

Aug. 22, 1967

D. A. LAUKZEMIS

3,337,253

LID SUPPORT

Filed Jan. 24, 1966

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FIG. 1

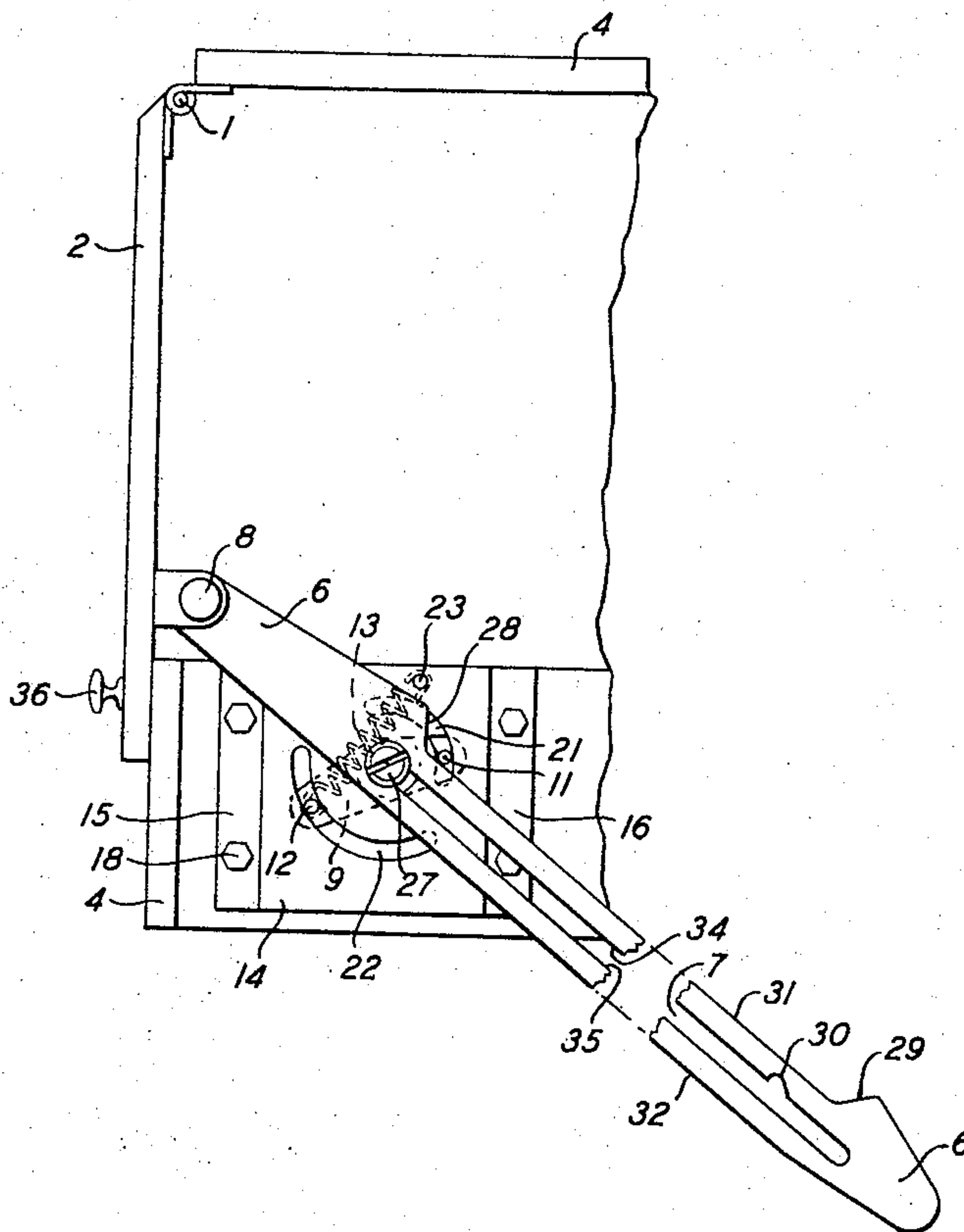
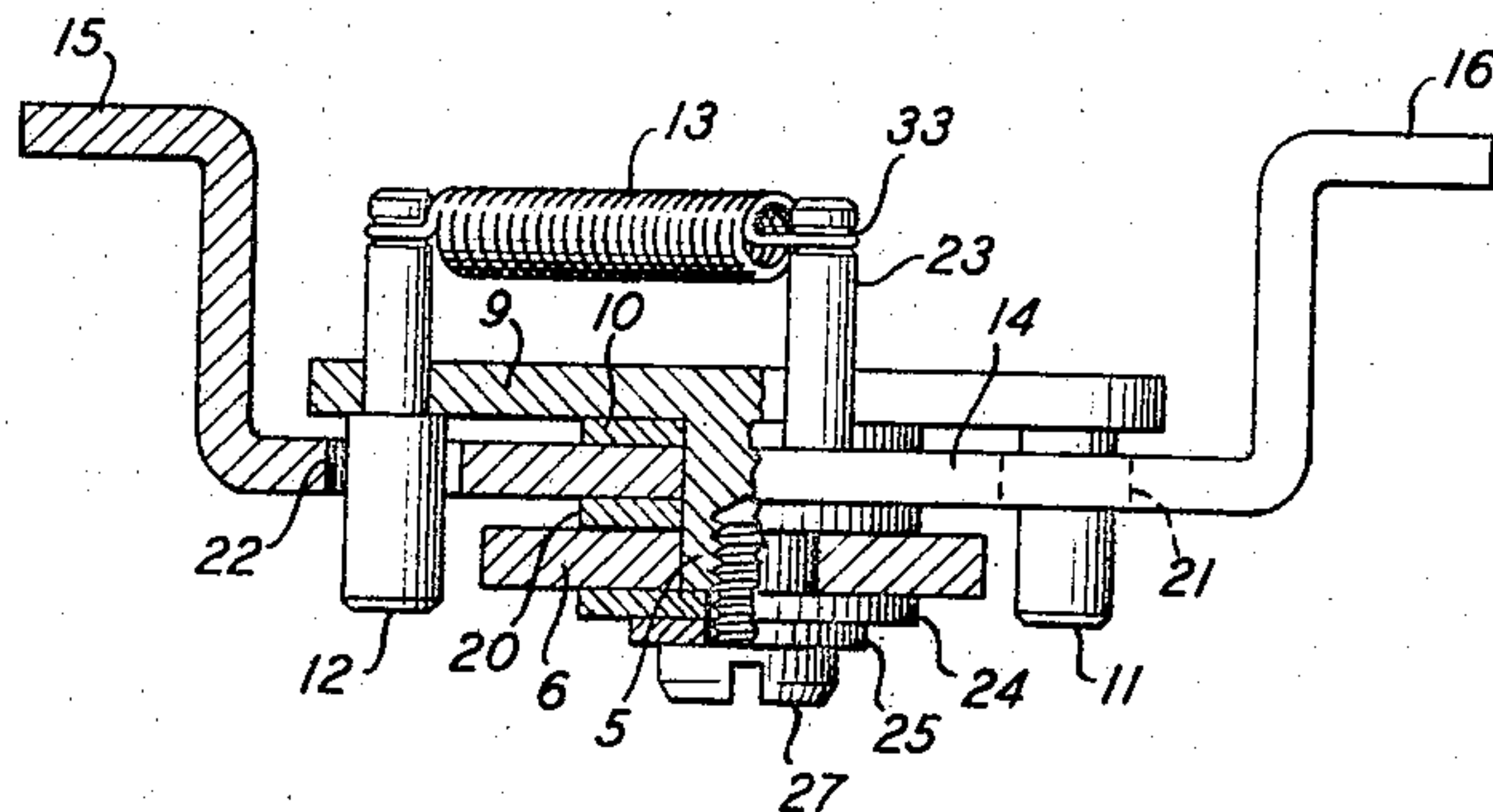


FIG. 3



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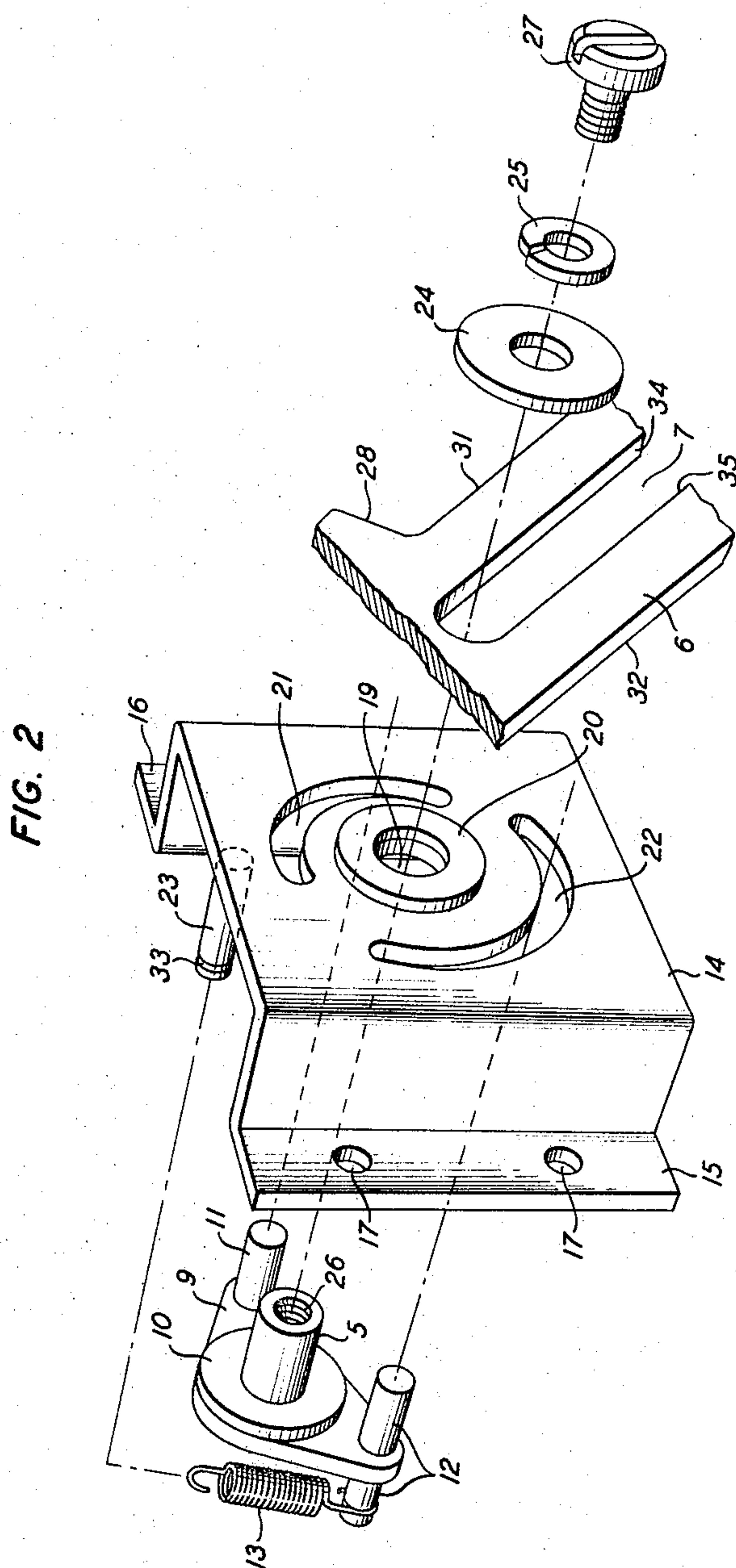
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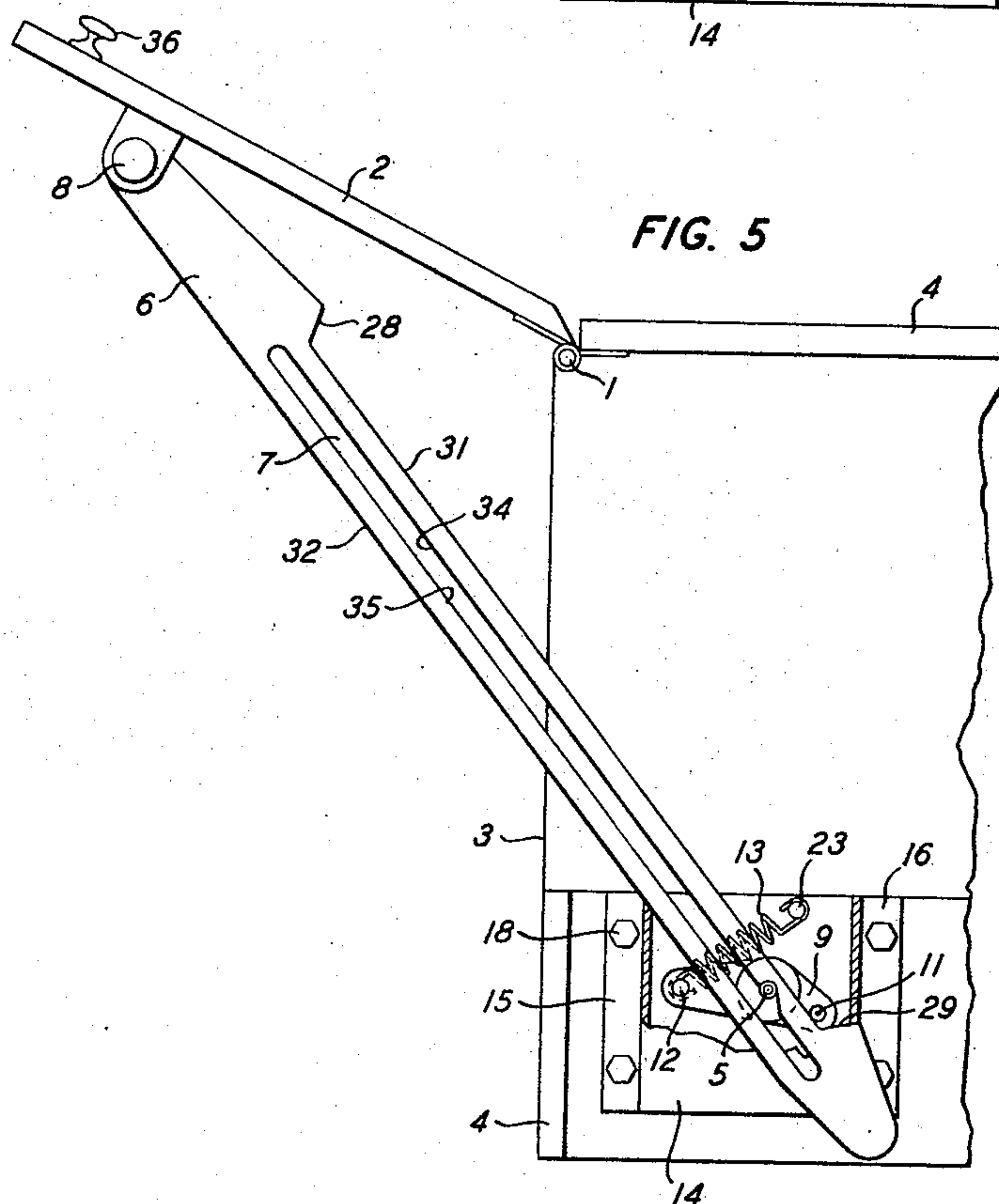
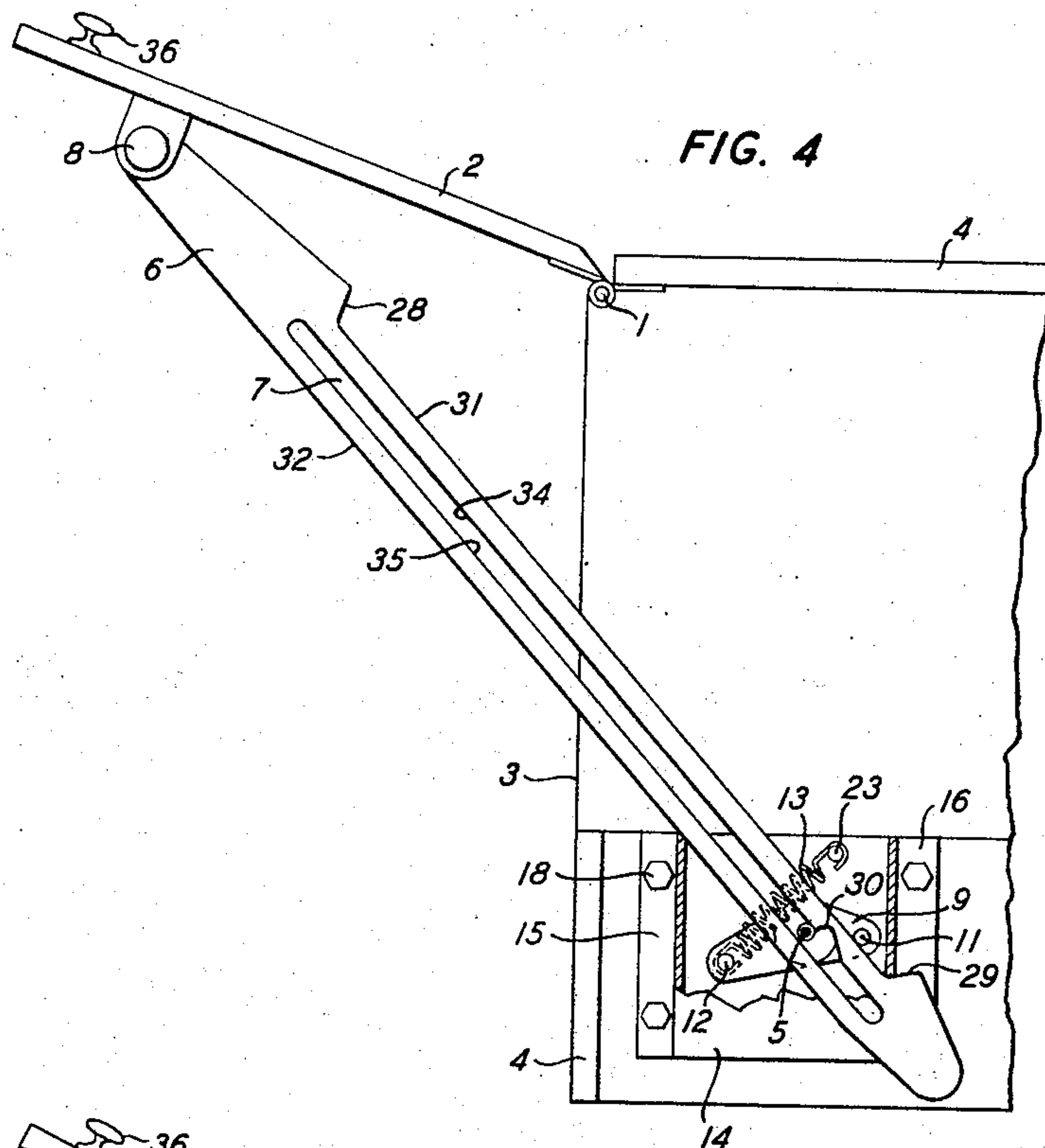
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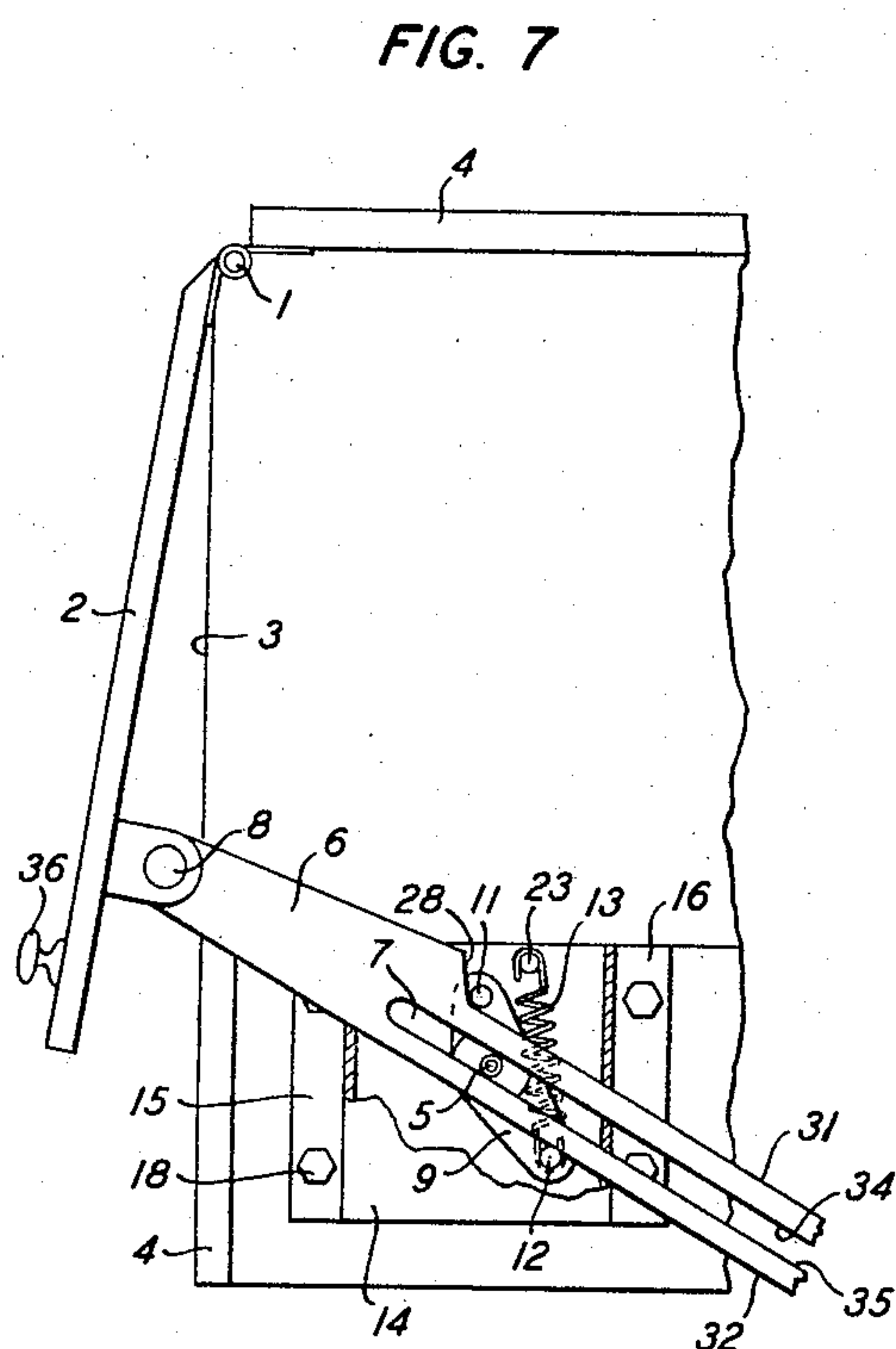
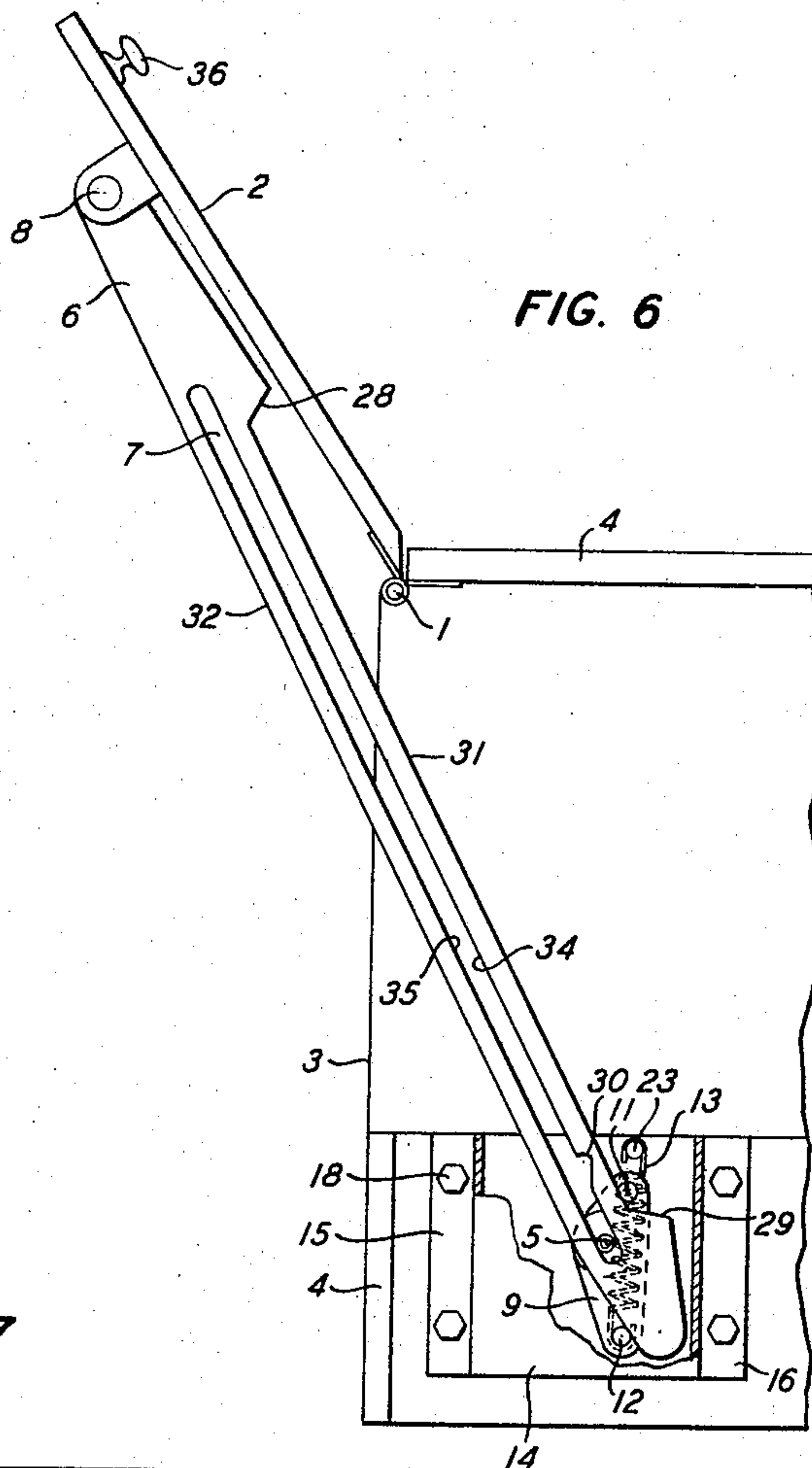
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3,337,253

LID SUPPORT

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9 Claims. (Cl. 292-268)

This invention relates to improved means for supporting a lid and, more particularly, to an improved lid support having automatic latching means for locking a lid in an open position.

Although various other lid supports are found in the art, they generally have not been fully satisfactory because of their high cost due to the number of parts involved and the close manufacturing tolerances required. Furthermore, the complex nature of some of the prior art lid supports has rendered them susceptible to malfunctioning.

Accordingly, it is an object of this invention to provide a simple and inexpensive lid support.

It is also an object of this invention to provide a lid support with improved latching means for locking a lid in an open position.

Another object of this invention is to provide an improved lid support which can be smoothly and easily operated manually through the use of only one hand.

These and other objects of the invention are attained by employing an improved spring-loaded rotating latch which is operated by the movement of a prop having one end pivotally attached to a lid. The prop is provided with a longitudinal slot therein which is disposed in sliding relation to a fixedly located stud. One side of the slot has a notch formed therein. The spring in the latch causes an instrumentality to press the notched side of the slot against the stud while the lid is being opened. When the lid is in its open position, the notch automatically engages the stud thereby locking the lid in its open position. The latch is unlocked by opening the lid still further as this motion produces a partial rotation of the latch. When the lid is subsequently closed, the spring causes another instrumentality to press the other side of the slot against the stud so as to prevent the notch from engaging the stud at this time.

These and other features of the invention are more fully discussed in connection with the following detailed description of the drawing, in which:

FIG. 1 is a side elevational view of a lid in its closed position and having attached thereto the improved supporting means of this invention;

FIG. 2 is an enlarged exploded perspective view of the components of the latching mechanism and a portion of the prop;

FIG. 3 is a side view partly in section showing the components of the latching mechanism in an assembled condition together with a portion of the prop;

FIG. 4 is a side elevational view showing the lid in a nearly fully opened position with the prop about to move into its locking position;

FIG. 5 is a side elevational view of the lid in its open position with the prop held in its locking position by the latching mechanism;

FIG. 6 is a side elevational view of the lid in an extended open position with the latching mechanism partly rotated for unlocking the prop; and

FIG. 7 is a side elevational view of the lid in a nearly closed position with the prop in a position preparatory for moving the latching mechanism to its initial condition shown in FIG. 1.

In the exemplary embodiment of the invention shown in the drawing, the supporting means of this invention is

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represented as being applied to a movable lid or door 2 which is pivotally attached by hinge means 1 to the upper edge of an opening 3 in a cabinet 4 or the like as is shown in FIG. 1. The supporting means comprise a fixedly located stud 5 and a prop 6 having a longitudinal slot 7 disposed in sliding relation to the stud 5. The width of the slot 7 is somewhat greater than the diameter of the stud 5 so as to permit slight lateral movement of the lower end of the prop 6.

The upper end of the arm or prop 6 is attached to a pivot 8 which is mounted on the lid 2 for movement therewith. Thus, when the lid 2 is moved about its hinge 1, the prop 6 follows the movement of the lid 2 while turning about the pivot 8. During this movement of the prop 6, its slot 7 slides against the stationary stud 5 which is a part of the latching mechanism.

The latching mechanism is shown in enlarged detail in FIG. 2 together with a portion of the prop 6. In FIG. 2, the stud 5 is shown to be mounted on a latch plate 9 with its lower portion surrounded by a washer 10. The stud 5 is fixedly attached to the latch plate 9 by any convenient means, such as welding it thereto. If desired, the washer 10 may also be fastened by any appropriate means, such as by welding, to the latch plate 9.

One end of the latch plate 9 carries a pin 11 which is fixedly secured thereto by any suitable means, such as by welding. The other end of the latch plate 9 carries a pin 12 which extends both above and below the surface of the latch plate 9 as is shown in FIG. 2. The lower portion of the pin 12 has one end of a coiled spring 13 attached thereto for a purpose that is explained hereinafter.

FIG. 2 also shows a bracket 14 which is bent in such a manner as to provide two flanges 15 and 16. Holes 17 are drilled in the flanges 15 and 16 so that the bracket 14 can be attached to an interior wall of the cabinet 4 by means of screws 18 as is represented in FIG. 1. The upper surface of the bracket 14 is provided with a hole 19 which is of an appropriate size for receiving therein the stud 5. The hole 19 is surrounded by a washer 20 which, if desired, may be attached to the bracket 14 by any suitable means, such as by welding.

Two arcuate slots 21 and 22 are cut through the upper surface of the bracket 14, one on each side of the hole 19. These slots 21 and 22 have sufficient width for receiving therein the pins 11 and 12. At a point near the slot 21, the lower surface of the bracket 14 has a pin 23 attached thereto in any convenient manner, such as by welding.

The latch plate 9 is intended to be rotatably attached to the bracket 14. This is accomplished by inserting the pins 11 and 12 into the respectively associated slots 21 and 22 while, at the same time, inserting the stud 5 into the hole 19. The prop 6 is then placed upon the washer 20 in such a manner that the stud 5 is received within the slot 7 in the prop 6.

The stud 5 has sufficient length to protrude a short distance above the upper surface of the prop 6. Over this protruding portion of the stud 5, a suitable washer 24 and lock washer 25 are placed. This upper portion of the stud 5 has a threaded bore 26 formed therein which is adapted to receive a bolt 27. Accordingly, when the bolt 27 is inserted in the bore 26 and is suitably tightened, the latch plate 9 will become rotatably fastened or secured to the bracket 14 as is best shown in FIG. 3. Under this condition, the washers 10, 20, and 24 act as bearing surfaces for the rotary movement of the latch plate 9 with the stud 5 functioning as pivot means. The bolt 27 is not fastened so tightly as to prevent the slotted portion of the prop 6 from sliding with respect to the stud 5.

It should be noted that, when the latch plate 9 has thus been attached to the bracket 14, the pins 11 and 12

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have sufficient length to protrude above the upper surface of the prop 6 as is best shown in FIG. 3. This is for the purpose of limiting the lateral movement of the lower end of the prop 6 as is described in more detail hereinafter.

It should also be noted that, as is indicated in FIG. 1, the intermediate portion of the prop 6 is of reduced width so as to form two shoulders or camming surfaces 28 and 29 which both project outwardly from the same edge 31 of this narrowed intermediate portion at the ends thereof. The other edge of the prop 6, which is the lower edge 32 shown in the drawing, is substantially parallel to the upper edge 31.

The width of this reduced portion of the prop 6 is less than the spacing between the pins 11 and 12 so as to permit limited rotary movement of the latch plate 9 in either direction with the pins 11 and 12 moving in their respectively associated slots 21 and 22. Such rotary movement is effected in part by spring-loading the latching mechanism. This is accomplished by fastening an end of the coiled spring 13 around the lower portion of the stationary pin 23. If desired, this lower portion of the stationary pin 23 may have a groove 33 formed therein for receiving the end of the spring 13.

In addition, it should be noted that, near the free end of the prop 6, one side 34 of the slot 7 has a notch 30 formed therein while the other side 35 of the slot 7 is straight. The notch 30 is of sufficient size to receive therein the stud 5. The upper edge of the notch 30 is shaped in such a manner that, when it is pressed against the stud 5, downward movement of the prop 6 will be prevented. The lower edge of the notch 30 is shaped in a slanting manner so that, when it is pressed against the stud 5, it will perform a camming action such as to move the notch 30 out of engagement with the stud 5. These features are discussed more fully hereinafter.

The operation of the lid support of this invention will now be described with reference firstly to FIG. 1 which shows the lid or door 2 in its closed position. When it is desired to open the lid 2, its handle or knob 36 is grasped manually by one hand of an operator and is pulled so as to swing the lid 2 upwardly about its hinge 1. Since the upper end of the prop 6 is attached to the lid 2 by the pivot 8, the prop 6 follows the upward movement of the lid 2. During this movement of the prop 6, its slotted portion slides with respect to the stud 5 so that it moves from the position shown in FIG. 1 to the position shown in FIG. 4.

In this stage of the opening procedure, the latching mechanism is in the condition wherein its spring 13 is stretched thereby tending to pull the pin 12 toward the stationary pin 23. This tends to rotate the latch plate 9 clockwise about the stud 5 thus pressing the pin 11 against the upper edge 31 of the prop 6 as is shown in FIG. 4. The resulting pressure effects a limited lateral movement of the prop 6 and causes the notched side 34 of the slot 7 to bear against the stud 5 during the upward sliding movement of the prop 6.

Due to the notched side 34 of the slot 7 being thus pressed against the stud 5, the notch 30 in the prop 6 will automatically engage the stud 5 when the lid 2 reaches its fully open position as is shown in FIG. 5. As was explained above, the upper edge of the notch 30 is shaped in such a manner that, when it is pressed against the stud 5, downward movement of the prop 6 will be prevented. Thus, the latching mechanism of this invention automatically locks and holds the lid 2 in its open position where it is firmly and securely supported.

When it is desired to close the lid 2, the latching mechanism is unlocked by manually opening or raising the lid 2 still further to its extended open position shown in FIG. 6. At the beginning of this extended upward movement of the lid 2, the lower edge of the notch 30 is drawn against the stud 5. As was stated above, this lower edge of the notch 30 is shaped in a slanting manner so that, when it is pressed against the stud 5 by the action of the

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spring-biased pin 11, it will perform a camming action which will move the notch 30 out of engagement with the stud 5. When the notch 30 thus moves free of the stud 5, the slot 7 again engages the stud 5. At this time, the lower shoulder 29 on the upper edge 31 of the prop 6 engages the pin 11 as is represented in FIG. 6.

Further upward movement of the lid 2 draws the prop 6 with it and causes the shoulder 29 to pull the pin 11 upward. This forces the latch plate 9 to turn about the stud 5 in a counterclockwise direction so as to effect a partial rotation of the latching mechanism. In thus rotating about the stud 5, the latch plate 9 moves the pins 11 and 12 from their locations shown in FIG. 5 to the positions shown in FIG. 6. In turn, this movement flips the spring 13 from one side of the stud 5 to the other side of the stud 5, as is indicated in FIG. 6. In this new position, the spring 13 pulls the pin 12 against the lower edge 32 of the prop 6. The resulting pressure produces a limited lateral movement of the prop 6 and causes the unnotched side 35 of the slot 7 to bear against the stud 5. Accordingly, the notched side 34 of the slot 7 is now pushed away from the stud 5.

Shortly after this partial rotation of the latching mechanism has been accomplished, the end of the slot 7 is pulled against the stud 5, as is indicated in FIG. 6, thereby terminating the extended upward movement of the lid 2. The operator now moves the lid 2 downward toward its closed position which is shown in FIG. 1. This downward movement of the lid 2 pushes the prop 6 downward with the unnotched side 35 of the slot 7 sliding against the stud 5. Since, as was explained above, the notched side 34 of the slot 7 is pushed away from the stud 5 at this time, the notch 30 is prevented from engaging the stud 5 during this downward movement.

By the time the lid 2 approaches its nearly closed position, the prop 6 will have moved to its position shown in FIG. 7 wherein the upper shoulder 28 on the upper edge 31 of the prop 6 engages the pin 11. Further downward movement of the lid 2 causes the shoulder 28 to push the pin 11 toward the right in FIG. 7 thereby forcing the latch plate 9 to turn about the stud 5 in a clockwise direction so as to effect a partial rotation of the latching mechanism in this direction. This partial rotation is of sufficient extent to effect the movement of the latch plate 9 back to the position in which it is shown in FIG. 1.

In so moving, the latch plate 9 carries the pins 11 and 12 from the position shown in FIG. 7. to the locations shown in FIG. 1. This movement causes the spring 13 to flip from the right side of the stud 5 to the left side of the stud 5. In other words, the latching mechanism is recycled so that the pin 11 now pushes against the upper edge 31 of the prop 6 thus causing the notched side 34 of the slot 7 to bear against the stud 5. Accordingly, this notched side 34 of the slot 7 will slide against the stud 5 during the last portion of the closing movement of the lid 2. When the lid 2 is finally closed, the prop 6 and all the components of the latching mechanism will be in the condition shown in FIG. 1.

I claim:

1. Supporting means adapted for use with a lid subject to movement from a closed position to an open position and vice versa,

said supporting means comprising a fixedly located stud,

a prop attached to said lid and having a longitudinal slot disposed in sliding relation to said stud,

said slot having a notch formed in one side thereof,

means movable about said stud and biased for pressing said notched side of said slot against said stud during opening movement of said lid for effecting the engagement of said notch with said stud whereby said lid is held in said open position, and

said means being actuable by engagement with at least a portion on said prop with further movement there-

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of to bias the other side of said slot against said stud during closing movement of said lid whereby said notch is held out of engaging relationship with said stud.

2. Supporting means adapted for use with a device having a lid attached thereto by hinge means for movement from a closed position to an open position and vice versa, said supporting means comprising a prop having one end pivotally attached to said lid, pivot means fixedly attached to said device, said prop having a slot disposed in sliding relation to said pivot means, said slot having at least two sides with a notch formed in one of said sides, means pivotally mounted on said pivot means, and biased for pressing said notch side of said slot against said pivot means during opening movement of said lid whereby said notch is pressed into engagement with said pivot means when said lid reaches its open position, said notch being adapted to become disengaged from said pivot means in response to movement of said lid toward an extended open position, and said means being responsive to such further movement of said lid toward its extended open position for actuation terminating the aforesaid pressure exerted by said means and for effecting the pressing of the other side of said slot against said pivot means whereby said notch is held out of engaging relationship with said pivot means during at least a portion of movement of said lid toward its closed position.

3. Supporting means adapted for use with a device having a lid attached thereto by hinge means for movement from a closed position to an open position and vice versa, said supporting means comprising a prop having one end pivotally attached to said lid, pivot means fixedly attached to said device, said prop having a slot disposed in sliding relation to said pivot means, said slot having at least two sides with a notch formed in one of said sides, pressure means pivoted on said pivot means and biased for pressing said notched side of said slot against said pivot means during opening movement of said lid, said notch being adapted when said lid is in its open position to be pressed by said pressure means into engagement with said pivot means for holding said lid in its fully open position, said notch being adapted to disengage itself from said pivot means in response to movement of said lid toward an extended open position, said means being responsive to such further movement of said lid toward its extended open position for actuation terminating the aforesaid pressure exerted by said pressure means, and said pressure means being responsive to still further movement of said lid toward its extended open position for actuation pressing the other side of said slot against said pivot means whereby said notch is held out of engaging relationship with said pivot means during at least a portion of movement of said lid toward its closed position.

4. Supporting means in accordance with claim 3 and further comprising means responsive to the approach of said lid to its closed position for terminating the pressure exerted by said pressure means and for effecting the re-application of pressure by said pressure means for resuming the pressing of said notched side of said slot against said pivot means.

5. Supporting means adapted for use with a lid subject to movement from a closed position to an open position and vice versa,

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said supporting means comprising fixedly located pivot means,

an arm having one end attached to said lid and having a slot disposed in sliding relation to said pivot means, said slot having at least two sides with a notch formed in one of said sides,

a member attached to said pivot means for at least partial rotation in first and second opposing directions thereabout,

said member having first and second pins projecting therefrom,

biasing means adapted for applying force to said first pin for effecting the pressing of said notched side of said slot against said pivot means in response to partial rotation of said member in said first direction, said notch being adapted to be pressed into engagement with said pivot means in response to movement of said lid to its open position whereby said lid is held in its open position,

and means for effecting partial rotation of said member in said second direction in response to movement of said lid to an extended open position,

said biasing means being further adapted for discontinuing the application of force to said first pin and for applying force to said second pin for effecting the pressing of the other side of said slot against said pivot means in response to said partial rotation of said member in said second direction whereby said notch is held away from engaging relation with said pivot means.

6. Supporting means adapted for use with a lid subject to movement from a closed position to an open position and vice versa,

said supporting means comprising a fixedly located bracket,

a stud mounted on said bracket,

a member mounted on said stud for at least partial rotation in first and second opposing directions thereabout,

two pins mounted on opposite ends of said member for movement therewith,

said bracket having a pair of diametrically opposed arcuate slots formed therein for receiving said pins and for accommodating their movement,

said pins being of sufficient length to extend through said slots with a portion of each of said pins protruding above a surface of said bracket,

an arm having one end fastened to said lid and having a slot with at least two sides formed therein,

a portion of said arm being disposed on said surface of said bracket with portions of the side edges of said arm disposed between said protruding portions of said pins and with a portion of said stud disposed in said slot and in engagement with at least one of the sides of said slot for guiding sliding movement of said arm,

and a spring having one end fastened to a first one of said pins and adapted for alternatively pressing first one and then the other of said pins against their respectively associated side edges of said arm for effecting lateral movement thereof against and away from retention formation means on one of said sides in response to movement of said member.

7. Supporting means in accordance with claim 6 and further comprising a notch formed in said one of said sides of said slot,

said arm having a first shoulder formed at one portion thereof and a second shoulder formed at another portion thereof,

said first shoulder being adapted for pressing against the second one of said pins for effecting partial rotation of said member in its first direction with corresponding movement of said pins in said arcuate slots whereby said spring is stretched in a position for

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pulling said second pin against one of the side edges of said arm for exerting pressure thereon, and said notch being adapted to respond to said pressure by engaging with said stud when said lid is in its open position.

8. Supporting means in accordance with claim 7 wherein said notch is adapted to disengage itself from said stud in response to movement of said lid toward an extended open position,

said second shoulder being adapted during extended opening movement of said lid for pressing against the second one of said pins for effecting partial rotation of said member in its second direction with corresponding movement of said pins in said arcuate slots whereby said spring is stretched in a different position for pulling said first pin against the other one of said side edges of said arm for exerting pressure thereon for effecting lateral movement of said arm and for holding said notched side of said slot out of engagement with said stud during closing movement of said lid.

9. Supporting means in accordance with claim 8 wherein said first shoulder is adapted for pressing against the

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second one of said pins only during the last portion of the closing movement of said lid for effecting partial rotation of said member in said first direction,

said spring being responsive to said last-mentioned partial rotation for discontinuing the application of force to said first pin and for reapplying force to said second pin for effecting the resumption of the pressing of said notched side of said slot against said pivot means.

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