US005741189A

United States Patent [19]

Briggs

[11] Patent Number: 5,741,189

[45] Date of Patent: Apr. 21, 1998

[54] **RETROFIT WATER PLAY STRUCTURE AND METHOD**

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[21] Appl. No.: **772,499**

[22] Filed: **Dec. 23, 1996**

[51] **Int. Cl.**[6] **A63G 31/00**

[52] **U.S. Cl.** **472/128**; 482/35

[58] **Field of Search** 472/117, 128; 482/35; 285/123.1, 122.1, 123.15, 125.1

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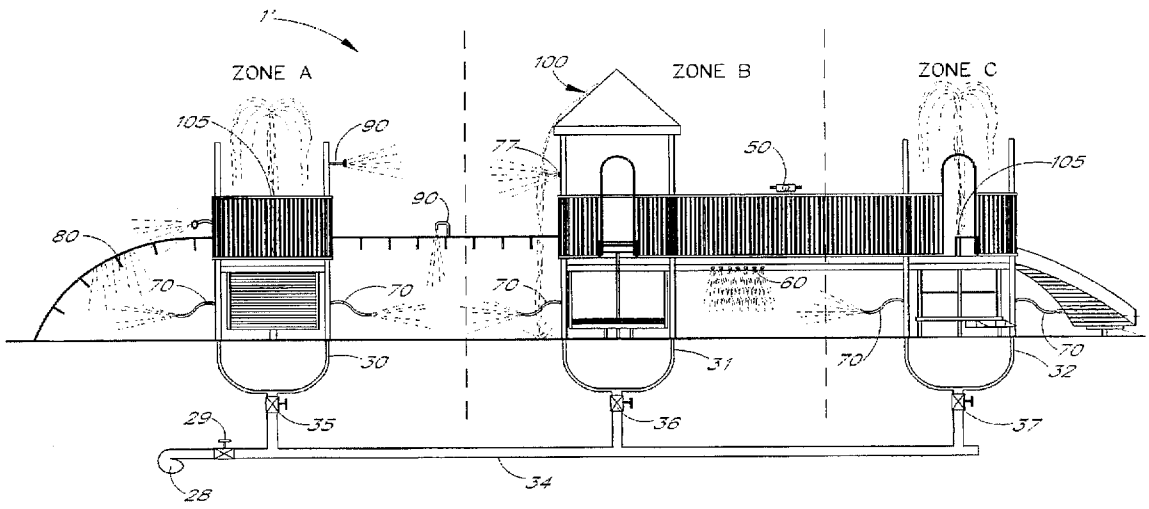
Primary Examiner—Kien T. Nguyen

Attorney, Agent, or Firm—Knobbe, Martens, Olson & Bear

[57] **ABSTRACT**

A low-cost interactive water play structure and method is provided wherein an existing dry play structure is retrofitted or converted to incorporate various interactive water play elements. Water supply conduits are mounted on or in the support members of the dry play structure to provide water to one or more water forming elements and associated control valves. Play participants adjust the various valves and can immediately observe the change in the rate, direction or velocity of water flowing from the various associated water forming elements, allowing play participants to experiment with and learn about various cause-and-effect reactions using a familiar and entertaining play medium.

35 Claims, 9 Drawing Sheets



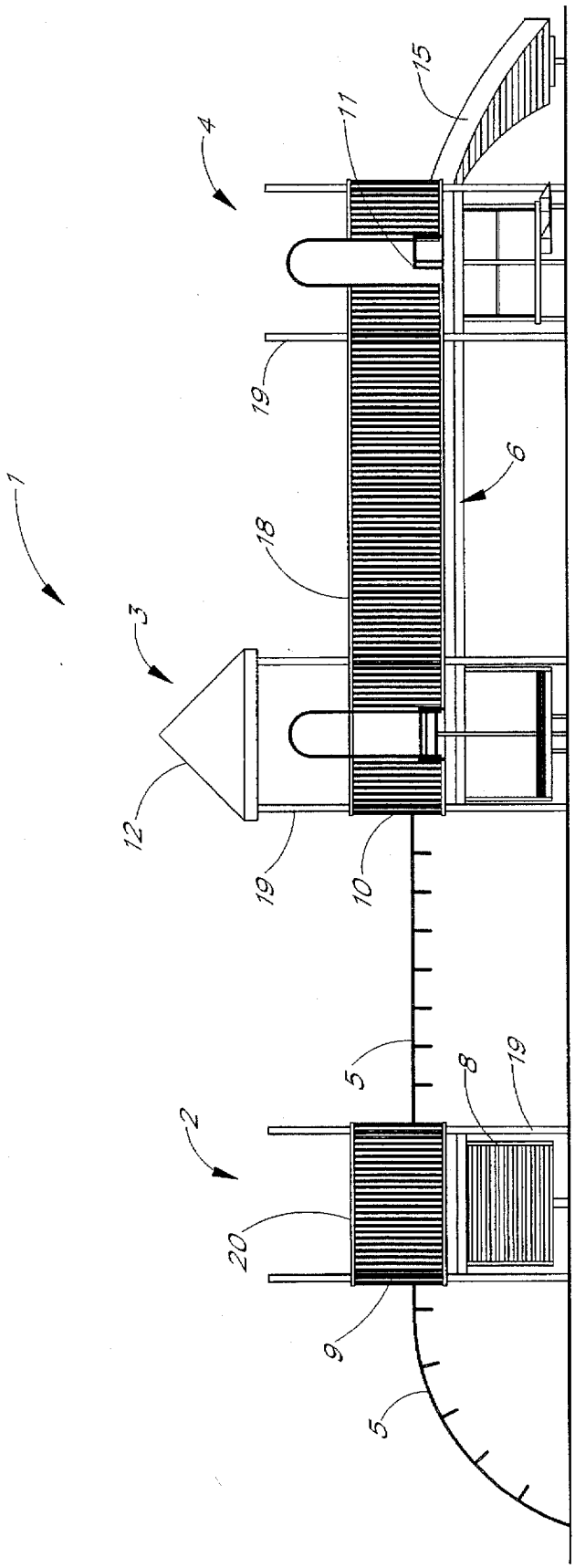


FIG. 1

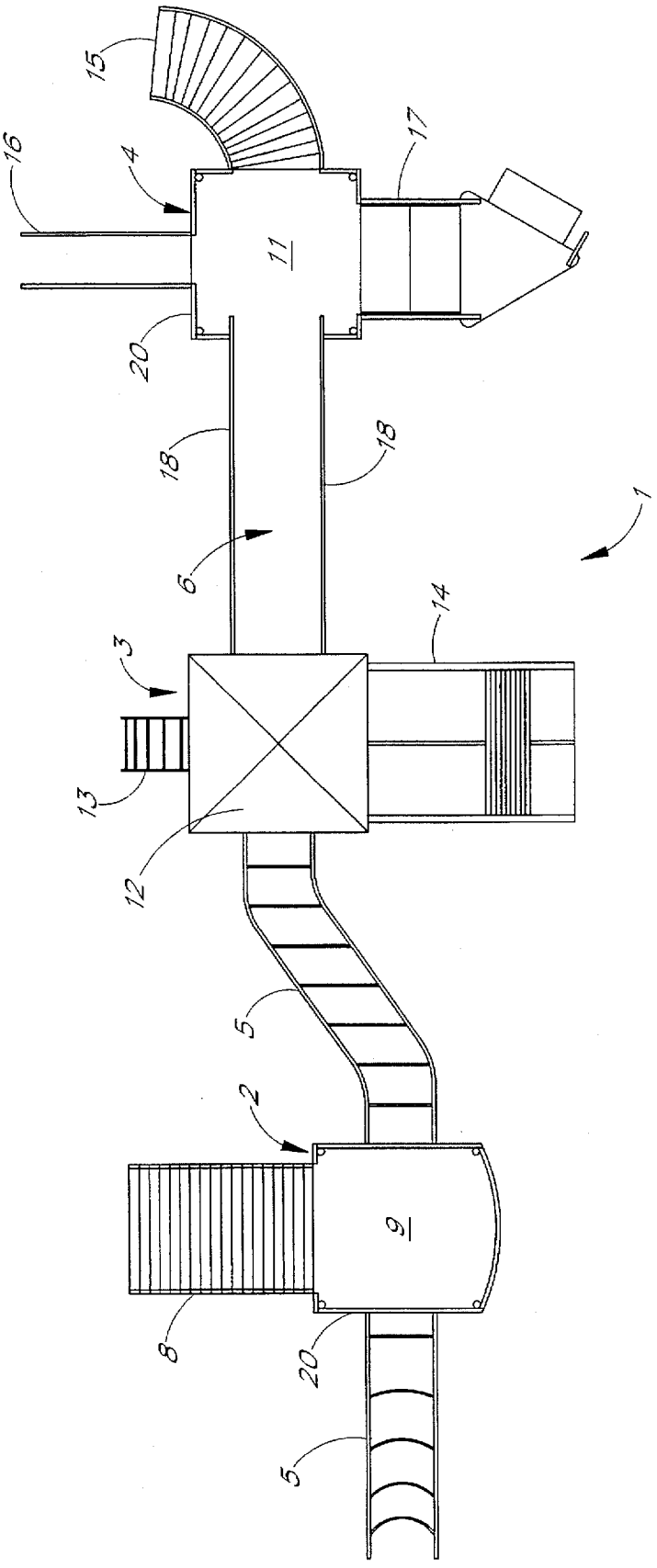
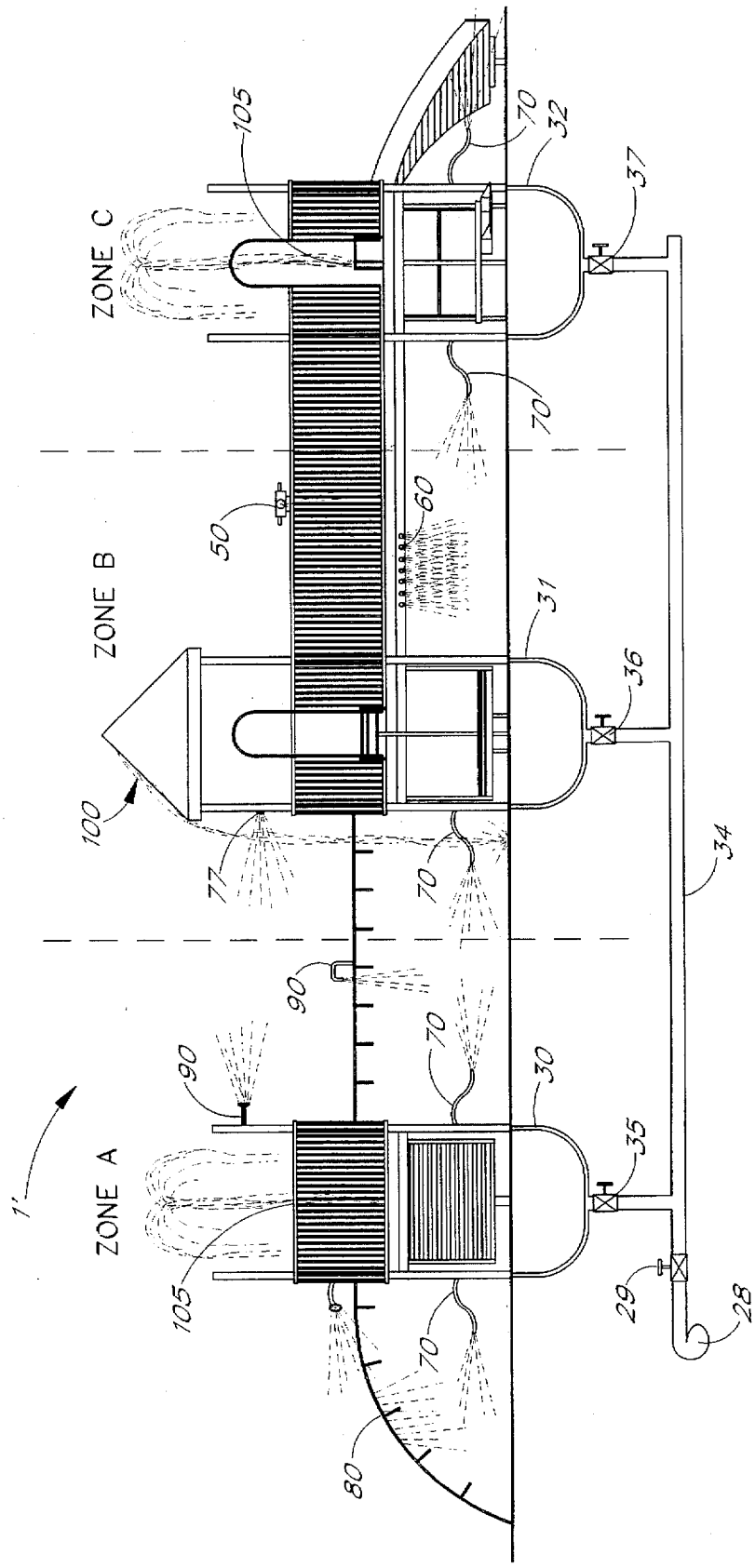


FIG. 2


ZONE C
ZONE B
ZONE A
105
70
32
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28
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1'

FIG. 3

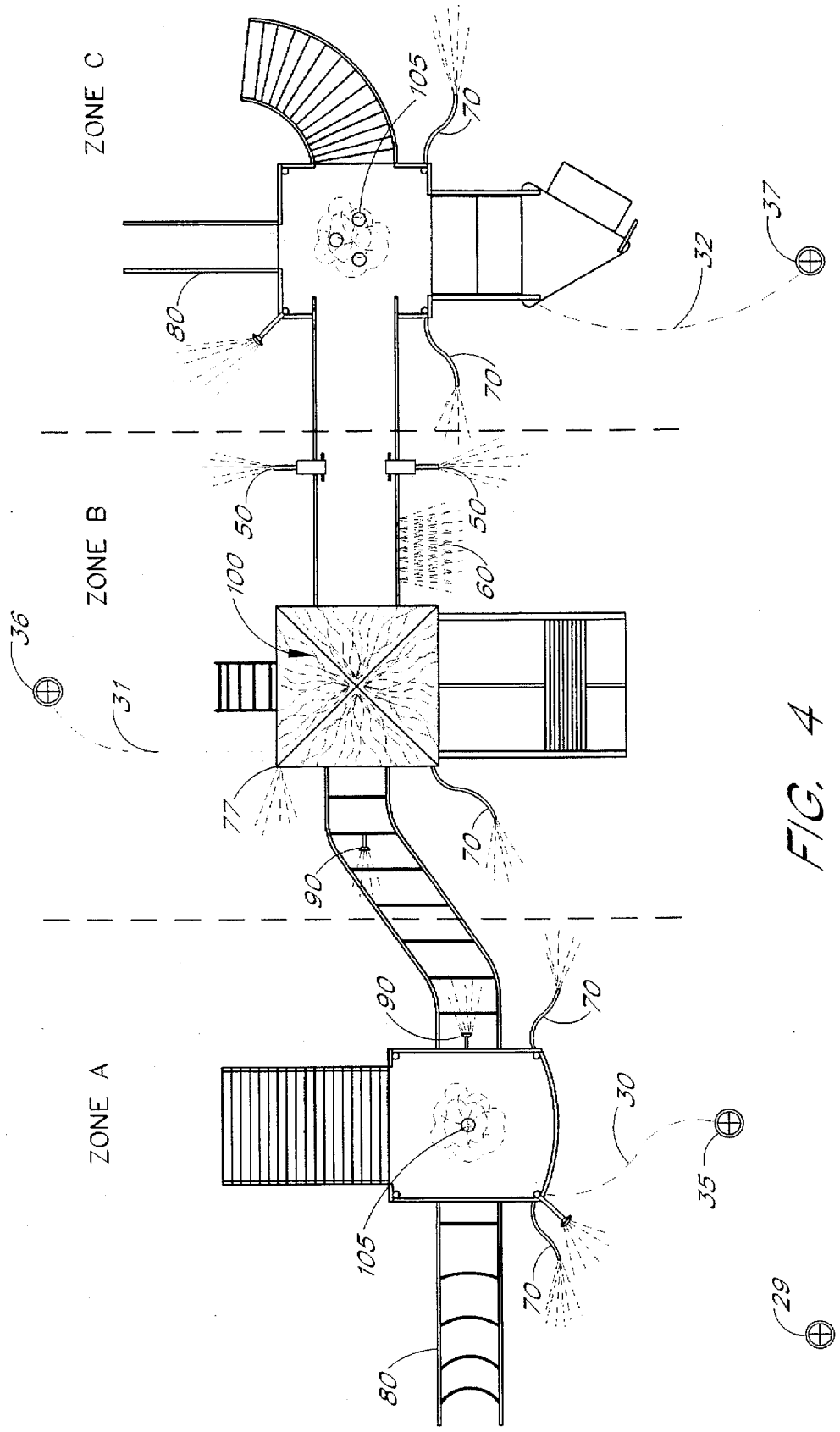

FIG. 4

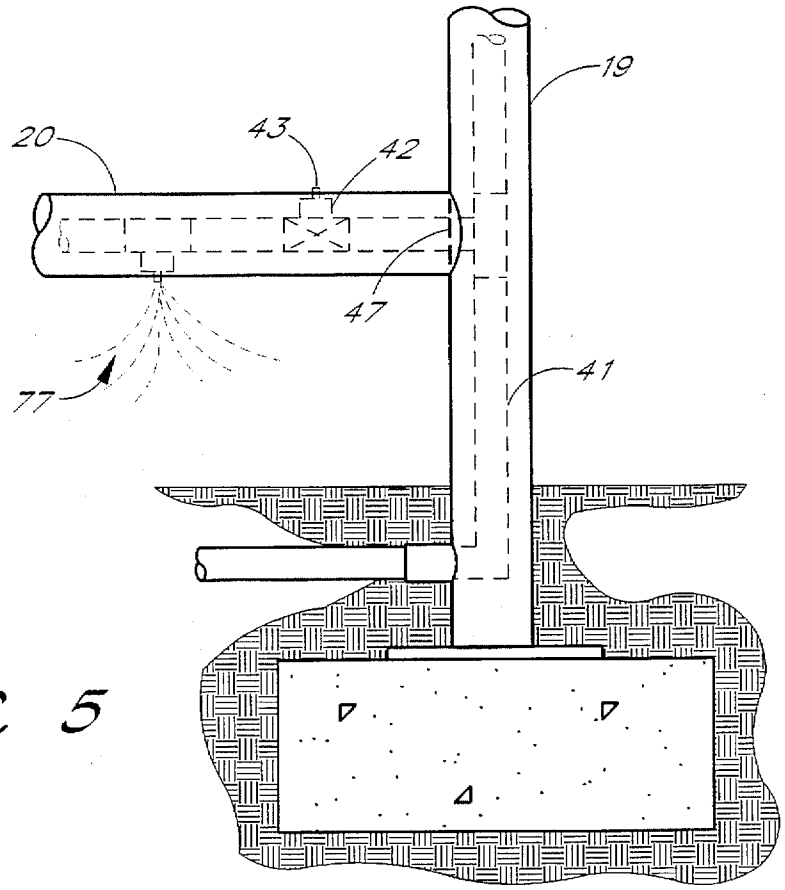

FIG. 5

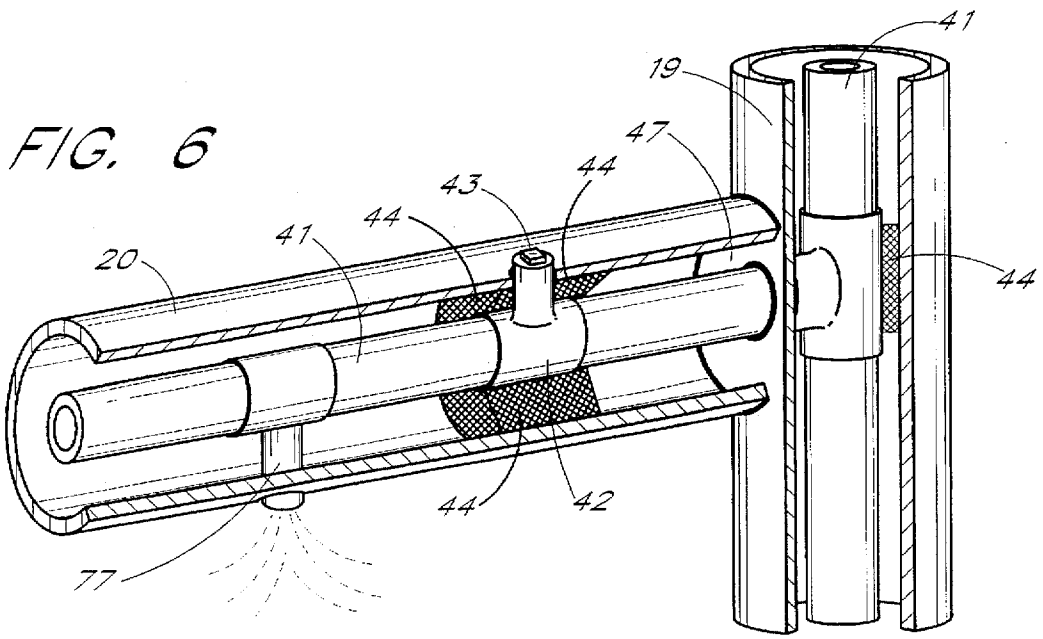

FIG. 6

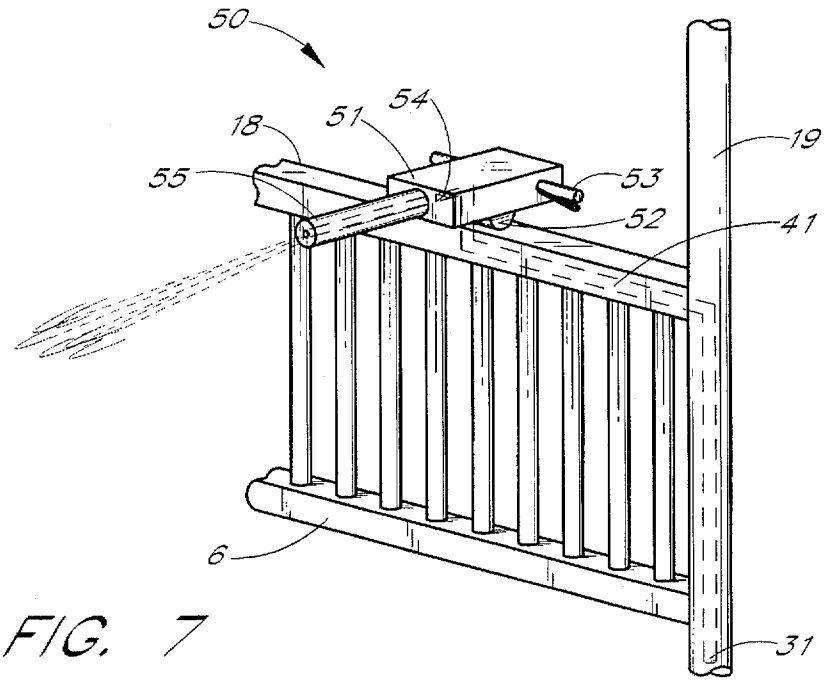

FIG. 7

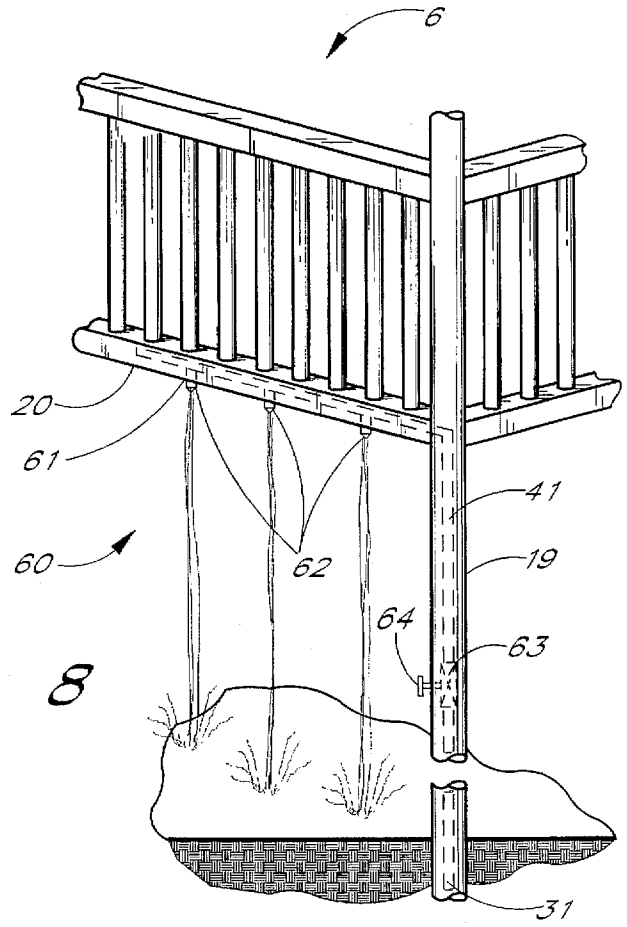

FIG. 8

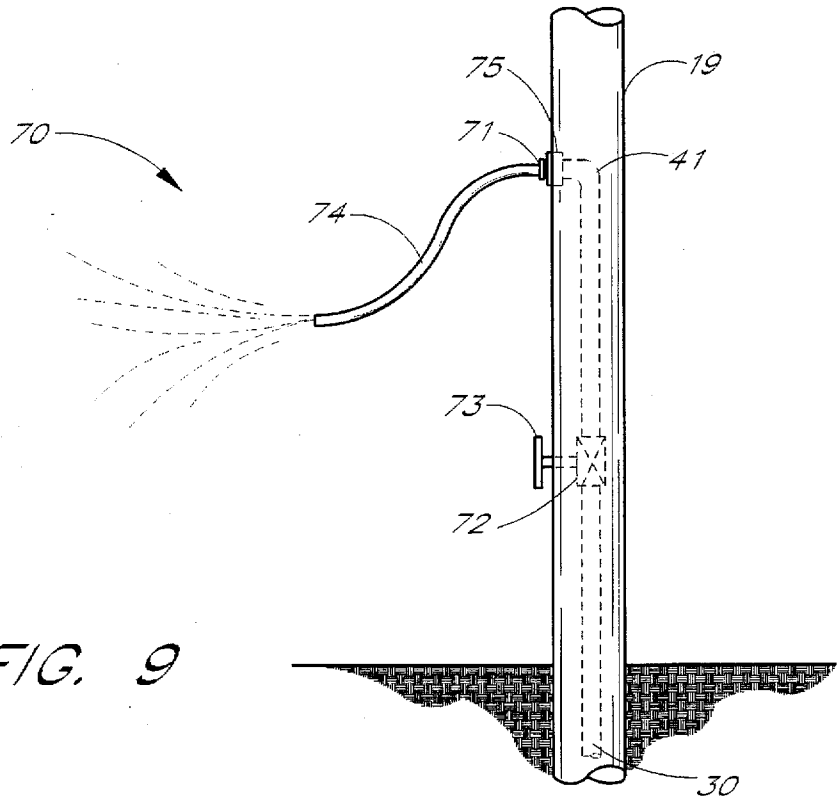

FIG. 9

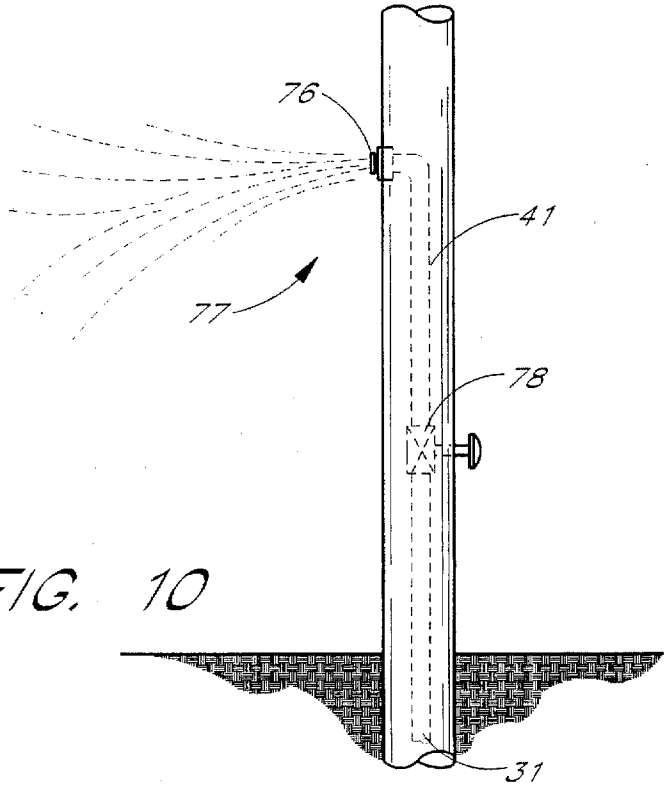

FIG. 10

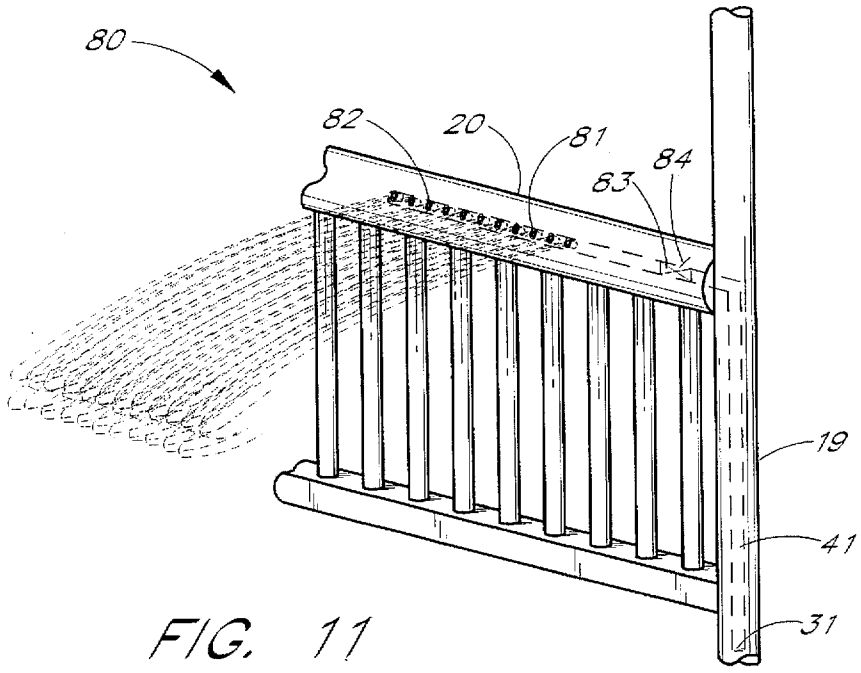

FIG. 11

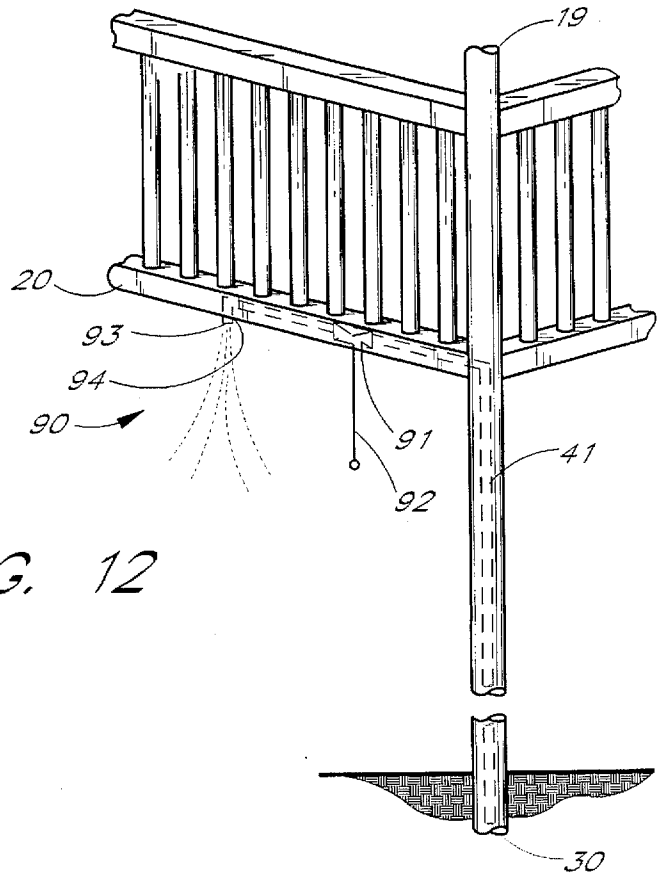

FIG. 12

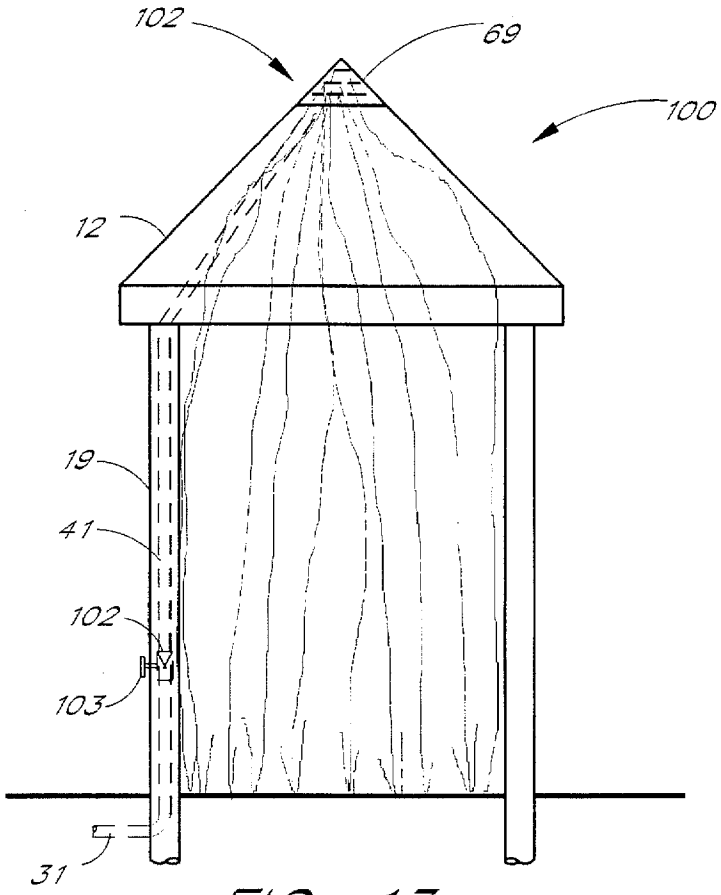

FIG. 13

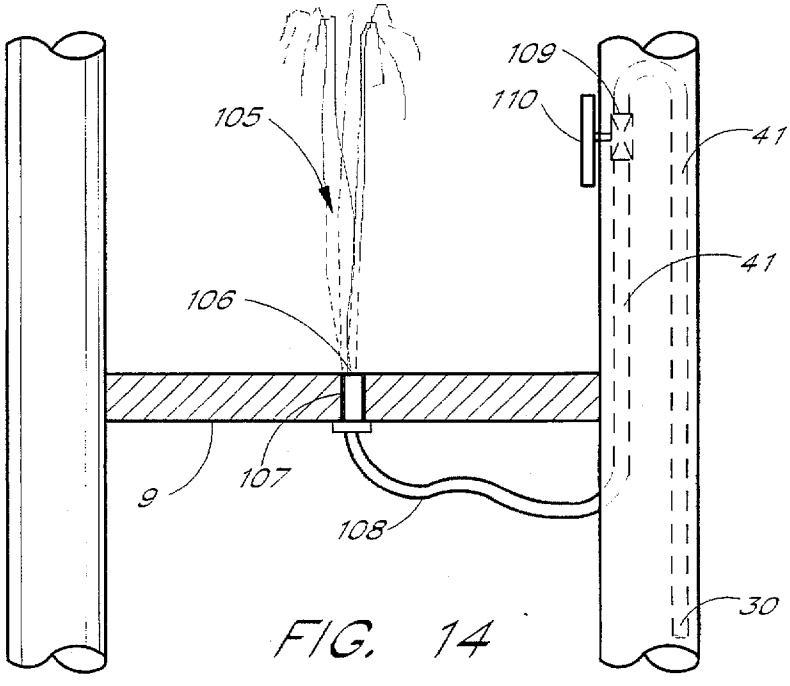

FIG. 14

RETROFIT WATER PLAY STRUCTURE AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to the field of commercial play structures and, in particular, to "wet" interactive play structures and methods for retrofitting or converting conventional "dry" play structures for interactive water play.

2. Description of the Related Art

The popularity of family-oriented theme parks and commercial recreation facilities has increased dramatically in the last decade. Water parks, in particular, have proliferated as adults and children alike seek the thrill and entertainment of "wet" play attractions as a healthy and enjoyable way to cool off in the hot summer months. Wet play attractions featuring "interactive water play" are especially popular among families having young and intermediate age children.

My U.S. Pat. No. 5,194,048 and related Design Patent D330,579 first disclosed the concept of "interactive water play," in which play participants can operate any one of a number of valves to adjust the amount of water spraying from one or more associated water effects. Play participants adjust the various valves and can immediately observe the change in the rate of water flowing from the various associated water effects. This allows play participants to experiment with and learn about the cause-and-effect relationship between action (pulling a rope or turning a wheel) and reaction (getting doused with a gush of water or watching a water geyser erupt) using a familiar and entertaining medium, namely water. Small children, particularly, can benefit from the fun learning experiences garnered from interactive water play.

Many successful large-scale commercial water parks now incorporate interactive water play structures of the type disclosed in my U.S. Pat. No. 5,194,048. Families that have patronized these commercial water parks have discovered for themselves the valuable entertainment and educational benefits that interactive water play provides. Sales of admission tickets for many such commercial water parks have surged following the introduction of a new interactive water play structure.

Due in part to the increasing popularity of water theme parks, many conventional "dry" (i.e. non-water) recreation parks have sought to add various wet play attractions to meet growing demand for such attractions and to increase overall park attendance. However the cost of many large-scale water attractions, in terms of initial capital expenditures and operation and maintenance costs, is often prohibitive. Many dry recreation parks do not have existing systems for drainage and/or recirculation of the large quantities of run-off water often generated by such large-scale water attractions. Moreover the level of patronage and revenues generated by many conventional dry recreation parks, particularly in rural or suburban areas, would not justify the expense of installing extensive water drainage and recirculation systems.

SUMMARY OF THE INVENTION

There is an unfulfilled need in the industry for a low-cost interactive water play structure that is particularly adapted for use in conventional dry recreation parks and that does not necessarily require the use of extensive water drainage or recirculation systems. There is a further need in the industry for an interactive water play structure that can be fabricated by retrofitting or converting a conventional dry play structure for interactive water play. There is a further need in the industry for a low-cost interactive water play structure that allows play participants to change or alter the water effects by the simple physical acts of pushing a lever, pulling a rope, hitting a button or turning a valve, thereby enhancing their knowledge of water dynamics, shapes, forms, textures, and various dynamic water effects. Finally, there is a need in the industry for a play structure that synergistically combines both wet and dry play elements to create a single integrated play unit such that the synergistic interplay of wet and dry play elements results in a whole that is more exciting, creative, and fun than the sum of its parts.

In accordance with one embodiment, the present invention provides a method of retrofitting or converting an existing dry play apparatus to incorporate various interactive wet play elements. This is accomplished by inserting water supply tubing inside the hollow support members of an existing dry play apparatus and using this tubing to transport water from a water supply source to water forming devices and associate control valves disposed throughout the play apparatus.

In accordance with another embodiment, the present invention provides a method of retrofitting or converting an existing dry play apparatus to incorporate various wet play elements. This is accomplished by disposing water supply tubing along the exterior surface of the non-hollow support members of the apparatus and using this tubing to transport water from a water supply source to water forming devices disposed throughout the dry play apparatus.

In accordance with another embodiment the present invention provides a water play structure having a plurality of support members, with hollow tubes or conduits inserted in or disposed adjacent to the support members, said hollow tubes carrying water from a water supply source to water forming devices located throughout the retrofit play structure.

Advantageously, the present invention not only makes possible the fabrication of inexpensive interactive water play structures, but it also allows retrofitting of existing dry play structures for interactive water play. By retrofitting or converting an existing dry play structure for interactive water play in accordance with the present invention, the normal expenses associated with the design, development and installation of a new interactive water play structure are greatly reduced. A related benefit is that existing manufacturers of dry play structures can incorporate a variety of wet play elements into currently produced dry play structures, allowing these manufacturers to offer both wet and dry versions of existing product lines without requiring substantial changes in manufacturing techniques or retooling of production lines. Moreover, because the inner surfaces of the support members do not contain the pressurized water transported by the conduits, they need not be coated or galvanized against corrosion, resulting in even further cost savings. The resulting manufacturing efficiency and flexibility in accordance with the present invention provides an enhanced product offering at significant cost savings.

Another feature and advantage of the subject invention is the synergistic integration of play elements and support structure. The method and manner in which components are arranged in the play environment significantly effects the educative process and degree of enjoyment that play participants experience. Often, dry play structures consist of isolated passive play elements separated by empty spaces. The subject invention not only provides interactive play

elements, but allows the use of empty spaces by yet other play partcipants, and coordinates many, if not all, play elements, valves, and water-forming devices into one integrated unit such that the synergistic interplay results in a whole that is more exciting, creative, and fun than the sum of its parts. Participants can experience and learn the value of interactive and cooperative play in a fun and enjoyable environment.

These and other embodiments, features and advantages of the present invention will become readily apparent to those skilled in the art from the following detailed description of the preferred embodiments having reference to the attached drawings, the invention not being limited to any particular preferred embodiment disclosed or described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevation view of a dry play structure prior to retrofitting in accordance with the present invention;

FIG. **2** is a top plan view of the dry play structure of FIG. **1**;

FIG. **3** is a schematic front elevation view of a wet interactive water play structure having features of the present invention and being formed by retrofitting or converting the dry play structure of FIG. **1**;

FIG. **4** is a schematic top plan view of the wet interactive water play structure of FIG. **3**;

FIG. **5** is a schematic view illustrating one possible method for retrofitting hollow support members of a dry play structure for interactive water play in accordance with the present invention;

FIG. **6** is a detail cross-section view of the support members of FIG. **5** retrofitted in accordance with the present invention;

FIG. **7** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated watergun;

FIG. **8** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated overhead bar jet;

FIG. **9** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated hose jet;

FIG. **10** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated stream or mist jet;

FIG. **11** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated horizontal stream jet;

FIG. **12** is a partial schematic view of an interactive water play element provided in the form of an overhead rope-pull-actuated mist jet;

FIG. **13** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated water falls; and

FIG. **14** is a partial schematic view of an interactive water play element provided in the form of a play-participant-actuated jet geyser.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Basic Dry Play Structure

FIGS. **1** and **2** are front elevation and top plan views, respectively, of a basic dry play structure prior to retrofitting in accordance with the present invention. The particular play structure shown is of an open frame design provided in the theme of a fortress or wilderness outpost or the like. Of course, those skilled in the art will readily appreciate that the present invention may be used with a wide variety of other possible dry play structures and exciting play themes or they may be unthemed. For example, a medieval castle, lost temple, military fort or fire station can each provide an exciting play theme for a play structure having features and advantages as taught herein. Other framing designs can also be used such as enclosed structures, molded fiberglass structures and the like.

The play structure **1** basically comprises a multi-level structure fabricated using any number of convenient materials and construction techniques well known to those skilled in the art. The structure **1** may be suitable for either outdoor or indoor use, as desired. Preferably, the structure **1** comprises a supporting framework formed from a plurality of interconnected support members, such as posts **19** and beams or rails **20**. The support members **19**, **20** may be formed from any number of convenient materials having sufficient strength and durability to safely support multiple play participants. For example, hollow plastic or PVC pipes, aluminum or steel pipes, I-beams or channel beams, reinforced concrete posts or beams, and the like may all be used to form the supporting framework for the play structure **1**. Preferably, posts **19** and beams **20** are hollow aluminum posts and beams having diameters ranging from about 4 to 6 inches. The posts **19** and beams **20** may be round or square in cross-section, as desired, or they may be provided in other cross-sectional shapes. Of course, those skilled in the art will appreciate that the present invention may be used with play structures constructed of other materials, such as solid metal beams, wood timbers, and/or other hollow or non-hollow support members.

A number of platforms **9**, **10** and **11** are preferably supported between adjacent post members **19** at various desired elevations with respect to ground level, defining play areas **2**, **3** and **4**. Play area **3** has an optional peaked roof **12**, as shown. As best illustrated in FIG. **2**, the platforms are preferably of similar shape and dimension such they can be assembled in a modular fashion, as shown. Mating 4'×4' square platforms and 4'×8' rectangular platforms are preferred, although it is envisioned that any one of a number of other suitable modular or non-modular shapes and sizes may also be used, including without limitation, triangles, pentagons, hexagons and/or trapezoids. Various dry play elements **5**, **6**, **8** and **13–17** are disposed in, on or around the play areas **2**, **3** and **4**, and may be accessed from the associated platforms **9**, **10** or **11**.

The various dry play elements are best illustrated in FIG. **2**, which is a top plan view of the dry play structure of FIG **1**. Play area **2** is connected between ground level and to play area **3** by "monkey bars" **5**. Other dry play elements incorporated in play area **2** include a wide slide or ramp **8** which is accessible from either ground level or the raised platform **9**. Play area **3** is connected to play area **4** by elevated bridge **6** and railings **18**. Other dry play elements incorporated in play area **3** include a ladder **13** and a double slide **14**. Play area **4** also includes several dry play elements such as a curved slide or ramp **15** accessible from either ground level or the raised platform **11**, a slide **16** and access steps **17**.

Retrofit Water Play Structure

FIGS. **3** and **4** are schematic front elevation and top plan views, respectively, illustrating the play structure of FIGS. **1**

and 2 after retrofitting for interactive water play in accordance with the present invention. In addition to the dry play elements, described above, the retrofit water play structure 1' incorporates a number of interactive water play elements, such as waterguns **50**, bar jets **60**, hose jets **70**, mist jets **77**, horizontal jets **80**, overhead rope-pull jets **90**, water falls **100** and jet geysers **105**. These elements are described in more detail later.

As can be seen from FIGS. **3** and **4**, the play structure 1' has been divided into three zones, A, B and C, each of which has an associated water distribution main **30**, **31** and **32**, respectively. In operation, a pump **28** or other supply source provides water through master control valve **29** to supply main **34** and then to each of the distribution mains **30**, **31** and **32**. Isolation valves **35**, **36** and **37** regulate water flow through each of the distribution mains **30**, **31** and **32**, respectively, in order to provide a safe, balanced and functional rate of water flow to the various control valves and water forming devices in each zone A, B and C. Isolation valves **35**, **36** and **37** also permit zone sequestering in order to facilitate independent temporary or emergency shutdown of a defective or malfunctioning zone while permitting operation of unaffected zones.

Preferably, the water supply main **34** and distribution mains **30**, **31**, and **32** are buried in the ground adjacent the play structure 1' so as to provide a subterranean water supply and distribution system. Master control valve **29** and isolation valves **35**, **36** and **37** are preferably mounted aboveground and/or in one or more accessible wells in order to facilitate adjustment thereof. While subterranean water distribution is preferred, alternative embodiments may include ground-level or elevated above-ground water supply and/or distribution systems, as may be convenient or desirable for the functioning of the play structure and/or to complement a desired theme.

Drainage may be provided, if desired, as either a waste water system or a recirculation system. If waste water drainage is provided, then preferably the various interactive water forming devices **50**, **60**, **70**, **77**, **80**, **90**, **100**, **105** are selected and/or adjusted to provide relatively low water output (less than about 200 gallons per minute (gpm) so as to reduce overall waste water runoff. If water recirculation is provided, then the overall water output of the interactive water play elements is less critical, although it may still be desirable to conserve water usage in order to minimize the energy required to run the water recirculation pump(s).

For example, in the particular preferred embodiment shown in FIGS. **3** and **4**, zone A produces a maximum or peak flow rate of approximately 26 gpm, zone B produces a peak flow rate of approximately 42 gpm, and zone C produces a peak flow rate of approximately 32 gpm for a total peak output of about 100 gpm. The flow capacity of recirculation pump **29** is preferably selected or adjusted to approximately match the overall peak output of the water play structure 1'. Alternatively, water requirements for each zone may be supplied by one or more individual recirculation pumps or other sources, as desired.

Illustrative water flow requirements for each of the various individual water play elements are summarized in TABLE 1 below:

TABLE 1

Ref. No.	Description	gpm (per effect)
50	waterguns	≈2 gpm
60	bar jets	≈5–10 gpm
70	hose jets	≈15 gpm
77	mist jets	≈2 gpm
80	horizontal jets	≈5–10 gpm
90	overhead rope-pull jets	≈2–5 gpm
100	water falls	≈15–25 gpm
105	jet geysers	≈5–10 gpm

FIGS. **5** and **6** are schematic and partial cross-sectional views, respectively, of one section of a typical retrofit water play structure having features of the present invention. FIG. **5** illustrates one preferred method for retrofitting or converting hollow support members of a dry play structure to accommodate interactive water play elements. In accordance with one preferred embodiment, water supply tubing or conduit **41** having an external diameter less than the internal diameter of support members **19** and **20** is positioned within the hollow support members **19** and **20**, as shown. Holes are drilled in the intersecting wall portions **47** of hollow support members **19** and **20**, as needed, to accommodate insertion and passage of the supply conduit **41** throughout the play structure.

Control valve **42** is mounted within the hollow support member **20**, as shown, with the actuator extending through an opening provided in the outer wall of the support member. The valve **42** may comprise any number of commercially available valves well known to those skilled in the art. These may include, for example, wheel-controlled butterfly valves, lever-controlled butterfly valves, counter-weight valves, gate valves, flush valves, wheel-controlled ball valves, lever-controlled ball valves, and any number of other control valves well know to those skilled in the art. A standard 1 inch diameter in-line ball valve should be suitable for most purposes. Push-button actuated valves are particularly preferred. These can be instantaneous on/off valves, sustained on/off valves, variable flow valves, or other types of push-button valves, as desired. Electric solenoid valves and the like may also be used, provided that the circuitry is well isolated and/or the operating voltage is sufficiently low to avoid a shock hazard.

Those skilled in the art will appreciate that valve **42** operates mist jet **77**, which is also mounted within the hollow support beam member **20**, as shown in FIG. **6**. The mist jet **77** comprises a nozzle having an opening formed at the discharge end thereof and adapted to spray a mist or fan pattern of water into the air, as shown. The nozzle portion of the mist jet **77** is aligned with an opening formed in the outer wall of the hollow support beam member **20**, as shown, to allow spraying of water when push button **43** of valve **42** is actuated. A threaded collar (not shown) may be used to secure the nozzle portion of mist jet **77** to the wall of the hollow support beam member **20**. Optionally, the mist jet **77** or a portion thereof may be adapted to rotate to allow play participants to adjust the spray pattern from a fine mist to a coarse stream in accordance with well known principles of spray nozzle design.

In order to keep internal conduit **41** and various other components of the interactive water play elements, such as push-button actuated control valve **42** and mist jet **77**, in a fixed position relative to the support members **19** and **20**, optional internal packing or bracing **44** may be used inside the hollow support members **19** and **20**, as desired. Bracing

materials may include, without limitation, silicone, rubber, styrofoam, or the like. Alternatively, these and/or other components can be secured to the hollow support members by a threaded lock ring or the like (not shown), threaded over a protruding end of a nozzle or push button actuator. Optionally, if desired, openings formed in the wall of the support members **19** and **20** may be countersunk to accommodate a threaded lock ring or the like.

Internal conduit **41** may comprise any one of a number of water-carrying pipe or tube structures well know to those skilled in the art. Polyvinyl chloride (PVC) pipes are particularly preferred because of their light weight, durability and low cost. Of course, other durable materials such as plastic, fiberglass, ceramic, copper or galvanized steel may also be used to form conduit **41** as the particular application permits. If desired, one or more portions of the conduit **41** or all of the conduit **41** may comprise flexible hosing, such as rubber or polytetrafluoride (PTF).

Internal conduit **41** is preferably round and has an outer diameter of between about ¼ and 3 inches and, more preferably, between about ¾ and 1½ inches, and most preferably, about 1 inch. This should ensure adequate volume of water flow and water pressure throughout the play structure. Alternatively, a wide variety of other types and sizes of conduit may be used while still enjoying the benefits of the invention herein disclosed. Individual conduit sections may be connected to one another using any one of a number of well-known pipe-joining devices or techniques available to those skilled in the art, including without limitation threaded assembly, press-fit, gluing, heat welding, ultra-sonic welding, chemical welding or bonding, as desired. Threaded assembly and/or chemical welding is preferred, however, for durability and ease of assembly.

Water supply conduit **41** can either be of a uniform diameter and/or water carrying capacity throughout the play structure **1'** or, if desired, certain portions may be of a larger or smaller internal diameter than other portions in order to balance the flow of water and pressure to the various interactive water play elements. Alternatively, one or more flow restrictors or orifices (not shown) may be provided in the flow path of water through one or more portions of the conduit **41** in order to help balance the flow of water to the various water play elements in accordance with well known principles of hydrodynamics.

In alternative embodiments, the subject invention may also be utilized in connection with play structures that incorporate solid or semi-solid support members. In that case, water supply conduit **41** may be secured to an external surface of the support structure, rather than inside the support members. Those skilled in the art will recognize that a wide variety of interactive water play elements can be incorporated in various types of dry play structures in accordance with the general principles and teachings of the present invention as taught herein.

The present invention makes possible the fabrication of inexpensive interactive water play structures and also allows retrofitting of existing dry play structures for interactive water play. Thus, the normal expenses associated with the design, development and installation of a new interactive water play structure are greatly reduced. By incorporating a variety of wet play elements into currently produced dry play structures, existing manufacturers of dry play structures can offer both wet and dry versions of existing product lines without substantial changes in their manufacturing techniques or retooling of production lines. As the water supply for the wet play structure is not contained by the inner surfaces of the support members, such surfaces need not be coated or galvanized against corrosion, resulting in even further cost savings. The resulting manufacturing efficiency and flexibility in accordance with the present invention provides an enhanced product offering at significant cost savings.

The subject invention also advantageously allows the utilization of empty spaces in a dry play structure by yet other play participants, and coordinates many, if not all, play elements, valves, and water-forming devices into one integrated unit such that the synergistic interplay results in a whole that is more exciting, creative, and fun than the sum of its parts. The method and manner in which components are arranged in the play environment significantly effects the educative process and degree of enjoyment that play participants experience. Thus, play participants can experience and learn the value of interactive and cooperative group play in a fun and enjoyable environment.

Interactive Water Play Elements

FIG. **7** illustrates one embodiment of an interactive water play element provided in the form of a watergun **50** mounted on a railing **18**. Watergun **50** generally comprises a housing **51** mounted on a swivel base **52**, and a nozzle **55** from which water is ejected. In operation, a play participant depresses a handle or trigger **53** causing a valve **54** (shown here schematically) to open. Water from supply conduit **41** passes through valve **54** and is ejected out nozzle **55** as a continuous or broken stream of water. When the handle **53** is released, the watergun valve **54** preferably automatically returns to a closed position, stopping the flow of water through the nozzle **55**. The water supply for watergun **50** is provided by supply conduit **41** which runs from distribution main **31** to watergun **50** within the hollow interior of support member **19**, as described above. Supply conduit **41** is preferably about ¼ to ½ inch in diameter, depending upon water flow requirements.

FIG. **8** illustrates one embodiment of an interactive water play element provided in the form of one or more bar jets **60** provided on the underside of a horizontal support beam **20** such as on elevated bridge **6**. Bar jets **60** preferably comprise one or more openings **61** provided on the underside of horizontal support beam **20**. Downward directed nipple nozzles **62** are disposed in the openings **61** and, when actuated, eject downward vertical streams of water simulating, for instance, the bars of a prison cell or a laser beam force field. Water supply for bar jets **60** is provided by supply conduit **41** which runs from distribution main **31** to each of the nipple nozzles **62** through the hollow interior of post member **19** and horizontal support beam **20** of elevated bridge **6**. Alternatively, conduit **41** may have formed therein a series of longitudinally spaced apertures for spraying streams of water and the horizontal support beam **20** may have a corresponding slotted opening (not shown) for accommodating the spraying water.

A push-button actuated control valve **63** is provided in the path of water flow through the conduit **41** such that it controls the water supplied to the bar jets **60**. Water will shoot out of bar jets **60**, for example, when a play participant depresses push-button **64**. Persons skilled in the art will appreciate that the push-button **64** may either be placed inside of the water spray pattern from bar jets **60** or outside the water spray pattern, depending upon the effect desired.

FIG. **9** shows one embodiment of an interactive water play element provided in the form of a hose jet **70**. Hose jet **70** preferably comprises a suitable hose fitting or nozzle **71**

mounted on the hollow post member **19**. The water supply for hose jet **70** is provided by supply conduit **41** from distribution main **30** through the hollow interior of support member **19**, as described above. A control valve **72**, preferably push-button actuated, is provided in the path of water flow through the supply conduit **41** such that it controls water to the hose jet. In operation, a play participant will depress push button **73**, which will in turn open control valve **72**, allowing water to flow out of nozzle **71**. A ½ to ¾ inch heavy duty rubber hose **74** is attached to hose fitting **75** to allow a water play participant to direct the flow of water emitting from the hose jet **70**. Alternatively, the valve **72** may be a standard in-line ball valve and the hose **74** may include a play-particises through valve **83** to horizontal jets **80** when push button **84** or other suitable actuator is depressed.

FIG. **12** illustrates one embodiment of an interactive water play element provided in the form of an overhead rope-pull jet **90** mounted on a horizontal support beam **20**. Rope-pull jet **90** preferably comprises a pull-rope-actuated valve **91** (shown schematically), a pull-rope **92** and one or more overhead spray jets **93** provided in corresponding openings **94** formed in horizontal support beam **20**. Water supply for rope-pull jet **90** is provided by supply conduit **41** running from distribution main **30** to rope pull jet **90** through the hollow interiors of support member **19** and horizontal support beam **20**. Valve **91** is provided in the path of water flow through conduit **41** such that water may pass through valve **91** when rope **92** is tugged on by a play participant. The water then sprays out of the spray jet **93** onto play participants below. When rope **92** is released, valve **91** preferably returns to its closed position and water ceases to shoot out of spray jet **93**.

FIG. **13** illustrates one embodiment of an interactive water play element provided in the form of a water falls **100**. Preferably, water falls **100** comprises a water distribution box **101** mounted on the top of peaked roof **12**, as shown, or other elevated structure. One or more slotted openings or weirs or openings are provided along various sides of the water distribution box **101** through or over which water is allowed to flow. Water supply for water falls **100** is provided by supply conduit **41** running from distribution main **31** to water distribution box **101** through the hollow interior of support member **19** and along the underside of peaked roof **12**. Valve **102**, preferably push-button actuated, is provided in the path of water flow through conduit **41** such that water may pass through valve **102** to distribution box **101** when push button **103** is depressed by a play participant. The water then continuously showers down one or more sides of the roof **12** simulating a water curtain or water fall. Alternatively, water distribution box **101** may be mounted under, or partially through peaked roof **12**, such that water flowing from water distribution box **101** will flow both on and under peaked roof **12**, thereby enhancing the water play effect and allowing more play participants to get wet.

FIG. **14** illustrates one embodiment of an interactive water play element provided in the form of a jet geyser **105**, mounted in raised platform **9**. Jet geyser **105** preferably comprises an upward directed nozzle **106** mounted in an opening **107** formed in raised platform **9**. The nozzle **106** may comprise ½ to ¾ inch PVC pipe flush-mounted with the top surface of platform **9**. Water supply hose **108**, comprising ½ to ¾ inch flexible hose, PVC pipe or the like, extends underneath the platform **9** and is connected between nozzle **106** and supply conduit **41**. Control valve **109**, preferably push-button actuated, is provided in the path of water flow from the distribution main **30** to the nozzle **106**. When the control valve **109** is actuated, water shoots upwards from nozzle **106**, simulating an erupting geyser. Preferably, when the play participant releases button **110**, control valve **109** automatically closes and stops water flowing to the nozzle **106**. If desired, a plurality of jet geysers may be mounted in the floor of a platform, as shown in raised platform **11** of FIG. **4**. Alternatively, the geyser jet **105** could be of the jumping-water-ball type wherein balls or short sports of water are caused to jump upward out of the nozzle when the control valve **109** is actuated.

It should be noted that, in alternate embodiments of the subject invention, other types of valves and activation devices may be used in the place of the push button control valves described in the above invention. Such activation devices may include handwheels, levers, gate valves and the like. In addition, a plurality of valves and activation devices may be used such that participants must operate two or more valves or activation devices simultaneously in order to achieve the desired water effect, thus fostering group interactive participation.

Although this invention has been disclosed and described in the context of certain preferred embodiments, it will be understood by those skilled in the art that the present invention extends beyond the specific disclosed embodiments to other alternative embodiments of the invention. Thus, it is intended that the scope of the present invention herein disclosed should not be limited to the particular disclosed embodiments described above, but should be determined only by a fair reading of the claims that follow.

What is claimed is:

1. A method for installing an interactive water play element in a hollow support member of a play structure, comprising the following steps:

forming an opening in said support member;

inserting a water forming element in said opening formed in said support member;

inserting one or more water supply conduits inside said hollow support member, said supply conduit having an external diameter that is less than the internal diameter of said hollow support member;

placing one end of said supply conduit in communication with a source of water and placing the other end of said supply conduit in communication with said water forming element; and

providing a control valve in the path of water flow from said source to said water forming element, thereby enabling play participants to adjust the velocity, amount or direction of water provided to said water forming element.

2. The method of claim **1**, wherein said water forming element comprises a watergun.

3. The method of claim **1**, wherein said water forming element comprises a series of nipple nozzles.

4. The method of claim **1**, wherein said water forming element comprises a hose.

5. The method of claim **1**, wherein said water forming element comprises a mist jet nozzle.

6. The method of claim **1**, wherein said water forming element comprises a plurality of overhead spray jets.

7. The method of claim **1**, wherein said water forming element comprises an upward directed nozzle adapted to form a water geyser.

8. The method of claim **1**, wherein said control valve comprises an on/off push-button-actuated valve.

9. The method of claim **1**, wherein said control valve comprises an instantaneous on/off push-button-actuated valve.

10. The method of claim 1, wherein said control valve comprises a sustained on/off push-button-actuated valve.

11. The method of claim 1, comprising the further step of securing said water forming element to said support member by threaded engagement with a lock nut, lock washer or other threaded member.

12. The method of claim 11, comprising the further step of counter-sinking the exterior side of said opening to allow for substantially flush-mounting of said water forming element.

13. The method of claim 1, comprising the further step of dividing said play structure into a plurality of zones and providing a plurality of interactive water play elements in each zone throughout said play structure and wherein separate distribution conduits are provided for supplying water to each said zone.

14. The method of claim 13, comprising the further step of providing one or more isolation valves in series with each of said distribution conduits for facilitating independent control and/or shut down of water supplied to each said zone.

15. The method of claim 13, comprising the further step of selecting and/or adjusting said plurality of interactive water play elements to provide a total peak output of less than about 200 gpm.

16. The method of claim 15, wherein said interactive water play elements are selected and/or adjusted to provide a total peak output of about 100 gpm.

17. A method for converting a dry play structure for wet interactive play, comprising the following steps:

forming one or more openings and/or passageways in said dry play structure for accommodating the insertion of interactive water play elements and/or water supply conduits;

inserting one or more water forming elements in said openings or passageways;

inserting one or more corresponding play-participant-actuated control valves in said openings or passageways in the path of water flow to at least one of said water forming elements;

inserting one or more supply conduits in said openings or passageways;

connecting one end of said supply conduit to a source of water and connecting the other end of said supply conduit to one or more of said control valves;

whereby play participants can adjust the velocity, amount or direction of water provided by one or more of said water forming elements.

18. An interactive water play structure, comprising:

a plurality of hollow support members;

a plurality of platforms supported by said support members at various locations and/or elevations throughout said play structure and being adapted to safely support multiple play participants playing on, in or around said play structure;

one or more water forming elements secured within corresponding openings formed in said hollow support members;

one or more supply conduits disposed inside said hollow support members of said play structure, said supply conduit having an external diameter that is less than the internal diameter of said hollow support members, said supply conduit having one end in fluid communication with a source of water and another end in fluid communication with one or more of said water forming elements; and

one or more play-participant-actuated control valves provided in the path of water flow from said source to one or more of said corresponding water forming elements for enabling play participants to adjust the velocity, amount or direction of water provided to each said corresponding water forming element;

whereby an inexpensive interactive water play structure is provided wherein the water supplied to said water forming elements is substantially contained away from and does not contact the inner walls of the hollow support members.

19. The water play structure of claim 18, wherein at least one of said water forming elements comprises a watergun.

20. The water play structure of claim 18, wherein at least one of said water forming elements comprises nipple nozzles.

21. The water play structure of claim 18, wherein at least one of said water forming elements comprises a hose.

22. The water play structure of claim 18, wherein at least one of said water forming elements comprises a mist jet nozzle.

23. The water play structure of claim 18, wherein at least one of said water forming elements comprises an overhead spray jet.

24. The water play structure of claim 18, wherein at least one of said water forming element comprises water falls.

25. The water play structure of claim 18, wherein at least one of said water forming elements comprises an upward directed nozzle adapted to form a water geyser.

26. The water play structure of claim 18, wherein at least one of said control valves comprises an on/off push-button-actuated valve.

27. The water play structure of claim 26, wherein said control valve comprises an instantaneous on/off push-button-actuated valve.

28. The water play structure of claim 26, wherein said control valve comprises a sustained on/off push-button-actuated valve.

29. The water play structure of claim 18, wherein at least one of said water forming elements is secured to said support member by threaded engagement with a lock nut, lock washer or other threaded member.

30. The water play structure of claim 29, wherein the exterior side of at least one of said openings is countersunk to allow for substantially flush-mounting of said corresponding water forming element.

31. The water play structure of claim 18, wherein said play structure is divided into a plurality of zones each comprising a plurality of interactive water play elements and wherein separate distribution conduits are provided for supplying water to each said zone.

32. The water play structure of claim 31, further comprising one or more isolation valves in series with each of said distribution conduit for facilitating independent control and/or shut down of water supplied to each said zone.

33. The water play structure of claim 18, wherein said interactive water play elements are selected and/or adjusted to provide a total peak output of less than about 200 gpm.

34. The water play structure of claim 18, wherein said interactive water play elements are selected and/or adjusted to provide a total peak output of about 100 gpm.

35. An interactive water play structure, comprising:

a plurality of support members;

a plurality of platforms supported by said support members at various locations and/or elevations throughout said play structure and being adapted to safely support multiple play participants playing on, in or around said platforms;

one or more water forming elements secured to said support members or platforms and being adapted to create a desired water effect;

one or more play-participant-actuated control valves secured to said support members or platforms and being adapted to control the velocity, amount or direction of water provided by a corresponding water forming element; and

one or more water supply conduits secured to said support members or platforms, said supply conduit having one end in communication with a source of water and another end in communication with one or more of said water forming elements whereby an inexpensive interactive water play structure is provided.

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