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C. E. LARRABEE.
MOTOR PROPELLED VEHICLE.
APPLICATION FILED FEB. 2, 1903.

NO MODEL.

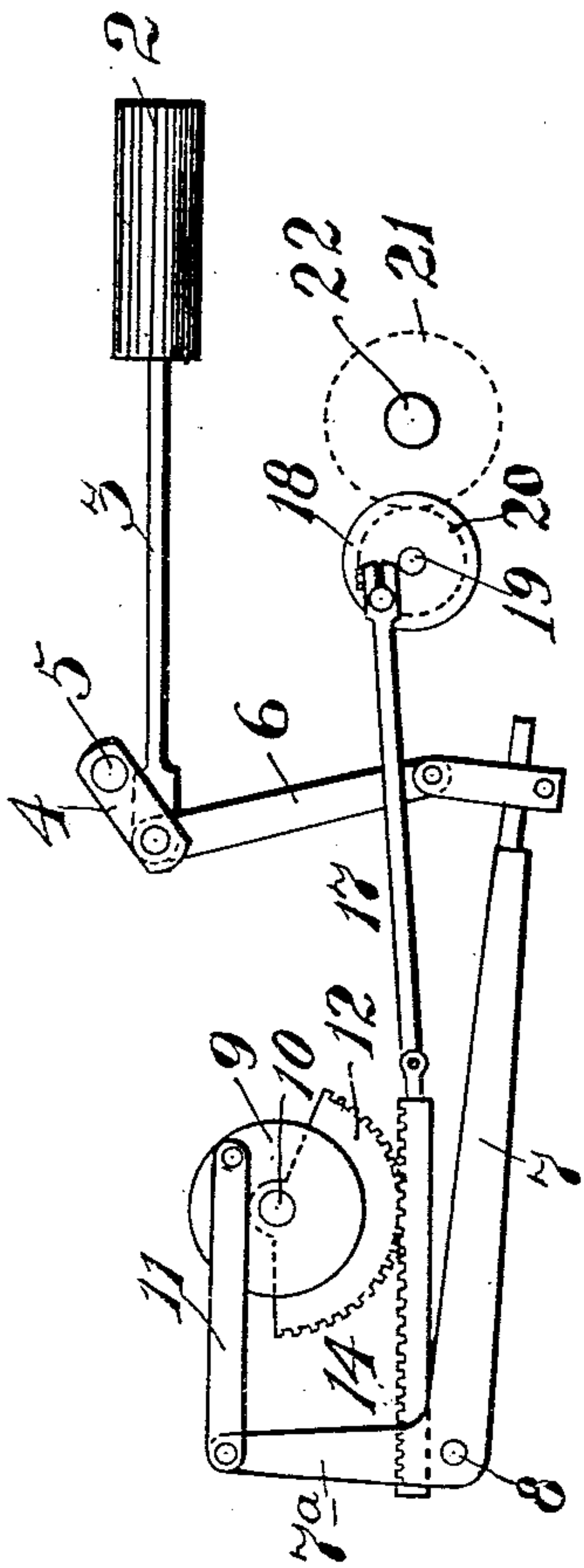


Fig. 2.

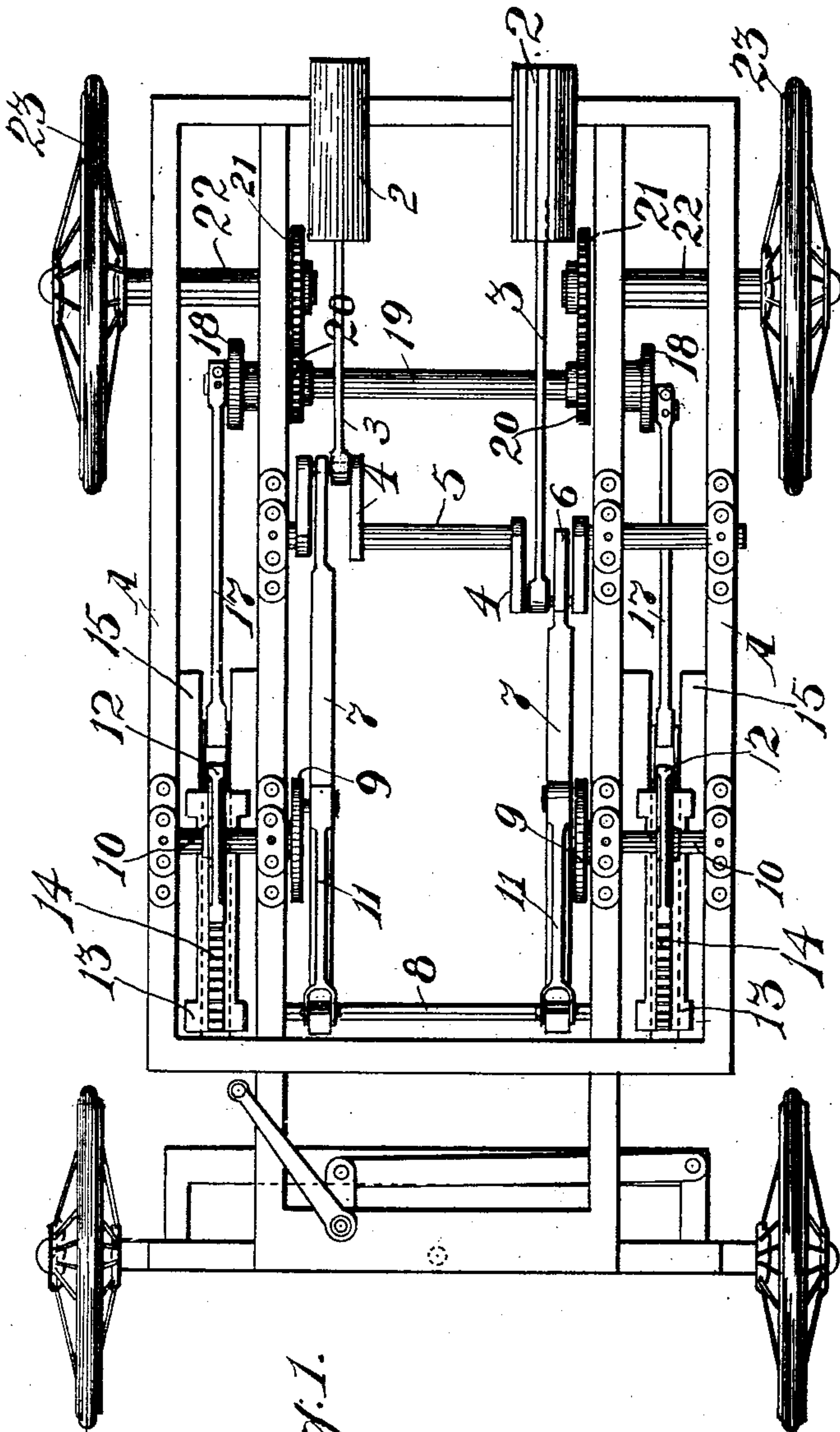


Fig. 1.

WITNESSES:

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MOTOR-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 751,660, dated February 9, 1904.

Application filed February 2, 1903. Serial No. 141,579. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. LARRABEE, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Motor-Propelled Vehicles; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improved mechanism with self-propelled vehicles; and it consists in the combination, with suitable engines or motors, of crank-shafts, connecting-rods, and levers having short and long arms and toothed segments and racks with intermediate gears through which power is transmitted to the propelling-wheels of the vehicle.

My invention also comprises details of construction, which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the vehicle, and Fig. 2 is a diagrammatic view of the operating mechanism.

The object of my invention is to provide an improved means for transmitting movement from suitably-propelled motors to the vehicle bearing and propelling wheels.

As shown in the accompanying drawings, A is a framework, which may be made in any suitable or desired form to suit the character of vehicle to which the apparatus is to be applied. The cylinders 2 in the present case illustrate a means of propulsion by reciprocating pistons movable in said cylinders and connected by rods 3 with cranks 4 upon a shaft 5, journaled across the machine. The pistons in these cylinders may be propelled by any available fluid under pressure, such as steam or an explosive vapor, the latter being the method usually employed; but it will also be understood that power might be transmitted to the shaft 5 from a continuous rotary engine. The cranks 4 or other equivalent cranks upon the shaft 5 are preferably set at right angles with each other, and they are connected by links or connecting-rods 6 with the outer ends of long levers 7. The other arms, 7^a, of these levers are here shown as standing at right angles with the arms 7, thus forming bell-crank levers,

which are fulcrumed upon shafts or bearings 8, which are suitably supported upon the frame. The motion derived from the propelling-engine is thus transferred through the crank-shaft 5 to the bell-crank levers 7 7^a, and by reason of the cranks 4 being set at right angles with each other it will be manifest that the oscillations of the bell-crank levers will be successive. 9 represent rocker arms or disks fixed upon the shafts 10, which shafts are independently journaled at each side of the vehicle-frame.

The arms 7^a of the bell-crank levers are connected with the rocker arms or disks by pitmen 11, so that motion transmitted from the bell-crank levers causes the rocker-arms and their shafts to be oscillated a distance depending upon the length of the main driving-cranks and the proportional length of the bell-crank-lever arms.

Upon the shafts 10 are fixed toothed segments 12, and in line beneath these segments are slides 13, carrying racks 14, which engage with the toothed segments, and the slides are movable upon guides 15, so that the oscillations of the rocker-arms will be transmitted through the toothed segments to correspondingly reciprocate the racks and slides. The slides are connected by connecting-rods or pitmen 17 with cranks or crank-disks 18, mounted upon the ends of a shaft 19, which is journaled to the vehicle-frame, as shown. This shaft has fixed to it pinions 20, which engage with gear-wheels 21, fixed upon the independently-journaled shafts 22. These shafts 22 have fixed upon their outer ends the bearing-wheels 23, through which power is transmitted to propel the vehicle.

The cranks or disks 18 are fixed upon their shaft 19 at right angles with each other, so that the motion from the main propelling-cranks 4 transmitted through the bell-crank levers, toothed segments, and racks will be in like manner transmitted to these cranks set at right angles with each other. Thus there will be no dead center or point, as one or the other of the cranks 18 will be in position to apply its full power while the other is passing the dead-center.

By the peculiar arrangement of the bell-crank levers with reference to the power-transmitting cranks it will be seen that the power of the cranks 4 when at their greatest throw is transmitted to the long arms 7 of the bell-crank levers at the instant when these levers are nearly at the end of their upward or downward movement. Thus the power which may be applied is greatly multiplied, and the difference between the long and short arms of the bell-crank levers provides an additional increase of power, which is transmitted to the rocker arms or disks, and as the peripheries of the toothed segments engage the racks and always at the same distance from the segment-shaft it will be seen that there is a very economical application of the power for the propulsion of the vehicle.

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

1. The combination with a vehicle of a motor-engine and crank-shaft, bell-crank levers having long arms connected with the cranks, and rocker-arms with which the short arms are connected, toothed segments fixed to the rocker-arm shafts, reciprocating racks with which said segments engage, a crank-shaft, connecting-rods between the slidable racks and the cranks of said shaft, and gears and pinions intermediate between said crank-shaft and the bearing-wheels of the vehicle.

2. The combination in a motor-vehicle of a plurality of engines, a shaft having cranks at right angles, with which said engines are con-

nected, bell-crank levers having long arms extending horizontally beneath, and rods connecting them therewith, rock-shafts having rocker-arms and toothed segments fixed thereto, connections between the short arms of the bell-crank levers and the rocker-arms whereby motion is transmitted alternately to said arms, slides having toothed racks fixed thereon and movable on guides, a shaft having crank-arms at right angles, rods connecting the slides with said cranks, pinions carried upon the crank-shaft, and gears fixed to independent bearing and driving wheel shafts, through which motion is communicated to propel the vehicle.

3. The combination in a motor-vehicle of independently-journaled bearing-wheel shafts, a counter-shaft having cranks at right angles, and intermediate gears through which motion is transmitted to the bearing-wheel shafts, slidably-guided reciprocating racks and rods connecting them with the counter-shaft cranks, toothed segments mounted upon independent rocker-arm shafts and engaging the racks, and a bell-crank lever having short arms connecting with the rocker-arms, and long arms through which motion is transmitted from the propelling-engine.

In witness whereof I have hereunto set my hand.

CHARLES E. LARRABEE.

Witnesses:

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JESSIE C. BRODIE.