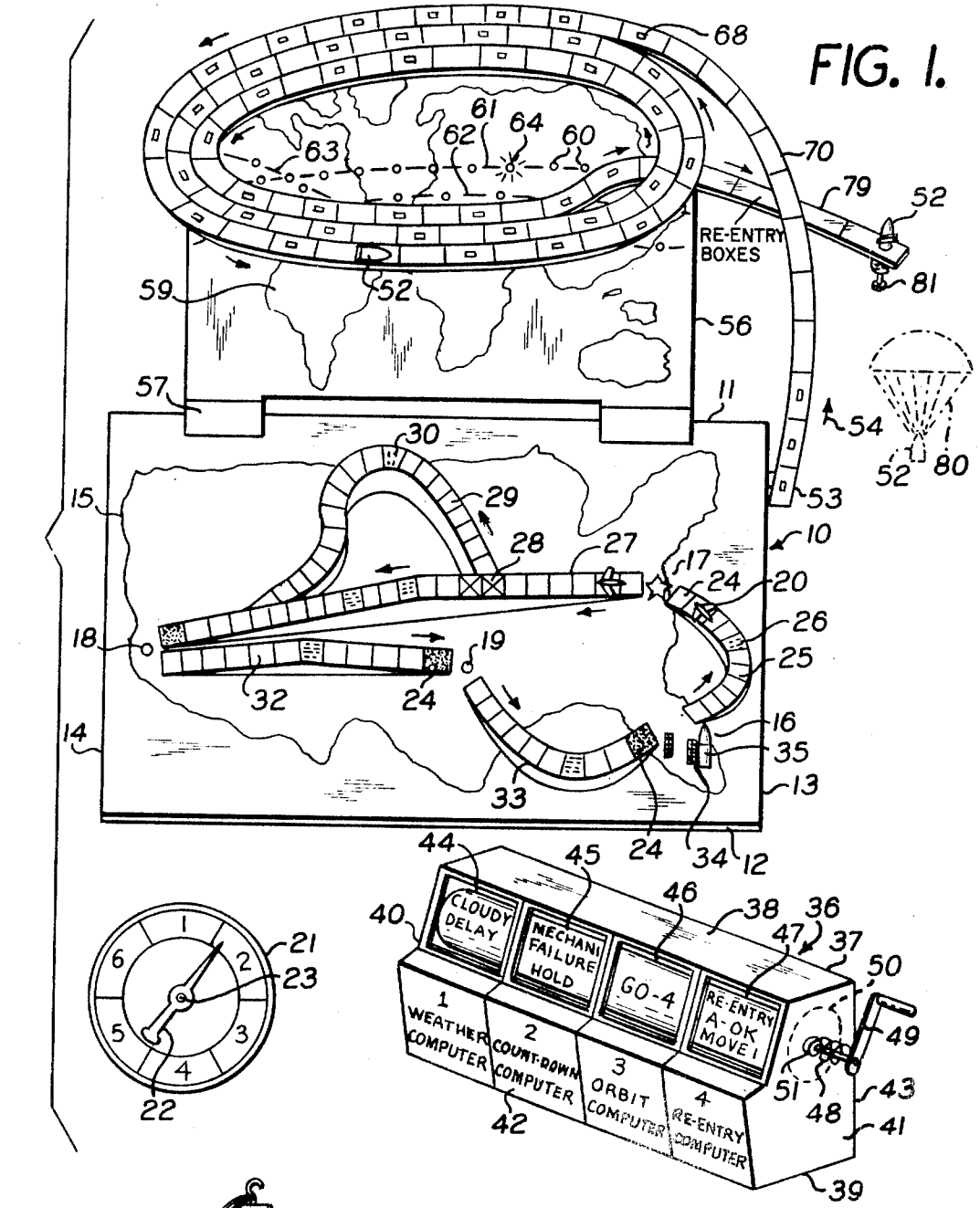
May 26, 1970 P. D. CRAWFORD 3,514,111

ORBITAL MANNED SPACE FLIGHT GAME

Filed May 6, 1966 2 Sheets-Sheet 1

FIG. 1.



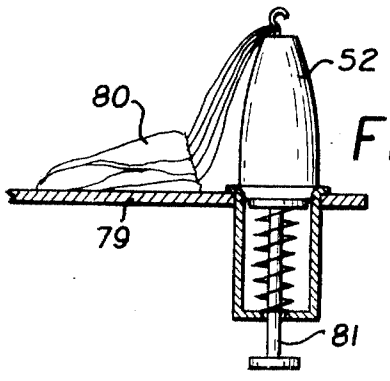


FIG. 6.

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ORBITAL MANNED SPACE FLIGHT GAME

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FIG. 2.

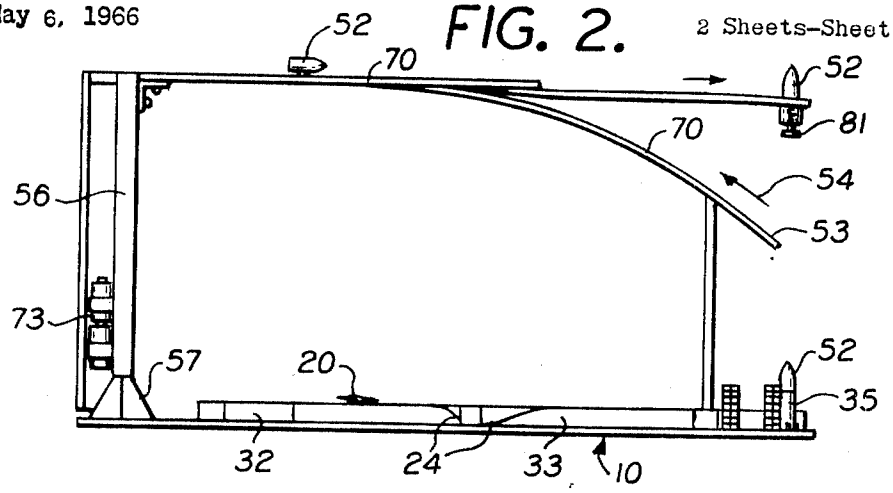


FIG. 3.

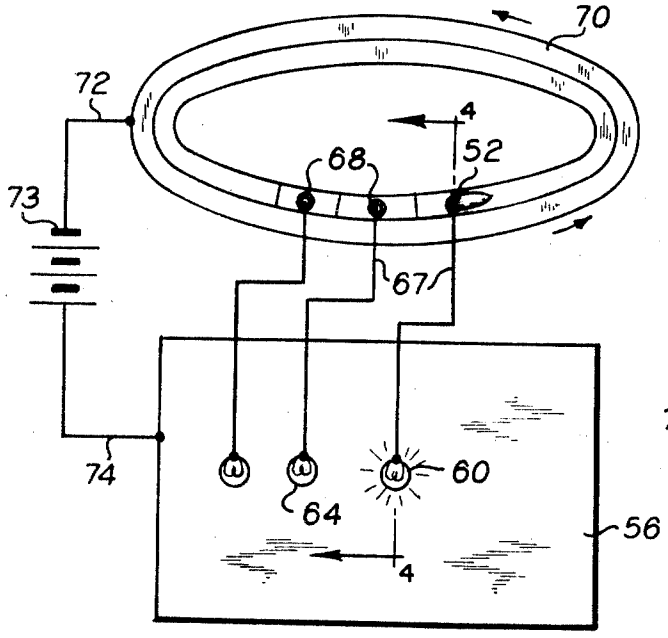


FIG. 4.

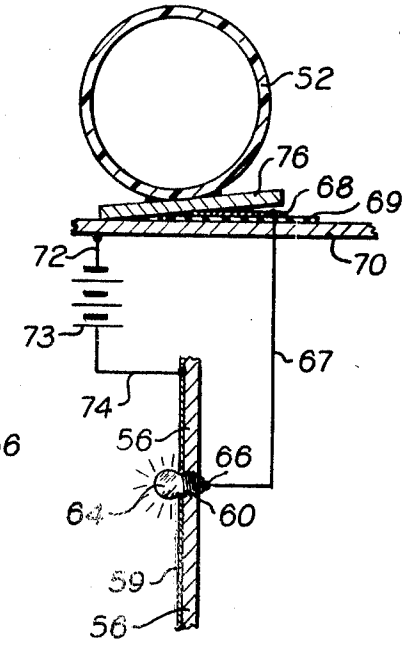
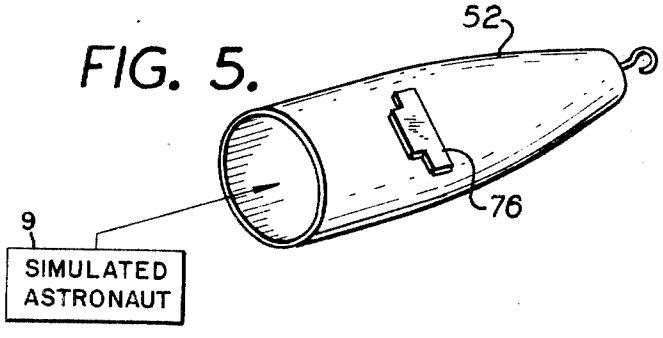


FIG. 5.



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United States Patent Office 3,514,111 Patented May 26, 1970

3,514,111

ORBITAL MANNED SPACE FLIGHT GAME

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U.S. Cl. 273—134 10 Claims

ABSTRACT OF THE DISCLOSURE

A game apparatus comprising a game board having spaced locations including a space flight launching site and flight paths connecting the locations, a plurality of simulated capsules, a spinner for determining the number of moves of simulated aircraft along the flight paths, a vertical support wall having a flat map of the earth thereon and having predetermined earth orbital flight paths marked thereon, and an orbit track perpendicularly supported above said support wall and paralel to said board. A simulated computer is provided for determining whether the capsules enter into the orbit track and for determining the movements thereof therealong.

This invention relates to improvements in games, and in particular a manned space flight game or the like in which the players are afforded the opportunity of engaging in all the activities that are required for the initiation, carrying out, and completion of a successful manned space flight.

An object of the invention is to provide a novel and improved game, in which one or more players may participate in the initiation and completion ultimately of a simulated successful manned orbital space flight, and in which simulated capsules are launched as astronauts onto an orbital flight path depicting means following the initial simulated ground activitites, and then are returned after the flight back to the ground.

Another object of the invention is to provide a novel and improved game device, simulating the actual steps which would be encountered in carrying out an ultimately successful space flight.

Still a further object of the invention is to provide a novel and improved game device for realistic simulation of a manned space flight, in which there are battery operated electric circuits by means of which the flight path and instant location on the orbit about and relative to the earth are shown by lamps which are lighted up at designated locations on the tracking map.

Still a further object of the invention is to provide a novel and improved game device, in which reentry of the capsules through the earth's atmosphere is simulated.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

FIG. 1 is a top plan view of the layout of the playing device or game according to the invention, the view also showing the rotatable game sequence device and the game computer device forming parts of the complete game;

FIG. 2 is a side view of the mechanical arrangements employed in the game for launching and for simulating the reentry procedure, as well as the movements of the jet aircraft from point to point in the United States prior to the astronaut entering into space orbit;

FIG. 3 is a schematic circuit diagram showing the connections for indicating the position of the astronauts while in orbit;

FIG. 4 is a vertical sectional elevational view taken substantially along plane **4**—**4** of FIG. 3 and indicating the

completion of the circuit by suitable positioning of the orbiting capsule to illuminate a particular signal lamp;

FIG. 5 is a perspective view of the space capsule and illustrating its conductive circuit-completing base portion or blade;

FIG. 6 is a sectional elevational view of a capsule launching device, for simulating the parachute-controlled reentry of the capsule.

In connection with the operation of these types of games, it has been important to involve the players intimately and directly with the activities connected with the games. In the present invention we have a device whereby one or more players are enabled to involve themselves directly and intensely with a novel activity, namely simulating the actions of an astronaut in possibly achieving a manned space flight by means of a rocket. While this game would necessarily take place on the ground, nevertheless, the full excitement and inherent involvement of the players with the action are possible. As constituted, this game enables the players to enter what amounts to a three-dimensional game in which, by relatively simple means, action takes place in which the players engage themselves in and with what ultimately results in a round-the-world orbital space flight.

Reference may now be had to the drawings in which like numerals denote similar parts throughout the several views.

Referring now to FIG. 1, it is seen that there is represented a main base or game board **10**, having hinged thereto an upright wall **56** having thereon a map of the world above which an orbital track or orbital flight path depicting means **70** is attached, the orbital track **70** being parallel to the game board **10** in the operating game position (FIG. 2). The board **10** is formed of any suitable sheet or plastic material, with edges **11**, **12**, **13** and **14**, and constructed so as to form a stable platform for the game itself. The game board **10** is of suitable dimensions so that there may be superimposed or imprinted thereon the map **15** generally indicating the outlines of the United States and, while it is not illustrated for clarity of illustration of the drawings, such map may merely be divided up into the various states, with an indication in each state of the main cities, or it may be quite detailed, depending upon the needs of the game.

In any event, the map will contain an indication of several locations in the United States which are of significance in relation to astronautic endeavours, obtaining of financing, and the ultimate launching into space, such features or locations being, for example, Cape Kennedy, located generally at **16** in Florida, Washington, D.C., located generally at **17**, San Diego, located at **18** in California, and an intermediate location which might be, for example, Kansas City, Mo., located generally at **19**.

As seen further in FIG. 1, there are elevated flight paths which may be formed of light plastic material, either mounted on the game board, and extending across the map of the United States, or formed integral therewith, by suitable well known plastic molding methods. Such guide paths, being three-dimensional, are preferably formed with their intermediate portions elevated, while at either end they slope smoothly toward the surface of the game board for take-offs and landings.

The players at the start of the game each select one of the astronauts **9**, which are in different colored uniforms or space suits, and the correspondingly colored aircraft which may be miniature jet planes **20**, and then each player takes a turn with the spinner **21** shown in the left lower corner of FIG. 1. The spinner **21** may be formed of carboard or a suitable sheet material and has its perimeter divided up into a number of numbered

spaces, with indicator or pointer **22** mounted on an axial pivot **23** for rotation thereon, and the player who spins the highest number on the spinner **21** is the first to move.

As in any space program, millions of dollars are needed to initiate the launching of an astronaut and a space vehicle, and it is important that each player fly to Washington, D.C., to appear before an appropriate body, such as a Senatorial or Congressional Military Appropriations Committee, to request a suitable amount of money such, for example as 6 million dollars. In order to take-off for all jet flights, each player must first spin on the spinner **21** a 1, 2 or 3, and if he does this, then he spins again and moves the number of spaces indicated. If the player does not come up with 1, 2 or 3, then he must wait until his next move to try again. On landings, each player must first stop on the red space indicated at **24** at the end of each flight path, no matter what his required spaces were from the spinner. Immediately upon stopping on the flight pattern at the red space, the player tries to spin a 4, 5 or 6. A 4, 5 or 6 allows him to move the one additional space to complete his landing on that particular flight path. To simulate the necessary negotiations at each city, the player loses one turn at each city.

During the negotiations in Washington, the player receives two United States Treasury checks, one for four million dollars and one for two million dollars which are included as play money as parts of the game. These checks will be used later to negotiate the purchase of the rocket booster in San Diego, Calif., and of the Mercury capsule in Kansas City, Mo.

It is seen that each of the flight paths, such as flight path **25** leading from Cape Kennedy to Washington, D.C., is divided up into a series of boxes marked thereon, and the player advances therealong by spinning the spinner **21** which indicates the number of spaces he has to move his plane on the flight path, there being certain penalty spaces, such as space **26**, marked also on each flight path, which are appropriately provided with legends indicating the forms of penalties, such as "miss next turn," in which event he must not be allowed to take his next turn at spinning. The take-off from Washington, D.C., is accomplished in the same manner as the jet flight take-off described above, and while the flight to San Diego starts on path **27**, the player may find that he has landed on a bad weather space **28** indicating bad weather up ahead and so requiring him to take the long way around by detour flight path **29**. This path also has penalty spaces therealong, such as space **30**, which causes the player to lose his next turn, for example. In moving about on the flight path, only one play may occupy any one space at one time. A player whose move ends up on a space already occupied must move to the next open space, the exceptions being the red flight pattern spaces **24** or landing approach spaces, as they may be called, and as many players as necessary may occupy the spaces **24** and the airfields at the particular cities. The players should be sure to count the occupied spaces when passing them.

After the player has arrived at San Diego, Calif., and has purchased his Atlas rocket booster, he then proceeds along flight path **32** to another city which may be Kansas City, Mo., at **19**, where he may purchase his Mercury capsule, and then he is ready to proceed along the final jet flight path **33** to Cape Kennedy, where he assembles his rocket booster and Mercury capsule on the launching pad **34**, which has suitable gantry cranes, the assembled capsule and booster being indicated at picture **35**.

From this point on, the capsule, having been assembled with the rocket booster and in communication with the adjacent control tower and launching devices, is to be readied for launching into orbit, and from this point on the moves of the players are governed by the computer shown generally at **36** in the lower right hand corner of FIG. 1. As in any space flight, weather clearance must be first achieved before any further plans for launching can be made, and the computer is equipped for this purpose.

The computer has means for governing the entire launching of the orbital flight and return to earth, and includes a main housing **37** with a top wall **38**, a bottom wall **39**, left and righthand walls **40** and **41**, and front and rear walls **42** and **43**. It is seen that the computer assembly is divided generally into four major sub-divisions which for convenience are provided with legends marked on the front wall **42** of the computer. The first one at the left is the Weather Computer, the second one is the Count-Down Computer, the third is the Orbit Computer, and the fourth one at the right is the Re-Entry Computer. It will be observed that for these legends exhibiting windows **44**, **45**, **46** and **47** are provided, behind which movable indications or legends are changeably displayed.

A common shaft **48** extends through the entire length of the computer **36**, forming a common supporting rotatable axis for the movable parts therewithin and for rotation therewith, and is provided with a handle or crank **49** which may be rotated against the force of a wind-up drive spring **51** and then released for spinningly rotating the shaft, thereby to change the legends displayed in the windows, without permitting any selective control by a player of the outcome of any spin. Suitable locking means may be provided for guiding and controlling the movement of the computer shaft and maintaining its position on stopping at any particular location after a spin. The shaft **48** of the computer furnishes the support for the rotor or barrel **50** inside the computer housing so that, after the turning of the handle **49**, the rotor **50** upon which the various legends are marked, spins rapidly. Alternately any type of well known spinning device for spinning toys such as tops, may be provided. In this manner the player has no control over the rotation of the rotor **50** directly, but can only turn the handle **49**, winding up the spring **51** to a point where upon release it then causes the rotor **50** to spin at a high speed without control by the handle **49**.

Chart A below shows in developed form the various markings and legends which appear on the periphery of the computer rotor **50** and can be displayed in the computer windows.

CHART A.—COMPUTER

1	2	3	4
Weather Computer	Count-Down Computer	Orbit Computer	Re-Entry Computer
Cloudy Delay	Mechanical Failure-Hold	Go-4	Re-Entry. A-OK. Move 1 Space.
A-OK	Systems-Go	Hold Don't Move	Path Bad-Hold. Lose 2 moves.
Rain Delay 1 move	Malfunction Delay 1 move	Go-5	Adjust Path. Hold-No Move.
A-OK	Systems-Go	Go-1	Re-entry Path. OK-Move 1.
Overcast Delay	Trouble Delay (Don't Move)	Go-2	Re-Entry. Proceed 1 Space.
A-OK	Systems-Go	Go-3	Adjust Path-Hold. Lose 1 move.

From Chart A, it is seen that the first player, in order to obtain weather clearance, will spin rotor **50**, so as to obtain a suitable reading in window **44** of the weather computer portion of the computer. Thus, on spinning for the Weather Computer indication, the top legend on Chart A, left column, may appear in the window and he will then discover that he is delayed because of cloudiness, but if the second legend appears, this is marked A-OK which gives him weather clearance to proceed for the next step in the launch. The other portions of the computer have similar possibilities to control the movement of the prospective astronaut, and are more or less

self-explanatory. However, the astronaut must proceed in step-by-step fashion. accepting any delays indicated or proceeding to move when a suitable legend appears in the involved window. This simulates in life-like fashion what an astronaut may encounter in the way of delays and gives a great deal of excitement for the players as they each try their hand at getting into orbit.

Each astronaut is also provided with a check list, a sample of which is shown in Chart B, set forth below, and on which he marks in each appropriate column the results of operation of the computer all the way from the beginning of the weather checks right down to re-entry OK at which point he will have returned to earth, presumably without mishap.

Each astronaut is also provided with a "Red" Astronaut's Check List, shown on Chart C, below, in which the various technical problems involved in the count-down after the weather check is cleared are set forth for use with the Count-Down portion of the computer, and here again the spinning of the computer brings into exhibition in window **45** the various possibilities step-by-step in the Count-Down, after weather clearance has been obtained, in a very realistic fashion just as in life-like count-downs for astronauts. As each phase of the Count-Down on Chart C is carried out by means of the computer, the astronaut makes appropriate checks on his "Red Astronaut's Check List," so that he may simulate the great concern for absolute safety by the launching authorities before an astronaut is launched into space.

Having obtained weather clearance from the Weather Computer portion, and having obtained a "Go," the player then places his miniature astronaut **9** inside the capsule **52** which is mounted on the top of the rocket booster at picture **35** in FIG. 1, and is shown in separate detail in FIG. 5 and in cross-section in FIG. 4, as well as in FIG. 6 and in smaller size in FIGS. 1 and 2.

The player who has received the necessary weather clearance starts his count-down which is controlled as mentioned by the "Count-Down Computer." This play has three parts or more, (1) Booster Systems Check, (2) Capsule Systems Check, and (3) Lift-Off Check. The results are also checked off on the astronaut's check list on Chart B.

Each player uses his own Check List as he spins the computer. He spins first for the Booster Systems Check and if he gets a "Go," he immediately spins again for the Capsule Systems Check, and if he again achieves a "Go," he spins again for the Lift-Off Check and if he again achieves a "Go," he is successfully launched and places the capsule in the launch position on the orbit track.

Referring now to FIGS. 1 and 2, the orbit track launching position for entry into orbit is shown at **53** and the astronaut having been placed into orbit will proceed along the track in the direction indicated by the commencing arrow **54**. In using the charts, each player, being governed by the computer, places check marks for OK's or Go's on his check list, and delays will be indicated with a D. When the delay calls for a missed turn, the player will place the number of delay times after the D, depending on what is shown on the computer. For example, D–1 would mean a miss of one turn. Blast-off cannot occur until the first four columns on Chart B have an unbroken string of checks. Each time there is a hold or delay, the player will start his next series of checks on the next line below.

It is understood that in the actual blast-off, the player spins once more and a "Go" lifts him off the pad on trajectory for Orbit. A player must complete all of the Count-Down procedures in one move (three successive "System-Go" spins). If, during the Count-Down, anything other than a "Go" is prescribed by the computer, then the player waits until his next move, or longer if there is a delay for more than one move time, and he must start again with the Weather Computer to ascertain the status of the weather for his planned launch.

Referring again to FIG. 1, there is an upright wall **56**, having lower supporting feet **57** which may be hinged near the edge **11** of the base game board **10**, so that the game may be folded flat for easy storage and transportation. However, the supporting feet **57** might also be so formed as to be rigidly securable with the game board **10**, when the game is to remain for a long time or permanently in playing position.

On the upright board **56** is imprinted or otherwise shown graphically a map of the world laid-out in plane or relief form on one face of the wall **56** so as to be visible to the players, and means are provided for indicating the position of each player's capsule as it proceeds in orbit around the earth. The tracking map **59** on wall **56** is provided with a series of openings **60**, extending across an intermediate portion of the earth in the form of a belt which may be employed as a guide, indicating the position of the capsule over corresponding places of the earth, and in this manner tracking three orbits around the earth. These orbit paths are arranged as at **61**, **62**, and **63**. Each opening **60** has a socket seated therein to receive a lamp **64** and each socket has one terminal **66**, as seen in FIG. 4, connected by a wire **67** of a large number of wires to a terminal plate **68** secured to the conductive orbital track **70**, a lamp being connected by a wire **67** to each one of the positions along the track, that is, the orbital track **70**. The orbital track itself is insulated from the terminal **68** by means of an insulating washer **69** and the terminal **68** is positioned on top of and extends through the insulating washer **69**, with wire **67** extending therethrough. The track **70** is connected by a common wire **72** to a common battery **73**, the other terminal of which is connected by wire **74** to the conductive map-containing wall **56**. Accordingly, the astronaut has the means for completing the circuit to the particular lamp upon which related space his capsule is at any given moment placed, and this is illustrated by FIGS. 3, 4 and 5. As seen, each capsule is provided with a conductive plate **76** made of aluminum or copper or other metal. As shown in FIG. 4, all the astronaut does when he reaches any particular location along the orbital track, such as at **68** in FIG. 1, is to place his capsule so that its metal conducting plate **76** completes the circuit from the conductive orbital track **70** to the terminal **68** at that particular orbital space. This causes a lamp **64** to light up on the face of the map **59**, as seen in FIG. 1, and thus gives a clear indication of where the astronaut is at any particular time. When he lifts his capsule along to the next space, he again does the same thing by merely short-circuiting across from the conductive orbit track **70** to the terminal **68** at that next space and a lamp for that particular space then lights up.

All moves while in orbit are controlled by the Orbit Computer. A player must make three complete orbits to complete the game, but the players may decide to extend the number of orbits and, if so, then the players would negotiate the agreed number of additional orbits before entering into the re-entry phase. Players move their capsules the number of spaces as indicated by the computer, that is the Orbit Computer, and occasionally certain spaces may be marked with legends to delay the astronaut in his progress. The tracking map **59** shows each player's position while in orbit, and each space on the orbital track lights a different lamp on the map as the capsule races around the world.

Players, upon reaching the end of their third orbit, must stop on the first re-entry space near location **79**, for example, on FIG. 1 in order to fire the retro-rockets (simulated by spinning the "Re-Entry Computer" **4**), to slow down the capsule. On the final space the player attaches a parachute **80**, as seen in FIG. 1 and in FIG. 6, and pulls the plunger **81** down and seats his capsule in engagement therewith, as seen in FIG. 6, and then he releases the plunger which propels the capsule upwardly and then it floats safely down to earth by means of the parachute.

Re-entry is governed by the Re-Entry Computer and players can move only one space at a time during re-entry. This is necessary for deceleration. When the player reaches the final re-entry space, he then checks off on Chart B "Retro Rockets Fired OK" and he is then ready to attach the parachute and operate the mechanism as explained, which shoots the capsule up and then it floats safely down to earth, after which time he checks off on Chart B "Re-Entry OK." The first player to accomplish this wins the game and becomes a True Astronaut and receives a Certificate, which is not shown.

after the third orbit, players can elect to start the first orbit over again, thus completing six orbits before re-entry.

It is seen that this game is a true action game that works in three dimensions, permits the players to go through a blast-off, orbit and re-entry, after an exciting, tense countdown and at the same time permits variations to be introduced in the game to enhance its interest. The astronaut on re-entry may be considered to come down at sea for pick-up by naval vessels, or he may come down on land at the option of the players.

CHART B

Astronauts Check List
[Count-Down]

Astronaut _____ (name)

Weather Check	Booster System Check	Capes System Check	Lift-Off Check	End of Orbits 1	2	3	Retro Rockets Fired OK	Re-Entry OK

CHART C

Red Astronaut's Check List
[Count-Down]

(Note: Check off each system when Go is achieved. If system does not check out A-OK then next series start checks under column 2, etc.)

PHASE I. Weather Check	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
PHASE II. (cannot start Phase II without Go from Phase I.)										
A. Booster Systems Check										
B. Capsule Systems Check										
C. Lift-Off Check										

(Astronaut's name) _____ (Date) _____

If there are more than two players participating, they may want to continue until all players have completed the mission. Variations can be added to the game by adding additional orbits, and instead of going into re-entry

While I have disclosed a preferred embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense.

I claim:

1. A game device for preparation of players as prospective astronauts, comprising:

a main base forming a game board having designated thereon spaced locations and members on said board simulating flight paths connecting said locations, one of said locations having associated therewith indicia representing a space flight launching site,

a plurality of simulated capsules,

first means for simulating the flight of aircraft along said flight paths between said spaced locations, including simulated aircraft and second means for determining for each turn of the players the extent of said simulated flight of the aircraft along said flight paths,

third means for determining whether said capsules enter into orbit,

at least one earth orbital flight path depicting means mounted substantially parallel to and above said game board,

fourth means for determining the extent of the movement of each capsule along said at least one earth orbital flight path depicting means,

a support wall having thereon a flat map of the earth having at least one orbit path marked thereon covering portions of the earth assumed to be below the path depicted by said at least one earth orbital flight path depicting means, said support wall positioned upright and attached to said game board, said at least one earth orbital flight path depicting means connected perpendicularly to and above said support wall,

fifth means operatively connected to said capsules, said at least one earth orbital flight path depicting means and said support wall for exhibiting the location of each capsule on the depicted earth orbital flight path on said orbit path marked on said flat map, and

sixth means for returning said capsules from said earth orbital flight path depicting means to the level of said main base.

2. A game device according to claim 1, wherein:

said flight paths are each simulated by a plurality of said members, each member having serial divisions for the simulated air flight, and

said second means including means operable by said players for indicating by chance the number of said serial divisions over which said planes are to be moved.

3. A game device according to claim 2, wherein:

said game board includes a map of a country, and wherein said plurality of serially divided flight path simulating members have intervals intermediate the ends of adjacent said flight path simulating members, and

said locations are designated at said intervals.

4. A game device according to claim 1, and wherein said second means comprises:

a play selecting counter means including a counter means base, with edge portions thereof divided into spaces with numerals thereon, and

a counter arm pivoted on said base, for being spun therearound over said numbered outer spaces, by the players, so as to indicate to them the number of steps of movement they are to take in each play in the game.

5. A game device according to claim 1, wherein:

said at least one earth orbital flight path depicting means comprises an orbit track simulating framework constituting a single continuous single continuous track having a plurality of loops and carried by said support wall,

said orbit track simulating framework including step by step serially placed boxes therealong.

6. A game device according to claim 1, wherein:

said at least one earth orbital flight path depicting means comprises an orbit track simulating framework constituting a single continuous track having a plurality of loops and adapted for receiving at one end thereof said simulated space capsules, and

said third means comprising simulated computer means constructed and arranged for exhibiting chance selected successive movement guiding legends.

7. A game device according to claim 1, and wherein said third means comprises:

a simulated computer device, constructed and arranged for being actuated by each player in turn, and delineating moves by the player on attempting to enter into orbit.

8. A game device according to claim 1, and wherein:

said fifth means comprises,

a plurality of lamp means carried by said support wall in selected serially related positions along said orbit path and mounted thereon so as to be seen on a visible face on said map of the earth on said support wall,

said at least one earth orbital flight path depicting means carried by and supported on said support wall above said map of the earth, and formed of a continuous substantially spiral conducting orbital track, with an orbital track entrance position at one end of said track, and an orbital exit position at the other end of said track, said track being divided into a series of successive orbit track boxes,

capsule contact terminal means carried by and insulated from each of said orbit track boxes,

each of said simulated capsules comprises a short circuiting switch plate, and said fifth means also comprises said track, said contact terminal means, said switch plates, and

a common battery and circuit means connecting one side of each of said lamp means to said conducting orbital track, the other side of each of said lamps being connected to the capsule contact terminal means on said orbital track box corresponding thereto, whereby when said capsule is placed upon any box, it closes the circuit to its respective said lamp means, lighting it up and thereby indicating on said map of the earth by means of said illuminated lamp means, a predetermined corresponding position of said capsule in its orbital flight.

9. The construction according to claim 1, including:

a simulated re-entry computer for use in the re-entry of said capsules at the end of the flight,

said sixth means comprising,

said at least one earth orbital flight path depicting means including an orbital flight track carried above said game board, and including an exit portion spaced from said game board for exit of said capsules from orbit,

parachute means including means for supporting engagement with said capsule at the end of said flight, and

means disposed on said orbital flight track at said exit portion thereof for launching said capsule, with parachute attached, out of said orbit to end the flight.

10. A game device for players for simulated space flight, comprising:

a main base forming a horizontally disposed board,

members on said board simulating thereon a first flight path track,

a plurality of first pieces adapted to be moved along said first flight path track,

a vertical tracking board adjacent said game board,

an orbital flight path track substantially disposed in a horizontal plane adjacent to and above said tracking board,

a plurality of simulated capsules adapted to be moved along said orbital flight path track,

means operable by the players for determining the extent of the movement along said orbital flight path track for each of said capsules, and

means for exhibiting on said tracking board the location of each of said capsules on said orbital flight path track.

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