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Revell

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[54] **DOOR HANDLE AND LATCH DEVICE**

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[52] **U.S. Cl.** **292/59**; 292/336.3; 292/348; 70/224

[51] **Int. Cl.** **E05b 3/00**

[58] **Field of Search** 292/57–61, 292/68, 67, 336.3, 348, 352; 70/224

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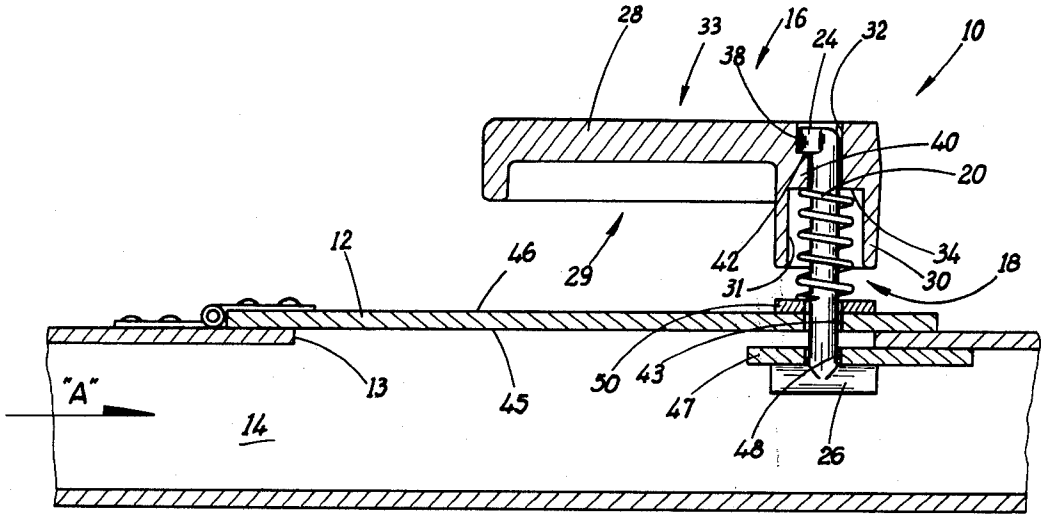
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[57] **ABSTRACT**

A combination door handle and latch device to be mounted to a door includes a handle portion removably connected to a latch portion and a spring which both maintains the handle portion to latch portion connection and produces a latching force.

10 Claims, 5 Drawing Figures



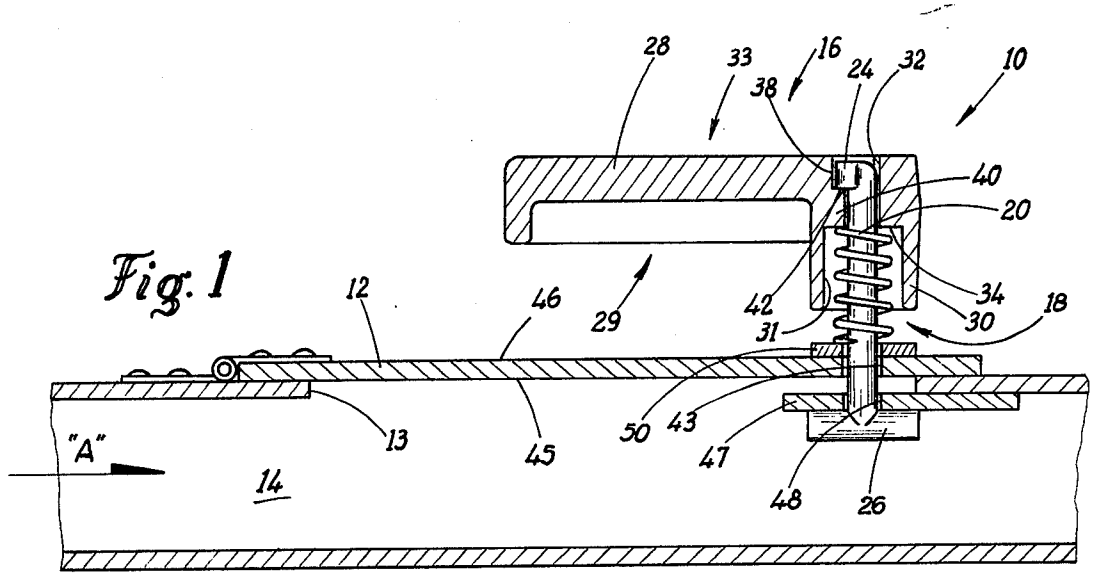


Fig. 1

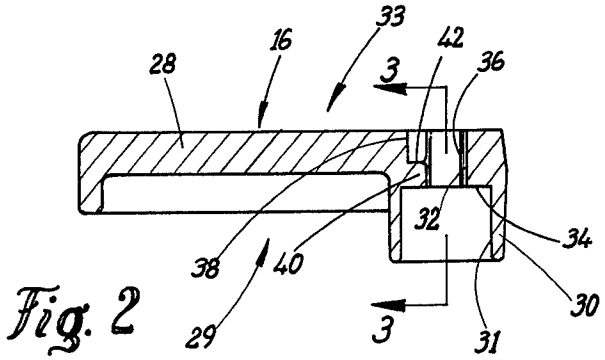


Fig. 2

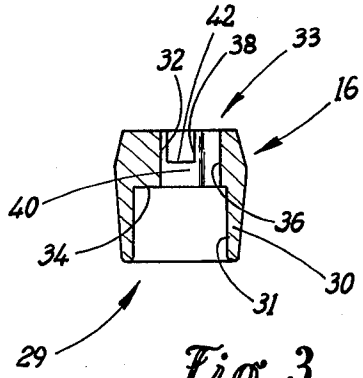


Fig. 3

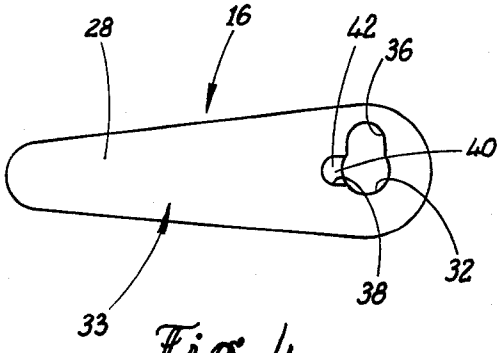


Fig. 4

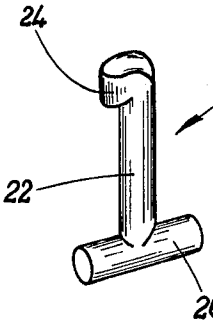


Fig. 5

DOOR HANDLE AND LATCH DEVICE

BACKGROUND OF THE INVENTION

The present invention relates to door handle and latch mechanisms and more particularly to door handle and latch mechanisms for use on thin doors in applications wherein the door is subject to vibratory forces.

Heretofore known door handle and latch devices are usually held together by clips or set screws. These prior art devices have generally proved to be inadequate because vibratory forces transmitted to the door handle and latch devices cause the clip or set screw to loosen. When the clip or set screw becomes loose enough the handle and latch disassemble and fall from the door allowing the door to open.

Because in industrial applications a door handle and latch device is generally considered a minor item, it must be inexpensive and straightforward to manufacture and install. Thus, any solution to the above-described problem must be inexpensive as well as effective. Therefore, a need exists for an inexpensive easy-to-install door handle and latch device which will not loosen and disassemble when mounted on a door which is subjected to vibratory forces.

SUMMARY OF THE INVENTION

The present invention provides a new, useful and novel door handle and latch device which will not loosen and disassemble when subjected to vibratory forces, which is easily assembled without the aid of tools and which is inexpensive to manufacture.

More particularly, the present invention provides a door handle and latch device comprising:

a. a latch portion having a stem adapted to be received through a hole in a door to be latched; an arm connected to one end of the stem, the arm projecting generally transversely outwardly of the stem; and a striker engaging means connected to the other end of the stem;

b. a handle portion having a resilient means retaining pocket open to one side of the handle portion; a latch stem receiving aperture open to the pocket; a latch arm clearance notch formed in a wall of the stem receiving aperture and open to the pocket; a latch arm engagement cavity formed in a wall of the stem receiving aperture; and an arm abutment shoulder separating the cavity from the pocket; and,

c. resilient means disposed in the pocket to urge the handle portion generally away from the latch portion causing the arm abutment shoulder to move into abutment with the stem arm interior the arm engagement cavity.

DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention will be had by reference to the accompanying drawings wherein like numerals refer to like parts throughout the several views and in which:

FIG. 1 is a longitudinal view of a door handle and latch device of the present invention assembled on a door;

FIG. 2 is a longitudinal sectional view of a handle portion of the present invention;

FIG. 3 is a cross-sectional view of the handle portion taken of FIG. 2 through the line 3—3;

FIG. 4 is a top view of the handle portion of FIG. 2; and,

FIG. 5 is a perspective view of a latch portion of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIG. 1, there is shown a combination door handle and latch device **10** removably attached to a thin door **12** closing an access opening **13** into, for example, an air duct **14.** Air flowing through the duct **14,** see arrow A, generates vibratory forces which are, of course, transmitted to the door handle **10** through the door **12.** The door handle and latch device **10** of the present invention consists of a door handle portion **16,** a latch portion **18** removably connected to the door handle portion **16,** and resilient means, such as a compression coil spring **20,** which maintains the handle portion **16** and latch portion **18** assembled even when subjected to vibratory forces.

With reference to FIGS. **1** and **5,** the latch portion **18** consists of a stem **22** having a latch arm **24** connected at, and extending generally transversely outwardly from one of its ends, and a striker engaging means, such as a bar **26,** connected to, and extending generally transversely to its other end. Preferably, the stem **22,** arm **24** and bar **26** are integrally formed, for example, by casting.

Now with reference to FIGS. **1–4,** the door handle portion **16** comprises a hand grip **28** adapted to be grasped by a human hand to latch and unlatch the door **12.** The door handle portion **16** includes a falnge **30** forming a generally cylindrical spring retaining pocket **31** open to one side, preferably the back receiving aperture **32** is formed in the hand portion **16** generally coaxial with and open to the spring retaining pocket **31** and also open to the other side, preferably the front side **33** of the handle portion. The stem receiving aperture **32** has a smaller diameter than the spring retaining pocket **31** and cooperates with the pocket **31** to form a spring abutment shoulder **34** in the pocket **31.** An elongated arm receiving notch **36,** open to the pocket **31** and front side **33,** is longitudinally formed in the wall of the stem receiving aperture **32.** A latch arm engaging cavity **38,** circumferentially off-set from the arm receiving notch **36** by, for example, 90°, is formed in the wall of the stem receiving aperture **32.** The arm engaging cavity **38** is open to the front side **33** of the handle portion, but is separated from the spring retaining pocket **31** by an inwardly extending flange **40** which forms an arm abutment shoulder **42** interior the cavity **38.**

In practice, casting the handle portion **16** of aluminum has been found to be practical and inexpensive.

Referring once again to FIG. **1,** the door handle and latch device **10** is assembled to the door **12** by inserting the stem **18** through an appropriate hole **43** in the door **12** from the back side **45** of the door such that the arm **24** extends from the outside surface **46** of the door **12** and the striker engaging bar **26** extends from the inside surface **45** of the door to engage a striker plate **47** attached to the duct structure adjacent the opening **13** to be closed by the door. An inexpensive striker plate **47** consists of an elongated slot **48** formed therein, the elongated slot **48** being of the same general shape and only slightly larger than the striker bar **26.**

The compression coil spring **20** is disposed over and generally coaxial with the stem **22** from the front side **46** of the door. Preferably, a washer **50** is disposed between the outside surface **46** of the door and the coil spring **20** so that the coil spring can more easily move relative to the door as it is compressed and expanded as the door handle is rotated to latch and unlatch the door. The door handle portion **16** is assembled to the latch portion **18** from the outside surface **46** of the door by inserting the stem **22** into the stem receiving aperture **32** and the arm **24** into the arm receiving notch **36** from the back side **29** of the handle portion. The handle portion is manually forced toward the door, thus, compressing the spring **20** until the arm **24** has traveled the entire length of the arm receiving notch **36** and extends from the front surface **33** of the handle portion. The handle portion **16** is then rotated relative to the latch portion **18** until the arm **24** registers with the opening to the cavity **38** at the front side **33** of the handle portion **16.** The handle portion **16** is then released allowing the spring **20** to expand between the outer surface **46** of the door and the spring abutment shoulder **34** forcing the door handle portion **16** outwardly away from the outer surface of the door **12** causing the arm **24** to move into the arm engaging cavity **38** and causing the abutment shoulder **42** to come into contact with the arm **24.** The arm **24** is thus caged in the cavity **38** so that the latch portion **18** will rotate with the handle portion **16.**

In operation, to latch the door in a closed position, the striker engaging bar **26** is aligned with the slot **48** in the striker plate **46** by rotating the handle portion **16** toward the door, moving the handle portion toward the door and compressing the spring **20** between the outside surface **46** of the door **12** and the string abutment shoulder **34.** Concurrently, the latch portion **18** moves with the handle portion **16** due to frictional contact between the stem **22** and stem receiving aperture **32,** causing the striker engaging bar **26** to move away from the inside surface **45** of the door and through the slot **48** in the striker **47** to extend from the surface of the striker most remote from the door. The handle portion **16** is rotated, for example, 90° causing the striker bar **26** to turn with it due to the coaction between the arm **24** and the cavity **38,** thus moving the striker engaging bar **26** out of registration or alignment with the slot **48** in the striker plate **47.** The manual force is then released from the handle portion **16** allowing the compression spring **20** to expand between the outer surface **46** of the door and the spring abutment shoulder **34** moving the door handle portion **16** outwardly of the door and, due to the coaction of the arm **24** with the arm abutment shoulder **42,** causing the latch portion **18,** and more particularly, the striker bar **26** to move with it until the striker bar **26** tightly abuts the surface of the striker plate **47** most remote from the door, thus, latching the door in the closed position. The amount of latching force is dependent upon the modulus of elasticity of the coil spring **20** and, therefore, can be easily changed to suit a particular application merely by changing coil springs.

To unlatch the door, the handle portion **16** is rotated until the striker engaging bar **26** again registers with the slot **48** in the striker plate **47.** When they are in registration the coil spring **20** expanding between the spring abutment shoulder **34** and the outside surface **46** of the door **12** causes the shoulder **42** to contact the arm **24** moving which causes the striker engaging arm **26** to move through the slot **48** toward the door, thus, unlatching the door.

The foregoing detailed description is given primarily for clearness of understanding and no unnecessary limitations should be understood therefrom, for modifications will be obvious to those skilled in the art upon reading this disclosure and may be made without departing from the spirit of the invention or the scope of the appended claims.

What is claimed:

1. A combination door handle and latch device, comprising:

a. a latch portion comprising: a stem adapted to be received through a hole in a door to be latched; an arm connected to one end of said stem, said arm projecting generally transversely outwardly of said stem; and striker engaging means connected to the other end of said stem;

b. a handle portion comprising: a resilient means retaining pocket formed therein and one side of said handle portion; a latch stem receiving aperture formed therein and open to said pocket and cooperating therewith to form a resilient means abutment shoulder; a latch arm clearance notch formed in a wall of said stem receiving aperture and open to said pocket; a latch arm engagement cavity formed in a wall of said stem receiving aperture; and an arm abutment shoulder separating said cavity from said pocket; and,

c. resilient means disposed in said pocket between the door and said resilient means abutment shoulder to urge said handle portion generally away from said stem portion and cause said stem arm to move into said cavity and force said stem abutment shoulder against said stem arm.

2. The combination door handle and latch as defined in claim **1,** wherein said a resilient means abutment shoulder is adjacent the opening of said stem receiving aperture to said pocket.

3. The combination door handle and latch as defined in claim **1,** wherein said arm clearance notch is circumferentially displaced around the longitudinal axis of said stem receiving aperture from said arm retaining cavity.

4. The combination door handle and latch as defined in claim **3,** wherein said circumferential displacement is approximately 90°.

5. The combination door handle and latch as defined in claim **1,** wherein:

said latch stem receiving aperture is open to one side of said handle portion;

said latch arm clearance aperture is open to said one side of said handle portion; and,

said latch arm retaining cavity is open to said one side of said handle portion.

6. The combination door handle and latch as defined in claim **5,** wherein said resilient means retaining pocket is defined by a flange extending outwardly from the other side of said handle portion.

7. The combination door handle and latch as defined in claim **1,** wherein said resilient means retaining pocket is generally cylindrical in shape and is coaxially disposed with said latch stem receiving aperture.

8. The combination door handle and latch as defined in claim **1,** wherein said resilient means is a coil spring.

9. The combination door handle and latch as defined in claim 1, wherein said striker engaging means comprises a bar extending generally transversely from said stem, said bar being adapted to be received through a slot in a striker, and upon rotation of said latch portion, engage and disengage the striker.

10. The combination door handle and latch as defined in claim 1, wherein said coil spring is disposed between the front side of the door and said handle portion to urge handle portion outwardly away from the door and bias said stem arm into abutment with said arm abutment shoulder.

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