United States Patent

Strang

[15] **3,647,072**

[45] **Mar. 7, 1972**

[54] GARMENT HANGER LOCK MECHANISM

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[22] Filed: **May 7, 1970**

[21] Appl. No.: **35,397**

[52] **U.S. Cl.** **211/4**

[51] **Int. Cl.** **E05b 73/00**

[58] **Field of Search** 211/4, 7; 312/351; 194/74, 194/78; 149/38

[56] **References Cited**

UNITED STATES PATENTS

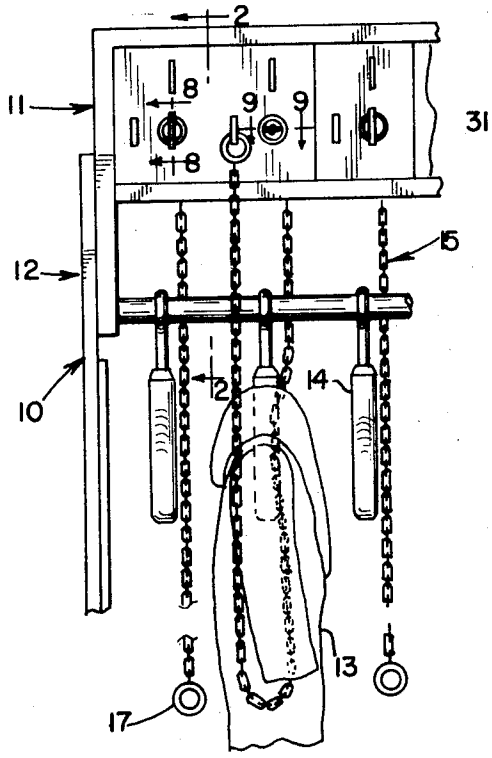
610,372	9/1898	Sanford	211/4
2,202,427	5/1940	Polen	211/4 X
2,438,783	3/1948	Kraft	211/4 X
2,868,605	1/1959	O'Connor	211/4 X
3,028,941	4/1962	McDonnell	194/78
3,552,535	1/1971	Strang	194/74

Primary Examiner—Nile C. Byers, Jr.
Attorney—Greist, Lockwood, Greenawalt & Dewey

[57] **ABSTRACT**

A locking device capable of being readily converted from a coin controlled to noncoin controlled condition. The extension and retraction of a locking hook or bolt is controlled by a key-operated drum cam which has means for receiving and positioning a coin thereon. A preferred embodiment includes a manually releasable drum-lock which can also be cammed by a coin in operating position on the drum out of drum-locking position when a key is turned.

3 Claims, 9 Drawing Figures



PATENTED MAR 7 1972

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SHEET 1 OF 2

FIG. 1

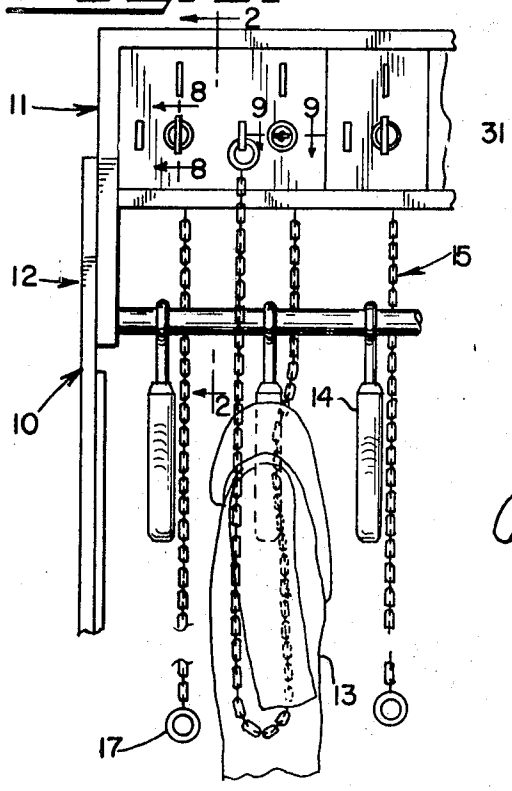


FIG. 2

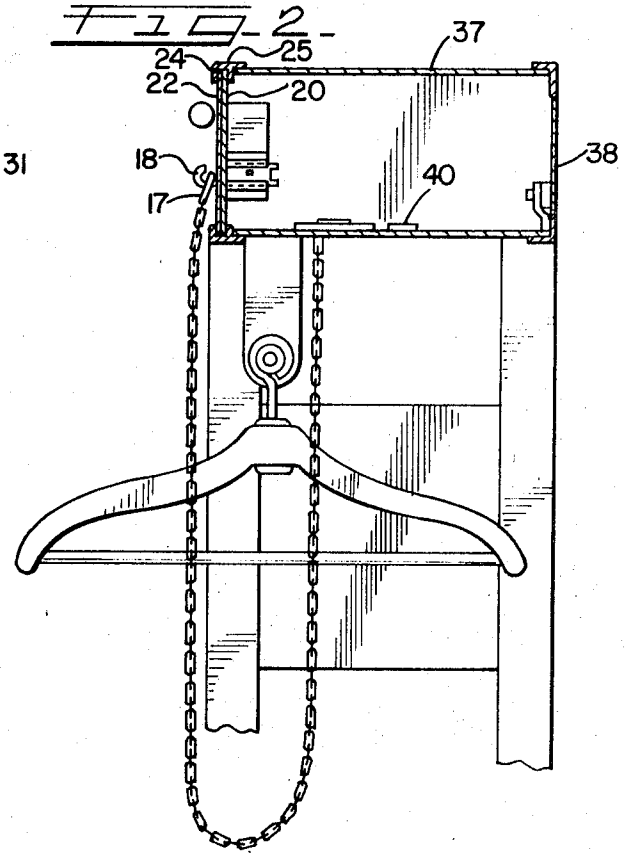


FIG. 3

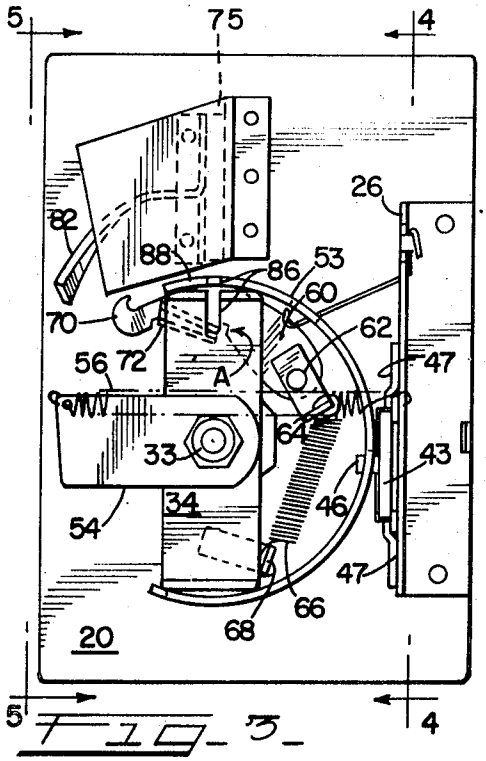
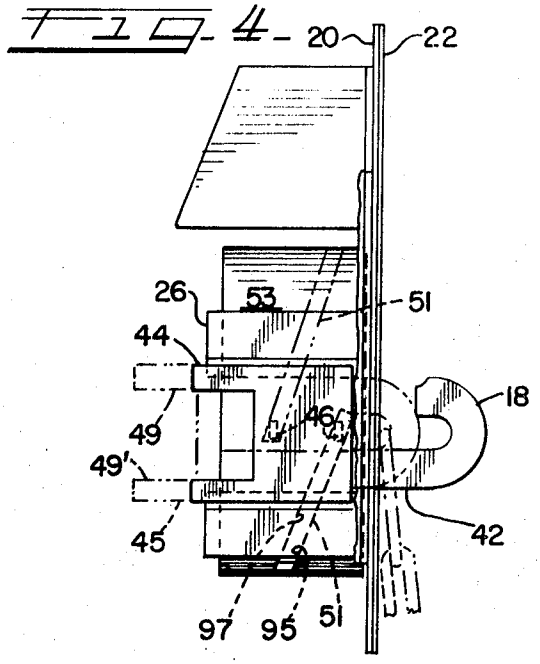


FIG. 4



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FIG. 5

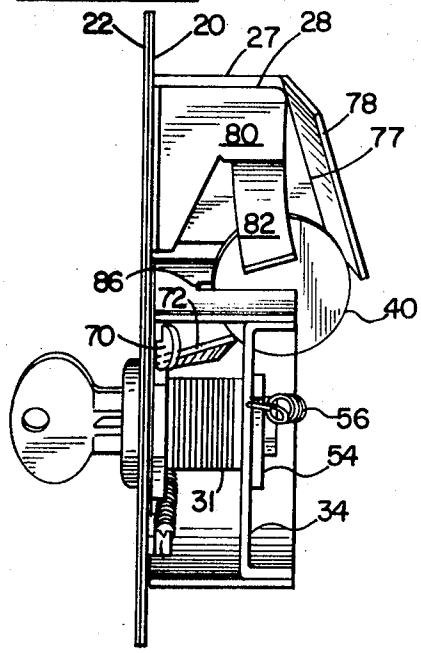
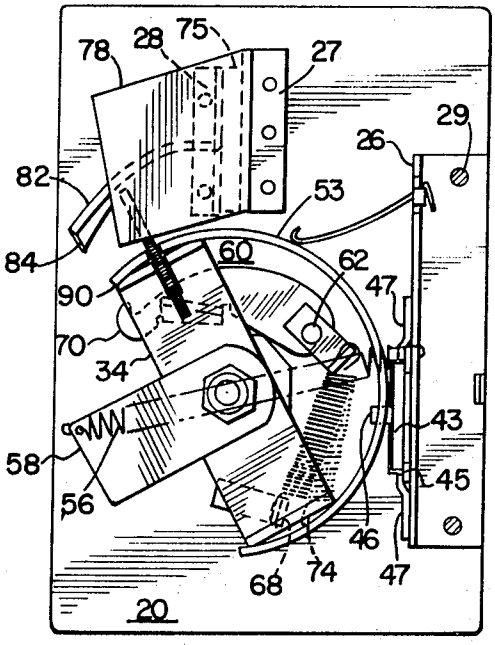


FIG. 6



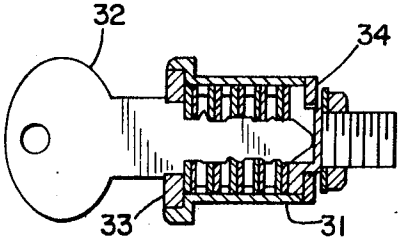


FIG. 8

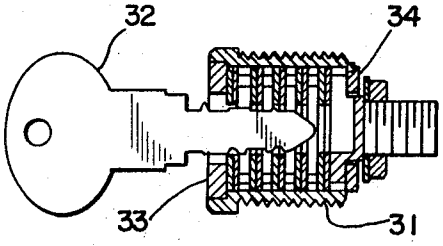
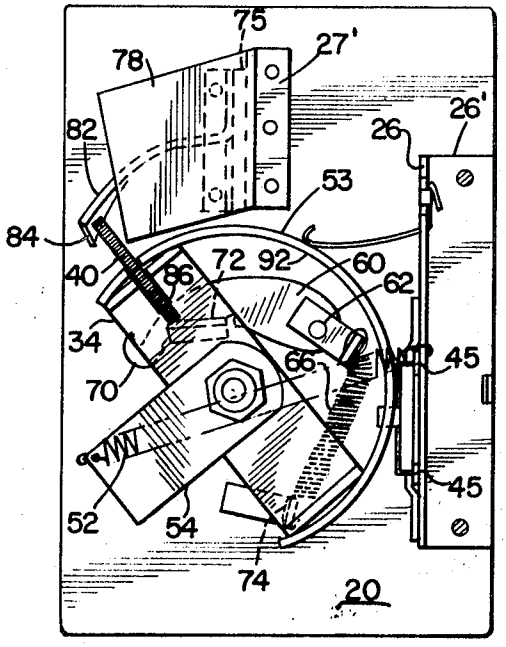


FIG. 9

FIG. 7



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GARMENT HANGER LOCK MECHANISM

BACKGROUND OF THE INVENTION

Many types of coin-operated locking mechanisms are well known. For example German Pat. Nos. 604,041, and 811,406, show coin-operated locking mechanisms which utilize a coin as a link which is essential in order to accomplish locking of the mechanism. These German patents show a removable plunger which can be secured in the locking mechanism by a bolt. The bolts cannot reach the plunger, in the absence of a coin, due to the presence of a bolt-obstructing shield. The inward movement of the plunger, when a coin is in a linkage position, backs away the bolt-obstructing shield, thus permitting the bolt to engage and lock the plunger.

Similar devices are shown in U.S. Pat. Nos. 2,989,388, and 3,028,941. The latter U.S. patents show the use of similar locking mechanisms in conjunction with a coat rack. While such locking mechanisms are generally satisfactory in coin-operated checking facilities, they are not readily converted from a coin-operated to a noncoin-operated locking condition.

Restaurant operators may find it desirable to use such a garment checking facility in a coin-operated condition, for example during the evening dinner hours, and yet may wish to convert the unit to a noncoin-operated condition, for example, for use in connection with the luncheon trade, or for use in connection with semiprivate gatherings.

A highly advantageous convertible coin-operated locking mechanism is disclosed in my copending U.S. Pat. application Ser. No. 792,923, filed Jan. 22, 1969. In accordance with that disclosure, a locking mechanism, having a bolt biased toward a lockable traveler, is provided with a bolt-obstructing shield which is pivotable, and which can be backed out of bolt-obstructing position by the inward movement of nonremovable lockable traveler when a coin in inserted through a separate opening. Also, the shield is manually pivotable to a second position and retainable in the second position to permit continual contact of the bolt against the lockable traveler. In the latter condition the locking mechanism is noncoin-operated, and insertion of the traveler will cause the traveler to be locked, even without a coin. In the structure disclosed in my copending application, the entire locking mechanism is moved from an unlocked to a locked condition by axial force exerted on the lockable traveler. In a preferred disclosed embodiment the key-lock is automatically rotated to a locked position by that force and the key is partially ejected.

Thus in the structure disclosed in my copending application, the unlocked mechanism cannot be locked by the turning of the key. Some individuals, who may fail to notice the automatic rotation of the key, after locking the mechanism by pushing the lockable traveler into locked condition, attempt to "lock" the already locked key-lock cylinder by rotation of the key. In preferred embodiments in which the key is partially ejected, the key-cylinder is not rotatable with the key partially inserted and the user in some instances has been observed to reinsert the key to fully inserted condition, turn the key, thus unlocking the already locked lockable traveler, and "losing" the coin. Hence, some garment security device owners object to the automatic locking feature of the previous mechanism, i.e., by the axial movement of the lockable traveler.

One of the objects of this invention is to provide a garment security apparatus having key-controlled locking mechanism, which locking mechanism also completely controls the positioning of a key-controlled traveler. It is another object of this invention to provide a locking mechanism which is readily converted from coin-controlled to noncoin-controlled condition.

It is another object of a preferred embodiment of this invention to provide a locking mechanism which lends itself for use in merchandising establishments which display relatively expensive garments, e.g., fur coats, on public-available racks.

It is another object of this invention to provide a garment security apparatus which is key-operated, which apparatus automatically retains the operating key when the locking device in in unlocked condition.

These and other objects which will be apparent hereinafter are achieved in accordance with this invention which is described generally hereinafter. Also, the following description includes the disclosure of a preferred embodiment and some contemplated alternative structures.

SUMMARY OF THE INVENTION

In accordance with this invention, a locking mechanism having a controlled traveler secured to a key-operatable cam, preferably, to a slotted drum cam, is provided with a cam-lock which is pivotable, and which can be moved out of cam-obstructing position by a coin carried on the rotatable drum cam. The cam-lock is also manually releasable or pivotable to a second position and when so released is retained in the second position by gravity or other biasing means. In the latter condition the overall locking mechanism is noncoin operated. Forces exerted on the controlled traveler do not activate the locking or unlocking of the mechanism.

DESIGNATION OF THE FIGURES

FIG. 1 is a fragmentary elevational view of a garment checking facility utilizing a locking mechanism in accordance with this invention.

FIG. 2 is a cross-sectional elevational view taken approximately along the line 2–2 of FIG. 1, except that a chain is shown in position in which it can be locked.

FIG. 3 is an elevational view from the rear of the locking mechanism, for example, as viewed through a rear door at the upper right of FIG. 2.

FIG. 4 is a cross-sectional elevational view taken approximately along the line 4–4 of FIG. 3.

FIGS. 5, 6 and 7 show the relative position of the components during the locking of the mechanism.

FIG. 5 is an elevational cross-sectional view taken approximately along the line 5–5 of FIG. 3.

FIGS. 6 and 7 are rear elevational views as presented in FIG. 3.

FIG. 8 is a fragmentary cross-sectional view taken approximately through the line 8–8 of FIG. 1.

FIG. 9 is a fragmentary cross-sectional view taken approximately through the line 9–9 of FIG. 1.

DESCRIPTION OF PREFERRED EMBODIMENT

Reference to the drawings indicates a garment rack assembly at 10 having head piece section generally 11 and a garment support section generally 12. Each chain 15 is secured to the headpiece section 11 at one end and has an open loop 17 at the other end. Open loops 17 are adapted to engage hook like projections 18 which extend forwardly of the supporting facing 20 and decorative facing 22. Supporting facing 20 carries locking mechanism, generally 21. Both support facing 20 and decorative facing 22 reside in slots 24 in framing members 25 of headpiece section 11. Secondary support structure 26 and coin channel members 27, 28 are preferably spot welded to support facing 20 and therefore decorative facing 22 is desirable as a convenient, readily maintained facade to cover the spot weld marks on supporting facing 20 as illustrated. Secondary support 26, and coin channel members 27, 28 are preferably platelike elements extending rearwardly from support facing 20, and having flanges 26', 27', and 28', respectively, extending at right angles therefrom, which are welded or otherwise secured to support facing 20. Shaded areas 29 indicate points at which spot welding is preferred. Drum stop 60 is pivotally secured to support facing 20, e.g., by rivet 62. Spring post 68 is also fixed to facing 20. Drum stop 60, and spring post 68 will be discussed hereinafter.

Key locks, generally 31, include a normally retained, but removable key 32, a rotatable cylinder 33, and rotatable arm 34 carried by rotatable cylinder 33 and fixed with respect to rotatable cylinder 33 (See FIG. 8). The key-lock 31 is

preferably a conventional mechanism of the type which retains key 32 in the lock while the lock mechanism is in unlocked condition, but releases key 32 while the locking mechanism in in locked condition. Thus, while the cylinder 33 is in the position corresponding to the position of arm 34 in FIGS. 3, 6, and 7, the key is automatically retained in the key lock. When the locking mechanism is in the locked position and pivoted to the position shown at FIG. 9, the key is released automatically. Locking mechanism 21 resides behind supporting facing 20 in an enclosed rectangular compartment 37 which has lockable access door 38 at the rear thereof. Coins 40 are retained within enclosed compartment 37 and can be removed through access door 38.

Lock-controlled traveler assembly, generally 44, includes projection 18, shaft 42, plate 43 and slidable carriage 45. Heavy cam follower 46 is fixed to plate 43 and extends perpendicularly from the side thereof. Carriage 45 is slidably retained between opposing brackets 47. Top and bottom carriage projections 49, 49', respectively, assist in maintaining traveling assemblies 44 in proper horizontal orientation, thus facilitating the smooth sliding of traveling assembly 44. Cam follower 46 resides in slot 51 in drum 53. Drum 53 is carried on and fixed with respect to rotatable arm 34. Slot 51, in the illustrated embodiment, is biased along drum 53. (See FIG. 4) In the illustrated embodiment, drum 53 does not extend completely around its axis of rotation, but rather only extends slightly more than halfway to constitute a partially cylindrical arcuate cam.

Also carried by rotatable arm 34 is levered arm 54 which is fixed with respect to arm 34. Spring 56 is extended between end 58 of lever arm 54 and secondary support frame 26 so that, as illustrated in FIG. 3, spring 56 extends along a line above the center of rotatable cylinder 33. When the locking mechanism 21 is in the condition illustrated in FIG. 3, spring 56 biases lever arm 54 upwardly. As illustrated in FIG. 6, partial rotation of cylinder 33, and with it, arms 34, 56 and drum 53, brings spring 56 "over-the-center" of center of rotation, of cylinder 33. Continued rotation of the arms 34, 54, and drum 53 "over-the-center" brings spring 56 to a position along a line below the rotational center of cylinder 33 as illustrated in FIG. 7, in which condition spring 56 biases arms 34, 54 to rotation in the counterclockwise direction as illustrated in FIG. 7.

Drum Lock

In the illustrated embodiment, a means for locking drum 53 against rotation, even by rotation of key 30, includes elongated pivotal drum stop 60, pivotally secured to supporting face or panel 20 by rivet 62. Near rivet 62, spring post element 64 is fixed to arm 60. Spring 66 is fixed to post 64 and extends downwardly to a releasable attachment to spring post 68 which is fixed to facing 20. When spring 66 is stretched between posts 64, 68, drum lock 60 is biased to rotate upwardly. Drum stop 70, positioned at the upper extreme of drum lock arm 60 is positioned to engage an advancing portion of drum 53. Extending rearwardly from, and fixed to drum lock arm 60 is flange 72. Flange 72 is oriented on the bias with respect to a radius drawn from the center of rotation of cylinder 33. The bias alignment of flange 72 permits a coin 40 fixed with respect to, and residing on drum 53, to cam drum stop 60 downwardly as will be explained in greater detail hereinafter.

Lower end 74 of spring 66 is releasable from post 68, as illustrated in phantom lines in FIG. 6. When so released, the length and weight of drum stop 60 causes the drum-engaging portion 70 to drop under gravity, thus freeing drum 53 from cooperation with drum lock 60.

COIN CHANNEL

As illustrated in FIG. 2, coin 40 is inserted perpendicularly with respect to facade 22 through aligned coin slots 75 which pass through facade 22 and supporting panel 20. Coin channel member 27 extends rearwardly from a line adjacent one edge of slot 75 for a distance slightly greater than coin 40, at which point member 27 is bent laterally along downwardly and rearwardly biased line 77 to provide laterally extending portion 78 which extends downwardly and rearwardly. Coin channel member 28 extends rearwardly from the other vertical edge of slot 75 and terminates just short of lateral projection 78. Rearwardly extending portion 80 of channel member 28 and rearwardly extending portion of channel member 27 thus form a relatively narrow channel therebetween in which an inserted coin is channelled in substantially vertical alignment and is also channelled between face 20 and laterally extending projection 78. Extending laterally from channel panel 80 is arcuate guide 82 which, as perhaps best appreciated from a consideration of FIGS. 6 and 7 has a curvature approximating a circumference around the center of rotating cylinder 33. However, the radii between the center and end 84 of guide 82 is somewhat shorter, particularly at the portion thereof closest to supporting panel 20. Coin seating notch 86 extends through drum 53 and lever arm 34. Seating notch 86 is positioned in alignment with, i.e., immediately below, coin slot 75, when the projection 18 is extended, unlocked position.

OPERATION

One of the chains 15 is dropped through the sleeve of a garment 13 either before or after it is placed on hanger 14, and end loop 17 of chain 15 is placed over hooklike projection 18. Should the patron attempt to push projection 18 axially into lock position, the movement of projection 18 is stopped immediately since cam follower 46, residing in slot 51 acts as a detent, or stop. Moreover, the taper of slot 51, i.e., its pitch, is so small that it constitutes a nonreversible drive cam. Hence, even though rotation of drum 53 (and with it slot 51) smoothly and easily drives traveler assembly 44 back and forth, it is impossible to drive drum 51 by attempting to force traveler assembly 44 in either direction. Whenever the locking assembly is in coin-controlled configuration, i.e., whenever biasing spring 66, is extended between post 64 and 68, the patron cannot turn key 31 to retract projection 18 unless an appropriate coin has been place in operating position. Whenever the mechanism 21 is in coin-operated condition, attempted rotation of drum 53 brings advancing edge 90 of drum 53 into engagement with upwardly biased stop 70. However, when coin 40 passes through slot 75 it is maintained in vertical alignment between rearwardly extending portion of channel members 27, 28. Coin 40 drops by gravity against outer face 88 of drum 53. As perhaps best appreciated from a consideration of FIG. 5, the center of gravity of coin 40 is far enough over slot 86 to cause coin 40 to fall outwardly and downwardly into seat slot 86. Laterally extending projection 78 stops continued rearward movement of coin 40 out of seat slot 86. FIGS. 5 and 6 illustrate a side and rear view, respectively, of the relative position of various components of the mechanism at the same intermediate stage of rotation. It is noted that coin 40 in its initial (vertical) rest position in seat 86 comes to rest at the bottom of notch seat 86 at a level (see A in FIG. 3) at which a lower edge thereof engages flange 72 of pivotal drum lock 60. As illustrated in FIGS. 3, 5 and 6 initial rotation of rotatably cylinder 33 with coin 40 in coin seat slot 86 causes coin 40 to rotate with drum 53 while being retained in seat slot 86 by guides 78, 82. As rotation continues the edge of coin 40 bears downwardly against flange 72 pivoting flange 72, and with it lock arm 50, moving drum-engaging member 70 downwardly, out of the path of advancing leading edge 90, as illustrated in FIG. 6. Thus the coin is the operator element driving drum lock 60 out of drum-locking position as drum 53 rotates. Continued rotation of drum 53 to the position illustrated in FIG. 7 brings coin 40 clear of laterally extending guide member 78, but not clear of curved guide member 82. As indicated above, the radius of curvature of guide member 82 shortens towards end 84 thereof with the result that as coin 40 is moved along guide 82 towards end 84

the resiliency of guide member 82 biases coin 40 downwardly and rearwardly. As soon as coin 40 clears guide 78 the downward and rearward biasing of guide 82 forcibly ejects coin 40 from seat slot 86. As soon as coin 40 clears flange 72 spring 66 biases lock 60 upwardly and it now slidably rides along inner face 93 of drum cam 53.

As indicated in FIG. 7 spring 56 is mounted on secondary frame 26 to spring 56 over-the-center of rotation of drum 53 and, as illustrated in FIG. 7, this "over-the-center" change in direction of bias of rotation occurs at the moment at which coin 40 is ejected from drum 53. Spring 56, with the aid of the high mechanical advantage afforded by arm 54 snaps drum 53 to a stop point. The extremes of rotation of drum 53 are perhaps best appreciated from a consideration of FIG. 4 in which drum 53 is shown with cam slot 46 in the positions obtained at the lock and unlock configuration of lockable traveler assembly 44. Thus, it will be appreciated from a consideration of FIG. 4, that the position indicated for slot 51 at the lower portion of drum 53 corresponds to the position in which cam follower 46 resides with traveler 44 in extended position, i.e., with projection 18 extended forwardly of facade 22. As drum 53 rotates in an upward direction, as viewed in FIG. 4, cam slot 51 moves upwardly to the position illustrated in phantom lines forcing cam follower 46 rearwardly, thus bringing traveler 44 (and projection 18) into rearward locked position. It is further noted that cam follower 46 also serves as a rotation stop at each end of slot 51. Thus, downward rotation of drum 53 is stopped by the upper end of slot 51 as viewed in FIG. 4, and the rotation of drum 53 in the opposite direction is stopped by follower 46 at the other end of slot 51.

NONCOIN OPERATING CONDITION

To convert the locking mechanism to a noncoin-operated condition, end 74 of spring 66 is detached from spring post 68. The condition obtained is indicated by the phantom presentation of spring 74 in FIG. 6. Due to the generally elongated character of drum-lock 60, and due to the weight of the elements, the drum-lock assembly 66 will pivot by gravity to a configuration approximately that illustrated in FIG. 6 in which drum-engaging element 70 is pivoted downwardly and out of the path of advancing edge 90 of drum 53.

Should the basic mechanism be needed for use in an installation which will never be coin-operated, e.g., in a retail merchandising establishment displaying relatively expensive garments, such as fur coats, in a publicly available setting, facade 22 would not have slot 75 extending therethrough, and drum-lock mechanism would be disengaged by release of end 74 of spring 66 from post 68, or drum-lock mechanism simply be omitted. Thus, in such an embodiment, the garment-security apparatus would be operable only by key, and the turning of the key would permit unrestricted rotation of drum 53, and with that rotation, the controlled extension or retraction of lockable traveler assembly 44.

This apparatus provides inherent mechanism of utter simplicity for rejecting wrong-sized coins. Thus, the size of slot 75 is selected to permit close fitting proper coin to pass therethrough. Hence, an assembly 10 intended for use with American quarters, for example, will include slot 75 sized to permit the passage of a quarter therethrough, but not permit the passage of a half-dollar, for example. Guide panel 78 is sized to retain the coin of proper size in seating slot 86. Substantially smaller-sized coins, e.g., dimes or nickels, upon falling into seating slot 86 do not engage guide panel 78 and consequently immediately roll rearwardly and downwardly out of seating slot 86. Thus, should a patron attempt to operate a mechanism which is sized to be operated by quarters by use of a nickel or a dime, for example, the assembly 10 simply accepts the coin and retains it, but the coin automatically disengages itself from an operating relationship with locking mechanism 21, thus making subsequent jamming impossible.

In the illustrated embodiment, cam slot 51 controls the position of slidable traveler assembly 41. Front edge 95 of slot 51 is the surface which is essential for retraction and locking, i.e., preventing extension of traveler 44. Rear edge 97 serves to force extension of traveler 44 as drum 53 is rotated in extending direction. Rear edge 97 also prevents retraction independently of corresponding rotation of cam 53. Alternatively, a nonslotted drum cam similar to drum 53, except that edge 97 is eliminated, can be used in accordance with this invention. In such an embodiment, conventional biasing means for urging cam-follower 46 against edge 95 is employed. In such an embodiment, the traveler is not "controlled" inasmuch as it can be pushed by axially directed force on extension 18, into a retracted position, independently of rotation of drum 53. However, it automatically reextends, when the force is released to a position at which cam-follower 46 engages surface 95. Nonetheless, traveler 44 is "controlled" to the extent that it is retracted by rotation of cam 53, and extension beyond that permitted by the prevailing position of cam edge 95 is prevented. Other modifications of this invention will also be apparent. The disclosure above is not intended to be limiting, but illustrative of the invention which is defined in the claims.

ACHIEVEMENT

It will be appreciated that the mechanism disclosed herein, being key operated, has the psychological advantage of readily adapting itself to the instinctive tendency of a patron to turn a key to lock the mechanism, and moreover patrons exhibit little tendency to inadvertently rerelease the locked traveler and accidentally lose the coin. Because of the relatively gentle pitch which is used, in accordance with this invention, in slot 51 on cam drum 53, it is impossible to drive the locking mechanism by axially exerted forces on traveler 44.

The mechanism can be almost instantly converted from a coin-operated to a noncoin-operated condition by release of spring 66. It is further noted that the invention requires the use of no tools, and no special skills, in order to convert the mechanism from coin-operated to noncoin-operated condition.

Moreover, the apparatus of this invention is eminently satisfactory for use either as a coin-operated unit, or a noncoin-operated unit. Thus, a manufacturer can supply a single lock mechanism 21 even if the customer needs it solely for use as either a coin-operated unit, or a noncoin-operated unit. Thus, if a customer requires only a noncoin-operated unit, e.g., as a garment-security apparatus in a retail store, the same mechanism can be supplied, except that drum lock 60 is provided in its swung-down position. In this case a decorative facade is inserted instead of facade 22. The decorative facade is identical to facade 22 in every respect, but lacking in coin-slot 71.

Moreover, because of the relatively large size of drum 53, and because of the fact that traveler 44 moves parallel to the face of drum 53, the assembly is capable of withstanding the exertion of great forces in an axial direction on lockable traveler 44, and, because of the relatively large size of drum 53 these forces are distributed over a wide portion of the rear face of supporting base 20.

I claim:

1. In a garment security apparatus including a frame, means for hanging a garment on said frame, a chain permanently attached to said frame at one end of the chain, retractable chain-engaging means for retracting and locking the other end of said chain against a facing panel on the apparatus, and a locking mechanism for locking said retractable chain-engaging means in the retracted position, the improvement which includes:

key-operable lock cylinder pivotal around an axis which is perpendicular to said facing panel;

slotted drum cam means fixed with respect to said pivotal lock cylinder, said cam means having a cam slot;

cam-follower means fixed with respect to the retractable chain-engaging means, said cam-follower means being operatively associated in the cam slot of said cam means;

slide means for slidably supporting the retractable chain-engaging means, and for maintaining the cam-follower means in operative association with said slot;

over-the-center biasing means for biasing the rotation of the lock cylinder toward a first and a second position corresponding to the extended and retracted positions, respectively, of said retractable chain-engaging means.

2. In a garment security apparatus including a frame, means for hanging a garment on said frame, a chain permanently attached to said frame at one end of the chain, chain-engaging means for locking the other end of said chain against a facing panel, said chain-engaging means including a traveler which can move to an extended and to a retraced position, and a locking mechanism for locking said chain-engaging means in a retracted position, the improvement which includes:

key-operable pivotal lock cylinder pivotal around an axis which is perpendicular to said facing panel, said cylinder being carried by said panel;

slotted drum cam means fixed with respect to said pivotal lock cylinder;

over-the-center biasing means for biasing said pivotal lock cylinder towards a first and a second position, said first position corresponding to the position of the cylinder when the chain-engaging means is in an extended position with respect to the facing panel, said second position corresponding to the position of the cylinders when the chain-engaging means is in a retracted position with respect to said facing panel;

said chain-engaging means including cam-follower means fixed with respect to the traveler; and

slide means for slidably supporting the retractable traveler and for maintaining the cam-follower means in operative association with said slot.

3. In a garment security apparatus including a frame, means for hanging a garment on said frame, a chain permanently attached to said frame at one end of the chain, retractable chain-engaging means for locking the other end of said chain against the front of a facing panel of said apparatus, and a locking mechanism for limiting the extension of said retractable chain-engaging means, the improvement in which:

a retractable traveler is slidably supported for movement between an extended and retraced position along a line substantially perpendicular to said facing panel, said traveler having a laterally extending projection, said projection extending from said traveler behind said facing panel;

said apparatus includes cam means for retracting said traveler, including pivotal cam means, said pivotal cam means including key-operated lock cylinder means for controlling pivotal movement of the cam means; and

coin-releasable lock means for locking the cam means against pivotal movement for retracting the traveler.

* * * * *

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,647,072 Dated March 7, 1972

Inventor(s) Herman D. Strang

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 1, line 36, take out "in" and insert -- is -- .

In column 4, line 23, after "is", insert -- in -- .

In column 4, line 62, take out "rotably" and insert -- rotatable

In column 7, line 16, take out "retraced" and insert

-- retracted -- .

In column 8, line 17, take out "retraced" and insert

-- retracted -- .

Signed and sealed this 29th day of May 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents

FORM PO-1050 (10-69)

USCOMM-DC 60376-P69
* U.S. GOVERNMENT PRINTING OFFICE : 1969 O—366-334.