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WEIGHT MOTOR.

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Patented July 29, 1919.

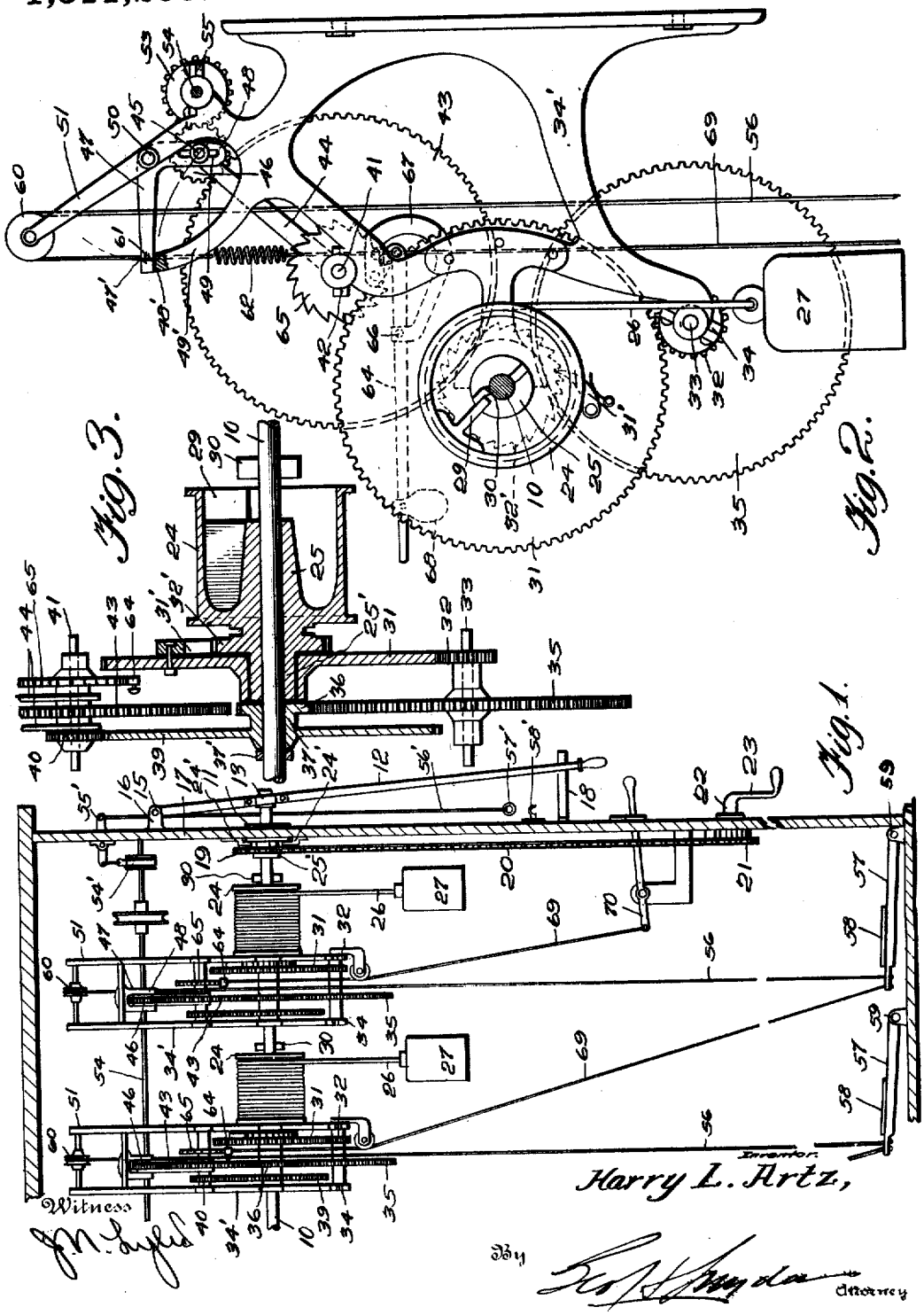


Fig. 3.

Fig. 2.

Fig. 1.

Witness

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UNITED STATES PATENT OFFICE.

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WEIGHT-MOTOR.

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To all whom it may concern:

Be it known that I, HARRY LLOYD ARTZ, a citizen of the United States, residing at 211 West 146 street, in the county of New York and State of New York, have invented certain new and useful Improvements in Weight-Motors, of which the following is a specification.

My invention relates to weight motors, and has particular reference to such apparatus wherein a plurality of units are automatically successively thrown into action.

An important object of the invention is to provide apparatus of the above mentioned character, which is automatic in operation and highly convenient to control in such operation.

A further object of the invention is to provide simple means to simultaneously rewind the several wheels or drums included in the apparatus.

A further object of the invention is to provide means whereby each unit of the apparatus is normally disconnected from the shaft to be driven, and is connected therewith, prior to the starting of such unit into operation.

A further object of the invention is to provide apparatus of the above mentioned character, which is simple in construction, strong and durable.

Other objects and advantages of the invention will be apparent during the following description.

In the accompanying drawings, forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of apparatus embodying my invention,

Fig. 2 is an edge elevation of the same, and,

Fig. 3 is a central longitudinal section through a drum or cylinder.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a horizontal shaft, which is arranged within supports or bearings 11. This shaft 10 is rotatable and is also free to move longitudinally.

At one end, the shaft 10 has a suitable swiveled connection with a swinging shifting lever 12, as shown at 13. The lever 12 is pivoted at its upper end, as shown at 15, with a bracket 16, secured to a support 17. The lever 12 is shown in the outer position, and is adapted to be swung to an inner or vertical position, and be held in such position by a bracket or device 18, or any other suitable means, carried by the support 17.

Splined upon the shaft 10, near the lever 12, is a sprocket wheel 19, engaged by a downwardly extending sprocket chain 20 engaging a second sprocket wheel 21. The sprocket wheel 21 is rigidly secured to a transverse shaft 22, which is journaled in the support 17, and rotated by a hand crank 23. The sprocket wheel 19 is held against longitudinal movement by brackets 24′, fixed upon the support 17, and operating in an annular groove 25 in the hub of the sprocket wheel.

The apparatus comprises two or more units, which art identical, and a detailed description of one unit will suffice for both.

Each unit comprises a drum or cylinder 24, having a hub 25, which is rotatable upon the shaft 10. The drum is free to rotate but is held against perceptible longitudinal movement by means to be described. The drum has connection with a flexible element or cable 26, adapted to be wound thereon, and having connection with a weight 27, as shown.

As more clearly shown in Fig. 3, the drum 24 is provided at one end with an internal clutch element 29, for engagement with a coacting clutch element 30, which is rigidly secured to the shaft 10. It is thus apparent that when the shaft 10 is shifted longitudinally to the left all of the drums 24 of the units will be locked thereto, and by turning the crank 23, the shaft 10 may be rotated in the proper direction, to rewind the cables 26 upon the several drums.

Each drum 24 is provided at one end with a gear 31, permanently engaging a gear 32, which is rigidly secured to a stub-shaft 33, journaled in stationary elements or bearings 34, carried by frame plates 34′. The gear 31 is pivoted upon an extension 25′ of the tubular hub 25 and is provided with pawls 31′ to engage a ratchet wheel 32′, which is preferably formed integral with the tubular hub extension 25′. These elements form pawl-and-ratchet means to lock the drum 24 to the gear 31 when the drum is turning to unwind, but disconnects these parts when the drum is turned in an opposite direction, as upon rewinding.

A larger gear 35 is rigidly secured to the

stub-shaft 33, and engages a smaller gear 36. This gear 36 is rigidly secured to a sleeve 37, rotatable upon the shaft 10. One end of the sleeve 37 connects with the hub extension 25′, while its opposite end contacts with an extension 37′ of the frame plate. A larger gear 39 is rigidly secured to the sleeve 37, and engages a smaller gear 40 rigidly secured to a stub-shaft 41, which is journaled in stationary bearings 42. The stub-shaft 41 has a larger gear 43, rigidly secured thereto, as shown.

Disposed upon opposite sides of the gear 43 are swinging arms 44, the lower ends of which are apertured for pivotally receiving the shaft 41. The upper ends of the arms 44 have connection with a transverse shaft 45, carrying a small gear 46 arranged between the arms 44. The numeral 47 designates a bell-crank lever, having its lower end forked to provide arms 48, having slots 49 for receiving the shaft 45. This bell-crank lever is pivoted, as shown at 50, to a stationary arm 51. The horizontal arm of the bell-crank lever 47 has a reduced extension 47′, adapted to enter a socket 48′, formed upon a stationary stop-arm 49′, as shown.

The bell-crank lever 47 is adapted to shift the gear 46 into and out of engagement with and from the gear 53, which is rigidly connected with a driven shaft 54. The driven shaft is journaled in stationary bearings 55, as shown. The shaft 54 may be employed to operate any suitable apparatus. The driven shaft 54 is provided with a brake mechanism 54′, operated by a pivoted lever 55′, having connection with a cable 56′, having a ring 57′, to engage over a hook 58′, to set the brakes and hold them set. The brakes are inactive when the cable 56′ is released.

Each unit has a flexible element or cable 56, extending downwardly for connection with a swinging lever 57, of the same unit. The lever 57 has a plate 58 secured thereto, and this lever is pivoted at 59. The cable 56 extends upwardly and is passed about a grooved pulley 60, pivoted upon the stationary arm 51. The cable 56 extends downwardly over the pulley 60 and downwardly for attachment with the horizontal arm of the bell-crank lever 47, as shown at 61. A suitably stiff retractile coil spring 62 is connected in the cable 56, between the bell-crank lever 47 and the forward end of a dog 64, with which said cable is connected.

This dog is arranged beneath and acts upon a ratchet wheel 65, which is rigidly secured to the shaft 41. The dog is pivoted, at 66, to a stationary arm 67. At its opposite end, the dog carries a weight 68 which is adjustable.

Connected with the forward end of the dog 64 is a cable 69, which extends downwardly. The cable 69 in the starting unit is connected with a pivoted lever 70, while the cable 69 in each succeeding unit is connected with the lever 57 of the preceding unit.

The operation of the apparatus is as follows:

The weights of the levers 57, when the apparatus is at rest, act upon the cables 56, to pull the same down, whereby the bell-crank levers will be retained in the outer position, for normally retaining the gears 46 out of engagement with the gears 55. The springs 62 are now placed under sufficient tension to oppose the further downward swinging movement of the levers 57. It is thus apparent that all gears 46 are normally out of engagement with the gears 55.

The lever 12 may now be swung inwardly, shifting the shaft 10 to the left, whereby the drums 24 will be locked to the shaft 10, for rotation therewith. The crank 23 is now turned clockwise and the drums correspondingly rotated, to rewind the cables 26 thereon. This rotation of the drums does not rotate the gears 31 and associated gears, because of the pawl and ratchet connection between the gears 31 and the drums 24. However, when the drums are turned in an opposite direction, as upon the unwinding of the cables therefrom, the gears 31 are locked to the drums for rotation therewith. As soon as the cables are properly wound upon the drums, the winding action is stopped, and the shaft 10 is shifted to the right, whereby the drums are unlocked from this shaft. The dogs 64 are now in engagement with the ratchet wheels 65, and the drums are thereby prevented from improperly unwinding, while they are disconnected from the shaft 54, at the gears 46 and 53.

In starting the apparatus, the starting unit is set into action by swinging the outer end of the starting lever 70 upwardly, to draw the opposite end downwardly, which in turn draws the cable 69 downwardly. The cable 69 draws the dog 64 out of engagement with the ratchet wheel 65, and at the same time places the spring 62 under sufficient tension to overcome the weight of the lever 57, swinging the same upwardly. This action of the spring 62 swings the bell-crank lever 47 downwardly, whereby the gear 46 is shifted into engagement with the gear 53. It is thus apparent that the drum 24 in the starting unit is now connected or geared to the driven shaft 54. The drum 24, in the starting unit, being released, the weight 27 descends, and rotates the drum, which rotation is imparted to the driven shaft 54. When the weight 27 of the starting unit has moved to the end of its downward travel, the same contacts with the plate 58 of the lever 57 and swings this lever to the lowermost position. The lever 57 is retained in this lowermost position while the

other succeeding units are acting or being set into action. When the lever 57 in the starting units is thus shifted to the lowermost position, the cable 56 of the starting unit is pulled downwardly in opposition to the spring 62, which is already under tension, as the lever 70 is held in the shifted position. This movement of the cable 56, in the starting unit, swings the bell-crank lever 47 upwardly, thereby bringing the gear 46 out of engagement with the gear 53. It is thus apparent that after the starting unit has its cable 26 completely unwound, the drum 24 and parts thereof, are disconnected from the driven shaft 54.

When the lever 57, in the starting unit, is swung to the lowermost position, by the weight 27, the cable 69 of the next succeeding unit is pulled downwardly whereby its dog 64 is moved out of engagement with the corresponding ratchet wheel 65, and the gear 46 shifted into engagement with the gear 53. The second succeeding unit is thus thrown into action and connected with the driven shaft 54. The second unit continues in action until its weight 27 forces the corresponding lever 57 to the lowermost position, at which time the second unit is stopped and the third succeeding unit set into action. It is obvious that the operation will be repeated, depending upon the number of units employed, which may be present in any desired number.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in shape, size, and arrangement of parts, may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A weight motor of the character described, comprising a driven element, a gear carried thereby to rotate the same, a rotatable drum supported near the driven element, a ratchet associated with the drum to control its rotation, driving connecting means between the drum and the gear including a movable gear to be shifted into and out of engagement with the first named gear, a bell-crank lever pivoted near the movable gear and connected therewith to move the same, a pulley supported above one arm of the bell-crank lever, a cable connected with the arm of the bell-crank lever and passed about the pulley to extend downwardly therefrom, a dog to engage the ratchet, a retractile coil spring connecting the dog and arm of the bell-crank lever to move the dog upwardly into engagement with the ratchet, a member connected with the lower end of the cable and having a suitable weight to swing the bell-crank lever upwardly in opposition to the retractile coil spring thereby shifting the movable gear out of engagement with the first named gear, a cable carried by the drum, a weight secured to the cable and adapted to contact with the member to move it downwardly whereby the bell-crank lever is swung upwardly, and means to move the dog downwardly whereby the spring will swing the bell-crank lever downwardly when the weight is in the elevated position.

2. In a weight motor of the character described, a driven element, a starting unit and a succeeding unit to drive the element, each unit comprising a rotatable drum, a flexible element to be wound thereon, and a weight connected with the flexible element, means for normally disconnecting the starting unit from the driven element and adapted to connect the starting unit and driven element and to set the same into action, means to normally disconnect the succeeding unit with the driven element and connect the succeeding unit and driven element and to set the same into action, a movable member arranged in the path of travel of the weight of the starting unit and adapted to be shifted thereby, and connecting means between the movable member and the second named means.

3. In a weight motor of the character described, a driven element, a starting unit and a succeeding unit to drive the element, each unit comprising a rotatable drum, a flexible element to be wound thereon, and a weight connected with the flexible element, means for connecting the starting unit with the driven element, means to set the starting unit into action, means for connecting the succeeding unit with the driven element, means to set the succeeding unit into action, a movable member arranged in the path of travel of the weight of each unit, means for disconnecting the starting unit from the driven element and having connection with the movable member of the starting unit, means for disconnecting the succeeding unit from the driven element and having connection with the movable member of the succeeding unit, and means for connecting the setting means of the succeeding unit with the movable member of the starting unit.

4. In a weight motor of the character described, a driven element including a plurality of gears; a starting unit and a succeeding unit to drive the element, each unit comprising a rotatable drum; a flexible element to be wound upon the drum, a weight connected with the flexible element, a movable member arranged in the path of travel of the weight, a train of gears connected with the drum to be driven thereby and including an end gear; a movable support arranged near the end gear, a shifting gear carried

by the movable support and engaging the end gear, and adapted to engage the gear of the driven element, a movable element to move the movable support, a yielding element connected with the movable element to move the same in one direction, means connecting the movable element with the movable member, and means to lock the train of gears against movement; means to actuate the yielding means and the locking means of the starting unit; and means connecting the yielding means and the locking means of the succeeding unit with the movable member of the starting unit.

5. In a weight motor of the character described, a driven element including a plurality of gears, a starting unit and a succeeding unit to drive the element, each unit comprising a rotatable drum, a flexible element to be wound upon the drum, a weight connected with the flexible element, a movable member arranged in the path of travel of the weight, a train of gears connected with the drum to be driven thereby and including an end gear and a ratchet wheel, a support pivoted concentrically with respect to the end gear, a shifting gear carried by the support and engaging the end gear and adapted to engage the gear of the driven element, a pivoted lever connected with the pivoted support to move the same in one direction, a yielding element connected with the pivoted support to move the same in an opposite direction, means connecting the pivoted lever with the movable member, and a pawl to engage the ratchet wheel, the yielding means and the pawl of the starting unit, and means connecting the yielding means and the pawl of the succeeding unit with the movable member of the starting unit.

6. In a weight motor of the character described, a driven gear, a train of gears including a shifting gear to engage and disengage the driven gear; a movable element connected with the shifting gear to shift the same; a yielding element connected with the movable element to shift the same in one direction; means to normally lock the train of gears against movement, means for connecting the yielding means and the locking means, means to actuate the locking means, and an element connected with the movable element to move the same in opposition to the yielding means.

7. In a weight motor of the character described, a driven gear, a train of gears including a shifting gear to engage and disengage the driven gear, and a ratchet wheel; a movable element connected with the shifting gear to shift the same; a yielding element connected with the movable element to shift the same in one direction, a pawl to engage with the ratchet wheel and having connection with the yielding element, means to move the pawl in one direction, and an element connected with the movable element to move the same in opposition to the yielding element.

8. In a weight motor of the character described, a rotatable and longitudinally movable shaft, means to support the shaft, means to shift the shaft longitudinally, a driven element, a plurality of weight-operated units to drive the driven element and including a plurality of drums rotatable upon said shaft, means to lock the drums to the shaft upon the longitudinal movement of the shaft, and means to rotate the shaft.

9. In a weight motor of the character described, a rotatable and longitudinally movable shaft, means to support the shaft, means to shift the shaft longitudinally, a plurality of trains of gears arranged between the shaft and driven element, a corresponding number of drums rotatable upon the shaft, a corresponding number of gears having pawl and ratchet connections with the drums and engaging said trains of gears, flexible elements connected with the drums to be wound thereon; a plurality of weights connected with the flexible elements; means to lock the drums to the shaft upon its longitudinal movement; and means to turn the shaft upon its longitudinal axis.

In testimony whereof I affix my signature in the presence of two witnesses.

HARRY LLOYD ARTZ.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."