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Slovensky, Jr.

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[45] **Sept. 10, 1974**

[54] **MULTIPLE LATCH LOCK ASSEMBLY AND METHOD**

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[73] Assignee: **Cleveland Hardware & Forging Co.**

[22] Filed: **Mar. 24, 1972**

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[52] **U.S. Cl.**..... **292/38,** 292/DIG. 31, 292/DIG. 38

[51] **Int. Cl.**..... **E05c 1/12**

[58] **Field of Search** ..... 292/38, 171, DIG. 36, 28, 292/50, 84, 125, 133, 225, 235

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Assistant Examiner—William F. Pate, III
Attorney, Agent, or Firm—John H. Mulholland

[57] **ABSTRACT**

The specification and drawings disclose a multiple latch assembly particularly suited for use in contoured vehicle doors. The disclosed assembly includes a plurality of latch members each having an outwardly biased latch pin. Operatively connected to all of the latch pins is a common operating assembly including a case defining a cavity and a handle pivotally mounted between the sides of the cavity. A slide member is carried on the case and interconnects with the handle so that oscillation of the handle produces reciprocation of the slide member. Lengths of flexible actuating cable are connected between the slide member and each of the latch pins. Each length of cable is arranged so that movement of the slide member in one direction will produce simultaneous inward movement of all latch pins.

3 Claims, 8 Drawing Figures

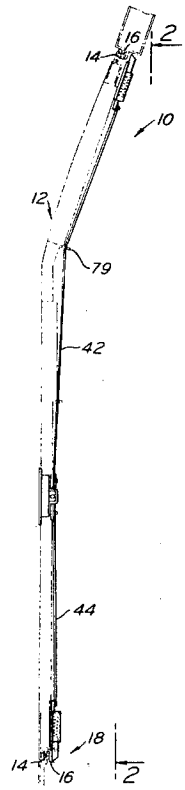


Fig 1

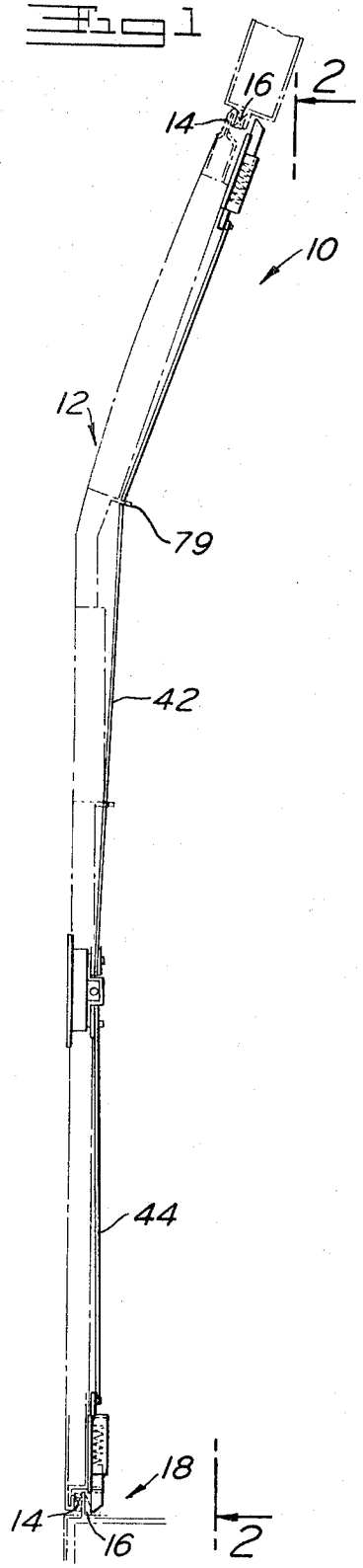

16
2
14
10
12
79
42
44
18
14
16
2

Fig 2

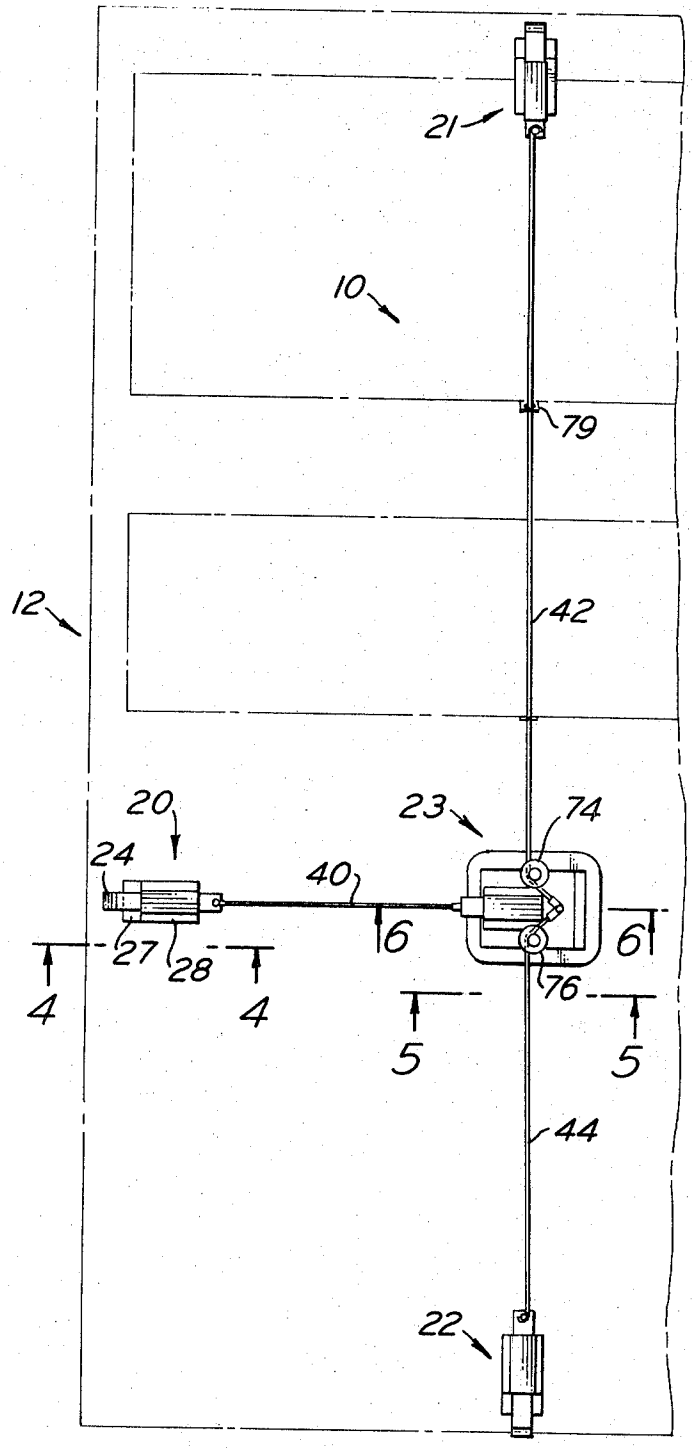
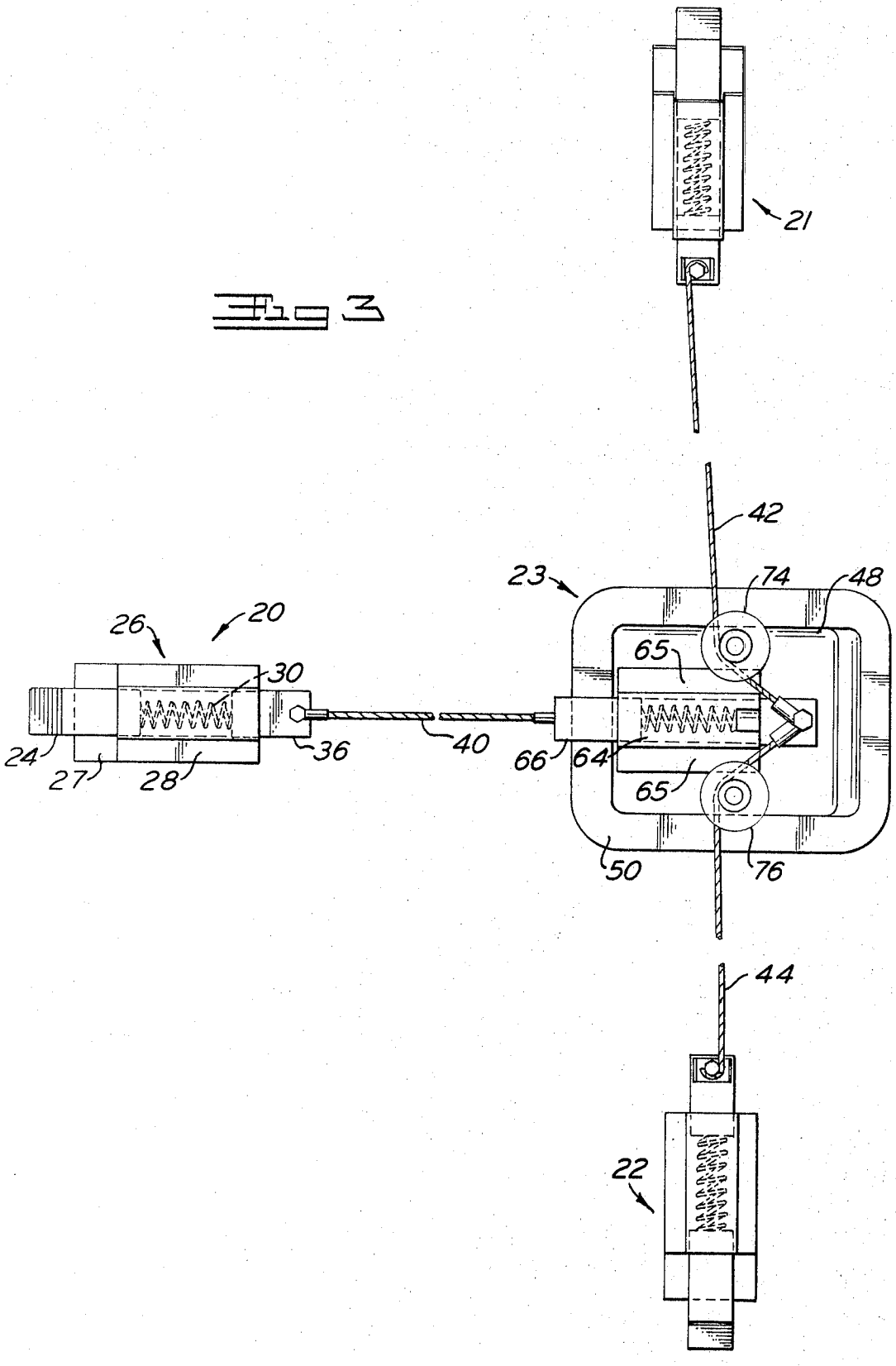

21
10
79
12
42
20
23
74
24
40
6
6
27
28
4
4
5
5
76
44
22

Fig 3



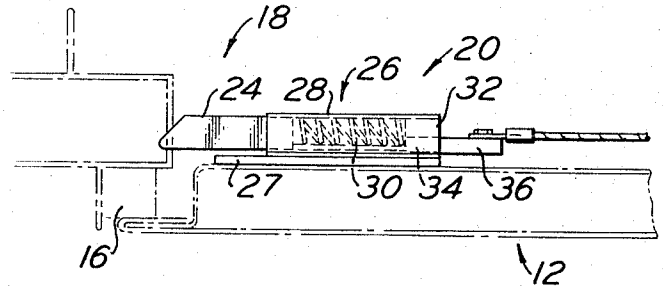


Fig 4

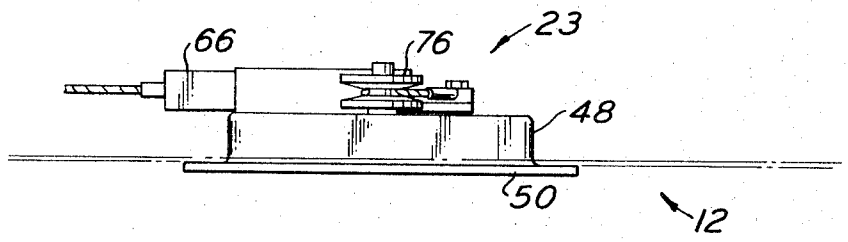


Fig 5

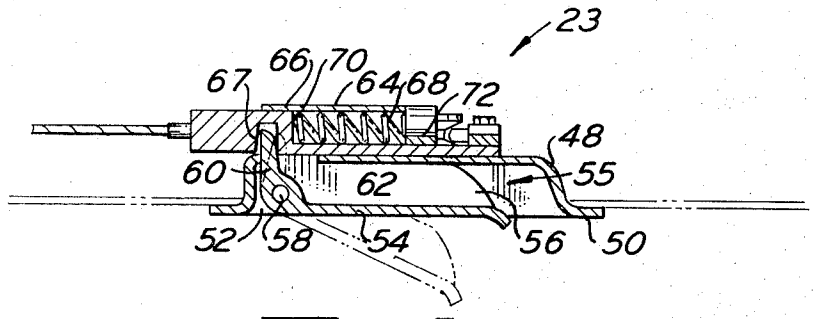


Fig 6

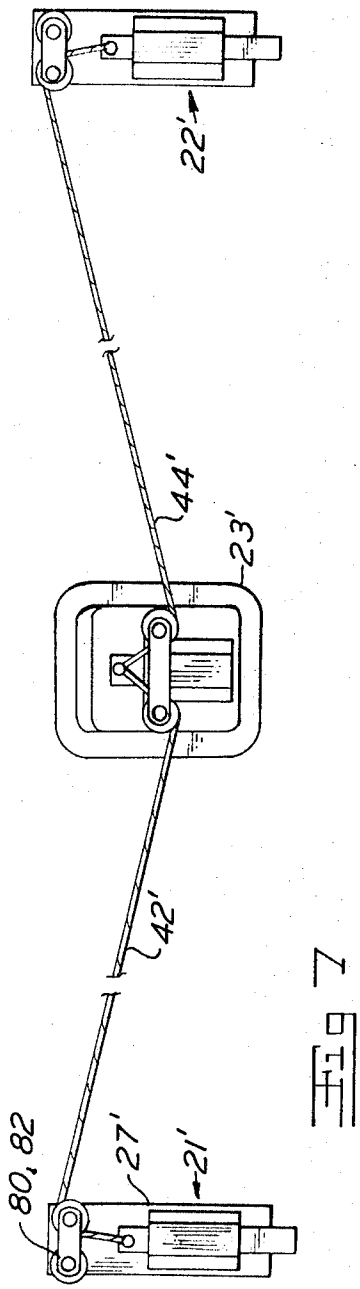


Fig 7

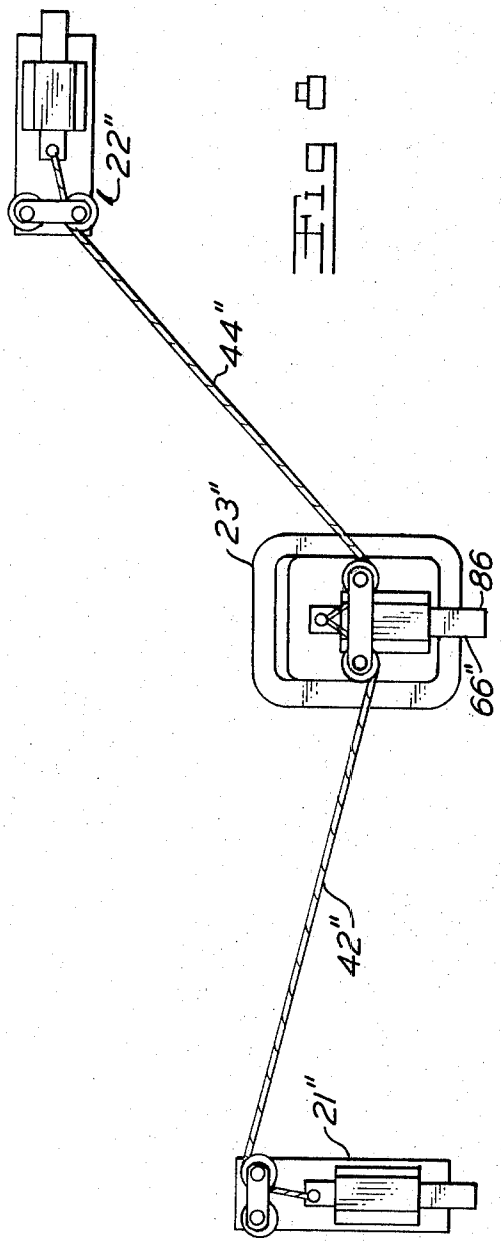


Fig 8

MULTIPLE LATCH LOCK ASSEMBLY AND METHOD

BACKGROUND OF THE INVENTION

The subject invention relates to an improved multiple latch and operating mechanism for doors.

The invention is particularly adapted for use in connection with contoured doors of truck bodies and the like and will be described with particular reference thereto; however, as will become apparent, the invention is capable of broader application and could be used in many types of doors.

In the large access doors often used on delivery vans and similar vehicles, it is often necessary to have several latch bolts actuated from a common operating handle. For example, a latch may be located on each of the three non-hinged edges of each door. The operating handle is located at a central position in the door and, in the past, has been connected to the individual latches through rigid bars. A cam plate mechanism moved by the operating handle reciprocated the bars to positively extend and withdraw the latch bolts.

The described multiple latch mechanism functioned satisfactorily for most uses; however, it did have certain disadvantages. For example, the stroke of the latches was controlled by the configuration of the cam plate. To change the latch stroke, as was sometimes required for different installations, it was necessary to redesign the cam plate. An additional problem was that the mechanism cannot readily be used in contoured door assemblies. This is because the actuating bars must generally be in a single plane throughout their length. In the relatively thin contoured doors, this was not possible. If used at all, special curved actuating bars and guides were required for each different installation.

BRIEF DESCRIPTION OF THE INVENTION

The subject invention overcomes the above-discussed problems and provides a highly simplified multi-latch assembly. In general, assemblies formed in accordance with the invention include a plurality of latch members each having an outwardly biased latch pin. Operatively connected to all of the latch pins is a common operating assembly including a case defining a cavity and a handle pivotally mounted between the sides of the cavity. A slide member is carried on the case and interconnects with the handle so that oscillation of the handle produces reciprocation of the slide member. Lengths of flexible actuating cable are connected between the slide member and each of the latch pins. The invention also contemplates that each length of cable will be arranged so that movement of the slide member in one direction will produce simultaneous inward movement of all latch pins.

Preferably, when the assembly is used in contoured doors, the lengths of cable are connected over suitable guide means such as pulleys. The combination of the biased latch pins and the flexible cable allows the mechanism to be used in substantially any shape door without modification. Merely by adjusting cable length and positioning cable guides at the proper locations, any needed configuration or layout can be provided. Additionally, the length of latch pin travel can be varied merely by providing pin stops as needed. This is a distinct advantage as compared with the prior cam actuated assemblies and permits great freedom in latch pin and actuating handle layout.

As can further be seen, the actuating assembly, cables and latches can be at substantally any angle relative to one another. Moreover, the thickness of the door or its contour does not affect use of the assembly.

Accordingly, a primary object of the invention is the provision of multiple latch assembly of the general type described which can be used in a wide variety of doors.

A further object is the provision of a multiple latch assembly in which the latches are non-rigidly connected with the operating mechanism.

Yet another object is the provision of a latch assembly of the type discussed which allows substantial freedom in door design and, latch and operating handle place.

Still another object is the provision of a door latch operating assembly which is simple to construct and reliable in operation.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and advantages will become apparent from the following description when read in conjunction with the accompanying drawings wherein:

FIG. **1** is a side elevation of a multipoint latch assembly formed in accordance with a preferred embodiment of the invention (the assembly is shown mounted on a contoured door illustrated by dot-dash lines);

FIG. **2** is a view taken on line **2—2** of FIG. **1**;

FIG. **3** is an enlarged view similar to FIG. **2**;

FIG. **4** is a cross-sectional view taken on line **4—4** of FIG. **2**;

FIG. **5** is a cross-sectional view taken on line **5—5** of FIG. **2**;

FIG. **6** is a cross-sectional view taken on line **6—6** of FIG. **2** and showing the operating handle assembly in detail; and,

FIGS. **7** and **8** are views similar to FIG. **2** but showing modified form of the invention.

Referring more particularly to the drawings wherein the showings are for the purpose of illustrating a preferred embodiment of the invention only and not for the purpose of limiting the same, FIGS. **1** and **2** illustrate a preferred form of multiple latch assembly **10** installed on a contoured door **12** of the type often used in delivery vans, panel trucks or the like vehicles. In the embodiment under consideration, the door is mounted for pivotal movement about a generally vertically extending edge. A peripheral seal strip **14** extends about the edges of the door and sealingly engages a lip or stop **16** formed about the door opening **18.** The details of the door and door opening are relatively conventional and further description appears unnecessary.

Of importance to the invention is the arrangement of the latch pin and operating assembly. The number of latch pins used, as well as, their placement can vary widely; however, in the embodiment under consideration, the assembly includes three latch pin units **20, 21** and **22.** The latch pin units **20–22** are shown mounted on the inner side of the three unhinged edges of the door **12.** Preferably, and in accordance with the invention the latch pin assemblies are simultaneously actuated between extended and withdrawn positions by a common operating handle assembly **23.**

Although the latch pin assemblies **20** through **22** could vary, in the subject embodiment, they are all of identical construction. As best shown in FIGS. **4** and **4***a*, each of the assemblies **20** through **22** preferably include a latch pin member **24** reciprocally mounted in a housing **26.** In the construction illustrated, the housing **26** includes a base plate **27** and a generally U-shaped cover member **28** joined to the base plate in any convenient manner, such as by welding. The cover plate **28** and the base plate **27** define a generally rectangular guideway **25** for the pin **24.**

The pin member **24** is continually maintained under an outwardly directed bias by a spring means **30** carried within the guideway. The spring is positioned between the inner end of the latch pin member **24** and end member **32** carried within the cover plate **28.**

As best shown in FIG. **4,** a drive bar **34** extends through the housing **26** and is formed integrally with, or joined to, the under side of the inner end of the latch pin **24.** Bar **34** extends through the housing and has an outer end portion **36** which engages the stop block **32** to limit the amount of outward movement of the latch pin **24.**

As previously mentioned, each of the latch pin assemblies **20** through **22** are of identical construction. They are mounted on the interior of the door **12** with their latch pins extending outwardly as shown. Suitable openings are formed or mounted in the frame of the door opening and receive the latch pins when they are in the outward position shown in FIG. **4.** As can be appreciated, the latch pins are maintained biased outwardly by the springs **30**; however, to withdraw them for door opening operation, the subject invention proposes to interconnect all of the latch pin assemblies **20** through **22** with the common operator **23.** In particular, each of the latch pins is connected to a length of flexible cable or the like (see FIGS. **2** and **3**). Note that a first length of cable **40** extends from latch bolt assembly **20** to the operating assembly **23.** Similar lengths of cable **42** and **44** extend from latch bolt assemblies **21** and **22** respectively.

Operating assembly **23** is arranged to simultaneously withdraw all three latch bolt assemblies. Although the operating assembly **23** could take different forms, it is illustrated as a flush mounted, lever operated type of actuator and, is preferably formed as illustrated in FIGS. **5** and **6.** As shown, the assembly **23** is what is commonly referred to as a flush-type actuator and is arranged to extend inwardly of the outer surface of the door so that there are no exposed handle operating parts or the like. In general, the assembly shown includes a first generally dish-shaped housing member **48** which is received in the outer face of the door **12.** A peripheral flange **50** extends about the member **48** and is connected to the door by welding or the like. Mounted within the housing member **48** for pivotal movement on a pivot pin **58** which extends between the sides of housing **48** is an operating handle **54.** A pair of side flanges **56** are formed on handle **54** to provide a stop for the inward movement of the handle and a recess **55** in which the hand can be inserted for operating the handle. Extending laterally from handle **54** through an opening **61** formed in housing **48** is a finger **60.**

Carried on the back surface of housing **48** is a channel shaped member **64** having lateral flanges **65** which are joined to the housing member **48.** Channel shaped member **64** defines an enclosed guideway **69** having a generally rectangular cross-section. A rectangular bar **66** is mounted for reciprocation in guideway **69.** Bar **66** includes a recess **67** shaped generally as shown in FIG. **6** and receiving the finger **60** of operating lever **64.** The bar **66** is continually biased to the left (as viewed in FIG. **6**) by a coil spring **68** which acts between shoulder **70** and stop **72.** Stop **72** is merely a depressed portion of member **64.**

As best shown in FIGS. **2** and **3,** cable **40** is connected to the left hand end of the bar **66.** Cables **42** and **44** are connected to the right hand end in any convenient manner such as by being attached to a threaded stud **71.** Notice that cables **42** and **44** pass about suitable guide pulleys **74** and **76** respectively. The guide pulleys are rotatively mounted on shafts joined to the back of housing **48.**

As is apparent, operation of handle **54** to the dotted-line position of FIG. **6** causes bar **66** to be actuated to the right. This causes all three latch bolts to be actuated inwardly against the bias of their respective springs **30.** Release of handle **54** permits the latch pins to move outwardly under the influence of their springs and returns the handle to its solid line position.

Because of the flexible cable interconnections between the operating assembly **23** and the latch bolt assemblies **20–22,** the various assemblies can be positioned in substantially any desired relative orientations. All that is necessary is that suitable guides be provided for the cable. For example, in the subject embodiment, cable **42** is required to pass through a guide plate **79** because of the contour of door **12.** Other guide means such as small pulleys could be used if desired.

FIGS. **7** and **8** further illustrate the flexibility of the invention and the manner in which it permits variation in the spacial relationships between the latch pin assemblies and the operating assembly. The embodiments shown in FIGS. **7** and **8** are broadly similar to that shown in FIGS. **1** thru **6.** Accordingly, the corresponding reference numerals differentiated by prime (') and double prime (") suffixes will be used to identify similar components. The description of one such component is to be taken as equally to the others unless otherwise noted.

In particular, the embodiment of FIG. **7** shows how two latch pin assemblies **21'** and **22'** can be arranged to operate in parallel along a single edge of a door with the operating assembly **23'** located at some intermediate point. In this embodiment, the operating assembly **23'** is shown as having exactly the same construction as that described with reference to assembly **23** of FIGS. **1** thru **6** embodiment. The latch pin assemblies **21'** and **22'** however, differ from the latch pin assemblies in the FIGS. **1** thru **6** embodiment in that the base plates **27'** are somewhat larger and carry a pair of spaced rollers **80, 82.** The rollers **80, 82** are rotatively mounted from suitable pins extending outwardly from the base **27** prime. The use of the rollers **80, 82** serve to guide the cable and the individual latch pin assemblies to be mounted in substantially any desired relationship relative to each other and the operating assembly. Several such arrangements are shown dotted in the figure.

As can be appreciated, the arrangement of the operating assembly, the cables and the guide pulleys permits the transfer of the reciprocal motion of the bar **66'** to be converted into linear motion in substantially any direction relative to the bar. There are, of course, no sub-

stantial limitations on the placement of the latch pin assemblies.

The embodiment shown in FIG. **8** is closely similar to the FIG. **7** embodiment with the difference that the operating assembly **23''** has its bar member **66''** shaped and arranged to serve as an additional latch pin member. Note that the lower end **86** of the bar member **66''** has an inclined surface corresponding in general to the shape of the latch pins. In this embodiment, as in the FIG. **7** embodiment, each of the latch pin assemblies is provided with spaced pairs of rollers so that the latch pin assemblies can be readily shifted to have different orientations.

The invention has been described in detail sufficient to enable one of ordinary skill to make and use the same. Obviously, modifications and alterations will occur to others upon a reading and understanding of the specification and it is my intention to include all such modifications and alterations as part of my invention insofar as they come within the scope of the appended claims.

Having thus described my invention, I claim:

1. In combination, a door having an inner surface, an outer surface, at least four edges and hinge means along one of said edges, latch means located along at least two of said edges, each of said latch means including a pin member mounted for reciprocation and continually maintained under a bias in a direction outwardly of said edges, operating means for withdrawing all of said pin members simultaneously including, a housing mounted in one of said surfaces and in a plane different from a plane containing at least one of said latch means and operatively connected to a slide member such that oscillation of said lever produces reciprocation of said slide member; and lengths of flexible cable connected between said slide member and each of said pin members.

2. The combination as defined in claim **1** wherein each of said latch means further includes a base plate and a guideway in which said pin members reciprocate.

3. The combination as defined in claim **1** including guide means positioned between said operating means and at least one of said latch means.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,834,747 Dated September 10, 1974

Inventor(s) Mike J. Slovensky, Jr.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 6, line 10, after "and" insert -- said housing having a lever---.

Signed and sealed this 10th day of June 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks