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Goldfarb et al.

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[54] **STACKING TOY**

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 214/6 BA, 198/25, 198/210
[51] Int. Cl..... **A63h 33/30**
[58] Field of Search **214/6 BA, 6 C, 6 A,**
 214/6 P, 6 H, 6 DK; 221/81; 198/25, 209,
 211, 210; 46/40, 42, 243, 245, 247

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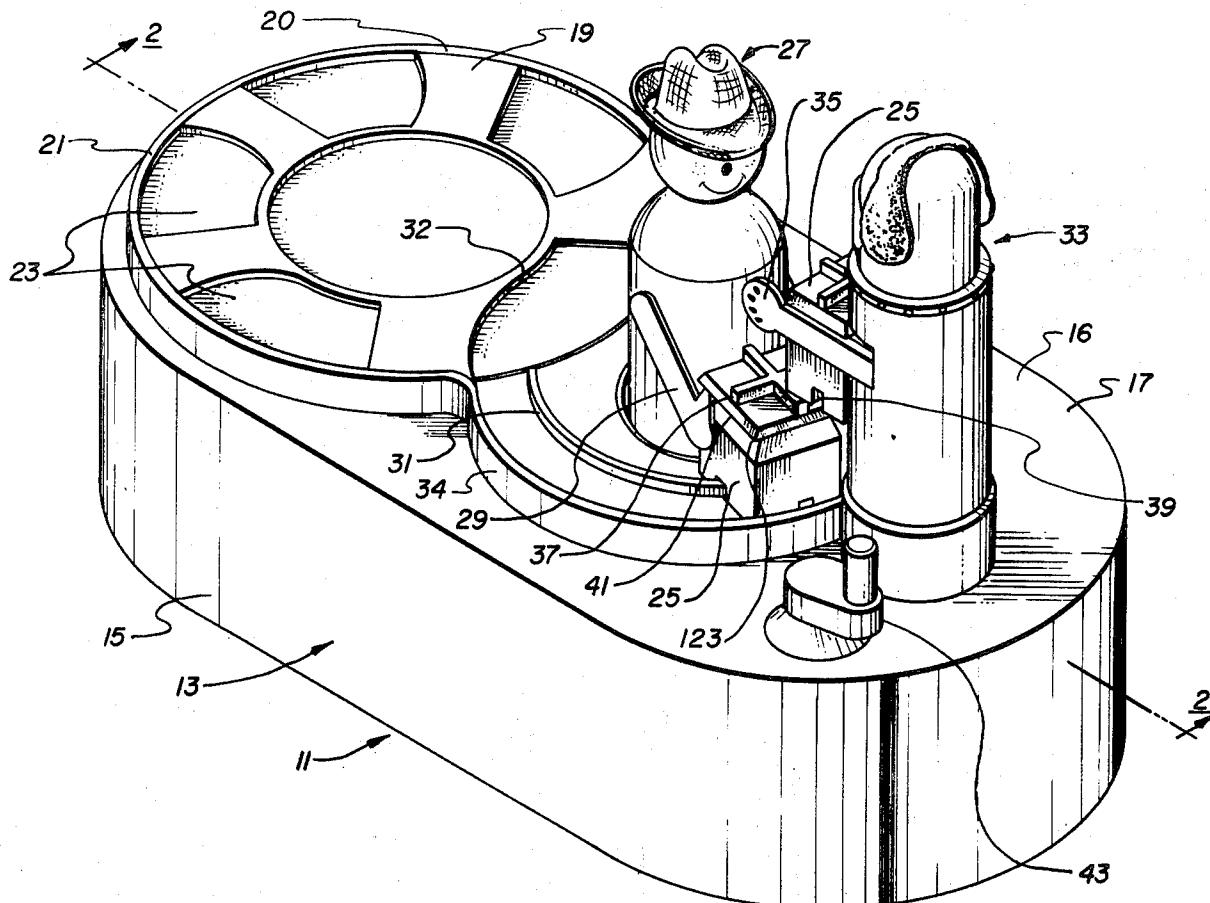
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Primary Examiner—Robert J. Spar
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[57] **ABSTRACT**

A toy comprising a rotating turntable having a plurality of individual objects thereon. A first figure disposed adjacent the turntable and a second figure disposed adjacent the first figure such that the first figure rotates from the turntable to the second figure, removing one object at a time from the turntable and delivering it to the second figure. The second figure successively lifts the increasing stack of objects placed before it such that the first figure can continually deliver a new object under the lifted stack. A crank means can be provided to manually operate the toy.

8 Claims, 8 Drawing Figures



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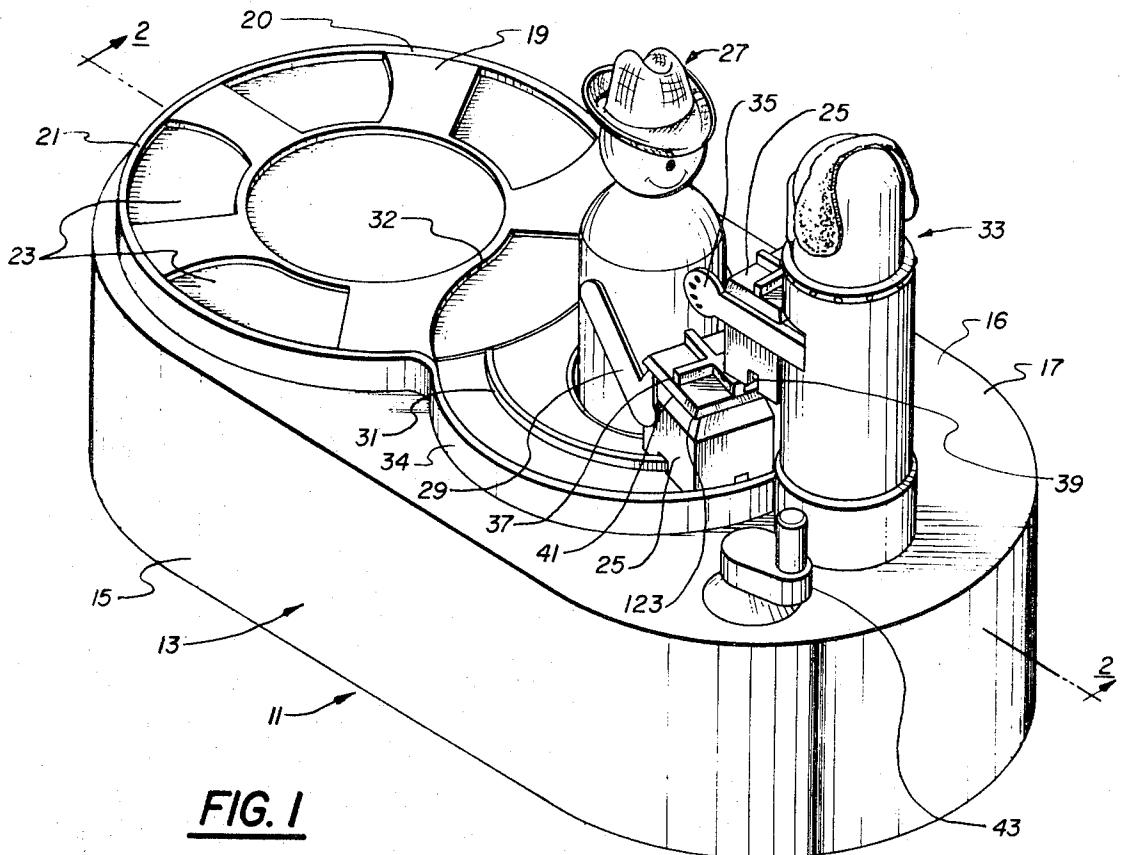


FIG. 1

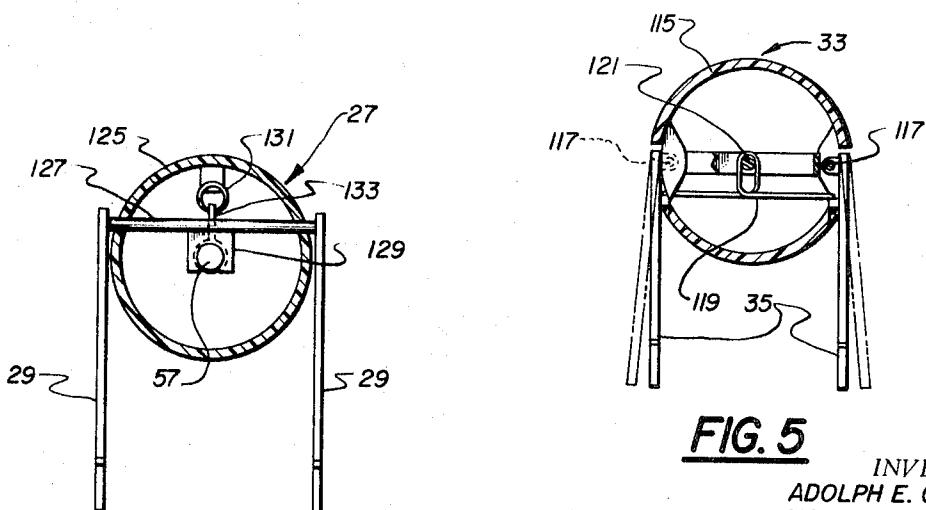


FIG. 5

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FIG. 6

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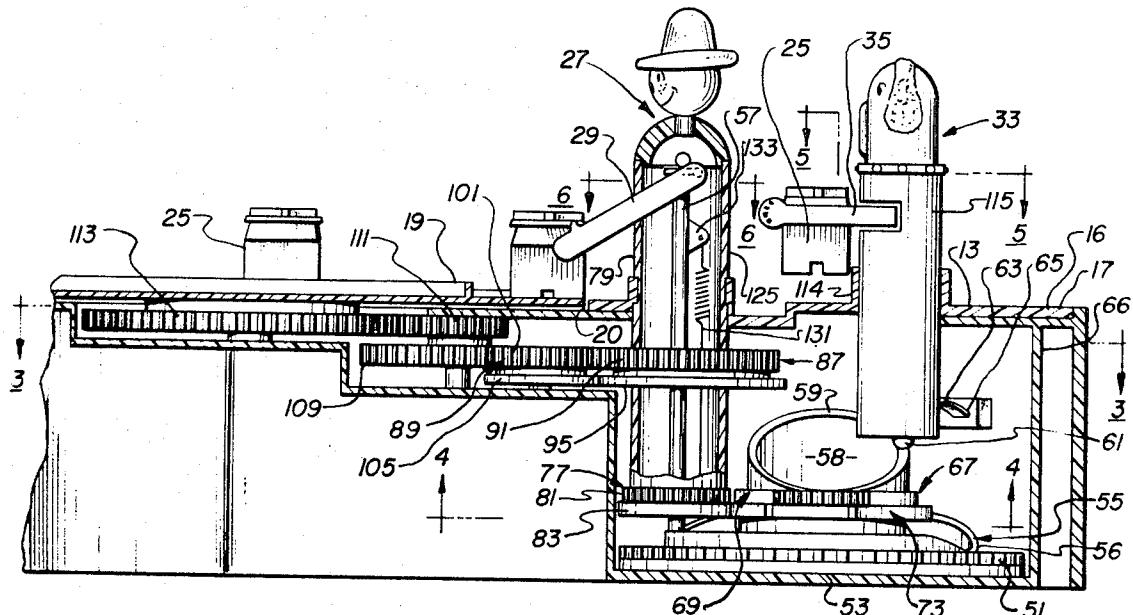


FIG. 2

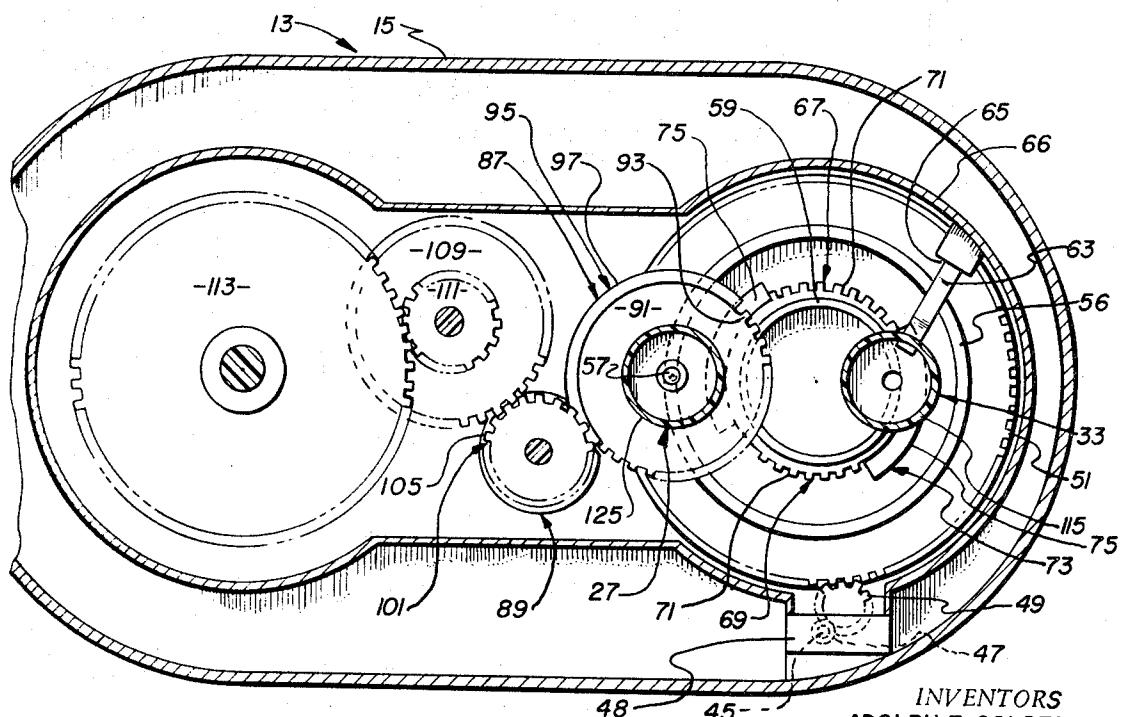


FIG. 3

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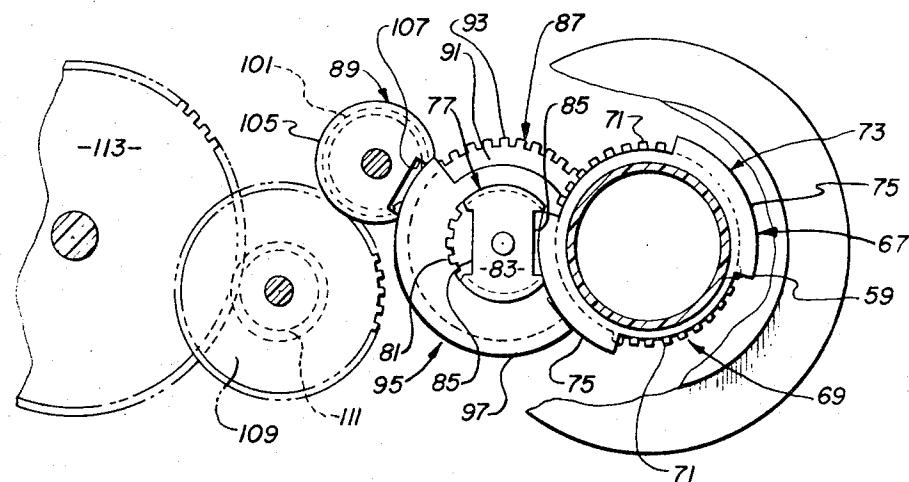


FIG. 4

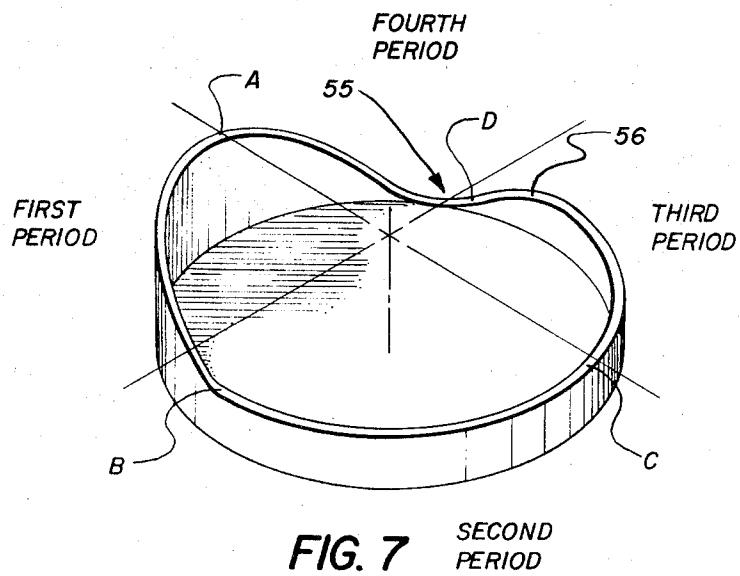


FIG. 7

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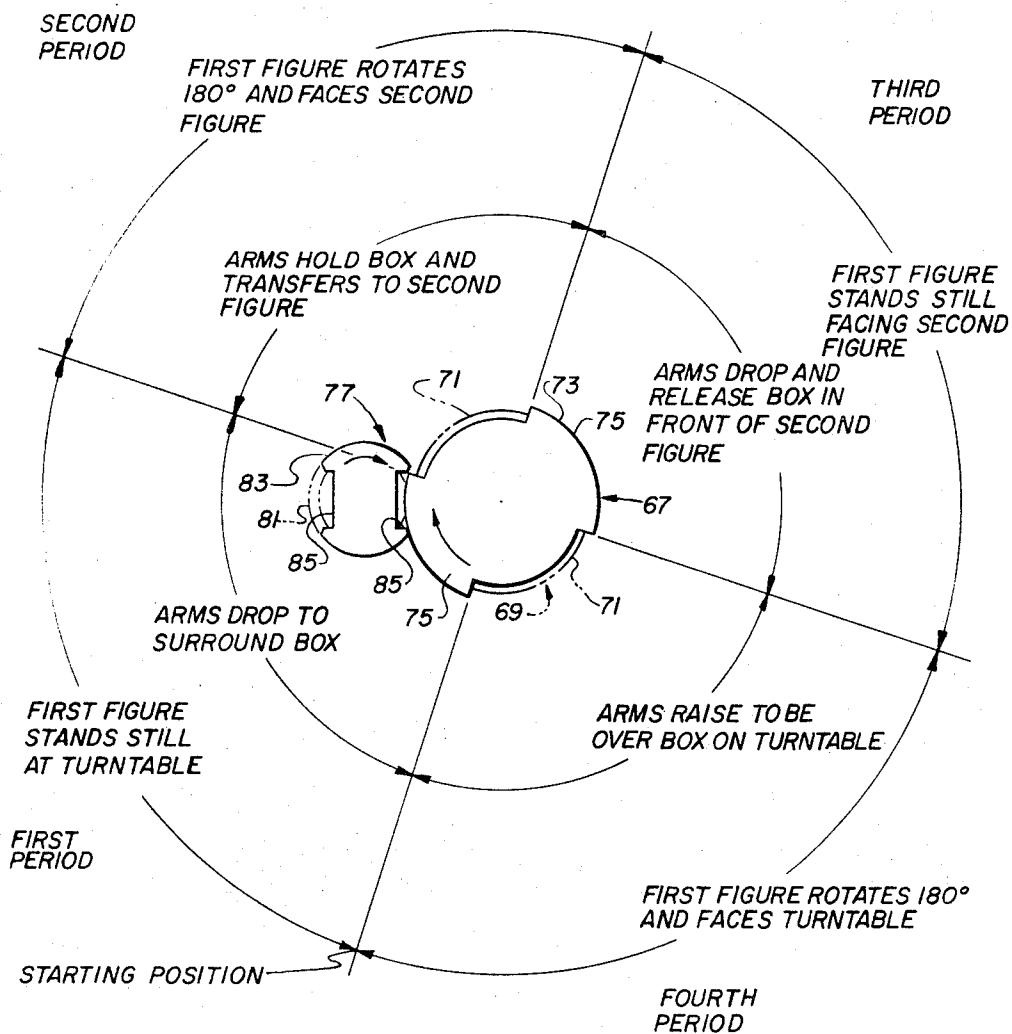


FIG. 8

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STACKING TOY

Young children, particularly pre-schoolers, have long played with building blocks or other similar items, stacking them in various arrays. Further, young children are particularly fascinated by various mechanical dolls and other similar toys which are able to maintain the child's attention span over a relatively long period of time due to the mechanical workings. Most mechanical children's toys, however, perform a given function repetitively such as a wind up truck, car, or mechanical animals that walk or perform other functions. Few, if any mechanical toys, proceed to accomplish a given end result by performing a series of individual steps leading to that end result. The attention span of the child and the interest in the game is greatly increased where mechanical functions are performed leading up to an end result that the child can anticipate. Further, in most mechanical games, as indicated, the same function is repeated by a single object. It is further desirable that there be more than one object involved, with the objects performing differing functions. If these are work functions, the child can be taught the cooperative nature of elements interworking to produce the desired end result, which is particularly educational as well as being interesting to the child.

The herein game accomplishes the foregoing desired results, providing two animated or actuated figures in a toy with the figures cooperating together to perform a function of stacking individual discrete objects, such as boxes and the like. The illustrated toy consists of a housing having a generally flat upper surface. Disposed on the upper surface is a rotatable turntable. A plurality of boxes or other stackable objects can be disposed on the turntable and thus rotated thereby when the device is operated. Additionally, on the upper surface adjacent the turntable is a first figure having arms emanating therefrom. A second figure is disposed on the upper surface of the housing adjacent the first figure on the side of the first figure opposite from the turntable, such that the first figure is disposed between the second figure and the turntable. A crank disposed on the housing operates a mechanism to drive the turntable and actuate both of the figures in a time coordinated sequence to achieve the desired results. The toy is used by placing the objects on the turntable. The first figure faces the turntable, and its arms are directed toward the turntable and surround a first object positioned on the turntable in front of the figure. The figure then rotates so as to slide the object off of the turntable and move it along the housing surface toward the second figure. The arms of the first figure are then moved to clear the object and leave it sitting in front of the second figure, as the first figure rotates back toward the turntable. At the same time, the second figure moves such that its arms surround the object and lift it above the housing surface a height at least as great as the height of one of the objects. The first figure moves a second object off the turntable and slides it underneath the lifted first object. The second figure then releases the first object, permitting it to stack atop the second object, and grasps and lifts the second object. It thus lifts a stack of two objects. This sequence is repeated with the second figure lifting the stacked objects the required height to provide a clearance for an additional object to place under the stack while the first figure is continually moving objects from the turntable to the stack. It is believed that the invention will be fur-

ther understood from the following detailed description and drawings in which:

- FIG. 1 is a pictorial representation of the device of the invention.
- 5 FIG. 2 is a cross sectional view taken generally along line 2—2 of FIG. 1.
- FIG. 3 is a top view of the gear mechanism taken generally along line 3—3 of FIG. 2.
- 10 FIG. 4 is a bottom view of the gear mechanism taken generally along line 4—4 of FIG. 2.
- FIG. 5 is a cross sectional view of the second figure taken along line 5—5 of FIG. 2.
- 15 FIG. 6 is a cross sectional view of the first figure taken along line 6—6 of FIG. 2.
- FIG. 7 is a pictorial representation of a cam which serves to move the arms of a first figure of the device.
- FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 20 Turning to FIG. 1, there is seen a pictorial representation of the toy 11 of the invention which comprises a housing 13 having an outer peripheral wall 15 and an upper wall 16 with a top surface 17. Disposed in a circular opening 20 in the upper wall 16 is a rotatable circular turntable 19. A peripheral wall 21 on the upper wall 16 extends around all but a central portion of the opening 20 to surround the turntable 19 except at the center of the top surface 17 where the turntable is adjacent to a first figure 27. The turntable 19 has a plurality of circumferentially spaced recesses 23 formed therein in which objects 25 are placed. Disposed adjacent the turntable 19 is the first figure 27 extending upwardly from the top surface 17. The figure 27 is provided with a pair of arms 29 which are shown in FIG. 1 surrounding an object 25. A curved track 31 at the top surface 17 leads from the turntable 19 to a second figure 33. The recesses 23 have a curved side 32 which serves to guide the object 25 from the turntable onto the track 31. The peripheral wall 21 also has a portion 34 which extends from the turntable in a path around the first figure 27, running generally parallel to the curved track 31 and spaced outwardly therefrom. The second figure 33 extends upwardly from the surface 17 and is disposed adjacent the first figure opposite the turntable.
- 30 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 35 The second figure 33 has a curved track 35 which surrounds and lifts an object 25 such that an additional object 25 can be placed thereunder. In order to assure a rigid stacking, the objects 25 can be in the form of squares having flat upper surfaces with cross members 37 formed thereon to engage corresponding grooves 39 formed in the base or lower surface of each object. This provides a locking effect. Additionally, the objects 25 can be provided with an annular lip 41 adjacent the outer periphery of the upper surface of the object such that the arms 35 of the second figure 33 can be seated thereunder so that the object can be lifted without it slipping from between the arms 35. A crank 43 is located on the top surface of the housing and serves to turn the internal mechanism and actuate the device.
- 40 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 45 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 50 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 55 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 60 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- 65 FIG. 8 is a view of parts of the cam and gear mechanism together with an indication of the sequence for rotating the first figure of the device.
- Turning now to FIGS. 2, 3 and 4, there is seen the gear mechanism utilized to operate the device, in the desired manner. As shown in FIG. 3, a vertical axle 45 depending downwardly into the housing from the crank 43 is fixed to and thereby drives a small gear 47. The axle may additionally serve to operate a music box 48 to provide a tune, if desired. Gear 47 engages a somewhat larger gear 49 which in turn engages and drives a

large gear 51, disposed adjacent a bottom wall 53 of the housing 13. Extending upwardly from larger gear 51 is a cylindrical cam 55 having an upwardly facing annular cam surface 56 shown in further detail in FIG. 7. Cam 55 is thus integrally formed with and concentrically disposed within the outer periphery of gear 51 and will rotate therewith. A vertical rod 57 disposed within the first figure 27 rides on the cam surface 56 to control, in a manner to be further explained, the vertical up and down movement of the arms 29 of the first figure.

Additionally affixed to large gear 51 and mounted concentrically within the cam 55 is a second cylindrical cam 58 having an upwardly facing annular cam surface 59. A bottom cam follower 61 on the second figure 33 follows the cam surface 59, serving to raise and lower the second figure 33 which is maintained in contact with the cam surface 59 by a leaf spring 63 affixed at one end 65 to the inner side wall 66 of the housing 13.

Mounted coaxially and for common rotation with the cams 55 and 58 immediately below cam 58 is a timing gear 67 which forms part of a first Geneva type drive utilized in timing the rotation of the first figure 27. The timing gear 67 is comprised of a first circular element 69 which has teeth around two opposed 90° segments 71. The element 69 is a driving gear, having teeth along 180° thereof divided, into the segments 71 as particularly seen in FIG. 4. Below the element 69 there is integrally affixed a second timing element 73 that has two segments 75 of an enlarged diameter greater than the maximum diameter of the tooth segments 71. The segments 75 are 90° segments spaced between the tooth segments 71. The timing gear 67 rotates together with the large main driving gear 51. However, since the tooth segments 71 are located in two opposite 90° segments, the timing gear 67 will drive a cooperating timing gear 77 only one half of time, alternating between driving for a period and not driving for a period, and so on.

Timing gear 77 is rigidly affixed to the base of the housing 79 of the first figure 27, and thus causes the figure 27 to rotate at proper intervals. Specifically, timing gear 77 comprises a continuous gear 81 which meshes with the tooth portions 71 on element 69 and which lies in the same plane therewith. Disposed immediately below and affixed to the gear 81 is a timing element 83 having opposed recesses 85 (FIG. 4) formed therein which receive the large diameter segments 75 of element 73. The foregoing arrangement of timing gears 67 and 77 thus provides a Geneva system whereby the tooth segments 71 on element 69 engage the gear 81 at the base of the figure 27 on alternate 90° revolutions of the timing gear 67. When a segment 75 of the element 73 is seated within a recess 85 of element 83, as shown in FIG. 4, during alternate portions of the cycle, the figure 27 is prevented from rotating.

Affixed to the housing 79 of the first figure 27, above the timing gear 77, is a turntable-driving timing gear 87 which in turn engages a corresponding timing gear 89 as part of a second Geneva type drive for controlling the rotation of the turntable. Turning first to the timing gear 87, there is a gear element 91 having a tooth segment 93 extending continuously about 180° of its periphery. Disposed adjacent and below the gear 91 is a timing element 95 which has an enlarged smooth-edge portion 97 along 180° of its periphery, circumferentially spaced from the tooth segment 93 of the gear 91. The corresponding timing gear 89 has a gear element

101 that has gear teeth around its entire periphery. The gear element 101 is aligned to engage the tooth segment 93 of element 91. The timing gear 89 also includes a circular element 105 which is disposed below the gear element 101 and has a recess 107 formed in its periphery to be occupied by smooth-edge portion 97 of element 95. The foregoing arrangement allows the turntable driving timing gear 87 which has gear teeth about half of its periphery to in turn engage and drive the timing gear 89 one half of the time that timing gear 87 is rotating. It should be kept in mind that timing gear 87 itself only rotates part of the time as determined by the intermittent transfer of rotation from timing gear 67 to timing gear 77.

15 Timing gear 89 engages larger gear 109 which is part of a gear reduction train to ultimately drive the turntable 19. Gear 109 is integrally connected with gear 111 that in turn drives larger gear 113 as part of the train. Gear 113 is directly connected to the turntable 19 to cause the desired intermittent rotation thereof, as timed and determined by the relationship of the gearing mechanism of the toy.

Turning now to FIGS. 2 and 5, there is seen the second figure 33 which is locationally stationary in the device but moves up and down in sleeve 114 under the influence of the spring 63 and the cam surface 59. As indicated above, the second figure 33 must lift an object or box 25 up to receive the next box 25 underneath. The cam 58 is timed so as to lift the second figure 33 up at appropriately the time when, as seen in FIG. 1, the next box 25 is being slipped thereunder. The cam 58 subsequently lets the second figure 33 lower to re-position its arms 35 about the lowermost box 25 in the stack. As seen best in FIG. 5, the second figure 33 has an outer cylindrical body 115. The arms 35 are pivotally connected on vertical pivot pins 117 to the body 115, whereby they can be moved outwardly as shown in broken line in FIG. 5 and back inwardly. The arms 35 are biased to the inward positions by a bent wire spring 119 which is affixed to a support 121 within the cylindrical body 115. When the arms 35 are moved downwardly past the side edges or lips 41 of a box 25, the lips 41 cam the arms outwardly against the force of the spring. When the arms 35 pass the lips 41, the spring 119 then urges the arms 35 inwardly to engage and grasp the sides of the box below the lip 41. Then when the arms 35 raise, the box is lifted. When another box is placed below the held box and the arms 35 are again lowered, the arms slide along the top box and are cammed over the lips 41 of the lower box to assume a holding position below the lips of the lower box. This continues as more boxes are added to the stack.

The mechanism for operating the arms 29 of the first figure 27 can be seen from FIGS. 2 and 6 combined. The first figure 27 has an outer cylindrical housing or body 125. A horizontal axle 127 passes through and is rotatably supported by the body. The axle 127 is fixed at each end to one of the arms 29. A vertically movable upright center rod 57 is pivotally connected in a tabular extension 129 integrally affixed to the axle 127. Additionally, a coil spring 131 is connected at its upper end to a tab 133 fixed to the upper portion of the rod 57 and is connected at its lower end to the base of the figure 27. The spring 131 urges the movable rod 57 downwardly so that it will ride on the cam surface 56. As the cam surface 56 rotates, the rod 57 is caused to move

upwardly and downwardly according to the contour of that cam surface.

With the first figure 27 facing a box on the turntable, the rod 57 moves downwardly on an intermediate portion of the cam surface 56. The rod will thereby pull extension 129 affixed to the axle 127 downwardly therewith, lowering the arms 29 to an intermediate holding position where they are about a box 25 as shown in FIG. 2.

When the first figure 27 rotates to deliver a box underneath a stack held by the second figure 33, the lower portion of the cam surface 56 is engaging the rod 57 to permit the rod to move further downwardly, and the arms 29 will be lowered to a downward position sufficient to clear the stack of delivered boxes. This permits the first figure to continue its rotation to return to facing the turntable 19. As the first figure moves toward the turntable, the cam 55 raises the arms 29 above the box on the turntable so that they can assume a position above that box and the sequence of operation of the first figure can repeat.

The sequence of operation of the toy may be related particularly to movement of the turntable 19. The turntable 19 is provided with five equally spaced box receptacles 23 for each receiving a box or stacking object 25. Thus, the gear ratios are such that the turntable will rotate one fifth of its diameter each time that the first figure 27 makes an entire rotation to deliver a box. This enables a new box to be placed in front of the first figure 27 each time it turns again toward the turntable.

The relationship of the Geneva gear arrangement comprised of timing gears 67 and 77 with regard to the rotational body movement and up and down arm movement of the first figure 27 is diagrammatically illustrated in further detail in FIG. 8. The functions are divided into four segments about the diameter of gear 67. As explained above, element 69 has a pair of 90° tooth segments 71 which are spaced apart 90°. Thus, the segments 71 will cause the timing gear 77 to rotate with gear 67 every other 90°. For the starting position and throughout the first period as shown in the diagram of FIG. 8, the first figure 27 stands still in front of and facing the turntable. The cam 55 as seen in FIG. 7, is programmed such that the cam follower 57 moves from point A on the surface 56 of cam 55 where the arms 29 of the first figure are above the box 25 to point B where the arms will drop to positions on either side of a box 25 on the turntable positioned in front of it. In the next second period, the first figure 27 rotates 180° due to the engagement of one of the tooth segments 71 on element 69 with gear 81. After rotating 180°, the first figure 27 is facing the second figure 33. During this period, the cam follower 57 moves on the cam surface 56 from point B to point C and the arms 29 are maintained about the box by the cam 55 so that as the first figure 27 rotates, the box is moved off of the turntable by the arms 29 and into engagement with the track 31 which seats in groove 39 at the bottom of the box. The box is guided to the track by the curved side 32 of the recess 23. The portion 34 of the peripheral wall 21 which leads from the turntable forms a continuation of the curved side 32 and cooperates with the track 31 to guide the box as it is moved by the arms 29 from the turntable to the position in front of the second figure 33. During the third period, the first figure 27 remains standing still facing the second figure 33; however, its arms drop downwardly (as the cam follower 57 moves

from point C to point D on cam surface 56) and clear of the box positioned in front of the second figure 33. In the fourth period, the first figure 27 rotates 180° to again face the turntable due to the engagement of the outer toothed segment 71 with gear 81. The cam follower 57 moves from point D back to point A on the cam surface 56. Thus, as the first figure 27 approaches the turntable, its arms 29 are raised and positioned above the next box on the turntable. As the cycle repeats, the arms 29 are lowered by the cam 55 to surround that box.

As indicated above, the second figure 33 is synchronized by means of the cam 58 to raise up to permit a new box 25 to be delivered to the stack. The cam 58 will then permit the second figure 33 to move down to place the stack on the new box and to move its arms 35 down about the lowest box in the stack. As particularly seen in FIG. 2, as the arms of the first figure 27 surround a box on the turntable, the second figure 33 begins to lift the lowermost box 25 so that when the first figure 27 has made its 180° rotation to face the second figure 33, the second figure 33 has lifted that lowermost box a sufficient height to allow the new box to be delivered thereunder. Similarly, the second figure will lower its stack onto the new box and will be further lowered to engage the new box as the first figure turns back to the turntable.

It should be apparent that the first figure has two arms to make it look more like a man or other animated character. However, only one arm is required to push the box 25 off the turntable and direct it to the second figure. The recess side 32, the track 31 and the peripheral wall portion 34 cooperate with the arm to move the box to the desired position in front of the second figure.

Additionally, with regard to the second figure 33, its function of lifting boxes and then lowering them on top of a newly placed box can be achieved by merely moving the arms up and down rather than the whole body as disclosed.

Though the description and drawings of the invention have referred to and shown first and second figures which may represent humans or animals, it should be appreciated that the figures can have any shape or configuration as long as it will perform the desired functions. Thus, the figures can even comprise open frame structures or geometric bodies having varying shapes and sizes.

It might further be noted that when the arms 35 are lowered from a held box to grip a newly arrived one, they are aided in their movement downwardly from under the lips 41 by first passing over a chamfered surface 123 thereunder that eases the arms outwardly to the sides of the box.

We claim:

1. A toy which is operated to stack objects comprising:
a housing,
a turntable mounted on said housing,
said objects being placed on said turntable,
a first fanciful figure having arm means emanating therefrom mounted for rotation on said housing adjacent to said turntable,
a second fanciful figure having arm means emanating therefrom mounted on said housing adjacent to said first figure, and

drive means for intermittently rotatably driving said first figure so that the arm means thereof slides objects off said turntable and towards the second figure one at a time, said drive means further driving said second figure so that the arm means thereof lifts the objects previously delivered thereto so as to permit each newly delivered object to be placed under the previously delivered objects.

2. The toy of claim 1 wherein said drive means comprises a gear train, means for rotatably driving said gear train, said turntable and said first figure being intermittently rotatably driven by said gear train, first cam means attached to one of the gears of said gear train for intermittently driving said second figure downwardly and upwardly successively to provide the lifting of said objects, and second cam means attached to one of the gears of said gear train for intermittently driving the arms of said first figure downwardly to engage one of said objects.

3. The toy of claim 2 wherein said drive means fur-

ther includes a hand crank for manually rotating said gear train.

4. The toy of claim 1 wherein each of said arm means comprises a pair of parallel arms for engaging an object therebetween.

5. The toy of claim 1 and further including a track formed on said housing between the turntable and the second figure to guide the movement of the objects.

10 6. The toy of claim 4 wherein said objects are in the form of boxes having annular lips formed around the upper edges thereof for engagement with the arms of said second figure.

15 7. The toy of claim 1 wherein said objects have mating grooves and cross members on the opposite sides thereof to enable mating engagement between objects when stacked on top of each other.

8. The toy of claim 6 and further including means for resiliently biasing the arms of said second figure inwardly to grasp the sides of said objects.

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