This invention relates, generally, to toys and more particularly to toys employing an object adapted to be rotated through the agency of a flexible member or cord held at each extremity by the user and projected into space.

The present period is often referred to as the "space age." Beginning with the stories of flying saucers, and continuing up to the present time when significant developments have been made in the fields of rocketry, launching of satellites, globe circling astronauts, etc., children of today are particularly fascinated by toys which bear relationship to these fields of space activity. Thus, the present invention is concerned with the provision of a toy which may be rotated at a relatively high speed, projected into space from a launching pad and recovered from space intact for repeated projection.

To sustain the interest of a child in a toy, particularly of the type to which the present invention relates, it is essential that the satisfaction resulting from the toy require skill and dexterity on the part of the youngster. For many years, children have spin tops by the use of a string manually applied to the top in such a manner that the top could be tossed toward a surface, such as a smooth floor surface, and subjected to rotation. This procedure required a certain amount of skill and, in fact, a youngster with sufficient abilities could actually toss the top into the air and catch it in his hand while still spinning, before the top would touch the ground. Later, in the development of tops, a spinning device known in the trade as a "diabolo," was brought on the market. This consisted of a member in the shape of a hourglass which could be rotated by a string or cord held at each extremity by the user. After the hourglass structure had been subjected to sufficient rotation, it could be tossed into space and recaptured by the actuating cord held by the user.

The present invention is concerned with a toy device including a space element which may be rotated at high speeds by a cord or string held at opposite extremities by the child, and which embodies significant structural and functional advantages over the toys referred to above, as well as other toys on the market with which I am familiar. One of the problems incident to the use of diabolo type toys heretofore available, is that it is difficult to impart sufficient speed of rotation to the top member to induce or develop the required gyroscopic balance. The present invention contemplates a toy device which overcomes the foregoing and other disadvantages heretofore encountered.

To this end the present invention contemplates the provision of means to insure impartation of rotation to the aforementioned top or spaced object prior to the projection or launching thereof into space at a speed which is essential for inducing gyroscopic balance and thus facilitate directional control of the toy as it is tossed into space. It is also an object of the present invention to provide a novel top support or launching pad upon which a top may be subjected to high speeds of rotation and subsequently released for projection into space.

The foregoing and other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawings wherein:

FIG. 1 is a perspective view of a toy device of the type contemplated by the present invention to illustrate the manner in which said toy may be manipulated by a user;

FIG. 2 illustrates the manner in which the user of the aforesaid toy device may retrieve the rotating toy member or object from space; FIG. 3 is a side elevational view of the launching pad and rotateable object space supported thereby; FIG. 4 is a fragmentary vertical sectional view taken along the line 4—4 of FIG. 3; FIG. 5 is an enlarged, fragmentary sectional view of the rotateable space member or object taken substantially along the line 5—5 of FIG. 4 to illustrate the sound-producing slots which serve to induce a sound indication when a predetermined speed of rotation is attained; FIG. 6 is a view similar to FIG. 3 with portions broken away to show the structure of the shaft shifting mechanism of a launching pad device of modified form; FIG. 7 is a fragmentary plan view of the structure shown in FIG. 6; FIG. 8 is a fragmentary sectional view of the leaf spring mechanism incorporated in the launching pad device of FIGS. 6 and 7, said view being taken substantially along the line 8—8 of FIG. 6;

FIG. 9 is a fragmentary central cross-sectional view of the central portion of one form of rotateable space member;

FIG. 10 is an exploded perspective view of the hub assembly parts of FIG. 9; FIG. 11 is a fragmentary central sectional view of a rotateable space member equipped with a modified hub arrangement of simplified form; and FIG. 12 discloses the device for imparting rotation to the space member and the retrieving not associated therewith.

Referring now to the drawings more in detail, wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that the toy device of the present invention consists primarily of three parts; namely, a rotateable member or object designated generally by the numeral 12, a combined actuating and retrieving device 14, and a launching pad device identified by the numeral 16 in FIGS. 1, 3 and 4. FIGS. 6 and 7 disclose a launching pad device of modified form designated by the numeral 16a.

The rotateable space member or object 12 preferably includes a pair of disc-like members or plates 18 and a central hub 20 (FIGS. 6, 7 and 11). The plates 18 may be secured to the opposite sides of the hub 20 by an adhesive or other suitable fastening means. The plates 18 may be formed from inexpensive light weight sheet material such as paper, plastic, or even light weight thin gauge sheet metal. It is desirable to have the periphery of the disc-like members or plates 18 rounded as shown more clearly in FIG. 11, to counteract the hazard of the user injured if struck by the disc during its gravitation downwardly.

The hub 20 may be of extremely simple construction as shown in FIGS. 3, 6 and 11. In these forms, the hub 20 consists of a single hub element 20 having a central aperture 22. The opposed sides of the hub 20, as previously mentioned, may be adhesively secured to the complementary disc-like members 18 or such fastening may also consist of conventional fastener brads or the like.

In FIGS. 9 and 10 another form of hub assembly is shown which consists of a central hub member 20a, clamping members or discs 24—26 and four fastening screws 28. The hub member 20a has a central aperture 22a and is formed with equally spaced apertures 30 to accommodate complementary alignment lugs 32. The clamping member 26 is also provided with equally spaced lug accommodating apertures 34 which are adapted to register with the hub apertures 30. The discs 18 are also provided with apertures to receive the lugs 32. When the members 20a, 24, 26 and the discs 18 have been as-
seemed so as to occupy the positions shown in FIG. 9, the screws 28 are then applied to secure all of said parts together as a unit. It will be noted that the members 24 and 26 as well as the discs 18 are provided with central apertures which register with the hub apertures 22a. The arrangement shown in FIGS. 9 and 10 makes it very convenient to replace one or both of the flexible actuators 18 in the event of breakage or fracture. Such a construction lends itself for use in kits containing parts sold in disassembled form.

The device 14 for imparting rotation to the member 12 is illustrated in FIGS. 1, 2 and 12. This device includes a pair of actuating rods or sticks 36 connected at their extremities by a flexible actuating member 38 or cord 38. The opposite extremities of the actuating rods 36 have a retrieving net 40 extending therebetween. The cord 36 is used to impart rotation to the disc-like space member 12 by a reciprocating movement as has heretofore been used to impart rotation to conventional diablo tops. If desired, the peripheral surfaces of the hub members 20-20a may be roughened to increase frictional engagement therewith of the actuating cord 38. After the space member or top 12 has been tossed into space, the retrieving net or net 40 is used to catch the top shown in FIG. 2. Normally the conventional diablo top is retrieved from space by use of the cord alone. However, a rotatable space member such as the toy member 12, having relatively adjacent positioned disc-like members 18, requires increased skill to retrieve the top 12 from space by use of the cord 38 alone. The retrieving net is therefore provided to facilitate retrieval of the top at least until the user has acquired sufficient skill to retrieve the top by the use of the actuating cord alone. Also, when the top is tossed high into space the cord with which it may be retrieved by merely the use of the actuating cord is materially short. The opposite margins of the net 40 are slidably mounted upon their respective handles. When the handles 36 are being used to impart reciprocation to the cord 38, the net 40 may be compressed so as to occupy the space indicated by the bracket A in FIG. 12. When operated for retrieving the toy member, the net may be expanded to occupy the space indicated by the bracket B, FIG. 12.

In order for the space member or top 12 to attain the desired gyroscopic balance as it sails through space, it should be rotating at relatively high speeds. This is accomplished by the use of the rotating cord 38 as has heretofore been practiced in the use of conventional diablo tops. Hence the present invention contemplates the use of the launching pad device 16 shown in FIG. 3 and the modified form of launching pad 16a shown in FIGS. 6 and 7.

Referring to FIG. 3 it will be seen that the launching device or pad 16a comprises a base portion 42 adapted to rest upon a floor or the surface of the ground. Extending upwardly from the base 42 are a pair of support frame members 44 and 46. These frame members are secured in a fixed position upon the base 42 in any suitable manner and are separated sufficiently to accommodate the space member 12 as shown in FIG. 3. A horizontally disposed, reciprocable pin 48 serves to rotateably support the member 12 when the pin occupies the position shown in FIG. 3. The pin is slidable within complementary apertures formed at the upper extremities of the frame members or standards 44-46.

Movement of the pin 48 is controlled through the agency of a bell crank 50 and a foot actuated lever 52. The crank 50 is pivotally supported at 54. A lower and relatively short arm 56 is adapted to be engaged by the underside of the lower extremity of the lever or foot pivot 52 as viewed in FIG. 3, said pedal being mounted upon an intermediate pivot support 58. Pressure exerted on the foot pedal 52 by the user's foot, so as to cause it to tilt in a counterclockwise direction will cause the longer arm 60 of the bell crank 50 to be shifted from the solid to the dotted line position shown in FIG. 3. In this manner the pin 48 is shifted sufficiently to release the space member 12 for reasons later to be set forth.

In FIG. 4 it will be noted that the upper end of the bell crank arm 60 is bifurcated to receive the extremity of the pin 48.Protuberances 62 carried by the pin 48 serve to engage said pin with the actuating arm 60. A leaf spring 64 yieldably resists shifting of the arm 60 to the right (FIG. 3) and serves to urge said arm to the left when pressure of the foot pedal or lever 52 is released.

As previously stated, it is important to impart rotation to the member 12 at relatively high speeds before tossing or projecting it into space. This is accomplished by first mounting the member 12 upon the supporting pin 48. Before doing so, however, the actuating cord 38 should first be positioned between the discs 18 of the rotatable space member 12. The operator then places one foot on the pedal 52 as shown in FIG. 1. By engaging the cord 38 with the periphery of the hub, the space member 12 may be subjected to a relatively high speed of rotation. When the desired speed of rotation is attained, the operator presses downwardly upon the forward end of the launching device 16 and the user may now be associated with the space member 12. At this point the member 12 may be tossed or projected into space. After the member 12 has reached the limit of its upward projection and gravitates downwardly, the net 40 may be used to retrieve it as shown in FIG. 2. Of course, after skill has been developed by the operator or user, it may be possible to catch the member 12 on the cord. However, due to the proximity of the discs 18, some difficulty may be experienced in such a maneuver particularly in instances where the member or top 12 is tossed relatively high into space.

It may be advantageous in some instances to provide the discs 18 with a frictional surface so that rotation of the member is retained. In addition to producing a pleasing sound to a child operator, it also serves to audibly indicate when a rotary speed has been obtained which warrants projection of the member 12 into space; namely, a speed which will assure gyroscopic balance. Such balance enables the operator better to control the direction of projection of the member and thus lends considerable interest and fascination to its use. It will be noted that the outer peripheries of the discs 18 are somewhat rounded so as to facilitate reception of the toy by the cord 38.

In FIGS. 6, 7 and 8 a slightly modified launching pad device 16a is shown. Structural features or parts of the device 16a which are functionally similar to corresponding parts of the device 16 are given like numerals with the suffix (a). The main structural distinction between the device 16a and the device 16 is incorporated in the mechanism for controlling the movement of the pin 48a. The launching device 16a employs a coil spring 68 which acts between a bracket 70 on the frame 46a and an enlargement or head 72 on the pin 48a. This spring 68 will shift the pin 48a to the dotted position of FIG. 6, providing a latch strip 74 is shifted downwardly to clear an abutment collar 76 carried by the pin 48a. The latch strip 74 is guided in its vertical shifting by a guide member 75. Downward shifting of the latch strip 74 is occasioned by tilting the foot pedal 52a against a lateral projection 78 (FIG. 6) at the lower extremity of the latch strip 74. To reset the pin 48a to its normal toy supporting position it is only necessary to press the head or knob to the left and then release pressure on the foot pedal. A left spring 80 will urge the latch strip upwardly, as shown in FIG. 6, into pin locking position.

From the foregoing, it should be apparent that the present invention contemplates a toy which is of such a nature as to sustain the interest of a user. While it requires a certain degree of dexterity and skill to be developed by the user, such requirements are not beyond
the capabilities of a normal child. In fact, as previously pointed out in the introductory portion of this specification, the exercise and development of one's skills and talents in the use of a toy is most important in initially stimulating and subsequently sustaining interest in its use. With astronauts circling the earth and plans for man's exploration of the moon underway, the toy envisioned by this invention is most timely. As previously mentioned, the toy device may be produced and sold as a completely assembled unit or in the form of a kit which includes the constituent parts. This applies both to the rotary toy member and the launching pad structure.

The toy device of the present invention contemplates its use by one person or by several. When more than one person enters into its use, one party may project the toy members into space and the other serve as a retriever of the toy member from space. The rotary toy members or space objects may be brilliantly and attractively colored and readily replaced when needed, at an extremely low cost. In fact, the entire toy device may be produced at minimum manufacturing costs and thus made available at prices well within the reach of a wide range of potential purchasers.

Changes and modifications in structure may be made without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

1. A toy device of the type described including a frame adapted to be supported by a surface such as the surface of the ground, substantially horizontally disposed bearing means associated with said frame for accommodating a diabolo type rotatable toy member, shiftable foot accommodating means for controlling said bearing means to permit the release of an associated toy member after relatively high speed has been imparted thereto.

2. A toy device of the type described, including a rotatable toy means for projection into space, flexible actuating cord means having two end portions with each end portion free to be grasped and manipulated by a user and with intermediate portions thereof engaging the toy means only at an undersurface portion for rotating the same pulling the actuating cord means at either end portion, bearing means for rotateably supporting said projectible toy means to permit relatively high speed rotation to be imparted to said toy means through the agency of said actuating cord means, and means for effecting the release of said toy means from said bearing means, whereby to permit said toy means to be projected into space by the actuating cord means while rotating at relatively high speed.

3. A toy device of the type described, including a rotatable toy means for projection into space, flexible actuating cord means having two end portions with each end portion free to be grasped and manipulated by a user and with intermediate portions thereof engaging the toy means only at an undersurface portion for rotating the same by pulling the actuating cord means at either end portion, bearing means including retractable shaft means for rotateably supporting said projectible toy means to permit high speed rotation to be imparted to said toy means through the agency of said actuating cord means, and means for effecting the retraction of said shaft means whereby to permit said toy means to be projected into space by the actuating cord means while rotating at relatively high speed.

4. A toy device of the type described, including a rotatable toy member for projection into space, flexible actuating cord means adapted to be held at each end by a user, said toy member adapted to be rotated by engagement therewith of said actuating cord means, shiftable bearing means for rotateably supporting said projectible toy member to permit high speed rotation to be imparted to said member through the agency of said flexible actuating cord means, and foot operated means for shifting said bearing means to effect release of said toy member from said bearing means whereby to permit said toy member to be projected into space while rotating at relatively high speed.

5. A toy device of the type described including a rotatable toy means for projection into space, flexible actuating cord means having two end portions with each end portion free to be grasped and manipulated by a user and with intermediate portions thereof engaging the toy means only at an undersurface portion for rotating the same by pulling the actuating cord means at either end portion, bearing means including retractable shaft means for rotateably supporting said projectible toy means to permit relatively high speed rotation to be imparted to said toy means through the agency of said actuating cord means, and means for effecting the release of said toy means from said bearing means, whereby to permit said toy means to be projected into space by the actuating cord means while rotating at relatively high speed.

6. A toy device as set forth in claim 2 in which said bearing means includes a structure adapted to be held in place by the user's foot.

7. A toy device as set forth in claim 2 wherein the toy release means is foot controlled.

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RICHARD C. PINKHAM, Primary Examiner.
F. BARRY SHAY, DELBERT B. LOWE, Examiners.
W. R. BROWNE, Assistant Examiner.