

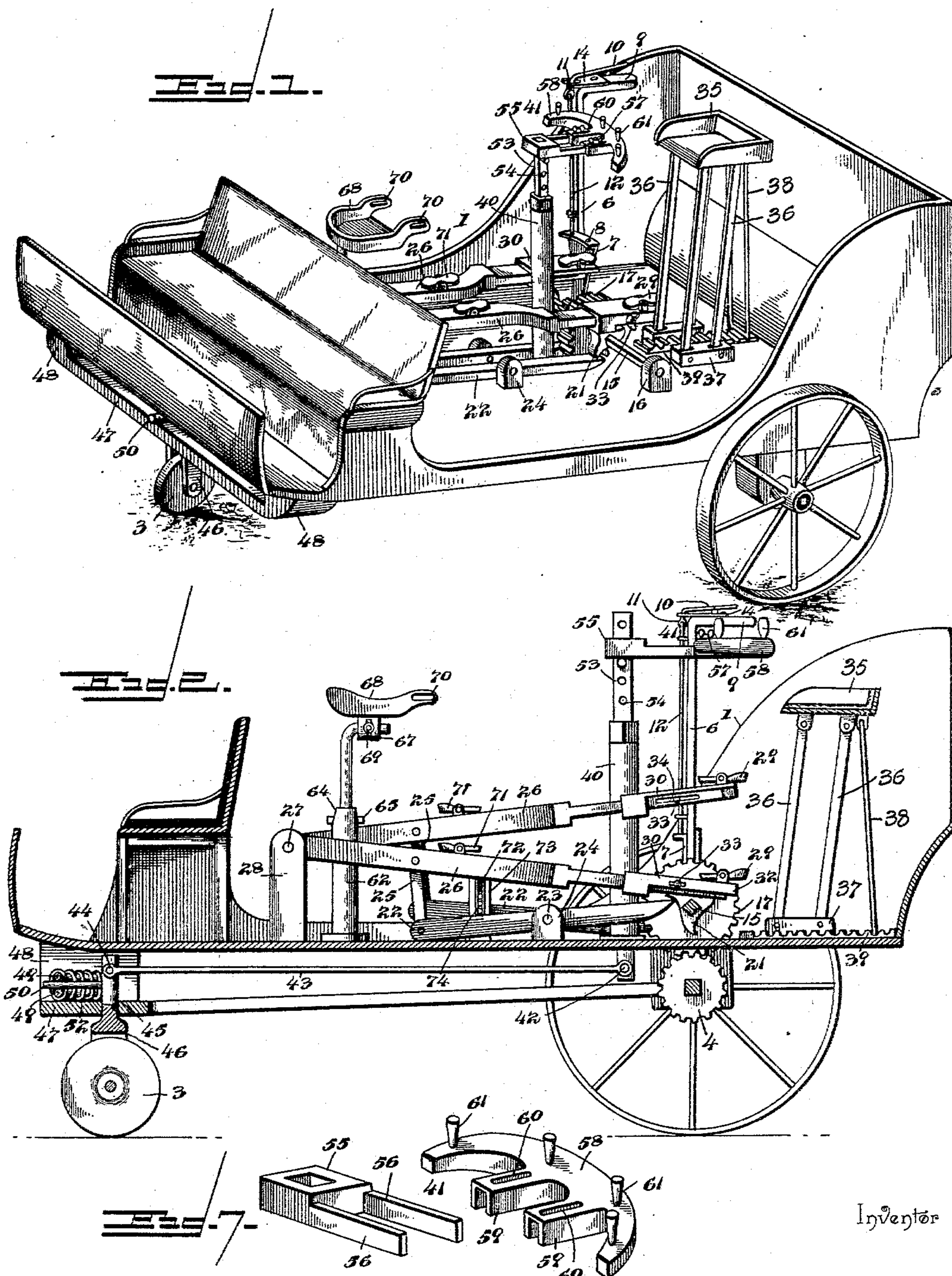
(No Model.)

2 Sheets—Sheet 1.

G. G. J. MILLAR.
FOOT PROPELLED VEHICLE.

No. 565,117.

Patented Aug. 4, 1896.



Inventor

Witnesses
E. H. Stewart
R. M. Smith

By *his* Attorneys.

George G. J. Millar

C. A. Snow & Co.

(No Model.)

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Fig. 3.

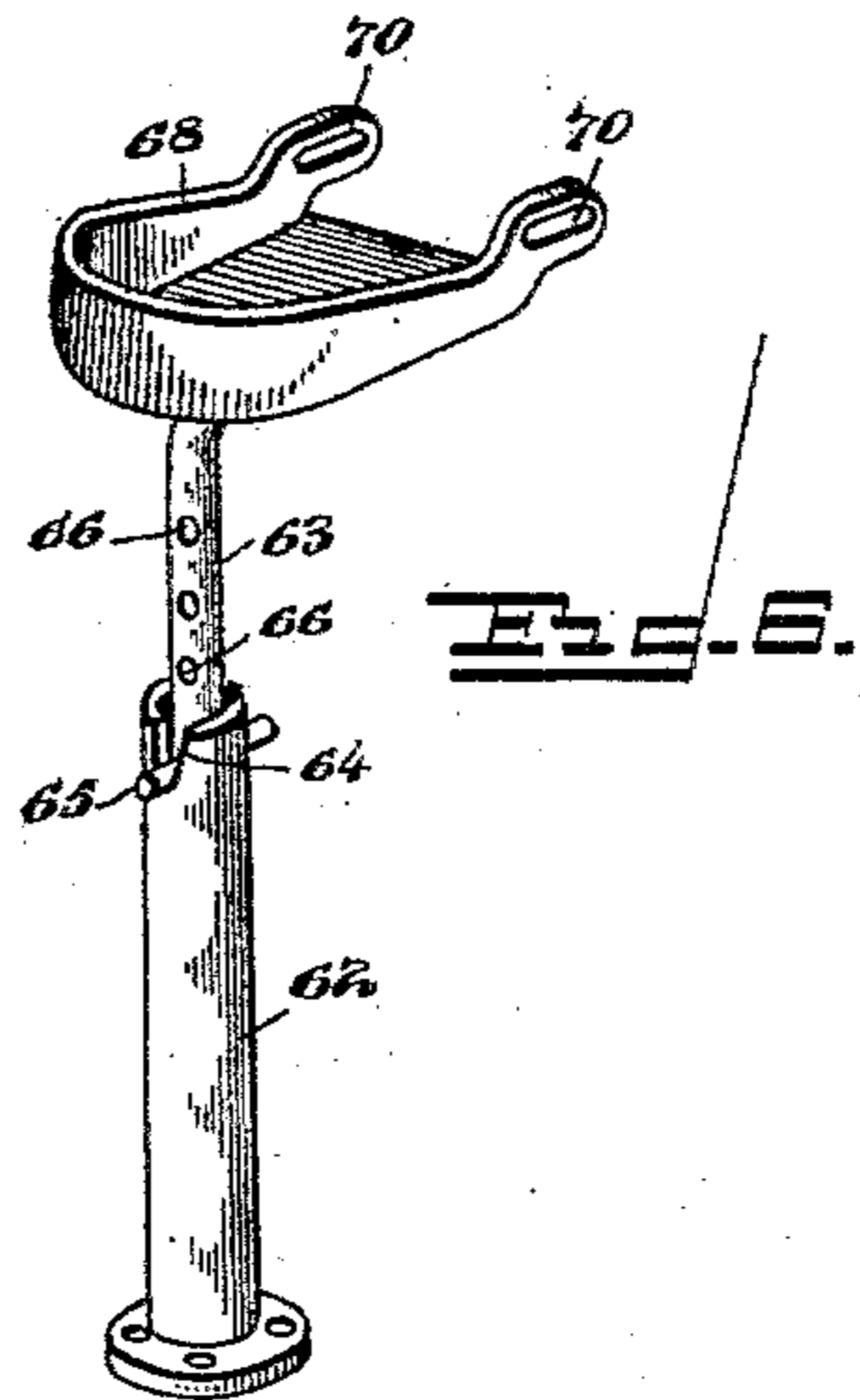
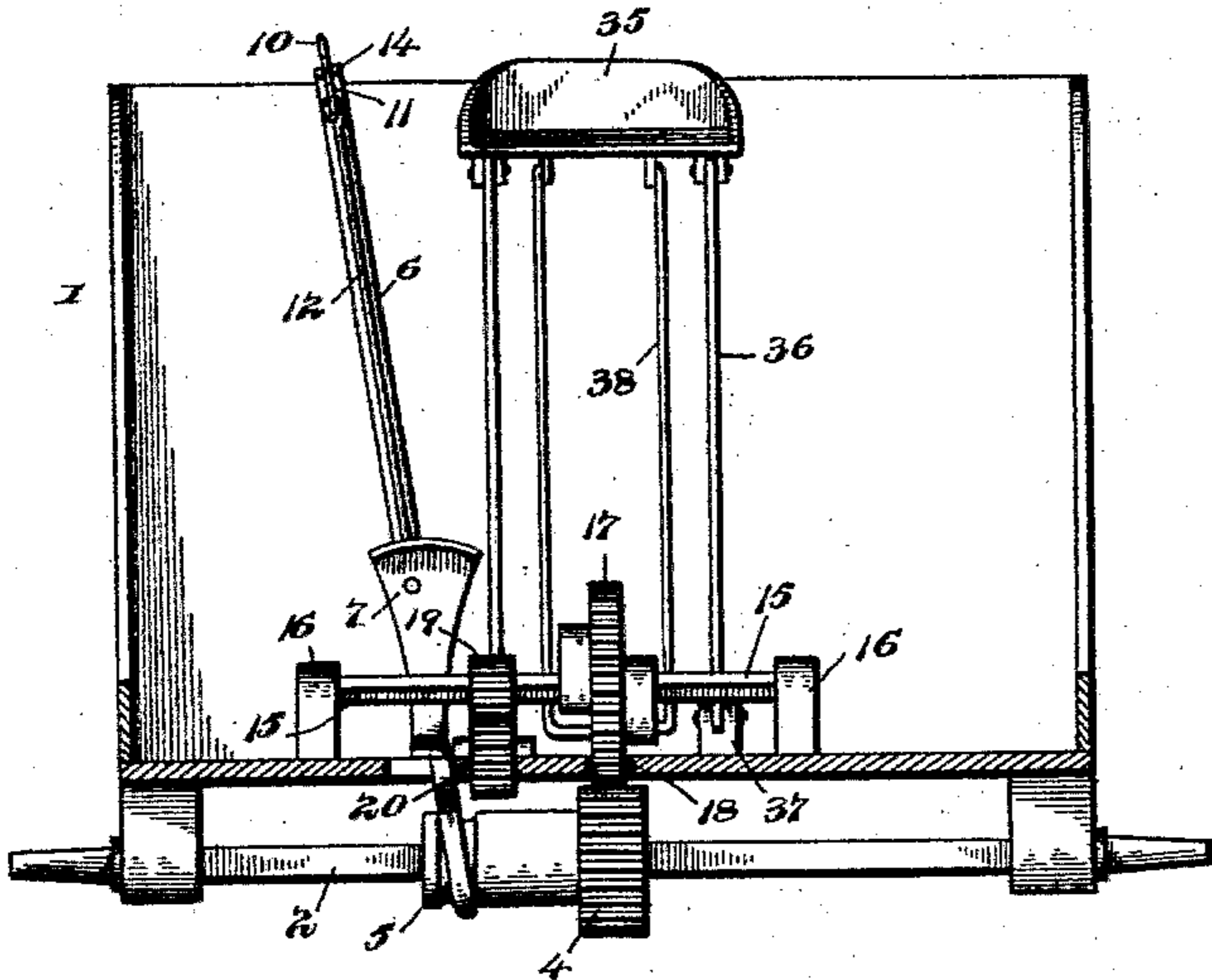


Fig. 5.

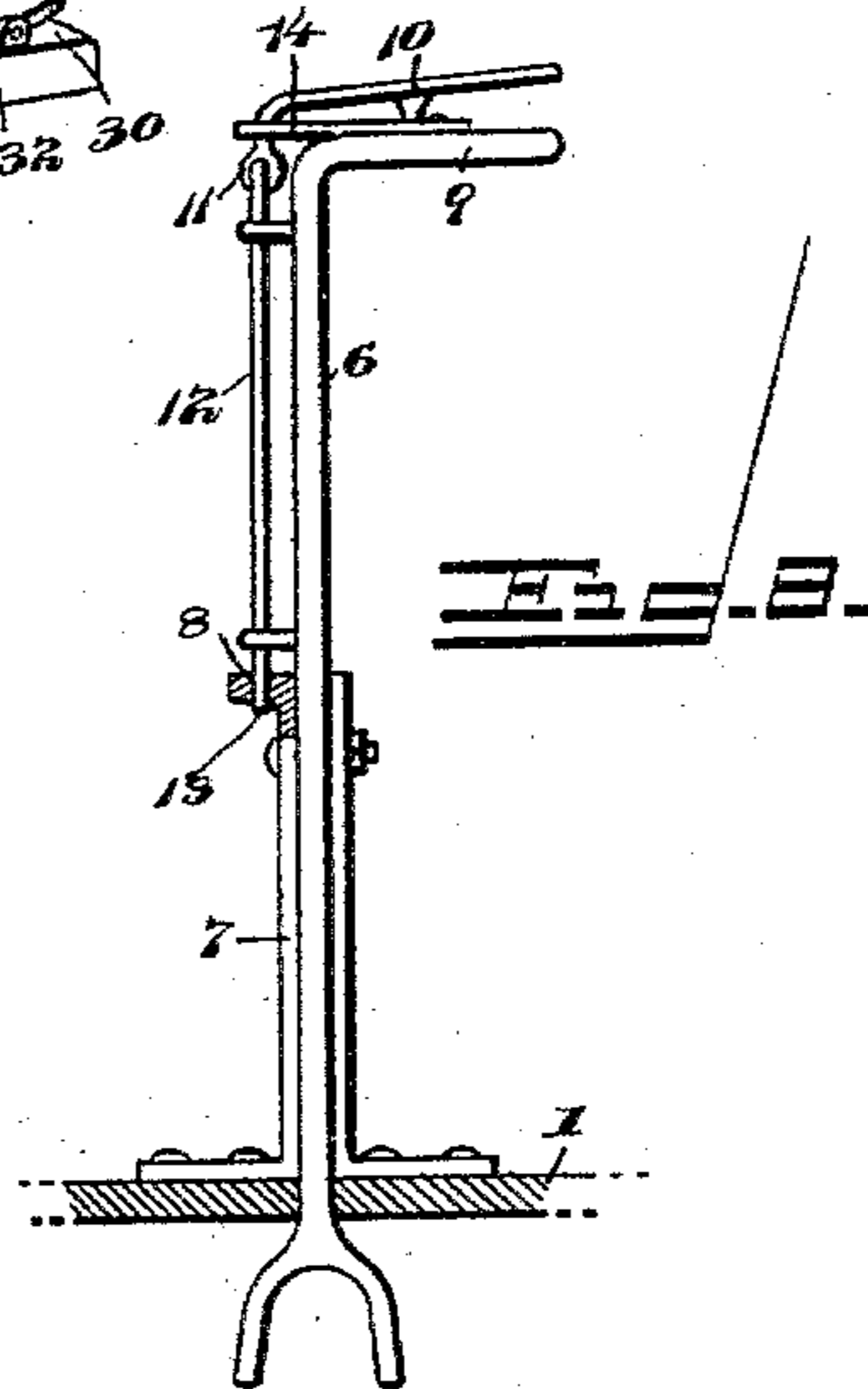
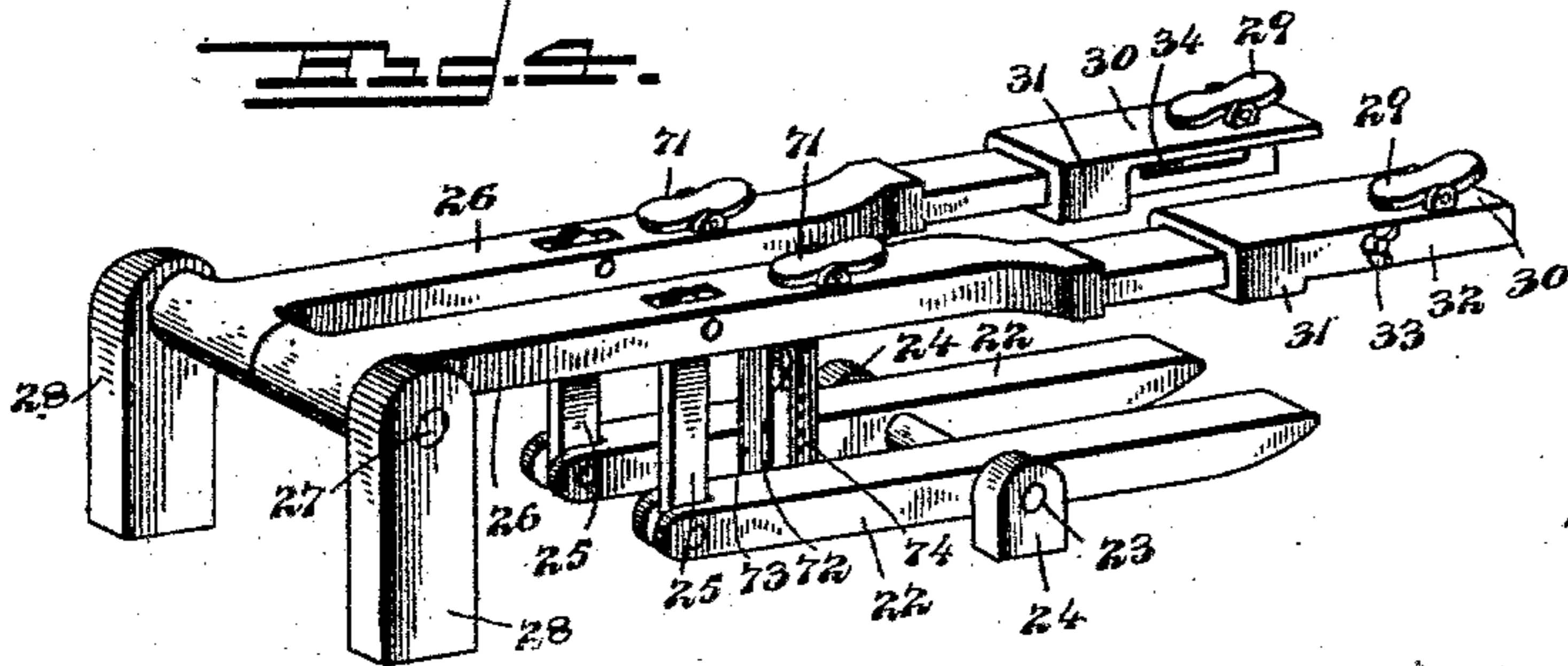
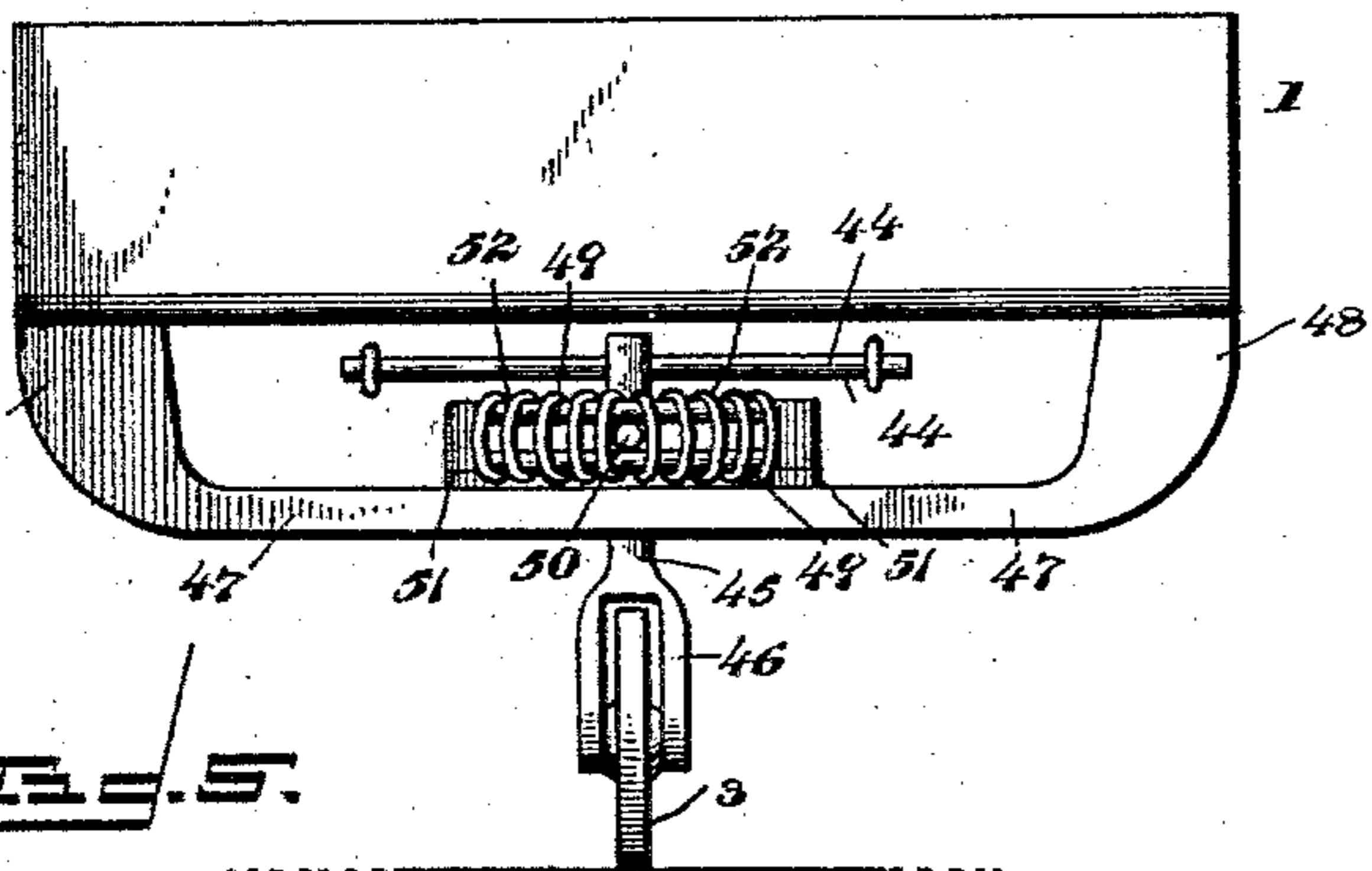


Fig. 5.



Inventor

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UNITED STATES PATENT OFFICE.

GEORGE G. J. MILLAR, OF COLUMBUS, OHIO, ASSIGNOR OF ONE-HALF TO
LUKE G. BYRNE, OF SAME PLACE.

FOOT-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 565,117, dated August 4, 1896.

Application filed April 26, 1895. Serial No. 547,267. (No model.)

To all whom it may concern:

Be it known that I, GEORGE G. J. MILLAR, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented a new and useful Foot-Propelled Vehicle, of which the following is a specification.

This invention relates to that class of velocipedes or foot-propelled vehicles known as "polycycles."

The object of the present invention is to simplify and improve the construction of vehicles of the nature referred to, and to provide one which shall be simple in construction and efficient in operation and be capable of being propelled by means of foot-power with the aid of a system of levers and adjustable gears, combined and arranged in a novel manner and adapted to drive the vehicle at any reasonable desired rate of speed either backward or forward.

A further object of the invention is to provide a novel form of steering apparatus by means of which the vehicle may be properly guided and which will operate automatically to direct the vehicle in a straight line when not otherwise influenced by the operator.

Other objects and advantages will appear in the course of the subjoined description.

In order to accomplish the objects above mentioned, the invention consists in certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and finally embodied in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a vehicle constructed in accordance with this invention. Fig. 2 is a vertical longitudinal section through the same. Fig. 3 is a vertical transverse section adjacent to or in line with the rear driving-axle. Fig. 4 is a detail perspective view of the operating levers and pawls and their connections and attachments. Fig. 5 is a similar view of the front bracket, showing the manner in which the steering-wheel is mounted and the means by which said wheel is influenced. Fig. 6 is a detail perspective view of the assistant's seat, showing the means for supporting and adjusting the same. Fig. 7 is a similar view of the adjustable steering-

head. Fig. 8 is a detail elevation of the shipping-lever for adjusting the wide-faced pinion on the main driving-shaft.

Similar numerals of reference designate corresponding parts in the several figures of the drawings.

Referring to the drawings, 1 designates the body of a vehicle, which, it will be understood, may be of any preferred form or construction and supplied either with three or four or more wheels, as may be desired. The body of the vehicle is preferably constructed in the form of an ordinary two-seat surrey.

In the drawings I have represented the vehicle as mounted upon three wheels, two of said wheels being mounted upon a revoluble axle 2 at the rear of the vehicle and the third or steering wheel 3 being arranged at the forward end of the vehicle and centrally beneath the body thereof.

The vehicle may be provided with the usual hounds and other parts of the running-gear, the axle 2 being mounted loosely in suitable bearings carried thereby and having the rear driving-wheels keyed to the opposite ends thereof.

Intermediate the bearings in which the main driving-shaft is mounted the latter is provided with a wide-faced spur-pinion loosely mounted thereon and adapted to slide longitudinally of said axle and transversely of the vehicle-body. The wide-faced pinion 4 is feathered to the main driving-shaft 2 by providing the same with a polygonal perforation corresponding to the cross-sectional shape of the main driving-axle. The pinion 4 is provided at one side with a hub extension having an annular groove 5, adapted to receive the forked lower end of a shipping-lever 6, said lever extending through an aperture in the floor of the vehicle and upward inside thereof at one side of the center of the vehicle in convenient position to be operated by the attendant, and in such position as not to interfere with the propulsion of the machine by said attendant. The shipping-lever 6 is pivoted between the upper ends of an upwardly-extending pair of parallel standards secured to the floor of the vehicle, and one of said standards (indicated at 7) is provided with a curved upper edge having one or more holes

8, said plate somewhat resembling a segmental rack. The upper end of the lever 6 is extended a short distance at right angles to the main body of the lever, as shown at 9, and has pivoted thereto a centrally-hinged thumb-lever 10, one end of which, adjacent to the elbow of the shipping-lever, is bent downwardly and formed with an eye 11, which receives the upper hooked end of a rod 12, the lower end of which carries a finger or pawl 13, which is adapted to engage either one of the holes 8 in the segment or plate 7. The engagement between the finger 13 and segment or plate 7 is preserved by means of a flat or leaf spring 14, secured at one end to the angular extension 9 of the shipping-lever, and having its opposite end bifurcated or forked to strike the downwardly-bent end of the lever 10, just above the eye 11 thereof, said eye operating as a stop for preventing the rod 12 from lifting when the tension of the spring is not overcome. It will be apparent that the finger 13 may be lifted out of engagement with the plate or segment 7 by pressing upon the free end of the lever 10.

15 designates a shaft arranged within and near the floor of the vehicle above the main driving-axle 2, being mounted at opposite ends in suitable bearing-blocks 16, resting upon and secured to the floor of the vehicle. 17 represents a spur gear-wheel which is keyed to said shaft and is arranged about in the transverse center of the vehicle. Said spur gear-wheel works through an aperture 18 in the flooring of the vehicle and is adapted to mesh with the wide-faced pinion 4, above described, when the latter is properly adjusted.

The shaft 15 is provided with a smaller spur-gear 19, keyed thereto and arranged at one side of the main gear 17, said small spur-gear 19 being constantly in mesh with a corresponding wheel or pinion 20, interposed between the gear 19 and the wide-faced pinion 4, with which it is also adapted to mesh.

From the foregoing description it will be apparent that by adjusting the shipping-lever 6 in one direction, or toward the side of the vehicle, the wide-faced pinion will be thrown into gear with the master spur-gear 17, while by adjusting said lever in the opposite direction, or toward the center of the vehicle, the wide-faced pinion will be thrown into gear with the small spur-gear or pinion 20. Under the former adjustment it will be apparent that as the master-gear 17 is rotated in a backward direction the main driving-shaft and the wheels thereon will be propelled forward, while under the latter adjustment the backward rotation of the master-gear 17 will result in turning the main driving-axle and its wheels in a backward direction for backing the vehicle.

The master-gear 17 is provided upon each side with lateral hub extensions, which are substantially triangular in form, the three sides of the hub, which is indicated at 21,

being each formed in an ogee curve. The hub extensions 21 are so disposed upon opposite sides of the master-gear that the angles or points of one alternate with those of the other. Operating in connection with these triangular hub extensions are a pair of centrally-pivoted levers 22, mounted upon a common shaft 23, extending between a pair of bearing lugs or blocks 24, secured to the vehicle-floor. The rear ends of said levers are projected within the path of the triangular hub extensions 21, and are adapted to operate upon said extensions for the purpose of revolving the master-gear 17 for imparting motion to the main driving-axle, as above described. The forward ends of the levers 22 are bifurcated to receive pivotally the lower ends of suitable links 25, pivotally connected at their upper ends with a pair of lever-arms 26. The lever-arms 26 at their forward ends are journaled on a common shaft 27, supported in a pair of blocks or supports 28, the rear ends of said lever-arms being arranged in convenient position to receive and be acted upon by the feet of the operator. The pedals (indicated at 29) are pivotally mounted upon and have a rocking relation to a pair of adjustable extension-bars 30, the forward ends of which are looped, as indicated at 31, to pass around the lever-arms 26. Each extension-bar 30 is further provided at one side with a depending flange 32, which is perforated to receive a clamping-bolt 33, the latter passing through and capable of longitudinal movement within a correspondingly-elongated slot 34 in the rear end of each lever-arm 26. By means of this construction the extension-bars 30 may be adjusted for a twofold purpose, namely, to bring the pedals directly under or in the desired relation to the operator and to increase or diminish the leverage of the arms 26 by changing the length thereof.

35 designates the operator's seat, which is preferably made of a width to accommodate only a single person. The seat 35 is supported at each end upon a pair of parallel arms 36, which are pivotally connected at their upper ends with the seat and at their lower ends to suitable base-blocks 37. The pivoted arms 36, at each end of the seat, are arranged adjacent to the front and rear edges of said seat, and by this arrangement the seat may be moved forward or rearward without changing the angle thereof in a manner that will be readily understood. The seat 35 may be held at any desired adjustment by means of a brace 38, pivotally connected at its upper end to the seat, and adapted to engage at its lower end with a rack-bar 39, fastened to the vehicle-floor. The object in adjusting the seat 35 is to accommodate persons of different sizes and to bring said seat into the desired relation to the operating lever-arms 26.

40 designates a steering post or rod which is provided at its upper end with a steering-

head 41. The post or rod 40 is mounted in suitable bearings and passes through a perforation in the flooring of the vehicle, beneath which it is provided with a cross-head 42, from which suitable rods, wires, or chains 43 extend forwardly to a similar cross-head 44, connected with the vertical spindle 45 of the steering-wheel. The steering-wheel 3, before referred to, is mounted within a fork 46, arranged beneath and bearing upwardly against the lower face of a bracket 47, secured beneath the vehicle-body at its forward end, and the spindle 45 extends upwardly from the crown of said fork through a vertical perforation in said bracket 47. The bracket 47 is provided at each end with upwardly-extending arms 48, by means of which it is secured to the vehicle-body, and a sufficient space left between the central portion of said bracket and the bottom of the wheel to provide for the attachment of the cross-head 44. In order to keep the steering-wheel in proper position and prevent the same from being accidentally turned sidewise, I provide a pair of substantially semicircular arms 49, spaced a sufficient distance apart vertically to receive between them a pin or stud 50, projecting forwardly from the spindle 45. The arms 49 are connected at their opposite ends and provided with suitable perforated feet 51, by means of which said arms are attached firmly to the upper face of the central portion of the bracket 47. Suitable spiral springs 52 surround both of the arms 49 upon opposite sides of the pin or stud 50, and are so arranged and disposed with relation to said pin or stud that the latter will be normally held projecting forward, thereby keeping the steering-wheel in a straight line. When the steering-wheel is turned to one side or the other, the tension of said springs will be overcome, but when released said springs will return the steering-wheel to a straight line. The upper end of the steering-post is squared, as indicated at 53, and provided with a series of perforations or sockets 54, adapted to receive a pin for supporting a vertically-adjustable bracket 55, to which the steering-head is adjustably secured. The bracket 55 is formed with a pair of rigid arms 56, projecting rearwardly therefrom, and the arms 56 are vertically perforated to receive clamping-bolts 57.

The steering-head comprises a substantially semicircular rim 58, from which a pair of hollow rigid arms 59 extend forwardly, said arms being formed in cross-section in approximately inverted-U shape, adapting them to embrace the arms 56 of the bracket 55. The arms 59 are provided with elongated slots 60, which are adapted to receive the clamping-bolts 57, referred to. By this construction it will be apparent that the steering-head is capable of adjustment not only in a vertical direction, but longitudinally of the vehicle to accord with the position which the operator's seat 35 occupies. A series of upwardly-projecting handles 61, arranged at

intervals around the rim 58, facilitate the manipulation of the steering-head.

62 designates a hollow or tubular pedestal which is arranged between the steering-post and the front seat of the vehicle and is adapted to receive the vertical portion of a seat-post 63. The upper end of the pedestal 62 is provided with oppositely-disposed notches 64, adapted to receive the laterally-projecting ends of a pin 65, which may be passed through any one of a series of perforations 66 in the vertical portion of the seat-post, which may thereby be adjusted in height and at the same time be prevented from turning. The upper end of the seat-post is provided with a horizontal bend or extension for engaging a perforated lug 67, beneath a supplemental seat 68. A set-screw 69, passing through the perforated lug 67, bears against the horizontal extension of the seat-post and holds the seat 68 in place. The seat 68 is provided with rearwardly-extending handles 70, which may be grasped by the assistant for enabling him to apply increased power to the lever-arms 26, the latter being provided with pedals 71, pivotally connected and having a rocking relation to the lever-arms 26, the same as the pedals 29 before described. The seat 68, being intended for use only when the operator requires assistance, is adapted to be readily lifted and removed from the supporting-pedestal 62 and hidden from view when not wanted.

The vehicle above described is very light and simple in construction, is capable of being driven at a good rate of speed by means of the mechanism described, and will be found efficient in use. The lever-arms are adapted to operate alternately and to lift each other by means of a sprocket-wheel 72, mounted in a post 73, arranged between said levers, and having a chain 74 running over said wheel, one end of said chain being attached to one of the levers 22, and the opposite end of said chain being secured to the other lever 22.

It will be apparent that various changes in the form, proportion, and minor details of construction and arrangement of parts may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. The combination with a vehicle-body, of the main driving-axle, a spur gear-wheel mounted thereon, the master-gear arranged within the vehicle and meshing with the gear on the driving-axle, the triangular hub extensions upon said master-gear formed with ogee-shaped faces for affording clearance to the operating-levers, a pair of levers engaging said triangular extensions for revolving the master-gear, and means for operating said levers, substantially as described.

2. In a velocipede, a master spur-gear provided with triangular hub extensions dis-

posed in such relation that the points of one extension will alternate with those of the other, in combination with a pair of levers arranged upon opposite sides of the master-gear and adapted to engage with the points of said hub extensions, and means for operating said levers alternately in opposite directions, substantially as described.

3. In a foot-propelled vehicle, the main driving-shaft having the ground-wheels keyed thereto, in combination with a wide-faced gear feathered to said shaft and provided with a grooved hub, a shipping-lever for moving said gear longitudinally of the axle, a shaft arranged in parallel relation to said axle and provided with a master-gear keyed thereto, a small spur-gear also mounted rigidly on said shaft, an idler spur-gear or pinion interposed between said small gear and the wide-faced gear on the driving-axle and adapted to mesh therewith for reversing the direction of travel, and means for imparting motion to the master-gear, substantially as specified.

4. In a foot-propelled vehicle, a tubular pedestal having oppositely-disposed notches in its upper end, in combination with a seat-post having its vertical portion provided with a series of perforations for the reception of a supporting-pin adapted to rest within said notches, whereby said seat-post and the seat

attached thereto may be adjusted in height and held at the desired angle and also easily removed when desired, substantially as described.

5. The combination with the steering-post having a squared upper end, of a vertically-adjustable bracket having a pair of rigid arms, a steering-head having a pair of grooved arms engaging with the arms of said bracket, and means for adjusting said steering-head relatively to said bracket, substantially as described.

6. The combination with the steering-post having a squared upper end, of a vertically-adjustable bracket on said post having a pair of rigid parallel arms, a semicircular steering-head provided with a pair of arms of substantially inverted-U shape in cross-section and formed with elongated slots for the reception of clamping-bolts providing for the adjustment of said steering-head relatively to the vertically-adjustable bracket, and an adjustable swinging operator's seat, all arranged substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

GEORGE G. J. MILLAR.

Witnesses:

JOHN H. SIGGERS,

E. G. SIGGERS.