(No Model.)

# G. S. SANFORD & H. H. BARNARD.

## TREADLE MECHANISM.

No. 555,739. Patented Mar. 3, 1896.

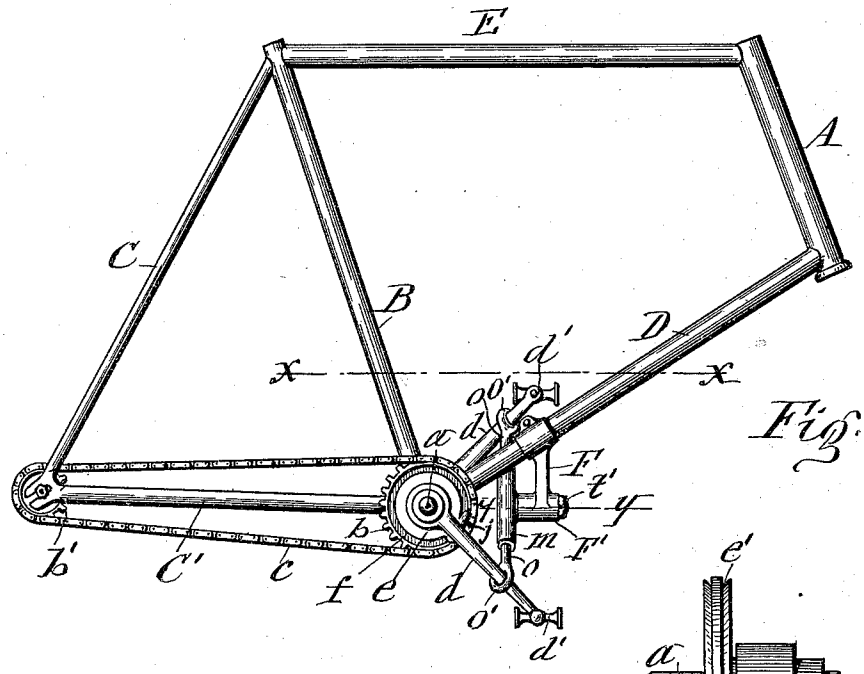


Fig. 1

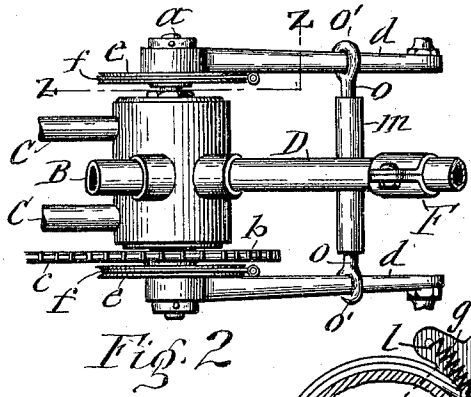


Fig. 2

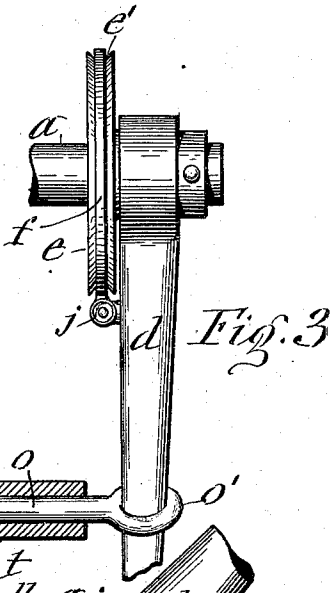


Fig. 3

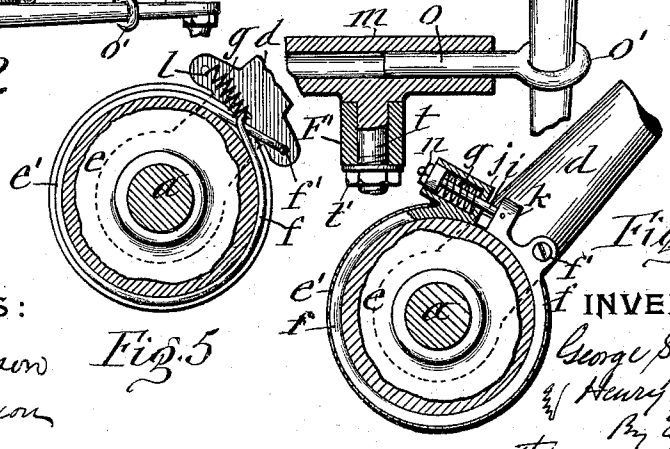


Fig. 4




Fig. 5

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# UNITED STATES PATENT OFFICE.

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## TREADLE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 555,739, dated March 3, 1896.

Application filed October 7, 1895. Serial No. 564,872. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE S. SANFORD and HENRY H. BARNARD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Treadle Mechanism, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in an improved means for transmitting rotary motion to an axle from oscillatory cranks connected to said axle, as hereinafter described and set forth in the claims.

In the annexed drawings, Figure 1 is a side view of a bicycle-frame with the driving mechanism connected thereto. Figs. 2 and 3 are enlarged horizontal sections, respectively, on lines *x x* and *y y* in Fig. 1. Fig. 4 is an enlarged vertical transverse section on line *z z* in Fig. 2, and Fig. 5 is a sectional view of a modification of the means for transmitting motion to the crank-axle.

Similar letters of reference indicate corresponding parts.

A, B, C, C′, D, and E represent the main component members of a bicycle-frame. *a* denotes the crank-axle, from which motion is transmitted to the bicycle usually by means of sprocket-wheels *b* and *b′* attached respectively to said crank-axle and to the axle of the rear wheel and connected by a sprocket-chain *c*.

Our invention resides in the means for imparting rotary motion to the crank-axle *a*, and consists of the following mechanisms: On this axle we hang loosely the cranks *d d*, the free ends of which are provided with suitable pedals *d′*. At the side of each of said cranks is a small wheel *e*, which is rigidly secured to the axle *a* and preferably formed with a circumferential groove *e′*, in which lies a metal band or wire *f* which encompasses the periphery of the wheel and has one end connected positively or directly to the adjacent crank, as shown at *f′*, and the opposite end yieldingly connected to said crank, preferably by means of a spiral spring *g* seated in a shoe *j*, which is either attached to or formed integral with said end of the band or wire and has extending through it a rod *i* attached to a bracket *k* affixed to the opposite end of the band or wire, as shown in Fig. 4 of the drawings. The free end of said rod is screw-threaded and provided with a nut *n*, between which and the inner end of the shoe the spring *g* is to a greater or less degree compressed by the adjustment of the nut. We do not, however, limit ourselves to this specific attachment of the spiral spring *g*, inasmuch as it may be attached at one end directly to one end of the band or wire *f* and at the opposite end to the crank *d*, as shown at *l* in Fig. 5 of the drawings.

In order to cause the depression of one crank *d* to lift the other crank and thus time the movement of the cranks so as to operate alternately in transmitting the propelling-power, we fulcrum on the frame of the bicycle a lever *m*, preferably by attaching to the lower strut, D, a hanger F terminating with a sleeve F′, which is axially at right angles to the crank-axle *a* and receives through it the trunnion *t*, which projects from the central portion of the lever and constitutes the pivot on which said lever rocks. The protruding end of said trunnion is screw-threaded and provided with a nut *t′* to retain the trunnion within the sleeve, as shown in Fig. 3 of the drawings.

The ends of the lever are suitably connected to the cranks to allow the latter to freely oscillate on the crank-axle. For this purpose we prefer to form the lever *m* tubular and insert in opposite ends thereof the arms *o o*, which slide longitudinally on the lever and are revoluble therein and have their outer ends formed with eyes *o′ o′*, which loosely embrace the cranks *d d*.

In propelling the bicycle the downward pressure on one crank causes the band or wire *f* which is attached thereto to become tightened around the wheel *e* at the side of said crank and grip said wheel, so as to compel it to partake motion from the crank. At the same time the other crank rises and causes the band or wire *f* of the latter to be released from compression and thus permit the adjacent wheel *e* to freely revolve.

What we claim as our invention is—

1. The combination, with the bicycle-frame and crank-axle, of cranks hung loosely on opposite ends of said axle, wheels fixed to the axle at the sides of the cranks, bands embracing the said wheels and each of said bands connected at one end directly and positively

to the adjacent crank, a spring connecting the opposite end of the band to said crank, and a lever fulcrumed at its center on the frame and engaged at opposite ends with the two cranks to cause the depressed crank to lift the opposite crank and thereby allow the band on the latter crank to release the adjacent wheel as set forth.

2. The combination, with the bicycle-frame and crank-axle, of cranks hung loosely on opposite ends of said axle, wheels fixed to the axle at the sides of the cranks clutches connected to the cranks to engage and release the wheels during the oscillations of the cranks, a tubular lever fulcrumed at its center on the frame, arms in opposite ends of the lever and movable lengthwise and revoluble therein, and sliding connections between the free ends of said arms and cranks as set forth.

In testimony whereof we have hereunto signed our names this 4th day of October, 1895.

GEORGE S. SANFORD. [L. S.]
HENRY H. BARNARD. [L. S.]

Witnesses:
J. J. LAASS,
M. A. LEYDEN.