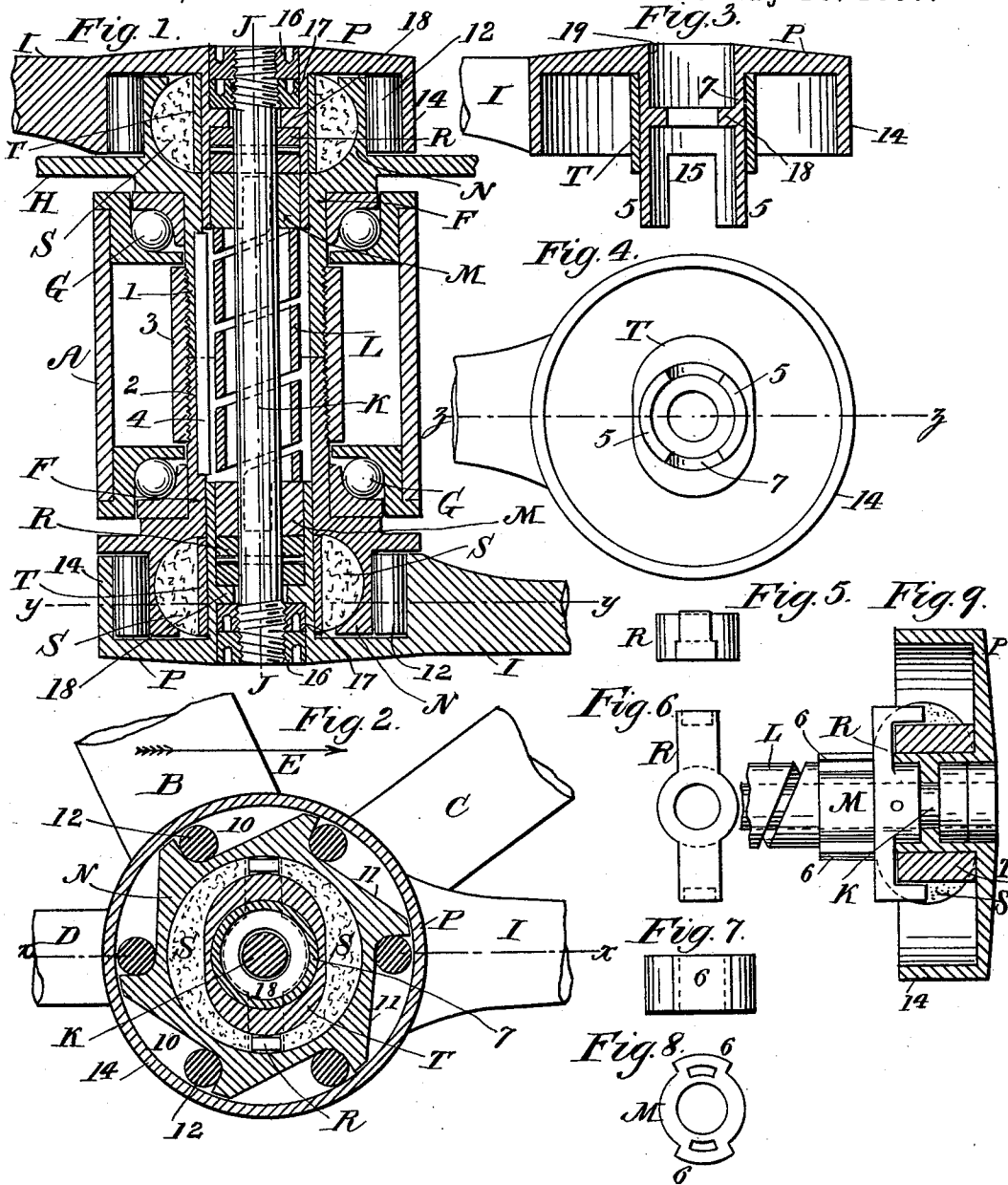


(No Model.)

G. BEEKMAN.
PROPELLING MECHANISM FOR BICYCLES.

No. 582,974.

Patented May 18, 1897.



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UNITED STATES PATENT OFFICE.

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PROPELLING MECHANISM FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 582,974, dated May 18, 1897.

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To all whom it may concern:

Be it known that I, GERARD BEEKMAN, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Propelling Mechanism for Cycles, of which the following is a specification.

My invention relates to improvements in bicycle-propelling mechanism wherein the motion of the pedal-cranks is imparted to the sprocket-wheel or other driven element by means of an automatic clutch mechanism in which the clutch action is produced intermittently by the pressure or impulses of the rider's feet upon the pedals, and in which coasting, braking, or back-pedaling, as well as propelling, may each be effected according to the manner of moving or arresting the pedal-cranks and without requiring the feet to be removed from them.

The object of the invention is to provide a simple, effective, and durable means of producing the clutch action by the pressure of the feet on the pedals and to obtain positive propulsion and controllable brake-pressure in the clutch action and to provide a self-contained and neat appearing construction.

My invention consists in certain novel features and combinations of parts hereinafter described and claimed wherein the pedal-cranks are flexibly connected with relation to each other, so that their movement of flexure for actuating the clutch occurs on their axis of rotation; also wherein the elastic means tending to support said cranks in diametrically opposite relation is located on their axis of rotation; also wherein the construction of the friction-clutch device itself is improved and simplified, and also wherein a compound friction and positive clutch mechanism is used.

Referring to the accompanying drawings, Figure 1 is a horizontal section taken at xx , Fig. 2, showing the crank-shaft hanger and crank mechanism embodying my improvements adapted to the frame of a rear-driven bicycle. Fig. 2 is a vertical section taken at yy , Fig. 1. Fig. 3 is a detail sectional view of the crank-boss, taken at zz , Fig. 4; Fig. 4, an inside elevation of the crank-boss; Fig. 5, a top plan view of the connecting-fork for

guiding the movable parts of the friction-clutches, (the position corresponding to Fig. 1;) Fig. 6, an inside face view of said fork; Fig. 7, a top plan view of the spring-collar, one of which is connected to each end of the torsional spring. Fig. 8 is a face view of said collar; and Fig. 9 is a vertical section through the crank-boss, showing the clutch-cam, the fork, the collar, the spring, and the internal shaft, which connects the forks and assists in alining the axis of the cranks.

In Figs. 1 and 2, A represents the crank-shaft hanger; B, the center brace of the frame; C, the front lower brace, and D the rear lower brace, the arrow E representing the direction in which the machine is to be propelled.

F represents the crank-shaft, which is tubular and is journaled in ball-bearings G G and bears the sprocket-wheel, which is represented at H. For convenience the shaft F is made in two parts 1 2, which are united by a screw-threaded sleeve 3 and rotatively locked by a key 4.

The cranks I I are mounted in oppositely-disposed relation on their axis of rotation, (represented by the line J J.) Said cranks are maintained in opposite relation through the agency of a torsional spring L, the extremities of which are firmly joined to collars M, which turn loosely on the internal shaft K to the limited extent required, and to these collars M the cranks I I are securely connected, the projections 5 5, Figs. 3 and 4, which terminate the inwardly-projecting sleeve 7 of the crank-boss, interlocking between the projections 6 6, Figs. 7 and 8, on the collar M at each end of the device.

N represents the clutch-ring of the driven element, which ring is integral with the tubular shaft F, carrying the sprocket-wheel H. The ring N is provided on its exterior portion with clutch-pockets 10, presenting beveled or tangent surfaces 11, as shown, and containing rollers 12, which engage between the flange 14 of the crank-boss P and said tangent surfaces in such manner as to engage the crank positively with the ring N and driven element of the machine when the cranks are propelled forwardly. In addition to the positive clutch thus constituted I provide a friction-clutch which in the illustration is composed of two

segmental movable parts S S, of rawhide or other suitable material, which are adapted when expanded apart to frictionally engage on the internal surface of the ring N.

5 The parts S S are actuated by means of a cam T, securely keyed or otherwise fastened to the sleeve 7 of the crank-boss P, and the cam T will expand the clutch-pieces S S by rotative pressure in either direction.

10 The internal shaft K has fixed thereon the guiding-forks R at each end, which project loosely through the furthestmost portions 15 of the slots between the projections 5 of the crank-sleeves 7, and said forks enter between the ends of the segments S S and guide them, so that the one pair will always be kept in a rotative position corresponding with the other pair of segments. The extremities of the shaft K are provided with round nuts 16 17, right and left threaded, so as to lock one another and secure the parts in position when put together, and the said nuts seat on shoulders 18 in the sleeves 7.

The cranks are maintained in alinement of 25 axis J J by the proper contact of the peripheries of the nuts 16 17 with the countersunk holes 19, Fig. 3, in the crank-bosses, and the cranks may also be steadied by contact of the flange 14 with the ring N at the points of projection between the pockets. Moreover, the inner extremities of the sleeves 7 of the cranks uniting with the collars M and interlocked or mortised together, as before described, and turned off evenly form bearings for the cranks in the tubular shaft F, which serve to support the axis of the cranks.

By means of the foregoing construction it will be seen that when the cranks or either of them are pressed in a forward direction of rotation the clutch on the outer side of the ring N will positively engage at the initial part of the movement and impart propulsion.

When the machine is running, the cranks I I may be brought to rest, the rollers 12 becoming idle, and the spring L is stiff enough to support the weight of the rider's feet for purposes of coasting or intermittent resting.

When muscular pressure is exerted upon the pedals of the cranks, the tendency is to move them simultaneously in opposite directions about the axis J J of rotation. The spring L yielding, a limited arc movement of the cranks relatively to one another will occur, and the cams T T will be actuated in opposite directions to expand the clutch-pieces S S, which are connected to one another on opposite sides of the machine, so as to resist relative rotative displacement, as before described, by the agency of the forks R R and shaft K. Consequently a frictional engagement will be effected between the pieces S S and the rings N, which by the excess of back-pedaling pressure of the feet on the cranks will produce a braking action. The cranks

may remain stationary while the braking action is thus effected, or after the machine has been stopped the same may be propelled backward by the backward rotation of the cranks, the clutch device S S engaging.

Having thus fully described my invention, 70 what I claim, and desire to secure by Letters Patent, is—

1. In a cycle, the combination with a rotary-driven element, of two rotary pedal-cranks flexibly connected in diametrically opposite relation to each other upon their axis of rotation and having their pivot of flexure on said axis, and clutch mechanism operated by the flexure of said cranks whereby to engage with said driven element. 80

2. In a cycle, the combination with a rotary-driven element, of two rotary pedal-cranks flexibly connected in diametrically opposite relation to each other upon their axis of rotation, torsional elastic means located on said axis connecting said cranks and tending to support them in said relation, and clutch mechanism operated by the flexure of said cranks whereby to engage with said driven element. 90

3. In a cycle, the combination with a rotary-driven element, two rotary pedal-cranks flexibly connected in diametrically opposite relation to each other upon their axis of rotation and having their pivot of flexure on said axis, of a clutch mechanism consisting in diametrically-movable parts engaging with said driven element, and cam formations connected to said cranks and upon their axis acting on said diametrically-movable parts so as to press them against said driven element by the motion of flexure of said cranks. 100

4. In a cycle, the combination with a rotary-driven element, of two rotary pedal-cranks flexibly connected in diametrically opposite relation to each other upon their axis of rotation and having their pivot of flexure on said axis, each said crank provided with two independent clutch mechanisms; one clutch positively engaging with said driven element by the initial forward-propelling rotation of a crank irrespective of its relative flexure to the other crank, and the other clutch frictionally and controllably engaging with said driven element by the retardation or backward rotation of said cranks and according to the relative flexure thereof produced or initiated by simultaneously opposing pressures of the feet of the rider on the respective crank-pedals. 115

Signed at New York, in the county of New York and State of New York, this 2d day of February, A. D. 1897. 120

GERARD BEEKMAN.

Witnesses:

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