No. 647,261. Patented Apr. 10, 1900.

W. HAY.

FRAME FOR MOTOR VEHICLES.

(Application filed Aug. 14, 1899.)

(No Model.) 3 Sheets—Sheet 1.

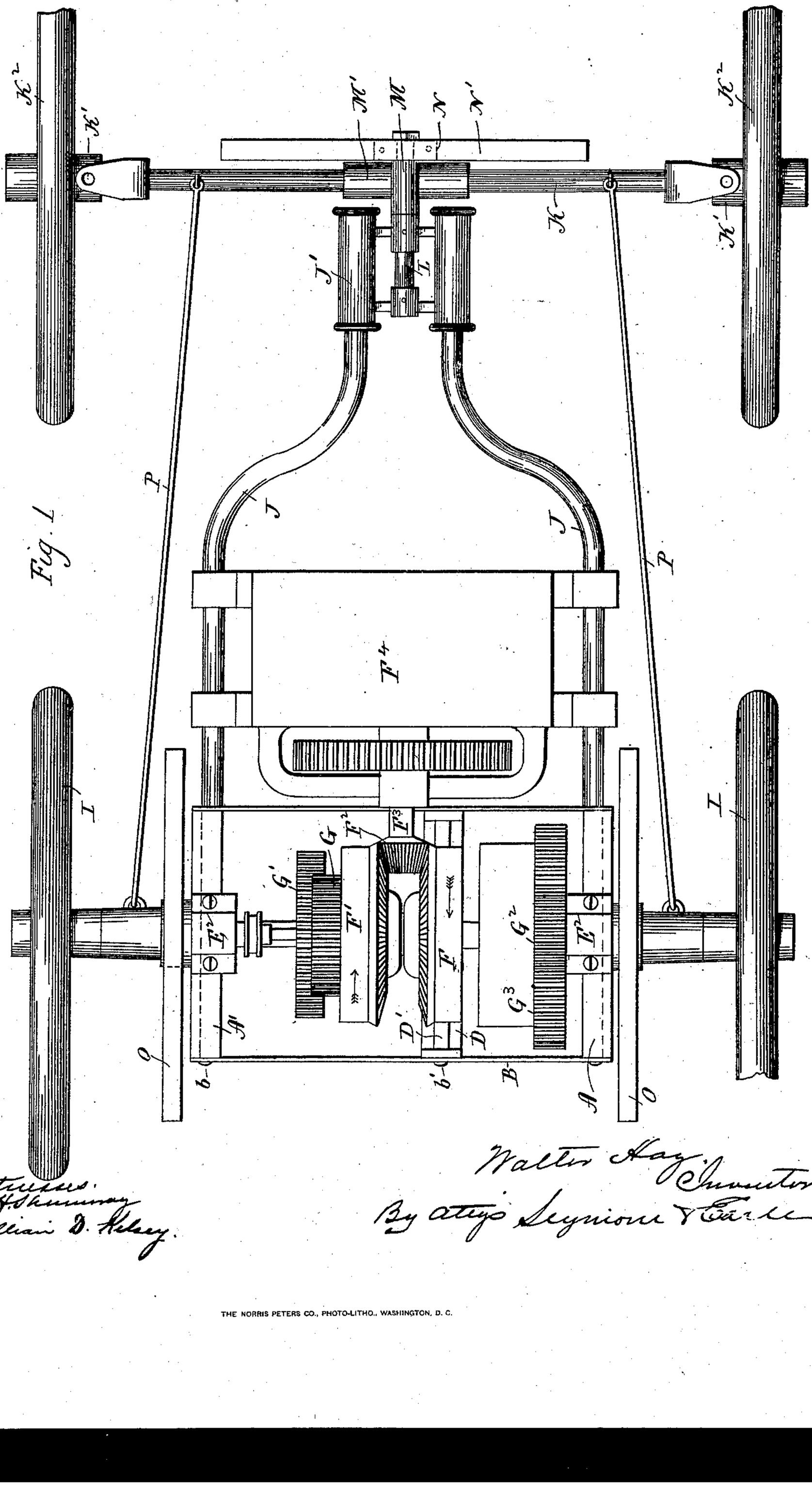

Fig. 1.

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Fig. 2

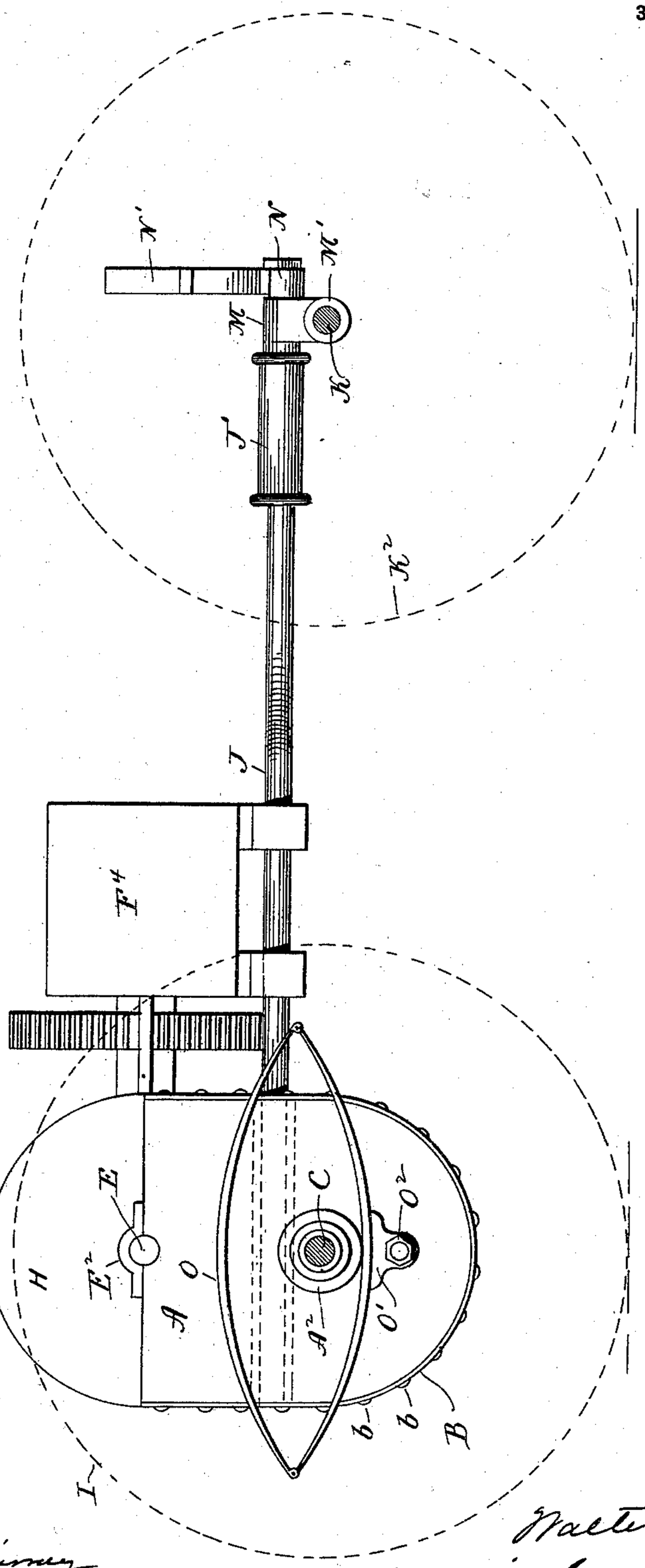

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Fig. 3

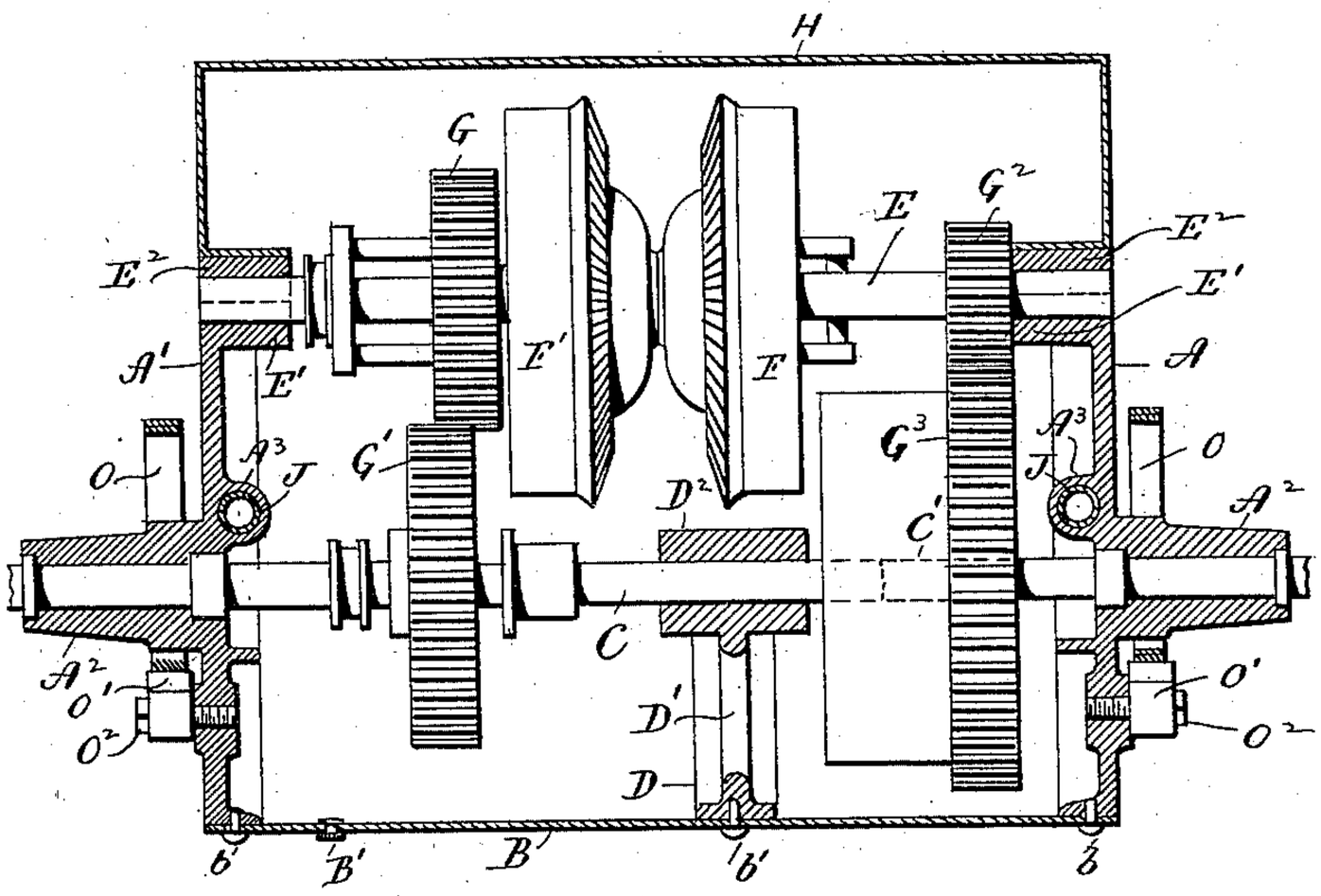


Fig. 4

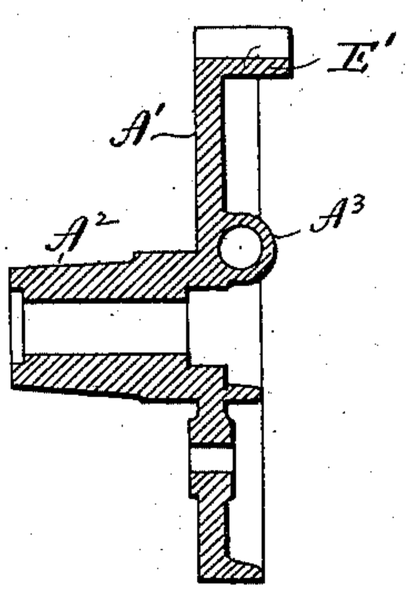
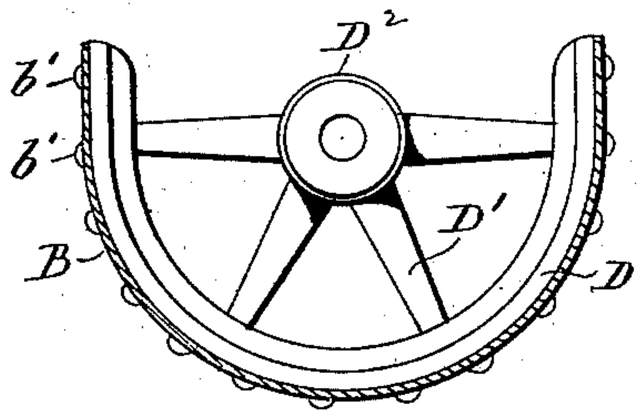


Fig. 5



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UNITED STATES PATENT OFFICE.

WALTER HAY, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO EMERSON M. HOTCHKISS, OF WATERBURY, CONNECTICUT.

FRAME FOR MOTOR-VEHICLES.

SPECIFICATION forming part of Letters Patent No. 647,261, dated April 10, 1900.

Application filed August 14, 1899. Serial No. 727,142. (No model.)

To all whom it may concern:

Be it known that I, WALTER HAY, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Frames for Motor-Vehicles; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a plan view showing a motor-vehicle provided with my improvements; Fig. 2, a partial view thereof in side elevation; Fig. 3, a view in vertical section through the gear-box; Fig. 4, a detached view, in vertical section, of one of the two heads of the gear-box; Fig. 5, a detached view in elevation of the intermediate supporting-head of the gear-box.

My invention relates to an improvement in frames for motor-vehicles, the object being to produce a simple and compact frame constructed with particular reference to housing the gears of the driving mechanism of the vehicle and to relieving the front body-spring, vehicle-body, and frame from the torsional and other strains imposed upon them by the tilting of the front axle, which is pivotally attached to the frame so as to tilt in a vertical plane.

Further objects of my invention are to produce a simple, strong, and durable frame without the use of pipe-joints, which in such vehicles are always a source of danger on account of their great liability to breakage.

With these ends in view my invention consists in a "gear-box" composed of two metal heads and of a sheet-metal plate attached to and connecting the said heads, to the exterior contour of which it is bent. As shown, the heads are made of cast metal; but they may be drop-forged or even struck up from sheet metal.

My invention further consists in the combination, with a motor-vehicle frame, of a front axle pivotally connected therewith and a front body-spring connected with the frame independently of the axle, which is free to work on its pivot without placing the said spring under any tension.

My invention further consists in certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In carrying out my invention as herein shown I employ what for convenience I shall term a "gear-box," for the reason that it is used to contain and support the gears of the driving mechanism of the vehicle. This box consists of two corresponding metal heads A A′, which are U-shaped in side elevation, and of a heavy sheet-metal plate B, connecting the said heads and bent to correspond to their exterior contour and secured to their outer edges by rivets *b* or in any other suitable manner. In its bent form this plate is therefore U-shaped in cross-section. Each of the heads A A′ is formed with a heavy outwardly-extending hub A^2, respectively receiving the ends of the rear axle, which is a "sectional" axle and composed of two sections C and C′. The outer ends of the respective sections of the axle are supported in the said hubs A^2 A^2, while their inner ends are supported by an intermediate supporting-head comprising a curved rim D, radial arms D′, and a hub D^2. This supporting-head is located within the gear-box, of which it really forms a part, and is secured in place therein by means of rivets *b*′ or in some other suitable manner, whereby the curved rim D of the supporting-head is rigidly connected with the inner face of the curved sheet-metal plate B of the gear-box, intermediate the ends thereof. The inner end of the axle-section C passes through the hub D^2 of this head, whereby the inner end of the said axle is directly supported, while the inner end of the axle-section C′ is supported indirectly through the supporting-head by its differential connection with the projecting end of the axle-section C.

It is without the purview of this particular application to describe the differential gear employed for connecting the two sections of the axle. It will be sufficient for me to explain that I may employ any approved form of differential gear the purpose of which is to permit the two axle-sections and therefore the two rear wheels I I to be rotated independently of each other when the vehicle is turning corners, &c., so as to prevent either wheel from sliding.

Directly above the sectional axle I locate the counter-shaft E, the ends of which rest in bearings E′ E′, formed in the horizontal upper edges of the heads A A′, the ends of the counter-shaft E being held in place in these bearings by means of boxes E^2 E^2. As shown, this shaft carries the forward driving-gear F and the reversing-gear F′, these gears being driven in opposite directions by the bevel-pinion F^2, mounted upon the rear end of the motor-shaft F^3, which is driven by any approved motor located within the motor-box F^4. The said counter-shaft also carries, as shown, the normal driven gear G, which is meshed into by the normal driving-gear G′ on the axle-section C. The counter-shaft also carries a hill-climbing pinion G^2, which is meshed into by a hill-climbing gear G^3, mounted upon the axle-section C′. It is apparent, however, that other forms of driving and controlling mechanism employing other and different arrangements of gears might be utilized in connection with my improved gear-box, and I do not therefore limit myself to employing the gearing shown. A sheet-metal cover H, having a curved or dome-like top, is adapted to rest upon and be secured to the horizontal upper ends of the heads A A′, as clearly shown in Figs. 2 and 3, whereby the driving mechanism, including the gears described, is inclosed and dust and other foreign objects excluded. The gear-box, as I may here mention, also forms a drip-trough for oil used to lubricate the gearing. This oil will accumulate in the trough-shaped bottom of the box, from which it may be drawn off through the valve or cock B′, as seen in Fig. 3.

It will be understood that the gear-box is supported by the sectional axle, which in turn is supported by the rear wheels I I of the vehicle. The gear-box also provides for the support of the rear ends of the two reaches J J, which constitute a part of the frame of the vehicle and which terminate at their forward ends in a head J′, with which the forward axle K of the vehicle is pivotally connected. For this purpose the said head J′, which may be of any approved construction, is provided, as shown, with a rigidly-secured heavy shaft-like stud L, the forward end of which consitutes a bearing which passes through a sleeve M, constituting the upper member of a T-like head, the lower member of which consists of a longer sleeve M′, extending at a right angle to the sleeve M and affording a bearing for the axle K, to the ends of which the pivotal hubs K′ K′ of the forward wheels K^2 K^2 are attached. This pivotal hub construction is well known, and I hold myself free to employ any form of it which I may choose to select. It will be understood from the foregoing that the forward axle is thus pivotally connected through the stud L with the head J′, so as to be free to rock or tilt in a vertical plane extending at a right angle to the planes of the rear wheels I I.

The extreme forward end of the stud L projects through the sleeve M and carries a spring-block N, (shown by broken lines in Fig. 2,) the forward body-spring N′ being secured to this block. It will be understood, of course, that the forward portion of the frame or body of the vehicle is supported upon this spring. By locating the spring forward of the said forward axle I secure a better disposition of the strains than by locating it to the rear of the said axle, which, however, I may see fit to do. I wish, however, to call particular attention to the fact that whether the spring is located forward of the axle, as shown, or in rear of the axle, as suggested, it is connected with the forward end of the vehicle-frame itself rather than with the forward axle, which is thus left free to rock on the stud L in accommodating itself to the inequalities in a road-bed without transmitting such rocking action through the spring to the vehicle-body and frame, whereby greater comfort is secured to the passengers in the vehicle and whereby the spring, the vehicle-body, and the frame are relieved of those torsional and other strains which are imposed upon them when the spring is attached to the axle itself and placed under unequal tension every time the said axle is deflected from a horizontal position.

The rear ends of the reaches J J are entered into tube-like lugs A^3 A^3, horizontally arranged upon the inner faces of the heads A A′, as shown in Fig. 3. The motor is supported by these reaches J J whether inclosed in a motor-box F^4 or not. The head J′ and the lugs A^3 A^3 avoid the necessity of employing any pipe-joints in the frame, which is thus relieved of one of the greatest sources of breaks in such vehicles.

For supporting the rear body-springs O, upon which the rear end of the vehicle-body rests, I employ two spring-blocks O′ O′, secured, respectively, to the outer faces of the heads A A′ by means of bolts O^2 O^2 or in any other manner, the said spring-blocks being located substantially below the hubs A^2 A^2, as shown, although they might be arranged above the said hubs.

For taking the strains imposed upon the T-shaped head M and stud L of the forward axle by rearward or forward thrusts upon the ends thereof I by preference employ two stay-rods P P, pivotally connected at their rear and forward ends with the rear and forward axles; but these may be replaced by other known means for accomplishing the same or substantially the same results.

In view of the modifications suggested and of others which may obviously be made I would have it understood that I do not limit myself to the exact construction herein shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. In a motor-vehicle, a gear-box comprising two heads, a sheet-metal plate bent to the external contour of the said heads, and uniting the same to form a box, an intermediate supporting-head located within the box and secured to the said plate, and a shaft having bearing in said the heads.

2. A frame for motor-vehicles having a gear-box comprising two heads, each formed with hubs for the rear axle of the vehicle, and with bearings for a counter-shaft, a sheet-metal plate attached to and connecting the said heads to the external contour of which it is bent, a cover resting upon the upper ends of the heads for closing in the box, and an intermediate supporting-head located within the box and supporting the inner ends of a sectional rear axle.

3. In a frame for motor-vehicles, the combination with a gear-box composed of two metal heads and a sheet-metal plate attached to and connecting the said heads to form a box, of two frame-reaches connected at their rear ends with the said heads, and terminating at their forward ends in a head, and a forward axle pivotally connected with the said head of the frame.

4. In a motor-vehicle, the combination with a frame having two reaches terminating at their forward ends in a head, of a shaft-like stud secured to the said head and projecting forwardly therefrom, a T-shaped head formed with a sleeve for receiving the said stud, and with a sleeve located at a right angle to the said sleeve and receiving the forward axle, a spring-block connected to the forward end of the said stud and a spring attached to the said block and located in front of the axle.

5. In a frame for motor-vehicles, the combination with a gear-box comprising two metal heads and a sheet-metal plate uniting the same and bent to conform to their exterior contour, of two long reaches connected at their rear ends with the said heads, a head located at the forward ends of the said reaches, and a forward axle pivotally connected to the said head.

6. In a frame for motor-vehicles, a gear-box comprising two metal heads and a sheet-metal plate attached to and connecting the said heads, to the exterior contour of which it is bent in combination with two spring-blocks respectively connected with the outer faces of the said heads, and body-springs attached to the said blocks.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WALTER HAY.

Witnesses:
FREDERIC C. EARLE,
GEORGE D. SEYMOUR.