Oct. 31, 1933. D. J. SLATTERY 1,933,126

MAGNETIC LOCK

Filed June 17, 1931 2 Sheets-Sheet 1

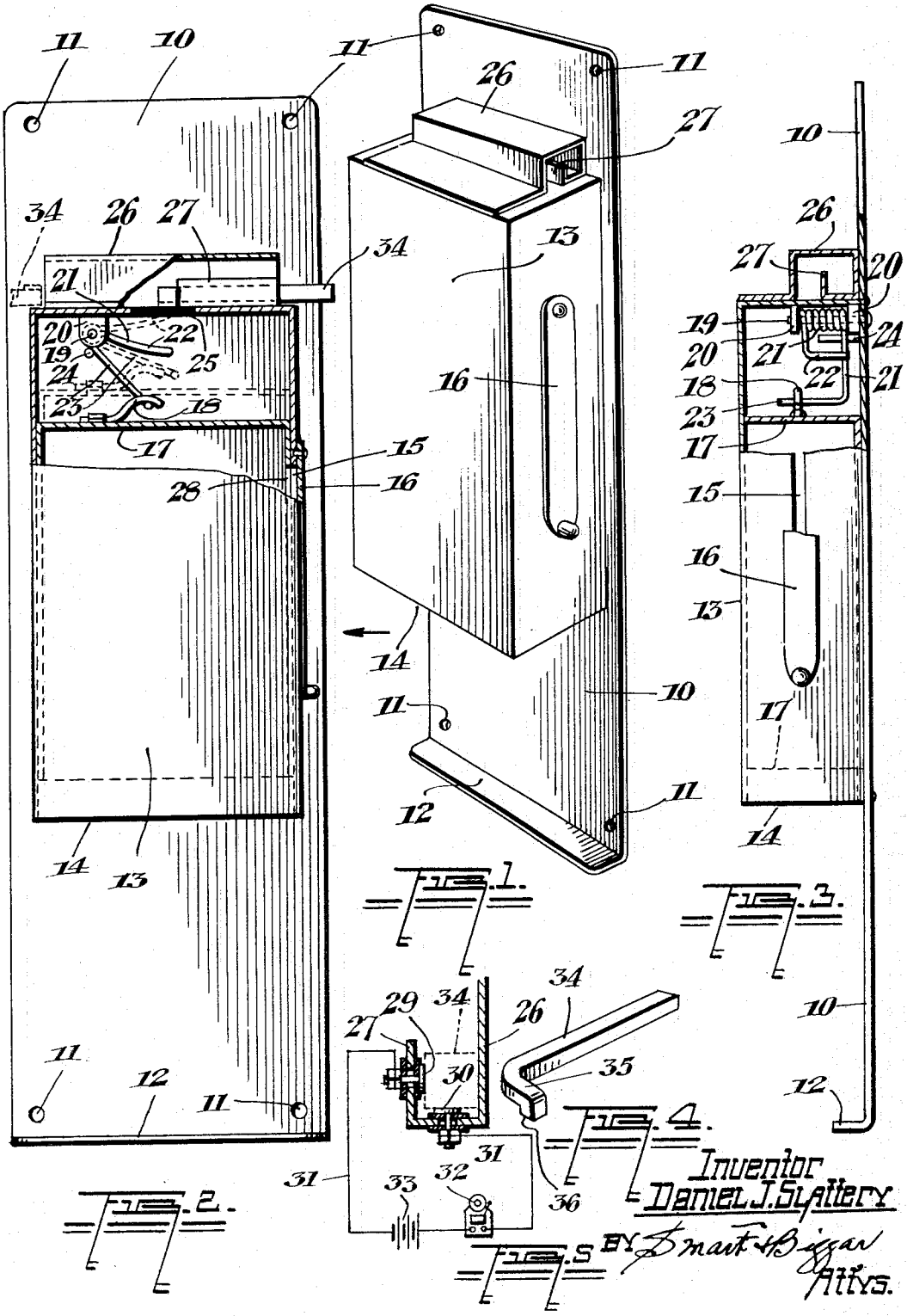


Fig. 1. Fig. 3. Fig. 2. Fig. 4. Fig. 5.

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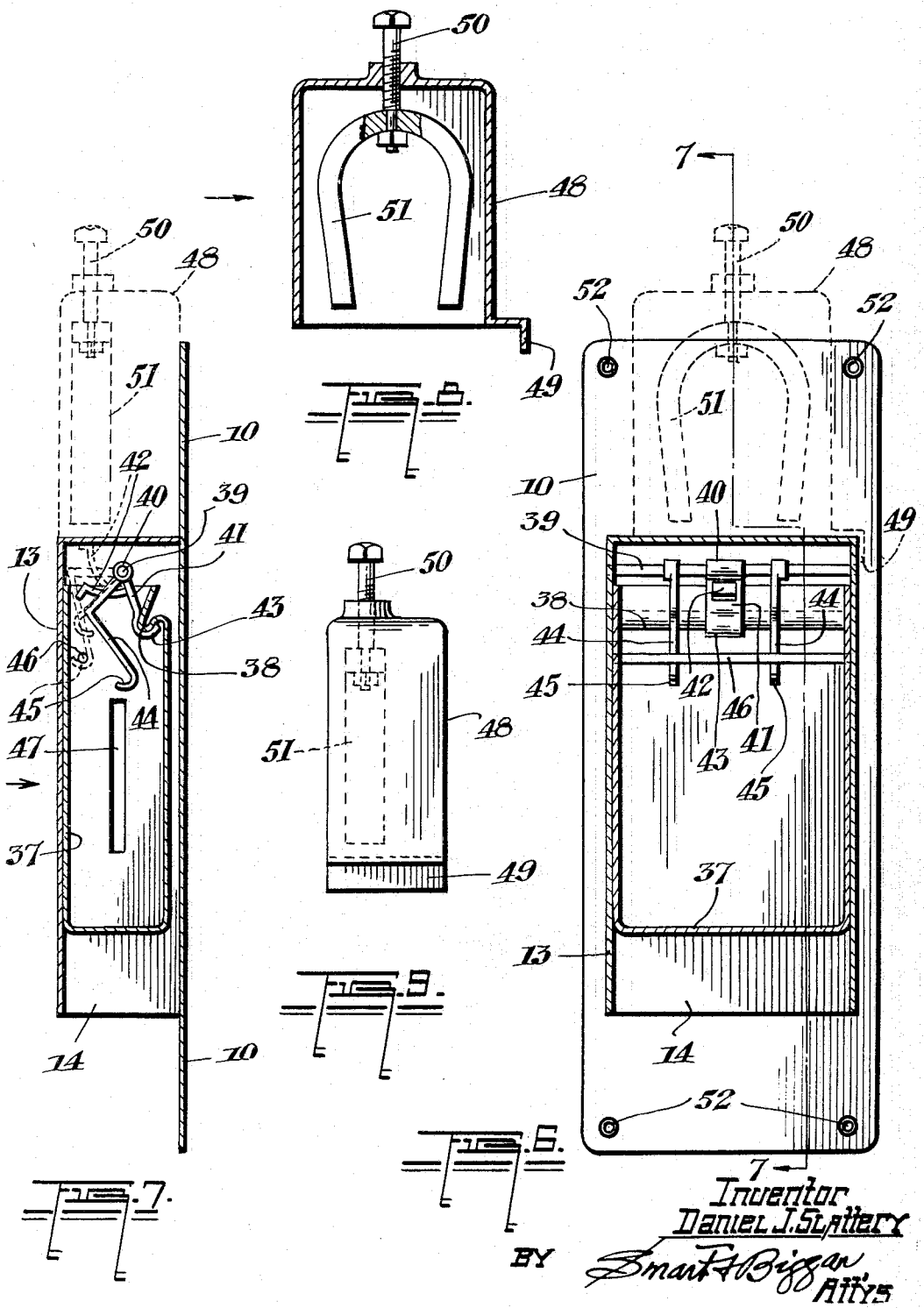


Fig. 9.

Fig. 6.

Fig. 7.

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MAGNETIC LOCK

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3 Claims. (Cl. 70—50)

This invention relates to improvements in containers and combined gravity and magnetic locking and unlocking mechanism therefor and the object of the invention is to provide an improved type of container and an improved form of gravity and magnetic locking and unlocking mechanism therefor which will have wide application for a great variety of uses and which is of simple and inexpensive construction.

A further object is to provide a container of sheet metal construction in which access thereto may be controlled by a novel form of combined gravity and magnetically actuated locking mechanism.

A further object is to provide with such a container, an audible alarm signal whereby an alarm will be sounded when the container is being opened or should any unauthorized person insert a key thereto in an attempt to open the container.

Other objects of the invention will appear in the following specification.

The present invention is particularly applicable to containers for domestic use in the collection of milk tickets and to similar apparatus such as slot machines, cash registers, rural mail boxes or practically any other form of container where one authorized person makes the round of a number of such containers to remove the contents thereof and the present invention provides a simple, safe, reliable, and efficient container of this type in which access thereto can only be had by the authorized party who is in possession of the proper magnetic key therefor.

A feature of the present invention resides in the provision whereby the opening of the container is controlled by a magnetic key or magnetic opening device, which must be accurately positioned with respect to the container in order to permit opening thereof. This is of importance in that the container cannot be opened by any ordinary magnetic key as, unless the key is of the proper form or unless it is properly adjusted and positioned with respect to the interior mechanism, it will not operate to release the locking mechanism to permit opening, which feature acts as a valuable safeguard in preventing unauthorized opening of the container.

The present invention consists essentially of a sheet metal container adapted to be mounted upon a supporting surface and comprising a rectangular casing so positioned that its side walls are vertical, the bottom end of the container being open and a drawer slidable vertically within the container and adapted to slide outwardly through the open lower end thereof, together with gravity controlled means for locking the drawer within the casing and magnetically controlled means for rendering the gravity locking means inoperative to permit opening of the drawer, all as hereinafter more particularly described and illustrated in the accompanying drawings in which:—

Figure 1 is a perspective view of one form in which the present invention may be embodied, the container being shown in the closed position.

Figure 2 is a front elevation of Figure 1, a portion at the upper end of a casing, forming part of the container, being broken away to show the interior construction and the locking mechanism.

Figure 3 is a side elevation of Figure 2 looking in the direction of the arrow, a portion thereof being broken away to show the interior construction.

Figure 4 is a perspective view of a magnetic key for use in opening the improved container.

Figure 5 is a detached fragmentary view of a portion of a key receiving channel forming a part of the improved container as illustrated in Figures 1, 2 and 3 with the position of the key therein, shown in broken lines and showing two insulated terminals and an electric alarm circuit which may be used in connection with the improved container.

Figure 6 is a front elevation, looking in the direction of the arrow in Figure 7, of a modified form in which the invention may be embodied, a casing forming part thereof and a drawer slidably contained within this casing, being shown in section, the drawer and associated parts being shown in the locked position and a magnetic unlocking device or key for use therewith, being indicated in broken lines.

Figure 7 is a vertical section taken on the line 7—7 of Figure 6.

Figure 8 is a sectional elevation of a casing and a magnet contained therein, which forms the magnetic unlocking device shown in broken lines in Figures 6 and 7, the magnet itself in Figure 8, being shown partly in elevation.

Figure 9 is an edge elevation of the magnetic unlocking device shown in Figure 8, looking in the direction of the arrow.

In the drawings like characters of reference indicate corresponding parts in the different views.

Referring first to the form of the invention illustrated in Figures 1 to 5 inclusive, the device comprises a flat sheet metal body 10 provided with

nail or screw holes 11 and formed at its lower end with a forwardly bent flange 12.

Secured upon the front face of the body 10 is a rectangular sheet metal casing 13, which is formed with an open bottom end 14 and in its side with a slot 15 covered by a pivoted strap 16.

Slidable vertically within the casing 13 is a drawer 17, this drawer being slidable outwardly or downwardly through the open bottom end 14 of the casing 13 and the flange 12 forming a stop against which the lower end of the drawer abuts in its opening operation so as to limit the opening movement thereof.

Carried at the upper end of the drawer is a hook or catch 18 forming part of the locking mechanism as will be presently explained.

Pivotally mounted upon a pin 19 carried in lugs 20 at the upper end of the casing 13, is a wire latch 21, which comprises an upper arm 22 and a lower arm 23, either the entire latch 21 or at least the upper arm 22 thereof being of magnetic material, the purpose of which will presently appear.

Associated with the lower arm 23 of the latch 21 is a pin 24 which forms a stop for limiting the downward oscillation of the latch. The position of this latch 21, when fully lowered, is as illustrated in full lines in Figures 2 and 3 and its position when fully raised is as shown in broken lines in Figure 2.

Provided in the upper end of the casing 13 and at the point against which the arm 22 of the latch 21 strikes when in its raised position is provided a portion 25 of non-magnetic material such as zinc, copper or aluminum which will be presently referred to. Upon the upper end of the casing 13 and exteriorly thereof, is provided an open ended channel 26, within which is provided an upstanding rib 27, which rib terminates above the portion of non-magnetic material 25, adjacent to the point of contact between the upper arm 22 of the latch 21 and this material 25.

One side wall of the drawer 17 is provided with a slot 28 which is adapted to register with the slot 15 in the casing 13 when the drawer is in its closed position. Mounted within the channel 26 are two insulated terminals 29 and 30, (see Fig. 5) which are connected in an electric circuit 31 containing an alarm bell 32 and a battery 33.

For use in effecting the opening of the container, is a magnetic key 34 having a right angle bend 35 at one end and a downwardly directed extremity 36 forming at the end of the key an offset portion.

The present invention may be applied in a wide number of ways, to suit different uses thereof, including among others such adaptations as slot machines, cash registers, rural mail boxes, and such like, and while the form illustrated and the following description relate more particularly to its use as applied to a container for the collection of milk tickets, it is not intended that the invention be limited to this specific embodiment or this specific use but rather that this form be considered merely as illustrative.

The construction and operation of the improved container is as follows:—

Considering first the form shown in Figures 1 to 5 inclusive, the device would be mounted by securing it on the outside of a house door frame by suitable nails or fastenings inserted through the openings 11 in the base 10, the device being mounted in a vertical position.

Considering the parts to be in the position shown in full lines in Figure 2, which corresponds to the closed or locked position of the drawer, in which position the lower arm 23 of the latch 21 is engaged under the hook or catch 18 carried at the upper end of the drawer 17, so that by this engagement between this arm 23 and the catch 18, the drawer is supported in its locked position and the lower end of the drawer is accessible through the open bottom 14 of the casing. Further, in this closed position the slots 28 and 15 in the drawer 17 and casing 13, register with each other, which slots are covered by the flap 16 and by opening this flap either coins, milk tickets or any other suitable article to be collected may be inserted into the drawer 17.

Access to the lower closed end of the drawer 17, it will be observed, may be had through the open bottom end 14 of the casing and by inserting the fingers upwardly into this open end 14, the drawer 17 may be pushed upwardly within the casing, in which upward movement it will be apparent that the latch 21 will be oscillated upwardly, and the drawer may be pushed upwardly until the upper arm 22 of the latch 21 strikes against the upper end of the casing, at which point further upward movement of the drawer is prevented. This upward oscillation of the latch 21 is, of course, caused by contact between the upper end of the drawer and the lower arm 23 of the latch.

Ordinarily it will also be apparent that the latch 21 is normally urged by gravity into its lowermost position, shown in full lines in Figure 2, so that as the drawer is pushed upwardly, beyond this point, thus oscillating the latch upwardly, immediately the drawer is released and permitted to descend, the latch will descend therewith and thus by the engagement between the lower arm 23 of the latch and the catch or hook 18 of the drawer, the drawer will be prevented from downward movement beyond the point shown in full lines in Figure 2, and in Figure 3 and thus be retained in closed position.

In order to permit opening of the drawer, the key 34 is inserted through the open end of the channel 26 and after insertion is drawn outwardly again until the hooked end 35 thereof strikes the inner end of the rib 27 in which position further outward movement of the key is prevented and thus this rib 27 forms a means for accurately positioning the inner end of the magnetic key in a desired position relative to the casing 13, this desired position being that in which the offset end 36 of the key is located directly above the non-magnetic material 25 and directly above the point of contact of the upper end 22 of the latch 21 with this non-magnetic material 25.

When the key 34 is in this position, if the drawer 17 is pushed upwardly so that the upper arm 22 strikes against the upper end of the casing 13, the magnetic attraction of the key for the upper arm 22 retains the latch in this raised position so that when the drawer is released and permitted to descend the lower arm 23 of the latch is held in its raised position, as shown in broken lines in Figure 2, in which position it is clear of the hook or catch 18 carried at the upper end of the drawer and thus this hook may move freely past the lower arm 23 which thus fails to engage therewith and the drawer will slide outwardly by gravity through the open bottom and 14 of the casing until it strikes against the flange 12.

In opening the drawer therefore, the author-

ized person who is in possession of a magnetic key 23, simply inserts this key within the channel 26, draws it outwardly against the rib 27 to properly position it with respect to the latch 21, pushes the drawer 17 upwardly and upon then releasing the drawer it immediately falls open so that the contents thereof may be removed.

After removal of the contents of the drawer, it is again locked by simply removing the key 34 and pushing the drawer upwardly until it is locked by engagement between the arm 23 and the hook 18.

An important feature of the mechanism is that the magnetic key is only operative when accurately positioned with respect to the latch 21 and if positioned either too far in or too far out of the channel 26 it will not operate to maintain the latch 21 raised.

In mounting the device, as an extra precaution if desired, it may be so mounted upon the doorframe that the slots 15 and 23 face the door and are therefore rendered inaccessible to any except those within the house, as when the door is closed these slots would be covered thereby and in this case the key 34 would obviously have to be inserted into the channel 26 from the opposite end thereof to that shown in full lines and as shown in broken lines in Figure 2 in which a portion only of the key 34 being inserted from the opposite end, is indicated.

The procedure therefore, in opening the container, consists merely of inserting the magnetic key 34 into its proper position, which is insured by the peculiar form of the key and the rib 27 and then pushing the drawer upwardly upon release of which it falls open. The closing of the drawer is accomplished by simply removing the key 34 or pushing it further into the channel 26, so that its inner end is not in proper position for retaining the latch 12 raised, then pushing the drawer upwardly past its normal locked position and finally releasing it when it will fall slightly and be retained in its locked position.

In inserting the key 34 from the left-hand side, as shown in dotted lines in Figure 2, either a raised rib 27 would be provided at the left-hand end of the channel 26 or the key would be made so that it would simply strike against the end of the rib 27 as shown, the important feature being that there is within the channel 26 the provision of means co-acting with the key whereby the end of the key is accurately positioned in its desired location with respect to the latch 21.

The mechanism is such that there is provided gravity controlled means for normally locking the drawer within the casing and magnetically controlled means for rendering the gravity locking means inoperative to permit opening of the drawer.

As an additional precaution against the unauthorized opening of the container, there may be combined therewith the audible electric signal device shown in Figure 5 in which the insulated contact terminals 29 and 30 are provided within the key channel 26 so that when the key 34 is inserted into its opening position therein, it bridges these contacts and closes the electric circuit to sound the bell 32. This electric circuit could be the ordinary door bell circuit so that, when the key 34 is inserted by the authorized party, the door bell would ring notifying the occupants of the house that the container was being emptied. This would be a still further protection against unauthorized opening in that, should any unauthorized person insert a metal key in an attempt to open the container the bell would sound. In fact the provision of this alarm circuit within the container would provide a positive means of notifying the occupants of the house whenever the container was being opened or of any attempt to open it.

The modified embodiment of the invention illustrated in Figures 6, 7, 8 and 9 is the same in principle as that already described but is of somewhat different detail mechanical construction. In this case the body 10 is the same as that already described and also the casing 13 is identical with the casing 13 of the former form and has an open bottom end 14 in which is mounted a drawer 37. This drawer 37 is formed adjacent to its upper end with an inturned portion 38 which forms a catch adjacent to the upper end of the drawer, which catch is in the form of a downturned curved shoulder, as shown in Figure 7.

Extending across the casing 13, adjacent to its upper end, is a bar or rod 39 and upon this bar is pivotally mounted a latch 40, which latch comprises a lower arm 41 and an upper arm 42, the entire latch or at least the upper arm 42 being of magnetic material. This latch 40 is normally urged by gravity downwardly to the position shown in full lines in Figure 7, in which the hooked end 43 of the lower arm 41 is adapted to operatively engage with the catch 38 formed upon the drawer and to retain the drawer in its closed, locked position.

Also pivotally mounted upon the bar 39 are two further latches 44, each of which is formed at its lower end with a hook 45 adapted when the latches 44 are raised to engage with a bar 46 secured within the drawer 37 and extending thereacross.

As in the previous form, the drawer and casing are provided with slots 47 adapted to register when the drawer is in the closed position so that in this position insertion into the drawer, of tickets, coins or other articles, is permitted. The latches 44 are also of magnetic material.

For use with the container and as an opening means therefor, is provided a magnetic device, shown in Figures 8 and 9, which device comprises a metal casing 46 open at its bottom end and provided along one edge with a downturned flange 49, the purpose of which will presently appear. Suspended within this casing 48 by means of an adjusting screw 50, is a horse-shoe magnet 51 and it will be clear that the position of this magnet within the casing may be adjusted as desired, by means of the screw 50 which permits of the magnet being raised or lowered within the casing.

In using this modification the procedure is practically the same as that previously described in that the device would be mounted against a door frame or other suitable surface so that the base 10 is secured thereto by nails or screws extending through the orifices 52 and this base 10 would of course, necessarily be vertical.

When the drawer 37 is in its closed position within the casing, under the action of gravity the latch 40 normally falls to its lower position as shown in full lines in Figure 7 so that the hooked lower end 43 thereof engages with the catch 38 of the drawer to retain the drawer locked in this closed position. In order to open the container the authorized party, who is in possession of the magnetic opening device 48, simply places this device upon the top of the casing 13, the depending flange 49 by engagement with the side of the casing 13 forming a

means for accurately positioning the magnetic device 48 in its proper location with respect to the casing.

The position of the magnet 51 within the casing is accurately adjusted so that it will exert the proper degree of magnetic pull upon the upper arm 42 of the latch 40 and when placed in opening position, due to the attraction of the magnet, the latch 40 will be oscillated upwardly into its raised position, shown in broken lines in Figure 7, in which position the arm 42 strikes against the upper end of the casing and the hook 43 of the lower arm 41 is disengaged from the catch 38 of the drawer, so that the drawer falls open through the open bottom end 14 of the casing, permitting removal of the contents therefrom.

Upon the drawer being subsequently inserted and pushed upwardly into the casing 13 and the magnetic opening device 48 being removed, when the drawer reaches its fully closed position the hook 43 of the latch 40 again engages beneath the catch 38 of the drawer and retains the drawer in its locked position.

As a further safety precaution and in order to prevent unauthorized opening of the drawer, the additional latches 44 are provided, which latches are also of magnetic material and are each located under one leg of the horseshoe magnet 51. If the magnet 51 is not properly adjusted and the magnetic attraction is too great, these latches 44 will also be raised, due to the magnetic attraction, and the hooks 45 thereof will engage with the rod 46 of the drawer and prevent opening thereof. The construction therefore, is such that there is provided gravity controlled locking means for normally retaining the drawer closed and locked, and magnetically controlled means for permitting opening of the drawer, and also a safeguard in the form of provision whereby it is necessary that exactly the proper amount of magnetic pull be exerted, as if too great a pull is exerted the drawer will not only be unlocked but will be again immediately locked and therefore, it will be necessary that in order to open the drawer, a person be in possession of a properly adjusted magnetic opening device.

As previously stated the invention has been particularly described in reference to containers suitable for use in the collection of milk tickets and the like, but by varying the shape and size thereof, it could, of course, be made suitable for the collection of practically any commodity.

In the drawings, while two specific forms in which the catch at the upper end of the drawer and the latch cooperating therewith may be provided, this catch and latch may be provided in various other ways and forms and the scope of the present invention includes all suitable equivalent ways and forms in which this catch and latch may be provided and is not limited in any way to the specific constructions illustrated.

In certain applications of the improved apparatus it may be desirable to make the slot through which the coins or tickets are to be inserted into the container, of sufficient size to permit the fingers to be inserted thereinto, so that the contents of the container may be thus withdrawn.

This feature may be desirable where the device is used for the collection of milk tickets when it may be desirable to enable the housewife to have access through this slot to the contents of the container so that she may be able to get change out for money inserted.

In this case, however, it would be necessary that the container be so mounted that this slot faces the door so as to be thereby rendered inaccessible when the door is closed and to be only accessible to those within the house when the door is open, as previously explained.

From the foregoing it will be apparent that the invention provides an improved container of the type described whereby the objects set forth have been attained.

Various modifications may be made in this invention without departing from the spirit thereof or the scope of the claims, and therefore the exact forms shown are to be taken as illustrative only and not in a limiting sense, and it is desired that only such limitations shall be placed thereon as are disclosed in the prior art or are set forth in the accompanying claims.

What I claim as my invention is:—

1. Locking mechanism for containers having a slidable drawer comprising latch means for locking the drawer within the container, said latch means having at least a portion thereof formed from magnetic material, the latch means being swingably mounted within the casing and formed with a projection normally to engage a member on the drawer, a magnetic member for releasing said latch means and means in connection with said magnetic member coacting with said container for accurately positioning said member in latch-releasing position.

2. Locking mechanism for containers having a slidable drawer comprising latch means for locking the drawer within the container, said latch means having at least a member associated therewith formed from magnetic material, a magnetic member for releasing said latch means and auxiliary latch means operable in conjunction with a magnetic member of greater strength than that required to operate the first mentioned latch means.

3. Locking mechanism for containers having a slidable drawer comprising latch means for locking the drawer within the container, said latch means having at least a portion of magnetic material, a magnetic member for releasing said latch means, means in connection with said member co-acting with said container for accurately positioning said member in latch-releasing position, and auxiliary latch means operable in connection with a magnetic member of greater strength than that required to operate the first mentioned latch means.

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