Dec. 15, 1959 J. P. PYKA 2,917,335

GARAGE DOOR LATCH

Filed April 22, 1957 2 Sheets-Sheet 1

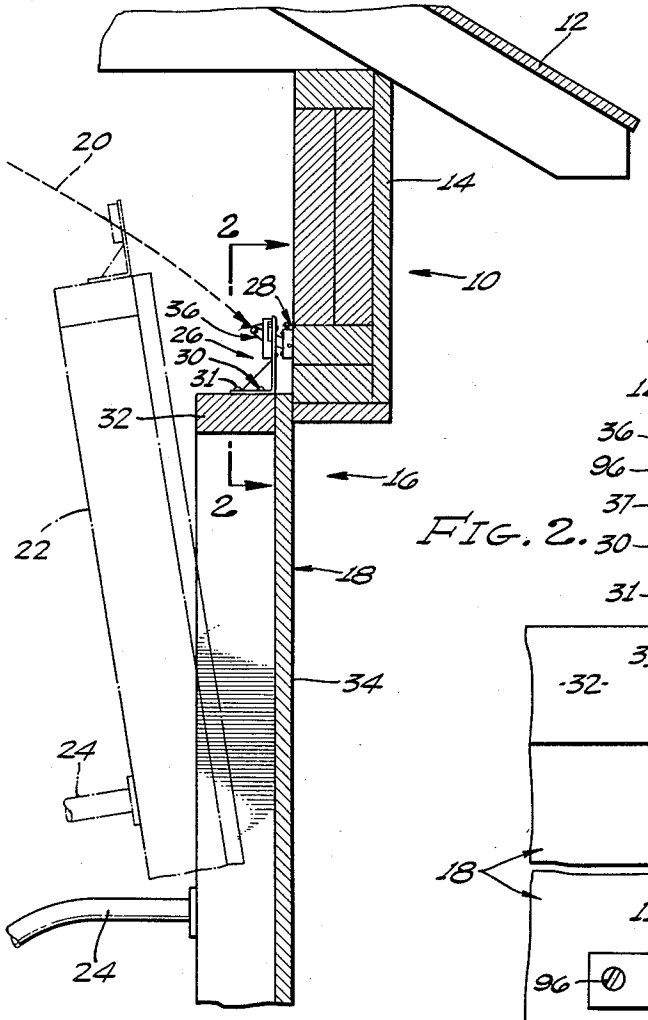


FIG. 1.

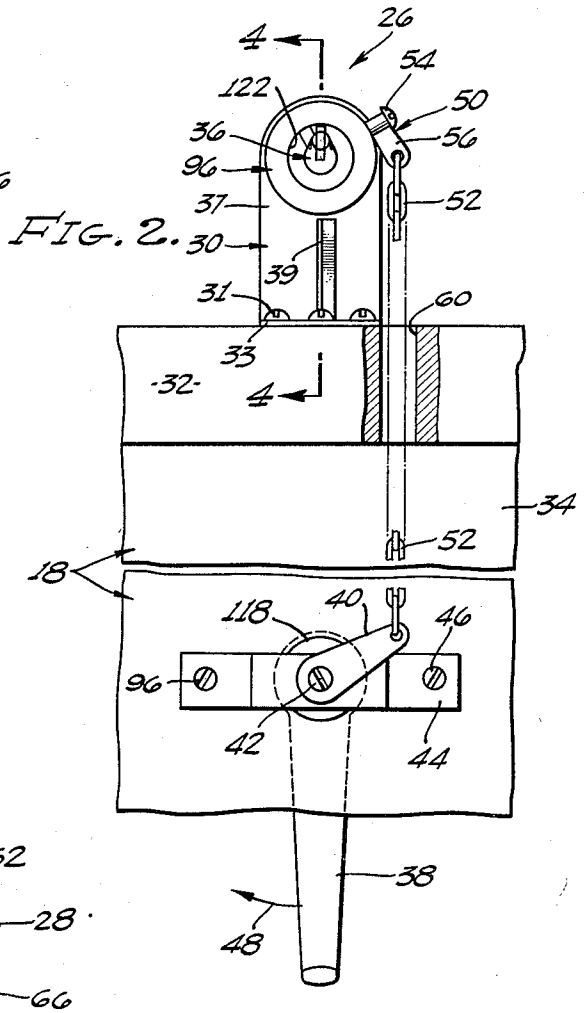


FIG. 2.

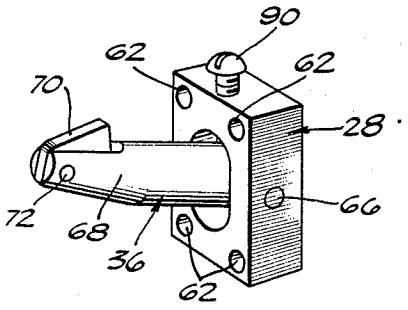


FIG. 3.

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GARAGE DOOR LATCH

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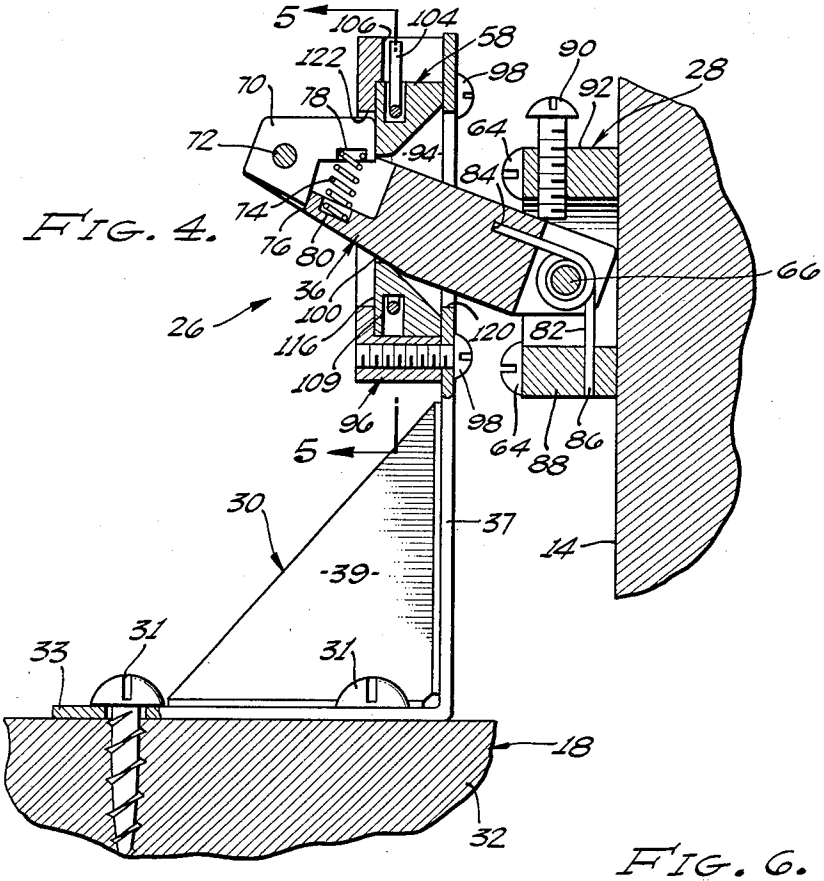


FIG. 4.

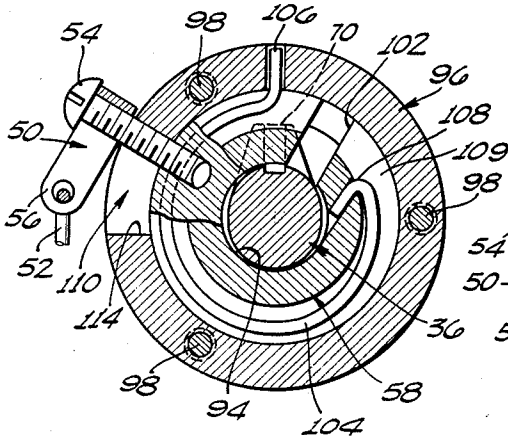


FIG. 5.

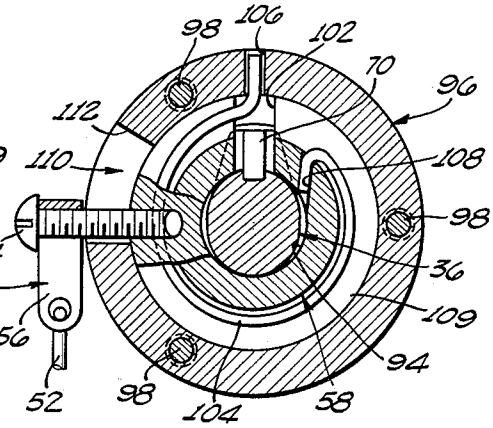


FIG. 6.

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GARAGE DOOR LATCH

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7 Claims. (Cl. 292—1)

This invention relates to devices for preventing unauthorized entry of persons into buildings, and more particularly to catches to be used with locks on overhead doors employed in garage buildings and the like.

Those skilled in the art will already recognize that an extremely large number of overhead garage door latches would be of practical value if all such doors were precision made and precision hung. For example, hasps or bolts or many other devices would be used. However, as a practical matter, most all garage doors are not "precision" doors because it is uneconomical to make and install such doors. For this reason most all conventional door latches are unsuitable for use on such doors, because a door may close at a somewhat different position each time and because no shock absorbing mechanism is normally ever provided on an overhead garage door latch to minimize wear and damage on the latch.

Still further, conventional garage door latches are not normally easily operable from both the inside and outside of a garage.

It is therefore an object of the invention to provide a mechanical latch for use on overhead garage doors which are not precision made or installed.

It is another object of the invention to provide a shock absorbing garage door latch.

It is another object of the invention to provide a latch for an overhead door of a garage which may be easily operated from both the inside and outside of the garage.

These and other objects of the invention are achieved and the above-described and other disadvantages of the prior art are overcome by providing a latch for a door in a garage building or the like having a front wall overhanging an entrance way, the door of the garage being adapted to travel from an overhead position inside the garage to a vertical position covering the entrance way. This latch then comprises a projection mounted inside the garage on the front wall in a position to rotate about a horizontal axis through one end perpendicularly to its own longitudinal axis. Bias means are then provided to hold the projection in a position extending upwardly and rearwardly in the garage. The bias means preferably includes resilient means to resist yieldingly rotation of the projection to a position extending downwardly and rearwardly in the garage. A bracket is then fixed to the upper end of the garage door and a constraining member is fixed to the bracket in a position to present a frusto-conical or equivalent type of tapered surface to a free end of the projection opposite said one end. The frusto-conical surface then is a surface of revolution about an axis which is horizontal when the garage door is lowered to a position covering the entrance way. The constraining member is provided with an aperture at the center of the frusto-conical surface to receive the free end of the projection. A catch member or pawl is then rotatably mounted on the free end of the projection to engage a rear surface of the constraining member to prevent removal of the door from the entrance way when engaged by the pawl. The pawl is preferably spring-loaded so

that it will normally be urged to a position extending radially downwardly of the projection at a particular circumferential position there around at the free end. Release means are then provided to permit removal of the constraining member from the projection so that the garage door may be raised to its overhead position.

Thus, it can be seen that use of the projection with the aperture in the constraining member and its frusto-conical type surface facilitates positive actuation of the latch by guiding the projection toward the aperture and through it to securely latch the door in its position covering the entrance way by use of the spring-loaded pawl, that is, side to side movement of the door cannot prevent positive actuation of the door latch of the invention because the frusto-conical surface of the constraining member will always guide the projection to the central aperture provided in it. In addition, the means used to mount the projection in a position extending upwardly and rearwardly in the garage facilitates positive actuation of the latch because allowance in this manner can be made for the angular movement of the door relative to some pivot point. This is true whether or not the whole door is rotated about a single horizontal axis or whether the door is put together in a number of hinged panels which are lowered successively to their operative position covering the entrance way on suitable trackways on each side of the garage.

Although it is not necessary that the pawl be maintained at a particular angular position on the projection, preferably it is so maintained so that when the constraining member is provided with a radially extending slot it may be rotated to a position such that the slot is aligned with the pawl and the constraining member may be removed from the projection as the garage door is raised to its overhead position.

In accordance with a feature of the invention, resilient means are employed to urge the projection to a position normally extending upwardly and rearwardly in the garage. This resilient means thus performs two functions. In the first place, it yields to force applied to the projection downwardly as the constraining member surrounds the projection and the door is lowered to its operative position covering the entrance way. Secondly, it provides a shock absorbing mechanism for the latch to prevent unnecessary wear and damage to the latch itself.

Conveniently a handle may be rotatably mounted through the garage door to operate the latch from the outside of the garage by means of, for example, a chain fixed to an operating arm extending radially downwardly from the radially slotted constraining member. It is therefore an advantage of the invention that the garage door latch may also be opened from the inside simply by pulling the chain to rotate the constraining member to a position such that the pawl is aligned with the radial slot in the constraining member. Thus, the garage door may be raised from its lower to its overhead position both from the outside and from the inside, the latch of the invention being operated by a handle from the outside and by a chain from the inside.

The novel features which are believed to be characteristic of the invention both as to its organization and method of operation, together with further objects and advantages thereof will be better understood from the following description considered in connection with the accompanying drawings made a part of this specification. It is to be expressly understood, however, that the drawings are for purposes of illustration and description only, and that they are not intended as a definition of the limits of the invention.

Fig. 1 is a broken-away sectional view of a front portion of a garage for the latch of the invention in its operative position;

Fig. 2 is a sectional view of a garage door showing a front view of the latch in place and taken on the line 2—2 shown in Fig. 1;

Fig. 3 is a perspective view of a bracket, an adjustment screw, and a projection rotatably mounted in the bracket employed in the garage door latch of the present invention;

Fig. 4 is a sectional view of the door latch of the invention itself shown in its operative position and taken on the line 4—4 shown in Fig. 2;

Fig. 5 is a sectional view of a constraining member and associated mechanical structure taken on the line 5—5 shown in Fig. 4; and

Fig. 6 is a sectional view of the constraining member taken at the same position as on line 5—5 shown in Fig. 4 but with the constraining member rotated to a position such that a radial slot therein is aligned with a pawl on the projection shown in Fig. 3, whereby the constraining member may be removed from the projection to open the garage door to which it is attached.

In the drawing in Fig. 1, a garage is indicated generally at **10** having a roof **12** with a front wall **14** overhanging an entrance way indicated generally at **16**. Entrance way **16** is covered by a garage door **18** which may be located at the position shown in solid lines from an overhead position from which it swings along an arc indicated by an arrow **20**, an intermediate position of which is indicated by the dotted lines **22**.

Although a garage door made of several horizontally hinged sections may be moved on trackways on each side of the garage, the door **18** shown in Fig. 1 is one which is rotatably mounted by a single horizontal axis. Door **18** is for this reason fixed to braces **24**, only one of which is shown in Fig. 1.

The garage door latch of the invention is indicated generally at **26** in Fig. 1. It includes two principal parts. One is a bracket **28** fixed to front wall **14** and the other is a bracket **30** fixed to the upper end of garage door **18**. As can be seen in Fig. 4, wood screws **31** extend through a horizontal portion **33** of bracket **30** into a beam **32** of door **18**. Bracket **30** also includes a vertical body portion **37** strengthened by means of a triangular web **39** also fixed to horizontal portion **33**. Garage door **18** is provided with a covering wall **34** for entrance way **16** as shown in Fig. 1. The covering wall **34** need not necessarily bear against a rear portion of the front wall **14**, as shown in Fig. 1, but may hang loosely on a projection **36** of the door latch **26** which will provide a shock absorbing function as will be explained subsequently.

The manner in which the door latch **26** may be operated is better illustrated in Fig. 2 where a handle **38** is shown rotatably mounted through door **18** and has an arm **40** fixed to it by means of a longitudinal screw **42**. Handle **38** has a transverse portion rotatably mounted from a bracket **44** that is fixed to the inside of enclosing wall **34** of door **18** by means of screws **46**. Rotation of handle **38** in the direction of arrow **48** will cause door latch **26** to open, arm **40** actuating an arm **50** of door latch **26** through a vertical chain connection **52**. Operating arm **50** of door latch **26** includes a screw **54** threaded through an ear **56** and into the body portion of a rotatable constraining member **58**, better shown in Fig. 5. As can be seen, a hole **60** is provided through the beam **32** in the door **18** to permit the passage of chain **52** therethrough.

Bracket **28** is perhaps best shown in Fig. 3 including holes **62** which are provided for screws **64** to maintain the bracket in a fixed position on wall **14** as best indicated in Fig. 4. A shaft **66** is then located through side portions of bracket **28** and through projection **36** to rotatably mount projection **36** about a horizontal axis perpendicular to its longitudinal axis. Preferably projection **36** is tapered at its free end indicated at **68** and is provided with a pawl **70** at that end rotatably mounted about a shaft **72** at a particular circumferential position on the projection **36**. The pawl **70** is spring-loaded by a spring **74** best indicated in Fig. 4 which urges pawl **70** to rotate to the position shown in Fig. 4, this being limited by a stop **76** on projection **36**. Spring **74** is located at its upper end in a groove **78** in a lower surface of pawl **70** and in a groove **80** in a slot of projection **36**.

Projection **36** is normally canted upwardly and rearwardly in the garage as indicated in Figs. 1, 3 and 4. This is performed by means of a wire spring **82** that is located in a hole **84** in projection **36**, wound about shaft **66** one or two turns, and located in a hole **86** in a lower transverse portion **88** of bracket **28**. The upward canted angle of projection **36** may be and probably is adjustable with a screw **90** threaded through an upper transverse portion **92** of bracket **28**.

Rotary member **58** is provided with a frusto-conical surface **94** which need not be exactly frusto-conical but which preferably is tapered inwardly toward its center 360° around its circumference as indicated in Fig. 4. Constraining member **58** is rotatably mounted in a housing **96** fixed to bracket **30** by means of bolts **98**, three of which are indicated in both Figs. 5 and 6. Constraining member **58** is provided with an aperture **100** at its symmetrical center and at the converging end of frusto-conical surface **94**. Thus, body portion **37** of bracket **30** must be apertured at **120** to permit projection **36** to extend therethrough. Similarly, housing **96** for constraining member **58** is also provided with an aperture **122**. Projection **36** thus projects through aperture **100** when the latch **26** of the invention is maintained in its operative latching position. As indicated in Fig. 5, rotary member **58** is provided with a radial slot **102** which may be moved to the position of the pawl **70** as indicated in Fig. 6 to permit release of projection **36**. The peculiar shape of projection **36** which may be noted in Figs. 5 and 6, it will be observed, comes from the fact that the section of the latch of the invention taken on the line 5—5, shown in Fig. 4, is at an angle with respect to projection **36**.

Constraining member **58** is normally urged to the position shown in Fig. 5 to cooperate with pawl **70** on projection **36** to prevent movement of garage door **18** upwardly and rearwardly in garage **10** to its overhead position by a torsion spring **104** that extends from a hole **106** extending through housing **96** loosely around constraining member **58** as indicated in Fig. 5 and then into a hole **108** in constraining member **58** extending approximately radially into it. Thus, when constraining member **58** is moved to the position in Fig. 6, torsion spring **104** is moved to a position radially closer to the exterior of constraining member **58**, torsion spring **104** also extending into a groove **109** in constraining member **58** itself.

Housing **96** is provided with a radial slot **110** having one terminal portion **112** at its upper end to provide a stop for screw **54** of operating member **50** and a lower terminal portion **114** to provide a lower stop for operating member **50**.

Although the invention should not be limited to any specific lock, it will obviously be desirable to use a lock with a latch of the invention. For this reason a tumble lock **118**, as indicated in Fig. 2, may be provided to lock handle **38** in a fixed position as indicated in Fig. 2.

Although much of the structure shown in the drawings in this case are preferably used with the invention, all of course need not necessarily be employed and many changes and modifications thereof may be made without departing from the invention. However, certain structures necessarily must be employed. In the first place, it is necessary to employ projection **36** pivoted at one end as in Fig. 4 so that vertical and arcuate movement of garage door **18** will not affect positive actuation of the latch of the invention. In addition, resilient means must be employed to urge projection **36** to extend upwardly and rearwardly in garage **10**. This is necessary because

of the arc movement indicated at arrow **20** in Fig. 1 of garage door **18**. Further, although of course surface **94** of constraining member **58** need not be expressly frusto-conical, it must be tapered towards its center as indicated in Fig. 4 approximately 360° about its circumference. For purposes of definition, however, it is to be understood that the adjective "frusto-conical," as used hereinbefore and hereinafter, is not to be limited to a specific tapered shape. This mechanical structure must be employed to locate the end of projection **36** positively within aperture **100** in constraining member **58**. Of course, some deterrent or pawl must be provided on projection **36** to engage a rear portion or back surface **116** of constraining member **58** to latch garage door **18** securely in place.

Although it is not necessarily employed, it is to be noted that use of adjustment screw **90** is very advantageous when the door with which the latch of the invention to be used is very poorly hung and where provision cannot appropriately be made to locate the position of bracket **28** accurately on front wall **14**.

It is to be noted that no resilient means is required to return constraining member **58** to its position as the use of torsion spring **104** is indicated. This certainly is convenient, but is not a necessary expedient. Still further, it will be obvious that the invention should not be limited to the use of any specific release means for the pawl **70** on projection **36**, or operating arm such as the arm **50**. Still further, pawl **70** may take various forms as deterrent means on projection **36**. Furthermore, the specific structures of spring **82**, projection **36**, and constraining member **50** may be varied considerably under the above-described qualifications. It is to be understood that springs **76**, **82** and **106** need not be wire springs as shown but may take the form of any resilient means.

Preferably door latch **26** is located centrally of garage door **18** to minimize rotational movement of garage door **18** about its central horizontal axis. However, it is to be understood that the door latch **26** is to be used for the specific purpose of making irregular movements of door **18** immaterial as far as its positive actuation goes. For this reason, provided that a door latch of the invention is fitted to a particular door, one may be provided at each side of a garage door. The fact that preferably the door latch of the invention is used at the center of a door is not only desirable from the point of view of positive actuation, but also makes an operating mechanism for it easier and more economical to make and install. For example, it may be necessary to employ a latch of the invention at each side of a garage door because of the considerable leverage one might obtain to break the latch if a person attempted to enter the garage **10** by forcing the garage door **18** at one side.

Since all these and many other changes and modifications of the invention will be obvious to those skilled in the art, it is to be understood that the invention is by no means limited to any more than to the general structures which are required and not to the specific forms shown. Further, although only one specific embodiment of the invention has been shown, this embodiment has been shown merely for purpose of description and illustration. For this reason, the invention is not to be limited to the embodiment shown but it is to be understood that the true scope thereof is defined only in the appended claims.

What is claimed is:

1. A latch comprising: a projection to rotate about a predetermined axis perpendicular to its own longitudinal axis; bias means to hold said projection yieldingly in an inoperative rotational position about said predetermined axis; a bracket having a constraining member mounted thereon, said constraining member having a substantially frusto-conical surface of revolution, said constraining member having a hole approximately at the center of said frusto-conical surface to receive the free end of said projection; a catch member on the free end of said projection to engage a rearward surface of said constraining member; and release means to permit removal of said constraining member from said projection.

2. A latch comprising: a projection to rotate about a predetermined axis perpendicular to its own longitudinal axis; bias means to hold said projection yieldingly in an inoperative rotational position about said predetermined axis; a bracket having a member rotatable thereon, said rotatable member having a substantially frusto-conical surface of revolution, said rotatable member also having a hole approximately at the center of said frusto-conical surface to receive the free end of said projection; a pawl rotatably mounted on said projection about an axis perpendicular to the longitudinal axis of said projection; and resilient means to hold said pawl yieldingly outwardly of said projection in a manner to be depressed when entering the aperture of said rotatable member, but to snap outwardly after passing through it to engage a rearward surface of said rotatable member to prevent subsequent removal of said projection from said rotatable member, said pawl normally extending radially outwardly of said projection at a particular circumferential position thereabout, said rotatable member having a slot of a width larger than that of said pawl through said frusto-conical surface at a circumferential position different than that of said pawl on said projection, said rotatable member being rotatable to the position of said pawl to release said projection.

3. The invention as defined in claim 2, wherein resilient means are additionally provided to urge said rotatable member to move to a position in which said rotatable member slot and said pawl are not aligned.

4. The invention as defined in claim 3, wherein said projection is pivotally mounted on a shaft, wherein a bracket is also provided to retain the ends of said shaft, and wherein said bracket is provided with a lower transverse portion having a vertical hole, said projection means being normally maintained in an inoperative position by a wire spring extending longitudinally into said projection having at least one turn wrapped around said shaft and extending downwardly into said hole in said bracket.

5. The invention as defined in claim 4, wherein said bracket is provided with an upper portion, and wherein an adjustment screw is threaded through said upper portion to adjust the unlatched angular position of said projection.

6. The invention as defined in claim 3, wherein the following are additionally provided: a housing fixed to said bracket, said housing having a slot extending radially therethrough, and an operative arm fixed to said rotatable member extending through said housing slot.

7. The invention as defined in claim 6, wherein a torsion spring is provided to urge said rotatable member to a position in which said operating arm engages one terminal portion of said housing slot as a stop, said housing and said rotatable member both having holes extending approximately radially through them at different angular positions, said torsion spring extending from the hole in said housing, around said rotatable member and into the hole in said rotatable member in a position to be drawn towards said rotatable member as said operating arm is moved from said one terminal portion of said housing slot to an opposite terminal portion thereof.

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