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Stebe

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[54] **CONCEALED ENCLOSURE LATCH**

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[52] **U.S. Cl.** **312/333,** 312/215

[51] **Int. Cl.** **A47b 88/00**

[58] **Field of Search** ..... 312/333, 7 TV, 215, 223, 312/217, 257 A, 222, 210; 49/463, 465, 63, 67; 292/196, 138, 139, 223

[56] **References Cited**

UNITED STATES PATENTS

1,146,759	7/1915	Hawkins	312/291
1,209,376	12/1916	Baily	49/67
2,192,862	3/1940	Eagley	312/257 A
2,575,530	11/1951	Reid	312/291 X
3,287,079	11/1966	Courson	312/291
3,636,661	1/1972	Strawsine	49/463
3,728,662	4/1973	Puri	312/320
3,744,864	7/1973	Schmitz	312/7 TV

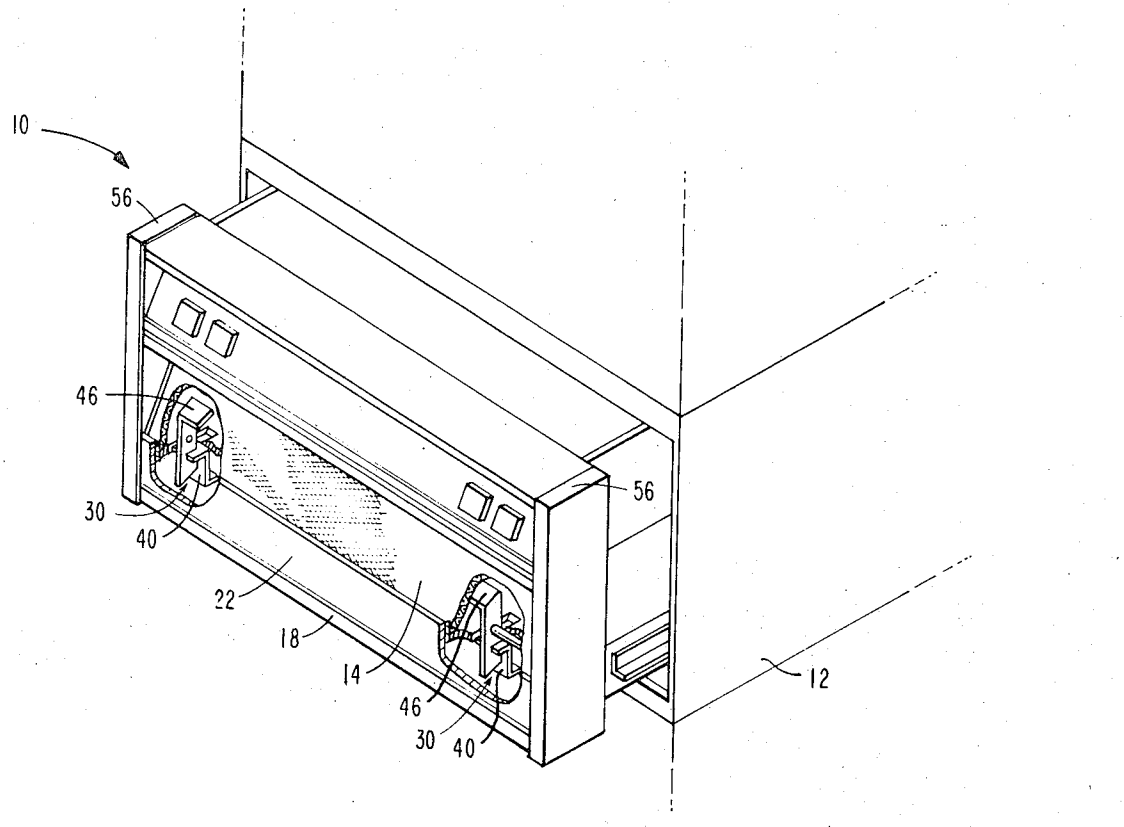
Primary Examiner—James T. McCall

Attorney, Agent, or Firm—Fraser and Gogucki

[57] **ABSTRACT**

A concealed latch enclosure is disclosed having a frontally disposed panel concealing an elongated member. An L-shaped door below the panel covers a chamber having a circuit card slidably mounted therein. The door has a base pivotally attached at an edge of the enclosure and an upright portion extending from the base remote from the pivotal attachment. An element joined to the base includes a tongue extending in a lateral direction. The elongated member is pivotably mounted on a support member rigidly joined to the enclosure. The elongated member has a surface for receiving a manually exerted force on one side of the pivotal attachment and an indentation mating with the tongue on the opposite side of the pivotal attachment. To actuate the latch, the panel is lifted up and outward. A rotation of the elongated member disengages the tongue from the indentation allowing the door to rotate about its pivot axis, exposing the chamber and allowing circuit card removal.

7 Claims, 4 Drawing Figures



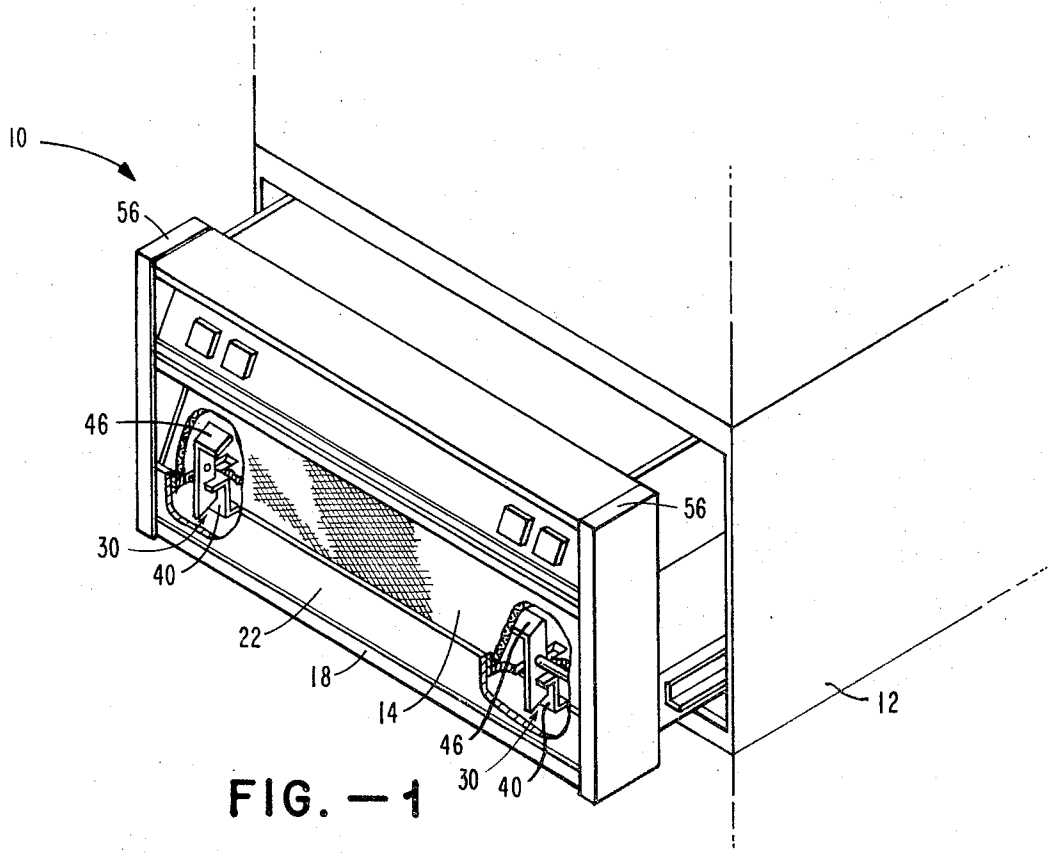


FIG. — 1

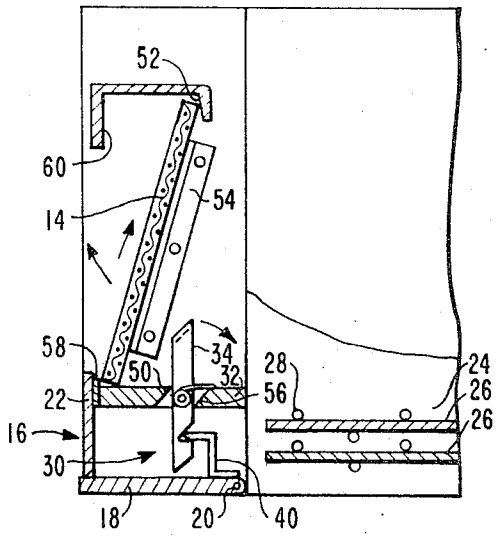


FIG. — 2

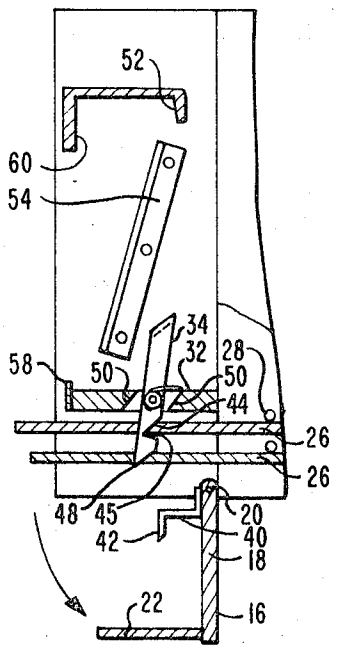


FIG. — 3

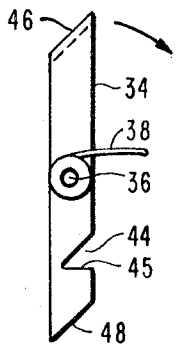


FIG. — 4

CONCEALED ENCLOSURE LATCH

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to concealed latches. More particularly this invention pertains to enclosures having concealed latches controlling access to compartments containing electronic circuits and components.

2. Description of the Prior Art

It has been found desirable in complex electronic equipment to limit the access of certain circuit chambers to qualified service personnel. Electronic equipment used in memory systems is expensive and generally unserviceable by those not having an expertise in the field. Quite frequently a user may examine the interior of such equipment and attempt repairs and modifications. Such attempts by unqualified persons may result in the destruction of circuitry or may increase the expense of eventual repairs. Thus it would be advantageous to have a concealed enclosure having a circuit chamber which is easily accessible to qualified personnel yet unavailable to persons lacking knowledge of its structure.

SUMMARY OF THE INVENTION

The concealed enclosure latch of this invention is used in conjunction with an enclosure having an electronic circuit chamber. A door at the front of the enclosure encloses the electronic circuit chamber when the door is in a closed position. The circuit components of the chamber are exposed when the door is in an open position. A panel on the front of the enclosure which conceals a latch is at least partially removable for providing access to the latch. The latch, disposed to the rear of the panel, is coupled between the door and a support within the enclosure. The latch maintains the door in the closed position when engaged therewith and allows the door to rotate to the open position when disengaged.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view with portions removed of a concealed enclosure latch in accordance with the invention;

FIG. 2 is a side view of the concealed enclosure latch of FIG. 1 with portions removed and in a closed position;

FIG. 3 is a side view of the concealed enclosure latch of FIG. 1 with portions removed and in an open position;

FIG. 4 is a plan view of an elongated member forming a part of the concealed enclosure latch of FIG. 1.

DETAILED DESCRIPTION

Referring to FIGS. 1, 2 and 4, a portion of an electronic equipment enclosure 10 is shown extending from a cabinet 12. The cabinet 12 typically stores one or more enclosures 10 containing electronic equipment such as, for example, a disc drive memory unit. A panel 14 is disposed in the front of the enclosure 10 and is at least partially removable therefrom. In this particular embodiment, the enclosure 10 stores a disc drive memory unit which is supplied with a flow of purified air by means of an air filter which also is used as the panel 14.

A door 16 having a generally L-shaped cross section is disposed substantially beneath the panel 14. The door 16 comprises a base 18 coupled at a longitudinal edge with a pivot 20 to the enclosure 10. A generally upright portion 22 extends at an angle from the base 18. The door 16 may be integrally formed from a single piece of sheet metal or other suitable material. The disclosed embodiment utilizes a folded piece of sheet metal for the upright portion 22 suitably attached to a base portion 18 of metal plate.

A circuit component chamber 24 houses one or more printed circuit cards 26 slidably mounted between guides 28. In a closed position, the door 16 protectively covers and conceals the chamber 24 and the circuit cards 26 housed therein. The door 16 exposes the printed circuit cards, allowing the convenient removal thereof when the door 16 has been dropped downwardly.

FIG. 1 depicts a pair of latch means 30 disposed on opposite sides of the enclosure 10, each coupled between a support member 32 attached to the enclosure 10 and the door 16. One or more latch means may be used in accordance with this invention though a single latch means is referred to hereafter for brevity. In the preferred embodiment the latch means 30 comprises an elongated member 34 pivotably attached at a pivot 36 to the support member 32 and spring biased with biasing means 38. The latch means in the preferred embodiment further includes a tongue-bearing element 40 affixed to the base 18 of the door 16 and comprising a tongue 42 extending in a generally lateral direction from the element 40. The tongue 42 mates with an indentation 44 in the elongated member 34. The indentation 44 preferably has a lower supporting surface 45 which slopes towards the opening of the indentation 44 at an angle of less than about 90°. A flag 46 extends from the elongated member 34. The flag 46 provides a surface for manual actuation of the elongated member 34. The elongated member 34 in conjunction with the element 40 maintains the door 16 in the closed position when the tongue 42 is engaged with the indentation 44. The biasing means 38 urges the indentation 44 of the elongated member 34 to bear on the tongue 42, thereby helping to maintain engagement of the indentation 44 and the tongue 42. The biasing means 38 also allows closure of the door 16 without further manual movement of the flag 46. As shown in FIG. 4 a tongue bearing surface 48 slopes upward near the opening of the indentation 44 and allows the tongue 42 to rotate the elongated member 34 over a relatively limited arc. Limiting surfaces 50 on the support member 32 limits the rotation of the elongated member 34.

A ledge 52 provides support for the panel 14. Angled brackets 54 are affixed to panels 56 on opposite sides of the enclosure 10. The angled brackets 54 provide support for the panel 14. A ledge 58 extending vertically upward from the reference 32 provides further support for the panel 14. A handle 60, used to pull the enclosure 10 out from the cabinet 12, provides clearance for removal of the panel 14, yet conceals the upper portion of the panel 14 and its manner of removal.

FIGS. 2 and 3 aid in depicting the operation of invention. When maintenance personnel desire to remove one or more of the circuit cards 26, the panel 14 is removed upward and outward from the enclosure 10 as indicated by the arrows adjacent the panel 14. FIG. 3 depicts the enclosure with the panel 14 removed. The absence of the panel 14 allows the maintenance per-

sonnel to reach into the enclosure and grasp the flag **46** of the elongated member **34** and rotate the member **34** in the direction indicated by the arrow in FIG. **2.** A slight rotation of the elongated member **34** disengages the tongue **42** from the indentation **44,** thereby allowing the door **16** to drop, rotating about the pivot **20.** The door **16** is now in the open position as shown in FIG. **3,** exposing the chamber **24** with the circuit cards **26** therein. Qualified maintenance personnel may then pull out the circuit cards **26** for modification, repair, or replacement.

Once the circuit cards **26** have been replaced in the chamber **24,** the door **16** is closed by rotating it in the direction as indicated by the arrow in FIG. **3.** As the door is rotating, the tongue **42** contacts the bearing surface **48** of the elongated member **34** causing a rotation of the elongated member **34** as indicated by the arrow extending from the elongated member **34** in FIG. **2.** Further rotation of the door **16** causes the engagement of the indentation **44** with the tongue **42,** thereby locking the door **16** firmly in place. The biasing means **38** urge the indentation **44** towards the tongue **42,** helping to maintain the engagement of the indentation **44** and the tongue **42.** The door **16** is now in the closed position concealing the chamber **24.** The panel **14** is then replaced by inserting the panel **14** under the handle **60** and upward and allowing the panel **14** to rest on the ledge **52,** the ledge **58** and the angled brackets **54.** The panel **14** now conceals the latch means **30** while the door **16** conceals the chamber **24.**

Thus a concealed enclosure latch has been described which allows access to a chamber having printed circuit cards therein, by qualified personnel having knowledge of the latch, yet prevents unauthorized parties from gaining access to the electronic components.

While the invention has been particularly shown and described with reference to a preferred embodiment thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In an electronic equipment enclosure having at least one chamber in which circuit components reside, the combination therewith of:

latch means disposed within the enclosure;

panel means mounted on the enclosure; and

door means mounted on the enclosure and movable between a first position which encloses the chamber and a second position which opens the chamber and permits removal of the circuit components therein;

said latch means extending between a support member in the enclosure and the door means and being engageable with the door means to maintain the door means in the first position and disengageable from the door means when manually actuated to permit movement of the door means into the second position, the panel means at least partially removably concealing the latch means from view while providing access to the latch means for manual actuation thereof when the panel means is at least partially removed.

2. The invention as set forth in claim **1,** wherein the panel means is supported in a normal position and is temporarily movable out of the normal position to permit manual access to the latch means.

3. The invention as set forth in claim **1,** wherein the door means comprises an elongated element having a base and an upright portion extending outwardly from the base along the length of the element to provide the element with a generally L-shaped cross section, the base being pivotally attached to the enclosure at an edge remote from the upright portion.

4. The invention as set forth in claim **3,** wherein the latch means includes an element coupled to the base of the door means and having a tongue extending therefrom and a latch arm coupled to the support member and having an indentation engageable with the tongue.

5. An electronic equipment enclosure comprising:

a lower chamber adapted to slidably receive at least one circuit card therein;

a movable panel normally disposed generally at the front of the enclosure and concealing an elongated element when so disposed;

a door having a generally L-shaped cross section for covering the lower chamber when in a first position and for exposing the lower chamber when outside the first position, the door comprising a base pivotally attached to the enclosure near a longitudinal edge of the base and a generally upright portion extending at an angle from the base remote from the pivotal attachment;

latching means comprising an engaging element coupled to the door and an elongated member pivotally coupled with respect to a support member on the enclosure and biased so as to rotate toward and mate with the engaging element when the door is in the first position, the elongated element being manually rotatable away from the engaging element to permit movement of the door outside of the first position; and

stop means limiting the rotation of the elongated element when not mating with the engaging element.

6. The invention as set forth in claim **5,** wherein:

the engaging element comprises a generally laterally directed tongue coupled to the base of the door; and

the elongated member has a sloping tongue-bearing surface engageable with the tongue to cause rotation of the member in response to movement of the tongue and an indentation located adjacent the tongue-bearing surface and having a supporting surface, the tongue being engaged by the indentation and held by the supporting surface when the door is in the first position.

7. A concealed arrangement for permitting controlled access to a printed circuit card compartment within a cabinet for electronic equipment comprising:

door means coupled to the cabinet and movable between first and second positions to respectively close and open the compartment;

locking means mounted within the cabinet for holding the door means in the first position, said locking means being manually actuable to release the door means from the first position and permit movement of the door means into the second position; and

means concealing the locking means from view from outside the cabinet and including means providing access to the locking means for manual actuation thereof while the locking means is concealed from view.

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