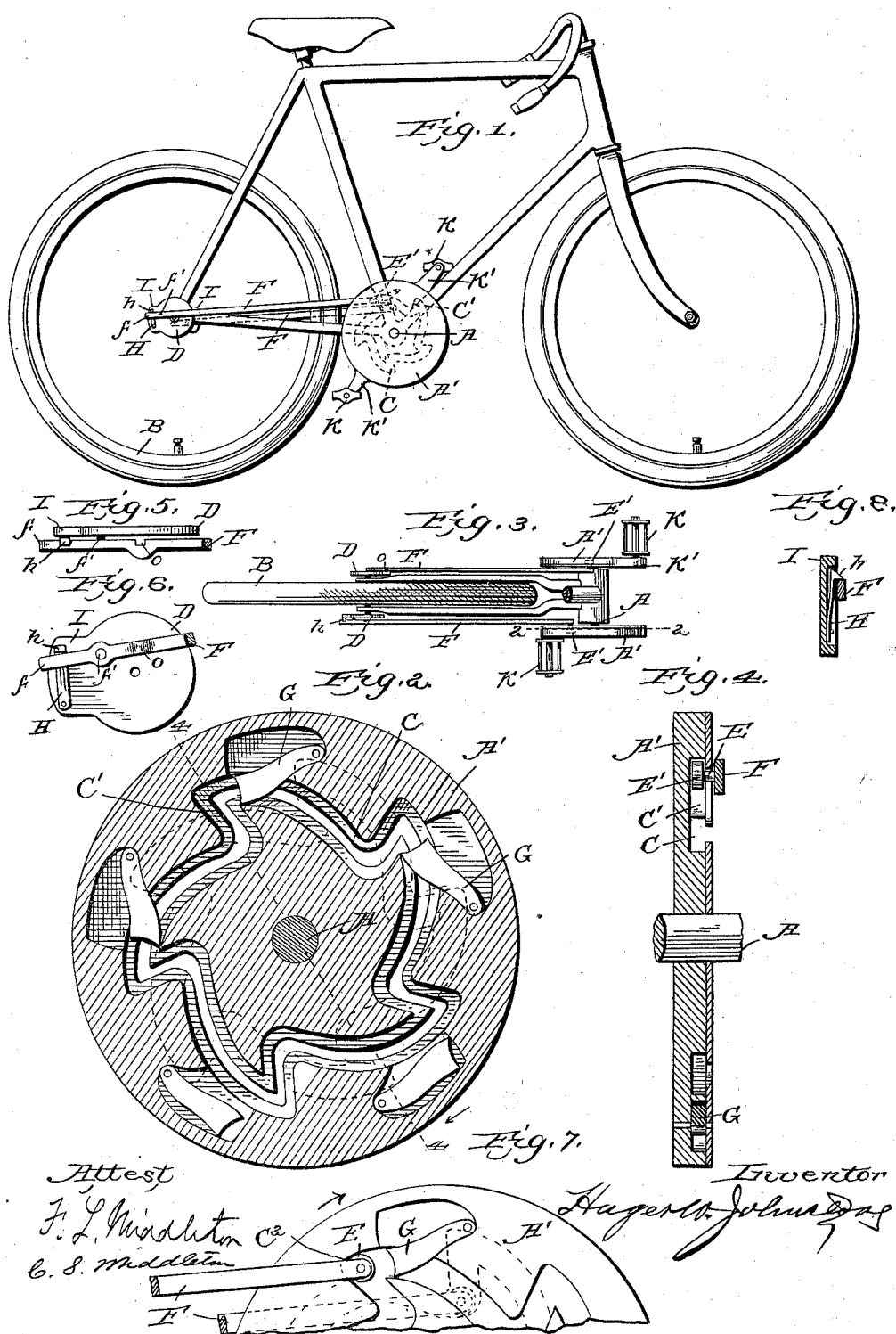


(No Model.)

H. W. JOHNSTONE.
DRIVING CONNECTION FOR BICYCLES.

No. 605,183.

Patented June 7, 1898.



UNITED STATES PATENT OFFICE.

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TO PAUL H. JOHNSTONE, OF IDYLWILD, GEORGIA.

DRIVING CONNECTION FOR BICYCLES.

SPECIFICATION forming part of Letters Patent No. 605,183, dated June 7, 1898.

Application filed March 12, 1897. Serial No. 627,191. (No model.)

To all whom it may concern:

Be it known that I, HUGER W. JOHNSTONE, a citizen of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented certain new and useful Improvements in Driving Connections for Bicycles, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to an improved means for connecting a driving part or member with a driven part or member—such, for instance, as the driving or crank shaft of a bicycle and the driven or rear wheel.

The object of the invention is to connect the driving and driven parts by a connecting rod or rods in such a manner that a direct pull is exerted by the driving part without the use of cams or levers, while at the same time the parts may be so arranged as to produce any amount of speed.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation showing the invention as adapted for use in connection with a bicycle. Fig. 2 is a sectional view of the disk on line 2 2 of Fig. 3. Fig. 3 is a plan view of a portion of Fig. 1, and Fig. 4 is a sectional view on the line 4 4 of Fig. 2. Figs. 5, 6, 7, and 8 are detail views.

In the drawings, A represents the crank-shaft of a bicycle, and B the rear or driven wheel. To the crank-shaft on each side is secured a disk A', having on its face a continuous way or groove C, which is provided at suitable intervals with angular portions C', extending approximately radially of the disk. The rear wheel of the bicycle is also provided upon each side with a disk-plate or crank-arm D, to which is pivotally connected the rear end of a connecting-rod F, the forward end of which is provided with an angular extension or offset E, forming a journal which carries a roller E', which travels in the continuous groove of the corresponding disk upon the front or crank axle. Referring to Fig. 7, it will be seen that in the position of the parts as therein shown the roller E' rests against the shoulder C², formed by the angular portion of the groove, and upon the wheel or disk being rotated in the direction of the arrow a direct pull would be imparted

through the connecting-rod to the disk upon the rear or driven wheel. This pull would continue to be exerted until the rod reached the position shown in dotted lines, representing the opposite rod, at which time the rear wheel would have made a semirevolution. While the parts are in this position the roller E' would be drawn away from the shoulder and would drop into the lower portion of the groove and would permit the connecting-rod to travel rearwardly while the driving-disk continued its forward revolution. The length of the groove between any two shoulders is sufficient to permit the rod to travel backward until its point of connection with the disk upon the driven wheel has returned to the position shown in full lines in Fig. 1, at which time the roller E' abuts against the next succeeding shoulder and the pulling action is repeated. It will be observed from the dotted lines in Fig. 7, which represent the position of the disk and parts upon the opposite side of the bicycle, that just as the connecting-rod at one side is beginning to exert its pull the rod upon the other side has begun its backward movement, and so at all times the driving-disk imparts a direct and positive pull upon the driven member.

In descending a hill or in slowing down the speed of the bicycle it is desirable to apply a backward pressure upon the pedals, and to prevent the rollers from traveling backward in the portions of the groove between the shoulders I provide the pivoted pawls G, which are adapted to be raised to permit the rollers to travel under them in approaching the shoulders and then to drop behind them and hold them securely against back motion. These pawls are pivoted in recesses in the disk and act by gravity.

In order to prevent the roller from dropping away from the shoulder when no pressure is applied upon the pedals, springs H are provided upon the extensions I of the disks of the driven wheel. Each of the springs has a shoulder h, which, as the extended end f of the rod rises in the forward turning of the wheel, overtakes the end f, and, hooking over, it effectually prevents the forward end of the rod from dropping away from the shoulders of the grooves. It will be observed that the spring H, being farther away from the center

of the disk D than the pivot f' , will travel faster than the said end f , and by the time the disk has made a semirevolution the spring-shoulder will be far enough away from the rod so as not to interfere with the roller passing away from the shouldered portion of the disk. The spring H is located in a recess in the portion I of the disk, and I find it desirable to provide a recess o in the inner face of the rod, so that on the downward movement of the parts the spring will pass the rod without contact.

I prefer to retain the rollers within the groove by means of overlapping flanges.

The pedals K may be secured to cranks connected to the crank-axle in the ordinary manner, or they may be carried upon arms or extensions K', secured to the disks themselves, as is found desirable.

It will be observed that in order to provide a driving connection with greater or less speed it is only necessary to vary the number of shoulders in the driving-disks and any number may be used, as found desirable, the size of the disks being changed, of course, as found necessary.

I claim—

1. In combination with the driving-shaft and driven wheel, the connecting-rods having their rear ends pivotally connected to the driven wheel, disks upon the driving-shaft having continuous ways in their faces provided with approximately radial portions forming shoulders, the forward ends of said connecting-rods having a sliding connection with the ways and being arranged to alternately engage with said shoulders to exert a longitudinal pull upon the rods during the entire forward movement thereof, and to be released therefrom to permit the rods to move freely backward to their initial position, substantially as described.

2. In combination, the driving-shaft and driven wheel, the connecting-rods having their rear ends pivotally connected with the driven wheel, the disks upon the driving-shaft having grooves in their faces with angular portions forming shoulders, extensions or offsets upon the forward ends of the rods adapted to alternately engage said shoulders and slide in the intermediate portions of the grooves, and means for holding the ends of the rods against reverse movement in the grooves after they have reached the shoulders, substantially as described.

3. In combination, the driving-shaft and driven wheel, the connecting-rods having their rear ends pivotally connected with the driven wheel, the disks upon the crank-shaft having continuous grooves in their faces with approximately radial portions forming shoulders, extensions or offsets upon the forward ends of the rods traveling in the grooves adapted to alternately engage the shoulders to exert a pull upon the rods and to disengage the shoulders to permit the rods to move rearwardly, and means for preventing the

disengagement of each rod from the shoulders until the rear wheel has made a semirevolution, substantially as described.

4. In combination, the driving-shaft and driven wheel, the disks or crank-arms carried by the driven wheel, the disks on the crank-shaft, having continuous grooves in their faces provided at intervals with shoulders, connecting-rods pivotally connected to the disks on the driven wheel and having extensions or offsets at their front ends adapted to travel in the grooves and alternately engage the shoulders, and slide in the intermediate portions of the grooves, and springs carried by the disks of the rear wheel adapted to engage the end of the rod in rear of its pivot and prevent the front end from disengaging the shoulders until the driven wheel has made a semirevolution, substantially as described.

5. In combination, the driving-shaft and driven wheel, disks carried by said parts, continuous grooves in the faces of the driving-shaft disks having shoulders at intervals, connecting-rods pivotally connected at their rear ends to the driven-wheel disks or crank-arms and having offsets at their front ends adapted to travel in the grooves and to engage the shoulders, and springs carried by the driven-wheel disks and adapted to engage the rods in rear of their pivots, said rods having recessed portions to permit the passage of said springs in front of the said pivots, substantially as described.

6. In combination, the driving-shaft and driven wheel, disks carried by said parts, continuous grooves in the faces of the driving-shaft disks having shoulders at intervals, connecting-rods pivotally connected at their rear ends to the driven-wheel disks or crank-arms and having offsets or extensions traveling in the grooves of the driving-disks and adapted to alternately engage the shoulders and to disengage the same and slide in the intermediate portions, and pawls located in proximity to the shoulders adapted to engage the rods and hold them against reverse movement until the rear wheel has made a semirevolution, substantially as described.

7. In combination, the driving-shaft, the driven wheel, the disks carried by the driving-shaft having grooves in their faces provided at intervals with approximately radial shoulders, the connecting-rods having their rear ends pivotally connected to the rear wheel, and having offsets traveling in the grooves and adapted to abut against the shoulders to exert a longitudinal pull upon the rods, said grooves having overhanging edges adapted to retain the offset ends in the grooves, substantially as described.

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

HUGER W. JOHNSTONE.

Witnesses:

HENRY E. COOPER,
WALTER DONALDSON.