Dec. 14, 1965 R. L. TURNER 3,223,420

SOLAR SYSTEM TRAVEL GAME

Filed March 7, 1963 2 Sheets-Sheet 1

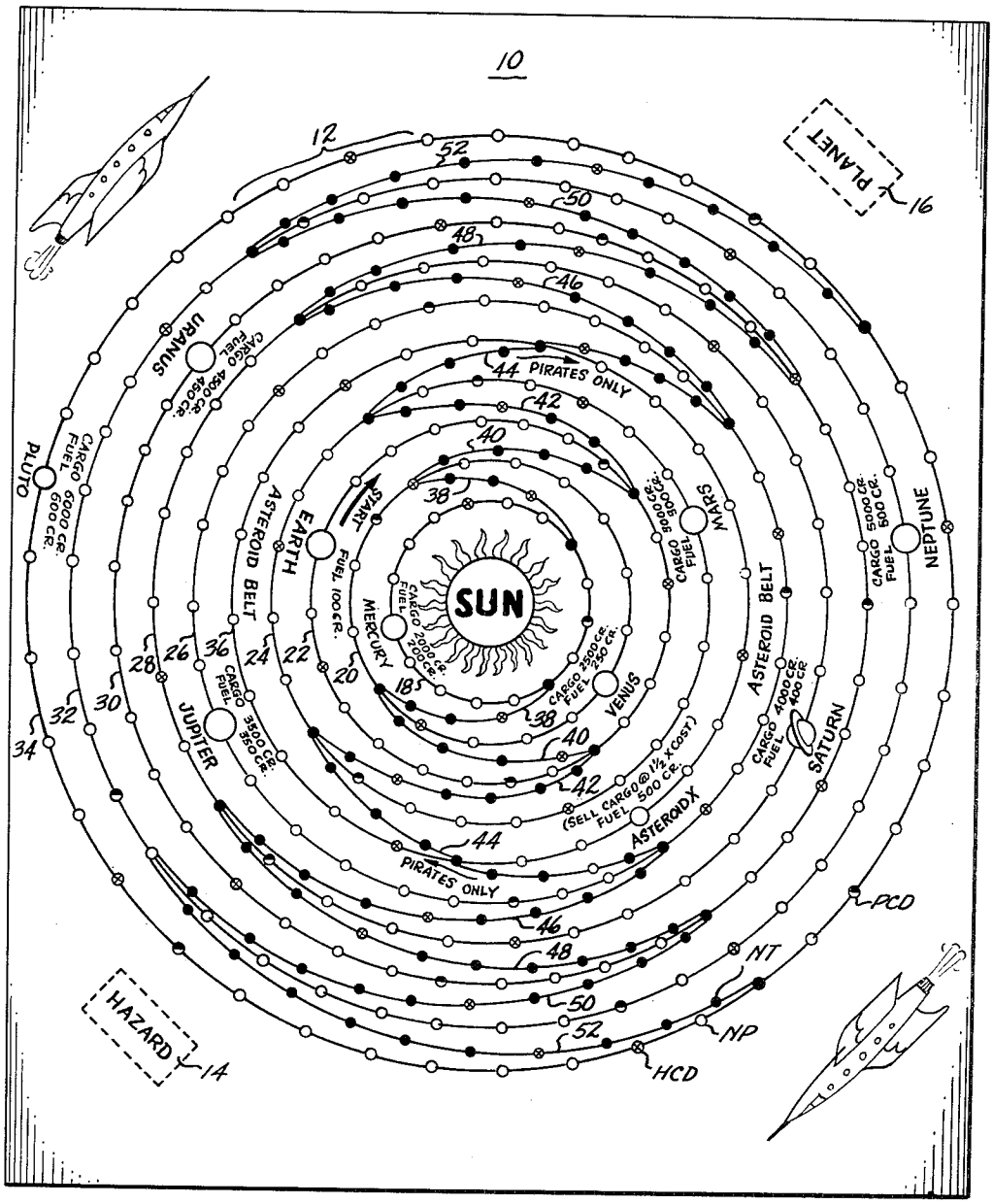


Fig. 1.

INVENTOR.
RICHARD L. TURNER
BY Mathis and Mayfield
ATTORNEYS

Dec. 14, 1965 R. L. TURNER 3,223,420

SOLAR SYSTEM TRAVEL GAME

Filed March 7, 1963 2 Sheets-Sheet 2



Fig. 2.

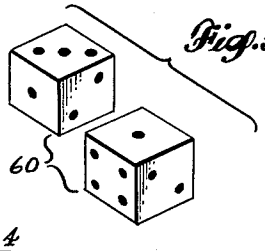


Fig. 5.

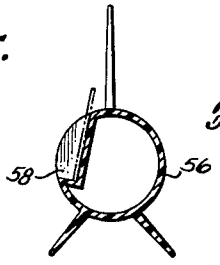


Fig. 4.

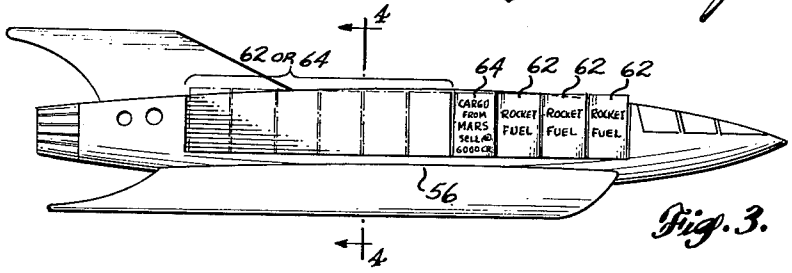


Fig. 3.

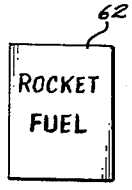


Fig. 6.



Fig. 7.

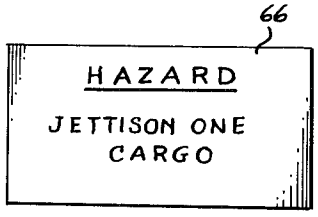


Fig. 8.

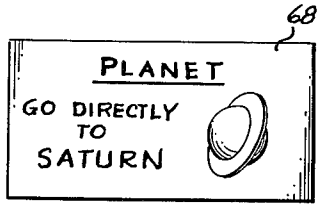


Fig. 9.

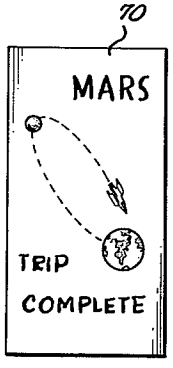


Fig. 10.

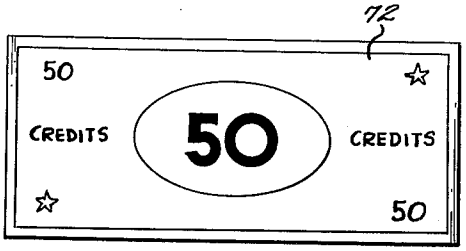


Fig. 11.

INVENTOR.
RICHARD L. TURNER

BY Mattis and Strayhead

ATTORNEYS

United States Patent Office 3,223,420
Patented Dec. 14, 1965

3,223,420

SOLAR SYSTEM TRAVEL GAME

Richard L. Turner, 232 Belmont E., Seattle, Wash.

Filed Mar. 7, 1963, Ser. No. 263,449
4 Claims. (Cl. 273—134)

The present invention relates to a game, and more particularly to a game based upon simulated trading trips throughout the solar system on planetary and interplanetary transfer orbits.

Briefly, the game equipment comprises a game board, player position markers, chance means such as a pair of dice or the like, player instruction cards, value tokens, value token holders, trip return cards, and a medium of exchange such as credit currency. The game board has indicia thereon symbolic of the solar system, including the planets in their respective orbits surrounding the Sun, the asteroid belt, an asteroid in the asteroid belt designated Asteroid-X, and transfer orbits interconnecting adjacent planetary orbits and interconnecting the orbit or Asteroid-X with the orbits of planets Jupiter and Mars. Travel routes are delineated on each of the planetary orbits, on the orbit of Asteroid-X, and on each of the transfer orbits, and such travel routes include stopping stations disposed at intervals thereon. The game board also includes card placement areas printed upon corner portions of the playing surface of said board. The instruction cards are placed face down on such areas to be drawn by the players during the playing of the game.

The major objective of the game is to travel from earth to the other planets of the solar system, buy cargo at such other planets, and then return to Earth and sell such cargo at a profit. The first player to return to Earth with cargo from each of the other eight planets wins the game. The interrelation and interplay of the dice, the instruction cards, the value tokens and the value token holders with the game board limit player movement and in this and other ways make the feat of traveling from Earth to other planets and back to Earth will cargo difficult and challenging, thus adding to the enjoyment to be derived from playing the game.

Another aspect of the game involves one or more players declaring themselves to be "space pirates." Space pirates are the only players that may enter the asteroid belt, and after becoming a space pirate, a player no longer returns to Earth to sell his cargo, but proceeds instead to Asteroid-X and sells his cargo on the black market at one and one-half (1½) times it cost. Once a player declares himself to be a space pirate he must remain a space pirate for the remainder of the game. A player who is a space pirate can win the game by being the first to obtain (either by theft or purchase) and sell cargo from all eight planets.

For further comprehension of the invention, and of the objects and advantages thereof, reference is made to the following description and accompanying drawings illustrating a game typical of the invention, in which drawings:

FIG. 1 is a plan view of the game playing board, showing the planets in their respective orbits surrounding the sun, the asteroid belt and its Asteroid-X in an orbit situated between the planets Jupiter and Mars, transfer orbits or paths interconnecting adjacent planetary orbits and interconnecting the orbit of Asteroid-X with the orbits of Jupiter and Mars, travel routes delineated on each of said orbits, and the card placement areas printed on corner portions of said board;

FIG. 2 is a view in elevation of one of the position markers used in the game of the present invention to mark each player's position on the game board;

FIG. 3 is a view in elevation of one of the value card holders used in the game of the present invention;

FIG. 4 is a sectional view taken substantially on line 4—4 of FIG. 3 and presenting a clear showing of the transverse configuration of the card holding rack portion of the value card holder of FIG. 3;

FIG. 5 is a perspective view of the dice used to determine the number of moves a player is to make during his turn;

FIG. 6 is illustrative of one type of value token employed, namely the "fuel" tokens;

FIG. 7 is illustrative of a second type of value token employed, namely the "Cargo" tokens;

FIG. 8 is illustrative of one type of direction or instruction card employed, namely the "Hazard" cards;

FIG. 9 is illustrative of a second type of direction or instruction card employed, namely the "Planet" cards;

FIG. 10 is illustrative of one of the trip completion cards given to a player to indicate that he has sold Cargo from the designated planet, at Earth in the case of regular players, or at Asteroid-X in the case of players who are space pirates.

FIG. 11 is illustrative of one denomination of the credit paper or curency used in the game.

As shown in FIG. 1, the game board **10** has printed or otherwise provided thereon a central playing area **12** and instruction card placement areas **14, 16.** The instruction cards, hereinafter to be described, are placed face down in the placement areas **14, 16** and any player who is compelled by the rules of the game to draw an instruction card takes the top card from the pack indicated and after following the instructions printed thereon returns the card face down to the bottom of the pack or set of such cards.

The indicia representing the playing area **12** is symbolic of the solar system. Circles **18, 20, 22, 24, 26, 28, 30, 32, 34** represent the respective orbits of each planet from Mercury to Pluto and will be referred to hereinafter as orbits rather than circles. The circle **36** situated between orbits **24, 26,** the respective orbits of the planets Mars and Jupiter, represents the orbit of the asteroid belt and an asteroid designated Asteroid-X. Thus, circle **36** will be referred to hereinafter as either the asteroid belt or the orbit for Asteroid-X.

Transfer orbits **38, 40, 44, 46, 48, 50, 52** interconnect adjacent planetary orbits. Transfer orbits **44** interconnecting orbit **24** of Mars with orbit **26** of Jupiter cross the asteroid belt **36** and provide a means of access onto and off of said asteroid belt **36** from planetary orbits **24, 26.**

Travel routes are delineated on both the planetary and the transfer orbits. In the preferred form of the invention the travel routes consist of circular stopping stations disposed at intervals along said planetary and transfer orbits. The stopping stations are of two general types, regular stopping stations which merely represent a "move," and special stopping stations which represent a move and also require that the player ending his turn thereon draw an instruction card.

Preferably, the regular stopping stations (depicted as open circles) situated on the planetary orbits are of a different color, shape, etc. than the regular stopping stations (depicted as solid black circles) situated on the transfer orbits. For the sake of convenience in describing the game board **10,** the several kinds of stopping stations are described hereinafter as being distinctly identified by a separate color, with the aforementioned open circles representing the color blue and the aforementioned solid circles representing the color yellow, for example. The special stopping stations are of two types and are disposed in scattered arrangement on both the planetary

and transfer orbits. The first type of special stopping stations (shown in FIG. 1 by an X within a circle) are colored red, for example, and for reasons to hereinafter become apparent are referred to in the remaining part of the description as HCD (hazard card draw) stopping stations. The second type of special stopping stations are are of yet another color say green, for example, and are denoted in FIG. 1 by circles that are half open and half solid. This second type of special stopping station is referred to hereinafter as PCD (planet card draw) stopping stations, also for reasons subsequently to become apparent.

Any reasonable number of players can play the game, but two to six players have been found to be the most desirable. Each player is represented on the game board **10** by a position marker **54** which is preferably in the shape of a space ship, as shown in FIG. 2. The several position markers **54** are given different colors, numbers, etc. in order to distinguish them from each other.

Each player is furnished with a value token holder **56**, also preferably in the form of a space ship, as shown in FIGS. 3 and 4, and of the same color, number, etc. as the player's position marker **54**. The token holder **56** is provided with a token holding rack portion **58** which faces the player and which is constructed to hold only a predetermined number of value tokens (ten being the preferred number), for reasons also hereinafter presented.

A pair of dice **60** (FIG. 5), or the like, are employed to determine the number of moves a player is to make during his turn. Dice are preferred over other types of chance-determining means because throwing of "doubles" gives the player special rights, in accordance with at least the preferred manner of playing the game.

The value tokens are of two types, Fuel tokens (one of which is presented by FIG. 6 and designated **62** therein), each representing a unit of fuel, and Cargo tokens (a typical Cargo token being presented by FIG. 7 and designated **64** therein), each representing a unit of cargo purchased at one of the planets other than the Earth. The Fuel tokens are all alike and need only state on them "Rocket Fuel" (as shown in FIG. 6), or more simply Fuel, for example. The Cargo tokens should state the planet from which the cargo was purchased and also the selling price of such cargo. Cargo token **64** illustrated in FIG. 7 represents cargo from the planet Mars selling for six thousand (6,000) credits. The selling price of a cargo at Earth is always twice the purchase price of such cargo, and the respective purchase prices for the various cargos are printed on the game board **10** adjacent the illustrations of the planets. Thus, the various cargo tokens would read as follows:

"Cargo from Mercury sell @ 4,000 CR"
"Cargo from Venus sell @ 5,000 CR"
"Cargo from Mars sell @ 6,000 CR"
"Cargo from Jupiter sell @ 7,000 CR"
"Cargo from Saturn sell @ 8,000 CR"
"Cargo from Uranus sell @ 9,000 CR"
"Cargo from Neptune sell @ 10,000 CR"
"Cargo from Pluto sell @ 12,000 CR"

For reasons hereinafter expressed, there are only three Cargo tokens for each of these planets.

The instruction cards are also of two types, one type being termed Hazard cards (a typical one of which is shown in FIG. 8 and designated **66**) and the other type being termed Planet cards (one of which is shown in FIG. 9 and designated **68**). The Hazard cards each instruct a player to do a specific act detrimental to his chances of winning the game, e.g. he may be required to jettison fuel and/or cargo, or pay money for ship repairs, etc. The following is typical of the various instructions that appear on the Hazard cards:

"Hazard—jettison 1 cargo"
"Hazard—jettison 2 cargos"

"Hazard—jettison 1 cargo and 1 fuel"
"Hazard—jettison 1 fuel"
"Hazard—jettison 2 fuels"
"Hazard—pay bank 5,000 CR. for ship repairs"
"Hazard—move backwards next turn"

The Planet cards each instruct the player to move his position marker to a designated planet. Thus, there are nine kinds of Planet cards, card **68** being illustrative of the card directing the player to move his position marker to the planet Saturn. The other types of Planet cards are substantially the same as card **68**, differing only as to the name of the planet appearing on the card and the pictorial illustration of the planet, if such is included.

Whenever a player returns to Earth (or to Asteroid-X in the case of pirates, as explained below) with cargo obtained from one of the other planets, and sells such cargo at Earth (or Asteroid-X), he is given a Trip Complete card, a typical one of which is illustrated in FIG. 10 and designated **70** therein. Obviously, there are eight different kinds of Trip Complete cards, with the only difference between them being the planet designation, i.e. the Trip Complete cards for the other planets are like card **70** (FIG. 10) except for the name of the planet appearing on each.

Some medium of exchange, such as credit paper (game money or currency) is used to purchase the Fuel cards, Cargo cards, etc. Such credit paper is preferably provided in several denominations, such as 50, 100, 1,000 and 5,000 credits, for example. A typical piece of credit paper **72** of fifty (50) credit denomination is presented by FIG. 11.

In playing the game, the following rules are preferably observed:

One of the players is chosen as banker and is given charge of the Credit Paper, the Fuel tokens, the Cargo tokens, and the Trip Complete Cards. At the start of the game each player selects a position marker **54** and a value token holder **56**, the latter of which he places on the table before him. The banker gives each player ten thousand (10,000) credits, for example, and the players then each purchase from the banker ten (10) Fuel tokens at the price of one hundred (100) credits each. This completely fills the token holder **56** as it is constructed to hold only ten (10) value tokens (i.e. it has only ten compartments).

The separate packs of Hazard and Planet cards are separately shufled and placed face down on their respective card placement areas **14**, **16** depicted on game board **10**.

(1) To start the game, each player rolls the dice **60**, and the one rolling the highest number takes his turn first. Other players follow in succession clockwise around the board **10**. All players start from the planet Earth.

(2) When it is a player's turn he throws the dice and moves his position marker in the clockwise direction (movement is always in the clockwise direction unless instructed otherwise by a Hazard Card) a number of stopping stations equal to the number of marks showing on the dice. If doubles are thrown, the player throws the dice a second time and makes a second move before relinquishing his turn. If doubles are thrown three times in a row, the player must move his token back to Earth, pay a one thousand (1,000) credit fine to the bank, and wait till his next turn to start again. A player may stop whenever his position marker reaches a planet even though he has thrown a larger number than necessary to get him to such planet, i.e. if a player is situated four (4) stopping stations away from a planet and then throws seven (7) on the dice, he need move only the four stations to the planet, disregarding the excess moves.

(3) If a player's position marker is on a planet at the start of his turn, his next move is termed "taking of." Of course, he shakes the dice to determine the

number of moves to make during such turn, the same as when moving on an orbit between planets. After a player has thrown the dice, if he decides that it is to his advantage to remain on the planet he is then on, he may do so, except if he should happen to throw doubles he must immediately leave the planet. When taking off from a planet, fuel must be expended just as it is in the case of an actual rocket. The amount of fuel to be expended is two (2) Fuel tokens when leaving a planet and one (1) Fuel token when leaving Asteroid-X. The expended Fuel tokens are returned to the bank for reuse. If a player is short of Fuel tokens and/or money, he can elect to stay where he is until he can throw doubles on the dice, at which time he can leave the planet without expending fuel. However, in such case he does not throw the dice a second time on account of having thrown doubles, as he would under normal circumstances.

(4) In order to "transfer" from one planetary orbit to another, a player must continue to move on the planetary orbit he is then on until he reaches a transfer orbit. Movement onto a transfer orbit requires a slight change in the direction of travel. Therefore, the player must expend one (1) fuel token in moving from a planetary orbit (or from the orbit of Asteroid-X) onto a transfer orbit. A player may move his position marker from Earth all the way out to Pluto without stopping at any of the in-between planets, if he so desires and has enough Fuel tokens (or money to buy fuel as it is needed) to make all of the takeoffs and transfers involved in such a trip.

(5) When a player runs out of fuel, i.e. he has expended all of the Fuel tokens which he held, he must continue to move his position marker around the planetary orbit that such marker is then on until the planet on such orbit is reached. The player may then purchase additional fuel at the price stated on the game board **10** adjacent the planet involved. The price stated is per Fuel token, and is different at each planet, with fuel being the cheapest at Earth and the most expensive at Pluto. Thus, for example, if a player should expend the last of his fuel transferring from orbit **26** (Jupiter) to orbit **28** (Saturn), he must then continue to travel on orbit **28** until he reaches the planet Saturn. At Saturn he then can purchase additional fuel at the cost of four hundred (400) credits per Fuel token.

(6) Upon reaching a planet the player is eligible to purchase Cargo at the price stated on the board adjacent the planet. The player pays the bank the amount stated and receives in return a Cargo token. The player has the option of stopping at other planets and buying more Cargo, or returning directly to Earth to sell the Cargo he has just obtained. As earlier mentioned, there are only three Cargo tokens for each planet. A player may purchase one, two or all three Cargos for a particular planet, and if he purchases all three (or the remaining two if another player has one, he blocks the other players from buying Cargo at that particular planet until the Cargo is sold and in that manner returned to the banker. As previously mentioned, the cargo is sold at Earth at the price stated on the Cargo token (twice the price paid for such token). It is not mandatory that all Cargo be sold when a player returns to Earth. The player may hold onto a Cargo token from a particular planet for any length of time, or he may trade such Cargo token to another player for credit paper or a Cargo token from a different planet, the manner of trading being described hereinafter. When a player returns to Earth and sells a Cargo unit, he receives from the banker a Trip Complete card for the planet from which the Cargo was obtained. The player does not have to travel to such planet again, but may do so if he so wishes. However, a player may receive only one Trip Complete card for each planet, and the player first obtaining a complete set of eight Trip Complete cards wins the game.

(7) When a player ends his turn with his position marker positioned on an HCD stopping station, such player must draw the top card off of the Hazard card pile and follow the directions stated thereon. When a player ends his turn with his position marker positioned on a PCD stopping station such player must draw the top card from the Planet card pile and move his position marker to the planet indicated thereon.

(8) If, during the course of the game, a player feels that he is losing, or that he has a better chance of winning if he had a Cargo token then held by another player such player may declare himself a "space pirate" and proceed to "rob" the other players of their Cargo. In order to rob another player the play must be in orbit (i.e. not on a planet), and the pirate must come within a designated number of stopping stations (e.g. three) ahead of or behind such player on the same orbit. The pirate may then rob such player of as many Fuel and/or Cargo tokens as the pirate's "spaceship" (token holder **56**) will hold. The player that has been robbed may not immediately pursue the pirate, but must first move to and stop on a planet. However, any other player within range may pursue the player and attempt to capture him for a reward.

(9) A player may capture a pirate by chasing the pirate and coming within a designated number of stopping stations (e.g. three) either ahead of or behind the pirate. When this is done the pirate is "captured." The captured pirate must (a) return the stolen Fuel and/or Cargo tokens to the player from which they were stolen, (b) forfeit to the bank all other Fuel and/or cargo tokens that he then has in his spaceship (token holder), (c) return his position marker to Earth to start his next turn there, and (d) pay a ten thousand (10,000) credit fine to the bank. If the captured pirate is unable to pay the fine, he is out of the game. The player capturing the pirate receives a five thousand (5,000) credit reward from the bank. A pirate can only be captured when he is carrying stolen Fuel and/or Cargo tokens.

(10) After becoming a pirate a player no longer returns to Earth to sell his Cargo. Instead he proceeds to Asteroid-X and sells his Cargo there on the "black market" at one and one-half (1½) times its cost. He receives a Trip Complete card for any Cargo sold, the same as the other players who return to Earth, and is eligible to win the game by obtaining a set of eight Trip Complete cards, just as any other player. As previously indicated, only a player who has declared himself to be a pirate may enter the asteroid belt. Thus, a pirate cannot be captured while he is orbiting on the asteroid belt. A pirate may elect, for a short time at least, to remain on the asteroid belt and hold onto his Cargo for the purpose of blocking the attempts of other players to win the game. Of course, the pirate is eligible for capture as soon as he leaves the asteroid belt. After selling stolen Cargo at Asteroid-X, the pirate is free to travel to the other planets (without fear of being captured since he no longer possesses stolen Cargo) to buy more Cargo. As in the case of stolen Cargo, the pirate must sell his purchased Cargo at Asteroid-X at the black market price.

(11) A pirate may continue to orbit or pass up his moves and "lay-in-wait" in the asteroid orbit, for the purpose of eventually leaving the asteroid orbit and intercepting and robbing other players who are returning to Earth with Cargo.

(12) If a player is short of funds to purchase Fuel, he may sell any Cargo aboard his spaceship (on his value token holder **56**) back to the bank at cost. Cargo cards may also be traded or sold between players or auctioned to the highest bidder.

(13) As previously explained, when a player finds himself stranded on a planet without sufficient Fuel cards to leave, or without sufficient funds to buy additional Fuel at such planet, he may keep throwing the dice (as his turns occur) until he throws doubles, at which time he

may leave the planet. However, he is without substantial funds and his only choice after leaving the planet is to become a pirate, i.e. a player in this position is compelled to declare himself a pirate. If such player (as a pirate) does not overtake and rob another player of Fuel and/or Cargo, or land on a PCD stopping station (where he draws a planet card and moves to the planet indicated thereon) within one revolution of the planetary orbit he then occupies, such player is declared "bankrupt" and is out of the game. A pirate in this situation who has drawn a Planet card, and has moved his position marker to the planet indicated on such card, must either overtake and rob another player, or land on another PCD stopping station, within one revolution of new orbit, or he is declared bankrupt.

(14) If a player draws a Hazard card which requires him to pay out a certain number of credits, and such number is more than he possesses, he is declared bankrupt and is out of the game.

(15) If at any stage of the game a player draws a Hazard card instructing him to jettison Fuel and/or Cargo, and such a player is then out of Fuel and/or Cargo, whichever the case may be, such requirement may be ignored. If the player merely possesses less than the amount of Fuel and/or Cargo required to be jettisoned, such player must relinquish the Fuel and/or Cargo tokens that he does possess, and ignores the rest.

Various changes or modifications may be made in the rules previously described in order to fill the wants and capabilities of a particular set of players. For example, the following short version of the game is recommended for relatively young children:

The players start at Mercury (because it is closest to the sun) and simply race out to Pluto and back, traveling in the clockwise direction on the respective planetary and transfer orbits. As before, the number of moves are determined by a pair of dice, or the like. Fuel may or may not be used, depending upon the age and capabilities of the children.

As will be readily understood by those skilled in the art to which the invention is addressed, various modifications can be adopted as to the game layout and its manner of play if desired, such as in the specific rules involved, such as in the number of stopping stations per orbit, such as in the number and arrangement of the special stopping stations, such as in the types of instruction cards employed, and such as in the number of planets or other orbiting bodies involved, for example. These and other variations will readily occur and are to be considered within the spirit and scope of the invention, as defined by the following claims.

What is claimed is:

1. A solar system travel game comprising:

(a) a game board having indicia thereon symbolic of the solar system including planets in individual concentric orbits about the Sun, transfer orbits interconnecting adjacent planetary orbits, travel routes delineated on said planetary and said transfer orbits, said travel routes including stopping stations disposed at intervals thereon, including a distinctively identified planet station on each planetary orbit representing a stop on the planet of such orbit, said game board further including indicia adjacent each planet station indicating the purchase price of cargo and fuel at such planet;

(b) a plurality of differently identified position markers, each to be manually moved by a player along said routes;

(c) a like number of similarly identified token holders to be disposed in front of the players, and constructed to hold only a predetermined number of tokens;

(d) a group of Fuel tokens to be held on the token holders, to be expended by a player when he moves his position marker from a planet position and from a planetary orbit to a transfer orbit;

(e) a group of Cargo tokens identical in physical size and shape to said Fuel tokens, to be held on the token holders with said Fuel tokens, and comprising tokens representing cargo from each of the planets;

(f) chance means for determining the number of stopping stations to be traversed by a player's position marker during such player's turn; and

(g) credit paper to be used for purchasing Fuel and Cargo tokens.

2. A solar system travel game in accordance with claim 1, wherein a scattered few of the stopping stations on the planetary and transfer orbits, between the planet stations, are specially identified in a manner distinguishing them from the rest of the stopping stations, and the game further includes a group of instruction cards to be drawn from by a player whenever his turn ends with his position marker resting on one of said specially identified stopping stations, said cards including a group of Hazard cards instructing a player who draws such a card to do an act detrimental to his chances of winning the game, and a group of Planet cards instructing a player who draws such a card to move his position marker to a designated one of the planet positions depicted on the game board.

3. A solar system travel game in accordance with claim 1, wherein each token holder is constructed to hold only ten tokens, and the Cargo tokens consist of only three tokens per planet.

4. A solar system travel game comprising:

(a) a game board having indicia thereon symbolic of the solar system including planets in individual orbits around the Sun, transfer orbits interconnecting adjacent planetary orbits, travel routes delineated on said planetary and said transfer orbits, and said travel routes including stopping stations disposed at intervals thereon, a scattered special few of which are depicted in a manner distinguishing them from the rest, distinctively identified planet stations on each one of the planetary orbits representing a stop on the planet of such orbit, markings on said board adjacent the planet stations indicative of the cost of fuel and cargo at such planet, and an instruction card placement area printed on a portion of said board;

(b) position markers to be manually moved by players along said routes;

(c) token holders to be disposed in front of the players, each having a rack portion thereon constructed to hold only ten tokens;

(d) a group of Fuel tokens to be held on the rack portions of the token holders, to be expended by a player when he moves his position marker from a planet position and from a planetary orbit to a transfer orbit;

(e) a group of Cargo tokens, identical in physical size and shape to said Fuel tokens, to be held on the rack portion of the token holders with said Fuel tokens, and comprising tokens representing cargo available for purchase at each one of the planets;

(f) a group of instruction cards to be positioned on said instruction card placement area of the board, to be drawn by a player when his turn ends with his position marker on one of the scattered special stopping stations, and such instruction cards including Hazard cards instructing a player who draws such a card to do an act detrimental to his chances of winning the game, and Planet cards instructing a player who draws such a card to move his position marker to a designated one of the planets depicted on the game board;

(g) chance means for determining the number of stopping stations to be traversed by a player's position marker during such player's turn;

(h) Trip Return cards having indicia printed thereon indicating a completed trip to and from a designated planet; and

(i) credit paper to be used for purchasing said Fuel and Cargo tokens.

References Cited by the Examiner

UNITED STATES PATENTS

1,460,791	7/1923	Cunningham	273—150
1,571,374	2/1926	Richards et al.	273—150
1,652,851	12/1927	Bentin	273—134
1,656,943	1/1928	Firestone	273—134
1,665,516	4/1928	Tuttle et al.	273—134
2,145,394	1/1939	Hobbs et al.	273—134
2,211,297	8/1940	Bull	273—134
2,458,966	1/1949	Waldrop	273—134
2,571,403	10/1951	Aird	273—134
2,824,741	2/1958	Wiley	273—150 X
2,990,181	6/1961	Lippold	273—134
3,037,773	6/1962	Chambers et al.	273—134
3,075,772	1/1963	Martino	273—134
3,099,451	7/1963	Newhouse	273—134

DELBERT B. LOWE, *Primary Examiner.*

E. R. ZACK, *Assistant Examiner.*