

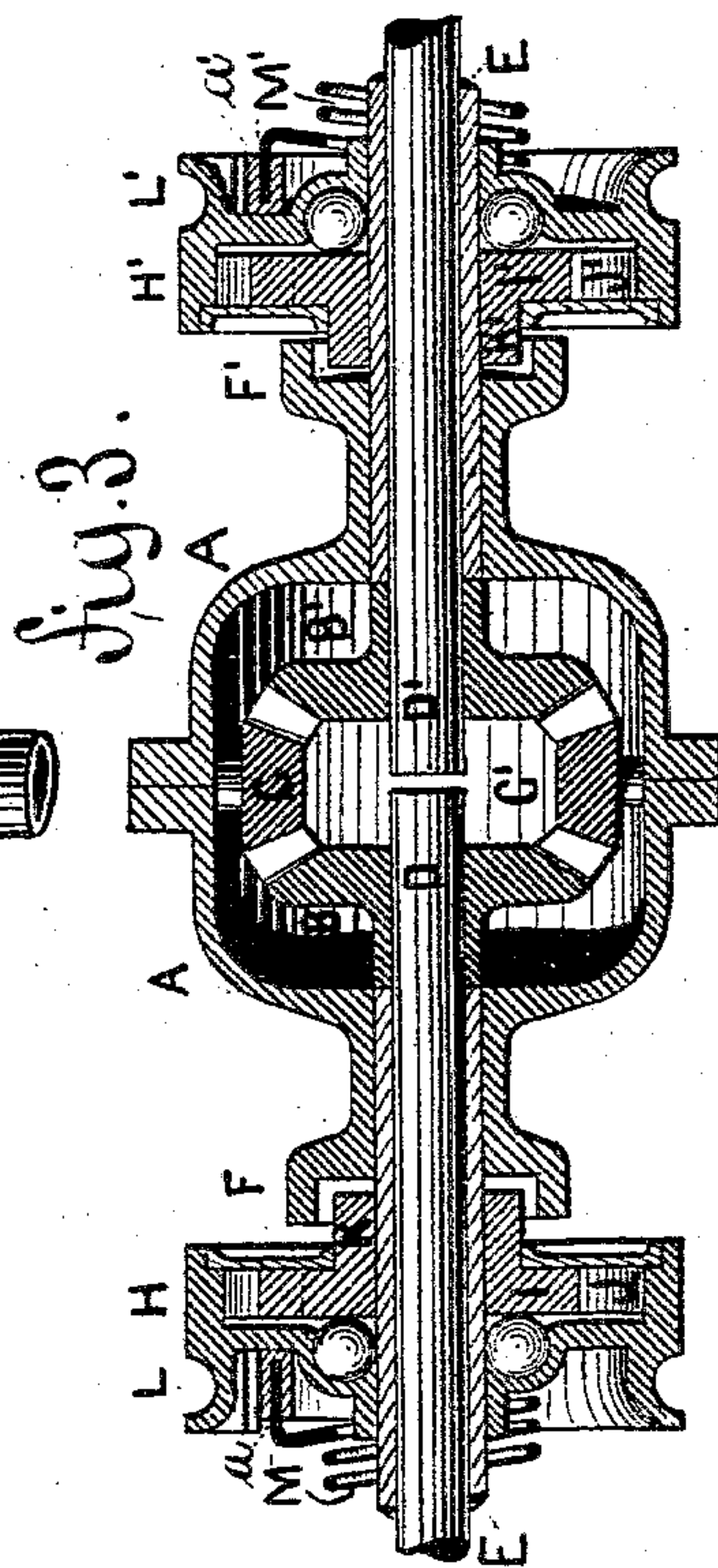
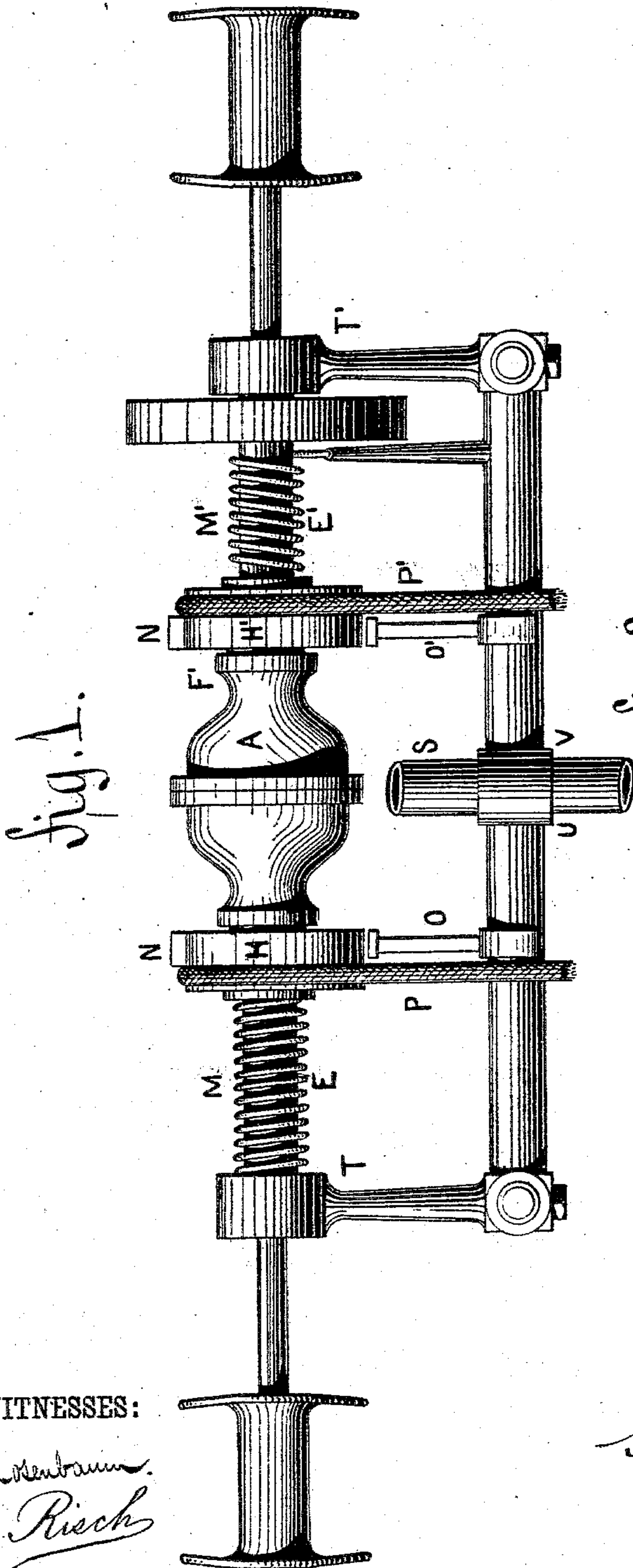
(No Model.)

2 Sheets—Sheet 1.

G. W. QUATREMAINE.
DRIVING GEAR FOR VELOCIPEDES.

No. 287,960.

Patented Nov. 6, 1883.



WITNESSES:

For W. C. Krenbaum.
Otto Riech

INVENTOR

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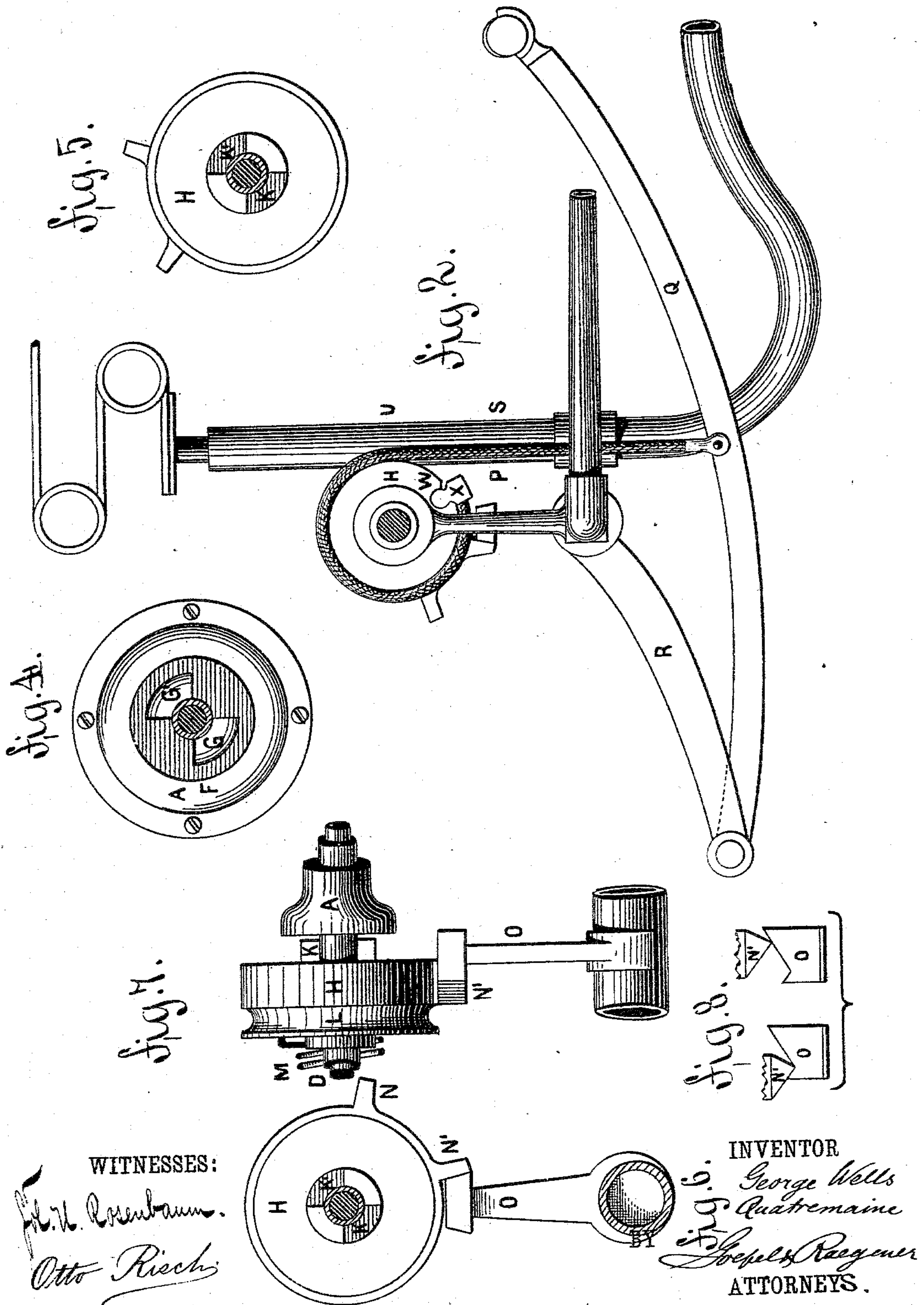
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UNITED STATES PATENT OFFICE.

GEORGE W. QUATREMAINE, OF STRATFORD-ON-AVON, COUNTY OF WARWICK, ASSIGNOR TO AUGUSTUS LEA BRICKNELL, OF BUXTON, ENGLAND.

DRIVING-GEAR FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 287,960, dated November 6, 1883.

Application filed June 15, 1883. (No model.) Patented in England October 7, 1882, No. 4,790.

To all whom it may concern:

Be it known that I, GEORGE WELLS QUATREMAINE, of Stratford-on-Avon, in the county of Warwick, England, artist, have invented
5 certain new and useful Improvements in Driving-Gears for Velocipedes, (for which I have obtained Letters Patent in Great Britain, No. 4,790, dated October 7, 1882,) of which the following is a specification.

10 This invention has reference to an improved driving-gear for velocipedes, which is specially designed with a view to combine in the same machine the advantages of driving both driving-wheels at once, in either a straight or a
15 curvilinear course, with either or both feet, by means of treadles which are disconnected with or independent of each other, and which may both be depressed together whenever desired.

Tricycles may be classified as "single drivers," in which one side wheel only is driven,
20 "alternate drivers," in which first one side wheel and then the other is driven, "central drivers," in which one centrally-placed wheel is driven, and "double drivers," which latter
5 are subdivided into two distinct classes—one in which both wheels are driven together only while the machine is run in a perfectly straight course, the other class in which, by means of a differential gear, commonly known as "balance-gear," both wheels are driven, whether the course be straight or curved. In the balanced double driver the greatest degree of safety and the greatest grip on the road are at all times secured, and the loss of power and impaired steering incidental to single and alternate driving are avoided. Balanced double driving has, however, heretofore only been applied in tricycles in combination with imperfect means of transmitting the power of the rider to the balanced double-driving mechanism.

The first and main part of my invention consists, therefore, in the combination, with a balance-gear, or mechanism for driving both wheels of a velocipede, whether in a straight or curvilinear path, of disconnected treadles or pedal-levers, and of independent or disconnected clutches, whereby the balance-gear is operated by one or both treadles.

The second part of my invention consists of the combination of the independent or disconnected clutch mechanism with crank-lever or equivalent mechanisms, which, when the driving wheel or wheels are revolved to their extreme limit in a backward direction, shall engage said clutch mechanism and cause it to
55 slide away and become disconnected from the driving-wheels, so as to permit the backward travel of the velocipede to any desired extent.

In the accompanying drawings, Figure 1
60 shows a front elevation of my improved driving-gear for tricycles, the treadles being not shown for the sake of space; Fig. 2, a side view of the same, showing the pedal or treadle at upstroke; Fig. 3, an enlarged vertical longitudinal section of the differential or balanced double-driving gear, and of the clutches actuating it. Fig. 4 is an end view of the differential-gear box; Fig. 5, an end view of one of the clutches facing the gear-box. Fig. 6 is a
70 side elevation, showing the clutch in the act of being automatically disengaged from the differential-gear box. Fig. 7 is a front elevation of the parts shown in Fig. 6, and Fig. 8 shows details of the engaging devices shown in Figs. 75 6 and 7.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, and now more particularly to Fig. 2, A represents the gear-
80 box, at the interior of which two bevel-wheels, B B', are mounted on the inner ends of shafts D D', to the outer ends of which the driving-wheels are fixed. Pinions C C' are applied to short fixed shafts of the gear-box A in such a
85 manner as to intermesh with the bevel-wheels B B'. The gear-box A is rigidly attached to tubes E E', which inclose the shafts D D' and extend into bearings T T' of the forked supporting-frame of the tricycle. So far the arrangement is well known as applied to balanced double-driving velocipedes. The ends
90 F F' of the gear-box A are provided with sector-shaped recesses G G'. (Shown clearly in Fig. 4.) H H' are the clutch boxes, drums, or pulleys, which turn loosely on the tubes E E'.

I I' are notched disks, which slide with the entire clutch on the tubes E E'. The notches

of the disks are inclined at their faces and the clutch-boxes closed by covers, between which and the shallower parts of the notches rollers or balls J J' are jammed on the forward rotation of the clutch boxes, pulleys, or drums H H', said rollers J J' being released on their backward motion. Balls are shown interposed between the clutch-pulleys and the tubes E E', to reduce friction. The clutch-boxes H H' are provided with grooves L L', for the endless belts or straps, chains, or other devices, P P', by which power is transmitted to the pulleys H H'.

According to my invention, I provide projections or lugs K K' on the notched disks I I', so that when the entire clutch slides inwardly on the tubes E E' the lugs on the disks K K' enter the recesses G G' on the gear-box A and become locked to it, as shown in Fig. 2. When the clutch is slid outwardly, as shown in Fig. 7, then the entire clutch mechanism is released from the gear-box A.

To force the clutches H H' toward the box A, and at the same time roll the clutches H H' back when the treadles are raised, and to raise the treadles independently of each other, coiled springs M M' are placed over the tubes E E', the inner end of the springs being secured to studs a a' at the outer faces of the clutch-pulleys H H', as shown in Fig. 2. The other ends of these springs M M' are attached in any suitable manner to the frame-work of the machine, such as in Fig. 1, or independent springs are used to effect any two or either of these operations. The outer circumferences of the clutch boxes, drums, or pulleys H H' are provided with projecting wedges N' N', which play the second important part in my invention. The upper ends of the bracket-arms O O', carried by the cross-tube of the main frame, or in other convenient manner, are provided with wedge-surfaces. (Clearly seen in detail in Fig. 8.) The front parts of the arms O O', as shown in Fig. 6, may be cushioned with leather or other material. The clutch boxes, drums, or pulleys H H' are provided with a second set of projecting stops, N N, which strike against the front part of O O' when the clutches are pulled forward and fully around by the treadles. The stops N N prevent the treadles from descending too low, and so act as limit-stops, dispensing with the necessity of extensions on the frame to carry stops.

When it is desired to wheel the velocipede backward, it is run back, or the wheels are backwardly revolved, till the wedges N' N' come against the wedge-surfaces O O', (see Fig. 6,) and begin to descend on the same, as shown in Fig. 8, thus sliding the clutches H H', with their projections K K', out of the recesses G G' in the driving-gear box A, as shown in Fig. 7, and so allowing the velocipede to be wheeled backward.

Instead of wedges operated by the clutches coming against them, short cranked levers or other devices may be used to be struck by the treadle-levers when rising to their utmost

limit, and thus automatically shifting the clutches, as hereinbefore described, when the velocipede is wheeled back; but these two plans are the mechanical equivalents of each other, as the clutches and treadles are connected parts. Other forms of clutches may be used with my disconnected treadles and double-driving balance-gear.

I do not confine myself to the use of any special form of balance-gear, so understood, or of clutches for the purpose of deriving the advantages obtained by the combination of balanced double-driving with disconnected treadles.

The vertical tubes that carry the bearings T T' are bolted or otherwise secured to the main cross-tube of the velocipede. Elbow-pieces, as shown in Fig. 2, are brazed to this, to carry tubes for the purchase and steering handles. Brackets R are secured to the cross-tube, and the treadles Q are pivoted at their rear ends thereto.

S is an upright tube, which carries at its upper end the seat-rod, which tube is curved and extended forward, so as to carry the steering-wheel. The tube S is brazed to a bracket, U, that carries also the cross-tube V. The belts P P' are connected to the treadles Q, then passed over the grooves L L' of the pulleys H H', to which they are attached by metallic pieces X, set into recesses W, that correspond in shape to the pieces X. The fastening-pieces X are secured into the recesses of the pulleys H H' with sufficient play to lock slightly therein, when they are slid in edgewise, in order to get the belt over the grooves L of the pulleys. When the metal piece X is slid in, it cannot be withdrawn except sidewise, and this cannot be effected till the belt P is taken out of the groove of the pulley.

Y shows a band-brake drum.

By depressing the treadles the clutches arranged on each side of the case containing the differential driving-gear grasp and rotate the said case, but release, at their return or backward rotation, the case, and allow of its continued revolution. Each clutch may be turned back and its treadle raised by the reaction of a spring or other power applied in any suitable and well-known manner; or the clutch alone may be so drawn back, the raising of the treadles being provided for by making the treadle itself wholly or partly of spring-steel, and attaching the pliable end to the frame-work, instead of hinging or pivoting it. Each treadle may also be lifted by an independent spring. A band-brake may be applied in any well-known manner to the outer periphery of the brake-drum Y, whereby both wheels will be retarded when descending hills.

I do not claim the framing of the velocipede, nor the treadles and other accessories used therewith.

Instead of stops N on the drums to limit the play of the treadles, I may use stops placed on extensions of the framing.

I am well aware of a British patent granted

to Thomas Edward Heath, Jr., No. 4,121, of 1881, and which patent specification shows an arrangement for double driving by treadles connected with each other and balance-gear; 5 but one treadle cannot be depressed without raising the other, whereby the rider works against himself. Neither do I broadly claim the use of double driving—*i. e.*, driving both wheels of a tricycle or other velocipede, when 10 running either in a straight or curvilinear path—by treadles and actuating-clutches; nor do I claim the mere use of treadles operating clutch mechanism, as all these features are well known and have been used heretofore for 15 many different purposes, and also applied to velocipedes.

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

20 1. In a velocipede, the combination, with a double balance driving-gear, or mechanism for driving both wheels in a straight or curvilinear path, of treadles or pedal-levers discon-

nected one from the other, and of independent or disconnected clutches operated by said treadles, as and for the purposes described. 25

2. In a velocipede, the combination of the disconnected actuating-treadles, independent or disconnected clutches having projecting wedges on their clutch boxes or pulleys, and bracket-arms of the supporting-frame, 30 having wedge-surfaces, whereby the clutches are caused to slide away and become disconnected from the driving mechanism when the wheels are revolved backward to their extreme limit, so as to permit the backward 35 travel of the velocipede to any desired extent, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

GEORGE WELLS QUATREMAINE.

Witnesses:

W. H. HARRIS,
F. BAXTER.