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Diebel et al.

[11] **3,735,613**

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[54] RETRACTABLE DOOR HANDLE AND LOCK

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[52] **U.S. Cl.** **70/208,** 200/61.64

[51] **Int. Cl.** **E05b 5/04**

[58] **Field of Search** ..... 70/208, DIG. 49, 70/441; 200/61.64, 61.85; 340/274

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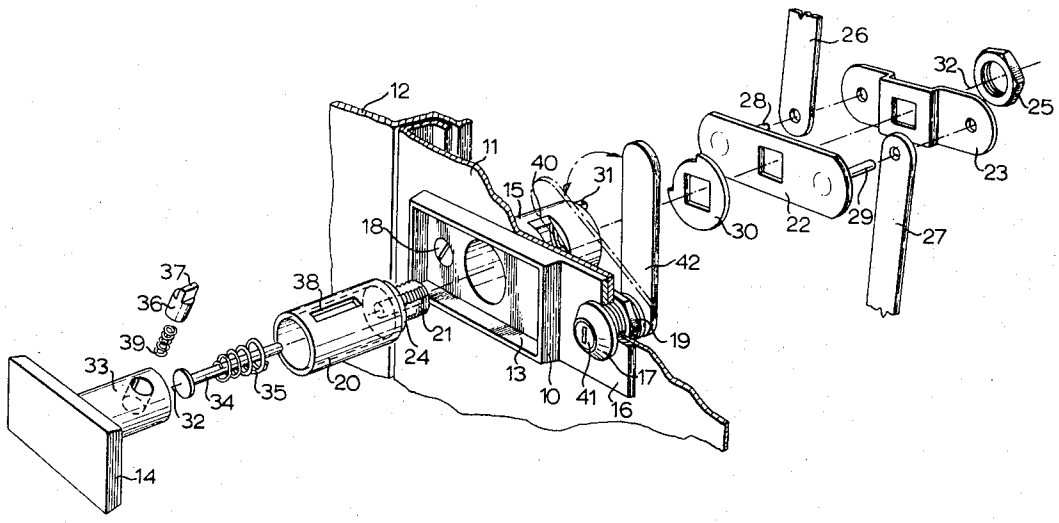
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[57] **ABSTRACT**

A retractable door handle, especially suited for vending machines to prevent forcing of the door while locked, is mounted for movement between a retracted position and an extended operative position. A spring urged latch retains the handle in the retracted position when it is moved into that position. A key operated lock is mounted displaced from the handle and includes a latch-releasing member which can be moved upon insertion of the key to unlatch the handle latch, whereupon the handle is moved by a spring to the extended position to be grasped by an operator.

6 Claims, 2 Drawing Figures



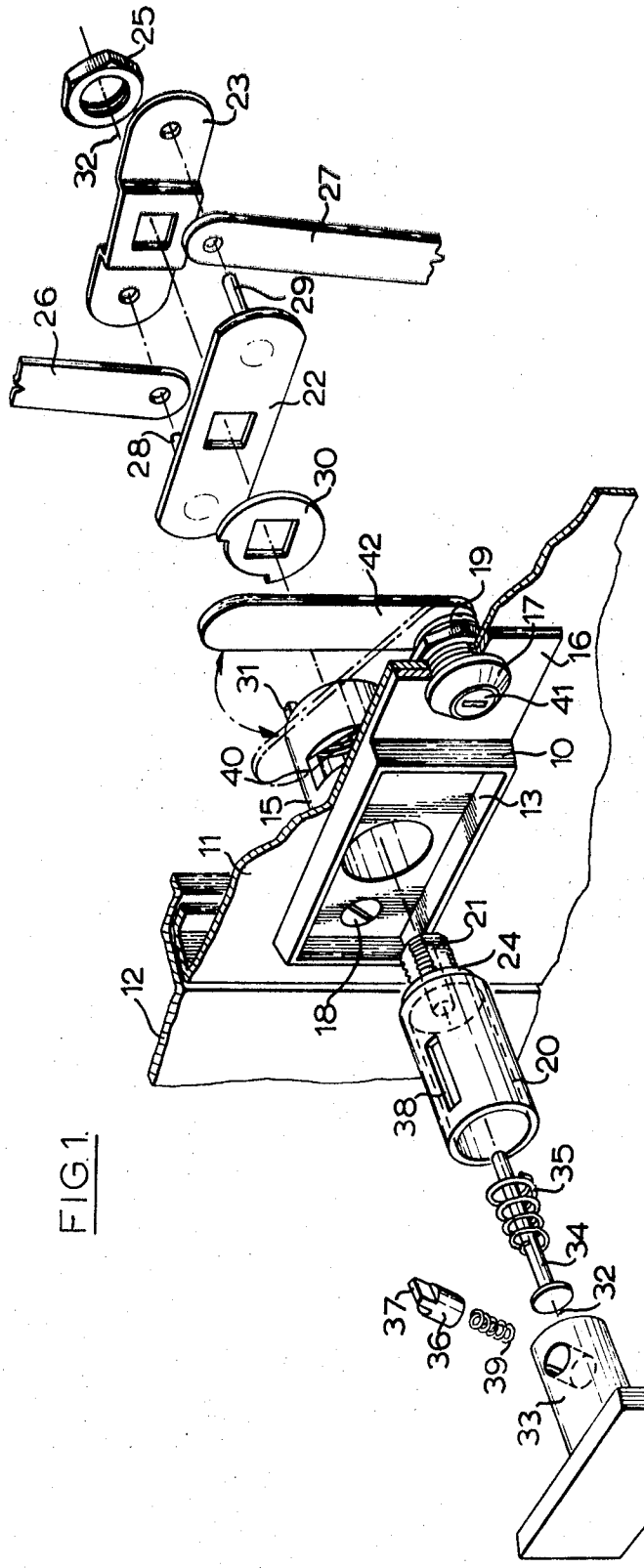


FIG. 1.

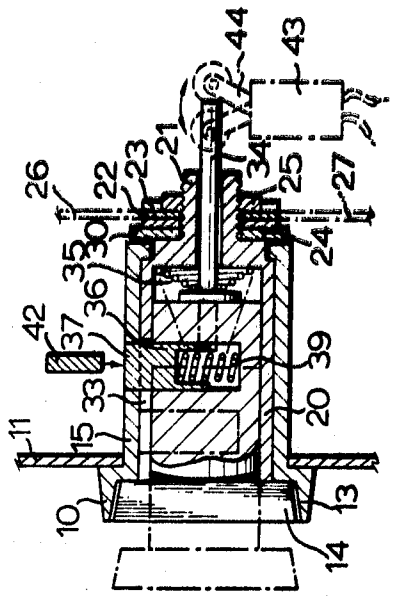


FIG. 2.

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RETRACTABLE DOOR HANDLE AND LOCK

This invention is concerned with improvements in or relating to door handles, and especially but not exclusively to such door handles that are particularly suitable for use in vending machines.

REVIEW OF THE PRIOR ART

A special problem is encountered with door handles intended for use with vending machines, in view of the fact that such machines are usually placed in exposed locations, where they are subject to the vagaries of the weather and the possibility of vandalism. A substantial handle should be provided for the serviceman to grasp, since the door lock and/or the door itself may stick and require considerable force for its opening, but such a handle may provide a useful means for a vandal to apply leverage to the lock and/or the door.

It is now therefore common to arrange that, after the handle has been rotated to lock the door of the vending machine cabinet, it can be pushed backwards into a closely-conforming recess in the door and will be retained therein automatically by a latch. This latch can only be actuated to release the handle and permit it to be moved out of the recess to its operative position by means of a key carried by the serviceman, so that the handle is normally completely inaccessible to others.

An example of such a door handle is disclosed in U.S. Pat. No. 3,234,765 issued to Chicago Lock Company, wherein a lock barrel adapted to receive a key is telescopically slideable in a sleeve which carries a member engagable with the door frame to hold the door closed. The lock barrel constitutes a tubular shank carrying the handle and, it is said that in constructions prior to U.S. Pat. No. 3,234,765, it has been found that the sleeve and shank tend to bind with one another under the forces applied by the engagement of the member carried by the sleeve with the door frame, causing difficulty in extracting the handle from its recess, even when a spring is provided for this purpose. The construction proposed in this prior patent constitutes a method of overcoming this binding problem.

DEFINITION OF THE INVENTION

It is an object of the present invention to provide a new retractable door handle.

It is a more specific object of the invention to provide a new retractable door handle that is particularly suited for use in vending machines.

In accordance with the present invention there is provided a retractable door handle and lock comprising a mounting member providing a housing having an internal cylindrical opening, a handle having a cylindrical shank, a cylindrical drum member rotatably mounted in said housing and having the handle shank mounted therein for axial movement to permit movement of the handle between a retracted position and an extended operative position, a latch retaining the handle in its retracted position when the handle is in that position, the latch comprising a radially-extending member mounted in the handle shank and latching the shank to the housing through the said drum member, a lock adapted to be mounted in a position displaced from the handle, and a latch releasing member operatively connected to the lock and movable upon operation of the lock to engage the said radially-extending member for unlatching

the said latch and thereby permit movement of the handle member to the extended position.

BRIEF DESCRIPTION OF THE DRAWING

Specific embodiments of the invention will now be described, by way of example, with reference to the accompanying drawing wherein:

FIG. 1 is an exploded view of the entire lock assembly, and

FIG. 2 is a section taken on the line 2—2 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The handle comprises a mounting member **10** which is illustrated herein as mounted adjacent one edge of a door **11**, the door being a close fit in a cooperating door frame **12**. The mounting member will usually be of die-cast construction and provides a recessed portion **13** for the reception of a handle **14**, a rearwardly extending hollow cylindrical housing **15**, which protrudes through the door **11**, and a transversely displaced portion **16** which receives a key-releasable lock **17**. The mounting member is fastened securely to the door by a screw **18** in the recess of the portion **13** and by the lock **17**, the exterior of the lock being threaded and receiving a clamping nut **19**.

A cylindrical drum **20** is rotatably mounted within the housing **15**, the drum having a threaded spigot **21** extending through an aperture in the rear end of the housing. The spigot is of non-circular cross-section and carries a latching operating arrangement for the door constituted by two radially-extending arms **22** and **23** clamped to the shoulder **24** between the spigot and the drum by a nut **25**. Two connecting arms **26** and **27** are pivoted to the arms **22** and **23** by respective pivot pins **28** and **29**, and are moved longitudinally upon rotation of the drum to engage and disengage respective door bolts (not shown) attached to the ends of the connecting arms. A stop member **30** on the spigot cooperates with a pin **31** on the housing to limit the rotation of the drum. The common longitudinal axis of the housing **15**, drum **20**, spigot **21**, etc. is indicated by the reference **32**.

The handle **14** is integrally formed with a cylindrical shaft portion **33**, the shaft portion being mounted in a respective cylindrical recess in the drum **20** for axial sliding. The handle **14** is of a size and shape to fit closely within the recessed portion **13** of the base member when in the position shown in FIG. **2** in solid lines (called herein for convenience its retracted position). The inner end of the shaft **33** is engaged by the head of a headed pin **34** and a spring **35** is interposed between the head of the pin and the rear end of the drum recess, the spring urging the pin **34** to the left as seen in the drawing and thereby urging the handle to move to the position shown in FIG. **2** in broken lines (called herein for convenience its extended position). A radially-extending pin **36** is mounted in the shaft **33** and has a rectangular cross-section end **37** engaged in a longitudinal-extending slot **38** in the drum, so that the drum and the shaft can move freely axially relative to one another within the limits imposed by the engagement of the pin end **37** with the end walls of the slot **38**, but positively connects the drum and the shaft for rotation with one another, so that rotation of the handle **14** ensures positive rotation of the spigot **21** and the arms

22 and 23. The pin is urged radially outwards by a spring 39.

The pin end 38 is also adapted to engage in a circumferentially-extending slot 40 provided in the wall of the housing 15, the location of this slot 40 being such that the pin end can only engage therein when the handle 14 is fully home in its retracted position in the recess of the portion 13.

A key releasable lock 17 is of any suitable type and its internal structure is not illustrated herein, since it is not necessary for a full understanding of the present invention. The lock is of the type wherein the key-receiving cylinder 41 provides a shaft (not shown) extending from the rear thereof and carrying a radially-extending latch arm 42 which is moveable between two positions, in one of which (shown in broken lines in FIG. 1) it protrudes into slot 40 in the housing 15, and in the other of which (shown in solid lines) it is clear of the said slot.

In operation of a retractable handle device in accordance with the invention the operator closes the door 11 with the handle 14 in its extended position, and closes the door fully home into its frame 12 by rotating the handle, whereupon the connecting arms 26 and 27 move their respective bolts into recesses in the door frame. With the door fully closed the operator pushes the handle into the recess 13, against the urge of the spring 35, until the pin end 37 engages in the slot 40 and locks the handle in this retracted position. At this time the latch arm 42 may be in any position in which it is not engaged in the circumferential slot 40. It will be seen that this action of closing the door does not require the use of a key, and is automatically self-locking.

There is now no way in which an intruder can grasp the door handle in order to try to force the door open, and the spaces between the handle and the recess walls are too narrow for the insertion of a pry bar.

To open the door the operator inserts the key in the lock cylinder 41 and thereby releases the shaft, so that it can be rotated by rotation of the key in the lock. The rotation of the shaft is accompanied by a corresponding movement of the latch arm 42, which in this particular embodiment is a rotational movement, until it protrudes into the slot 40 and pushes the pin 36 back against the urge of its spring 39 until the plunger is free of the housing 15, whereupon the shaft 33 is immediately pushed by the spring 35 until the handle is in the extended position. The handle can now be used to rotate the arms 22 and 23 to unlatch the door.

The rear end of the pin 34 is permitted to extend beyond the spigot 21 and can be employed as the operator of a safety switch indicated in FIG. 2 by the reference 43. Thus, with the handle in its extended position the pin moves with the handle shaft 33 under the action of the spring 35 and permits the switch operating arm 44 to move to the "off" position. The switch can therefore be used as a safety device preventing operation of the machine electric system until the handle is returned to the retracted position.

Although in this embodiment the lock 17 is mounted on the member 10, which is a preferred arrangement, so that a unitary structure is provided for mounting on the door 11, it is also possible for the lock 17 to be mounted on the door frame or some other part of the cabinet, since physical engagement of the latch arm 42 with the pin 36 is only required while the door is in its closed position. Although in the particular embodiment described the latch arm 42 is rotated about an axis to engage the pin 36 and release the handle other arrangements can be provided. For example, the latch arm can be mounted for linear movement and be moved in such movement by means of an eccentric cam mounted on the lock cylinder shaft, engaged in an aperture in the latch arm and rotatable by rotation of the lock cylinder 41.

We claim:

1. A retractable door handle and lock comprising a mounting member providing a housing having an internal cylindrical opening, a handle having a cylindrical shank, a cylindrical drum member rotatably mounted in said housing and having the handle shank mounted therein for axial movement to permit movement of the handle between a retracted position and an extended operative position, a latch retaining the handle in its retracted position when the handle is in that position, the latch comprising a radially-extending member mounted in the handle shank and latching the shank to the housing through the said drum member, a lock adapted to be mounted in a position displaced from the handle, and a latch releasing member operatively connected to the lock and movable upon operation of the lock to engage the said radially-extending member for unlatching the said latch and thereby permit movement of the handle member to the extended position.

2. A handle as claimed in claim 1, wherein the mounting member also mounts the lock in its position displaced from the handle.

3. A handle as claimed in claim 1, wherein the latch releasing member comprises an arm mounted by the lock for rotative movement about an axis upon operation of the lock.

4. A handle as claimed in claim 1, wherein said latch member is spring-urged to engage in a circumferential latch slot in the housing and is moved out of the slot for release of the latch by the latch arm.

5. A handle as claimed in claim 1, wherein the said latch member is engaged in a longitudinal slot in the drum member and thereby constrains the drum member and the shank for relative axial movement.

6. A handle as claimed in claim 1, wherein a spring urging the handle to move to the extended position automatically upon release of the latch is mounted in the said drum member and is operative between the drum member and the handle shank.

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