

No. 610,503.

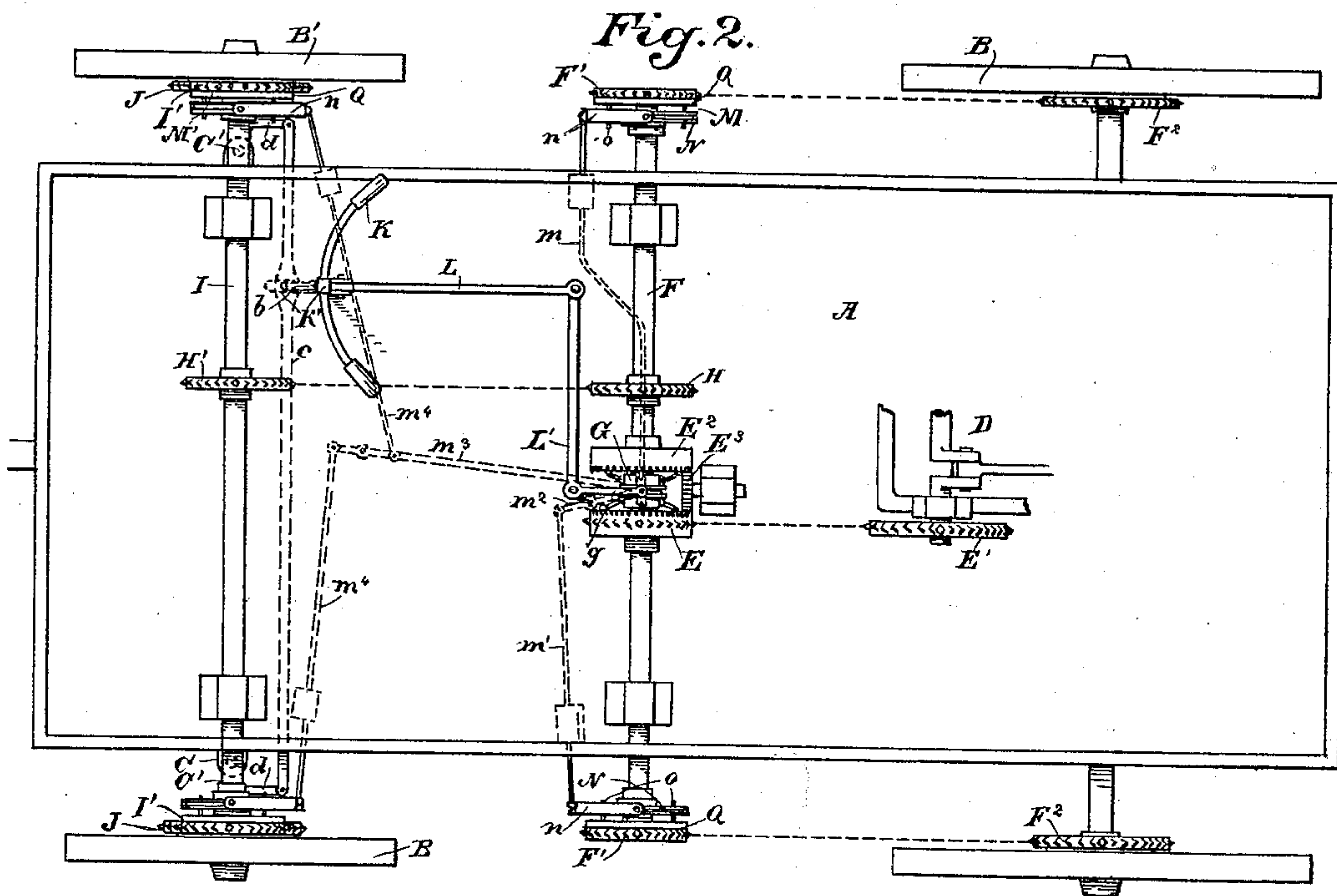
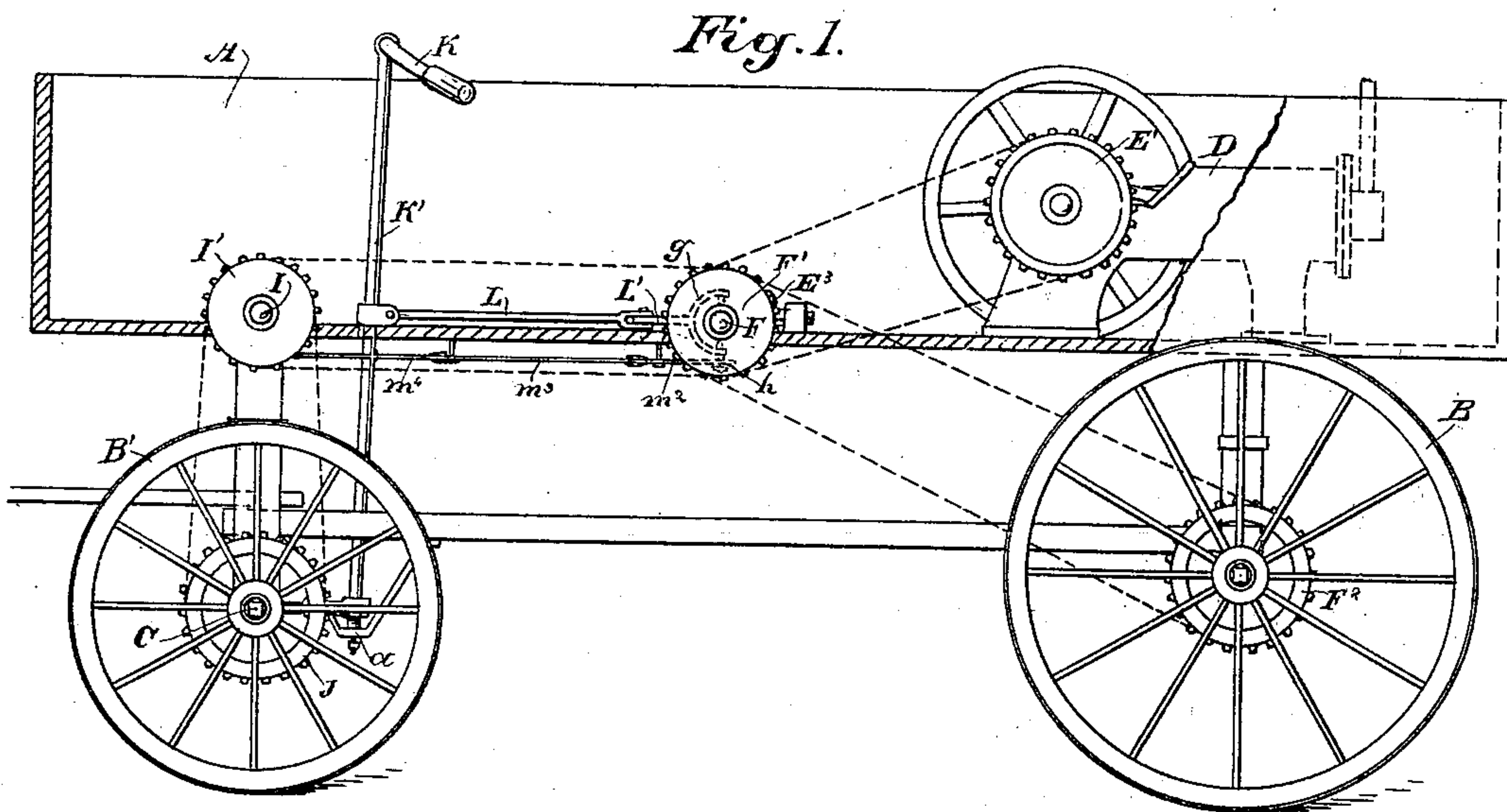
Patented Sept. 6, 1898.

W. E. TWICHELL.  
MOTOR CARRIAGE.

(Application filed Oct. 27, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

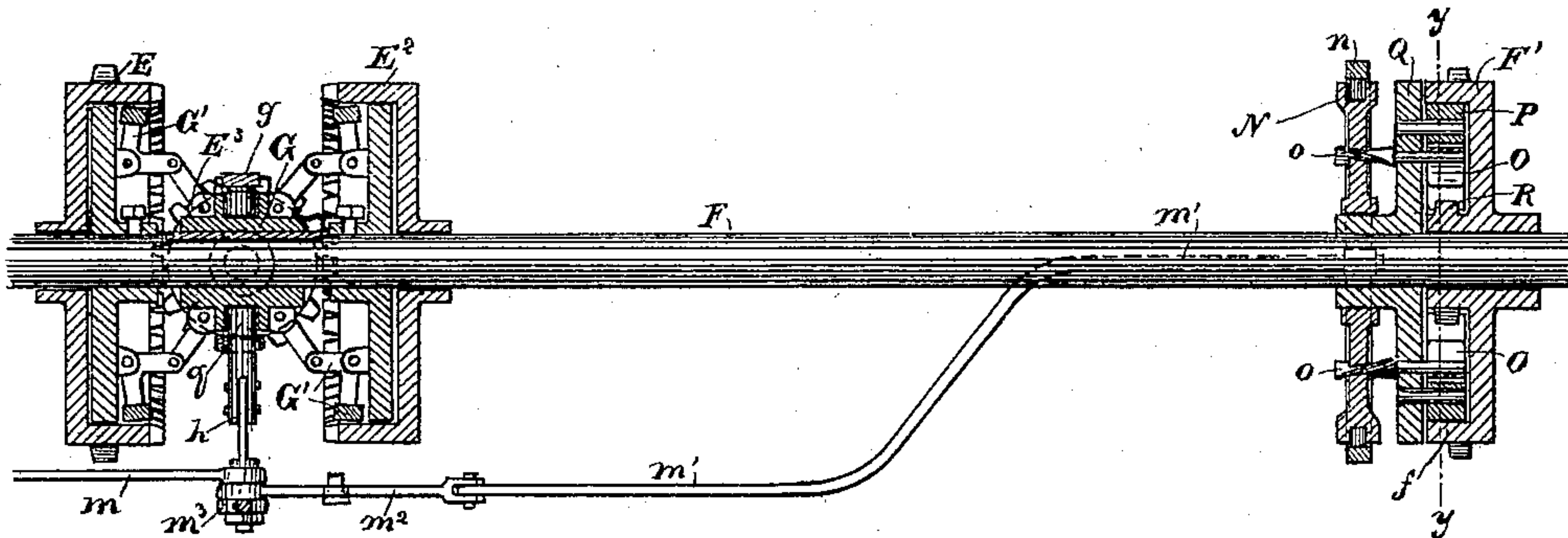


Fig. 4.

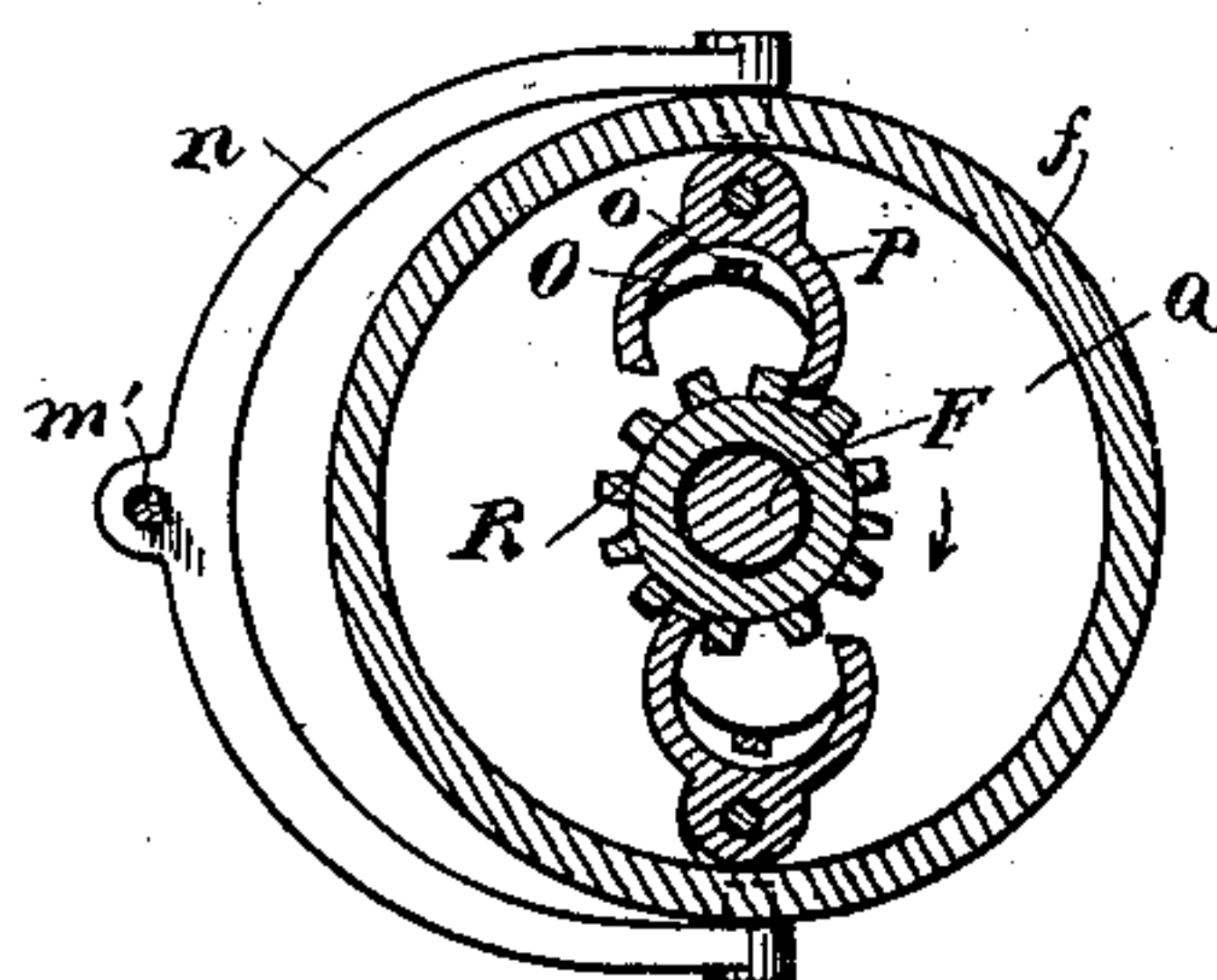


Fig. 5.

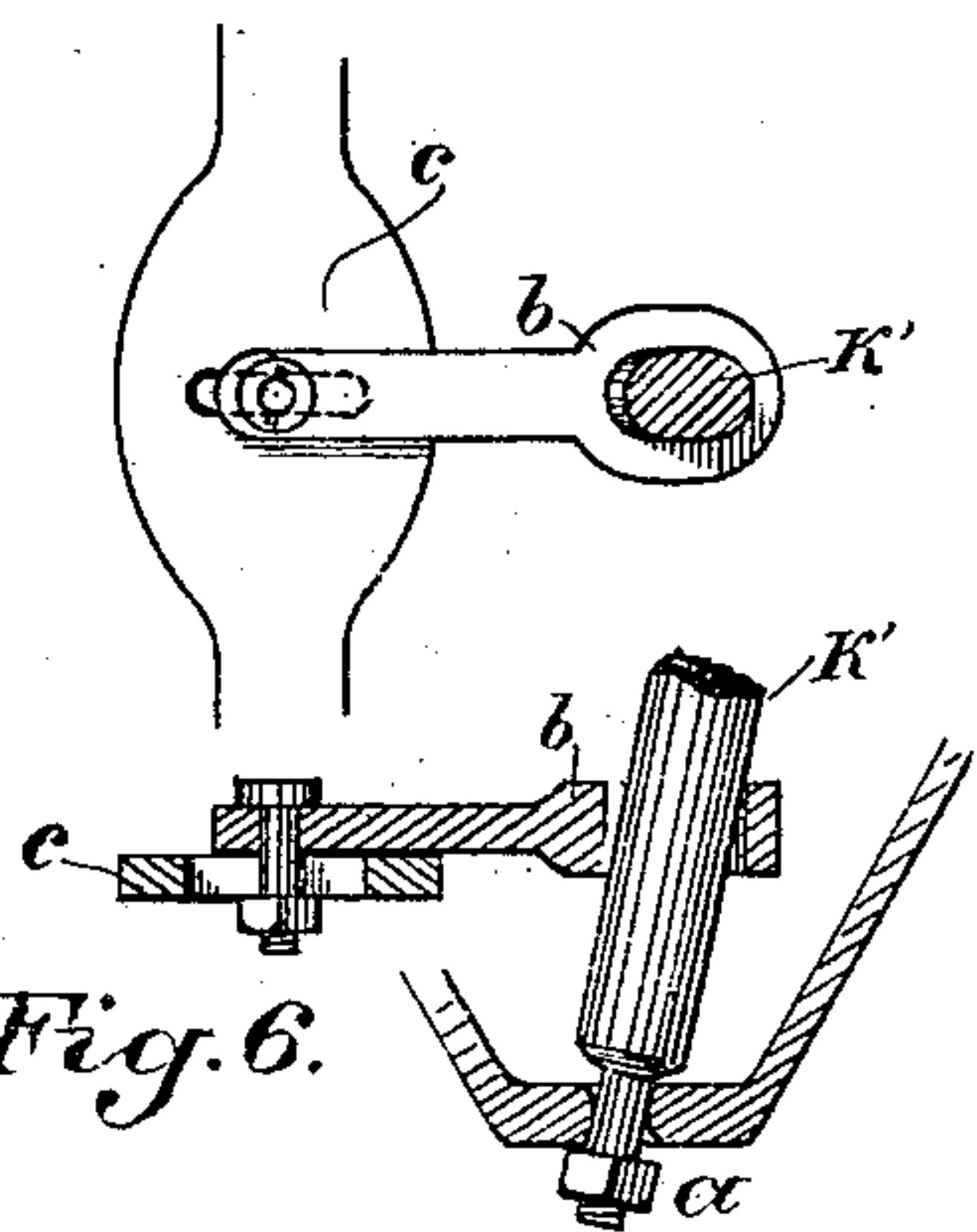
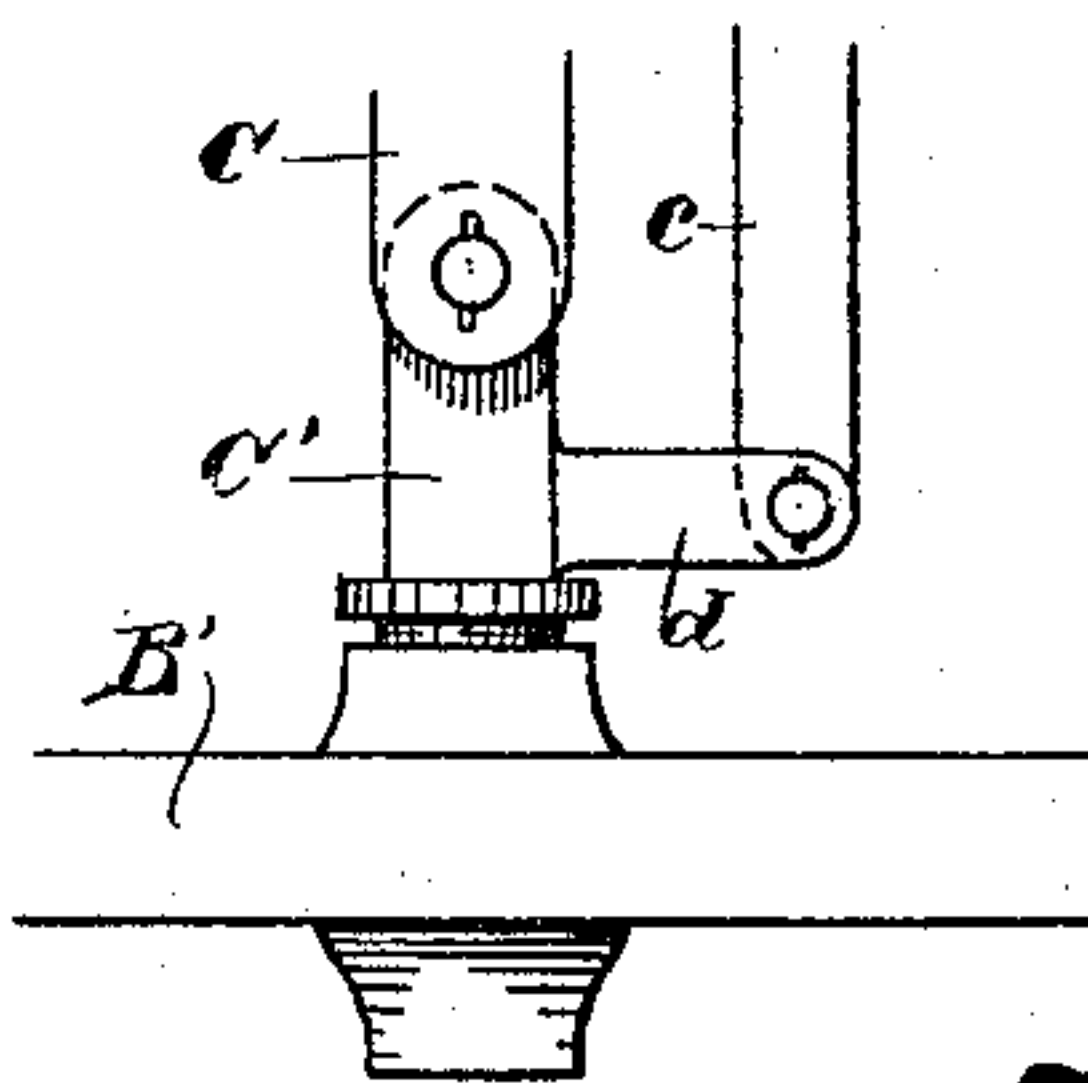


Fig. 6.

Fig. 7.



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# UNITED STATES PATENT OFFICE.

WALTER E. TWICHELL, OF ST. HELENA, CALIFORNIA.

## MOTOR-CARRIAGE.

SPECIFICATION forming part of Letters Patent No. 610,503, dated September 6, 1898.

Application filed October 27, 1897. Serial No. 656,482. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER E. TWICHELL, a citizen of the United States, residing at St. Helena, county of Napa, State of California, have invented an Improvement in Motor-Carriages; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in what are known as "motor carriages or vehicles."

It consists in the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is a side elevation of my carriage. Fig. 2 is a plan of the same. Fig. 3 is a sectional detail of the reversing mechanism. Fig. 4 is a transverse section on line *y y* of Fig. 3. Fig. 5 is a plan of the steering-post with the bar. Fig. 6 is a vertical section through the same. Fig. 7 is a detail of one of the jointed ends of the axle.

My invention is designed to produce an improved mechanism for transmitting the power of any motor—such as gasoline, electric, or other engine carried upon the vehicle—to both sets of wheels, and to thus increase the efficiency of the driving and also to provide improved means for operating the various parts.

A is a vehicle of any suitable description. At the present time I have shown it as mounted upon two sets of wheels B and B', respectively, beneath the rear and front of the vehicle. These wheels turn loosely upon the spindles of the axles upon which they are carried, the rear axle being fixed in the usual manner of vehicles and the front axle C having the ends jointed, as shown at C', so that these ends are turnable about the joints where they unite with the fixed central portion of the shaft.

D indicates a motor of any suitable or desired description, the details of which are not especially shown or carried out, as they form no part of my present invention. From this power is transmitted to a sprocket-wheel E by means of a chain intermediate between said sprocket-wheel and a driving-sprocket E', to which power is transmitted from the engine.

The sprocket-wheel E is mounted upon a counter-shaft F, suitably journaled upon the

vehicle, and power may either be transmitted directly from this sprocket-wheel to the shaft to drive it in one direction or the movement of the shaft may be reversed by means of a clutch G, movable upon a feather on the shaft and so constructed as to engage the sprocket E or the wheel E<sup>2</sup>, so that by means of the intermediate pinion E<sup>3</sup>, which engages with both the wheels E and E<sup>2</sup>, the movement may be reversed. Any suitable or well-known form of clutch mechanism may be employed for this purpose. In the present case I have shown a form in which the clutch G actuates lever-clamps G', which in turn engage the rims E and E<sup>2</sup>. When the clutch is moved in one direction, it engages with the sprocket-wheel E, and motion is directly transmitted through the clutch to the shaft F. When moved to the other side, the clutch in the same manner engages the wheel E<sup>2</sup> and the sprocket-wheel E transmits motion through the pinion E<sup>3</sup>, so as to drive the wheel E<sup>2</sup> in the opposite direction to itself. The reverse motion will be communicated to the shaft F. The clutch may be disengaged from both of the wheels E and E<sup>2</sup> and allowed to stand intermediate between them, when the engine will continue running without transmitting any movement to the shaft F.

Upon the outer ends of the shaft F are sprocket-wheels F', and from these sprocket-wheels by means of intermediate chains motion is transmitted to sprocket-wheels F<sup>2</sup>, which are fixed directly to the rear wheels B.

Upon the shaft F, at a convenient point between its ends, is fixed a sprocket-wheel H, and from this wheel a chain transmits power directly to a sprocket-wheel H', which is fixed upon a shaft I, conveniently journaled beneath the front of the vehicle and approximately in line above the front-wheel axle C.

Upon the outer ends of the shaft I are fixed sprocket-wheels I', and from these sprocket-wheels chains transmit power to sprocket-wheels J, fixed upon the front wheels and communicating motion thereto. Thus through the train of gearing here shown motion is transmitted to both sets of wheels B and B', and greater tractional power is derived for traveling over loose or soft roads or for climbing hills.

The steering and the reversing mechanisms



are both actuated by means of a single handle K, fixed upon the upright shaft K', the lower end of which is stepped at *a*.

*b* is a short lever-arm, the rear portion of which is slotted, and the shaft K' extends down through this slot, being flattened, so that when the shaft K' is turned it will also turn the lever *b*. The slot is also sufficiently long to allow the shaft K to be moved backward and forward within the slot.

The shaft K' has attached to it, at a point considerably above the arm *b*, a connecting-rod L, and this rod again connects with the clutch-lever L', through which movement is communicated to the clutch G to slide it into or out of engagement with the wheels E and E<sup>2</sup>, this being effected by moving the shaft K' backward or forward, as previously described, and the length of the slot in *b* allows of this movement without interfering with the connection of B'. This lever *b* connects with a connecting-bar *c*, extending, respectively, toward opposite ends of the front-wheel axle C, and the outer ends of this bar are jointed to short levers *d*, which connect directly with the hinged ends C' of the axle C. From this connection it will be seen that when the vertical shaft K' is simply turned about its axis it will act through the lever *b* upon the connecting-rods *c*, and these in turn will act through the short arms *d* to turn the front wheels B' and thus steer the vehicle.

In order to allow the wheels upon one side of the vehicle to turn faster than those upon the other when the wagon is being turned to travel in an arc of a circle, I have shown an engaging and disengaging mechanism at M, connecting, respectively, with the gears F' upon the counter-shaft F and also with a similar mechanism M', connecting with the driving-sprockets I', through which power is transmitted to the front wheels of the vehicle. The sprocket-wheels F' and I' turn loosely on their respective shafts and are formed with peripheral flanges *f* and pinions R upon their hubs. Opposite to the flanges are disks Q, keyed to the shafts, and these disks Q carry one or more pawls P, which are adapted to engage the pinions R. A similar-shaped piece O is fastened to the inner portion of the pawls, having a stem *o* extending through the disk Q and also through a second disk N, which is slidable over the hub of disk Q by means of a yoke *n*, the latter being operated by rods *m*'. To that part of stem *o* which projects through disk N is given a little spiral twist, which by moving disk N causes the stem *o* to move axially and force either one of the points of pawl P into engagement with the pinion R, thereby giving the sprocket F' the desired direction of travel. Now if, as shown in Fig. 4, the sprocket F' should require a greater speed this construction will allow it, as the engaging point of the pawl will simply slip over the teeth of the pinion and not stop the greater speed. This compensates the variable speed of the wheels B

in turning corners. The operating-rods for the several sprocket-wheels are all connected with the bottom of clutch-lever fork *g*, the latter having an elastic extension *h*, to which the rod *m*', the lever *m*<sup>2</sup> to operate rod *m*', and also the lever *m*<sup>3</sup> are connected to operate rods *m*<sup>4</sup> and their respective sprocket-wheels, so that when the clutch G is moved to either one side or the other the corresponding motion is transmitted by this lever system to all the end pulleys.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A vehicle-body having front and rear wheels turnable upon their axles, a motor carried upon a vehicle, a counter-shaft journaled to the vehicle-body between the front and rear wheel axles, a sprocket-wheel upon the counter-shaft to which motion is communicated directly from the motor, a second counter-shaft journaled to the vehicle essentially in line above the front-wheel axle thereof, sprocket wheels and chain through which motion is communicated thereto from the first counter-shaft, hinged or jointed ends of the front-wheel axles and mechanism whereby they are turnable about their hinge-points to steer the vehicle, sprocket-wheels fixed upon the outer ends of the second counter-shaft, corresponding sprocket-wheels fixed to the front bearing-wheels essentially in line beneath the second counter-shaft, and chains whereby motion is communicated from the second counter-shaft to the front bearing-wheels and the latter allowed to turn so as to steer the vehicle.

2. A vehicle having mounted upon it a motor, rear wheels loosely turnable upon a fixed axle, front wheels turnable upon short hinged spindles, said spindles having their inner ends connected with a front axle and turnable about said hinges, a mechanism whereby said wheels are turned consisting of lever-arms fixed to the turnable sections connecting-rods extending from said levers to a common meeting-point, a steering-post having a turning handle at the upper end and a flattened portion in its length and a lever-arm uniting it with the meeting ends of the connecting-rods said lever-arm having an elongated opening in which the flattened portion of the post operates whereby the said arm is turned and the post may be moved back and forth.

3. A vehicle having a motor carried upon it, rear wheels turnable upon a fixed axle having sprockets, wheels fixed to them, a counter-shaft with sprocket-wheels upon the ends and chains intermediate between it and the sprockets of the rear wheels, a sprocket wheel and chain through which motion is communicated from the motor to the counter-shaft, a reversing-gear connecting with said counter-shaft, front bearing-wheels turnable upon spindles, the inner ends of which are connected with a front axle and turnable about



their hinge-points, levers projecting from said turnable spindles, connecting-rods extending from said levers to a common meeting-point, a steering-post having a lever-arm uniting it with said connecting-rods whereby the turning of the posts acts to turn the wheels and steer the vehicle, rods connecting the steering-post with the reversing-clutch mechanism of the counter-shaft, said steering-post being movable forward and back as well as turnable whereby the single post is employed to steer and reverse the movement of the vehicle.

4. A vehicle-body mounted upon bearing and steering wheels a motor carried upon said vehicle, intermediate counter-shafts and sprocket-wheels upon its ends through which motion is transmitted to the wheels, a second shaft journaled approximately in line above the front-wheel axle having sprocket-wheels upon its ends through which motion is transmitted to the front wheels of the vehicle and mechanism connecting with the said sprocket-wheels and controllable by a single actuating-lever whereby the sprockets upon one side may be engaged and those upon the other disengaged when the vehicle is turning corners.

5. In a vehicle of the character described, counter-shafts to which motion is communicated from a motor carried upon the vehicle, sprocket-wheels upon the ends of said shafts, and upon the vehicle-wheels with chains through which motion is transmitted, mechanism

by which the counter-shaft sprockets are locked thereto or disengaged therefrom, said mechanism comprising flanges on the sprocket-wheels and pinions on the hubs thereof, and disks on the shafts opposing the sprocket-wheels, and provided with pawls, means for forcing said pawls into engagement with the pinions, and connections between said mechanism and an operating-lever.

6. In a vehicle of the character described, counter-shafts to which motion is transmitted from a motor carried upon the vehicle, sprocket wheels and chains through which motion is transmitted from the counter-shafts to the bearing and driving wheels of the vehicle, interlocking devices upon the counter-shafts and comprising flanges and pinions on the sprocket wheels and disks, with rocking pawls, on the shafts, and means for actuating the pawls, whereby the sprocket-wheels may be engaged to turn with their shafts, or disengaged upon one side so that only one set are operative in making turns, and connections between said interlocking devices and a lever through which they are simultaneously adjusted.

In witness whereof I have hereunto set my hand.

WALTER E. TWICHELL.

Witnesses:

J. J. COUSINS,  
S. H. NOURSE.