

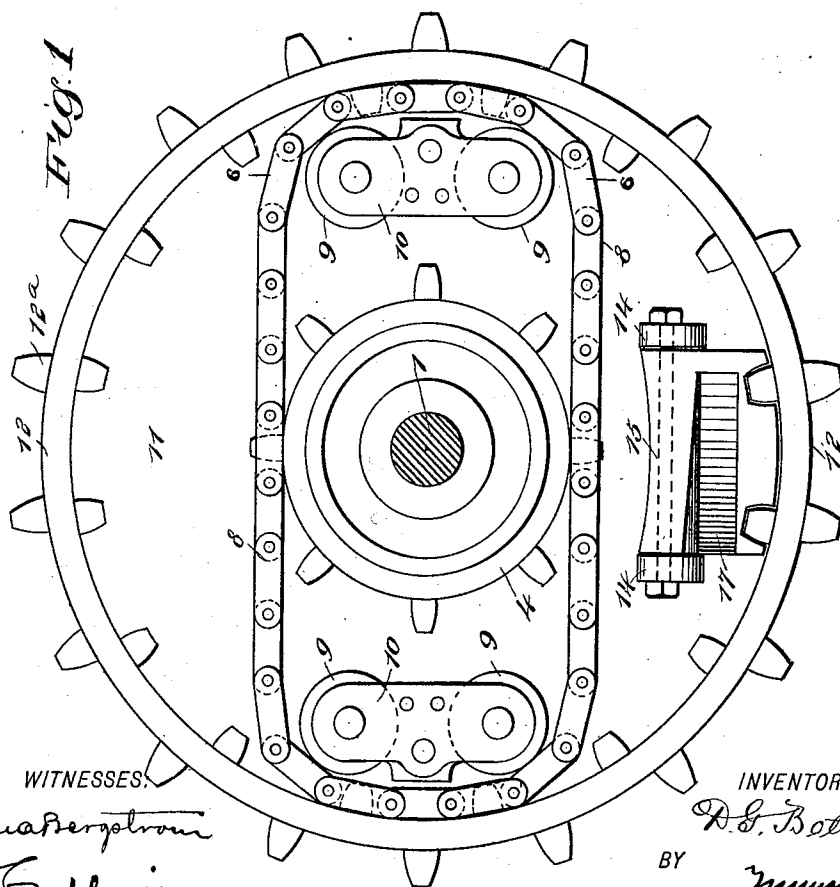
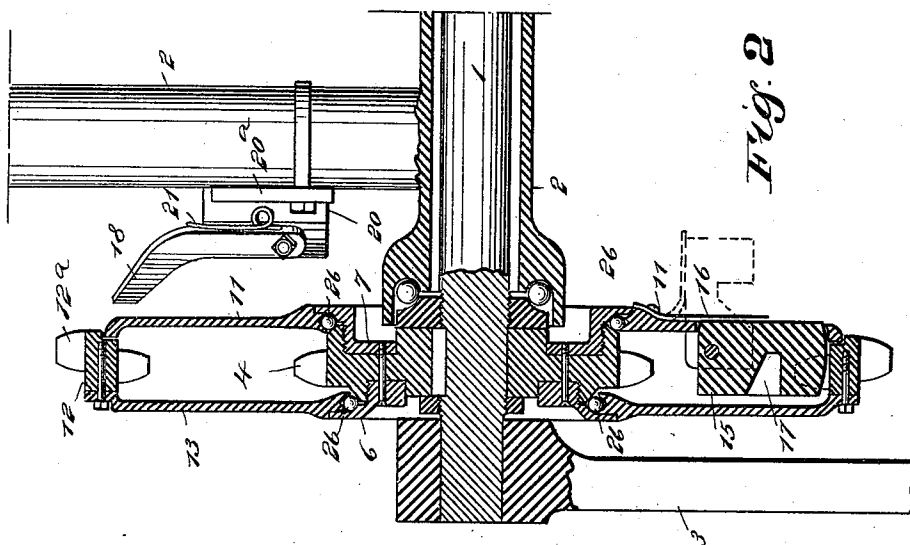
(No Model.)

2 Sheets—Sheet 1.

D. G. BOLTON.
CHANGEABLE DRIVING GEAR..

No. 550,474.

Patented Nov: 26, 1895.



WITNESSES:

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INVENTOR

D. G. Bolton

BY

Mumford

ATTORNEYS.

(No Model.)

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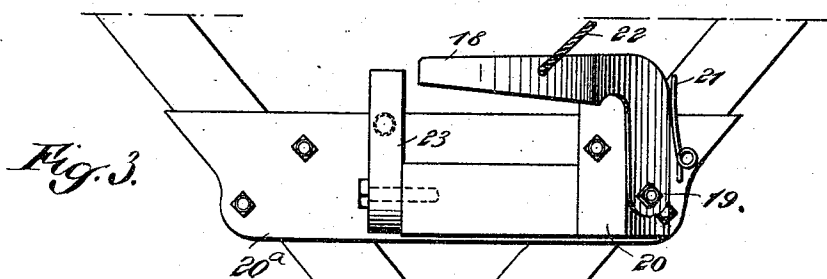


Fig. 4

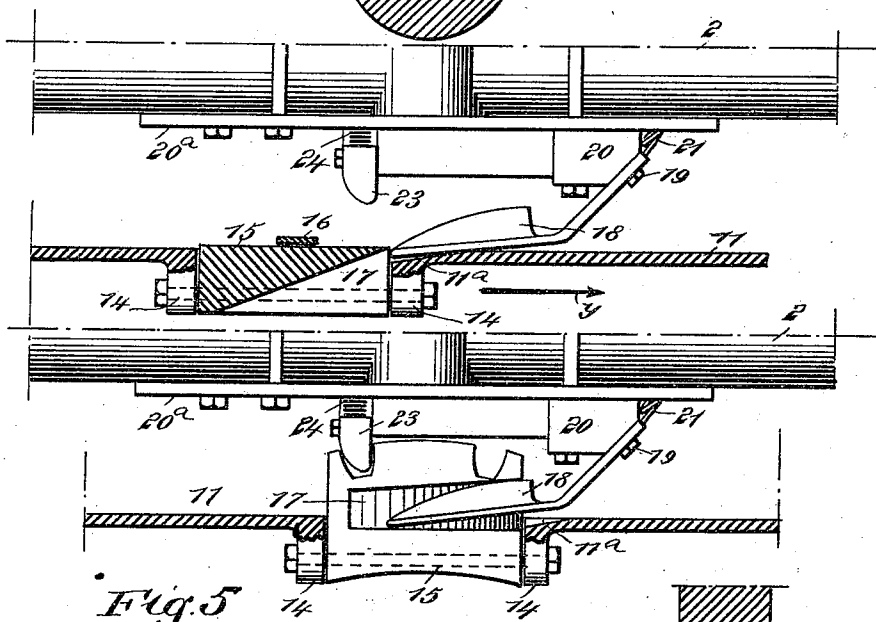


Fig. 5

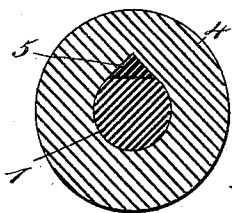


Fig. 7

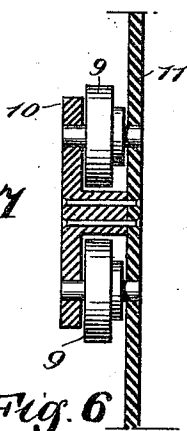
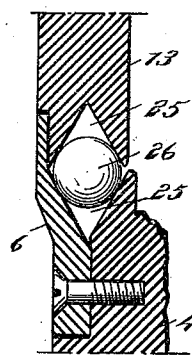


Fig. 6

Fig. 8



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UNITED STATES PATENT OFFICE.

DAN GREGORY BOLTON, OF COOPERSTOWN, NEW YORK.

CHANGEABLE DRIVING-GEAR.

SPECIFICATION forming part of Letters Patent No. 550,474, dated November 26, 1895.

Application filed February 8, 1895. Serial No. 537,678. (No model.)

To all whom it may concern:

Be it known that I, DAN GREGORY BOLTON, of Cooperstown, in the county of Otsego and State of New York, have invented a new and Improved Changeable Driving-Gear, of which the following is a full, clear, and exact description.

This invention relates to changeable driving-gear for bicycles and the like; and the object of the invention is to provide a gear of this character of an improved and simplified construction which will be lighter, stronger, and consequently better adapted for ordinary use than the other forms of changeable gearing heretofore employed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a face view of the gear with the front plate removed. Fig. 2 is a vertical axial section taken through the crank-shaft. Fig. 3 is a face view of the mechanism carried on the frame for operating the latch. Figs. 4 and 5 are sectional plan views showing the latch-operating mechanism on the frame and the latch itself in different positions; and Figs. 6, 7, and 8 are sectional views illustrating certain details of construction, as will be hereinafter set forth.

1 represents the crank-shaft of the bicycle mounted on the frame 2 in the ordinary manner and provided with the usual cranks 3.

4 represents the sprocket-wheel mounted on the shaft 1 and secured in place by means of a triangular key 5, as is seen in Fig. 7. The sprocket-wheel 4 is recessed on its opposite sides and provided with screw-threads to receive threaded cones 6 and 7, having grooves for balls, as will be hereinafter described. The chain 8 passes around the sprocket-wheel 4, being held on rollers 9, preferably mounted in bearings 10, secured to the back plate 11 of the dust-proof casing of the gear, and the said bearings 10 are arranged at diametrically-opposite sides of the sprocket-rim 12, having inner teeth engaging with the said chain 8 and provided with outer teeth 12^a to mesh with the ordinary drive-chain.

The gear is provided with a front plate 13, secured at its edges to the periphery of the sprocket-rim 12 and provided at its inner edge

with a V-shaped groove 25 to receive the balls 26, as is clearly seen in Fig. 8, and the back plate 11 of the gear is similarly provided with a V-shaped groove to receive balls held in the V-shaped grooves between the gear 4 and the cone 7.

A latch 15 is pivoted between lugs 14 at one side of the back plate 11 of the gear and plays through an opening formed in the said sprocket-plate, being provided with an actuating-spring 16 and having its edge notched, as seen in Fig. 1, to engage the inner teeth of the sprocket-rim 12, and in its inner face the latch 15 is provided with an inclined groove 17 to receive the end of an operating-lever 18, pivoted at 19 on a block 20, mounted on a tie-plate 20^a on the frame 2, as is clearly seen in Fig. 3, and provided with an actuating-spring 21. The lever 18 is pivoted on the block 20 in a plane at an angle of about forty-five degrees to the plane of the back plate 11 of the gear-casing and is normally held by means of its spring, with its free end in position to engage an incline 11^a, formed at one side of the opening in the said plate 11 through which the latch 15 passes and adjacent to the lower edge of the inclined groove 17 in the said latch, whereby when the lever is in its operative position its free end will engage the said inclined groove 17 as the gear rotates and turn the latch on its pivot out from engagement with the teeth of the rim 12, as is seen in Fig. 5, and when in this position the said latch will be held against movement by a dog 23, pivoted at the opposite end of the block 20 and actuated by a spring 24, the said dog being adapted to enter one of the notches in the face of the latch.

The lever 18 will be actuated from a hand-lever (not shown) mounted on the frame of the bicycle and connected to said lever 18 by means of a wire 22.

The operation of the device is as follows: When it is desired to drive the bicycle with as much power as possible, as in going up hill, the lever 18 is released, so as to be thrown by the spring 21 into its operative position. (Indicated in Fig. 4.) As the plate 11 rotates in the direction of the arrow *y*, Fig. 4, the free end of the said lever 18 engages the inclined groove 17 and throws the latch 15 on its pivot to the position indicated in dotted

lines in Fig. 2, said latch being held in said position by the combined action of the lever 18 and the dog 23, whereby the plate 11 is locked to the frame of the bicycle. When the parts are in this position, the sprocket-wheel 4 imparts movement to the chain 8 and through said chain drives the rim 12 at a slow speed—say one-half the speed of the sprocket-wheel 4—the rim 12 being provided with twice as many teeth as said sprocket-wheel. When it is desired to drive the machine at a greater speed, as when on a level, the lever 18 is drawn out of its operative position and disengaged from the groove 17 in the latch, whereupon the said latch is thrown by its spring 16 into engagement with the teeth upon the inner face of the rim 12, and in this position of the parts the said rim 12 will be driven from the shaft 1 at the same speed with the said shaft.

The construction of the gear as above described is very simple and combines the maximum of strength with the minimum of weight, since it will be seen that the rim 12 is driven at diametrically-opposite points from the chain 8, and consequently the strain is greatly reduced and the parts can be made much lighter.

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

1. The combination with a shaft, a sprocket wheel on the shaft, and a sprocket rim encircling the sprocket wheel and provided with internal teeth, of a chain driven from the sprocket wheel and gearing with the internal teeth of the said rim on diametrically opposite sides of the sprocket wheel, substantially as described.

2. In a changeable driving gear, the combination with a shaft, a sprocket wheel on the shaft, and a sprocket rim encircling the sprocket wheel and provided with internal teeth, of a revoluble plate adapted to be locked stationary to the sprocket rim, guide rollers on the plate at diametrically opposite sides of the sprocket wheel, and a chain passing over said guide rollers and engaged by the sprocket wheel and the internal teeth of the sprocket rim, substantially as described.

3. In a changeable driving gear, the combination with a shaft, a sprocket wheel on the shaft, and a sprocket rim encircling the sprocket wheel and provided with internal teeth, of a revoluble plate, a latch carried by the plate and adapted to engage the internal teeth of the sprocket rim to lock the plate to said rim, means for disengaging the latch and locking the plate stationary, guide rollers carried by the said plate on diametrically opposite sides of the sprocket wheel, and a chain passing over said guide rollers and engaged by the sprocket wheel and the internal teeth of the sprocket rim, substantially as described.

4. In a changeable driving gear, the combination with a shaft, a sprocket wheel on the

shaft, and a sprocket rim encircling the sprocket wheel and provided with internal teeth, of a revoluble plate, a spring pressed latch carried by the revoluble plate and adapted to engage the internal teeth of the sprocket rim to lock the plate to the rim, a lever for engaging the latch to disengage it and lock the plate stationary, guide rollers carried by the plate on diametrically opposite sides of the sprocket wheel, and a chain passing around said rollers and engaged by the sprocket wheel and the internal teeth of the sprocket rim, substantially as described.

5. The combination with a frame, of a crank shaft, a sprocket wheel thereon, a sprocket rim having internal teeth and encircling the sprocket wheel, a revoluble plate, a pivoted latch having its edge notched and provided with an inclined recess on its inner surface and adapted to lock the said plate to the sprocket rim, bearings on the plate adjacent to the opposite sides of the sprocket wheel, a chain driven from the sprocket wheel and meshing at opposite sides of the sprocket rim, and a lever mounted on the frame and adapted to engage the inclined recess of the latch, substantially as set forth.

6. The combination of a frame, a crank shaft, a sprocket wheel thereon, a sprocket rim encircling the sprocket wheel and provided with internal teeth, a revoluble and apertured plate, a latch on the said plate having its edge notched and provided with an inclined recess on its inner face, bearings on the plate adjacent to opposite sides of the sprocket rim, a chain driven from the sprocket wheel, and gearing at opposite sides of the sprocket wheel, said chain passing over the said bearings and engaging the sprocket wheel and the internal teeth of the sprocket rim, a lever on the frame adapted to move the latch out of its operative position, and a dog on the frame adapted to hold the latch when moved by said lever, substantially as set forth.

7. In a changeable driving gear, the combination with a sprocket wheel, and a sprocket rim encircling the sprocket wheel and provided with internal teeth, of a revoluble plate provided with an opening near its periphery, a pivoted and spring pressed latch carried by the revoluble plate and adapted to be projected by its spring through the opening of the plate into engagement with the teeth of the sprocket rim, a lever on the frame and adapted to engage the latch to move it out of engagement with the sprocket rim, a dog for engaging the latch for holding it disengaged, bearings on the plate on opposite sides of the sprocket wheel, and a chain passing around said bearings and engaging the sprocket wheel and the internal teeth of the sprocket rim, substantially as described.

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Witnesses:

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A. M. AUGUR.