

PATENT SPECIFICATION

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(54) CATCH ASSEMBLY

(71) We, YOSHIDA KOGYO K.K., a corporation duly organised under the laws of Japan and existing at No. 1, Kanda Izumicho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to a catch or lock assembly for use on a pair of panel closures such as sashes of a dual sash window unit.

It is well known to provide catch or window lock assemblies with a lock device whereby a catch cam or rotary crescent is locked relatively to a coacting cam keeper against rotation out of an operative or engaged position where the catch cam engages the cam keeper to retain a pair of closure panels such as sashes of a dual sash window in engaged relation, to thereby prevent the unauthorized opening of the sash window. A typical example of such a lock device automatically locks the catch cam relatively to the co-operating cam keeper when the catch cam is rotated to its operative or latched position. This is undesirable because one might inadvertently rotate the catch cam until it is locked, and the lock device must be unlocked solely with a key.

The present invention seeks to provide a catch or window lock assembly having a lock device which is operable by a key to selectively lock and unlock a catch cam.

According to the invention, there is provided a catch assembly comprising: a catch cam pivotally actuable between an engaged and a disengaged position with respect to a keeper; a slider movable manually between a first position in which it is inoperative and a second position in which it engages a projection on the catch cam in its latched position to prevent disengagement of the catch; retaining means for retaining the

slider in its second position; and key-operated lock means for rendering the retaining means effective.

Preferably the lock means comprises a retainer member coupled with the slide member, a keeper plate having means for keeping the retainer member in a position in which the catch cam is locked in its keeper engaging position, said keeper plate being normally urged to keep the retainer member in its said position, a tumbler assembly having a tumbler plate engageable with the keeper plate to hold the keeper plate out of engagement with the retainer member, and a subsidiary plate having a projection engageable with the tumbler plate, and a key having an actuating portion which when pivoted engages the projection to move the tumbler plate out of engagement with the keeper plate, said actuating portion upon continued pivotal movement engageable with the keeper plate to enable the latter to engage the tumbler plate.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:-

Figure 1 is an exploded, perspective view of a catch or window lock assembly incorporating a lock device, which assembly is provided in accordance with the present invention;

Figure 2 is a perspective view of a retainer plate incorporated in the lock device;

Figure 3 is a vertical sectional view taken along line III-III of Figure 1, with the parts assembled;

Figure 4 is a fragmentary view showing the operative relation between the retainer plate and a keeper plate when the lock device is in its unlocked condition;

Figure 5 is an enlarged fragmentary perspective view showing a tumbler assembly;

Figures 6 to 8 inclusive are fragmentary plan views showing progressive movements of the tumbler assembly and keeper plate

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when a key is turned for locking action; and

Figures 9 to 11 inclusive are fragmentary plan views showing progressive movements of the tumbler assembly and keeper plate when the key is turned for unlocking action.

Figure 1 shows a catch or window lock assembly 10 which comprises a cam assembly 11 adapted to be secured to an end face of a meeting stile of one of sashes of a conventional dual sash window unit (not shown), and a cam keeper 12 adapted to be secured to an inside face of a meeting stile of the other sash. The cam assembly 11 includes an elongated, hollow base of housing 13 of rectangular configuration having a front wall portion 14, a pair of side wall portions 15, 16, a pair of end wall portions 17, 18 and a detachable separate rear wall plate 19. The cam assembly 11 also includes a catch cam or rotary crescent 20 rotatably mounted on the front wall portion 14 by a pivot means which here comprises a double-headed rivet 21. The catch cam 20 includes a base portion 22 of generally circular configuration, an arcuate cam wall or rim 23 formed on the outer surface of the base portion 22 and extending along the edge thereof, a lever 24 extending from the arcuate cam wall 23, and a tubular portion 25 formed on the inner surface of the base portion 22 and disposed in generally concentric relation thereto. The tubular portion 25 has a pair of arcuate engaging sections 26, 27 formed integrally on its edge in diametrically opposed relation, the arcuate engaging sections defining therebetween a pair of diametrically opposed recesses 28. The lever 24 is manipulated to rotate the catch cam 20 about the pivot means 21 between an operative or engaged position (Figure 1) where the arcuate cam wall 23 engages a detent or hook means 29 of the cam keeper 12 to retain the sashes in latched relation and an inoperative or unlatched position where the arcuate cam wall 23 is disposed out of engagement with the detent or hook means 29 to permit the relative movement between the sashes.

The cam assembly 11 also includes a lock device 30 (Figure 3) for locking the catch cam 20 relatively to the cam keeper 12 against rotation about the pivot means 21 from its operative or engaged position, the lock device 30 being contained in the housing 13. The lock device 30 comprises an elongated keeper plate 31 of generally rectangular configuration arranged longitudinally over the rear wall plate 19 and pivotally mounted thereto at one end by means of a pivot pin 32, a slide member 33 received in a longitudinal elongated slot 34 formed through the side wall portion 15 for movement therealong, an L-shaped retainer plate 35 operatively associated with the slide member 33 for movement therewith, and a

tumbler assembly 36 pivotally mounted on the rear wall plate 19 by a pivot pin 37 adjacent to the end wall portion 18.

The L-shaped retainer plate 35 has a recess 38 formed in one leg 39 thereof. The other leg 40 is reduced in width but widened immediately adjacent to the leg 39 to provide an engaging shoulder 41, as best shown in Figure 2.

The slide member 33 includes a one-piece body having a thumb-piece portion 42 of square cross-section projecting exteriorly of the housing 13, an inner portion 43 of generally inverted L-shaped configuration having an abutment edge or surface 44, and an intermediate portion 45 extending through the slot 34 and the recess 38 of the L-shaped plate 35, the inner and intermediate portions 43, 45 having the same thickness and being substantially thinner than the thumb-piece portion 42. The depth of the intermediate portion 45 is substantially equal to the combined thicknesses of the side wall portion 15 and the L-shaped retainer plate 35 so that the leg 39 is held in sliding contact with the inner surface of the side wall portion 15.

The rear wall plate 19 has a stamped-out tab 46 facing and disposed adjacent to the end wall portion 17. The keeper plate 31 also has a stamped-out tab 47 at one marginal portion thereof facing the side wall portion 16, the tabs 46 and 47 being spaced from each other along the length of the housing 13. A torsion spring 48 is coiled about the pivot pin 32 intermediate opposite ends thereof and has its opposite ends borne against the tabs 46, 47, respectively, to normally urge the keeper plate 31 to rotate about the pivot pin 32 in a counter clockwise direction (Figure 3) so that the engaging shoulder 41 of the L-shaped retainer plate 35 can be held in sliding contact with one edge 49 of the keeper plate 31 facing the side wall portion 15, as best shown in Figure 4.

The keeper plate 31 has a longitudinal finger 50 extending from its free or distal end toward the end wall portion 18, the finger 50 having a retaining lug 51 formed thereon and extending toward the rear wall plate 19. The keeper plate 31 has a detent notch 52 of an inverted L-shaped contour formed in the edge 49 adjacent to its distal or free end located remotely from the pivot means 32.

As best shown in Figure 5, the tumbler assembly 36 comprises a tumbler plate 53 placed slidably on the rear wall plate 19 and a subsidiary plate 54 placed slidably on the tumbler plate 53, the tumbler plate 53 and subsidiary plate 54 being supported for pivotal motion about the pivot pin 37. The tumbler plate 53 is interposed between the rear wall plate 19 and the finger 50 of the

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keeper plate 31 and has its distal or free end bifurcated to provide a pair of arms 55, 56, the arm 56 terminating in a hook 57. The tumbler plate 53 has a cam edge or surface 58 facing the end wall portion 18. The subsidiary plate 54 has on its free end a projection 59 extending downwardly beyond the upper face of the tumbler plate 53 toward the rear wall plate 19. A first torsion spring 60 is coiled about the pivot pin 37 intermediate opposite ends thereof, one end thereof bearing against a first stamped-out tab 61 formed at one end portion of the rear wall plate 19 facing the end wall portion 18, and the other end bearing against a tab 62 on the tumbler plate 53 so as to normally urge the tumbler plate 53 to rotate about the pivot pin 37 on the counterclockwise direction as seen in Figure 3. A second torsion spring 63 is coiled about the pivot pin 37 intermediate opposite ends thereof, one end thereof engaging the subsidiary plate 54 and the other end engaging the tab 62 on the tumbler plate 53 so as to normally urge the subsidiary plate 54 to rotate about the pivot pin 37 in the clockwise direction as seen in Figure 3. Thus, the projection 59 on the subsidiary plate 54 is normally held against the cam surface 58 on the tumbler plate 53.

A tension spring 64 (Figure 3) acts between a lug 65 formed on the side wall portion 15 and the slide member 33 to normally urge the slide member 33 upwardly to an inoperative position where the abutment surface 44 is disposed out of engagement with the arcuate engaging section 26, to thereby permit the catch cam 20 to rotate freely about the pivot means 21 between its inoperative or unlatched and operative or latched positions, in which latched position the leg 40 of the retainer plate 35 engages the arcuate engaging section 27. When the slide member 33 is in its inoperative position, the hook 57 of the tumbler plate 53 engages the retaining lug 51 of the keeper plate finger 50.

A snap-action spring wire 66 extends longitudinally within the housing 13 and engages the arcuate engaging sections 26 and 27 to facilitate the rotation of the catch cam 20 into its operative or latched position upon manipulation of the lever 24. The housing 13 has a key hole 67 provided in its front wall portion 14, the key hold 67 being located adjacent to the end wall portion 18. The key hole 67 is receptive therethrough of a key 68 which has an actuating portion 69 shaped to act on the tumbler assembly 36. The rear wall plate 19 has an aperture 70 corresponding in position to the key hold 67, the aperture 70 being provided for reception of the distal end of the inserted key 68.

In operation, the lever 24 is first actuated

to rotate the catch cam 20 to its operative or latched position (Figures 1 and 3.) When the catch cam 20 is to be locked in a manner to prevent the unauthorized unlatching of the sashes, the key 68 is first inserted through the key hole 67. Then, the key 68 is turned counterclockwise in the direction of the arrow 71 in Figure 6 until the actuating portion 69 of the key 68 engages and pushes the subsidiary plate 54, whereupon the downward projection 59 forces the tumbler plate 53 to pivot clockwise in the direction of the arrow 27 in Figure 7. The rotation of the key 68 is continued until the hook 57 is displaced out of engagement with the lug 51 of the keeper plate 31. Upon disengagement of the lug 51 from the hook 57, the keeper plate 31 becomes shifted toward the right or in the direction of the arrow 73 as seen in Figure 8 under the force from the torsion spring 48. When the keeper plate 31 is forced to the position of Figure 8, the lug 51 bumps against the tumbler plate 53 and produces a click, whereupon the operator can stop rotating the key 68 before its actuating portion 69 slides over the projection 59 onto the cam surface 58. As the key 68 is turned back in the direction of the arrow 74 in Figure 8 for withdrawal through the key hole 67, the tumbler assembly 36 is returned under the bias of the spring 60 in the direction of the arrow 75.

With the downward projection 59 engaging the cam surface 58 on the tumbler plate 53, pivotal movement of the key 68 through a slight angle is sufficient for the hook 57 to shift out of engagement with the lug 51.

Then the thumb piece 42 of the slide member 33 is lowered against the bias of the spring 64 to allow the shoulder 41 to move down in sliding engagement with the edge 49 of the keeper plate 31, as the shoulder 41 displaces the keeper plate 31 sideways against the resistance from the torsion spring 48. The shoulder 41 is caused to slide down until it clears an edge that defines the notch 52, whereupon the keeper plate 31 is permitted to spring back again to the position illustrated in Figure 8 where the shoulder 41 is received in the notch 52.

With the shoulder 41 retained in the notch 52, the L-shaped retainer plate 35 and hence the slide member 33 are prevented from moving upwardly. Thus, the abutment surface 44 of the slide member 33 is held in engagement with the arcuate engaging section 26 to thereby arrest rotation of the catch cam 20 out of its latched position.

For unlocking the catch cam 20, the key 68 is again inserted through the key hole 67 and turned counterclockwise in the direction of the arrow 76 (Figure 9), whereupon the actuating portion 69 of the key 68 engages the projection 59 of the subsidiary plate 54 and lifts the tumbler plate 53 to the

extent that the hook 57 is cleared out of the way in which the lug 51 on the keeper plate finger 50 is movable. As the tumbler plate 53 pivots upwardly in the direction of the arrow 77, the actuating portion 69 slides over the projection 59 and pushes the free end of the finger 50 against the force of the spring 48 in the direction of the arrow 78 in Figure 10 until the lug 51 is moved beyond the hook 57. Thus, the keeper plate 31 is shifted sidewise away from the side wall portion 15, and the shoulder 41 is released out of engagement with the notch-bounding edge of the keeper plate 31. When shoulder 41 is allowed out of the notch 52, the L-shaped retainer plate 35 and the slide member 33 are forced to return upwardly in the direction of the arrow 78a (figure 10). The abutment surface 44 of the slide member 33 becomes disengaged from the arcuate engaging section 26, whereupon the catch cam 20 can freely rotate to its unlatched position.

As soon as the actuating portion 69 goes past the projection 59, the tumbler plate 53 is pivoted under the bias of the spring 60 downwardly in the direction of the arrow 79 (Figure 10) in order to allow the hook 57 to get behind the lug 51. With the lug 51 engaged by the hook 57, the keeper plate 31 stays away from the side wall portion 15. The key 68 is then rotated in the direction of the arrow 80 in Figure 11 to enable the actuating portion 69 to shove the projection 59 of the subsidiary plate 54 away from the cam surface 58 of the tumbler plate 53 against the resistance of the torsion spring 63, until the actuating portion 69 moves past the projection 59 into alignment with the key hold 67 for removal therethrough out of the housing 13.

With this arrangement, the slide member 33 and hence the L-shaped retainer plate 35 are never locked as long as the keeper plate 31 is retained away from the side wall portion 15 by engagement of the lug 51 with the hook 57. Thus, unless the tumbler assembly 36 is actuated by the key 68, no accidental locking of the latched catch cam 20 takes place even if the thumb piece 42 is pushed down. Further, once the latched catch cam 20 is locked, it is impossible to unlock the same without a key to the lock device 30.

WHAT WE CLAIM IS:-

1. A catch assembly comprising: a catch cam pivotally actuatable between an engaged and a disengaged position with respect to a keeper; a slider movable manually between a first position in which it is inoperative and a second position in which it engages a projection on the catch cam in its latched position to prevent disengagement of the catch; retaining means for retaining the slider in its second position; and key-

operated lock means for rendering the retaining means effective.

2. A catch assembly according to claim 1, wherein the lock means comprises a retainer member coupled with the slider, a keeper plate having means for keeping the retainer member in a position in which the catch cam is locked in its keeper engaging position, said keeper plate being normally urged to keep the retainer member in its said position, a tumbler assembly having a tumbler plate engageable with the keeper plate to hold the keeper plate out of engagement with the retainer member, and a subsidiary plate having a projection engageable with the tumbler plate, and a key having an actuating portion which when pivoted engages the projection to move the tumbler plate out of engagement with the keeper plate said actuating portion being upon continued pivotal movement engageable with the keeper plate to enable the latter to engage the tumbler plate.

3. A catch assembly according to claim 1 or 2, wherein the slider is actuated by way of a thumb piece.

4. A catch assembly according to claim 1 or 2, wherein the slider is normally biased so as to be out of engagement with the projection on the catch cam.

5. A catch assembly according to claim 2, or claim 3 or 4, wherein appendent to claim 2, wherein the tumbler plate is normally biased so as to be in engagement with the keeper plate.

6. A catch assembly substantially as herein described with reference to the drawings.

For the Applicants,
J.F. WILLIAMS & CO.,
Chartered Patent Agents,
34 Tavistock Street,
London WC2A AY.

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5 extent that the hook 57 is cleared out of the
way in which the lug 51 on the keeper plate
finger 50 is movable. As the tumbler plate
53 pivots upwardly in the direction of the
arrow 77, the actuating portion 69 slides
over the projection 59 and pushes the free
end of the finger 50 against the force of the
spring 48 in the direction of the arrow 78 in
10 Figure 10 until the lug 51 is moved beyond
the hook 57. Thus, the keeper plate 31 is
shifted sidewise away from the side wall
portion 15, and the shoulder 41 is released
out of engagement with the notch-bounding
edge of the keeper plate 31. When shoulder
15 41 is allowed out of the notch 52, the
L-shaped retainer plate 35 and the slide
member 33 are forced to return upwardly in
the direction of the arrow 78a (figure 10).
The abutment surface 44 of the slide mem-
ber 33 becomes disengaged from the arcuate
engaging section 26, whereupon the catch
cam 20 can freely rotate to its unlatched
position.

25 As soon as the actuating portion 69 goes
past the projection 59, the tumbler plate 53
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downwardly in the direction of the arrow 79
(Figure 10) in order to allow the hook 57 to
get behind the lug 51. With the lug 51
engaged by the hook 57, the keeper plate 31
stays away from the side wall portion 15.
The key 68 is then rotated in the direction of
the arrow 80 in Figure 11 to enable the
actuating portion 69 to shove the projection
35 59 of the subsidiary plate 54 away from the
cam surface 58 of the tumbler plate 53
against the resistance of the torsion spring
63, until the actuating portion 69 moves past
the projection 59 into alignment with the
key hold 67 for removal therethrough out of
40 the housing 13.

With this arrangement, the slide member
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accidental locking of the latched catch cam
50 20 takes place even if the thumb piece 42 is
pushed down. Further, once the latched
catch cam 20 is locked, it is impossible to
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1. A catch assembly comprising: a catch
cam pivotally actuatable between an engaged
and a disengaged position with respect to a
keeper; a slider movable manually between
60 a first position in which it is inoperative and
a second position in which it engages a
projection on the catch cam in its latched
position to prevent disengagement of the
catch; retaining means for retaining the
65 slider in its second position; and key-

operated lock means for rendering the
retaining means effective.

2. A catch assembly according to claim
1, wherein the lock means comprises a
70 retainer member coupled with the slider, a
keeper plate having means for keeping the
retainer member in a position in which the
catch cam is locked in its keeper engaging
position, said keeper plate being normally
75 urged to keep the retainer member in its
said position, a tumbler assembly having a
tumbler plate engageable with the keeper
plate to hold the keeper plate out of
engagement with the retainer member, and
80 a subsidiary plate having a projection en-
gageable with the tumbler plate, and a key
having an actuating portion which when
pivoted engages the projection to move the
tumbler plate out of engagement with the
keeper plate said actuating portion being
85 upon continued pivotal movement engage-
able with the keeper plate to enable the
latter to engage the tumbler plate.

3. A catch assembly according to claim 1
or 2, wherein the slider is actuated by way of
a thumb piece.

4. A catch assembly according to claim 1
or 2, wherein the slider is normally biased so
as to be out of engagement with the projec-
95 tion on the catch cam.

5. A catch assembly according to claim
2, or claim 3 or 4, wherein appendent to
claim 2, wherein the tumbler plate is nor-
mally biased so as to be in engagement with
the keeper plate.

6. A catch assembly substantially as
herein described with reference to the draw-
ings.

For the Applicants,
J.F. WILLIAMS & CO.,
Chartered Patent Agents,
34 Tavistock Street,
London WC2A AY.

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