No. 648,210. Patented Apr. 24, 1900.

W. P. KIDDER.

ROAD VEHICLE.

(Application filed Apr. 13, 1899.)

(No Model.) 5 Sheets—Sheet 1.

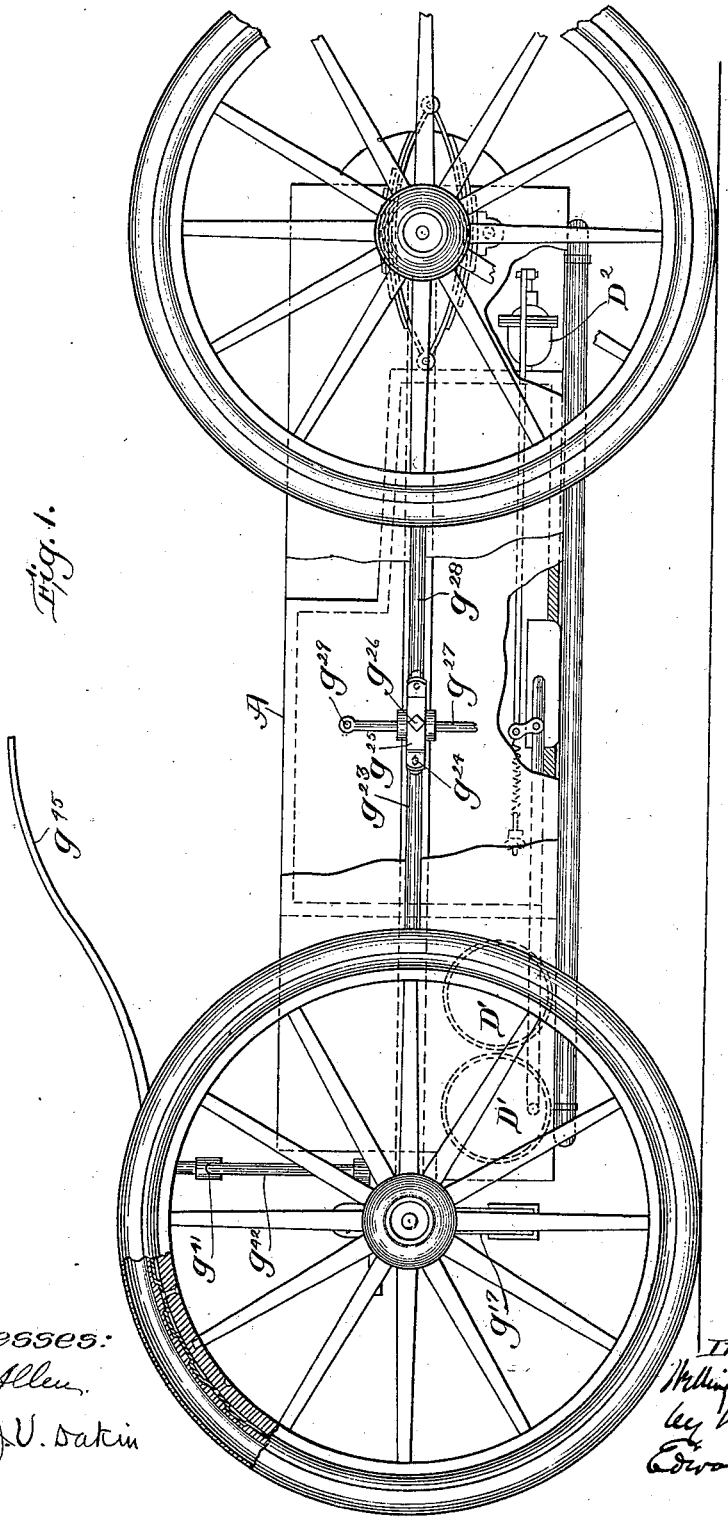

Fig. 1.

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Francis J. V. Dakin

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by his attorney
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(No Model.) 5 Sheets—Sheet 2.

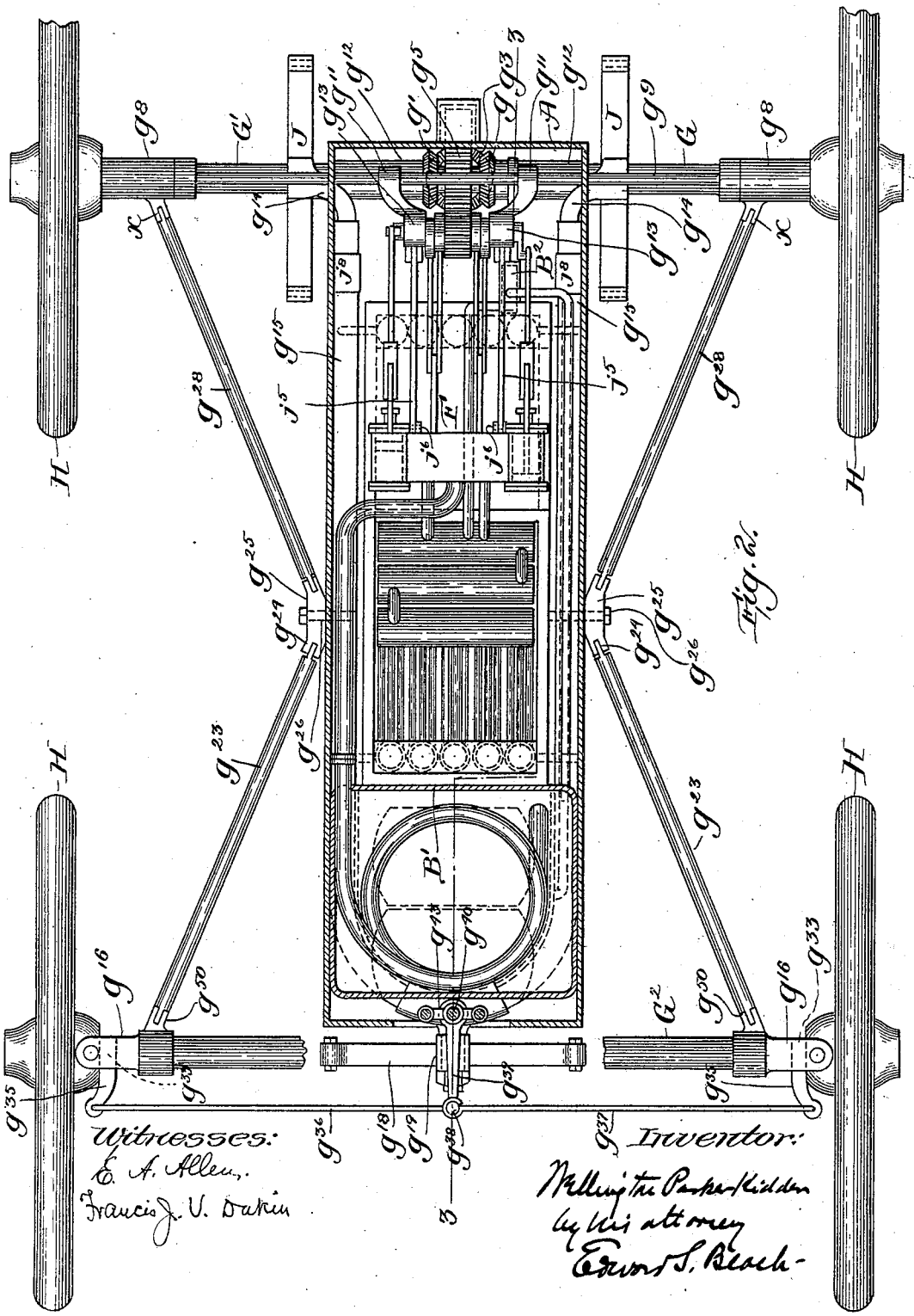

Fig. 2.

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(No Model.) 5 Sheets—Sheet 3.

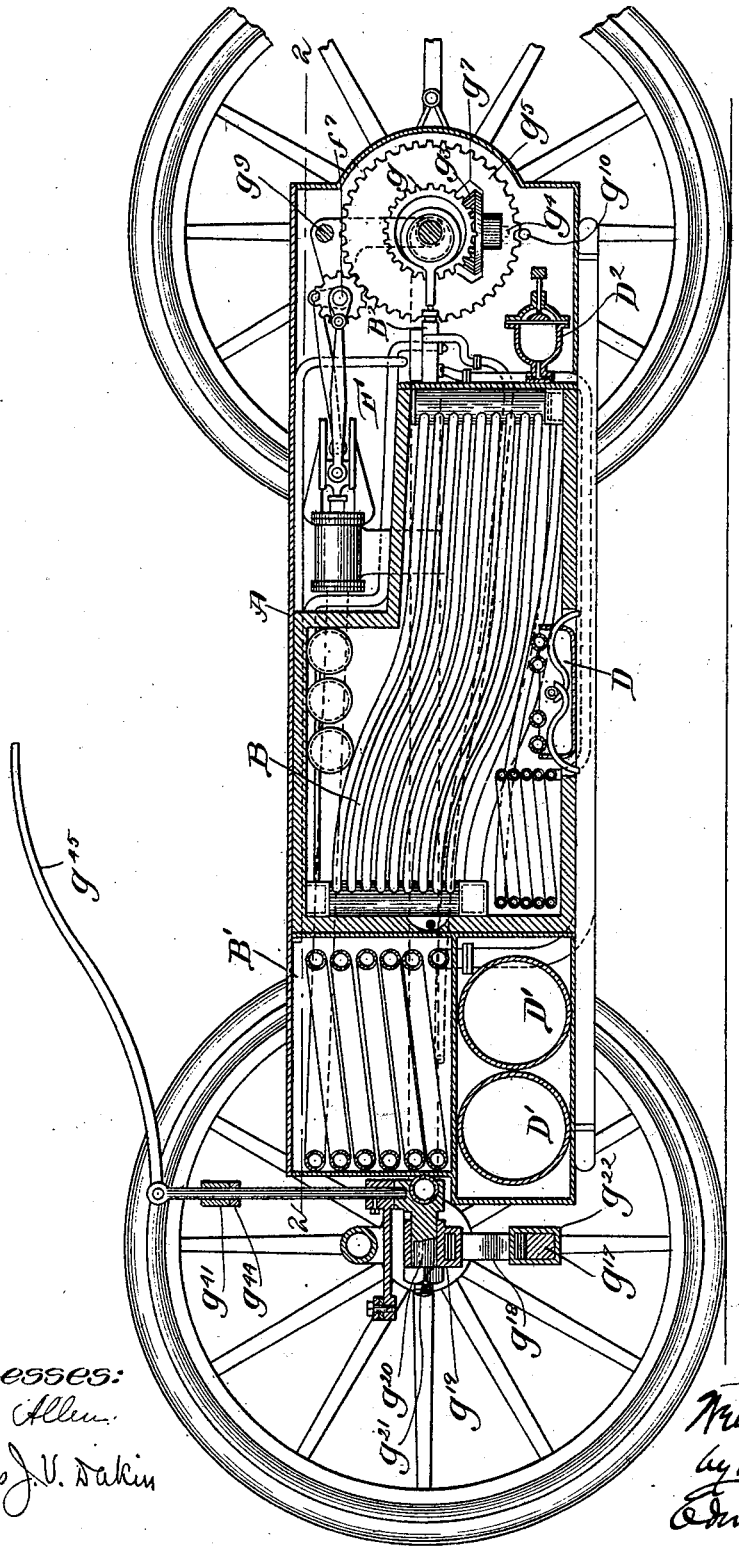

Fig. 3.

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(No Model.) 5 Sheets—Sheet 4.

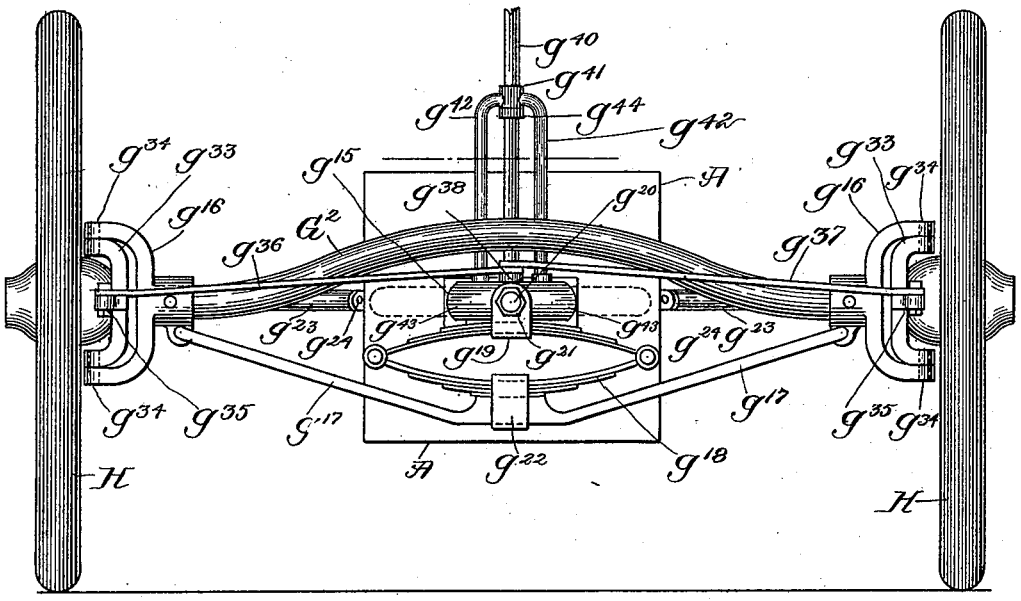

Fig. 4.

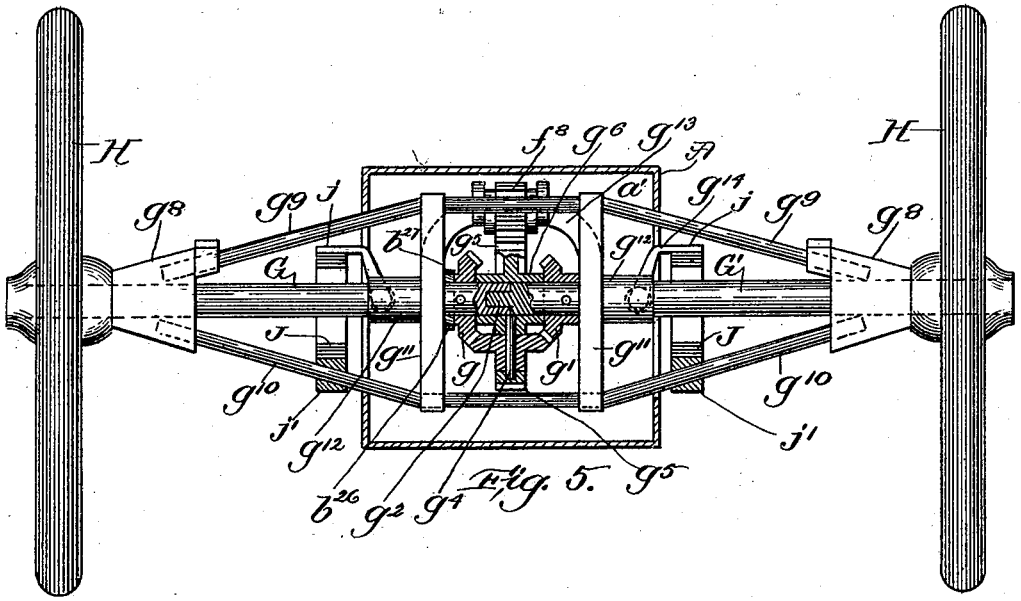

Fig. 5.

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(No Model.) 5 Sheets—Sheet 5.

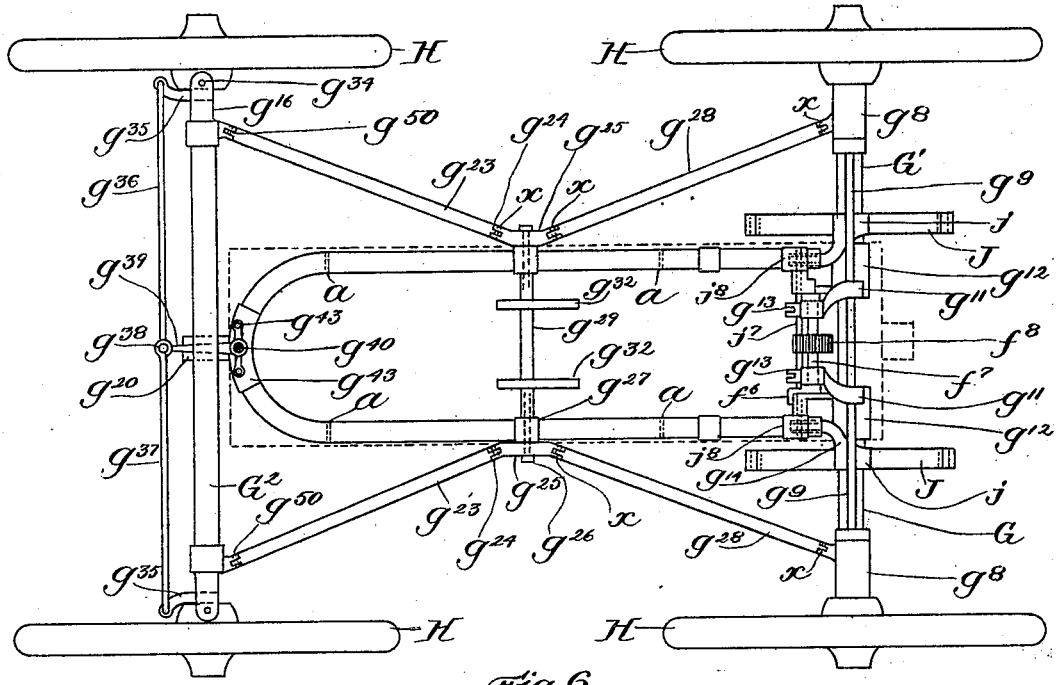


Fig. 6.

Fig. 7.

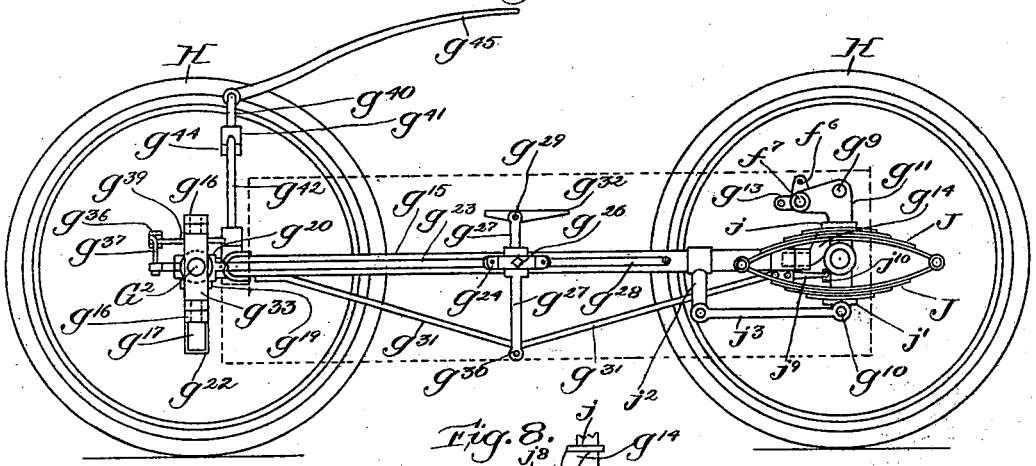


Fig. 8.

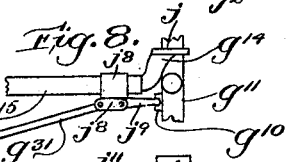
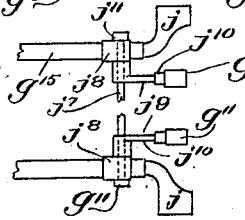


Fig. 9.



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UNITED STATES PATENT OFFICE.

WELLINGTON PARKER KIDDER, OF BOSTON, MASSACHUSETTS.

ROAD-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 648,210, dated April 24, 1900.

Original application filed February 2, 1899, Serial No. 704,227. Divided and this application filed April 13, 1899. Serial No. 712,882. (No model.)

To all whom it may concern:

Be it known that I, WELLINGTON PARKER KIDDER, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Road-Vehicles, of which the following is a specification, reference being had therein to the accompanying drawings.

This application is a division of my application, Serial No. 704,227, filed February 2, 1899.

Figure 1 is a partial side elevation of the running-gear of my new vehicle, parts being broken away for greater clearness. Fig. 2 is a top plan view, partly in section, at line 2 2 of Fig. 3, showing parts of the running-gear. Fig. 3 is a sectional elevation on line 3 3 of Fig. 2. Fig. 4 is a front end elevation of the driving-gear, showing also a portion of the steering-gear. Fig. 5 is a rear end elevation, partly in section, at line 5 5 of Fig. 2 of the running-gear. Fig. 6 is a top plan view of the running-gear and is partially in section at line 6 6 of Fig. 4. Fig. 7 is a side elevation of the running-gear, showing the motor-casing in dotted lines. Fig. 8 is a partial side elevation of the parallel rocker-arm mechanism for maintaining the engine-supporting frame in parallelism with the rear axle. Fig. 9 is a plan of same.

The main object of my invention is to combine the motor with the running-gear in such wise that when the vehicle is jolted the motor is kept at a constant distance from the crank-shaft with which it and the driven axle are connected, and the crank-shaft is kept in a stationary position with respect of both the motor and the driven axle, whereby variations of speed, due to jolting, and danger of stripping the teeth from gears intermediate the crank-shaft and driven axle are either prevented or minimized.

My invention consists in the combinations hereinafter described and claimed, the most important feature of my invention consisting in the combination of elastically-mounted engine-cylinders with a crank-shaft which is driven from the engine and is in fixed relation to the driven axle and with any kind of mechanism or contrivance for keeping constant the distance between the cylinders and the crank-shaft.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, A is the motor-casing for steam-generator B, furnace D, engine F, water-supply reservoir B′, fuel-supply reservoir D′, automatic fuel-feeder D^2, and automatic steam-generator feeder B^3. G G′ are members of the rear axle, G^2 is front axle, of the running-gear of the vehicle, and H H H H the wheels thereon. Casing A, with its contained mechanisms, is mounted in any suitable manner to the running-gear, which of course may be of widely-different construction than that here shown without departure from my invention.

Referring to Figs. 4, 5, 6, and 7, illustrating the running-gear in its preferred form, G G′ are the wheel-receiving members of the rear axle, and these members G G′ are coupled together by a differential gear, such as is commonly used in tricycle construction. Member G is provided with a beveled gear g, and member G′ is provided with a beveled gear g', and the opposed ends of the members G G′ are centered by means of a tang g^2, Fig. 5, on member G′ entering a corresponding recess in the opposed end of the member G. Beveled gears $g\ g'$ are coupled by the interworking beveled gear g^3, mounted on a stud g^4, which is mounted in and carried by the driving-gear g^5, whose hub g^6 is mounted on the inner ends of members G G′, between the opposed sides of the beveled gears $g\ g'$. The driving-gear g^5 is formed with an opening g^7, within which the beveled gear g^3 is mounted and rotates. (See Figs. 3 and 5.) Member G rotates in a bearing-block g^8, whose outer end forms an abutment for the hub of a wheel H. Member G′ also rotates in a bearing-block g^8, whose outer end forms an abutment for the hub of the wheel H. The bearing-blocks g^8 are connected by an upper and lower truss, transversely braced. The upper truss member g^9 and the lower truss member g^{10} pass through the upper and lower ends, respectively, of the vertical braces $g^{11}\ g^{11}$, the truss member g^9 being above and the truss member g^{10} being below the axle members G and G′. The vertical braces $g^{11}\ g^{11}$

are integral portions of the axle-bearings g^{12} g^{12}, whose inner ends form convenient abutments for the outer ends of the hubs of the beveled gears g g'. The beveled gears g g' are pinned or otherwise secured, respectively, to axle member G and axle member G'. The upper and lower trusses g^9 g^{10}, with the truss members g^{11} g^{11}, form a stiff and strong support for the rear end of the running-gear, so far as vertical distortions or strains are concerned; and the differential-gear construction is properly supported by the four bearings g^8 and g^{12}. The object of the differential gear is, of course, to drive the wheels of the vehicle at different speeds with the same propelling force when the vehicle-wheels are going round curves. The braces g^{11} g^{11} and axle-bearings g^{12} are each a casting or forging and are each provided with an integral upwardly and inwardly projecting bearing g^{13}, which support the crank-shaft of the engines, as hereinafter described. Arms g^{14}, in which the ends of the horizontally-extending U-shaped frame g^{15} are mounted, rest each on a spring J, carried by an under truss g^{10}. Frame g^{15} is preferably made of a bent tube. The front or bowed end of frame g^{15} is connected with the front axle G^2 in any suitable manner, but preferably as follows: The axle G^2 is provided at each end with the well-known pivotal hub-steering contrivance now in use on motor-carriages; that is to say, with a U-shaped bracket g^{16}, from the under side of which truss g^{17} extends transversely of the vehicle or lengthwise of axle G^2, the ends of the truss being secured to the brackets g^{16}. Truss g^{17} supports a suitable spring g^{18}, which carries at its upper portion a vertical bracket g^{19}, forming a bearing for the horizontal king-bolt g^{20}. (Compare Figs. 2, 3, and 4.) The bowed end of the frame g^{15} is attached to and supported by the rear end of the horizontal king-bolt g^{20}. (See Fig. 3.) The king-bolt has a lengthwise movement in its bracket g^{19}, as shown clearly in Fig. 3, and in order to allow for the movement of the front wheels over uneven ground, throwing the front axle out of parallelism with the rear axle, the nut g^{21} of the king-bolt is on the outer or front side of the bracket g^{19}, and a suitable bracket g^{22} secures spring g^{18} to truss g^{17}, Fig. 4. From each bracket g^{16} there extends rearwardly toward the rear axle a horizontal brace g^{23}, each brace g^{23} being pivotally connected at g^{24} to a bracket g^{25}, which is rigidly connected with the frame g^{15} by means of a bolt g^{26} entering the vertical stationary brackets g^{27}, which are on and extend above and below the side portions of the horizontal U-shaped frame g^{15}. From each bracket g^{25} there extends rearwardly a horizontal brace g^{28}, whose front end is pivotally connected to bracket g^{25} and whose rear end is secured pivotally to the bearing-blocks g^8 above mentioned. Said pivots are marked x. Horizontal braces g^{23} and g^{28} unite the front and rear axles with opposed sides of the U-shaped frame g^{15} about midway between the front and rear axles and give lateral rigidity to the running-gear. The side brackets g^{25} g^{25} are tied together transversely by means of upper and lower tie-rods g^{29} and g^{30}. To stiffen the frame g^{15} vertically, I provide beneath each side portion of said frame a truss g^{31}, the rear ends of which are attached to lugs j^8, depending from the rear ends of frame g^{15}, and the front ends of which are attached in any suitable manner to the under sides of the horizontal U-shaped frame g^{15}, the middle portions of the trusses g^{31} being carried downwardly toward the lower ends of the vertical brackets g^{27} and thereto connected. The upper end of the vertical brackets g^{27} are provided with heads g^{32} on shaft g^{29} to assist in supporting portions of the steam-generator. The front ends of the braces g^{23} are pivoted at g^{50} to lugs on the brackets g^{16}. The front wheels H H are journaled on studs projecting from the bracket g^{33}, each arm of which is connected by a vertical pivot g^{34} to the bracket g^{16}. This particular construction is old, but is a very excellent one for securing the free movement of the wheels at the ends of the front axle.

While any desired form of steering mechanism may be used, I here show the following: From the front sides of the brackets g^{33} there extend arms g^{35}, which are connected by the transverse tie-rods g^{36} and g^{37}, whose inner ends are held together by a pivot g^{38}, passing through the holes in the meeting ends of the tie-rods g^{36} and g^{38} and being anchored in the outer end of the horizontal lever g^{39}, which is fast to the vertical steering-spindle g^{40}. This spindle g^{40} is rotatively mounted in the bearing-head g^{41}, the side members g^{42} of which are anchored in the lateral wings g^{43} of the horizontal king-bolt g^{20}. The lower end of spindle g^{40} also has a bearing in the butt-end of the horizontal king-bolt, passing through the butt-end of the horizontal lever g^{39}, to which it is rigidly secured. A collar g^{44}, fast on the spindle g^{40} underneath the bearing-head g^{41}, keeps the spindle in place, and the upper end of the spindle is provided with a suitable handle g^{45}.

I have thus described the preferred form of running-gear, and one which is sufficiently rigid in all directions to withstand the ordinary strains of use and abuse, and one which permits the front wheels to pass over obstacles and uneven roads without wrenching or injuring the driving-gear, and which at the same time keeps the horizontal frame g^{15}, upon which the motor is supported, in line with the rear axle.

The brackets g^{14} have horizontal top extensions j, (see Figs. 5 and 7,) which rest on the upper sides of springs J, and the brackets g^{14} are rigidly attached to the rear ends of the U-shaped frame g^{15}, which springs J are supported on brackets j', carried by the under truss g^{10}. Frame g^{15}, with the brackets supported by it, are therefore elastically mounted on the rear axle. As casing A and the parts

supported thereby are mounted on the springs J and are subjected to vertical movement under the yielding action of the springs J it is desirable in order to prevent wrenching of the engine that the frame g^{15} should have a yielding connection with the engine in order that the engine may preserve its distance from the crank-shaft f^7 and at the same time permit of the free vertical movement of the frame and parts carried thereby on the springs J. To accomplish this, I provide the U-shaped frame g^{15} with hangers j^2, to the lower ends of which are pivoted the rearwardly-extending connecting-links j^3, whose rear ends are loosely mounted on the lower truss g^{10}, and provide the upper ends of the vertical brackets g^{11} with forwardly-projecting arms g^{13}, to which are loosely pivoted the parallel links j^5, each link j^5 being loosely pivoted at j^6 to the engine. (See Fig. 2.) The parallel links j^3 and j^5 thus permit the U-shaped frame g^{15}, with its load, to play up and down somewhat vertically under the resiliency of spring J without changing the distance of the engine from the crank-shaft f^7 carried on the rear axle, as above described.

There are two rear springs J. As it is quite likely that said springs will be of unequal strength, and as one of the rear wheels will frequently run into a rut while the other will be on higher or smoother ground, it becomes desirable to provide means for preventing casing A and its contained parts from depression on one side—in other words, to provide means to keep the casing A and its contained parts as nearly as possible in parallelism with the rear axle. Therefore I connect to the rear-end portion of the U-shaped frame g^{15} a transverse rocker-shaft j^7, (see Figs. 6 and 7,) which is mounted in the independent brackets j^8, the rocker-shaft being provided with a pair of thereto rigidly-attached rocker-arms j^9, the rear ends of which are pivotally socketed at j^{10} in the vertical brace g^{11}. Therefore as the rear end of the U-shaped frame g^{15} plays up and down on the rear springs J each rear end of the frame g^{15} is kept in substantial parallelism with the rear axle. The transverse rocker-shaft j^7 also serves as a tie for the opposite rear-end portions of the U-shaped frame g^{15}, the collars j^{11} keeping the rocker-shaft in place and keeping the rear end of the U-shaped frame from sliding outwardly along the rocker-shaft. The butt-ends of the rocker-arms j^9 form the inner abutments for the dependent brackets j^8.

Having described the best forms of embodiments now known to me of the several features of my invention, it will be plain to all skilled in mechanics that the embodiments of the several features of my invention above described may be varied in very many respects all without departure from my invention, and I desire to be understood as claiming each and every feature of my invention in the broadest legally-permissible manner.

What I claim is—

1. The combination, in a motor-vehicle, of a running-gear comprising a driven axle, with a motor-supporting frame operatively mounted in said running-gear; an elastically-mounted motor; a crank-shaft; crank-shaft bearings rigidly mounted in the running-gear; means which operatively connect the motor with the crank-shaft and rotate it; gearing connecting the crank-shaft with the driven axle; and a mechanism which holds the motor at a constant distance from the crank-shaft.

2. The combination, in a motor-vehicle, of a running-gear comprising a driven axle, with a motor-supporting frame operatively mounted in said running-gear; an elastically-mounted motor; a crank-shaft; crank-shaft bearings rigidly mounted in the running-gear; means which operatively connect the motor with the crank-shaft and rotate it; gearing connecting the crank-shaft with the driven axle; and a mechanism which holds the motor at a constant distance from the crank-shaft; the driven axle being made up of two wheel-carrying members and a differential gear mechanism which operatively connects said driven-axle members.

3. The combination, in a motor-vehicle, of a front axle; wheels therefor; a rear axle comprising independent members; a differential gear mechanism operatively connecting and rotating said members; wheels therefor; an elastically-mounted motor; a crank-shaft in fixed relation to the rear axle; means operatively connecting the motor with the crank-shaft; means operatively connecting the crank-shaft with and driving the differential gear mechanism; and means which keep constant the distance between the motor and the crank-shaft.

4. The combination, in a motor-vehicle, of a front axle; wheels therefor; a rear axle comprising independent members; a differential gear mechanism operatively connecting and rotating said members; wheels for the rear axle; a steam-engine; means which elastically support the cylinders of the engine; a crank-shaft; a link mechanism connecting with the crank-shaft support; and means for operatively connecting the crank-shaft with the differential gear.

5. In a running-gear for vehicles, the combination of a front and rear axle and wheels therefor of a U-shaped load-supporting frame; a horizontal king-bolt connecting the front end of the frame with the front axle and means for connecting said frame with the rear axle, said king-bolt being attached to the load-supporting frame and being movable endwise in its connection with its front axle.

6. In a running-gear for vehicles, the combination of front and rear axles; and wheels therefor, of a connecting load-supporting frame; a pivotal connection between said frame and the front axle; means for connecting said frame to the rear axle; and side

braces from near the wheel ends of the front axle to opposite sides of said frame; said front braces being pivotally connected with the front axle and also pivotally connected with said frame.

7. In a running-gear for vehicles, the combination of front and rear axles and wheels therefor, of a load-supporting frame pivotally connected with the front axle; means for connecting it with the rear axle; side braces from near the wheel ends of the front axle to opposite sides of said frame, said braces being pivotally connected with the front axle and also pivotally connected with said frame; an under truss extending lengthwise of the front axle; and a spring between said truss and said supporting-frame.

8. In a motor-vehicle, a running-gear comprising in combination a front and rear axle and wheels therefor; a load-supporting frame connecting said axles; the frame being pivotally connected with said front axle; front braces pivotally connected with the front side axle and pivotally connected with said frame; an under truss extending lengthwise of the front axle and supported thereby; a spring between said truss and frame; brackets at the rear end of said frame; an under truss extending lengthwise of the rear axle and carried thereby; and springs between said truss on the rear axle and the brackets of said frame; an upper truss extending lengthwise of said rear axle; vertical braces connecting said upper and lower truss of the rear axle; rear side braces extending from near the wheel ends of the rear axle to opposite sides of said frame, and pivotally connected with said frame and with the rear axle, said rear axle consisting of two main-wheel-carrying members; and a differential gear mechanism which couples the inner ends of said rear-axle members.

9. In a motor-vehicle, the combination of front and rear axles and wheels therefor of a supporting-frame pivotally connected with the front axle and having a spring connection with the rear axle; an engine supported by said frame; a crank-shaft in fixed relation to the rear axle; means for supporting said shaft rotatively in said relation; a driving mechanism connecting the crank-shaft with the rear axle; means of operating the engine and a yielding mechanism connecting an engine-cylinder with the crank-shaft.

10. In a motor-vehicle, the combination of front and rear axles, and wheels therefor, with a supporting-frame pivotally connected with the front axle and having a spring connection with the rear axle; an engine supported by said frame; a crank-shaft in fixed relation to the rear axle, hangers depending from said frame; a truss; links connecting said hangers with said truss; brackets connected to said truss and supporting the said crank-shaft; links connecting said engine with said brackets; a driving mechanism connecting the crank-shaft with the rear axle; means of operating the engine; and a yielding mechanism connecting an engine-cylinder with the crank-shaft.

11. In a motor-vehicle, the combination of front and rear axles, and wheels therefor, with a supporting-frame pivotally connected with the front axle; a truss-supporting bearing for said rear axle; springs resting upon said truss; brackets fast to said frame and resting upon said springs; braces pivotally connected to said frame and said truss; an engine carried by said frame; means for operating the engine; a driving mechanism operatively connecting the engine with the rear axle; a rocker-shaft journaled in said frame; and a rocker-lever fast to said rocker-shaft, the free end of said lever being socketed in said truss.

12. In a motor-vehicle, the combination of front and rear axles and wheels therefor with a supporting-frame pivotally connected with the front axle; means for elastically connecting said frame with the rear axle; an engine carried by said frame; means for operating the engine; means for operatively connecting the engine with the rear axle to rotate the same; and mechanism which connects said frame with the rear axle and holds the rear end portion of the frame in parallelism with the rear axle.

13. In a motor-carriage, a rear axle; an upper lengthwise-extending truss for the axle; an under lengthwise-extending truss for the axle; vertical cross-braces connecting said trusses; said axle comprising two members; a bevel-gear on the inner portions of each axle member; a bevel-gear intermeshing with and operatively connecting the bevel-gears on the inner portions of the axle; a spur-gear loose on the rear axle and having a chamber within which that bevel-gear which intermeshes with the bevel-gear on the axle members is rotatively mounted; a driving-shaft supported by said rear axle; suitable supports for said driving-shaft and a pinion which is fast on the driving-shaft and meshes with said driving-gear on the rear axle.

14. In a motor-vehicle, the combination of front and rear axles, and wheels therefor, with a supporting-frame; a rocker-shaft journaled in said frame; a rocker-lever fast upon said rocker-shaft, the free end of said lever being socketed in a truss; said truss supporting bearings for said rear axle; and mechanism for propelling said vehicle.

In testimony whereof I affix my signature in presence of two witnesses.

WELLINGTON PARKER KIDDER.

Witnesses:
EDWARD S. BEACH,
E. A. ALLEN.