

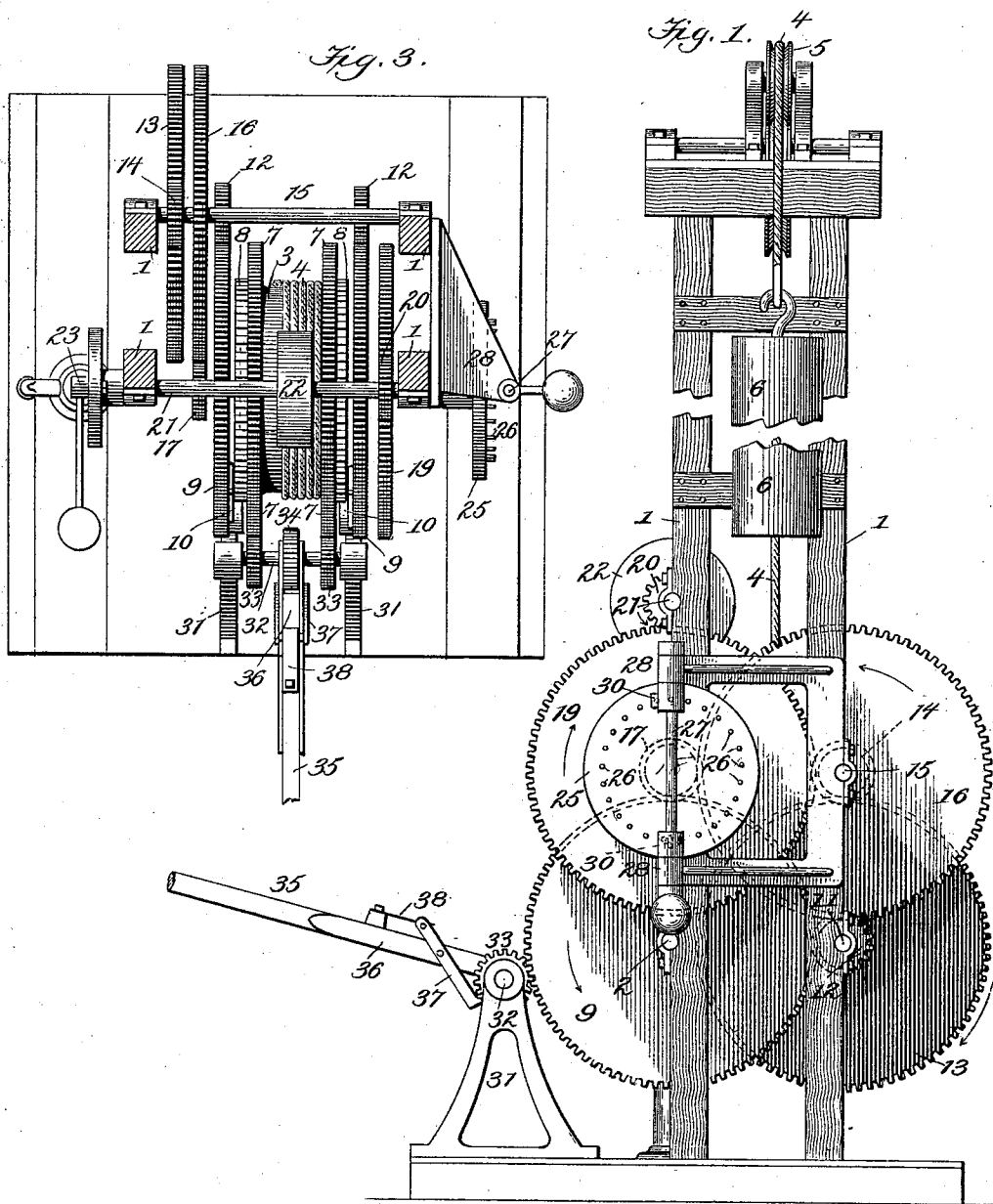
(No Model.)

2 Sheets—Sheet 1.

A. PINK & D. BUSCHING.
GRAVITY MOTOR.

No. 538,881.

Patented May 7, 1895.



WITNESSES:

Edwin L. Bradford
Melville L. Bradford.

INVENTORS

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Andrew Pink
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BY *g/*
Johnson & Johnson
ATTORNEYS.

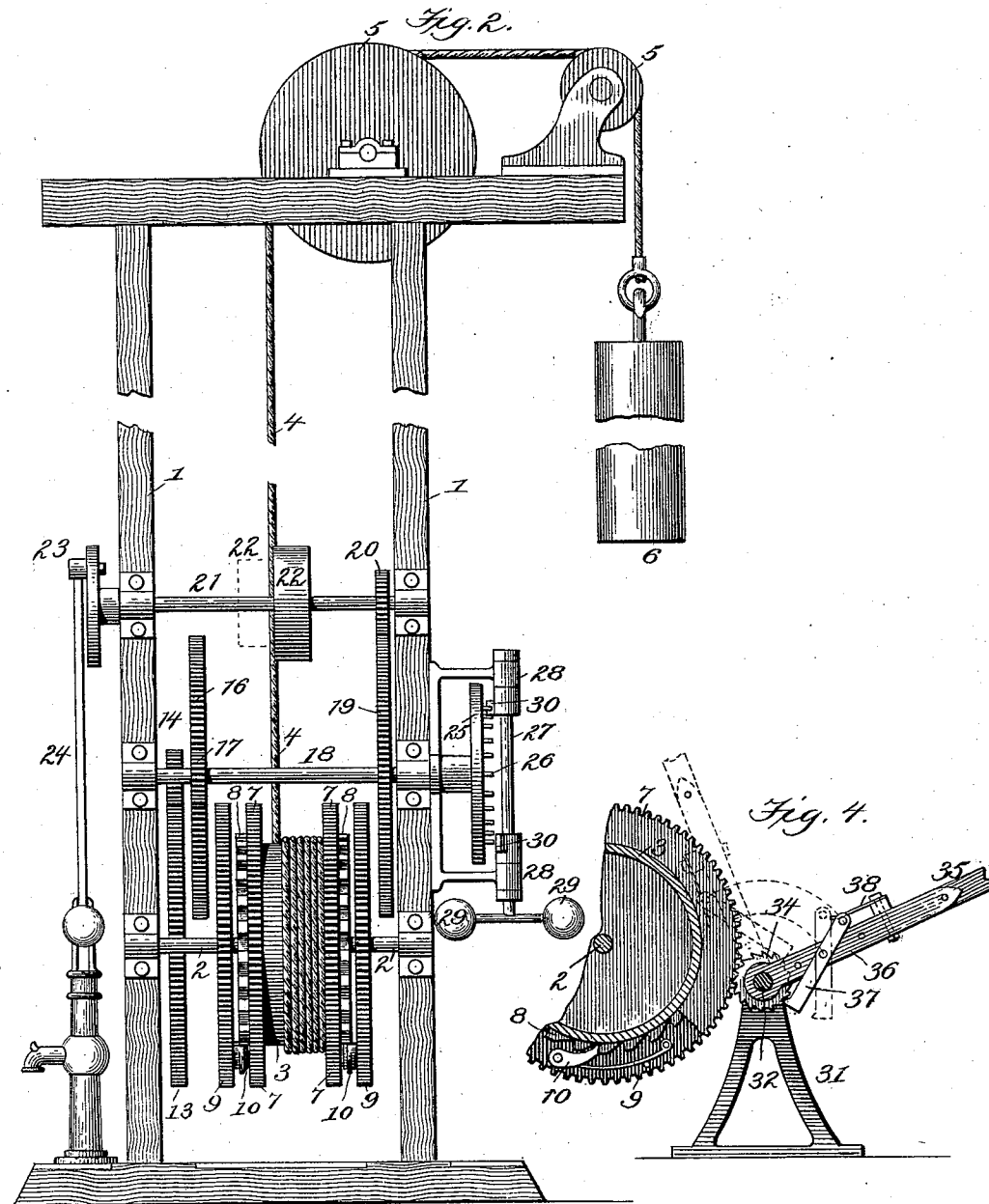
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UNITED STATES PATENT OFFICE.

ANDREW PINK AND DIEDRICH BUSCHING, OF GUTTENBERG, IOWA.

GRAVITY-MOTOR.

SPECIFICATION forming part of Letters Patent No. 538,881, dated May 7, 1895.

Application filed January 21, 1895. Serial No. 535,684. (No model.)

To all whom it may concern:

Be it known that we, ANDREW PINK and DIEDRICH BUSCHING, citizens of the United States, residing at Guttenberg, in the county of Clayton and State of Iowa, have invented certain new and useful Improvements in Gravity-Motors, of which the following is a specification.

For operating pumps and other light machinery, we have produced an improved mechanical motor in which a weight provides the driving power through a train of gearing; and the particular matters which constitute our improvements will be specifically set out in the claims concluding this specification in connection with the drawings which illustrate the machine.

Referring to the drawings, Figure 1 shows in side view our improved gravity-motor. Fig. 2 is a front view of the same, the winding device being removed. Fig. 3 is a top view of the motor and its winding device. Fig. 4 is a vertical section of the winding and locking device in position to wind up the weight, and wherein the dotted lines show the winding lever and its pawl in the position it occupies turned up and resting against the drum as a means of stopping the operation of the machine and to lock it when the weight is wound, but the machine is not required to operate.

A strong frame of standards 1, 1 are connected in pairs to a base-platform and upon these standards are mounted in bearings, the shafts of a train of gear which connect the weight driven rope-drum. Connecting this train of gear on one side of the machine, is the pump, and on the other side of the machine is a governor, both arranged in vertical relation to the frame and connecting the train of gear in such manner as to give an easy and balanced movement thereto.

At the front side of the machine is mounted the shaft 2, which carries the rope-drum 3 for the weight-cord 4 which passes over pulleys 5, 5 at the top of the standards and has the weight 6, which is of sufficient gravity to drive the train of gear and the pump to be operated. The drum 3 is loose upon its shaft and has fixed gear wheels 7, 7 and ratchet-teeth 8, 8 at each end.

On the drum shaft are fixed gear wheels 9,

9 next to the ratchet-heads and these gears 9, 9 are provided with pawls 10, 10 which engage the ratchets to connect the drum with its shaft for operating the machine and to allow the drum to be turned without moving the train when the weight is to be wound up, as we shall presently state as shown in Fig. 4.

On the rear standards and in a horizontal plane with the shaft of the rope-drum, is a shaft 11 Fig. 1 which has two pinions 12, 12 which engage with the gear-wheels 9, 9 fixed upon the drum-shaft. This shaft 11, has a gear wheel 13 which engages a pinion 14 on a shaft 15 above the shaft 11 in the rear standards to make the train connection. On the same end this shaft 15 has a gear-wheel 16 which engages a pinion 17 on a shaft 18, Fig. 2, mounted in the front standards on a horizontal plane with the rear shaft 15. On its other end this shaft 18 has a gear-wheel 19 which engages a pinion 20 on the shaft 21 in the front standards above the shaft 18. This top shaft 21 may have pulleys 22 to receive driving belts for suitable machines; or it may have a crank 23 which connects with a pump operating pitman 24 at the side of the frame. This disposition of the gear gives a compact arrangement upon and between the two pairs of standards. When the weight is wound up the pawls 10, 10 being engaged with the ratchet-wheels 8, 8 of the drum, the pump connecting shaft would run with increasing velocity. To prevent this and to automatically control the speed of the gearing we provide a governor-device and arrange it on the outer side of the standards. For this purpose the shaft 18 has fixed on its end a disk 25 provided with an uneven number of pins 26 in a concentric row. Vertically and centrally across the face of this disk a rod 27 is mounted in bearings in a bracket 28 secured to the standards and having on its lower end a horizontal ball-governor 29.

The governor-rod is provided with tappets 30, 30 placed at right angles to each other so as to alternately engage the pins at the top and at the bottom of the disk so that as the latter revolves, the pins will engage the tappets alternately and rocking the rod, produce thereby an oscillation of the governor-balls in a horizontal plane and give a regular intermittent motion to the disk to automatically

control and render uniform the motion of the train of gear and its weight connecting drum. It is important to notice that this governor-device has no direct connection with the pump operating-pitman, but forms a governor for the gear-shaft 18 which connects, by intermediate gear, with the pump-pitman and with the rope-drum, so that the action of the governor-balls is merely to render certain the rocking movement of the tappet-rod that the tappets may regularly engage the pins of the disk to render its revolution of uniform speed and this gives regular speed to the shaft 18, but the governor does not revolve.

It is important to notice that the weight connecting drum is loose upon its shaft; that said drum has a ratchet-wheel 8 fixed on each end and that joining each of these drum ratchet-wheels, there is a gear-wheel 9, 9 fixed upon the drum-shaft, and provided with a pawl 10 adapted to engage the drum ratchet-wheels 8, so that the weight will operate the gearing, while the drum will be free to turn in the opposite direction to wind up the weight. For winding the weight we provide a lever-device which, by its construction, serves also as the means for locking and holding the machine out of action. This winding device consists of a pedestal 31 firmly secured to the platform of the machine in front of the winding-drum and having a short shaft 32 parallel with and on a plane a little below the drum-shaft. Two pinions and a ratchet-wheel are fixed on this drum-shaft. The pinions 33, 33 are on its ends and engage the gear-wheels 7, 7 and the ratchet-wheel 34 is medially between the pinions. A lever 35 is loosely mounted on the winding-shaft by a forked-strap 36 and is provided with a pawl 37 which is preferably made of strap-iron to embrace the lever and is pivoted to it so that its lower end will engage the said ratchet-wheel at the under side of the lever. The upper ends of the pawl are connected above the lever and a spring-detent 38 is pivoted to the lever so as to bear upon the upper end of the pawl to press its upper end down and thereby hold its lower end in engagement with the ratchet-wheel. The depression of the lever by its pawl engagement, turns the pinions 33, 33 part of a revolution, and these pinions engaging with the gear-wheels 7, 7, will correspondingly turn the drum and wind up the weight-rope without turning the gear-wheels 9, 9.

Should the weight be wound up and it be desired to stop the working of the pump, the lever, by the unwinding action of the drum and its pawl engagement with the winding shaft 32, will be caused to be turned up and supported against the drum, as seen by dotted lines in Fig. 4 and thereby stop the operation of the machine.

We use the pivoted spring-detent to hold the pawl in engagement with the winding ratchet-wheel and allow the pawl to ride over the said ratchet-teeth in raising the lever, and it will be seen that the pawl is held in engagement

with the ratchet wheel both in winding up and in locking the machine and is only out of such engagement when the machine is operating. This disengagement of the pawl is effected by turning the spring-detent on its pivot to one side so as to release the pressure upon the pawl when the latter will hang down as seen by dotted lines in Fig. 4, and thereby disconnect the winding-device from the drum, during the operation of the machine. In the position shown by dotted lines, the lever rests against the drum and it is carried to this position by the engagement of the pawl 37 with the winding-shaft so that the lever, the drum, the pawl, its spring detent and their connections coact to stop the machine and to lock it out of operation.

The provision of a ratchet-wheel on each end of the loose-rope drum; of gear wheels 9—9 fast on the shaft by the side of the ratchet-wheels; of the pawls connecting the fixed gear-wheels with the ratchets of the loose-drum; and of the winding-shaft 32 having pinions engaging the drum connecting gear-wheels 7—7, together with the winding-lever loose upon the said winding-shaft provided with the pawl and the spring detent engaging a ratchet-wheel 34 on the winding-shaft, gives the advantage of connecting the winding-power with both ends of the rope-drum and of equalizing the driving action of the weight upon both ends of the drum and upon the gear-train by the pinions 12—12. This brings the force in a center line upon the machine and tends greatly to enhance its durability by counteracting all tendency to undue twisting strain.

Referring to the winding device it is important to notice that both in the winding and in the locking function of the pawl, the strain thereon is upon its pivot, which is at the middle of the length of said pawl and that the latter is so mounted that the spring bears upon its upper end in a way to hold the pawl in engagement with the ratchet and prevent the pawl slipping when the machine is being locked thereby.

We claim as our improvement—

1. In a gravity motor the winding and locking device for the rope-drum consisting of the lever 35 loosely pivoted on the shaft 32 in front of the drum, said shaft having a pinion 33 on each end, and a ratchet 34 medially between said pinions, the said lever having a pawl 37 engaging said ratchet-wheel, and a pivoted spring detent 38 arranged to hold said pawl in engagement and to release such engagement, in combination with the loosely mounted rope-connected drum 3 arranged to form an abutment for the handle of said lever, the gear-wheels 7, 7 and 9, 9 and the pawls 10, 10 and the weight and drum connecting train of gear whereby the lever and its pawl serve to both wind the drum and to automatically lock it from turning, the mounting of the pawl being such that when engaged the strain is through its pivot and the holding function of

the spring is such as to prevent the slipping of the pawl when the machine is being locked, as set forth.

2. In a gravity-motor, the combination with
5 a train of gear and a rope connected weight-operated drum, of a governor device connected with said gearing and consisting of the disk provided with a concentric row of pins, a vertical rod 27 having tappets 30, 30 arranged at
10 right angles to each other adapted to alternately engage the disk-pins and the horizontal arm on the lower end of said tappet-rod

having the governor-balls 29, 29 to automatically control the speed of the gear train by a rocking motion of the governor, substantially 15 as described.

In testimony whereof we have hereunto signed this specification in the presence of witnesses.

ANDREW PINK.

DIEDRICH BUSCHING.

Witnesses:

D. D. MURPHY,

W. H. MEYER.