April 24, 1951 A. P. FREEMAN 2,550,008

SELF-RELEASING BRACKET

Filed Aug. 24, 1948 2 Sheets-Sheet 1

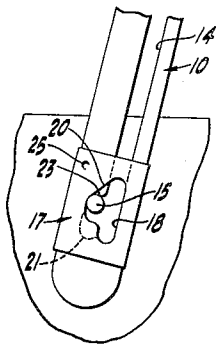


FIG. 4

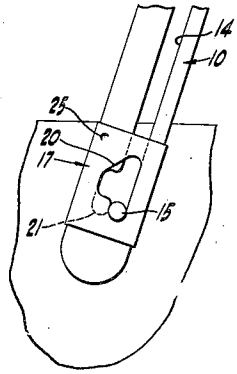


FIG. 3

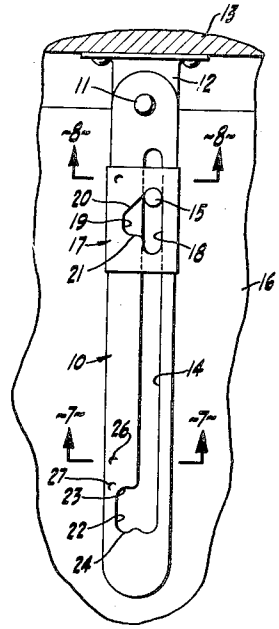


FIG. 1

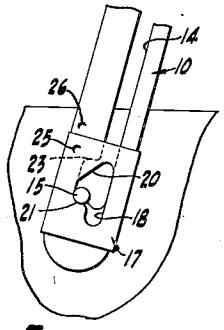


FIG. 5

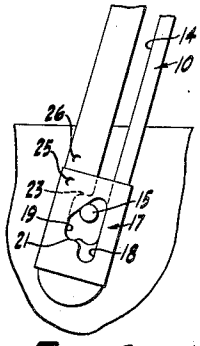


FIG. 6



FIG. 7

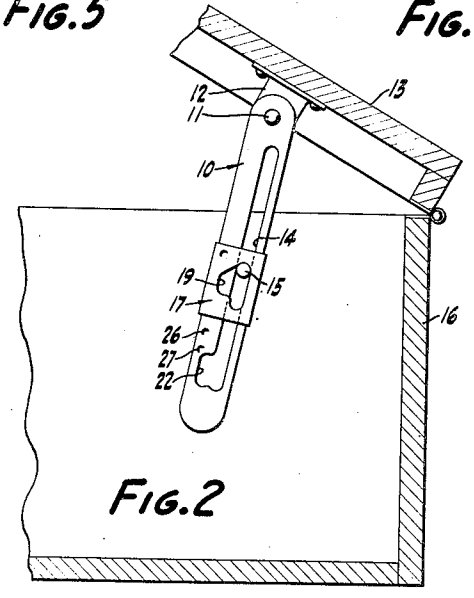


FIG. 2



FIG. 8

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2 Sheets-Sheet 2

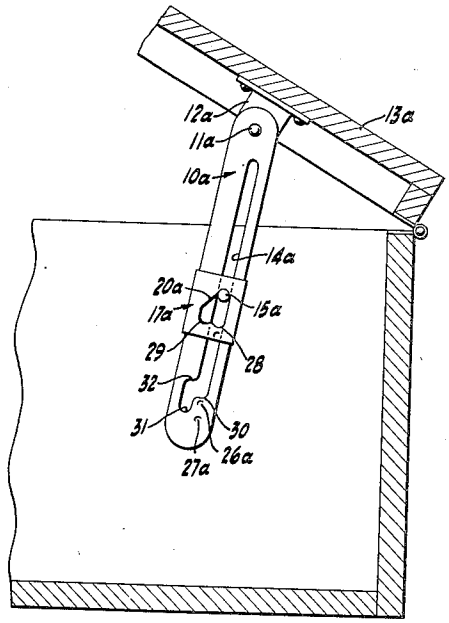


FIG. 9

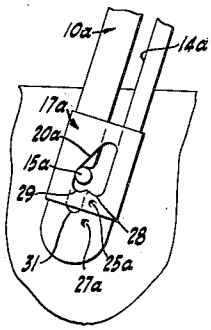


FIG. 10

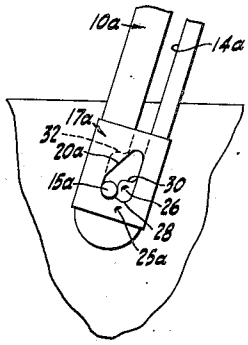


FIG. 11

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UNITED STATES PATENT OFFICE

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SELF-RELEASING BRACKET

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Application August 24, 1948, Serial No. 45,839

4 Claims. (Cl. 217—60)

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The present invention relates to closure supports and more particularly to the self locking and releasing type of props such as used in connection with the hinged tops or covers of cabinets, boxes and the like where it is desired to support the cover in open position at times.

The main object of the invention is to improve the construction of self locking and releasing props through simplification of the complicated slot and cam systems heretofore used in devices of this type, while adding to the strength, efficiency and ease of operation and reducing cost of manufacture. Another object is to minimize the amount of lost motion required to effect locking and release of the prop. A further object is to make possible a higher latching position for a given length of prop. Other objects and advantages will be apparent in the details of construction hereinafter described and illustrated in the accompanying drawing showing certain preferred embodiments of the invention claimed.

In said drawings:

Figure 1 is a sectional view showing the device of the invention in side view as applied to the closure or lid of a box, the lid being shown as closed and the locking device in idle position;

Figure 2 is a similar view on a smaller scale showing the device in the position assumed when the lid is about half way to closed position;

Figures 3, 4, 5 and 6 are detail side views showing the prop locking and releasing means in the several positions assumed upon full opening of the lid and upon subsequent release for closing;

Figures 7 and 8 are detail sectional views along lines 7—7 and 8—8 of Figure 1;

Figure 9 is a view similar to Figure 2 showing a modified form of the device; and

Figures 10 and 11 are detail side views showing the positions of parts when locked, and in the course of being released.

In the embodiment of the invention illustrated on the drawings, there is provided a lid support or prop 10 preferably formed from a flat strip of metal of suitable stiffness and strength. This prop is pivoted at its upper end, as at 11, to a lug or ear 12 secured to the under side of a hinged cover or lid 13 and is provided with a longitudinal slot 14 forming a guideway in free engagement with a fixed cylindrical projection or pin 15 on the inside wall of the box 16 to which the lid 13 is hinged. The prop 10 carries a cam slide 17 in frictional engagement therewith, which slide is preferably formed from thin sheet metal with ends folded over to resiliently embrace and frictionally grip the edges of prop

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10, as shown in Figure 8. As best seen in Figure 1, the slide is formed with a generally triangular opening comprising a vertical portion 18 in parallel alignment with the slot 14 in the prop and receiving the pin 15, and with a lateral inward extension 19 overlying the prop and having an upper diagonal cam edge 20 merging with a lower shoulder 21 located a distance above the lower end of vertical portion 18 at least equal to the distance which slide 17 must move in order to prevent pin 15 from effectively engaging the seat 23 as hereinafter described.

The slot 14 in prop 10 is approximately doubled in width for a short distance at its lower end to form the lateral extension 22, the upper and lower ends 23 and 24 of which are rounded to form opposed seats adapted to receive pin 15 at certain times in complemental mechanical relation with cam slide 17.

To assure proper frictional resistance to movement of slide 17 on prop 10 during its locking and releasing movements, a depression may be struck in the metal of the slide at 25 to form a nib on its under side (Figure 8) adapted to register with either of two vertically spaced complemental seats 26, 27, formed on the surface of the prop just above the lower enlarged portion 22 of its slot.

The configuration of the opening in slide 17 is such that when the prop has had its full range of initial movement upwardly on pin 15 (Figure 3), the slide, which has been correspondingly moved downward, will remain capable of being moved further down the prop, by supplemental movement, for a short distance, i. e., the fraction of an inch in commercial structures. Having this in view, it will be evident that when the prop is moved to the position of Figure 3 by full opening of the lid, a slight reverse movement will cause the prop to drop by gravity thereby causing pin 15 to enter the lateral enlargements 19 and 22 in the slide and prop respectively, which are then in registration, whereupon release of the lid will allow pin 15 to engage seat 23 (Figure 4) to lock and support the lid in raised position. At this position the nib in the slide at 25 will be in engagement with the upper seat 26 on the prop to yieldably hold it against further movement. When it is desired to release the prop lock to close the lid, a slight upward movement of the lid and prop 10 will bring the pin 15 into contact with shoulder 21 on the slide causing it to be moved downward on the prop to the position of Figure 5 at which time the nib at 25 will engage the lower depression 27 in the prop. In this

position the diagonal cam edge 20 will have been moved to a position just below seat 23 and subsequent lowering movement of the lid and prop will cause the cam edge 20 to ride on pin 15 (Figure 6) thereby bringing pin 15 to the upper angle of the triangular opening in the slide and into alignment with slot 14 of the prop. Further movement, or the weight of the lid, will then cause sleeve 17 to release and move up the prop to the initial position of Figure 1.

In the modification of Figures 9 to 11 a prop 10*a* is shown as pivotally connected at 11*a* to an ear 12*a* of a tiltable hinged lid 13*a*. The prop is formed with a longitudinal slot or guide 14*a* engaging fixed pin 15*a* and a cam slide 17*a* on the prop has a triangular opening a portion of which registers with the slot and also receives the pin 15*a*. In this species of the invention the opening in the cam slide has the diagonal cam edge 20*a* in its upper edge and its lower edge presents two transversely aligned seats 28 and 29. The lower end of slot 14*a* is formed with an angular turn providing a shoulder 30 lying adjacent a laterally offset prolongation 31, formed by a second angular turn of the slot, the upper end of this turn forming a shoulder 32. The slide may be provided with a depression at 25*a* forming a nib adapted to engage complemental depressions 26*a* and 27*a* on the lower end of the prop.

With this species upward movement of the prop as the lid is raised will cause the slide to move down on the prop until pin 15*a* contacts shoulder 30, and slight reverse movement of the prop will have caused it to drop by gravity on pin 15*a* bringing it into contact with shoulder 32 where it will support the lid in open position as shown in Figure 10. To effect release, a slight upward movement of the prop by lifting the lid will cause pin 15*a* to engage seat 29 of the slide and move it down as pin 15*a* moves in slot prolongation 31. The slide will then be in the position of Figure 11 with the diagonal cam edge 20*a* below seat 32. On subsequent downward movement of the prop the edge 20*a* will ride on pin 15*a* and raise the prop to align the pin with the slot 14*a* allowing the lid to close. In the positions of Figures 10 and 11 the slide is yieldably held in its positions by frictional engagement of the nib at 25*a* with the depressions 26*a* and 27*a* respectively.

It will be evident that the construction described has the advantage of simplicity of parts including the slot configurations and seats employed to effect locking and release of the prop. These are such that movements of the slide on the prop and with relation to the support pin necessary to effect locking and release are reduced to a minimum as they are limited to the distance from the lower end of opening 18 in the slide to the seat 23 on the prop when locking open, and to the short distance from seat 23 to seat 24 when releasing to close (Figures 3 to 6). The same is true with respect to the modification of Figures 9 to 11, as the relative arrangement of pin seats in both forms is such that the inner pin seat on the slide (21, Figures 1–6 and 29, Figures 9–11) remains in upward spaced relation to the inner seat (24, 31) in the prop opening at the limit of main upward movement of the prop. It will also be evident that the impact of the pin at the limit of both main and supplemental upward movement of the prop is received by the prop at the lower end and not by the more fragile slide. Moreover, substantially the full length of the prop is made use of during opening and closing of the lid and therefore a prop of given length will allow wider opening of the lid than in previous known devices of its type.

The improvements embodying the invention as herein disclosed are obviously capable of other modifications without departing from the scope thereof as defined in the following claims.

What is claimed is:

1. A device of the class described comprising a base, a member hinged thereon, a lock pin on the base, and a prop pivoted to said member and provided with a longitudinally extending pin receiving slot formed with angular turns at its lower end terminating in a short parallel inwardly offset prolongation of the main slot forming vertically opposed upper and lower pin seats, a cam slide on the prop having a substantially triangular opening, said opening comprising a straight vertical portion extending in parallel alignment with the pin receiving slot in the prop and normally receiving the pin and an inward extension overlying the prop and positioned to register with the said opposed seats when the slide is at the lower end of the prop, said inward extension of the slide opening having an upper diagonal cam edge merging into a lower edge shaped to provide two adjacent pin seats one of which forms the lower end of the vertical portion of the triangular opening in the slide and the other of which is positioned to be moved into registration with the lower pin seat in the prolongation of the prop slot, the pin seat at the lower end of the vertical portion of the slide opening bringing the lock pin into contact with the lower end of the main slot in the prop to limit the main upward movement of the prop and the corresponding downward movement of the slide thereon, the inward extension of the slide opening exposing the upper seat in the offset prop slot prolongation at the limit of said main movement, whereby the prop can then drop by gravity to bring said seat on the pin to lock the prop in extended position and whereby subsequent supplemental upward movement of the prop will bring the pin into contact with the inner pin seat on the slide to further move the slide down on the prop and bring the diagonal cam edge below said upper seat, thereby permitting free reverse movements of the prop and slide.

2. A device of the class described comprising a base, a member hinged thereon, a prop pivoted to said member and provided with a longitudinal slot, a lock pin on the base, and a cam slide on the prop having a substantially triangular opening, said opening comprising a straight vertical portion extending in parallel alignment with one edge of said slot and normally receiving the pin and an inward extension overlying the prop, said opening having an upper diagonal cam edge merging into a lower edge shaped to provide a pin seat adjacent the lower end of said diagonal cam edge and above the lower end of the straight vertical portion of said slide opening, the longitudinal slot in the prop being formed with an enlarged opening in its lower end presenting vertically opposed upper and lower pin seats adapted to register with the end of the inward extension of the opening in the slide when same is at the lower end of the prop, the lower end of the straight vertical portion of the slide opening serving to bring the lock pin into contact with the lower end of the slot in the prop to limit the main upward movement of the prop and the corresponding downward movement of the

slide thereon, the inward extension of the slide opening exposing the upper pin seat in the prop opening at the limit of said main movement, whereby the prop can then drop by gravity to bring said seat on the pin in locked relation, and whereby subsequent supplemental upward movement of the prop will break said locked relation and bring the before-mentioned seat in the lower edge of the slide opening into contact with the pin and further move the slide to bring the diagonal cam edge below said upper seat in the prop opening, thereby permitting free reverse movements of the prop and slide.

3. A device of the class described comprising a base, a member hinged thereon, a prop pivoted to said member, a lock pin on the base, and a cam slide on the prop having a substantially triangular opening, said opening comprising a straight vertical portion extending in parallel alignment with the prop and normally receiving the pin and an inward extension overlying the prop and having an upper diagonal cam edge merging into a lower edge formed to provide adjacent inner and outer pin seats, said prop being formed with an opening in its lower end presenting vertically opposed upper and lower pin seats adapted to register with the inward end of the extension of the opening in the slide and with a second pin seat on its lower edge adapted to register with the straight vertical portion of the opening in the slide, the lower end of the straight vertical portion of the slide opening serving to bring the lock pin into contact with said second pin seat in the prop opening to limit the main upward movement of the prop and the corresponding downward movement of the slide thereon, the inner lower seat on the slide being positioned to remain in upward spaced relation to the inner lower seat on the prop at said limit of movement, the inward extension of the slide opening exposing the upper pin seat in the prop opening as said limit of movement of the slide is reached, whereby the prop can then drop by gravity to bring said upper seat on the pin in locked relation, and whereby subsequent supplemental upward movement of the prop will break said locked relation and bring the inner seat in the lower edge of the slide opening into contact with the pin and further move the slide to bring the diagonal cam edge below the upper seat of the prop opening, thereby permitting free reverse movements of the prop and slide.

4. A self-locking and releasing connection comprising the combination of a base, a member hinged on the base for tilting movement, a prop pivoted on the member, a lock pin on the base, and a cam slide on the prop having a substantially triangular opening, said opening comprising a vertical portion extending longitudinally of the prop and normally receiving the pin and an inward extension having an upper diagonal cam edge merging into a lower edge formed to provide adjacent inner and outer pin seats, said prop being formed with an opening in its lower end presenting vertically opposed upper and lower pin seats adapted to register with the inward end of the extension of the opening in the slide and with a second pin seat on its lower edge adapted to register with the vertical portion of the opening in the slide, the lower end of said vertical portion of the slide opening serving to bring the lock pin into contact with said second pin seat in the prop opening to limit the main upward movement of the prop and the corresponding downward movement of the slide thereon, the inner lower seat on the slide being positioned to remain in upward spaced relation to the inner lower seat on the prop at said limit of movement, the inward extension of the slide opening exposing the upper pin seat in the prop opening as said limit of movement of the slide is reached, whereby the prop can then drop by gravity to bring said upper seat on the pin in locked relation, and whereby subsequent supplemental upward movement of the prop will break the locked relation and bring the inner seat in the lower edge of the slide opening into contact with the pin and further move the slide to bring the diagonal cam edge of said opening below the upper seat of the prop opening, thereby permitting free reverse movements of the prop and slide.

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