No. 660,011. Patented Oct. 16, 1900.

U. J. FUHRMAN.

WEIGHT MOTOR.

(Application filed May 14, 1900.)

(No Model.) 2 Sheets—Sheet 1.

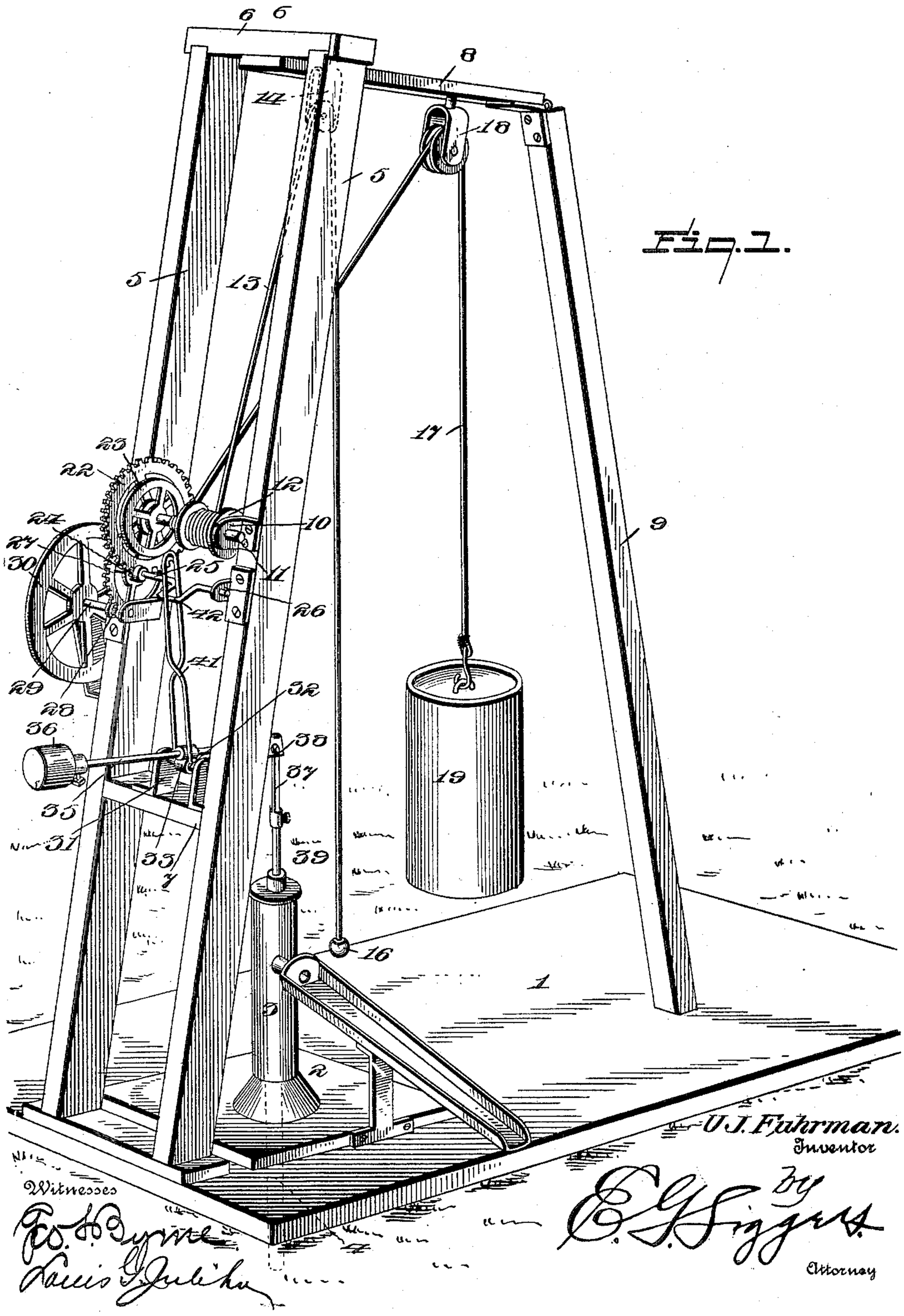

Fig. 1.

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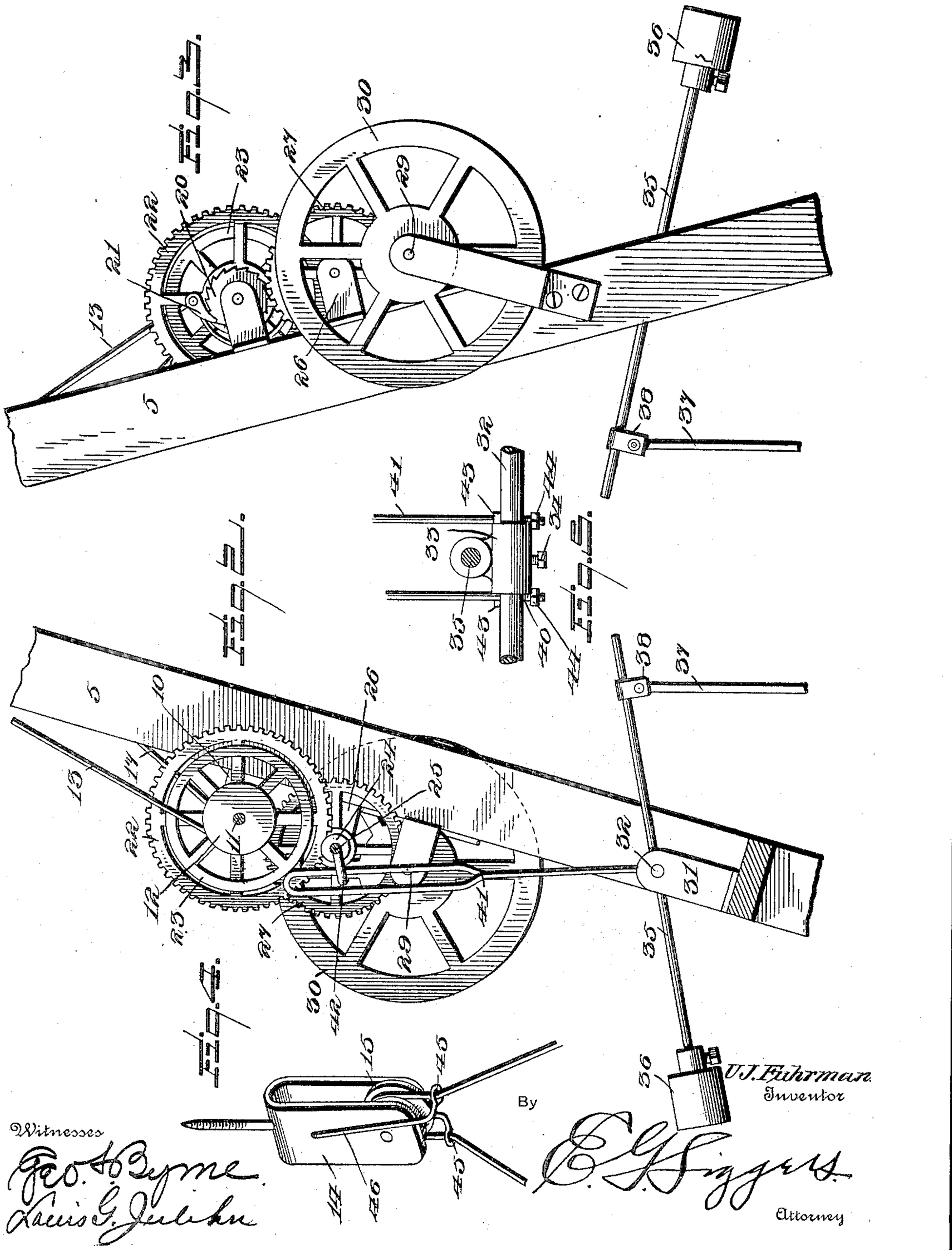

UNITED STATES PATENT OFFICE.

U J. FUHRMAN, OF WEST SALEM, OHIO.

WEIGHT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 660,011, dated October 16, 1900.

Application filed May 14, 1900. Serial No. 16,645. (No model.)

To all whom it may concern:

Be it known that I, U J. FUHRMAN, a citizen of the United States, residing at West Salem, in the county of Wayne and State of Ohio, have invented a new and useful Weight-Motor, of which the following is a specification.

My present invention relates to a novel weight-motor for the generation of power designed to be transmitted to pumping or other transforming mechanisms.

The objects in view are to so construct and arrange the coöperating parts of the motor as to obtain a maximum efficiency of applied force with a minimum expenditure of initial energy and, further, to embody in a motor a driven or power-transmitting element having an oscillatory movement and related to the rotary power or driving element in a manner to overcome in a large measure the tendency of such coöperating parts to bind when the direction of pressure exerted by the rotary element is in a practically direct line with the resistance opposed by the driven or transmitting element.

To these ends and to others subordinate thereto the invention consists in the construction and arrangement of parts hereinafter fully described, and succinctly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of my apparatus complete equipped for use as a pump-motor. Fig. 2 is a sectional view, on a somewhat-enlarged scale, showing the relations of the elements of the motor proper, one position of the oscillatory transmitter being shown in dotted lines. Fig. 3 is a view illustrating the subject-matter of Fig. 2 viewed from the opposite side of the gearing, and Fig. 4 is a detail view of the tackle-block and guard for the winding-cable. Fig. 5 is a detail view of the angle-sleeve and connected parts.

Referring to the numerals of reference employed to designate corresponding parts in each of the several views, 1 indicates a base or platform designed to support my apparatus and having bolted or otherwise secured thereon a stand 2 of a pump 3, whose suction or supply tube 4 is extended below the platform 1 for the purpose of placing the pump in connection with a source of water-supply. The frame or superstructure designed for the support of the motor at a point above the pump may be constructed in any suitable manner; but I prefer that the frame should be composed of the parallel slightly-inclined standards 5, connected at their upper ends and at a point above the pump by a head-beam and transverse bar, (indicated, respectively, by the numerals 6 and 7.) From the center of the head-beam extends rearwardly a head-beam extension 8, to the rear extremity of which is hinged the upper end of an inclined brace 9, resting at its lower end upon the platform 1 or upon suitable step-blocks carried thereby, the relative inclinations of the standards and brace serving to form a comparatively-broad supporting-base for the motor frame or superstructure.

At a suitable point above the standards, preferably some little distance above the pump, I provide opposed bearing-brackets 10, in which are journaled the opposite ends of what may be termed the "cable" or "drum" shaft 11, upon which is keyed adjacent to one end the winding-drum 12 for the reception of the winding or resetting cable 13, which is passed upwardly and over the sheave 14 of a tackle-block 15, suspended from the under side of the head-beam 6. The extremity of the winding-cable depends to within convenient reach of an operator stationed upon the platform 1 and is provided with a handle or button 16, designed to be grasped by the operator for the purpose of exerting a pull upon the winding-cable to unwind the latter from the drum 12. The unwinding of the cable 13 from the drum 12 effects the winding of the power or weight cable 17, which is wound upon the shaft 11 in a direction the reverse of the winding of the cable 13 upon the drum. The weight-cable 17 is carried upwardly from the shaft 11 and is carried over the sheave 18 of a pulley-block suspended from the head-beam extension 8 at a point which will cause the weight 19, attached to the lower end of the power-cable, to move in a vertical plane located midway between the standards and brace. This relation of the weight to the frame is desirable, as the weight is thus distributed equally upon the several supporting elements of the frame, but it is not essential, since the weight might be located in any suitable position, so long as its gravitation would

be exerted to effect the unwinding of the weight-cable and the consequent driving of the cable or drum shaft 11.

Keyed or otherwise rigidly mounted upon the shaft 11 at the end opposite the drum is a ratchet-disk 20, designed to be engaged by a spring-urged pawl 21, carried by a gear-wheel 22, loosely mounted on the shaft 11 intermediate of the ratchet wheel or disk 20 and the cable guard-wheel 23, fixed upon the shaft and designed to prevent the weight-cable when wound upon the shaft from interfering with the operation of the gearing. The gear-wheel 22 meshes with a pinion 24, mounted upon a crank-shaft 25, journaled in suitable bearings 26, located just below the bearing-brackets 10. Upon the crank-shaft, which I will hereinafter denominate the "driving" shaft or element, is also keyed a gear-wheel 27, meshing with a pinion 28, keyed upon a short shaft 29, which carries a fly-wheel 30, designed to render the operation of the motor uniform and to overcome by its impetus the tendency of the elements to stall. At a suitable point below the drive-shaft, preferably upon the transverse bar 7, I mount a pair of bearing-brackets 31 for the reception of a rock-shaft 32, which passes through an angle-sleeve 33 and is retained in rigid relation to the shaft by a set-screw 34. The sleeve 33 is designed for the retention upon the shaft of the balance or pump lever 35, provided at one extremity with an adjustable counterpoise 36 and at its opposite end with an adjustable bracket 38, to which is connected a pitman 37, pivotally connected at its lower extremity to the upper end of the piston-rod 39 of the pump. At opposite sides of the sleeve 33 the shaft 32 is provided with apertures 40 for the reception of the lower extremities of a twisted loop 41, extending upwardly from the rock-shaft and within which moves the wrist 42 of the crank-shaft 25. It will be observed that the elongated twisted loop 41 is so formed to permit the wrist of the driving-shaft to pass therethrough and to permit the lower ends of the loop, which are threaded, to pass through the apertures 40, which are correspondingly threaded and which retain the ends of the loop in such close proximity to the opposite ends of the sleeve 33 that the latter is retained against lateral movement upon the rock-shaft in the event of its set-screw becoming accidentally disengaged.

In order to prevent axial movement of the sleeve upon the shaft, the ends of the former may be provided with projections 43, engaging the lower ends of the loops, the latter being provided with terminal nuts 44 to prevent their displacement. The tackle-block 15 is provided with a spring cable-guard comprising a pair of eyelets 45, carried in close proximity immediately under the sheave 14 and carried, respectively, at the opposite ends of spring-arms 46, extending along the opposite sides of the block and preferably connected at their upper ends by a transverse connecting portion which pierces the block. This guard retains the winding-cable in contact with a considerable portion of the periphery of the sheave 14 and is designed to hold the winding-cable taut as it is drawn through the block by the rotation of the drum under the influence of the descending weight.

The operation of my device is as follows: Assuming the apparatus to be organized as represented in Fig. 1 of the drawings, the descent of the weight will cause the rotation of the drum-shaft in the direction indicated by the arrow, which will unwind the weight-cable 17 from the shaft and will wind the winding or resetting cable 13 upon the drum. The teeth of the ratchet-wheel 20 will engage the pawl 21 and being in this manner connected to the gear-wheel 22 will operate the train of gears and will rotate the driving-shaft 27. The movement of the wrist 42, moving as it does in a circular path, will oscillate the loop 41, which being rigid with the rock-shaft 32 will rock the latter and cause the vibration or oscillation of the balance or pump lever 35, which by reason of its connection with the pitman 37 will reciprocate the pump-piston, the weight of the latter and its connected parts being compensated for or balanced by the counterpoise 36, mounted upon the opposite end of the lever. The provision of the adjustable bracket 38 and the adjustable counterpoise 36 upon the opposite ends of the balance-lever permits the ready connection of the balance-lever with any mechanism to be operated and the proper balancing of the operative parts of such mechanism.

From the foregoing it will be observed that I have produced a simple, durable, and highly-efficient weight-motor adapted for the generation of power to be applied for the operation of various forms of machinery and in which the various parts subjected to wear may be readily removed and replaced without any considerable disorganization of the coöperating elements; but while the present embodiment of my invention appears at this time to be preferable I do not wish to limit myself to the structural details defined, but reserve the right to effect such changes, modifications, and variations as may be comprehended within the scope of the appended claims.

What I claim is—

1. The combination with a platform, of a superstructure composed of parallel standards, an upstanding inclined brace, and a horizontal head-beam supported adjacent to the upper ends of the standards and brace, a pair of separate and independent sheaves carried by the head-beam, a cable-drum journaled between the standards, a balance-lever mounted between the standards below the drum and provided with an upstanding loop, a crank-shaft engaging said loop and geared to the drum, a shiftable bracket upon one end of the lever, a pump-piston connected to said bracket, a weight-cable wound upon the drum and passed over one of the sheaves, a

weight carried by the weight-cable, and a rewinding-cable wound upon the drum in the reverse direction and passed over the other sheave, the free end of said rewinding-cable being extended into proximity to the platform.

2. The combination with a crank-shaft, and means for actuating said shaft, of a rock-shaft, an angle-sleeve carried by the rock-shaft, a balance-lever carried by the angle-sleeve, and a loop engaged by the crank-shaft and having its ends detachably connected to the rock-shaft at opposite sides of the angle-sleeve.

3. In a motor, the combination with a driving-shaft and means for actuating said shaft, of a rock-shaft, an angle-sleeve carried by said shaft, a balance-lever passed through the sleeve at right angles to the shaft to effect the oscillation of the lever when the shaft is rocked, and a twisted loop engaged by the crank-shaft and having its ends screw-threaded and passed through threaded openings in the rock-shaft, and nuts screwed upon the lower ends of the loop.

4. In a weight-motor, the combination with a cable-shaft, a weight-cable wound upon said shaft, a drum movable with the cable-shaft, and a winding-cable wound upon the drum in a direction the reverse of the direction of winding of the cable-drum, sheaves located above the shaft for the guidance of the cable, a weight suspended from the weight-cable, a spring-guard adjacent to the sheave of the winding-cable and engaging said cable to keep it taut, motion-transmitting mechanism designed to transmit motion from the motor to the mechanism to be operated, gearing intermediate of the cable-shaft and the transmitting mechanism, and means for automatically disconnecting the cable-shaft from the gearing when the said shaft is operated by the winding-cable to effect the rewinding of the weight-cable and the elevation of the weight.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

U J. FUHRMAN.

Witnesses:
E. E. FUHRMAN,
W. K. SHILLING.