No. 633,032. Patented Sept. 12, 1899.

C. E. NEWMAN.

MOTOR VEHICLE.

(Application filed Sept. 16, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

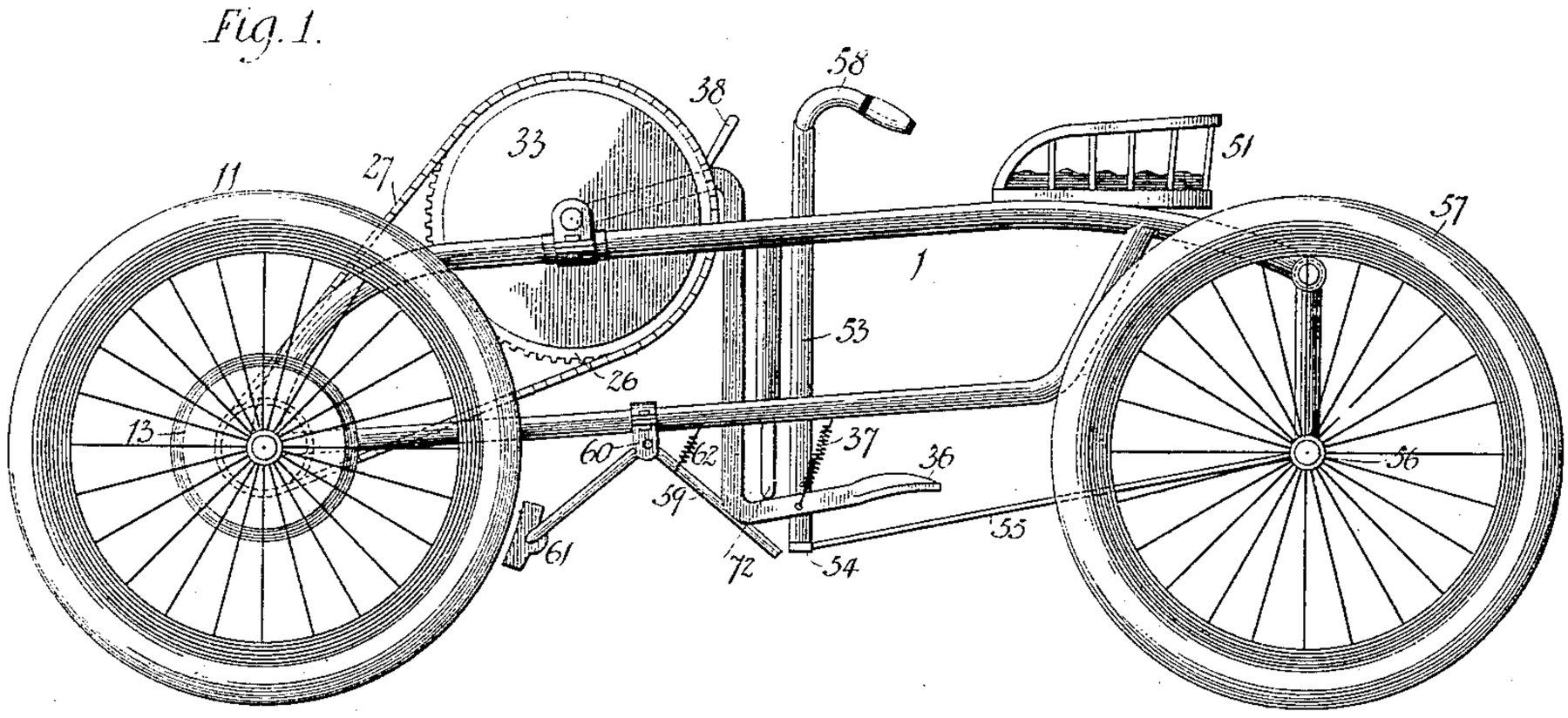


Fig. 2.

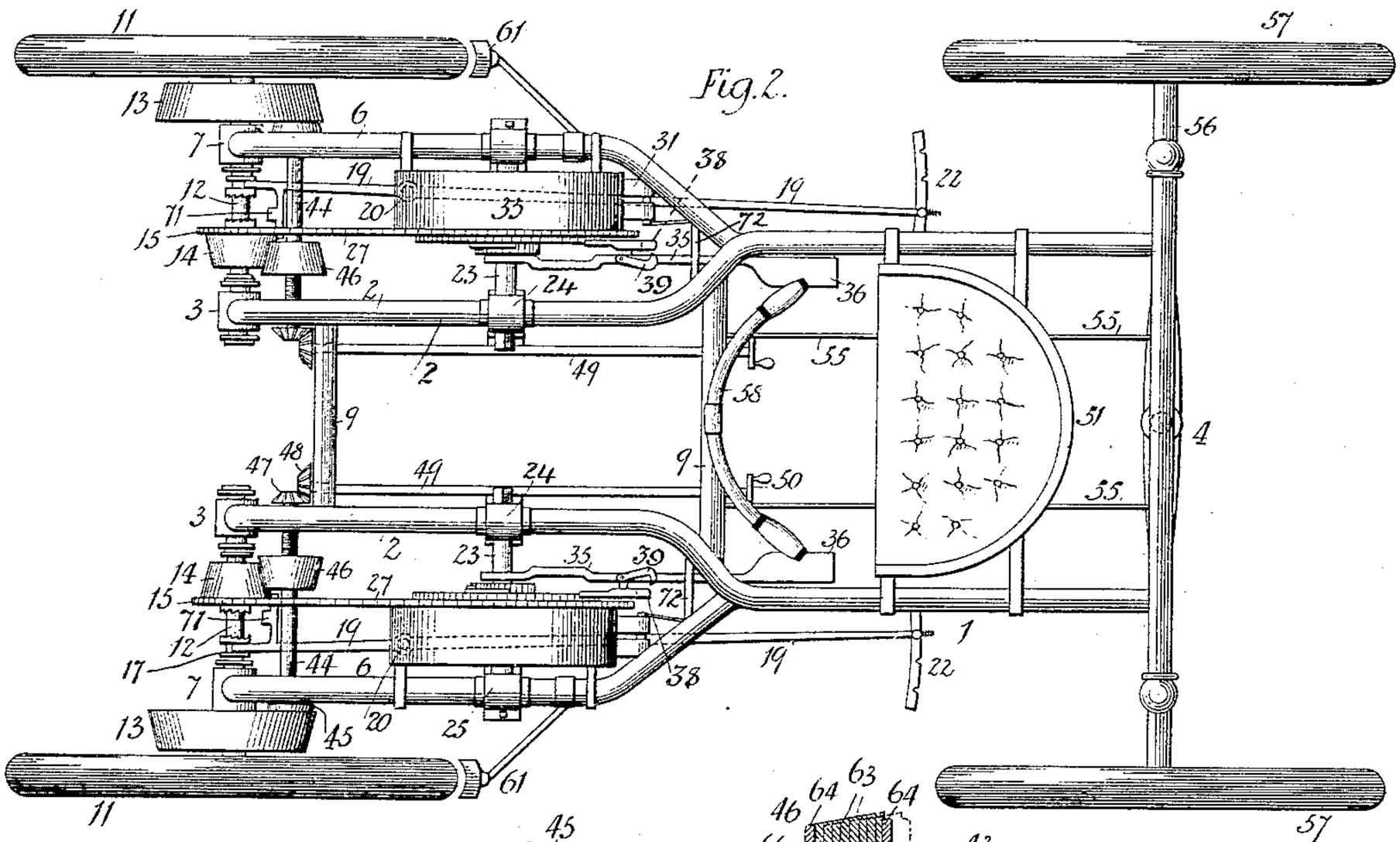
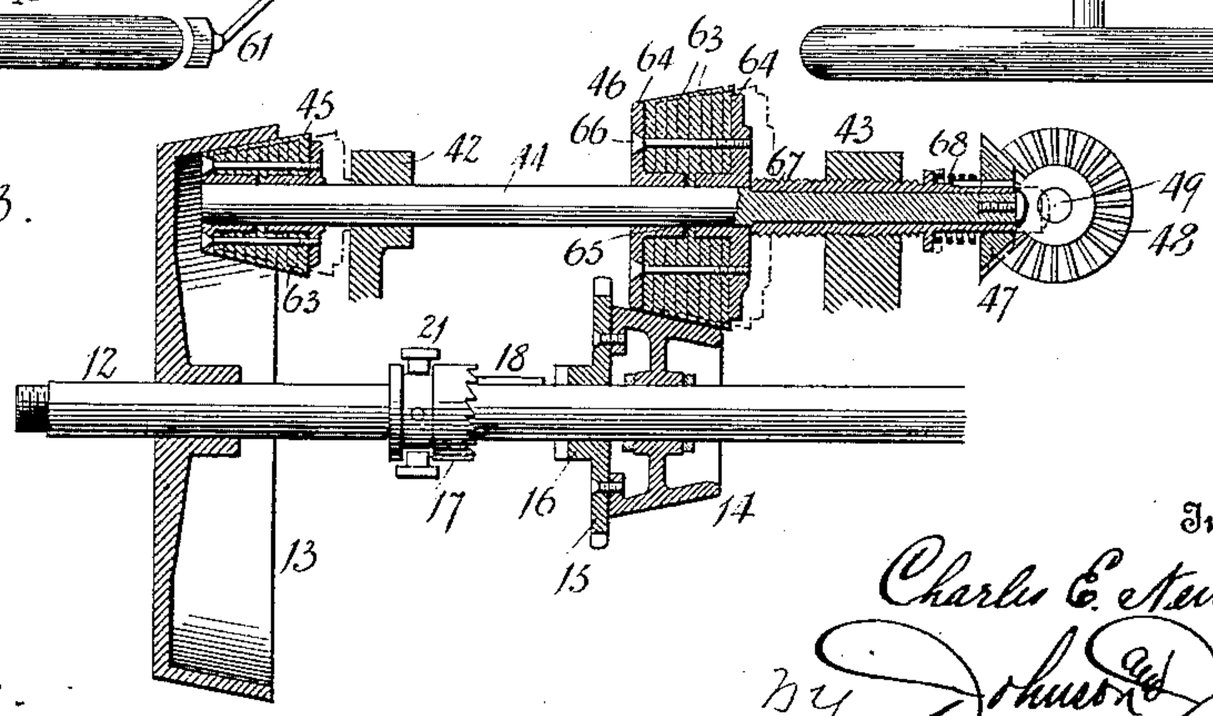


Fig. 3.



Witnesses

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Fig. 4.

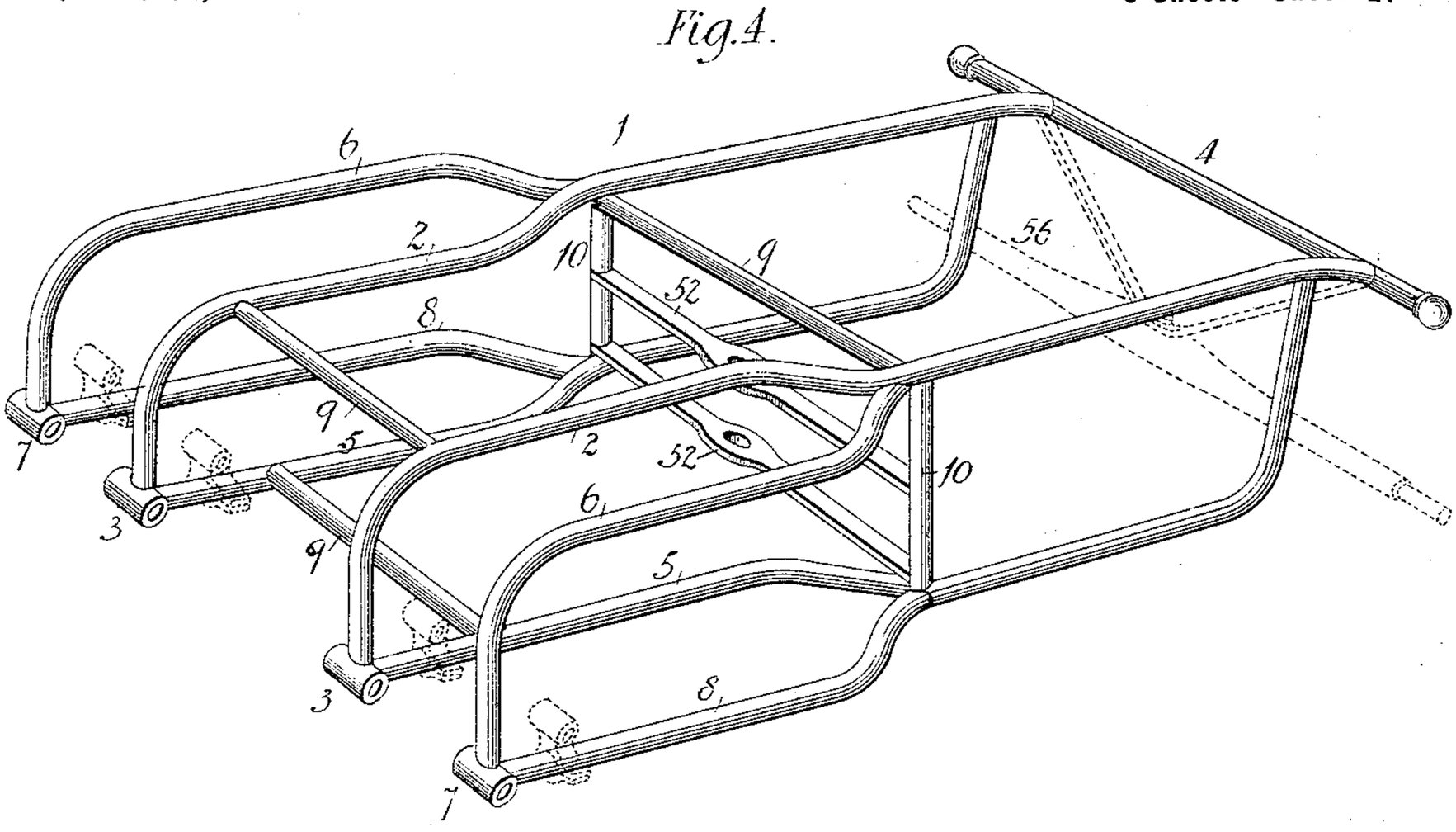

Fig. 5.

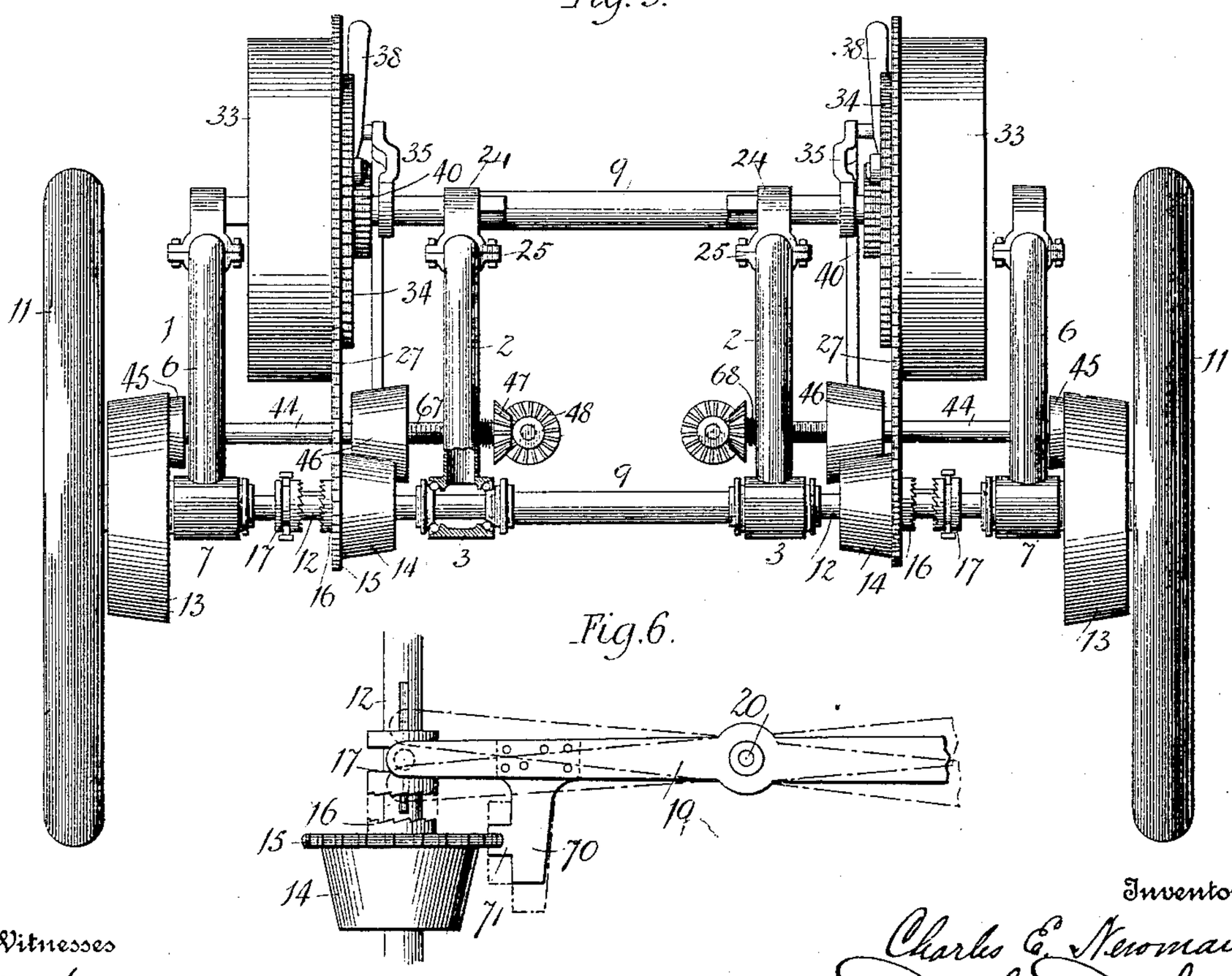

Fig. 6.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

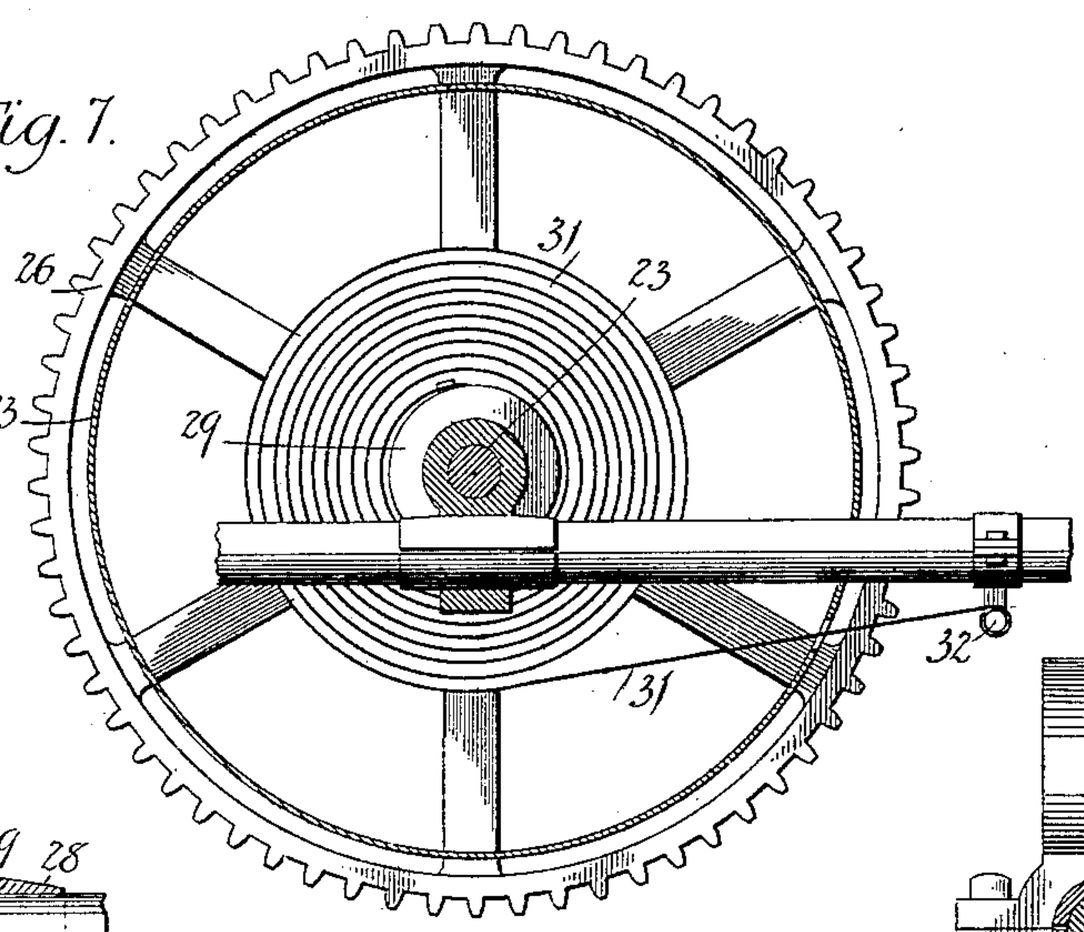

Fig. 10.

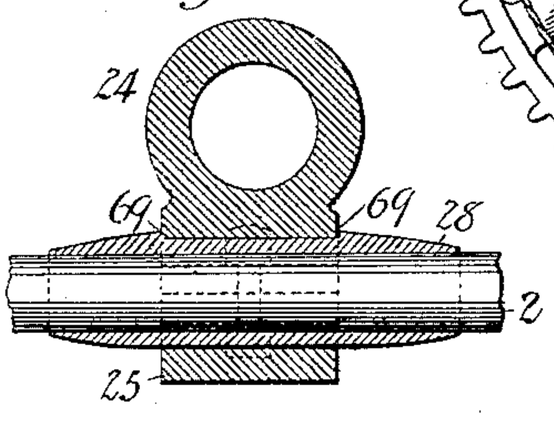

Fig. 11.

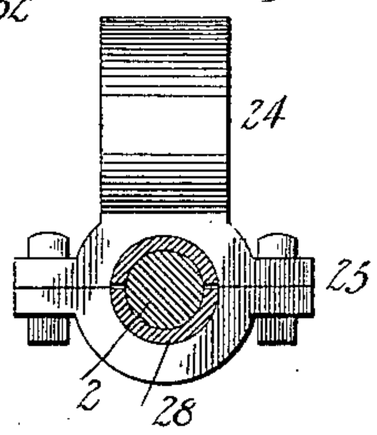

Fig. 8.

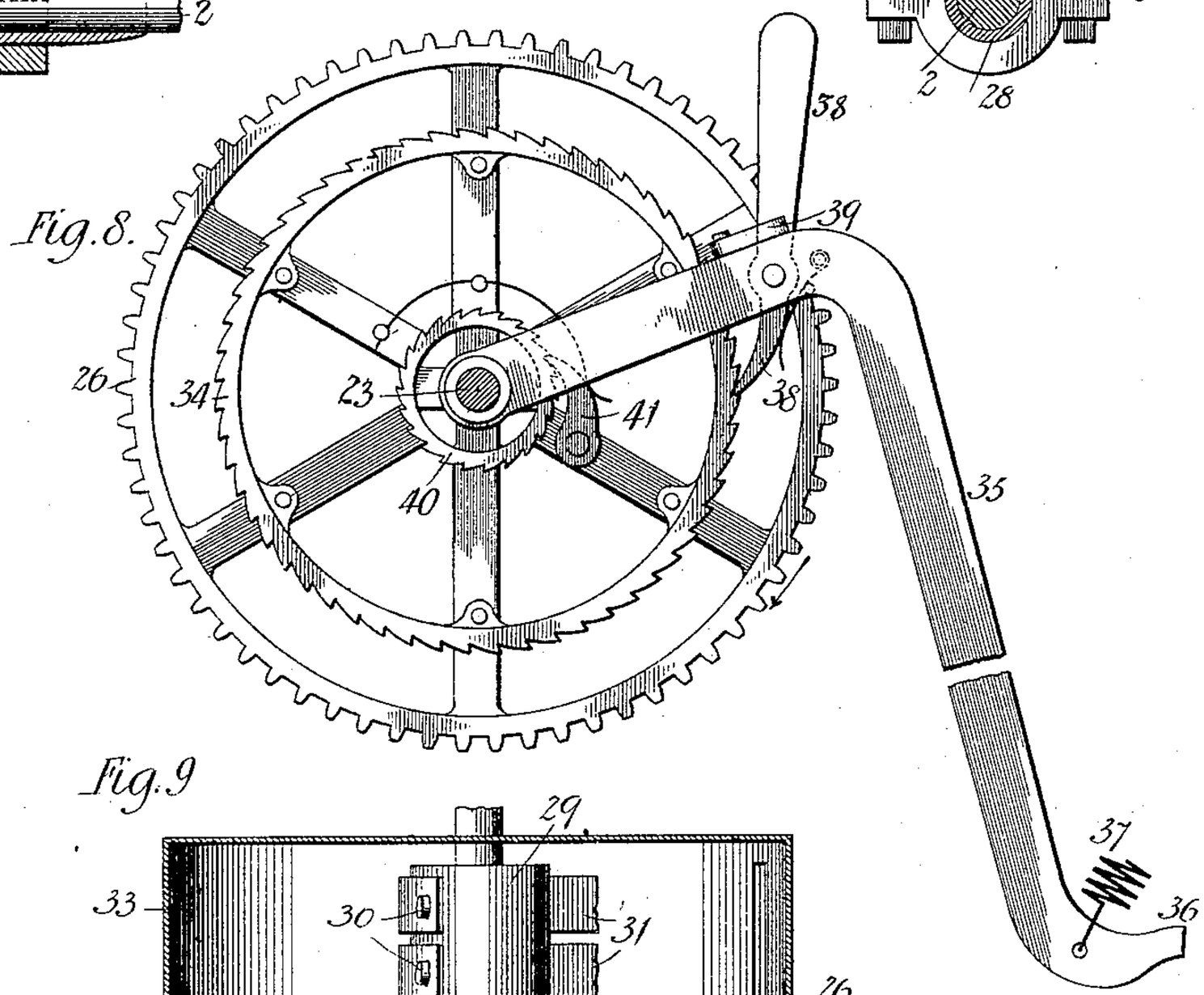

Fig. 9

Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES E. NEWMAN, OF BALTIMORE, MARYLAND, ASSIGNOR TO WILLIAM COLTON AND CHARLES G. HILL, OF SAME PLACE.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 633,032, dated September 12, 1899.

Application filed September 16, 1898. Serial No. 691,076. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. NEWMAN, a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented new and useful Improvements in Motor-Vehicles, of which the following is a specification.

This invention is directed to improvements in the class of velocipedes which are known as "motor-vehicles;" and the object of the invention is the provision of a machine of this character which is possessed of advantages in the direction of simplicity and cheapness of construction and durability and which avoids trains of gear for transmitting the power.

The invention will be fully understood by reference to the following description and the drawings which form a part thereof, and in which—

Figure 1 is a side elevation of a motor-vehicle embodying my invention. Fig. 2 is a top view. Fig. 3 is a sectional view showing the hand-actuated friction-gear engaged with the power-driven shaft 12 to wind the spring by the loose-clutch sprocket-wheel 15 in descending a hill. Fig. 4 is a perspective view of the frame. Fig. 5 is a front view of the machine. Fig. 6 shows the means for locking the loose-clutch sprocket-wheel 15 when the machine is stopped or standing; Fig. 7, an enlarged detail view, in side elevation, of the spring and its sprocket-gear. Fig. 8 is an elevation of the opposite side of said wheel and showing its operating treadle-lever and sprocket and ratchet-gear 34 on the hub of the power-springs. Fig. 9 is a top view of this wheel, said gear, and hub. Figs. 10 and 11 show the adjustable split bearing for the shaft of the power-springs.

Referring to said drawings by numerals, 1 denotes the frame of the machine, which comprises upper members 2, each of which is connected at its forward end with a shaft-hanger 3 and extends upwardly and thence rearwardly and is connected at its opposite or rear end with a cross member 4, lower members 5, each of which is connected at its forward end with the hanger 3 and extends rearwardly in parallel relation to the member 2 and is connected with the latter at a point forward of its connection with the cross member 4, upper side extension members 6, each of which is connected at its forward end with a shaft-hanger 7 and extends upwardly and then rearwardly parallel with the member 2 to a point approximately centrally of the latter and then is bent inward and connected with said member 2, thereby providing with said latter member a bifurcation to permit of the mounting of the propelling mechanism hereinafter to be described, and a lower extension member 8, which is connected to the hanger 7 and extends forwardly in parallel relation to the other frame members to a point approximately centrally to the frame member 5, from which point it is bent inwardly and connected to the latter in a manner similarly described with reference to the member 6.

By reference to Fig. 4 of the drawings it will be observed that the frame members above described are in duplicate, and cross members 9 are employed to connect the two frame portions, thereby securing a framework of sufficient strength and rigidity for the weight and strain to which it is subjected in practice. The frame is braced at such points as receive the most strain, vertical brace members 10, for instance, being provided at the bifurcations.

11 11 denote the driving-wheels, each of which is rigidly mounted on the shaft 12, journaled in the hangers 3 and 7. To minimize the friction at the journals, ball-bearings are provided in the hangers, as in Fig. 5. Fixed to each of the drive-wheels and of course rigid with the shaft 12 is a hollow cone 13, flaring inward, Fig. 3, and loosely mounted upon the shaft, between the bearings, is a cone 14. Fixed to one side of this cone 14 is a sprocket-wheel 15, and beyond said wheel is a clutch member 16.

17 denotes a movable clutch member which is slidable on the shaft to engage the clutch member 16, but is prevented from rotation on said shaft by a spline 18. Obviously by moving the clutch member 17 into engagement with the member 16 the cone 14 will be caused to revolve with the shaft 12. The means for throwing the clutch consist of a lever 19, which is pivoted to the frame at 20, Fig. 2, and is provided at one end with a bifurcation or fork 21, which engages an annular groove in the movable clutch member 17.

The other end or arm of the lever extends forward to a point convenient to the hand of the operator, where there is provided a rack-bar 22, the teeth of which are engaged by the lever. By moving the handle end of the lever the movable clutch is thrown into or out of engagement with the other clutch member, and by the employment of the rack-bar the parts are locked in their adjusted position.

On the frame members 2 and 6, at each side of the machine, is mounted a shaft 23, said shaft being loosely journaled in bearings 24, carried by split boxes 25, which are clamped to the said frame members. On this shaft 23 is fixed the driving sprocket-wheel 26, which is connected to the smaller sprocket-wheel 15 on the front shaft by means of a sprocket-chain 27, and to facilitate the adjustment of these parts to secure tightening of the chain there is interposed between the boxes 25 and the frame members a split sleeve 28, which is longer than the box, and thereby enables the said shaft and its bearings to be moved to the desired position. Adjacent to the sprocket-wheel 26 and fixed on the shaft 23 is a hub 29, provided with pins 30 for connection with the inner ends of two helical springs 31 and 31, the other ends of said springs being secured to the frame at 32. These springs 31 31 are covered by a removable shield 33. On the other side of the sprocket-wheel 26, opposite to the hub 29, is fixed securely a ratchet-wheel 34.

35 denotes a treadle-lever which is pivotally secured at one end on the shaft 23 adjacent to the sprocket-wheel 26, the other end carrying a pedal surface 36 and said other end being normally elevated to the position shown in Fig. 8 by the action of a coiled spring 37, which is connected to said end and to the frame. This lever carries a pawl 38, to which is attached a handle, whereby said pawl may be brought into engagement with the teeth of the ratchet-wheel 34 and when in engagement to cause the rotation of the sprocket-wheel 26 by the downward movement of said lever 35 to wind the spring. In this treadle-winding action the pawl 38 is maintained in engagement with the ratchet-wheel 26 by a spring on the treadle-arm bearing against the pawl; but when the power-driving mechanism is operating then this pawl is moved out of engagement with the ratchet-wheel and is so held by a locking-pawl 39 on the treadle-arm and adapted to be hooked with or engage the handle of said pawl. It will be understood, however, that when this treadle-winding pawl is in function, as in Fig. 8, the clutch-locking lever device 71 is engaged with the loose sprocket-wheel 15, as in Fig. 6, so that the pawl will wind the spring. When, however, the machine is standing, both the pawl 38 and the locking lever device may be engaged to prevent the unwinding of the spring, as in Figs. 6 and 8.

The inner end of each of the shafts 23 is squared for engagement with a crank-handle, and preliminarily to the operation of the machine the springs are wound by the employment of such a device. The power of the springs is communicated by the hub and ratchet-wheel and pawl 40 and 41 to the sprocket-wheel 26 and from said latter wheel to the driving-wheels 11 11 through the chain 27 and sprocket-wheels 15 15, the latter being clutched with the shaft 12. The power of the springs is diminished by their unwinding, and to rewind them either one or both of the pedal-levers 35 are repeatedly depressed in the manner before stated, the hand-pawl 38 being first brought into engagement with the ratchet-wheel 34. In descending grades no power is required to drive the machine, as it is carried forward by its own momentum, and one feature of my invention is to utilize this momentum to rewind the spring, the means for effecting this result consisting of the friction-gearing, certain parts of which have previously been referred to. On the frame members 5 and 8, to the rear of the shaft-hangers 3 and 7, are secured bearings 42 and 43, the latter bearing being threaded. In these bearings is mounted a shaft 44, on the outer end of which is a cone 45, which is adapted for engagement with the hollow cone 13, and 46 is a similar cone on said shaft, which is adapted to engage the cone 14. The inner end of the shaft 44 has a threaded sleeve to engage the threaded bearing 43, and at the extreme end of this shaft 44 is secured on said sleeve a bevel gear-wheel 47, which meshes with a bevel gear-wheel 48, carried by a rod 49, which rod is extended to a point convenient to the operator and is provided with a crank-handle 50. In descending a grade the rod 49 is rotated by hand and with it the gear-wheels 47 and 48, and through the engagement of the threaded sleeve with its threaded bearing the shaft is moved to bring the cones 45 and 46, respectively, in engagement with the hollow cone 13 and cone 14, said latter cone being unclutched from the shaft 12. The rotation of the driving-wheels operates through the cones 13, 45, 46, and 14 and the sprocket-gearing 15, 27, and 26 to rotate the hub and to wind the spring thereon to the desired tension, as I shall more particularly presently state.

A seat 51 is provided at the rear of the frame for the operator, and mounted in front of said seat in cross-bars 52 is a steering-post 53, having at its lower end a bar 54, which is connected, by means of rods 55, with the axle 56 of the rear wheels 57. A handle-bar 58 is secured to the upper end of the steering-post, its handles being within easy reach of the operator.

59 denotes a brake-lever which is pivotally secured to the frame at 60 and carries brake-shoes 61, which are adapted to be brought into or out of contact with the driving-wheels by depressing the outer arm of said lever by means of the foot against the action of a coiled spring 62.

The cones 13 and 14 are preferably of metal,

and, if desired, the cones 45 and 46 may be of this material. To obtain the maximum of frictional contact between the cones, I employ in the construction of cones 45 and 46, at least, contact surfaces of wood or equivalent material. By reference to Fig. 3 it will be observed that each of the cones last referred to are built up of sections of wood the grain of which is presented edgewise, said sections, which are numbered 63 63, being confined between flanges 64 64, formed integrally with sleeves 65 65. Screws 66 66 are passed through openings in one of the flanges and through openings in the sections, and the threaded ends of the screws engage threaded openings in the opposite flanges.

Various other modifications in construction may be resorted to without departing from the spirit of my invention.

By reference to the foregoing it will be observed that the invention is comparatively very simple in its nature, the parts being few in number, whereby is secured cheapness in construction and durability. Moreover, the parts are constructed to be as light as possible, and in consequence the machine may be run at high speed with the expenditure of comparatively little power. When wound to their full tension, the springs will operate to propel the machine a considerable distance, and as the rewinding of the spring may be effected by the exercise of little manual power the machine may be said to be practically automatic in its operation. Perhaps the most important feature of the invention lies in the provision of means for storing power in descending grades, and in hilly localities it is possible by this means to accomplish great distances without the necessity of rewinding the springs by foot or hand power. The devices for controlling the various mechanisms are within convenient reach of the operator and are easily manipulated, so that the exercise of skill necessary to the operation of the machine is comparatively slight.

Referring to Fig. 3, the cone 45 is seen in full lines engaged with the inner flaring wall of the hollow cone 13, which thereby drives the shaft 44 by friction, and the cone 46, fixed on said shaft, is engaged with the cone 14, which being disengaged with the clutch is rotated backward by the friction-gear to drive the sprocket-chain to wind the springs of one of the shafts 23. In this way the clutch-cone 14 on the drive-wheel shaft is caused to wind the springs; but when the clutch and the sprocket are engaged and the friction-gear is disengaged, as shown by dotted lines in Fig. 3, then the clutch-cone transmits the power of the spring to drive the machine. In this figure is seen the screw-threaded sleeve 67, fitted to turn loosely on the shaft 44 and by so turning to move endwise and carry with it the shaft to engage and disengage its cones with the cones of the drive-wheel shaft. In this endwise movement of the shaft the sleeve moves with it; but the bevel-gear does not move with the sleeve. The screw-sleeve is caused to slide through the bevel-gear, so that the latter maintains its engagement with the hand-actuated gear 48. For this purpose the screw-sleeve has a spline which engages the gear 47, while a spring 68, coiled on the sleeve, constantly keeps its gear engaged. This endwise movement of the shaft is only sufficient to engage and to separate the surfaces of the cones, and when so engaged the shaft 44 is caused to rotate within the sleeve to transmit the motion of the drive-wheel through the several cones and the sprocket-chain to wind the springs. While the screw-sleeve is rotated by hand, the friction-gear is rotated by the rotation of the drive-wheel under the momentum of the machine, and it is obvious that the sleeve may be rotated by any suitable means.

The provision of the split sleeve 28 (shown in Figs. 10 and 11) as a seat and bearing for the box of the motor-shaft gives the advantage of forming a long clamp-bearing on the frame for the box, which being clamped on the split sleeve the latter has a frictional hold on the frame much greater than the box would have, while the box being seated in a recess 69, formed by shoulders, is prevented from slipping thereon, whereby the power-transmitting chain is kept under the required tension.

Provision is made for locking the spring-driven sprocket-wheel 15 when the machine is standing and to prevent the unwinding of the springs when their driving power is not needed. Provision is also made whereby the sprocket-wheel 15 is rotated backward in winding the springs by the friction-gear, and this can only be done when said sprocket-wheel is both unlocked and unclutched by the hand-lever 19 engaging the rack 22. These provisions consist of the sprocket-wheel 15 being free to turn on the drive-shaft, the clutch-lever having a locking-arm adapted to engage the said sprocket-wheel, as illustrated in Figs. 2 and 6. In Fig. 6 is seen a detail of the clutch mechanism by which the sprocket-wheel and its connected friction-cone are brought into and out of engagement with the drive-shaft. It also shows the means for locking said sprocket-wheel to prevent unwinding of the springs when the wheel is unclutched, the machine then standing still, or when it is being moved by its own momentum and the springs are wound to the desired tension. As stated, the loose sprocket-wheel 15 serves to transmit the driving power of the springs to wind them and to prevent them unwinding, and in these functions it is controlled by the clutch and its lever, which as a means for locking the sprocket-wheel has a lateral arm 70, formed with a stop-tooth 71, adapted to be brought by the movement of the clutch-lever into and out of engagement with the teeth of the said sprocket-wheel and hold and release it. The clutch-lever is shown in three positions. That seen in its

middle position in full lines brings its stop 71 between the teeth and locks the sprocket-wheel, thereby holding it against rotation by the springs, while the drive-shaft at the same time being unclutched from said wheel the machine is free to move without being effected by or controlling the action of the springs. In dotted lines are shown the two other positions to which the clutch-lever and its locking-arm can be adjusted. That showing the clutch engaged clutches the sprocket-wheel to the drive-shaft and moves the clutch-lever stop so as to unlock the wheel, and this is the position of the clutch when driving by the power of the springs. The movement of the clutch-lever in the opposite direction both unlocks and unclutches the wheel, and this is the position shown by both the clutch-levers in Fig. 2, and this leaves the machine free to move without interference with the springs. It is in this adjustment of the clutch only that the friction-gear is brought into engagement to wind the springs by rotating the sprocket-wheels 15 backward by means of the treadle and pawl.

While I have shown and described provision for locking the springs by the clutch-lever stop-arm, the occupant may effect the same results by putting the treadle-lever pawl 38 into engagement with the ratchet-wheel 34 of the spring-driven shaft, in which event the treadle-lever by its engagement with a frame-stop 72 serves to prevent the unwinding rotation of the treadle-winding sprocket-wheel 26, because limited by the frame-stop 72, Fig. 1. The pawl engaging the ratchet 34 will prevent the turning of the spring-propelled shaft. These spring-locking devices may be used separately or together, the one supplementing and reinforcing the other to hold in check the power of the springs.

The treadle-ratchets while giving the advantage of winding the springs afford convenience in connection with the locking device for the sprocket 15 for holding the springs in check when the machine is temporarily stopped, and the hand pawls and levers can be quickly actuated by the occupant. Another advantage in using the treadle-pawls to lock the springs is to prevent the unwinding of the springs in case the clutch is disengaged before the clutch-lever stop is engaged with the loose sprocket.

The clutch-levers may be suitably held in engagement with the rack-bars, and when the machine is not in use the springs can be unwound by unclutching and unlocking the loose sprocket-wheel and disengaging the hand-pawl, in which case the brakes can be applied to prevent too rapid unwinding.

Although I have specifically described the construction and arrangement of the several elements of my invention and which I believe to be the best means now known to me for carrying out my several improvements separately and in their combinations, yet I wish to be understood as not limiting myself to the exact construction and arrangement shown and described, but hold that such changes as might suggest themselves as equivalents would properly fall within the limit and scope of my invention.

I claim as my invention—

1. In a spring-propelled vehicle, and in combination drive-wheels, a shaft for each, a sprocket-wheel loose on each shaft, a clutch on each shaft for engaging said loose sprocket-wheel and shaft, a spring-motor for each drive-wheel, and a winding-shaft for each spring, a sprocket-gear 26 fixed on each shaft, a chain connecting the sprocket-wheels, a winding-ratchet 34 fixed on said shaft, and a treadle-lever loose thereon and having a pawl 38 for engaging each ratchet-wheel 34 and means on said levers for holding said pawls out of engagement.

2. In a spring-propelled vehicle, the combination with the frame, a shaft, a power-spring for driving said shaft, a sprocket-wheel fixed on said shaft, the front drive-wheel and its shaft, a driven sprocket-wheel loose thereon, a clutch adapted to engage said loose sprocket-wheel, and means for controlling said drive sprocket-wheel, of a cone fixed on said loose sprocket-wheel, a hollow cone fixed on said drive-shaft, a second shaft, companion cones thereon, and means for shifting said second shaft endwise to effect the engagement of its cones with the drive-shaft cones, whereby the rotation of the drive sprocket-wheel may be reversed to effect the winding of the power-spring by the momentum of the vehicle.

3. In a velocipede of the class described the combination with a spring-actuated drive sprocket-wheel having chain connection with a sprocket-wheel loosely mounted on a shaft carrying the drive-wheels, a cone fixed to the last-named sprocket-wheel, a cone fixed to said shaft, companion cones mounted on a second shaft adjacent to the drive-wheel shaft and means for shifting said cones to effect their engagement with the companion cones of the drive-wheel shaft, whereby the rotation of the drive-wheel shaft effects the winding of the spring of the drive sprocket-wheel, substantially as described.

4. In a spring-propelled vehicle, the combination with a frame, the drive-wheel and its shaft, a spring-actuated drive sprocket-wheel, a driven sprocket-wheel loose on the drive-shaft, means for clutching the loose sprocket-wheel and its drive-shaft, and means for controlling said drive sprocket-wheel, a cone fixed on the drive-shaft, a cone fixed on the loose sprocket-wheel, a second shaft, companion cones thereon, a sleeve on said second shaft having a screw-thread, a fixed threaded bearing engaging said sleeve, and means for rotating said screw-sleeve to move it and said shaft endwise, to bring its cones into and out of engagement with the driven-shaft cones, whereby to reverse the operation of the drive sprocket-wheel to wind the spring.

5. In a velocipede of the class described the combination with a frame, a drive sprocket-wheel and the velocipede-propelling wheel, a hub fixed to the sprocket-wheel, a spring, one end of which is secured to the hub, and the other end of which is secured to the frame, a ratchet-wheel rigid with the hub, a pedal-lever pivoted at one end on the shaft of the drive sprocket-wheel, and carrying the pawl, adapted to be moved into or out of engagement with the ratchet-wheel, and a spring connecting the pedal-lever and frame, substantially as described.

6. In a spring-motor vehicle and in combination with propelling mechanism including a drive-wheel shaft and a spring-impelled shaft having a fixed sprocket-wheel thereon, of mechanism for winding the spring by the momentum of the vehicle, consisting of the cones 13, 14 on the drive-wheel shaft, the cone 14 being loose and having a sprocket-gear 15, a second shaft having cones 45, 46 a clutch on the drive-shaft for engaging said loose cone, a chain engaging the sprocket-wheels, and means for moving said second shaft endwise to frictionally engage the said cones when the clutch is disengaged.

7. In a spring-motor vehicle and in combination with propelling mechanism including a drive-wheel shaft and a spring-impelled shaft, of mechanism for winding the spring by the momentum of the vehicle, consisting of cones on the drive-wheel shaft, one of which cones is loose and provided with a sprocket-gear, a shaft having cones and a screw-sleeve, free to rotate on said shaft, one of the bearings for said shaft being screw-threaded to engage said sleeve, means for rotating said screw-sleeve to move it, the shaft and its cones endwise to bring the latter into engagement with the cones of the drive-wheel shaft, and a clutch for engaging the loose cone and its sprocket with the drive-shaft.

8. In a spring-motor vehicle and in combination with propelling mechanism including a drive-wheel shaft and a spring-impelled shaft, of mechanism for winding the spring consisting of a ratchet-wheel 34 on said shaft, a treadle-lever 35 on said shaft having a pawl engaging said ratchet-wheel, cones on the drive-wheel shaft, one of which is loose and provided with a sprocket-gear, a shaft having cones and a screw-sleeve, one of the bearings for said shaft being screw-threaded to engage said sleeve, hand-actuated means for rotating said sleeve to move the shaft and its cones endwise into engagement with the cones of the drive-wheel shaft and a clutch for changing the winding action from the treadle-winding mechanism to the friction-winding mechanism.

9. In a spring-motor vehicle and in combination, drive-wheels, a shaft for each, a sprocket-gear loose on each shaft, a clutch on each shaft for engaging said loose sprocket and shaft, a spring-motor for each drive-wheel and a winding-shaft for each spring, a sprocket-gear 26 fixed on said winding-shaft and a pawl for said ratchet-wheel, a chain connecting the sprockets, a fixed and a loose cone on each drive-shaft, and cones mounted on separate shafts movable endwise and parallel with said drive-shafts, for engaging the drive-shaft cones whereby the rotation of the drive-wheels is caused to wind the springs through the sprocket-chain.

10. In a spring-motor vehicle and in combination with propelling mechanism including a drive-wheel shaft and a spring-propelled shaft, a sprocket-wheel free to turn on the drive-wheel shaft, a clutch thereon for said loose sprocket-wheel, a drive sprocket-wheel fixed on the spring-propelled shaft, a chain connecting said sprocket-wheels, means for putting the power-springs under tension and means including and carried by the clutch-lever for disengaging the clutch-lever and for locking the loose sprocket-wheel to prevent the unwinding of the spring.

11. In a spring-motor vehicle and in combination with propelling mechanism including a drive-wheel shaft and a spring-propelled shaft, of a sprocket-wheel free to turn on said drive-wheel shaft a clutch thereon for said loose sprocket-wheel, a drive sprocket-wheel fixed on the spring-propelled shaft, a chain connecting said sprocket-wheels, means for putting the power-springs under tension and means for locking the springs consisting of the ratchet-gear 34 on the spring-propelled shaft and the treadle-lever having the pawl for engaging said ratchet-wheel.

12. In a vehicle of the class described and in combination with propelling mechanism including a drive-wheel shaft and a spring-propelled shaft, of a drive connection for said shafts consisting of the power-springs, a sprocket-wheel fixed on the spring-propelled shaft, a sprocket-wheel loose and the drive-shaft and a chain connecting said sprocket-wheels and a clutch for said loose sprocket-wheel, means for putting the springs under tension and means for locking said springs consisting of the clutch-lever having a stop-arm, the ratchet-gear 34 fixed on the spring-propelled shaft and the treadle-lever having the pawl 38 for engaging said ratchet-gear.

In testimony whereof I have hereunto set my hand this 30th day of July, A. D. 1898.

CHAS. E. NEWMAN.

Witnesses:
MURRAY HANSON,
H. TEBBS.