United States Patent

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[54] FOUNTAIN DISPLAY HAVING A MOVING SPRAY

12 Claims, 4 Drawing Figs.

[52] U.S. Cl. **239/20,** 239/18
[51] **Int. Cl.** **F12p 7/00**
[50] **Field of Search** 239/16-23, 536, 558, 550

[56] **References Cited**

UNITED STATES PATENTS

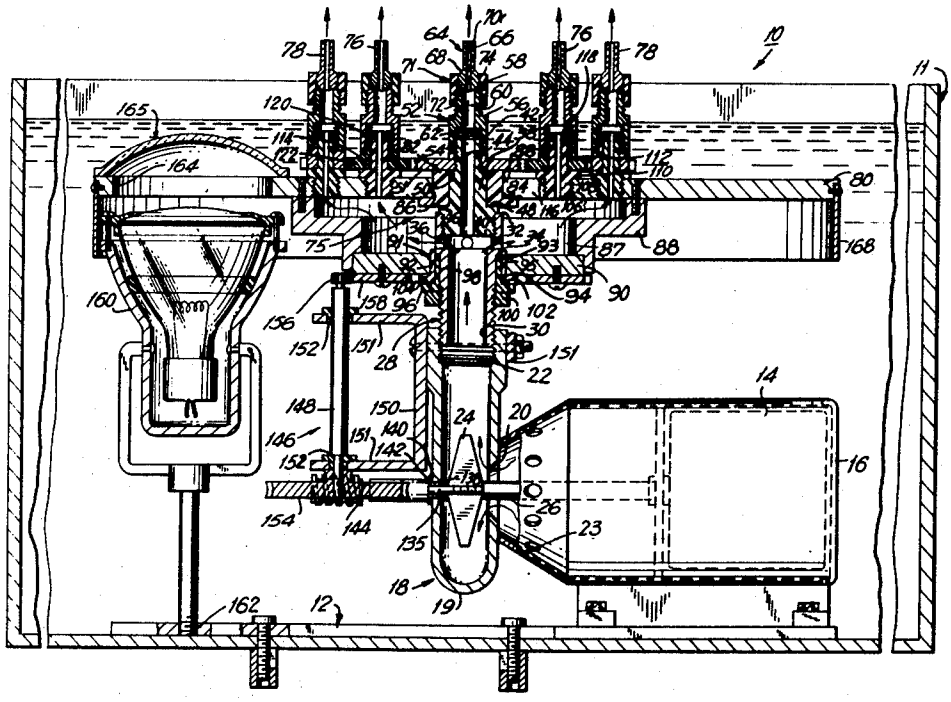
966,229	8/1910	McLevie	239/18
2,687,915	8/1954	Keech	239/18

FOREIGN PATENTS

1,150,029	6/1963	Germany	239/17
690,707	0/1965	Italy	239/17

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ABSTRACT: A pool fountain display consists of a primary central nozzle around which a plurality of secondary nozzles orbit in concentric relation thereto. Water is supplied from the bottom of the pool to a water pump and from the pump it is forced directly to the central nozzle and simultaneously to all of the secondary nozzles by means of a plenum chamber. A motor drives the pump and simultaneously rotates the secondary nozzles about the central nozzle. All of the nozzles have individual angularly adjustable heads. Some of the secondary nozzles rotate about their own axes as they travel concentrically around the central nozzle, this by means of a sun and planetary gear arrangement, and others are rotated about their own axes by the rotating planetary gears. Colored lenses rotate about the central nozzle along with the secondary nozzles. Stationary lights, mounted below the lenses, illuminate the moving fountain spray through the rotating lenses.



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Sheet 1 of 2

FIG. 1

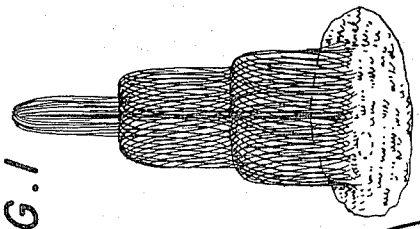


FIG. 2

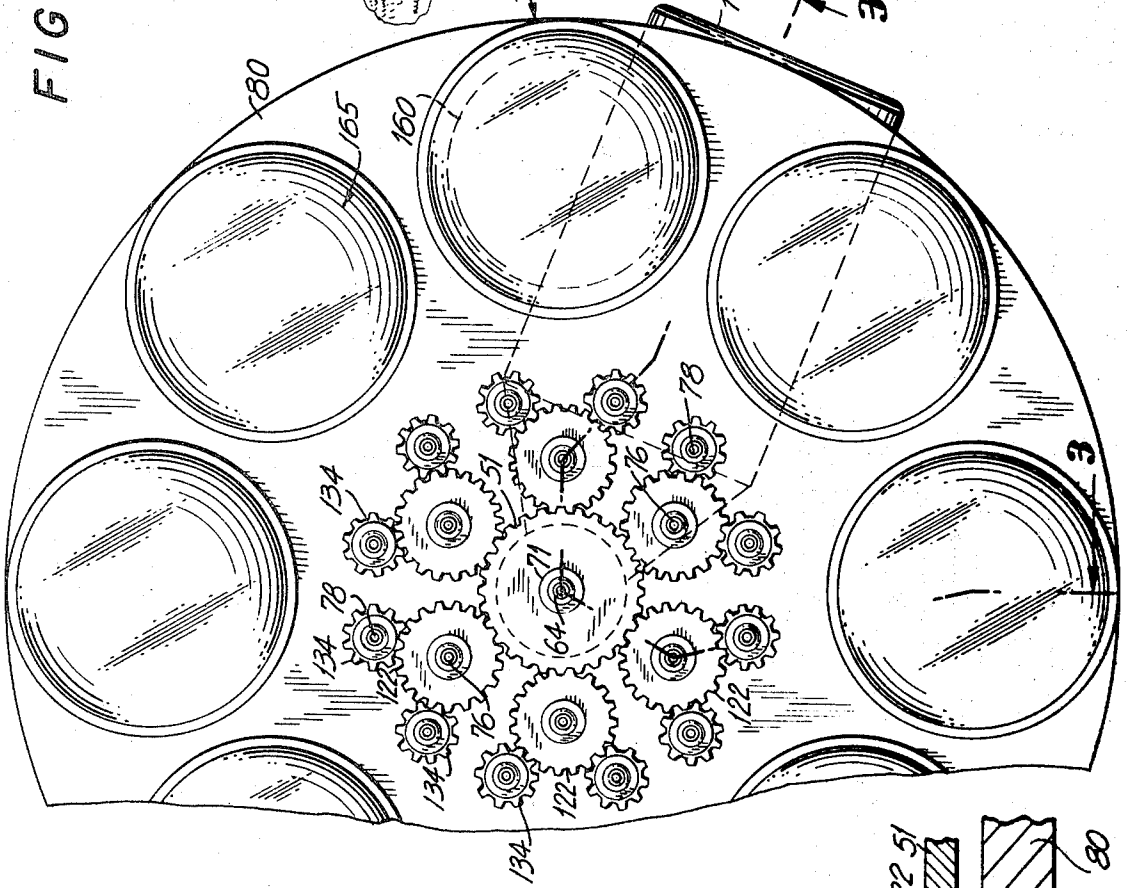
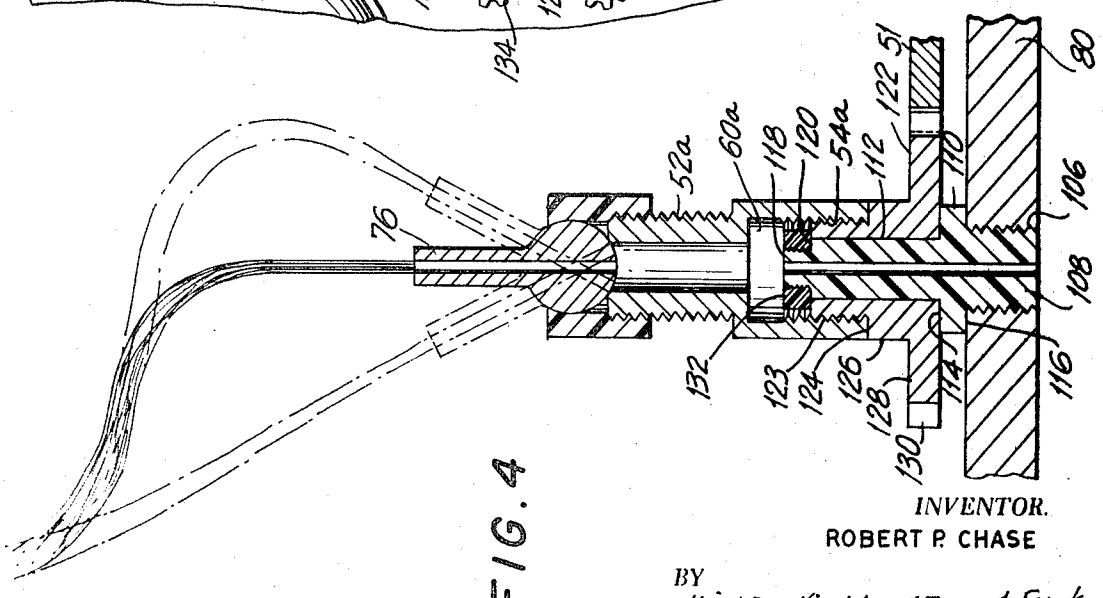


FIG. 4



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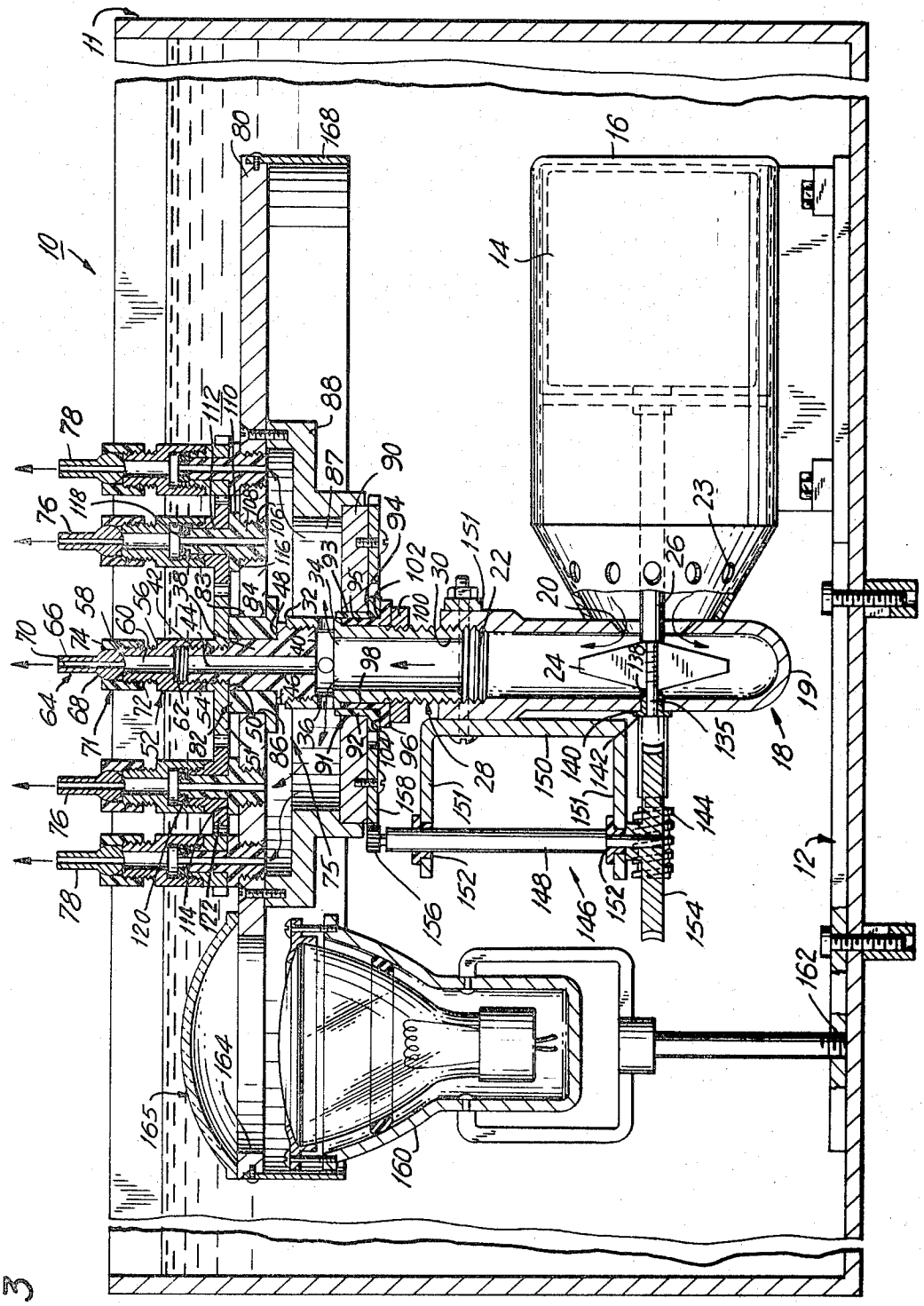


FIG. 3

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FOUNTAIN DISPLAY HAVING A MOVING SPRAY

BACKGROUND OF THE INVENTION

1. Field of the Invention

Display water fountains.

2. Description of the Prior Art

Illuminated fountains present a most enjoyable sight and serve to beautify many fairs, parks, airports, buildings and other structures. It has been heretofore known to utilize, in conjunction with illuminated fountain displays, a series of colored lenses which pass over stationary underwater lights to vary the color of the light illuminating the water spray. Such fountains produce colorful and somewhat attractive display effects at a reasonable cost, but lack the ability to vary the direction and/or pattern of the fountain spray.

It has been additionally known heretofore to provide an automatically variously adjustable spray in conjunction with display fountains. Some of these prior devices did, additionally, include colored light effects. There were, however, quite elaborate and involved a multiplicity of parts and systems for controlling and varying the fountain spray. Accordingly, prior devices which varied the spray were extremely costly and because of their high costs, the use of fountains which produced a moving-type water display was limited to municipalities and establishments with sufficient budgetary allotments for such equipment.

An additional difficulty encountered with these prior devices was the fact that they consisted of so many parts and systems that they were frequently disabled. This was due to the fact that a single particle, for instance, carried with the water, could clog and impede one of the many various components of the prior fountains. Thus, in addition to high initial costs, the maintenance costs for such equipment were also an impediment to widespread acceptance.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an illuminated fountain display which is so constructed that it is not subject to any of the foregoing disadvantages.

More specifically, it is an object of the invention to provide an illuminated fountain display of the character described which is simple and rugged in construction, and which can be fabricated at an appreciably lower cost than prior devices designed to serve the same function.

It is another object of the invention to provide a fountain display of the character described wherein a plurality of orbiting sprays move concentrically about a stationary central spray.

Yet another object of the invention is to provide a fountain display of the character described wherein a series of nozzles travel in concentric relation about a central nozzle and additionally rotate about their individual axes.

Still another object of the invention is to provide a fountain display of the character described wherein a disc carrying a plurality of colored lenses and water spray nozzles moves concentrically about a stationary nozzle.

It is another object of the present invention to provide a fountain display of the character described wherein two series of secondary nozzles move concentrically about a central nozzle and simultaneously about their own axes.

It is another object of the invention to provide a fountain display of the character described wherein a series of secondary nozzles are swivelably mounted upon a disc and move concentrically about a central nozzle while rotating about their individual axes.

Other objects of the invention in part will be obvious and in part will be pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts which will be exemplified in the illuminated fountain display hereinafter described and of which the scope of application will be indicated in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings in which is shown one of the various possible embodiments of the invention:

FIG. 1 is an isometric view of the fountain display in a pool, showing the spray created;

FIG. 2 is a plan view of the fountain display of the present invention with a portion thereof broken away;

FIG. 3 is a sectional view taken along line 3–3 of FIG. 2 with portions deleted for clarity; and

FIG. 4 is an enlarged fragmentary axial sectional view of one of the secondary spray nozzles, and showing in dashed lines, various possible positions of the nozzle during the course of its operation and the swirl spray generated.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The fountain display **10** generates a central stationary spray and a series of sprays which circularly orbit the stationary spray in concentric relation thereto. The orbiting sprays can be angularly inclined with respect to a vertical axis running through their respective spray nozzle seats and as they orbit the central spray, the orbiting spray generating nozzles rotate about vertical axes running through their respective nozzle seats to generate individual swirl spray patterns. The nozzles of the orbiting sprays are mounted to a plate and are supplied with water by a plenum chamber secured to and below the plate. Both the plate and the base rotate about a central spindle to which the central nozzle is directly mounted.

Referring now in detail to the drawings, the reference numeral **10** denotes the fountain display of the present invention, submerged within a pool **11** of water as seen in FIG. 1. The display **10**, is mounted to a base plate **12** below the water level. The base plate **12** is shaped to support the various components of the display **10** and is fastened to the bottom of the pool.

As seen in FIG. 3, the display is actuated by means of an electric motor **14**, suitably mounted within a submersible motor casing **16** which, in turn, is secured to the base plate **12** by any conventional fastening arrangement such as nuts and bolts.

A centrifugal pump **18** has a pump casing **19**. The pump casing **19** is constructed with an inlet portion **20** and a female threaded outlet portion **22**. The pump casing **19** is secured to the motor casing **16**. The casing **16** has inlets **23** through which water is drawn from the bottom of the pool to the pump through the pump inlet **20**. Impeller blades **24** of the pump **18** are driven by a shaft **26** connected to the motor **14** and rotated thereby.

A hollow supply pipe **28** having male threads adjacent its inlet end **30**, threadingly engages the pump outlet **22**, and projects vertically upward therefrom being supported thereby. The upper end **32** of said water supply pipe **28** has an enlarged female threaded bore. The outer diameter of the supply pipe **28** is enlarged from the end **32** to a stepped shoulder **34** from which point downwardly the outer diameter of the pipe **28** is constant.

A portion of the water flow from the pump **18** escapes from the pipe **28** before reaching the upper end **32** thereof through a plurality of radial holes **36** slightly above the shoulder **34**.

A coupling **38** having male threaded inlet **40** and outlet **42** ends and an axial bore **44** engages the upper end **32** of the pipe **28**. The diameter of said bore **44** is slightly larger than that of the circular holes **36** and the bore **44** is cylindrical throughout the length of the coupling **38**. The outer diameter of the coupling **38** increases from that at the male threaded inlet end **40** at a stepped shoulder **46** which abuts the upper end **32** of the pipe **28**. Said external diameter then decreases at a step **48** and again at a step **50**, from which point it remains constant upwardly to its male threaded outlet end **42**.

A sun gear **51** having a centrally located opening is fixed to the upper portion of the coupling and is seated upon the shoulder of the step **50**. The function of the sun gear **51** will be described hereinafter.

A hollow elongated nozzle seat **52** threadingly engages the coupling outlet end **42** at its female threaded inlet end **54**. The external diameter of the seat **52** decreases at a shoulder **56**, from which point a male threaded portion extends upwardly to a spherically dished outlet end **58**. The bore **60** of the nozzle seat **52** is enlarged at its internally threaded inlet end **54** to threadingly engage the outlet end **42** of the coupling **38**. The inlet end **54** of the nozzle seat **52** engages the upper face of the sun gear **51** to lock the sun gear between the nozzle seat and the coupling against both vertical and rotational movement. The diameter of the bore **60** is reduced at a step **62** from which point the bore extends cylindrically to the outlet end **58**.

A primary central nozzle **64** is seated over the bored portion of the dished outlet end **58** of the nozzle seat **52**. The nozzle **64** is composed of an elongate tubular body portion **66** which projects integrally from a spherical base **68** whose curvature matches that of the dished end **66**. A cylindrical hollow bore **70** of restricted diameter passes centrally through the longitudinal axis of the nozzle body **66** and the base **68**.

The nozzle **64** is swivelably secured to the outlet end **58** of the nozzle seat **52** by a hollow cylindrical cap **71** having a bore running through the length thereof. The bore is female threaded from the lower end **72** of the cap **71**. The threads matingly engage the male threads at the outlet end **58** of the nozzle seat **52**. At the opposite end **74** of the cap **71** the internal walls of the bore taper inwardly and upwardly in an arcuate path and are constricted to a diameter at the end **74** of the cap **71** which is less than the major diameter of the spherical base **68**. The tapered walls of the cap bore form a bearing surface which mates with the spherical base **68** of the nozzle **64** so that the nozzle is secured in a ball-and-socket joint which permits inclination of the nozzle **64** with respect to the common longitudinal vertical axis of nozzle seat **52**, the nozzle coupling **38** and the water supply pipe **28**.

The nozzle coupling **38** and the supply pipe **28** form a stationary spindle **75** about which orbiting secondary nozzles **76** and **78** rotate. The nozzles **76** and **78** are carried by a horizontal plate **80** which is rotatably journaled to the coupling **38** of the spindle **75**. The journaled connection between the plate **80** and the coupling **38** comprises a cylindrical bearing **82**. The outer cylindrical surface **83** of the bearing **82** is stepped outwardly to an enlarged diameter at a shoulder **84**, spaced from the lower end of the bearing. The outer cylindrical surface **83** is of a diameter which is equal to or slightly greater than a circular opening **86** in the center of the plate **80** so that the bearing **82** is press fitted in the plate **80**. The shoulder **84** abuts the bottom of the plate **80** when the bearing **82** is firmly seated. When the plate **80** is mounted on the spindle **75**, the lower end of the bearing **82** rotatably abuts the shoulder of the step **48** on the coupling **38** so that said step acts as a thrust bearing.

A plenum chamber **87** supplies water to the orbiting nozzles **76** and **78**. The plenum chamber sidewall **88** is concentrically connected to and depends from the bottom of the plate **80**. The chamber wall **88** has a stepped groove adjacent the bottom thereof to accommodate a circular plenum base **90**. The base **90** is constructed with a central circular opening **91** into which is forced a stepped cylindrical bearing **92**. The outer cylindrical surface **93** of the bearing **92** is stepped outwardly to an enlarged diameter at a shoulder **94**, spaced from the lower end of the base **90**. A hollow cylindrical bore **95** passes through the bearing **92**. The outer cylindrical surface **93** is of a diameter which is equal to or slightly greater than the mating circular opening **91** in the center of the plenum chamber base **90**, so that the bearing **92** is press fitted in the base **90**. When the bearing **92** is firmly seated, the shoulder **94** will abut the bottom of the base **90**.

A stepped pipe bearing **96** is mounted upon the outer surface of the supply pipe **28**. The diameter of the bore **98** running through the bearing **96** is such as to accommodate the outer diameter of the supply pipe **28**. The upper end of the bearing **96** abuttingly engages the shoulder **34** of the pipe **28** and is maintained in such position by a nut **100**. The nut **100** threadingly engages the male threaded surface of the supply pipe **28** and abuts the lower end of the bearing **96**, forcing the upper end of the bearing **96** against the shoulder **34**.

The outer cylindrical surface **102** of the pipe bearing **96** is stepped outwardly to an enlarged diameter at a shoulder **104** spaced from the lower end of the bearing. The outer cylindrical surface **102** is of a diameter which is slightly less (*e.g.* .0005 inches) than the diameter of the bore **95** running through the bearing **92**. Thus, when the bearings **92**, **96** are interengaged, rotation of the bearing **92** around the bearing **96** is permitted. When the bearing **92** is rotatably seated on the pipe bearing **96**, the shoulder **104** of the pipe bearing **96** will rotatably abut the bottom of the bearing **92** and provide a stop to prevent downward movement of the plenum chamber **87** with respect to the spindle **75**. The pipe bearing **96** is held against downward movement with respect to the spindle **75** by means of the nut **100**.

The bearings which journal the plenum chamber **87** to the spindle **75** form a rotatable watertight connection. At the journal between the plenum base **90** and the water supply pipe **28** of the spindle **75**, the pipe bearing **96** acts as a stator bearing and is constructed of brass, nylon or any other material having suitable physical properties. Additionally, the mating stepped bearing **92** acts as a rotor bearing and is press fitted into the plate **90**. This bearing may also be constructed of brass, nylon or any other material having suitable physical properties.

At the journal between the plate **80** of the plenum chamber and the coupling **38** of the spindle **75**, the stepped bearing **82** acts as a rotor bearing which is press fitted into the plate **80**. The coupling **38** and the bearing **82** may both be constructed of brass, nylon or any other material having suitable physical properties.

Referring now to FIG. 4, the nozzles **76** are carried by the circular plate **80** and are mounted in concentric relation around the spindle **75** by a plurality of threaded openings **106** in the plate **80**. A bored nozzle seat support **108** having a male threaded lower end is engaged in each of the openings **106**. Each nozzle seat support has an intermediate peripheral flange **110**. The flange **110** projects radially outwardly from the cylindrical outer wall **112** of the nozzle seat support **108** with shoulders **114** and **116** serving as top and bottom faces thereof. Adjacent the upper end **118** of the nozzle seat support **108**, a shoulder **120** is formed which joins the male threaded upper end **118** to the cylindrical outer wall **112**. The male threaded upper end **118** is of a diameter which is less than that of the cylindrical outer wall **112**.

A planetary gear **122** having a central circular bore is rotatably mounted on the cylindrical outer wall **112** of the nozzle seat support **108** with the lower surface of the gear **122** abutting the shoulder **114** of the nozzle seat support. The upper portion of the gear **122** is cylindrical with a male threaded portion **123** adjacent the upper end thereof. An annular shoulder **124** extends from the threaded portion to a section of increased diameter **126** and a second shoulder **128** extends to the gear teeth **130**. The planetary gear **122** is held against axial movement on the nozzle seat support **108** and against shoulder **124** by a stop nut **132** which threadingly engages the upper end **118** of the nozzle seat support **108** and overlies a portion of the upper face of the gear **122**. The maximum width of the nut **132** is, however, less than the diameter of the male threaded upper portion **123** of the gear **122**. The fit between the bore of the planetary gear and the wall **112** permits rotation of the said gear about the nozzle seat support **108**.

A hollow elongated nozzle seat **52*a*** threadingly engages the threaded upper portion of the gear **122** at its female threaded inlet end **54*a***. The nozzle seat **52*a*** is identical in structure to the nozzle seat **42** except that the threads in the inlet end **54*a*** do not extend the full length of the enlarged inlet bore **60*a***. The bore **60*a*** is further enlarged after the threads terminate to provide additional clearance for the nut **132** which rotatably secures the gear **122** against vertical movement as previously described.

The remainder of the nozzle mounting structure and the nozzle **76** itself is identical to that of the nozzle **64**.

The auxiliary planetary nozzles **78** are also carried by the plate **80** and are mounted in concentric relation around both spindle **75** and planetary nozzles **76**. The diameter of a circular centerline passing through the centers of the auxiliary planetary nozzles **78** is greater than the diameter of a circular centerline passing through the centers of the planetary nozzles **76**. The structure of the nozzles **78** and their associated mountings are identical to that of the nozzles **76** with their associated mountings, the single exception being the gear diameter and number of teeth on the gear portions **134** which are used in lieu of the gear **122**. As can be seen in the drawings, the gear **134** is of smaller gear diameter and has less teeth than the gears **122**. In assembled position, the gears **122** mesh with the stationary sun gear **51** and the gears **134** mesh with the gears **122**.

In operation, the plate **80** carrying the nozzles **76** rotates about the spindle **75** (being driven in a manner soon to be described) turning the nozzles **76** and their associated gears **122** concentrically about the central nozzle **64** and its associated sun gear **51**.

Because the sun gear **51** is stationary and in continual intermeshing engagement with the gears **122** of the planetary nozzles **76**, the gears **122** and their associated nozzles **76** will rotate about the axis of the gears **122** while axes of said gears **122** orbit with the plate **80** about the spindle **75**. As the nozzles **76** rotate about the stationary nozzle **64**, and with the nozzles **76** inclined with respect to the longitudinal axes of the nozzle seats **52***a*, the sprays from the nozzles **76** will be varying in direction forming a conical swirl pattern about the axes of rotation of the gears **122** with respect to the plate **80** illustrated in the dashed lines of FIG. **4**. Additionally, even if a nozzle **76** is in vertical alinement with the vertical axis of the nozzle seat **52***a*, the spray from the rotating nozzle **76** will swirl in a vertical pattern about the vertical axis of the spindle **72** so that whether a nozzle **76** is inclined or absolutely vertical, the spray issuing therefrom will have a compound swirl pattern.

The nozzles **78** are also carried on the plate **80** and rotate about the spindle **75** with said plate. Hence the nozzles **78** and their associated gears **134** orbit concentrically about the stationary sun gear **51**. The gears **134** of nozzles **78** are in continual intermeshing engagement with the gears **122** as seen in FIG. **3**. Additionally, the stationary sun gear **51** is in continual intermeshing engagement with the gears **122** of nozzles **76** so that as the plate **80** turns about the spindle **75**, the gears **122** rotate about their own axes and, in turn, drive the gears **134** which will rotate about their own axes. Thus, the nozzles **78** rotate about the axes of the gears **134** as they orbit the stationary nozzle **64**. With a nozzle **78** angularly inclined with respect to the longitudinal axis of the nozzle seat **52***a*, the spray from such nozzle **78** will be barying in direction and form a conical swirl pattern similar to that formed by a nozzle **76** which is illustrated in the dashed lines of FIG. **4**. Additionally, if a nozzle **78** is in alinement with the vertical axis of the nozzle seat **52***a*, the spray from the rotating nozzle will swirl in a vertical pattern about the vertical axis of the nozzle seat **52***a*. In either event, the swirl will be modified by a further swirl about the vertical axis of the spindle **75**.

The plate **80** is driven around the spindle **75** by a gear train which is powered by the motor **14** in the following manner.

A power shaft **135** is connected to the outer end of and is driven as an axial extension by the shaft **26** which drives the impeller blades **24** of the water pump **18**. The power shaft **135** is journaled for rotation in and extends through the pump casing **19** by a bearing **138** with a flange **140** at the end thereof abutting the outer surface of the pump casing **19**. A shoulder **142** of the shaft **135** abuts the flange **140** on the face opposite the pump casing **19**. The diameter of the shaft **135** outside of the pump casing **19** is greater than that inside the casing; the end of the shaft **135** within said casing **19** engages the outer end of the shaft **26**. The outer peripheries of the shafts **26** and **135** engage the hollow hub of the impeller blades **24** from the opposite ends of the axial length of said hub and are secured therein.

A worm **144** is secured to the outer end of the shaft **135** and concentrically disposed along the same longitudinal axis. As the motor spindle **26** turns the impeller blades **24** it simultaneously turns the power shaft **135** which directly engages the worm **144**. The worm **144** rotates the plenum chamber **89** and plate **80** through a power train **146** consisting of a vertically disposed drive shaft **148** which is rotated by the worm and which rotates the base **90** of the plenum chamber **87**.

The drive shaft **148** is vertically supported by a U-shaped bracket **150** which is secured to the pump casing **19** by a clamp **151**. The drive shaft is journaled for rotation within appropriate openings of the parallel arms **151** of the U-shaped bracket **150** by means of suitable bearings **152**. A worm gear **154** is secured to the bottom end of the drive shaft **148** in concentric relation thereto and positioned below the lower arm **151** of the bracket **150**. The worm gear **164** is intermeshed with the worm **144** of the power shaft **135** so that rotation of the power shaft **135** will cause rotation of the drive shaft **148**.

To transmit rotary motion from the power train to the nozzles a gear **156** is secured to the top end of the drive shaft **148** in concentric relation thereto and is positioned above the upper arm **151** of the bracket **150**. The gear **156** engages a meshing gear **158** which is affixed to the undersurface of the plenum base **90**. Any suitable means may be used to secure the gear **158** to the undersurface of the plenum base **90**, such as screws as illustrated in FIG. **3** for example. The gear **158** is concentrically positioned on the plenum base **90** and when caused to rotate by the gear **156**, it turns the entire plenum chamber **87** about the spindle **75**.

Of course, the plate **80** with the planetary nozzles **76**, **78** carried thereon, will rotate with the plenum chamber **87** since the base **90** and plate **80** are rigidly interconnected by means of the plenum sidewall **88**.

In operation, the motor **14** drives the pump **18** which forces water from the bottom of the pool through the stationary nozzle **64** and additionally into the plenum chamber **87**. From the plenum chamber **87** the water is ejected through the planetary nozzles **76**, **78** carried on the plate **80**.

As the motor **14** drives the pump **18**, it actuates (through the pump) the power train **146** which causes the plenum chamber **87** and plate **80** to rotate about the spindle **75**. The planetary nozzles **76** and **78** thereby orbit about the stationary sun nozzle **64** and, additionally, rotate about the longitudinal axes of their respective nozzle seats.

In addition to the moving fountain sprays the invention provides means to illuminate the orbiting swirling sprays to enhance the water display. Also incorporated in the invention is means to provide for varying the color of the fountain illuminating lights.

These illumination effects are produced by apparatus including a pair of diametrically opposed submersible lamp housings **160** each with a suitable electric lamp contained therein and connected to an electrical supply. The lamp housings **160** are supported from the display base **12** by any suitable connection such as the threaded connection **162** shown in FIG. **3**. The lamp of the lamp housing **160** is oriented to direct its illumination upwardly toward the water spray of the display fountain **10**.

The lamp housing **160** is positioned beneath the plate **80**, said plate extending beyond the peripheral limits of the plenum sidewall **88**. The illumination passes through a series of equiangularly spaced openings **164** in the plate **80** which are concentrically located about the center of the plate **80**.

Differently colored filters **165** are positioned over and secured to the top of the plate **80** covering each of the openings **164**.

Thus, the light rays illuminating the fountain will pass through the colored filters **165** and, when the fountain is operating, the plate **80** rotates in the manner previously described causing successive filters **165** of varying colors to pass over the lamps thus causing the colors of the illuminating lights to vary accordingly.

A depending circular skirt **168** projects downwardly from the peripheral edge of the circular plate **80** to a point below the lamp openings of the submersible lamp housings so that stray light may not be visible from the side of the display fountain **10**.

In a typical application of the fountain device **10**, the motor **14** rotates at approximately 3,500 r.p.m., the worm gear **154** has 50 teeth and turns the drive shaft at about 70 r.p.m. With a 12 to 1 gear deduction ratio between the drive shaft gear **156** and the plenum chamber gear **158**, the plenum chamber and plate **80**, carrying the secondary nozzles **76** and **78** and the colored filters **165** will orbit the spindle **75** at about 6 r.p.m. If a stationary sun gear having 72 teeth is used and the gears **122** of the nozzles **76** have 48 teeth, the nozzles **76** will rotate at about 9 r.p.m. about the vertical axes of the nozzle seats **52***a*. Additionally, if the gears **134** of the nozzles **78** have 36 teeth each nozzle **78** will rotate at about 12 r.p.m. about the vertical axis of its nozzle seat **52***a*. Thus, all of the moving nozzles **76**, **78** will orbit at 6 r.p.m. about the stationary central sun nozzle **64** and the nozzles **76**, **78** will rotate about the vertical axes of the nozzle seats **52***a* at 6 and 9 r.p.m., respectively. The effect of the latter rotation of the moving nozzles will produce considerable swirling of the individual sprays of these nozzles and aid in producing an effective spray pattern.

To further enhance the ornamental effect, the openings of the nozzles desirably are so proportioned that the various spray jets are projected at different heights, preferably as an inverse function of their distance from the spindle **75**. For instance the central jet may have a vertical rise of 24 feet, the inner circle of secondary jets issuing from the nozzles **76** a vertical rise of 16 feet and the outer circle of jets issuing from the nozzles **78** a vertical rise of 8 feet. A typical spread of the spray is 30 feet.

Thus it will be seen that there has been provided a fountain display which achieves the various objects of the invention and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the present invention and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communicating between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis, and a power train connected to said motive means for rotating said first series of movable nozzles about said first vertical axis, said power train being connected to said motive means through said pump.

2. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communicating between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication through a plenum chamber supported by said pump casing with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, and means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis.

3. The fountain display of claim 1 wherein said means mounting said first series of movable nozzles includes a supporting surface journaled for rotation about said central nozzle and carrying the first series of movable nozzles.

4. The fountain display of claim 3 further including a second series of movable nozzles, said plenum chamber hydraulically coupling said second series of movable nozzles to said liquid outlet, said second series of movable nozzles being carried by said supporting surface.

5. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communicating between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis, a power train connected to said motive means for rotating said first series of movable nozzles about said first vertical axis, a second series of movable nozzles, means hydraulically coupling said second series of movable nozzles to said pump and permitting the passage of liquid from said pump to said second series of movable nozzles, means mounting said second series of movable nozzles for orbital movement about said central nozzle, and means for orbiting each of the nozzles in said second series of movable nozzles about a second different vertical axis parallel to the first vertical axis and orbiting about said first vertical axis, said power train additionally rotating said second series of movable nozzles about said different vertical axes.

6. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communicating between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis, the orbiting vertical axes passing through the associated orbiting nozzles, a power train connected to said motive means for rotating said first series of movable nozzles about said first vertical axis, a second series of movable nozzles, means hydraulically coupling said second series of movable nozzles to said pump and permitting the passage of liquid from said pump to said second series of movable nozzles, means mounting said second series of movable nozzles for orbital movement about said first vertical axis, and means for individually rotating each of the nozzles in said second series about a second different vertical axis orbiting about said first vertical axis as said second series of movable nozzles rotates in its circular path about said central nozzle, said power train additionally rotating said second series of movable nozzles, the means for individually rotating the nozzles of said second series including gearing means connected to each of the nozzles of said second series, each of said gearing means engaging different gearing means rotatable with nozzles of said first series to cause rotation of each of the nozzles of said second series of movable nozzles as the nozzles of said first series are rotated.

7. The fountain display of claim 3 further including fountain spray illuminating lamps mounted beneath said supporting surface, said supporting surface having a plurality of openings permitting the passage of light therethrough, and a plurality of transluscent filters of various colors, each mounted to said supporting surface and spanning one of said openings.

8. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communications between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis, and a power train connected to said motive means for rotating said first series of movable nozzles about said first vertical axis, said central nozzle and said first series of orbiting nozzles being supported by said pump casing.

9. The fountain display of claim 5 wherein said central nozzle, said first series and said second series of movable nozzles are supported by said pump casing.

10. The fountain display of claim 5 including means for varying the angle of inclination of each of the nozzles in said second series with respect to said second different vertical axes.

11. A fountain display for generating a decorative moving spray from a pool of liquid, said fountain display comprising a pump, a pump casing, motive means driving said pump, said pump casing having a liquid inlet in communication with the liquid in the pool, and a liquid outlet, a stationary central spray nozzle, hydraulic coupling means communicating between said liquid outlet and said central nozzle, a first series of movable spray nozzles in hydraulic communication with said liquid outlet, means for orbiting said first series of movable nozzles about a first vertical axis passing through said central nozzle, means for individually rotating each of said nozzles in said first series of movable nozzles about a different vertical axis orbiting about said first vertical axis, a second series of movable nozzles orbiting about said first vertical axis, and means for individually rotating each of said nozzles in said second series of movable nozzles about a second different vertical axis orbiting about said first vertical axis.

12. The fountain display of claim 11 wherein each of said second different vertical axes passes through its associated nozzle in said second series of nozzles.