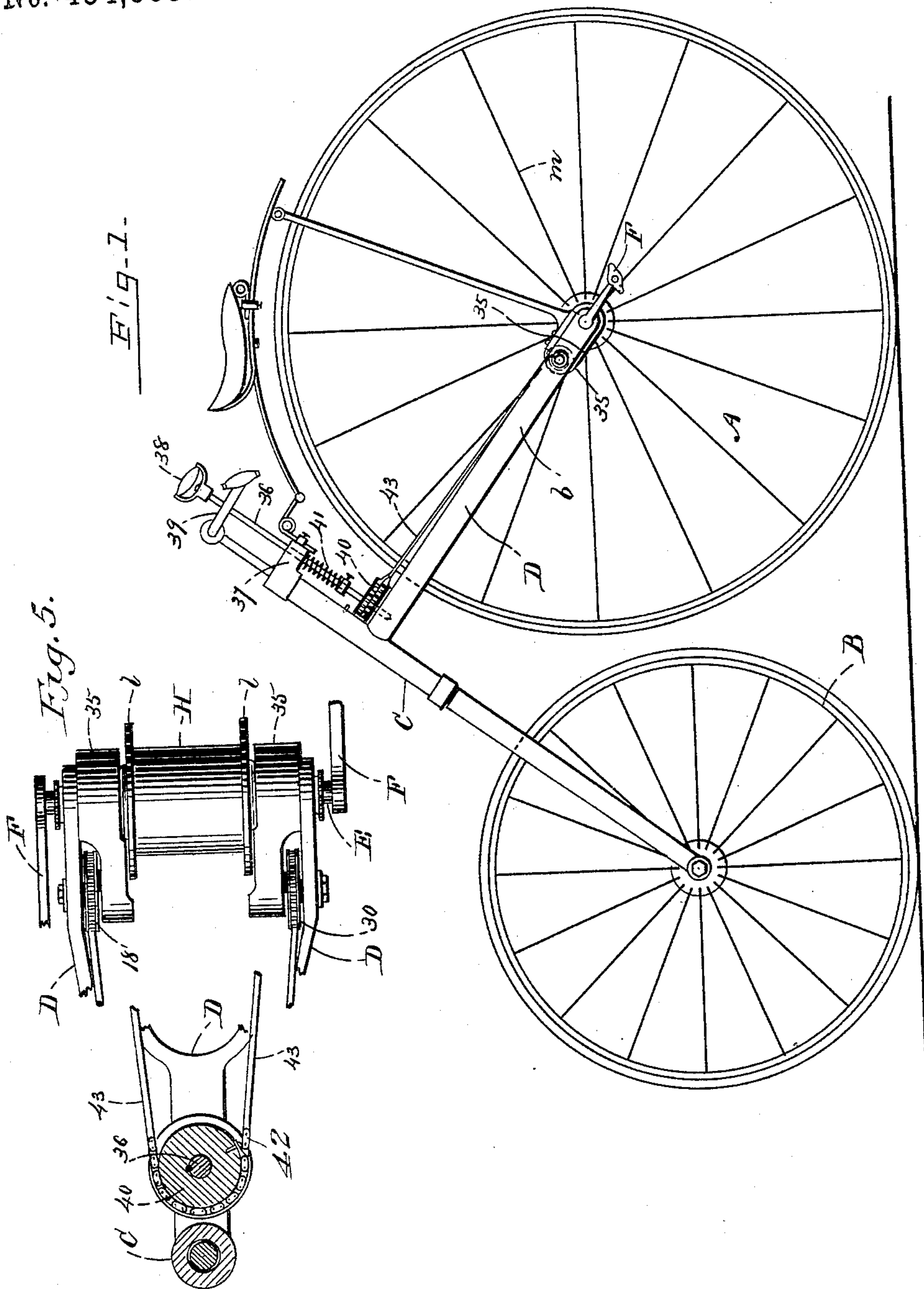


(No Model.)

F. H. S. MOYNAHAN.
BICYCLE.

Patented June 23, 1891.

No. 454,583.



WITNESSES:
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(No Model.)

3 Sheets—Sheet 2.

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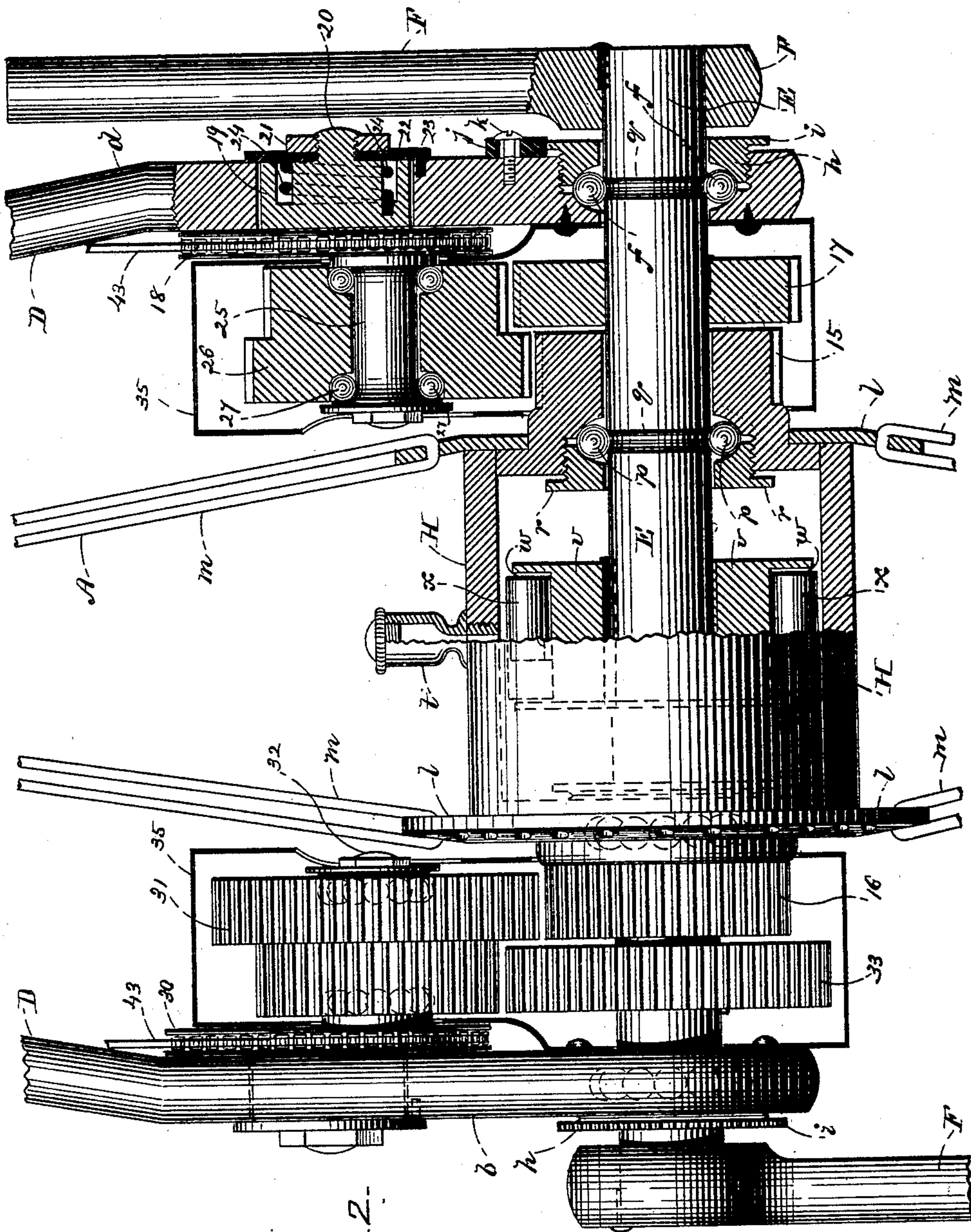


Fig. 2.

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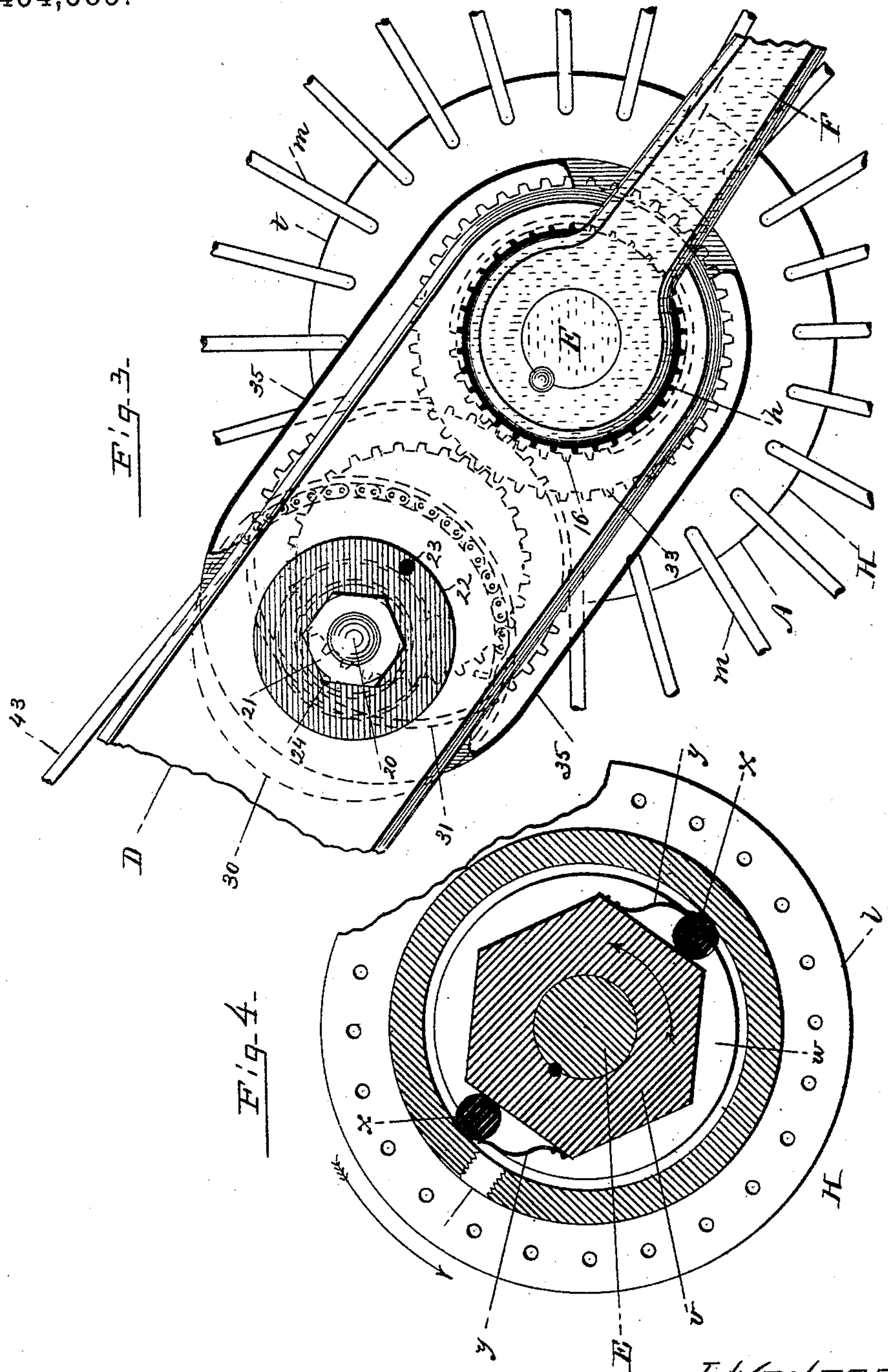
(No Model.)

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BICYCLE.

No. 454,583.

Patented June 23, 1891.



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UNITED STATES PATENT OFFICE.

FREDERICK H. S. MOYNAHAN, OF BOSTON, MASSACHUSETTS.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 454,583, dated June 23, 1891.

Application filed October 31, 1890. Serial No. 369,925. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. S. MOYNAHAN, of Boston, in the county of Suffolk, State of Massachusetts, have invented certain
5 new and useful Improvements in Bicycles, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which
10 the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my improved bicycle; Fig. 2, an enlarged sectional elevation of the pedal, shaft, hub, and gearing;
15 Fig. 3, an end elevation of the same; Fig. 4, a central transverse section of the hub; and Fig. 5, a sectional plan view illustrating certain details of construction.

20 Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates especially to an adjustable gearing and clutch mechanism for
25 the pedal-shaft of bicycles; and it consists in certain novel features, hereinafter fully set forth and claimed, the object being to produce a simpler, cheaper, and more effective device of this character than is now in ordi-
30 nary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation.

35 In the drawings, A represents the driving or rear wheel, B the forward wheel, C the head, and D the fork, these parts being arranged in the ordinary manner. The pedal shaft or axle E is journaled by ball-bearings
40 in the lower ends of the fork-arms *b* *d*, the balls *f* thereof working, preferably, in a groove *g* in said axle. An exteriorly-threaded nut *h* turned into said arms serves to take up the wear on the balls. Said nuts have a toothed
45 or serrated flange *i*, which is engaged by a locking-plate *j*, secured by a screw *k* to the fork-arm, preventing the nuts from accidentally turning out. The pedals F are keyed to the outer ends of the shaft in the usual
50 manner.

The wheel A is provided with a hollow cylindrical hub H, having perforated annular flanges *l* at its ends, in which the ordinary wire spokes *m* are secured. Said hub is mounted by balls *p*, working in grooves *q* in
55 the axle E, and take-up nuts *r*, similar to the nuts *h* in the fork, are turned into said bearings. An oil-cup *t* opens centrally into the hub. A hexagonal nut *v* is keyed to the axle
60 within said hub, the edges of said nut being recessed at *w*. Binding-rolls *x* are disposed loosely in said recesses. Flat springs *y*, (see Fig. 4,) secured to the nut with their free ends
65 in engagement with the rolls *x*, tend to force them in a direction opposite the line of motion of the hub. Said nut and rolls form a clutch mechanism for automatically tightening the hub on the axle. The hub is provided
70 at each end, respectively, with a gear 15 and 16. Between the gear 15 and the adjacent fork-arm *d* a gear 17 is keyed to the axle. A sprocket-wheel 18 is journaled on the inner face of the fork-arm *d* by means of its hub 19, which projects therethrough. Said hub has a threaded nipple 20, into which a nut 21 is turned,
75 a washer 22 being interposed and pinned at 23 to the fork-arm to prevent the rotation of said washer. The hub is chambered, and a coiled spring 24 disposed in said chamber has one end secured to the hub and its opposite end
80 to the washer 22. A wrist-pin 25 is secured to the outer face of the wheel 18, and a double gear 26 is journaled by balls 27 on said wrist. The broader section of the gear 26 is in position to be meshed with the hub-gear 15, and its
85 companion section to engage the fast gear 17 on the axle. A similar spring-tensioned sprocket-wheel 30 is mounted in like manner in the opposite arm of the fork D, and a double gear 31 of greater diameter than the gear 26 is
90 mounted on its wrist-pin 32, the large section of said gear being in position to be meshed with the hub-gear 16, and its small section with a fast gear 33 on the axle. Said gear 33 is of greater diameter than the corresponding
95 gear 17. The gearings described are inclosed in dust guards or boxes 35, secured to the fork. A vertical rod 36 (see Fig. 1) is fitted to rotate and slide in the upper end of the fork and a lug 37 on the head C. Said rod is pro- 100

vided at its upper end with a handle 38, adjacent to the ordinary handle-bar 39, and on its lower end with a sprocket-wheel 40. A return-spring 41 for the rod is disposed between a collar on said rod and said lug. A short section of jack-chain 42 works on the sprocket 40 and has its ends respectively connected by rods 43 with jack-chains working on the sprockets 18 and 30. Normally the gears 26 and 31 are disconnected from the axle-gears, as shown in Fig. 2.

Power being applied to the pedals the axle is rotated, and the nut v thereon, moving faster than the hub H , jams the rolls x between it and the walls of the hub, locking the same thereto and rotating the drive-wheel A . The application of power to the wheel is direct and this arrangement is employed when great power is necessary, as in climbing inclines. To impart greater speed to the wheel, the rod-handle 38 is moved, turning the rod 36 from right to left. This relieves the chain on the sprocket 30, permitting the spring 34 therein to rotate said wheel and throw the gear 31 on its wrist into engagement with the hub-gear 36 and axle-gear 33. This intermediate gearing greatly increases the speed of the hub, rotating it much faster than the axle moves. This causes the clutch-rolls x to tend to travel in the line of motion of the hub and against the pressure of the springs y , preventing them from locking the hub to the nut v . By rotating the rod 36 in the opposite direction the sprocket 30 is rotated in the opposite direction against its spring 24, disengaging the gears described. At the same time the sprocket 18 is freed, its spring 24 rotating it and meshing the gears 26 with the opposite hub and axle gears 15 and 17. The hub is driven thereby in like manner, but slower and with more power than when the gear 31 is employed, said gears 17 and 26 being of less diameter than the corresponding gears at the opposite side of the axle. These gears are employed for ordinary traveling, and drive the hub sufficiently fast to prevent the clutch-rolls from acting.

The mechanism described occupies little space on the machine and avoids the necessity of using the long jack-chain, frame, bracket, and sprockets ordinarily employed to drive the wheel, while enabling the speed and power applied to be varied at will.

I do not confine myself to mounting the gearing on ball-bearings, as described, nor to using the take-up mechanism or clutch mechanism specified, as any suitable means may be employed to effect like results.

Having thus explained my invention, what I claim is—

1. In a bicycle, the combination of the frame and pedal-shaft with a drive-wheel loose on said shaft, a gear on the wheel-hub, a gear fast on said shaft, and a spring-actuated crank-wheel journaled in the fork of said frame,

and bearing-gears adapted to be engaged with the hub and shaft-gears, substantially as and for the purpose set forth.

2. In a bicycle, a pedal-shaft mounted by ball-bearings in the fork, in combination with a drive-wheel mounted by ball-bearings on said shaft, take-up mechanism for said bearings, and a clutch for automatically locking the hub to the shaft when in motion, substantially as described.

3. In a bicycle, a pedal-shaft journaled in the fork, in combination with a drive-wheel loose thereon and having gears on its hub, gears of different diameters fast on the shaft at opposite sides of said hub, a spring-actuated crank-wheel journaled in each fork-arm, gears on the wrist-pin of said wheels in position to mesh with the adjacent hub and shaft-gears, and mechanism for disengaging said gears, substantially as and for the purpose set forth.

4. In a bicycle, the combination of a crank-wheel journaled in the fork, a torsion-spring in the hub thereof, a double gear journaled in the wrist-pin thereof, a pedal-shaft, a drive-wheel loose thereon and provided with a hub-gear, a fast gear on said shaft, and mechanism, substantially as specified, for disengaging the double gear from said hub and shaft-gear.

5. In a bicycle, a drive-wheel loose on the pedal-shaft, in combination with spring-actuated crank-wheels journaled in the fork-arms and provided with double gears, respectively of different diameters, on their wrist-pins, gears on said hub, and fast gears of different diameters on the shaft in position to be alternately engaged by their corresponding double gears, mechanism for alternately engaging and conjointly disengaging said gears, and a clutch mechanism for locking the hub and shaft when said gears are disengaged, substantially as set forth.

6. In a bicycle, the pedal-shaft and loose drive-wheel having hub-gears, in combination with the spring-actuated crank-wheels, the fast gears on said shaft, the intermediate gears for connecting the shaft and hub-gears, and a clutch mechanism for fastening the hub to the shaft when said gears are disconnected, substantially as set forth.

7. In a bicycle, the pedal-shaft provided with the fast gears, in combination with the loose drive-wheel having the geared hub, the spring-actuated sprocket-wheels 18 and 30, journaled in the fork D and provided with wrist-pins, the double gears 26 and 31 on said pins, chains connecting said sprockets with a sprocket at the fork-head for rotating them to disengage said gears, and a clutch mechanism for locking the hub to the shaft when said gears are disengaged, substantially as set forth.

8. In a bicycle, the combination of the fork and pedal-shaft with the drive-wheel provided

with a hollow geared hub H, a clutch for locking the hub on said shaft when in motion, the gears 17 and 33 on said shaft, the sprockets 18 and 30, journaled in said fork and provided with wrist-pins bearing double gears 26 and 31, torsion-springs for said sprockets, and chains connecting said sprockets with a sprocket at the fork-head, whereby they may be alternately released or conjointly held against the action of said springs, substantially as and for the purpose set forth.

FREDERICK H. S. MOYNAHAN.

Witnesses:

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O. M. SHAW.