

- [54] **SAFE DEPOSIT APPARATUS**
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232/50
[51] Int. Cl. **B65g 11/04**
[58] Field of Search **232/44, 47, 52, 50;**
109/66

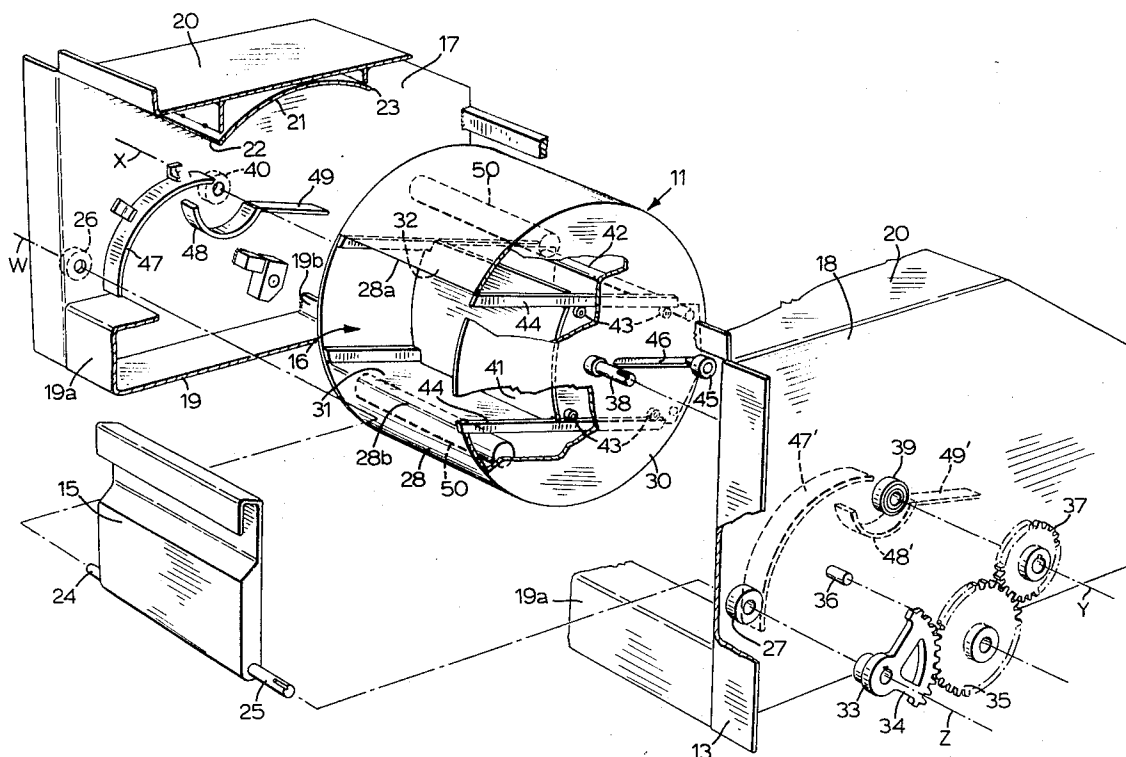
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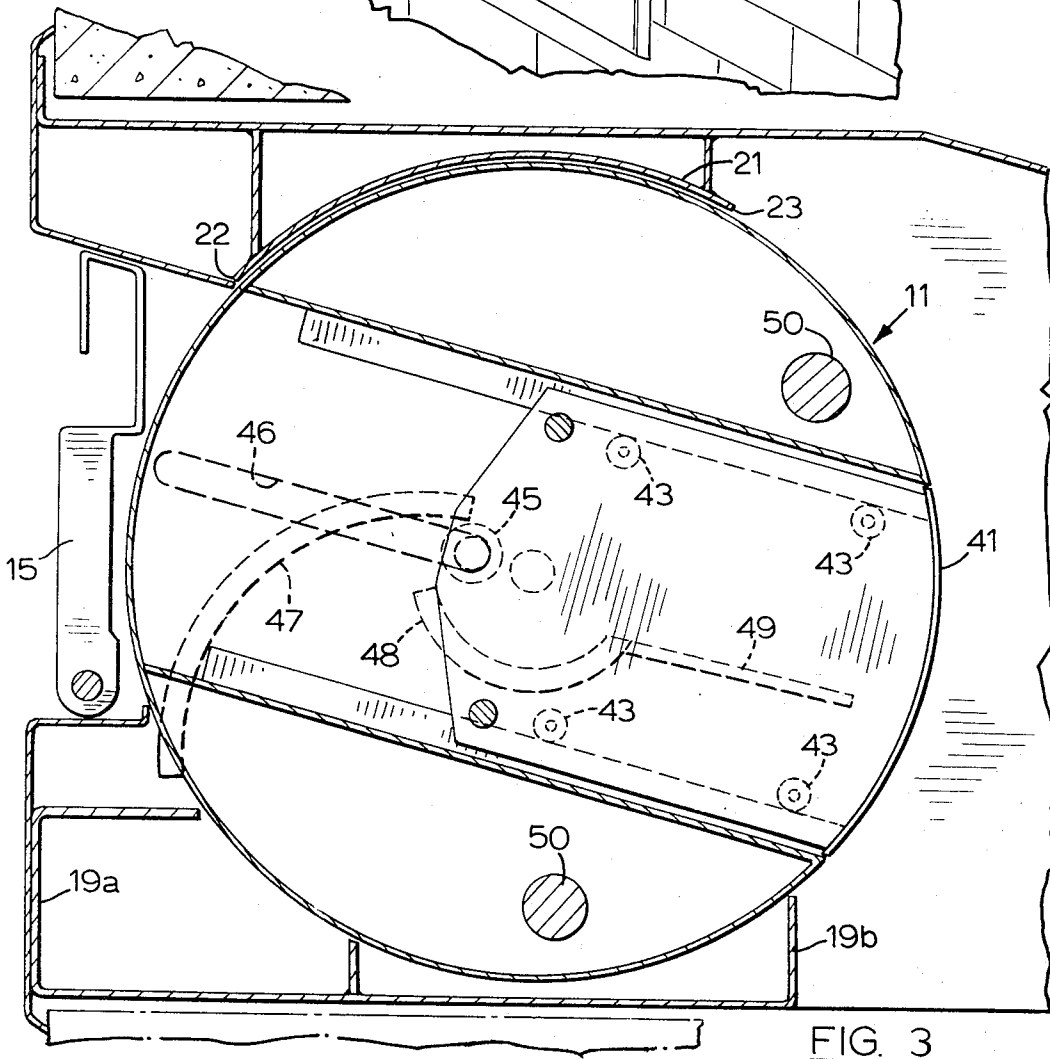
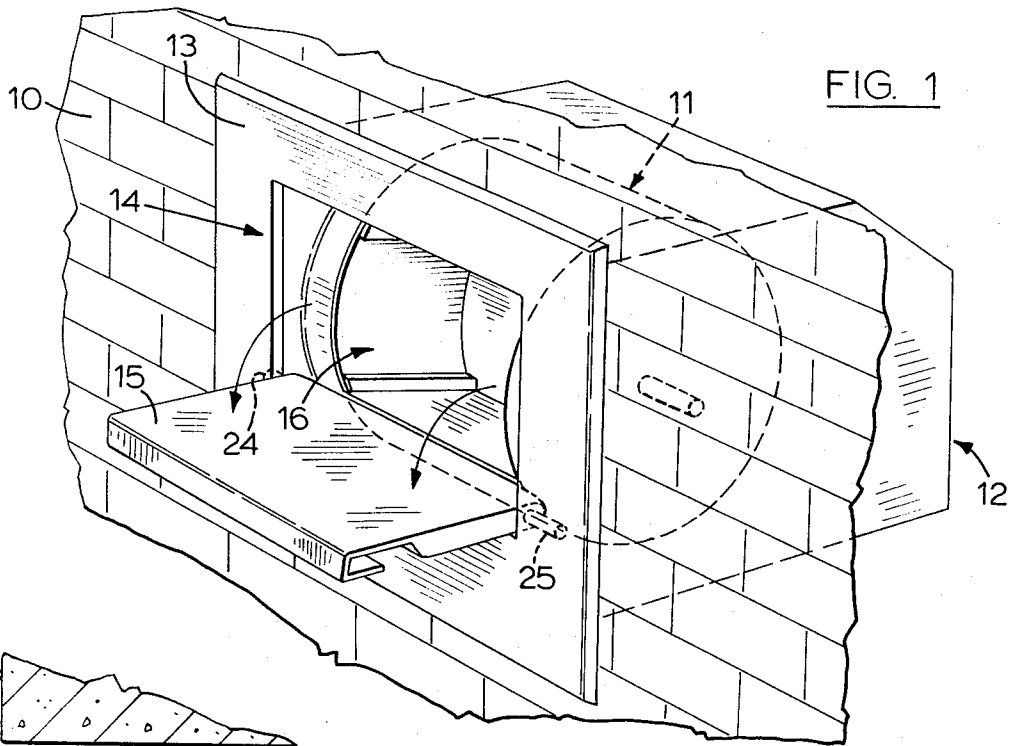
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[57] **ABSTRACT**

A safe deposit apparatus includes a rotary drum providing a receptacle into which the deposit is placed. The receptacle includes a reciprocatory ejector plate for ejecting the deposit when the drum is rotated into a discharging position. The ejector plate is actuated by a cam mechanism in accordance with the rotation of the drum, the ejector plate being retained by the mechanism in a position flush with the surface of the drum until the drum is returned to a receiving position.

9 Claims, 7 Drawing Figures





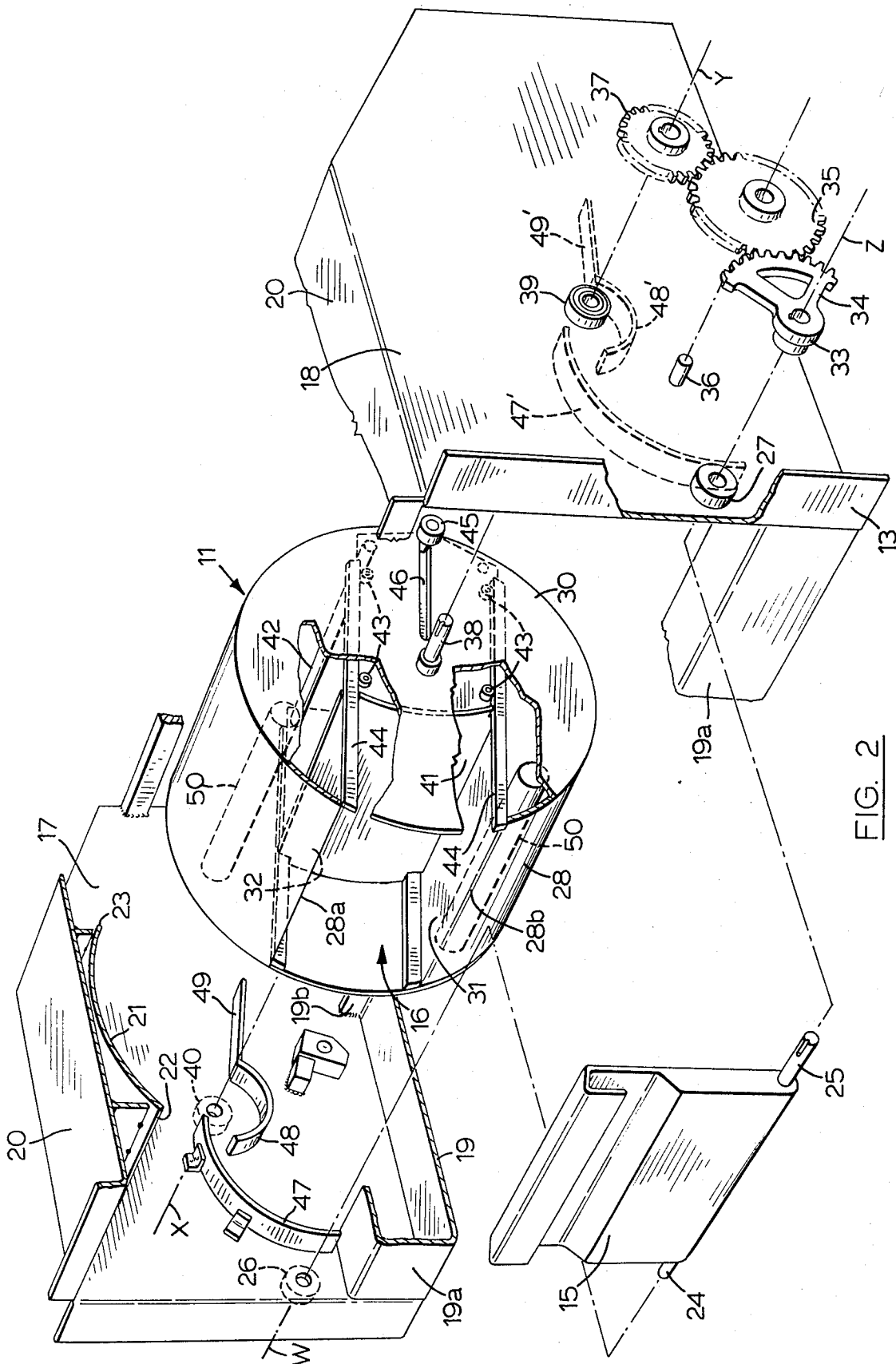


FIG. 2

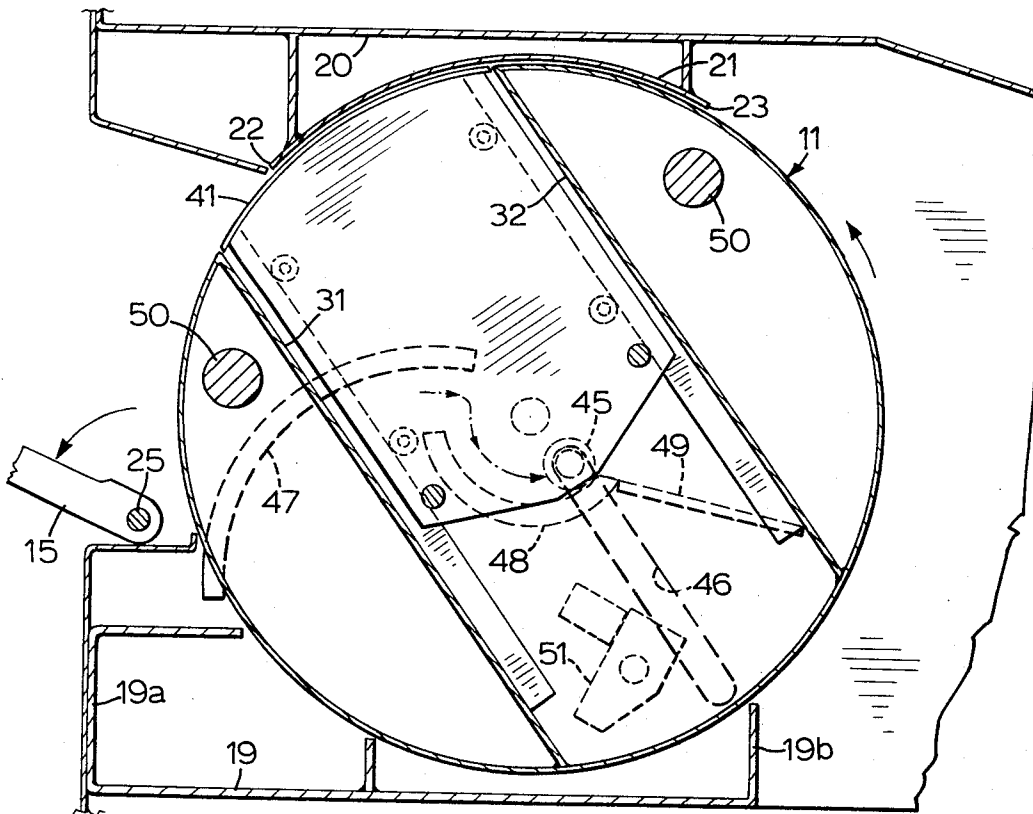


FIG. 4

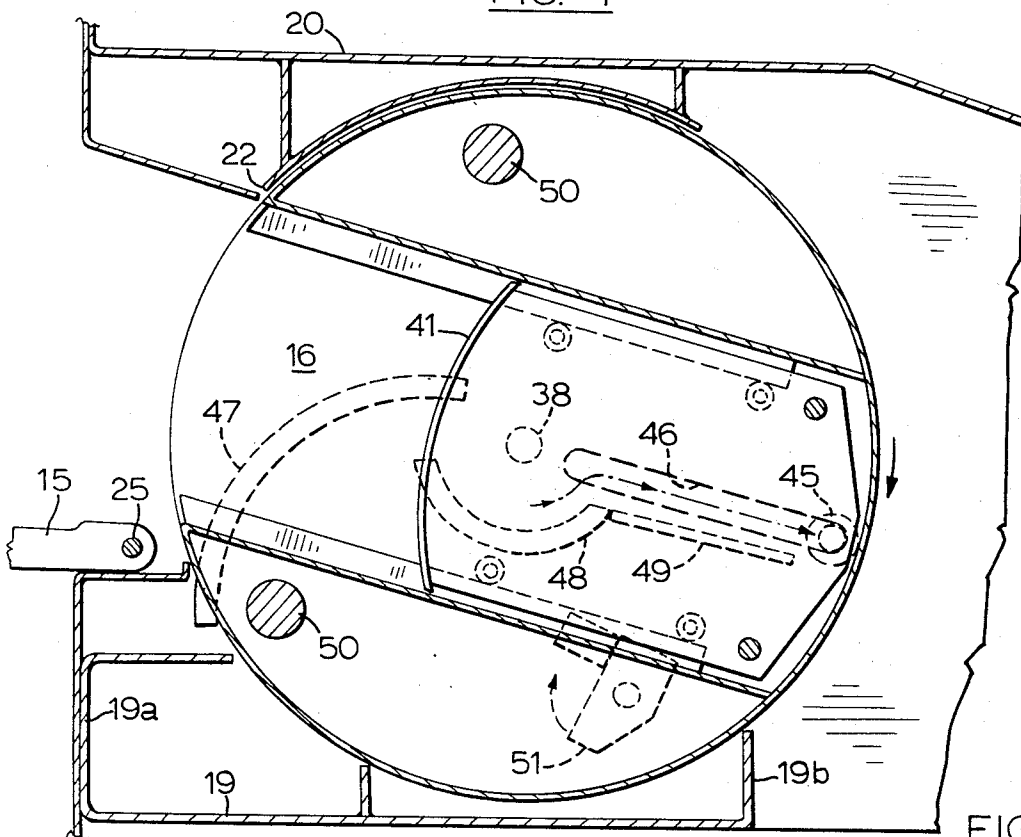


FIG. 5

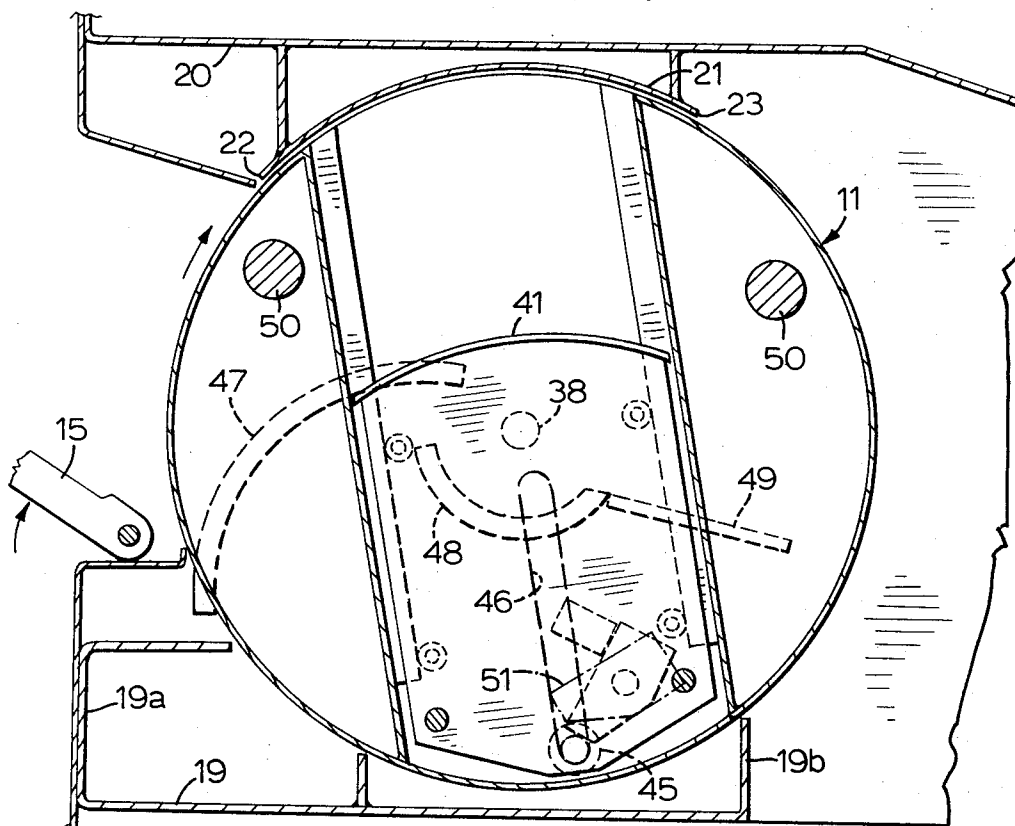


FIG. 6

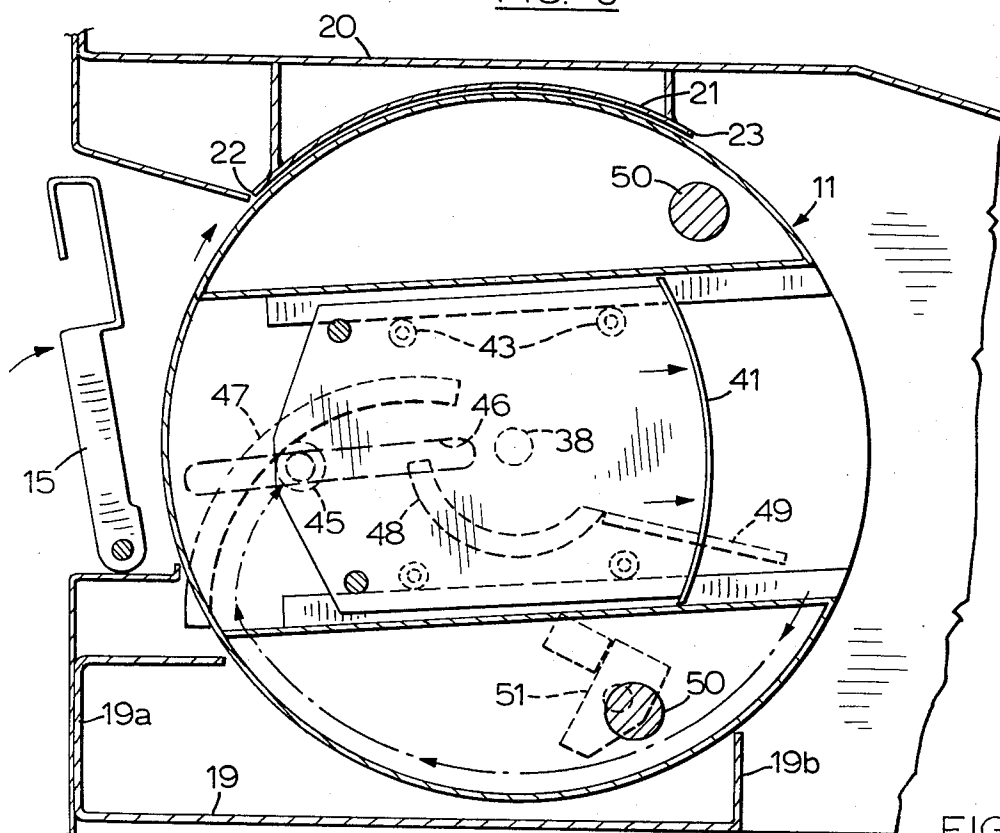


FIG. 7

SAFE DEPOSIT APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to a safe deposit apparatus, and is concerned particularly with bank depositories of the type which enable depositors safely to make deposits after banking hours.

Many banks provide a supplementary safe or vault within the bank which connects with an outside entrance by means of a chute. At the entrance to the chute a lockable receptacle is provided which is movable from a charging position, in which a depositor may place a deposit in the receptacle, to a discharging position in which the entrance is closed and the deposit is dropped through the chute into the safe or vault. Normally the receptacle is locked in the discharging position by a key-operated lock operated by the depositor's key.

Bank depositories of the type referred to frequently do not provide adequate security against theft. Thieves in possession of keys to such depositories have been known to unlock a receptacle after a deposit has been made and recover the deposit from the receptacle. In certain cases in which the deposited items were bulky they became wedged in the receptacle, making the task of recovery very simple. In other cases, thieves have been known to place adhesive in the receptacle, thus ensuring that deposits would be retained. However, even in cases in which the deposited items have been discharged via the chute, thieves have been able to fish up deposited items by means of cords with a bag or hooks on their lower ends, the cords being suspended in the chute prior to a deposit being made by an unwary depositor.

It is an object of the present invention to provide a safe deposit apparatus which eliminates the possibility of theft by these methods. The object is achieved using a minimum number of parts, thus providing a rugged unit which lends itself to economical manufacturing methods.

A safe deposit apparatus according to the present invention includes a rotary drum providing a receptacle into which the deposit is placed via an access opening, and a reciprocatory ejector plate which ejects the contents of the receptacle when the drum is rotated to the discharging position, the ejector plate being retained in a position in which it closes the access opening until the drum is again returned to its charging position. Preferably the casing structure in which the rotary drum is mounted provides a cowl positioned to sweep the surface of the drum and the ejector plate, as the drum is returned to its charging position, so as to shear any cords or wires which might have been suspended in the chute and to clear any items adhering to the ejector plate.

In order that the invention may be readily understood, one embodiment thereof will now be described by way of example with reference to the accompanying drawings. In the drawings:

FIG. 1 is a perspective view of the apparatus with the apparatus door open and the drum in the receiving position;

FIG. 2 is an exploded perspective view of the apparatus showing the drum, casing structure and hinged door;

FIG. 3 is a vertical sectional view of the apparatus when locked;

FIG. 4 is a sectional view of the apparatus in which the drum is rotating from the discharging position to the receiving position;

FIG. 5 is a sectional view of the apparatus with the drum in the receiving position;

FIG. 6 is a sectional view of the apparatus with the drum rotating towards the discharging position;

FIG. 7 is a sectional view of the apparatus with the drum approaching the discharging position immediately prior to locking.

The safe depository illustrated in FIG. 1 is mounted in the exterior wall 10 of a bank. The apparatus comprises a cylindrical drum 11 mounted in a casing structure 12 for rotation about a horizontal axis, the casing structure having an external face panel 13. The face panel 13 defines a rectangular entrance opening 14 which is normally closed by a hinged door 15 in the conventional manner. In order to make a deposit a depositor must unlock the door 15 by means of a key, and swing the door open to the position shown in FIG. 1. Opening of the door 15 causes the drum to rotate, as hereinafter described, to bring the entrance of a receptacle or receiving chamber 16 in register with the entrance opening 14 as shown. When the deposit has been made, the door 15 is raised to its closed position, the drum 11 thereby being rotated to bring the entrance of the chamber 16 into register with an exit opening at the back of the casing, the exit opening communicating with the safe or vault by means of a chute.

Referring now to the drawings generally, but more particularly to FIG. 2, the casing structure 12 defines a horizontally oriented cylindrical cavity in which the drum 11 is rotatably mounted, the cavity and the drum having a common horizontal axis XY. The casing structure 12 comprises a pair of flanged, vertical side walls 17, 18, a floor 19, and a roof 20. A cylindrical cowl 21, having front and rear horizontal edges 22, 23, is rigidly connected to the roof 20. The front edge 22 defines with the side walls 17, 18 and front flange 19a of the floor 19 the entrance opening indicated by the general reference 14 in FIG. 1. The rear edge 23 defines with the side walls 17, 18 and the rear flange 19b of the floor 19 the exit opening which registers with the chute (not shown). The door 15 is provided with a pair of stub shafts 24, 25 which engage in bushings 26, 27 in the side walls of the casing, the bushings defining a hinge axis WZ.

The drum 11 is of welded metal plate construction. It comprises a cylindrical plate 28 and a pair of end plates 29, 30. The horizontal edges 28a, 28b of the plate 28, constituting the cylindrical drum wall, define with the end plates 29, 30 a rectangular opening providing access to the receptacle or receiving chamber 16. The receiving chamber 16 is rectilinear and has a floor and a ceiling constituted by a pair of parallel plates 31 and 32 respectively, within the drum 11 and terminating at the edges 28a, 28b.

The stub shaft 25 is keyed to the hub 33 of a gear quadrant 34, which meshes with an idler gear 35, the idler gear 35 being mounted on a fixed stub 36 and meshing in turn with a pinion 37. The drum 11 has a pair of stub shafts 38 (only one being shown in FIG. 2) which are journaled in bushings 39, 40. One of the stub shafts 38 is keyed to the pinion 37. Therefore, when the door 15 is opened and closed, the drum 11 is reciprocated between a first, receiving position in which the

access opening of the chamber 16 registers with the entrance opening 14, and a second, discharging position in which the access opening registers with the exit opening leading to the chute.

Within the chamber 16 is a curved plate 41, hereinafter called an ejector plate, whose function is to eject the contents of the chamber 16 into the chute when the drum is rotated into its second position. The ejector plate 41 is backed by a frame 42 mounted on rollers 43; the rollers run on rails 44 extending along the chamber. A roller 45 connected to the frame of the ejector plate is constrained to move linearly along a slot 46 in the end wall 30 of the drum 11. A similar roller and slot are positioned in the same way on the opposite end wall 29 of the drum, but are not visible in the drawings. The ejector plate 41 is thus reciprocally movable between a first position spaced from the access opening, as shown in FIGS. 1, 2, 5 and 6, and a second position flush with the access opening, as shown in FIGS. 3 and 4. In the first position the ejector plate forms an end wall to the chamber 16, and in the second position it lies flush with the drum surface, providing a continuation of the cylindrical wall 28, and thus denying access to the chamber.

On each of the side walls 17, 18 of the casing structure 12 are mounted three cam tracks 47, 48, 49 (or 47', 48', 49') the rollers 45 being engageable with these tracks in turn according to the rotary position of the drum.

Referring now to FIG. 3, which shows the drum 11 in its second position, the ejector plate 41 is in its second or forward position where it lies flush with the cylindrical surface of the drum. The hinged door 15 is in its closed position. In order to gain access to the receiving chamber a depositor must open the door 15. Opening of the door 15 causes the drum to rotate in the anti-clockwise direction, as shown in the drawings, the drive being effected through the gearing 34, 35, 37, or alternatively by means of a direct chain drive. One stage in the anti-clockwise rotation of the drum is illustrated in FIG. 4. It will be observed that for the greater part of this movement the rollers 45 are in engagement with the cam tracks 48, 48', these cam tracks being coaxial with the drum itself. Thus the ejector plate 41 is retained in the forward position. It will also be observed that the cowl 21 sweeps the surface of the drum and the ejector plate during such movement; this ensures that no deposited items can be returned to the entrance opening 14.

As the drum moves into its first, or receiving, position, the rollers 45 leave the cam tracks 48, 48', and pass onto the linear cam tracks 49, 49'. In this position the rails 44 and cam tracks 49, 49' are inclined downwardly towards the rear of the casing, and the ejector plate and frame assembly returns freely to its second position under gravity. This position of the drum is shown in FIG. 5. The drum is balanced by two steel bars 50 which extend for the full length of the drum, these being arranged so that the drum goes through its cycle of operation in a shock-free manner. In this position of the drum the ejector plate 41 is spaced from the access opening and provides an end wall to the chamber 16. The depositor can now make his deposit and reclose the door 15. During the reclosing of the door 15, successive stages of which are illustrated in FIGS. 6 and 7, the final stage being illustrated in FIG. 3, the drum is again rotated by the gears 34, 35, 37, this time in a

clockwise direction as viewed in the drawings. The rollers 45 remain at the rear ends of the slots 46, the ejector plate and frame assembly being gravity biased to its rear position. The ejector plate therefore does not move in the chamber. At one position during this movement of the drum the rollers 45 engage and move past a pair of spring loaded pawls 51. Thereafter the drum is prevented from returning to its receiving position until the contents of the chamber have been ejected by the ejector plate 41. Such ejection is effected in the last part of the drum movement as the drum is moved into its receiving position. At this stage the rollers 45 engage the cam tracks 47, 47', and following these tracks they urge the ejector plate into its second position to expel deposited items from the chamber. It will be apparent that there is no way in which the deposited items can be recovered through the apparatus. Before the drum can be returned to its first position, the receiving chamber must be cleared; furthermore, any items which might adhere to the ejector plate are necessarily removed from the plate, during return motion of the drum, by the shearing action of the cowl 21.

Thus the invention provides in a safe deposit apparatus a rotary receptacle having an ejector which is operated positively in accordance with rotary movements of the receptacle by the engagement of a cam follower or roller with a succession of cam tracks.

What I claim as my invention is:

1. Safe deposit apparatus comprising a casing having an entrance opening and an exit opening, a rotary drum mounted in the casing for rotation about a horizontal axis, means defining a rectilinear chamber within the drum, the chamber having an access opening which registers with the entrance opening in a first position of the drum and with the exit opening in a second position of the drum, means for reciprocating the drum between said first and second positions, a reciprocating ejector plate defining an end wall of the chamber, the ejector plate being movable between a first position spaced from said access opening and a second position flush with said access opening, a first cam track mounted on the casing, a cam follower connected to the ejector plate, the cam follower being engageable with the first cam track during rotation of the drum into the second drum position whereby to urge the ejector plate into the second ejector plate position, a second cam track mounted on the casing, the cam follower being engageable with the second cam track during rotation of the drum from the second drum position whereby to retain the ejector plate in the second ejector plate position, and a third cam track mounted on the casing, the cam follower being engageable with the third cam track upon rotation of the drum into the first drum position to cause the ejector plate to move to the first ejector plate position.

2. Safe deposit apparatus according to claim 1, wherein the ejector plate is gravity biased towards its first position.

3. Safe deposit apparatus according to claim 2, in which the drum has a cylindrical wall and a pair of flat end walls, and in which the ejector plate is a curved plate which lies flush with the cylindrical wall of the drum in its second position.

4. Safe deposit apparatus according to claim 3, in which the casing provides a cylindrical cowl disposed adjacent the cylindrical wall of the drum, the cowl

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being positioned to sweep the ejector plate when the drum is rotated from the second to the first drum position.

5. Safe deposit apparatus according to claim 4, wherein one end wall of the drum provides a rectilinear slot, the cam follower being constrained to move along said slot.

6. Safe deposit apparatus comprising a casing structure, said casing structure defining a cylindrical cavity having an entrance opening and an exit opening, a cylindrical drum mounted coaxially within the cavity for rotation about a horizontal axis, means defining a rectilinear chamber within the drum, the chamber having an access opening which registers with the entrance opening in a first position of the drum and with the exit opening in a second position of the drum, means for reciprocating the drum between said first and second positions, a curved ejector plate defining a convex end wall of the chamber, the ejector plate being constrained to reciprocate between a first position spaced from the access opening and a second position in which it lies flush with the cylindrical surface of the drum, the ejector plate being gravity biased towards its second position, a first cam track mounted on the casing structure, a cam follower connected to the ejector plate and engageable with the first cam track during rotation of the drum into the second drum position for urging the ejector plate into its second position, a second cam

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track mounted on the casing structure, the cam follower being engageable with the second cam track during rotation of the drum from the second drum position for retaining the ejector plate in its second position, and a third, linear, cam track, the cam follower being engageable with the third cam track when the drum is rotated into the first drum position to permit movement of the ejector plate into its first position.

7. Safe deposit apparatus according to claim 6, including a spring-loaded pawl engageable with the cam follower during rotation of the drum towards the second drum position whereby to prevent return movement of the drum prior to the ejector plate being urged into its second position.

8. Safe deposit apparatus according to claim 7, wherein the casing structure provides a cylindrical cowl constituting a wall of said cavity and disposed adjacent to the drum surface, the cowl being positioned to sweep the ejector plate during movement of the drum from the second to the first drum position.

9. Safe deposit apparatus according to claim 8, wherein the drum is of welded metal plate construction comprising a cylindrical wall having an opening therein, a pair of flat end walls, and a pair of parallel interior walls terminating at the edges of the opening and defining said rectilinear chamber.

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