The present invention pertains to novel improvements in the construction of overhead door operating mechanisms for garages and the like.

More specifically, the invention relates to a counterbalanced garage door construction of this type which may be manually operated with a minimum of effort; which may be installed in a present day garage or incorporated in a garage to be built; and which includes mechanism whereby unauthorized opening of the door may be prevented.

In a general summary, the invention may be said to include means for pivotally mounting the door-supporting structural members; a counter-weight door balancing arrangement adapted to maintain the door in any selected position intermediate the entirely closed or entirely opened position thereof; manually operable mechanism for selectively permitting or preventing swinging movements of said door about its pivotal mounting; means included in the latter mechanism for automatically latching said door against unauthorized opening thereof; and means associated with a conventional lock device whereby the insertion and turning of a key will unlock the latching means aforesaid so that the door may be easily and quickly opened.

An object of the present invention is the provision of a simple latch mechanism which automatically functions to prevent the opening of the door from outside the garage without the use of a proper key insertable into a conventional lock assembly mounted in the door, and cooperatively associated with the latching mechanism aforesaid.

A further object is the provision of means, manually operable from within the garage, whereby opening of the door by the release of the latching mechanism may be had, and whereby the said mechanism may be immediately reset, following partial opening of said door, so as to automatically again effect the latching thereof when brought to its closed position, as will appear.

Other features and advantages not hereinbefore set forth, will be apparent or specifically pointed out in the description of the invention to follow, reference being also had to the accompanying drawings, wherein the preferred embodiment of the invention is illustrated.

In said drawings:
Fig. 1 portrays a conventional garage equipped with an overhead door construction embodying the present invention, the said door being shown in closed position;
Fig. 2 is a longitudinal sectional view on a larger scale, and taken on line 2—2 of Fig. 1;
Fig. 3 is a similar view, the door being shown in fully opened position;
Fig. 4 is a longitudinal section drawn to the same scale as Figs. 2 and 3, the view being taken on line 4—4 of Fig. 1;
Fig. 5 is a view similar to Fig. 4 with the door shown in an exemplary or optional partly opened position;
Fig. 6 is an enlarged horizontal sectional view taken on line 6—6 of Fig. 2;
Fig. 7 is a similar vertical sectional view taken on line 7—7 of Fig. 3;
Fig. 8 is a similar horizontal sectional view, taken on line 8—8 of Fig. 4;
Fig. 9 is a view on approximately an actual size scale of a portion of Fig. 2;
Fig. 10 is a horizontal sectional view taken on line 10—10 of Fig. 9;
Fig. 11 is a vertical sectional view taken on line 11—11 of Fig. 6, the scale being similar to that of Figs. 9 and 10;
Fig. 12 is a vertical sectional view taken on line 12—12 of Fig. 9;
Fig. 13 is a view of a portion of Fig. 6, with certain parts in an alternate position;
Fig. 14 is a horizontal sectional view through the door, illustrating a conventional lock cooperatively associated with the invention;
Fig. 15 is a vertical section taken on line 15—15 of Fig. 14;
Fig. 16 is an end view, partly in section, of a cam member;
Fig. 17 is a view, partly in section, of a device for anchoring one end of a tension spring.

With particular reference to Fig. 1, a typical garage, generally indicated by numeral 20, is portrayed more or less schematically, it being of course understood that the structural details of a garage may vary without impairing the adaptability of the instant invention thereto.

Provided in the front wall 22 of the garage, is a rectangular opening 24 for the entrance and exit of an automobile, as is understood. In the garage 20 illustrated, this opening is defined by suitable uprights 26, an overhead lintel 28, and the floor 30, which may be of concrete as shown.

Numeral 32 designates a door which normally closes the opening aforesaid. For illustrative purposes, the door 32 has been portrayed as a unitary wooden structure. Obviously it may be of metal, or partly wooden and partly metallic.

As has been hereinbefore stated, the invention may be installed in a garage already con-
The mechanism for locking the door in closed position is illustrated particularly in Figs. 9 through 15. It includes a latch bolt assembly, generally indicated by numeral 52 and mounted on the plate 46, and a lock assembly similarly indicated by numeral 54 and mounted in the door 32. These assemblies are in alignment and are operatively connect by means of a rotate rod 96 on a portion of which is supported in a bearing 98, affixed to door 32 and the rear end portion in an angle bracket 100 secured to plate 46 by tap bolts 102 as shown, or otherwise.

As best seen in Fig. 10, the rear end portion of rod 56 also extends through an elongated slot 104 formed in a rectangular block 106. Endwise movement of the rod is prevented by a collar 108 secured thereto by set screw 110, and by a cam member 112 secured thereto by set screw 114.

The cam member 112 appears per se in Fig. 16. It includes a body portion 116, and an annular flange portion 118 cut away so as to provide oppositely disposed vertical edges 120, for a purpose to appear hereinafter.

The internal configuration of block 106 is best seen in Fig. 15. For instance, in addition to slot 104, are threaded apertures 122 and 124, and a pair of longitudinal bores 126. Aperture 142 receives the threaded shank portion of latch bolt 130 preferably beveled off on its underside as at 132, for a reason to appear. An opening 131 is provided in the plate 46 to slidably receive the said bolt.

Numerical 132 designates a manually rotatable member pivotally mounted on the smooth shank portion of a screw 134, the threaded shank portion of which engages aperture 124. Preferably, a washer 136 is interposed between the head of screw 134 and member 132.

In each of the bores 126, there is a tension spring 138 for normally biasing the block 106 outwardly, that is, to the left. The inner end of each spring is anchored to a vertical pin 140 preshifted into the block as shown. The other end of each spring 138 is anchored to the aperture extremity 142 of an eye-member 144, shown per se in Fig. 17. Tap bolts 146 serve to affix the members 144 to the plate 46.

With particular reference to Figs. 1 and 14, numeral 148 indicates a conventional key-operable lock mechanism of the cylinder type. As is well known, this type of lock includes an elongated flat connecting bar 150 which projects beyond the key-inserting opposed face of the housing 152. Upon insertion of the proper key and thereafter turning same, the connecting bar will rotate, as is well understood.

With reference also to Fig. 15, it is noted that the forward end of rod 96 is bifurcated, that is, slotted as at 154, to receive the bar 150, so that the motion of said bar will be transmitted to said rod, and to the cam member 112 attached to the latter.

Normally, that is when door 32 is closed, each of the cam edges 120 is adjacent one of a pair of vertically spaced and aligned pins 156, each of which is preshifted into block 106, and projects beyond the front face thereof, as appears to best advantage in Fig. 9.

Operation

Normally, door 32 is closed, so that the parts occupy the positions portrayed in Figs. 1, 2, and 7. At such time, the door rests upon floor 20.
with its upper marginal portion against lintel 28. Manually rotatable member 132 is vertically disposed, so that in response to the tension inherent in springs 138, bolt 128 projects beneath stationary abutment channel 40. Cam member 112 is positioned as portrayed in Fig. 16, with its edges 120 in contact with the left peripheral portion of pins 155.

Obviously therefore, the door cannot be moved to open position, either from within or from without the garage. In other words, as will appear, in order to permit opening the door from within the garage, manual withdrawal of the latch bolt 128 from beneath the abutment 40 is requisite; in order to permit opening the door from without, mechanical withdrawal of said bolt by the insertion and partial rotation of the proper key in lock 148 is requisite.

Assuming that a person within the garage desires to open the door, he grasps the member 132 and pulls it in his direction against the tension of springs 139 until said member can be rotated approximately ninety degrees. This simple operation withdraws bolt 128 from beneath that may be termed keeper member 48, and maintains it so. Attention is directed to Figs. 6 and 13 for clarification. With member 132 in the horizontal position it occupies in Fig. 13, angular member 103 releasably maintains said bolt in its retracted status.

A slight downward pressure on end 80 of arm 48 will raise the door for example, to approximately the position portrayed in Fig. 5, in which position it will remain indefinitely because of the perfect counterbalancing arrangement resulting from the provision of a horizontal, and an angularly disposed weight arm.

Assuming that the person within the garage desires to swing the door to the entirely open or overhead position depicted in Fig. 3, the application of further slight downward pressure on the arm 48 is all that is required.

In order to set the assembly 92 for automatically latching the door again, the member 132 is now returned to its vertical position. Immediately thereupon, the springs 139 cause the block 106 to snap outwardly, or to the left, thus returning bolt 128 to the position illustrated in Fig. 11. Reference to Fig. 7 is also invited in this connection.

It is noted that thus far, because of the slot 104, rod 96 and all elements associated therewith have been immobile.

Closing of the door from outside the garage may now be accomplished by the application of slight downward pressure on the bottom edge thereof, and the body portion of the door 32, as is understood.

As the balanced door swings downwardly in an arcuate path about the opposed trunnions 44 and 70, the projecting latch bolt 120 strikes the upper edge of the abutment member 40 just before the door reaches its closed position. As a result, the block 108, and together with it, the bolt 120 moves to the right against the restraining action of springs 138, this action being facilitated by the bending of the spring 138 of the bolt 120.

As the door continues its descent, the extremity of bolt 120 rides across the inner face of the member 48, until momentarily later, when the bottom of the door reaches the floor 39, the springs 138 cause bolt 120 to again project beneath the abutment member 48, as in Fig. 11. Thus the door is automatically latched in closed position.

In order to permit opening of the door from without, a key must be inserted in lock 148, and turned either to the right or to the left, the direction depending upon the design thereof, as is understood.

The present invention provides for successful operation regardless of direction, by the inclusion of the pair of opposed pins 155, and the pair of opposed edges 123 on the cam member 112, so that rotation of rod 96 to the right or to the left, will effect the withdrawal of bolt 128 from beneath the abutment member 40.

It is assumed for explanatory purposes, that the device 148 is operable by turning the key to the right, so that Fig. 12 portrays the withdrawn status of the bolt 128 at the end of the turning operation.

Immediately following, or simultaneously with, the turning of the key as is understood, slight manual pressure exerted against the door above the lock 148 will cause said door to swing upwardly a few degrees whereupon the key may be extracted. Additional pressure will swing the door 32 again to its overhead position illustrated in Fig. 3.

It should be apparent that after removal of the key from the lock 148, bolt 128 after passing beyond the abutment member 40, reverts to its Fig. 11 position, so that subsequent closing of the door will automatically latch the same as hereinbefore described.

It is noted that should it be desired to permit opening and closing of the door either from without or within the garage at will, it is only necessary to set the assembly 92 in the Fig. 13 position thereof.

From the foregoing, it should be manifest that the present invention incorporates novel mechanism adapted to attain all of its objectives.

Obviously, the precise details of construction illustrated and described admit of modifications without departure from the principles of my invention. For example, it may be desirable to mount assembly 92 on the horizontal centerline of plate 45, in which case the bolt 128 may enter and be withdrawn from a suitable opening provided in the vertical face portion of member 40.

In other words, the invention is not to be limited to the precise details of construction shown and described.

What I claim is:

1. In combination with the swingably mounted supporting structure of a garage door, said structure including a pair of rearwardly converging strut members each rigidly secured at one end to said door, and at the other end to a triangular plate rotatable about a horizontally disposed trunnion, said plate having an opening therein; means to prevent swinging movements of said supporting structure about said trunnion for opening the door, said means comprising a stationary horizontal keeper member from which said trunnion projects; and latch mechanism mounted on said plate, said mechanism including a spring actuated latch bolt normally projecting through said opening in the plate and into engagement with the underside of said keeper.

2. In combination with the swingably mounted supporting structure of a garage door, said structure including a pair of rearwardly converging strut members each rigidly secured at one end to said door, and at the other end to a triangular plate rotatable about a horizontally disposed trunnion, said plate having an opening therein; means to prevent swinging movements of said
supporting structure about said trunnion for opening the door, said means comprising a stationary horizontal keeper member from which said trunnion projects; latching mechanism mounted on said plate, said mechanism including a spring actuated latch bolt normally projecting through said opening in the plate and into engagement with the underside of said keeper; and means manually operable from within the garage for withdrawing said bolt from beneath said keeper and releasably maintaining same in withdrawn position to permit swinging movements of said door supporting structure.

3. The construction set forth in claim 2, wherein the means for releasably maintaining the latch bolt in withdrawn position comprises an angular abutment member rigidly secured to the triangular plate aforesaid adjacent a slide block included in said latching mechanism, said abutment member normally projecting beyond one end of said block, and said latch bolt being secured to and projecting beyond the opposite end thereof; and a manually rotatable member mounted on the smooth shank portion of a screw passing therethrough into engagement with a threaded aperture in said block, said rotatable member being adapted, following partial rotation thereof, to engage the projecting edge of said abutment member when the end of said slide block is brought flush with said edge.

4. In combination with the swingably mounted supporting structure of a garage door, said structure including a pair of rearwardly converging strut members each rigidly secured at one end to said door, and at the other end to a triangular plate rotatable about a horizontally disposed trunnion, said plate having an opening therein; means to prevent swinging movements of said supporting structure about said trunnion for opening the door, said means comprising a stationary horizontal keeper member from which said trunnion projects; latching mechanism mounted on the plate, said mechanism including a spring actuated latch bolt normally projecting through said opening and into engagement with the underside of said keeper; and key-operable mechanism mounted in the door and operatively connected with the latch bolt for effecting the temporary withdrawal of said bolt from beneath said keeper to permit swinging movements of said door supporting structure.

5. The construction set forth in claim 4, wherein the key-operable mechanism operatively connected with the latch bolt for effecting the temporary withdrawal of said bolt from beneath the keeper includes: a lock device mounted in the door and incorporated in a cylindrical casing having a key insertable face portion outside the door, a key rotatable elongated flat connecting bar projecting beyond the opposite face of said casing, a rotatable rod the forward end portion of which is supported in a bearing affixed to said door and the rear end portion of which is supported in an opening formed in an angular member secured to the triangular plate aforesaid, a slot provided in the forward end of said rod for the reception of the projecting bar of the lock device, and a cam member affixed to the rod near the rear end thereof, said cam being adapted upon rotation of the rod in either direction, to engage one or the other of a pair of spaced vertically aligned pins projecting from one side of a slide block which carries the latch bolt aforesaid.

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