No. 621,740. Patented Mar. 21, 1899.

C. BEW.

BICYCLE GEARING.

(Application filed May 28, 1898.)

(No Model.)

Fig. 1.

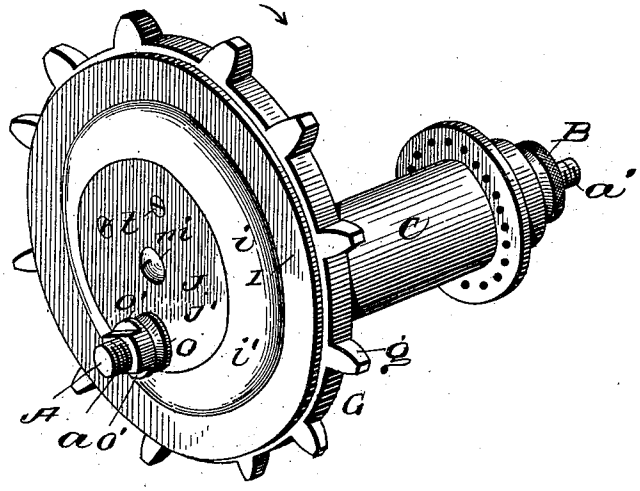


Fig. 2.

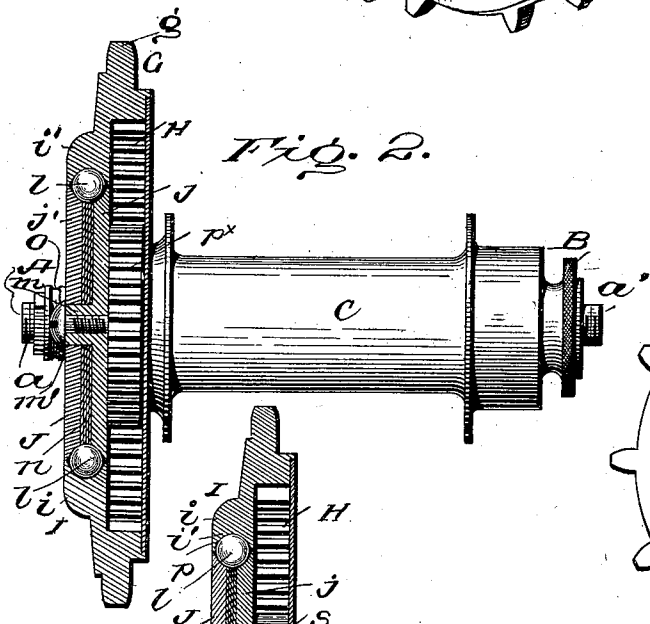


Fig. 4.

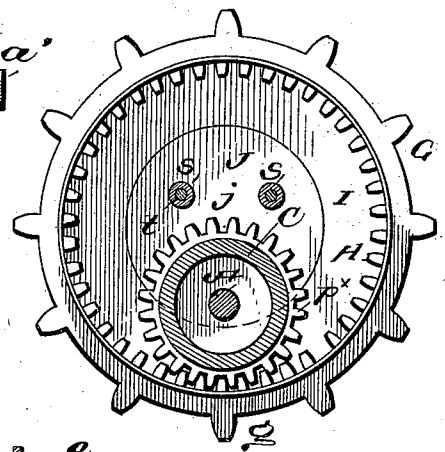
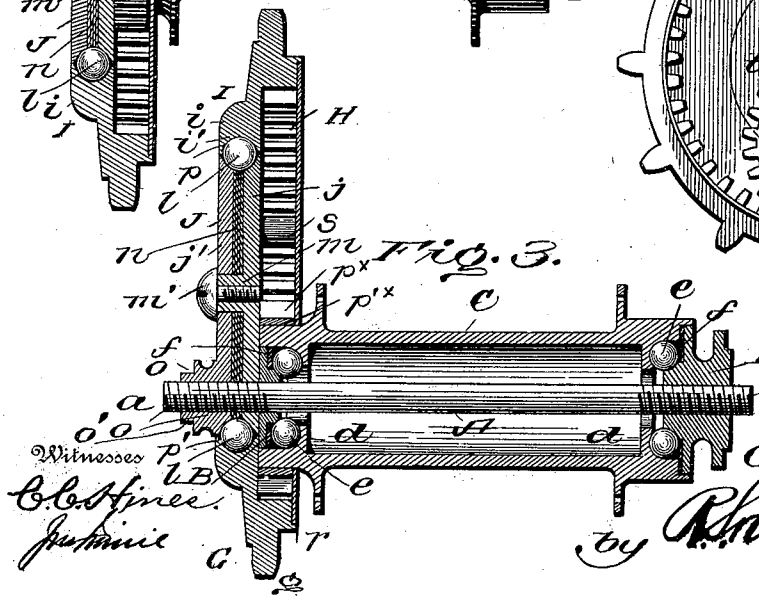


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES BEW, OF CHICAGO, ILLINOIS.

BICYCLE-GEARING.

SPECIFICATION forming part of Letters Patent No. 621,740, dated March 21, 1899.

Application filed May 28, 1898. Serial No. 681,970. (No model.)

To all whom it may concern:

Be it known that I, CHARLES BEW, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Bicycle-Gearing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in bicycle-gearing of that class in which the rear-wheel hub carries a spur-gear meshing with an internal gear on the sprocket-wheel, which is mounted upon an eccentric detachably connected with the axle, whereby rotary motion is communicated from the crank-shaft to the rear-wheel hub at an accelerated speed with a minimum expenditure of power.

The objects of the invention are to provide an improved gearing which is adapted for application to bicycles already in use without altering the construction thereof and which requires no special form of hub, to provide improved means for excluding dust and dirt from the gearing, to provide an improved construction of eccentric combining simple and effective means for adjusting and lubricating the bearings thereof, and, finally, to generally simplify and improve the construction and render more efficient the operation of this class of gearing generally.

To these ends the invention consists in the features and in the construction, combination, and arrangement of parts hereinafter more fully described, and specifically set forth in the appended claims, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of a rear-wheel hub embodying my improved gearing. Fig. 2 is a top plan view of the hub and a sectional plan view of the gearing. Fig. 3 is a central vertical longitudinal section of the same; and Fig. 4 is a cross-section through the hub and an inner side view of the sprocket, showing the gear of the hub in mesh with the internal gear.

Referring now more particularly to the drawings, wherein like letters of reference designate corresponding parts throughout the several views, A represents the rear-wheel axle, having its opposite ends a a' screw-threaded, as usual, to receive the jam-nuts (not shown) and adjusting-cones B B', and C represents the hub, provided on its interior at opposite ends with annular flanges d, which are concaved on their outer faces to form cups constituting, in conjunction with the cones on the axle, raceways in which travel the annular series of bearing-balls e. Resilient retaining-washers f are removably fitted in the outer ends of the hub and hold the balls in position when the cones are loosened or removed.

The sprocket-wheel consists of a ring G, provided with peripheral sprocket-teeth g and internal gear H. The outer side or face of this ring is formed with an integral annular cover-plate or bearing-plate I, having an enlarged portion i, which is concaved on its inner face i' to form a semicircular surrounding groove. This wheel is mounted upon an eccentric J, comprising in its construction inner and outer annular disks j j', which have position in the opening formed by the cover or bearing plate I and are provided with peripheral cone-faces p p', acting in conjunction with each other and with the semicircular grooved face i' of the said cover-plate or bearing-plate to form a raceway, in which travel an annular series of bearing-balls l, interposed between said eccentric and the bearing-plate. The two disks are detachably connected by means of a hollow boss m, projecting outwardly from the disk j through an opening in the disk j' and internally threaded for the reception of a screw m'. The said disks are maintained in position and may be adjusted to compensate for wear of the bearing-balls by a series of washer-disks n. These disks are composed of some suitable fibrous material, and in addition to their function as washers are adapted to absorb and retain oil to lubricate the bearing-balls e'. By simply removing the outer disk j' the washers may be readily and conveniently removed and replaced, as desired, to compensate for wear of the balls and also supplied with oil.

The outer eccentric-disk j' is provided with a hollow boss o, which is internally screw-threaded for the reception of the end a of the axle and formed with a reduced portion hav-

ing parallel plane faces o', which in operation bear against the upper and lower arms of the bifurcated bracket on the rear portion of the wheel-frame and hold the eccentric rigidly against rotation.

The hub C carries at one end a spur-gear p, which meshes with the internal gear H. This gear may be formed integrally with the hub in the process of manufacture of the latter, or may consist, as shown in Fig. 3, of a toothed ring or band p', brazed or otherwise rigidly secured to the hub. This latter construction is employed where it is desired to use my improved gearing on bicycles already in use, and thus it will be seen that the usual form of hub may be readily and conveniently adapted for use in connection with my gearing and that no special form of hub is required. This material advantage I am enabled to attain by dispensing altogether with antifriction-bearings connecting between the hub and eccentric and also with a special form of eccentric, which is adapted for use only with a particular construction of hub. I preferably construct the cone B in such manner that it will slide freely on the axle, so that by simply operating the cone B′ both bearings will be simultaneously adjusted.

The entire gearing may be detached from the hub by removing the cone B′ and then withdrawing the sprocket and eccentric, with the axle connected therewith, laterally, as will be readily understood, or by unscrewing the end a of the axle and removing both the axle and hub, the resilient washers serving to retain the balls in position while the parts are disconnected. Lateral displacement of the cone B is prevented by the eccentric-disk, against which it bears, as shown in Fig. 3.

In operation the sprocket-wheel when rotated imparts rotary motion to the hub through the medium of its internal gear and the spur-gear p on said hub.

An important feature of my improvement resides in the relative proportions of the gear-wheels, four revolutions of the usual sprocket-wheel causing the hub to rotate five times, thus accelerating the speed of the hub above what it would be if it were concentrically fixed in the sprocket-wheel.

The peculiar construction and relation of the cover-plate or bearing-plate and the eccentric insures the exclusion of dust and dirt from the internal gear from the exterior side or outer face of the sprocket, and in order to prevent access of dust and dirt from the inner side thereof an annular shield or plate R is provided. This shield or plate may be rigidly secured to the hub or formed with an opening through which the end of the hub may project and fits snugly within a chamber formed by an annular flange r, projecting from the inner side of the sprocket-ring. On the inner side of the shield or plate are fixed internally-threaded bosses or posts s, which are engaged by screws t, projecting through the eccentric, whereby the plate is held securely in place.

Changes in the form, proportions, and minor details of construction may be made within the scope of the invention without departing from the spirit or sacrificing any of the advantages thereof.

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

1. In gearing for bicycles, the combination of an axle, a hub carrying at one end a gear, an eccentric mounted on one end of the axle and comprising a pair of disks detachably connected with each other and having interposed therebetween a series of fibrous packing and lubricating disk-washers, said disks having their edges concaved to form an annular groove, a sprocket consisting of a ring provided with an internal gear meshing with a pinion on the hub and with an integral annular cover or bearing plate on its outer side formed with an annular groove in its edge, and bearing-balls interposed between the eccentric-disks and cover-plate and adapted to traverse said grooves in contact with said fibrous disk-washers, substantially as described.

2. The herein-described gearing for bicycles, comprising an axle, a hub mounted thereon and carrying at one end a gear, an eccentric comprising a pair of disks detachably connected and having their edges concaved to form an annular groove, said disks being provided with threaded openings for the reception of the end of the axle and the outermost one provided with a boss having parallel plane faces, fibrous packing and lubricating-washers interposed between the disks, a sprocket-ring having an internal gear meshing with the gear in the hub and provided on its outer side with an integral annular cover or bearing plate partially closing the same and formed in its edge with a groove, bearing-balls interposed between the eccentric-disks and cover-plate and traversing said grooves in contact with the fibrous washers, and a shield-plate inclosed within an annular chamber on the inner side of the sprocket-ring and secured to the eccentric, substantially as described.

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

CHARLES BEW.

Witnesses:
A. E. AUSTIN,
JOHN B. DE WEES.