April 6, 1965 J. F. McKEE ETAL 3,177,022

LATCHING MECHANISM FOR OVERHEAD DOORS

Filed May 7, 1963 2 Sheets-Sheet 1

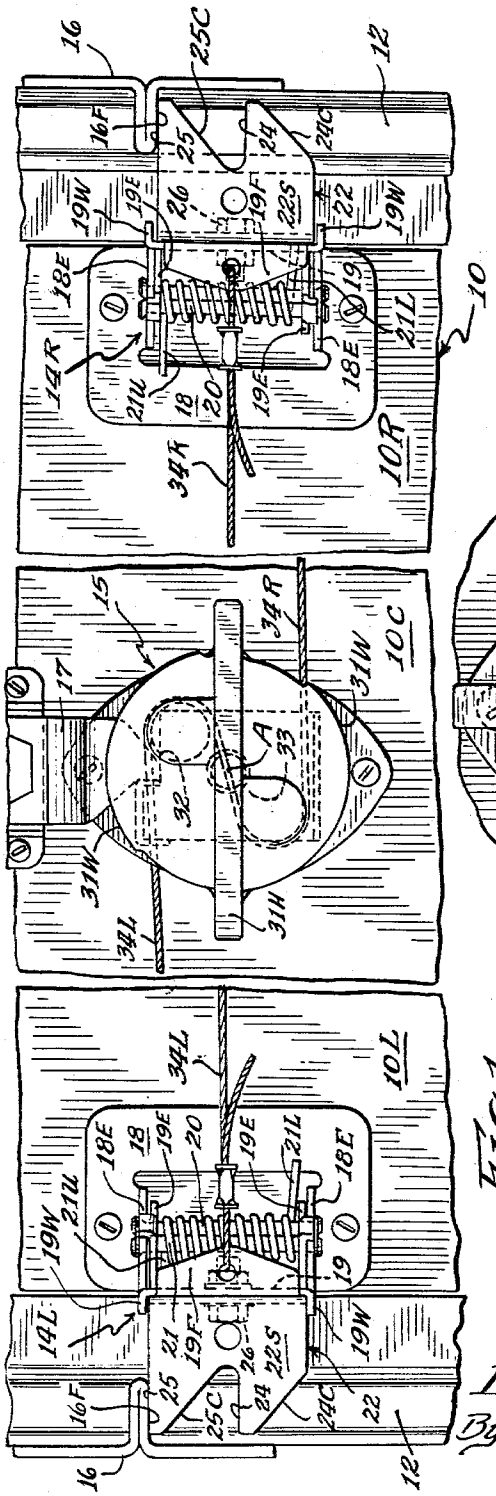

Fig. 1.

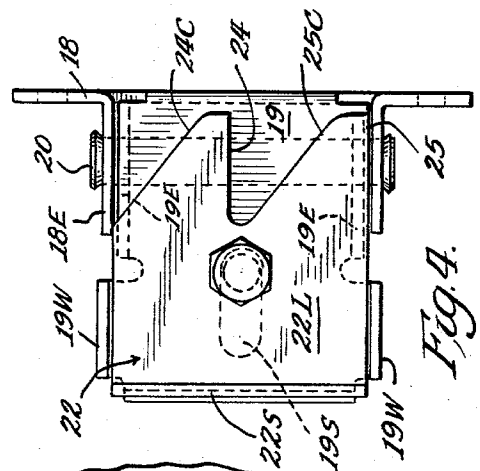

Fig. 4.

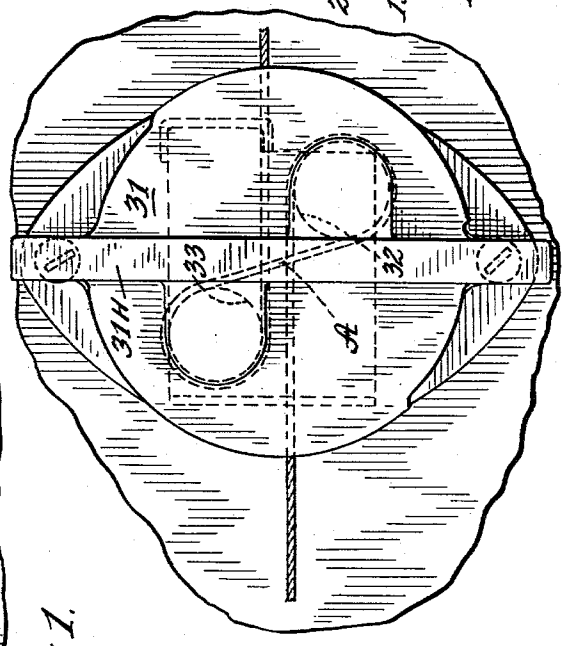

Fig. 5.

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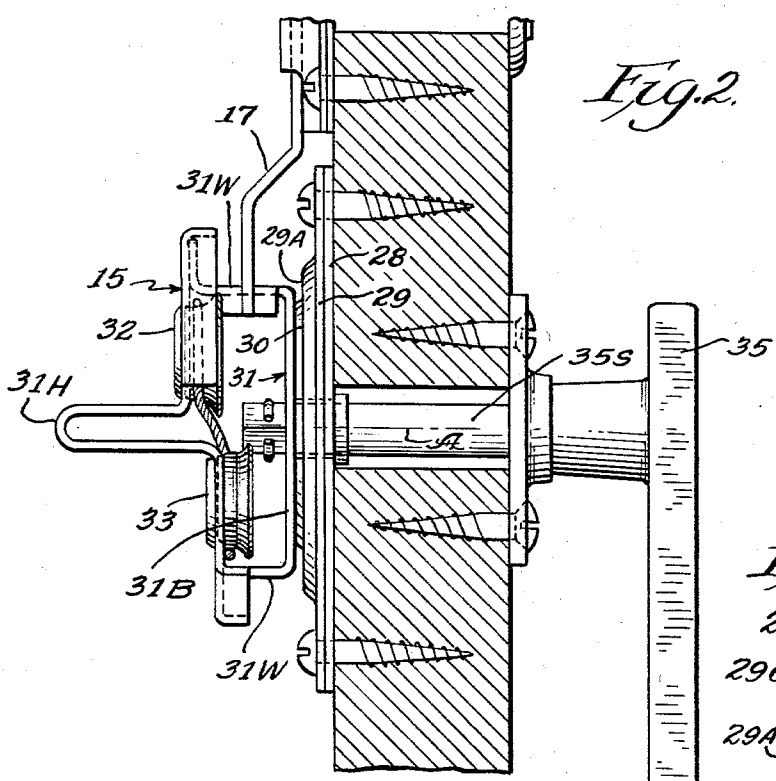

Fig. 2.

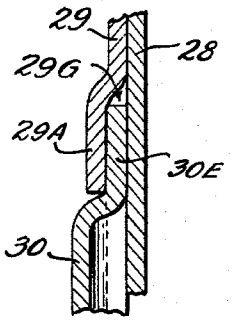

Fig. 2A.

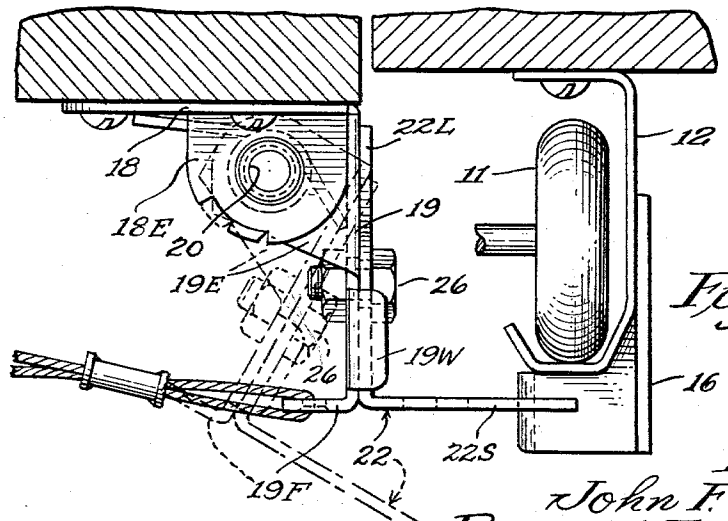

Fig. 3.

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LATCHING MECHANISM FOR OVERHEAD DOORS

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1 Claim. (Cl. 292—50)

This invention relates to a latching mechanism for an overhead door and more particularly is concerned with providing a simplified, low cost, reliable latching mechanism that is easy to install, adjust and operate.

The principal objects of the invention are to provide a latching mechanism: that is stable in both its latch position and its release position; that may be left in its latch position during door closure to automatically latch without any requirement for manual actuation; that is readily adjustable to engage a track mounted strike over a considerable range of track taper; that is adaptable to various door clearance conditions such as may occur due to heaving of the floor, or due to obstacles such as snow, ice or stones under the door and preventing complete closure thereof; and that is readily releasible by a door opening motion applied to the latching mechanism at any intermediate point therealong.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same;

FIG. 1 is a fragmentary, elevational view of the latching mechanism applied to an overhead door with the door shown in closed position and with intermediate portions of the door and the latching mechanism broken out to facilitate enlarged illustration;

FIG. 2 is a fragmentary side elevational view of the actuator element of the latching mechanism of this invention;

FIG. 2A is an enlarged fragmentary view of the actuator structure;

FIG. 3 is a fragmentary plan view illustrating the details of the latch and strike arrangement provided for each track;

FIG. 4 is a side elevational view illustrating additional details of the latch; and

FIG. 5 is a front elevational view of the actuator illustrating it in its latch release position.

Referring now to the drawings, and particularly to FIG. 1 thereof, there is a fragmental illustration of an overhead door designated generally as 10 and having a central portion 10C, a left-hand portion 10L, and a right hand portion 10R. The door 10 may comprise a plurality of hingedly-connected horizontal sections, one or more of which are equipped with guides 11 (see FIG. 3), operating in guideways defined by tracks 12 that lead upwardly at a slight incline adjacent to the opposite edges of the door for cooperably controlling door opening and door closing movements.

The latching mechanism which is also shown fragmentally in FIG. 1 includes left and right hand latch assemblies, designated generally at 14L and 14R, respectively, mounted on the corresponding door portions and a central latch actuator 15 mounted on the door center portion 10C and rotatable about its central axis A between a latch position as represented in FIG. 1 and a release position as represented in FIG. 5. It should be apparent that the axis A is oriented generally normal to the plane of the door 10. Each guide track 12 has a strike 16 mounted at an intermediate point therealong and projecting transversely of the track direction to present a downwardly directed strike face 16F for engagement by the corresponding latch. In FIG. 1 a spring driven bolt 17 is shown immediately above the actuator 15 and may be controlled by any suitable lock unit (not shown) for securing the actuator in its latch position as shown in FIG. 1.

Each latch assembly includes a door mounted bracket 18 and a pivot bracket 19, each having integrally formed upper and lower ears 18E and 19E, respectively, provided with aligned apertures to receive a vertical hinge sleeve 20. A helical coil spring 21 is disposed in telescoping relation about the hinge sleeve 20. At the right edge of the door, the spring 21 has its upper end 21U extended to abut against the door bracket 18 and its lower end 21L extended to abut against the pivot bracket 19 and yieldably bias the pivot bracket toward the position in which it is illustrated in FIG. 3. At the left edge of the door, the spring 21 provides rotation bias in the opposite direction and hence has its lower end 21L extended to abut against the door bracket 18 and its upper end extended to abut against the pivot bracket 19. The pivot bracket 19 has outwardly directed upper and lower guide wings 19W and a horizontally elongated slot 19S (see FIG. 4) intermediately thereof to accommodate selectively adjustable mounting of the throw 22 which is illustrated as being of right angle configuration to accommodate reversible mounting of the throw.

As is apparent from a consideration of FIGS. 1, 3 and 4, the throw 22 is comprised of right angularly oriented, integrally connected long and short jaw plates, 22L and 22S, respectively. Each jaw plate has a pair of horizontal jaw edges 24 and 25 for selective latching engagement with the abutment face 16F of the corresponding strike 16, and a pair of cam edges 24C and 25C for selective camming engagement with the corresponding strike to cause the throw to pivot enough to permit it to pass beneath the strike and return automatically to strike engaging position. This automatic action of the pivotally mounted throws allows the door 10 to be closed when the latch assemblies are in their latch position as shown in FIG. 1.

The jaw and cam edges on the different jaw plates 22L and 22S of each throw 22 are arranged in inverted relationship as required to enable reversible mounting of the throw for presenting either the long jaw 22L or the short jaws 22S for engagement with the strike 16. In the illustrated arrangement, the longer jaw plate 22L serves for mounting to the pivot bracket 19 and a nut and bolt fastener 26 engages through a central hole in the plate and through the slot 19S in the pivot bracket. Where the strikes 16 are spaced further apart, the shorter jaw plate 22S serves for mounting to the pivot bracket 19 and the longer plate 22L, which is then inverted from the position in which it is illustrated herein, is in position to engage the strike 16. Finally, each pivot bracket 19 has an outer edge flange 19F having a central eye to facilitate the attachment of a cable end.

The latch actuator unit 15 includes a mounting plate 28 for stationary attachment to the door, a retaining plate 29 overlying and rigid with the mounting plate 28 and having an open center bordered by an annular wall offset 29A to define an annular guideway 29G (see FIG. 2A) between the mounting and retaining plates and encircling the axis A, a guide plate 30 having edge offsets 30E slidably movable along the guideway, and a support shell 31 fixed to the guide plate and rotatable jointly therewith.

A pair of cable spools 32 and 33 are mounted within the actuator shell 31 at locations spaced symmetrically about the axis A and as shown in FIG. 1 where the actuator is in latch position, the spool 32 is in the first quad-

rant and the spool **33** is in the third quadrant, whereas, when the actuator is at release position (see FIG. 5), the spool **32** is in the second quadrant and the spool **33** is in the fourth quadrant. The shell structure **31** has interrupted peripheral side walls **31W** at its periphery to provide access passages for the cable that is to be secured upon these spools.

The cable end **34L** engaged to the left hand latch assembly **14L** leads on to the spool **32** which is remote therefrom when the actuator **15** is in its latch position of FIG. 1, and it is trained about the spool **32** in a spirally inwardly winding configuration relative to the axis A. Similarly, the cable end **34R** leading from the right hand latch assembly **14R** is trained about the spool **33** in a spirally inwardly winding configuration relative to the axis of rotation A. In the preferred construction illustrated herein for purposes of disclosure, the cable ends **14L** and **14R** are joined and constitute a single line of cable having a center region engaged over the spools **32** and **33** of the actuator **15** and having opposite ends connected to the latch assemblies **14L** and **14R** to enable rotation of the actuator **15** from its latch position of FIG. 1 to its release position of FIG. 5 to cause corresponding pivotal movement of each throw **22** from an outboard position (shown in full lines in FIG. 3) to an inboard position (shown in phantom lines in FIG. 3). To eliminate interference between the cable lengths exiting from the spools **32** and **33**, the spools are located in laterally offset vertical planes as shown in FIG. 2. Where a single line of cable is employed, as shown herein, the spools are rotatably mounted on the actuator shell **31**.

One important feature of the invention is that the movement of the actuator **15** from its latch position of FIG. 1 to its release position of FIG. 5 causes each of its eccentrically mounted spools **32** and **33** to move over center with respect to the horizontal plane of the axis A of the actuator **15**, and thus causes the line of exit of each cable length from its corresponding spool to move over center with respect to the axis A. When the latch assemblies are at their inboard or release positions, the springs **21** are stressed and act to swing the throws toward their outboard position. This subjects each cable end to a pull and applies torque to the actuator through the spools **32** and **33**. Since the line of action of the cable ends moved over center as the actuator was turned to its release position of FIG. 5, the applied torque, due to the springs acting to swing the throws **22** to latch position, acts in an opposite sense on the actuator **15** and tends to hold it in release position and resist return movement. The shell **31** of the actuator has an integral diameteral offset portion **31H** providing a handle for operating the latch arrangement from the inside of the door. The usual handle **35** is mounted on the outside of the door and has a shaft **35S** keyed to the base wall **31B** of the actuator shell **31** for imparting rotary movement to it.

Another important feature of the latch arrangement resides in the fact that a pull on the cable at any point along its length will cause the cable to slide around the cable buttons **32** and **35** and release the throws **22** from latch position towards release position, while the Latch Actuator **15** remains in locked position.

Thus, a simple pull on the cable in an upward or door opening direction will simultaneously disengage the latch mechanism and initiate door opening movement.

The provision of vertically spaced jaw edges in combination with automatically camming throws biased toward latch position permits the arrangement to adapt to changes in door clearance conditions such as occur after the door installation is completed.

It should be understood that the description of the preferred form of the invention is for the purpose of complying with Section 112, Title 35, of the U.S. Code and that the claims should be construed as broadly as prior art will permit.

What is claimed is:

Latching mechanism for an overhead door having door mounted guides operable in vertical tracks disposed alongside the door, a separate strike for securement at an intermediate point along each track, a separate throw for each strike, means for mounting each throw to the door for shifting movement between an outboard position wherein such throw underlies the corresponding strike when the door is in closed position and an inboard position wherein such throw is clear of the corresponding strike, resilient means biasing each throw towards its outboard position, a rotary actuator, means mounting the rotary actuator to the door at a point intermediate of and generally aligned with the throws to allow rotation of the actuator about an axis generally normal to the plane of the door to move between a latch position and a release position, said actuator having a pair of spools individually rotatable thereon at horizontally offset locations spaced symmetrically from said axis such that when said actuator is at latch position, one spool is in a first quadrant of rotary position about said axis and the other spool is in a third quadrant of rotary position about said axis and when the actuator is at release position, said one spool is in a second quadrant of rotary position about said axis and said other spool is in a second quadrant of rotary position about said axis, and a single piece of cable providing a length of cable engaged to each throw and engaged in a spirally inwardly winding configuration upon the spool that is remote from the corresponding throw when said actuator is in latch position, with the line of the cable from the spool to the throw moving vertically beyond said axis when the actuator is rotated from latch position to release position to enable the biasing action of said resilient means acting through the cable to yieldably hold the actuator at its release position, wherein said actuator spools are offset horizontally a slight distance and individually rotatable and a single cable line has its intermediate portion engaged upon said spools and its end portions attached to the throws.

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