Sept. 17, 1963 P. NEMSKY 3,104,052

BANK WITH COMBINATION LOCKING MEANS

Filed Dec. 30, 1960

FIG-1

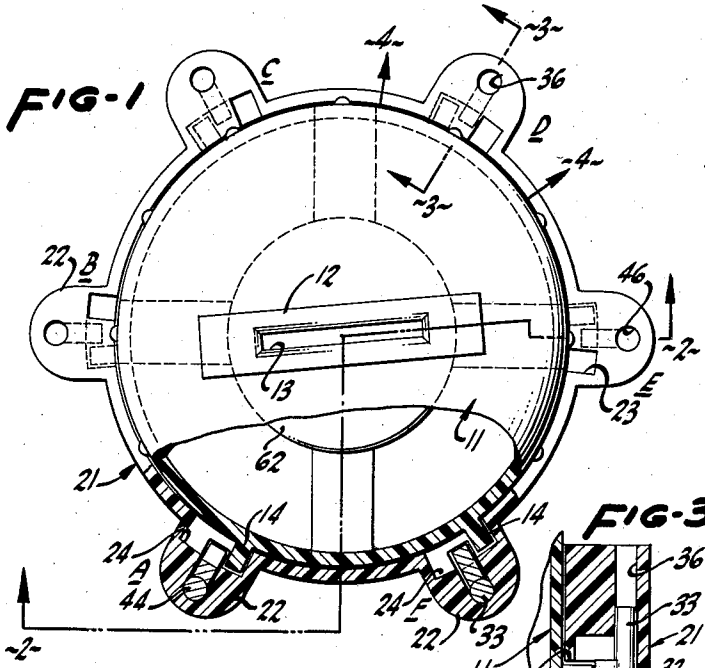


FIG-4

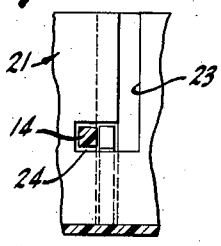
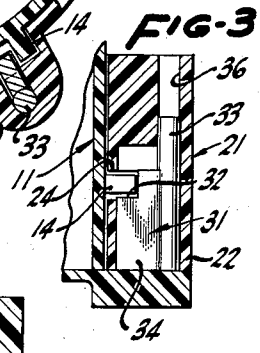


FIG-3



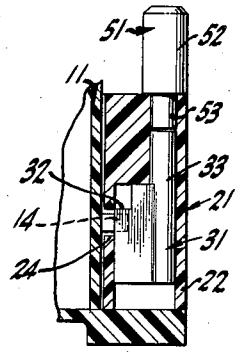


FIG-5

FIG-2

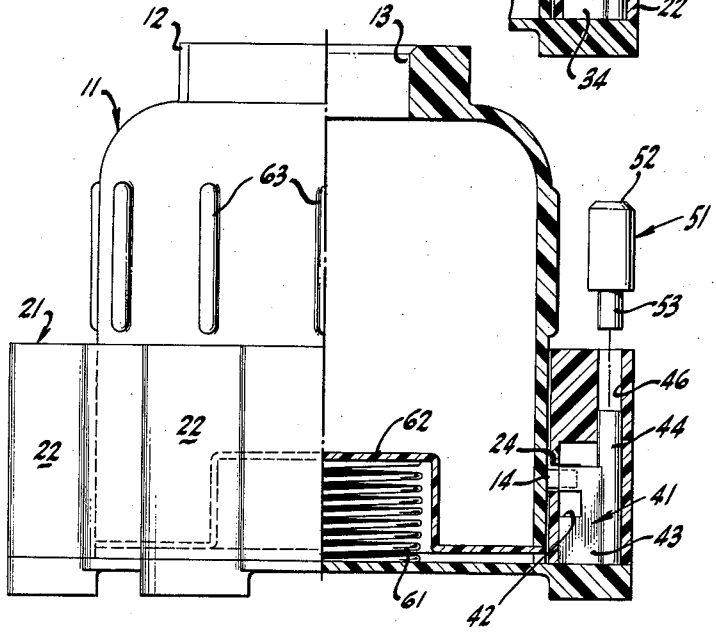
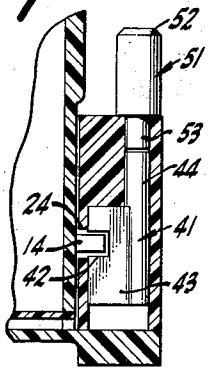


FIG-6



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BANK WITH COMBINATION LOCKING MEANS

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7 Claims. (Cl. 232—4)

The present invention relates in general to a locked enclosure or bank structure having magnetically operated combination locking means, particularly adapted for toy banks, or the like, by reason of the simplicity and low cost of construction.

There is provided by the present invention a bank enclosure, or the like, formed of non-magnetic materials and preferably of plastic. Combination locking of the bank structure hereof is accomplished by the provision of a plurality of sets of magnetically operated keepers which, upon selective actuation by separate keys or plugs, free the parts of the bank structure for separation. By the utilization of a plurality of such keys or plugs which may, themselves, comprise magnets, there is herein afforded a large plurality of possible opening combinations for the bank while yet retaining a marked simplicity of structure. The invention hereof is particularly well suited to utilization as a toy bank, or the like.

It is an object of the present invention to provide enclosure locking means including a plurality of sets of stop means, together with a plurality of actuating means therefor, whereby unlocking is attained only through the proper combination of actuating and stop means.

It is another object of the present invention to provide in a bank structure for combination locking with a plurality of magnetic actuating elements.

It is a further object of the present invention to provide an improved bank structure with simplified multiple combination locking means employing magnetic actuation.

It is yet another object of the present invention to provide an improved plastic bank structure having two portions locked together by magnetically actuated means and separable by predetermined combination of magnets and magnetic actuating means.

Various other possible objects and advantages of the present invention will become apparent to those skilled in the art from the following description of a preferred embodiment of this invention; however, no limitation is intended by the terms of such description, and instead, reference is made to the appended claims for a precise delineation of the true scope of this invention.

The invention is illustrated in the accompanying drawings, wherein:

FIG. 1 is a plan view of the bank structure with portions broken away, as illustrated;

FIG. 2 is an elevational view of the bank structure, partially in section, as indicated by the line 2—2 in FIG. 1;

FIG. 3 is a sectional view through one of the normally open locking mechanisms and taken in the plane 3—3 of FIG. 1;

FIG. 4 is a sectional view of the same locking mechanism taken in the plane 4—4 of FIG. 1;

FIG. 5 is a sectional view taken in the same plane as FIG. 3, and illustrating the locking mechanism thereof in actuated position; and

FIG. 6 is a partial sectional view taken in the same plane as FIG. 2, and illustrating the normally closed locking mechanism in actuated position.

Considering now the illustrated embodiment of the present invention in some detail, and referring to the drawings, the bank structure therein illustrated will be seen to include an upper cylindrical top 11 formed of

non-magnetic material, and preferably of plastic. This cylindrical top has an upwardly extending boss 12 atop same with a slot 13 vertically therethrough for passing coins, or the like, into the interior of the bank. About the circumference of this cylindrical top, there are provided a plurality of radially projecting lugs 14 disposed adjacent the bottom edge of the top cylinder, and employed in locking of the structure.

A further main portion of the bank structure comprises a cylindrical bottom 21 dimensioned to receive the top in sliding relation therein. About the circumference of this bottom there are provided a plurality of vertical bosses, or thickened portions 22 of the bottom wall. Vertical slots 23 are provided in each of these bosses 22 about the inner surface of the bottom cylinder, in appropriate orientation to receive the lugs or protuberances 14 upon the top cylinder. Thus, it will be seen that the top cylinder may be slid downwardly into the bottom cylinder by placing the lugs 14 in the slots 23 and pressing the top downwardly. At some distance down from the upper edge of the bottom cylinder, the vertical slots 23 are provided with circumferential extensions 24, so that there is, in fact, formed by each of the slots a generally L-shaped opening whereby the top cylinder may be limitedly rotated after slidable engagement with the bottom cylinder, to thereby dispose the lugs 14 in the circumferential extensions of the vertical slots in the bottom cylinder.

Locking of the top and bottom of the bank structure together is herein accomplished by the provision of a plurality of sets of keepers. These keepers are individually mounted in the bosses 22 of the bottom cylinder, and are therein disposed in slidable relation for vertical movement, in accordance with actuating forces discussed below. Appropriate openings are provided in the bosses 22 to accommodate the keepers in vertically slidable relation, and referring to FIG. 3, there will be seen to be illustrated a first keeper 31 in normal position resting upon the bottom of the opening provided therefor. This first keeper 31 is provided with a cut-out or indentation 32 at the top inner edge thereof, so that in normal position, as illustrated, the keeper does not obstruct the circumferential slot 24. Each of the keepers of the present invention is formed, at least in part, of magnetic material, and may, for example, be formed as illustrated with a vertical rod 33 of magnetic material affixed to a vane or blade 34 which has the indent 32 formed therein. In this instance the keeper rod 33 is disposed in a vertical bore 36 extending downwardly from the top of the boss 22, so as to accommodate vertical motion of the keeper. Each of the bosses 22, herein denominated A–F, may have identical locking mechanisms therein.

In addition to the above-described keeper 31, there is also provided an alternative keeper structure such as that illustrated in FIG. 2, wherein it will be seen that the keeper 41 is provided with an indentation 42 below the top thereof at the inner edge of the blade or vane 43 which is, in turn, affixed to the vertical magnetic rod 44 within the passage 46. This keeper 41 will be seen, as shown in FIG. 2, to rest upon the bottom of the opening provided therefor with a portion of the keeper blade 43 obstructing the circumferential slot 24 thereat.

As above noted, there are provided herein at least two sets of keepers with one set being illustrated by the keeper 31 and the other illustrated by the keeper 41. These different types of keepers are disposed in separate bosses about the circumference of the bottom cylinder of the bank structure in some predetermined order as, for example, by alternating the different types of keepers about such circumference. All of the keepers, as above

noted, are mounted for vertical movement in the openings provided therefor in the bottom cylinder bosses, and furthermore, are provided, at least in part, with magnetic material so as to be responsive to magnetic forces. Further to the foregoing, the bottom cylinder and bosses thereof are formed of non-magnetic material, peferably plastic. As may be readily seen from a comparison of FIGS. 2 and 3, the normal positions of keepers **31** and **41** at the bottom of their openings produce exactly opposite results with regard to the closure of the circumferential slots in the bottom cylinder. Thus, with the top cylinder inserted in the bottom cylinder and rotated therein, the keepers **41** in lower or normal position, as illustrated in FIG. 2, will be seen to lock the top against rotation, while the other keepers **31** will have no effect upon the top. Extension of the keepers **41** into the circufferential slots **24**, adjacent thereto, close off these slots so that the lugs **14** upon the top cylinder will strike the keepers upon attempted rotation of the top into alinement of the lugs thereof with the vertical slots **23** in the bottom cylinder.

Actuation of the individual keepers of the bank structure hereof is accomplished by the utilization of a plurality of actuating members **51**, such as illustrated in FIG. 2, for example. These actuating means or members, which may otherwise be considered as keys, include an upper knob **52** for grasping of same, and a depending plug **53**, adapted to slide into the vertical bores **36** and **46** of the bosses about the bottom cylinder. These plugs are formed of magnetic material and either or both of the plugs or keeper bars are permanently magnetized. In the instance wherein the plug itself is magnetized, it will be seen that upon placement of the plug in the bore and lowering of same therein to the position shown in FIG. 5, for example, the magnetic force exerted by the plug upon the keeper bar **33** will raise the keeper to the upper limit of its travel in the opening provided therefor. This will then serve, as illustrated in FIG. 5, to raise the keeper blade so that with regard to the type of keeper **31**, the opening **32** therein will be moved out of alinement with the circumferential slot **24**. This will then dispose a solid portion of the keeper blade across the circumferential slot so as to thereby close off same and prevent rotation of the lug **14** therein into alinement with the vertical slot **23** in the boss. It will thus be seen that placement of the actuating member **51** in a boss opening **36** wherein there is disposed a keeper of the type shown at **31**, will serve to move such keeper into closing or locked position, and thereby prevent removal of the top cylinder from the bottom cylinder.

This same actuating member **51** is also adapted for actuating the other type of keeper **41** in the manner shown in FIG. 6. Thus, insertion of the actuating plug **53** in the boss opening **46** will serve to attract the keeper bar **44** upwardly, and consequently, to raise the keeper so as to aline the opening **42** thereof with the circumferential slot **24** in the bottom cylinder. There are provided the same number of actuating members as there are keepers of the type **41**. In the illustrated example there may be provided three keepers of the type **31** and three keepers of the type **41**, alternating about the circumference of the bank structure, as noted above. In this instance there would be provided three actuating members **51**. Insertion of these actuating members or keys **51** in the bores **46** of the bottom cylinder bosses will serve to raise the keepers of the type illustrated at **41**, so that each of these keepers then is disposed in unlocked position to open the circumferential slots in the bottom cylinder and thereby to free the upper cylinder lugs. With the actuating members so positioned, it is possible to rotate the upper cylinder in the lower cylinder, inasmuch as the normally locked keepers **41** are moved to unlocked position, and the normally unlocked keepers **31** remain in normal unlocked position, so that each of the circumferential slots **24** is open and the lugs **14** can freely move therein.

The insertion of actuating members in any other relationship will serve to maintain the top and bottom cylinders locked together. Thus, the insertion of a key or actuating member **51** into a bore **36** in one of the bosses containing the normally unlocked keeper, will operate to raise this keeper into the locked position illustrated in FIG. 5, and consequently to place a solid portion of the keeper blade across the circumferential slot and thereby to prevent circumferential movement of that top cylinder lug **14** therein. Without the insertoin of any actuating members, the top and bottom cylinders will be locked together, inasmuch as the keepers of the type **41** serve to normally lock the two cylinders together, and insertion of the actuating members in any but predetermined order for selectively actuating keepers of the type **41**, will serve to maintain the two cylinders locked together. In manufacture, the order of arrangement of the two types of keepers may be varied, so that individual banks produced have different combinations for opening same. Furthermore, no limitation is intended upon the number of keepers employed about the circumference of the bottom cylinder, nor is any limitation intended upon the number of types of keepers. With the six keepers illustrated, there will be appreciated to be provided a relatively large number of possible combinations of which only one will serve to unlock the top from the bottom portion of the bank. Thus, for example, a combination may herein be comprised of A, C, E so that insertion of a key **51** in the openings in the bosses A, C, E will serve to unlock the bank.

Various modifications are possible within the scope of this invention, and also certain additional features may be incorporated herein. Thus, for example, there is illustrated in FIGS. 1 and 2 the provision of spring means for pushing the top of the bank upwardly when same is rotated into released position. This may, for example, take the form of a spring **61** disposed within the lower cylinder upon the bottom surface thereof and compressed between same and a retainer plate **62** affixed to the lower portion of the top cylinder. Additionally, there may be provided a bell, or the like suitably mounted within the bank structure for actuation upon raising of the top cylinder. Likewise, there may be provided decorative and utilitarian bosses or raised portions **63** about the circumference of the upper cylinder, adjacent the top hereof, in order to facilitate gripping of the upper cylinder for rotation of same during locking and unlocking operations. In the event that the bank structure hereof is to be employed as a toy for children, various modifications of the external appearance thereof may be desired, and accomplished quite readily, in order to provide particular desired appearances, such as that of animals, dolls, or the like.

It will be appreciated from the above description of a preferred embodiment of this invention, that there is herein provided a relatively simplified locking structure for enclosures, wherein there is accomplished combination locking with a minimum of structural complexity. The bank structure hereof is admirably suited for construction from plastic materials with conventional manufacturing techniques.

What is claimed is:

1. A bank structure comprising first and second parts adapted for slidable engagement and limited relative rotation after such engagement, the first of said parts having radial projections thereon accommodated by openings in said second part, a plurality of keepers slidably mounted upon said second part and movable between blocking and unblocking positions relative to portions of the openings in said second part, said keepers having openings therein for engagement with the projections on said first part in the blocking position of said keepers to block relative rotation of said parts, and a plurality of actuating means separate from said first and second parts for selective actuation of each of the individual keepers in predetermined combination to dispose all keepers in the unblocking positions

thereof for freeing said parts for relative rotation and separation.

2. A bank structure comprising a container having first and second separable parts adapted for slidable engagement into and out of closing relationship, said parts being further limitedly rotatable relative to each other in closed relationship, a plurality of keepers mounted in the first of said parts for reciprocation between normal and actuated positions, said keepers being mounted to engage said second part in the closed and rotated position of parts for locking together the parts in the normal position of some keepers and actuated position of others, and a plurality of actuating members removably engaging said container in operative relation to said keepers for reciprocation of some of the latter from normal to actuated position whereby operation of those keepers engaging the second part in normal keeper position unlocks said part for separation of the parts and access to the bank interior.

3. Bank structure as defined in claim 2, further characterized by said parts being formed of non-magnetic material and said keepers and actuators being formed of magnetic material with at least one thereof being magnetized for movement of keepers by actuators through magnetic forces.

4. A locked enclosure comprising first and second cylindrical members adapted for slidable engagement to define a chamber therein, the first of said members having a plurality of lugs projecting therefrom, the second of said members having a plurality of slots therein accommodating said lugs and offset portions at the ends of said slots whereby said members are limitedly rotatable in slidably engaged relation with said lugs in the offset slot portions, a plurality of keepers retained in slidable relation in said second member for movement into and out of closing relation with the offset portions of said slots, and actuating members adapted for insertion in said second member adjacent predetermined ones of said keepers to slide same for opening said offset portions of said slots to release the first member for rotation and removal from the second member.

5. Apparatus as set forth in claim 4, further defined by said keepers having normal and actuated positions, and separate keepers having openings through different portions thereof to close said offset slot portions in different keeper positions, and said actuating members moving said keepers from normal to actuated positions whereby only actuation of selected keepers releases said first member.

6. Apparatus as set forth in claim 5, further characterized by said first and second cylindrical members being formed of non-magnetic material, said keepers being formed, at least in part, of magnetic material and said actuating members including magnets attracting said keepers to move same.

7. A bank comprising a cylindrical, plastic top having lugs projecting radially outward about the bottom thereof, a cylindrical plastic bottom having longitudinal slots therein for accommodating said top in sliding relation therein with said lugs in said slots, said bottom further defining inner circumferential slots limitedly extending from said longitudinal slots to accommodate limited rotation of the top and the bottom whereby said lugs move in said circumferential slots, a plurality of sets of keepers slidably mounted on said bottom with one keeper in each circumferential slot, all of said keepers having openings therethrough with the openings in keepers of one set being at a different vertical level than the openings of keepers of the other set, said keepers being formed of magnetic material, and a plurality of keys of magnetic material adapted for individual disposition in openings in said bottom adjacent said keepers, said keepers and keys being at least one magnetized so that each keeper is moved by a key inserted in the bottom adjacent same, said bank being openable by disposing keys in the bottom adjacent those keepers normally closing circumferential slots to move such keepers out of closing relation thereto for freeing the top to rotate in the bottom.

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