No. 644,954. Patented Mar. 6, 1900.

I. F. WALES.

DRIVE GEARING.

(Application filed Apr. 26, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

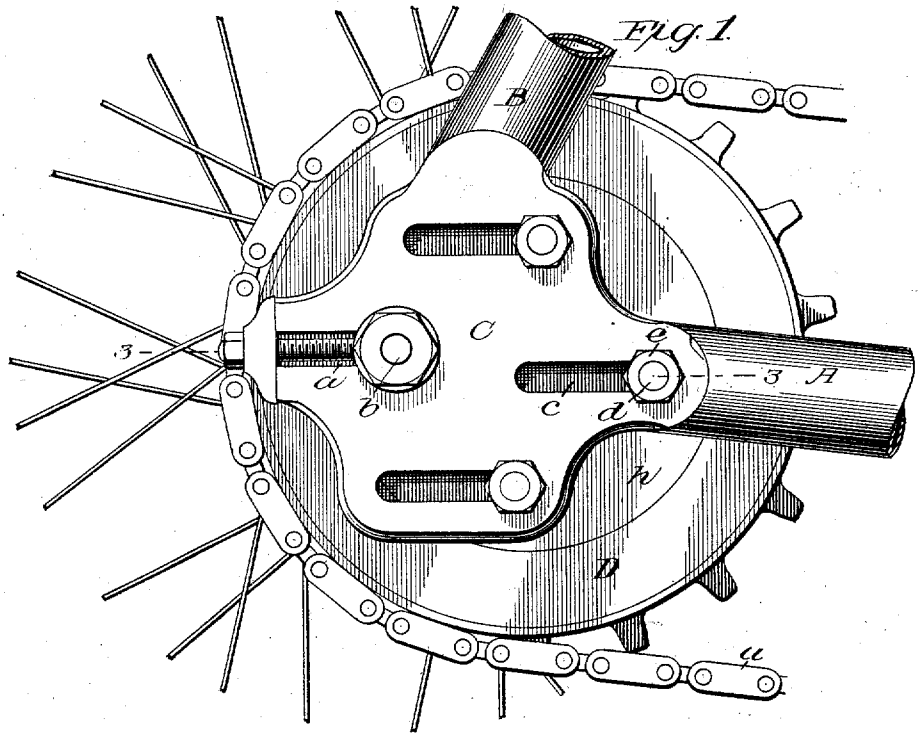
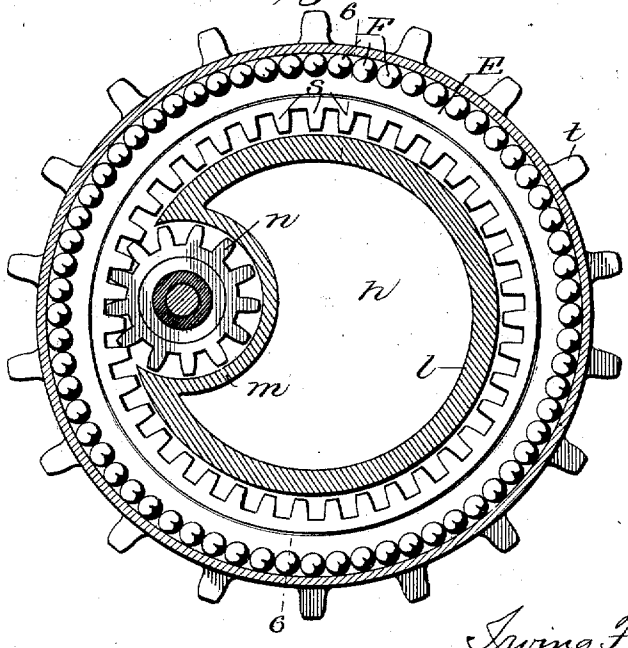


Fig. 2.



Witnesses
Jos. C. Stack
J. G. Crowley

Inventor
Irving F. Wales
By James J. Shelby
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

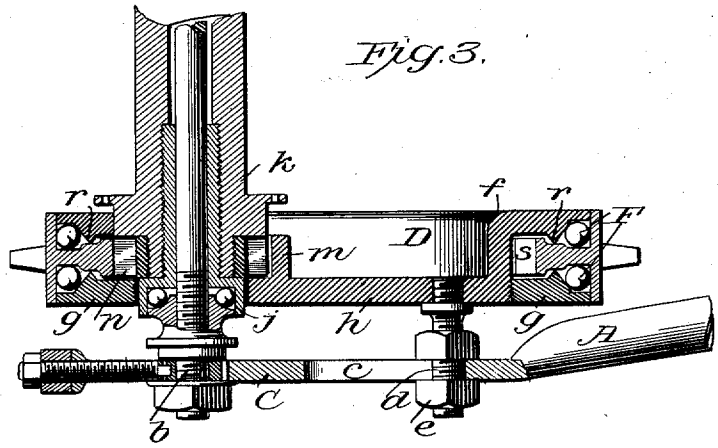


Fig. 4.

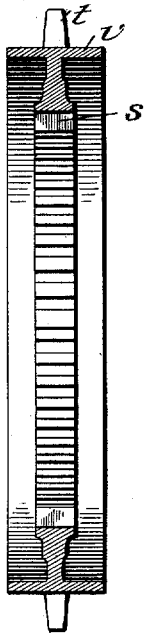


Fig. 5.

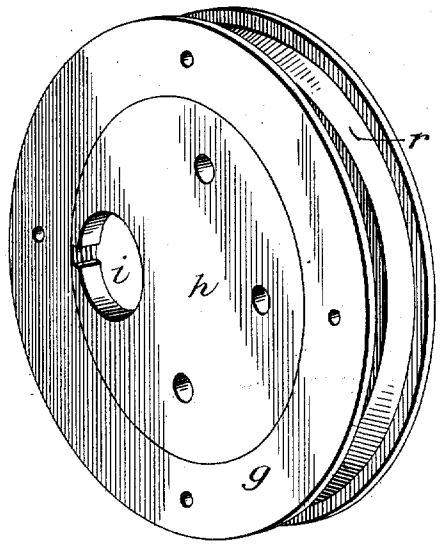
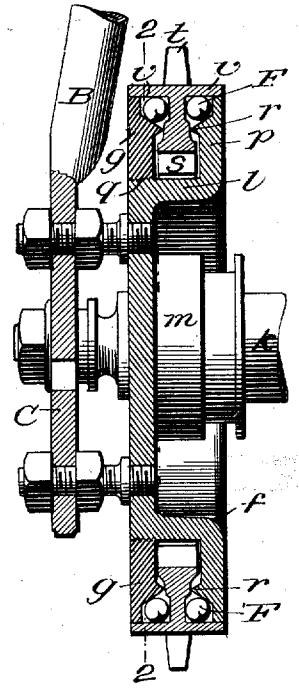


Fig. 6.



Witnesses
Jos. C. Stack
J. L. Cerney

Inventor
Irving F. Wales
By James J. Shechy
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

IRVING F. WALES, OF WOONSOCKET, RHODE ISLAND.

DRIVE-GEARING.

SPECIFICATION forming part of Letters Patent No. 644,954, dated March 6, 1900.

Application filed April 26, 1899. Serial No. 714,573. (No model.)

To all whom it may concern:

Be it known that I, IRVING F. WALES, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented new and useful Improvements in Drive-Gearing, of which the following is a specification.

My invention relates to velocipedes, and more particularly to drive-gearing therefor. It consists in the peculiar construction, novel combination, and adaptation of parts hereinafter described, and particularly pointed out in the claim appended.

In the accompanying drawings, Figure 1 is a detail side elevation of a portion of a bicycle equipped with my improved gearing. Fig. 2 is a detail section taken in the plane of line 2 2 of Fig. 6. Fig. 3 is a horizontal section taken in the plane of line 3 3 of Fig. 1. Fig. 4 is a diametrical section of the annular gear. Fig. 5 is a perspective view of the gear-case. Fig. 6 is a vertical section taken in the plane of line 6 6 of Fig. 2.

In the said drawings similar letters designate corresponding parts in all of the several views, referring to which—

A is a bottom line run, B a rear brace, and C a plate connecting said run and brace and forming part of a bicycle-frame, which may otherwise be of the ordinary or any approved construction. Said plate C is provided in its rear edge with a notch *a*, designed to receive a wheel-axle *b* and the usual means for adjustably fixing the said axle with respect to the frame, and it is also provided with three (more or less) slots *c*. These latter are designed for the reception of bolts *d*, which are adjustably fixed to the plate by nuts *e* and have for their purpose to adjustably connect a gear-case D to the said plate. The gear-case is preferably made up of two sections *f g*. The section *f* comprises a vertically-disposed circular central portion *h*, having an opening *i* to loosely receive the cup *j* of an ordinary wheel-hub *k*, a marginal flange *l*, extending laterally from the central portion *h*, a comparatively-shallow lateral flange *m*, which merges at its ends into the flange *l* and is designed to inclose a pinion *n* on the wheel-hub *k*, and a vertically-disposed annular flange *p*, into which the flange *l* merges, as illustrated. The section *g* of the gear-case is in the form of an annulus and is interiorly threaded, as shown, to engage the exterior threads *q* of the section *f*. At their inner sides the case-section *g* and the flange *p* of the section *f* are provided with ribs *r*, the purpose of which will be presently explained.

E is an annular gear which is arranged and adapted to move in the annular space between the side walls *g* and *p* of the gear-case. This annular gear is provided with an inner longitudinal central rib the inner portion of which is enlarged and equipped with interior teeth *s*, designed to mesh with the teeth of the pinion *n*, and exterior teeth *t* for the engagement of a sprocket-chain *u* or other suitable driving medium. It is also provided with lateral flanges *v*. These flanges are arranged quite close to the outer edges of the case-section *g*, so as to exclude dust from the interior of the gear-case, and they are also designed for the engagement of antifriction-balls F, which are interposed between the annular gear and the ribs *r* and have for their purpose to ease the rotary movements of said gear and at the same time hold it against lateral or radial movement or play.

In the practical operation of my improved driving-gear motion is transmitted from the chain *u* to the annular gear E and from the said annular gear to the traveling wheel through the medium of the pinion *n* on the hub *k* of said wheel. It follows from this that the pinion is caused to make a plurality of revolutions incident to each revolution of the annular gear and that the said annular gear enables a rider to attain a greater speed with a less expenditure of power than by the ordinary gearing.

It will be appreciated from the foregoing that my improved gearing is very simple and light and does not add materially to the weight of a machine. It will also be observed that it lacks delicate and complicated parts, such as are likely to be impaired and rendered useless by a short period of use.

When it is desirable to clean the gearing, the parts may be readily disconnected by removing the gear-case from frame and turning the section *g* of the case off the section *f*.

When necessary, the chain *u* may be tight-

ened or loosened by simply adjusting the gear-case, the traveling-wheel axle, and the traveling-wheel with respect to the frame.

I have specifically described the construction and relative arrangement of the parts embraced in my improved gearing in order to impart a full, clear, and exact understanding of the same. I do not desire, however, to be understood as confining myself to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of my invention.

Having thus described my invention, what I claim is—

The bicycle described consisting essentially of the frame having the bottom line run, the rear brace, and the vertically-disposed plate connecting said run and brace and having a notch *a* in its rear end and also having horizontal slots *c*, a gear-case made up of a section *f* formed in one piece and having a central, vertically-disposed portion *h* provided with an opening *i* and also with screw-threaded apertures, a marginal flange *l* extending laterally from the portion *h* and having exterior threads arranged in the same plane as portion *h*, the shallow, lateral flange *m* merging at its ends into the flange *l*, and a vertically-disposed, annular flange *p* provided on its inner side with a rib *r*, and an annular section *g* screwed on the threaded portion of section *f* and having a rib *r* at its inner side, a wheel-hub equipped with a pinion *n* arranged within the flange *m* and having one of its ends loosely arranged in the opening *i* of case-section *f*, an axle extending through the hub and having one of its ends adjustably secured in the notch *a* of the frame-plate, bolts screwed into the threaded apertures in the portion *h* of the case-section *f* and adjustably secured in the slots *c* of said frame-plate, the annular gear having the inner rib disposed between the section *g* and the flange *p* of the gear-case and provided with teeth intermeshed with those of the pinion *n*, the outer teeth, and the lateral, circular flanges, and antifriction-balls disposed at opposite sides of the inner rib of the annular gear and interposed between said gear and the ribs of the case, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

IRVING F. WALES.

Witnesses:
GEO. W. SPAULDING,
E. LE ROY SPAULDING.