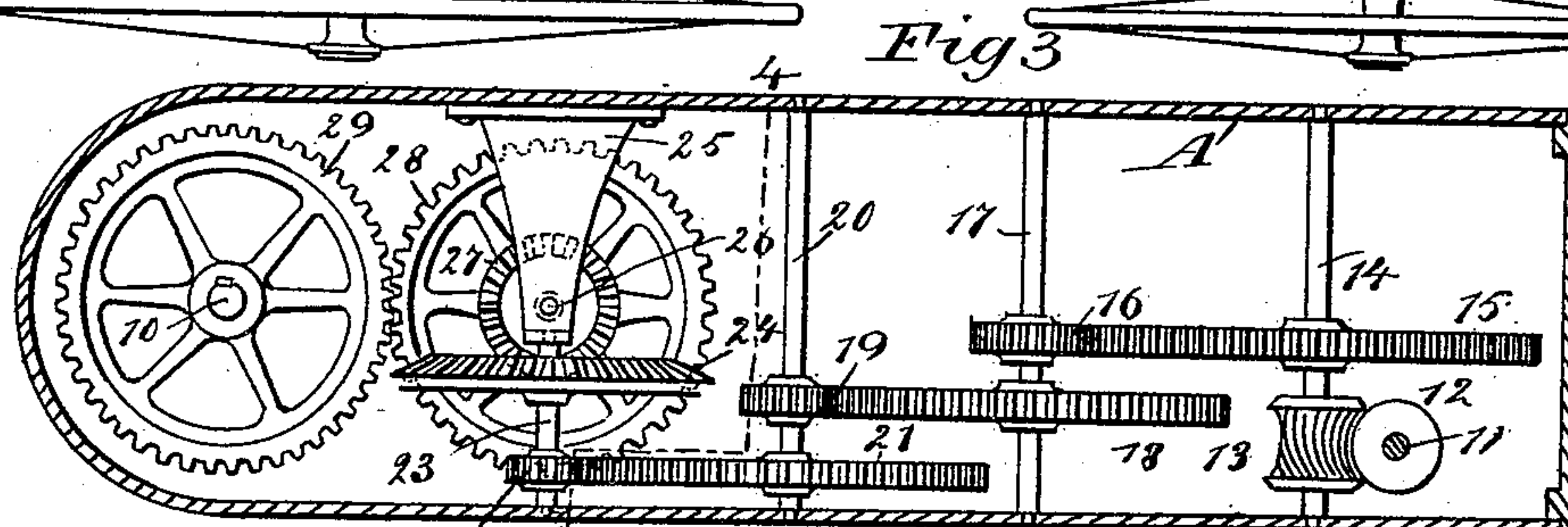
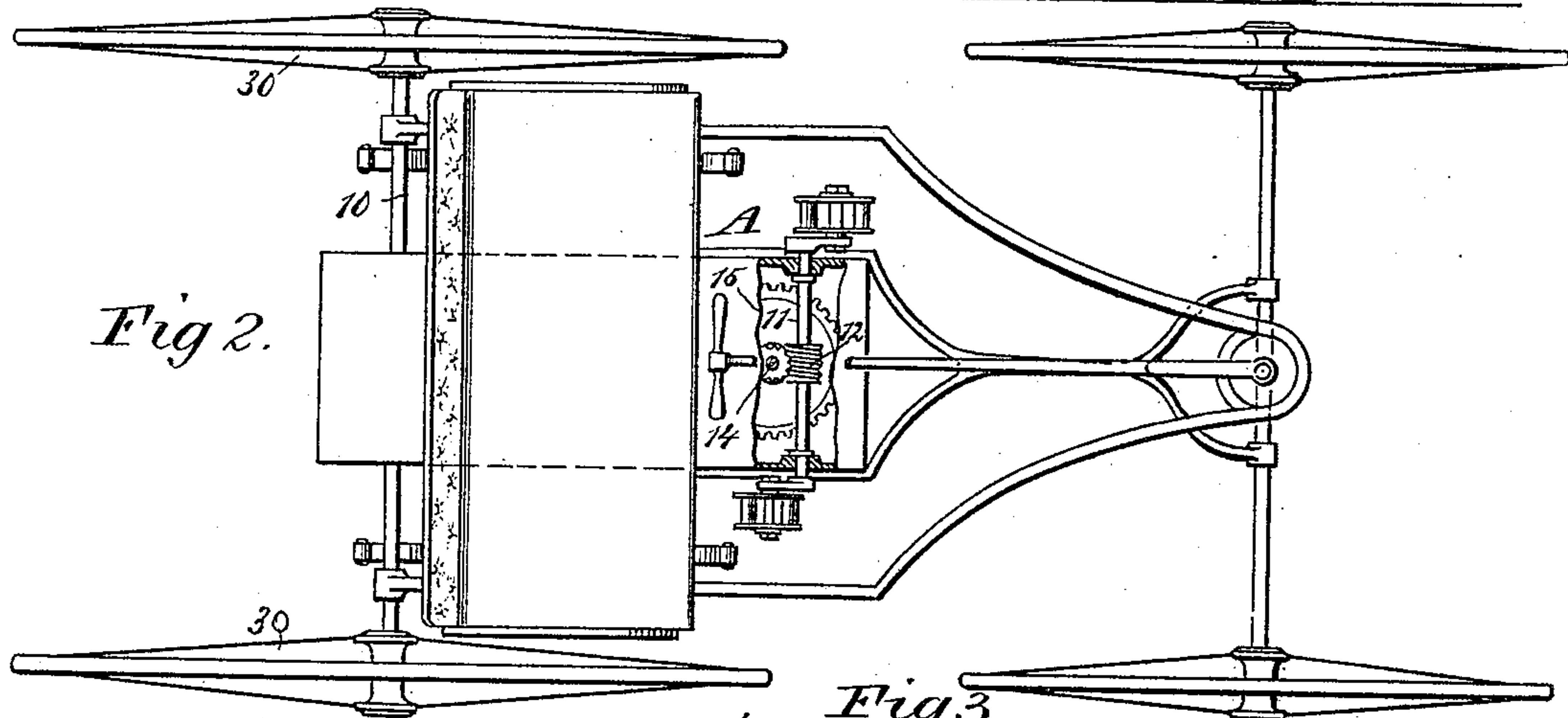
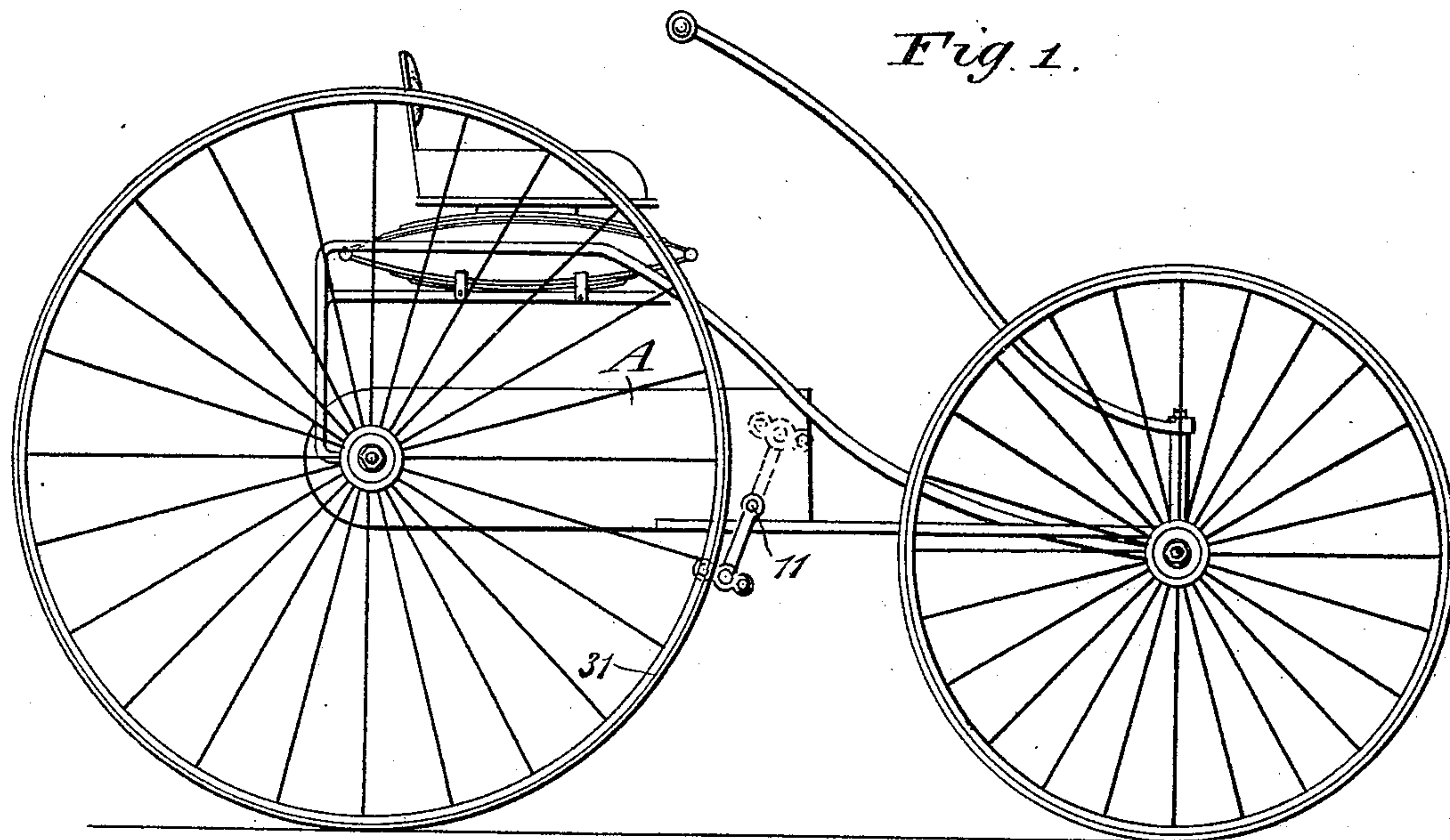


(No Model.)

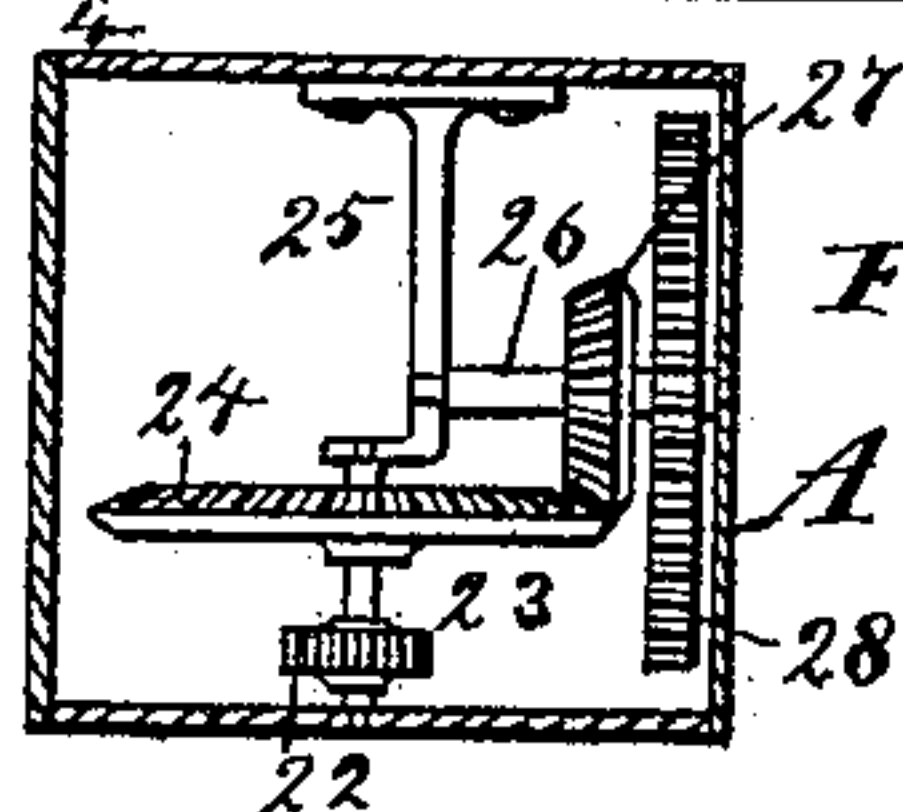
W. A. EVANS & T. COWAN.
DRIVING MECHANISM FOR VELOCIPEDES.

No. 459,682.

Patented Sept. 15, 1891.



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UNITED STATES PATENT OFFICE.

WALTER AYLWARD EVANS AND THOMAS COWAN, OF WINNIPEG, CANADA.

DRIVING MECHANISM FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 459,682, dated September 15, 1891.

Application filed April 9, 1891. Serial No. 388,783. (No model.)

To all whom it may concern:

Be it known that we, WALTER AYLWARD EVANS and THOMAS COWAN, both of Winnipeg, in the Province of Manitoba and Dominion of Canada, have invented a new and Improved Driving Mechanism for Velocipedes and Similar Machines, of which the following is a full, clear, and exact description.

Our invention relates to an improvement in the driving mechanism for velocipedes and machines of like character.

The object of the invention is to provide a mechanism whereby a regular, positive, and powerful motion may be imparted from the pedal-shaft to the axle of the driving-wheels of the machine with a minimum of friction and a minimum of exertion.

A further object of the invention is to provide a mechanism capable of being applied conveniently to any form of velocipede, bicycle, or tricycle, and which will be durable and simple in its construction.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of a velocipede having the improvement applied thereto. Fig. 2 is a plan view of a velocipede, a portion of the body being broken away to disclose the pedal-shaft and its connection with the driving mechanism. Fig. 3 is a vertical section through the casing containing the mechanism intermediate of the pedal-shaft and driving-axle; and Fig. 4 is a transverse section through the casing, taken practically on the line 4 4 of Fig. 3.

A casing A is employed to inclose the driving mechanism, through the rear end of which casing the driving-axle 10 of the machine passes, and the pedal-shaft 11 is journaled in the forward end of the casing. The pedal-shaft 11 has a worm 12 produced thereon meshing with a worm-wheel 13, fast upon a vertical shaft 14, the shaft being journaled within the casing. At each complete revolution of the pedal-shaft the worm-wheel 13 is turned

the distance of one tooth, the said worm-wheel being preferably provided with fifteen teeth and requiring the pedal-shaft 11 to be turned fifteen times to impart one revolution to the worm-wheel. A spur-wheel 15 is fast upon the shaft 14 above the worm-wheel, and to increase the speed the wheel 15 meshes with a pinion 16, fast upon a vertical shaft 17, journaled in the casing, which pinion is provided with about ten teeth, and upon the same shaft with the pinion a large spur-wheel 18 is secured, which wheel will make three revolutions to one revolution of the wheel 15. The wheel 15 has preferably about thirty teeth, and the wheel 18 is also preferably given the same number. The wheel 18 meshes with a pinion 19, fast upon a vertical shaft 20, also journaled in the casing, and the pinion 19 is preferably provided with ten teeth. Consequently a spur-wheel 21, which is also fixed upon the shaft 20, will turn three times to every one revolution of the wheel 18, or nine times to every revolution of the spur-wheel 15. The wheel 21 is preferably provided with thirty teeth and meshes with a pinion 22, fast upon a short shaft 23, which shaft also carries a bevel-gear 24. The shaft 23 is journaled in a bracket 25, located within the casing, as is also a horizontal shaft 26, carrying a bevel-pinion 27, meshing with the bevel-gear 24 and a vertical spur-gear 28. The pinion 22 is preferably made with ten teeth, and the bevel-gear 24 will make three revolutions to every one revolution of the spur-gear 21, or nine revolutions to every one of the spur-gear 18, or twenty-seven revolutions to every one revolution of the forward spur-gear 15. The bevel-gear 24 is preferably provided with thirty teeth, and the bevel-pinion 27 has ten teeth, and the spur-gear 28 makes three revolutions to every one revolution of the bevel-gear, or nine revolutions to every one revolution of the horizontal spur-gear 21, or twenty-seven revolutions to every one revolution of the horizontal spur-gear 18, or eighty-one revolutions to every one revolution of the forward horizontal spur-gear 15. The vertical spur-gear 28 meshes with and turns a similar-sized spur-gear 29, which is fast upon the driving-axle 10 of the implement. As the two vertical spur-gears 28 and 29 are of the same size, a driving-wheel 30, four feet high, will turn

about five and one-half times, or practically so, to every one revolution of the pedal-shaft.

A machine provided with the driving-gear above described will be easy to run, and a great increase of speed will be obtained over the old system of driving direct by cogs, as in the improved driving mechanism described there is no direct resistance upon the pedal-shaft, the motive power being produced by the sliding motion of the worm and screw, which worm only turns one tooth of the worm-wheel in every complete revolution, and therefore no direct resistance is offered to the feet of the rider of the machine.

The driving mechanism may, if desired, be employed in connection with mowers or binders by placing the worm upon the axle, whereby the drive-wheels will act direct upon the worm-wheel.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In the driving mechanism for velocipedes and similar machines, the combination, with the pedal-shaft having a worm produced thereon, and the driving-axle provided with an attached gear, of a shaft at a right angle to the pedal-shaft and provided with a worm-wheel meshing with the worm upon said pedal-shaft and capable of being turned about the distance of one tooth at each revolution of the pedal-shaft, a series of shafts intermediate of the worm-wheel shaft and the driving-axle, and spur-gears and pinions carried by said

shafts, the spur-gears and pinions of each shaft being practically of the same size and forming a connection between the worm-wheel shaft and the gear of the driving-axle, as and for the purpose set forth.

2. In a driving mechanism for bicycles, velocipedes, or similar machines, the combination, with the pedal-shaft provided with a worm, and the driving-axle provided with an attached spur-gear, of a series of vertical shafts, one being provided with a worm-wheel engaging with a worm-shaft and a spur-gear of a given number of teeth, the next shaft with a pinion meshing with the spur-gear and an attached spur-gear of a like number of teeth to the gear of the first shaft, a third shaft provided with a pinion and spur-gear having teeth corresponding to the pinion and gear of the intermediate shaft, a fourth vertical shaft provided with a pinion and bevel-gear, the bevel-gear and pinion having teeth corresponding in number to the teeth upon the pinions and gears of either of the intermediate shafts, a horizontal shaft, a gear carried by said shaft meshing with and of the same size as the gear upon the driving-axle, and a bevel-pinion upon the horizontal shaft engaging with the bevel-gear of the vertical shaft, as and for the purpose specified.

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