

No. 619,118.

Patented Feb. 7, 1899.

N. M. BARNES.
BICYCLE.

(Application filed May 3, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

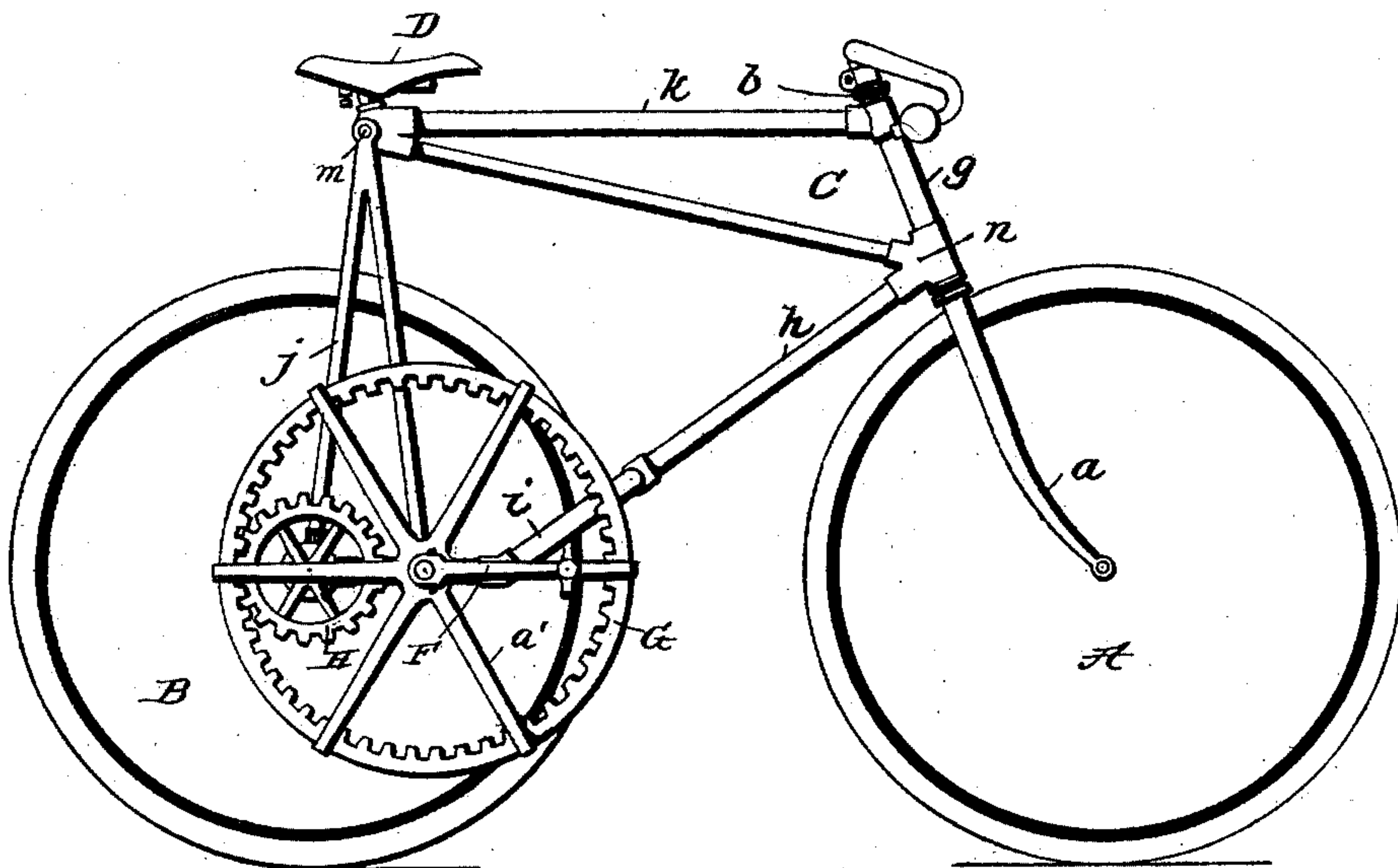
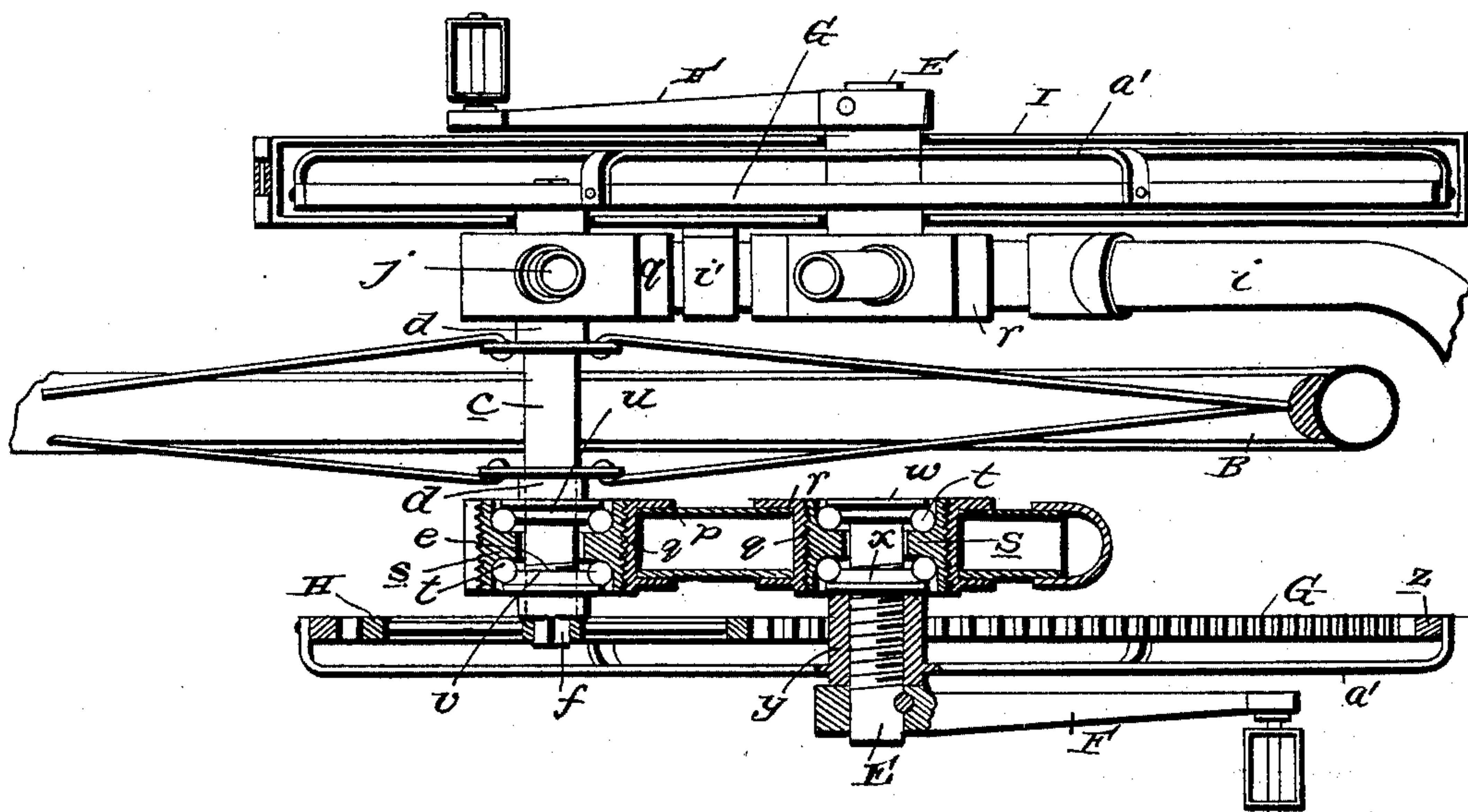


Fig. 2.



witnesses:
Chas. J. Spader
J. H. Conroy

Inventor
N. M. Barnes
BY *James J. Sheehy*
Attorney

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Fig. 3.

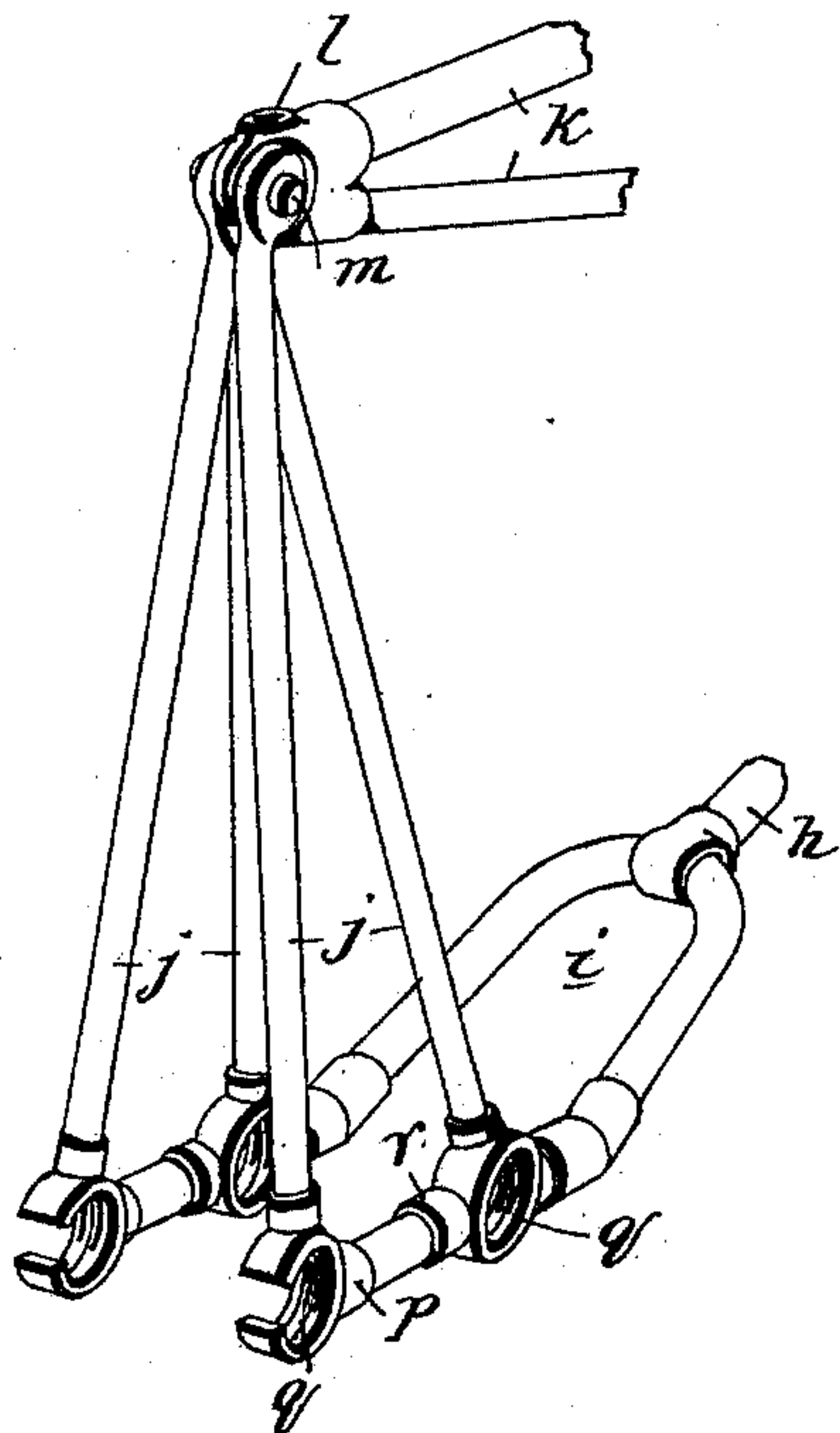
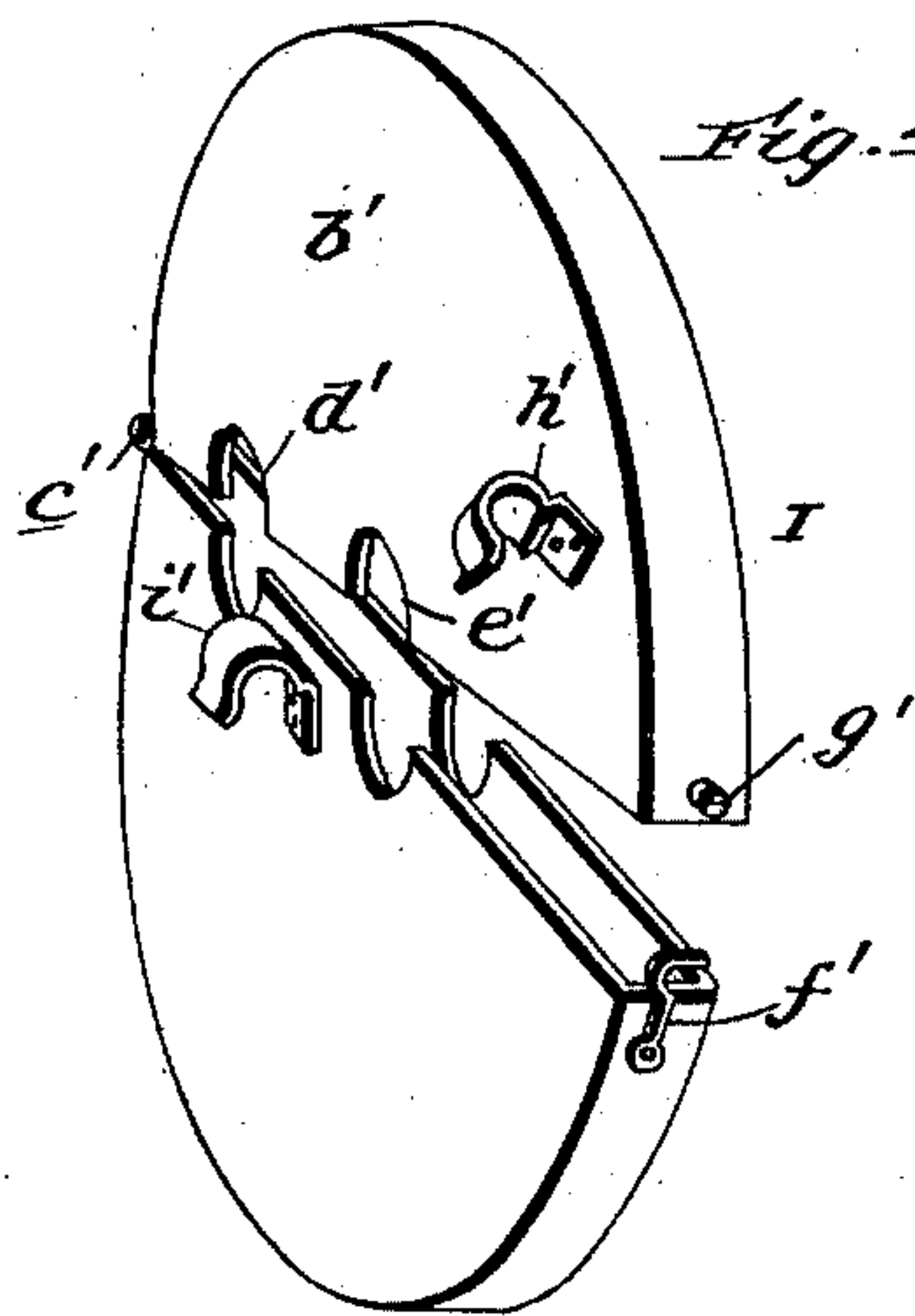


Fig. 4.



Witnesses:
C. G. Gaudin
J. H. Crony

Inventor
N. M. Barnes
By *James P. Huey*
Attorney

UNITED STATES PATENT OFFICE.

NATHAN M. BARNES, OF MINNEAPOLIS, MINNESOTA.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 619,118, dated February 7, 1899.

Application filed May 3, 1898. Serial No. 679,603. (No model.)

To all whom it may concern:

Be it known that I, NATHAN M. BARNES, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented new and useful Improvements in Bicycles, of which the following is a specification.

My invention relates to bicycles of the safety type, and will be fully understood from the following description and claim when taken in conjunction with the accompanying drawings, in which—

Figure 1 is a side elevation of a safety-bicycle constructed in accordance with my invention. Fig. 2 is an enlarged horizontal section of the rear portion of the bicycle, illustrating the frame construction and the driving-gear. Fig. 3 is a detail perspective view of the rear portion of the frame. Fig. 4 is a perspective view of one of the gear-cases.

Referring by letters to said drawings, A designates the front or pilot wheel, which may be of the ordinary construction and is mounted in the fork *a* of a steering-post *b* after the well-known manner.

B designates the rear or drive wheel, which is also of the ordinary construction, with the exception that it has its axle *c* extended on opposite sides and provided with shoulders *d* and threaded portions *e* and also with angular ends *f*, and C designates the main frame, which is preferably constructed of steel tubing. This frame C has the usual head-bar *g* to receive the steering-post carrying the wheel A. It also has a bottom line-bar *h*, which is peculiar in that it terminates at its rear end in a fork *i*, the rear portions of the branches or arms of which are horizontally disposed, as best shown in Fig. 3. In lieu of the usual rear stays and king-post the said frame C has two bifurcated uprights *j*, the lower ends of the branches of which are connected to the branches of the fork *i* after the manner shown in Fig. 3, while in lieu of the usual top line-bar a bifurcated brace *k* is provided. The rear end of this brace *k*, which is split and provided with a socket *l* to receive a seat-post, is interposed between and connected to the uprights *j* by a bolt *m*, said bolt serving the additional purpose of clamping the split end of the brace against the seat-post, as shown. The forward end of one arm of the brace *k*

is connected to the upper end of the head-bar *g*, and the forward end of the other arm is connected to the forward end of the bottom line-bar and the lower end of the head-bar by a joint *n*, so as to better distribute the weight of the rider on the frame.

The uprights *j* and the fork *i* on the bottom line-tube *h* are provided in order to accommodate the rear wheel B and the driving-gear, presently described, and permit of the said gear being so arranged as to be conveniently actuated by a rider seated on the saddle D.

As best shown in Fig. 3, the joints *p*, which connect the rear arms of uprights *j* and the branches of fork *i*, are provided with threaded apertures *q*, as are also the joints *r*, which connect the forward arms of said uprights and the branches of the forks. In each of these apertures *q* is placed a double cup *s*, which is secured in position by screw-threads, as shown.

The cups *s* in the joints *p* receive the axle *c* of the drive-wheel B, and in order to reduce the friction balls *t* are interposed between the inner sides of the cups and cones *u*, arranged on the axle and bearing against the shoulders *d* thereof, and other balls *t* are interposed between the outer sides of the cups and cones *v*, which engage the threaded portions *e* of the axle and serve the additional purpose of securing said axle in position.

E designates short threaded shafts which are arranged in the cups *s*, carried by joints *r*, and are provided with a fixed cone *w* and a threaded and adjustable cone *x*, between which and the cup anti-friction-balls *t* are interposed, as shown. These short shafts E are also provided with pedal-cranks F, keyed thereon, and gear-wheels G. As best shown in Fig. 2, the said wheels G respectively comprise an interiorly-threaded hub *y*, an interiorly-toothed annulus *z*, and spokes *a'*, disposed at the outside of the annulus and connected at one end to the hub and at their outer ends to the periphery of the annulus, as shown. Arranged within and in alinement with the annular portions *z* of the gear-wheels G and intermeshed with said annular portions *z* are pinions H, which are mounted on the angular ends *f* of the axle *c* or are otherwise fixed against turning on said wheel. In virtue of this construction it will be observed

that when the gear-wheels G are turned by the rider through the medium of the cranks F the pinions H and the wheel B will also be turned, and because of the disparity between the diameters of the wheels G and pinions H the wheel B will be caused to make a plurality of revolutions to each revolution of the wheels H, the number depending on the gear employed.

10 The gearing described is exceedingly cheap and simple and is not liable to get out of order. It is also advantageous because of the facility with which the sets of gears and pinions may be entirely inclosed by casings I, 15 such as shown in Fig. 4. These casings respectively comprise two semicircular sections b' , connected in a hinged manner at c' and having notches $d' e'$ in their meeting edges to accommodate the end of the axle c and the 20 hub of the gear-wheel G when they are placed in their operative position. The sections of the casings are designed to be detachably connected when in their operative position by hooks and lugs $f' g'$ or other suitable means, 25 and they are designed to be supported in such position by their hooks $h' i'$, the hooks h' being sprung into engagement with the oblique portions of the fork-arms and the hooks i' being sprung into engagement with the rear 30 horizontal portions of said forks. This mode of connection prevents casual displacement of the cases I and yet permits of their ready removal when necessary and is desirable for such reasons.

Having described my invention, what I claim is— 35

In the bicycle described, the combination with a frame comprising a head-bar, a bottom line-bar terminating at its rear end in a fork having joints p in its branches and threaded 40 apertures q in said joints, bifurcated uprights having the lower ends of their branches connected to the joints p , bearings arranged in the apertures of the joints p , a longitudinal bifurcated brace having the rear ends of its 45 branches connected together and to the upper ends of the uprights, a joint connecting the forward end of the bifurcated brace and the upper end of the head-bar, and a joint connecting the forward end of the lower 50 branch of the brace, the lower end of the head-bar, and the forward end of the bottom line-run; of the rear drive-wheel arranged in the fork, between the bifurcated uprights, and having its axle journaled in the rear 55 bearings of the fork and provided with pinions, and short crank-shafts journaled in the forward bearings of the fork and carrying gear-wheels surrounding and intermeshed with the pinions on the axle of the drive- 60 wheel, substantially as specified.

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

NATHAN M. BARNES.

Witnesses:

J. T. MCCUAIG,
J. C. UPSON.