An automatic pinsetting bowling game is provided which includes a housing assembly, a plurality of bowling pin-like members, reset means operatively connected to the bowling pin-like members, and control means for actuating the reset means. The housing assembly includes a front housing, a rear housing, and a longitudinally extending, substantially flat bed, i.e., playing surface which serves to interconnect the front and rear housings. The playing surface is configured in the form of a lane of a bowling alley, and has a plurality of first magnetic means which are arranged in a triangular-shaped cluster embedded therein adjacent the end of the playing surface which is connected to the rear housing. Each of the bowling pin-like members is provided with second magnetic means adapted to cooperate with a corresponding one of the plurality of first magnetic means whereby through magnetic attraction created therebetween, each of the bowling pin-like members is caused to be positioned in a preselected location on the playing surface. The reset means is actuable between a first condition wherein the magnetic attraction between the first magnetic means on the playing surface and the second magnetic means of one or more of the bowling pin-like members is weakened beyond a predetermined level the reset means is operable to cause the latter member or members to be lifted from the playing surface, and a second condition wherein the reset means operates to cause any bowling pin-like member which has been lifted from the playing surface to be repositioned in the location on the playing surface previously occupied thereby. The control means which is mounted so as to be externally accessible is operated to place the reset means in either the first condition or the second condition thereof.

8 Claims, 9 Drawing Figures
AUTOMATIC PINSETTING BOWLING GAME

BACKGROUND OF THE INVENTION

One of the sports which has down through the years become a favorite pastime for many is the sport of bowling. Particularly during the winter months when participation in many forms of outdoor sports is significantly restricted because of unfavorable weather conditions, interest turns to participating in indoor sports. This has annually led millions of people to visit the numerous bowling establishments which have been built throughout the United States. In addition, as the interest in bowling has become more widespread, this has led to bowling centers being constructed in other parts of the world. These centers in turn have also been well patronized by the people in those countries.

Here in the United States, practically each small town has its own bowling center. The latter during the winter months often functions as the focal point for the recreational activities of the people of the town. To this end, leagues are commonly formed at this center which provides men as well as women of all ages and of varying levels of experience with an opportunity to bowl competitively against their peers. Many of these leagues are sponsored by industrial companies for their employees while others are sponsored by religious and civic organizations as a type of recreational and social activity for their members.

Thus, it is not uncommon to find many families wherein most if not all of the adult and teenage members thereof engage in the sport of bowling. Generally, however, the younger members of these families, i.e., those below the age of teenagers are excluded from participating in the sport of bowling. More specifically, this is primarily because these children commonly do not have the ability required to play a game of bowling. Children generally do not possess sufficient strength to be able to roll a bowling ball down a bowling alley either with the accuracy or consistency necessary to strike the bowling pins. On the other hand, many of these same children have a strong interest in bowling which has been nurtured by having watched the older members of their family bowl or merely by listening to their parents and older brothers and sisters talk about the enjoyment they get from a game of bowling.

As a result, there have been numerous attempts made by various manufacturers to develop a bowling game adapted to be played primarily by children which possesses sufficient similarity to actually participating in the sport of bowling so as to appeal thereto. In this regard, the bowling games which have been developed by the prior art to date have generally been of two basic types. For example, one type of bowling game which is well-known and which is intended to be played primarily by young people consists of one or more bowling balls and ten bowling pins. To play the game, a suitable bowling lane is delineated on any level surface such as a floor, a sidewalk, a driveway, etc. The pins are placed at one end of this lane and the bowler positions himself at the other end of the lane and attempts to knock down the pins by rolling the ball along the level surface into engagement with the pins. In accordance with another type of bowling game which has been known previously, a game board is provided having a bowling lane outlined thereon. One end of the latter bowling lane is provided with markings identifying the location on which the bowling pins are supported. The bowler positions himself at the other end of the game board and attempts to knock down the pins by rolling a bowling ball into engagement therewith.

Neither of these two prior art forms of bowling games has found total acceptance with the children. This appears primarily to stem from the fact that both of these forms of bowling games lack much of the realism of participating in an actual game of bowling. For example, both of these games require the bowler to remove the pins he has knocked down and retrieve the ball before he can continue bowling. This is unlike actual bowling wherein each bowling lane at a bowling center is commonly equipped with an automatic pinsetter and an automatic ball return. In addition to these features which are lacking from the aforesaid bowling games which detract from the realism of participating in an actual game of bowling, the sharp, crisp sound which is heard at a bowling alley when the bowling ball strikes the pins has not been duplicated in these games.

Therefore, in summary, although different bowling games have been developed heretofore in the prior art in an effort to simulate the conditions under which the sport of bowling is actually performed even to the extent of attempting to embody some form of automatic pin reset means therein, the results heretofore have not been entirely satisfactory. Thus, there has existed a need to provide a bowling game adapted particularly to be played by young people, etc., who are unable to participate in the actual sport of bowling, and which possesses as much of the realism of the conditions under which an actual game of bowling is bowled as possible.

Accordingly, it is an object of the present invention to provide a novel and improved bowling game which is portable and self-contained, and which embodies structure that simulates the construction of a bowling lane at a bowling center on which bowling is actually played.

It is also an object of the present invention to provide such a bowling game having automatic pinsetting means operable to cause any bowling pins, which are knocked out of position as a result of being struck by the bowling ball, to be removed automatically from the playing surface of the bowling game.

It is a further object of the present invention to provide such a bowling game wherein the automatic pin-setting means also includes means capable of repositioning the bowling pins at the completion of bowling each frame of a game without necessitating the individual handling of any of the pins by the bowler.

Still another object of the present invention is to provide such a bowling game which includes automatic ball return means operable to cause the bowling ball after being rolled at the bowling pins to be automatically returned to a position wherein the ball is readily accessible to the bowler.

A further object of the present invention is to provide such a bowling game wherein when the bowling ball strikes the bowling pins the sound produced thereby is similar to the sound heard when the bowling pins are struck by a bowling ball during an actual game of bowling thereby adding realism to the bowling game.

Yet another object of the present invention is to provide such a bowling game wherein the manner in which the game is played as well as the type of ability required therefor are sufficiently similar to those encountered while playing an actual game of bowling as to make the
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playing of the subject bowling game enjoyable for young people as well as adults.

Yet still another object of the present invention is to provide such a bowling game which is relatively inexpensive to manufacture, relatively easy to assemble, yet is characterized by the fact that it is sufficiently durable to withstand long and arduous hours of play by young people.

SUMMARY OF THE INVENTION

It has now been found that the foregoing and related objects can be readily attained in an automatic pinsetting bowling game which includes a housing assembly, a plurality of bowling pin-like members, reset means operatively connected to the bowling pin-like members, and control means for actuating the reset means. The housing assembly includes a front housing, a rear housing, and a longitudinally extending, substantially planar playing surface which interconnects the front and rear housings. The playing surface is configured in the form of a bowling lane, and has a plurality of first magnetic means, which are arranged in a triangular shape cluster, positioned adjacent the end of the playing surface which is connected to the rear housing. Each of the bowling pin-like members is provided with second magnetic means adapted to co-operate with one of the plurality of first magnetic means when placed in engagement therewith whereby the magnetic attraction which exists therebetween, each of the bowling pin-like members is maintained in a preselected position on the playing surface. The reset means includes a plurality of cord-like members, at least a corresponding number of biasing means and a movably mounted support brace. Each of the cord-like members is attached at one end to one of the bowling pin-like members and at the other end to one of the biasing means. The other end of each of the biasing means is attached to the support brace whereby when the support brace is in a first position substantially all of the biasing means are relaxed and all of the bowling pin-like members rest on the playing surface, and when the support brace is in a second position, the biasing means are extended so that if the magnetic attraction between the first magnetic means and the second magnetic means of one or more of the bowling pin-like members is weakened beyond a predetermined level, the latter members are caused to be lifted from the playing surface by the biasing means. The control means, which is mounted so as to be externally accessible, is operable to move the support brace between the first and second positions thereof.

In accordance with the preferred embodiment of the invention, the bowling game includes ten bowling pins, each of which has a magnet mounted on its base, the latter magnets comprising the aforesaid second magnetic means. The first magnetic means comprises ten magnets which are imbedded in the playing surface whereby to be equally spaced in four rows of one, two, three and four magnets respectively. The polarity and strength of the magnets is selected to be such that when one of the magnets of the second magnetic means is permitted to move adjacent to one of the magnets of the first magnetic means, sufficient magnetic attraction is provided therebetween to cause the bowling pin to be pulled into engagement with the playing surface, i.e., so that the base of the bowling pin on which the magnet is mounted overlies one of the ten magnets imbedded in the playing surface. Moreover, the rear housing preferably includes a support member having ten cone shaped recesses formed therein, each suitably dimensioned to be capable of receiving therein the head of one of the bowling pins. The reset means in accord with the preferred form of the invention includes an elongated support brace which is supported on the rear housing whereby to be movable relative thereto. The biasing means comprises twelve springs each of which has one end attached to the support brace whereby the springs are all positioned in a single row. The outer spring loaded at either end of the row thereof has its other end suitably attached to a portion of the rear housing whereby these two springs perform a stabilizing function. The other ten springs each have their other end attached by one of the cord-like members which preferably comprises a piece of string of suitable length, to the head of one of the ten bowling pins. The strings which interconnect the springs to the heads of the bowling pins are each passed through a suitable opening provided in a corresponding one of the cone shaped recesses whereby by applying a pulling force on the end of each of the strings which is attached to the springs, the bowling pins can be caused to be drawn into the cone shaped recesses. The control means includes a handle which is mounted so as to be externally accessible at the front of the bowling game, and so as to be movable between a reset position and a playing position. The handle in turn is connected to a support brace by means of a suitable length of string which has one end thereof attached to the handle while the other end thereof is attached substantially at the midpoint of the support brace. When the handle is moved to the reset position, the springs which are connected to the bowling pins are relaxed whereby to enable the pins under the influence of gravity to drop to a position slightly spaced from the playing surface whereupon through magnetic attraction the bowling pins are pulled into predetermined locations on the playing surface. Thereafter, the handle is moved to the playing position whereby all of the springs are caused to be extended. However, the upward biasing force imparted to each of the bowling pins by each of the springs is less than the force of the magnetic attraction between the magnets on the bowling pins and the magnets imbedded in the playing surface. As a result, the pins will continue to rest on the playing surface until struck by the bowling ball. When the latter occurs, it causes the magnetic attraction to be broken whereupon the bowling pin or pins which have been struck are drawn rapidly into the corresponding cone shaped recess by the force applied thereto by the spring which is attached thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of an automatic pinsetting bowling game constructed in accordance with the present invention, illustrating the handle and the bowling pins in the playing position;

FIG. 2 is a perspective view of the front housing of an automatic pinsetting bowling game constructed in accordance with the present invention, illustrating the handle in the reset position and the bowling ball returned to the ball tray;

FIG. 3 is a side elevational view of a portion of the handle of an automatic pinsetting bowling game constructed in accordance with the present invention, illus-
trating the means provided on a handle by which the handle is assembled to the front housing;

FIG. 4 is a side elevational view of a portion of an automatic pinsetting bowling game constructed in accordance with the present invention, illustrated with parts broken away for clarity of illustration;

FIG. 5 is a partial schematic perspective view of the reset means of an automatic pinsetting bowling game constructed in accordance with the present invention;

FIG. 6 is an exploded view of the housing member and cone support of an automatic pinsetting bowling game constructed in accordance with the present invention;

FIG. 7 is a top plan view of a portion of an automatic pinsetting bowling game with parts broken away for clarity of illustration, illustrating the automatic ball return means thereof;

FIG. 8 is a schematic diagram of the reset means of an automatic pinsetting bowling game constructed in accordance with the present invention, illustrating in solid lines the position of a bowling pin before being struck by a bowling ball and in dotted lines the position of a bowling pin after being struck by the bowling ball; and

FIG. 9 is an exploded view of the first and second magnetic means of an automatic pinsetting bowling game constructed in accordance with the present invention.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENT

Referring now to the drawings and more particularly FIG. 1 thereof, there is illustrated therein an automatic pinsetting bowling game, generally designated by reference numeral 10, constructed in accordance with the present invention. The bowling game 10 includes a front housing 12, a rear housing 14, and a longitudinally extending, substantially level playing surface means, generally designated by reference numeral 16, which is connected at its opposite ends to the front and rear housings 12 and 14, respectively. The front housing 12 comprises a rectangular shaped member which has formed therein a longitudinal slot 18 having a pre-selected length and which is operable for a purpose yet to be described. Adjacent one side edge of the housing 12 there is also formed therein an opening 20 which is suitably located so as to be spaced from the aforesaid slot 18. Below the opening 20 there is provided a slot (not shown) of relatively short length which is suitably dimensioned so as to permit a portion of the ball return tray 24 to be received therein for purposes of retaining the tray 24 in mounted relation on the front housing 12 to which further reference will be had hereinafter. In accord with the illustrated embodiment of the invention the front housing 12 preferably has formed integrally therewith on the inner surface thereof one or more longitudinally extending rib-like members (not shown) with one or more transversely extending rib-like members (not shown). The rib-like members serve to provide the front housing 12 with additional strength.

The rear housing 14 includes a housing member 30 which has a substantially H-shaped configuration, and a rear cover 32 which is detachably mounted to the member 30. The member 30 is comprised of a pair of side portions 34 and 36 that are interconnected by means of a wall portion 38. The latter portion 38 is secured to the side portions 34 and 36 intermediate the ends of the latter for a purpose which will become apparent subsequently. In accord with the illustrated embodiment of the invention, the top 30a of the housing portion 30 is of a lesser width than the base 30b thereof. Accordingly, the side portions 34 and 36 are configured so as to correspond to the shape of the housing member 30. To this end, each of the side portions 34 and 36 is provided with a substantially planar portion 34a and 36a, respectively, and a portion 34b and 36b, respectively which diverges inwardly. Intermediate the length of the housing assembly 30 there are provided a pair of substantially U-shaped shelf-like members 40 and 42. The shelf-like members 40 and 42, which may be formed either as integral parts of the housing 30 or as separate parts which are suitably affixed to the housing member 30, are located in spaced relation relative to each other. The shelf-like member 40 is positioned inwardly a predetermined distance from the top 30a of housing member 30 while shelf-like member 42 is located at the point where the side edges of housing member 30 begin to diverge inwardly. Each of the shelf-like members 40 and 42 performs the dual functions of providing added rigidity to the rear housing 14 as well as serving as a support member in a manner which will be described more fully subsequently.

With further reference to the construction of the housing member 30, the latter is provided adjacent the top 30a thereof with a row of ten holes 44. The holes 44 are formed in the housing member 30 so as to be equally spaced relative to each other and so that the holes 44 located at the outer ends of the row are substantially equally spaced inwardly from the corresponding side edge of the housing member 30. In addition, housing member 30 is provided with three equally spaced bosses 46 which project outwardly from the inner surface of the housing member 30 in slightly spaced relation to the shelf-like member 40. The bosses 46 cooperate with the shelf-like member 40 to assist the latter in providing the previously mentioned support function thereof. Adjacent the base 30b of the housing member 30 on the inner surface thereof there is provided a slot 48 which is suitably dimensioned so as to enable a cord-like member such as a string or cord 50 to be passed therethrough for a purpose yet to be described. On the outer surface of the housing member 30 in juxtaposed relation to the slot 48 there is preferably provided a pulley support 52. The pulley support 52 provides a support for a pulley 54 around which the string 50 is made to pass. The pulley 54 is provided at each end thereof with an outwardly extending stub shaft which is received in a corresponding of a pair of suitably dimensioned apertures 52a which are provided for this purpose in the pulley support 52 whereby to enable the pulley 54 to be retained on the latter support 52.

The housing member 30 is also provided on the outer surface thereof in slightly spaced relation below the row of holes 44 with a horizontally extending ledge 56, the latter being viewed with reference to the illustration thereof in the drawings. Connected to the ledge 56 at either end thereof is a pair of vertically extending ribs 58 and 60. As will be described more fully hereinafter, the ledge 56 as well as the ribs 58 and 60 function as a form of alignment and guide means. Inwardly of the ribs 58 and 60 and in slightly spaced relation below the ledge 56 there is provided a first pair of posts 62 and
64. A second pair of posts 66 and 68 are provided on the outer surface of the housing member 30 adjacent to the base 30b thereof and spaced outwardly of the ribs 58 and 60. Each of the posts 66 and 68 is provided with an internally threaded aperture which is capable of receiving therein a threaded fastener 70 in threaded engagement therewith to provide a means for securing the rear cover 32 to the posts 66 and 68 with the rear cover 32 being spaced from the outer surface of the housing member 30 whereby to provide a space therebetween for a purpose which will be described hereinafter.

Consideration will now be given to a description of the playing surface means 16 which interconnects the front housing 12 and the rear housing 14. The playing surface means 16 is comprised of a horizontally extending flat surface 72 which comprises the bowling lane of the bowling game 10, a pair of side panels 74 and 76 which depend from the surface 72, and a rear end wall 78 which extends between the side panels 74 and 76 along the rear edge of the surface 72 and which is suitably secured thereto through the use of any suitable conventional securing means. The side panels 74 and 76 function as the external side walls for the bowling game 10. In addition, the side panels 74 and 76 serve to provide concealment for a portion of the control means 80 which is operable to actuate the reset means 82 of the automatic pin setting means, generally designated by reference numeral 84. In accord with the illustrated embodiment of the invention, a cross brace 86 is preferably employed for purposes of providing added rigidity to the bowling game 10. The cross brace 86 extends between the side panels 74 and 76 at a point intermediate the length thereof and is suitably connected thereto by any conventional connecting means such as a plurality of suitable threaded fasteners. An aperture 88 is suitably located in the cross brace 86 so as to permit the string 50 to be passed therethrough. In this connection, a brass eyelet is preferably positioned in the aforementioned aperture 88 through which the string 50 passes whereby to provide a bearing surface therefor. In addition, the rear end wall 78 is also provided with a suitable opening 90 to permit the string 50 to be passed therethrough. A string guide 92 is mounted by any suitable means on the inner surface of the side panel 74 adjacent the front edge thereof as a further aligning and guiding means for the string 50. The front edge portion of the playing surface means 16 is connected to the front housing 12 by means of a plurality of fasteners 94 which pass through suitable openings (not shown) provided for this purpose in the sides of the front housing 12 and are secured in suitable threaded openings (not shown) provided for this purpose in the side panels 74 and 76 whereby the front edge of the bowling lane surface 72 is positioned substantially in abutting engagement with the inner surface of the front housing 12. The rear end wall 78 of the playing surface means 16 is similarly secured to the rear housing 14 by means of a plurality of threaded fasteners 98 which pass through suitable openings (not shown) provided for this purpose in the side portions 34 and 36 and are threaded into suitable openings (not shown) provided for this purpose in the side panels 74 and 76 in slightly spaced relation to the inner surface of the rear end wall 78. When so assembled, the rear end wall is substantially in abutting engagement with the inner surface of the housing member 30 with the bowling surface 72 positioned adjacent the shelf-like member 42 and with the opening 90 in the rear end wall 78 aligned with the slot 48 in the housing member 30 so as to permit the string 50 to be passed therethrough.

In accordance with the present invention, bowling game 10 is provided with a novel and improved automatic pin setting means 84 which includes a reset means 82 and a control means 80. The reset means 82 is operable when in a first condition to cause the bowling pins 102 as they are struck by a bowling ball which is rolled into engagement therewith to be automatically rapidly removed from the bowling surface 72, and when in a second condition to cause the bowling pins 102 to be repositioned in the proper locations on the bowling surface 72. The control means 80 is operatively connected to the reset means 82 and is operable to cause the reset means 82 to be placed in either of the aforementioned first or second conditions.

Considering first the structure which comprises the control means 80, the latter means 80 includes a handle 104 which is positionable in the slot 18 formed in the front housing 12 so as to be movable therein. The handle 104 intermediate the ends thereof is provided with a cutout portion 104a which is suitably dimensioned so that the handle 104 at the portion 104a has a thickness which is less than the width of slot 18 thereby enabling the portion 104a of the handle 104 to be slid in the slot 18 while the sides of the cutout portion 104a function as stop means which serve as a means of retaining the handle 104 in the slot 18 once the handle 104 has been positioned therein. At its inner end, as viewed with the handle 104 positioned in the slot 18, the handle 104 is provided with a hole 106 which is suitably dimensioned to receive therethrough one end of the string 50 thereby enabling one end of the string 50 to be tied to the handle 104. From the handle 104, the string 50 as has been mentioned previously hereinabove extends through the string guide 92, the aperture 88 in cross brace 86, the opening 90 in rear end wall 78, through the slot 48 in housing member 30, around the pulley 54, and through an opening (not shown) provided for this purpose in a spring support brace 110 to which the other end of string 50 is tied.

Insofar as concerns the reset means 84, the latter includes the aforementioned spring support brace 110, a pair of stabilizing springs 112, 10 biasing springs 114, 10 pieces of cord 116, a cone support 118, and first and second magnetic means 120 and 122, respectively. The spring support brace 110 is provided with 12 pins 124 which are arranged in a row so as to be substantially equally spaced along the length of the spring support brace 110. The two stabilizing springs 112 each have one end thereof attached to the outermost pins 124 located at one end of the row thereof. The other ends of the stabilizing springs 112 are attached to the pair of posts 62 and 64, respectively. Each of the ten biasing springs 114 has one of its ends attached to a corresponding one of the remaining ones of the pins 124 which are provided for this purpose in the spring support brace 110. The other end of each of the biasing springs 114 is tied to one end of a corresponding one of the cords 116. Each of the cords 116 is passed over the ledge 56 and through one of the row of holes 44. With the cone support 118 secured to the shelf-like member 40 in a manner yet to be described, each of the cords 116 after passing through a corresponding one of
the holes 44 is passed through an opening 126 provided for this purpose in each of the cone-like recesses 128 which are formed in the cone support 118, and so as to be located substantially at the center of each of the cone-like recesses 128. Thereafter, the other end of each of the cords 116 is attached to the head of a corresponding one of the bowling pins 120 through a hole (not shown) provided for this purpose therein.

Referring more particularly to the construction of the cone support 118 and manner in which it is secured to the shelf-like member 40, the cone support 118 has a triangular shaped portion 118a in which the cone shaped recesses 128 are formed. The cone support 118 has a rear portion 118b the width of which corresponds to the distance by which the side portions 34 and 36 are spaced apart. In addition, each corner of the rear portion 118b is provided with a notch 118c. The latter notches 118c are suitably dimensioned whereby to enable the cone support 118 to be inserted between the three bosses 46 and the shelf-like member 40, i.e., below the three bosses 46 and on the shelf-like member 40. When the cone support 118 is so positioned, the notches 118c are in abutting engagement with the side portions 34 and 36. The cone support 118 is fixedly secured to the housing member 30 by a pair of threaded fasteners 130 which are passed through a pair of slots 132 formed for this purpose in the shelf-like member 40 and are threaded into suitable openings (not shown) provided for this purpose in the cone support 118. By moving the fasteners 130 in the slots 132 before the fasteners 130 are tightened, the position of the rear portion 118b of the cone support 118 relative to the inner surface of the housing member 30 can be adjusted.

Continuing with the description of the reset means 84, the first magnetic means 120 comprises ten individual magnets 134 each preferably being of equal strength, which are suitably supported on the bowling surface 72 such as by being imbedded therein. The ten magnets 134 are arranged on the surface 72 in four rows having one, two, three, and four magnets, respectively, in each row. Moreover, the magnets 134 are arranged so as to be equally spaced relative to each other and so as to be centered with respect to the side edges of the bowling surface 72 adjacent the rear housing 14. The second magnetic means 122 of the reset means 84 comprises ten magnets 136. Each of the ten magnets 136, which preferably are each of equal strength, is mounted by any suitable means on the base of a corresponding one of the ten bowling pins 102. The magnets 134 and 136 are selected so that magnetic attraction will exist therebetween when the magnets 136 on the bases of the bowling pins 102 are brought into juxtaposed relation with the magnets 134 imbedded in bowling surface 72. In addition, the magnets 134 and 136 are further selected so that the strength thereof is such that the magnetic attraction therebetween is sufficiently strong to resist the upward biasing force being applied to a corresponding one of the bowling pins 102 as will be referred to more fully hereinbelow in connection with the description of the mode of operation of the bowling game 10 and more specifically the reset means 84 thereof.

In accord with the illustrated embodiment of the invention, the bowling game 10 is provided with an automatic ball return means 138. The ball return means 138 includes the ball tray 24 to which reference was had previously hereinabove, a ball return chute 140 and a ball run 142. As depicted in the drawings, the ball return chute 140 and the ball run 142 are each generally semicircular in shape. The ball return chute 140 is supported on the under side of the bowling surface 72 so as to extend transversely thereof and so as to be located adjacent the rear edge of the bowling surface 72 where the latter is affixed to the rear housing 14. The ball run 142 is supported along the under side of the bowling surface 72 adjacent one side edge thereof, and so as to extend the length of the bowling surface 72. One end of the ball run 142 suitably connects with the ball return chute 140 while the other end of the ball run 142 suitably connects with the ball tray 24. Accordingly, the automatic ball return means 138 is operable to cause a bowling ball which is rolled the length of the bowling surface 72, from the front to the rear thereof, to be received in the ball return chute 140 when the ball reaches the rear portion of the bowling surface 72. The ball then under the influence of gravity rolls the length of the ball return chute 140 and into the ball run 142. Thereafter, the ball rolls the length of the ball run 142 and is deposited in the ball tray 24 where the ball is readily accessible to the player for use thereby once again.

Bowling game 10 is constructed in such a manner as to be easily assembled. In this regard, as has been set forth previously above, the front housing 12 is fastened to one end of the playing surface means 16 by means of suitable fastening means. The handle 104 is then inserted into the slot 18. With the handle 104 so positioned, the string 50 is passed through the opening 90, the aperture 88 in cross brace 86, and then through the string guide 92 and is tied to the handle 104. Next the ball run 142 is mounted under the playing surface 72 so that one end thereof rests on the ball return chute 140 and so that the other end of the ball end 142 rests on the top of the lip of the ball tray 24, the latter being supported on the front housing 12 adjacent the opening 20 formed therein. Now, the cone support 118 is affixed to the housing member 30 by being inserted under the three bosses 46 so that the cone support 118 rests on the shelf-like member 40, and preferably fastened in place through the use of suitable fastening means. Then, each of the bowling pins 102 is assembled to the housing member 30. This is accomplished by tying one end of a corresponding one of the cords 116 to each of the bowling pins 102. The cords 116 are cut to different lengths corresponding to the varying differences by which the cone support recesses 128 are spaced from the inner surface of the housing member 30. The other ends of the cord 116 are passed through the openings 126 in the cone shaped recesses 128, then through the holes 44 and over the ledge 56, and are each tied to one end of a corresponding one of the biasing springs 114. The other end of each of the springs 114 is attached to the spring support brace 116, the latter being positioned between the ribs 50 and 60 adjacent the rear surface of the housing member 30. Peripherally, the two stabilizing springs 112, each of which having one end affixed to the support brace 110, is attached at its other end to the posts 62 and 64, respectively. In accord with the illustrated embodiment of the invention, a top cover 144 is preferably positioned over the cone support 118. More specifically, the top cover 144 is fastened to the cone support 118 through the use of suitable fastening means which pass through openings provided for this purpose in the cone support 118.
and are threadedly engaged in suitably threaded recesses provided for this purpose in the top cover 144. To complete the assembly of the bowling game 10, the free end of the string 50 is passed through the slot 48 in the housing member 30 and around the pulley 54. The rear housing 14 is then affixed to the playing surface means 16 by suitable fastening means. Thereafter, the string 50 is passed through the hole 108 provided for this purpose in the support brace 110 and is tied thereto. Finally, the rear cover 32 is secured to the housing member 30 through the use of suitable threaded fasteners which are bolted through the rear cover 32 and are received in the threaded posts 66 and 68.

Turning now to a description of the mode of operation of the bowling game 10, the handle 104 is moved to the play position, i.e., to the extreme right as viewed with reference to FIG. 1 of the drawings. In this position of the handle 104, the bowling pins 102 rest on the playing surface 72, and are retained thereat by virtue of the magnetic attraction which is established between the magnets 134 which are imbedded in the playing surface 72 and the magnets 136 supported on the base of the bowling pins 102. The player who positions himself at the front end of the bowling game 10 then rolls a bowling ball 146 along the playing surface 72 towards the pins 102. The ball is returned to the ball tray 24 by the automatic ball return means 138. Any bowling pins 102 which have been struck by the bowling ball are lifted into the cone shaped recesses 128 by virtue of the operation of the biasing springs 114. The bowling ball is then rolled for a second time at the pins 102. Again the ball is automatically returned to the ball tray 24, and any more pins 102 which have been struck by the ball rise into the cone shaped recesses 128. The striking of the pins 102 by the ball is sufficient to break the magnetic attraction between the magnets 134 and 136. This completes the bowling of one frame of a game. Accordingly, the handle 104 is moved to the reset position, i.e., to the extreme left as viewed with reference to FIG. 1 of the drawings. This permits the pins 102 to drop under the influence of gravity to the playing surface 72 enabling magnetic attraction between the magnets 136 on the pins 102 and the magnets 134 on the playing surface 72 to be once again established. The handle 104 is then returned to the play position in preparation for the player bowling the second frame of the game. This procedure is continued until the game is completed in the same manner in which an actual game is played.

Although only one embodiment of an automatic pin-setting bowling game is described in accordance with the present invention has been shown in the drawings and described hereinabove, it is to be understood that modifications in the construction thereof may be made thereto by those skilled in the art without departing from the essence of the invention. In this connection, some of the modifications which can be made in the bowling game 10 have been alluded to hereinabove while others will become readily apparent to those skilled in the art when exposed to the present description and illustration of the construction of the bowling game 10. For example, as illustrated in FIGS. 1 and 9 of the drawings, the magnets 134 which are imbedded in the playing surface 72 are preferably covered by a transparent sheet of suitable material 48 which functions to assist in retaining the magnets 134 suitably positioned. However, it is, of course, to be understood that some form of other means could equally well be employed for purposes of retaining the magnets 134 in supported relation on the playing surface 72. Also, although in accord with the preferred embodiment of the invention most of the various elements which comprise the bowling game 10 are formed of suitable wear-resistant plastic material, it is to be understood that these components of the bowling game 10 could be made of other materials without departing from the essence of the invention. Furthermore, as noted above, it has been found desirable to employ ten biasing springs 114 and two stabilizing springs 112 each of which has the same spring characteristics. The use of the two stabilizing springs in this manner has been found effective to impart a desirable stabilizing effect with regard to the movement of the spring support brace 110. However, it is, of course, to be understood that if so desired some other number of stabilizing springs could be employed for this purpose.

Thus, it can be seen that the present invention provides a novel and improved automatic pinsetting bowling game which is portable and self-contained, and which embodies structure that simulates the construction of a bowling lane at a bowling center at which actual bowling takes place. Moreover, the bowling game of the present invention is provided with automatic pin-setting means operable to cause any bowling pins, which are knocked out of position as a result of being struck by the bowling ball, to be removed automatically from the playing surface of the bowling game. Furthermore, in accord with the present invention a bowling game is provided wherein the automatic pin-setting means also includes means capable of repositioning the bowling pins at the completion of bowling each frame of a game without necessitating the individual handling of any of the pins by the player. The bowling game of the present invention includes automatic ball return means operable to cause the bowling ball after being rolled at the bowling pins to be automatically returned to a position wherein the ball is readily accessible to the player. In accordance with the present invention a bowling game has been provided wherein when the bowling ball strikes the bowling pins the sound produced thereby is similar to the sound heard when the bowling pins are struck by a bowling ball during an actual game of bowling thereby adding realism to the bowling game. Also, a bowling game in accord with the present invention has been provided wherein the manner in which the game is played as well as the type of ability required therefor are sufficiently similar to those encountered while playing an actual game of bowling as to make the playing of the subject bowling game enjoyable for young people as well as adults. Finally, the bowling game of the present invention is relatively inexpensive to manufacture, relatively easy to assemble, yet is characterized by the fact that it is sufficiently durable to withstand long and arduous hours of play by young people.

Having thus described the invention, I claim:
1. A bowling game adapted to be played by rolling a bowling ball into engagement with a plurality of bowling pins comprising:
a. a housing assembly including a front housing, a rear housing, and a longitudinally extending substantially flat playing surface having one end thereof connected to said front housing and the other end thereof connected to said rear housing;
b. a plurality of bowling pins supported on said housing assembly for movement into and out of engagement with said playing surface;

c. automatic pinsetting means including reset means having a first operating condition and a second operating condition, and control means operatively connected to said reset means;

d. said reset means including first magnetic means supported on said playing surface, second magnetic means supported on said bowling pins, a plurality of cord-like members each having one end thereof attached to a corresponding one of said plurality of bowling pins, biasing means including a plurality of resilient first members each having one end thereof secured to the other end of a corresponding one of said plurality of cord-like members, a support brace having the other end of each of said resilient first members attached thereto, and stabilizing means comprising a plurality of resilient second members having one end thereof affixed to said rear housing and the other end thereof connected to said support brace for supporting said support brace in spaced relation to said rear housing for movement thereto between a first position which corresponds to said first operating condition of said reset means and a second position which corresponds to the second operating condition of said reset means, said stabilizing means being further operable to stabilize the movement of said support brace in moving between said first and second position thereof; and

e. control means connected to said control brace and including manually operable means supported on said housing assembly so as to be externally accessible, said control means being operable in response to actuation of said manually operable means to cause said support brace to move between said first position and said second position thereof, wherein said plurality of resilient first members of said biasing means and said plurality of resilient second members of said stabilizing means are in an extended condition thereby placing said reset means in said first operating condition thereof and said second position of said support brace wherein said plurality of resilient first members of said biasing means and said plurality of resilient second members of said stabilizing means are in a substantially relaxed condition thereby placing said reset means in said second operating condition thereof.

2. The bowling game as set forth in claim 1 further comprising automatic ball return means operable to automatically return a bowling ball which is rolled along said playing surface to an externally accessible location at the front of the bowling game, said ball return means including a ball return chute supported on said rear housing, a ball run supported under said playing surface and having one end operatively connected to said ball return chute, and a ball tray supported on said front housing and being operatively connected to the other end of said ball run.

3. The bowling game as set forth in claim 1 wherein said plurality of bowling pins consists of ten bowling pins, said first magnetic means comprises ten magnets imbedded in said playing surface and arranged in equally spaced relation in four rows wherein one row contains one magnet, one row contains two magnets, one row contains three magnets and one row contains four magnets, and said second magnetic means comprises a magnet supported on the base of each of said ten bowling pins.

4. The bowling game as set forth in claim 3 wherein said plurality of resilient first members of said biasing means comprises ten springs each having substantially the same spring characteristics.

5. The bowling game as set forth in claim 4 wherein said plurality of resilient second members of said stabilizing means comprises a pair of springs each being substantially identical to each of said ten springs of said biasing means.

6. The bowling game as set forth in claim 1 wherein said control means further includes a length of string having one end thereof attached to said spring support brace, and said manually operating means comprises a handle attached to the other end of said length and movable between a playing position to place said reset means in said first operating condition thereof and a reset position to place said reset means in said second operating condition thereof.

7. A bowling game adapted to be played by rolling a bowling ball into engagement with a plurality of bowling pins comprising:

   a. a housing assembly including a front housing, a rear housing, and a longitudinally extending substantially planar playing surface having one end thereof connected to said front housing and the other end thereof connected to said rear housing;

   b. a plurality of bowling pins supported on said housing assembly for movement between a first position wherein said plurality of bowling pins rest on said playing surface and a second position wherein said plurality of bowling pins are spaced from said playing surface;

   c. pin reset means movable between a playing condition and a reset condition, said pin reset means including a plurality of first magnets supported on said playing surface in a predetermined arrangement, a plurality of second magnets comprising a magnet supported on each of said plurality of bowling pins and operable when brought into juxtaposed relation with said plurality of first magnets to effect a magnetic attraction therebetween, a plurality of cord-like members supported on said rear housing and each having one end thereof attached to a corresponding one of said plurality of cord-like members wherein a biasing force is capable of being imparted from said plurality of springs through said plurality of cord-like members to said plurality of bowling pins, a spring support brace having attached thereto the other ends of said plurality of springs, and stabilizing means comprising a plurality of resilient members having one end thereof affixed to said rear housing and the other end thereof connected to said spring support brace for supporting said spring support brace in spaced relation to said rear housing for movement relative thereto between a first position wherein said plurality of springs are in an extended condition and a second position wherein said plurality of springs are in a relaxed condition, said stabilizing means being further operable to stabilize the movement of said spring support brace in moving between said first and second positions thereof; and

   d. control means operatively connected to said spring support brace and including manually operable
means positioned on said front housing so as to be externally accessible and movable between a reset position wherein said spring support brace is in said second position thereof and said plurality of bowling pins rest on said playing surface, and a playing position wherein said spring support brace is in said first position thereof and said plurality of bowling pins are retained resting on said playing surface by the magnetic attraction which exists between said plurality of first magnets and said plurality of second magnets against the biasing force being imparted to said plurality of bowling pins by said plurality of springs.

8. The bowling game as set forth in claim 7 further comprising automatic ball return means operable to automatically return a bowling ball which is rolled along said playing surface to an externally accessible location at the front of the bowling game, said ball return means including a ball return chute supported on said rear housing, a ball run supported under said playing surface and having one end operatively connected to said ball return chute, and a ball tray supported on said front housing and being operatively connected to the other end of said ball run.

* * * *
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,866,691 Dated February 18, 1975

Inventor(s) Richard Freeman

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 13, line 24, "relation" should be --relative--; line 32, "control" (second instance) should be --support--;

Column 14, line 17, after "length" insert --of string--; line 61, "ae" should be --are--.

 Signed and sealed this 27th day of May 1975.

(SEAL)
Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks
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