

No. 627,282.

Patented June 20, 1899.

W. E. TWICHELL.

MOTOR CARRIAGE DRIVING MECHANISM.

(Application filed Nov. 4, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

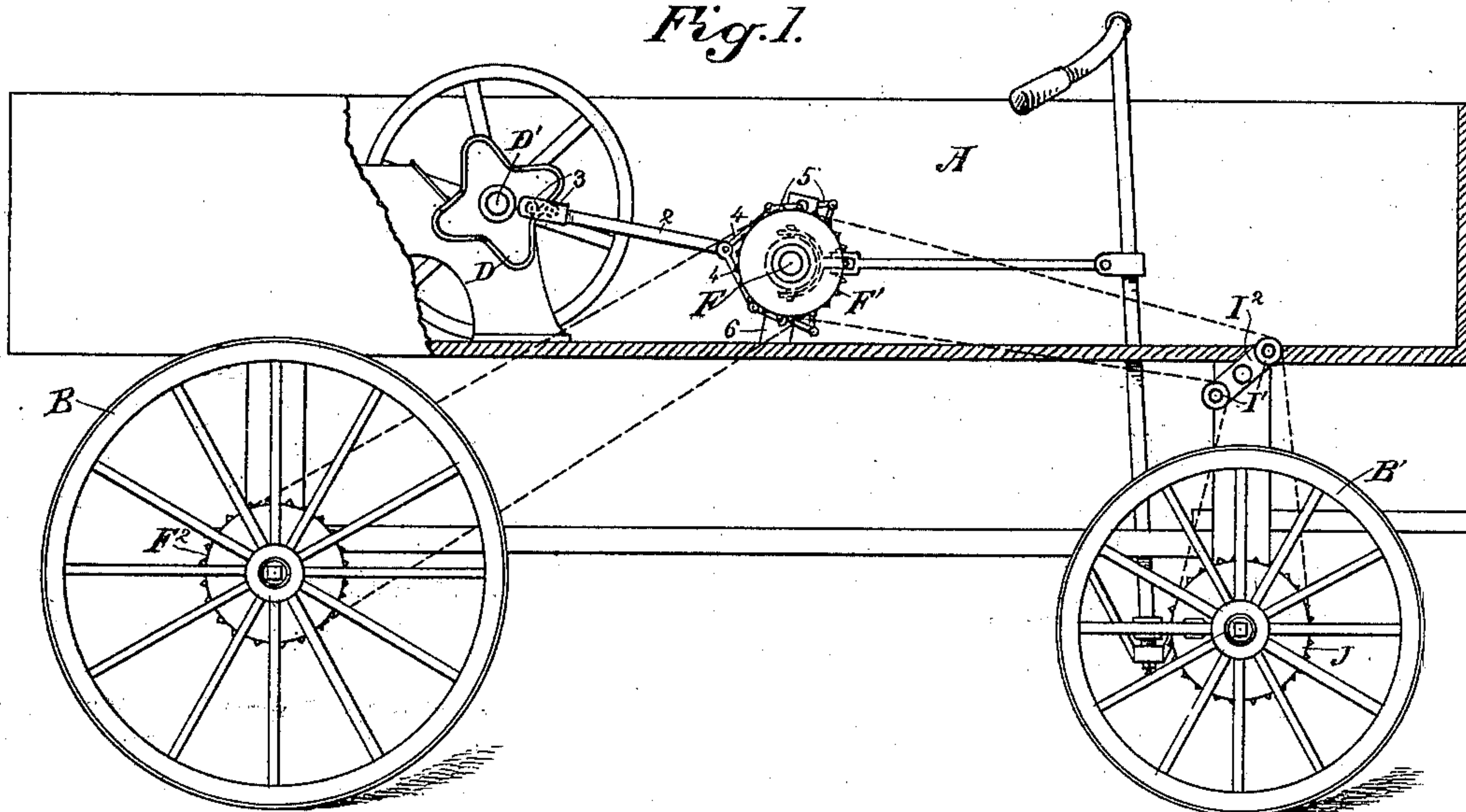
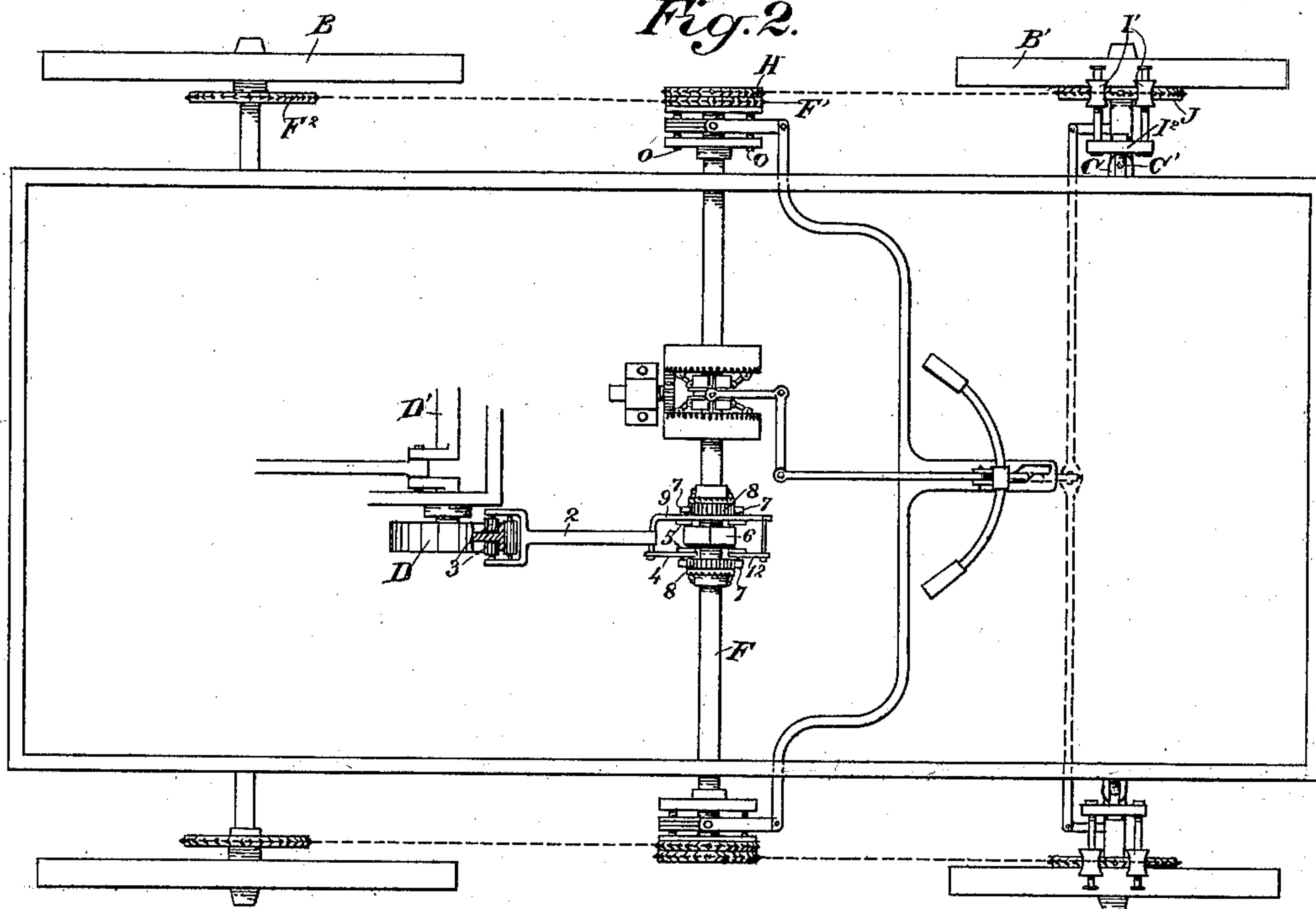


Fig. 2.



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Fig. 3.

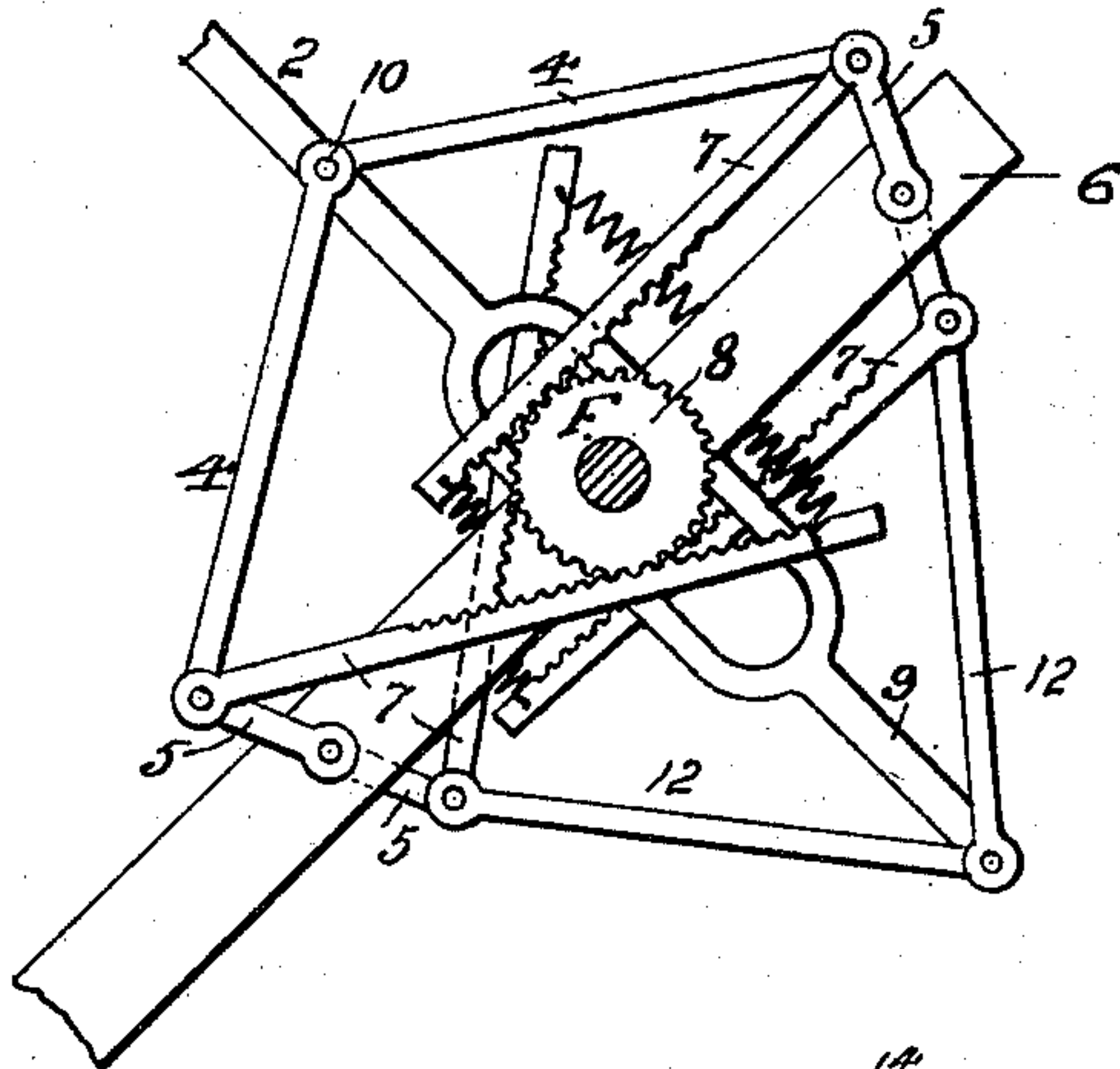


Fig. 4.

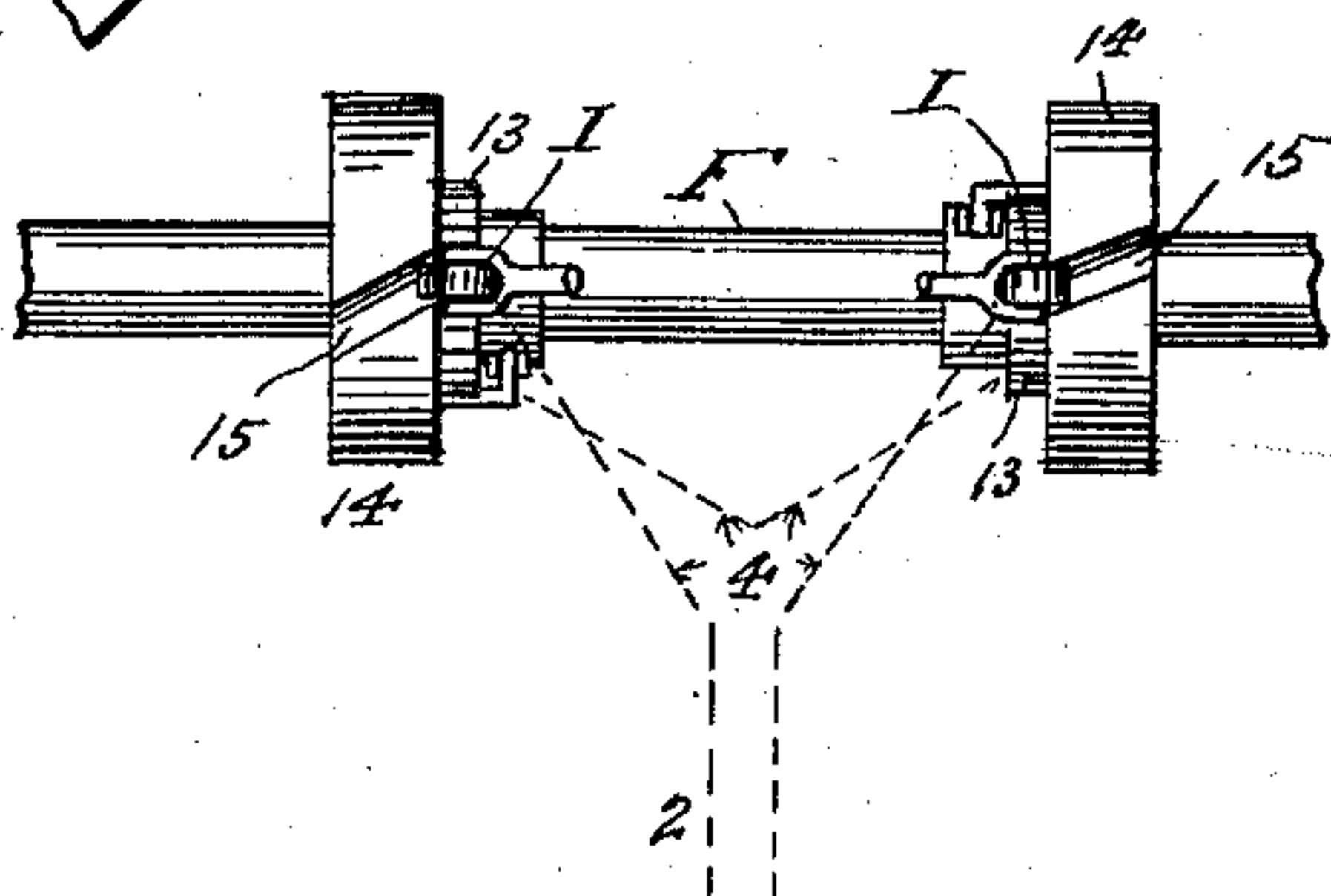
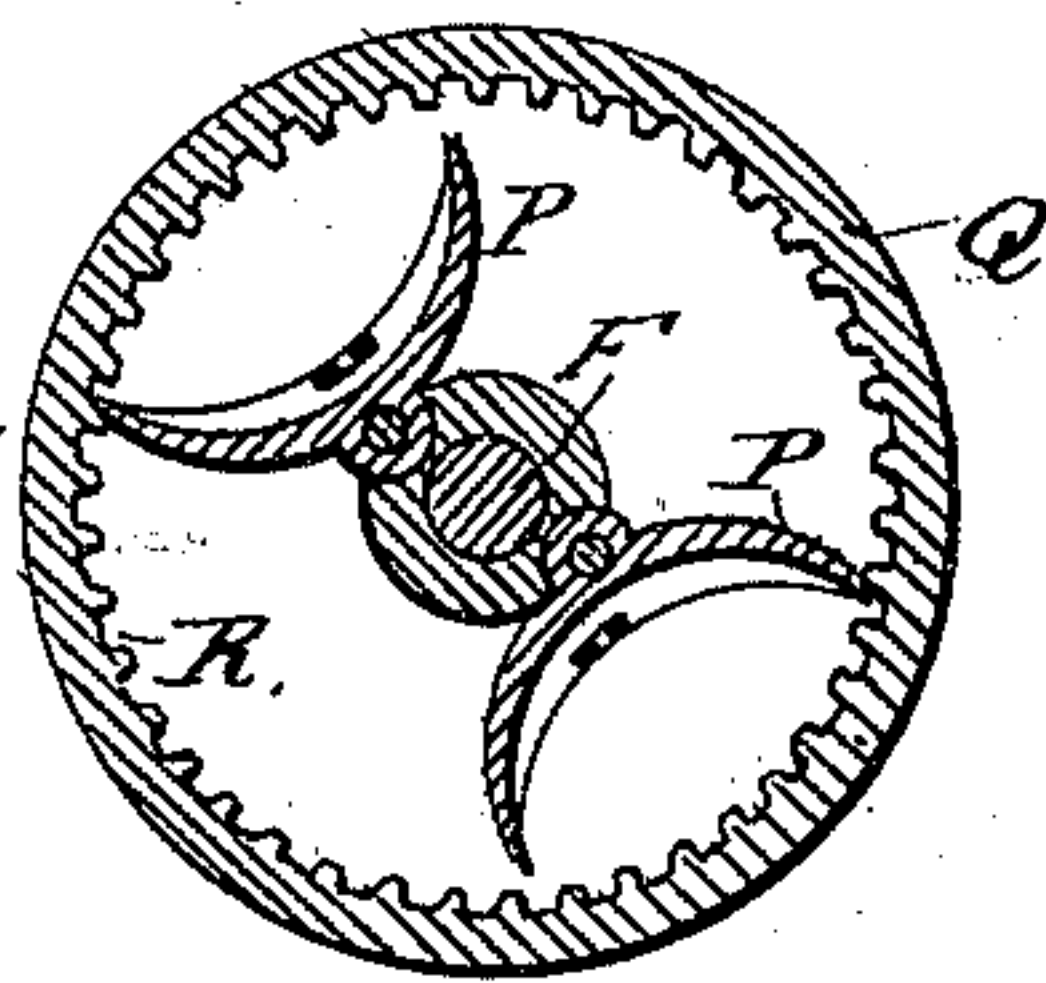


Fig. 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

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

MOTOR-CARRIAGE DRIVING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 627,282, dated June 20, 1899.

Application filed November 4, 1898. Serial No. 695,502. (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-Carriage Driving Mechanism; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in motor carriages and vehicles and in the mechanism by which such vehicles or equivalent contrivances are propelled.

It consists, essentially, in an improved means for transmitting power from the main driving-shaft of the motor to a supplemental or counter shaft and a means for transmitting the power directly from the counter-shaft to the wheels to be driven, in mechanism for reversing the apparatus, and in details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is a detail of the power-transmitting device. Fig. 4 is a modification of the same. Fig. 5 is a detail of the reversing-gear.

The object of my present invention is to simplify the mechanism intermediate between the motor and the shafts of wheels to be driven and to provide a novel means for applying the power of the motor to the shaft or shafts to be driven thereby.

In the present case I have illustrated the invention as applied to a vehicle, of which A may represent the bed. B B' are the rear and the front wheels, respectively. The rear wheels are mounted upon axles and are turnable by means of chains passing over sprocket-wheels F² upon the wheel-hubs from sprocket-wheels F', which are located upon a counter-shaft F. The front wheels B' have the short carrying-spindles, which are pivoted or jointed, as shown at C', to the front axle C and are turnable about these joints, so that both wheels are turned in unison to one side or the other to steer the vehicle without turning the main axle C. Chains to drive these wheels in unison with the rear wheels pass around sprocket-wheels J, which are fixed to the front-wheel hubs. Thence the two parts of the

chain pass over grooved guide-rollers I', which are supported and adjustable with relation to each other from a yoke I², so that one part of the chain passes from the sprocket J over one of the rollers I', thence to a driving-sprocket H upon a counter-shaft, passing around the latter, thence back over the other roller I', and down to the sprocket-wheel J. By this construction I am enabled to drive the two front wheels directly from the counter-shaft without the interposition of another long shaft with sprocket-wheels to which power must first be transmitted from the counter-shaft and then transmitted from this other shaft to the wheels. These rollers I' are slidable upon their spindles, so as to allow the chains to readily adjust themselves to the sprockets J when the wheels are turned. By this construction the guide-rollers I being so situated nearly in line above the short turnable spindles of the wheels will change the direction of the driving-chain, so that motion is transmitted from the counter-shaft approximately horizontally to these rollers, and thence approximately vertically to the sprockets J, and this allows the wheels to turn without essentially altering the tension or direction of motion of the chain.

In a former application made by me, for which patent was issued September 6, 1898, No. 610,503, I have shown a mechanism for transmitting power from the motor, consisting of a crank-shaft having a sprocket-wheel thereon, a chain connecting said sprocket-wheel with the counter-shaft, from which by other chains and sprocket-wheels and intermediate shafts power is transmitted to the vehicle-wheels. In the present case I have reduced the mechanism necessary first by the employment of the guide-rollers I' and a single endless chain to the front wheels in place of an intermediate shaft and two chains from the counter-shaft, and I have further reduced the mechanism and increased the rapidity of movement of the counter-shaft by mechanism which consists of a disk having the curved channels or guides D, which are fixed upon and rotated by the shaft D' of the motor. The connecting-rod or pitman 2 has rollers 3 journaled upon it at such points that they will clasp the star-shaped yoke D,

or, if the latter be a similarly-shaped channel in the face of a disk a single roller will be adapted to travel in that channel, the result in either case being that there will be
 5 four reciprocations of the rod 2 for each complete revolution of the shaft D', and these may be increased or diminished by making a less or greater number of the convolutions D with which the guiding roller or rollers en-
 10 gage. At the opposite end of the pitman 2 are hinged or pivoted rods 4, which diverge and have their outer ends connected with one end of links 5, and the other end of these links is pivoted to an arm 6, which extends
 15 radially in each direction from a loose hub or sleeve on the counter-shaft F. From the junction of the arms 4 with the links 5 the rack-bars 7 extend inwardly and have teeth on their inner faces, which engage with the
 20 toothed gears 8 upon the counter-shaft. The rack-bars are retained in contact with these gears by springs pressing the bars, and the rods 4 and links 5 are caused to move in unison by means of a guide 9, which extends
 25 from the joint connection 10 across the shaft F and is jointed at 11 to arms 12, which extend outwardly and connect with the links 5, as shown. The rod 9 is separated to form a yoke where it passes the shaft F and is slid-
 30 able through openings made in the hub or sleeve of the support 6, so that this rod 9 may reciprocate in unison with the movements of the pitman 2, and the diverging rods 4 and 12 will partake of this movement. By this
 35 operation the rack-bars 7 are alternately caused to reciprocate transversely over the gears H, and by means of pawl-and-ratchet or other clutch mechanisms these gears are caused to turn the shaft F when moving in
 40 one direction and are allowed to return freely when the racks move in the opposite direction. By the peculiar arrangement of this transmitting mechanism one pair of the racks will always be acting to impel the gears with
 45 which they are connected and turn the shaft F in a forward direction, while the others will be retracted, and the pawl-and-ratchet or clutch mechanism will allow them to turn backward freely without affecting the move-
 50 ment of the shaft. In this manner I am enabled to apply a power continuously to rotate the shaft F at each reciprocation of the pitman 2, and there may be as many of these reciprocations as there are numbers of con-
 55 volutions of the guide D.

In Fig. 4 I have shown a modification of this mechanism in which a ratchet-wheel 13 is sur-
 60 rounded by a cylindrical sleeve 14, having a diagonal slot 15 made across its face. The reciprocating arms in this case have travelers I fixed to them which are slidable in these slots, and as they slide in line parallel with the shaft the diagonal position of the slots causes the
 65 sleeve to be advanced at each reciprocation, and rapid reciprocations will produce a continuous revolution of the shaft in the same manner as previously described. This device

will give a less speedy movement and a greater power, but is essentially equivalent in its op-
 70 eration with the device previously described.

In the reversing-gear in my former appli-
 cation I showed a pinion fixed upon the cen-
 tral shaft and rocking pawls P upon opposite
 sides with spirally-twisted bars o, which were
 75 slidable in correspondingly-shaped slots, so that when moved in one direction the pawls
 would be turned so that the teeth upon one
 side would engage with the pinion, causing
 the rotation of the shaft to turn the exterior
 sleeve in one direction, and when the oppo-
 80 site side of the rocking pawls were engaged
 the shaft would be turned in the opposite di-
 rection. In my present invention I have re-
 versed these clutches, making an interior gear
 R in the outer casing Q, and the rocking
 85 clutches P are reversed, so that the pivot-
 points are central upon the sleeve surround-
 ing the shaft and the ends of the arched
 locking-clutches are adapted to engage with
 the internal gear-teeth R, this construction
 90 giving a stronger and more effective mechan-
 ism than that previously described.

Having thus described my invention, what
 I claim as new, and desire to secure by Letters
 Patent, is--
 95

1. A vehicle having mounted upon it a mo-
 tor, rear wheels loosely turnable upon the
 fixed axle, front wheels turnable upon short
 hinged spindles which have their inner ends
 pivoted to a stationary front axle and turn-
 100 able about said pivots, a counter-shaft to
 which power is transmitted directly from the
 motor, sprocket-wheels upon the counter-shaft
 and similar sprockets in the same vertical
 planes fixed upon the forward-wheel hubs,
 105 grooved direction-pulleys and spindles upon
 which they are loosely turnable and chains
 passing between the sprocket-wheels and over
 the direction-pulleys whereby the front vehi-
 cle-wheels are driven directly from the coun-
 110 ter-shaft and are turnable about the pivot-
 points of their spindles, substantially as de-
 scribed.

2. A vehicle-body having front and rear
 wheels turnable upon their axles, a motor car-
 115 ried upon the vehicle, a counter-shaft jour-
 naled to the vehicle-body between the front
 and rear wheel axles, sprocket-wheels fixed
 upon and turnable with the counter-shaft to
 which motion is communicated, other sprock-
 120 et-wheels fixed to and turnable with the front
 wheels, grooved direction-pulleys mounted
 and loosely slidable upon spindles in line es-
 sentially above the front-wheel sprockets
 whereby motion is transmitted directly from
 125 the counter-shaft to said front wheels, and
 the latter are allowed to turn from side to
 side without deranging the alinement of the
 driving-chain.

3. A vehicle-body having front and rear
 130 wheels turnable upon their axles, a motor car-
 ried upon the vehicle, a counter-shaft jour-
 naled to the vehicle-body between the front
 and rear axles and sprocket-wheels upon the

counter-shaft and upon the wheels with chains whereby motion is transmitted to both sets of wheels and the counter-shaft, a mechanism whereby power of the motor is transmitted to the counter-shaft consisting of return curved yokes or channels, a pitman having guide-rollers adapted to travel within the curved yokes, arms pivoted to and diverging from the opposite end of the pitman and links with which said arms connect whereby the outer ends are alternately separated and brought together by the reciprocations of the pitman, and rack-bars connecting with the arms and links, pinions on the counter-shaft with which said rack-bars engage, and pawl-and-ratchet mechanisms whereby the pinions are rotated freely in one direction and act to rotate the shaft upon which they are mounted when moved in the opposite direction.

4. A mechanism for transmitting rotary motion of a motor-shaft to a counter-shaft, consisting of sinuous curved yokes or channels carried by the motor-shaft, a pitman having a roller or rollers at one end adapted to engage and be reciprocated by the movements of the yoke, a hub or sleeve through which the counter-shaft extends and turns freely, said sleeve having arms extending radially in opposite directions therefrom, diverging arms having their adjacent ends pivoted to the reciprocating pitman, links having one end pivoted to the arms which project from the hub, and the opposite ends connecting

with the divergent rods, other rods connecting with the outer ends of correspondingly-pivoted links and their adjacent ends pivoted to the end of a guide which extends from the pitman and is divided and slidable through openings in the hub or sleeve upon the shaft, pinions with pawl-and-ratchet or clutch mechanisms by which they are caused to engage with and turn the counter-shaft when moved in one direction and to turn without action thereon when rotated in the opposite direction, and rack-bars having the outer ends connecting with the movable ends of the jointed links and their teeth engaging the peripheries of the pinions with guides whereby the teeth of the rack-bars are maintained in mesh with the pinion-teeth.

5. A mechanism for transmitting power from a driving to a driven shaft, consisting of sinuous curved yokes, with connected pitmen reciprocable therefrom, arms diverging from the pitmen ends and links with which their opposite ends connect, rack-bars connected with and reciprocated by the arms, and pinions engaged by said racks with pawl-and-ratchet mechanism whereby the reciprocating is converted into a continuous rotary motion.

In witness whereof I have hereunto set my hand.

WALTER E. TWICHELL.

Witnesses:

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CHAS. J. MCCARTHY.