

No. 732,870.

PATENTED JULY 7, 1903.

H. LEMP.
SELF PROPELLED VEHICLE.
APPLICATION FILED MAR. 27, 1900.

NO MODEL.

4 SHEETS—SHEET 1.

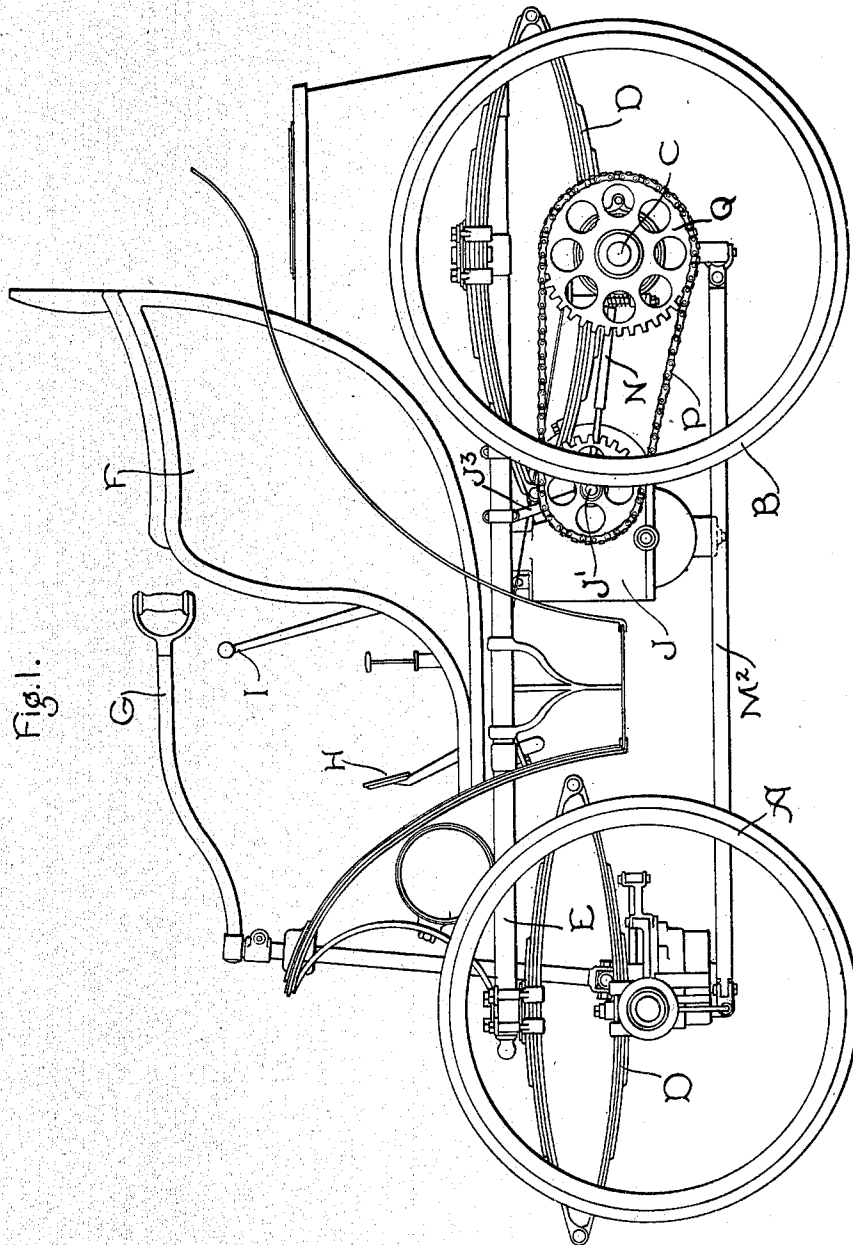


Fig. 1.

Witnesses.

Edward Williams, Jr.

A. F. Macdonald.

Inventor
Hermann Lemp,

by *Albert Davis*
Atty.

H. LEMP.
SELF PROPELLED VEHICLE.
APPLICATION FILED MAR. 27, 1900.

NO MODEL.

4 SHEETS—SHEET 2.

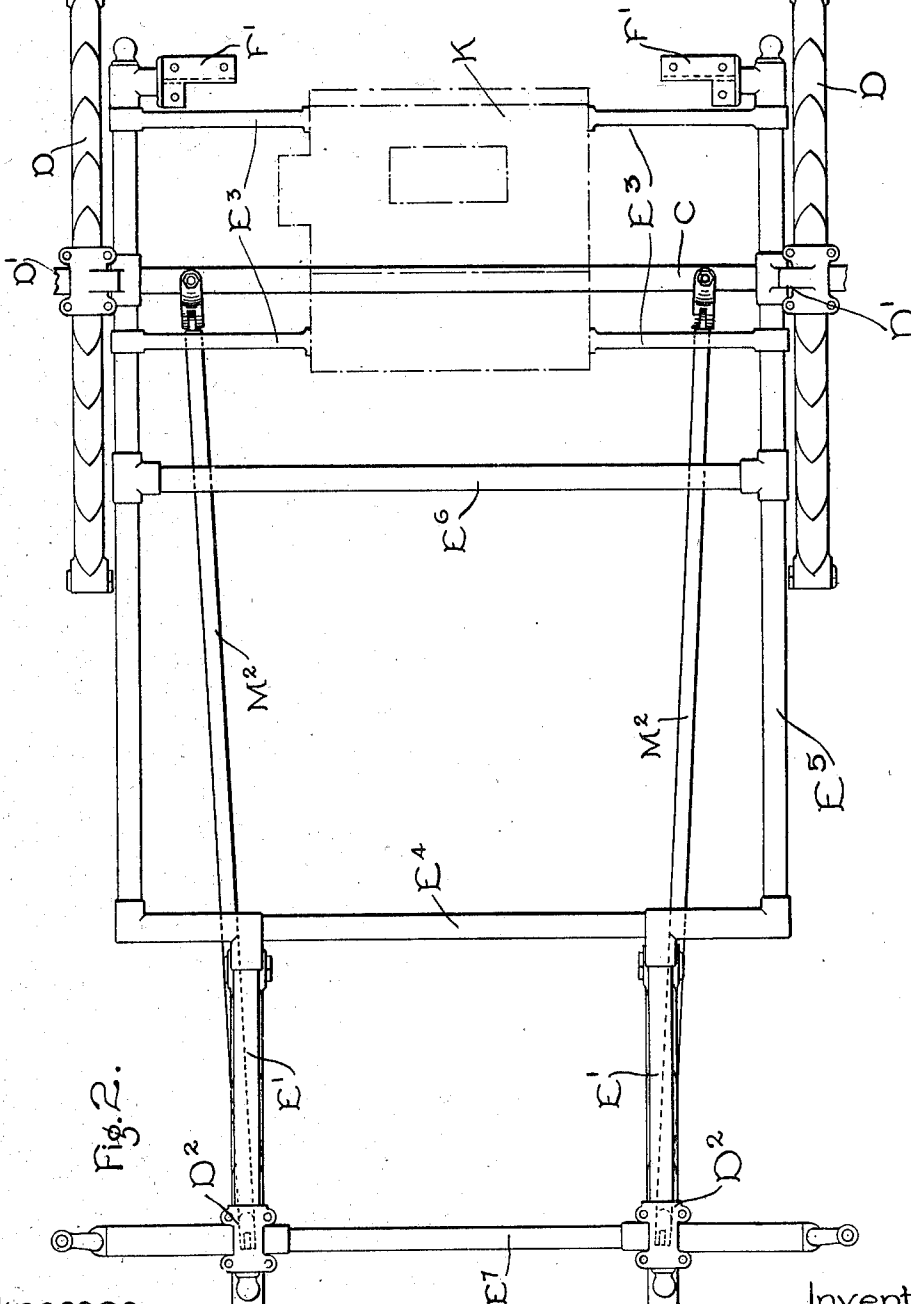


Fig. 2.

Witnesses.
Edward Williams, Jr.

A. F. Macdonald,

Inventor:
Hermann Lemp,

by *Albert Davis*
Atty.

H. LEMP.
SELF PROPELLED VEHICLE.

APPLICATION FILED MAR. 27, 1900.

NO MODEL.

4 SHEETS—SHEET 3.

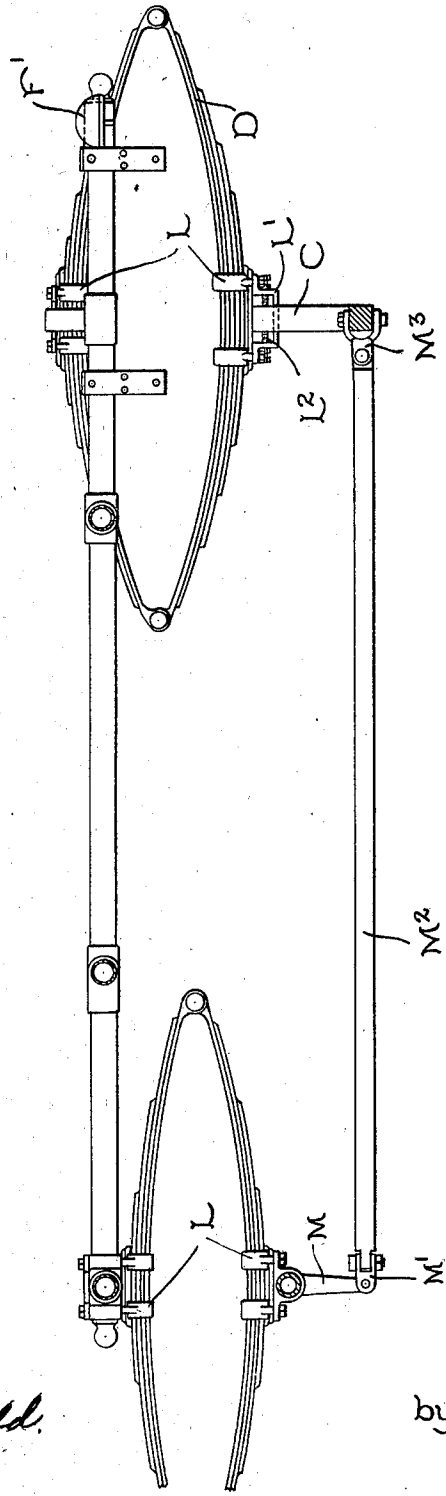


Fig. 3.

Witnesses.

Edward Williams, Jr.

A. F. Macdonald.

Inventor:
Hermann Lemp,

by *Albert G. Gami*
Atty.

H. LEMP.
SELF PROPELLED VEHICLE.
APPLICATION FILED MAR. 27, 1900.

NO MODEL.

4 SHEETS—SHEET 4.

Fig. 4.

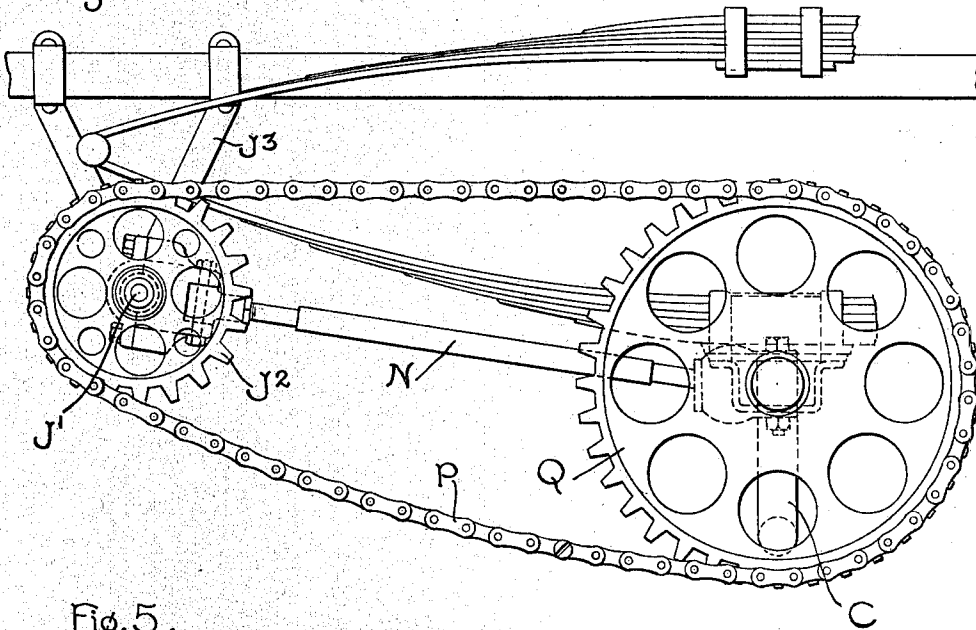
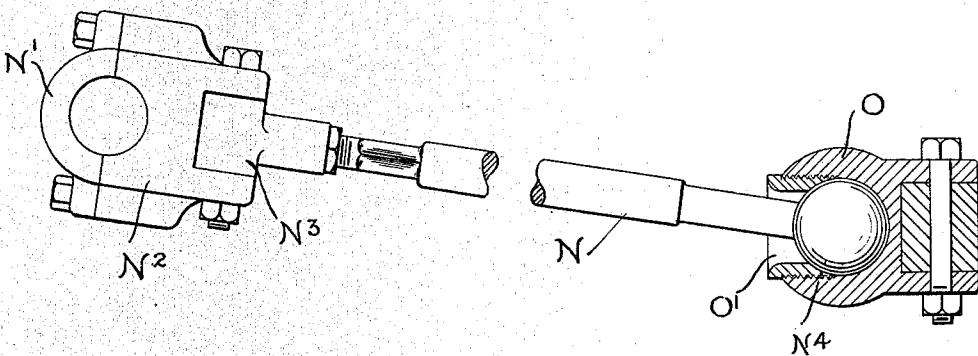


Fig. 5.



Witnesses.

Edward Williams, Jr.

A. F. Macdonald.

Inventor:
Hermann Lemp,

by Albert G. Davis
Atty.

UNITED STATES PATENT OFFICE.

HERMANN LEMP, OF LYNN, MASSACHUSETTS, ASSIGNOR TO ELIHU THOMSON,
OF SWAMPSCOTT, MASSACHUSETTS.

SELF-PROPELLED VEHICLE.

SPECIFICATION forming part of Letters Patent No. 732,870, dated July 7, 1903.

Application filed March 27, 1900. Serial No. 10,385. (No model.)

To all whom it may concern:

Be it known that I, HERMANN LEMP, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Self-Propelled Vehicles, of which the following is a specification.

My invention relates to self-propelled vehicles, and has for its object to improve their construction, particular reference being made to the framework.

In the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is a side elevation of a vehicle. Fig. 2 is a plan view of the upper frame. Fig. 3 is a longitudinal section of the vehicle-frame. Fig. 4 is a detail view of the means employed for maintaining the proper relation between the driving and driven parts, and Fig. 5 is an enlarged detail of the same.

Referring to Fig. 1, A represents the steering-wheels, which are mounted on short axles after the manner of the well-known double-axle suspension, and B represents the driving-wheels, mounted on a stationary rear axle C. Located above the wheel-axes and supported by four elliptic springs D is a frame E for the body F. The body may be of any desired shape and construction, and mounted either on the body or frame therefor are supports for the steering-handle G, the foot brake-lever H, and control-lever I. The frame E is entirely spring-supported, and carried thereby is an engine J or other motive-power agent, the boiler K, (shown in broken and dotted lines in Fig. 2,) and other necessary adjuncts. The boiler is supported by rods E³, which engage with and are supported by the side tubes E⁵ of the main frame. The engine J is supported independently of the boiler by hangers J², which also engage the side rods of the frame. The hangers are in line with each other and also serve to maintain the counter-shaft J' in proper alinement with the axle. The frame is composed of two rectangular portions, one of which is somewhat larger than the other. The larger portion is formed by parallel extending side tubes E⁵, which are connected at the left-hand end by the tube E⁴ and at the rear end by the boiler K (shown in broken and dotted lines) and the

rods E³. The central portion is braced by the tube E⁶. The smaller rectangular portion is formed by the parallel extending side tubes E¹, which are connected at their outer ends by the cross-tube E⁷, the tube E⁴ being a member common to both parts of the frame. Rigidly secured to the side frame-tubes are brackets D', to which the rear elliptic springs D are secured. The ends of the tubes E¹ and E⁷ are united by brackets D², and secured to the brackets are the front elliptic springs. The rear ends of the side tubes E⁵ are provided with plates E', and bolted thereto is the vehicle-body F. The front stationary axle or support is made of tubing and is straight throughout its length, while the rear axle is provided with two decided offsets, one in each end, so that the center portion is considerably lower than the ends where they enter the wheel-hubs. The rear springs are rigidly clamped to the top frame E; but means are provided for adjusting their position with respect to the axle. This feature is best shown in Fig. 3, wherein C represents the axle and D the elliptical leaf-spring. The leaves of the spring are clamped together by inverted-U-shaped holders L, which are extended at their ends to form bolts. On the under side of the spring and held in place by nuts on the holders is a U-shaped holder L', that surrounds the axle on three sides. In the holder L' are two adjusting-bolts L², located on opposite sides of the axle and arranged to engage therewith, suitable check-nuts being provided to retain them in any desired place. This feature is a desirable one both for the purpose of lining up the parts and for adjusting the position of the rear axle with respect to the fixed engine or driving shaft J'.

In vehicles of this class it is necessary to provide some form of running-gear for connecting the front and rear axles, which running-gear must be rigid so far as movement of the axles toward or away from each other is concerned, yet capable of permitting one axle to move vertically with respect to the other as the wheels roll over irregularities in the path traveled over. In carrying out this feature a downwardly-extending support M is rigidly secured to the front axle, and to the

lower end thereof is secured by a horizontal pivot a fork M'. Between the arms of the fork and secured thereto by a vertically-extending pivot is a rod or side bar M², which
 5 extends to the rear axle C. The rear end of the rod or side bar is secured to a double fork M³ by a horizontal pivot, while the second pair of fork-arms embrace the axle and are secured thereto by a vertical pivot. Only
 10 one of the rods or side bars M² is shown in Fig. 3 on account of the character of the views; but it is to be understood that more than one are employed and are located at suitable places, as shown in Fig. 2. By this arrange-
 15 ment a universal connection is provided between each end of the rod and the axles, so that one axle may move vertically and at the same time independent of the other without straining the frame. At the same time any
 20 tendency of the axles to spread or to approach each other is prevented.

Motion is imparted from the engine or other source of motive power to the driving wheel or wheels by sprockets and chains, one of
 25 which sprockets is mounted on the upper or spring-supported frame E, while the second is mounted on the driving-wheel. With an arrangement of this kind there is a tendency of the chain to ride upon the teeth of the sprockets as the vehicle-body moves up and down
 30 under the action of the supporting-springs due to the irregularities in the road. To prevent this and also to provide simple means of adjusting the tension on the sprocket-chain, an adjustable connection N is employed between each driving and driven shaft
 35 and their sprockets.

Referring particularly to Figs. 4 and 5, J² represents the driving-sprocket, rigidly secured to the shaft J', which shaft is supported in bearings formed in the hangers J³. The rear or driven sprockets Q are rigidly mounted on the hubs of the rear wheels B. Surrounding the driving-shaft is a strap composed of a detachable cap N' and a fork N²,
 45 and in the latter is pivotally secured the head or forward end of the rigid connector or rod N. The strap is capable of moving circumferentially around the shaft J', and the rod
 50 N, due to its pivotal connection with the fork, is capable of swinging in a plane transverse to that of the strap. The end of the rod is screw-threaded at the point where it enters the head N³, and a check-nut is provided for
 55 holding the parts in place after the adjustment is made. The portion of the rod just back of the head is made angular, so that an ordinary wrench may be employed for adjusting. Bolted to the rear axle is a cup O,
 60 adapted to receive the ball N⁴, formed on the end of the rod N. The cup is screw-threaded to receive the adjusting-nut O', which nut is provided with a spherical bearing-surface where it engages the ball, and an enlarged
 65 opening through which the rod N is free to move as the parts alter their position with respect to each other. With this arrange-

ment a connection having a universal joint therein is provided between the shafts, and no matter how much the frames are moving
 70 up and down or twisting with respect to each other the distance between the sprockets is always constant, and therefore the tension on the chain or other power-transmitting device P remains the same. By having two of these
 75 connectors, each with a universal joint, between the driving and driven axles and arranged one on each side of the vehicle no opportunity is presented for the parts to get out of alinement, even though the driving is
 80 done from one side instead of two, as shown. The driving mechanism can readily be modified to the extent of using a single chain and sprockets and locating them between the
 85 wheels, with a universal-joint connector on each side and either inside or outside of the springs. The present arrangement is shown as being outside of the elliptic springs, since this is the most satisfactory arrangement; but they may be located inside, if desired.
 90

In accordance with the provisions of the patent statutes I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but
 95 I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim as new, and desire to secure by Letters Patent of the United States, is— 100

1. In a vehicle, the combination of a spring-supported frame, an engine and its driving-shaft, supports to hold the engine and shaft in proper alinement with the frame, a boiler
 105 which is separate from the engine, means independent of the engine for securing the boiler to the frame, a driving and a driven axle, a device for maintaining a fixed distance between the engine-shaft and the driving-axle, and a pivotal connection which is
 110 included in said device.

2. In a vehicle, the combination of a spring-supported frame, a body mounted thereon, a boiler mounted on the frame independent of
 115 the engine, an engine, which is also mounted on the frame and supported by means independent of the boiler, a driving-shaft, front and rear axles, a frame uniting the axles, a driving-wheel, a driving connection between the engine-shaft and the wheel, means for
 120 maintaining a fixed distance between the driving-shaft and the wheel, and universal connections for said means.

3. In a vehicle, the combination of a pair of axles, a frame comprising two rods, which
 125 rods are pivotally secured to both axles, a second frame, springs between the frames, a boiler mounted on the second frame, an engine also mounted on the frame and independent of
 130 the boiler, an engine-shaft extending parallel with the axles, gearing on opposite ends of the shaft, driving-wheels, and mechanical connections between the ends of the engine-

shaft and the wheels for separating them by a fixed distance irrespective of the independent movements of the frame.

4. In a vehicle, the combination of a frame, a second frame comprising the two axles and universally-connected side rods, which frames are movable with respect to each other, one of which supports the vehicle-body, a driving-shaft mounted on one frame, a driven shaft mounted on the other frame, a mechanical connection between the shafts, and a universal joint in said connection.

5. In a vehicle, the combination of axles, bars mounted on and directly connecting the axles, a frame, springs between the axles and the frame, a body mounted on the frame, a driving-wheel, a gear connected to the wheel, a driving-shaft on the spring-supported frame, means for transmitting motion from the shaft to the gear, adjustable connectors between the shaft and gear whereby they may be separated by the desired distance, and universal joints in each of the connectors whereby the shaft and gear may twist or move independently of each other to a certain extent.

6. In a vehicle, the combination of front and rear axles, a frame connecting the axles, comprising a pair of members, each member being connected to both axles by pivotal connections, a second frame situated above the first and supported by elliptical springs, a driving-shaft mounted on one frame, a driving-wheel mounted on one of the axles, a power-transmitting device between the shaft and the wheel, and means located at each side of the vehicle-frame, for separating the driving-shaft and the wheel by a fixed distance irrespective of the independent movements of the frames.

7. In a vehicle, the combination of two frames which are connected with each other by springs, one of which frames supports the motor while the second unites the axles and consists of a pair of rods, each rod being connected to the axles, universal connections between the rods and the axles, a shaft mounted on each of the frames, and two independent devices for holding the shafts at a fixed distance apart, irrespective of the independent movements of the frames.

8. In a vehicle, the combination of a frame, a second frame mounted on springs above the first in such a manner that it is free to move vertically or twist around a central axis, as would be occasioned by depressing one side thereof, a driving and a driven means, and a pair of connectors, each containing a universal joint, for holding the driving and driven means in fixed relation irrespective of the movements of the frames.

9. In combination, a frame, springs for supporting the frame, axles connected to the springs, rods connected to opposite ends of the axles for holding them a fixed distance apart, pivotal connections between the rods and the axles, a motor mounted on the frame

and provided with a driving-shaft, a driven axle, and an adjustable connector between the motor and the wheel which maintains a fixed pitch distance between the driving-shaft and the driven axle.

10. In a vehicle, the combination of front and rear axles, a spring-supported frame, rods pivotally secured to the axles for holding them a fixed distance apart, a motive-power device mounted on the frame and provided with a sprocket, a driving-wheel mounted on one of the axles, a sprocket secured to the wheel, a chain connecting the sprockets, and a connector which is secured at one end to the sprocket-shaft on the spring-supported frame, and at the other end to the axle carrying the driving-wheel.

11. In a vehicle, the combination of front and rear axles, a spring-supported frame, a driving-sprocket mounted on the frame, a driven sprocket, a wheel mounted on one of the axles and carrying the driven sprocket, a connector between the shaft of the driving-sprocket and the axle on which the wheel is mounted, the said connector being provided with a pivotally-connected strap at one end, which surrounds the sprocket-shaft and at the other end with a ball which is seated in a socket attached to the wheel-axle.

12. As an article of manufacture, a connector for vehicle-shafts, comprising a rod having an adjustable head with a strap pivotally secured to said head at one end, and a ball which is seated in a cup-shaped bearing at the other end, with a nut having a central opening, and a spherical seat for retaining the ball in place at the other end.

13. In a vehicle-frame, the combination of side tubes connected by cross-pieces to form a substantially rectangular frame, a second rectangular frame smaller than the first and secured thereto, a pair of axles, side rods pivotally connected to the axles at opposite ends, and springs which are secured to one of the axles and to the smaller frame for supporting it.

14. In a vehicle-frame, the combination of side tubes united by cross-pieces to form a rectangle, tubes extending outward from one of the cross-pieces, a cross-piece which unites the ends of the said tubes, brackets for the rear springs, which are secured to the side tubes, and brackets for the front springs, which are secured to the outwardly-extending tubes.

15. In a vehicle-frame, the combination of side tubes, a cross-tube for uniting the side tubes at the end, a boiler, and rods which are secured to the boiler and the side tubes, and form the end connection of the vehicle-frame.

16. In a vehicle the combination of a frame, a spring, a clamp for securing the spring to the frame, a second clamp, a hanger which is secured to the second clamp and is provided with an opening for receiving the axle, an axle mounted in the opening, means for ad-

justing the axle back and forth within said opening, and a frame-bar which is connected to the axle.

17. In a vehicle-frame, the combination of a spring, a holder for the spring, an axle, a U-shaped piece which surrounds the axle and is clamped to the holder, and means for shifting the position of the axle within said U-shaped piece.

18. In a vehicle, the combination of a frame, a spring rigidly secured thereto, a power-driven shaft mounted on said frame, an axle which is adjustably connected to the spring, a wheel mounted on the axle, means for transmitting motion from the shaft to the wheel, and means for adjusting the relation between the axle and the spring.

19. In a running-gear frame for vehicles, the combination of front and rear axles, two side bars connecting the axles, each of said bars being attached to the rear axle by a universal joint, means for securing one of the

bars to the front axle, a pivotal connection for securing the second bar to the front axle, a second frame mounted above the first, and springs for uniting the frames whereby they are permitted to have vertical movement with respect to each other.

20. In a running-gear frame for vehicles, the combination of front and rear axles, side bars connecting the axles, universal connections between each bar and the axles, a second frame mounted above the first, springs for uniting the frames whereby they are permitted to have universal movement with respect to each other and means for adjusting the springs with respect to the frames.

In witness whereof I have hereunto set my hand this 24th day of March, 1900.

HERMANN LEMP.

Witnesses:

DUGALD MCKILLOP,
CHAS. B. BETHUNE.