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GRAVITATIONAL POWER GENERATOR

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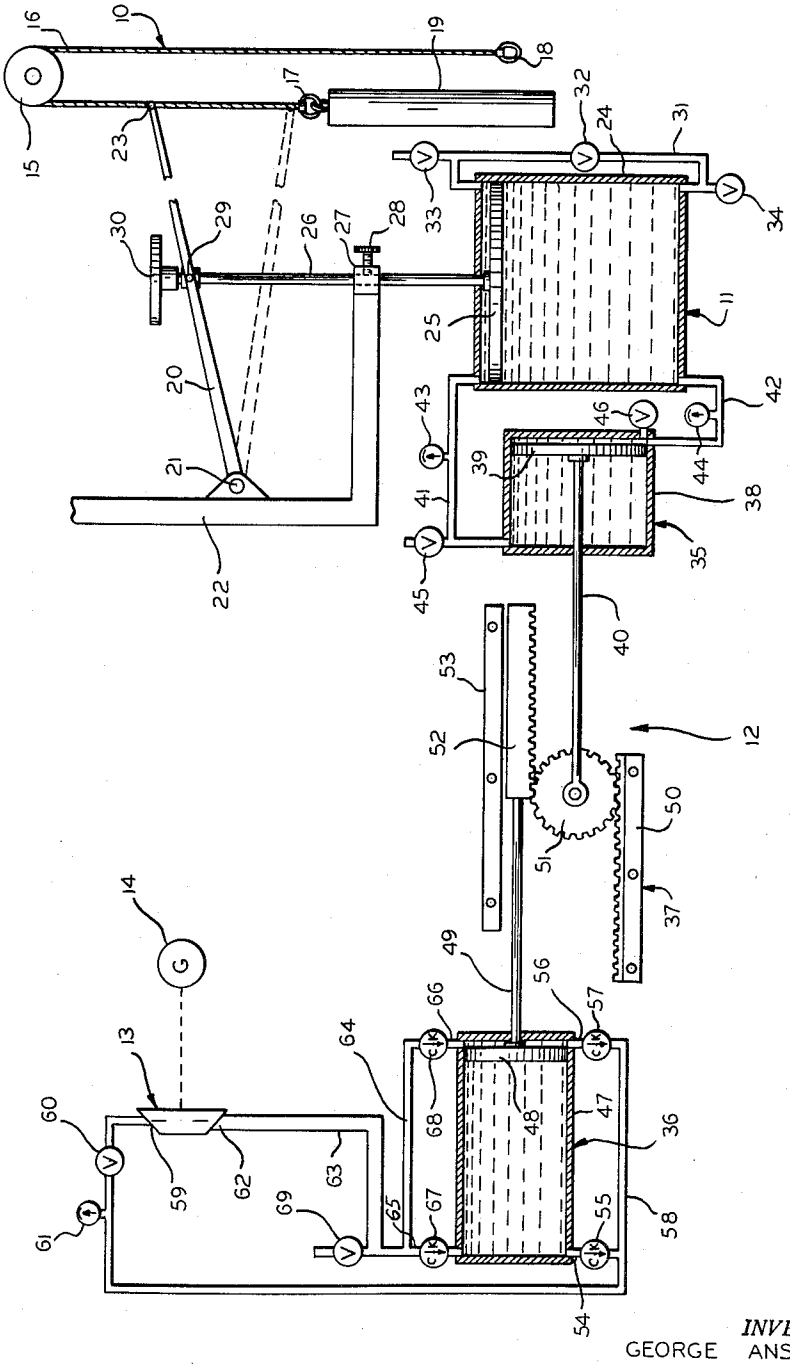

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GRAVITATIONAL POWER GENERATOR

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This invention relates in general to an apparatus for producing power and generating electricity, and more particularly to a gravitational power generator, wherein electrical energy is produced by means of utilizing gravitational forces.

The gravitational power generator of the present invention includes a weight operating a power cylinder through a lever. The combination hydraulic and mechanical intensifier is operated from the power cylinder which, in turn, delivers highly pressurized fluid to a fluid motor that may be drivingly connected to a generator.

Accordingly, it is an object of this invention to provide an apparatus for producing power and electrical energy at a very low cost.

Another object of this invention is in the provision of a gravitational power generator for operating a generator to produce electrical energy, wherein pressurized fluid is utilized which has been pressurized by means of a hydraulic and mechanical device.

A still further object of this invention is the provision of a gravitational power generator, wherein a weight operates a power cylinder through a lever and drives a combination hydraulic and mechanical intensifier to deliver highly pressurized fluid to a fluid motor for powering an electric generator.

Other objects, features, and advantages of the invention will be apparent from the following detailed disclosure, taken in conjunction with the accompanying sheet of drawing, wherein like reference numerals refer to like parts, in which:

The single FIGURE in the drawings is a generally diagrammatic view of the gravitational power generator according to the invention, with some parts in section.

Referring now to the drawing, the gravitational power generator of the present invention includes generally a weight operated mechanism 10, a power hydraulic cylinder 11, a combination hydraulic and mechanical intensifier 12, and a fluid operated motor 13. The fluid operated motor 13 is mechanically connected to a generator 14 for producing electrical power.

The weight operated mechanism 10 includes a rotatably mounted pulley 15 having a cable or rope 16 of predetermined length trained thereover, and connecting rings 17 and 18 at the opposite end of the cable 16. A weight 19 of a predetermined value may be selectively connected to either ring 17 or ring 18 as will be more clearly hereinafter explained.

An elongated lever 20 is pivotally connected at one end at 21 to a stationary frame or standard 22, and pivotally connected at the other end at 23 to an intermediate portion of the cable 16. Thus, by selectively connecting the weight 18 first to ring 17 and then to the ring 18, the lever 20 will be oscillated or swung up and down about the pivot 21, approximately between the position shown in solid line and the position shown in dotted lines.

The power cylinder 11 includes a casing or housing 24 having a piston 25 movable therein and connected to a piston rod 26. The piston rod 26 is slidably guided at 27 to the frame 22, and may be held in any one position by the setscrew 28. The upper end of the piston rod 26 is pivotally mounted at 29 to an intermediate point along the lever 20. A platform 30 adapted to receive weights in order to aid the downward movement of the lever 20 is mounted above the lever 20 on the piston rod 26. An example of the length of the arm 20 would be where the

distance between the pivot points 23 and 29 was ten times the distance between the pivot points 21 and 29. However, this ratio may vary depending upon the needs and circumstances of the installation. In order to provide servicing of the hydraulic cylinder 11, a line 31 is provided to connect the opposite sides of the piston 25 having a valve 32 therein for controlling the fluid flow. Additionally, fill and drain valves 33 and 34 are provided at the upper and lower ends of the connecting line 31.

The combination hydraulic and mechanical intensifier 12 includes generally a first hydraulic cylinder 35, a second hydraulic cylinder 36, and a mechanical multiplication mechanism between the two hydraulic cylinders. The second hydraulic cylinder 36 has a smaller diameter than the first hydraulic cylinder 35, and a length approximately twice the length of the cylinder 35 for reasons to be explained.

The first hydraulic cylinder 35 includes a casing or housing 38 having a piston 39 reciprocable therein and carried on a piston rod 40. Pressurized fluid is delivered from the power hydraulic cylinder 11 from one side of the piston 25 to one side of the piston 39 through a line 41, and from the other side of the piston 25 to the other side of the piston 39 through a line 42. Pressure gauges 43 and 44 are provided respectively in the lines 41 and 42 for determining the pressure of the fluid therein. Drain and fill valves 45 and 46 are provided in the casing 38 on opposite sides of the piston 39 for servicing the cylinder. Thus, downward movement of the piston 25 in the cylinder 11 urges the piston 39 in the cylinder 35 to the left, while upward movement of the piston 25 in the cylinder 11 urges the piston 39 in the cylinder 35 to the right.

The second hydraulic cylinder 36 includes a casing or housing 47 having a piston 48 reciprocable therein and mounted on a piston rod 49. The piston rods 40 and 49 of the cylinders 35 and 36 are interconnected by the mechanical multiplying device 37.

The mechanical multiplying device 37 includes a fixed rack gear 50, a pinion gear 51 journalled on the end of the piston rod 40 and in meshing engagement with the rack gear, and a movable rack gear 52 carried on the end of the piston rod 49 of the cylinder 36 and also in meshing engagement with the pinion gear 51. A fixed guide bar 53 is provided to maintain the movable rack gear 52 in engagement with the pinion gear 51. Operation of this mechanical multiplying device is such that the piston rod 49 will be driven through twice the movement of the piston rod 40. Thus, the stroke of the piston 48 is double the stroke of the piston 39.

The pressurized fluid leaving the second hydraulic cylinder 36 in the combination hydraulic mechanical intensifier 12 is forced through the line 54 and the one way check valve 55 during movement of the piston 48 toward the left, and through the line 56 and the one way check valve 57 during movement of the piston 48 toward the left and into a common line 58 to the inlet end 59 of the fluid motor 13. The check valves 55 and 57 only permit flow out of the cylinder 36, and prevent backflow into the cylinder through the lines 54 and 56. A control valve 60 is provided in the line 58. Also, a pressure gauge 61 may be provided in the line 58 to determine the operating conditions of this part of the system.

The fluid after performing the work in the fluid motor 13 is then discharged through the outlet 62 and through an enlarged line 63 that interconnects with a common line 64. Lines 65 and 66 intercommunicate the common line 64 to the opposite end of the cylinder and the opposite sides of the piston 48. One way check valves 67 and 68 are provided in the lines 65 and 66 to permit flow only into the cylinder 36 and prevent backflow out of the cylinder through these lines. A fill and drain valve 69 is provided above the common line 64.

Any type of fluid may be utilized in the second hydraulic cylinder **36**, but preferably water will be employed, and the fluid motor **13** will be a water turbine or a "Pelton" type water wheel.

This application is a continuation in part of my copending application Serial No. 526,906, filed August 8, 1955, now abandoned, and entitled "Gravitational Power Generator."

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention, but it is understood that this application is to be limited only by the scope of the appended claim.

The invention is hereby claimed as follows:

A gravitational power generator comprising a fluid turbine having an inlet and outlet and a power take-off shaft for driving a generator, a combination hydraulic-mechanical intensifier receiving fluid at one pressure and feeding fluid at a substantially greater pressure to said turbine, said intensifier including a first hydraulic cylinder having an inlet-outlet at one end thereof and an inlet-outlet at the other end thereof and a piston movable therein having a piston rod connected thereto, a second hydraulic cylinder having an inlet and outlet at each end thereof and a piston movable therein having a piston rod connected thereto, fluid lines interconnecting the inlets and outlets of said second cylinder to the outlet and inlet respectively of said turbine, check valves between the outlet of said turbine and the inlets of said second cylinder permitting fluid flow only into the cylinder, and check valves between the inlet of said turbine and the outlets of said cylinder permitting fluid flow only out of the cylinder, and a mechanical multiplying mechanism between said cylinders including a fixed rack gear, a pinion gear engaging said rack gear and journalled on the piston rod of said first hydraulic cylinder, and a movable rack gear engaging said pinion gear and connected to the piston rod of said second hydraulic cylinder, a third hydraulic cylinder of larger size than said first hydraulic cylinder having an inlet-outlet at one end thereof and an inlet-outlet at the other end thereof, a piston movable in said third hydraulic cylinder and having a piston rod connected thereto, fluid lines interconnecting the inlet-outlet at one end of said third cylinder to the inlet-outlet at one end of said first hydraulic cylinder and the inlet-outlet at the other end of said third cylinder to the inlet-outlet at the other end of said first hydraulic cylinder, a lever pivotal ly mounted at one end to a stationary frame and pivotally connected intermediate its ends to the piston rod of said third hydraulic cylinder, a flexible cable trained over a rotatably mounted pulley and having means on each ned thereof for removably securing a weight thereto, said cable being secured to the other end of said lever, and a weight for securement to said cable for driving said lever.

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