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N. HOWARD.

MECHANICAL MOVEMENT.

APPLICATION FILED NOV. 11, 1905.

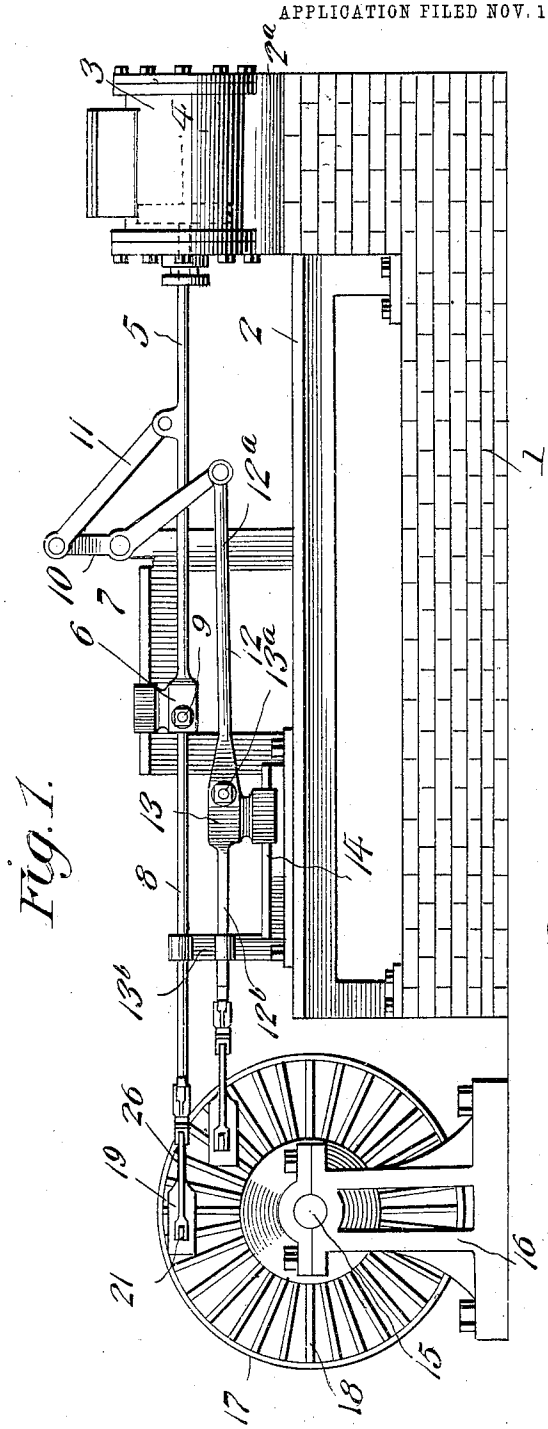

Fig. 1.

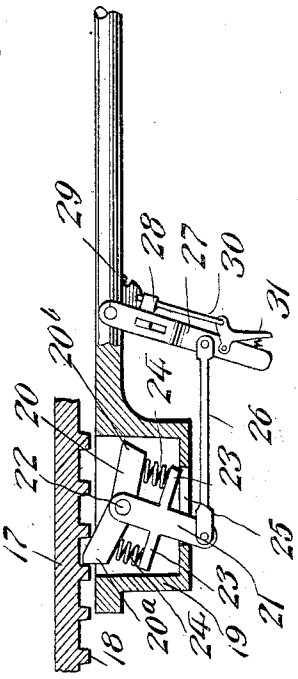

Fig. 2.

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MECHANICAL MOVEMENT.

No. 836,579. Specification of Letters Patent. Patented Nov. 20, 1906.

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To all whom it may concern:

Be it known that I, NATHAN HOWARD, a citizen of the United States of America, residing at Philomath, in the county of Benton and State of Oregon, have invented new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention relates to mechanical movements, and has for its object to provide a mechanical movement of the pawl-and-ratchet type embodying simple and effective means for imparting continuous rotary motion to a drive-wheel and eliminating dead-centers.

In the accompanying drawings, Figure 1 is a side elevation of an engine or motor embodying my invention. Fig. 2 is a fragmentary plan view of the drive-wheel and a section through the adjacent end of one of the actuating-rods.

The numeral 1 in the drawings designates an engine-base carrying an engine-frame 2 and a cylinder-base 2^a, on which latter is mounted a power-cylinder 3, in which reciprocates a piston 4, which may be operated by any known fluid-impelling means.

The piston-rod 5 carries at its outer end a cross-head 6, which works on a suitable guide 7 and receives the inner end of a main driving-rod 8, clamped thereto by a set-screw or other fastening 9.

Fulcrumed on the frame 2 is a bell-crank lever 10, one arm of which is pivotally connected by a link 11 with the rod 5, while the other arm thereof is pivotally connected with an auxiliary driving-rod 12, carrying a cross-head 13, arranged to slide upon a suitable guide 14. The rod 12 is composed of inner and outer sections 12^a and 12^b, the section 12^a being pivotally connected with the cross-head 13 by a pivot-bolt 13^a, while said cross-head is fixedly connected with the section 12^b. The main driving-rod 8 and section 12^b of the auxiliary driving-rod 12 reciprocate in a straight line in a suitable guide 13^b provided upon the engine-frame.

A drive-shaft 15 is mounted in bearings in a supporting-frame 16 and carries a drive-wheel 17, keyed or otherwise fixed thereto, but which may be revoluble thereon according to the mode in which the power of the engine is to be transmitted for driving machinery. This wheel is provided upon one side with an annular series of ratchet-teeth 18. The outer ends of the main and auxiliary driving-rods 8 and 12 are each formed with a chamber 19, in which is arranged a reversible double-acting pawl 20, comprising a bar having opposite terminals actuating teeth 20^a and 20^b. This pawl is pivotally connected with a carrier-arm 21, pivotally mounted in the chamber on a pivot pin or bolt 22, which may pivotally connect the arm to the chamber and the pawl to the arm. The arm is provided with lateral branches or projections 23, between which and the opposite ends of the pawl are arranged springs 24, which permit the pawl to have a yielding or tilting movement. The outer end of the arm 21 extends through and is movable in a slot 25, formed in the outer side wall of the chamber 19, and is connected by a link 26 with a controlling-lever 27, pivoted to the rod, said lever carrying a sliding pawl 28, adapted to engage a segment-rack 29 on the rod to hold the lever in adjusted position. A rod 30 connects the pawl with the usual pawl-operating lever 31, pivoted to the controlling-lever, whereby the pawl may be adjusted into and out of engagement with the rack.

The pawl ends of the actuating-rods are adapted to act alternately upon the teeth of the ratchet-wheel to impart continuous rotary motion thereto, Fig. 1 showing the positions of the parts as they appear when the teeth 20^a of the pawls are projected for operation to rotate the wheel 17 to the left, the rods 8 and 12 being respectively at the limits of their inward and outward movements. When the rod 8 moves outwardly, the link 11 is drawn upon to swing the bell-crank lever in a proper direction to draw the rod 12 inwardly and upon the return movement of the rod 8 the link and bell-crank lever will force the rod 12 in the reverse direction or outwardly. By this means the rods will be simultaneously reciprocated in opposite directions and the pawls thereof caused to alternately engage and impart a partial rotation to the wheel, the continuous action of the rods resulting in the wheel being continuously rotated. It will be understood that the spring 24 acting upon the pawl 20^a will hold said end projected upon the outward movement of the rod and that both springs will permit the pawl to tilt to permit said pawl end to ride back on the ratchet-teeth upon the return movement of the rod. It will be apparent that by adjusting the levers 27 the pawls may be shifted to rotate the wheel in the opposite direction or

to the right, in which event the acting ends or teeth 20^b will be projected for operation, while the teeth 20^a will be retracted. The mechanism may therefore be adjusted to rotate the wheel in either direction at will. It will be observed that the operating mechanism is simple and the action of the rods such as to prevent the wheel from hanging on center or of its motion being otherwise retarded.

Having thus described the invention, what I claim is—

1. In a mechanical movement, a ratchet-wheel provided on its side with radial teeth, a pair of rods arranged to reciprocate in parallel planes and provided with pawls to act upon the said ratchet-teeth, driving-rods pivotally connected with the pawl-carrying rods, means for communicating direct motion to one of said driving-rods, and means for communicating indirect motion in the reverse direction to the other driving-rod.

2. In a mechanical movement, a ratchet-wheel provided upon one of its sides with radial teeth, rods arranged to reciprocate in fixed parallel planes and provided with reversible pawls to act upon said ratchet-teeth, and means for reversing the same, driving-rods pivotally connected with the pawl-carrying rods, means for communicating direct motion to one of said driving-rods, and means for communicating indirect motion from said driving-rod in reverse direction to the other driving-rod.

3. In a mechanical movement, a ratchet-wheel provided upon its side with radial teeth, rods arranged to reciprocate in fixed parallel paths and provided with chambers at their outer ends, pawls arranged within said chambers to act upon the teeth of the ratchet-wheel, driving-rods pivotally connected with the inner ends of the pawl-carrying rods, means for communicating direct motion to one of the rods, a bell-crank lever connected by one of its arms with the other rod, and a link connection between the other arm of the bell-crank lever and the first-named driving-rod.

4. In a mechanical movement, a ratchet-wheel, a driving-rod having a chambered end, a carrier pivotally mounted therein, a pawl having opposite tooth portions pivotally mounted upon the carrier, springs between said opposite tooth portions and the carrier, means for swinging the carrier to reverse the positions of the pawl, and means for imparting reciprocatory motion to the rod.

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

NATHAN HOWARD.

Witnesses:
S. H. MOSES,
G. A. SCOTT.