

(No Model.)

3 Sheets—Sheet 1.

C. YINGST.
TRICYCLE.

No. 426,518.

Patented Apr. 29, 1890.

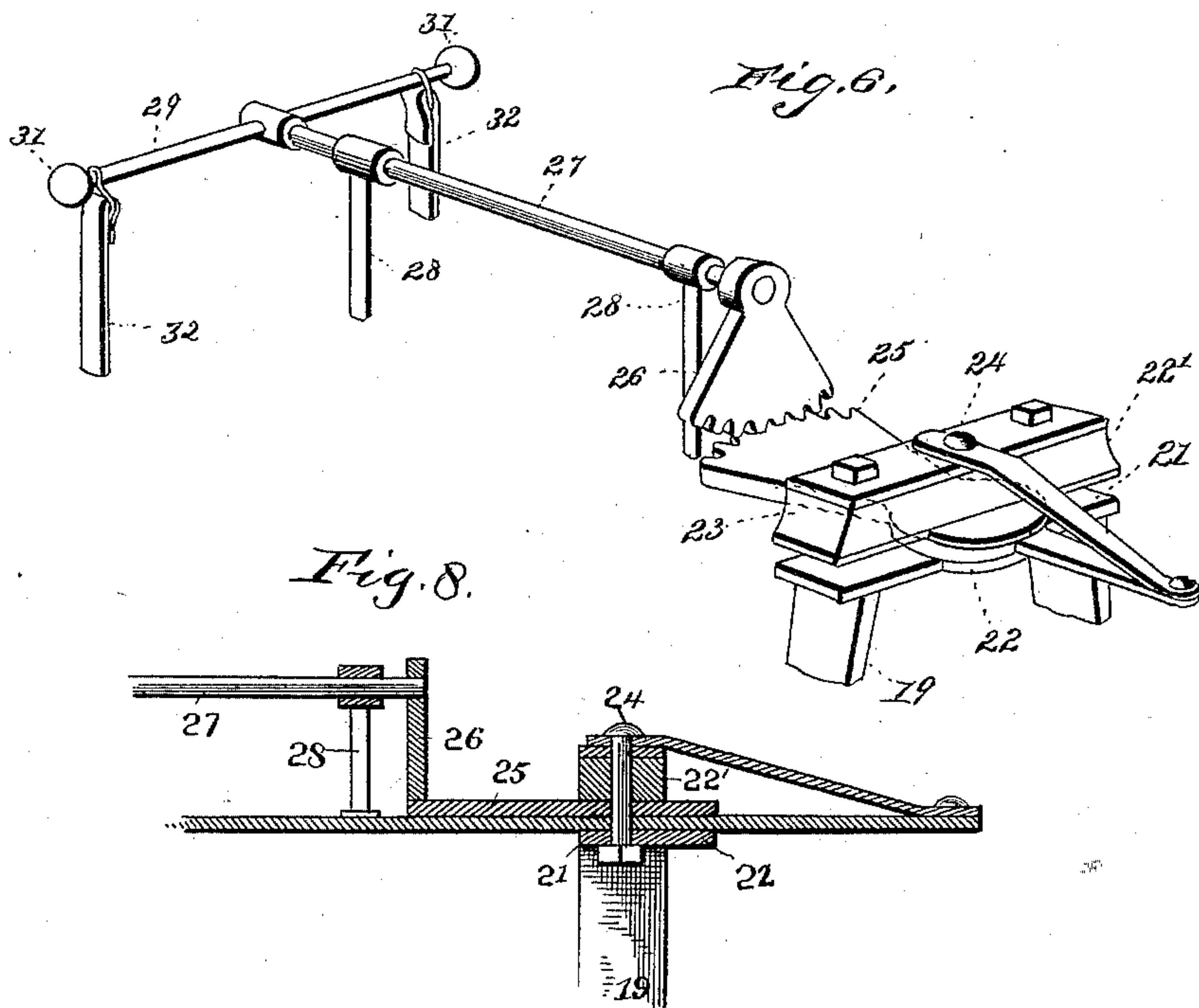
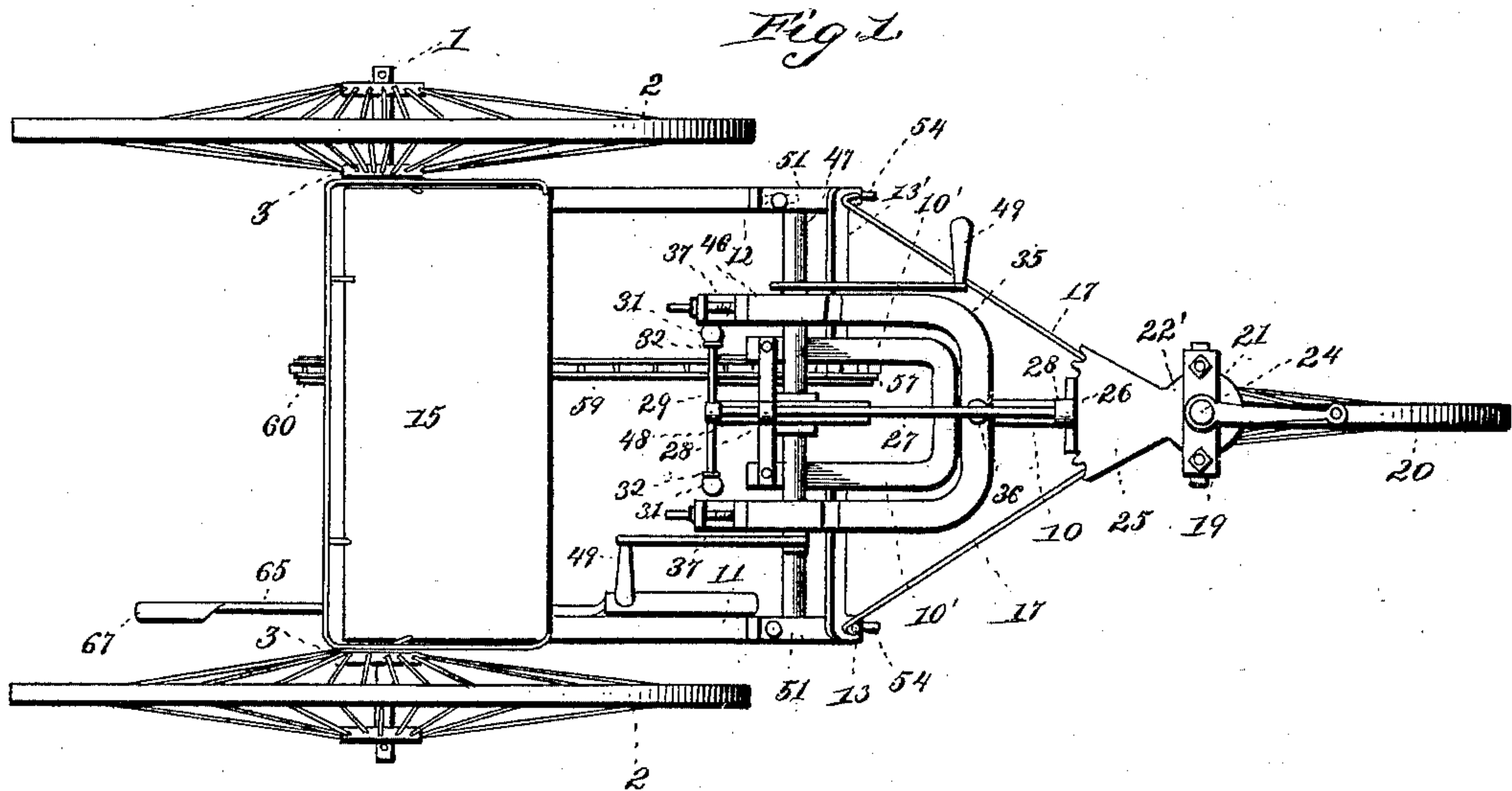
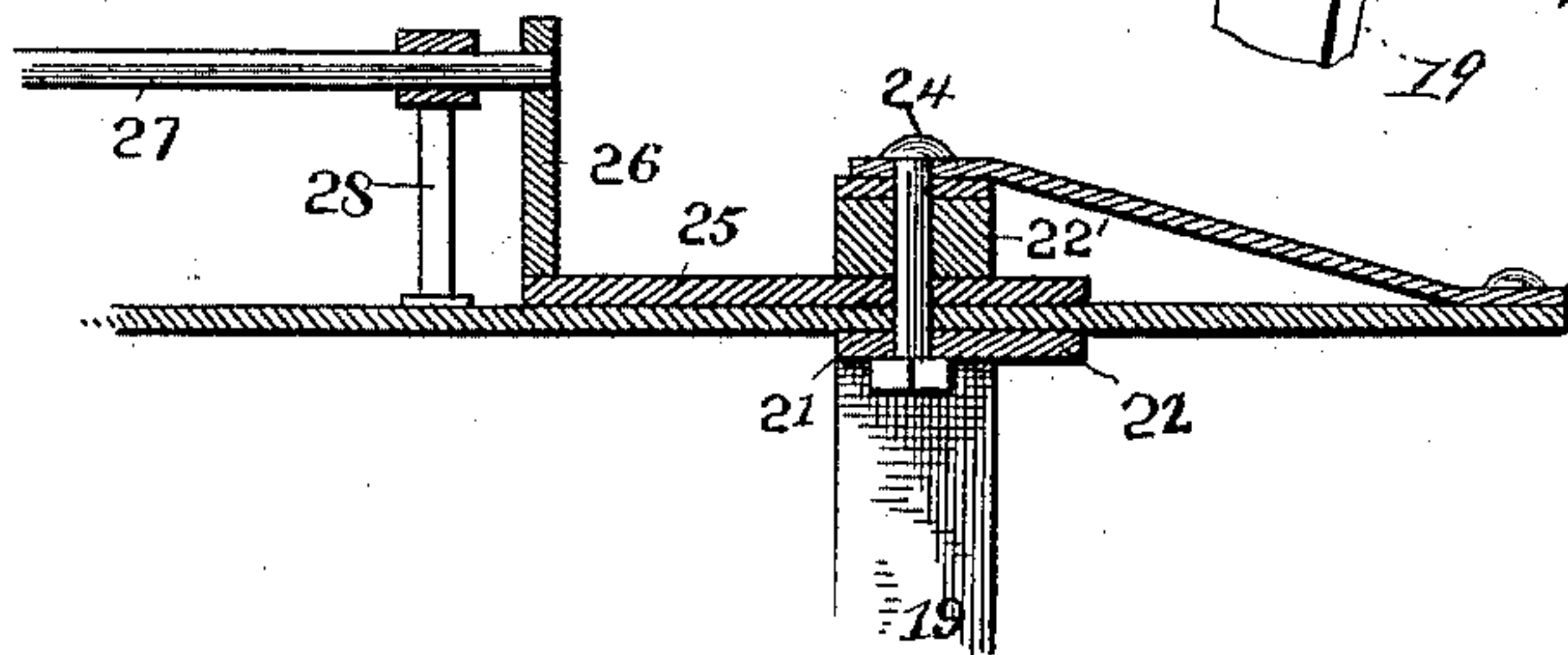


Fig. 8.



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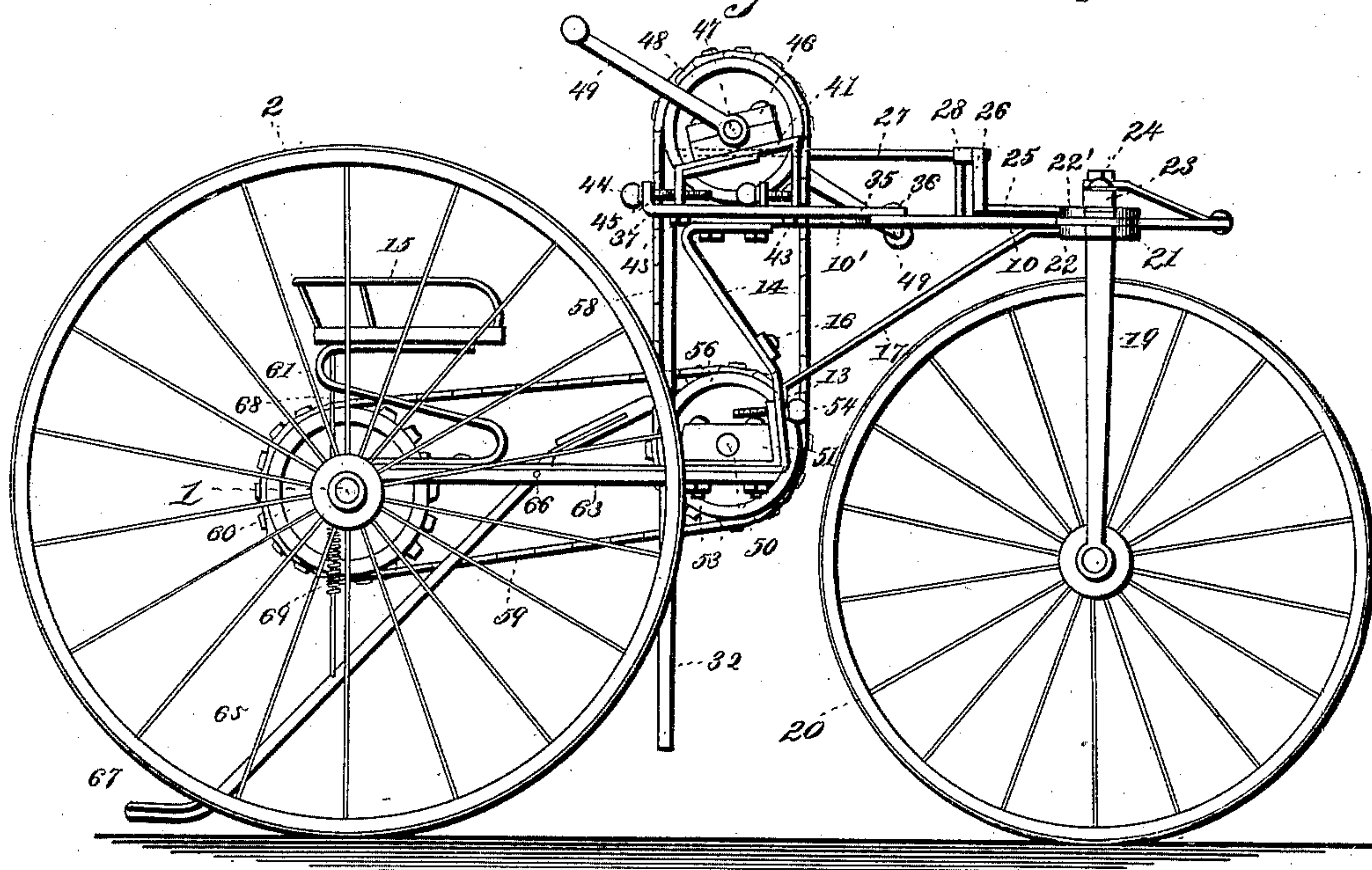
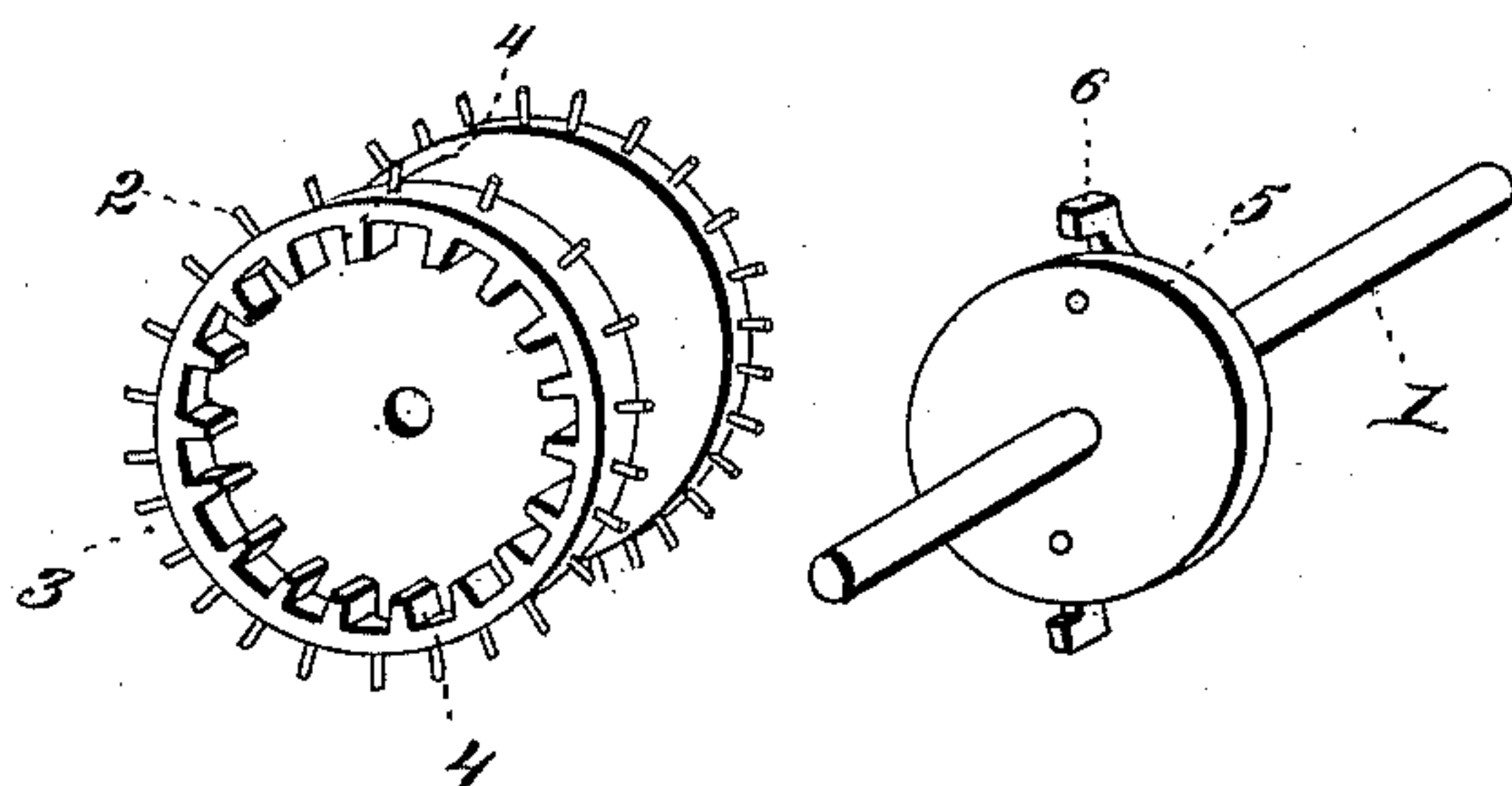


Fig. 5.



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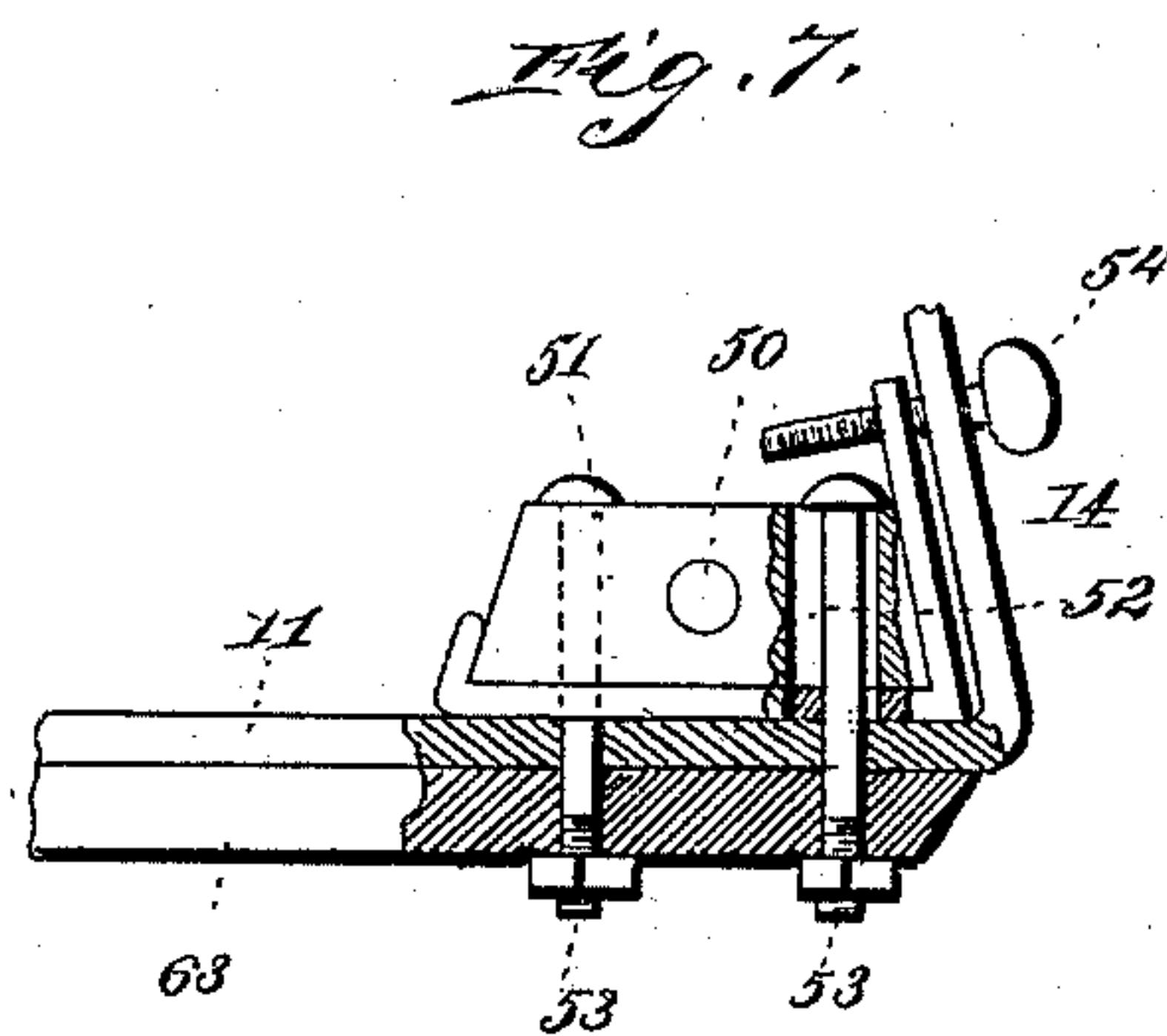
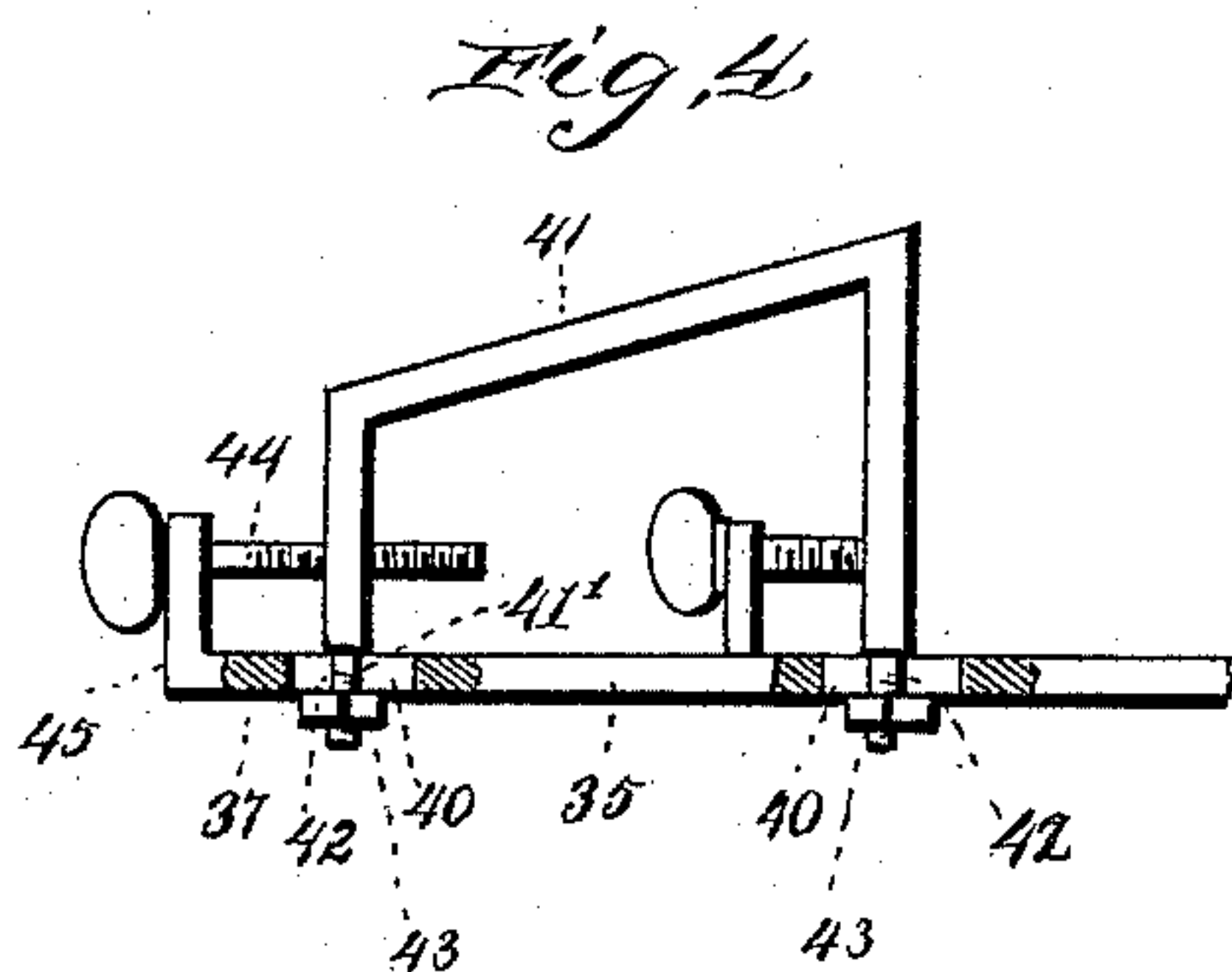
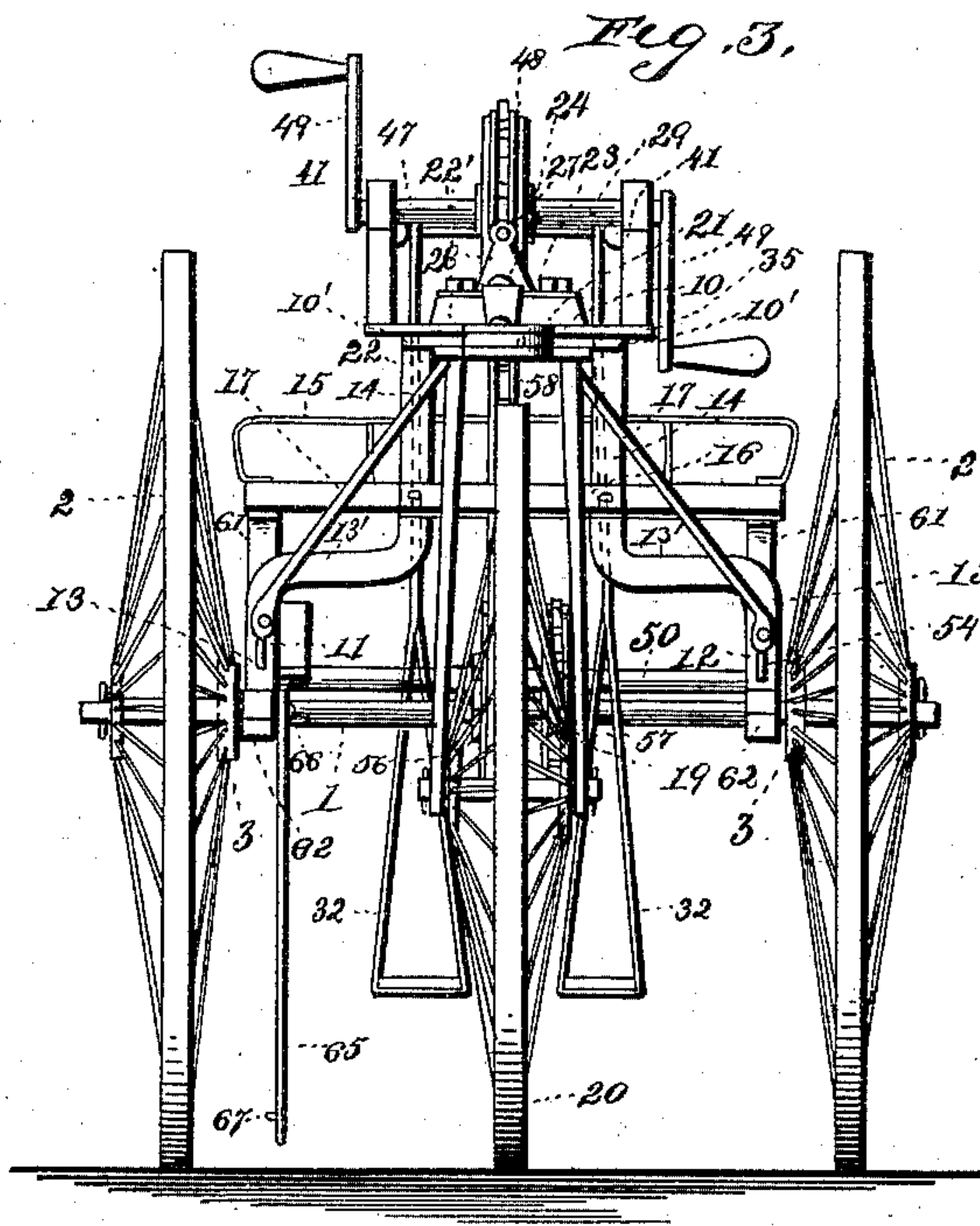
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3 Sheets—Sheet 3.

C. YINGST.
TRICYCLE.

No. 426,518.

Patented Apr. 29, 1890.



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UNITED STATES PATENT OFFICE.

CYRUS YINGST, OF ANNVILLE, PENNSYLVANIA.

TRICYCLE.

SPECIFICATION forming part of Letters Patent No. 426,518, dated April 29, 1890.

Application filed November 8, 1889. Serial No. 329,631. (No model.)

To all whom it may concern:

Be it known that I, CYRUS YINGST, a citizen of the United States, residing at Annville, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Tricycles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in tricycles of the class shown in a prior patent issued to me on December 11, 1888, and numbered 394,492; and the object of my present invention is to improve my former machine in the following essential particulars, to wit: a simple and efficient steering mechanism, which can be easily and safely operated by the feet when the hands and arms are engaged in propelling the machine, and which can be also operated by hand when the latter are unemployed—as, for instance, in “coasting” down a hill or declivity; secondly, to increase the power and speed of the machine without undue exertion on the part of the rider; thirdly, an improved brake mechanism; fourthly, a ratchet mechanism for the driving-axle and carrying-wheels by which the power of the machine can remain at rest, while the carrying-wheels rotate loosely on the axle in descending a declivity, thus relieving the operator of the labor of propelling the machine and imposing upon him only the slight exertion necessary to guide the same, which, as explained, can be accomplished by foot-power, and, finally, to improve the machine in minor details with a view to increasing the simplicity and durability of construction and efficiency of operation.

With these ends in view my invention consists in the combination of devices and peculiar construction and arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

To enable others to understand my invention, I will now proceed to a detailed description thereof in connection with the accompanying drawings, in which—

Figure 1 is a plan view of my improved tricycle. Fig. 2 is a side elevation thereof. Fig. 3 is an end elevation looking at the front of the machine. Fig. 4 is a detail view of one of the

adjustable bearings on the elevated part of the frame at the front end of the machine. Fig. 5 is a detail view of the clutch or ratchet box for one of the rear carrying-wheels and the driving-axle. Fig. 6 is a detail view of the steering mechanism. Fig. 7 is an enlarged detail view of one of the adjustable bearings for the counter-shaft intermediate of the power-shaft. Fig. 8 is a detail sectional view through the steering-head and the steering device on the line *xx* of Fig. 6.

Referring to the drawings, in which like numerals of reference denote corresponding parts in all the figures, 1 designates the driving rear axle of my machine, which is propelled or rotated by manual power, and 2 the carrying-wheels mounted on the ends of the axle and connected thereto by a peculiar clutch or ratchet, so as to rotate with the axle when the latter is positively propelled by manual power, said axles and the propelling mechanism remaining at rest, while the carrying-wheels rotate on the axle, when the machine is descending or coasting down a declivity.

The hub 3 of each carrying-wheel is made hollow, with one side open, as shown in Fig. 5, and provided on its inner surface with a series of radial integral teeth or projections 4, and in this open side of the hub or clutch-box is fitted a disk 5, which is keyed or otherwise rigidly secured on the axle near or at the inner end of the spindle thereof on which the carrying-wheel is fitted. This disk 5 is provided with a projection 6, that extends beyond the periphery of the disk, and when the wheel is properly fitted on the axle-spindle the fixed disk fits in the open side of the clutch-box and the projection of the disk engages or impinges against one of the series of radial teeth of the clutch-box. The tooth or projection 6 on each end of the axle is pivotally connected by a suitable pin or shaft to one of the disks, and the latter in turn connects each tooth or projection to the shaft, and these teeth or projections are adapted to automatically drop into one of the series of teeth in each clutch-box as the machine starts.

When power is applied to the axle in the manner hereinafter described, the latter and the disks thereon are turned to bring the pivoted teeth or projections 6 on the lower side

of the axle, and these teeth then drop by gravity between adjoining teeth on the clutch-boxes of the wheels, thereby coupling the wheels to the axle as the machine moves forward, the continued rotation of the axle as power is applied thereto serving to hold the pivoted teeth or projections in engagement with the clutch-boxes; but in stopping the vehicle, or when its speed is slackened very much, the power continues to turn the axle partially or until the pivoted teeth or projections are carried around to the upper side of the axle, when said teeth drop by gravity and disengage the axle from the clutches of the wheels. The action of the pivoted teeth or projections is entirely automatic and noiseless, and upon practical trial have been found to give perfectly satisfactory results.

It is obvious that when power is not applied to the axle, as when the machine is descending a hill or declivity, the teeth or projections do not engage the clutch-boxes, and hence these teeth, the axle, and the power devices remain at rest, it only being necessary for the rider to steer or guide the machine.

The operative parts of the machine are mounted on a main frame which extends from the rear driving-axle to the head of the fork of the steering-wheel, and in order to place the propelling mechanism in a convenient position in front of the rider this main frame is bent upward or elevated at the front end. This main frame consists of three essential parts—to wit, an elevated front end arranged on a higher plane than the lower horizontal part and an upright intermediate part connecting the contiguous ends of the front and rear horizontal parts of the main frame. The front elevated part of the main frame consists of a bar which is connected at one end to the vertical spindle or king-bolt of the steering-fork, and the rear end of this bar 10 of the frame is bifurcated to form two parallel arms 10', to the rear extremities of which are connected the upper ends of the upright part of the main frame. The upright part and the horizontal rear part of the main frame consist of two bars 11 12, of metal, each bar being made continuous and bent at its front end in a peculiar manner to form a part of the upright portion of the main frame.

The horizontal rear parts of the bars 11 12 of the main frame are arranged parallel with each other below the seat 15 of the vehicle, and the parallel parts of said bars extend forward beyond the axle a suitable distance and terminate below the rear end of the upper horizontal part of bar 10 of the frame. The front ends of the bars 11 12 are bolted to the rear ends of the arms 10' of the bar or front part 10 of the main frame, and said bars 11 12 are further bent to form the upright part of the main frame between the upper and lower horizontal parts of said frame, the upright parts of said bars being bent upwardly for a short distance from the lower part of the

frame, as at 13, then inwardly toward each other at 13', and then upwardly again at 14 to the points where said bars join the part or bar 10 of the frame, the upright part of the frame being inclined slightly from the lower horizontal part of the frame toward the upper horizontal part thereof.

The parts 14 of the upright bars of the frame are braced laterally by a strut 16, and to the bent parts 13' of said frame are connected the rear ends of inclined brace-rods 17, which strengthen the frame, the front ends of said inclined rods being secured to the joining-bar 10 of the main frame in rear of a cross-head of the steering-fork 19. This steering-fork 19 of the machine is bifurcated, and its lower end is provided with bearings in which is journaled the axle of the front steering-wheel 20. The upper end of this fork is provided with a head 21, consisting of the parallel spaced bars 22 22', which are separated laterally to form an intermediate space or slot to receive the front end of the bar or part 10 of the main frame, said head of the fork being further provided with a head-block 23, the parallel plates and head-block being united to the fork by suitable bolts. Through the head-block, the plates of the fork, and the front end or bar 10 of the main frame is passed a king-bolt or spindle 24. The head-block, the steering-fork, and its attached wheel are turned in either direction, right or left, by steering mechanism, which I will now proceed to describe. Between the head of the steering-fork and the head-block is rigidly clamped a horizontal geared rack 25, located on the rear side of the head-block, and with this geared rack meshes a vertical segment 26, which is carried by a horizontal shaft 27, that extends rearward from the head-block and terminates within convenient reach of the rider. This horizontal shaft is journaled in suitable bearings 28, fixed on the horizontal upper part 10 of the main frame, and at its rear end said shaft is provided with a rigid cross-bar 30, which is secured at its middle to the shaft, the ends of said bar being provided with means whereby the bar can be operated to turn the shaft 27 either by the hands or feet of the operator. Near the ends of the cross-bar are provided knobs 31, which are adapted to be grasped by the hands to turn the shaft and operate the segment to turn the steering fork and wheel, and from the ends of the cross-bar 30 depend the stirrups and straps 32, into which the feet of the rider can be readily placed in order to safely steer or guide the machine by foot-power.

I will now proceed to describe the propelling mechanism adapted to be operated by the rider, which mechanism is placed immediately in front of the rider occupying the seat 15 on the elevated front part of the main frame and within convenient reach of the rider.

To the elevated front part or bar 10 of the main frame is secured a horizontal supple-

mental frame 35, which is substantially U or V shape in outline, and which rests upon the rear bifurcated part 10' of the bar or front part 10 of said main frame. The front or continuous end of this supplemental frame is secured to the bar 10 of the main frame by a through-bolt 36, and the rear ends of said supplemental frame are provided with inwardly-extending arms 37, which are rigidly secured to the corresponding ends of the bifurcated arms 10' of the bar 10 by the same through-bolts 37 which unite the upper ends of the bars 11 12 to the bar 10 of the main frame, as is obvious from an inspection of the drawings.

The supplemental frame 35 is provided with longitudinal slots 40, and upon said frame are placed the inclined supports 41—one on each side of the frame—said supports being provided with depending feet 41', which rest upon the sides of the frame 35, and the lower ends of the feet 41' are formed with threaded studs 42, which pass through the slots in the frame 35 and receive nuts 43 on their lower ends. The supports are thus connected to the supplemental frame, so that they can be moved back or forth thereon for a limited distance, which adjustment of said supports can readily be accomplished by means of adjusting-screws 44, which work in threaded openings in the depending feet of the supports and are mounted in rigid bearings 45 on the rear ends of the supplemental frame, as clearly shown. The supports normally remain at rest on the supplemental frame, and they are only adjusted when it is desired to adapt the position of the power-shaft, which is carried by the supports, to the rider, or to tighten the sprocket-chain between said power-shaft and the counter-shaft. The supports are provided with boxes or bearings 46, which are rigidly secured thereon, and in these bearings is journaled a power-shaft 47, which is provided near its middle or at a point between the bearings with a sprocket-wheel 48 and at its ends with the cranks 49, which are adapted to be grasped and rotated by the hands of the rider.

Below the power-shaft and parallel therewith is a counter-shaft 50, which is journaled in bearings 51, said bearings being fitted on the horizontal lower part of the main frame at or near the points where the bars 11 12 are bent upwardly, at 13, to form the lower end of the upright part of said main frame. These bearings 51 are each provided with longitudinal slots 52, through which are passed bolts 53 to secure the bearings on the main frame and at the same time permit the bearings and the counter-shaft to be adjusted in order to take up the slack and regulate the tension of the sprocket-chain between the counter-shaft and rear driving-axle, or between said counter-shaft and power-shaft, or between the counter-shaft and both the power-shaft and driving-axle. The adjustment of the bearing 51 is effected by means of screws 54, which are loosely fitted in openings in the

parts 13 of the main frame and in threaded openings in the upright arms 55, which are rigidly attached to said bearings 51. The counter-shaft is provided with two sprocket-wheels 56 57, one of which is geared by a vertical sprocket-chain 58 to the sprocket-wheel 48 of the power-shaft, while the other sprocket-wheel is similarly geared by a horizontal sprocket-chain 59 to a sprocket-wheel 60, fixed on the rear driving-axle of the vehicle.

The sprocket-wheels 56 57 of the counter-shaft may both be located on the middle of said shaft, as shown, so that the sprocket-chains are both at the longitudinal center of the machine. With this arrangement of parts the tricycle is adapted for use by a male rider; but in order to enable the machine to be used by a lady the sprocket-wheels 57 and 60 and the sprocket-chain 59 are located at one side of the machine, the sprocket-wheels being fixed to the ends of the counter-shaft and axle, as is obvious.

The seat 15 of the machine is mounted on springs 61, which are preferably of the form shown, and the lower ends of the springs are united to the rear ends of the bars 11 12 of the main frame and to axle-boxes 62, in which the axle is journaled by the same set of bolts, as is obvious. The bars 11 12 of the main frame are preferably braced by slabs or re-enforcing pieces of wood or metal 63, which are bolted to the under sides of said bars, but these re-enforcing-strips can be omitted, if desired.

I will now describe my preferred form of brake, by which the motion of the vehicle can be arrested. The brake consists of a lever 65, which is bent at an intermediate point of its length to form the inclined ends, as shown, and the lever is fulcrumed on the main frame at a point below the seat, the bolt 66, which serves as the fulcrum, passing through the lever at the point where the bend occurs therein. One end of the lever is within convenient reach of the occupant of the seat, while the other end depends from the fulcrum and is bent to form a friction-shoe 67, having its lower face roughened to contact with the ground when the lever is lowered by pulling up the front end of the lever, the rear end of said lever being normally elevated above the ground by a suspending rod 68, having a coiled spring 69, one end of the rod being connected to the lever and the other end to the seat of the machine.

The operation of my invention will be readily understood from the foregoing description, taken in connection with the accompanying drawings.

I am aware that changes in the form and proportion of parts can be made without departing from the spirit or sacrificing the advantages of my invention, and I would therefore have it understood that I reserve the right to make such changes and alterations as fairly fall within the spirit of my invention.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. In a tricycle, a main frame consisting of the front elevated part or bar 10 and the lower horizontal part and upright part formed by the continuous bars 11 12, which are bent to form said horizontal lower part and upright part and are united to the rear end of the part 10, in combination with a power-shaft journaled on the part 10 of the main frame, a counter-shaft journaled in bearings located at the juncture of the lower horizontal and upright parts of the main frame, an axle, and the vertical and horizontal sprocket-chains passing over suitable sprocket-wheels on the power and counter shafts and the axle, substantially as described.

2. In a tricycle, the combination, with a main frame, of a steering-fork journaled in the main frame and having its head provided with a head-block, a horizontal segmental rack 25, clamped between the head and head-block of the steering-fork, a vertical king-bolt which passes through the fork-head, the head-block, and the front end of the segmental rack, which is clamped between said fork-head and head-block, a horizontal shaft journaled in upright bearings on the main frame and provided at its front end with a depending toothed segment which meshes with the rack, a trans-

verse bar 29, secured centrally to the rear end of the horizontal shaft, and the depending stirrups connected to the ends of the transverse bar, substantially as described.

3. In a tricycle, the combination of a main frame, a brake-lever fulcrumed on said frame and having a friction-shoe at its lower extremity, and a suspending rod connected to the brake-lever and the main frame and provided with a coiled retracting-spring for normally holding the friction-shoe out of contact with the ground or other surface, substantially as described.

4. In a tricycle, the combination of an axle, a carrying-wheel having its hollow hub formed with an open side and a series of radial teeth on its inner surface, a disk fixed on said axle and fitted within the open side of said hub to close the same, and a tooth or projection that extends beyond the disk to engage the teeth on the hub, and which is pivoted loosely on the disk, for the purpose described, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CYRUS YINGST.

Witnesses:

A. C. YINGST,
J. H. ULRICH.