A flat cylindrical housing having a channel in its flat surface for fitting over abutting flange ends connected to the members to be locked together, the flanges having an aligned aperture therein. A lock cylinder having a shaft with retaining means thereon is situated in a passageway through the housing transverse to the channel. The shaft fits within the aperture and the retaining means, under control of a key, holds the housing on to the flange ends. The same locking device may be used to lock a hasp which passes over a staple.
LOCK DEVICE FOR SECURING AN APERTURED MEMBER

This application is a continuation-in-part of my co-pending application Ser. No. 244,465, filed Apr. 17, 1972 and now U.S. Pat. No. 3,769,821.

This invention relates to a lock device for apertured hasps and, more particularly, to a lock which fastens together two apertured flanges connected respectively to a cabinet and a door pivoted at one end thereof, such cabinets being typically used in coin-operated vending machines. The apparatus may also be used on a hasp and staple such as employed to lock doors on trucks and buildings.

BACKGROUND OF THE INVENTION

The use of coin operated vending machines has become widespread. However, the major problem in business operating such machines is the frequent robberies associated with them. Since these machines generally remain unattended, their internal bank arrangement collects large sums of money. Because of their widespread use, it becomes very difficult to remove the funds at frequent intervals. As a result, these machines are a prime target for thieves.

In order to discourage and prevent thieves from breaking into the vending machines and removing the coin boxes, the machines are generally constructed of an extremely strong type of material such as steel. Furthermore, the machines are generally bolted or firmly implanted to a fixed member such as a wall or the ground to prevent the entire removal of the machine itself. However, the basic difficulty in securing these machines relates to the locking arrangement closing the walled door on to the cabinet. Since the walled door is generally pivoted on to the cabinet at one end, the locking arrangement is placed at the opposite end of the pivot.

Some of the prior art locking arrangements use external hasp latching means or internal locks, either of which could be forced open by proper application of a pry bar or jimmy between the door and the stationary cabinet. Other more complex locking arrangements, although providing more complicated and expensive locking devices, have similarly proved to be of little resistance to well equipped thieves. Many vending machines presently in use have a pair of L-shaped steel flanges wherein one side of each of the flanges is connected to the walled door and the cabinet respectively, while the other ends abut each other and extend perpendicularly outward from the vending machine. An aperture is placed through the abutting ends of the two flanges and a standard pad lock is inserted within the apertures of the abutting ends. While this type of locking arrangement has reduced the cost of the locking device and is easily fitted on to existing vending machines, the security of the vending machine is completely dependent upon the strength of the lock. Since pad locks have a steel U-shaped link which passes through the apertures, it is possible to cut the link with a bolt cutter and open the vending machine.

A commonly employed fastening device is the conventional hasp and staple. The present device may be locked to the staple and thereby secure the hasp. The lock means may protect the staple mounting plate. One embodiment disclosed combines the hasp and lock in an integral device.

It is, therefore, an object of this invention to provide a lock device which avoids the aforementioned problems of the prior art.

A further object of this invention is to provide a lock device suitable for closing cabinets having a pivoted walled door which is to be sealed on to the cabinet.

Still a further object of this invention is to provide a lock device for use with vending machines.

Yet another object of this invention is to provide a lock device in retaining together two members, each having an L-shaped flange connected thereto, with one end of each flange securely mounted on to one of the members, respectively, and the other end of both flanges abutting each other and having an aperture therethrough.

Still a further object of this invention is to provide a lock device having a housing which encases a lock and the abutting members being locked together.

A further object of this invention is to provide a lock device for firmly holding together abutting apertured flanges wherein a shaft passes through the apertures and when locked said shaft rotates within the aperture and holds said flanges from separating.

Still another object of this invention is to provide a lock device having a bolt type lock which passes through apertured openings in abutting ends of flanges to be securely locked together, wherein the bolt engages a threaded receptacle at the other end of the aperture.

BRIEF SUMMARY OF THE INVENTION

Briefly, the lock device of this invention comprises a flat cylindrical member constructed of a solid, durably strong material such as steel. An approximately rectangular channel section similar to a trough, cut in one flat surface partially through the cylinder, is constructed. A longitudinal passageway, commencing from the circular wall, extends substantially perpendicularly to the channel and continues through the cylinder to slightly past the channel. A cylindrical lock is inserted within the passageway and is held within the passageway in such a manner that it can move in a single directional plane within the passageway, but is prevented from being completely removed from the flat cylindrical member. In one embodiment, the lock is a quarter turn latch having a transverse latching pin at the end of the cylindrical lock and the movement of the lock within the passageway is in an axial direction. In another embodiment, the lock is a bolt type lock having a threaded portion at the end of the bolt and the movement of the lock within the passageway is also axially directed. In another embodiment, the lock is a quarter turn lock having a shaped portion at the end of the lock shaft and the movement of the lock within the passageway is in a circular direction.

In operation, the channel in the flat cylindrical member is placed over abutting ends of adjacent flanges having an aligned aperture through their abutting ends. The lock is then arranged to have the lock shaft pass through the aperture. With the appropriate key inserted into the lock, the lock is turned to hold the flanges securely together. In one embodiment, the turning of the lock will latch the transverse pin across the aperture, thereby locking it into place. In the other embodiment, turning the lock will engage the threaded end of the bolt into a threaded receiving socket at the other end of the flat cylindrical member. In the further
embodiment, turning the lock will place the shaped end of the shaft in a wide position preventing removal.

The invention will be more fully appreciated together with features, objects and advantages thereof in the following more fully descriptive explanation of the invention, taken in conjunction with the accompanying drawing which forms an integral part thereof.

In the various figures of the drawing, like reference characters designate like parts.

**BRIEF DESCRIPTION OF THE DRAWING**

FIG. 1 is a pictorial view of a cabinet having the locking arrangement in accordance with this invention;

FIG. 2 is a partially sectioned pictorial view, partially cut away, of the locking arrangement in accordance with one embodiment of this invention;

FIG. 3 is a partly cut away sectional elevational view of the locking arrangement in accordance with the embodiment of this invention shown in FIG. 2;

FIG. 4 is a partially cut away sectional bottom view of the locking device in accordance with the embodiment of this invention shown in FIG. 2;

FIG. 5 is a pictorial view of the lock cylinder in accordance with the embodiment of this invention shown in FIG. 2;

FIG. 6 is a partly cut away sectional elevational view of an alternative embodiment of the locking arrangement in accordance with this invention;

FIG. 7 and FIG. 8 are partly cut away sectional bottom views of a further embodiment of the lock device in accordance with this invention;

FIGS. 9 and 10 are end views of the flanges showing the method of locking in accordance with the further embodiment of this invention;

FIG. 11 is a top view of the flanges to be held together;

FIG. 12 is pictorial view of the lock cylinder in accordance with the further embodiment of this invention;

FIG. 13 is a pictorial view of a lock mechanism applied to a conventional hasp and staple;

FIG. 14 is a side elevational view of the lock mechanism just prior to application to a hasp and staple with the open position of the hasp shown in phantom;

FIG. 15 is a partially broken away top plan view of a lock with integral hasp;

FIG. 16 is a side partially broken away elevational view of the lock device of FIG. 15 with a key inserted. A portion of a conventional staple mount is shown in phantom.

**DESCRIPTION OF THE INVENTION**

Referring now to FIG. 1, there is shown a pictorial view of a vending machine 10 having a door 12 pivotally connected to a cabinet 14 (hinges not shown). The cabinet 14 is anchored to a wall 16 by means of anchor 18. The door 12 is secured on to the cabinet 14 by means of the locking arrangements shown generally at 20. The locking arrangement 20 consists of a flange 22 securely connected on to the door portion and a flange 24 securely connected on to the cabinet portion. The lock device of this invention is shown at 38. As shown in FIGS. 2 and 3, the flanges are typically mounted respectively on to the steel cabinet and door by means of rivets 26 which pass through holes 28 arranged in the L-shaped flanges 22 and 24. Typically, the flanges may be secured on to the cabinet and door by further including a backing plate (not shown) provided on the inside of the cabinet and door, respectively, wherein the rivets 26 would pass through, sequentially, the flanges 22 and 24, the steel cabinet or door, and the backing plate. Other fastening means could be in place of the rivets, as is well known in the art. Typically, bolts could be used of the round head type with nuts so that no removal could be achieved by means of tools.

The flanges 22, 24 have abutting sections, respectively, 32, 34 extending perpendicularly outward from the surface of the cabinet. The abutting ends of the flanges meet at approximately the juncture of the door and the cabinet. An aperture of generally rectangular shape is inserted within the outwardly extending ends of the flanges 22, 24, so that when the door is in a closed position, the abutting apertures are aligned.

The lock device shown generally at 38 comprises a flat, cylindrical member 40 constructed of solid material such as steel and being, for example, 3 inches in diameter and 1 1/4 inches in thickness. Referring to FIGS. 2, 3 and 4, an approximately rectangular channel section 42 is milled-out of one flat surface of the member 40 and extends partially through the thickness of the flat, cylindrical member 40. A longitudinal passageway 44 substantially perpendicular to the channel is drilled from the circular wall extending through the solid member 40 until it reaches the milled-out channel 42 and then continues on the other side of the milled-out section partially extending further into the steel member 40.

A lock cylinder, as best shown in FIG. 5, is inserted within the passageway 44. The lock includes a shaft portion 46, having a plunger 48 extending therethrough and including a transverse latch 50 securely connected to the end of the plunger 48. The transverse latch 50 may be keyed on to the plunger 48, held by means of a pin, or any other method as is well known in the art. A keyway 52 extends longitudinally along the shaft surface 46 extending from the outer end thereof and continuing through most of the length of the shaft surface but not reaching the opposite end thereof. A pin 54, securely connected to the flat, cylindrical member 40, extends into the keyway 52 thereby permitting the shaft portion 46 to slide within the passageway 44, however, preventing the shaft portion 46 from completely sliding out of the flat cylindrical member 40.

The lock itself is a quarter-turn latch type lock controlled by a key, shown at 56. When the key is turned, the transverse latch 50 can rotate 90° around the shaft section 46. As shown in the figures, the key 56 is of the type which has a round tang as in the Ace type lock.

In operation, the door 12 of the cabinet 10 is closed so that the abutting ends of the flanges connected respectively to the door and the cabinet body are adjacent to each other. The lock cylinder including the shaft portion 46, the plunger 48 and transverse latch 50 are extracted from the flat cylindrical member 40 to the fullest extent permitted by the fixed pin 54. The flat cylindrical member 40 is then placed over the abutting ends of the flanges whereby the abutting ends of the flanges are enclosed within the milled-out channel 42. The lock cylinder is then pushed into the member 40 so that it slides along the passageway 44 as the pin 54 slides along the keyway 52. The transverse latch 50 is shaped to generally correspond to the aperture shape in the flanges. In its open position, its shape is congru-
ous with the shape of the aperture. In its closed position, its shape is transverse to the aperture shape. When the lock is open, the latch will, therefore, pass through the apertures. When closed, the latch cannot pass therethrough. The key 56 is then inserted into the lock cylinder 46 and as the key is turned to lock the device, the transverse latch 50 turns 90° from its open position to its closed position, thereby crossing transverse to the aperture 36 and locking the flanges together.

To remove the device, the key 56 is again inserted into the lock cylinder 46, the transverse latch 50 is rotated 90° back to its open position with its shape congruous to the aperture, and the entire lock cylinder 46, together with the plunger 48 and transverse latch 50, is slid out of the member 40 until pin 54 stops the movement. At that point, the end of the transverse latch 50 is completely removed from the apertures in the flanges (FIG. 4) and the entire member 40 can be removed from the ends of the flanges. In order to facilitate easy slidability of the lock cylinder 46, once the lock has been opened, it is possible to place a compression spring abutting the shaft portion 46 and mounted on to the member 40, whereby as soon as the lock is opened, the spring will automatically slide the cylinder 46 outward from the member 40 thereby extracting the transverse latch 40 from the apertured flanges.

It will be appreciated that when the lock device is positioned over the ends of the flanges, the entire ends of the flanges are enclosed within the member 40. The lock cylinder is likewise completely enclosed within the member 40 when in a closed position. As a result, there are no parts of the locking assembly which can be pried open, or sawed off. In order to break open the cabinet, it would be necessary to cut through the steel cabinet itself or to rip off the entire flanges from the steel cabinet.

Referring to FIG. 6, there is shown an alternative embodiment of this invention. As shown, the plunger 60 extending from the shaft portion, has its end threaded. In this embodiment the lock is of the slide bolt type, whereby as the key is turned in the lock cylinder, the bolt turns. The end of the passageway drilled through the member is internally threaded at 66 to receive the bolt as it extends through the apertures in the flanges to the other side of the channel 42.

In operating the lock device shown in FIG. 6, the member 40 is placed over the ends of the flanges 32, 34 and the cylinder 62 is slid along the passageway with the pin 54 engaging the keyway 52 until the edge of the bolt 64 reaches the threaded portion of the passageway at 66. The key is then inserted and as the key is turned, the bolt threads into the receiving portion 66 and engages therein, thereby securing the flanges together.

Referring to FIGS. 7–12, there is shown a further embodiment of the invention. The flat cylindrical member 40 has the channel 42 milled partly therethrough from its flat surface, and has a longitudinal passageway 44 extending substantially perpendicular to the channel commencing from the circular wall and extending through the solid member until slightly past the channel, as heretofore described in connection with the other embodiments.

The cylindrical lock, as is best seen in FIG. 12, includes a shaft 70 having a circumferential keyway 72 passing through a quadrant of the shaft near one end thereof. A pin connected to the passageway 44 of the solid member 40 is positioned to engage the keyway, permitting the shaft a quarter turn rotation within the passageway and simultaneously preventing any axial movement of the shaft.

At the opposite end of the shaft, flattened sections 76, 78 are formed on opposite sides of the circular portion and extending longitudinally at least through part of the length of the shaft. The resultant shape at the end 80 represents an elongated four-sided figure with two sides straight and parallel and two sides opposingly curved. A protruding stem 82 extends from the end 80.

The cylindrical lock is positioned within the passageway 44 such that the stem 82 fits into the end of the passageway on the other side of the channel. The passageway can typically have a reamed hole 84 which snugly holds the stem 82 while permitting it to rotate. The cylindrical lock is situated such that the shaped portion thereof transversely crosses the channel 40 and is rotatably held securely on both sides of the channel.

The flanges for use with the lock device of this embodiment have apertures whose shape includes a hole 88 and a keyed opening 90 extending from the outer edge of the flanges 92, to the hole. The shape at the end of the cylindrical lock is such that when the lock is in an open position the straight portions 76, 78 can slide within the keyed part of the aperture 90. When the device is in a closed position, the curved portion of the shaft fits snugly within the hole 88. Since the shape of the end of the shaft is elongated, when in a closed position the shaft cannot be moved directly upward. Once the shaft is in a closed position within the aperture, it must be rotated 90° to be removed.

In operation with the lock device in an open position it is placed over the abutting ends of the flanges 32, 34. In the open position the straight portions 76, 78 slide into the aperture until it is within the hole as shown in FIG. 10. The lock is then closed by means of the key 56 whereby the shaft is rotated 90° such that the shaft is now in its transverse position as shown in FIG. 9. The flanges are then held together by the solid enclosure 40 and the lock device cannot be removed therefrom. To remove the lock device, the key is inserted and the lock is turned to its open position. The lock device can then be lifted off the flanges with the shaft passing through the keyed section 90 of the aperture.

In FIGS. 13–16 there is shown the lock mechanism 40' applied to a hasp 104, and staple 114. The cylinder 46 is so oriented that shaft 48 will pass through the opening in staple 114. It will be noted that the staple in FIG. 14 is rotated 90° with respect to the staple of FIGS. 15 and 16. A convenient method of making the device is to drill a bore in member 45 to provide a chamber 121. Pins 119 are then inserted from the bottom of the lock in bores 123. Bolt member 48' is provided with a "T" shaped head 125 which in the erect position shown in FIG. 16 will pass between pins 119 while in the locked position shown in FIG. 15 is transverse to the pins thereby locking bolt 48' in place.

The lock may be integral with the hasp 120 as shown in FIGS. 15 and 16. This arrangement is particularly suited for use in application such as trucks as the lock is captive and cannot be lost. Ears 106 shown in phantom in FIG. 14 and 106' shown in FIG. 16 hingedly secure hasp 104 and 120 respectively in the opening 108 formed in base 112.
The cylinder is slidingly retained by said screw 127 which permits replacement of the cylinder mechanisms at any time that the lock is removed from the installation.

Although the lock assembly has been shown as being used with a vending machine cabinet, it will be appreciated that the same lock apparatus can be used with any type of cabinet having a pivoted or movable section which is to be secured to a frame. Such forms of cabinets include by way of example filing cabinets and clothes closets. Furthermore, the lock assembly could also be used in connection with any door which is to be securely connected to a door frame. In this case, one flange would be connected to the door itself and the other flange connected to the door jamb with the ends of the flanges extending perpendicularly outward from the door. It will also be appreciated that although heretofore there has been described flanges of L-shape, other shaped flanges could also be used. For example, in one type of device the edge of the door may be close to the front of the cabinet whereby one L-shaped flange would be connected to the cabinet frame while a flat flange would be connected to the door. The ends of the flange abutting together would be apertured so that in a closed position the apertures are aligned. An important application of the apparatus is for locking truck body doors.

Referring again to FIG. 13 it will be observed that lock 40' is provided with a skirt portion 111 which is contoured to fit over base member 110 thereby eliminating an opening into which a pry bar may be inserted to force the lock.

This device can also be used to secure two ends of a chain if one end link is passed through the other end link and the lock attached to the first mentioned end link.

While not shown, the lock may be provided with a spring which is tensioned by the bolt or lock cylinder in the locked position and which will move the bolt to the unlocked position when the key is turned to its unlocked position. This spring may be a coil spring surrounding the lock cylinder and fixed thereto or a leaf or coil spring in chamber 121 against which member 125 seats.

While the best embodiments of the invention has been illustrated and described it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What I claim as new and desire to secure by Letters Patent is:

1. A locking device for retaining two adjacent members in a closed position, said locking member comprising:
   a. a first member having means for attachment to one of the adjacent member and having a protruding portion with an aperture therein;
   b. a staple member extending from said first member and defining an aperture;
   c. a hasp hingedly secured to said second member;
   d. a housing having a top and bottom surface and a wall enclosure therebetween carried by said hasp;
   e. a channel formed into one of said surfaces extending partially through said housing and adapted to fit over said staple member;
   f. a passageway in said housing extending transverse to said channel from said wall enclosure to a point past said channel;
   g. a key controlled lock having a shaft longitudinally movable with respect to said passageway; and
   h. holding means carried by said housing for preventing said lock from removal from said passageway; and
   wherein, when said housing is placed over said protruding staple portion in said closed position, said longitudinal shaft is situated within the aperture in said staple and is under control of said key and said shaft is withdrawn from the staple in the open position.

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