C. A. DEYERLE.

MECHANICAL-MOVEMENT.

No. 184,232. Patented Nov. 14, 1876.

Fig. 1.

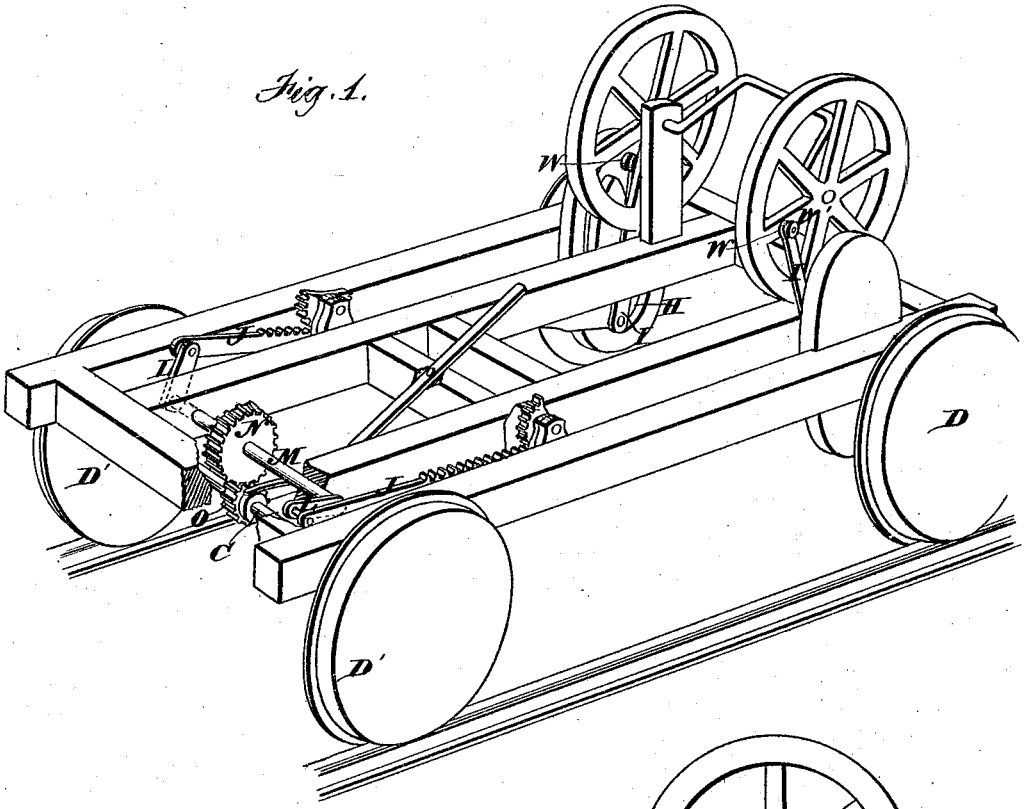
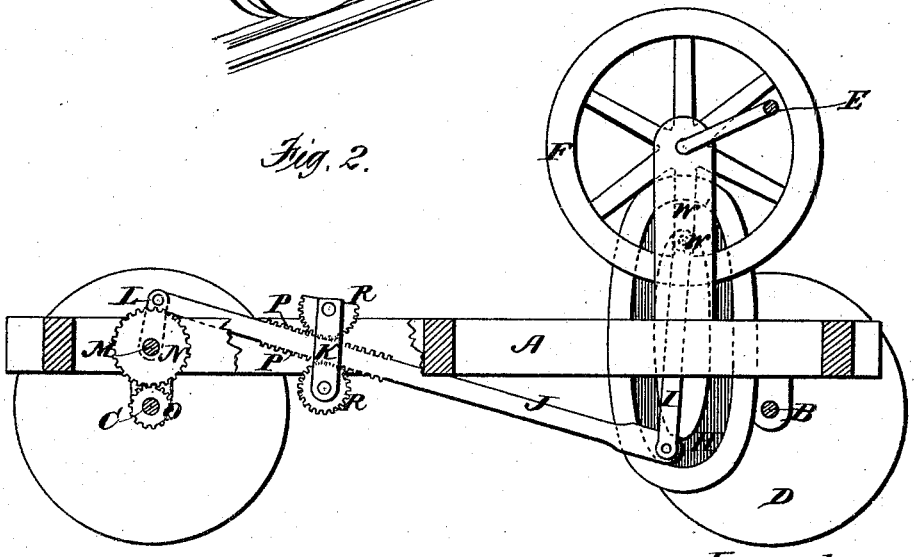


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MECHANICAL MOVEMENTS.

Specification forming part of Letters Patent No. **184,232**, dated November 14, 1876; application filed October 14, 1876.

To all whom it may concern:

Be it known that I, CHARLES A. DEYERLE, of Big Spring, in the county of Montgomery and State of Virginia, have invented certain new and useful Improvements in Mechanical Movements; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view, showing the adaptation of my invention to a hand-car; and Fig. 2, a longitudinal section of the same.

Similar letters of reference in the accompanying drawings denote the same parts.

My invention has for its object to provide a simple and effective mechanical movement for the transmission of rotary motion from one shaft to another in such manner as to avoid a dead-center and multiply power. To this end my invention consists, primarily, in connecting the crank-arms of two shafts by a rod sliding between two fulcrums, converting it into a lever of the third degree, which transmits the motion of the driving to the secondary shaft. It consists, secondly, in the provision of an elliptical guide for the purpose of controlling the movement of one end of the connecting rod or lever when its arms are unequal in length; and, thirdly, in the construction of the fulcrums and connecting rod or lever, adapting the latter to reciprocate between its fulcrums with a minimum degree of friction, all of which I will now proceed to describe.

In the drawings, showing the adaptation of my invention to a hand-car, A represents the frame or body of the car, provided with axles B C and wheels D D′. Near one end of the frame A are standards containing the bearings of a transverse driving-shaft, E. M is a transverse secondary shaft, substantially parallel with the driving-shaft E, and provided at its ends with cranks or arms L. The driving-shaft is provided with similar crank-arms, or, preferably, with fly-wheels F F, the cranks being the distance between the axis of the fly-wheels and the wrist-pins W, (represented by W′.) J J are long rods connecting the cranks L of the shaft M with the cranks or fly-wheels F of the driving-shaft. The rods J pass between pivoted fulcrums R R, to be hereinafter described, and are converted thereby into levers of the third degree. When the cranks L W′ are of the same length, and the fulcrums R are so located as to divide the rods or levers J into equal arms, the ends of the latter may be connected directly to both cranks; but when the cranks are unequal in length, and the levers are divided into longer and shorter arms, as shown in the drawings, the levers are connected to the cranks W′ of the driving-shaft by links or rods I, one end of each being pivoted to the crank W′, while the other is provided with a friction-roller, which enters an elliptical guide or groove, H, suitably attached to the frame of the car.

When the driving-shaft E is rotated by the application of suitable power, the cranks W′ communicate the motion to the rods or levers J, either directly, when the cranks W′ and L are of equal lengths, and the arms of the levers alike, as above described, or through the medium of the connecting-links I, when the cranks and lever-arms are unequal, the result in both cases being a vertical oscillation and a longitudinal reciprocation of the levers on and through their fulcrums, this movement causing the rotation of the shaft M in an opposite direction to that of the driving-shaft E. When the cranks L W′ and the arms of the levers J differ in length, and the links I and elliptical guides H are employed, the guided ends of the links, and the ends of the rods or levers J to which they are attached, describe an ellipse whose major axis is equal to twice the radius of the longer crank, and whose minor axis is equal to twice the radius of the shorter crank, the guide H being proportioned accordingly. Hence, when the cranks W′ are the longer, the major axis of the guides is vertical, as shown in Fig. 2, while if the cranks L were the longer the major axis would be horizontal. It will be seen, therefore, that the function of the elliptical guides is to enable the fulcrums to be so arranged as to give the levers long and short arms, the long arms being connected to the longer cranks, which are preferably those of the driving-shaft, thereby multiplying the power.

The fulcrums R R preferably consist of rack-segments or pinions, journaled in a suitable frame, K, the latter having side trunnions,

which rest in bearings in the frame A, the whole being thus adapted to oscillate and conform in this particular to the movement of the rods or levers J. The fulcrums R are located sufficiently far apart to permit the passage between them of the levers, which are provided with rack-teeth P P, meshing with the teeth of the segment or fulcrums. By this arrangement the friction of the reciprocating rods or levers is reduced to the minimum. The action of the rods or levers J on the cranks L and shaft M is such as to obviate dead-points, the rods J becoming levers and turning on their fulcrums, while the cranks L are in line with them, or, in other words, while passing the dead-points of the cranks, thus carrying the cranks beyond the dead-points without loss of power, and insuring their uniform rotation.

The rotation of the secondary shaft is preferably imparted to the axle C of the car or other vehicle by a cog-wheel, N, on the shaft meshing with a sliding pinion, O, on the axle, the pinion being provided with a suitable shifting-lever, for the purpose of throwing it in and out of gear. Any suitable mechanism may be employed in this connection that will answer the purpose.

By the application of the rotary motion of the driving-shaft to the levers in the manner described, the motive power is utilized and multiplied to great advantage; hence, by the use of my invention, a hand-car can be propelled with the expenditure of about half the power usually required, one man being enabled to perform the work of two.

It will be readily seen that this mechanical movement may be applied to a great variety of uses, either in propelling vehicles or operating stationary machinery. It is well adapted, in particular, to be used in transmitting the power of water-wheels of various kinds, steam-engines, &c., the power of the machine depending on the relative proportions of the cranks and levers.

The points of connection of the connecting-rods I I with the fly-wheels form a right angle with the axis of the latter, while the crank-arms L of the shaft M radiate in corresponding directions. By this arrangement the power is always advantageously exerted.

A single lever, connecting two cranks, and provided with the necessary attachments, may be employed for many purposes, instead of the duplication shown in the present case.

I claim as my invention—

1. The combination of the lever J, elliptical guide H, connecting-rod I, and the unequal cranks L W′, substantially as described.

2. The lever J, having racks P, in combination with the toothed fulcrums R, located in the pivoted frame K, substantially as described, for the purpose specified.

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