(No Model.) 2 Sheets—Sheet 1.

H. BRINGS.

CYCLE.

No. 571,298. Patented Nov. 10, 1896.

Fig. 1.

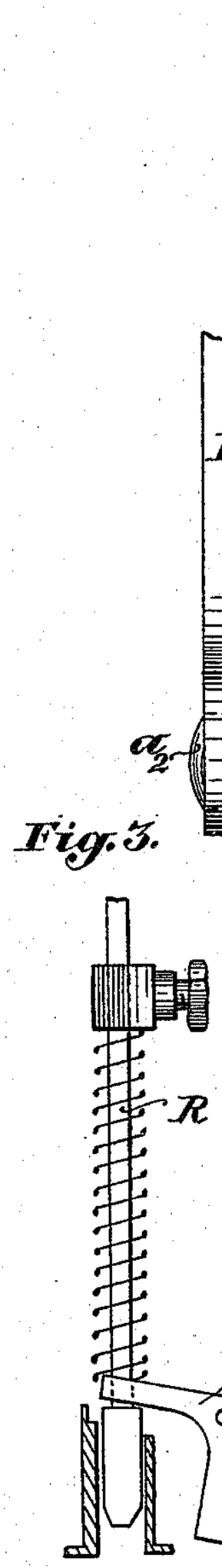

Fig. 3.

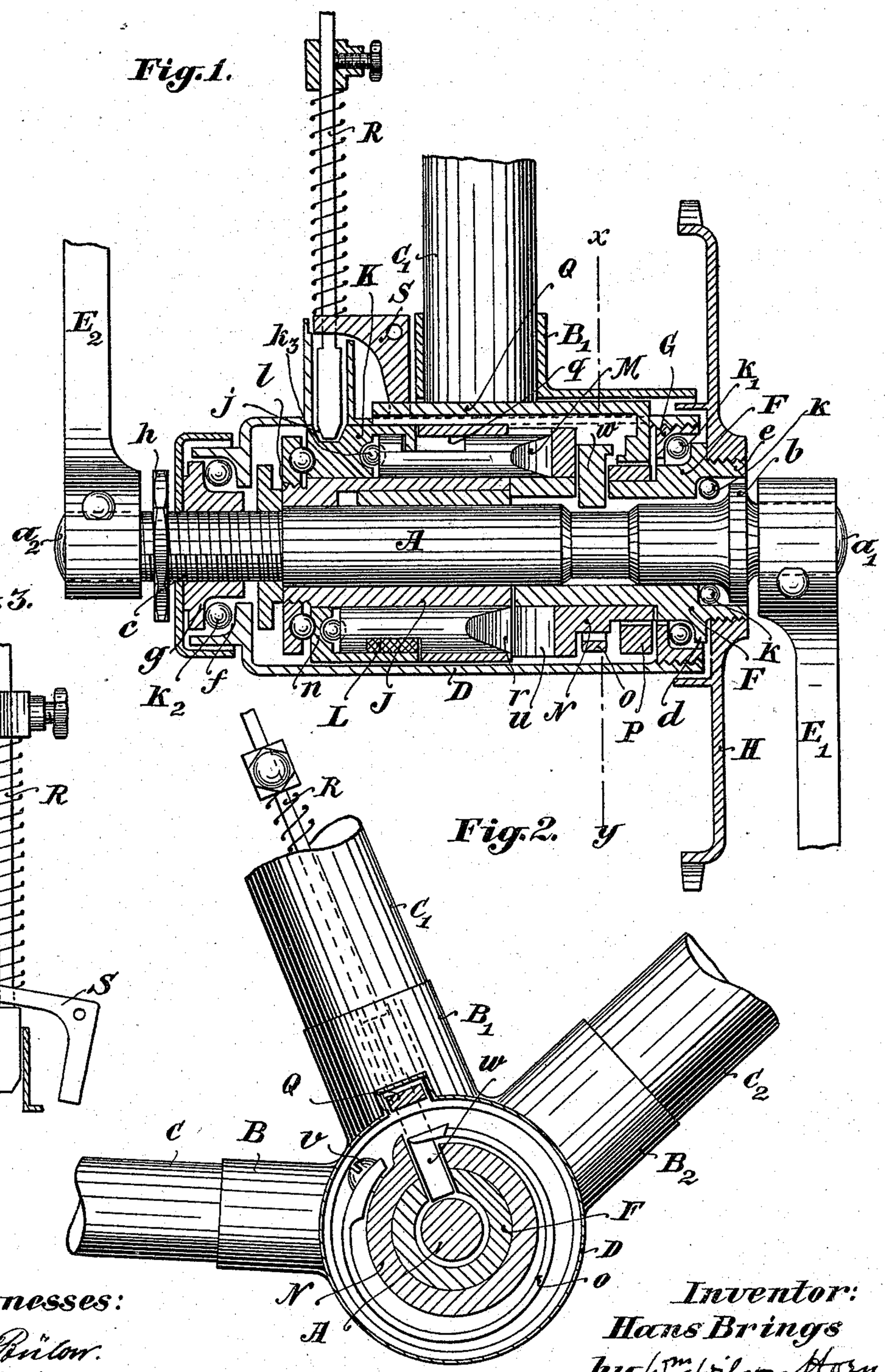

Fig. 2.

Witnesses:
C. A. Snow.
R. Ozias.

Inventor:
Hans Brings
by Wm. Wilson Horn
Att'y.

(No Model.) 2 Sheets—Sheet 2.

H. BRINGS.

CYCLE.

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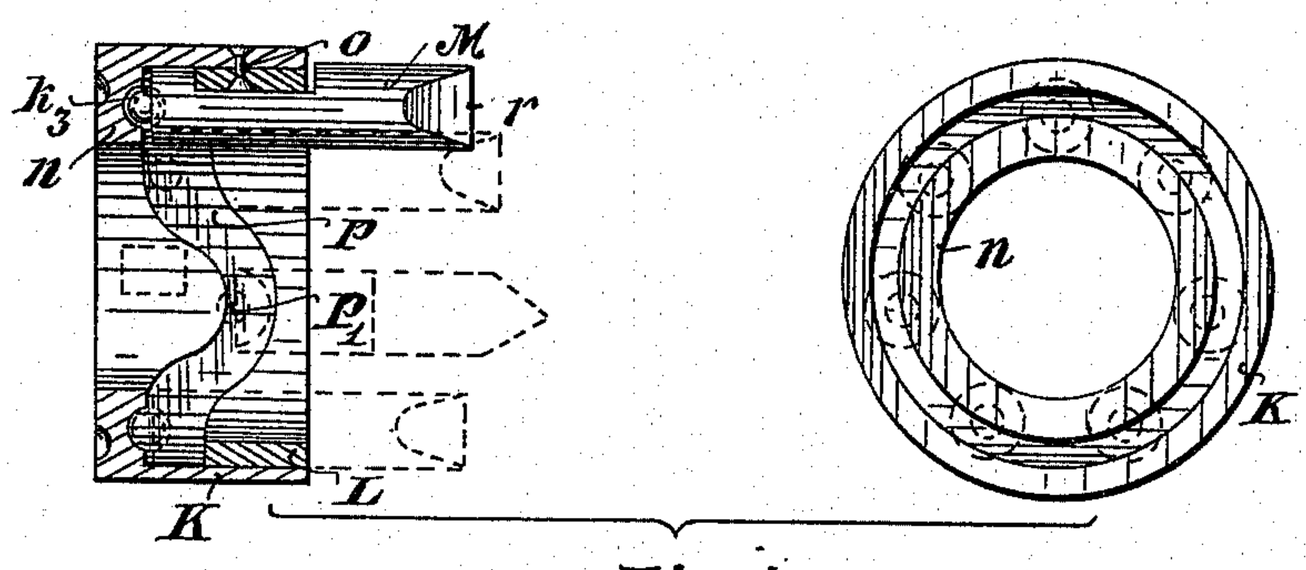


Fig. 4.

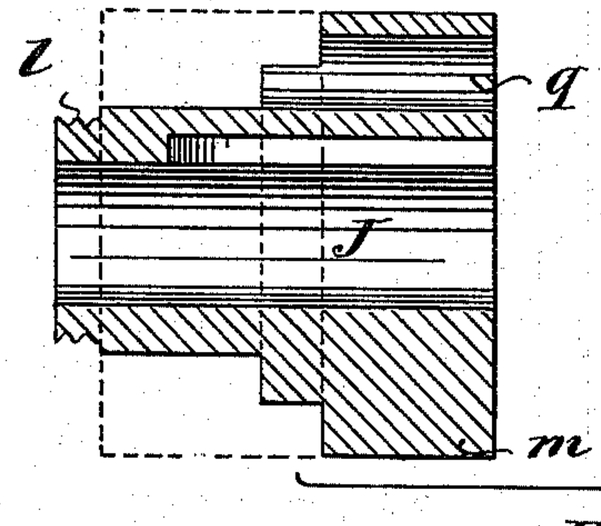
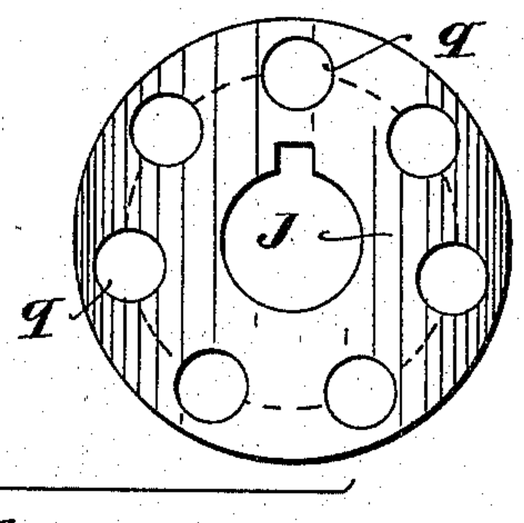


Fig. 5.



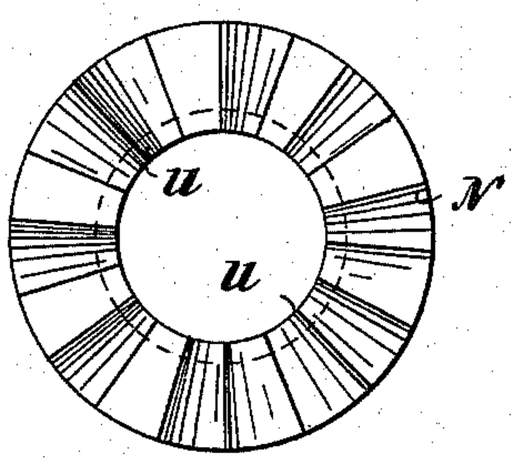


Fig. 7.

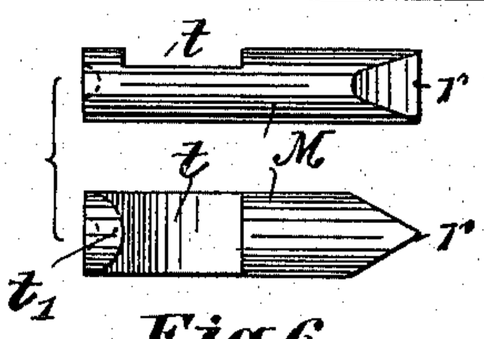


Fig. 6.

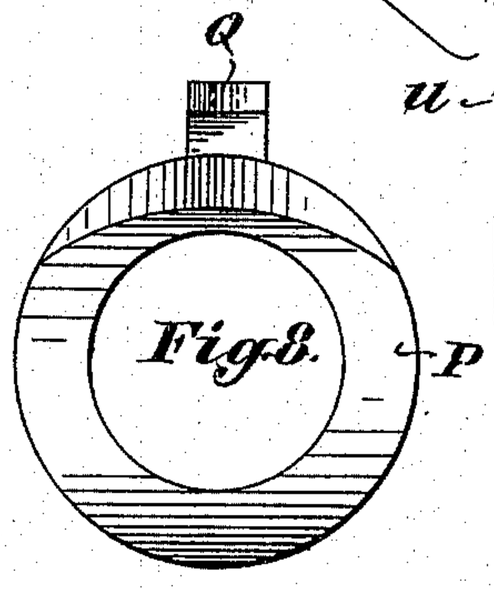
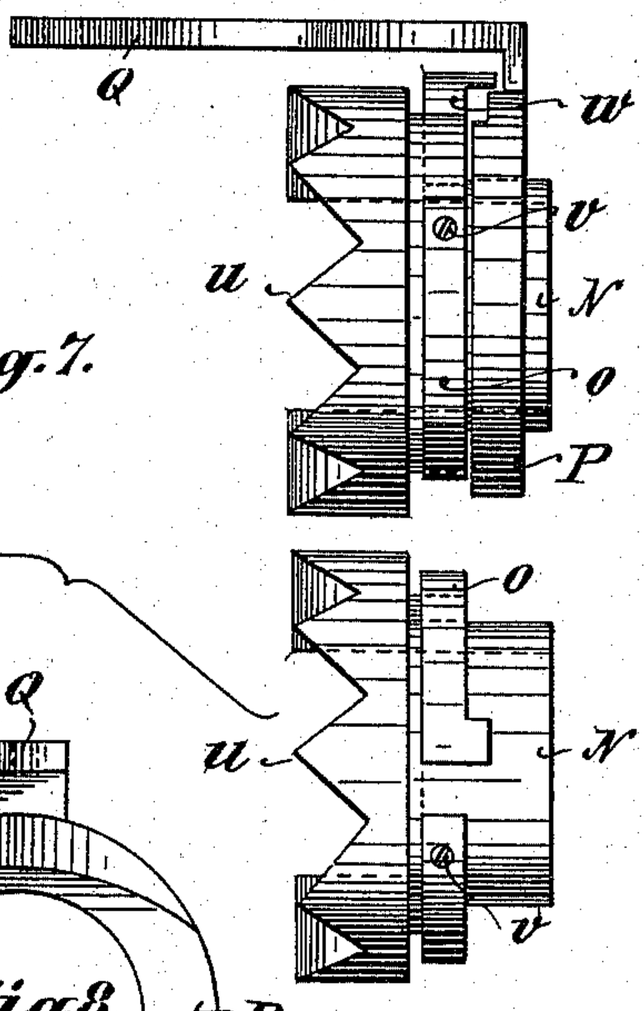


Fig. 8.



Witnesses:
Carl Bilow.
K. Osius.

Inventor:
Hans Brings
by Wilson & Thorn
Atty.

UNITED STATES PATENT OFFICE.

HANS BRINGS, OF COLOGNE, GERMANY.

CYCLE.

SPECIFICATION forming part of Letters Patent No. 571,298, dated November 10, 1896.

Application filed August 5, 1895. Serial No. 558,277. (No model.)

To all whom it may concern:

Be it known that I, HANS BRINGS, a subject of the King of Prussia, Emperor of Germany, and a resident of Cologne, Germany, have invented a certain new and useful Improvement in Cycles, of which the following is a full, clear, and exact description.

The present invention consists of a device in connection with cycles by means of which it is possible to vary the gearing of the cycle, for instance, when riding uphill and to throw the treadles out of gear with the driving-wheel when running downhill. For uphill work the driving-chain wheel is thrown out of engagement with the treadles direct, and the latter geared to an intermediate mechanism by means of which the number of revolutions of the cranks are increased with regard to those of the driving-chain wheel; and in order to make the present invention more easily intelligible reference is had to the accompanying drawings, in which similar letters of reference denote similar parts throughout the several views.

Figure 1 is a longitudinal section through the crank-axle of a bicycle; Fig. 2, a transverse section on the line *x y* of Fig. 1, and Figs. 3 to 8 details of construction severally referred to in the course of the specification.

A is the crank-axle, having attached thereto at a' and a^2 the cranks E′ and E².

D is the casing inclosing the mechanism hereinafter described and having the usual sockets B B′ B² for the frame of the machine C C′ C². The crank-axle A is mounted in ball-bearings at *k*, *k′*, and k^2, said balls *k′* being supported at the end a' between a cup-ring G, screwed into the end of the casing D, and a flange of a sleeve F, hereinafter described, the balls *k* between a collar *b* on the axle A and an interior cup-shaped depression in the end of the said part F, while the balls k^2 at the opposite end of the axle are held between an annular cup-shaped depression of a collar *g*, screwed onto the end of the axle at *c* and retained by a lock-nut *h*, and a similar annular recess formed in the end of the casing D at *f*.

The sleeve F is loosely mounted on the axle A and has screwed onto its end *e* the driving-gear H of the cycle. Loosely mounted on the said sleeve F is one half N of a coupling-clutch (see also Figs. 6 and 7) carrying a series of teeth laterally and capable of being locked to the said sleeve F by means of a spring *o*, attached to the part N at *v*, Fig. 2, extending around the same and adapted to engage with its pin *w* with an opening in the sleeve F and couple the latter to the clutch N, as shown in Fig. 2. The disengagement of the coupling-spring *o w* is effected by means of a cam-disk P, Figs. 1 and 3, extending around the sleeve part of the clutch N and having an upper horizontal bolt Q, guided in the casing D, extending out of the latter at its farther end to engage one arm of an angle or bell-crank lever S, pivotally mounted in the machine-frame and operated by a spring-pressed rod R, as indicated in Fig. 8, to move the said cam P backward and forward within certain limits on the sleeve of the clutch N. In the position shown in Figs. 1 and 2 the cam is out of engagement with the spring *o* and the parts are coupled. On raising the rod R the cam will contact with the spring *o* at the opposite side to the pin *w* and push the latter out of engagement with the sleeve F. When this has been effected, the treadles are out of engagement with the driving-gear H and the same may be retained stationary, as desired, when running downhill.

The variation of the proportion of the gearing of the treadles with the driving-gear H is effected by the following mechanism: Keyed onto the axle A is the opposite half of the coupling-clutch J, Fig. 5, which is enlarged at *m* and provided with a series of guide-holes *q q*, (in the drawings seven,) which serve to guide horizontally-movable pins M, Figs. 1 and 4. These pins are pointed at their projecting ends to correspond to the notches of the clutch N and are guided at their rear ends in a cam-sleeve K, (shown in detail at Fig. 4,) said cam-sleeve having an interior cam-groove *p* formed therein, said groove being bounded at the opposite side by a ring L, fixed by means of a screw O or other suitable device within the said sleeve N. The cam-sleeve K is capable of rotation on the sleeve part of the clutch J, the latter having a screw-thread *l* at its rear for the reception of a disk having a groove for ball-bearings, which rest against the rear end of the said cam disk and prevent the latter from moving longi-

tudinally on the clutch J. Each pin M is seated on a ball k^3, being provided at its rear end with a depression into which the said ball extends and being notched at t, so as to leave a rearwardly-extending butt t', Fig. 6, which engages the interior cam-groove p. The groove p is waved or provided with a bend p', which is so arranged that when the butt-end of a pin M is in this bend the point of the said pin will be in engagement with the corresponding notch of the clutch N.

From the foregoing description it will be clear that if the cam-sleeve K is rigid on the sleeve J one pin M only will remain at the bend, and will consequently be in engagement with a tooth of the clutch N, which latter will then be coupled to the sleeve J. Consequently if the spring w is in engagement with the sleeve F the treadle-cranks will rotate the driving-wheel H in the ordinary manner. If, however, the cam-sleeve is disengaged from the sleeve J and held stationary by suitable means, the pins M will be brought successively into the bend p' of the cam-groove p and successively engage the clutch N, moving the same a short distance each time. If now the clutch N is provided, as shown in the drawings, with nine teeth, and there are only seven pins M, it will be evident that each turn of the crank, and consequently of the sleeve J, will only rotate the clutch N, and with it sleeve F and driving-wheel H, seven-ninths of a revolution, and thus the gearing may be varied. The gearing may be varied in any other way by simply varying the number of pins M or teeth of the clutch N. The cam-sleeve K is held stationary by sinking the rod R still lower, when its lower end will engage a recess j in the cam-sleeve K and retain the same stationary.

Briefly recapitulated, the rod R has three functions. In its highest position the cam P will engage the spring v and disconnect the sleeve F from the clutch N, so that the treadle-cranks will be thrown out of gear with the driving-wheel H. On moving the rod half-way down the clutch N will be locked to the sleeve F, and the crank will actuate the driving-wheel in the ordinary manner, and on adjusting the rod in its lowest position its lower end will engage the depression of the cam-sleeve K and arrest the same, thus varying the gearing of the crank-shaft and driving-wheel, as specified.

I claim as my invention—

1. The combination of a crank-axle suitably mounted, a sleeve J keyed thereto and having mounted therein longitudinally-movable pins with V-shaped ends, a cam-sleeve detachably mounted on said sleeve J to operate said pin-butts, a sleeve F loose on said crank-axle, a clutch N loose on said sleeve F and having teeth to engage with said pins, a driving-chain wheel mounted on said sleeve F, means for coupling the clutch N and sleeve, and means for arresting at times the said cam-sleeve substantially as described.

2. The combination of a crank-axle A, having affixed around it a series of longitudinally-movable pins M having V-shaped ends, a cam-sleeve loosely mounted on said axle and engaging the butt-ends of said pins, as specified, clutch having correspondingly-shaped teeth to engage the projected end of said pins, a sleeve F loosely mounted on said axle and having driving-wheel H and suitable orifice, a spring-pressed pin w to enter said orifice, said pin being spring-mounted on the said clutch N, means to operate said pin, and means to retain the cam-sleeve stationary at will, substantially as described.

3. The combination of a crank-axle A, having affixed around it a series of longitudinally-movable pins M having V-shaped ends, a cam-sleeve loosely mounted on said axle and engaging the butt-ends of said pins, as specified, means to retain said cam-sleeve stationary, a clutch having correspondingly-shaped teeth to engage the projected end of said pins, a sleeve F loosely mounted on said axle and having driving-wheel H; an orifice in said sleeve and a spring-pressed pin on the clutch, to engage said orifice, a cam-disk p to operate said pin, and means to move said cam-disk longitudinally on said sleeve F substantially as described.

4. The combination of a crank-axle A having affixed around it a series of longitudinally-movable pins M having V-shaped ends, a cam-sleeve loosely mounted on said axle and engaging the butt-ends of said pins, as specified, a clutch having correspondingly-shaped teeth to engage the projected end of said pins, a sleeve F loosely mounted on said axle and having driving-wheel H, means for coupling said clutch and sleeve, an orifice j on the cam-sleeve K and a vertically-movable spring-pressed rod R to engage said orifice substantially as described.

5. The combination of a crank-axle A having affixed around it a series of longitudinally-movable pins M having V-shaped ends, a cam-sleeve loosely mounted on said axle and engaging the butt-ends of said pins, as specified, a clutch having correspondingly-shaped teeth to engage the projected end of said pins, a sleeve F loosely mounted on said axle and having driving-wheel H, means for coupling said clutch and sleeve, an orifice j on the cam-sleeve K and a vertically-movable spring-pressed rod R to engage said orifice, a bell-crank lever s connected to said rod and to the cam-disk P in the manner and for the purpose substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

HANS BRINGS.

Witnesses:
FRITZ SCHRÖDER,
SOPHIE NAGEL.