United States Patent [19]

Galbreath et al.

[11] **3,893,722**

[45] **July 8, 1975**

[54] **LATCH AND LOCK STRUCTURE**

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[73] Assignee: **Overhead Door Corporation**, Dallas, Tex.

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[52] **U.S. Cl.** **292/100**; 292/240; 70/70

[51] **Int. Cl.²** **E05C 3/16**

[58] **Field of Search** 292/100, 108, 134, 210, 292/240, 241; 70/69, 70, 71, 73

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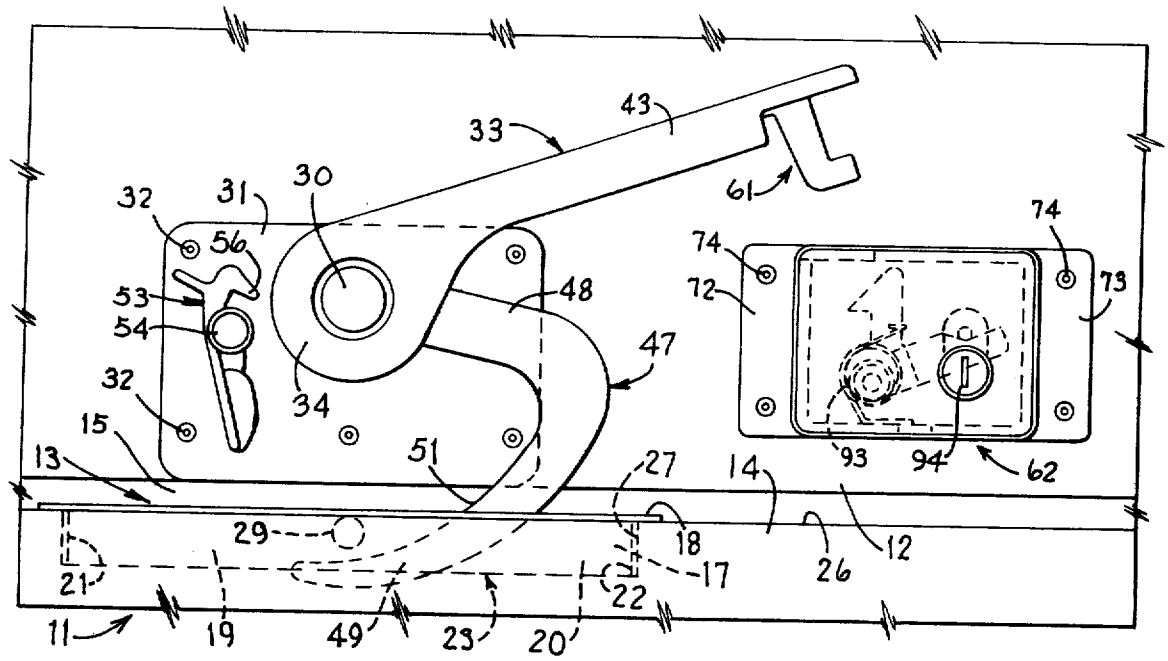
Primary Examiner—Richard E. Moore

Attorney, Agent, or Firm—Woodhams, Blanchard and Flynn

[57] **ABSTRACT**

Latch and lock structure for a door wherein the latch includes a bolt and is pivotally mounted upon the door for movement around an axis substantially perpendicular to the plane of the door when it is in its closed position. The latch has an end portion with a recess opening radially of said axis. A bracket is secured to the door for engagement by the latch when it is in the latch position. An L-shaped lever is pivotally secured to the bracket and has an abutment on one leg thereof which is receivable into said recess when said latch is in the latched position. Actuating means engages the other leg of said L-shaped lever for pivoting same and thereby moving said abutment out of said recess. Resilient means yieldably urges said abutment means into the locked position, said actuating means limiting the amount of said urging.

3 Claims, 8 Drawing Figures



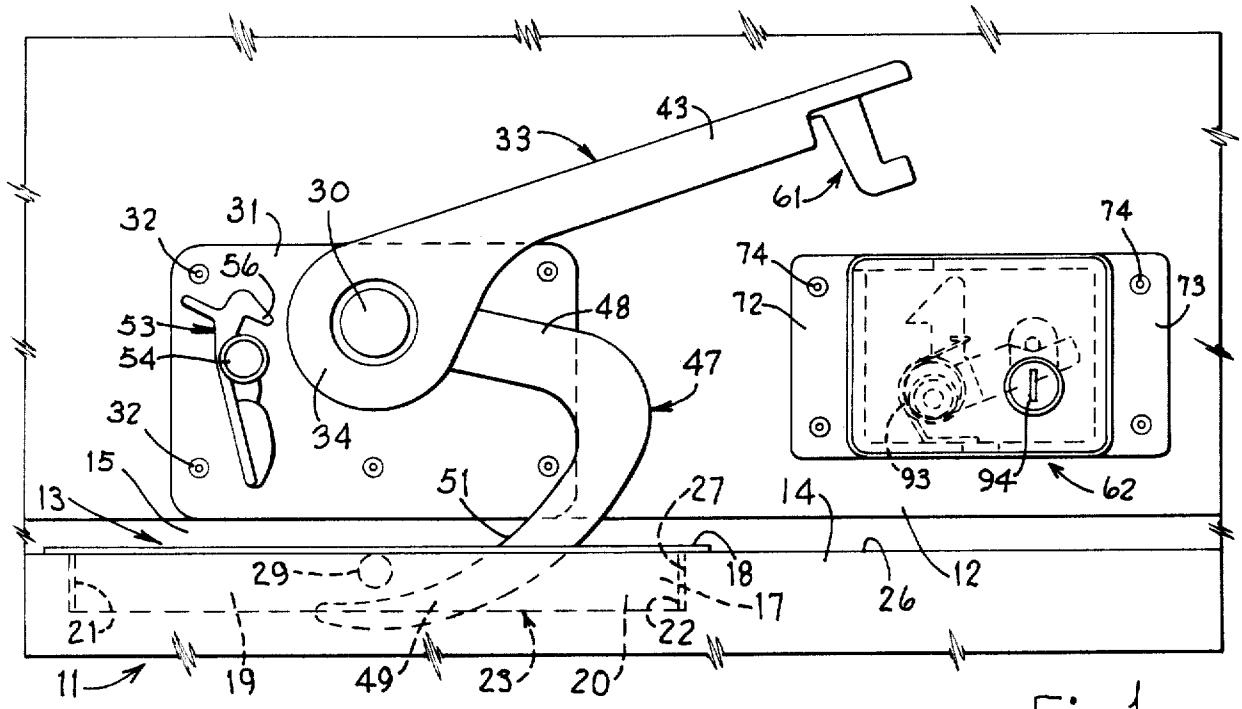

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Fig. 1

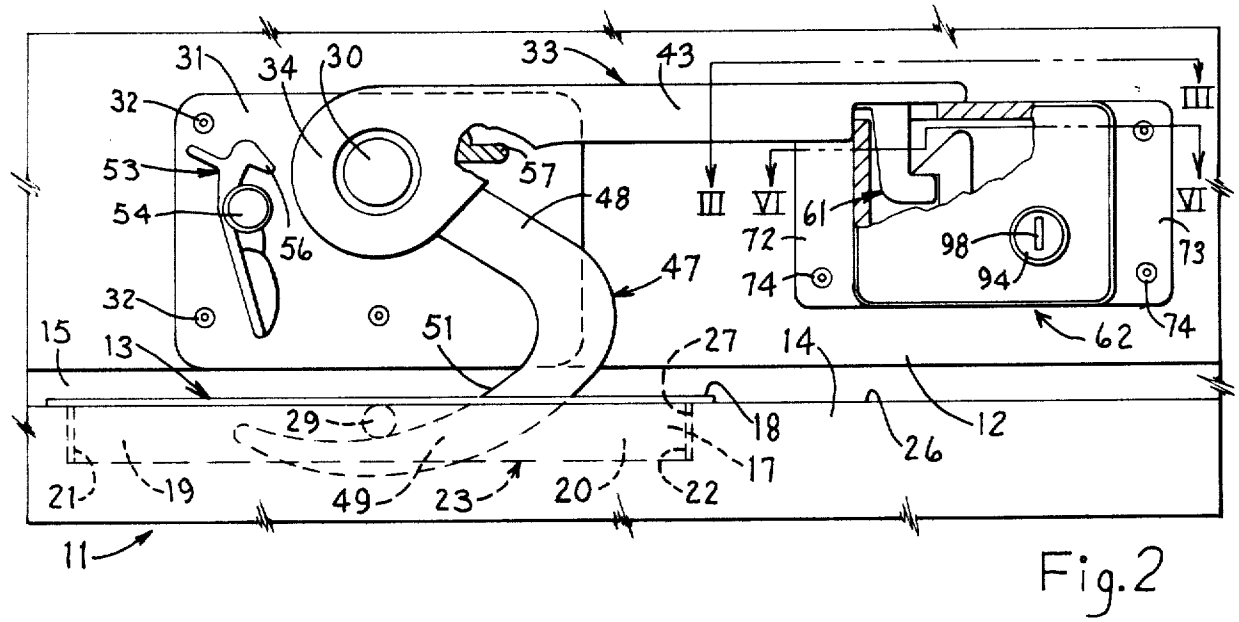

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Fig. 2

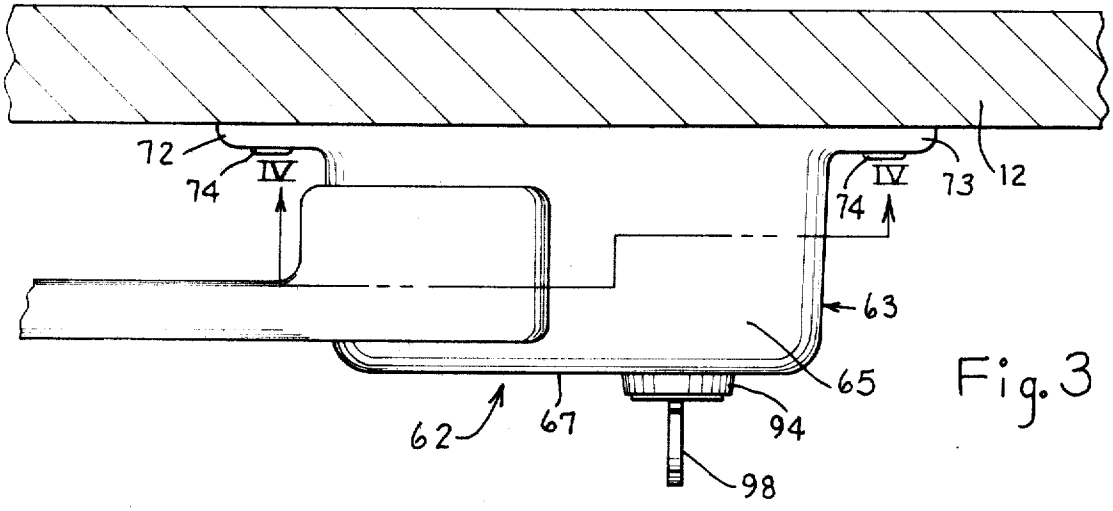


Fig. 3

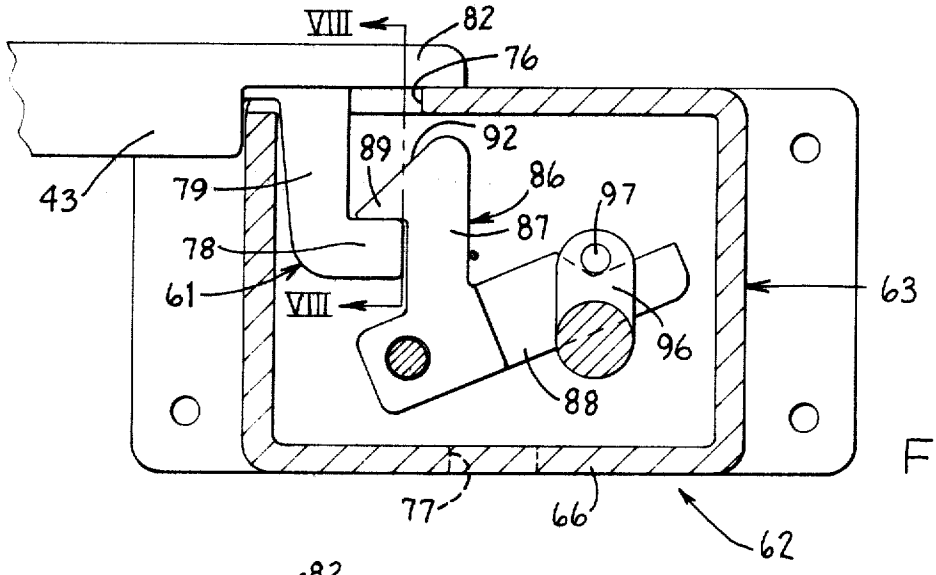


Fig. 4

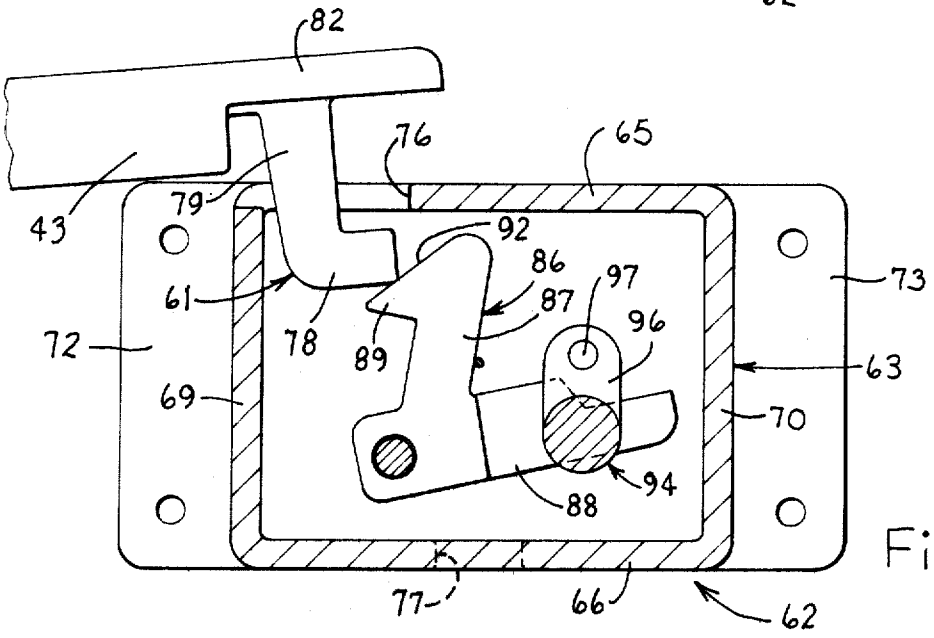


Fig. 5

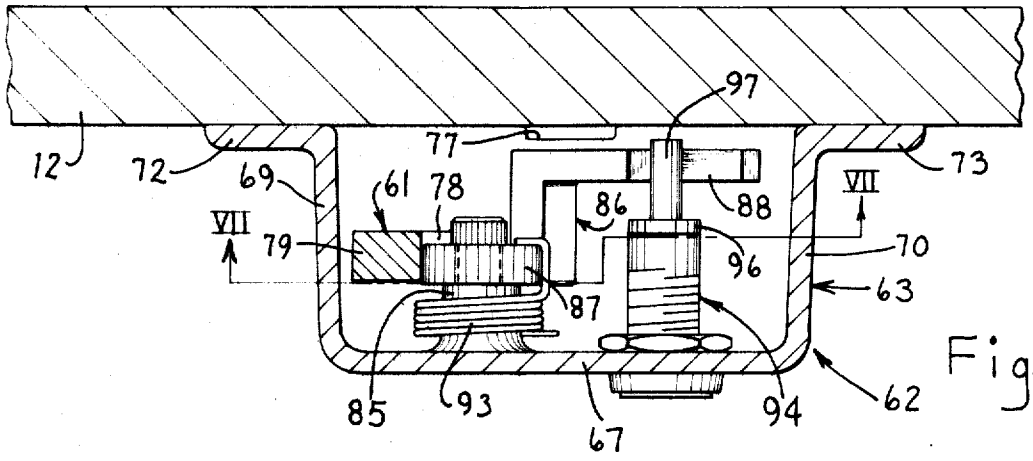


Fig. 6

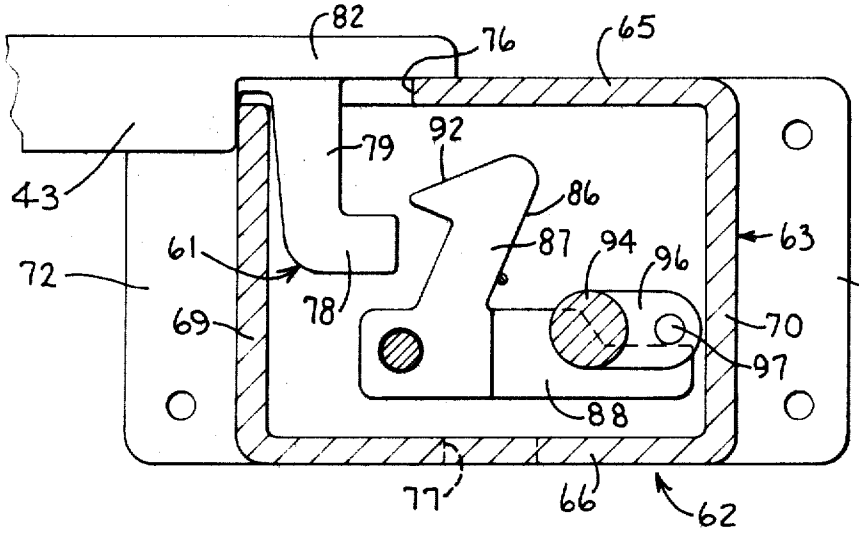


Fig. 7

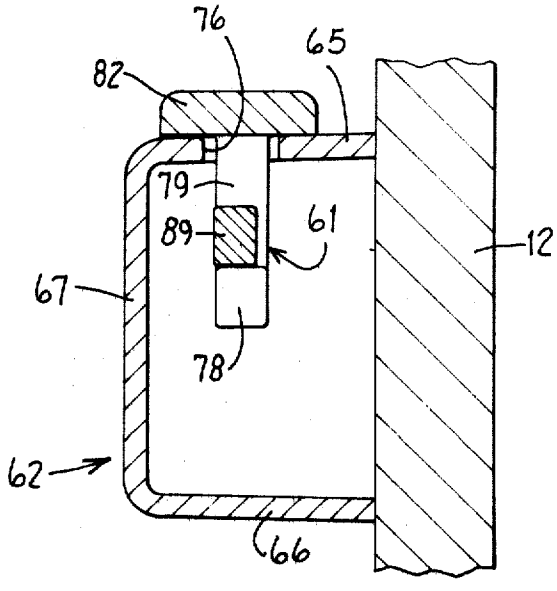


Fig. 8

LATCH AND LOCK STRUCTURE

BACKGROUND OF THE INVENTION

This invention relates in general to a latch and lock structure for a door and, more particularly, to a type thereof adapted for mounting upon an upwardly acting truck door, the latch means being capable of automatic self-adjustment to compensate for looseness, and a lock means including a tamper-proof device for locking the latch in the locked position whereby to provide maximum security within the truck.

Persons familiar with the manufacture, installation and maintenance of doors, particularly upwardly acting doors for truck vans, for example, have long been aware that the latch structures in such doors are subject to unusually rough treatment, even under substantially normal operating conditions. That is, truck doors and their latch structures are constantly exposed to the weather, they are often strained by the loads carried in the truck van or battered by external obstructions, and they are frequently subjected to excessive and distructive forces, sometimes intentionally for the purpose of effecting unauthorized access to the contents of the truck van.

Where looseness exists between the latch bolt on a door and the catch on the truck bed, the result is a noisy and unsightly door the movements of which tend to aggravate the wear problem and usually accelerate latch and/or lock failure. U.S. Pat. No. **3 642 314**, which is assigned to the Assignee of this application, discloses and claims a lock structure which minimizes, if not virtually eliminates, most of the above discussed problems which develop from a loose latch and catch condition.

In order to prevent unauthorized entrance into the van of the truck, the door latch structure is usually furnished with some type of mechanism, such as a padlock, which releasably holds the latch handle in the latched position. However, this arrangement has not been altogether satisfactory, if only because it is necessary to furnish expensive padlocks which are frequently misappropriated. The latch and lock structure claimed and disclosed in U.S. Pat. No. **3,740,978** was developed in an effort to provide a tamper-proof lock for the latch structure. This patent is assigned to the Assignee of this application. The lock assembly shown in U.S. Pat. No. **3,740,978** was a step forward and overcame the combined problems of unauthorized entry and stolen padlocks. However, it lacks one highly desirable feature, namely, the ability to return automatically to the locked engagement with the latch handle when the latch handle is returned to its latched position. That is, the locking action is not automatic in the previous lock structure.

Accordingly, a primary object of this invention has been the provision of an improved latch and lock structure for a door, such as an upwardly acting truck door, wherein the latch mechanism is adapted to adjust automatically and thereby minimize looseness between the door and the truck bed resulting from normal wear, minor inaccuracies of installation and/or acceptable tolerances in parts, whereby the useful life of the latch and lock structure and/or the door is extended.

A further object of this invention is the provision of a latch and lock structure for a door in which the latch mechanism includes an elongated handle pivotally mounted upon the door and a spring urged catch lever which is pivotally mounted upon the door, said catch lever being engageable with the latch handle for holding same in the latched position.

A further object of this invention is the provision of a lock mechanism, as aforesaid which positively prevents pilferage of the lock mechanism, which minimizes the possibility of unauthorized opening of the lock, as by force, and which provides for an automatic locking of the latch handle when it is returned to the latched position.

Other objects and purposes of the invention will become apparent to persons familiar with latch and lock structures, particularly for upwardly acting truck doors, upon reading the following descriptive material and examining the accompanying drawings, in which:

FIG. **1** is a broken, fragmentary rear elevational view of a truck door and an adjacent portion of a truck bed including the latch and lock structure embodying the invention.

FIG. **2** is a broken, fragmentary rear elevational view of a truck door and an adjacent portion of a truck bed similar to that shown in FIG. **1** but with parts thereof in different operating positions.

FIG. **3** is an enlarged sectional view taken along the line III—III in FIG. **2.**

FIG. **4** is a sectional view taken along the line IV—IV in FIG. **3.**

FIG. **5** is a sectional view similar to that shown in FIG. **4** with parts thereof in different operating positions.

FIG. **6** is an enlarged view taken along the line VI—VI in FIG. **2.**

FIG. **7** is a sectional view taken along the line VII—VII in FIG. **6.**

FIG. **8** is a sectional view taken along the line VIII—VIII in FIG. **4.**

For convenience in description, the terms "upper", "lower", "front", "rear" and words of similar import will have reference to the latch and lock structure of the invention and parts of the truck door associated therewith as appearing in FIG. **1** which discloses the rear side of the door. The terms "inner", "outer" and derivatives thereof will have reference to the geometric center of the latch and lock structure of the invention and parts thereof or associated therewith.

SUMMARY OF THE INVENTION

The objects and purposes of the invention, including those set forth above, have been met by providing a latch and lock structure comprising catch means mounted in the bed of a truck or similar vehicle and a latch mechanism mounted upon the lower end of an upwardly acting door of the truck van and having a latch bolt including an elongated hook portion engageable with the catch means. The latch bolt is pivotally mounted upon the door and is moved into the latched position by an actuating member which is releasably held in its latching position by a tamper-proof lock mechanism. Gravity also opposes release of the latch bolt from its latched position. The actuating member is held away from its latching position by a keeper.

DETAILED DESCRIPTION

The latch and lock structure of the invention, a preferred embodiment of which is disclosed in FIG. **1**, is comprised of a latch assembly **11** mounted upon the lower end of an upwardly acting door **12** for engage-

ment with a catch assembly **13** that is mounted in the bed **14** of an otherwise substantially conventional truck van, of which the door **12** is a part. The door **12** may be comprised of a plurality of horizontally hinged sections which are disposed in a substantially vertical plane, when the door is closed, and in a substantially horizontal plane near the roof of the van when the door is open. A resiliently flexible weather seal **15** (FIG. **1**) is mounted on the lower edge of the door **12** and is engageable with the bed **14** in a conventional manner and for conventional purposes.

The catch assembly **13** (FIGS. **1** and **2**) is comprised of an elongated, substantially rectangular casing **17** having a top flange **18**, a pair of sidewalls **19** and **20** (FIG. **1**) and a pair of end walls **21** and **22** (FIG. **6**). The sidewalls **19, 20** and the end walls **21, 22** define a catch chamber **23** which preferably opens upwardly to receive the latch bolt **47** and downwardly for drainage.

The top flange **18** (FIG. **1**) preferably extends beyond both end walls **21, 22** and the rear sidewall **20** for engagement with the upper surface **26** of the bed **14** when the casing **17** is located within the opening **27** in the bed **14**. The top flange **18** may be secured to the bed **14** by welding, by screws or any other convenient, conventional means. The catch assembly **13** includes a catch pin **29**, which is secured to and extends between the sidewalls **19** and **20** of the casing **17** about midway between the end walls **21** and **22**.

The latch assembly **11** (FIG. **1**) has a mounting plate **31** which is secured to the rear surface of the door **12** adjacent the lower edge thereof by means of rivets **32**. The front end of the axle **30** is rigidly secured to the mounting plate **31** by means such as welding and/or staking.

A manually operated actuating member **33** (FIGS. **1** and **2**), which is rotatably supported on axle **30**, is comprised of a housing **34**, the details of which are disclosed in said U.S. Pat. No. **3,642,314**. The actuating member **33** (FIG. **1**) has an integral handle **43** which projects from the housing **34** lengthwise thereof and substantially radially of the axle **30**.

The latch bolt **47** (FIG. **1**) has a shank **48**, which is rotatably supported at its upper end upon the axle **30**, and an elongated, arcuate hook **49** integral with the outer end of the shank **48** and having a slightly cammed inner surface **51**. The portion of surface **51** adjacent shank **48** is nearer to axle **30** than is the portion of surface **51** adjacent the free end of the hook **49**. The center of gravity of the latch bolt **47**, when it is pivotally supported by axle **30** is near the shank **48**. Thus gravity urges latch bolt **47** into its locked position of FIG. **2**.

An unlatched keeper **53** (FIGS. **1** and **2**) is pivotally mounted upon a pivot pin **54** which is rigidly secured to the mounting plate **31** near the housing **34**. The keeper **53** has a hook **56** near one end which is engageable with a flange **57** (FIG. **2**) on the housing **34** whereby the actuating member **33** and bolt **47** are held in their unlatched positions, which are approximately **180°** from their latched positions of FIG. **2**.

The free or rightward end of the handle **43** (FIGS. **1** and **2**) has a C-shaped portion **61** which, in this embodiment opens radially outwardly, relative to the axle **30**.

The lock assembly **62** (FIGS. **4** through **8**), which includes the portion **61** of handle **43**, also includes the rectangular casing **63** (FIG. **3**) which has a top wall **65**, bottom wall **66**, rear sidewall **67** and end walls **69** and **70**. A pair of flanges **72** and **73** (FIG. **7**) which are integral with and preferably perpendicular to the end walls **69** and **70**, extend away therefrom for mounting the casing **63** on the door **12** by means such as rivets **74**.

The top and bottom walls **65** and **66** (FIG. **8**) have openings **76** and **77**, respectively. The lower leg **78** and bight **79** of the C-shaped portion **61** can move through opening **76** into the positions thereof shown in FIG. **4** from the positions thereof shown in FIG. **1**. When the C-shaped portion **61** is in its FIG. **4** position, lateral extensions of the upper leg **82** (FIG. **7**) bear against the upper surface of the top wall **65** to positively limit downward movement of the portion **61**.

A pivot axle **85** is rigidly secured, as by brazing or staking, to the rear side wall **67** so that it extends toward the door **12** near the lower edge thereof. A substantially L-shaped catch lever **86** is pivotally supported near the intersection of the arms **87** and **88** thereof for movement around a horizontal axis which, in this embodiment, is preferably parallel with the pivotal axis of the axle **85**. The catch arm **87**, which has a hook or projection **89** near its upper end, is laterally offset rearwardly from the locking arm **88**.

The upper edge of the catch arm and its attached hook **89** have a downwardly and leftwardly sloping upper surface **92** which permits the lower leg **78** of the C-shaped portion **61** to slide therealong as it moves downwardly through the opening **76**, thereby causing the arm **87** to pivot rightwardly away from the portion **61**. A coil spring **93** has one end thereof anchored upon the casing **63**, the other end thereof being hooked around the catch arm **87** whereby said catch arm is continuously urged into its locking position with the C-shaped portion **61**, as shown in FIGS. **4** and **6**. A substantially conventional lock cylinder **94** is mounted upon the rear sidewall **67** so that it extends axially toward the lower edge of the door **12**. This is the reason for the offset of the arm **87** rearwardly form the arm **88**. A crank **96** is included in the lock cylinder assembly and has a crank pin **97** which is engageable with the upper edge of the locking arm **88** near its outer end, as shown in FIGS. **4, 6** and **7**, for rotating the catch lever **86** around its axle **85** from the locked position of FIG. **4** into the unlocked position of FIG. **7**, while overpowering the contrary urging of the spring **93**.

The lock cylinder **94** may be one of at least two different types. For example, the lock cylinder may be operated by a key **98** (FIG. **3**) which cannot be removed unless it is in the vertical plane. This assures that the handle **43** will always be positively prevented from moving upwardly away form the casing **63** if said handle **43** has been moved into its latched position where the lateral extensions (FIG. **8**) on the leg **82** have come into bearing engagement with the upper surface of the top wall **65**. That is, with the upper leg **82** bearing against the top wall **65** of the casing **63** the hook **89** will automatically move into its locked position of FIG. **4** due to urging by the spring **93**.

On the other hand, the lock cylinder **94** may be of the type wherein the key can be removed after the lock has been rotated **90°**, as appearing in FIG. **2**. In such case, the crank **96** and its pin **97** acting through the catch lever, will continue to hold the catch arm **87**, away from engagement with the portion **61** of the handle **43**. In that case, the handle **43** can be freely moved between positions where the bolt **47** is in and out of engagement with the catch pin **29**.

It will be seen that the C-shaped portion **61** can open radially inwardly, relative to the axle **30**, and produce the same results provided that the catch lever **86** is mounted upon the opposite side, namely the left side, of the C-shaped portion **61**, as it appears in FIG. **5**.

OPERATION

The operation of the door latch and lock structure described above will be apparent from such description to a person of ordinary skill in the manufacture of truck door latches and locks. However, primarily for the purpose of convenience, the latch and lock operation will now be summarized.

When it becomes desirable to unlatch the assembly **11**, the key **98** (FIG. **2**) is turned **90°** in the clockwise direction, whereby the hook **89** is moved sidewardly away from the lower leg **78** of the C-shaped portion **61**, as shown in FIG. **7**. The C-shaped portion **61** can now be moved upwardly away from the casing so that the handle **43** (FIG. **1**) can be raised and pivoted around the axle **30**, whereby the hook **49** of latch bolt **47** is moved from beneath the pin **29**. After the bolt **47** is released from the pin **29**, continued counterclockwise movement of the handle **43** brings the flange **57** (FIG. **2**) into engagement with the hook **56** whereby the handle **43** is held in its unlatched or inoperative position.

When it becomes desirable to relatch the door and lock the handle in latched position, the hook **56** is released from the flange **57** and the handle **43** is rotated in the clockwise direction (FIG. **1**) so that the C-shaped portion **61** can move through the opening **76** in the top wall of the casing **63**. During such movement of the handle **43**, the hook **49** of the latch bolt **47** slides under and engages the pin **29** in the catch assembly **13**. During the downward movement of the handle **43**, the door **12** is forced downwardly so that the seal **15** will be in engagement with the bed **14** of the truck van.

As the latch handle **43** is moved into its latched position, the lower leg **78** of C-shaped portion **61** slides down the upper sloped surface of the hook **89**, thereby moving the catch arm **87** rightwardly. When the upper leg **82** bears against the casing **63**, the spring **93** urges the catch arm **87** in the counterclockwise direction until the hook **89** is in locked position with respect to the C-shaped portion **61**. At this point, a release of the hook **89** from the C-shaped portion **61** can be achieved only by placing the proper key in the cylinder **94** and rotating it clockwise.

Although a particular preferred embodiment of the invention has been disclosed above for illustrative purposes, it will be understood that variations or modifications of such disclosure, which come within the scope of the invention are fully contemplated.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In combination, a truck van having a door frame defining an access opening into the interior of said van, a door movably supported on said van and having interior and exterior surfaces, said door being positionable in a closed position wherein it closes said access opening and being movable upwardly into an open position, catch means mounted on the bed of said van, and latch means movably mounted on said door adjacent said exterior surface and coacting with said catch means for holding said door in said closed position, said latch means including a hook-shaped latch bolt swingably mounted on said door and releasably engageable with said catch means, said latch means further including an elongated actuating handle pivotally supported on said door for swinging movement about a pivot axis and coacting with said latch bolt for controlling the movement thereof, said actuating handle being pivotally movable relative to said door between latched and unlatched positions, the improvement comprising:

bracket means fixedly mounted on said door adjacent the exterior surface thereof and projecting outwardly therefrom, said bracket means comprising a boxlike casing cooperating with said exterior surface to define a substantially closed compartment therebetween, said compartment being totally closed except for an opening formed in the top wall of said casing;

said casing also having a front wall which is spaced outwardly from and is substantially parallel to the exterior surface of said door;

said actuating handle having a recessed portion defining a recess therein, the recessed portion of said handle comprising a C-shaped portion fixedly connected to said handle adjacent the free end thereof and defining said recess which extends radially with respect to said pivot axis, the bight and the lower leg of said C-shaped portion projecting through said opening and being totally enclosed within said compartment when said handle is in said latched position, the upper leg of said C-shaped portion abutting the top wall of said casing and overlapping said opening for closing same, whereby said compartment is totally closed when the handle is in said latched position;

lever means disposed within said compartment and pivotally mounted relative to said bracket means, said lever means having a projection means fixedly mounted thereon and disposed for movement between locked and unlocked positions responsive to swinging movement of said lever means, said projection means being disposed within said recess when said projection means is in said locked position and said actuating handle is in its latched position for positively preventing material movement of said handle away from said latched position;

resilient means coacting with said lever means for yieldably urging said lever means in a direction whereby said projection means is automatically moved into said locked position; and

key-operated release means mounted upon said bracket means and engageable with said lever means for pivoting said lever means so that said projection means is moved from its locked position into its unlocked position, said key-operated release means being operated solely by a key and being the sole means for permitting movement of said lever means away from its locked position so as to release said actuating handle, said key-operated release means including a rotatable lock cylinder disposed within said compartment for rotation about an axis which is substantially perpendicular to the front wall of said casing, said lock cylinder being rotatably mounted solely on said front wall and having the key-receiving end thereof projecting through said front wall.

2. In combination, a truck van having a door frame defining an access opening into the interior of said van, a door movably supported on said van and positionable

in a closed position wherein said door closes said access opening, said door being movable upwardly into an open position, catch means mounted on the bed of said van, and latch means movably mounted on said door and coacting with said catch means for holding said door in said closed position, said latch means including a hook-shaped latch bolt swingably mounted on said door and releasably engageable with said catch means, said latch means further including an elongated actuating handle pivotally supported on said door for swinging movement about a pivot axis and coacting with said latch bolt for controlling the movement thereof, said actuating handle being pivotally movable relative to said door between latched and unlatched positions, the improvement comprising:

bracket means fixedly mounted on said door adjacent the exterior side thereof, said bracket means defining therein a substantially closed compartment;

said actuating handle having a recessed portion defining a recess therein;

lever means disposed within said compartment and pivotally mounted relative to said bracket means, said lever means having a projection means fixedly mounted thereon and disposed for movement between locked and unlocked positions responsive to swinging movement of said lever means, said projection means being disposed within said recess when said projection means is in said locked position and said actuating handle is in its latched position for positively preventing material movement of said handle away from said latched position;

said bracket means having an opening formed therein and providing communication with said compartment, and said portion of said handle projecting into said opening when said handle is in said latched position, said handle covering and closing said opening when said handle is in said latched position;

resilient means coacting with said lever means for yieldably urging said lever means in a direction whereby said projection means is automatically moved into said locked position; and

key-operated release means mounted upon said bracket means and engageable with said lever means for pivoting said lever means so that said projection means is moved from its locked position into its unlocked position, said key-operated release means being operated solely by a key and being the sole means for permitting movement of said lever means away from its locked position so as to release said actuating handle;

said lever means comprising an L-shaped lever having first and second legs laterally offset from one another and interconnected by a transversely extending intermediate portion which defines the pivot for said lever, said first leg having said projection means fixedly mounted thereon adjacent the free end thereof, and said release means including rotatable crank means disposed in engagement with said second leg.

3. The combination according to claim 2, wherein said recess opens radially relative to the pivot axis of said handle, said lever being mounted for pivoting movement about a second axis which is parallel to said pivot axis, and said release means including a rotatable lock cylinder rotatably mounted on said bracket means for rotation about a third axis which is spaced from but substantially parallel to said second axis.

* * * * *