Jan. 6, 1942. E. GATEWOOD 2,268,932

CONTRIVANCE FOR AMUSEMENT AND ENTERTAINMENT

Filed Sept. 14, 1938

Fig. 1

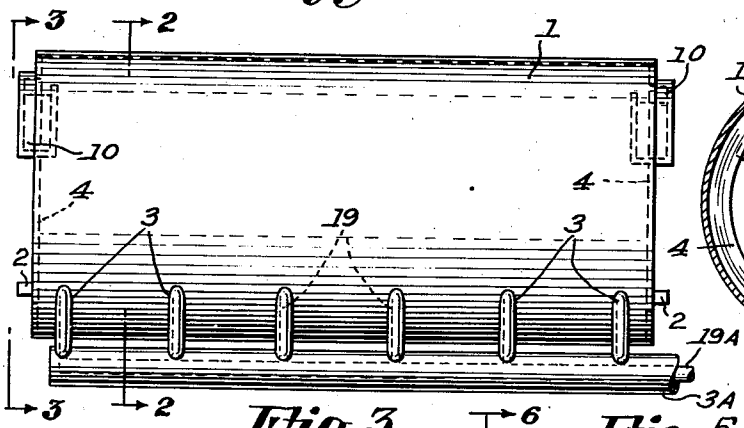


Fig. 2

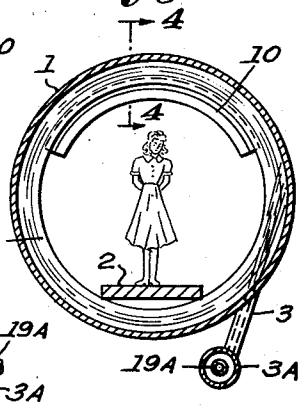


Fig. 3

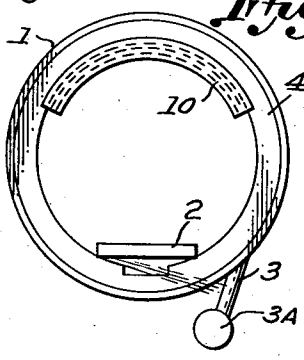


Fig. 5

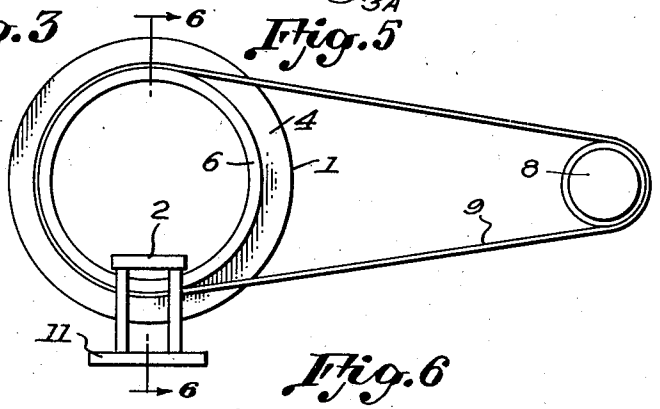


Fig. 4

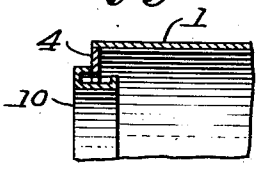


Fig. 6

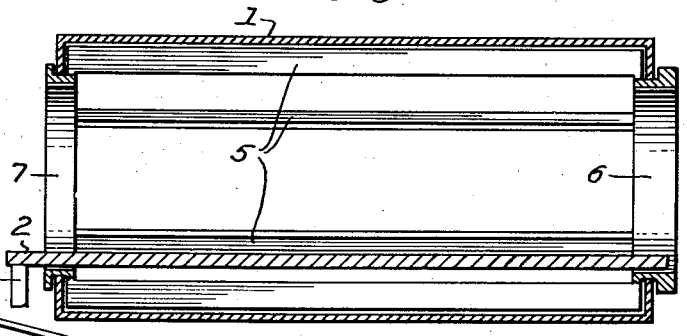
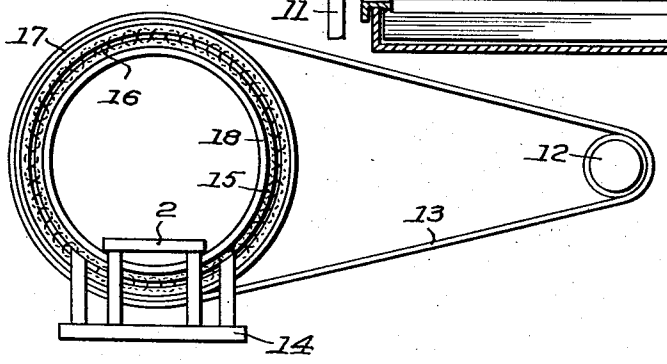


Fig. 7



Inventor:

Elbridge Gatewood

Patented Jan. 6, 1942 2,268,932

UNITED STATES PATENT OFFICE

2,268,932

CONTRIVANCE FOR AMUSEMENT AND ENTERTAINMENT

Elbrige Gatewood, New York, N. Y.

Application September 14, 1938, Serial No. 229,901

10 Claims. (Cl. 272—26)

The object of this invention is to provide a water tunnel of any length desired through which passengers may pass, surrounded by water above, below and on the sides.

The object is to provide it in national parks where high waterfalls will provide a plentiful supply of water under pressure, also in places of amusement where it may be profitable to use pumps to produce the pressure required.

Referring to the drawing:

Figure 1 is a side view of a water tunnel, showing also pipes for supplying water and air for its operation.

Figure 2 is a view on the line 2—2 of Figure 1, revealing the position of water in the tunnel, trackway for passengers, and pipes for injecting water and air.

Figure 3 is an end view on the line 3—3 of Figure 1.

Figure 4 is a view on the line 4—4 of Figure 3, showing a water trough to carry away water that would otherwise fall over the entrance.

Figure 5 is a front view of an alternative form in which the flow of the water is induced by means of fan blades rotating in the tunnel.

Figure 6 is a sectional view of the tunnel on the line 6—6 of Figure 5, disclosing also the fan in the tunnel.

Figure 7 is a front view of another alternative form in which the tunnel rotates, carrying the water around with it.

In all forms of the invention water is held to the inner walls of the tunnel by centrifugal force, leaving a passageway through the center of the tunnel, which is free of water.

In the form shown in figures numbers 1 to 4 water is injected at high velocity into the tunnel through the feed pipes 3, and enters at such a tangent to the walls of the tunnel that the water flows along the wall and around. When it completes its circuit it encounters the incoming stream which gives it an additional impulse sufficient to drive it around the circuit again. The tunnel quickly fills with a swiftly flowing stream of water travelling at such velocity that centrifugal force causes it to follow the tunnel wall. When the tunnel is filled to the level of annular closure plate 4 it flows out at the ends or at such drains as may be provided. One such drain is shown under the trackway in Figure 3.

The minimum velocity necessary to overcome the force of gravity is established by the well known laws of centrifugal force. The formula is $v=5.67\sqrt{R}$ where v equals the velocity of water per second and R equals the radius of curvature in feet. This formula derives from the relation

$$g=\frac{v^2}{R}$$

wherein g=32.2 feet per second per second.

The velocity of the entering water at 3 must be sufficient to provide the energy to cause the water on the inner part nearest the tunnel wall to flow swiftly enough to drag with it the surface water at the minimum required velocity. This required velocity will depend on the diameter of the tunnel, the number of injection nozzles, amount of water injected, and other details of construction. This can be determined by the well known laws of hydromechanics.

Air under pressure can be injected through injection points or nozzles 19. The air will enter at high velocity and disperse in very small bubbles in the water. It will aid in maintaining the required flow of water and permit the use of a smaller amount of water.

Passengers may walk through the tunnel on the trackway 2 or, if the diameter is too small, they may be transported while lying down on a movable trackway or other means of transportation.

In the alternative form shown in Figures 5 and 6 the water is made to rotate by means of fan blades 5 inside the tunnel. The ends of the fan 6 and 7 are rotatably supported by the inner edges of the end piece 4 of the tunnel 1.

The walkway 2 is supported independently of the tunnel by the foundation support 11.

The fan is driven by the motor 8 and belt 9.

In the alternative form shown in Figure 7 the tunnel 17 is rotated by the motor 12 and belt 13. The tunnel is supported by means of extension 18 of the tunnel, resting on bearings 16 which are carried on the stationary member 15, which is supported by the foundation 14. The trackway 2 is also supported by the foundation 14.

As the tunnel rotates it drags the water around with it, aided by a rough inner wall or by vanes or other means that aid in dragging the water around.

I claim:

1. A means of entertainment consisting of a horizontal tunnel or large pipe with both ends partially closed and with a circular opening in the two ends, together with a stationary walkway or track extending through the tunnel, with water in the tunnel, and with pipes carrying water and projecting it in such manner as to produce and sustain a rapid flow of water around

the inside of the tunnel which shall be sufficient to produce a centrifugal force in the water that will cause the water to cling to the sides of the tunnel and leave the center free of water thereby permitting people to pass through the water without getting wet.

2. A device for entertainment as described in claim 1 including air injection nozzles for injecting air under pressure into the water and in the direction of its flow to impart to it additional circulatory motion.

3. A device for entertainment consisting of a rotatable tunnel with both ends closed except for openings in the center of the ends, together with a stationary track extending through the tunnel, water in the tunnel, the tunnel being rotated with sufficient speed that the water is set rotating with the tunnel with velocity which causes the water all to spread out on the inside of the tunnel and leave the track and passageway free of water.

4. A device for entertainment consisting of a tunnel with both ends closed except for openings in the center of the ends, a stationary track through the tunnel, and water flowing around the circumference of the tunnel with sufficient velocity to cause the center of the tunnel, including the trackway, to be entirely free of water and open for passage through the tunnel without entering the water.

5. A means of entertainment consisting of a tunnel with the ends partially closed around the circumference but with openings in the center, with water flowing around in the tunnel at a velocity which overcomes the force of gravity and leaves a means of passage clear of water through the tunnel, and means of inducing and keeping up the velocity of the water without interfering with the open passageway.

6. A means of entertainment consisting of a tunnel with the ends partially closed around the circumference but with openings in the center of the ends, including also fan blades rotating inside the tunnel near the circumference with sufficient velocity to induce and keep up a rotary movement of water about the inner wall of the tunnel at sufficient minimum velocity to overcome by centrifugal force the force of gravity, including means for rotating the fan blades without obstructing a passageway through the center of the tunnel and out at either end, including means for introducing water into the tunnel.

7. A means of entertainment comprising a cylinder with the ends partially closed about the circumference, means appropriately spaced along the length and about the circumference of the cylinder for injecting streams of water into the cylinder in such direction and at such velocity that they will flow around the inner circumference of the cylinder and that the force of the streams of water will impart sufficient energy into the water which accumulates that a wall of water will be formed and maintained about the inner wall of the cylinder leaving a clear passageway through a tunnel of water through which people or objects may enter and leave the tunnel without getting wet.

8. A means of entertainment as in claim 7 including also means for introducing air into the water under pressure and in the direction of flow of the water for the purpose of aiding in keeping up the velocity of flow of the water.

9. A means of entertainment comprising a rotatable tunnel with the ends partially closed about the circumference but with openings in the centers of the ends, means for admitting water into the rotatable tunnel, means for rotating the tunnel at sufficient velocity that water introduced into the tunnel will have sufficient movement imparted to it in the direction of the rotation that centrifugal force will hold the water to the side of the tunnel and leave a clear and open passageway through the center of the tunnel.

10. A means of entertainment consisting of a horizontal tunnel with both ends partially closed and with a circular opening in the ends, together with a stationary walkway or track extending through the tunnel, with water in the tunnel, and with rotatably mounted fan blades in the tunnel operated by outside power providing a circulatory motion of the water in the tunnel of such velocity as to produce a sufficient centrifugal force to cause the water to spread out on the inside of the walls of the tunnel and leave the center of the tunnel free of water.

ELBRIGE GATEWOOD.