

No. 668,784.

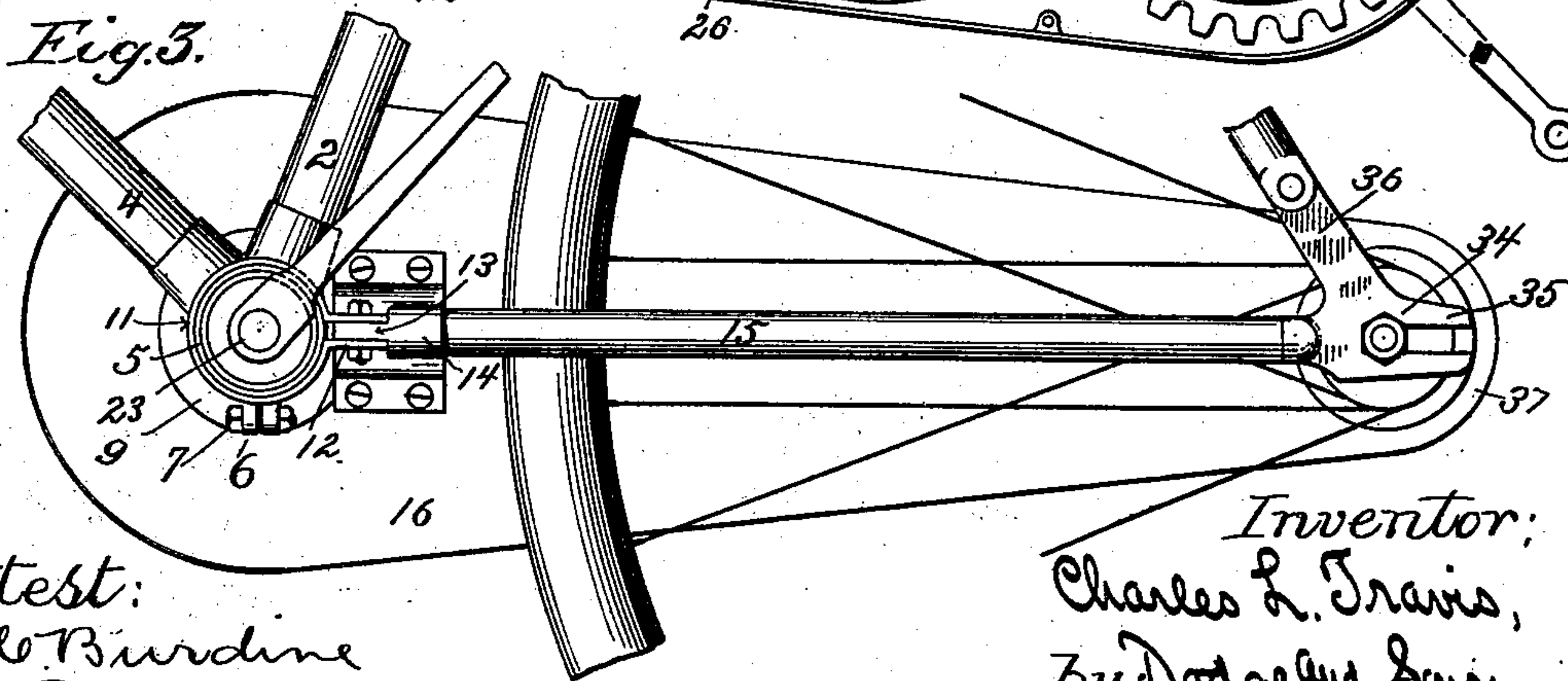
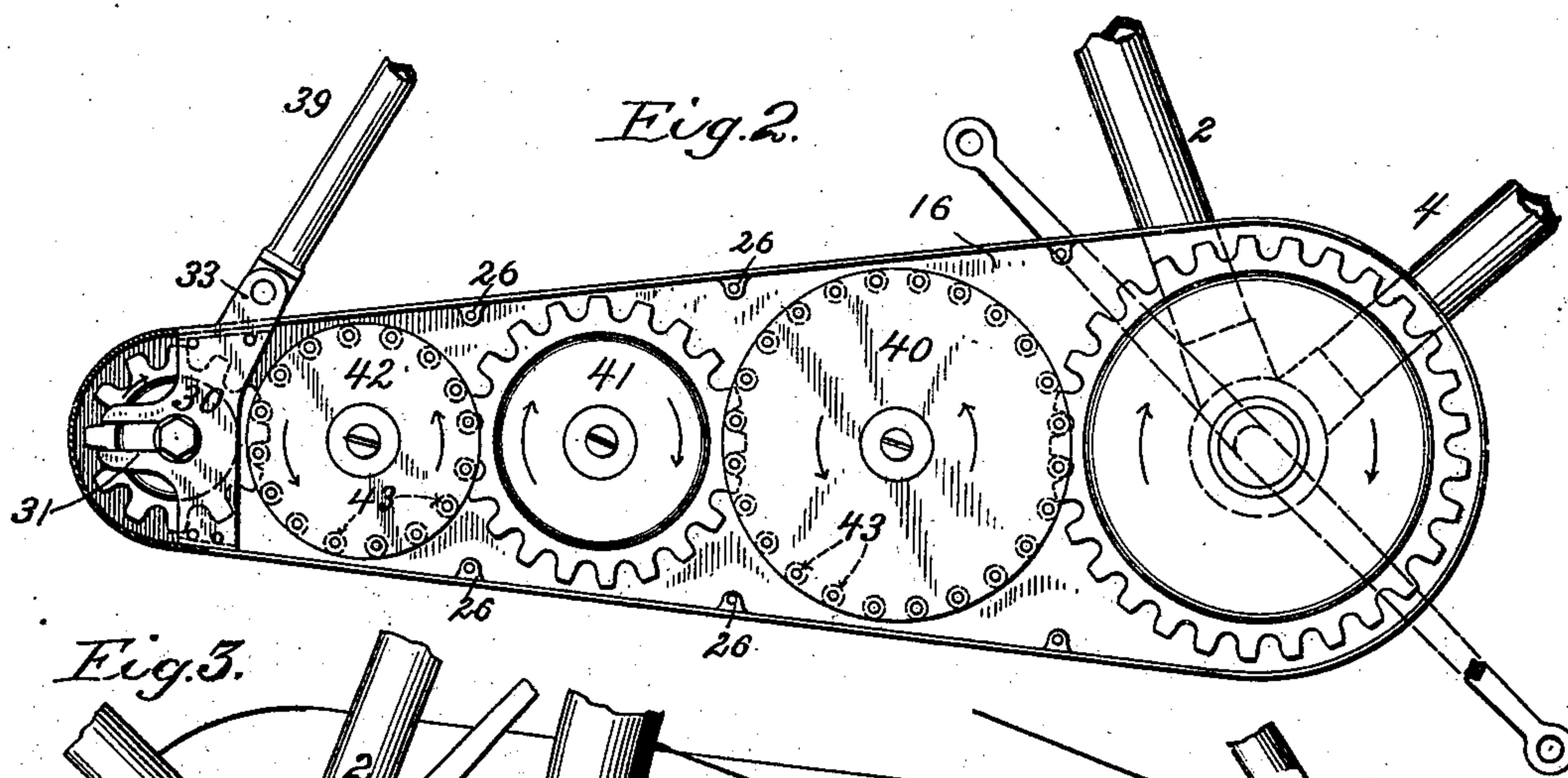
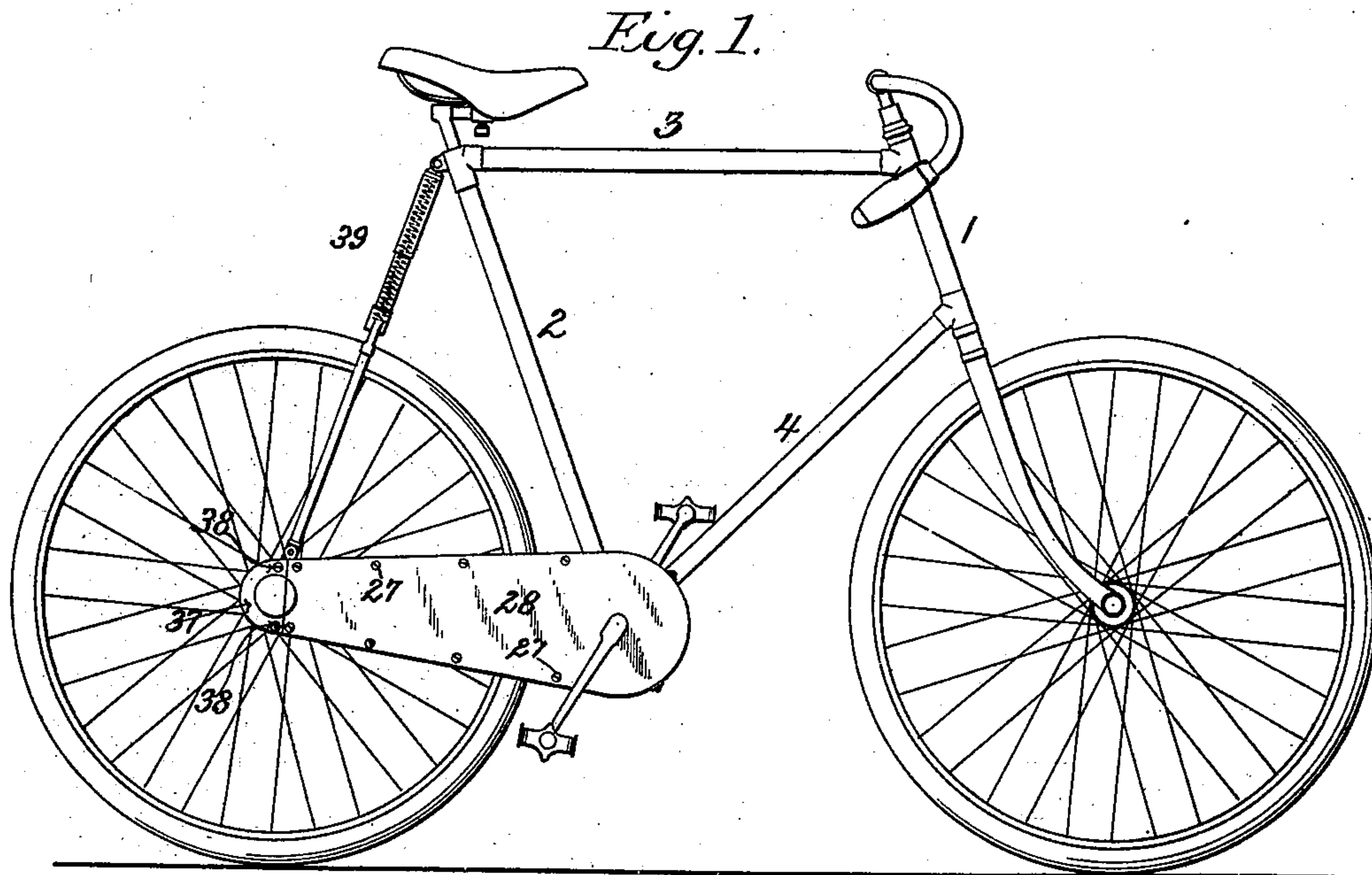
Patented Feb. 26, 1901.

C. L. TRAVIS.
BICYCLE.

(Application filed Mar. 19, 1897.)

(No Model.)

3 Sheets—Sheet 1.



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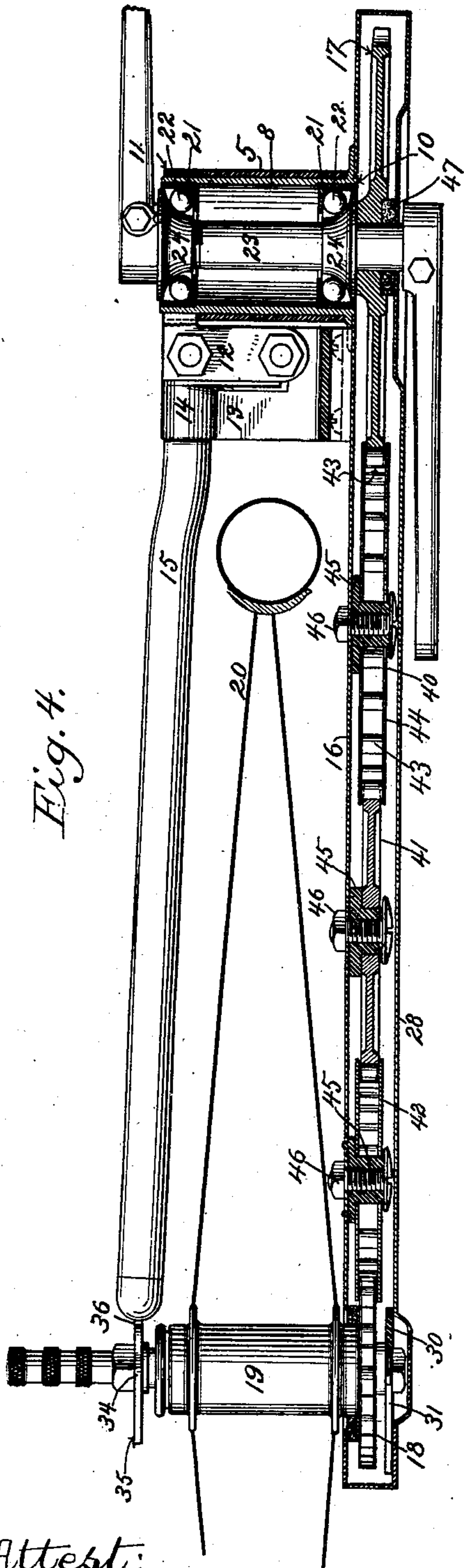


Fig. 4.

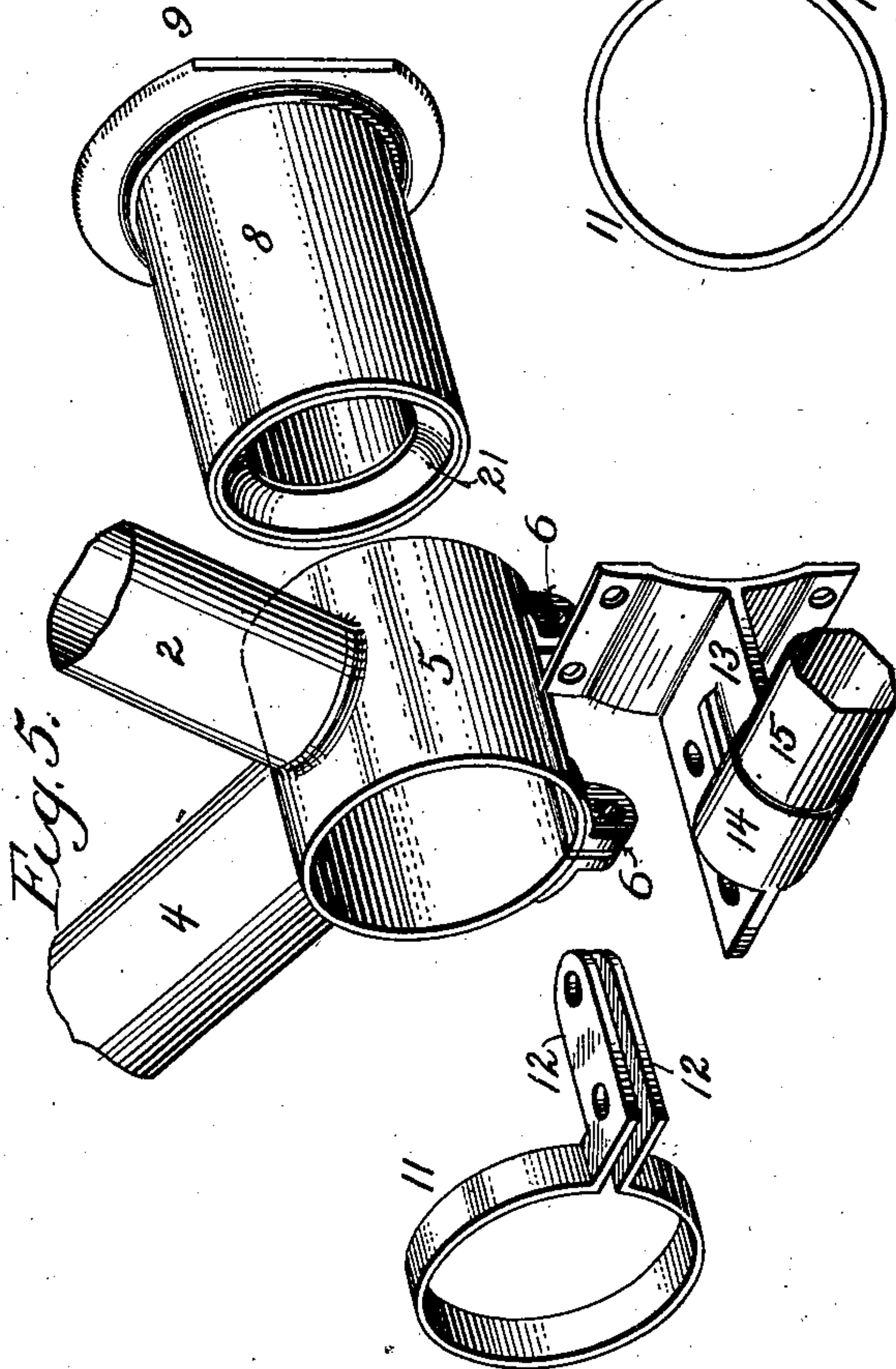


Fig. 5.

Fig. 6.

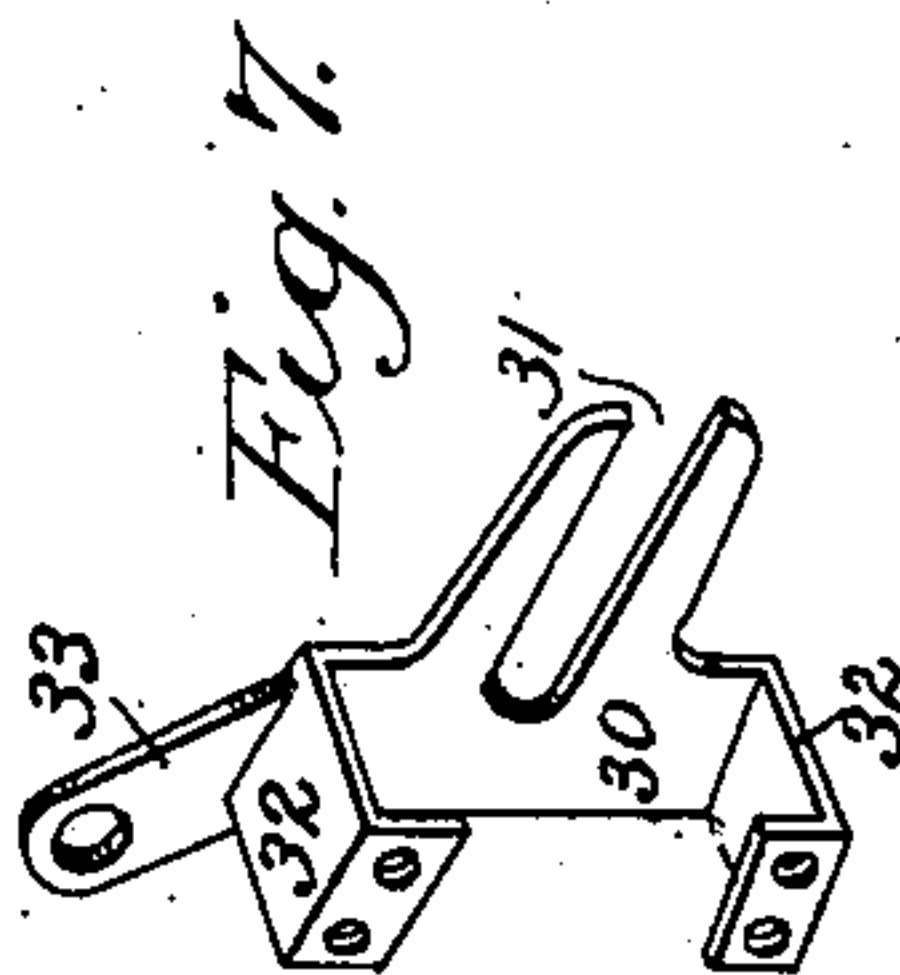


Fig. 7.

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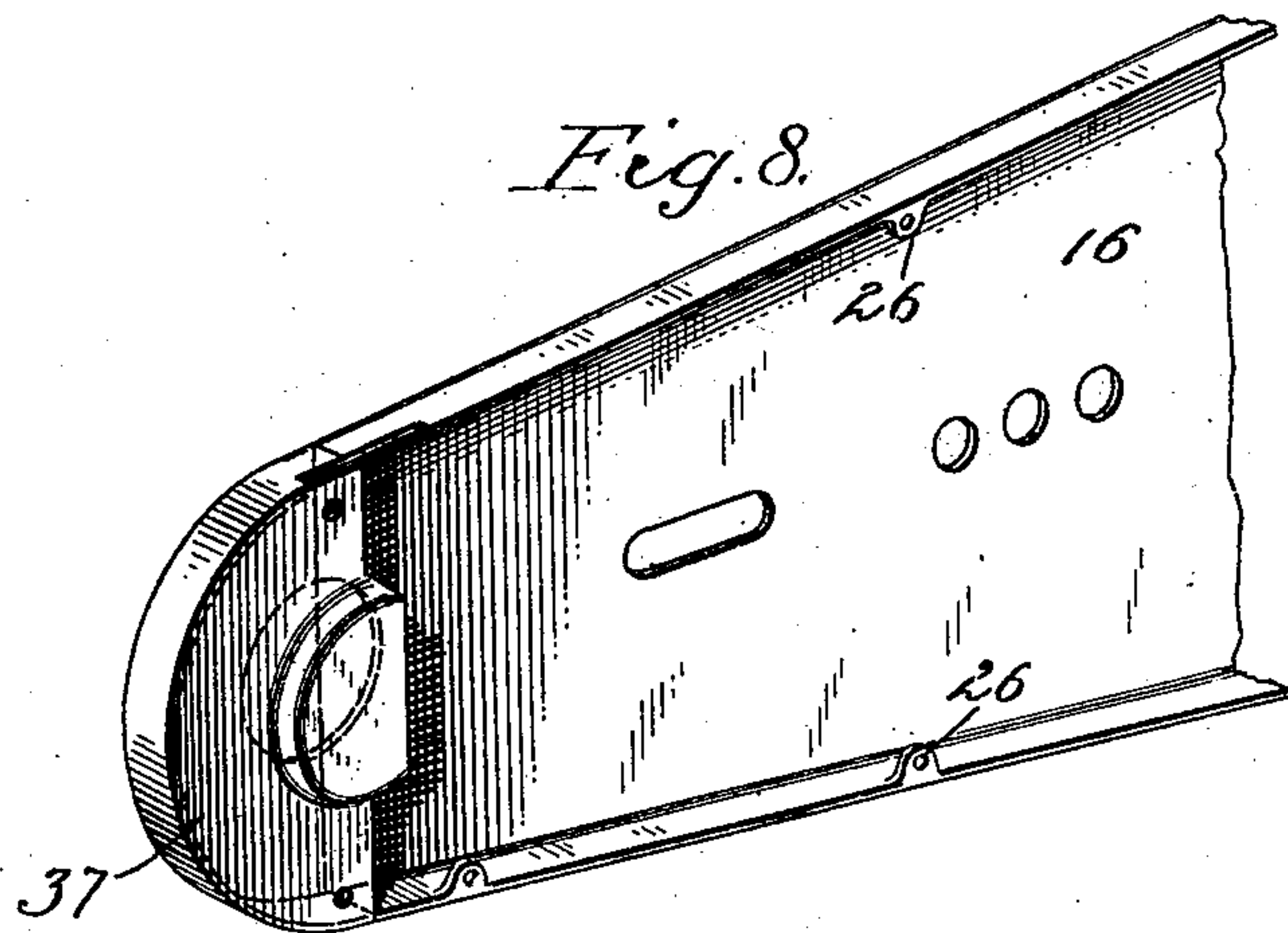
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3 Sheets—Sheet 3.



ATTEST;
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UNITED STATES PATENT OFFICE.

CHARLES L. TRAVIS, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE
HYGIENIC WHEEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 668,784, dated February 26, 1901.

Application filed March 19, 1897. Serial No. 628,337. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. TRAVIS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, (whose post-office address is care of Hygienic Wheel Company, St. Paul Building, New York city,) have invented certain new and useful Improvements in Bicycles, of which the following is a specification.

This invention relates to bicycles and like vehicles; and it consists in various novel features, details, and combinations hereinafter set forth, whereby a simple, strong, and durable machine is produced, embodying in its more complete form the cushioning features of the frame patented to me July 21, 1896, and numbered 564,546.

In the drawings, Figure 1 is a side elevation of a bicycle embodying my invention; Fig. 2, a view illustrating the driving-gear; Fig. 3, a side elevation showing the joint or hinge connecting the front and rear frames; Fig. 4, a horizontal sectional view through the hinge or joint and the driving-gear; Fig. 5, a perspective view of the parts forming the joint or hinge separated to show their construction and relation; Fig. 6, a view showing some of said parts assembled; Fig. 7, a perspective view of the fork-plate; Fig. 8, a view illustrating a slight modification.

For some time past efforts have been made to devise a satisfactory substitute for the chain commonly employed to transmit motion from the pedal-shaft to the rear wheel; but, though promising good results, such devices have not at this time come into general use, and their sufficiency is not established to the satisfaction of manufacturers or of the public. While this is true, there is a widespread belief that the excessive friction of driving-chains represents a loss that should be avoided, and my purpose is to attain this result without rendering the driving-gear clumsy or unsightly. At the same time I aim so to construct the driving-gear that it shall not interfere with nor be interfered with by the movements of the frame-sections one in relation to the other in yielding to absorb or take up the shocks and vibration incident to riding over roughnesses of any kind.

With these objects in view I construct the

front frame of the usual four members—the steering-head tube 1, saddle-post tube 2, and connecting-tubes 3 and 4, rigidly united to make a stiff and unyielding front frame or section—and I hinge or joint the rear frame thereto at or concentrically with the pedal-shaft hanger 5.

As shown in Fig. 5, the pedal-shaft hanger is made in the form of a split tube or shell provided with ears 6 to receive tap-bolts or bolts and nuts 7, by which to contract it, if desired, and it is brazed or welded to the tubes 2 and 4 and forms the connection between them or may do so.

Fitting within the hanger or shell 5 is a pedal-shaft barrel 8 (shown in Figs. 4 and 5) of a length somewhat greater than the hanger and provided at one end with a flange or collar 9, beyond the face of which the collar protrudes a short distance, forming a short neck 10, as seen in Fig. 4. The barrel 8 being passed into the hanger or shell 5 and carried lengthwise therein until the flange or collar 9 abuts against the end of the shell, its opposite end protrudes beyond the shell sufficiently to receive an encircling band or collar 11, which may be conveniently formed of sheet-steel stamped or cut of the requisite shape and bent into the form best shown in Fig. 5. As shown in said figure, the collar 11 is formed with two ears 12, which project first radially, or substantially so, and then laterally or in planes parallel with the axis of the pedal-shaft, regarding the parts in their assembled condition. The ears 12 are perforated and are designed to receive between them and to be bolted to or otherwise united with a clip or bracket 13, comprising a horizontal and a vertical plate, as best seen in Fig. 5. Clip or bracket 13 may be forged or otherwise produced, but should be quite strong. It is formed or furnished with a hollow or socketed boss 14 to receive the forward end of a side bar 15 of the rear frame, as shown in Figs. 4 and 5, while the vertical plate affords a means of connection or attachment to a gear-casing 16, which, as presently explained, constitutes the second side bar or member of the rear frame. Gear-casing 16 comprises a shallow box-like body of sheet-steel or other metal possessing due strength

and rigidity and of form and dimensions appropriate to the gearing to be contained within it. In practice I find it expedient to make the gear-casing of substantially the form and proportions indicated in Figs. 1, 2, 3, and 4—that is to say, wider at the forward end and narrower at the rear end and of a depth or measurement from face to face just sufficient to accommodate the gearing and afford due clearance. In practice it may be fluted, ribbed, braced, or stiffened in any well-known way and to such extent as may be required or deemed expedient; but ordinarily this will be found unnecessary, or at most a few corrugations judiciously placed will be found adequate generally.

Referring again to Figs. 1, 2, 3, and 4, but particularly to Figs. 2 and 4, the casing 16 will be seen to comprise merely the back plate reaching from a point slightly in advance of the front side of the pedal-shaft gear 17 to a point slightly in rear of the rear-wheel gear 18, terminating at each end in curved or semi-circular form concentric with, but somewhat larger than, the respective gears mentioned.

At its forward end the back plate or body of the casing 16 has a circular opening to permit it to fit accurately upon the short neck 10 of the pedal-shaft barrel, as seen in Fig. 4, and at its rear end it has an opening to permit the passage through it of the projecting end of the hub 19 of the rear wheel 20.

As shown in Figs. 3 and 4, screws or other fastenings pass through perforations in the vertical plate of bracket or clip 13 and into the gear-casing 16, binding the two firmly together and preventing the escape of the collar 11 from one end or the casing 16 from the other end of the pedal-shaft barrel. Being thus held in place upon and rigidly secured to the pedal-shaft barrel, it will be evident that these parts may move as one about the axis of said barrel if the hanger 5 be not drawn together so tightly upon the barrel as to bind and hold it fast. It will also be seen that if there be undue freedom or any radial play of the barrel within the hanger it may be taken up or suppressed by tightening the bolts 7. In this way I produce a simple, strong, and durable hinge or joint connecting the front and rear frames capable of compensating for wear at any time and able to withstand any lateral strains tending to throw the rear wheel out of alinement with the front wheel.

The ends of the pedal-shaft barrel 8 are counterbored or socketed to receive cups or thimbles 21, in or upon which the balls or spheres 22 rest and travel, as usual, and the pedal-shaft 23 is provided with cones 24, one of which may constitute an adjusting-nut, as is customary. The overhanging flange or horizontal boundary-wall of the casing 16 is provided with ears or lugs 26, tapped to receive screws 27, by which the cover-plate 28 is secured in place.

The rear end of the back plate of casing 16 is provided with an opening to receive the

hub of the rear wheel, and if it be deemed advisable to provide for adjustment of said wheel the opening will be elongated for that purpose. If thus elongated, the opening may be covered by a movable plate, a thick piece of felt or the like closely encircling the hub and extending beyond the boundaries of the opening, as shown in Fig. 4.

Extending across the open side of the casing 16 and sufficiently within the same to permit the proper application of the cover is a fitting 30, here shown as provided with a fork 31, two horizontal arms 32, and an upwardly-extending ear 33, as shown in Fig. 7. The arms 32 extend to the rear plate of the casing and afford means of firm attachment to the casing, while the ear 33 serves for the attachment of a brace which extends from a point near the rear-wheel axle upward to the upper end of the saddle-post tube or pillar 2.

The arms 32 are represented as having their ends turned toward each other to form a bearing for the arms against the back plate of casing 16. If preferred, they may be connected, the fitting being in that case forged or cast of suitable metal or alloy or otherwise produced.

The fitting 30 is brazed, riveted, welded, or otherwise made fast to the shell, and extending to the back plate and being firmly secured thereto it affords a firm support for the casing upon the rear axle, which enters its fork 31. The axle may be adjusted in the slot and clamped by a binding-nut, as usual, an adjusting-screw being provided or not, as deemed best. It will thus be seen that the casing at one side, the tubular bar 15 at the opposite side, and the connecting member 13 constitute jointly a rear frame or fork, the bar 15 being furnished with a fitting 34, having a fork 35 and an ear 36 corresponding to the fork 31 and ear 33 of fitting 30.

In order that access may be had to the fork 31 whenever desired, the rear end of the casing 16 is made in the form of a detachable cap 37 and is secured in place by screws 38, as indicated in Fig. 1.

39 indicates an elastic or yielding brace, preferably comprising a fork to straddle the rear wheel and pivotally connected to ears 33 and 36 and two telescoping tubular sections, one carried by the fork and the other pivotally attached to the front frame at or near the top of the saddle-post pillar 2. A spring placed within the tubular shells absorbs the shock or concussion incident to riding over rough roads, and this may be supplemented by the confined air. Such a construction has heretofore been patented and is not in itself claimed herein, nor do I restrict myself to its use, as any suitable yielding or elastic brace may be introduced between the rear-wheel fork and the front frame. It will now be seen that the purpose of the hinge joint or connection between the front frame and rear fork is to permit the play of said rear fork when the wheel passes over uneven

places, so that the shock and vibration may be taken up by the spring or yielding brace and not be transmitted to the rider.

Referring now to Figs. 2 and 4, the gearing will be explained. The pedal-shaft is furnished with a gear-wheel 17, which may be so designed as to serve in case of need as a sprocket-wheel, and the rear-wheel hub is provided with a pinion 18 of similar design, the purpose of adopting this form being twofold—to adapt them to the use of roller-gears for transmitting motion from one to the other and to permit the use of a driving-chain, if desired. Under existing conditions it is deemed expedient to employ three intermediate gear-wheels 40, 41, and 42, this number best suiting the approved proportions and design of machines now generally in use; but any convenient number may be used, care being of course taken so to proportion and arrange them as to give the requisite power, speed, and direction of motion. Gear-wheels 40 and 42 have rollers 43 in lieu of teeth, while wheels 17 are provided with teeth separated by spaces having a width and form to receive the rollers 43, as indicated. The rollers 43 may be merely shouldered cylinders, the reduced ends of which pass through holes in thin metal disks 44 and are headed sufficiently to prevent displacement, or they may be tubular rollers mounted upon small cylindrical axles passing from plate to plate and headed on the outer faces thereof, the latter construction being preferred. Each of the wheels 40 41 42 is mounted upon a stud-axle 45, secured to the back plate of the casing 16 by means of a bolt 46, as shown in Fig. 4, or in any other convenient way, the head of the bolt being sufficiently large to retain the wheel in place upon the stud or axle or a washer being provided for that purpose. The bases of the studs or axles are enlarged to give them a broad bearing, and they may be provided with small studs or pins to enter openings in the back plate of casing 16, if desired, to prevent shifting or turning and to relieve the fastening-bolt of strain.

It is desirable to make the "tread" of the machine or the distance between pedals as narrow as practicable, and hence the cover-plate 28 may be depressed around the opening through which the pedal-shaft passes, thus permitting the crank to set closer in.

To prevent dust and dirt from entering the casing around the pedal-shaft, the outer face of the gear-wheel 17 is recessed to receive a heavy felt washer 47, which effectually closes the small space necessarily left for clearance between the shaft and the walls of the opening through which it passes.

If desired, the wheels 40, 41, and 42 may run upon ball or roller bearings, though this is wholly optional.

It will be observed that under the construction thus set forth the gearing is wholly inclosed and protected from dust, grit, and moisture, and hence when once oiled it may

be used for a considerable time without further attention in this regard.

The casing herein set forth is similar in appearance to the chain guards or casings now employed in some machines, particularly those of foreign make, but is essentially different in construction. It is to be distinguished from all such as are merely supplemental to the usual side bar and from any mere chain-guard, whether constituting a side bar or not. It is essential that access to the interior of the casing at all points be possible in order that the gearing may be properly placed, adjusted, cleaned, and oiled, and to the end also that changes in number or arrangement may be made when change of power or of speed is required.

The possibility of using either the wheel-gearing or a driving-chain is of great advantage, in that it affords the dealer a ready means of supplying either drive that his customers may wish without carrying separate stocks of the complete machines and also in that it enables the user to make temporary repairs or to have them made where the particular transmitting device used in the machine is not at hand.

The cover 28 may be hinged to the casing at one side or edge, if desired.

Mere reversal of the parts of the joint is regarded as within my invention.

The holes for the bolts fastening the stud-axles to the casing may be slightly larger than the bolts to permit the limited adjustment of said axles. So, too, additional holes may be provided with a view to transposition of the intermediate wheels or of substitution of other wheels to vary the speed and power.

It is particularly to be noted that under the construction herein set forth all coöperative moving parts are assembled, fitted, adjusted, ground, and made true before the front and rear frames are brought together, and hence their subsequent union cannot in any manner affect the relation of working parts or disturb their adjustment. It will also be seen that by removing the wheels and disconnecting the rear brace from the front frame the rear fork and brace may be folded against the lower bar of the front frame and placed with the wheels in a case but little larger than the wheels themselves, a shallow trunk of moderate width taking it readily.

Having thus described my invention, what I claim is—

1. In combination with the front section of a bicycle-frame, provided with a split hanger or shell 5; a barrel 8 provided with shaft-bearings and rotatably mounted within the hanger or shell; a rear frame section or fork carried by said barrel; and means for contracting the split hanger or shell, substantially as set forth.

2. In combination with the front section of a bicycle-frame, having a hanger or shell 5; a tubular barrel 8 mounted within the shell and having at or near one end a flange to bear

against the end of said shell and a neck protruding slightly beyond the flange; a collar encircling the end of the barrel outside of the hanger at the end farthest from the flange; and a rear frame section or fork carried by said collar and neck, substantially as described and shown.

3. In combination with the front section of a bicycle-frame having a hanger or shell 5; a tubular barrel 8 mounted within the shell but having its ends protruding therefrom; a rear side bar or member attached to one protruding end of the barrel; a collar secured to the other protruding end of said barrel; a connecting plate or bracket separably joining the collar and said side member; and a second rear side member attached to said bracket; all substantially as described and shown.

4. In combination with front frame provided with hanger or shell 5; barrel 8 provided with flange 9 and neck 10; casing 16 mounted upon said neck; bracket 13 secured to said casing and provided with socket 14; bar or tube 15 having its end seated in said socket; and collar 11 encircling the protruding end of barrel 8 and secured to bracket 13, substantially as described and shown.

5. In a bicycle or like vehicle, the combination of a front frame provided with a pedal-shaft hanger or shell; a rear fork provided with a laterally-projecting barrel adapted to pass longitudinally into and through said hanger or shell; and means for connecting the free end of said barrel with the fork after its passage through the hanger, whereby the entire driving mechanism may be assembled, applied to and removed from the front frame without dismounting or separating the parts of said driving mechanism.

6. In a bicycle or like vehicle, the combination of a rigid front frame provided with a pedal-shaft shell or hanger; a rear frame having rigidly formed with it a barrel to pass through said shell or hanger; pedal-shaft bearings carried within said barrel; a pedal-shaft passing axially through said barrel and hanger; a rear wheel carried by the rear frame, and driving connections between the pedal-shaft and rear wheel, substantially as described and shown; whereby the pedal-shaft, wheel and driving connections may be mounted in the rear frame and adjusted, and the rear frame thereafter applied to and connected with the front frame without in any manner disturbing the adjustment of any of the parts carried by said rear frame.

7. In a bicycle or like vehicle, the combination of a rigid front frame provided with a pedal-shaft shell or hanger; a rear frame bearing the entire driving-gear, and having a barrel adapted to enter and turn within the shell or hanger; and driving-gear carried by the rear frame and having its driving-shaft and its bearings arranged within and concentric with the barrel; whereby the driving-gear, with the exception of one crank, can be assembled and adjusted in the rear frame, and said rear frame thereafter applied to and connected with the front frame without in any manner disturbing said driving-gear or its adjustment.

In witness whereof I hereunto set my hand in the presence of two witnesses.

CHARLES L. TRAVIS.

Witnesses:

JNO. P. TREADWELL,
HENRY P. PRICE.