

No. 712,829.

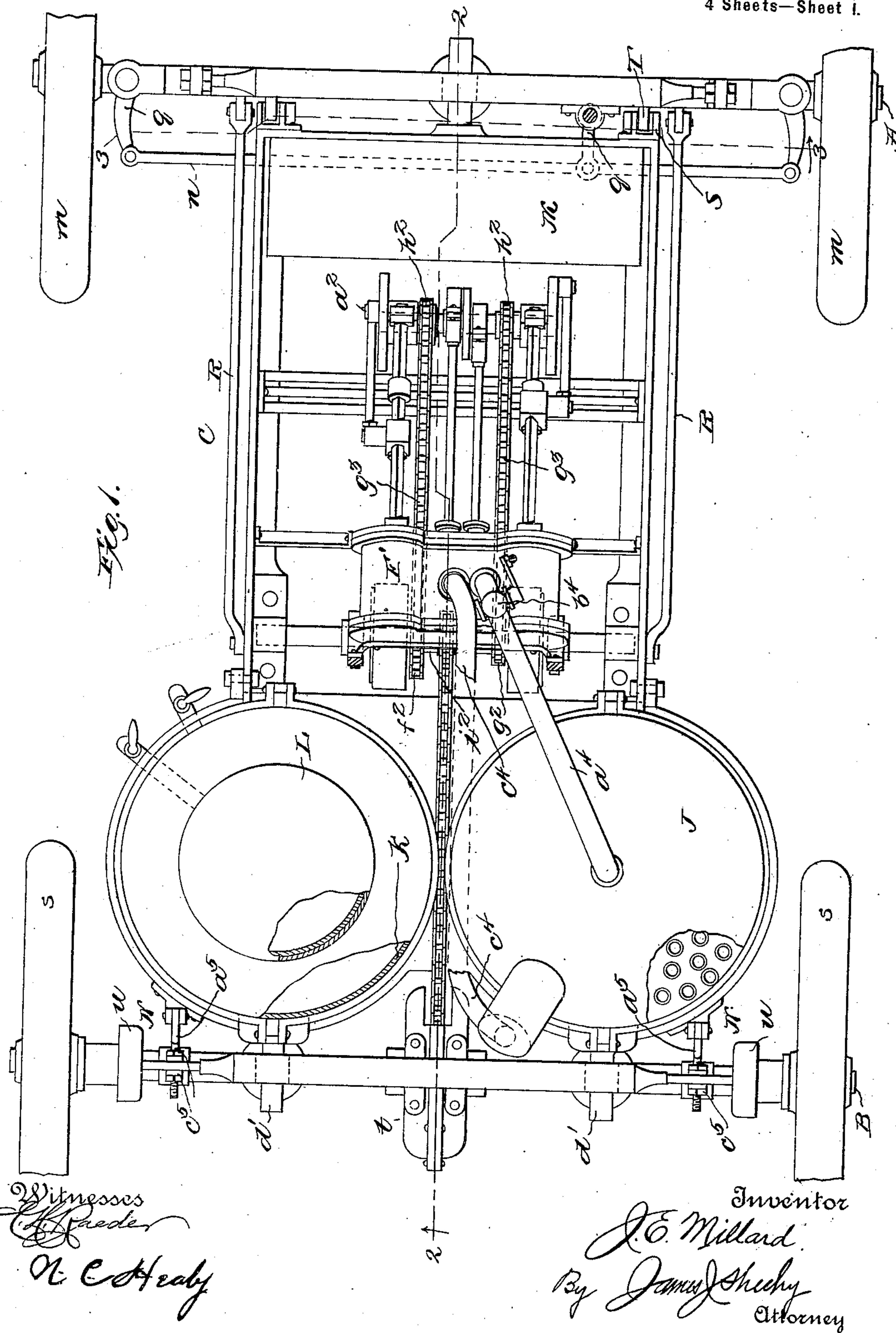
Patented Nov. 4, 1902.

J. E. MILLARD.
MOTOR VEHICLE.

(Application filed Aug. 12, 1902.)

(No Model.)

4 Sheets—Sheet 1.



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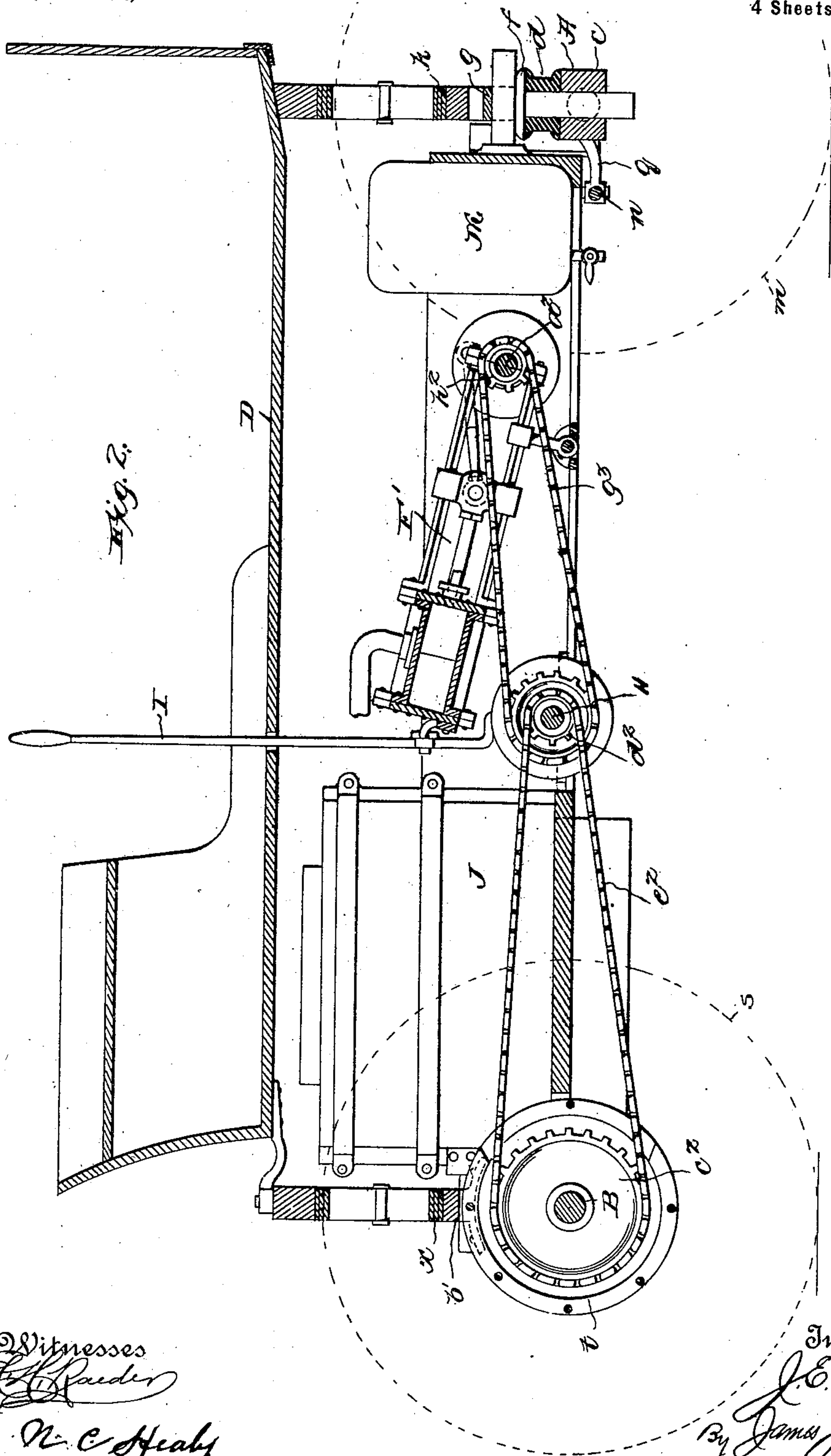
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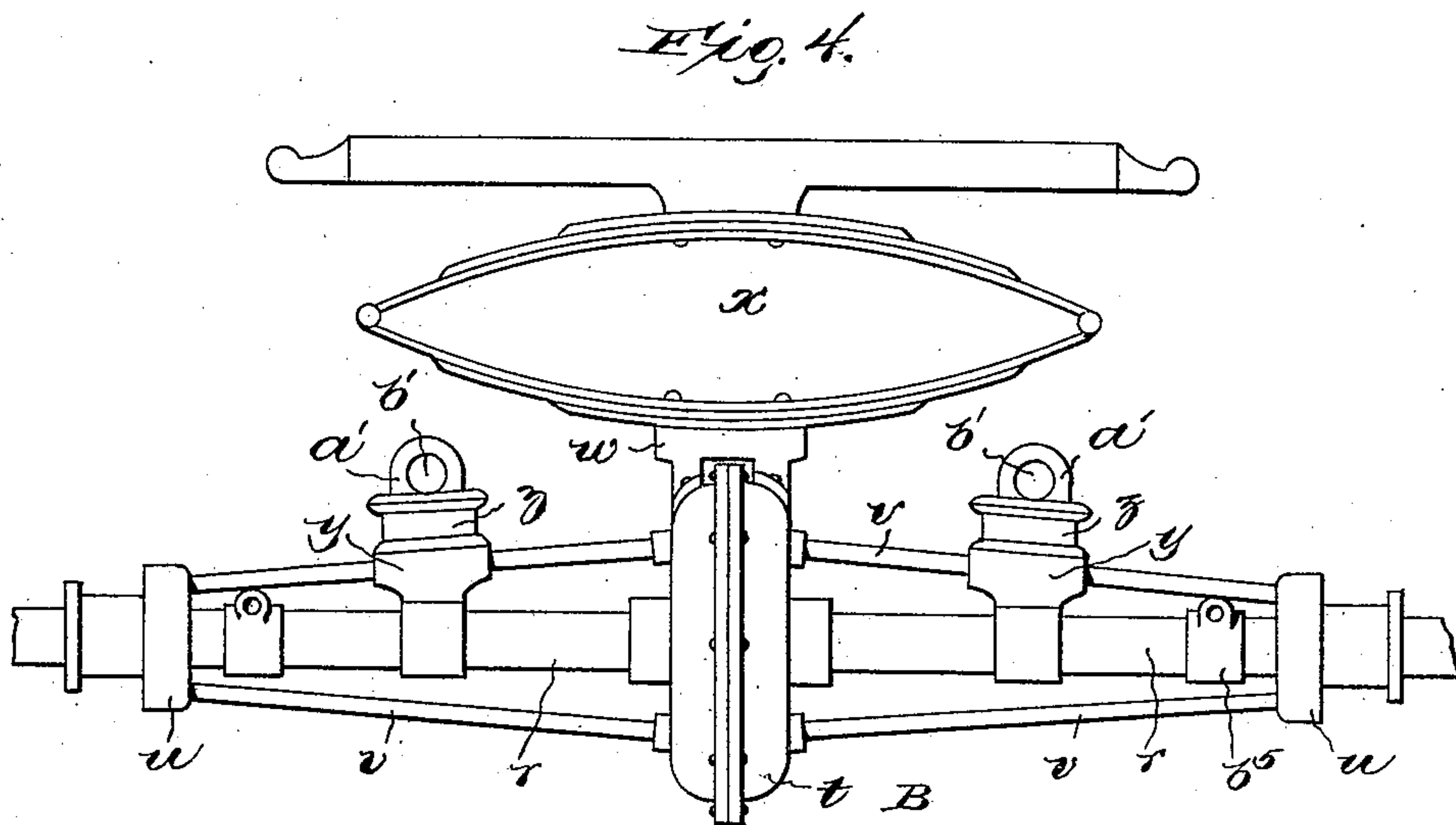
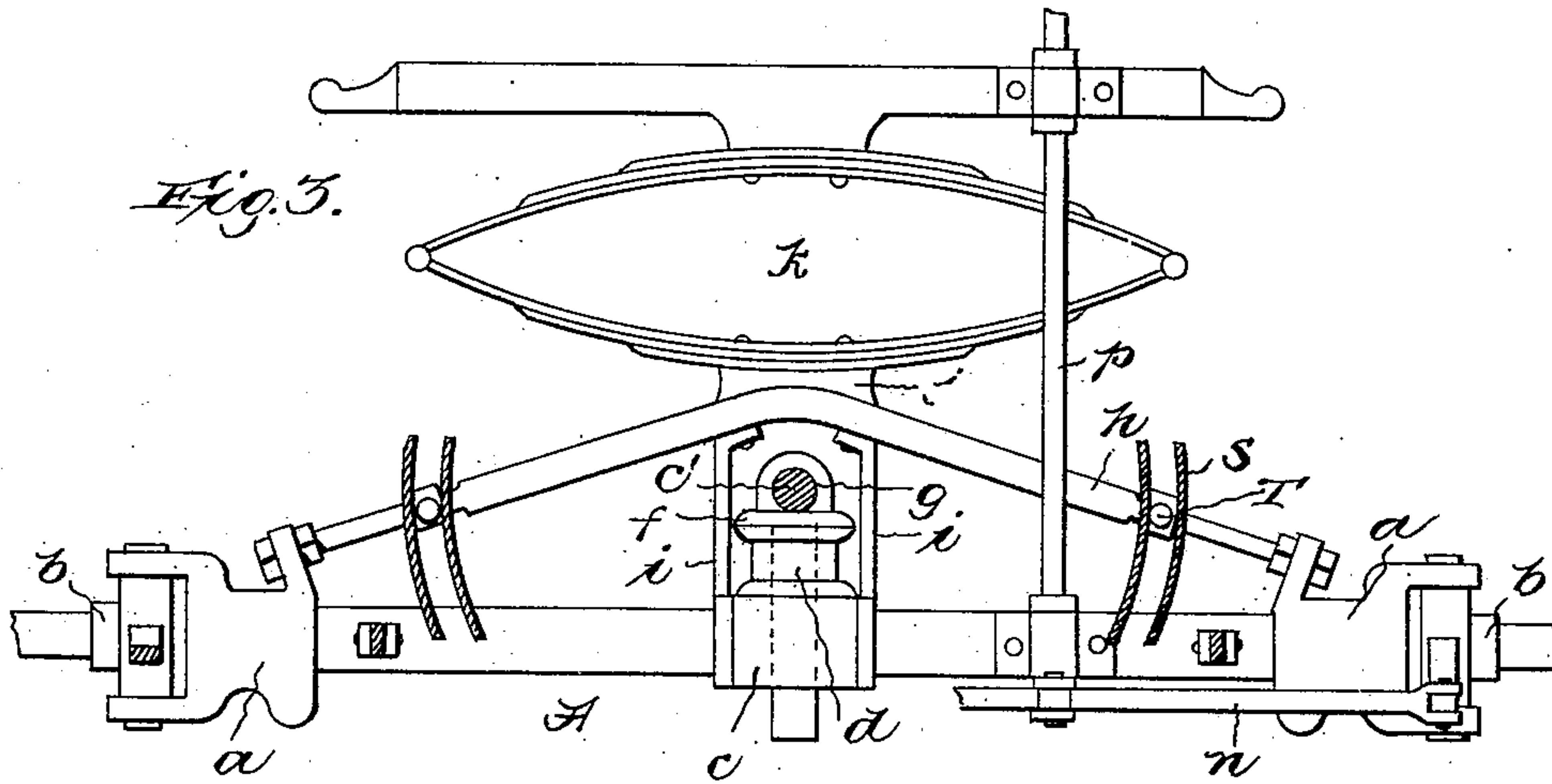
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4 Sheets—Sheet 3.



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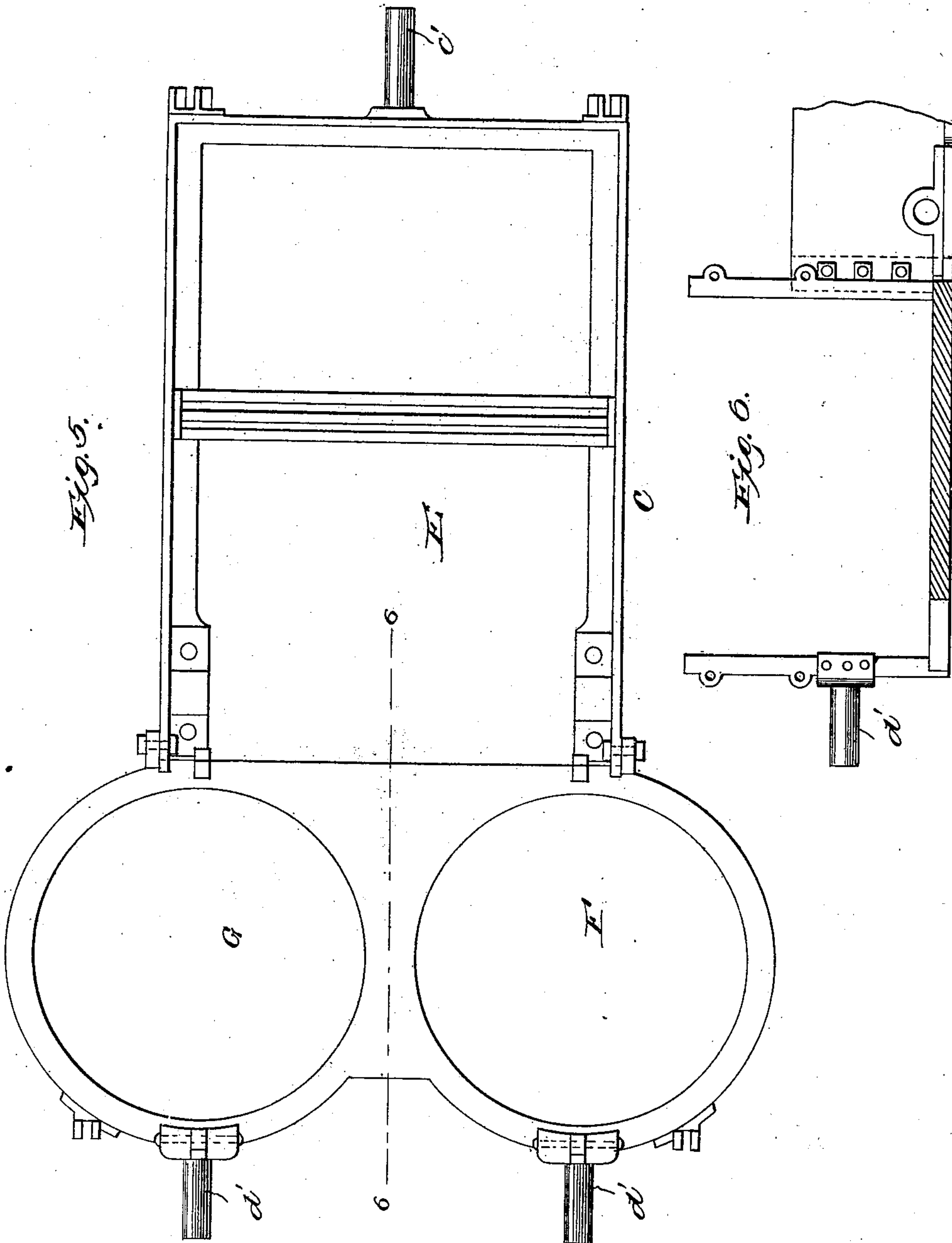
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

JOHN EDWARD MILLARD, OF POUGHKEEPSIE, NEW YORK.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 712,829, dated November 4, 1902.

Application filed August 12, 1902. Serial No. 119,431. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDWARD MILLARD, a citizen of the United States, residing at Poughkeepsie, in the county of Dutchess and State of New York, have invented new and useful Improvements in Motor-Vehicles, of which the following is a specification.

My invention relates to improvements in motor-vehicles; and it consists in a steam motor-vehicle in which the generator, engine, water-tank, and fuel-tank are mounted entirely on the running-gear in the peculiar and advantageous manner hereinafter described, and particularly pointed out in the claims appended.

In the accompanying drawings, Figure 1 is a plan view, with parts broken away, illustrating the generator, engine, water tank or tanks, and fuel-tank arranged on the running-gear of a motor-vehicle in accordance with my invention. Fig. 2 is a longitudinal vertical section taken in the plane indicated by the broken line 2 2 of Fig. 1 and illustrating the spring-supported body of the vehicle in position. Fig. 3 is a transverse section taken in the plane indicated by the broken line 3 3 of Fig. 1 looking in the direction indicated by arrow. Fig. 4 is a rear elevation illustrating the rear axle of the running-gear and the manner of mounting the body thereon. Fig. 5 is a detail plan view of the frame forming part of my improvements, and Fig. 6 is a detail longitudinal vertical section taken in the plane indicated by the broken line 6 6 of Fig. 5.

Similar letters of reference designate corresponding parts in all of the several views of the drawings, referring to which—

A is the front axle, and B the rear axle, of the running-gear of my improved vehicle, and C is the frame, which is interposed between and supported by said axles and has for its general purpose to carry a steam-generator, an engine, a water tank or tanks, and a fuel-tank, as will be hereinafter fully described and claimed.

The front axle A, Fig. 3, is provided at its ends with bearings *a* for the bell-crank levers *b* of a steering-gear, and at its middle it has an enlargement *c*, on which is supported by a rubber or other spring *d* a bearing *f*, having a longitudinally-disposed aperture *g* for

a purpose presently described. Said axle A is also provided with a truss-bar *h*, which is connected at its ends to the bearings *a* and supported at its middle by uprights *i*, rising from the axle. On this truss-bar *h*, at the middle thereof, is a pillow-block *j*, to which is connected the forward spring *k* for supporting the body D, presently described. The spring *d* between the bearing *f* and the enlargement *c* of the axle A has for its purpose to cushion the frame C and the machinery carried thereby, as will be presently made clear.

In addition to the bell-crank levers *b*, on the spindles of which the forward traveling wheels *m* are mounted, the steering-gear (shown in Figs. 1 and 3) comprises a rod *n*, interposed between and connecting the inner arms of the levers *b*, and a shaft *p*, which has a crank *q*, connected to the rod *n*, and is so arranged as to be conveniently manipulated by a person seated in the body D. Said steering-gear, however, forms in itself no part of my invention, and I therefore desire it understood that any other steering-gear may be employed without involving a departure from the scope of my invention.

The rear axle B, Fig. 4, comprises two sections *r*, which carry the rear traveling and drive wheels *s* and between which is interposed an equalizing-gear contained in a case *t*. The equalizing-gear *per se* forms no part of my invention, and I have therefore deemed it unnecessary to illustrate the same. Between the gear-case *t* and collars *u*, loosely receiving the sections *r*, are truss-bars *v*, while on said gear-case is a pillow-block *w*, to which the rear spring *x* for supporting the body D is connected. Mounted on the upper truss-bars *v* and loosely receiving the axle-sections *r* are blocks *y*, upon which are supported by rubber or other springs *z* bearings *a'*, provided with longitudinally-disposed apertures *b'*.

The frame C is provided at its forward end with a longitudinal central horizontal lug *c'* and at its rear end with longitudinally-disposed horizontal lugs *d'*, disposed at either side of its longitudinal center. The lug *c'* is disposed in the bearing *f* of the forward axle A and the lugs *d'* in the bearings *a'* of the rear axle B, and consequently it will be seen

that the distance between the axles A and B may be increased when it is necessary to take up slack of the chain intermediate of the sprocket-wheel of the equalizing-gear on the rear axle and the engine; also, that the front axle is adapted to rock in the direction of the width of the vehicle, so as to enable the vehicle to run freely on rough or uneven roads and without liability of the frame C being twisted. The arrangement of the springs d and z between the axles and the bearings in which the frame-lugs c' d' are disposed is advantageous, since said springs serve to cushion the frame C and the machinery carried thereby and prevent the transmission of shock and jar thereto.

As best shown in Fig. 5 of the drawings, the frame C comprises a case E and bands F G, arranged in rear of said case and side by side. In the case E of the frame C is arranged a steam-engine F', which is preferably, but not essentially, of the compound type. The drive-shaft a^2 of this engine might be connected with the sprocket-wheel of the equalizing-gear on the rear axle B in any suitable manner without involving a departure from the scope of my invention. I prefer, however, to transmit motion from the drive-shaft of the engine to the sprocket-wheel c^2 of the equalizing-gear on the axle B by the means best shown in Figs. 1 and 2, which means comprises a jack-shaft H, arranged in the case E and having a fast sprocket-wheel d^2 , connected by a chain e^2 with the sprocket-wheel c^2 of the equalizing-gear, and also having two loosely-mounted sprocket-wheels f^2 g^2 of different sizes connected by chains g^3 with sprocket-wheels h^2 on the engine-shaft a^2 and a friction or other suitable clutch i^2 , keyed or feathered on the shaft H and designed to be moved, through the medium of a lever I, into engagement with either of the sprocket-wheels f^2 g^2 and out of engagement with both. When the clutch i^2 is in engagement with the small sprocket-wheel g^2 , the vehicle will be driven at a high rate of speed, and when the clutch is in engagement with the large sprocket-wheel f^2 the vehicle will be driven at a lower rate of speed; but the power will be increased as is desirable for hill-climbing. When the clutch i^2 is out of engagement with both of the sprocket-wheels f^2 g^2 , the engine may be actuated without moving the vehicle to fill the boiler with water or for any other desired purpose. The lever I is carried up into such a position as to enable a person seated in the vehicle to conveniently manipulate the same, as are also the throttle-lever and reversing-shaft (not shown) of the engine.

In the band F of the frame C is secured a boiler J, which is connected by a pipe a^4 , containing a throttle-valve b^4 , with the engine F' and is equipped with the usual burner-case and smoke-pipe, the latter being connected with the exhaust-pipe c^4 of the engine. In the band G of the frame is secured a water-

tank K, which is suitably connected with the boiler and contains a fuel-tank L, suitably connected with the burners in the burner-case under the boiler. When desired, an auxiliary water-tank M may be employed, said tank being arranged in the case E of frame C in advance of the engine F' and suitably connected with the boiler through the tank K or direct, as desired.

N N, Fig. 1, are adjustable connections between the bands F G of the frame C and the rear axle B. These connections preferably comprise threaded bolts a^5 , pivotally connected to the bands F G and extending through apertured lugs on collars b^5 , mounted on the sections r of axle B, and nuts c^5 , mounted on the bolts at either side of the lugs on the collars b^5 . By adjusting the nuts c^5 on the bolts a^5 the distance between the axle B and the jack-shaft H may be readily increased to take up slack of the chain e^2 .

The frame C and the front axle B may be connected together in such manner as not to interfere with the rocking of said axle in the direction of the width of the machine by reach-rods R, or in lieu of said rods curvilinear sockets S may be provided on the forward end of the frame C to receive the heads of lugs T on the axle A. In either case it will be observed that the frame C will be held to the axle A without interfering with the rocking of the latter.

When desirable, the reach-rods R and the connections formed by the sockets S and the lugs T, movable therein, may all be employed, as shown in Fig. 1.

It will be appreciated from the foregoing that in my improved vehicle the generator, engine, water tank or tanks, and fuel-tank are arranged on the running-gear alone and have no connection with the body D. In virtue of this the body, which may be of any description, may be mounted on springs in such manner as to assure easy riding. It will also be observed that as no part of the body is taken up by the machinery the body may be adapted to carry freight in addition to passengers.

The described arrangement of the machinery on the frame C is very compact, and yet it will be noticed that ready access may be gained to the several parts for the purpose of cleaning or repairing the same.

In practice I contemplate providing the case E of frame C with a removable cover (not shown) of metal, cloth, or other suitable material, this with a view of excluding dust, grit, &c., from the working parts of the engine, so as to prolong the usefulness of the same.

When my improvements are embodied in a large vehicle having a long frame C, I contemplate arranging a boiler in the band G as well as in the band F and placing water and fuel tanks in the case E in advance of the engine.

I have entered into a detailed description

of the construction and relative arrangement of the parts embraced in the present and preferred embodiment of my invention in order to impart a full, clear, and exact understanding of the same. I do not desire, however, to be understood as confining myself to such specific construction and arrangement of parts, as such changes or modifications may be made in practice as fairly fall within the scope of the invention as claimed.

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

1. In a motor-vehicle, the combination of a frame having a longitudinal central, horizontal lug at its forward end, and one or more horizontal, longitudinally-disposed lugs at its rear end, a front axle having a horizontal, longitudinally-disposed bearing at its middle receiving the forward lug of the frame, a rear axle having one or more horizontal, longitudinally-disposed bearings loosely receiving the rear lug or lugs of the frame, whereby the said rear axle is adapted to be adjusted with respect to the frame, suitable means connecting the frame and the front axle, and one or more adjustable connections between the frame and the rear axle.

2. In a motor-vehicle, the combination of a front axle having a horizontal, longitudinally-disposed bearing at its middle, and a spring supporting said bearing, a rear axle having horizontal, longitudinally-disposed bearings at either side of its middle, and springs supporting said bearings, and a frame suitably connected with the front and rear axles, and having a longitudinal central, horizontal lug at its forward end journaled in the spring-supported bearing of the front axle, and horizontal, longitudinally-disposed lugs at its rear end arranged in the spring-supported bearings of the rear axle.

3. In a motor-vehicle, the combination of a front axle, a rear axle having one or more horizontal, longitudinally-disposed bearings, a frame suitably connected with the forward axle, and having one or more horizontal, longitudinally-disposed lugs arranged in the bearing or bearings of the rear axle, a motor on the frame, a driving connection between the motor and the rear axle, and one or more adjustable connections between the frame and the rear axle.

4. In a motor-vehicle, the combination of a front axle having a horizontal, longitudinally-disposed bearing at its middle, a rear axle having horizontal, longitudinally-disposed bearings at either side of its middle, a frame suitably connected with the front axle, and having a longitudinal central, horizontal lug at its forward end journaled in the bearing of the front axle, and horizontal, longitudinally-disposed lugs at its rear end arranged in the bearings of the rear axle, a motor carried by the frame, a driving connection between the motor and the rear axle, and one or

more longitudinally-adjustable connections between the frame and the rear axle.

5. In a motor-vehicle, the combination of a front axle having a horizontal, longitudinally-disposed bearing at its middle, and a spring supporting said bearing, a rear axle having horizontal, longitudinally-disposed bearings at either side of its middle, a frame interposed between the front and rear axles, and having a longitudinal central, horizontal lug at its forward end journaled in the bearing of the front axle, and horizontal, longitudinally-disposed lugs at its rear end arranged in the bearings of the rear axle, a connection between the front axle and the frame whereby the former is held to but enabled to rock in the direction of the width of the latter, a motor carried by the frame, a driving connection between the motor and the rear axle, and one or more adjustable connections between the frame and the rear axle.

6. In a motor-vehicle, the combination of a front axle having a horizontal, longitudinally-disposed bearing at its middle, and a spring supporting said bearing, a rear axle having horizontal, longitudinally-disposed bearings at either side of its middle, a frame interposed between the front and rear axles, and having a longitudinal central, horizontal lug at its forward end journaled in the bearing of the front axle, and horizontal, longitudinally-disposed lugs at its rear end arranged in the bearings of the rear axle, a connection between the front axle and the frame whereby the former is held to but enabled to rock in the direction of the width of the latter, a motor carried by the frame, a driving connection between the motor and the rear axle, and one or more adjustable connections between the frame and the rear axle, a body supported by springs on the front and rear axle.

7. In a motor-vehicle, the combination of a frame having one or more, horizontal, longitudinally-disposed lugs at its rear end, a front axle suitably connected with the frame, a rear axle having one or more horizontal, longitudinally-disposed bearings loosely receiving the lug or lugs of the frame, and one or more adjustable connections between the frame and the rear axle.

8. In a motor-vehicle, the combination of a front axle having a longitudinally-disposed, horizontal spring-supported bearing at its middle, a rear axle having longitudinally-disposed, horizontal, spring-supported bearings at either side of its middle, a frame having a longitudinal central, horizontal lug at its forward end journaled in the bearing of the front axle, and longitudinally-disposed, horizontal lugs at its rear end arranged in the bearings of the rear axle, a connection between the front axle and the frame whereby the former is held to but is free to rock in the direction of the width of the latter, one or more adjustable connections between the

rear axle and the frame, a motor carried by the frame, a driving connection between the motor and the rear axle, a body, and springs arranged between the front and rear axles and the body for yieldingly supporting the latter.

9. In a motor-vehicle, the combination of front and rear axles, a frame interposed between and connected with the axles, and comprising a case, and a band disposed in rear of the case, an engine disposed in the case of the frame, a generator for supplying the engine with steam, secured in the band of the frame, a driving connection between the engine and the rear axle, and a body supported by springs on the front and rear axles.

10. In a motor-vehicle, the combination of front and rear axles, a frame interposed between and connected with the axles, and com-

prising a case, and bands arranged in rear of the case, and side by side, an engine disposed in the case of the frame, a generator for supplying the engine with steam, secured in one of the bands of the frame, a tank for supplying the generator with water, secured in the other band of the frame, a fuel-tank arranged within the water-tank, a driving connection between the engine and the rear axle, and a body supported by springs on the front and rear axles.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN EDWARD MILLARD.

Witnesses:

STEPHEN G. GUERNSEY,
HOMER W. GUERNSEY.