July 25, 1967 R. SCHULLER 3,332,682

MULTI-MOVEMENT SPHERE

Filed May 14, 1964 4 Sheets-Sheet 1

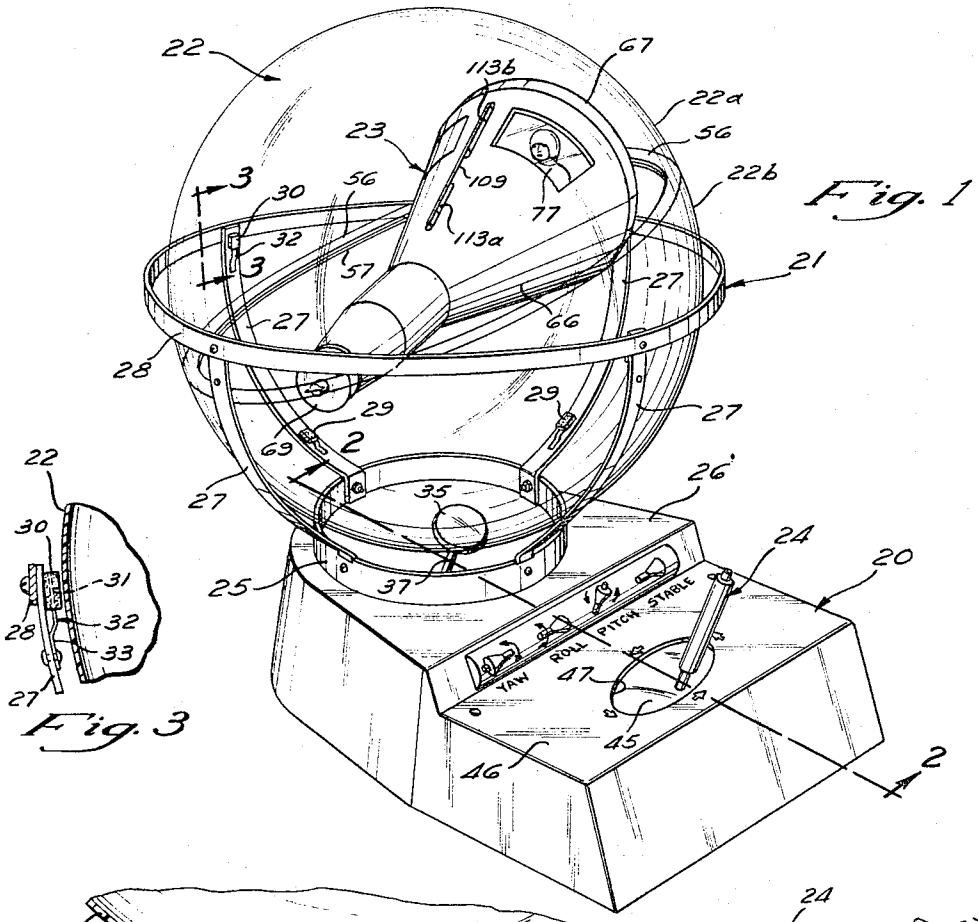


Fig. 1

Fig. 3

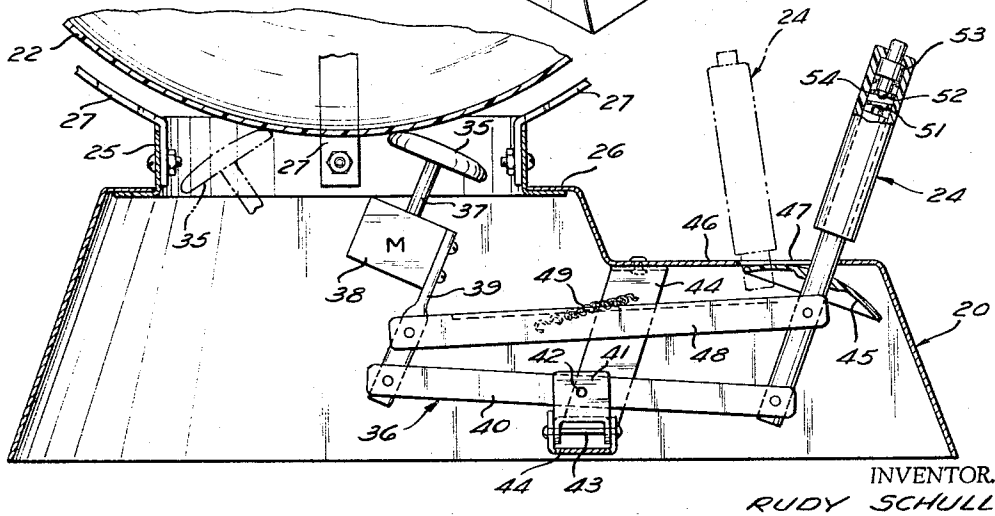


Fig. 2

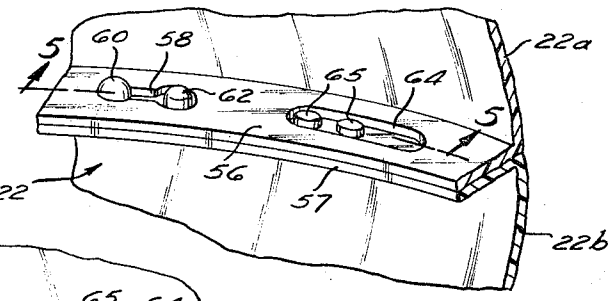
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MULTI-MOVEMENT SPHERE

Filed May 14, 1964 4 Sheets-Sheet 2



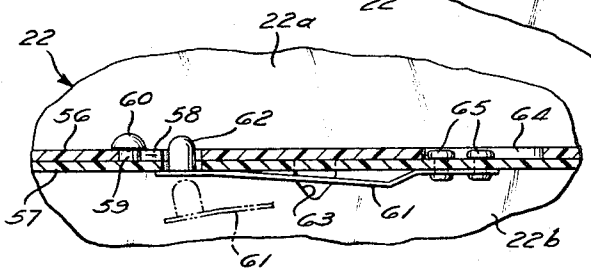


Fig. 4

Fig. 5

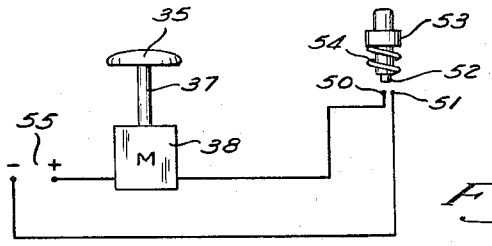


Fig. 6

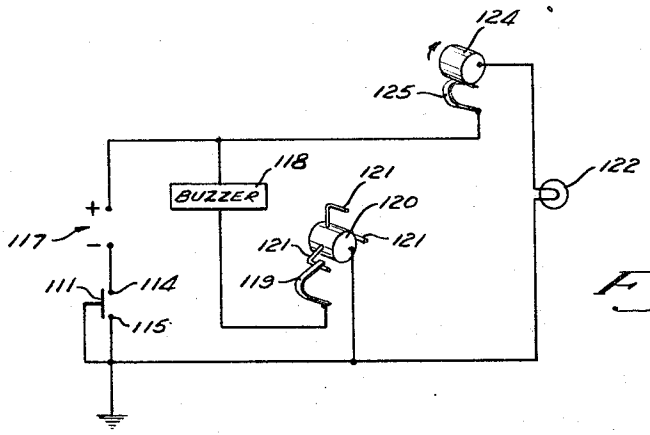


Fig. 12

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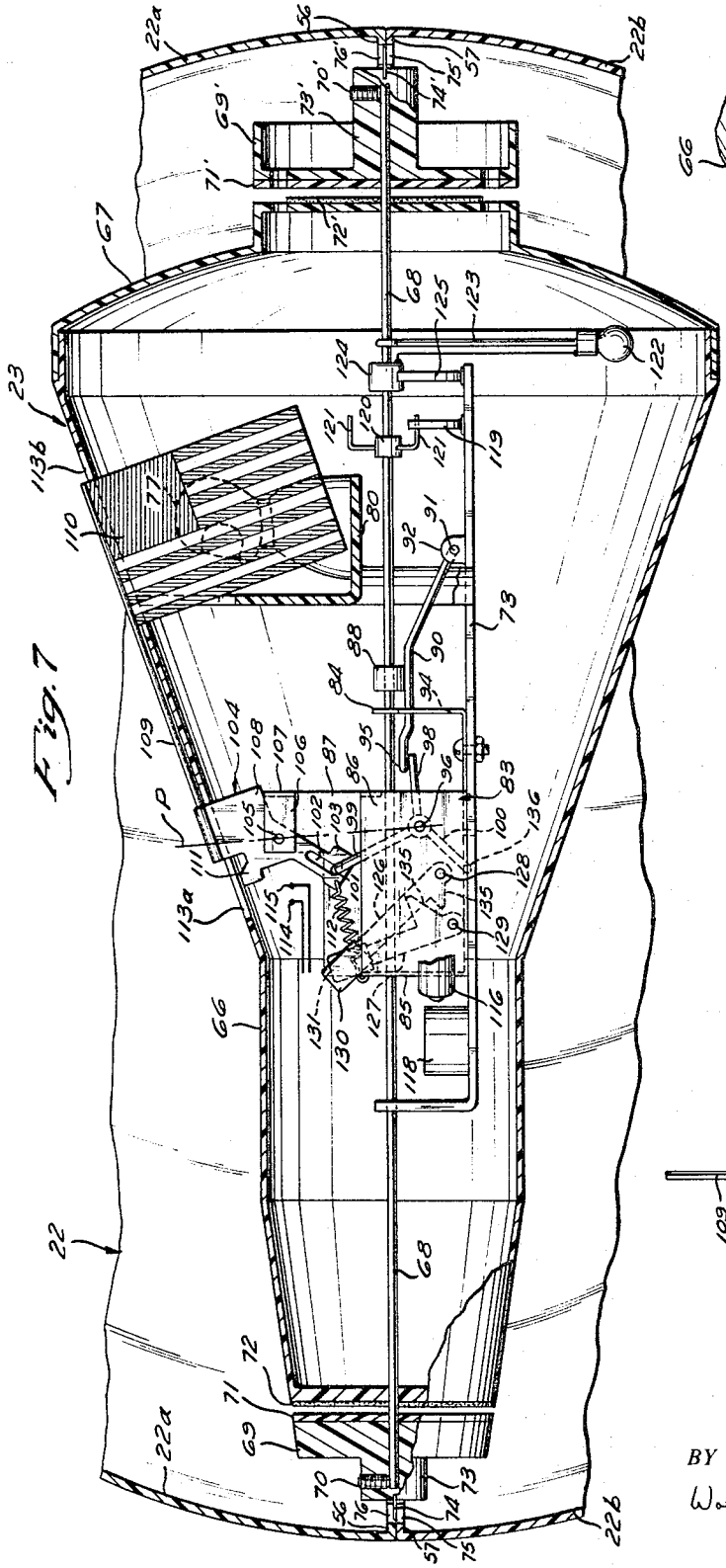


Fig. 7

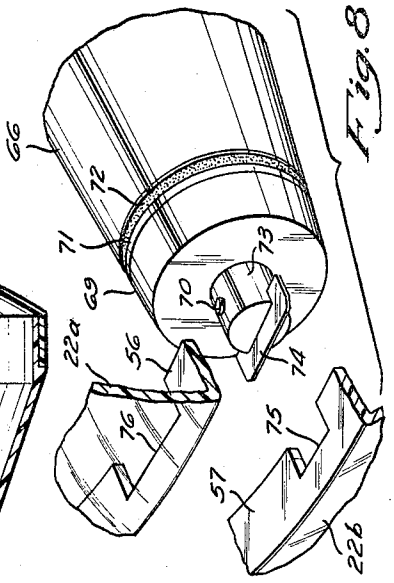


Fig. 8

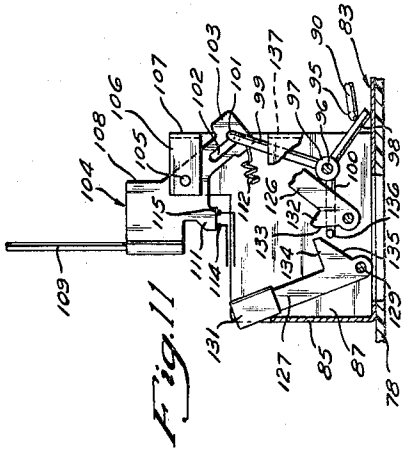


Fig. 11

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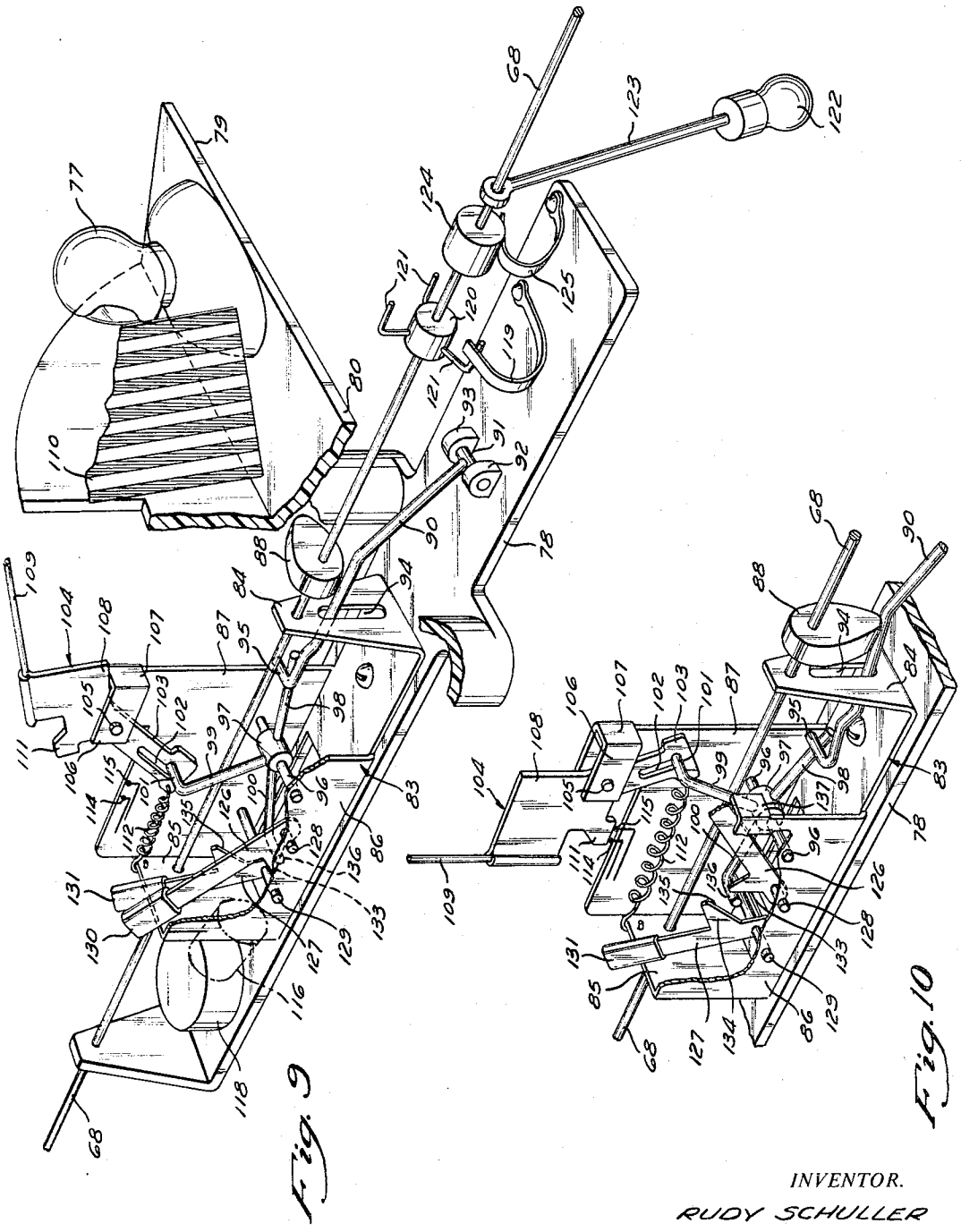


Fig. 9

Fig. 10

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3,332,682

MULTI-MOVEMENT SPHERE

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Filed May 14, 1964, Ser. No. 367,328
13 Claims. (Cl. 273—1)

This invention relates to a game, amusement or display apparatus.

It is a principal object of this invention to provide a novel and improved space game, amusement or display apparatus which challenges the user's skill to establish a predetermined condition in the apparatus.

Another object of this invention is to provide a novel and improved game or amusement apparatus in which the object of the game is to attain a stabilized position inside an enclosure of a body, such as a space vehicle in simulated flight.

Another object of this invention is to provide such a game or amusement apparatus having a manual control operated by the player to selectively control the movement of the enclosure in which the body is mounted in such a fashion that the body can attain a stabilized position only if the enclosure is moving correctly.

Another object of this invention is to provide such a game or amusement apparatus having provision for indicating when the body has attained a stabilized position within the enclosure.

In a presently-preferred embodiment of this invention, the apparatus comprises a transparent sphere mounted for universal rotation, a simulated space vehicle inside the sphere, and a drive arrangement for rotating the sphere in a direction controlled manually by the player. A simulated space vehicle is supported inside the sphere in such a manner that the vehicle will move in unison with the transparent sphere except when the vehicle is in a stable horizontal position. When this stable position of the vehicle is attained, as determined by the manually-controlled drive imparted to the transparent sphere, audible and visual indicators operate automatically to indicate the player's success in achieving this stabilized condition.

Further objects and advantages of the present invention will be apparent from the following detailed description of a presently-preferred embodiment thereof, which is illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of a game apparatus embodying the present invention;

FIGURE 2 is a fragmentary section taken along the line 2—2 in FIGURE 1 and showing the operator-controlled mechanism for rotating the transparent sphere in the game apparatus;

FIGURE 3 is a fragmentary section taken along the line 3—3 in FIGURE 1 and showing the transparent sphere engaging one of the pads carried by the support framework;

FIGURE 4 is a fragmentary perspective view showing details of the attachment of the two halves of the transparent sphere to each other;

FIGURE 5 is a section taken along the line 5—5 in FIGURE 4;

FIGURE 6 is a schematic view including the electrical circuit for the sphere-rotating drive motor;

FIGURE 7 is a fragmentary axial section through the transparent sphere and the simulated space capsule therein, showing the positions of the parts when the capsule first assumes a horizontal position;

FIGURE 8 is a fragmentary exploded perspective view showing the smaller front end of the space capsule and the adjacent parts of the transparent sphere;

FIGURE 9 is a fragmentary perspective view showing

the moving parts of the space capsule in the positions which they assume when the capsule is inclined downward toward the front;

FIGURE 10 is a fragmentary perspective view showing certain of the same parts in the positions which they assume when the axis of the capsule is substantially horizontal;

FIGURE 11 is a fragmentary view showing in elevation certain of the parts in the capsule in the FIGURE 10 position; and

FIGURE 12 is a schematic electrical circuit diagram of the circuits for the various indicator devices on the capsule for indicating when it has assumed a stabilized horizontal position.

Referring first to FIGURE 1, in broad outline the preferred embodiment of the present game apparatus shown therein comprises a base **20**, an open support framework **21** extending up from the base, and an enclosure in the form of a transparent sphere **22** supported by the framework **21** for rotation in any direction. A body in the form of a simulated space vehicle **23** is inside the sphere, and a control stick **24** extending up from the base **20** and movable selectively by the player controls the rotation of the sphere. The object of the game is to cause the sphere **22** to rotate in such a direction that the space capsule **23** will assume a stabilized horizontal position, at which time various indicator devices on the capsule will indicate that this stabilized position has been attained.

As shown in FIGURE 1, the support framework comprises a bottom ring **25** rigidly secured to a top wall **26** of base **20**, a plurality of circumferentially spaced, arcuate arms **27** bolted to the bottom ring **25** and extending upward and laterally outward therefrom, and a large diameter, horizontal, annular band **28** bolted to the upper ends of the arms **27** and extending around the middle of the sphere. Each of the arcuate arms **27** of the framework carries a spaced pair of pads **29** and **30** for engagement with the transparent sphere. Each of the lower pads **29** is located a short distance upward from the lower end of the framework arm **27** which supports it. Each of the upper pads **30** is located at substantially the level of the upper band **28** of the framework.

As shown in FIGURE 3, each upper pad **30** is a flat loop of mohair fabric which is inserted endwise over the upper, free end **31** of a mounting clip **32**. This clip has a lower end **33** which is riveted or otherwise attached to the inside of the respective framework arm **27**. The upper, free end **31** of the clip is offset radially inward from its lower mounting end **33** and it is biased toward the framework arm **27**, so that the radially outward half of pad **30** is snugly clamped between this end of the clip and the inside of the framework arm **27**.

Each of the lower pads **29** is similarly mounted on a respective spring clip.

With this arrangement the several pads **29** and **30** support the transparent sphere **22** at spaced locations around its lower half. The mohair fabric of the pads substantially prevents scratching of the sphere and the build-up of an electrical charge on the sphere as it rotates.

Referring to FIGURE 2, the sphere **22** is adapted to be rotated in any direction by a motor-driven, rotary rubber wheel **35**, which is mounted for adjustment through a universal movement linkage **36** acting between the control handle **24** and drive wheel **35**.

The drive wheel **35** is attached to the upper end of the shaft **37** of an eletcric motor **38**. The motor is bolted to an upstanding rigid end piece **39** of the linkage **36**. This linpage includes an elongated rigid bottom lever **40**, which is pivotally connected at one end to the lower end of the end piece **39** and is pivotally connected at its opposite end

to the lower end of the control handle **24**. A rigid fulcrum piece **41** carries a horizontal cross-pin **42** which provides a pivotal support for lever **40** midway between the latter's ends. The fulcrum piece **41** itself is pivoted on a horizontal pin **43** carried by a rigid bracket **44** attached to the base **20**. The respective axes of pins **42** and **43** are perpendicular to one another.

The control handle **24** carries a guide plate **45** with a convex upper face for sliding engagement with the underside of the adjacent top wall **46** of base **20**. As shown in FIGURE 1, this top wall of the base has a realtively large oblong opening **47**. The control stick **24** extends up through this opening and it may be moved from side-to-side and from front-to-back, or vice versa, within the limits of movement defined by the size of this opening.

The linkage **36** also includes an elongated, rigid, generally horizontal arm **48** spaced above the lever **40** and pivotally connected at its opposite ends to the control handle **24** and the end piece **39** of the linkage. Tension coil springs **49** act between the bracket **44** and arm **48** to bias the latter to the right in FIGURE 2, to a position in which the control stick **24** extends substantially vertical in the middle of the opening **47** in the top wall **46** of the base and the drive motor **37** extends substantially vertical and in substantial alignment with the vertical axis of the transparent sphere **22**.

The player may grasp the control handle **24** and move it in any direction, and this movement of the control handle is imparted to the drive wheel **35** through the universal movement likage **36**. The position of the drive wheel, as determined by the control handle, controls the direction in which the transparent sphere **22** will rotate as a result of its tangential engagement by the rotating drive wheel.

A push button switch for controlling the energization of the drive motor **38** is located in the upper end of the control handle **24**. This switch comprises a pair of laterally spaced, fixed contacts **50** and **51** (FIGURE 6) fixedly mounted in the handle and a mobile bridging contact **52** carried by a plunger **53** which is reciprocable in the handle. A compression coil spring **54** biases plunger **53** which is reciprocable in the handle. A compression coil **53** upward in FIGURE 2 to position the mobile contact **52** up away from engagement with the fixed contacts **50, 51**. The upper end of plunger **53** projects up through the top of the control handle **24**. When the player depresses this plunger, the mobile contact **52** is moved down into engagement with the fixed contacts **50, 51**, closing the circuit through these contacts.

As shown in FIGURE 6, the positive terminal of a battry **55** is connected to one side of the drive motor **38**. The opposite side of this motor is connected to one of the fixed contacts **50**. The other fixed contact **51** is connected to the negative terminal of battery **55**. Accordingly, when the mobile contact **52** is moved into bridging engagement with the fixed contacts **50, 51**, this completes the energization circuit for the drive motor **38** from battery **55**.

Referring to FIGURES 4 and 5, the transparent sphere **22** is composed of two half-spheres **22***a* and **22***b* which are detachably secured to one another to make up the complete sphere. The respective halves at their abutting edges are formed with radially inwardly extending, integral flanges **56** and **57** which extend contiguous to one another. Flange **56** is formed with a plurality of keyhole-shaped openings **58** at circumferentially spaced locations. The flange **57** on the other half of the sphere carries a plurality of correspondingly located studs **59** (FIGURE 5) having enlarged heads **60** disposed just beyond the flange **56** on the opposite half of the sphere. Each of these heads **60** is smaller in cross-section than the large end of the corresponding slot **58** in flange **56**, but larger than the narrow end of that slot. Accordingly, the separate halves of the sphere may be assembled together by first positioning the studs **59** in registration with the large ends of the keyhole slots **58** and then turning the halves relative to one another to move the studs into the narrow ends of these slots, with the enlarged heads **60** snugly overlying the flange **56**.

As shown in FIGURE 5, a leaf spring **61** is riveted or otherwise secured at one end to the flange **57**. At its opposite end, the leaf spring carries a protrusion **62** which is biased by the spring to project into the large end of one of the keyhole openings **58** in the flange **56** on the other half of the sphere when the two halves of the sphere are assembled together. This locks the two halves of the sphere to each other because they cannot now be turned with respect to one another. The sphere half **22***b* has an opening **63** (FIGURE 5) adjacent its flange **57** and in alignment with the leaf spring **61**. By inserting a thin tool through this opening the user may retract the leaf spring **61** so as to disengage the protrusion **62** from the keyhole slot **58**, so that then the two halves of the sphere may be separated by turning them with respect to one another. Flange **56** on the sphere half **22***a* has an enlarged opening **64** which receives the mounting rivets **65** for leaf spring **61**.

Referring to FIGURE 7, the simulated space capsule **23** inside the transparent sphere **22** comprises a hollow housing composed of a main housing shell **66** and an end cap **67** closing the larger end of the housing. In the particular embodiment shown, this simulated capsule has a housing which generally resembles the "Gemini" capsule. A shaft **68** extends longitudinally and axially through and beyond the capsule, extending slidably and rotatably through the opposite end walls of the capsule housing.

At the left end of shaft **68** in FIGURE 7 a clutch member **69** is rigidly attached to the shaft by a set screw **70**. This clutch member carries a clutch facing **71** which may be of smooth plastic material. The adjacent narrow end of the capsule carries a clutch facing **72** of suitable friction material, such as emery paper. These clutch facings are adapted to be in clutching engagement with each other whenever this end of the capsule is inclined downward, in which case the weight of the capsule will cause it to slide down along shaft **68** until the clutch facings engage one another.

Clutch member **69** at its opposite end has an integral, reduced diameter hub **73**. This hub rigidly supports a diametrically disposed flatmounting plate **74**, which projects endwise and laterally beyond the hub, as best seen in FIGURE 8. The inwardly projecting flange **57** on the half **22***b* of the transparent sphere is formed with a rectangular opening **75** which snugly receives the reduced hub **73** on clutch member **69**. The other half **22***a* of the transparent sphere has an elongated opening **76** in its flange **56** which receives the mounting plate **74** carried by the clutch body **69**. In the assembled position of these parts, the mounting plate **74** overlies the flange **57** on opposite sides of the opening **75** in this flange, so that clutch member **69** and shaft **68** cannot turn with respect to the transparent sphere. The opening **76** in the other half of the transparent sphere is longer circumferentially than the mounting plate **74**, so that the two halves of the sphere may be turned with respect to one another when it is desired to assemble them together or take them apart.

A substantially similar clutch arrangement is provided at the right end of shaft **68** in FIGURE 7. Corresponding elements of this clutch are given the same reference numerals with a "prime" subscript added, as the just-described clutch elements at the left end of this shaft. Since the construction and operation of the two clutches are basically similar, the clutch at the right end will not be described in detail.

With the foregoing arrangements, the shaft **68** and the clutch members **69, 69'** on its opposite ends are clamped to the transparent sphere **22** so that they move in unison with the sphere. If either end of the capsule **23** is inclined downwardly a substantial extent, the weight of

the capsule will cause it to slide down along shaft **68** to engage the clutch at that end. Under these circumstances the capsule **23** also will move in unison with the sphere **22**.

However, if the capsule **23** and shaft **68** are in a substantially horizontal position, as shown in FIGURE 7, there will be insufficient weight on either clutch to sustain the clutching engagement with the capsule and therefore the capsule will assume a position in which it is out of clutching engagement with either clutch member **69** or **69'**. Also, if the player succeeds in driving the sphere for rotation about the shaft **68** with the latter substantially horizontal, then the shaft **68** will rotate (in unison with the sphere) with respect to the space capsule **23**. The center of gravity of the capsule is below its longitudinal center line due primarily to the weight of batteries **116** therein, so that it will be in stabilized horizontal position shown in FIGURE 7 with the astronaut figures **77** sitting upright.

Within the capsule housing is located a rigid support base **78** of plastic or other suitable electrical insulation material. This base carries laterally projecting guide portions **79**, **80** at its opposite sides, which are slidably received in corresponding guideways in the housing, so that the base may be slidably inserted endwise into the housing when the latter's end cap **67** is removed.

A metal rigid bracket **83** is bolted to the base **78**. As best seen in FIGURE 9, this bracket has spaced, upstanding, opposite end walls **84** and **85** and spaced, upstanding, opposite side walls **86** and **87**. The shaft **68** extends rotatably and slidably through openings in the end walls **84** and **85**.

A cam **88** is affixed to shaft **68** to the right of the end wall **84** in FIGURE 7. This cam overlies a lever **90** which at its lower end is attached to a pivot pin **91**, rotatable in bearings **92**, **93** carried by the base **78**. Lever **90** extends freely through an elongated slot **94** in the end wall **84** of bracket **83** and terminates at its free end in a laterally turned extension **95**, which is disposed below shaft **68**.

The side walls **86**, **87** of bracket **83** support a cross-shaft **96** on which a hub **97** is rotatably mounted. Three arms **98**, **99** and **100** project radially from this hub. Arm **98** extends beneath the lateral end extension **95** of lever **90**, as shown in FIGURES 7 and 9.

The second arm **99** terminates at its radially outer end in a laterally turned extension **101** (FIGURE 9), which is slidably received in a generally L-shaped slot **102** formed in the depending leg **103** of a pivoted member **104**. Member **104** is pivotally supported by a cross pin **105** rotatably mounted in the upstanding side wall **87** of bracket **83** and in a parallel wall **106** connected rigidly to, and offset laterally from wall **87** by a connecting wall **107**. A second leg **108** of pivoted member **104** overlies this connecting wall, which serves as a clockwise limit stop for member **104**. A flag pole **109** is force fitted at one end to leg **108**. At its opposite end this pole carries a flag **110** which normally is disposed inside the capsule housing out of sight of the players, as shown in FIGURE 7. A third leg **111** on pivoted member **104** projects upward and to the left in FIGURE 9. A coil spring **112** is engaged under tension between the lower end of the depending leg **103** on pivoted member **104** and the left end wall **85** of bracket **83**.

Normally, as shown in FIGURES 7 and 9, the spring **112** biases the pivoted member **104** clockwise in these figures. The offset lower end of the L-shaped slot **102** in the depending leg **103** of member **104** engages the lateral extension **101** on the free end of arm **99**. Accordingly, spring **112**, acting through pivoted member **104** and arm **99**, positions hub **97** at a rotational position in which the free end of its arm **98** is disposed immediately below the lateral end extension **95** of lever **90**.

When shaft **68** turns with respect to the capsule, after the capsule has assumed the stabilized horizontal position, as described, its cam **88** will ride over lever **90**, causing the latter to pivot downward (counterclockwise) in FIGURES 7 and 9. The laterally turned end **95** of the lever bears down on the free end of arm **98** causing hub **97** to pivot clockwise in FIGURES 7 and 9. The clockwise movement of the arm **99** attached to this hub pulls the lower end of the depending leg **103** of pivoted member **104** counterclockwise in these figures against the bias of spring **112**. During such movement the lateral end extension **101** on arm **99** first rides up the L-shaped slot **102** until it passes through a plane P (FIGURE 7) common to the respective pivot axes of member **104** and hub **97**. Continued movement of arm **99** clockwise causes its lateral end extension **101** to ride back down slot **102**. As shown in FIGURE 11, clockwise movement of hub **97** is limited by the engagement of its arm **98** with the bottom of bracket **83**. In this position of the parts, the arm **99** is inclined to the right of a vertical position and the lateral extension **101** of this arm seats in the offset end of the L-shaped notch **102** in the depending leg **103** of pivoted member **104**. Spring **112** tends to urge member **104** clockwise and maintains the offset portion of slot **102** against the lateral extension **101** of arm **99**, arm **99** restrains member **104** against clockwise movement. This is a stable position of the parts and it will be maintained even after the rise on cam **88** has moved out of engagement wtih lever **90** as shaft **68** continues to rotate.

As shown in FIGURES 1 and 7, the capsule housing **66** has aligned elongated slots **113***a* and **113***b*. The pole **109** rests outside housing **66** between these slots when the flag is retracted. When member **104** is pivoted counterclockwise, as described, flag **110** passes up and out through slot **113***b*.

When pivoted member **104** is moved counterclockwise, as described, its arm **11** moves down into bridging engagement with a pair of laterally spaced, fixedly positioned switch contacts **114** and **115**, indicated schematically in FIGURES 7, 9, 10 and 11. One of these contacts **115** is grounded to the metal bracket **83**. Also, arm **111** is grounded to this bracket because all of the parts supporting it from the bracket are metal. A plurality of mercury cell batteries **116** are mounted on base **78** and are connected in series to provide a suitable D.C. power source. The switch contact **114** is connected to the negative terminal of this power source.

Referring to FIGURE 12, this voltage source is designated by the reference numeral **117**. The positive terminal of this power source is connected to one terminal of an electrically energizable buzzer **118** of conventional design. This buzzer is mounted on the base **78**, as shown in FIGURE 9. The opposite terminal of the buzzer is connected to a flexible and resilient metal leaf spring **119**, which constitutes one contact of an intermittently operable switch. As shown in FIGURE 9, this spring is mounted on the insulation base **78**. As metal hub **120** on shaft **68** carries three radial fingers **121** terminating in laterally turned ends which are adapted to engage the spring contact **119** in succession intermittently as shaft **68** rotates. Shaft **68**, hub **120** and fingers **121** are all grounded to the metal bracket **83**.

With this arrangement, when the arm **111** on pivoted member **104** bridges the fixed contacts **114**, **115**, this provides an energization circuit for the buzzer **118**, which circuit is completed each time one of the fingers **121** engages the spring contact **119**. Therefore, as long as switch **111**, **114**, **115** is closed and shaft **68** continues to rotate, the buzzer **118** will be energized intermittently.

An electric lamp **122** is mounted on the outer end of a radial arm **123** which is rigidly attached to shaft **68**. As shown schematically in FIGURE 12, one terminal of this lamp is grounded to the metal bracket **83**. The other terminal of this lamp is connected to a metal hub **124** mounted on shaft **68** but electrically insulated therefrom. This hub constitutes the rotating contact of a switch. The other contact of this switch is a metal leaf spring **125** mounted on the insulation base **78**. Leaf spring contact **125** is in

continuous engagement with hub contact **124** as the latter rotates. Contact **125** is connected to the positive power supply terminal **117**.

The end cap **67** of the capsule housing is translucent and, as shaft **68** rotates, the lamp **122** revolves about shaft **68** in proximity to the end cap. When switch **111**, **114**, **115** is closed, as described, this completes the energization circuit for lamp **112** through the rotary switch **124**, **125**, so that the revolving lamp will produce a revolving spot of light on the end cap **67** of the capsule housing.

Referring again to FIGURES 7 and 9 through 11, a pair of levers **126** and **127** are carried by pivot pins **128** and **129**, which are rotatably supported by the bracket side walls **86** and **87** at locations spaced apart lengthwise of the capsule. At their free outer ends these levers carry respective weights **130** and **131**. Lever **126** at its left side in the drawings has a projection **132** which presents a surface **133** inclining upward and to the left. Lever **127** at its right side in the drawings has a projection **134** presenting a surface **135** which inclines upward and the right.

The third radial arm **100** on rotatable hug **97** has a laterally turned end extension **136** which is adapted to pass up between the levers **126** and **127**, when hug **97** is turned clockwise in these figures.

As best seen in FIGURE 9, the top edge of the upstanding end wall **85** of bracket **83** defines a limit stop for counterclockwise movement of either lever **126** or **127**. As shown in FIGURE 10, the side wall **86** of bracket **83** carries a lateral projection **137** whose top edge defines a limit stop for clockwise movement of either lever **126** or **127**.

Assuming that the smaller end of the capsule has been inclined downward, the weights **130**, **131** on the levers **126**, **127** will have caused the levers to pivot counterclockwise, to the position shown in FIGURE 9, in which both levers engage the bracket end wall **85**. If now the capsule assumes a stable horizontal position, as described, and as a consequence the hub **97** is pivoted clockwise, as described, the lateral end extension **136** of arm **100** will pass up between levers **126** and **127**, riding up over the inclined surface **133** on lever **126** to turn the latter clockwise to the position shown in FIGURES 10 and 11, leaving lever **127** engaging the bracket end wall **85**.

Conversely, however, if the larger end of the capsule had been inclined downward, then their weights would have caused both levers **126** and **127** to assume their other extreme position, abutting against the projection **137** on the bracket. If now the capsule assumes a stable horizontal position, as described, the lateral end extension **136** of arm **100** will pass up between levers **126** and **127**, riding upon over the inclined face **135** on lever **127** to turn the latter counterclockwise to the position shown in FIGURES 10 and 11, leaving lever **126** engaging the bracket projection **137**.

In either event, the levers are inclined upwardly in opposite directions, as shown in FIGURES 10 and 11, after the capsule has assumed a stable horizontal position, and they remain in these positions until the capsule becomes inclined downward in either direction enough to tip the respective weight over-center in that direction. For example, if the capsule now tips downward a sufficient extent toward its smaller end, the center of gravity of lever **126** will move to the left of the axis of its pivot pin **128**, causing the lever to move counterclockwise over to the bracket end wall **85**.

During such movement of lever **126**, its projection **132** will engage the lateral and extension **136** on arm **100** and force the latter downward, turning the hub **97** counterclockwise. Such counterclockwise movement forces arm **99** to become disengaged from the offset end portion of slot **102** in depending leg **103** of pivoted member **104**, permitting coil spring **112** to bias the pivoted member **104** back to its normal position of rest, in which the flag is out of sight. Also, such movement of hub **97** causes its arm **98** to move upward, forcing the lever **90** upward to a position abutting against cam **88**.

A similar action takes place if the capsule tips downward a sufficient extent toward its large end. In that case, lever **127** will move clockwise and it will turn the hub **97** counterclockwise to restore the parts to their FIGURE 7 positions. Thus, it will be apparent that the weighted levers **126** and **127** constitute a gravity-actuated mechanism for restoring the moving parts in the capsule to their starting, or normal, positions whenever the capsule becomes tilted a predetermined amount away from its stable horizontal position.

Operation

In the operation of this apparatus, with the halves of the transparent sphere **22** assembled together and the capsule **23** inside the sphere, the player starts the sphere rotating by pressing the plunger **53** on the control handle **24** to start the motor **38** to rotate the drive wheel **35** and manipulating the control handle downward to bring the drive wheel into engagement with the underside of the sphere. The position of the control handle determines the position of the drive wheel with respect to sphere **22**, and thus the direction in which the sphere rotates. The framework **21** and the pads **29** and **30** carried thereby support the sphere for rotation in any direction, i.e., about any axis through the sphere.

As long as the direction of rotation of the sphere is such that the capsule **23** is not in a stable horizontal position, the capsule housing **66**, **67** and the parts inside this housing will move in unison with the sphere **22**. That is, the weight of the capsule will cause one or the other of the clutches at the ends of the capsule to be engaged, thereby coupling the capsule to shaft **68**, which is coupled to the sphere. Under such conditions, the buzzer will not be energized, the flag **110** will be out of sight, and the lamp **122** will be off.

When the player succeeds in manipulating the control handle **24** so that the shaft **68** is substantially horizontal and the transparent sphere **22** is rotating about shaft **68** as an axis, the capsule **23** will be in a substantially horizontal stabilized position, the shaft **68** will be rotating (in unison with sphere **22**) with respect to the now non-rotating capsule. Such rotation of the shaft will turn cam **88** to depress lever **90**, which turns hub **97** clockwise from the position shown in FIGURE 7. Such turning of the hub, through its arm **99**, pulls pivoted member **104** counterclockwise to raise the flag **110** and also to close switch **111**, **114**, **115**. Also, this turning of the hub **97** causes the weighted levers **126** to be spread apart. With switch **111**, **114**, **115** closed, the now-revolving lamp **22** is energized continuously through the rotary switch **124**, **125** and the buzzer **118** is energized intermittently through switch **119–121**.

If the capsule **23** again becomes substantially non-horizontal, one of the weighted levers **126** or **127** will drop over, causing hub **97** to turn counterclockwise to restore the parts to their previous positions, so that the flag **110** will be retracted out of sight and the switch **11**, **114**, **115** in the energization circuit for buzzer **118** and lamp **122** will be open again.

While a presently-preferred embodiment of the invention has been described in detail and illustrated in the in the accompanying drawings, it is to be understood that the invention is not limited to the particular embodiment shown and that various modifications, omissions and refinements which depart from the disclosed embodiment may be adopted without departing from the spirit and scope of this invention. For example, the simulated space capsule within the sphere may be replaced by another body, such as the figure of a clown or an acrobat or a game board. Also, the sphere and the operator-controlled drive arrangement therefor may be embodied in other amusement or display apparatus if desired.

What is claimed is:

1. A game apparatus comprising:
an enclosure;
means supporting said enclosure for universal movement;
drive means for moving the enclosure;
operator-controlled means for controlling said drive means selectively to thereby determine the direction of movement of the enclosure;
a body mounted in said enclosure;
means normally coupling said body to the enclosure for movement in unison with the enclosure and operative to uncouple said body from the enclosure in response to movement of the enclosure in a predetermined direction; and
indicator means operable in response to the uncoupling of said body from the enclosure to indicate the establishment of said predetermined direction of movement of the enclosure.

2. A game apparatus comprising:
an enclosure;
means supporting said enclosure for universal movement;
drive means for moving the enclosure;
operator-controlled means for controlling said drive means selectively to thereby determine the direction of movement of the enclosure;
a body inside said enclosure;
means normally coupling said body to the enclosure for movement in unison with the enclosure and operative to uncouple the body from the enclosure in response to movement of the enclosure in a predetermined direction; and
indicator means operable in response to the uncoupling of the body from the enclosure to indicate the establishment of said predetermined direction of movement of the enclosure.

3. A game apparatus comprising:
a transparent sphere;
means supporting said sphere for universal rotation;
drive means for rotating the sphere;
operator-controlled means for controlling said drive means selectively to thereby determine the direction of rotation of the sphere;
a body inside said sphere;
means supporting said body within the sphere and including clutch means operable by the weight of the body to couple the body to the sphere for movement in unison with the sphere except when the axis of the body is substantially horizontal; and
indicator means operable when the axis of said body is substantially horizontal and the sphere is rotating about said axis.

4. A game apparatus comprising:
a transparent sphere;
means supporting said sphere for universal rotation;
a rotary drive wheel beneath the sphere;
a motor coupled to said drive wheel for rotating the latter;
a universal movement linkage connected at one end to said motor;
a control handle connected to the opposite end of said linkage and movable manually to position the drive wheel in driving engagement with the sphere to rotate the latter in a direction determined by the position of the control handle;
a switch on the control handle connected in circuit with the motor to control the latter's energization;
a body vehicle inside said sphere;
means supporting said body within the sphere and including clutch means operable by the weight of the body to couple the body to the sphere for movement in unison with the sphere except when the axis of the body is substantially horizontal; and
indicator means operable when the axis of said body is substantially horizontal and the sphere is rotating about said axis.

5. A game apparatus comprising:
a transparent sphere;
means supporting said sphere for universal rotation;
operator-controlled drive means for the sphere selectively engageable with the sphere to determine the direction of rotation of the sphere;
a body vehicle inside said sphere;
means normally coupling said body to the sphere for movement in unison with the sphere and operative to uncouple the body from the sphere in response to rotation of the sphere in a predetermined direction; and
indicator means operable in response to the uncoupling of the body from the sphere to indicate the attainment of said predetermined direction of rotation of the sphere.

6. A simulated space game apparatus comprising:
a transparent sphere;
means supporting said sphere for universal rotation;
a rotary drive member beneath the sphere;
a motor having a rotary drive shaft connected to said drive member;
a universal movement linkage connected at one end to said motor;
a manually movable control member connected to the opposite end of said linkage for selectively positioning said drive member in driving engagement with the sphere to rotate the latter in a direction determined by the position of said control member;
a simulated space vehicle inside said sphere;
means normally coupling said vehicle to the sphere for movement in unison with the sphere and operative to uncouple the vehicle from the sphere in response to rotation of the sphere in a predetermined direction; and
indicator means operable in response to the uncoupling of the vehicle from the sphere to indicate the attainment of said predetermined direction of rotation of the sphere.

7. A simulated space game apparatus comprising:
a transparent sphere;
means supporting said sphere for universal rotation;
operator-controlled drive means for the sphere selectively engageable with the sphere to determine the direction of rotation of the sphere;
a simulated space vehicle inside said sphere;
a shaft extending longitudinally through said vehicle along a diameter of the sphere, said vehicle being slidable along said shaft and rotatably receiving the shaft;
a first clutch member secured to said shaft beyond one end of said vehicle, means securing said first clutch member to the sphere for movement in unison with the latter;
a second clutch member secured to said shaft beyond the opposite end of said vehicle, means securing said second clutch member to the sphere for movement in unison wtih the latter;
said vehicle being slidable down along said shaft when the latter is substantially non-horizontal to engage the respective clutch member and thereby couple the vehicle to the sphere for movement in unison with the sphere;
said shaft being rotatable with respect to the vehicle when the shaft is substantially horizontal and the sphere is rotating about the shaft as an axis; and
indicator means operable in response to the rotation of the shaft with respect to the vehicle to indicate the attainment of the stabilized position of the vehicle.

8. The game apparatus of claim 7 wherein said indicator means comprises:
battery means on said vehicle;

a lamp on said vehicle; and

switch means connected in circuit with said battery means and said lamp and operable in response to the rotation of said shaft with respect to the vehicle to energize said lamp from said battery means.

9. The game apparatus of claim 7 wherein said indicator means comprises:

battery means on said vehicle;

battery-operated sounding means on said vehicle; and

switch means connected in circuit with said battery means and said sounding means and operable in response to the rotation of said shaft with respect to the vehicle to energize said sounding means from said battery means.

10. The game apparatus of claim 7 wherein said indicator means comprises:

a visible indicator mounted on the vehicle for movement with respect thereto;

means normally maintaining said visible indicator in an out-of-sight position; and

means operable in response to the rotation of said shaft with respect to the vehicle to move said indicator to an exposed position.

11. A simulated space game apparatus comprising:

a transparent sphere;

means supporting said sphere for universal rotation;

a rotary drive member beneath the sphere;

a motor having a rotary drive shaft connected to said drive member;

a universal movement linkage connected at one end to said motor;

a manually movable control member connected to the opposite end of said linkage for selectively positioning said drive member in driving engagement with the sphere to rotate the latter in a direction determined by the position of said control member;

a simulated space vehicle inside said sphere;

a shaft extending longitudinally through said vehicle along a diameter of the sphere, said vehicle being slidable along said shaft and rotatably receiving the shaft;

a first clutch member secured to said shaft beyond one end of said vehicle, means securing said first clutch member to the sphere for movement in unison with the latter;

a second clutch member secured to said shaft beyond the opposite end of said vehicle, means securing said second clutch member to the sphere for movement in unison with the latter;

said vehicle being slidable down along said shaft when the latter is substantially non-horizontal to engage the respective clutch member and thereby couple the vehicle to the sphere for movement in unison with the sphere;

said shaft being rotatable with respect to the vehicle when the shaft is substantially horizontal and the sphere is rotating about the shaft as an axis; and

indicator means operable in response to the rotation of the shaft with respect to the vehicle to indicate the attainment of the stabilized position of the vehicle.

12. A simulated space game apparatus comprising:

a transparent sphere composed of two halves having interfitting parts for releasably attaching the halves together to form a complete sphere;

means supporting said sphere for universal rotation;

a rotary drive member beneath the sphere;

a motor having a rotary drive shaft connected to said drive member;

a universal movement linkage connected at one end to said motor;

a manually movable control member connected to the opposite end of said linkage for selectively positioning said drive member in driving engagement with the sphere to rotate the latter in a direction determined by the position of said control member;

a simulated space vehicle inside said sphere;

a shaft extending longitudinally through said vehicle along a diameter of the sphere, said vehicle being slidable along said shaft and rotatably receiving the shaft;

a first clutch member secured to said shaft beyond one end of said vehicle, means securing said first clutch member to the sphere for movement in unison with the latter;

a second clutch member secured to said shaft beyond the opposite end of said vehicle, means securing said second clutch member to the sphere for movement in unison with the latter;

said vehicle being slidable down along said shaft when the latter is substantially non-horizontal to engage the respective clutch member and thereby couple the vehicle to the sphere for movement in unison with the sphere;

said shaft being rotatable with respect to the vehicle when the shaft is substantially horizontal and the sphere is rotating about the shaft as an axis;

a cam on said shaft;

means operable by said cam in response to the latter's rotation for indicating that the vehicle has attained a stabilized, substantially horizontal position.

13. A simulated space game apparatus comprising:

a transparent sphere;

means supporting said sphere for universal rotation;

a rotary drive member beneath the sphere;

a motor having a rotary drive shaft connected to said drive member;

a universal movement linkage connected at one end to said motor;

a manually movable control member connected to the opposite end of said linkage for selectively positioning said drive member in driving engagement with the sphere to rotate the latter in a direction determined by the position of said control member;

a simulated space vehicle inside said sphere;

a shaft extending longitudinally through said vehicle along a diameter of the sphere, said vehicle being slidable along said shaft and rotatably receiving the shaft;

a first clutch member secured to said shaft beyond one end of said vehicle, means securing said first clutch member to the sphere for movement in unison with the latter;

a second clutch member secured to said shaft beyond the opposite end of said vehicle, means securing said second clutch member to the sphere for movement in unison with the latter;

said vehicle being slidable down along said shaft when the latter is substantially non-horizontal to engage the respective clutch member and thereby couple the vehicle to the sphere for movement in unison with the sphere;

said shaft being rotatable with respect to the vehicle when the shaft is substantially horizontal and the sphere is rotating about the shaft as an axis;

a cam on said shaft;

a lever pivotally mounted in the vehicle and engageable by said cam;

a hub member rotatably mounted in the vehicle and having first, second and third radial arms, said first arm being positioned for engagement with said lever;

a pivoted member in the vehicle having an elongated slot therein, said second arm on the hub member slidably engaging in said slot to couple said hub member and said pivoted member to one another;

spring means biasing said pivoted member to a predetermined first position to thereby bias said hub member to a predetermined position;

a flag attached to said pivoted member and positioned

within the vehicle in said predetermined first position of the pivoted member;

switch means operable by said pivoted member upon movement of the latter from said predetermined first position to a second position;

a spaced pair of weighted levers pivotally mounted at longitudinally spaced axes in the vehicle, abutment means at one side of both axes defining a first limit stop for both levers when the vehicle is inclined downward in one direction, abutment means at the opposite side of both axes defining a second limit stop for both levers when the vehicle is inclined downward in the opposite direction;

said third arm on the lever being movable between said axes of the levers to engage the lever which has the pivot axis farther from the limit stop then engaged by both levers and to pivot said lever into engagement with the other of said limit stops;

said cam, when the shaft turns with respect to the vehicle, pivoting said lever to turn said hub member in a direction for movement of said third arm on the hub member between said axes of the levers to spread said levers apart and for movement of said second arm on the hub member in a direction to turn said pivoted member against the bias of said spring means

to a position operating said switch means and positioning said flag outside the vehicle;

and electrically-operable indicator means on the vehicle energized in response to the rotation of said shaft while said switch means is operated,

said lever being movable in response to a downward inclination of the vehicle to a position engaging the limit stop at the opposite side of its pivot axis and by such movement engaging said third arm of the hub member to move the hub member in the opposite direction so as to restore said pivoted member to the said predetermined first position thereof.

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