Jan. 7, 1969 G. E. DRAZIN 3,420,077

PICK-PROOF LOCKS

Filed Dec. 16, 1966 Sheet 1 of 2

Fig. 1

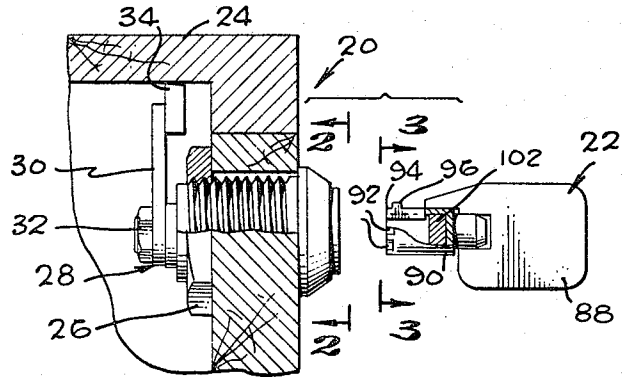


Fig. 2

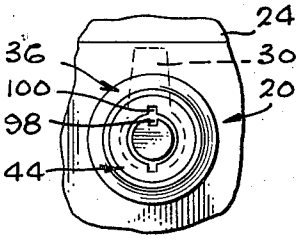


Fig. 3

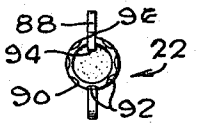


Fig. 4

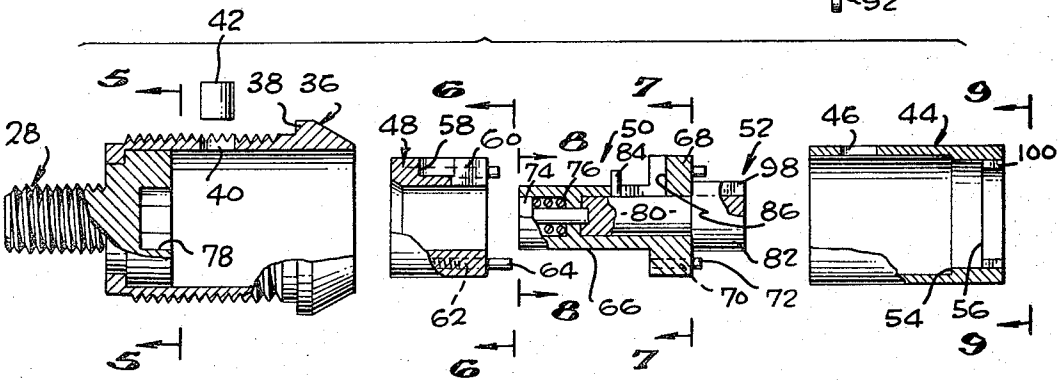


Fig. 5

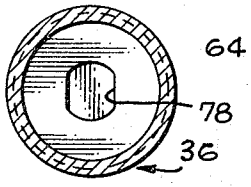


Fig. 6

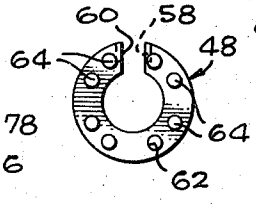


Fig. 7

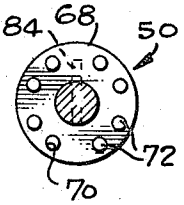


Fig. 8

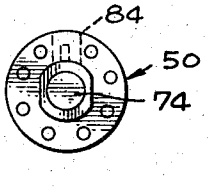
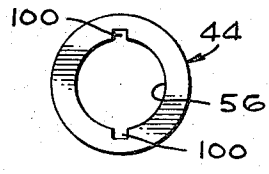


Fig. 9



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PICK-PROOF LOCKS

Filed Dec. 16, 1966 Sheet 2 of 2

Fig. 10

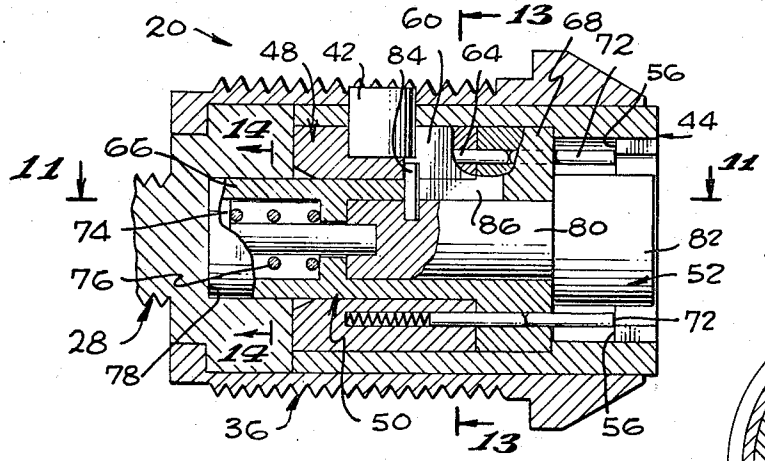
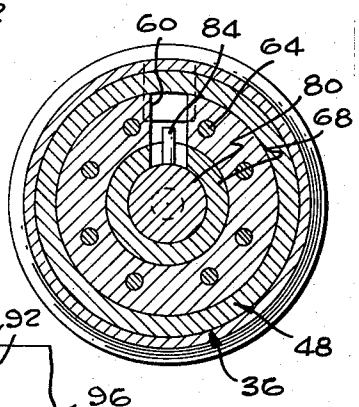


Fig. 13



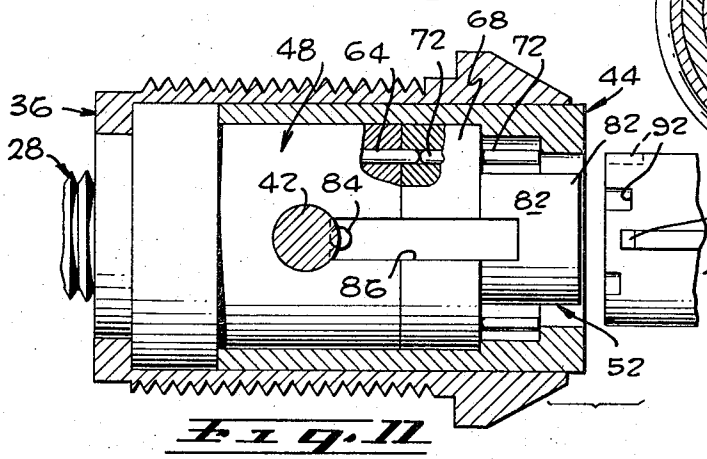


Fig. 11

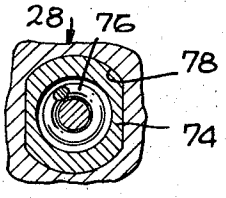


Fig. 14

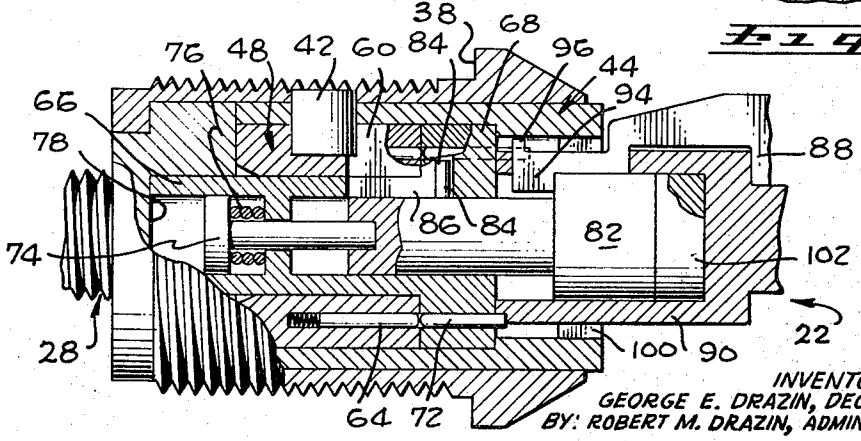


Fig. 12

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3,420,077

PICK-PROOF LOCKS

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Int. Cl. E05b *47/00;* E05b *33/00;* E05b *19/26*

ABSTRACT OF THE DISCLOSURE

This invention discloses a lock operable by a magnetic key which when inserted longitudinally therein moves a key guide against the action of a spring. The key guide includes a transverse pin which slides within a longitudinal slot in the key guide housing, the pin being withdrawn from the slot upon insertion of the magnetic key thereby allowing for rotation of the key guide within the key guide housing and the releasing of the lock mechanism.

This invention relates to locks and more particularly to a pick-proof lock which may be employed on untended coin-operated vending machines.

In such vending machines it is necessary to lock both the coin compartment and the merchandise supply department against thefts. A commonly employed lock is of the tubular key type which is relatively inexpensive. Unfortunately the simplicity of this type of lock makes it highly vulnerable to vandalism and pilferage, and the "picking" of such locks is becoming more frequent and costly. A new lock which is substantially "pick-proof" is sorely needed.

In the construction of locks it is well known that even the lock which gives the greatest protection is capable of being opened by the skilled "lock-picker." Therefore, locks are designed to require a series of separate distinct movements in order to be opened. The time involved in the accomplishing of each movement combined with the period of time in discovering what movements are to be made, and the order in which they are to be made increases the chances that the intruder will be discovered before he manages to open the lock. Extending the length of time it takes for the unauthorized opening of a lock is the best known weapon against theft.

The lock of this invention and its particular key are substantially identical in outward appearance to the locks and keys presently employed in vending machines. However, in addition to the normal action, this lock is constructed to be affected by a small magnetic force, exerted by a magnet located in the key. Briefly, this invention relates to a lock operable by a magnetic key which when inserted longitudinally moves a key guide against the action of a spring. The key guide includes a transverse pin which slides within a longitudinal slot in the key guide housing, the pin being removed from the slot upon insertion of the magnetic key thereby allowing for rotation of the key guide and the releasing of the lock mechanism.

It is an object of this invention to provide a new and novel lock.

Another object of this invention is to provide a lock which in appearance is substantially identical to the commonly employed locks but operates only with a special magnetic key.

Another object of this invention is to provide a lock utilizing a spring-biased security retainer which can be operated only by means of a magnetic force, applied from without the lock itself.

Other objects, features and advantages of the invention will become apparent from a consideration of the following description thereof in connection with the accompanying illustrative drawings in which:

FIGURE 1 is a side view of the lock and key of this invention as installed in a typical vending machine housing;

FIGURE 2 is a front view of the lock of this invention taken along line **2—2** of FIGURE 1;

FIGURE 3 is a view of the particular key of the invention taken along line **3—3** of FIGURE 1;

FIGURE 4 is an exploded side view of the lock of this invention;

FIGURE 5 is a view taken along line **5—5** of FIGURE 4;

FIGURE 6 is a view of this invention taken along line **6—6** of FIGURE 4;

FIGURE 7 is a view of this invention taken along line **7—7** of FIGURE 4;

FIGURE 8 is a view of this invention taken along line **8—8** of FIGURE 4;

FIGURE 9 is a view of this invention taken along line **9—9** of FIGURE 4;

FIGURE 10 is a side view of the lock of this invention showing its interior before insertion of the key for operation;

FIGURE 11 is a top view of the invention taken along line **11—11** of FIGURE 10;

FIGURE 12 is a view of this invention similar to FIGURE 10 but showing full insertion of the key and operation of the lock to the unlocking position;

FIGURE 13 is a view taken along line **13—13** of FIGURE 10; and

FIGURE 14 is a view taken along line **14—14** of FIGURE 10.

In FIGURES 1, 2 and 3 there is shown the lock **20** of this invention and corresponding key **22**. Lock **10** is shown as installed in a vending machine cabinet **24**, securely fastened thereto by means of nut **26**. A hasp **28** is rotatable by the action of the key **22**, the hasp **28** including a transverse arm **30** being securely held thereto by nut **32**. A protuberance **34** extends from the cabinet **24** which co-acts with arm **30** to prevent opening of cabinet **24** when the lock is in the latched position.

In FIGURES 4–9 the lock **20** is shown in an exploded view showing in detail the interior of lock **20**. Tumbler housing **36** is shown being cylindrical and hollow, hasp **28** being fixedly secured at one end of housing **36**. Housing **36** includes a flange **38** which co-acts with nut **26** to tightly support the lock **20** within cabinet **24**. Lock housing **36** has a transverse opening **40** adapted to receive lockpin **42**. Retainer housing **44** is to be concentrically held within lock housing **36**. Retainer housing **44** has a transverse opening **46** which is similar to transverse opening **40** of the lock housing **36**. To be contained within the retainer housing **44** are the tumbler housing **48**. Key guide housing **50** and key guide **52**. Tumbler housing **48** is slidably adapted to one end of retainer housing **44**, the key guide housing **50** which contains the key guide **52** is slidably held within the tumbler housing **48**. Lock housing **36**, retainer housing **44** and tumbler housing **48** are each cylindrical and substantially hollow and so constructed as to matingly support each other. Retainer housing **44** at one end includes a stop flange **54** and a collar **56**. Flange **54** co-acts with the outer edge of the key guide housing **50** to prevent further insertion. When key guide housing **50** is adjacent flange **54**, the housing **50** is fully inserted and is in the normal operating position. The function of collar **56** is to be explained further in the specification.

Tumbler housing **48** includes transverse openings **40**

and 46. Upon insertion of the tumbler housing 48 within the retainer housing 44, the resultant unit being inserted within the lock housing 36, the lockpin 42 is driven within the aligned openings 40, 46 and 58. Therefore, each member is held immoveable with respect to the other, effectively creating a single unit. Tumbler housing 48 contains a radial slot 60 which extends longitudinally to opening 58. The function of slot 60 will be explained further in the specification. Adjacent the outer periphery of tumbler housing 48, are a series of equiangularly spaced longitudinal apertures 62. Each aperture 62 contains a spring biased plunger 64, each plunger 64 being of a different length. The function of the plungers 64 likewise will be explained below.

Key guide housing 50 has a body portion 66 and a flange portion 68. Body portion 66 matingly fits within tumbler housing 48 with flange portion 68 in abutment therewith. Flange 68 includes a series of longitudinal openings 70 which are of the same diameter as openings 62 in tumbler housing 48. Openings 70 register with openings 62 and are alignable therewith. In this embodiment of the invention eight such alignable openings are shown, however, their number is a matter of choice.

Slidably contained within each opening 70 is a follower 72. The length of each follower 72 is determined by the length of its corresponding plunger 64, since when the followers 72 are acted upon by key 22 plungers 64 must be flush with the end of tumbler housing 48. This feature is necessary for the operation of the lock by its key.

Upon assembly of the lock, the collar of the retainer housing 44 prevents the spring biased tumblers 64 from ejecting their corresponding followers 72 from the lock unit. Also, the key guide housing 50 includes a central plunger 74 which is acted upon by expanding spring 76. Plunger 74 is fixedly secured by a press-fitting arrangement within the co-acting key guide 52. When the lock is fully assembled, the central plunger 74 and the end of body portion 66 of key guide housing 50 is adapted to protrude within opening 78 in hasp 28.

Upon rotation of the key guide 52 and key guide housing 50 by key 22, hasp 28 is rotated therewith by the connection established through opening 78.

One function of the spring biased central plunger 74 is to hold the key guide 52 in abutting relationship with the key guide housing 50.

Key guide 52 includes a body portion 80 and a head portion 82. Body portion 80 is slidably held within key guide housing 50, with head portion 82 abuting flange 68. A retainer pin 84 is mounted on body portion 82 and extends transversely thereto. A finite slot 86 is located in key guide housing 50 and the movement of retainer pin 84 is restricted thereby. Slot 86 allows only longitudinal movement and no rotational movement. Slot 60 of tumbler housing 48 allows for movement of retainer pin 84 therein.

All parts of the lock, except for key guide 52, are constructed of brass, aluminum, copper, or other non-magnetic materials. Key guide 52 is constructed of steel or some other magnetizable material.

With particularity, note FIGURES 1 and 3 which show the key 22 of this invention. Key 22 has a handle portion 88 and a tubular section 90 connected thereto. Located on the periphery of the open end of the tubular section 90 are a series of indentations 92. A rail 94 and a tongue 96 are located interiorly and exteriorly of the tubular section 90, respectively, the rail 94 and tongue 96 being in aligned relationship. Each indentation 92 is adapted to contact a corresponding follower 72 in the flange 68 of the key guide housing 50. The length of each indentation 92 is just sufficient to move its corresponding follower 72 the distance required to allow its particular tumbler 64 to be flush with the face of the tumbler housing 48. Thus no tumbler prevents rotational movement of the key guide housing 50 with respect to the tumbler housing 48.

For insertion of key 22 rail 94 must register with a groove 98 located in the head portion 82 of the key guide 52. In addition, tongue 96 must co-act with a slot 100 located in retainer housing 44. Any number of slots 100 could be employed (in this embodiment two are shown) as it is only necessary for the use of the rail 94 and its corresponding groove 98 to locate a single position for insertion of the key 22. However, slots 100 are provided to easily determine a locked and unlocked position of the lock 20.

Key 22 further includes a small magnet 102 located interiorly of tubular section 90. For reasons which will become clear, the key 22 itself is constructed of any suitable nonmagnetic material. The function of the magnet will be explained in connection with the following description of the actual operation of the lock.

Noting particularly FIGURES 10 to 14, the lock 20 is shown in its normal secured position in FIGURE 10. Followers 72 are extended by spring biased tumblers 64 against collar 56. Key guide 52 is retracted by the force of spring 76. Upon insertion of key 22 within retainer housing 44, surrounding head portion 82 of key guide 52, followers 72 are compressed by indentations 92, thereby moving tumblers 64 against the action of their springs. If the key is the correct one for the lock the tumblers will be positioned flush against the tumbler housing 48 thereby not preventing rotational movement therebetween. This is the only operation necessary to open a lock of the conventional type; however, in the subject invention an additional requirement must be satisfied in order to allow the lock to assume the unlocked position.

A magnet 102 located within key 22 attracts the key guide 52, overcoming the action of spring 76. Retainer pin 84 is then released from interaction with the tumbler housing 48, and relocated so as to cooperate with the flange 68 of the key guide housing 50. In this configuration, as shown in FIGURE 12, retainer pin 84 no longer prevents the rotational unlocking movement of the lock mechanism. Key 22 may then be rotated, causing rotation of hasp 28, thereby rotating arm 30 away from its locked position behind protuberance 34. Cabinet 24 is then capable of being opened.

While certain specific structures embodying the invention are shown and described herein, it will be manifest to those skilled in the art that various modifications and rearrangements of the parts may be made without departing from the spirit and scope of the underlying inventive concept as hereinafter claimed.

What is claimed is:

1. In a pick-proof lock for use on vending machines including a retainer housing; a tumbler housing containable within said retainer housing; a key guide housing insertable within said tumbler housing; a key guide insertable within said key guide housing; a lock housing containing said retainer housing; said lock housing and said retainer housing and said tumbler housing being held against relative movement; said lock housing and said retainer housing co-acting to contain and prevent withdrawal of said tumbler housing and said key guide housing and said key guide; said key guide being engageable by a key capable of rotating said key guide and thereby operating said lock, the improvement comprising:

said key guide being movable longitudinally within said key guide housing; and

means integral with said key guide movable into engagement and out of engagement with said relatively fixed tumbler housing.

2. The improvement in a pick-proof lock as defined in claim 1 wherein:

said key guide is magnetically responsive;

said key is provided with a magnet; and

said key guide is adapted to be moved longitudinally under the influence of said magnet.

3. The improvement in a pick-proof lock as defined in claim 2 wherein:

said means integral with said key guide include a pin,

said pin being movable longitudinally within a first slot in said key guide housing,

said pin being movable within a second slot located in said tumbler housing, and

said pin also being movable out of engagement with said second slot and rotatably movable with respect thereto.

4. The improvement in a pick-proof lock as defined in claim 3 wherein:

resilient means urge said key guide into engagement with said tumbler housing; and

said magnet is of sufficient strength to overcome said resilient means and move said key guide out of engagement with said tumbler housing.

5. In a lock having a cylindrical body portion; latching means protruding from one end of said body portion and rotatable with respect thereto; and a key insertable within said body portion at the other end thereof, said key being rotatable in said body portion, the improvement in which:

said key includes a magnet;

a magnetically responsive guiding member is located within said body portion and adapted for longitudinal movement between a first position and a second position therein under the influence of said magnet and for rotation by said key;

said guiding member is provided with means releasably engaging said body portion and thereby preventing rotation of said guiding member when said guiding member is in said first position;

said guiding member is adapted to engage said latching member for rotation thereof when said guiding member is in said second position; said guiding member is provided with an outwardly extending pin, which is moved between a first position and a second position by longitudinal movement of said guiding member, the pin in said first position fixing said guiding member relative to said body portion, and in said second position allowing for rotation of said guiding member relative to said body portion; resilient means urge said guiding member into said first position; and said magnet is of sufficient strength to move said guiding member longitudinally against the action of said resilient means and into said second position.

6. A lock as defined in claim 5 wherein:

said means releasably engaging said body portion is moved into and out of engagement with said body portion by said guiding member.

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U.S. Cl. X.R.

70—363, 413, 356, 360