United States Patent [19]

Little

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[54] **IMPROVED COVER MOUNTING HINGE AND COUNTER BALANCE MECHANISM AND METHOD OF MOUNTING SAME**

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[52] **U.S. Cl.** **16/190,** 16/85, 16/180, 16/145

[51] **Int. Cl.** **E05f 1/12**

[58] **Field of Search** 16/190, 180, 145, 16/146, 191, 142, 85, 71

[56] **References Cited**

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3,187,374 6/1965 Lundell 16/190

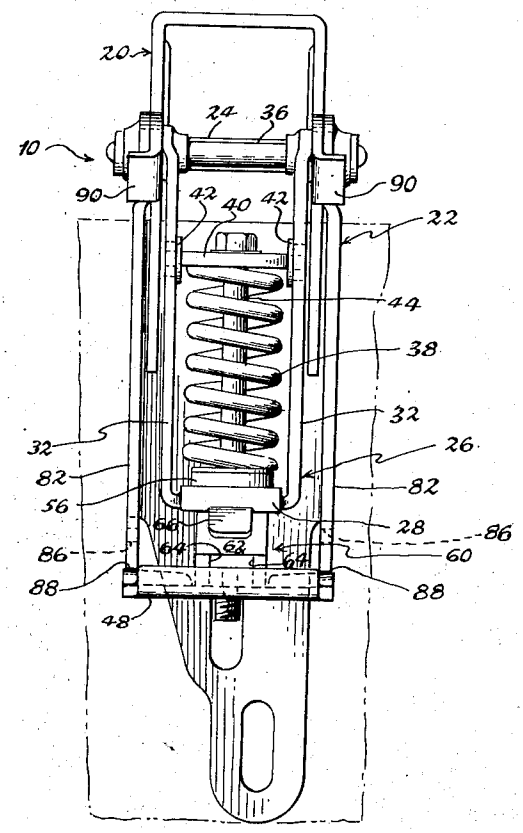
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[57] **ABSTRACT**

A cover mounting combination hinge and counterbalance mechanism for hingedly mounting a cover upon a cabinet for vertical swinging movement between horizontally disposed closed and vertically disposed open positions, which features an arrangement for mounting the mechanism without requiring adjustments of the cover counter-balancing compression spring.

4 Claims, 4 Drawing Figures



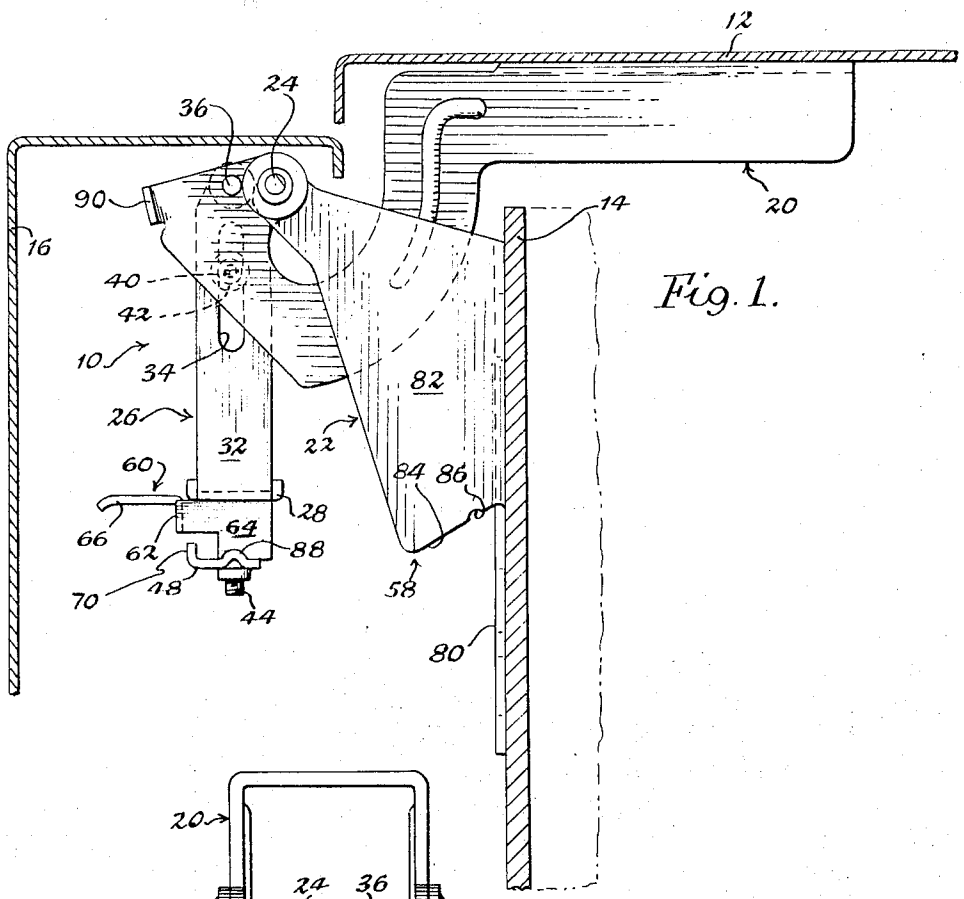


Fig. 1.

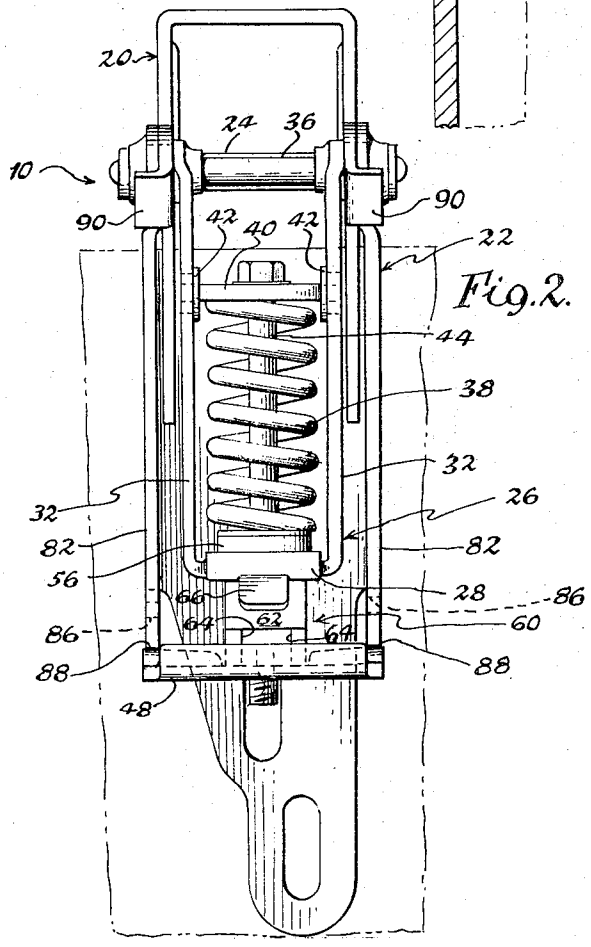


Fig. 2.

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Fig.3.

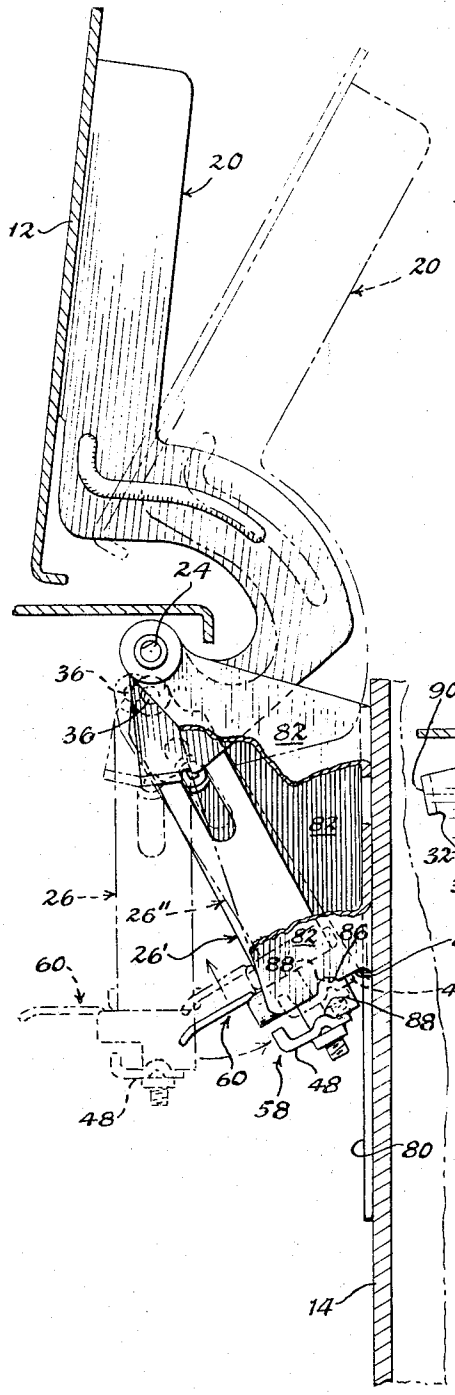
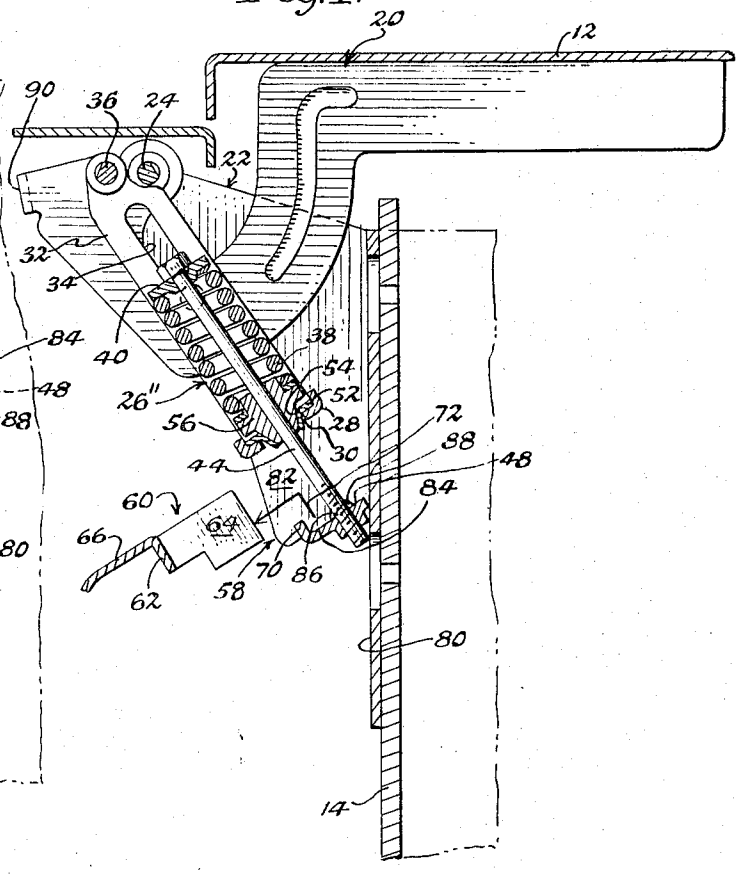


Fig.4.



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IMPROVED COVER MOUNTING HINGE AND COUNTER BALANCE MECHANISM AND METHOD OF MOUNTING SAME

BACKGROUND OF THE INVENTION

Commonly assigned U.S. Pat. No. 3,187,374 discloses a cover mounting combination hinge and counter balance mechanism for hingedly mounting a cover upon a cabinet for vertical swinging movement between horizontally disposed closed and vertically disposed open positions. The mechanism includes first and second brackets adapted to be fixed to the cover and the cabinet respectively, a hinge pin pivotally interconnecting the brackets, a stirrup member of U-shaped form including an apertured bottom sill portion and opposing leg portions pivotally connected at their upper ends to a hanger pin carried by the first bracket, a compression spring bearing downwardly, at its bottom end upon the sill portion and upwardly at its upper end against a cross arm having its opposite end portions riding in slide quide means formed in the stirrup leg portions, and a tie rod fixed at its bottom end to a bottom plate and slideably extending through the sill portion and the spring and fixed at its upper end to the cross arm whereby to hold the ladder in a constant distance relationship with the bottom plate. The bottom plate is constrained from movement by engagement with a bottom end portion of the second bracket, whereby the spring exerts forces acting through the stirrup member counter-balancing the torque effects of gravity on the cover substantially throughout the range of its positional movement. Also, a resilient, friction-material sleeve is disclosed as being arranged intermediate the bottom end of the spring and a conically bored cup carried by the bottom sill for use in dampening hinging movements of the cover.

While this prior construction has enjoyed wide commercial use, it does have the disadvantage of being difficult or time consuming to install. In this respect, it will be appreciated that when using this prior construction, it is necessary to install the mechanism with the tie rod loosened to remove essentially all compressive stress from the compression spring; this permitting the second hinge part to be easily swung relative to the first bracket for attachment to the cabinet, while the first bracket is attached to the cover and the latter arranged in a closed position. After attachment of the second hinge bracket, it is of course necessary to manually adjust the tie rod to compress the spring in order to counter-balance the torque effects of gravity on the cover. Such manual adjustments are time consuming, since more than one hinge mechanism is normally employed to support each cover.

SUMMARY OF THE INVENTION

The present invention is directed towards improvements in the cover mounting combination hinge and counterbalance mechanism disclosed in U.S Pat No. 3,187,374. Specifically, the present invention is intended to permit a mechanism of the type disclosed in the above mentioned patent to be quickly installed without the need for adjustments of the compression spring.

In accordance with the invention, a retainer is inserted between the sill portion and the bottom plate in order to initially precompress the compression spring; the construction being such that, when the hinge brackets are attached and the cover moved into a partially open position, the stirrup member is free to swing about the hanger pin to position the bottom plate for engagement with the bottom end portion of the second bracket. When the cover is returned to closed position, the spring is further compressed and the sill portion moved upwardly away from the bottom plate in order to free the retainer from manual removal. When the cover is again raised, the spring serves to resiliently retain the bottom plate in engagement with the second bracket throughout the range of cover movements.

DRAWINGS

The nature and mode of the present invention will now be more fully described in the following detailed description taken with the accompanying drawings wherein:

FIG. 1 is a side elevational view showing the hinge brackets connected to the cover and cabinet, but with the counterbalance mechanism inoperative;

FIG. 2 is a rear elevational view of the mechanism illustrated in FIG. 1; and

FIGS. 3 and 4 are sectionalized elevational views illustrating the procedure for placing the counterbalancing mechanism in operation.

DETAILED DESCRIPTION

Reference is now made more particularly to FIG. 1, wherein the combination hings and counter balancing mechanism of the present invention is generally designated as **10** and shown as being employed for hingedly mounting a cover or lid **12** upon an open top cabinet having a rear wall or frame member **14**, whereby cover **12** may be easily swung between the horizontally disposed closed and vertically disposed open positions. While in the illustrated construction mechanism **10** is fixed to the rearwardly facing surface of frame member **14** and hidden from view by removable sheet member cover **16**, it will be understood that the present invention is not limited thereto. One or more mechanisms may be employed to provide proper hinging support for a cabinet cover, depending upon its weight and/or dimensional characteristics.

By referring to the drawings, it will be apparent that mechanism **10** is structurally similar to the mechanism disclosed by the commonly assigned U.S. Pat. No. 3,187,374 in that it generally comprises first and second brackets **20** and **22** adapted to be suitably fixed, as by machine screws to cover **12** and frame **14**, respectively; a hinge pin **24** for pivotally interconnecting brackets **20** and **22**; a stirrup member **26**, which is of U-shaped form including a bottom sill portion **28** formed with an aperture **30** and a pair of opposing leg portions **32, 32** formed with lengthwise extending guide slots **34, 34**; a hanger pin **36** for pivotally connecting upper ends of leg portions **32** to first bracket **20** for swinging movement about an axis disposed parallel to the axis of hinge pin **24**; a coil type compression spring **38**; a cross arm or upper member **40** having wear resistant buttons **42** carried on its opposite ends to ride in guide slots **34, 34**; a tie rod **44** fixed at its bottom end to a bottom plate **48** and slideably extending vertically through sill portion aperture **30** and spring **38** and fixed at its upper end to cross arm **40**, whereby to hold the latter in constant distance relation with bottom plate **48**. Preferably, a motion snubbing mechanism is arranged between the bottom end of spring **38** and sill

portion 28 and comprises, as best shown in FIG. 4, a cup shaped member 52 having a conically shaped bore opening 54; and a resiliently deformably friction-material sleeve 56 having its rounded bottom end portion resting in bore 54.

In use, with bottom plate 48 being resiliently maintained by spring 38 in engagement with the bottom end portion 58 of second bracket 22 in the manner indicated in FIG. 4, mechanism 10 functions in a manner identical with the mechanism described in above mentioned U.S. Pat. No. 3,187,374. That is, the internal wall surfaces of sleeve 56 bear in frictional engagement with tie rod 44, whereby to snub movements of stirrup member 26 relative to the tie rod in order to dampen hinging movements of cover 12; the friction bearing pressure between sleeve 56 and tie rod 44 varying according to trust pressure variations of spring 38 against sleeve 56 as a function of spring compression variations incident to cover positional changes. Moreover, spring 38, which may be adjusted by rotations of the lower threaded end portion of tie rod 44 within bottom plate 48, exerts forces acting through stirrup 26 serving to counter balance the torque effects of gravity on cover 12 throughout substantially the whole of the range of its positional movement.

Mechanism 10 differs from that described in the above referenced patent principally in the provisions of a factory installed retainer or clip 60 and in the construction of second bracket 22.

Retainer 60 is shown in the drawings as being of generally U-shaped construction having a base 62 and a pair of legs 64, 64; base 62 having a pull tab 66 fixed to extend therefrom in a direction opposite to legs 64, 64. As best shown in FIGS. 1 and 2, the upper and lower edge surfaces of legs 64, 64 are disposed for engagement with sill portion 28 and bottom plate 48, respectively, such that bottom plate 48 is maintained at a given distance from hanger pin 36 against the bias of spring 38; such distance being in excess of the minimum distance between the hanger pin and the bottom end portion 58 in at least one position of the cover other than closed position, such as the position indicated in full line in FIG. 3. Accidental removal of retainer 60 may be effectively prevented prior to installation of mechanism 10 by forming bottom plate 48 with a tab 70 upstanding from adjacent its rearmost edge for abutting engagement with legs 64, 64. When sill portion 28 is moved in a direction away from bottom plate 48 in the manner to be described, retainer 62 may be lifted and then removed from its inserted position as indicated by arrow 72 in FIG. 4.

Second bracket 22 differs from the corresponding bracket disclosed in the above mentioned U.S. Pat. No. 3,187,374 in that it includes a front or mounting flange portion 80 and a pair of side flange portions 82, 82, which are unconnected rearwardly of front flange portion 80 so as to permit free swinging movement of stirrup member 26 therebetween, as indicated in FIG. 3. As best shown in FIGS. 1, 3 and 4, the downwardly and forwardly facing edge surfaces 84, 84 of side flange portions 82, 82 cooperate to define bottom end portion 58; such edge surfaces being preferably formed with aligned notch openings 86, 86 shaped to receive a pair of anchoring projections 88, 88 formed on base plate 48.

Any suitable means may be employed to limit opening movements of cover 12 so as to define its open position, such as for example first bracket carried stop flanges 90, 90, which are engageable with rear edge surface of side flange portions 82, 82.

Mechanism 10, which is preferably supplied to a user with a factory applied retainer 60, may be installed in the manner best shown in FIGS. 1, 3 and 4. First bracket 20 is first fixed to cover 12 and the cover then rested on top of the cabinet for the purpose of supporting the cover and properly positioning second bracket 22 relative to the cabinet. During attachment of the second bracket, a stirrup member 26 is free to swing relative to its counter-balance assembly disconnected position indicated in full and phantom line at 26 in FIGS. 1 and 3, respectively.

After attachment of second bracket 22, the first bracket and cover are freely swung upwardly, such as into the position shown in full line in FIG. 3, wherein hanger pin 36 is lowered at least to a point at which the given distance between the hanger pin and bottom plate 48 is in excess of the distance between the hanger pin and bottom end portion 58. This permits the stirrup member to be swung from its phantom line counterbalance disengaged position 26 into its full line position 26', wherein bottom plate 48 is positioned below and in alignment for engagement with bottom end portion 58. When the cover is subsequently lowered, the stirrup member is initially raised into the position designated as 26'' in FIGS. 3 and 4, wherein projections 88, 88 are seated in notch openings 86, 86 and bottom plate 48 is arrested from further movement. Continued lowering of the cover into its closed position shown in FIG. 4, serves to further compress spring 38 and to effect movement of sill portion 28 upwardly away from bottom plate 48 suffiently to permit removal of retainer 60. Since spring 38 is preferably designed such that it will tend to counterbalance the cover throughout its range of opening movements, the spring will also tend after removal of retainer 60 to resiliently retain bottom plate 48 seated in engagement with bottom portion 58 during such movements. Thus, with the present construction and mode of installation, the degree of spring compression of each of mechanisms 10 may be accurately pre-set at the factory and need not be varied during installation.

It will be understood that various changes in the structural details of the hinge brackets may be made as required to accommodate the mechanism to any given installation. Thus, as by way of example, the hanger pin may be connected by an intermediate motion transmitting linkage to the first hinge part, rather than being carried directly thereon.

I claim:

1. In a cover mounting combination hinge and counterbalance mechanism for hingedly mounting a cover upon an open top cabinet for vertical swinging movement between horizontally disposed closed and vertically disposed open positions, said mechanism including first and second bracket means adapted to be attached to said cover and to said cabinet, respectively, a hinge pin pivotally interconnecting said bracket means, a member movably connected to said first bracket means by pin means for movement relative to said second bracket means during swinging movements of said cover, said member having an apertured bottom portion, compression spring means bearing downwardly at its bottom end uopn said bottom portion and bearing at its upper end against an upper member, a tie

rod fixed at its bottom end to a bottom plate and slideably extending through said bottom portion and said spring means and fixed at its upper end to said upper member whereby to hold the latter in a constant distance relation with said bottom plate, said bottom plate being constrained from movement by engagement with a bottom end portion of said second bracket means, whereby said spring means exerts forces acting through said member counter balancing the torque effects of gravity on said cover throughout substantially the whole of the range of its positional movements, the improvement which comprises in combination:

retainer means removably insertable into a position intermediate said bottom portion and said bottom plate for releasably maintaining said bottom plate at a given distance from said pin means resulting in said spring means being releasably maintained by said retainer means in a partially compressed state, said given distance being in excess of the minimum distance between said pin means and said bottom end portion at least in one position of said cover other than said closed position whereby after said bracket means are attached said member may be swung about said pin means to position said bottom plate for engagement with said bottom end portion at least when said cover is in said one position, said bottom portion moving away from said bottom plate against the bias of said spring means to permit removal of said retainer means from between said bottom portion and said bottom plate when said bottom plate is engaged with said bottom end portion and said cover is pivoted from said one position towards said closed position, and said spring means tending to maintain said bottom plate at a distance from said pin means less than the minimum distance between said bottom end portion and said pin means for all positions of said cover.

2. The improvement according to claim **1,** wherein said second bracket means includes a front flange means for attaching said second bracket means to the rear surface of a back wall portion of said cabinet and a pair of side flange means extending rearwardly of said front flange means, said side flange means being unconnected adjacent reawardly facing edge portions thereof whereby to permit said member to be swung as aforesaid, said side flange means supporting opposite ends of said hinge pin adjacent upper ends thereof, said bottom end portion being defined by downwardly and forwardly facing lower edged surfaces of said side flange means.

3. The improvement according to claim **2,** wherein said lower edge surfaces are formed wih aligned notch openings, and said bottom plate is formed with projections dimensioned to be received within said notch openings.

4. The improvement according to claim **1,** wherein said bottom plate is formed with a tab upstanding from adjacent a rearwardly disposed edge thereof; and said retainer means is of U-shaped configuration having a base and a pair of legs, said legs legs having upper edges engageable with said bottom portion and having lower edges engageable with said bottom plate, said base having a pull tab fixed to extend therefrom in a direction opposite to said legs, and said legs when said retainer means is inserted as aforesaid rearwardly abutting against said bottom plate tab to prevent removal of said legs from between said bottom portion and said bottom plate by pull forces exerted on said pull tab until said bottom portion moves away from said bottom plate as aforesaid.

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