

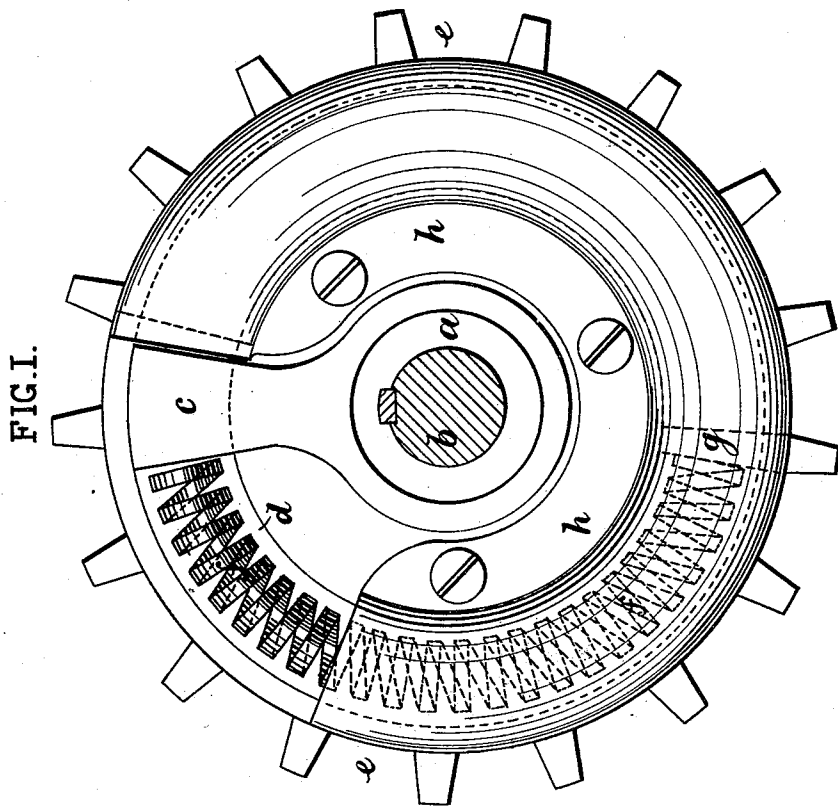
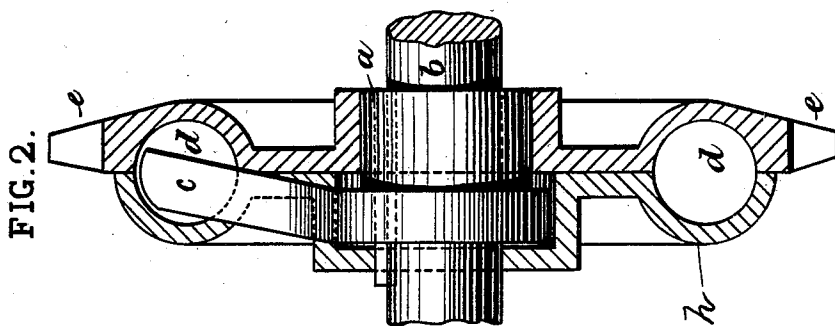
(No Model.)

2 Sheets—Sheet 1.

J. F. GUILD.
DRIVING GEAR.

No. 508,701.

Patented Nov. 14, 1893.



Witnesses:
E. W. Rice
L. B. Hill

Inventor:
James F. Guild
by Charles Bailey
his atty

(No Model.)

2 Sheets—Sheet 2.

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FIG. 4.

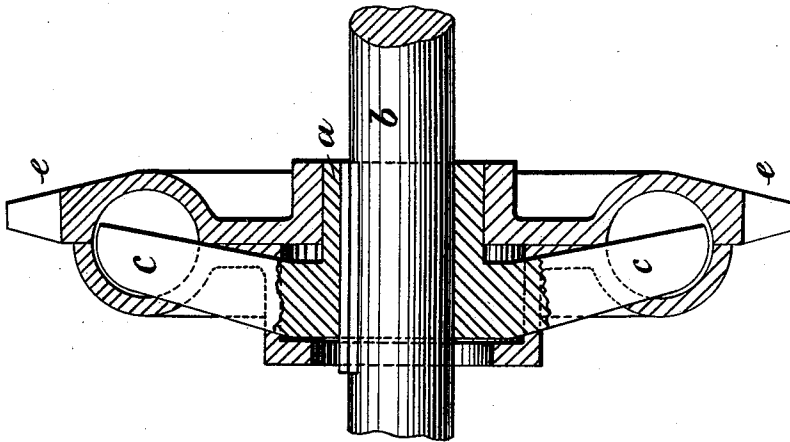
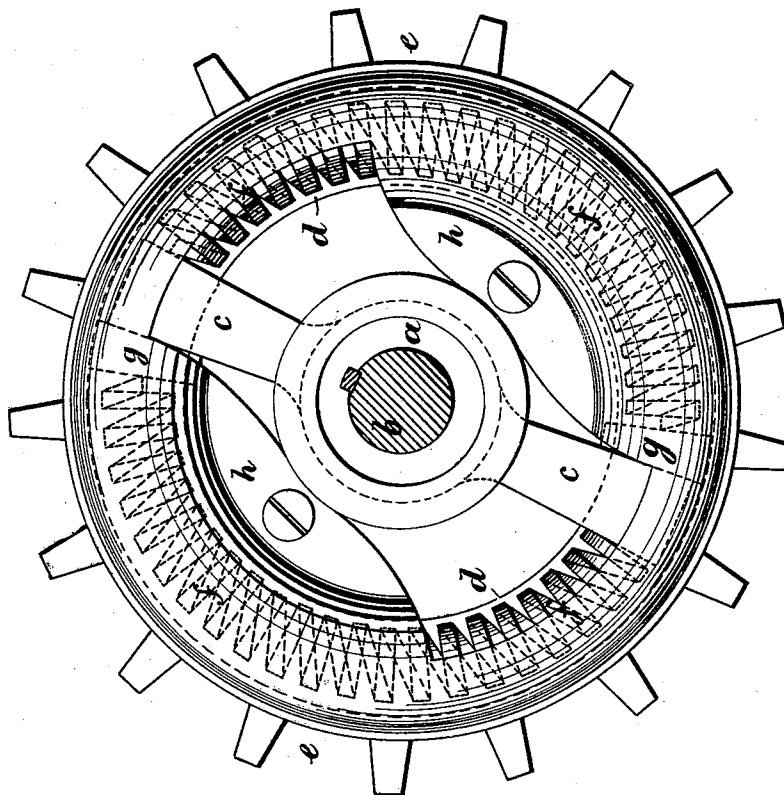


FIG. 3.



Witnesses:
Edmund Dick
L. C. Hill

Inventor:
James F. Guild
by *Marcus Bailey*
his atty.

UNITED STATES PATENT OFFICE.

JAMES FINDLAY GUILD, OF DUNDEE, SCOTLAND.

DRIVING-GEAR.

SPECIFICATION forming part of Letters Patent No. 508,701, dated November 14, 1893.

Application filed June 13, 1893. Serial No. 477,509. (No model.) Patented in England October 13, 1892, No. 18,347.

To all whom it may concern:

Be it known that I, JAMES FINDLAY GUILD, M. I. N. A., consulting engineer and steamship surveyor, a subject of the Queen of Great Britain, residing at 83 Ancrum Road, Dundee, Scotland, have invented new and useful Improvements in Driving-Gear for Velocipedes and Crank-Driven Mechanism generally, (for which I have obtained Letters Patent in Great Britain numbered 18,347 and dated October 13, 1892,) of which the following is a specification.

This invention relates to an arrangement of mechanism for assisting cranks over their dead centers, and thereby equalizing the motion of the machine especially when heavily loaded, as in the case of a cycle ascending an incline, and though designed more especially for use in connection with velocipedes, is applicable to crank driven mechanism of all kinds.

This invention consists mainly in the introduction of a spring or springs between the crank and the shaft or other mechanism driven thereby.

I will now proceed to describe this invention as applied to velocipedes. Its application to other mechanism will be so well understood that any further description will be unnecessary.

The chain wheel or driving wheel, as the case may be, of the velocipede is mounted upon the crank shaft, or upon a socket to be fixed on the crank shaft, so that it may be free to rotate thereon. In the side of this wheel is made an annular recess or groove to receive a spiral spring suitably bent in a circular form to lie within the said groove. A cover plate or disk is provided to inclose the said groove and retain the spring in position. An arm rigidly secured to the crank shaft or socket is made to project through a suitable slot in the side of the recess containing the spring and bear against one end of the said spring. The other end of this spring bears against a projection in the said annular spring chamber.

It will be seen that rotary motion given to the crank shaft will be conveyed to the chain wheel or driving wheel, as the case may be, through the intervention of the spring contained in

the annular recess. On the spring receiving the thrust of the arm occasioned by the downward pressure of either of the treadles it is compressed in proportion to the power applied. This compression if on a level road with easy driving is just sufficient to relieve the rider of the concentrated resistance of the machine. When the machine is being driven hard the recoil of the spring occasioned by the greater amount of compression carries the crank over the dead centers without depending upon the momentum of the machine for this purpose as in the case of machines of ordinary construction. In short this device absorbs the excess of power given out by the rider during one part of the stroke and gives it out to the machine during the other part of the stroke.

In some cases I find it advisable to employ two or more short springs in place of one long one. These are each operated upon by a separate arm projecting from the crank shaft or socket and of course each bears upon a separate projection formed within the annular spring chamber.

In order that my invention may be more fully understood and carried into practice I will now proceed to describe the same with reference to the accompanying two sheets of drawings of which—

Figure 1 is an elevation, and Fig. 2 a cross section of one form of the hereinbefore described device as applied to the chain wheel of a velocipede. Figs. 3 and 4 are similar views of a modified arrangement of the same.

As shown at Figs. 1 and 2 a short sleeve *a* is keyed upon the crank shaft *b* of the velocipede and carries at one end a radially projecting arm *c* which is inclined to the crank shaft at such an angle that its end enters an annular groove or recess *d* formed in the face of the web of the chain wheel *e*. In this groove is placed a helical spring *f* bearing at one end against a stop *g*, formed in one with the chain wheel *e*, and at the other against the radial arm *c* extending from the sleeve *a*. The spring is retained within the groove by the cover plate *h* which is screwed or otherwise attached to the face of the chain wheel *e*. A portion of this plate *h* is removed so as to allow of the clear passage of the radial arm

c into the groove *d*. The central part of this cover plate as shown at Fig. 2 bears against the end of the sleeve *a* and so serves to retain the chain wheel *e* in position.

5 In the arrangement shown at Figs. 3 and 4 the chain wheel is arranged to support two springs *f* and the sleeve *a* is provided with two radial arms *c* one to bear against the end of each of the said springs. The cover plate
10 is of course modified in construction to allow of the entry of the two arms *c* into the grooves *d*. In other respects the parts are similar to those already described as an inspection of the drawings will show.

15 It will be understood that the hereinbefore described device may be placed upon the axle of a chain wheel with equal success in working, it being only necessary to reverse the device so that it may rotate in the opposite direction.
20 rection.

What I claim is—

1. In a gear mechanism, the combination of a shaft, a gear wheel loosely mounted thereon, having a groove in the face of web, an arm
25 secured to the shaft beside the said wheel, a spring situated in the said groove, and bearing at one end against a stop on the wheel and at the other end on the said arm, and a confining plate for holding the spring in the
30 groove, substantially as hereinbefore set forth.

2. The combination of the crank shaft of a velocipede, a driving wheel mounted loosely thereon, and having an annular groove in the

face of its web, the arm *c* secured to the shaft and having its outer portion inclined so as to enter the said groove, and a spring situated in the said groove between the said arm and a stop on the wheel, substantially as hereinbefore set forth.

3. The combination of a shaft, a gear wheel loose thereon, having a recess or groove in one of its faces concentric with the shaft, an arm *c* secured to the shaft, a plate *h* secured to the wheel and having a recess corresponding with the recess in the wheel and having a portion adjacent to the arm *c* removed, and the spring situated in the said recesses, substantially as hereinbefore set forth.

4. The combination of the crank shaft of a velocipede, a sleeve *a* keyed thereto, an arm *c* carried by the said sleeve, a driving wheel having a portion adjacent to the arm *c* removed and mounted loosely upon said sleeve, and provided with the groove *d* in its side face, the plate *h* secured to the wheel, and a spring in the said groove between the wheel and the plate and bearing at one end against the said arm *c*, substantially as hereinbefore set forth.

J. F. GUILD.

Witnesses:

THO. BROWN,

ADAM BOWMAN,

Law Clerks, No. 41 Reform Street, Dundee, Scotland.