May 25, 1954 J. O. ROP 2,679,428

LATCH MECHANISM

Filed March 13, 1952 2 Sheets-Sheet 1

Fig. 1.

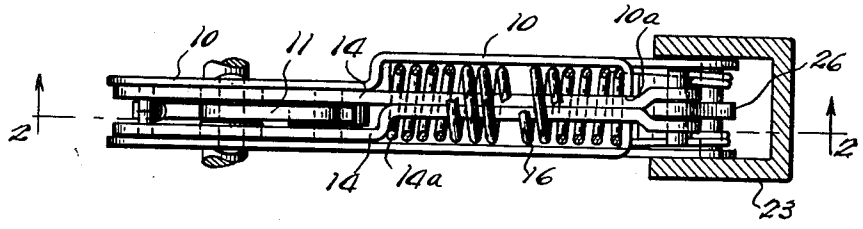
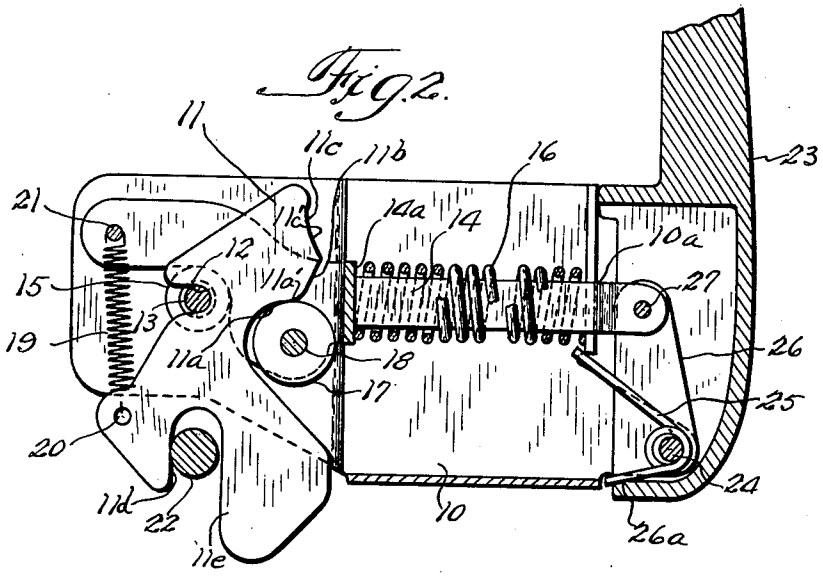


Fig. 2.



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2 Sheets-Sheet 2

Fig. 3.

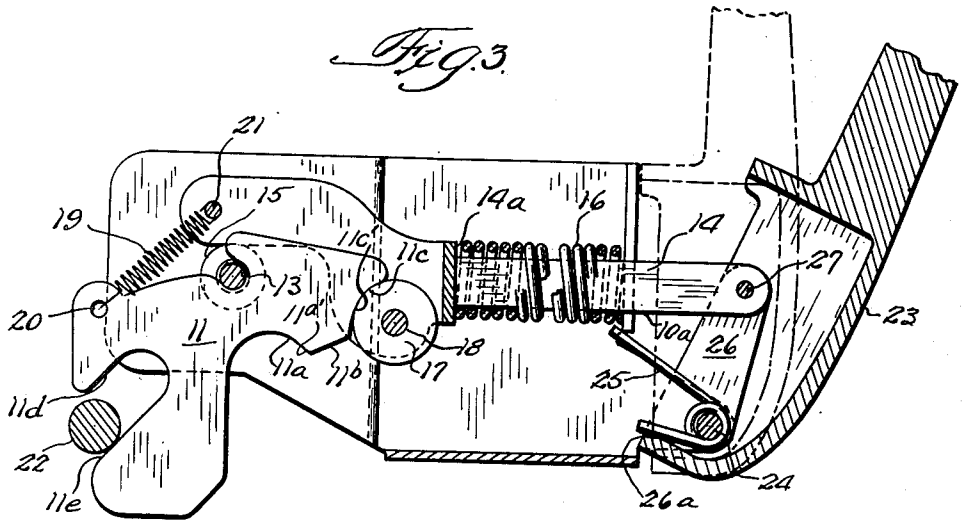
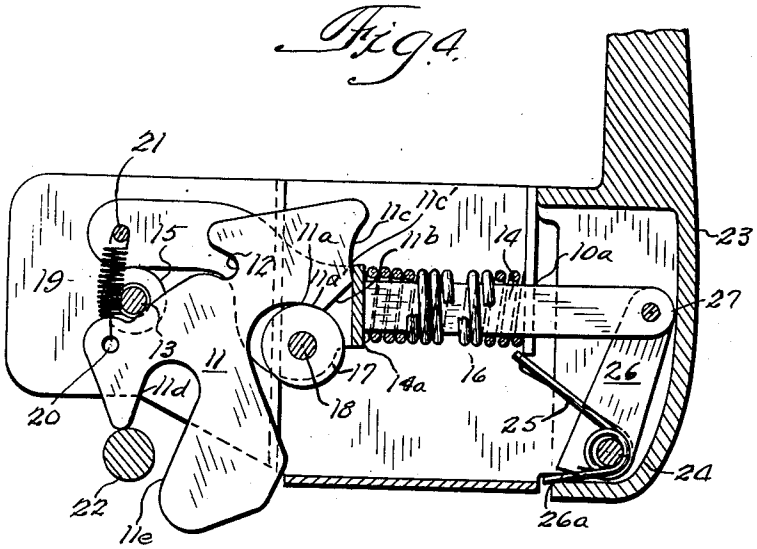


Fig. 4.



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UNITED STATES PATENT OFFICE

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LATCH MECHANISM

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Application March 13, 1952, Serial No. 276,328

5 Claims. (Cl. 292—332)

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This invention relates to a latch mechanism and it is an object of the invention to provide improved apparatus of that character.

In latch mechanisms for refrigerators and various other applications, it is desirable that a bolt member be urged forcefully toward a keeper engaging position in order that the latch mechanism may serve to compress a gasket between a door and a cabinet in the event that the operator does not close the door with sufficient force to compress the gasket. It is also desirable, when the latch is released to permit opening of the door, that the latch bolt be toggled or cocked in an open position, from which position it may readily be tripped by a relatively light, properly directed force. This enables the door to be closed with a minimum force.

With such a latch mechanism it is not an uncommon occurrence that the latch bolt is inadvertently tripped from its cocked position while the door is open. Accordingly, it is desirable also that the latch bolt be movable from its keeper engaging position to a keeper by-passing position merely by slamming the door shut. Where this feature is not present, if the latch mechanism becomes uncocked while the door is open it is necessary to operate the latch handle before the door can again be closed.

It is another object of the invention to provide an improved cocking latch mechanism.

It is another object of the invention to provide an improved cocking latch mechanism for mounting on a door and cabinet, for example, which latch mechanism permits the door to be slammed shut even though the latch mechanism may have been tripped from its cocked position while the door was open.

It is another object of the invention to provide an improved latch mechanism having the features described above in which assembly and disassembly of the parts is readily accomplished.

It is another object of the invention to provide an improved latch mechanism having the various features described above while being simple, reliable and economical to manufacture.

This invention, together with further objects and advantages thereof, will best be understood by reference to the following description taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

In the drawings, in which like parts are designated by like reference numerals,

Fig. 1 is a plan view of a latch mechanism constructed in accordance with the invention;

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Fig. 2 is a cross-sectional view of the same latch mechanism taken along the line 2—2 of Fig. 1; and

Figs. 3 and 4 are views similar to Fig. 2 but illustrating the latch mechanism in different operating positions.

The latch mechanism disclosed in the drawings is well adapted to use on a refrigerator and is arranged for cooperating with a simple form of keeper, the latch mechanism preferably but not necessarily being mounted on a door and the keeper being mounted on a cabinet or box.

The latch mechanism preferably includes a housing or supporting frame 10 having opposed walls as shown in Fig. 1. A bolt member 11 is arranged between the walls of the housing and has an open-ended slot 12 arranged to receive a pin 13 which extends between the walls of the housing and is secured thereto. A spring biased actuator 14 is also arranged between the walls of the housing and consists primarily of a pair of plates or strips which abut each other in their central portions but are open at both the right and left-hand ends to form yokes, all as readily seen in Fig. 1. The yoke formed at the left-hand end of the actuator 14 is arranged to receive the bolt member 11. The actuator 14 is movable linearly to the left and right and is guided near its right-hand end by a slot 10*a* in the housing and at its left-hand end by a roller 15 rotatably mounted on the pin 13 referred to above.

A compression spring 16 is wound around the central portion of the actuator and is compressed between the right-hand wall of the housing and a shoulder 14*a* formed on the actuator, the spring 16 thereby urging the actuator 14 forcibly to the left as viewed in the drawings.

A cam roller 17 is rotatably mounted on the actuator 14 by a pin 18 and is urged by the spring 16 against a cam surface formed on the right-hand edge of the bolt member 11. This cam surface on the bolt member includes a recessed portion 11*a*, a sloping portion 11*b* and a dwell portion 11*c*.

A tension spring 19 is engaged at one end with an opening 20 in the bolt member 11 and at its other end with a pin 21 secured to the left-hand end of the actuator 14. This spring tends to maintain the lower edges of the left-hand end of the actuator against the roller 15 and urges the bolt member 11 to pivot in a clockwise direction about the pin 13.

When the latch mechanism is in the position illustrated in Fig. 2, the cam roller 17 is engaged with the substantially flat upper edge portion 11*a'*

of the recessed cam portion 11*a*, and a keeper engaging portion 11*d* of the bolt member 11 is in position to engage a keeper pin 22. This is the keeper engaging or closed position of the latch mechanism. In this position it may be seen that the spring 16, in urging the cam roller 17 to the left, exerts a great force against the bolt member 11 urging the bolt member to pivot in a counterclockwise direction about the pin 12. The force applied to the bolt member is substantially greater than the force of the spring 16 by virtue of the wedging action obtained between the cam roller 17 and the cam portion 11*a'*. This substantial force is transmitted to the keeper pin 22 through the bolt member whereby the entire latch mechanism and the door, for example, upon which it is mounted are drawn forcibly to the left to a closed position. This is desirable in a refrigerator application as this substantial closing force inherent in the latch mechanism may be employed to compress a sealing gasket between the refrigerator door and the facing portions of the casing or the door frame.

An operating handle 23 is provided for drawing the actuator 14 to the right against the action of the spring 16. The handle 23 is pivotally mounted on the housing 10 through a pin 24 and is urged to rotate about this pin in a counterclockwise direction by a spring 25 which is wound around the pin 24 and engages the right-hand wall of the housing 10 and the lower edge of the handle 23 as shown.

A lever 26 is also pivotally mounted on the pin 24 and at one end engages the right-hand end of the actuator 14 through a pin 27. The lower left-hand corner 26*a* of the lever 26 normally abuts the lower left-hand portion of the handle 23. Accordingly, as the handle 23 is manually moved from its normal position illustrated in Fig. 2 to its door opening position illustrated in Fig. 3, against the action of the spring 25, the lever 26 is pivoted in a clockwise direction and draws the actuator 14 to the right.

As the cam roller 17 is drawn free of the recessed cam portion 11*a*, the bolt member 11 is free to rotate in a clockwise direction under the influence of the spring 19. As the actuator 14 is drawn further to the right, the cam roller 17 rolls along the sloping cam surface 11*b* permitting further clockwise movement of the bolt member 11, and finally engages a substantially flat cam portion 11*c'* of the dwell 11*c* whereupon the bolt member 11 will have rotated to the position illustrated in Fig. 3. This is the opened or cocked position of the latch mechanism, the keeper engaging portion 11*d* of the bolt member 11 having been withdrawn by the clockwise rotation of the bolt member to a position in which it may no longer engage the keeper pin 22. More specifically, when the latch mechanism is in the position illustrated in Fig. 3 the latch mechanism may move directly to the right, the bolt member passing freely by the keeper pin 22.

When the cam roller 17 is in contact with the cam portion 11*c'*, as in the position illustrated in Fig. 3, the force applied to the bolt member 11 by the cam roller 17 is directed along a line normal to the cam portion 11*c'* at the point of its contact with the cam roller, all as is well understood in the art. The cam portion 11*c'* is so formed that such force applied by the cam roller 17 will pass substantially through the pivotal axis of the bolt member 11, namely, the pin 13. With this arrangement the force applied to the bolt member by the cam roller has little or no tendency to cause rotation of the bolt member 11. In other words the cam members comprising the cam roller 17 and the cam portion 11*c'* are toggled or on center. The latch mechanism tends to remain in this position even through the handle 23 is released by the operator, until the balance is upset by the application of external forces.

It should be noted that the handle 23 after being released will return under the influence of the spring 25 to its normal position illustrated in Fig. 2. Since the lever 26 is not secured to the handle 23, the latter may return to its normal position while leaving the internal operating parts of the latch mechanism, including the lever 26, in their cocked positions.

Normally it would be preferable that the line of force applied by the cam roller 17 to the bolt member 11 pass appreciably below the pivotal axis of the bolt member whereby the cam elements when in the position illustrated in Fig. 3 are over center or toggled to a sufficient extent as to assure that the latch mechanism will remain in cocked position barring substantial jolting or other application of extraneous forces. In the illustrated embodiment of the invention, however, the tension spring 19 exerts an appreciable force urging the bolt member 11 in a clockwise direction. Accordingly, the slope of the cam portion 11*c'* may be such as to provide a dead center toggle position of the cam elements.

The extended length of the cam portion 11*c'* permits a substantial pivotal movement of the bolt member 11 in its cocked or toggled position without the cam elements passing substantially over center, which latter possibility would necessitate the application of a substantial force to bring the cam elements back over center to trip the latch mechanism. This extended on center range of the cam elements is desirable since it permits substantial leeway in the relative positioning of the keeper pin 22 with respect to the latch mechanism and more specifically with respect to the keeper engaging portion 11*d* of the bolt member.

It is desired of course that the latch mechanism cock in its open position at each opening of the door on which it is mounted and, accordingly, it is necessary that the latch mechanism be in cocked position or be in a position from which it will necessarily move into cocked position when the bolt member 11 is in such position that it will barely clear the keeper pin 22 to permit opening of the door. If precise relative positioning of the keeper pin 22 is to be avoided, it is necessary that the latch mechanism be cocked somewhat before the bolt member reaches a position in which it may clear the keeper pin. Accordingly, it is necessary that the bolt member be further movable in an opening direction, clockwise direction in the drawings, beyond its initial cocked position in order that it may clear the keeper pin. The extended surface of the cam portion 11*c'* obtains this objective.

When the cam roller 17 first passes onto the cam portion 11*c'* (these cam elements then being cocked or toggled) the bolt member 11 may still be in engagement with the keeper pin 22, and as the cam roller 17 rolls along the cam portion 11*c'*, the cam elements remaining substantially in an on center position, the bolt member 11 may pivot further in a clockwise position such that it may clear the keeper pin 22. With this arrangement, cocking of the latch is assured upon each opening of the door with

which it cooperates and, at the same time, the cam elements are not permitted to move substantially over center such that a large tripping force is needed to drive the cam elements back over center and to move the bolt member 11 again into its keeper engaging position.

With the latch mechanism in its cocked position, illustrated in Fig. 3, it is readily tripped by merely closing the door with which it cooperates. To this purpose the bolt member 11 includes a tripper arm 11e which is arranged to strike the keeper pin 22 when the door is moved toward its closed position. More specifically, when the door is closed the tripper arm 11e strikes the keeper pin 22.

The force applied by the keeper pin to the tripper arm 11e causes the bolt member 11 to rotate in a counterclockwise direction until the cam roller 17 passes off the dwell 11c onto the sloping cam surface 11b. The force applied by the cam roller to the bolt member is then one which passes substantially above the pin 13 with the result that a substantial counterclockwise torque is applied to the bolt member. The force of the spring 16 thereby rotates the bolt member 11 toward its keeper engaging position until the cam roller 17 enters the recessed cam portion 11a to engage the substantially flat surface 11a'. The bolt member 11 has then substantially reached its final keeper engaging position. The force urging the bolt member toward its final keeper engaging position is greatly magnified by the wedging action of the cam elements as previously described whereupon a sealing gasket arranged between the door and cabinet with which the latch mechanism cooperates may be compressed.

As is best seen in Figs. 2 and 3, the keeper engaging portion 11d and the tripper arm 11e of the latch bolt 11 form a slot therebetween which is of such width as to receive the keeper pin 22 with only a small amount of clearance. When the door is moved toward its closed position the keeper pin 22 engages the tripper arm 11e, as previously explained, and remains in contact therewith as it forces the latch bolt in a counterclockwise direction. When the cam and cam roller become so oriented that the latch bolt is urged in a counterclockwise direction by the spring 16, the tripper arm 11e is withdrawn from contact with the keeper pin 22 and the keeper engaging portion 11d of the latch bolt is brought into contact therewith. Since the slot formed in the latch bolt is little wider than the diameter of the keeper pin 22 the free counterclockwise movement of the latch bolt is sharply limited and, accordingly, the keeper engaging portion 11d of the latch bolt may not be brought into contact with the keeper pin 22 with a jolt, such as would occur if the spring 16 were permitted to rotate the latch bolt freely through a substantial angle before bringing the portion 11d into engagement with the keeper pin. This improved arrangement has been found to reduce wear on these engaging surfaces and to substantially eliminate the objectionable knock which is otherwise heard when the door is closed.

It will now be clear that each of the three portions 11a, and more particularly the substantially flat portion 11a', 11b and 11c of the cam surface performs a particular function. The portion 11a extends substantially perpendicular to its direction of movement and accordingly a force applied perpendicular to it tends to move the bolt member in a counterclockwise direction

into keeper engaging position. Furthermore, the cam portion 11a' extends substantially parallel to the direction of movement of the cam roller whereby the force of the spring 16 is greatly multiplied as applied to the bolt member.

The cam portion 11c, and more particularly the substantially flat cam portion 11c', extends substantially parallel to its direction of movement whereby a force applied perpendicular to it has little tendency to rotate the bolt member.

The cam portion 11b interconnects the cam portions 11a and 11c and is disposed at a substantial angle with respect to both. Accordingly, a force applied perpendicular to it tends to rotate the bolt member through a substantial angle and with a substantial torque. The portion 11b, then, serves as a means through which the major portion of the actuator-biased rotation of the bolt member is accomplished, whereby the cam portion 11a may be inclined, as described above, to produce relatively little rotation of the bolt member but with a powerful wedging action.

In a cocking latch there is a distinct possibility that the latch mechanism may be inadvertently tripped while the door is open as, for example, by a jolting of the latch mechanism. It is desirable therefore that the latch mechanism when in its normal or keeper engaging position permit closing and latching of the door by merely slamming the door, that is without manually recocking the latch. It will be apparent that slamming a door with which a cocking latch mechanism cooperates cannot move the latch into its cocked position, first, because of the wedging action of the cam elements, and, second, because of the force which may be applied to the bolt member by the keeper upon slamming of the door is in the wrong direction to accomplish such movement of the bolt member.

In the illustrated embodiment of the invention, however, the latch bolt 11 is movable from its keeper engaging position to a keeper by-passing position under the influence of the force applied by the keeper pin 22 to the bolt member 11 upon slamming of the door. As best seen in Fig. 4, the force applied by the keeper pin to the bolt member when the door is slammed shut with the latch mechanism in its keeper engaging position is in a direction upwardly and to the right. Such a force if of proper magnitude will drive the bolt member in a sliding motion upwardly and to the right, the pin 13 moving relatively out of the open-ended slot 12 and the cam roller 17 along with the entire actuator 14 being forced to the right. In the particular embodiment of the invention disclosed, the cam surface 11c engages the shoulder 14a of the actuator before the bolt member clears the keeper. Further movement of the bolt member by force of the keeper thereagainst causes the cam elements to assume the position illustrated in Fig. 4. When the keeper engaging portion 11d of the bolt member has passed by the keeper pin 22, the spring 16 acting through the cam roller 17 and the recessed cam surface 11a, drives the bolt member 11 back to its normal keeper engaging position illustrated in Fig. 2.

It will be apparent that the door must be slammed with sufficient force to overcome the spring 16. It is desired, of course, that the latch remain cocked while the door is open whereby the energy expended in opening the latch mechanism is stored in the latch and is released when the

door is closed to compress the gasket. However, in the event that the latch mechanism is tripped while the door is open, it is preferable that the door be slammable, even though the main latch spring must be overcome in so doing, rather than it being required that the handle **23** be operated to recock the latch. Furthermore, a cocking latch mechanism which may be slammed closed after being inadvertently tripped while open, prevents damage to the latch mechanism which frequently occurs when such a latch mechanism is not made slammable. More specifically, if a cocking latch which is not slammable is inadvertently tripped while the door which it cooperates is open, slamming of the door may seriously damage the latch mechanism.

In the illustrated embodiment of the invention, the bolt member **11** may readily be removed from the latch assembly simply by unhooking the spring **19** from either the bolt member or the actuator, and by operating the handle **23** to move the actuator into the position illustrated in Fig. 2. It will be apparent that under these conditions the bolt member may be removed simply by moving it upwardly and then to the right to disengage the open-ended slot **12** from the bin **13**. Similarly, the actuator **14** if released from the lever **26** may readily be withdrawn from the slot **10***a* and removed from the housing **10**.

The principal construction feature permitting such ready assembly and disassembly of the latch mechanism is that neither the bolt member **11** nor the actuator **14** is rigidly confined to a given path of sliding or pivotal movement or combination thereof. The bolt member is pivotable about the pin **13** which is normally arranged in the open-ended slot **12**, and the spring **16** acting through the cam roller **17** urges the bolt in such a direction as to maintain the pin **13** at the bottom of the slot **12**. One end of the actuator is engaged with the slot **10***a* while the other end rides on the roller **15**, the spring **19** urging the actuator into contact with this roller. Accordingly, while neither the actuator nor the bolt member is rigidly confined to the desired corresponding paths of movement, the forces interacting between the various elements of the latch mechanism are such as to maintain the actuator and the bolt member in their proper positions.

It will be apparent that the invention may be varied in its physical embodiment without departing from the spirit of the invention, and it is desired, therefore, that the invention be limited only by the scope of the appended claims.

The invention having thus been described, what is claimed and desired to be secured by Letters Patent is:

1. In a latch construction, a bolt member for engaging a keeper, said member being movable between a keeper engaging position and a cocked position, a spring-biased bolt actuating member movable between a normal position corresponding to said keeper engaging position of said bolt member and an energized position corresponding to said cocked position of said bolt member, and a pair of cooperative cam elements, said cam elements comprising a cam roller rotatably mounted on one of said members and a cooperating element mounted on the other of said members, said cam roller having a direction of movement substantially perpendicular to the direction of movement of said cooperating cam element as said bolt member moves between said keeper engaging position and said cocked position and as said actuating member moves between said normal position and said energized position, the cam element mounted on said actuator member lying in the path of the cam element mounted on said bolt member and being in engagement therewith when said bolt member is in said keeper engaging position and said actuator member is in said normal position, and the cam element on said bolt member lying in the path of the cam element on said actuator member and being in engagement therewith when said bolt member is in said cocked position and said actuator member is in said energized position, said cooperating cam element having a substantial flattened portion extending substantially parallel to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said cocked position, whereby said cam roller may roll along said flattened portion to permit corresponding movement of said bolt member with no substantial change in the bias of said bolt actuating member, said cooperating cam element having a second substantially flattened portion extending substantially perpendicular to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said keeper engaging position, whereby said cam roller may roll along said second flattened portion to permit relatively large movement of said actuator member with relatively small movement of said bolt member.

2. In a latch construction, a bolt member for engaging a keeper, said member being movable between a keeper engaging position and a cocked position, a spring-biased bolt actuating member movable between a normal position corresponding to said keeper engaging position of said bolt member and an energized position corresponding to said cocked position of said bolt member, and a pair of cooperative cam elements, said cam elements comprising a cam roller rotatably mounted on one of said members and a cooperating element mounted on the other of said members, said cam roller having a direction of movement substantially perpendicular to the direction of movement of said cooperating cam element as said bolt member moves between said keeper engaging position and said cocked position and as said actuating member moves between said normal position and said energized position, the cam element mounted on said actuator member lying in the path of the cam element mounted on said bolt member and being in engagement therewith when said bolt member is in said keeper engaging position and said actuator member is in said normal position, and the cam element on said bolt member lying in the path of the cam element on said actuator member and being in engagement therewith when said bolt member is in said cocked position and said actuator member is in said energized position, said cooperating cam element having a substantial flattened portion extending substantially parallel to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said cocked position, whereby said cam roller may roll along said flattened portion to permit corresponding movement of said bolt member with no substantial change in the bias of said bolt actuating member, said cooperating cam element having a second substantially flattened portion extending substantially perpendicular to the direction of movement of the cam element mounted on said

bolt member and in engagement with said cam roller when said bolt member is in said keeper engaging position, whereby said cam roller may roll along said second flattened portion to permit relatively large movement of said actuator member with relatively small movement of said bolt member, said cooperating cam element also having an intermediate portion connecting and disposed at a substantial angle with respect to each of said flattened portions.

3. In a latch construction, a bolt member for engaging a keeper, said member being movable between a keeper engaging position and a cocked position, a spring-biased bolt actuating member movable between a normal position corresponding to said keeper engaging position of said bolt member and an energized position corresponding to said cocked position of said bolt member, and a pair of cooperative cam elements, said cam elements comprising a cam roller rotatably mounted on one of said members and a cooperating element mounted on the other of said members and forming an edge therof, said cam roller having a direction of movement substantially perpendicular to the direction of movement of said cooperating cam element as said bolt member moves between said keeper engaging position and said cocked position and as said actuating member moves between said normal position and said energized position, the cam element mounted on said actuator member lying in the path of the cam element mounted on said bolt member and being in engagement therewith when said bolt member is in said keeper engaging position and said actuator member is in said normal position, and the cam element on said bolt member lying in the path of the cam element on said actuator member and being in engagement therewith when said bolt member is in said cocked position and said actuator member is in said energized position, said cooperating cam element having a substantial flattened portion extending substantially parallel to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said cocked position, whereby said cam roller may roll along said flattened portion to permit corresponding movement of said bolt member with no substantial change in the bias of said bolt actuating member, said cooperating cam element having a second substantially flattened portion extending substantially perpendicular to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said keeper engaging position, whereby said cam roller may roll along said second flattened portion to permit relatively large movement of said actuator member with relatively small movement of said bolt member.

4. In a latch construction, a bolt member for engaging a keeper, said member being pivotable between a keeper engaging position and a cocked position, a spring-biased bolt actuating member linearly movable between a normal position corresponding to said keeper engaging position of said bolt member and an energized position corresponding to said cocked position of said bolt member, and a pair of cooperative cam elements, said cam elements comprising a cam roller rotatably mounted on one of said members and a cooperating element mounted on the other of said members, said cam roller having a direction of movement substantially perpendicular to the direction of movement of said cooperating cam element as said bolt member moves between said keeper engaging position and said cocked position and as said actuating members moves between said normal position and said energized position, the cam element mounted on said actuator member lying in the path of the cam element mounted on said bolt member and being in engagement therewith when said bolt member is in said keeper engaging position and said actuator member is in said normal position, and the cam element on said bolt member lying in the path of the cam element on said actuator member and being in engagement therewith when said bolt member is in said cocked position and said actuator member is in said energized position, said cooperating cam element having a substantial flattened portion extending substantially parallel to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said cocked position, whereby said cam roller may roll along said flattened portion to permit corresponding movement of said bolt member with no substantial change in the bias of said bolt actuating member, said cooperating cam element having a second substantially flattened portion extending substantially perpendicular to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said keeper engaging position, whereby said cam roller may roll along said second flattened portion to permit relatively large movement of said actuator member with relatively small movement of said bolt member.

5. In a latch construction, a bolt member for engaging a keeper, said member being pivotable between a keeper engaging position and a cocked position, a spring-biased bolt actuating member linearly movable between a normal position corresponding to said keeper engaging position of said bolt member and an energized position corresponding to said cocked position of said bolt member, a pair of cooperative cam elements, said cam elements comprising a cam roller rotatably mounted on one of said members and a cooperating element mounted on the other of said members, said cam roller having a direction of movement substantially perpendicular to the direction of movement of said cooperating cam element as said bolt member moves between said keeper engaging position and said cocked position and as said actuating member moves between said normal position and said energized position, the cam element mounted on said actuator member lying in the path of the cam element mounted on said bolt member and being in engagement therewith when said bolt member is in said keeper engaging position and said actuator member is in said normal position, and the cam element on said bolt member lying in the path of the cam element on said actuator member and being in engagement therewith when said bolt member is in said cocked position and said actuator member is in said energized position, said cooperating cam element having a substantial flattened portion extending substantially parallel to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said cocked position, whereby said cam roller may roll along said flattened portion to permit corresponding movement of said bolt member with no substantial

change in the bias of said bolt actuating member, said cooperating cam element having a second substantially flattened portion extending substantially perpendicular to the direction of movement of the cam element mounted on said bolt member and in engagement with said cam roller when said bolt member is in said keeper engaging position, whereby said cam roller may roll along said second flattened portion to permit relatively large movement of said actuator member with relatively small movement of said bolt member, a roller against which said actuating member may bear, and spring means interconnecting said members, said spring means urging said actuating member against said roller and urging said bolt member to pivot toward said cocked position thereof.

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