

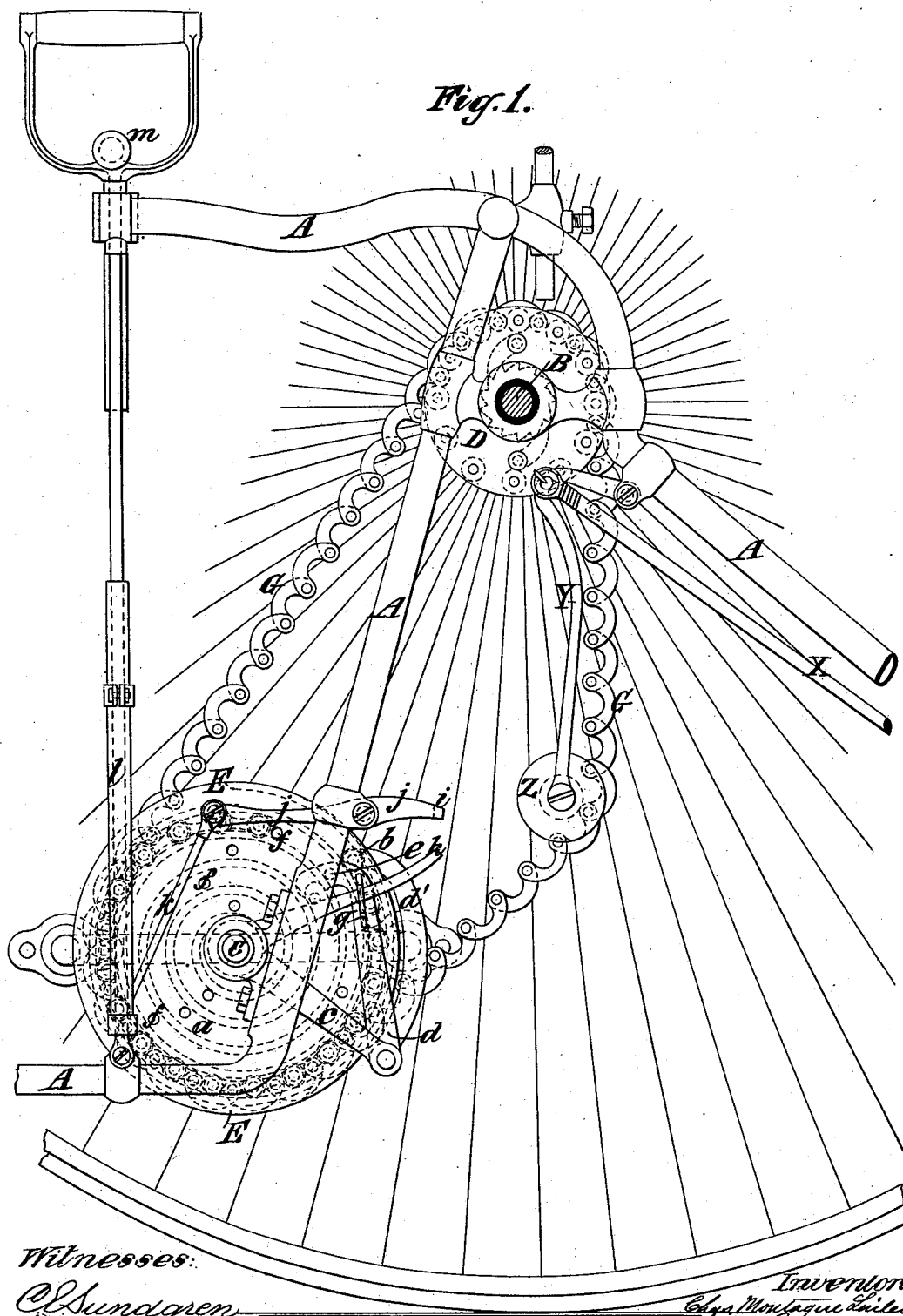
(No Model.)

2 Sheets—Sheet 1.

C. M. LINLEY & J. BIGGS.
SPEED AND POWER GEARING FOR VELOCIPEDES.

No. 351,873.

Patented Nov. 2, 1886.



Witnesses:

O. Sundgren
Emil Hector

Inventors
C. M. Linley & J. Biggs
By their Attorneys
Probert Hall

(No Model.)

2 Sheets—Sheet 2.

C. M. LINLEY & J. BIGGS.
SPEED AND POWER GEARING FOR VELOCIPEDES.

No. 351,873.

Patented Nov. 2, 1886.

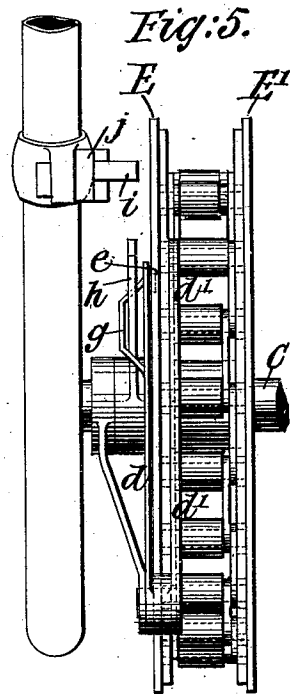
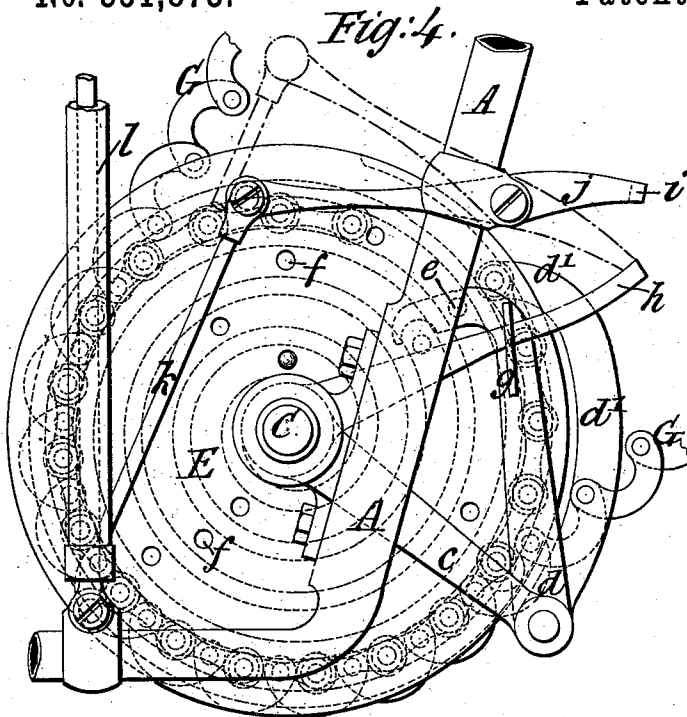


Fig. 2.

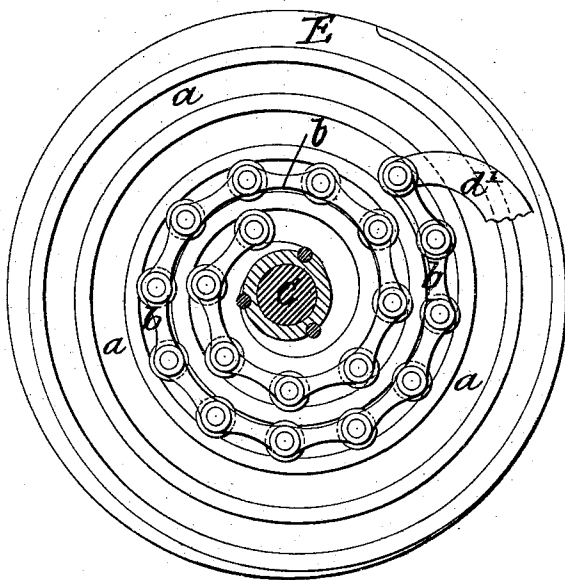
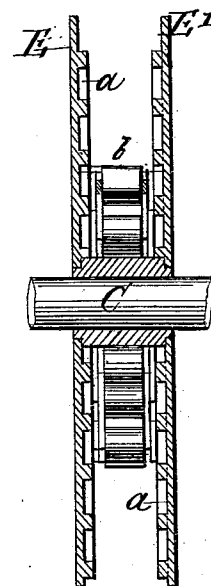


Fig. 3.



Witnesses:

O. Sundgren
Emil Herten

Inventors:

Chas. Montague Linley
John Biggs
By their atty
Brown Hall

UNITED STATES PATENT OFFICE.

CHARLES MONTAGUE LINLEY AND JOHN BIGGS, OF SOUTHWARK, COUNTY OF SURREY, ASSIGNORS OF ONE-HALF TO GEORGE GRAINGER TANDY, OF CEDARS ROAD, CLAPHAM, ENGLAND.

SPEED AND POWER GEARING FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 351,873, dated November 2, 1886.

Application filed August 18, 1886. Serial No. 211,220. (No model.) Patented in England February 1, 1884, No. 2,547, and in France November 10, 1885, No. 165,280.

To all whom it may concern:

Be it known that we, CHARLES MONTAGUE LINLEY, engineer, and JOHN BIGGS, engineer, both of Melior street, Southwark, in the county of Surrey, England, have invented Improvements in Speed and Power Gearing, of which the following is a specification.

This invention relates more particularly to a speed and power gearing for velocipedes, but it is equally applicable to machinery generally; and it consists, essentially, in a novel construction of expanding chain-wheel, the action of which may be produced direct from the shaft on which the wheel is mounted.

In carrying out our invention, we employ two disks, in the inner face of each of which we form a volute groove, in which work the joint-pins of a short length of ordinary driving-chain, the two disks being mounted at suitable distances apart on a shaft with the chain between them; and in order that our invention may be properly understood, we will proceed to describe it in connection with a tricycle, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a tricycle (the rear wheel being removed) with our invention adapted thereto. Fig. 2 shows the inner face of one of the disks with the chain in the contracted position. Fig. 3 is an edge view of the chain-wheel. Fig. 4 is a detached view of the chain-wheel with means for holding the chain, and Fig. 5 is an edge view of the same.

A is the framing of the vehicle, which may be of any convenient construction and adapted either for a front or rear steerer.

B is the main axle, which carries the framing in any suitable manner.

C is the crank-axle or treadle-shaft, which is mounted in suitable bearings secured in any convenient manner to the framing A; and D is the driving-pulley on the main axle B.

The improved speed and power gear consists of two disks, E E', (see Figs. 3 and 5,) each of which is formed with a volute groove, *a*, on its inner face, as shown at Fig. 2. The two disks E E' are keyed on the crank-axle C, so

that the two grooves face each other and exactly correspond.

Between the disks is placed a short length of chain, *b*, which is constructed in a manner similar to the ordinary driving-chain for velocipedes, except that the joint-pins are prolonged on either side of the chain, so as to enter and work in the grooves *a* of the disks. To avoid unnecessary friction, we may mount on the projecting ends of the joint-pins of the chain *b* small anti-friction rollers. If, now, the outer end of the chain be held fast and the disks be rotated, the chain, under the influence of the grooves, will be caused to expand until it assumes the position shown at Fig. 5 and in dotted lines at Fig. 4, and the diameter of the wheel will be thereby increased. By rotating the disk in the reverse direction, the chain being still held firmly at its front end, the chain will be coiled up, as seen at Fig. 2.

The means which we prefer to use to hold the front end of the chain will now be described.

Projecting radially from and mounted loosely on the treadle or crank-shaft C, outside one of the disks, is an arm, *c*, to the outer end of which is pivoted, at or near the bend, one arm, *d*, of a U-shaped piece, which fits over one of the disks. The other or inner arm, *d'*, of this U-piece is attached in any convenient manner to the forward or outer end of the chain *b*. (See Figs. 2 and 4.) The arm *d*, which is thinned down to act as a flat spring, is provided, first, on its under or inner side with a locking-pin or stop, *e*, which is arranged to enter a series of holes, *f*, made in the disk E, and serves to lock the chain and disks together, and, second, on the outer or upper side with a beveled bridge-piece, *g*. An arm, *h*, which is mounted loosely on the treadle or crank-axle, passes through this bridge-piece *g*, and is so arranged as to come into contact with a movable stop, *i*, when the latter is thrown into position. This stop *i* is placed at one end of a lever, *j*, which has its fulcrum on the frame, the other end being connected by a link, *k*, to a vertical rod, *l*, provided with a handle, *m*, which is secured

in any convenient manner within reach of the rider's hand, so that it may be raised or lowered, as desired, to throw the stop *i* in or out of action; but any other suitable means may be employed to actuate the stop *i*. When the stop *i* is out of action, the chain will be locked to the disks by means of the spring pin or stop *e* entering one of the holes *f* in the disk *E*, and the locking mechanism will rotate with the disks; but on throwing the stop into action, as shown by dotted lines in Fig. 4, the rotation of the arm *h* with the disks will be arrested, and the arm striking against the beveled portion of the bridge-piece *g*, which, with its arm *d*, continues to rotate with the disks, (being locked thereto by the pin *e*,) will draw the pin *e* out of the hole in the disks and allow the pair of disks to rotate with the shaft irrespective of the chain and its holding mechanism, so that the chain, under the influence of the volute grooves, and being firmly held by the arm *d'* of the *U*-piece, will be expanded or contracted, according to the direction in which the shaft *C* is rotating.

The holes in the disk *E* will be arranged to correspond to the grooves, and they are formed at regulated intervals, which will admit of the diameter of the expansible wheel being enlarged or contracted to any size within certain limits.

The means above described for holding the chain irrespective of the disks and for locking the chain to the disks, and also for actuating the stop *h*, are, however, capable of modification without departing from the essential features of our invention—viz., making an expansible wheel or pulley of two volute-grooved disks with a chain having prolonged joint-pins working between them in the grooves.

When adapting the expansible wheel to velocipedes, we form the driving-chain *G* of the vehicle of links shaped somewhat like a flattened *U*, which are pivoted together at their ends in any convenient manner, so that the connected ends of two links shall enter between the joint-pins of the chain *b* of the chain wheel or pulley *E E'*, as clearly indicated in Fig. 4. The chain *G* must be of sufficient length to pass round the chain-wheel *E E'*, when of the largest diameter, the slack caused by the reduction in the diameter of the wheel being taken up by any convenient means—such, for instance, as a tension-spring or a weighted lever pivoted to the frame, and carrying a pulley or roller round which the chain passes, or as shown at *X Y Z*, Fig. 1, *X* being a spring, *Y* a lever, and *Z* a pulley.

Either or both of the chain-wheels of the velocipede may be made expansible; but, in general, we prefer that the chain-wheel on the treadle-shaft only shall be expansible, as it is more convenient to operate. The chain-wheel on the driving-axle will be of a construction suitable to receive a driving-chain of the character above described.

In adapting the pulley to driving machin-

ery generally, a steel band may be secured to the chain; or the chain may be replaced by a band, pins being secured transversely to the under side of the band in any convenient manner, and at suitable distances apart, so that they may work in the grooves of the disks.

Having now described our invention, we declare that what we claim is—

1. An expansible wheel or pulley, consisting, essentially, of a pair of volute-grooved disks, *E E'*, and a short length of chain or band, *b*, the joint-pins of the chain or the carrying-pins of the band being prolonged to work in the grooves, substantially as herein shown and described.

2. In an expansible wheel or pulley, the combination of a pair of volute-grooved disks, as *E E'*, and a short length of chain having prolonged joint-pins or a pinned band, as *b*, with means for holding the forward end of the chain or band against the rotation of the disks, whereby the chain or band is caused to expand or coil up, according to the direction in which the disks are rotated, substantially as herein shown and described.

3. The combination of a pair of volute-grooved disks, as *E E'*, mounted on an axle or shaft, and a short length of chain having prolonged joint-pins or a pinned band, as *b*, with an arm, *c*, mounted loosely on the same shaft, and an arm, *d'*, pivoted to the arm *c*, and to the forward end of the chain or band, substantially as and for the purpose set forth.

4. The combination of a pair of grooved disks mounted on an axle or shaft, a short length of chain having prolonged joint-pins or a pinned band, an arm, *c*, mounted loosely on said shaft, an arm, *d'*, pivoted to the arm *c*, and also to the front or outer end of the chain or band, with an arm, *d*, formed in one with the arm *d'*, and carrying on its under side a pin, *e*, arranged to enter a series of holes in the disk *E*, whereby the disks and chain or band are locked together, substantially as described.

5. The combination, with the arm *d*, having on its under side a pin, *e*, of a beveled bridge-piece, *g*, an arm, *h*, mounted loosely on an axle or shaft, *C*, and a stop, as *i*, suitably carried, so as to be thrown into and out of gear, whereby the pin *e* is drawn out of the holes *f* in the disk *E*, as and for the purpose set forth.

6. The combination of a pair of grooved disks, as *E E'*, and a short length of chain having prolonged joint-pins, as *b*, with a driving-chain, as *G*, formed of flattened *U*-shaped links, the ends of which are pivoted together, and arranged to enter the links of the chain *b*, substantially as described.

CHARLES MONTAGUE LINLEY.

JOHN BIGGS.

Witnesses:

H. K. WHITE,

A. S. BISHOP,

Both of 6 Bream's Buildings, London, E. C.