

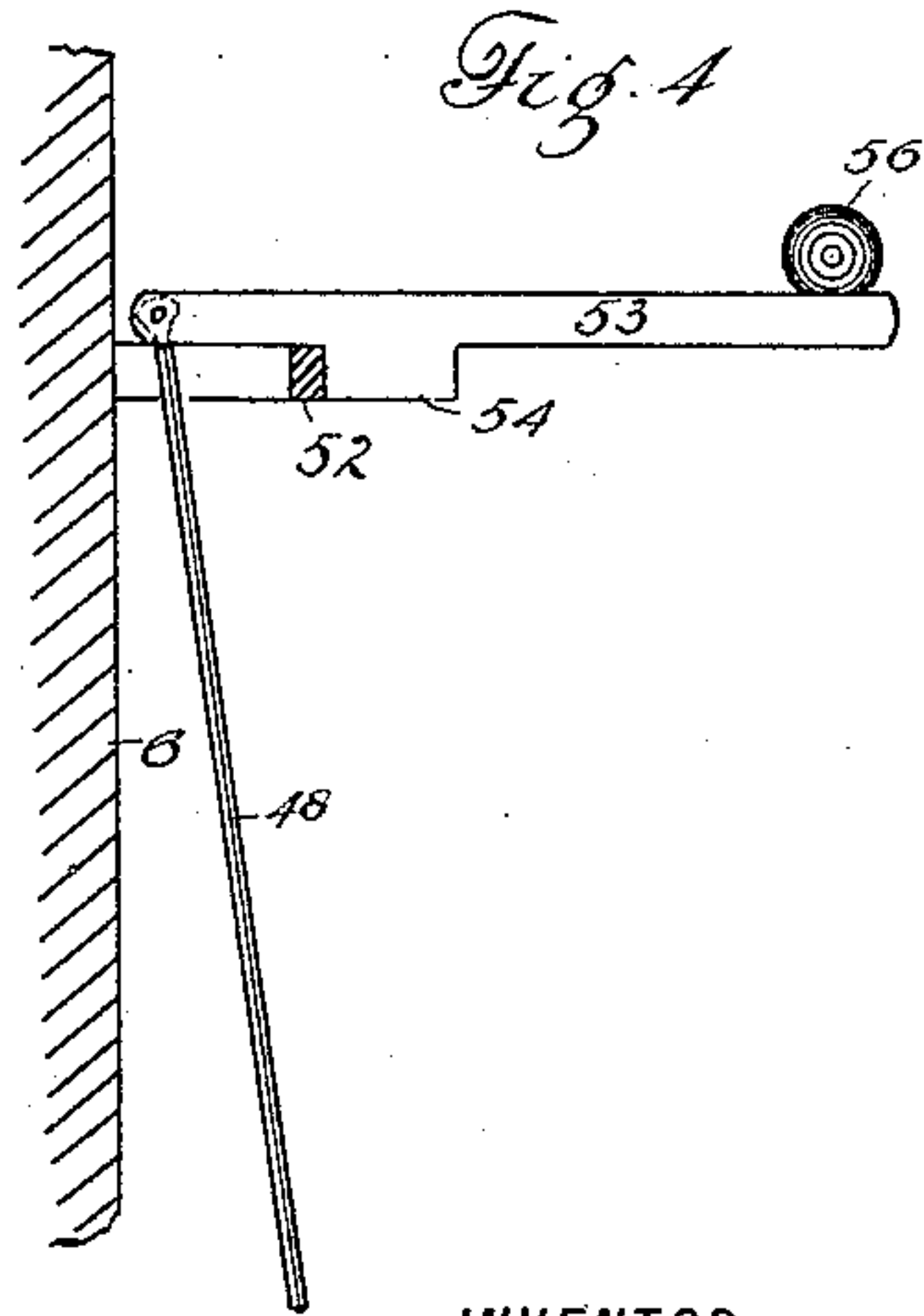
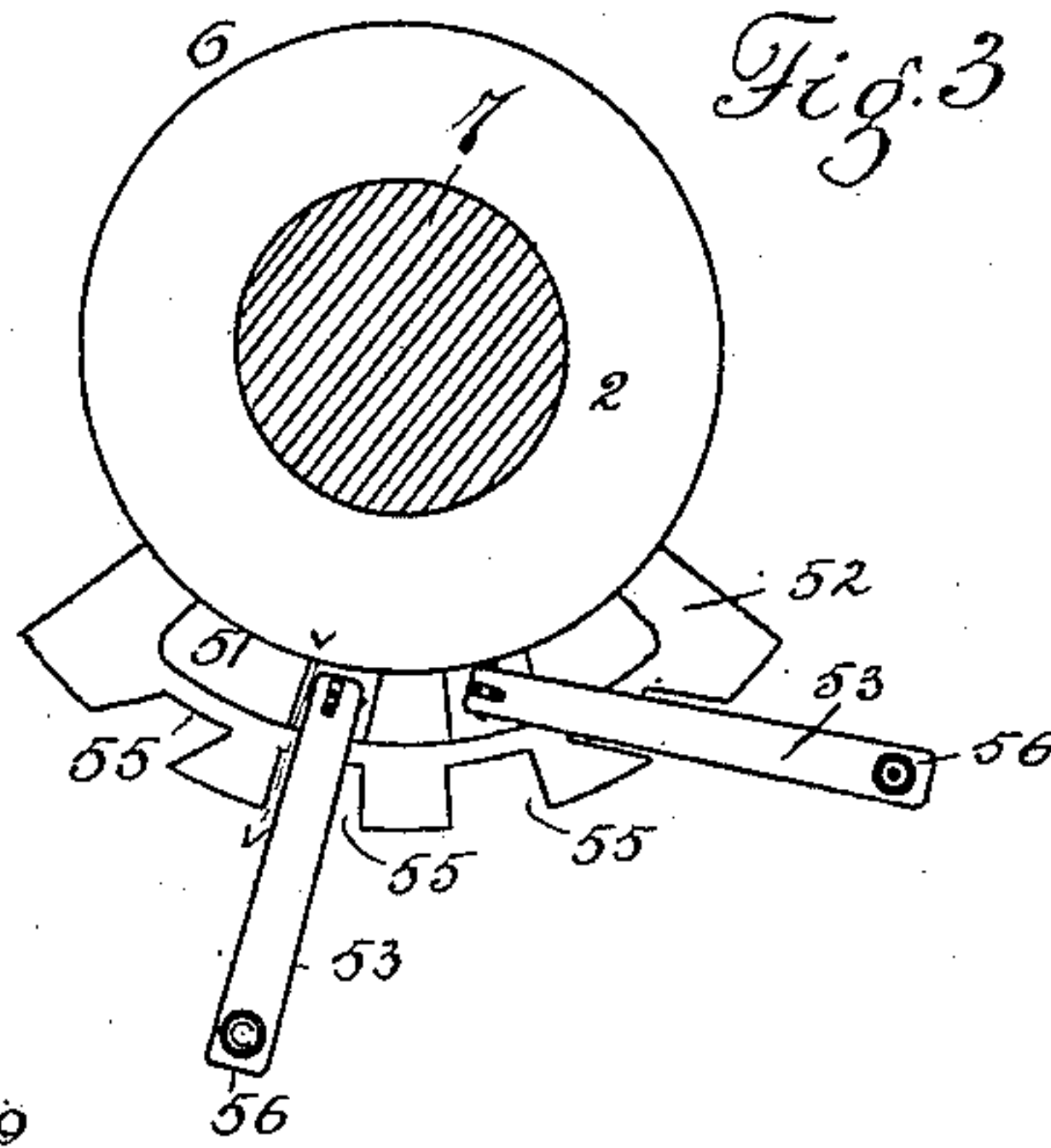
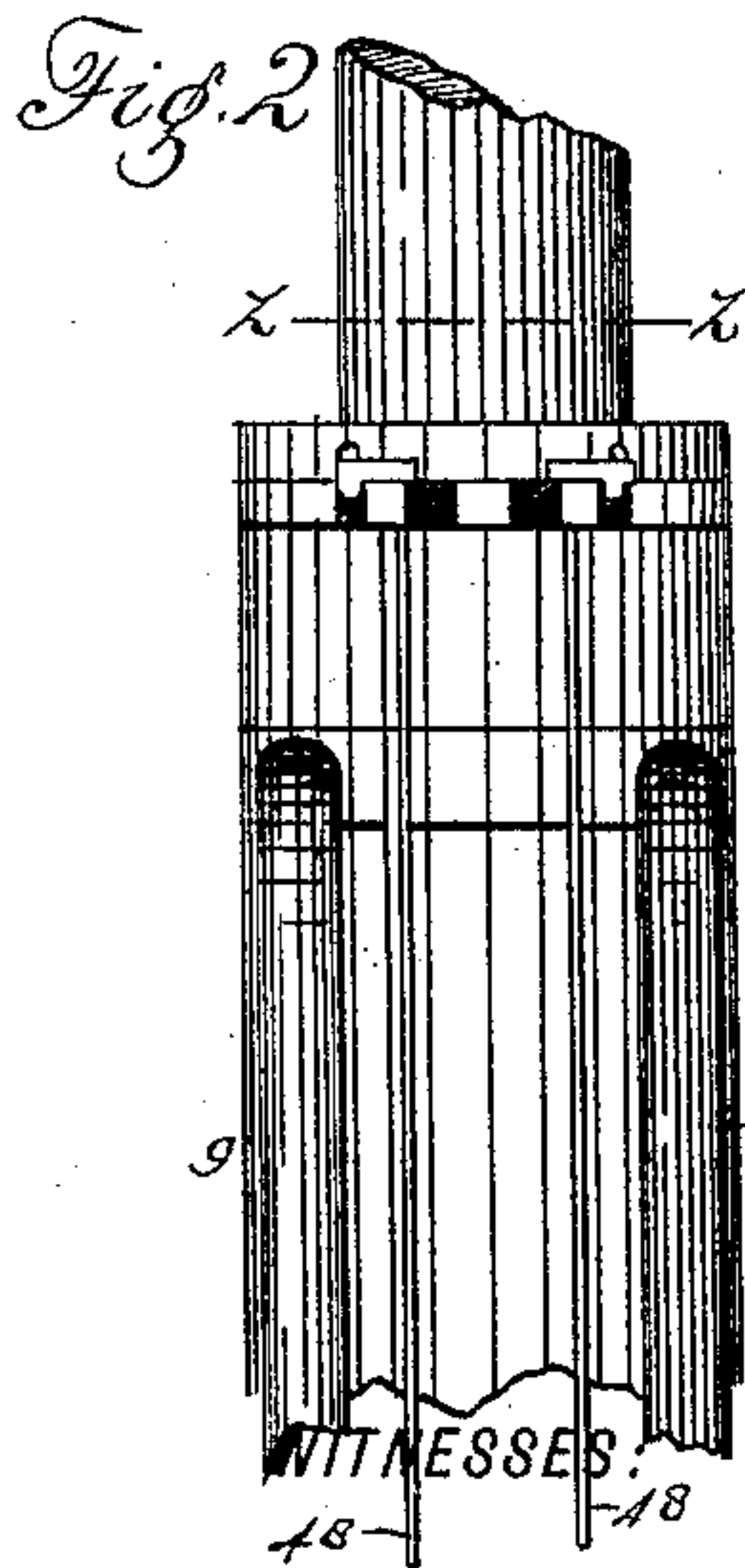
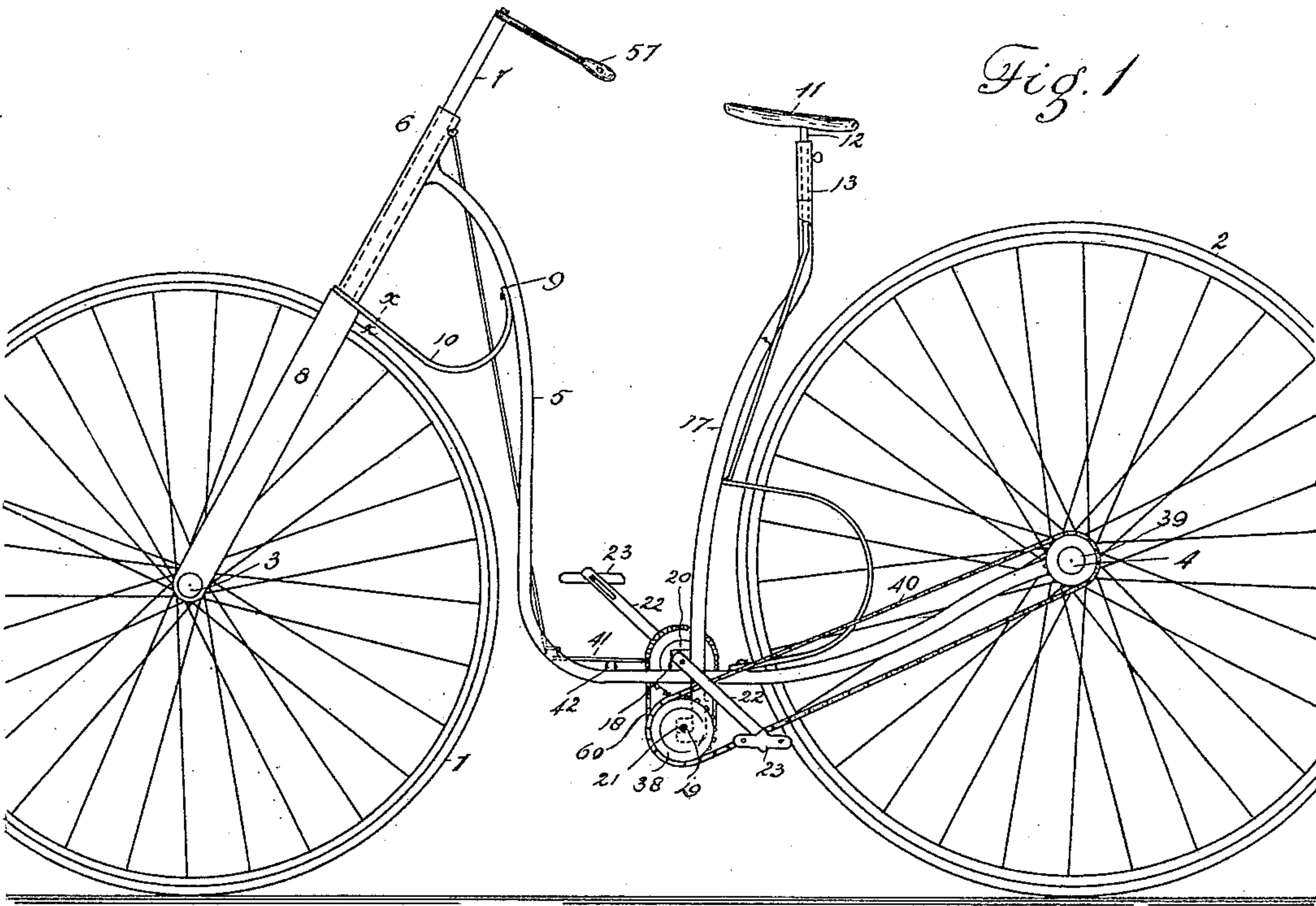
(No Model.)

2 Sheets—Sheet 1.

N. ROWEN.
BICYCLE.

No. 452,196.

Patented May 12, 1891.



WITNESSES:
G. J. Rolland
Wm. M. Connell

INVENTOR
Nelson Rowen
BY A. J. Brown
ATTORNEY.

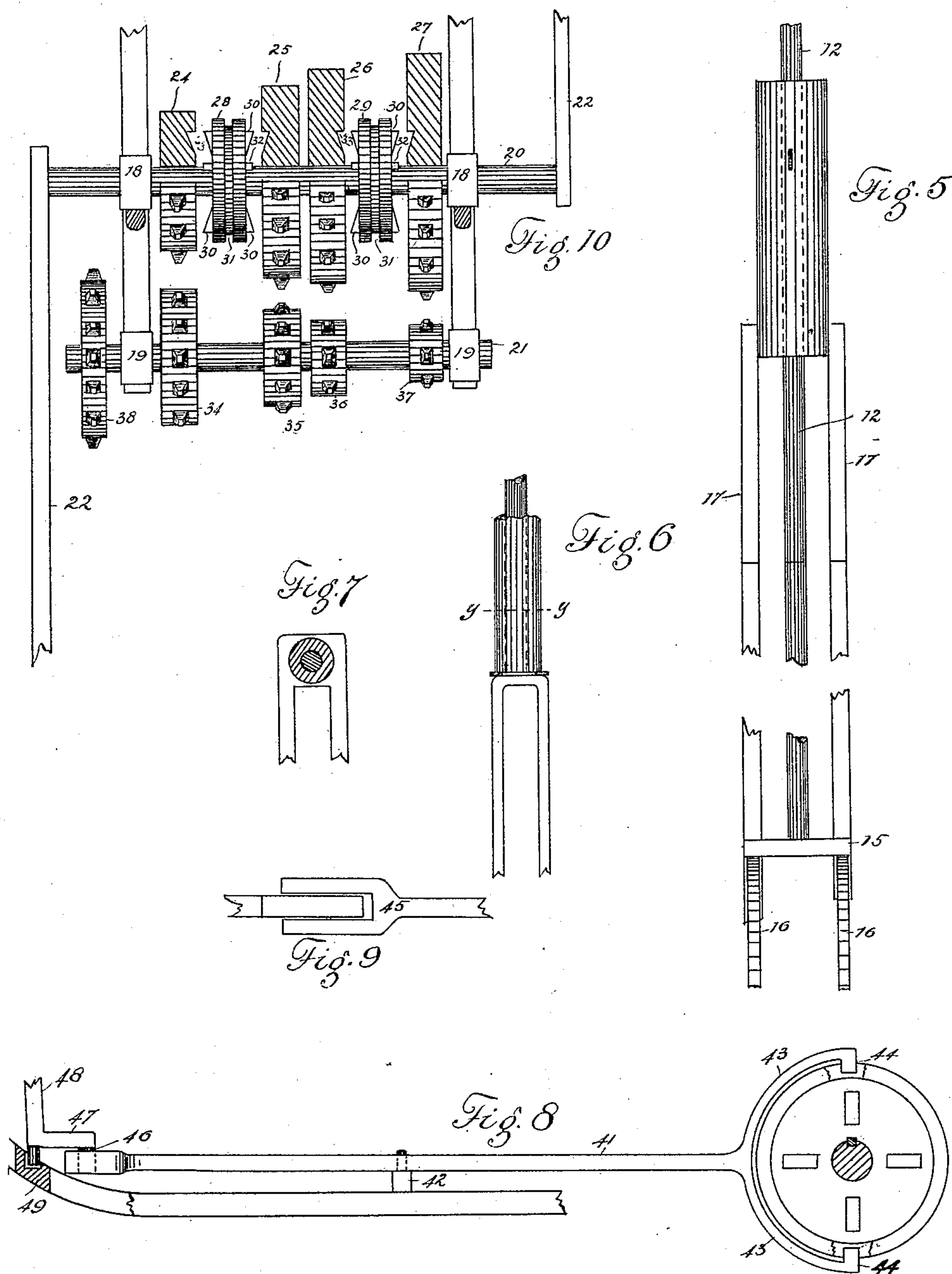
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A. J. O'Brien

ATTORNEY.

UNITED STATES PATENT OFFICE.

NELSON ROWEN, OF DENVER, COLORADO, ASSIGNOR OF ONE-HALF TO
SWAN T. BENSON, OF SAME PLACE.

BICYCLE.

SPECIFICATION forming part of Letters Patent No. 452,196, dated May 12, 1891.

Application filed November 7, 1890. Serial No. 370,700. (No model.)

To all whom it may concern:

Be it known that I, NELSON ROWEN, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Bicycles; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in bicycles of the class in which motion is communicated from the pedal or driving shaft to the shaft upon which one of the wheels is mounted. The speed of these machines or the number of rotations of the driven shaft for each rotation of the driving-shaft is usually determined by the relative sizes of the sprocket-wheels on the two shafts, these wheels being connected by a suitable chain.

The chief object of my invention is to introduce a new system of speed-gearing for these and similar machines, as tricycles, this gearing being capable of such adjustment that the speed of the machine may be changed at the will of the rider without leaving his seat or stopping the machine. This feature is believed to be a valuable one in this class of machines for the reason that the ordinary road traveled by those using them varies greatly in smoothness. Hence it is desirable that the speed of the machine should be correspondingly varied.

My invention consists, further, of the novel form and construction of frame for this class of machine, all of which will be hereinafter fully set forth, reference being made to the accompanying drawings, which form a part of this specification, and in which is illustrated an embodiment of my invention.

In the drawings, Figure 1 is a side elevation of a bicycle provided with my improvements. Fig. 2 is a rear elevation, on an enlarged scale, of a portion of the steering-post and its attachments. Fig. 3 is a horizontal section taken on the line *z z*, Fig. 2, looking downward, the parts below the section-line being shown in plan. Fig. 4 is a vertical sec-

tion taken on the line *v v*, Fig. 3, looking toward the right. Fig. 5 is a rear view of that portion of the frame connected with and supporting the seat. Fig. 6 is a section taken on the line *x x*, Fig. 1, the forward parts being shown in elevation. Fig. 7 is a section taken on the line *y y*, Fig. 6. Fig. 8 is a vertical section taken through the driving-shaft, a clutch and means for shifting the same upon the shaft being shown in elevation. Fig. 9 is a plan view of a portion of the mechanism shown in Fig. 8. Fig. 10 is a front or rear elevation, partially in section, of the adjustable speed-gearing.

In these views, wherein similar reference-characters indicate corresponding parts of the mechanism, let the numerals 1 and 2 designate the forward and rear wheels, respectively, of a bicycle. These wheels are of ordinary construction and are provided with suitable axles 3 and 4.

The rear axle is suitably journaled in bars 5 5 of the frame, one on each side of the wheel. These bars constitute the main feature of the frame and extend from the rear axle downward and forward to a point just in the rear of the forward wheel, whence they extend upward and forward to a sleeve 6, through which passes the upper or single portion of the steering-post 7. Bars 5 of the frame are rigidly secured to the sleeve 6, the lower extremity of which engages the top of the forked portion 8 of post 7. This forked part 8 straddles the forward wheel, the axle of which is journaled therein in the usual way.

Secured at a point 9 to each of the bars of the frame is a spring-brace 10. From point 9 each of these springs curves downward and forward to the lower extremity of sleeve 6.

Let the numeral 11 designate a seat secured to the top of supporting-rod 12, passing through a short sleeve 13 and adjustably secured thereon by a set-screw 14. The lower extremity of rod 12 is rigidly secured to transverse support 15, made fast to a pair of bow-shaped springs 16 16, the lower extremity of these springs being respectively secured to bars 5 of the frame, which forms their support, as shown. The lower portion of sleeve 13 terminates in and is provided with a pair

of upright bars 17, rigidly secured thereto, one of said bars being on each side of rod 12. To the lower portions of these bars 17 are secured the journal-boxes 18 18 and 19 19. Boxes 18 support the driving-shaft 20 and boxes 19 the driven shaft 21. The outer extremities of shaft 20 are provided with the usual cranks 22, provided with the pedals 23. Supported upon shaft 20 and between boxes 19 are the sprocket-wheels 24, 25, 26, and 27 and the clutch-disks 28 and 29.

The faces of the disks are provided with teeth or projections 30, while the periphery of each is provided with a circumferential groove 31. Each of these clutch-disks is secured upon the shaft by means of a feather or spline 32, one of them being located between wheels 24 and 25 and the other between wheels 26 and 27. The inner faces of these wheels, or the faces adjacent the toothed faces of the disks, are provided with notches 33, which are the counterpart of the adjacent teeth 30 of the disks. The wheels upon shaft 20 are all loose—that is, they turn freely thereon except when the clutch-face of the wheel is in engagement with the corresponding face of one of the clutch-disks. It will be observed that the wheels on shaft 20, while they may rotate independently of said shaft, must be so secured thereon that they will have no sliding or longitudinal movement.

Secured upon shaft 21, which lies directly beneath shaft 20, are the fast sprocket-wheels 34 35 36 37, connected with loose wheels 24, 25, 26, and 27, respectively. These four pairs of wheels (the two connected wheels being termed a pair) are connected by chains or belts 60 and are designed to illustrate a mechanism for giving four different speeds to the machine for a given number of rotations of the driving-shaft. For instance, wheels 24 and 34 are about the same size, while 25 is about twice the diameter of 35, 26 three times the diameter of 36, and 27 four times the diameter of 37. The proportions given are typical of any others which might be employed and are only mentioned as illustrating the principle of this gearing. Rigidly secured upon shaft 21 and to one side of the other wheels on said shaft is a sprocket-wheel 38, by means of which motion is transmitted from shaft 21 to wheel 2 through the medium of a suitable chain 40, which passes around wheel 38, and also around a similar sprocket-wheel 39, secured to the hub of wheel 2 or formed integral therewith.

The speed of the mechanism is changed by shifting the clutch-disks on shaft 20 to engagement with the desired wheel, this adjustment being accomplished by the following mechanism: Let the numeral 41 designate each of two horizontal levers employed in shifting the clutch-disks. The two levers are exactly alike. Hence only one is shown in the drawings, since the views are side elevations. Each of these levers is provided with a fulcrum 42, secured to a bar 5. The lever is

pivoted upon the upper portion of the fulcrum, which is also provided with a shoulder, which gives the lever the necessary bearing-support at this point. Each lever 41 is provided with a forked extremity consisting of arms 43 43, terminating in lugs 44, which engage the grooves 31 in clutch-disks 28 and 29. This mechanism, while allowing the disks perfect freedom of rotation, permits of their being shifted in either direction by the proper movement of the levers, as will be readily observed. The opposite extremity 45 of lever 41 is bifurcated for the reception of pin 46, projecting downward from a horizontal arm of a rod 48. Arm 47 projects from arm 48 near the lower extremity of the latter arm, which extremity enters a suitable socket formed in a bar 5 or in a cross-bar 49, connecting two bars 5, the cross-bars being shown in section in Fig. 8. The lower extremity of rod 48 turns easily within its socket. The upper extremity of each rod 48 (there being two, one for each lever 41) passes through a suitable opening formed in a notched rack 52, made fast to sleeve 6, and is hinged to a short arm 53, provided with a lug 54 on its under side, said lug being adapted to engage notches 55, formed in rack 52. The outer extremity of each arm 53 is provided with a suitable knob or handle 56, located near the handles 57 of the steering-post and within easy reach of the rider.

When it is desired to put the mechanism in operative position or to change the speed of the machine, the rider lifts one of the arms 53 so as to disengage lug 54 from the rack 52. This arm is now moved from one side to the other so as to turn rod 48 sufficiently to actuate a lever 41, which movement shifts a clutch-disk on shaft 20 so as to engage the desired wheel on said shaft.

I do not wish to limit myself to the mechanism herein shown for shifting these clutches, as I am aware that other suitable mechanism may be engaged to accomplish this purpose, that shown being typical and not exclusive.

Having thus described my invention, what I claim is—

1. In a bicycle or velocipede, the combination, with the frame, of two horizontal shafts journaled therein one above the other, pedals on the extremities of the upper shaft, graduating sprocket-wheels loosely mounted on said shaft, having a clutch-face on either side, sliding clutches mounted and sliding on feathers on the shaft between two sprockets, oppositely-graduating sprockets mounted on the lower shaft immediately below and in line with the loose sprockets, chains passing over and connecting the two series of sprockets, respectively, and a sprocket on one end of the lower shaft for imparting motion to the rear-wheel axle through the medium of a chain, substantially as and for the purposes described.

2. In a bicycle or velocipede, the combination, with the frame and steering-post, of two

shafts mounted in the frame one above the other, sprockets loosely mounted on the upper shaft, having a clutch-face on either side, clutches slidingly mounted on said shaft between two of the sprockets, sprockets rigidly mounted on the lower shaft, chains passing over and respectively connecting the two series of sprockets, levers pivoted on the frame for sliding the sprockets, handles on the upper ends of said levers, and a notched sector-plate on the steering-head with which the handles of the levers are adapted to engage to hold said levers, and clutches in their adjusted positions, substantially as and for the purposes described.

3. In a bicycle, the combination, with a frame connecting the rear axle with the steering-post, a seat supported upon a suitable rod or bar, a pair of bow-shaped springs secured at their lower extremity to the frame connecting the front and rear portions of the machine, their upper extremities being connected

by a cross-bar which forms a support for the lower extremity of the rod supporting the seat, a sleeve surrounding the upper portion of said rod and adjustably secured thereto, said sleeve terminating in legs or bars which extend downward, where they are suitably connected with the main portion of the frame, substantially as described.

4. A seat-support for bicycles, consisting of a hollow seat-post, the seat-support slidingly secured in said hollow post, and a rearwardly-reflexed C-spring having its upper end secured to the lower end of the seat-support and its lower end to the frame proper, substantially as and for the purposes described.

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

NELSON ROWEN.

Witnesses:

WM. McCONNELL,
FRED. W. FELDWISCH.