

(No Model.)

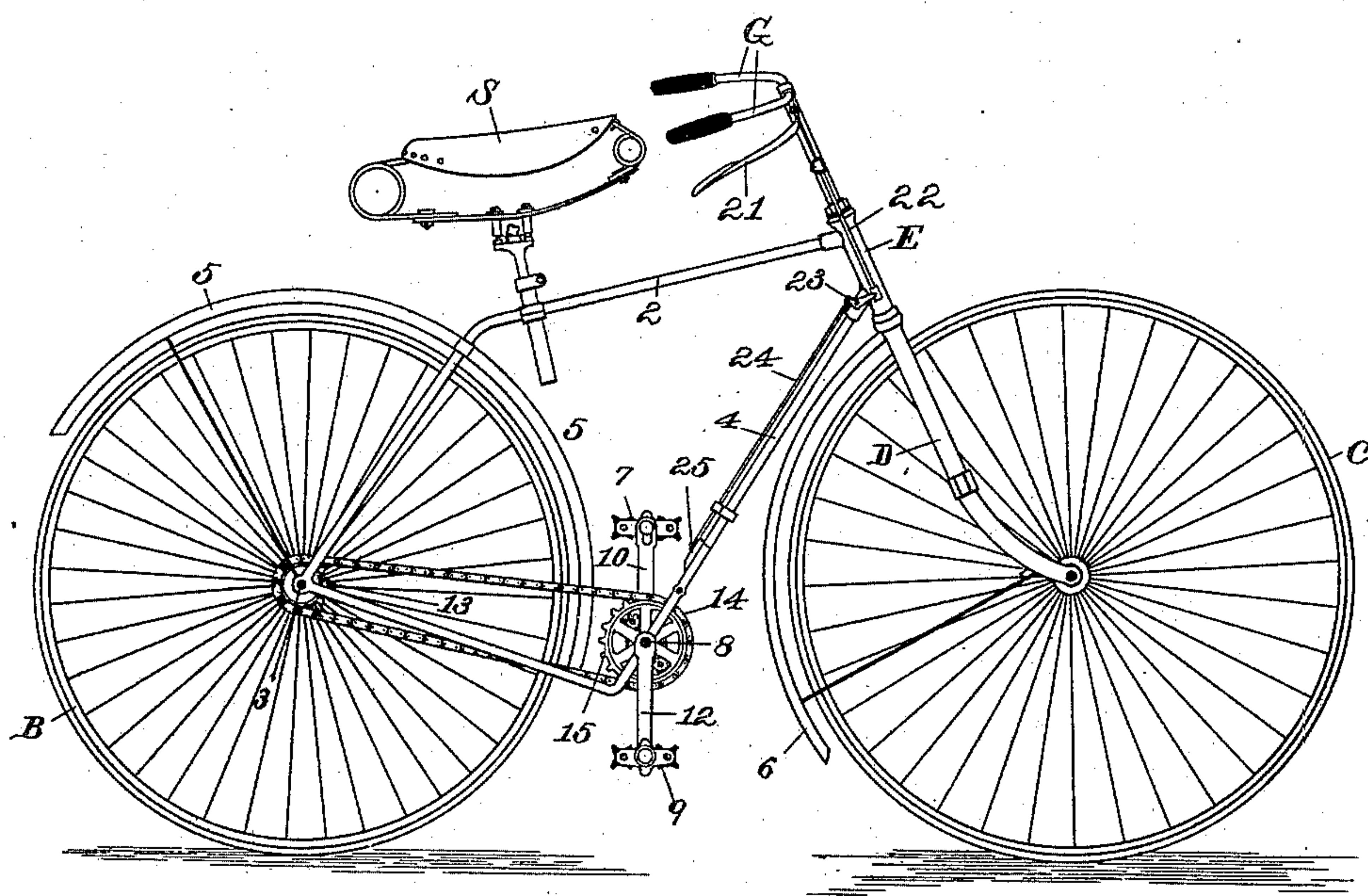
2 Sheets—Sheet 1.

A. SEQUEIRA.
BICYCLE.

No. 474,764.

Patented May 10, 1892.

Fig. 1



Witnesses:

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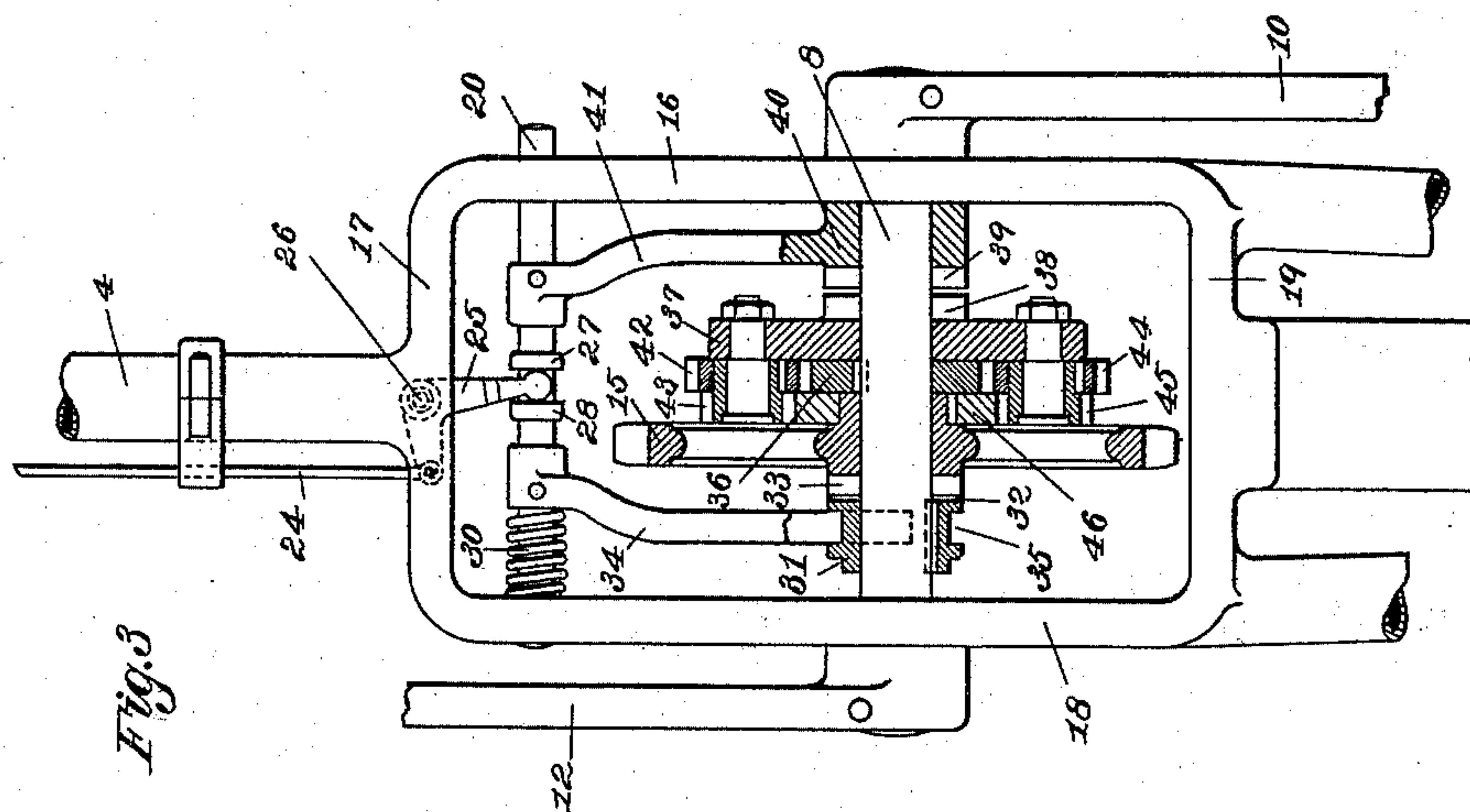
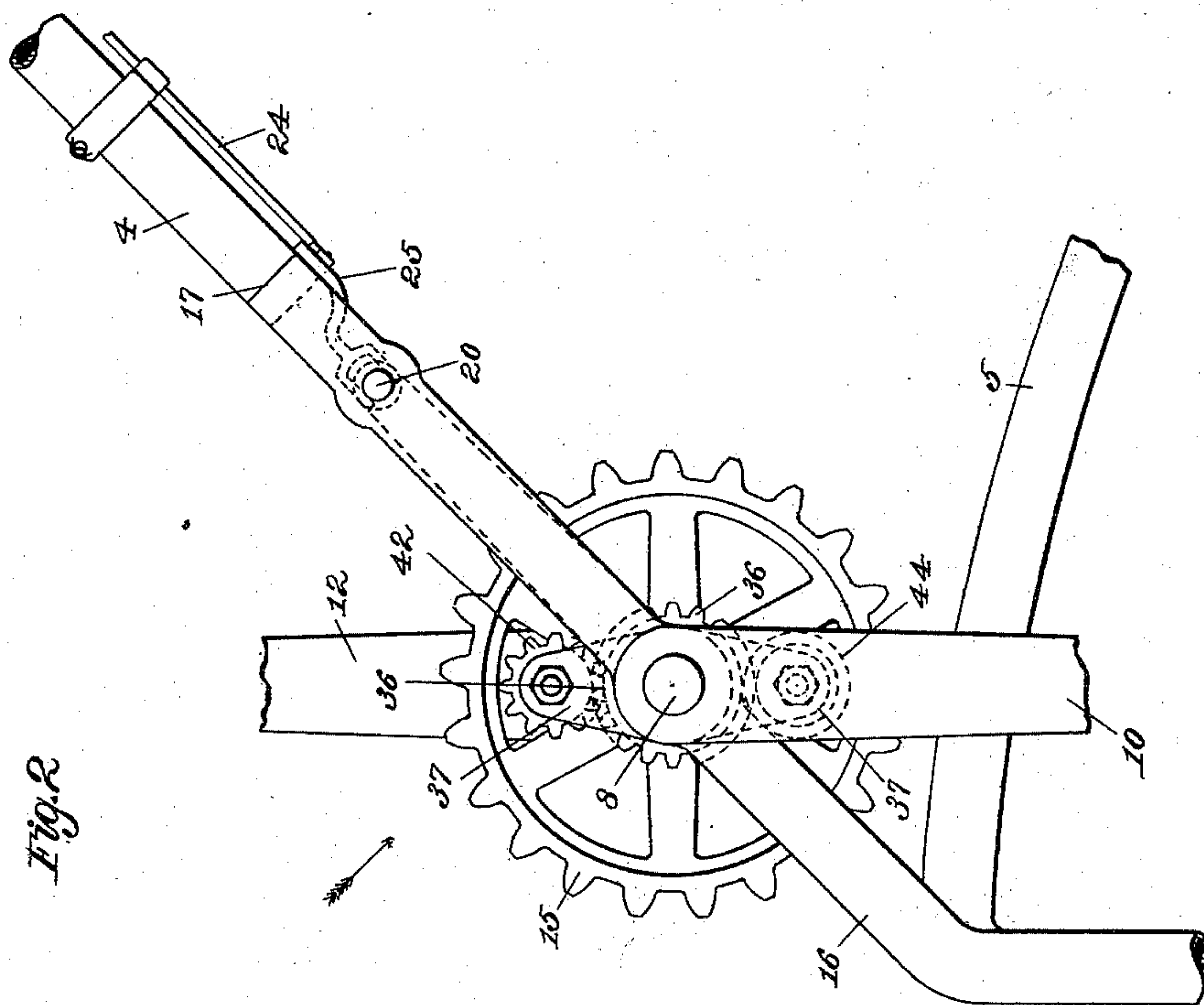
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2 Sheets—Sheet 2.

A. SEQUEIRA.
BICYCLE.

No. 474,764.

Patented May 10, 1892.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

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BICYCLE.

SPECIFICATION forming part of Letters Patent No. 474,764, dated May 10, 1892.

Application filed October 5, 1891. Serial No. 407,746. (No model.)

To all whom it may concern:

Be it known that I, AUGUSTUS SEQUEIRA, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

This invention relates to that class of bicycles known as "Safety" bicycles, the object being to provide improved driving-gear shiftable from one ratio of speed to another.

In the drawings accompanying and forming a part of this specification, Figure 1 is a side elevation of a Safety bicycle embodying my present improvements. Fig. 2 is an enlarged side elevation of the driving-gear portion of the bicycle. Fig. 3 is a sectional front view of the driving-gearing, as seen in the direction of the arrow, Fig. 2.

Similar characters designate like parts in all the figures.

The bicycle shown in the drawings is of the well-known "Safety" type, having a frame-work carrying at the rear end thereof the driving-wheel B and at the forward end having the usual leading-wheel C, journaled in the fork D, which is journaled in the forward bearing or head E of the frame-work and has at the upper end thereof the usual handle-bars G. The upper bar 2 of the frame-work carries the saddle S and reaches to the bearings of the driving-wheel. The lower bar 4 of the frame-work extends from the said fork-bearing E to the treadle-shaft and thence to said driving-wheel bearing 3. The frame-work is shown provided with the usual guard 5 over the driving-wheel, while the fork D is furnished with a similar guard 6 back of the leading-wheel. All of these parts are or may be substantially the same as now commonly used in the construction of the leading kinds of Safety bicycles, and therefore do not require to be herein more particularly described.

According to my present improvements the "driving-gear" (by which term I designate in a general way the driving-shaft and the gearing thereon, together with the driving-chain and its sprocket-wheels) consists of the usual treadle-shaft or crank-shaft 8, provided with the treadle arms or cranks 10 and 12, oppositely disposed on the opposite ends, respect-

ively, of said shaft and furnished with the usual pedals 7 and 9, a sprocket-wheel 15, carried on said crank-shaft and driven thereby, a corresponding sprocket-wheel 13 (usually of smaller size) on the driving-wheel, and a chain 14, extending over said sprocket-wheels 13 and 15 in the usual manner. For the purpose of properly supporting the crank-shaft 8 the lower part of the frame-work is or may be formed, substantially as shown, into a driving-gear frame comprising the side bars 16 and 18, the upper cross-bar 17, and the lower cross-bar 19. Said shaft 8 is journaled in bearings formed in said side bars, which bearings are located on the shaft immediately within the hubs of the crank-arms 10 and 12. The sprocket-wheel 15 is mounted to revolve freely on the shaft 8. For actuating said wheel 15 from its shaft I provide on one side of said wheel a clutch for connecting the wheel directly with its shaft and on the other side thereof back gearing for indirectly connecting the wheel and shaft and changing the ratio of their speeds. For operating said clutches to throw the same from and into engagement I provide a shipper-rod 20, journaled in said frame-work, and means for actuating said rod to slide the same in its bearings. Said rod-actuating means consist of a hand-lever 21, carried upon one of the handle-bars G of the machine and connected by intermediate rods and levers or like connecting devices to said shipper-rod. Said connecting devices may, as shown in the drawings, comprise the connecting-rod 22, extending from one end of said hand-lever to the angle-lever 23, pivoted to the frame-work and connected at one end to said rod and at the other end to a rod 24, which extends along the lower bar 4 of the frame-work and connects with another angle-lever 25, that is pivoted to the frame-work at 26, one of whose arms engages between the collars 27 and 28 of said shipper-rod. The organization of this clutch-actuating apparatus is such that an upward movement of the hand-lever 21 throws the shipper-rod toward the left hand in Fig. 3. For throwing the shipper-rod in the opposite direction a push-spring 30 is provided, whose operation will be obvious from inspection of Fig. 3.

The direct connection of the sprocket-wheel 15 with its shaft 8 is effected by means of the clutch 31, which is splined to said shaft and has clutch-teeth 32, adapted to engage the corresponding clutch-teeth 33 on the sprocket-wheel. This clutch is actuated by a shipper-rod arm 34, which is fixed to said rod and at its lower end engages with the groove 35 of said sliding clutch. On the opposite side of the sprocket-wheel 15 a gear 36 is rigidly fixed to the shaft 8, and adjacent to said gear on the side thereof opposite to the sprocket-wheel a carrier-arm 37 is loosely mounted on said shaft. This carrier is furnished on the right-hand side thereof (see Fig. 3) with clutch-teeth 38, adapted to engage the corresponding clutch-teeth 39 of the non-revolving clutch 40, that is formed on the lower end of another shipper-arm 41, carried by the shipper-rod 20. The carrier 37 has studs carrying one or more gears, as 42 and 44, meshing with said shaft-gear 36. The gears 42 and 44 are provided with pinions 43 and 45, which mesh with and drive (when the aforesaid clutch-teeth 38 and 39 are thrown into engagement) the gear 46, fixed to the hub of the sprocket-wheel 15. This gearing constitutes a simple system of back-gearing, which is thrown into action by means of the clutch 40, operated by the hand-lever 21.

In practice the two clutches 31 and 40 are set at such a distance apart, substantially as shown, that only one may be engaged at a time. Ordinarily the direct clutch 31 is maintained continuously in operation by the spring 30, acting through the clutch-rod 20 and the shipper-arm 34 on said rod; but for hill-climbing and similar work the rider, by seizing the hand-lever 21 and drawing the same upward toward the handle G, throws the shipper-rod toward the left-hand in Fig. 3 to disengage the direct clutch 31 and throw into engagement the indirect clutch 40, whereby the shaft 8 acts through said intermediate gearing to drive the sprocket-wheel 15 at a slower speed relatively to the rotation of the shaft.

Having thus described my invention, I claim—

1. In a bicycle, the combination, with a frame-work having bearings for the driving-shaft and for the shipper-rod, of the driving-shaft journaled in the frame-work and furnished with the pedal-cranks, a gear fixed on said shaft, the sprocket-wheel loosely mounted on the shaft and having a gear thereon and having a clutch, the carrier loosely mounted on the shaft and provided with a clutch, gearing carried on said carrier and actuating the sprocket-wheel gear from the shaft-gear, a clutch for locking said carrier against rotation with the shaft, a clutch for engaging and disengaging the sprocket-wheel with and from its shaft, and means, substantially as de-

scribed, actuating said clutches from the clutch-rod, substantially as set forth.

2. In a back-gear bicycle, the combination, with the supporting frame-work, and with the pedal-shaft mounted therein, of the sprocket-wheel revolubly mounted on said shaft, the gear fixed on said shaft adjacent to the sprocket-wheel, a carrier revolubly mounted on said shaft and constructed to engage a clutch, back gearing carried by said carrier and intermediate to said fixed gear and sprocket-wheel, the rotating sprocket-wheel clutch splined to the pedal-shaft, the non-rotating carrier-clutch on said shaft, a shipper-rod, as 20, carried in the frame-work, an arm carried by said shipper-rod in fixed engagement with the carrier-clutch, an arm carried by the shipper-rod and in loose engagement with said rotating clutch, a spring normally holding the sprocket-wheel clutch in engagement with the sprocket-wheel, whereby said wheel is rotated uniformly with the pedal-shaft, and means for actuating the shipper-rod to disengage the sprocket-wheel clutch and engage the carrier-clutch with the carrier, whereby the sprocket-wheel is driven through said back gearing at a different speed from the pedal-shaft, substantially as described.

3. In a back-gear bicycle, the combination, with the frame-work and with the pedal-shaft having the gear 36 fixed thereon, of the sprocket-wheel revolubly mounted on said shaft and having the gear 46 fixed thereon and adapted to engage a clutch, the clutch 31 splined to said shaft and constructed to engage the sprocket-wheel, the carrier 37, back gears revolubly supported on said carrier and meshing with the gears 36 and 46, the clutch 40, fitted to slide over said shaft and engage the carrier 37, and a shipper-shaft rigidly connected with said clutch 40 and loosely connected with the clutch 30, all organized and coacting substantially as shown and described.

4. In a bicycle, the combination, with the frame-work carrying the driving-shaft, of the driving-shaft journaled in the frame-work and having the pedal-cranks, a sprocket-wheel loosely mounted on said shaft, the carrier loosely mounted on said shaft, gearing intermediate to said wheel and carrier, the clutch 31 splined to said shaft and engaging the sprocket-wheel, the non-rotating clutch 40 engaging the carrier, a shipper connected to said clutches, a spring normally holding the clutch 31 into engagement with the sprocket-wheel, and means adapted to be actuated by hand, operating to disengage the clutch 31 and engage the clutch 40, all organized and coacting substantially as shown and described.

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Witnesses:

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