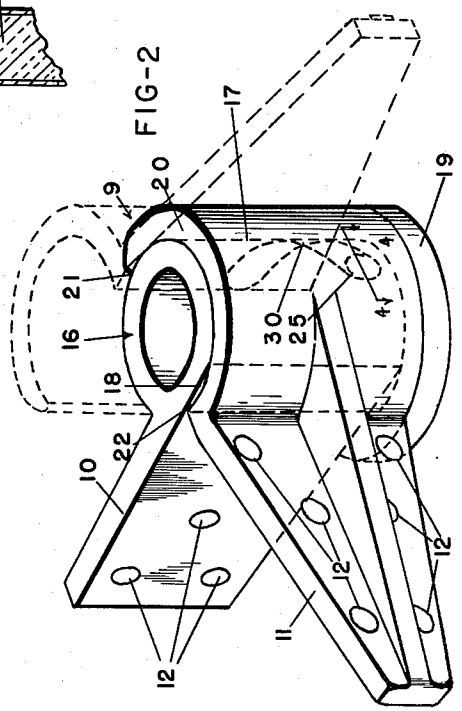
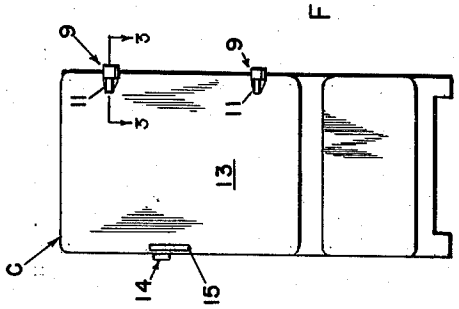


FIG-1



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CABINET HAVING PRESSURE RELEASABLE HINGE

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FIG-6

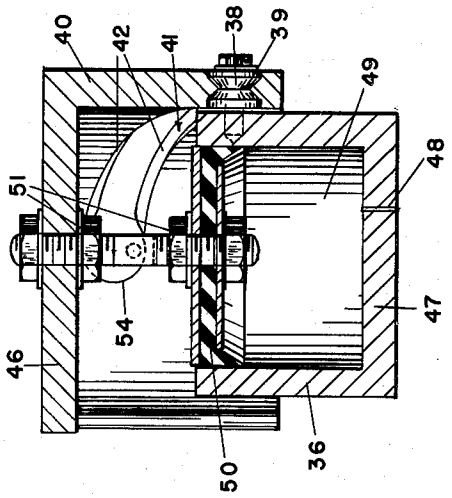
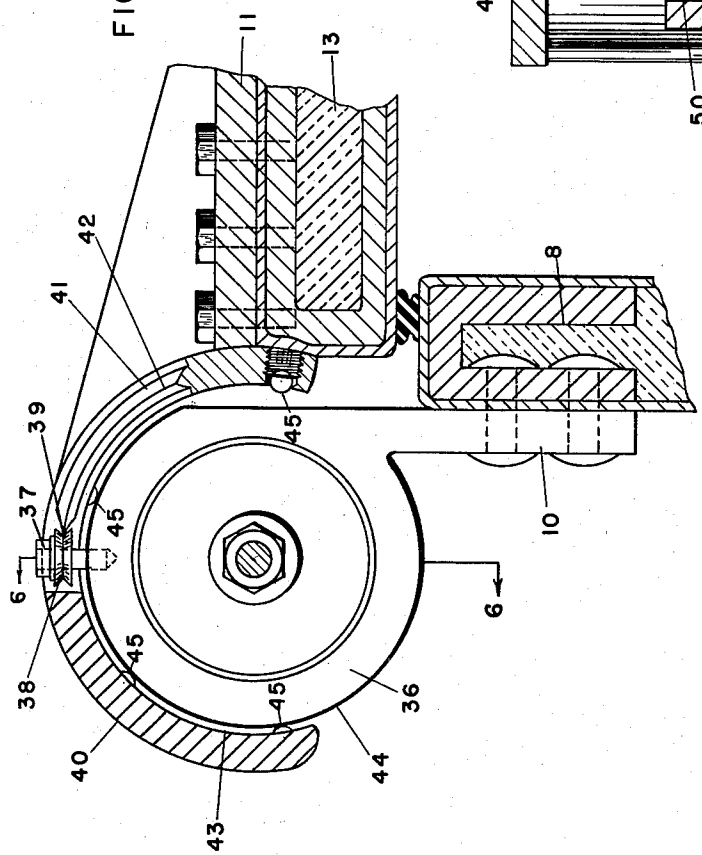


FIG-5



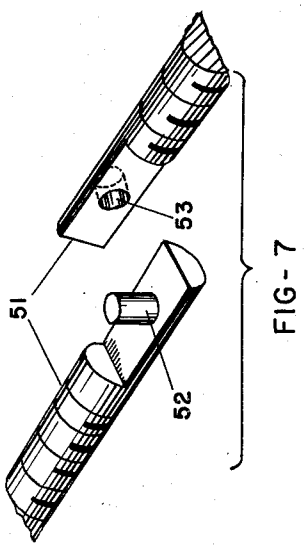


FIG-7

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2,990,571
CABINET HAVING PRESSURE RELEASABLE HINGE

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7 Claims. (Cl. 16—171)

This invention relates to a cabinet having hinges of such construction that their parts may be disconnected and the door opened by pressure within the cabinet.

When the door can be locked it frequently happens that a child becomes locked within a discarded cabinet and is unable to unlock the door to get out. Almost universally the doors on cabinets of this type swing outwardly and the hinge pintles are on the outside where they cannot be removed from the inside. Most likely one being caught in a cabinet of this type would not have the ability to remove the pintles to permit the door to open.

Therefore, it is the primary object of this invention to provide a unique door hinge which is sensitive to pressures to separate the parts of the hinge and permit the door to be opened when in its closed and locked position by pressure from within the cabinet.

A further object of the present invention lies in the provision of a door hinge which functions as an ordinary hinge in ordinary use but can never-the-less have its parts separated by pressure applied at the hinge edge of the door so that the door will swing about its locked edge.

A further object lies in the provision of a hinge having separable parts when these parts are positioned relative to each other as they would be on a door in a closed and locked position, but which parts not separable when the hinge is moved from said position to a position wherein the door is removed from the closed position toward an open position. To attain these objects I provide a hinge having a cylindrical pintle with a flat face on a chord thereof, a segmental cylindrical hinge member which endures for slightly more than 180° of a circle so that its parallel defining edges are spaced from each other a distance less than the normal diameter of the pintle but no less than the diameter of the pintle which last mentioned diameter is perpendicular to said flat surface. It can thus be seen that the hinge parts may be separated when the hinge members are disposed in only one relationship, but may not be separated while they are pivoted from this relationship.

In the accompanying drawings I have illustrated a preferred embodiment of my invention accompanied by an alternate form, but it should be understood that I do not desire to be limited to these particular disclosures, but desire to claim the invention broadly, limited only as required by the prior art as reflected in the appended claims.

In these drawings:

FIG. 1 is a front elevation of a cabinet having the hinges of this invention;

FIG. 2 is a perspective view of one hinge in the door-closed position in full line, and the door-open position in broken lines;

FIG. 3 is a horizontal cross section taken on the plane substantially as indicated at 3—3 in FIG. 1, showing the door in a closed position by broken line and with the hinge portions separated in full line;

FIG. 4 is a fragmentary horizontal cross section taken substantially on a plane indicated by line 4—4 of FIG. 2;

FIG. 5 is a view similar to FIG. 3, showing a modified species of the hinge of this invention;

FIG. 6 is a vertical diametrical cross section taken through the modified hinge as at line 6—6 of FIG. 5, and

FIG. 7 is a fragmentary perspective view of a motion arresting connector.

The hinges 9 illustrated in these drawings have leaves

10 and 11 which are provided with screws or bolt receiving apertures 12 for securing the leaves 10 and 11 respectively to the side wall 8 and the door 13 of the cabinet C. On the vertical edge opposite to the hinge 9 the door 13 may or may not be provided with a conventional latch 14 and handle 15.

Under normal circumstances the hinge 9 operates in the customary manner so that when the latch 14 is released and the handle 15 is pulled the door may be swung about the axis of the hinges 9. If however outward pressure is applied to the door 13 at the vertical edge to which the hinges are secured the elements of the hinge may separate to permit the door to swing outwardly about its locked edge so one trapped within the cabinet C may escape.

The leaf 10 is provided with an axially vertical pintle 16 which is generally cylindrical on its outer peripheral face 17 and has a flat surface 18 on a chord thereof which extends for the full axial length of the pintle 16. An enlarged cap plate 19 is secured coaxially on the lower end of the pintle 16 to constitute a support stop as will be hereinafter more particularly explained.

In the species of FIGS. 1–4 cap 19 may be apertured at the center or be solid without altering the function of the hinge.

The leaf 11 is provided with a segmental cylindrical hinge member 20, which is adapted to journal about the pintle 16 for hinging movement and, endures for only slightly more than 180° of a circle. The segmental cylindrical portion is defined by parallel defining edges 21 and 22 which are spaced from each other a distance less than the normal diameter of the pintle peripheral face 17 (which diameter may be considered to be one parallel to the flat surface 18) and this spacing is not less than the diameter measured perpendicular to the said flat surface 18.

Therefore it is seen that one leaf 11 when at right angle with respect to the leaf 10 as shown in FIG. 3, may be readily separated by removing the segmental cylindrical hinge member 20 from the pintle 16. I have however provided means for preventing accidental removal or separation of the hinge members 16 and 20 which may also serve to automatically close the door supported by the hinges. To prevent accidental displacement when the door is hingedly swung from its closed position the segmental cylindrical hinge member 20 is drilled and tapped at 23 to receive a threaded journal bolt 24 which forms a journal for roller 25 which has a peripheral V groove configuration 26. Disposed between the journal 24 and the roller 25, is a friction clutch 27 having a tapered or conic outer surface 28 mating with a cooperating internal configuration 29 in the roller so that when the journal bolt 24 is tightened the friction clutch increases the drag between the journal 24 and the roller 25 thus frictionally retarding or arresting the rolling movement of the roller and thus arresting the door movement.

The pintle 16 is provided with a helicoid way 30 which endures for substantially 90° about the pintle 16. The roller 25 is disposed in the way 30 which is provided with upper and lower V-shaped ridges 31 which extend to the upper end thereof from a point adjacent to the lower end thereof and terminate just short of the final position of the roller 25 when the hinge relationship is such that the door is in the closed position. (Note particularly FIG. 3, of the drawing.) At this point the lower edge of the segmental cylindrical hinge member 20 is resting upon the cap plate 19 while the roller 25 is resting in the lower-most portion of the helicoid way 30. The weight of the door carried by the roller 25 and the cap plate 19 effect sufficient frictional engagement to prevent lateral movement of the hinge portions under normal usage. But, when outward pressure is

applied at the hinged edge of the door the friction may be overcome and the hinge members separated as shown in FIG. 3.

Upon initial hinging movement of the leaf **11** with respect to leaf **10** the V-shaped ridges **31** cooperates with the V-groove **26** to prevent lateral misplacement of the hinge portion.

Since the way **30** is helicoid, during its opening movement the door is elevated and therefore the door is automatically closed by gravity, as the follower, consisting of the journal **24** and roller **25**, traverses downwardly along the helicoid way **30** effected by the weight of the door.

The speed of movement is controlled by adjusting the frictional tension between the roller **25** and its journal **24.**

In the species disclosed in FIGS. 5, 6 and 7 the pintle **36**, instead of having the helicoid way, is provided with the journal bolt **37** and a roller **38** having a peripheral V-groove **39.** The segmental cylindrical hinge member **40** is provided with the helicoid way **41** having the V-shaped ridge **42** for association with the roller **38.**

Instead of the close tolerance as a sleeve-bearing between the inner cylindrical face **43** of the member **40**, and the peripheral face **44** of the pintle **36**, I provide ball bearings **45** which are carried by the member **40** and roll upon the peripheral face **44** of the pintle **36.** As seen in FIG. 6 the helicoid way **41** is formed in the member **40** and instead of a cap plate **19** the member **40** is provided with a cap plate **46** which rests upon the upper end of the pintle **36** when in the door-closed position.

The lower end of the pintle **36** is provided with a closure **47** which is vented with an opening **48** selected to control the discharge of air from the chamber **49** and thus controls the closing movement of the door. A piston **50** is associated with the cylinder forming the chamber **49** for rectilinear movement therein and is releasably secured by the segmental bolt **51**, to move axially with the member **40.** It will be noted that the bolt **51** may separate laterally by withdrawing the pin **52** from the socket **53**, formed in the opposed segments of the bolt **51.** When the door is in the closed position this pin axis is directed toward the extremity of the helicoid way **41** so that the pin **52** and the journal **37** are axially parallel thus permitting the hinge members to separate and the door to be opened by pressure along the hinged edge from within the cabinet C.

Having thus described my invention I desire to secure by Letters Patent of the United States the following:

1. A door hinge comprising an inflexible vertical cylindrical pintle having mounting means; said pintle having a flat surface on a chord of its arc extending parallel to the axis thereof; an inflexible segmental cylindrical hinge member companion to and pivotally supported on said pintle and enduring for slightly more than 180°; said last named member having axially parallel defining edges spaced from each other a distance less than the diameter of said pintle parallel to said flat surface and no less than the diameter of said pintle perpendicular to said surface; and said segmental cylindrical hinge member having mounting means thereon.

2. A pressure sensitve door hinge comprising a cylindrical pintle having means for mounting the pintle; said pintle having a flat surface on a chord of its arc extending the full length thereof; a segmental cylindrical hinge member companion to and pivotally supported upon said pintle and enduring for slightly more than 180°; said last named member having axially parallel defining edges spaced from each other a distance less than a diameter of said pintle parallel to said flat surface and no less than a diameter perpendicular to said surface; means for mounting said segmental cylindrical hinge member; cooperating means mounted on said cylindrical hinge member and said pintle for effecting axially telescopic movement of said hinge member and said pintle during hinging movements thereof; and motion arresting mechanism for controlling the speed of said hinging movement.

3. The invention of claim 2 wherein the means for effecting relative telescopic movement comprising a helicoid way carried by one of said cylindrical hinge member or pintle and a follower carried by the other; said follower being disposed to follow said helical way during hinging movement of said parts.

4. The invention of claim 2 wherein the means for effecting relative telescopic movement comprises a helicoid way carried by one of said cylindrical hinge member or pintle and a follower carried by the other; said follower being disposed to follow said helicoid way during hinging movement of said parts; said follower including a roller journaled on a shaft carried by said member and disposed to roll in the way carried by said pintle; and said motion arresting mechanism including an adjustable friction clutch carried by said shaft for arresting the rolling movement of said roller.

5. The invention of claim 2 wherein the means for effecting relative telescopic movement comprises a helicoid way carried by one of said cylindrical hinge member or pintle and a follower carried by the other; said follower being disposed to follow said helicoid way during hinging movement of said parts; said motion arresting mechanism comprising a bore in said pintle to the atmosphere; a piston receptacle in said bore; and means interconnecting said cylindrical hinge to said piston whereby motion of said door is controlled by the size of said vent from said bore.

6. A pressure sensitive door hinge comprising a cylindrical pintle having means for mounting the pintle; said pintle having a flat surface on a chord of its arc extending the full length thereof; a segmental cylindrical hinge member companion to and pivotally supported upon said pintle and enduring for slightly more than 180° and having means for mounting said member; and said last-named member having axially parallel defining edges spaced from each other a distance less than a diameter of said pintle parallel to said flat surface and no less than a diameter perpendicular to said surface.

7. A pressure sensitive door hinge comprising a cylindrical pintle having means for mounting the pintle; said pintle having a flat surface on a chord of its arc extending the full length thereof; a segmental cylindrical hinge member companion to and pivotally supported upon said pintle and enduring for slightly more than 180° and having means for mounting said member; said last-named member having axially parallel defining edges spaced from each other a distance less than a diameter of said pintle parallel to said flat surface and no less than a diameter perpendicular to said surface; and means for effecting hinging movement of said hinge by gravity and including motion arresting mechanism for controlling the speed of said hinging movement.

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