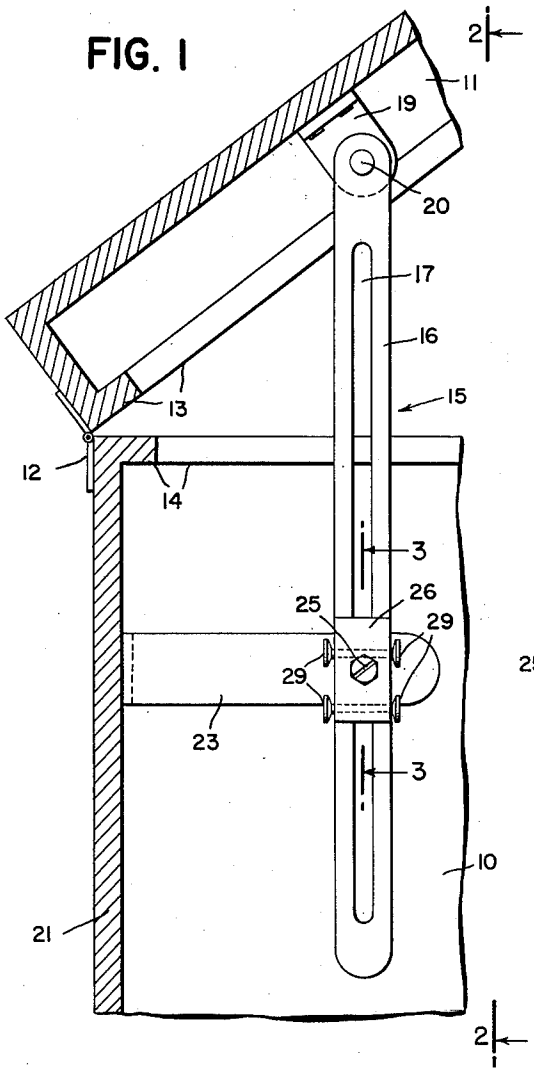
Nov. 15, 1955 C. H. JACOBSON 2,723,776

COVER SUPPORT DEVICE

Filed Dec. 31, 1951

FIG. 1



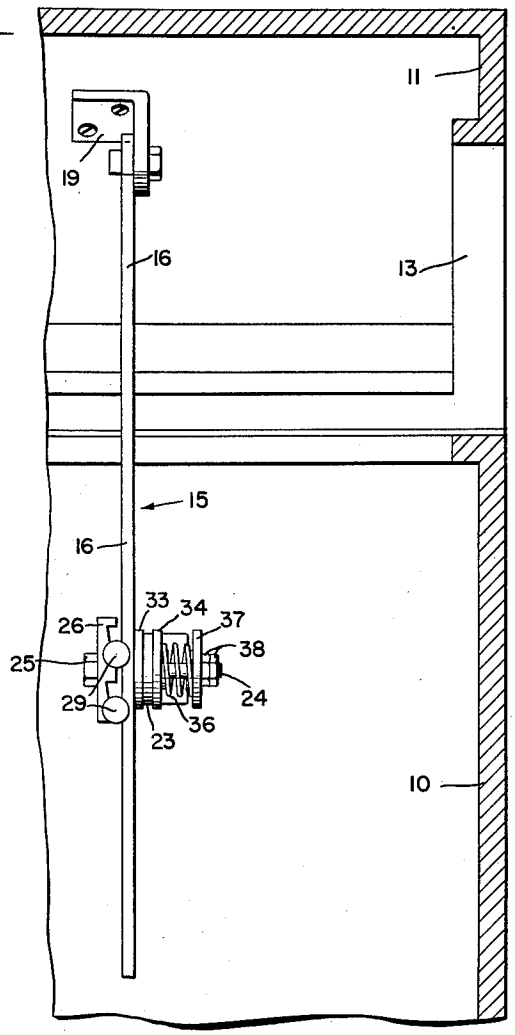


FIG. 2

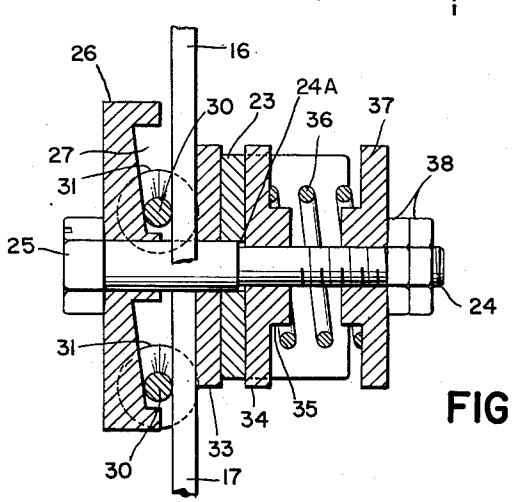


FIG. 3

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COVER SUPPORT DEVICE

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11 Claims. (Cl. 217—60)

This invention relates to devices for maintaining a cover or lid of a cabinet or the like in a desired position, and also relates to devices wherein the speed with which the cover may be moved to a closed position is adjustable.

An object of the invention is to provide a support device to safely maintain a cover of a cabinet or housing in any position to which it may be moved.

Another object of the invention is to provide a cover support device wherein the speed with which the cover may be moved to a closed position is adjustable.

Another object of the invention is to provide a cover support device wherein a cover is opened with a relatively free motion and closed with a restrained motion.

Another object of the invention is to provide a device which includes two cooperatively related parts, one of such parts being adapted for securing to a cabinet or housing, and the other of said parts being adapted for securement to a cover for said cabinet or housing, the cooperation of said parts being of such a character as to enable the cover to be safely maintained in any open position.

Another object of the invention is to provide a cover supporting unit for a cabinet or housing, said unit comprising a rigid arm portion pivotally connected to the cover and passing between spring urged friction means comprising a washer adjacent the side of the arm, and rollers carried in inclined grooves of a block adjacent the other side of said arm.

Another object of the invention is to provide a cover support device which is simple in construction and inexpensive to manufacture, of strong and sturdy character, and one which is easily installed and efficient in its operation.

Other objects of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings, which discloses, by way of example, the principle of the invention and the best mode, which has been contemplated, of applying that principle.

In the drawings:

Fig. 1 is a vertical section of a sufficient portion of a machine housing or cabinet and the cover thereof, in open position, to illustrate the application and functioning of the cover stay device of the present invention as applied thereto.

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view taken on the line 3—3 of Fig. 1 and showing the detail structure of a portion of the cover stay device.

Referring to Fig. 1, there is shown a machine housing or a cabinet comprising a body portion **10** and a cover portion **11** pivotally attached thereto by a hinge **12**. When the lid is in a fully closed position, the underedge **13** of the cover rests upon the upper edge **14** of the body portion **10**. The upper part of the body portion is open over the greater part of the area of the cover so that with the cover in any open position, such as indicated in Figs. 1 and 2, any machine or other device mounted within the housing is readily accessible.

A cover brace, generally designated **15**, maintains the cover in any desired open position and also serves to control the speed with which the cover may close. The cover brace comprises a flat bar or arm **16** containing a slot **17** which extends longitudinally from a point near one end to a point near its other end. The upper end of the arm, as shown in Figs. 1 and 2, is pivotally attached to a bracket **19** by a fastening **20**, the bracket being rigidly secured to the underside of the cover **11** in any suitable manner. Secured to the inner side of the wall **21** of the body portion **10** is a bracket **23** which extends outwardly from the wall as indicated. The outer end of the bracket **23** contains a hole which slidably receives a bolt **24**. The bolt extends through and slidably engages the previously mentioned slot **17** in the arm **16**. It will be noted in Fig. 3 that the bolt **24** includes a shoulder **24A**, the purpose of which will be later evident.

Slidably mounted on the bolt, between its head portion **25** and the arm **16**, is a roller block **26** having two wedge shaped recesses **27** in a surface of the block adjacent to the arm. Mounted in each of the wedge recesses is a roller **29** having a body portion **30** positioned between the surface of its related recess and the arm **16** as shown in Fig. 3, and having enlarged end portions **31** which prevent the roller from escaping the related recess **27**. The enlarged end portions also serve to maintain the rollers and block in alignment with the arm **16** by their engagement with the edges of the block and arm. It will be noted that the inner surface of the end portions **31** are slightly tapered, and the purpose of this taper will be later explained.

Slidably mounted on the bolt **24** between the arm **16** and the bracket **23** is a flat washer **33**. Similarly mounted on the bolt at the other side of the bracket **23** is a collar **34** having a reduced hub portion **35** extending from one side. A spring **36** surrounds the hub portion **35** and has one of its ends seating against the collar **34**. A collar **37**, identical to collar **34** and also slidably mounted on the bolt **24**, is similarly engaged by the other end of the spring **36**. Nuts **38** screwed in the bolt **24**, as indicated, maintain the collar **37** on the bolt **24** so that the spring **36** is compressed between the two collars.

When the cover is in its closed position, the arm **16** is positioned further downward relative to the bolt **24** than the position indicated in Fig. 1, the bolt being near to the upper end of the slot **17**. In addition, each roller **29** is positioned in the most shallow end of the related recess **27** in the block **26**, approximately as indicated in Fig. 3. With the rollers in this position, the bolt is positioned relative to the bracket **23** so that there is a clearance between the shoulder **24A** of the bolt and the collar **34**. It will be appreciated that with the mechanism in the above described position, the spring **36** yieldably maintains the washer **33** in frictional engagement with one side of the arm **16**, and also maintains the body portion **30** of each of the rollers **29** in engagement with the other side of the arm and the inclined surface of the related recess **27** on the block **26**. By adjustment of the nuts **38** on the bolt, the frictional forces acting against the arm **16** may be adjusted.

As the cover is raised from its closed position, the arm **16** slides upwardly on the bolt **24** and also rotates counterclockwise in Fig. 1 relative to the bolt. The rollers **29** and the washer **33**, by reason of the tension of spring **36**, tend to frictionally retard this upward movement of the arm relative to the bolt. As a result, the initial portion of the upward movement of the arm causes the rollers to roll upward relative to the block **26** towards the deepest part of the recesses **27**. As the rollers move towards the deepest part of the recesses, the block **26** and bolt **24** are shifted towards the right in Fig. 2 under the urging of the spring **36**. The shouldered portion of the bolt **24** is of such a length that as the rollers approach the deepest part of the recesses, the shoulder **24A** extends outward

slightly beyond the surface of the bracket **23**. As a result, the collar **34** bears against the shoulder **24A** rather than against the bracket **23**. Thus, the spring pressure on the rollers and arm is completely removed and the remaining upward movement of the cover is effected with complete freedom of any drag due to the tension of spring **36**. During the latter part of the opening movement of the cover, the rollers rotate in the deepest part of the recesses **27**.

The previously mentioned tapered inner surfaces of the end portions **31** of the rollers prevent any possible binding or jamming action between the end portions **31** and the edges of the block and the arm. These surfaces, however, engage the edges of the block and arm sufficiently to maintain the rollers, block, and arm in the same aligned relationship at all times. It should be noted in Fig. 3 that the diameter of the body portions **30** of each of the rollers **29** is greater than the depth of its mounting recess **27** at the deepest point so that the block itself is always maintained free of engagement with the arm **16**. The lower end of the slot **17** engages the bolt **24** to limit the amount the cover may be opened.

When the cover has been raised to its maximum open position or any desired open position less than the maximum, it is released. Upon the release of the cover, the weight thereof starts to force the arm **16** downwardly on the bolt **24**. A slight downward movement of the arm moves the rollers from the deepest part of their recesses in the block **26** toward the more shallow portions of the recesses. This action results in a shifting of the block and bolt to the left in Figs. 2 and 3 and finally into the position indicated. During this leftward shifting of the bolt and block, the collar **34** is reengaged with the bracket **23** while at the same time the shoulder **24A** is disengaged from the collar **34**. At this instant, the full force of the spring **36** is reapplied to the washer **33** and the rollers **29** bearing against the arm **16**. With the nuts **38** properly positioned in the bolt, the spring **36** is precompressed to such a degree that the frictional force suddenly applied to the arm as a result of the above described action is sufficient to support the cover against gravity and against any jarring and vibration to which it may be subjected.

When it is desired to close the cover, hand pressure is applied thereto. A slight further compression of the spring **36** as the block is crammed all the way to the left from the position indicated in Fig. 3, does not significantly change the frictional force tending to maintain the cover in an open position. The force required to close the cover must exceed the frictional force and must be a steady force, in order to effect a continuous closing movement of the cover.

It will be appreciated that by adjusting the nuts **38** on the bolt, the frictional force exerted on the arm **16** by the rollers **29** and the washer **33**, during a closing movement of the cover, may be adjusted. As a result, the force necessary to close the cover and the speed with which the cover may be closed, may be controlled as desired.

While there have been shown and described and pointed out the fundamental novel features of the invention as applied to a preferred embodiment, it will be understood that various omissions and substitutions and changes in the form and details of the apparatus illustrated and in its operation may be made by those skilled in the art, without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims.

What is claimed is:

1. A device for retaining in an open position a cover or the like hinged upon a supporting structure, said device comprising, in combination, an arm pivoted at one end to said cover, an elongated member slidably mounted on said supporting structure for longitudinal movement in a plane at right angles to a face of said arm, a block loosely mounted on said elongated member adjacent said face on said arm, said block including planar cam surfaces inclined from the plane of said face, a roller positioned between each of said cam surfaces and said face, said roller being smaller in diameter than the length of the related cam surface so as to permit a limited movement of the roller thereon in a direction at right angles to the axis of the roller, and means including a spring for urging said block toward said arm so as to maintain each roller in engagement with its related cam surface and with said face of said arm.

2. A device for releasably holding or retaining in an open position a cover or the like hinged upon a supporting structure, said device comprising a slotted arm pivoted at one end to said cover structure, a bolt passing through said slot in said arm and slidably mounted upon said supporting structure for longitudinal movement, a block slidably mounted on said bolt between a head portion thereof and one side of said slotted arm, said block including cam surfaces inclined from the plane of said arm, a cylindrical roller cam positioned between each of said cam surfaces and said arm, a nut on the other end of said bolt, and resilient means acting between said nut and said supporting means to maintain each roller frictionally engaging said arm and its related cam surface.

3. A device for retaining in an open position a cover or the like hinged upon a supporting structure, said device comprising, in combination, a slotted arm having one end pivotally attached to said cover and the other end extending downwardly therefrom, a bracket member secured to said supporting structure, a pin slidably extending through said bracket and said slotted arm, said pin having an enlarged head portion at one end, a block member slidably mounted on said pin between said head and one side of said arm, said block member having wedge shaped recesses in one face thereof, said recesses tapering from a shallow depth at their lower ends to a greater depth at their upper ends so as to form a cam surface inclined from the plane of said arm; a cylindrical roller positioned in each said recess between the related cam surface and one side of said arm, said rollers being of larger diameter than the depth of said recesses at their deepest point; a fastening secured to the other end of said pin, and resilient means acting between said fastening and said bracket wherein said rollers are frictionally engaged with said related cam surfaces and said arm.

4. The mechanism of claim 3 wherein said rollers have enlarged end portions with inner surfaces lying closely adjacent to the edges of said block and said arm to maintain said rollers, block, and arm in correct alignment.

5. The mechanism of claim 4 wherein said inner surfaces of said end portions are slightly tapered to prevent possible jamming action between said inner surfaces and said edges of said block and said arm.

6. A device for retaining in an open position a cover structure or the like hinged upon a supporting structure, said device comprising, in combination, a first bracket member secured to said supporting structure, a second bracket member secured to said cover structure, a slotted arm pivoted at one end to said second bracket, a bolt slidably extending through said first bracket and through said slotted arm, a member slidably mounted on said bolt between a head thereof and one side of said slotted arm, said member including cam surfaces inclined from the plane of said arm, a cylindrical roller positioned between each of said cam surfaces and said arm, a nut on the other end of said bolt, and a coiled spring mounted on said bolt and acting between said first bracket and said nut to maintain each roller in engagement with its related cam surface and the adjacent side of said arm.

7. A device for retaining in an open position a cover structure or the like hinged upon a supporting structure, said device comprising, in combination, a first bracket member secured to said supporting structure, a second bracket member secured to said cover structure, a slotted arm pivoted at one end to said second bracket, a bolt slidably extending through said first bracket and through

said slotted arm, a block slidably mounted on said bolt between a head portion thereof and one side of said slotted arm, said block having wedge shaped recesses in one face thereof, said recesses tapering from a shallow depth at their lower end to greater depth at their upper ends so as to form a cam surface inclined from the plane of said arm, a cylindrical roller positioned in each of said recesses between said cam surface and one side of said arm, said rollers being of larger diameter than the depth of said recesses at their deepest point, a washer slidably mounted on said bolt between said arm and said first bracket, a nut on the one end of said bolt, and a coil spring surrounding said bolt and acting against said nut and said first bracket to maintain each roller frictionally engaging said arm and its related cam surface in said block.

8. A device for retaining in an open position a cover or the like hinged upon a supporting structure, said device comprising, in combination, an elongated arm pivoted at one end to said cover for movement therewith, a member movably mounted on said supporting structure for movement in a plane at right angles to the movement path of said arm, said member having wedge shaped recesses on one face thereof which taper from a shallow depth at their lower ends to a greater depth at their upper ends so as to form cam surfaces inclined from the plane of said arm; a roller positioned between each of said cam surfaces and said arm, said rollers being movable from the shallow end of their recesses to the deepest end of their recesses by the initial movement of said arm during an opening movement of said cover, and conversely movable from the deepest part of said recesses to the most shallow part by the initial movement of said arm during a closing movement of said cover; resilient means acting between said supporting structure and said member for forcibly maintaining said rollers engaging said cam surfaces and said arm, and means integral with said movable member for rendering said resilient means operative when said rollers are displaced a predetermined distance from said deep end towards said shallow end of said recesses, and for rendering said resilient means inoperative when said rollers are displaced a predetermined distance from said shallow end towards said deep end of said recesses.

9. A device for retaining in an open position a cover or the like hinged upon a supporting structure, said device comprising, in combination, a slotted arm pivoted at one end to said cover structure, a bolt slidably extending through said slotted arm and through an extension of said supporting structure, said bolt including a shouldered portion of critical length and a reduced diameter portion of non-critical length; a member slidably mounted on said shouldered portion of said bolt between a head portion thereof and one side of said slotted arm, said member having recesses in a face thereof which taper from a shallow depth at one end to a greater depth at another end thus forming cam surfaces inclined from the plane of said arm; a roller positioned between each of said cam surfaces and said arm, a collar movably mounted on said reduced diameter portion of said bolt adjacent to said extension, the mounting opening of said collar being smaller than the diameter of said shouldered portion of the bolt; a nut on the end of said bolt, a precompressed coil spring surrounding said bolt and acting against said nut and said collar, wherein when said rollers are positioned in the deepest portion of their mounting recesses by a

movement of said arm in an opening movement of said cover, said member and said bolt are shifted relative to said extension so that the end of said shouldered portion of the bolt extends outwardly beyond the extension and engages said collar; and wherein when said rollers are positioned in the most shallow portion of their mounting recesses by the movement of said arm in a closing movement of said cover, said member and said bolt are shifted relative to said extension so that said end of the shouldered portion of the bolt is free of engagement with said collar, the collar then being free to engage said extension.

10. A device for retaining a hinged cover of a container in an open position comprising, in combination, a slotted arm pivotally connected to said cover, a bracket attached to said container and lying adjacent said arm, an elongated member extending loosely through the slot in said arm and an opening in said bracket, a spring surrounding a portion of said member at one side of said arm, abutment members for said spring loosely mounted upon said elongated member, means for limiting movement of said abutment members away from each other to positions at which said spring is partially compressed, a block mounted upon said elongated member at the opposite side of said arm, tapered recesses in said block adjacent said arm, and rollers in said recesses acting against said arm and urged by longitudinal movement of the latter toward one end or the other of said recesses, said rollers operating upon movement in said recesses toward the shallow ends of the latter to move said block away from said arm, said elongated member moving with said block and causing engagement between one of said abutment members and said bracket to effect compression of said spring as said rollers are moved beyond a predetermined point toward the shallow ends of said recesses.

11. A device for retaining a hinged cover of a container in an open position comprising, in combination, a slotted arm pivotally connected to said cover, a bracket attached to said container and lying adjacent said arm, a bolt extending loosely through the slot in said arm and an opening in said bracket, said bolt having a reduced portion providing a shoulder at its inner end, a nut threaded upon the outer end of said reduced portion, washers mounted loosely upon said reduced portion, a spring acting between said washers and held partially compressed when said washers engage said shoulder and said nut, a member mounted upon the head end of said bolt and having a cam surface, and a roller arranged between said cam surface and said arm for effecting relative movement between said bolt and said arm as said roller moves over said cam surface, the arrangement of the parts being such that the compression of said spring is varied during only a portion of said relative movement.

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